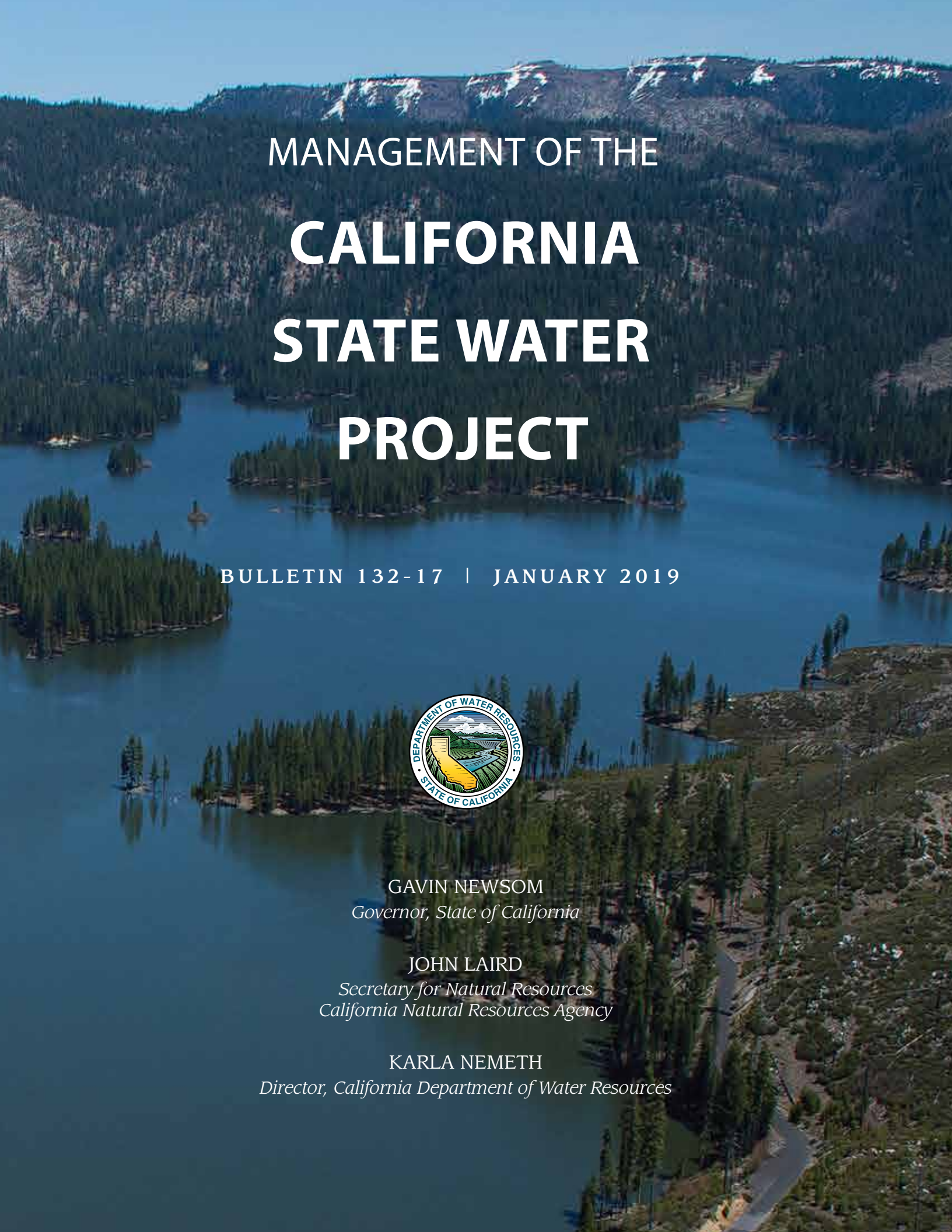

MANAGEMENT OF THE CALIFORNIA STATE WATER PROJECT

BULLETIN 132-17 | JANUARY 2019

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Publishing Information

Cover photo shows an aerial view of Frenchman Lake.

Photo provided by the Public Affairs Office Photography Unit.

Copies of this document are available for $25.00 per book from:

California Department of Water Resources
Attn: Publications Office
P.O. Box 942836
Sacramento, CA 94236-0001
(916) 653-1097

If you need this publication in alternate form, contact the Public Affairs Office, 1-800-272-8869.

Printed on recycled paper

Bulletin 132-17

Management of the California

State Water Project

Covers Calendar Year 2016 Activities

Published January 2019

Gavin Newsom *Governor*
State of California

John Laird *Secretary for Natural Resources*
California Natural Resources Agency

Karla A. Nemeth *Director*
Department of Water Resources

Foreword

Bulletin 132-17, Management of the California State Water Project, continues the Bulletin 132 annual series begun in 1963. Bulletin 132-17 reports water supply planning, construction, financing, management, and operation activities of the State Water Project (SWP). Appendix B contains data and computations used to determine the SWP water contractors' Statements of Charges for 2018. Appendix B was previously printed and distributed to SWP water contractors to document and support calculation of contractors' annual charges.

The Bulletin discusses significant events and issues that affected SWP management and operations from January 1, 2016, through December 31, 2016.

Bulletin 132-17 also discusses water supply and delivery, Delta resources and environmental issues, local assistance programs, power resources, recreation, and financial analysis of the SWP.

Please note that the water delivery figures listed are accurate at the time of this publication, but small volumes of water may be reclassified over time pursuant to long-term water supply contract provisions. If your research requires more current data than were available at the time of publication, please consult the most recent edition of Bulletin 132, or contact Department of Water Resources staff in the State Water Project Analysis Office.

Karla A. Nemeth
Director

Contents

Tables

Tables, continued

Tables, continued

Figures

Figures, continued

Sidebars

State of California

Gavin Newsom, Governor

California Natural Resources Agency

John Laird, Secretary for Natural Resources

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California Water Commission

The California Water Commission consists of nine members appointed by the Governor and confirmed by the Senate. Seven members are chosen for their expertise related to the control, storage, and beneficial use of water, and two are chosen for their knowledge of the environment. The commission advises the Director of the Department of Water Resources (DWR) on matters within DWR's jurisdiction, approves rules and regulations, and monitors and reports on the construction and operation of the State Water Project (SWP).

The roles and responsibilities of the California Water Commission are defined in the Water Code, Government Code, and Code of Civil Procedure.

The commission's SWP-specific responsibilities are to:

- conduct an annual review of the construction and operation of the SWP and report to DWR and the Legislature with any recommendations (Water Code Section 165);
- hold public hearings on all additional facilities proposed to be added to the SWP and name any new facilities (Water Code Sections 161.5 and 166); and
- adopt a resolution of necessity, and give each affected person a venue to be heard, before DWR may commence an eminent domain proceeding (Code of Civil Procedure Section 1245.210).

The California Water Commission's Executive Officer is Joseph Yun, and the Commission members at the time of publication are:

Carol Baker, Vice-Chair

Andrew Ball

Joseph Byrne

Daniel Curtin

Joe Del Bosque

Maria Herrera

Catherine Keig

Armando Quintero, Chair

Acronyms and Abbreviations

Symbols

µg/L micrograms per liter
µS/cm microsiemens per centimeter

A

af acre-feet/acre-foot
AWMP Agricultural Water Management Plan

B

Bay-Delta Plan Water Quality Control Plan for the San Francisco Bay/ Sacramento-San Joaquin Delta Estuary
BDCP Bay Delta Conservation Plan
BiOp biological opinion

C

CAISO California Independent System Operator
California State Parks California Department of Parks and Recreation
C.A.S.T. Catch A Special Thrill
CDPH California Department of Public Health
Central Valley Water Board Regional Water Quality Control Board, Central Valley Region
CEQA California Environmental Quality Act
CESA California Endangered Species Act
CFRs Comprehensive Facility Reviews
cfs cubic feet per second
CIMIS California Irrigation Management Information System
CVP Central Valley Project
CWA Clean Water Act
CWC California Water Code

D

D-1641 State Water Resources Control Board, Water Right Decision 1641
DDA Davis-Dolwig Act
Delta Sacramento-San Joaquin Delta
DFW Department of Fish and Wildlife
DMCP Delta Mercury Control Program
DO dissolved oxygen
DOE Division of Engineering

DSB Dam Safety Branch
DSC Delta Stewardship Council
DSM2 Delta Simulation Model 2
DSOD Division of Safety of Dams
DSRB Director's Safety Review Board
DWR Department of Water Resources

E

EC electrical conductivity, specific conductance, or specific conductivity
EIR environmental impact report
EIS environmental impact statement
EPA U.S. Environmental Protection Agency
ESA federal Endangered Species Act

F

FERC Federal Energy Regulatory Commission
FFGS floating fish guidance structure
FRFH Feather River Fish Hatchery
FRP Fish Restoration Program
ft feet

G

GHG greenhouse gas

H

HEA Habitat Expansion Agreement
HEP Habitat Expansion Plan

I

IRP Integrated Resource Plan
IRWM Integrated Regional Water Management

L

LADWP Los Angeles Department of Water and Power
LEC Lodi Energy Center

M

m meter/meters
maf million acre-feet
MCL maximum contaminant level
MeHg methylmercury
mg/L milligrams per liter

MIB 2-methylisoborneol
MIDS Morrow Island Distribution System
MLML Moss Landing Marine Laboratories
MME Mercury Monitoring and Evaluation
mS/cm millisiemens per centimeter
MW megawatt
MWh megawatt hour
MWQI Municipal Water Quality Investigations
MWT McCormack-Williamson Tract

N

NCPA Northern California Power Agency
NDOI Net Delta Outflow Index
NEPA National Environmental Policy Act
NERC North American Electric Reliability Corporation
NOAA Fisheries National Marine Fisheries Service

O

O&M Division of Operations and Maintenance
OMP&R operations, maintenance, power, and replacement
OM&R operations, maintenance, and replacement

P

PAD preliminary application document
PAO Public Affairs Office
PFMA Potential Failure Mode Analysis
PG&E Pacific Gas & Electric Company

R

Reclamation Bureau of Reclamation
RETI Renewable Energy Transmission Initiative
RFWE recreation and fish and wildlife enhancement
RM River Mile
ROV remotely operated vehicle
RST rotary screw trap

S

Sacramento Valley 40-30-30 Index Sacramento Valley Water Year Hydrologic Classification
San Joaquin Valley 60-20-20 Index San Joaquin Valley Water Year Hydrologic Classification
SBA South Bay Aqueduct
SCE Southern California Edison
SDIP South Delta Improvements Program

SFCWA State and Federal Contractors Water Agency
SJR San Joaquin 4 Rivers
SJRRP San Joaquin River Restoration Program
SMPA Suisun Marsh Preservation Agreement
SMSCG Suisun Marsh Salinity Control Gates
SRR Sacramento River Region
State Water Board State Water Resources Control Board
SWP State Water Project

T

TLR Tulare Lake Region
TUCP temporary urgency change petition

U

USFWS U.S. Fish and Wildlife Service

W

WECC Western Electricity Coordinating Council
WQCP water quality control plan
WSPP Western Systems Power Pool

State Water Project Water Contractors

The State Water Project water contractors are listed below, followed by shortened forms of their names that are used in Bulletin 132.

Alameda County Flood Control and Water Conservation District, Zone 7	Alameda-Zone 7
Alameda County Water District	Alameda County
Antelope Valley-East Kern Water Agency	AVEK
Castaic Lake Water Agency	Castaic Lake
City of Yuba City	Yuba City
Coachella Valley Water District	Coachella
County of Butte	Butte
County of Kings	Kings
Crestline-Lake Arrowhead Water Agency	Crestline
Desert Water Agency	Desert
Dudley Ridge Water District	Dudley Ridge
Empire West Side Irrigation District	Empire
Kern County Water Agency	Kern
Littlerock Creek Irrigation District	Littlerock
The Metropolitan Water District of Southern California	Metropolitan
Mojave Water Agency	Mojave
Napa County Flood Control and Water Conservation District	Napa
Oak Flat Water District	Oak Flat
Palmdale Water District	Palmdale
Plumas County Flood Control and Water Conservation District	Plumas
San Bernardino Valley Municipal Water District	San Bernardino
San Gabriel Valley Municipal Water District	San Gabriel
San Gorgonio Pass Water Agency	San Gorgonio
San Luis Obispo County Flood Control and Water Conservation District	San Luis Obispo
Santa Barbara County Flood Control and Water Conservation District	Santa Barbara
Santa Clara Valley Water District	Santa Clara
Solano County Water Agency	Solano
Tulare Lake Basin Water Storage District	Tulare
Ventura County Watershed Protection District	Ventura

State Water Project Highlights

Boat launch at Loafer Creek Recreation Area at Lake Oroville.

The annual Bulletin 132 series began in 1963 and reported the first deliveries of water by the new State Water Project (SWP). Bulletin 132-17, Management of the California State Water Project, continues this series as the fifty-fifth edition. It reports on SWP planning, construction, finance, management, and operations during calendar year 2016. Bulletin 132 is an overview of SWP programs and activities, and more information can be found on the Department of Water Resources (DWR) website.

The SWP is operated and maintained by DWR. The SWP is one of the world's largest water, power, and conveyance systems. In the past decade it has conveyed an annual average of 2.9 million acre-feet (maf) of water. SWP facilities—pumping and power plants; reservoirs, lakes, and storage tanks; canals, tunnels, and pipelines—capture, store, and convey water to public water agencies and local water districts.

Drought

In January 2014, the Governor declared a state of emergency due to severe drought conditions and directed State and local agencies to take all necessary actions to conserve water, enhance and protect water supplies, and reduce harmful effects of the drought. Subsequent proclamations and executive orders extended provisions and added new provisions. On November 13, 2015, the Governor issued Executive Order B-36-15, which requires the orders and provisions contained in the January 17, 2014 Proclamation; the April 25, 2014 Proclamation; and Executive Orders B-28-14 (December 22, 2014) and B-29-15 (April 1, 2015) to remain in full force and effect. The state of emergency and the associated executive orders remained effective through 2016.

Additionally, the Governor issued Executive Order B-37-16 on May 9, 2016, to establish long-term water conservation measures by building on existing temporary statewide emergency water restrictions. A group of five State agencies, including DWR, were tasked with implementation of the order. The agencies will establish a long-term water conservation framework that will be part of the implementation of the California Water Action Plan.

On January 15, 2016, DWR and Bureau of Reclamation (Reclamation) submitted the Drought Contingency Plan for the period February through November 2016, to the State Water Resources Control Board (State Water Board) as required in the State Water Board's water right order 2015-0043. Monthly updates were submitted for February through June. The Drought Contingency Plan serves as the framework to develop proposed modifications to D-1641 requirements during the drought. Reclamation and DWR continued to work closely with the fish and wildlife agencies and the State Water Board to update the Drought Contingency Plan as necessary based on changing circumstances.

Reclamation and DWR submitted the final working draft of the Central Valley Project (CVP) and SWP Fall 2016 Drought Preparedness Plan to the State Water Board on October 28, 2016.

For more information about State Water Board drought-related actions, see Chapter 4, Water Quality.

SWP Allocations

On October 1, 2015, SWP water contractors submitted initial requests for 2016 totaling 4.17 maf. DWR approved delivery of 0.42 maf on December 1, 2015, resulting in initial

Table A amounts of 10 percent of SWP water contractor requests. DWR increased the 2016 Table A amounts to 2.5 maf, for a final allocation of 60 percent, on April 21, 2016.

Water Supply Contract Extension Program

In May 2013, DWR and the SWP contractors began negotiations in a public forum to develop contract amendments to extend the term and change certain financial provisions of the water supply contracts. In June 2014, the negotiators for DWR and the SWP contractors reached a general agreement on principles for such an amendment. In 2016, DWR released the draft environmental impact report on August 17, 2016, and held a public hearing on September 12, 2016, in Sacramento. The public comment period closed on October 17, 2016. For more information see Chapter 9, Water Contracts and Deliveries.

Yearly Activities Summary

2016 Precipitation and Water Storage

Precipitation and Mountain Snowpack in Water Year 2015–2016

Water year 2015–2016 turned out to be an above average year for precipitation and slightly below average for mountain snowpack. It marked an increase after four consecutive years with significantly less than average precipitation and mountain snowpack. The state received precipitation at 104 percent of average in water year 2015–2016 compared to 74 and 56 percent of average in water years 2014–2015 and 2013–2014, respectively. The Northern Sierra 8-Station Precipitation Index had 57.8 inches of precipitation, which represents 116 percent of the index average. The San Joaquin 5-Station Precipitation and Tulare Basin 6-Station Precipitation indices totaled 40.1 inches (98 percent of average), and 25.8 inches (88 percent of average), respectively. The statewide mountain snowpack on April 1 was 85 percent of average, but peaked a few weeks earlier on March 15–16 at 90 percent (25.5 inches of snow water equivalent) of the April 1 average.

River Runoff

Statewide river runoff totaled 97 percent of average in the 2015–2016 water year, which was a dramatic increase over the previous water year's total of 46 percent of average. Water year runoff totals for the Sacramento River Region, San Joaquin 4 Rivers, and Tulare Lake Region were 98, 87, and 65 percent of average, respectively.

Water Supply Indices

The Sacramento Valley Water Year Hydrologic Classification and the San Joaquin Valley Water Year Hydrologic Classification were "below normal" and "dry," respectively," based on observed data for water year 2015–2016.

Water Year 2015–2016 Statewide Storage Totals

Monthly storage totals for the major Sierra Nevada reservoirs began at 54 percent of average reservoir storage. The percent of average storage remained below 55 percent through December 2015. Thereafter, the percent of average increased for each month until May 1. For the remaining months of the water year, the percent of average dropped gradually until the end of September when the percent of average was 82 percent.

2016 Storage Totals in Major SWP Reservoirs

End-of-year storage on December 31, 2016, in major SWP reservoirs and the State's share of joint-use reservoirs was 3.24 maf or 61 percent of maximum storage, compared to 1.6 maf or 30 percent of maximum storage at the end of 2015. The average end-of-month total storage in major SWP reservoirs for 2016 was 3.2 maf.

Diversions from the Sacramento-San Joaquin Delta

In 2016, the SWP diverted 2,595,218 acre-feet (af) at Banks Pumping Plant. There was 3,990 af pumped for the Cross Valley Canal, and no water was wheeled for the CVP at Banks Pumping Plant by DWR during 2016.

Maximum daily Sacramento-San Joaquin Delta Estuary (Delta) exports occurred on September 7, 2016, at 23,580 af. Combined SWP and CVP monthly Delta exports in 2016 varied from a low of 116,211 af in April, to a high of 604,503 af in August. Delta exports totaled approximately 4.5 maf in 2016.

For more information, see Chapter 8, Water Supply.

2016 Water Deliveries

A total of 3,338,083 af of SWP and non-SWP water was delivered to 29 long-term SWP water contractors and 21 non-SWP agencies. The SWP portion totaled 2,180,626 af, and the non-SWP portion totaled 1,157,457 af.

SWP

The 2,180,626 af delivered to SWP water contractors was categorized as follows:

- 1,701,425 af of Table A water;
- 115,013 af of transfers and exchanges of Table A water among SWP water contractors;
- 14,237 af of Multiyear Water Pool Program water;
- 71,248 af of 2015 carryover water;
- 3,319 af of Article 21 water;
- 124,812 af of water bank recovery;
- 81,123 af of delivery of backup water;
- 2,070 af of settlement water;
- 11,692 af of local water;
- 6,290 af of permit water; and
- 49,397 af of other non-SWP programs.

Non-SWP

The 1,157,457 af portion delivered to 21 non-SWP agencies was categorized accordingly:

- 112,521 af of SWP contracted supply;
- 28,612 af of water bank recovery;
- 990,983 af of regulated delivery of local supply;
- 1,064 af for parks and recreation;
- 618 af for fish and wildlife;
- 610 af for Cross Valley Canal contractors;
- 22,216 af for Kern National Wildlife Refuge; and
- 833 af for annual contracts.

For more information, see Chapter 9, Water Contracts and Deliveries.

Power Resources

SWP generation totaled 3,075,218 megawatt hours of energy in 2016. The SWP received a total of 4,108,601 megawatt hours of energy from other power resources and firm purchases under agreements and exchanges. Bilateral energy sales totaled 1,701,100 megawatt hours in 2016. For detailed information, see Chapter 10, Power Resources.

The sidebar, State Water Project Power Generation and Consumption in 2016, summarizes amounts of power generated and consumed by the SWP.

Greenhouse Gas Management

In 2016, DWR reported its calendar year 2015 pump load, generation, and sulfur hexafluoride emissions to the California Air Resources Board. DWR's sulfur hexafluoride emissions were below the maximum allowable limit; however, because the allowable limit will be lower in future years, DWR will continue to implement plans to further reduce its sulfur hexafluoride emissions. DWR also reported its 2015

State Water Project Power Generation and Consumption in 2016

Power Generation and Consumption	Megawatt Hours
Energy generation by SWP facilities	3,075,218
Energy sources and firm purchases under agreements and exchanges	4,108,601
Total Energy Available to the SWP	7,183,819
Energy sales[a]	(579,934)
Net SWP Power Consumption[b]	6,603,883

[a] Received under the Lodi Energy Center Power Sales Agreement as a purchase credit.
[b] Totals may not sum as expected due to rounding.

greenhouse gas emissions to The Climate Registry and submitted its fossil fuel report for 2015 to the Governor's Office.

For more information regarding DWR's management of greenhouse gas emissions, and its efforts to add renewable, greenhouse gas emission-free energy to the SWP's energy portfolio, see Chapter 10, Power Resources.

Hydropower License Planning and Compliance

DWR holds three hydropower licenses and two conduit exemptions issued by the Federal Energy Regulatory Commission (FERC): Oroville Facilities, FERC Project No. 2100; South SWP Hydropower, FERC Project No. 2426; Pine Flat Transmission Line, FERC Project No. 2876; Alamo Powerplant Project, FERC Project No. 14579; and Mojave Siphon Powerplant Project, FERC Project No. 14580.

Oroville Facilities Relicensing

On January 26, 2005, DWR filed an application with FERC requesting a new license for the Oroville Facilities. (More detailed information about the relicensing process is available in previous editions of Bulletin 132.) The existing 50-year license expired January 31, 2007; FERC is issuing annual licenses under the same terms and conditions as the expired license until the new license is issued. Issuance of the new license had been delayed pending issuance of the National Marine Fisheries Service (NOAA Fisheries) biological opinion, which was completed and filed with FERC on December 5, 2016. With the filing of the biological opinion, FERC now has all required documentation to issue a new license which is anticipated in 2018.

For more information regarding events associated with Oroville Facilities relicensing in 2016, see Chapter 3, Environmental Programs; Chapter 6,

Legislation and Litigation; Chapter 10, Power Resources; and Chapter 13, Recreation.

South SWP Hydropower

On August 1, 2016, two preliminary application documents (PAD) and notices of intent were filed with FERC for the relicensing of South SWP Hydropower. One PAD/notice of intent was filed on behalf of the DWR and the Los Angeles Department of Water and Power for the relicensing of Warne and Castaic powerplants. Another PAD/notice of intent was filed on behalf of DWR for the relicensing of Devil Canyon Powerplant. With the August 1 submission of the Devil Canyon Project PAD, DWR also requested FERC's approval to use the Traditional License Process in lieu of the Integrated Licensing Process, which is FERC's default relicensing process. DWR and Los Angeles Department of Water and Power will use the Traditional License Process process for the South SWP Hydropower relicensing. The PAD and notice of intent for relicensing are due to FERC by January 31, 2017.

For more information about hydropower relicensing activities, see Chapter 10, Power Resources.

Financial Analysis

DWR continued to pay bondholders as scheduled. The SWP was financially viable and was indirectly paid for by the approximately 27 million water users served by the project. Direct payment was through the 29 long-term water contractors. In 2016, the SWP handled approximately $1.13 billion in revenues and $1.13 billion in expenses. The 2016 Income Statement for the State Water Project sidebar presents a summary of the year's revenues and expenses. For detailed information, see Chapter 14, Financial Analysis.

Engineering, Construction, and Real Estate

Engineering, construction, and real estate activities continued to enhance, expand, repair, and protect SWP and other facilities. Significant projects included the seismic remediation of Perris Dam, the East Branch Extension Phase II projects, the South Bay Aqueduct Enlargement and Improvement projects, and habitat restoration projects.

DWR worked on 65 construction contracts in various SWP construction divisions in 2016. Contract projects included pipeline repair, control system upgrades, fire systems modernization, equipment refurbishments and upgrades, seismic upgrades of bridges, maintenance facility improvements at dam and reservoir sites, and the addition of new pumping units.

DWR processed a net total of $8.93 million in payments in 2016 in support of right-of-way activities required for the construction, operation, and maintenance of the SWP. This amount represents direct payments made for the cost of real property rights, damages, temporary entry permits, licenses, leases, and relocation expenses.

For more information, see Chapter 12, Engineering, Construction, and Real Estate.

Delta Resources and Environmental Issues

Invasive Species Issues

In February, New Zealand Mudsnails (*Potamopyrgus antipodarum*) were discovered in the lower Feather and lower Yuba rivers. The Department of Fish and Wildlife (DFW) asked recreational users to follow the "clean, drain, and dry" directive with all fishing and recreational gear and watercraft to help prevent the further spread of the invasive snails.

2016 Income Statement for the State Water Project

Revenues	Thousands of Dollars
Water Contract Payments	1,203,535
Revenue Bond Cover Adjustments	(55,249)
Rate Management Adjustments	(40,470)
Other Revenues	22,613
Total Operating Revenues	**1,130,429**
Expenses	
Project Operations, Maintenance, Power, and Replacement	767,568
Deposits to Reserves	74,335
Water Bond Principal	182,029
Water Bond Interest	106,498
Total Operating Expenses and Debt Service	**1,130,429**
Net System Revenues	**0**

In December, quagga mussels (*Dreissena rostriformis*) were discovered in the West Branch of the SWP. The mussels were initially discovered in the Angeles Tunnel, which moves water between Pyramid Lake and Elderberry Forebay. DFW classified Pyramid Lake and Elderberry Forebay as "infested" with quagga mussels and Castaic Lake as "presumed infested" because it is downstream of Pyramid Lake and Elderberry Forebay.

In December, DWR announced that Lake Davis would be allowed to fill and normal reservoir operations would resume. In 2007, Lake Davis was successfully treated with rotenone to eradicate non-native Northern Pike.

California WaterFix

Numerous activities related to the California WaterFix took place in 2016.

DWR and a joint powers authority comprised of public water agencies reached a tentative agreement for collaboration on the design and construction of the California WaterFix conveyance facility.

Phase 1 and 2A of the California WaterFix aquatic science peer review was conducted to provide NOAA Fisheries, U.S. Fish

and Wildlife Service, and DFW with an independent scientific evaluation of the methods, approaches, and analyses used for the adaptive management framework and the DFW incidental take permit application.

The State Water Board hearing began for DWR and Reclamation's petition for a change to SWP water rights necessary for the implementation of key components of California WaterFix.

DWR and Reclamation submitted a biological assessment for California WaterFix to NOAA Fisheries and U.S. Fish and Wildlife Service with a request to begin the formal consultation process under Section 7 of the federal Endangered Species Act.

A draft adaptive management framework for the California WaterFix (and its associated biological opinions) and the current 2008 and 2009 biological opinions for the coordinated long-term operation of the CVP and SWP was released in September.

DWR submitted an incidental take permit application to DFW for the incidental take of State-listed species during the construction and operation of California WaterFix.

DWR and Reclamation released the final environmental impact report/environmental impact statement.

California EcoRestore

DWR's EcoRestore Program functions as DWR's main connection point to California EcoRestore, and the two programs provide mutual support to one another. The program provided DWR with centralized coordination, communication, and integration of all habitat restoration planning and implementation efforts.

Both EcoRestore efforts, working closely with DWR's restoration programs, continued to address the many challenges and barriers constraining restoration project implementation.

Construction began for two EcoRestore projects: the Wallace Weir project and the Tule Red tidal wetland restoration project in the Suisun Marsh.

Endangered Species Act Consultation on Long-term SWP and CVP operations

In August, DWR and Reclamation requested reinitiation of federal Endangered Species Act Section 7 consultation with the U.S. Fish and Wildlife Service and NOAA Fisheries on the coordinated long-term operation of the CVP and SWP. A memorandum of understanding for the reinitiation of consultation was signed in December.

Fish Restoration Program

Pursuant to the U.S. Fish and Wildlife Service and NOAA Fisheries Biological opinions and DFW Longfin Smelt incidental take permit, the Fish Restoration Program continued to make progress towards fulfilling its restoration requirements. Planning, permitting, and acquisition activities moved forward on the program's restoration projects, including the Prospect Island, Decker Island, Bradmoor Island, and Winter Island. Construction started on the initial restoration activities on the Suisun Marsh project.

For more information about Delta resources and environmental issues, see Chapter 2, Delta Resources; Chapter 3, Environmental Programs; and Chapter 4, Water Quality Programs.

New Research Vessel

On December 16, 2016, DWR commissioned a new research vessel as a state-of-the-art replacement for the San Carlos, the research vessel used for monitoring water quality in the Delta and upper San Francisco Bay since 1976. The Sentinel enables DWR's Environmental Monitoring

Program to conduct water quality, nutrient, phytoplankton, zooplankton, and benthos monitoring in the Delta. The research vessel plays a critical role helping to meet mandated water quality objectives and requirements of biological opinions. The Sentinel will also be a resource to the Interagency Ecological Program.

Recreation

In 2016, SWP facilities supported nearly 4.2 million recreation days of use, down slightly from the 4.4 million recorded in 2015. Most of the SWP recreation use was concentrated at the major reservoirs, with approximately 41 percent occurring in the Oroville Field Division and 36 percent occurring in the Southern Field Division. For more information, see Chapter 13, Recreation.

SWP Security Measures

Security and protection of the SWP remain primary goals for DWR. SWP facilities are closely monitored, and DWR staff are vigilant in maintaining a secure environment. Security patrols of SWP facilities are frequent and ongoing, and plans are in place to address potential or actual acts of terrorism. Security system improvements continue in conjunction with Reclamation and other federal and State agencies.

SWP Milestones through the Decades

50 Years Ago—1966

Construction on Del Valle Dam and the Delta Fish Protective Facility began in May.

Los Banos Creek Detention Dam was completed in January, and Little Panoche Creek Detention Dam in September.

Grizzly Valley Dam was completed and water storage in Lake Davis began in December.

40 Years Ago—1976

The 1975-76 and 1976-77 water years were two of the driest years of record in California. SWP operations in 1976 were challenged by curtailed exports and water quality issues in the Delta.

30 Years Ago—1986

DWR and DFW signed the Delta Pumping Plant Fish Protection Agreement (Delta Fish Agreement) to annually provide funds to offset direct losses of Chinook Salmon, steelhead, and Striped Bass at Banks Pumping Plant. The Delta Fish Agreement is commonly referred to as the Four Pumps Agreement because it was adopted as part of the mitigation for four additional pumps at Banks Pumping Plant.

Construction began on the Suisun Marsh Salinity Control Gates.

20 Years Ago—1996

The South Delta temporary barrier at Grant Line Canal was installed and operated for the first time.

Mojave Siphon Powerplant on the East Branch of the California Aqueduct started commercial operation in August.

10 Years Ago—2006

The Settlement Agreement for Licensing of the Oroville Facilities (Oroville Facilities FERC relicensing) was signed in March.

Chapter 1
The State Water Project

Oso Pumping Plant, on the West Branch of the California Aqueduct.

This chapter primarily provides background on the State Water Project (SWP), including brief descriptions of SWP facilities, planning, construction, power operations, financing, contracting agencies, water deliveries, and the project's many uses and functions. It also provides a glimpse of California history, with a look at the processes and decisions that went into the creation of the largest State-built water project in the country.

Chapters 2 through 15 provide more detail on significant events and specific topics related to management of the SWP in calendar year 2016. At the end of the bulletin, Appendix B presents data and computations used to determine the SWP water contractors' Statements of Charges for 2018.

Information in this chapter was contributed by the Division of Operations and Maintenance and the State Water Project Analysis Office.

California's diverse geography contains both the highest and lowest elevations in the coterminous United States, with a resulting diversity of climate that ranges from desert to alpine to subtropical. In a typical year, some areas receive as little as 2 inches of rain, while others receive more than 100 inches. This diversity of geography and climate creates an intricate and constantly changing pattern of water supplies, which, in turn, creates enormous challenges in managing this vital resource.

The State Water Project

Like present-day Californians, the earliest settlers faced the problem of how best to conserve, control, and deliver water. Remains of aqueducts, canals, and dams are still found near some of California's original missions. The first recorded aqueduct, built in 1770 to serve the San Diego mission, was 6 miles long. In the early twentieth century, several cities, including San Francisco and Los Angeles, built aqueducts to convey water from the Sierra Nevada to other parts of the state.

In 1951, after many years of discussion and study, the Legislature authorized construction of a water storage and supply system to capture and store rainfall and snowmelt runoff in Northern California and deliver it to areas of need throughout the state. Eight years later, the Legislature passed the Burns-Porter Act, which provided the mechanism for obtaining funds necessary to construct the initial State Water Project (SWP) facilities. In 1960, California voters approved issuance of $1.75 billion in general obligation bonds, as authorized in the act, thereby securing funds to build the SWP. In 1962, the first water was delivered through a portion of the South Bay Aqueduct to two long-term SWP water contractors in Alameda County.

Today the SWP, built, operated, and managed by the Department of Water Resources (DWR), is the largest State-built, multipurpose, user-financed water project in the country. It was designed and built to deliver water, control flooding, generate power, provide recreational opportunities, and enhance habitat for fish and wildlife. SWP water irrigates about 750,000 acres of farmland, mainly in the southern San Joaquin Valley. Approximately 27 million of California's estimated 39 million residents benefit from SWP water.

The water stored and delivered by the SWP originates as rainfall and snowmelt runoff in Northern and Central California's watersheds, where most of the state's precipitation occurs. The amounts of precipitation and snowpack and the rate and amount of runoff are used to determine how much water the SWP can deliver in any given year.

Since 1968, DWR has monitored and recorded annual precipitation and runoff for each water year, which begins on October 1 and ends on the following September 30.

Project Facilities

The SWP depends on a complex system of dams, reservoirs, power plants, pumping plants, canals, pipelines, and aqueducts to deliver water. Although initial water transportation facilities were essentially completed in 1973, other facilities have since been built, and still others are either under construction or are planned to be built, as needed.

The SWP facilities include 30 dams (29 of which impound water), 20 reservoirs, 29 pumping and generating plants, and

approximately 700 miles of aqueducts and pipelines. Figure 1-1 shows the names and locations of primary SWP storage and water delivery facilities.

Project Design

Water from rainfall and snowmelt runoff is stored in SWP conservation facilities and delivered via SWP transportation facilities to water agencies and districts in the Upper Feather River, North Bay, South Bay, San Joaquin, Central Coastal, and Southern California areas.

Three small reservoirs—Antelope Lake, Lake Davis, and Frenchman Lake—are the northernmost SWP facilities. Situated on Feather River tributaries in Plumas County, these lakes are used primarily for recreation. They also provide water to the City of Portola and local agencies that have water rights agreements with DWR.

Downstream from these lakes lies Lake Oroville, which conserves water from the Feather River watershed. Created by Oroville Dam, the tallest earthfill dam in the Western Hemisphere, Lake Oroville is the project's largest storage facility with a capacity of approximately 3.5 million acre-feet (af).

Releases from Lake Oroville flow down the Feather River into the Sacramento River, which drains the northern portion of California's great Central Valley. The Sacramento and San Joaquin rivers flow into the Sacramento-San Joaquin River Delta (Delta), comprising 738,000 acres of land interlaced with channels that receive runoff from 40 percent of the state's land area. The SWP, federal Central Valley Project, and local agencies all divert water from the Delta.

From the northern Delta, Barker Slough Pumping Plant diverts water for delivery to Napa and Solano counties through the North Bay Aqueduct, which was completed in 1988. Near Byron, in the southern Delta, the SWP diverts water into Clifton Court Forebay for delivery south of the Delta. Banks Pumping Plant lifts water from Clifton Court Forebay into the California Aqueduct, which flows to Bethany Reservoir. From Bethany Reservoir, the South Bay Pumping Plant lifts water into the South Bay Aqueduct to supply Alameda and Santa Clara counties. The South Bay Aqueduct provided initial deliveries in 1962 and has been fully operational since 1965.

Most of the water delivered to Bethany Reservoir from Banks Pumping Plant flows into the California Aqueduct. This 443-mile-long main aqueduct conveys water to the agricultural lands of the San Joaquin Valley and to the urban regions of Southern California.

The California Aqueduct winds along the west side of the San Joaquin Valley. It transports water to O'Neill Forebay, Gianelli Pumping-Generating Plant, and San Luis Reservoir. San Luis Reservoir has a storage capacity of more than 2 million af and is jointly owned by DWR and the Bureau of Reclamation. DWR's share of gross storage in the reservoir is 1,062,183 af. Generally, water is pumped into San Luis Reservoir from late fall through early spring, where it is temporarily stored for release back to the California Aqueduct to meet summertime peaking demands of SWP and Central Valley Project water contractors.

SWP water not stored in San Luis Reservoir and water released from San Luis flows south through the San Luis Canal, a portion of the California Aqueduct jointly owned by DWR and the Bureau of Reclamation.

As the water flows through the San Joaquin Valley, numerous turnouts convey it to farmlands within the service areas of the SWP and Central Valley Project. Along its journey, this water is lifted more than 1,000 feet by four pumping plants—Dos Amigos, Buena Vista, Teerink, and

Figure 1-1 Names and Locations of Primary SWP Storage and Water Delivery Facilities, December 31, 2016

Chrisman—before reaching the foot of the Tehachapi Mountains.

In the southern San Joaquin Valley, near Kettleman City, Phase I of the Coastal Branch Aqueduct serves agricultural areas west of the California Aqueduct. In August 1997, completion of Phase II extended the Coastal Branch Aqueduct to serve municipal and industrial water users in San Luis Obispo and Santa Barbara counties.

The remaining water conveyed by the California Aqueduct is delivered to Southern California, home to roughly two-thirds of California's population. Before it can be delivered, the water must first cross the Tehachapi Mountains. Fourteen 80,000-horsepower pumps at Edmonston Pumping Plant, situated at the foot of the mountains, raise the water 1,926 feet—the highest single lift of any pumping plant in the world. The water enters 8.5 miles of tunnels and siphons as it flows into Antelope Valley, where the California Aqueduct divides into the East Branch and the West Branch.

The East Branch carries water through Alamo Powerplant, Pearblossom Pumping Plant, and Mojave Siphon Powerplant into Silverwood Lake in the San Bernardino Mountains. From Silverwood Lake, water flows through the San Bernardino Tunnel to Devil Canyon Powerplant. Water continues down the East Branch through the Santa Ana Pipeline to Lake Perris, the southernmost SWP reservoir.

The East Branch Extension is a nearly 33-mile pipeline linking parts of service areas for San Bernardino Valley Municipal Water District and San Gorgonio Pass Water Agency to the California Aqueduct. The East Branch Extension, Phase I, carries water from Devil Canyon Powerplant Afterbay to Cherry Valley, bringing water to Yucaipa, Calimesa, Beaumont, Banning, and other communities. Phase II, when completed, will expand deliveries in these service areas.

Water in the West Branch flows through Oso Pumping Plant, Quail Lake, Peace Valley Pipeline, and Warne Powerplant into Pyramid Lake in Los Angeles County. From there it flows through the Angeles Tunnel, Castaic Powerplant, Elderberry Forebay, and into Castaic Lake, terminus of the West Branch. Castaic Powerplant is operated by the Los Angeles Department of Water and Power.

The energy needed to operate the SWP, the largest single user of electrical power in California, comes from a combination of its own hydroelectric generating plants and power purchased from and exchanged with other utilities. The project's eight hydroelectric power plants, including four pumping-generating plants, produce enough electricity in a normal year to supply about two-thirds of the SWP's necessary operating power.

Tables 1-1 through 1-5 present statistical information about primary storage facilities, primary dams, pumping plants, power plants, and aqueducts.

Methods of Financing

Project facilities have been constructed with several general types of financing: general obligation bonds and tideland oil revenues (under the Burns-Porter Act, which was approved by the Legislature in 1959, and the bond issue approved by voters in 1960); revenue bonds; and capital resources revenues. Repayment of these funds, and the operation, maintenance, power, and replacement costs associated with water supply, are paid by the 29 SWP water contractors that have long-term contracts with DWR for the delivery of SWP water.

For more information on financing, see Chapter 14, Financial Analysis.

Table 1-1 Physical Characteristics of Primary Storage Facilities

Facility	Gross Capacity (acre-feet)	Surface Area (acres)	Shoreline (miles)
Antelope Lake	22,600	930	15
Frenchman Lake	55,500	1,580	21
Lake Davis	84,400	4,030	32
Lake Oroville	3,537,600	15,810	167
Thermalito Diversion Pool	13,400	320	10
Thermalito Forebay	11,800	630	10
Thermalito Afterbay	57,000	4,300	26
Clifton Court Forebay	31,300	2,180	8
Bethany Reservoir	5,100	180	6
Lake del Valle	77,100	1,060	16
San Luis Reservoir[a]	2,027,800	12,520	65
O'Neill Forebay[b]	56,400	2,700	12
Los Banos Reservoir	34,600	620	12
Little Panoche Reservoir	5,600	190	6
Quail Lake	7,600	290	3
Pyramid Lake	171,200	1,300	21
Elderberry Forebay	32,500	500	7
Castaic Lake	323,700	2,240	29
Silverwood Lake	75,000	980	13
Lake Perris	131,500	2,320	10

[a] DWR's share of storage in San Luis Reservoir, jointly owned with the Bureau of Reclamation, is 1,062,183 acre-feet.
[b] DWR's share of storage in O'Neill Forebay is 29,500 acre-feet.

Table 1-2 Physical Characteristics of Primary Dams

Facility	Crest Elevation (feet)	Structural Height (feet)	Crest Length (feet)	Structural Volume (thousand cubic yards)
Antelope	5,025	120	1,320	380
Frenchman	5,607	139	720	537
Grizzly Valley	5,785	132	800	253
Oroville	922	770	6,920	80,000
Thermalito Diversion	233	143	1,300	154
Thermalito Forebay	231	91	15,900	1,840
Thermalito Afterbay	142	39	42,000	5,020
Clifton Court Forebay	14	30	36,500	2,440
Bethany	250	121	3,940	1,400
Del Valle	773	235	880	4,150
Sisk	544	385	18,600	77,664
O'Neill Forebay	233	88	14,300	2,877
Los Banos Detention	384	167	1,370	2,100
Little Panoche Detention	676	152	1,440	1,210
Pyramid	2,606	400	1,090	6,860
Elderberry Forebay	1,550	200	1,990	6,000
Castaic	1,535	425	4,900	46,000
Cedar Springs	3,378	249	2,230	7,600
Perris	1,600	128	11,600	20,000
Crafton Hills	2,932	95	500	144

Table 1-3 Pumping Plant Characteristics

Facility	Number of Units	Normal Static Head (feet)	Total Flow at Design Head (cubic feet per second)	Total Motor Rating (horsepower)
Hyatt	3 (p-g)[a]	500–625	5,610	519,000
Robie Thermalito	3 (p-g)[a]	85–102	9,120	120,000
Barker Slough	9	95–120	228	4,800
Cordelia	11	138		
Banks	11	236–252	10,670	333,000
South Bay	9	566	330	27,750
Del Valle	4	0–38	120	1,000
Gianelli	8 (p-g)[a]	99–327	11,000	504,000
Dos Amigos	6	107–125	15,450	240,000
Las Perillas	6	55	461	4,050
Badger Hill	6	151	454	11,750
Devil's Den[b]	6	521	134	10,500
Bluestone[b]	6	484	134	10,500
Polonio Pass[b]	6	533	134	10,500
Buena Vista[b]	10	205	5,405	144,500
Teerink[b]	9	233	5,445	150,000
Chrisman[b]	9	518	4,995	330,000
Edmonston[b]	14	1,926	4,480	1,120,000
Oso	8	231	3,252	93,800
Pearblossom	9	540	2,575	203,200
Greenspot	4	382	50	3,900
Crafton Hills	3	613	40	4,000
Cherry Valley	2	130	75	300

[a] The term p-g indicates pumping-generating units.
[b] These plants have one unit in reserve.

Table 1-4 Power Plant Characteristics, by Facility

Hydroelectric Facility	Number of Units	Normal Static Head (feet)	Total Flow at Design Head (cubic feet per second)	Net Dependable Capacity (megawatts)	Nameplate Capacity (megawatts)
Hyatt	6 (3 p-g)[a]	410-676	16,950	645	645
Thermalito Diversion Dam	1	63-77	615	3	3
Robie Thermalito	4 (3 p-g)[a]	85-102	17,400	114	114
Gianelli (total)	8 p-g[a]	99-327	16,960	363	424
Warne	2	719-739	1,600	67	74
Castaic[b]	7 (6 p-g)[a]	900-1,050	20,820	1,128	1,254
Alamo	1	115-141	1,740	15	17
Mojave Siphon	3	81-136	2,880	29	30
Devil Canyon	4	1,406	2,940	235	276

[a] The term p-g indicates pumping-generating units.
[b] Castaic Pumping-Generating Plant is owned and operated by the Los Angeles Department of Water and Power.

Table 1-5 Total Miles of Aqueducts

Facility	Channel and Reservoir	Canal and Siphon	Pipeline and Discharge Line	Tunnel	Total
Grizzly Valley Pipeline	0.0	0.0	6.0	0.0	6.0
Thermalito Power Canal and Tail Channel	1.5	1.9	0.0	0.0	3.4
North Bay Aqueduct	0.0	0.0	27.6	0.0	27.6
South Bay Aqueduct (including Del Valle Branch)	0.3	10.7	31.9	1.7	44.6
Subtotal	*1.8*	*12.6*	*65.5*	*1.7*	*81.6*
California Aqueduct					
Clifton Court Forebay to O'Neill Forebay	4.5	61.9	0.3	0.0	66.7
O'Neill Forebay to Kettleman City	4.1	101.4	0.2	0.0	105.7
Kettleman City to Edmonston Pumping Plant	0.0	120.1	0.9	0.0	121.0
Edmonston Pumping Plant to Tehachapi Afterbay	0.0	0.2	1.9	7.9	10.0
Tehachapi Afterbay to Lake Perris	4.0	97.8	34.3	3.9	140.0
Subtotal	*12.6*	*381.4*	*37.6*	*11.8*	*443.4*
California Aqueduct Branches					
Coastal Branch	0.0	14.1	98.7	2.7	115.5
West Branch	9.7	9.3	5.8	7.1	31.9
East Branch Extension					
Devil Canyon Powerplant to Greenspot Pump Station	0.0	0.0	16.2	0.0	16.2
Greenspot Pump Station to Noble Creek Terminus	0.0	0.0	16.4	0.0	16.4
Subtotal	*9.7*	*23.4*	*137.1*	*9.8*	*180.0*
Total	**24.1**	**417.4**	**240.2**	**23.3**	**705.0**

Long-term SWP Water Contractors

From 1963 through 1967, 32 agencies or districts signed long-term water supply contracts with DWR. However, in 1965, the City of West Covina was annexed to The Metropolitan Water District of Southern California, and in 1981, Hacienda Water District was assigned to Tulare Lake Basin Water Storage District. On January 1, 1992, Castaic Lake Water Agency assumed all rights and obligations granted to Devil's Den Water District in accordance with its long-term water supply contract. Therefore, only 29 SWP water contractors have long-term contracts with DWR as of December 31, 2016.

The contracts are in effect for the longest of the following periods:

- the project repayment period, which extends to December 31, 2035;
- 75 years from the effective date of the contract; or
- the period ending with the latest maturity date of any bond used to finance the construction costs of project facilities.

The contracts initially provided for a combined maximum annual Table A amount of 4,230,000 af of water supply. As a result of contract amendments in the 1980s and the Monterey Amendment, the current combined maximum annual Table A amount by 2016 totals 4,172,786 af (see Appendix B, Table B-4 for details).

Figure 1-2 (located at the end of the chapter) shows the name and location of each SWP water contractor and the first year of SWP delivery service for each. Table 1-6 (also at the end of the chapter) presents information about each SWP water contractor.

For more information about existing long-term SWP water supply contracts and annual water deliveries, see Chapter 9, Water Contracts and Deliveries.

Future Planning and Construction

The planning, design, and construction of SWP facilities were based on studies and analyses that projected SWP water contractors' annual water delivery needs. To meet these projected needs, water conservation reservoirs, storage facilities, and delivery facilities were planned to be constructed in stages as demands for water increased. Lake Oroville and San Luis Reservoir were the first SWP conservation reservoir facilities constructed. Additional facilities were scheduled to meet increased demands. It was anticipated that population growth in delivery service areas and water supply areas of origin would influence the final schedule for SWP facilities.

Demands for SWP water are expected to increase and change as California's population continues to grow and as the effects of climate change impact the State's water resources. Increasingly, issues such as escalating costs, environmental concerns, and increased non-SWP demand for limited water supplies have become important factors affecting the planning and construction of new facilities.

In response to changes brought about by population growth, environmental concerns, climate change, differences in local water use, local water conservation programs, conjunctive-use programs, and other factors, DWR continues to plan, design, and construct transportation and power-producing facilities for the SWP.

In response to changes in water management policy, DWR continues to reassess plans for additional facilities that will incorporate increased environmental safeguards, while also increasing SWP delivery yield. Developing these plans involves the time-consuming process of finding technically suitable projects and satisfying many complex and dynamic environmental procedures, laws, and regulations.

For more information about current SWP planning and construction, see Chapter 12, Engineering, Construction, and Real Estate. Information about prior construction activities can be found in previous issues of Bulletin 132.

Climate Change

Climate change will have potentially serious effects on water resources. Temperature increases may affect water demand and aquatic ecosystems. Projected increases in air temperature may lead to changes in the amount, timing, and form of precipitation—rain or snow; the volume and timing of runoff; the water quality in the Delta due to sea-level rise; and the amount of irrigation water needed due to modified evapotranspiration rates.

The ability of the SWP and Central Valley Project to meet the water demands of their customers and the environment depends on the accumulation of mountain snowpack and subsequent spring and summer snowmelt runoff. A warming climate may reduce this natural water storage mechanism.

To address these concerns, DWR and the Bureau of Reclamation are coordinating with federal, State, and local agencies and nongovernmental organizations to provide

qualitative and quantitative assessments of the potential risks and effects of climate change on California's water resources. This multiagency coordination effort will also update decision makers on climate change impacts, the ability of existing facilities to accommodate these impacts, and available mitigation measures.

For more information on climate change, see Chapter 3, Environmental Programs.

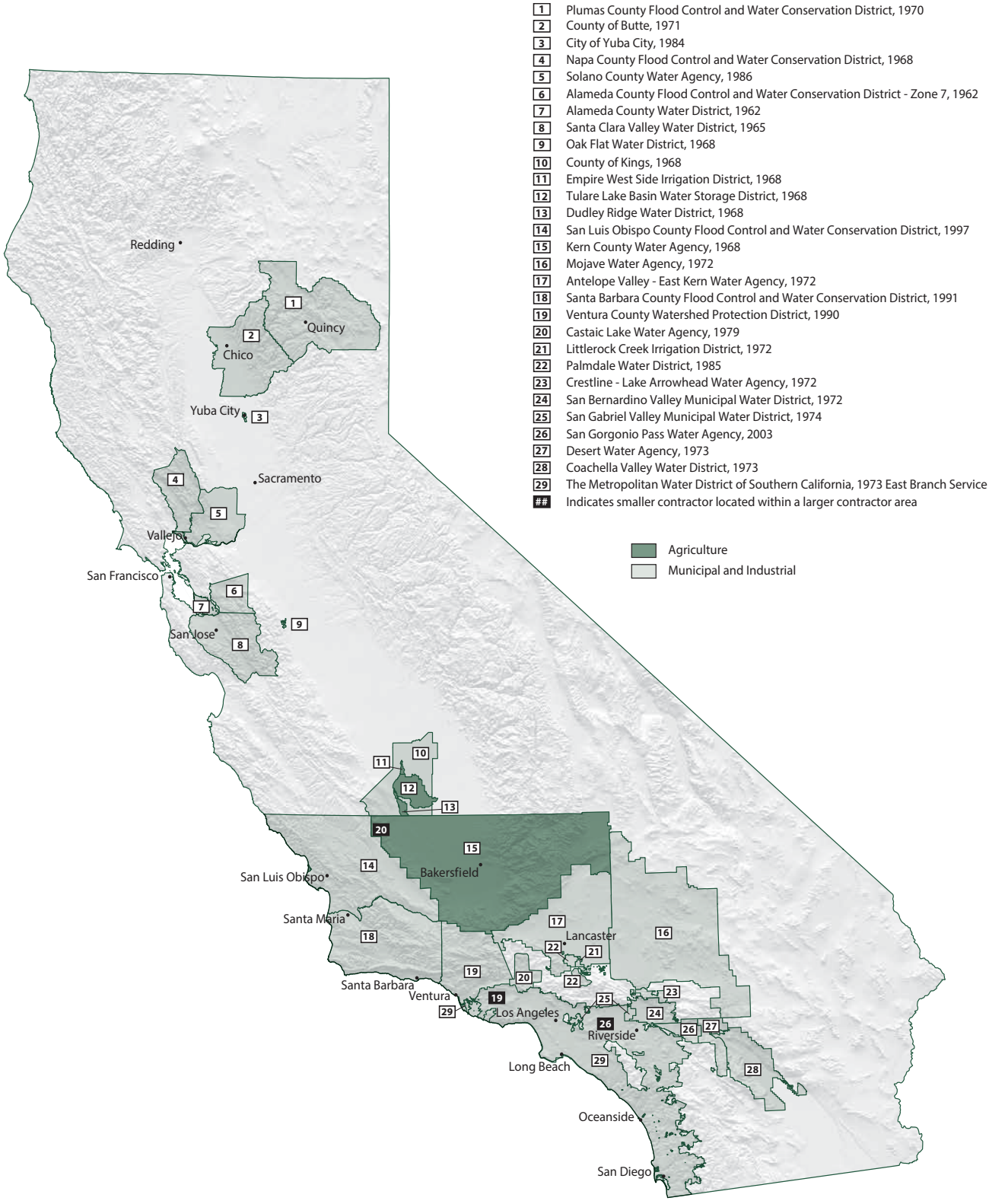


Figure 1-2 Names, Locations, and First Year of Service of Long-term SWP Water Contractors, December 31, 2016

Table 1-6 Long-term SWP Water Contractors, by Area, as of December 31, 2016

Contractor	Cumulative Deliveries (acre-feet)[a]	Annual Table A (acre-feet)	Payments (in dollars)[h]	Gross Area (acres)	Assessed Valuation (in dollars)[b]	Estimated Population
Upper Feather River Area						
City of Yuba City	49,507	9,600	8,595,599	10,133	4,713,051,974	71,070
County of Butte	89,331	27,500	11,119,957	1,049,280	18,070,400,000	204,000
Plumas County Flood Control and WCD	12,624	2,700	2,667,050	1,676,056[c]	2,060,744,342	21,200
Subtotal	*151,462*	*39,800*	*22,382,606*	*2,735,469*	*24,844,196,316*	*296,270*
North Bay Area						
Napa County Flood Control and WCD	346,518	29,025	140,277,821	510,010	35,015,910,757	139,099
Solano County Water Agency	889,276	47,756	189,037,566	581,760	46,508,725,535	440,207
Subtotal	*1,235,794*	*76,781*	*329,315,387*	*1,091,770*	*81,524,636,292*	*579,306*
South Bay Area						
Alameda County Flood Control and WCD–Zone 7	1,684,015	80,619	378,408,251	275,900	49,415,658,709	238,600
Alameda County Water District	1,359,535	42,000	156,726,241	66,943	56,707,000,000	348,600
Santa Clara Valley Water District	4,309,198	100,000	476,958,883	835,098	419,270,051,518	1,903,974
Subtotal	*7,352,748*	*222,619*	*1,012,093,375*	*1,177,941*	*525,392,710,227*	*2,491,174*
San Joaquin Valley Area						
County of Kings	164,335	9,305	12,210,349	893,300	9,125,193,927	149,942
Castaic Lake Water Agency	453,815			8,700[e]	4,532,936	
Dudley Ridge Water District	2,423,491	45,350	108,584,704	37,600	54,549,134	36
Empire West Side Irrigation District	125,281	3,000	5,459,027	7,500	[d]	12
Kern County Water Agency	38,242,219	982,730	2,437,941,746	5,224,000	89,200,000,000	882,176
Oak Flat Water District	216,020	5,700	9,050,065	4,500	[d]	10
Tulare Lake Basin Water Storage District	4,983,046	87,471	208,745,339	189,519	194,000,000	23
Subtotal	*46,608,207*	*1,133,556*	*2,781,991,230*	*6,365,119*	*98,578,275,997*	*1,032,199*
Central Coastal Area						
San Luis Obispo County Flood Control and WCD	86,169	25,000	110,472,229	2,122,240	45,457,307,011	279,083
Santa Barbara County Flood Control and WCD	397,853	45,486	743,766,369	193,391	31,407,071,230	373,906
Subtotal	*484,022*	*70,486*	*854,238,598*	*2,315,631*	*76,864,378,241*	*652,989*
Southern California Area						
Antelope Valley-East Kern Water Agency	2,153,458	144,844	631,225,026	1,525,120	26,661,474,279	397,634
Castaic Lake Water Agency	1,102,865	95,200	416,795,269	125,057[e]	38,065,430,008	275,820
Coachella Valley Water District	1,493,449	138,350	633,640,942	639,857	57,133,768,311	286,000
Crestline-Lake Arrowhead Water Agency	63,266	5,800	33,132,759	54,900	2,249,739,339	29,000
Desert Water Agency	1,304,063	55,750	353,035,375	209,760	13,000,000,000	106,000
Littlerock Creek Irrigation District	18,881	2,300	8,072,890	10,000	388,056,000	2,900
The Metropolitan WD of Southern California	37,733,478	1,911,500	12,551,210,966	3,315,238[f]	2,435,000,264,069	18,800,000
Mojave Water Agency	443,312	85,800	359,333,990	3,136,000	32,136,859,931	476,799
Palmdale Water District	288,750	21,300	101,415,223	119,680	1,414,494,581	114,533
San Bernardino Valley Municipal Water District	1,044,074	102,600	777,653,773	225,577	45,765,101,573	661,546
San Gabriel Valley Municipal Water District	450,936	28,800	193,600,740	18,297	16,850,589,307	197,636
San Gorgonio Pass Water Agency	76,303	17,300	207,172,789	140,800	5,708,130,719	78,268
Ventura County Watershed Protection District	72,905	20,000	78,031,392	308,252	48,280,974,844	472,776
Subtotal	*46,245,740*	*2,629,544*	*16,344,321,134*	*9,828,538*	*2,722,654,882,961*	*21,898,912*
Total	**102,077,973**	**4,172,786**	**21,344,342,330**	**23,514,468[g]**	**3,529,859,080,034**	**26,950,850**

[a] All water delivered to long-term SWP water contractors, including carryover, Article 21, surplus, unscheduled, exchange, permit, purchased, local, and non-SWP water.
[b] Statutes of 1978, Chapter 1207, added Section 135 to the Revenue and Taxation Code, requiring assessment at 100 percent of full value for the 1981–1982 fiscal year and fiscal years thereafter.
[c] Total of all Plumas County Flood Control and Water Conservation District, including Last Chance Creek Water District.
[d] Assessed valuation not available on an agency area breakdown.
[e] Castaic Lake Water Agency (Southern California Area) includes land in the San Joaquin Valley Area formerly known as Devil's Den Water District.
[f] Acreage for Metropolitan includes Calleguas Municipal Water District, which is common to Metropolitan and Ventura County Watershed Protection District.
[g] Includes duplicate values. Portions of some contractors' gross acreage fall within two contractors' geographic areas and are included in each contractor's total.
[h] Includes all payments pursuant to the repayment provisions of the Water Supply Contracts. Transportation and Conservation Replacement Accounting System payments are also included in this table.

WD = Water District; WCD = Water Conservation District
Dudley, Empire, Oak Flat, and Tulare are agricultural contractors. Kern is an agricultural and a municipal and industrial contractor.

Chapter 2
Delta Resources

Construction of the rock barrier on Old River near Tracy, part of the South Delta Temporary Barriers Project.

Significant Events in 2016

The final report for the Georgiana Slough Floating Fish Guidance Structure Study (conducted in the spring of 2014) was completed in October 2016.

In fiscal year 2016–2017, the Delta Levees Maintenance Subventions Program expects to reimburse up to $12 million to local agencies for eligible levee maintenance and rehabilitation work and to cover emergency response and levee repairs for storms that started late in 2016.

In 2016, flood-up began on the 650-acre Whale's Mouth Wetland Restoration Project on the lower southwest side of Sherman Island.

In late 2016, the uplands habitat area of the Sherman Scour Pond Habitat Enhancement Project was planted within Unit 2 of the Whale's Mouth site. Three of the five Twitchell Habitat Enhancement Project sites were planted, including the Elderberry Habitat Enhancement Site and the East and West Pocket Habitat Mitigation Sites.

Information for this chapter was contributed by the Division of Integrated Regional Water Management, the Bay-Delta Office, and the Division of Flood Management.

The Sacramento-San Joaquin Delta (Delta) is a unique environmental resource and a major source of water for millions of Californians. Since the 1950s, the Department of Water Resources (DWR) and other State and federal agencies have developed and implemented numerous programs to manage the Delta.

Delta Water Management Programs

Future water deliveries to millions of Californians throughout the state will be affected by many factors, including two significant changes: Delta pumping restrictions and climate change. Ongoing planning activities and regulatory actions continue to influence DWR activities in the Delta. These include the California WaterFix and California EcoRestore (these two programs replaced the Bay Delta Conservation Plan [BDCP]), the Delta Stewardship Council's (DSC) *Delta Plan*, the State Water Resources Control Board's water rights decisions, and federal biological opinions (BiOps).

BDCP/California WaterFix

In April 2015, the Governor announced a major change for the project known as the BDCP. A new preferred alternative (Alternative 4A) to the BDCP would not complete BDCP as a Natural Community Conservation Plan, but instead construct water conveyance facilities through an initiative called California WaterFix. A parallel effort called California EcoRestore proposes to implement habitat restoration actions in the Delta. California WaterFix is being developed in compliance with the federal Endangered Species Act.

For more information regarding BDCP/California WaterFix, see Chapter 3, Environmental Programs.

Delta Plan

The *Delta Plan*, adopted by the DSC in May 2013 in compliance with the Delta Reform Act of 2009, is a comprehensive, long-term management plan for the Delta. It became effective with legally enforceable regulations in September 2013. (For more information, see the sidebar, Delta Stewardship Council.) The plan was amended in September 2016.

More information about the *Delta Plan* is available on the DSC's website.

State Water Project Delta Compliance Program

The State Water Project (SWP) and Central Valley Project (CVP) obtained take authorization for the federal Endangered Species Act and California Endangered Species Act listed fish species for coordinated operations in the Delta through a U.S. Fish and Wildlife Service BiOp for Delta Smelt in December 2008, a Department of Fish and Wildlife incidental take permit for Longfin Smelt in February 2009, and a National Marine Fisheries Service (NOAA Fisheries) BiOp for salmon, steelhead, and Green Sturgeon in June 2009. Some of the requirements in these documents were implemented immediately, while others needed development of studies and projects before being implemented.

In 2016, efforts continued under the SWP Delta Compliance Program to develop and implement studies and construct projects to address regulatory requirements under the NOAA Fisheries and U.S. Fish and Wildlife

Delta Stewardship Council

Created by the Legislature under the Sacramento-San Joaquin Delta Reform Act of 2009 (Delta Reform Act), the Delta Stewardship Council (DSC) is an independent agency of the State of California composed of members who represent different parts of the State and offer diverse expertise in fields such as agriculture, science, the environment, and public service. Of the seven members, four are appointed by the Governor, one each is appointed by the Senate and by the Assembly, and the seventh is the Chair of the Delta Protection Commission. The council is the successor to the California Bay-Delta Authority and assumes all of its administrative rights, abilities, obligations, and duties.

The *Delta Plan* was adopted by the DSC on May 16, 2013. It became effective with legally enforceable regulations on September 1, 2013. The *Delta Plan* is a comprehensive, long-term management plan for the Sacramento-San Joaquin Delta. It establishes a set of integrated policies, strategies, and actions to guide State and local agencies to help achieve the coequal goals of providing a more reliable water supply for California and protecting, restoring, and enhancing the Delta ecosystem. It will also guide protection and enhancement of the unique resources, culture, and values of the Delta as an evolving place (California Water Code Section 85054). The plan was amended in September 2016.

The Delta Reform Act specifies eight policy objectives that are "inherent" in the coequal goals (see California Water Code Section 85020). It also specifies a statewide policy to reduce reliance on the Delta in meeting the State's future water supply needs through improved regional water self-reliance (California Water Code Section 85021) and identifies specific subjects and strategies that must be included in the *Delta Plan* (see generally, California Water Code Sections 85301–85309).

The Delta Reform Act also established the Delta Science Program and Delta Independent Science Board (ISB) to provide the scientific support and oversight the DSC needs to make decisions based on sound science. The Delta Science Program replaces the CALFED Bay-Delta Program Science Program, and the Delta ISB replaces the CALFED Bay-Delta Program ISB.

The Delta Science Program will develop scientific information and synthesis on issues critical to managing the Bay-Delta system. That body of knowledge must be unbiased, relevant, authoritative, integrated across State and federal agencies, and communicated to Bay-Delta decision makers, agency managers, stakeholders, the scientific community, and the public. The *Delta Science Plan,* released by the DSC in December 2013 and updated in 2016, provides a guide for organizing, conducting, and integrating science in the Delta. A Science Action Agenda will be a key component of implementing the *Delta Science Plan.*

The Delta ISB is a standing board of nationally and internationally prominent scientists with appropriate expertise to evaluate the broad range of scientific programs that support adaptive management of the Delta. The Delta ISB will provide oversight of the scientific research, monitoring, and assessment programs that support adaptive management of the Delta through periodic review of each of those programs. The overall objective of Delta ISB oversight is to ensure that the science supporting Bay-Delta programs, the application of that science, and the technical aspects of the Bay-Delta programs are optimally developed and implemented.

Service BiOps and the Department of Fish and Wildlife incidental take permit.

Predation, Release, and Efficiency Program

The predation, release, and efficiency program includes improving existing fish salvage release sites, developing additional fish salvage release sites, assessing predation reduction alternatives, continuing the associated predation study for Clifton Court Forebay, and evaluating the screening efficiency of the Skinner Fish Facility to comply with the requirements under the BiOps and incidental take permit. These requirements include:

- reducing prescreen loss of federal Endangered Species Act-protected salmon and steelhead in Clifton Court Forebay to no more than 40 percent (Prescreen loss is the loss of fish as they move across the forebay that results from predation by fish and birds.);
- reducing predation by 50 percent at the fish release sites;
- implementing fish release site studies to develop methods to reduce predation following release of salvaged fish; and
- identifying salvage deficiencies and recommending actions to improve salvage efficiency in order to meet a required efficiency goal of 75 percent for salmonids.

Fish Science Building

The addition of the Fish Science Building at the Skinner Fish Facility was essential to improve DWR's ability to conduct fish studies to meet regulatory requirements for operation of the SWP. The existing collection, handling, transport, and release building was too small and lacked the necessary equipment to hold and rear fish to carry out various studies and projects. The new building includes a small laboratory, fish rearing tanks, an office, and an area to store study gear and equipment. Construction of the Fish Science Building was initiated in 2013 and completed in 2014. It became fully operational in 2015, and in 2016, it provided critical support for numerous fishery studies related to the BiOps.

Fish Salvage Release Sites

The predation reduction strategy for the release sites includes designing and constructing the Curtis Landing fish release site with minimal in-water structure to reduce predation and improve survival of released salvaged fish. In addition, two new fish release sites are being built on Sherman Island so that more time can be allowed between releases at each site. Coordinated interagency use will occur at a total of six release sites.

Construction of the major components of the Curtis Landing fish release site was completed in 2014, and the facility became fully operational in 2015. Design of the two new Sherman Island sites (Little Baja and Manzo Ranch) was completed in 2014, all permits were obtained, and construction was initiated in fall 2015. Construction continued in 2016. A cost-sharing agreement with DWR's Delta Levees Program for these two sites was also implemented for the levee construction portion of this project.

Clifton Court Forebay Predation Reduction Studies

The predation reduction strategy for Clifton Court Forebay was to increase public fishing opportunities in the forebay to reduce the number of predatory fish and the prescreen loss of federal Endangered Species Act-protected salmon and steelhead. This strategy involved constructing a fishing pier to provide improved access to anglers.

Due to changes made to BDCP Conservation Measure 1 in 2014 the fishing pier project was indefinitely suspended. The related predator study continued in 2016. The study is designed to provide critical information on

the behavior and population demographics of predatory fish and birds, as well as salmonid survival. Full-scale predator sampling and acoustic tagging and releases of marked salmon were conducted.

Predator Reduction Alternatives

Subsequent to the suspension of the fishing facility project, DWR, in close coordination with NOAA Fisheries, analyzed other predator reduction alternatives in 2015. NOAA Fisheries identified six preferred alternatives and provided a ranking of these alternatives. The result of this effort was agreement to study several possible options for predator reduction in the forebay. In addition, NOAA Fisheries approved an extension for compliance with the BiOp requirement conditioned on DWR implementing four interim measures to reduce predation in the forebay. In 2016, DWR began work on the four interim measures:

- electrofishing the forebay;
- controlling aquatic weeds;
- establishing a fishing incentive program; and
- implementing operational changes to limit take.

DWR also initiated an in-depth study of various dredging proposals for the forebay that could contribute to the survival of listed fish species.

Additional information about CVP/SWP operations related to the BiOps can be found in Chapter 3, Environmental Programs.

Skinner Fish Facility

The strategy for determining the screening efficiency of the Skinner Fish Facility includes evaluating:

- fish losses through primary louvers, secondary louvers, and holding tanks;
- hydraulics within the facility;
- relative abundance of predators within the primary louver channels; and
- fish behavior and movement patterns as they are entrained and guided through the facility.

During 2016, the technical team continued to evaluate and recommend revisions to the SWP and CVP fish loss equations used at the respective facilities. In addition, DWR worked with the University of California, Davis, to conduct a study of juvenile Green Sturgeon behavior near louvers to develop management practices which will improve sturgeon survival at the Skinner Fish Facility. The study will also examine the risk of predation on juvenile Green Sturgeon by common predatory species in the Delta.

Fish Screen Evaluations

Fish screens at Barker Slough Pumping Plant, Roaring River Slough Distribution System, and diversions around Sherman Island continued to be evaluated to comply with the requirements of the BiOps and the incidental take permit. The evaluations consisted of three components:

- fish screen cleanliness;
- fish screen hydraulics; and
- fish entrainment.

The evaluations were used to determine whether facility structural components are in sufficient condition to perform as designed; the effectiveness of fish screen cleaning practices; water approach velocities for various screen cleanliness conditions; and entrainment for various combinations of fish presence, pumping rates, times of day, and times of year.

During 2016, a number of evaluations were conducted for each facility, and reports were prepared for prior years. Dredging work was completed at the Roaring River Slough Distribution System forebay as a result of these evaluations.

Salmon Survival Engineering Solutions Program

The salmon survival engineering solutions program includes completed work required by the 2009 NOAA Fisheries BiOp. To comply with Reasonable and Prudent Alternative Action IV.1.3, DWR and the Bureau of Reclamation are required to consider engineering solutions to further reduce the diversion of emigrating juvenile salmonids to the interior and southern Delta and reduce their exposure to CVP and SWP export facilities.

Georgiana Slough Floating Fish Guidance Structure Study

In the spring of 2014, a physical barrier called a floating fish guidance structure (FFGS) designed to reduce entrainment into Georgiana Slough was constructed just upstream of the Georgiana Slough divergence from the Sacramento River. The evaluation used acoustic telemetry to evaluate the effectiveness of the FFGS in deterring hatchery-reared juvenile late fall-run Chinook Salmon from entering Georgiana Slough and encouraging them to continue migrating downstream in the Sacramento River. The effectiveness of the FFGS was tested by monitoring the movements of the acoustically tagged fish when the FFGS was On (oriented away from the river bank into the downstream flow) compared to when it was Off (oriented parallel and close to the river bank) under a range of environmental conditions (e.g., tidal conditions, day and night, turbidity, water temperature, Sacramento River flows, and rate of flow entering Georgiana Slough). The study evaluated the effects of the FFGS on survival, entrainment rates, and behavioral responses. The study concluded that at intermediate Sacramento River flows (7000–14,000 cubic feet per second [cfs]), the FFGS reduced Chinook Salmon entrainment into Georgiana Slough by approximately 20 percent. The final report for the study was completed in October 2016.

In an effort to develop and refine quantitative barrier design tools an investigation of the correlation between salmon behavior and river turbulence was initiated with Cornell University.

Salmon Protection Technology Study

On-going work under this program includes planning and design for a longer-term barrier implementation program in the Sacramento River intended to boost salmonid populations, maintain on-going compliance with Reasonable and Prudent Alternative Action IV.1.3, and provide SWP water supply reliability. The Salmon Protection Technology Study project concept includes construction and operation of barriers at Delta junctions with known lower survival salmonid migratory pathways.

The study is based on the best available science. It consists of a 5-year salmon diversion and salmon protection technology implementation program and evaluation in the Sacramento River using a bioacoustic fish fence, floating fish guidance structure, or infrasound fish fence at locations that will provide the largest resource benefit. Locations under consideration include Georgiana Slough, Steamboat Slough, and Sutter Slough. The evaluation of the efficacy of these technologies will provide the basis for DWR to recommend to NOAA Fisheries future actions beyond the Salmon Protection Technology Study that will continue to enhance salmon populations and improve water supply reliability for SWP operations.

Project planning and design work continued through the first part of 2016, but was subsequently put on-hold, pending project cost share agreement discussions with Reclamation. There are efforts to re-initiate the project in the future.

Delta Knowledge Improvement Program

In response to Assembly Bill 1200 (Laird; Chapter 573, Statutes of 2005), which required DWR to provide a risk analysis of the Delta and Suisun Marsh and to develop a set of improvement strategies to manage those risks, DWR created the Delta Risk Management Strategy to look at the sustainability of the Delta and assess major risks to Delta resources from floods, seepage, subsidence, and earthquakes (see Bulletins 132-08 through 132-13).

During the course of the Delta Risk Management Strategy project, a number of information gaps and information quality issues were identified. The limited amount of quality information prompted the creation of the Delta Knowledge Improvement Program, as a means to actively fund specific studies to fill the data gaps identified in the Delta Risk Management Strategy.

The Delta Knowledge Improvement Program has been focused on studies to improve State levee investment decisions in the Delta. These studies included:

- an ongoing economic study to assist the DSC in developing a comprehensive investment strategy for the Delta levees;
- a feasibility study to assist the Delta Protection Commission with making recommendations on how to implement a Delta Flood Risk Management Assessment District; and
- an investigation to determine how Delta levees on peat soils respond under seismic loading.

North Delta Flood Control and Ecosystem Restoration Project

The North Delta Flood Control and Ecosystem Restoration Project will provide flood control improvements and ecosystem restoration in the North Delta. The project will implement important flood control improvements in the area of the North Delta where the Mokelumne River, Cosumnes River, Dry Creek, and Morrison Creek converge (see Figure 2-1). Flood flows in the area threaten levees, bridges, and roadways when levees on McCormack-Williamson Tract (MWT) are overtopped and a flood surge occurs. The proposed project will help regulate peak flood flows and prevent flood surges. It will also provide substantial aquatic and terrestrial habitat benefits.

The final North Delta Flood Control and Ecosystem Restoration Project environmental impact report (EIR) was certified in November 2010 and recommended the implementation of a preferred alternative (Alternative 1-A for the Group I actions and the No Action Alternative for the Group II actions [for details see Bulletin 132-11]). The project will create tidal, subtidal, aquatic, and terrestrial habitats benefiting a number of special status species such as Sacramento Splittail and Chinook Salmon. The project, as proposed, will provide contiguous habitat and a riparian corridor from the downstream portion of the Cosumnes River Preserve to the Delta.

Two project elements are proposed for implementation: the MWT element and the Grizzly Slough element. The MWT element combines North Delta flood surge reduction measures with the construction of habitat-friendly levees, floodplain restoration, and the creation of freshwater tidal habitat on MWT. The MWT property, purchased using a CALFED Bay-Delta Program grant, is currently owned and managed by The Nature Conservancy. (For background on the CALFED Bay-Delta Program, see Bulletins 132-95 through 132-11.) When completed, the MWT element will result in nearly 1,500 acres of tidal marsh and floodplain restoration. The Grizzly Slough element consists of breaching the Grizzly

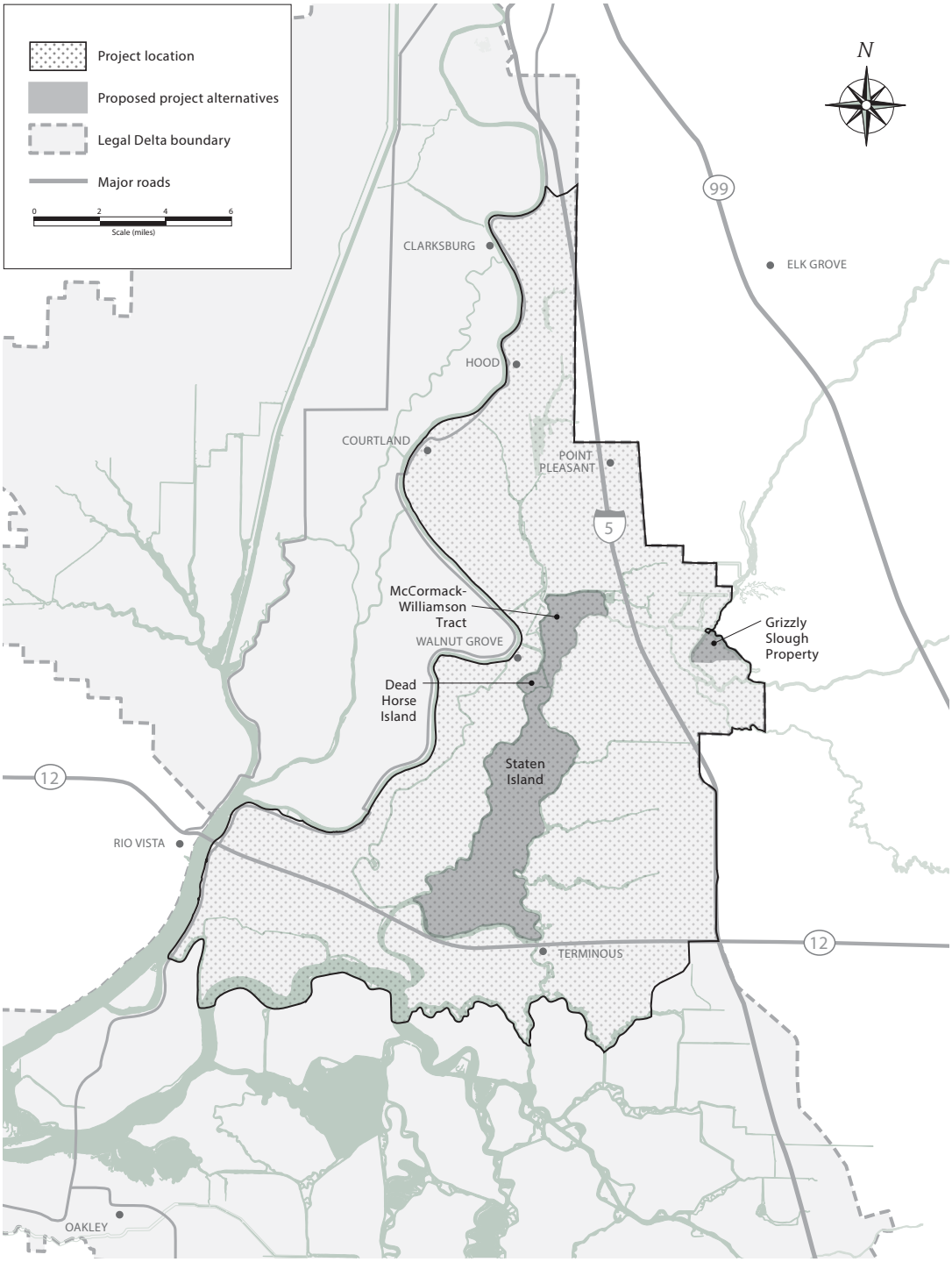


Figure 2-1 **North Delta Flood Control and Ecosystem Restoration Project**

Slough and Bear Slough levees upstream of MWT to help attenuate peak flood flows and maximize nearly 500 acres of floodplain habitat on the DWR-owned property. These projects are consistent with the objectives put forth in the *California Water Action Plan*, the *Delta Plan*, and the California EcoRestore initiative.

Project Status

In 2016, planning and permitting activities continued for the MWT and Grizzly Slough projects, however there were significant delays due to permitting and funding constraints. The North Delta EIR described a possible connection between the MWT and Grizzly Slough projects by utilizing the Grizzly Slough site as a possible soil borrow and/or mitigation site for the MWT project. However, due to the complexity of the MWT and Grizzly Slough projects, the desire to reduce impacts and costs, and the need to protect "at risk" infrastructure on MWT ahead of any restoration, project proponents decided to move forward with landside levee improvements on MWT independent of other project elements in the North Delta EIR. This decision effectively uncoupled the reliance of the projects on one another, and so the MWT and Grizzly Slough projects and timelines are now independent, though still supported by the North Delta EIR.

The MWT project planning, permitting, and implementation was divided into two phases, due to the size and complexity of the multibenefit project. Phase A entails constructing a protective tower levee and resloping the landside levee to strengthen the levees and minimize the effect of wave-wash erosion when the land receives flood water as designed. Phase B is proposed to include weir construction, levee breaching, and floodplain and tidal marsh restoration.

The Grizzly Slough project was simplified from the proposed two breach design with significant removal of fill, to a single breach concept with a significantly reduced grading plan. The Grizzly Slough project will restore seasonal wetland and riparian habitat, enhance the landscape corridor between Delta and tributaries, and provide wildlife-friendly agriculture. The project will restore natural flooding to the site by breaching a levee on Grizzly Slough and excavating a channel network from the breach. A new setback levee with one-way drainage culverts will maintain equivalent flood protection for farmlands to the south. An agricultural zone (157 acres) will be established on higher elevation and enhanced to allow cultivation of irrigated crops (corn) to benefit sandhill cranes.

South Delta Improvements Program

In 1999, the South Delta facilities became a key component of the CALFED Bay-Delta Program.

South Delta Improvements Program (SDIP) elements in the CALFED Bay-Delta Program record of decision included increasing diversions through Clifton Court Forebay (first to 8,500 cfs and then to 10,300 cfs), dredging and installing operable tidal barriers in the South Delta, installing a fish barrier at the Head of Old River, and constructing the first phase of a new intake and fish screen in Clifton Court Forebay. SDIP is proposed to be implemented in two component stages.

DWR and the Bureau of Reclamation identified the following SDIP project objectives and purposes:

- reducing movement of San Joaquin River watershed Central Valley fall-run and late fall-run juvenile Chinook Salmon into the South Delta via Old River (SDIP Stage 1);
- maintaining adequate water levels and water quality through improved circulation for agricultural diversions in

the South Delta, downstream of the Head of Old River (SDIP Stage 1);
- increasing water deliveries and delivery reliability to SWP and CVP water contractors south of the Delta (SDIP Stage 2); and
- providing opportunities to convey water for fish and wildlife purposes by increasing the maximum permitted level of diversion through the existing intake gates at Clifton Court Forebay to 8,500 cfs (SDIP Stage 2).

The SDIP Stage 1 physical/structural component includes the following elements:

- constructing and operating a fish-control gate at the Head of Old River to reduce downstream movement of San Joaquin River watershed Central Valley fall-run and late fall-run juvenile Chinook Salmon into the South Delta via the Head of Old River;
- constructing and operating up to three flow-control structures (gates) at Middle River (near the confluence of Middle River with Victoria Canal); Grant Line Canal (near the confluence of Grant Line Canal and Old River); and Old River (just east of the Delta-Mendota Canal intake) to improve existing water levels and circulation patterns in South Delta water channels;
- dredging various channels in the South Delta, including Middle and Old rivers, to improve conveyance; and dredging areas surrounding agricultural diversions to improve their function; and
- extending up to 24 agricultural diversion intake facilities to improve their function.

The SDIP final EIR/environmental impact statement (2006) determined the preferred alternative for SDIP Stage 1, which entails installation of permanent control gates to replace the temporary rock barriers currently installed and removed each year under the DWR South Delta Temporary Barriers Project. The preferred alternative also includes the elements of dredging and extending agricultural diversions.

Preferred Plan

The preferred plan for SDIP is to construct the Stage 1 physical/structural component as soon as permits are obtained and defer the operational component until more is known about the project's potential effects on Delta Smelt and other protected fish species.

DWR deferred both the increase in diversions of up to 10,300 cfs and the associated new fish screens as components of the SDIP due to major funding issues and significant technical uncertainties associated with the design and construction of the new fish screens.

Program Status

DWR and the Bureau of Reclamation continued to suspend most SDIP planning and permitting activities during 2016. Some activities were undertaken to address requirements of the 2009 NOAA Fisheries BiOp for the CVP and SWP Long-term Operations Criteria and Plan. DWR continued elements of the South Delta sediment transport, scour, water quality, flow, and seepage monitoring activities.

Prior discussions between DWR and NOAA Fisheries revealed NOAA Fisheries' concern for potential barrier hydraulic disturbances that could promote increased predation on juvenile salmon. DWR conducted a hydrodynamic study focusing on barrier design features to minimize these disturbances. A study report was submitted to NOAA Fisheries in April 2010, which identified several features that could be incorporated into the design.

NOAA Fisheries stated an interest in delaying further discussions on the SDIP until

completion of an ongoing, multiyear South Delta Temporary Barriers Project fisheries study. The study is being conducted as requested by NOAA Fisheries before further consultation. The study is examining the movements and survival of listed species in the South Delta and occurrence of predation associated with the project. The study's field data collection was completed in 2011, and data analysis is in progress. A final study report is expected in summer 2018. Data from the study will be useful in considering permanent barrier design options and operation strategies to minimize fish impacts.

For additional information about SDIP, see Chapter 7, Water Supply Development and Reliability.

Temporary Barriers Project Facilities

The South Delta Temporary Barriers Project is an ongoing project that installs up to four rock barriers in channels located in the southern portion of the Delta near the cities of Tracy and Lathrop in San Joaquin County. The barriers are usually installed during the irrigation season from April to November at four sites (see Figure 2-2), as follows:

(1) Head of Old River, in Old River where it splits from the San Joaquin River;
(2) Old River near Tracy, one-half mile east of the Jones Pumping Plant intake and about 8 miles northwest of Tracy;
(3) Middle River near Victoria Canal, just southeast of the confluence of Middle River, Trapper Slough, and North Canal; and
(4) Grant Line Canal, 420 feet east of the Tracy Boulevard Bridge.

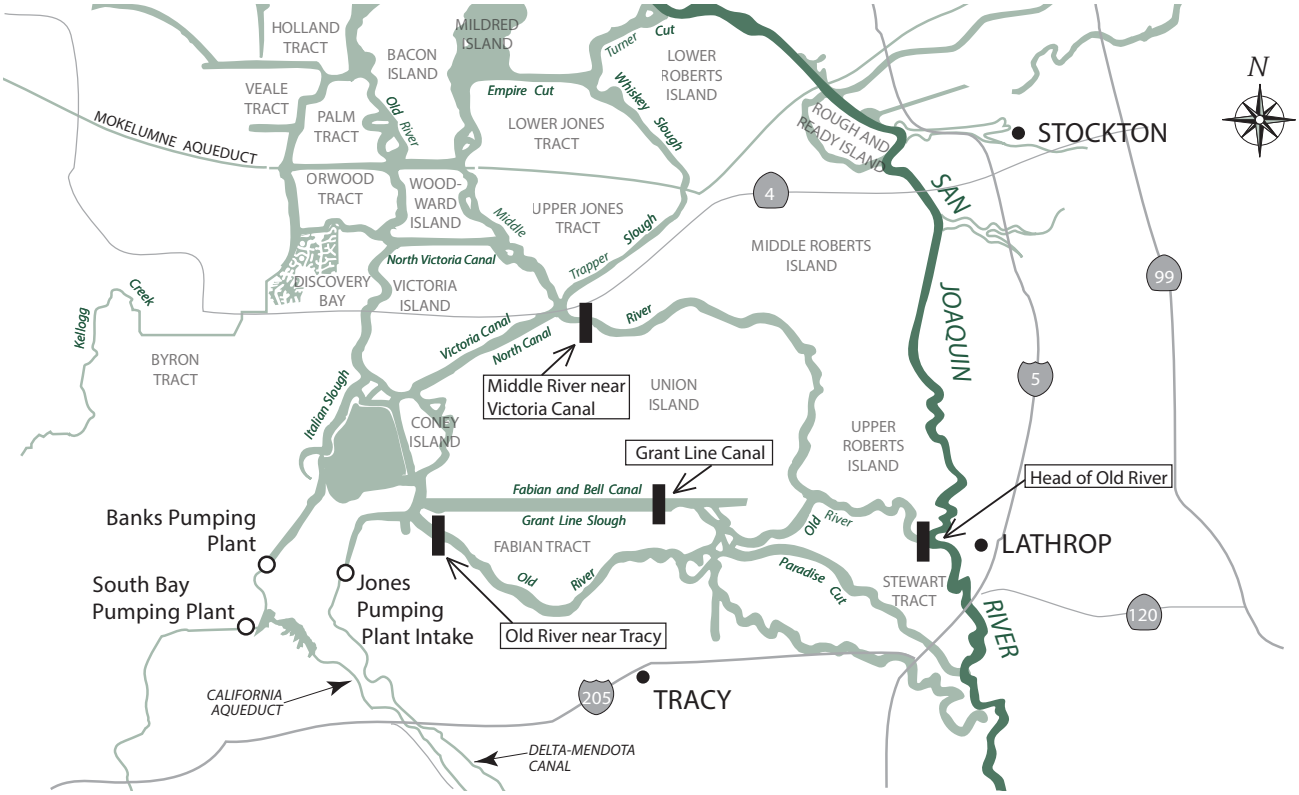


Figure 2-2 Temporary Barrier Locations in the South Delta

The Old River near Tracy, Middle River near Victoria Canal, and Grant Line Canal rock barriers are designed to act as flow-control structures to improve water levels and circulation within the South Delta. The Head of Old River barrier is designed to improve migration conditions for Central Valley fall-run Chinook Salmon and steelhead in the spring and fall. In the spring, the barrier blocks migratory movements of juvenile salmon into Old River from the San Joaquin River. In the fall, the barrier increases the volume of San Joaquin River flow passing downstream through the Port of Stockton and increases attraction flows for returning adult San Joaquin River salmon.

In 2016, the three flow-control agricultural barriers at Middle River near Victoria Canal, Grant Line Canal, and Old River near Tracy were installed and operated as planned. Installation started in March, and the barriers were removed in November. Additionally, the option of raising the Middle River barrier by 1 foot to increase the water level and improve circulation was exercised on June 22, 2016.

The spring Head of Old River rock barrier was installed in 2016 with construction beginning in early March and full closure achieved by April 4. Eight culverts with slide gates remained in the open position for the duration of the installation. The barrier was breached on June 1, 2016, and it was completely removed by June 14, 2016.

In 2016, the Head of Old River Predator Manipulation Study continued to investigate predatory fish distribution and abundance in the San Joaquin River in the vicinity of the Head of Old River. Coordinated acoustic telemetry studies were conducted by the Bureau of Reclamation, NOAA Fisheries, and the U.S. Fish and Wildlife Service to track the movements of salmon smolts, steelhead, and predatory fish. The purpose of the telemetry studies was to determine outmigrating salmon smolt survival in the Delta and learn more about the predatory fish impact on the salmon population. In the Predator Manipulation Study, NOAA Fisheries used genetic analysis to determine predator diet and tested the hypothesis that salmon smolt survival can be improved in one reach of the San Joaquin River by removing and relocating predatory fish to another reach.

Although NOAA Fisheries continued some acoustic monitoring, 2016 was mostly dedicated to completing analysis and reporting. Numerous presentations were provided by investigators at the Biennial Bay-Delta Science Conference.

In 2016, at the request of the Department of Fish and Wildlife, the fall Head of Old River rock barrier was installed and operated from September 15 until November 11, when the barrier was breached. Removal of the barrier was completed on November 21.

Delta Flood Control

Levees in the Delta protect valuable wildlife habitat, farms, homes, urban areas, recreational developments, highways, railroads, natural gas infrastructure, utility lines, a major aqueduct, and other public developments. Delta levees influence and protect critical water quality parameters in Delta waterways. Some levees also protect water quality for approximately 27 million Californians who receive a portion of their water from the Delta. The State Legislature recognized the importance of the Delta and enacted the Delta Flood Protection Act of 1988, declaring that ". . . the Delta is endowed with many invaluable and unique resources and that these resources are of major statewide significance" (California Water Code Sections 12300 et seq.).

Since 1988, the Delta Levees Program has provided more than $310 million in State-appropriated funds. These monies are combined with local cost-share funding to

provide flood protection and environmental benefits in the Delta.

In Senate Bill 34 (Boatwright; Chapter 28, Statutes of 1988), the Legislature declared its intent to appropriate $6 million for local assistance under the Delta Levee Maintenance Subventions Program and $6 million for Delta Levees Special Flood Control Projects, including subsidence studies and monitoring on Bethel, Bradford, Jersey, Sherman, and Twitchell islands; Holland, Hotchkiss, and Webb tracts; and the towns of Thornton and Walnut Grove.

In 1996, Assembly Bill 360 (Hannigan; Chapter 601, Statutes of 1996) expanded the area covered by the Delta Levees Program to include the remainder of the legal Delta and northern Suisun Bay.

Additional funding sources for the Delta Levees Program include:

- Proposition 204 enacted in 1996 ($25 million);
- Proposition 13 enacted in 2000 ($30 million);
- Proposition 50 enacted in 2002 ($70 million);
- Proposition 84 enacted in 2006 ($275 million);
- Proposition 1E enacted in 2006; and
- Proposition 1 enacted in 2014.

Delta Flood Emergency Preparedness, Response, and Recovery Program

The Delta Flood Emergency Preparedness, Response, and Recovery Program was initiated within the Division of Flood Management in response to the passing of the Disaster Preparedness and Flood Prevention Bond Act of 2006 (Proposition 1E). The program is designed to enhance emergency preparedness and enable DWR to better coordinate with its local partners to respond to and recover from a large-scale Delta flood emergency.

The *Delta Flood Emergency Management Plan* presents DWR's concept of operations for flood emergency response in the Delta. The plan describes the roles and responsibilities of DWR's emergency response organizations, including the Flood Operations Center, the SWP's Emergency Operations Center, and the Department Operations Center, and describes DWR's actions during flood emergency response. It also supports DWR's emergency preparedness efforts in the Delta and guides DWR management in making critical decisions during recovery.

Delta Levees Maintenance Subventions Program

The Delta Levees Maintenance Subventions Program (Subventions Program) is a cost-share program that provides technical and financial assistance to local levee-maintaining agencies in the Delta for the maintenance and rehabilitation of levees. The Subventions Program is authorized by California Water Code Sections 12980 through 12995 and is managed by DWR. The Central Valley Flood Protection Board reviews and approves DWR's recommendations and enters into agreements with local agencies to reimburse eligible costs for levee maintenance and rehabilitation.

The Subventions Program provides reimbursement funding to local levee-maintaining agencies for improving, maintaining, and enhancing nearly 700 miles of project and nonproject levees. Since its inception in 1973, the Subventions Program has provided more than $180 million of State funding to more than 70 islands in the Delta. In fiscal year 2016–2017, the program expects to reimburse up to $12 million to local agencies for eligible levee maintenance and rehabilitation work and to cover emergency response and

levee repairs for storms that started late in 2016 and continued into 2017. (In fiscal year 2015–2016, the program reimbursed $9.5 million.) The local levee-maintaining agencies' activities help minimize the risk of Delta levee failure, which in turn protects the Delta's ecosystem, communities, and agriculture; State and private infrastructure; and the State's water supply.

Delta Levees Special Flood Control Projects Program

The Delta Levees Special Flood Control Projects Program assists eligible local agencies in the Delta with flood protection and levee stability repairs. In 1990, the California Water Commission approved actions and priorities that serve as guides for DWR to determine the best use of appropriations to protect Delta islands. Long-term actions and current priorities include:

- rehabilitating threatened levees through the beneficial reuse of dredged material;
- improving water supply reliability, levee integrity, and habitat enhancement by soliciting multibenefit projects through the projects solicitation process;
- upgrading levees to the standards discussed in Bulletin 192-82 (*Delta Levees Investigation*); and
- considering projects that will help achieve net long-term habitat improvement for fish and wildlife.

While DWR seeks cost sharing for all program projects, in some cases, DWR may provide up to 100 percent of the cost. Districts receiving these funds are required to participate in a habitat improvement program to ensure net long-term habitat enhancement.

Levee restoration projects, habitat projects, and other special projects were conducted on various Delta islands and tracts in fiscal year 2016–2017. The program actively sought multibenefit projects through the release of the 2016 multibenefit projects solicitation package which provided $60 million in Proposition 1E funds.

Bulk Credit Program

In 2012, the Delta Levees Subventions Program and the Special Flood Control Projects Program established a model Bulk Credit Program allowing reclamation districts to more effectively meet habitat mitigation obligations.

Under the Bulk Credit Program, reclamation districts are able to utilize mitigation credits purchased in advance from an existing mitigation bank. These credits provide more biologically effective mitigation than past practices of establishing less formal, smaller mitigation sites, and are a much more efficient way of meeting mitigation obligations. The bulk purchase of credits from the mitigation bank is made at a substantial discount.

In 2016, the Bulk Credit Program continued to be the principal tool for participating reclamation districts to meet their habitat mitigation obligations resulting from Delta levee maintenance and improvement work.

West Delta Program

DWR currently owns approximately 13,000 acres on Sherman and Twitchell islands, located in the western Delta. The West Delta Program is tasked with land management on Sherman and Twitchell islands to achieve DWR's goals and objectives, such as mitigation of subsidence through various wetland restoration projects. Program objectives are supported by active research and application of land management activities used for subsidence reversal, carbon sequestration, and habitat development.

Since 2008, DWR has constructed approximately 1,700 acres of subsidence mitigation projects on Sherman and Twitchell islands and constructed approximately 6,000 lineal feet of habitat "fish friendly" setback levees (see Figure 2-3).

In 2016, work continued in partnership with the Sherman Island Reclamation District (Reclamation District 341) under a $10.5 million grant from the California Department of Fish and Wildlife's fiscal year 2014–2015 Wetlands Restoration for Greenhouse Gas Reduction Program. The grant provided funding for the construction and maintenance of the Sherman Island Whale's Mouth Wetland Restoration Project, and in 2016, provided funding for initial planning and engineering activities associated with the Belly Wetland project, a proposed 1,000+-acre wetland located on the lowest spots of Sherman Island. Matching funds from both DWR and the University of California, Berkeley, will provide for additional greenhouse gas monitoring throughout the Delta, resulting in a data set from a more robust variation of conditions.

In 2016, additional maintenance was completed and flood-up began on the 650-acre wetland on the lower southwestern side of Sherman Island. The flood-up of the Whale's Mouth project will promote vegetation growth and restore hundreds of acres of permanent palustrine emergent wetlands. The Scour Pond Habitat Enhancement Project, a portion of the Whale's Mouth wetland restoration project (funded by the Delta Levees Program's Habitat Proposal Solicitation Package 2009–2010 and managed by the Delta Ecosystem Enhancement Section), filled the scour pond adjacent to the San Joaquin River levee and will create 62 net acres of mixed habitat types on-site and within Unit 2 of the greater Whale's Mouth site. The Delta Levees

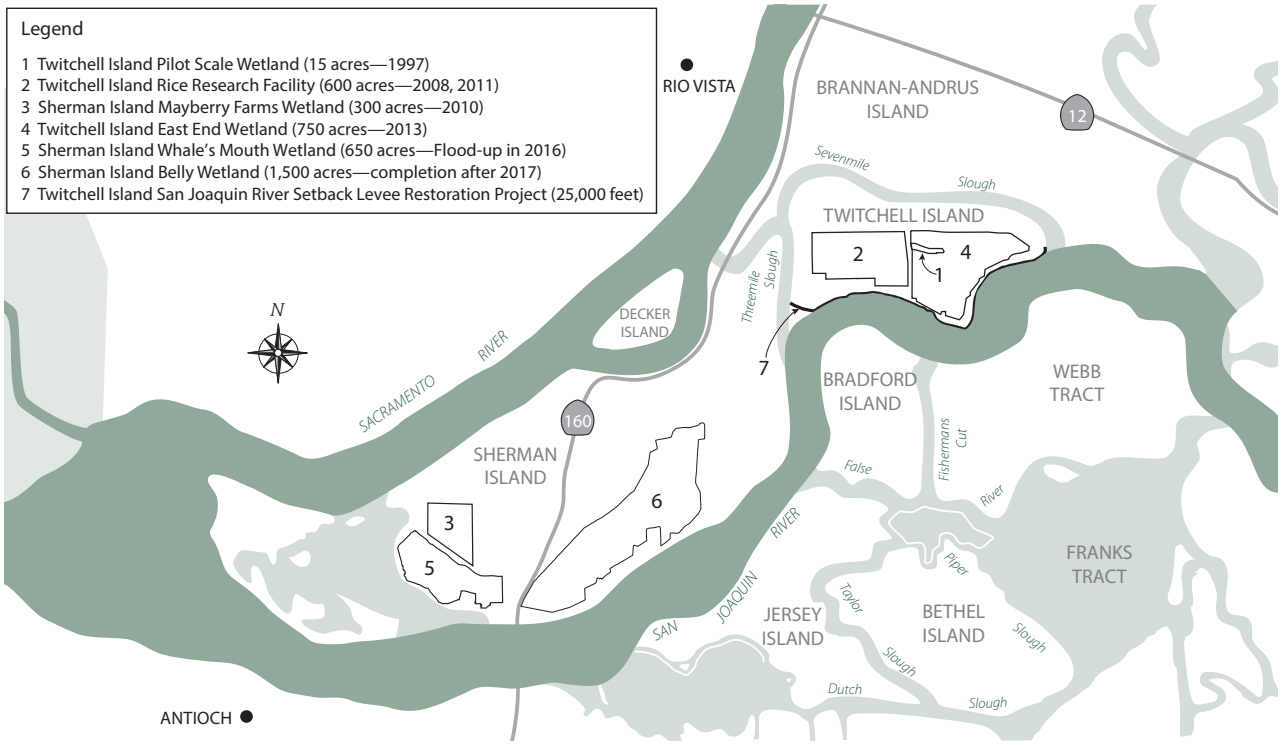


Figure 2-3 Selected West Delta Program Projects

Program merged the two adjacent projects to provide a substantial cost savings. Unit 2 was planted in late 2016, and the berms of the entire Whale's Mouth site will be planted in late 2017. The greater Whale's Mouth site will be monitored and maintained through 2021.

The West Delta Program continued a partnership with the University of California, Berkeley, to collect greenhouse gas data on both newly constructed wetland sites as well as typical Delta farmed crops such as corn, alfalfa, and irrigated pasture. Data collected since 2010 has shown that there is a net greenhouse gas benefit of approximately 10 metric tons of carbon dioxide equivalent by planting wetland crops on previously farmed Delta peatland soils. In 2016, data collected in the West Delta contributed to the ongoing multiagency effort to develop a draft greenhouse gas protocol that will allow for quantification of a wetland project's net increase in carbon sequestration. This draft carbon protocol will be considered for adoption by the California Air Resources Board in early 2017.

The West Delta Program continued working with the Twitchell Island Reclamation District (Reclamation District 1601) to develop construction plans and environmental permits for the Twitchell Island San Joaquin River Setback Levee Restoration Project. This project will construct approximately 25,000 lineal feet of setback levee along the San Joaquin River, allowing for habitat features to be developed on the water side.

Chapter 3
Environmental Programs

*Greater White-fronted Geese (*Anser albifrons*).*

Significant Events in 2016

In February, New Zealand Mudsnails (*Potamopyrgus antipodarum*) were discovered in the lower Feather and lower Yuba rivers. The Department of Fish and Wildlife (DFW) asked recreational users to follow the "clean, drain, and dry" directive with all fishing and recreational gear and watercraft to help prevent the further spread of the invasive snails.

In August, the Department of Water Resources (DWR) and Bureau of Reclamation (Reclamation) requested reinitiation of federal Endangered Species Act (ESA) Section 7 consultation with the U.S. Fish and Wildlife Service (USFWS) and National Marine Fisheries Service (NOAA Fisheries) on the coordinated long-term operation of the Central Valley Project (CVP) and State Water Project (SWP). Several factors resulted in the request for reinitiation of consultation, including the apparent decline in the status of several listed species, new information related to recent multiple years of drought, and the evolution of best available science.

In December, quagga mussels were discovered in the West Branch of the SWP. The mussels were initially discovered in the Angeles Tunnel, which moves water between Pyramid Lake and Elderberry Forebay. DFW classified Pyramid Lake and Elderberry Forebay as "infested" with quagga mussels and Castaic Lake as "presumed infested" because it is downstream of Pyramid Lake and Elderberry Forebay.

On December 22, DWR and Reclamation released the final environmental impact report/environmental impact statement (EIR/EIS) for California WaterFix. The release of the final EIR/EIS exemplifies an unprecedented level of public review, comment processing, and scientific input to refine and improve the proposed project.

Information in this chapter was contributed by the Division of Environmental Services, the Division of Operations and Maintenance, the Division of Integrated Regional Water Management, and the State Water Project Analysis Office.

The Department of Water Resources (DWR) has developed and implemented several programs to avoid, minimize, and/or mitigate adverse environmental impacts resulting from construction and operation of State Water Project (SWP) facilities. DWR has also established other environmental programs and partnered with other agencies to restore and enhance the natural environment.

Operations for Species of Concern

A primary consideration in the operation of the SWP is avoiding, minimizing, and/or mitigating adverse impacts to species of concern, species listed as threatened or endangered by a State or federal agency, or species proposed for listing. The SWP is operated pursuant to biological opinions (BiOps) issued under the federal Endangered Species Act (ESA), and consistency determinations or incidental take permits issued under the California Endangered Species Act (CESA). A key to avoiding and minimizing adverse impacts to these species is maintaining flexibility in SWP operations. Operational responses can include Delta Cross Channel gate closure, export curtailments, changes in delivery schedules, increased reservoir releases, preferential use of certain facilities, or a combination of these actions.

Additional information can be found in Chapter 7, Water Supply Development and Reliability.

San Joaquin River Restoration Program

The San Joaquin River Restoration Program (SJRRP) is a comprehensive long-term effort to restore flows to the San Joaquin River from Friant Dam to the confluence of the Merced River and to restore a self-sustaining Chinook Salmon (*Oncorhynchus tshawytscha*) fishery in the river, while reducing or avoiding adverse water supply impacts from restoration flows.

After more than 2 years of zero water allocation, ample snowpack allowed the SJRRP to get 263,295 acre-feet allocated for restoration flows from Millerton Lake in February 2016. The releases allowed the program to achieve restoration flows from Friant Dam to the confluence with the Merced River in October 2016. Achieving this connectivity required purchasing four flowage easements in the Eastside Bypass; completing Fresno Kangaroo Rat surveys in Reach 4A and a portion of the Eastside Bypass; and completing the Eastside Bypass Conveyance Project. Year-round connectivity is planned for the river for the first time in more than 60 years using restoration flows that will continue in all but the most critically dry years.

The Mendota Pool Bypass and Reach 2B Improvements Project environmental impact statement (EIS)/environmental impact report (EIR) was finalized in July 2016, and the record of decision was signed on October 25, 2016. The project consists of increasing channel capacity in Reach 2B of the San Joaquin River, creating a new channel to allow restoration flows to bypass the Mendota Pool, and constructing new intakes for water deliveries from the pool. The first components of the project are planned for construction in 2019.

Work continued on the Reach 4B, Eastside Bypass and the Mariposa Bypass Channel and Structural Improvements Project including outreach with landowners and stakeholders to identify a consensus-based alternative for the long-term routing of fish and flows in Reach 4B of the San Joaquin

River and flood bypass. DWR has begun preliminary designs for early implementation elements of the project to support near-term goals of unimpeded flow and fish passage. DWR plans to implement two fish passage projects and a levee stability project in the Eastside Bypass by 2019.

DWR also completed all major earthwork activities for the Sycamore Island Pond Isolation Project. The project isolated two gravel pits that impair fish reintroduction efforts. The project provided the opportunity to achieve closely aligned goals of the SJRRP and San Joaquin River Conservancy by improving access at the Sycamore Island Recreation Area while enhancing habitat for Chinook salmon. The project is scheduled to be completed in 2017.

The SJRRP sponsored the second annual science meeting in Fresno from August 17–19, 2016. The meeting focused on studies conducted for the SJRRP as well as other river restoration projects that may inform the work being conducted on the San Joaquin River.

More information is available on the SJRRP's website.

Oroville Facilities

Existing Federal Energy Regulatory Commission License Activities for 2016

Invasive Plant Management

DWR removed all the red sesbania (*Sesbania punicea*) along the Thermalito Power Canal, Thermalito Forebay, and Thermalito Diversion Pool as part of an annual maintenance effort, which started in 2007. The Thermalito Power Canal, Thermalito Forebay, and Thermalito Diversion Pool are the upstream extent of the red sesbania population on the Feather River and are considered a high priority management area.

DWR continued to partner with the Butte County Agricultural Commissioner to remove several invasive plants within areas of joint management. The Butte County Agricultural Commissioner treated several stands of red sesbania that are adjacent to the upstream extents managed by DWR, but are not on DWR property, and several locations of skeleton weed (*Chondrilla juncea*) near McCabe Creek and Ponderosa Reservoir.

Feather River Fish Hatchery

Fall-run Chinook Salmon. A total of 9,224,508 juvenile fall-run Chinook Salmon were released into the Delta, Sacramento River, and San Francisco and San Pablo bays.

Spring-run Chinook Salmon. A total of 2,183,890 spring-run Chinook Salmon were released in the Feather River.

Steelhead. A total of 71,955 steelhead were planted in the Feather River at Boyd's Pump Boat Launch.

Lake Oroville and Thermalito Afterbay

In October, 133,120 Chinook Salmon were planted in Lake Oroville.

Due to a shortage of steelhead and a surplus of Chinook Salmon at the Feather River Fish Hatchery (FRFH), 9,600 Chinook Salmon were stocked in the Thermalito Afterbay.

For additional information about fish stocking in the SWP, see Chapter 13, Recreation.

Habitat improvement continued in the fluctuation zone of the lake. Approximately 1,200 Christmas trees were recycled with the help of the Boy Scouts and the California Conservation Corps. The recycled trees were constructed into structures for juvenile fish habitat at the Spillway Boat Launch area, Loafer Creek, and Thermalito Afterbay.

Oroville Wildlife Area

Monitoring and weed removal activities continued at the wetland ponds that were constructed in 2011 in the Oroville Wildlife Area. These wetland ponds were created as a mitigation requirement in the 1995 Clean Water Act Section 404 permit for a project that constructed two waterfowl brood ponds at Thermalito Afterbay. The wetland ponds project converted a 20-acre area of low-quality, disturbed, upland habitat into 10 acres of emergent wetland and 10 acres of riparian habitat. The waterfowl brood ponds were a requirement of the revised recreation plan that was part of the Federal Energy Regulatory Commission's September 22, 1994, order.

Lake Oroville Elevation

A number of aspects of the Oroville Facilities can be affected by lake surface elevation including:

- habitat;
- flora and fauna of the lakeshore area and upstream tributaries;
- recreation;
- water quality;
- water temperature;
- shoreline and lakebed stability and erosion;
- flood storage capacity;
- power generation; and
- streamflow requirements (downstream of the lake).

The 2016 low point for the Lake Oroville reservoir surface elevation was reached on December 8 at 725.73 feet, and the annual high point of 891.74 feet was reached on May 12. The full pool elevation of Lake Oroville is approximately 900 feet.

Federal Energy Regulatory Commission Relicensing Activities

USFWS Biological Opinion for the Oroville Facilities Relicensing

Various conservation measures for the species identified in the USFWS 2007 BiOp for the Oroville Facilities relicensing project continued to be implemented on SWP lands. Monitoring associated with these measures includes an annual vernal pool survey (645 mapped vernal pools and/or features); protective measures for elderberry shrubs (*Sambucus* species, host plant for the valley elderberry longhorn beetle [*Desmocerus californicus dimorphus*]); and annual monitoring of nesting Bald Eagles (*Haliaeetus leucocephalus*) in the area (five currently active nests). In addition, habitat management activities within the Oroville Wildlife Area are coordinated through the Department of Fish and Wildlife (DFW). These activities include providing nest and forage habitat for waterfowl and upland bird species, monitoring and maintaining Thermalito Afterbay brood pond water surface elevations, and protecting and conserving Giant Garter Snake (*Thamnophis gigas*) habitat. An annual compliance report for 2016 was compiled by DWR and submitted to USFWS.

For more information about Oroville Facilities relicensing, see Chapter 10, Power Resources.

Invasive Species

Quagga and Zebra Mussel Monitoring and Assessment

The quagga mussel, *Dreissena rostriformis*, and the zebra mussel, *D. polymorpha*, are invasive freshwater mussels that pose a significant threat to the SWP. Both species attach to hard substrates, including other mussels, with strong byssal threads, forming dense colonies and causing significant biofouling impacts to raw water

infrastructure by clogging small diameter piping and filters and encrusting trash racks and fish screens.

In early 2007, the quagga mussel was detected in the lower Colorado River and spread throughout connected water diversion systems (see Bulletin 132-08). The following year, the zebra mussel was detected in San Justo Reservoir in San Benito County, adding to the existing threat. In response, DWR formed the Aquatic Nuisance Species Program within the Division of Operations and Maintenance. The program includes applied studies, early detection monitoring, vector management, rapid response planning, long-term mussel management, and public outreach.

Applied Studies

Assessment of Habitat Suitability. DWR's consultant (see Bulletin 132-11), examined the suitability of the SWP to support long-term populations of quagga and zebra mussels (dreissenids) if unintentionally introduced. Based on the results, SWP locations were classified into one of three groups: unable to support, potentially able to support, or able to support long-term populations of dreissenid mussels (see Bulletin 132-12). Understanding where dreissenid mussels may survive in the SWP was used to prioritize management efforts.

Early Detection Monitoring. DWR routinely monitors the California Aqueduct, SWP reservoirs, and the Delta for the presence of quagga and zebra mussels. DWR uses two methods to monitor for mussels: zooplankton tows (with DNA analysis) for veligers (the free floating larval stage) and settlement plates (see Bulletin 132-10).

In 2016, DWR and two collaborating water agencies, Santa Clara Valley Water District and The Metropolitan Water District of Southern California, sampled for veligers at 16 locations in the SWP (see Bulletin 132-10).

In addition, DWR staff are trained in quagga and zebra mussel identification and are instructed to look for mussels during regular field work and during routine facility maintenance activities.

Prevention and Response Planning

To protect against and prepare for mussels in the SWP, the Aquatic Nuisance Species Program developed several planning documents to guide actions and identify vulnerabilities. The *Quagga and Zebra Mussel Vector Management Plan for the State Water Project* identifies potential mussel points-of-entry and vectors and outlines mechanisms to reduce the risk of introduction. The two primary vectors of mussels are downstream transport of planktonic veligers in natural and constructed waterways and overland transport of veligers and attached adults on watercraft. A critical component of the vector management plan is reducing the risk posed by watercraft. To accomplish this, DWR contracted with the California Department of Parks and Recreation and the Los Angeles County Department of Parks and Recreation to implement vessel inspection and outreach programs at San Luis State Recreation Area (San Luis Reservoir, O'Neill Forebay, and Los Banos Creek Reservoir) and Pyramid and Castaic lakes (see Bulletin 132-12).

During the vessel inspection, watercraft are inspected for attached mussels and for the presence of standing water that could harbor mussel veligers. Watercraft must be 100 percent dry in order to launch, otherwise they fail inspection and must wait 7–8 days before returning. At San Luis State Recreation Area, 14,228 vessels were inspected during 2016. Of those vessels, 546 failed the inspection due to the presence of water. At Pyramid Lake, 15,295 vessels were inspected, with 1,092 failures. At Castaic Lake, 36,692 vessels were inspected, and 1,205 failed the inspection. Nearly all failures were the result of the presence of wet equipment or standing water. Mussels

were detected on one boat prior to launching at Castaic Lake. In October, several attached mussels were detected on a boat, and DFW was notified. The mussels were removed, and the boat was quarantined. The mussels were dead as the boat had been dry-docked for 2 years. Previously, it had been moored in Lake Piru.

The *Quagga and Zebra Mussel Rapid Response Plan for the State Water Project* outlines a course of action to confirm mussel sightings; delineate the population; implement containment and eradication measures; and notify State and federal partner agencies, the SWP water contractors, and any potentially impacted entities.

DWR also prepared a long-term mussel management plan that identifies facility vulnerabilities and outlines both short-term and long-term options to prevent or mitigate mussel biofouling impacts for all at-risk SWP facilities. The short-term control strategies are those that can be implemented within a few weeks to a few months time and may be temporary in nature, such as shutdowns for power washing and shell removal. The long-term control strategies have longer implementation times (6 months to multiple years) and are permanent in nature (alterations to infrastructure). DWR's consultant assisted DWR with plan preparation (see Bulletin 132-14).

Quagga Mussels Discovered in the SWP

In December 2016, quagga mussels were discovered in the West Branch of the SWP. The mussels were initially discovered in the Angeles Tunnel, which moves water between Pyramid Lake and Elderberry Forebay. The tunnel had been dewatered for approximately three weeks to conduct infrastructure condition assessment inspections and maintenance at the time the discovery was made. Subsequently, a video inspection via remote operated vehicle was conducted on the intake structure to the Angeles Tunnel. One adult mussel was observed and appeared to be alive. Los Angeles Department of Water and Power and The Metropolitan Water District of Southern California conducted an inspection of Elderberry Forebay, which had a lowered lake elevation, and found two dead quagga mussels near the Castaic Power Plant.

Settlement traps, buoys, and other structures were also inspected in Pyramid Lake, Elderberry Forebay, and Castaic Lake; sampling for veligers was conducted in Pyramid and Castaic lakes; and Middle Piru Creek immediately below the dam was surveyed. No mussels were found.

Immediately following the initial quagga mussel discovery, DWR implemented the actions outlined in the *Quagga and Zebra Mussel Rapid Response Plan for the State Water Project*. Actions included notifications to State and federal regulatory and partnering agencies, SWP water contractors, and recreation managers at uninfested lakes. Watercraft inspection procedures were modified to include exit inspections of all watercraft to prevent mussel veligers from spreading to other waterbodies.

DFW classified Pyramid Lake and Elderberry Forebay as "infested" with quagga mussels and Castaic Lake as "presumed infested" because it is downstream of Pyramid Lake and Elderberry Forebay. DFW requires managers of infested waterbodies to submit mussel containment and eradication plans. The Aquatic Nuisance Species Program will prepare these plans in early 2017.

New Zealand Mudsnail

In February 2016, New Zealand Mudsnails (*Potamopyrgus antipodarum*) were discovered in the lower Feather and lower Yuba rivers. DFW asked recreational users to follow the "clean, drain, and dry" directive with all fishing and recreational gear and watercraft to help prevent the further spread of the

invasive snails. Staff at the FRFH and DWR field staff working in and around Lake Oroville and the Feather River are following decontamination and prevention procedures.

California WaterFix

The California WaterFix will construct new north Delta conveyance facilities in compliance with the ESA and CESA. The conveyance facilities would allow greater flexibility in water diversions and better balancing of the associated water quality and hydrodynamic benefits for fish, drinking water, agriculture, and other beneficial uses.

Tentative Agreement between DWR and a Joint Powers Authority

DWR and a joint powers authority comprised of public water agencies will collaborate on the design and construction of the California WaterFix conveyance facility. The tentative agreement seeks to ensure accountability, transparency, and the safe, timely, cost-effective, and efficient completion of the project.

Aquatic Science Peer Review

On April 1, 2016, Phase 1 of the California WaterFix aquatic science peer review was held for two days. The purpose of the peer review was to provide NOAA Fisheries, USFWS, and DFW with an independent scientific evaluation of the methods and approaches for developing the BiOps and analyses prepared for the DFW incidental take permit application. Phase 1 resulted in a report drafted by the review panel and made public in May.

Phase 2A of the peer review process was held in early December to address Phase 1 comments and present to the review panel analyses of the adaptive management framework and analyses of winter- and spring-run Chinook Salmon, Delta Smelt, and Longfin Smelt conducted for the incidental take permit application.

Change Petition Hearing

In August 2015, DWR and Reclamation submitted a petition to the State Water Resources Control Board (State Water Board) for a change to SWP water rights necessary for the implementation of key components of California WaterFix.

On July 26, 2016 the State Water Board change petition hearings for the California WaterFix began. In Part 1 of the State Water Board hearings, DWR presented evidence showing that the proposed change will neither initiate a new water right nor injure any other legal users of water. Key points of DWR's testimony included:

- WaterFix would create more flexibility to better balance water quality and water supply (and fish protection, which will be discussed in Part 2 of the hearings);
- DWR and Reclamation do not seek a new or expanded water right or any modifications to the water quality standards upstream or downstream of the proposed diversion points;
- DWR has a proven track record of meeting the State Water Board's Delta water quality standards, WaterFix would operate within the standards established by the State Water Board, and meeting existing or future water quality standards would be easier with the flexibility provided by WaterFix; and
- WaterFix will be operated in real-time, and while modeling can perform an assessment of potential water operation effects, water project operators handle complex situations on a daily basis to stay in compliance with water quality standards.

The Part 1 rebuttal hearing will begin April 25, 2017, and will continue as scheduled by the State Water Board.

Revised Biological Assessment

In early 2016, DWR and Reclamation released a working draft of the biological assessment for the California WaterFix. The document presents an assessment of whether the project meets the ESA's specified standard ("likely to adversely affect listed species or their critical habitat") due to any component of the project or as a result of operations and maintenance. The biological assessment also proposes mitigation, monitoring, adaptive management, and other actions DWR and Reclamation may take to ensure that the project will avoid, minimize, or compensate for the potential impacts.

On August 2, 2016, DWR and Reclamation submitted a revised biological assessment to NOAA Fisheries and USFWS with a request to begin the formal consultation process under Section 7 of the ESA. Two BiOps will be the end result of this consultation process.

Draft Adaptive Management Framework

A draft adaptive management framework for the California WaterFix (and its associated BiOps) and the current 2008 and 2009 BiOps for the coordinated long-term operation of the CVP and SWP was released in September and continues to be developed. This working draft contains key elements associated with an adaptive management approach including identified areas of uncertainty, suggested research actions to help address uncertainties, and an initial set of objectives for addressing operations and other management actions.

Incidental Take Permit

In early October, DWR submitted an incidental take permit application to DFW for the incidental take of State-listed species. Key elements in the application include documentation that impacts are minimized and fully mitigated, funding is available for minimization and mitigation measures, and incidental take authorized by the permit would not jeopardize the continued existence of any CESA-listed species.

Final EIR/EIS

On December 22, 2016, DWR and Reclamation released the final EIR/EIS for California WaterFix. The final EIR/EIS, including the mitigation monitoring and reporting program, was made available on the WaterFix website. The release of the final EIR/EIS exemplifies an unprecedented level of public review, comment processing, and scientific input to refine and improve the proposed project.

California EcoRestore

California EcoRestore was established in April 2015 as an initiative under the California Natural Resources Agency to advance a minimum of 30,000 acres of critical habitat restoration in the Delta and Suisun Marsh by 2020. California EcoRestore's three primary purposes are to accelerate habitat restoration, guide the development of regional restoration plans, and facilitate the development of adaptive management plans for habitat projects.

In May 2015, DWR's Director created the DWR EcoRestore Program to provide DWR with centralized coordination, communication, and integration of all habitat restoration planning and implementation efforts. This program functions as DWR's main connection point to California EcoRestore, and the two programs provide mutual support to one another as needed.

Both EcoRestore efforts, working closely with DWR's restoration programs have been instrumental in addressing the many challenges and barriers constraining restoration project implementation. The initiative includes 26 habitat restoration and fish passage projects, including two projects

that started construction in 2016—the Wallace Weir modification and fish rescue facility in the northern Yolo Bypass and the Tule Red Tidal Wetlands Restoration Project in the Suisun Marsh.

In 2016, the DWR EcoRestore program provided assistance in the successful publication of the Fish Restoration Program's Request for Proposals for the construction of "turnkey" tidal habitat restoration projects to benefit Delta Smelt in the Delta and Suisun Marsh. In addition, DWR EcoRestore worked with DWR's Real Estate Branch and Fish Restoration Program to complete the acquisitions of two important habitat restoration properties, Winter Island in the west Delta and Bradmoor Island in the Suisun Marsh.

Biological Opinions Issued on CVP/SWP Operations

The NOAA Fisheries and USFWS have both issued BiOps on CVP and SWP operations that include reasonable and prudent alternatives to avoid jeopardy of federally listed species. (For more information see the sidebar, Endangered Species and Biological Opinions.) Both the 2008 USFWS and 2009 NOAA Fisheries BiOps were challenged in federal court but were eventually upheld and are the basis for ESA compliance for the SWP and CVP. For more information about the federal litigation, see Bulletin 132-12 through 132-16. As required by the court order, Reclamation completed an EIS in November 2015, and the Record of Decision was signed in January 2016.

Reinitiation of ESA consultation

In August 2016, DWR and Reclamation requested reinitiation of ESA Section 7 consultation with the USFWS and NOAA Fisheries on the coordinated long-term operation of the CVP and SWP. Several factors resulted in the request for reinitiation of consultation, including the apparent decline in the status of several listed species, new information related to recent multiple years of drought, and the evolution of best available science. The overall goal of reinitiating consultation is to achieve durable and sustainable BiOps issued by the USFWS and NOAA Fisheries that account for the updated status of the species and species' needs as developed through ongoing collaborative science processes, operation of CVP and SWP facilities, existing operations of the CVP and SWP, and operation of potentially new components of the CVP and SWP. A memorandum of understanding for the reinitiation of consultation was signed in December 2016.

Collaborative Science and Adaptive Management Program

The program was formed in May 2013 under a court order during the BiOps litigation. The program allowed DWR, DFW, Reclamation, USFWS, and NOAA Fisheries to undertake a collaborative adaptive management approach to interim operations under the existing BiOps. Once the BiOps litigation ended in 2015, all parties agreed to continue the program to promote the collaborative development of scientific information to inform sound decision-making in the future.

The Collaborative Science and Adaptive Management Program is comprised of a Policy Group, a Collaborative Adaptive Management Team, scoping teams, and investigators. The Policy Group includes State and federal agency directors, regional directors, general managers of water agencies, and executive directors of nongovernmental organizations. The Collaborative Adaptive Management Team includes managers and scientists working under the direction of the Policy Group to facilitate collaborative science and adaptive management. Scoping teams are created on an as-needed basis to scope specific science studies, and investigators are contracted to conduct the studies.

Endangered Species and Biological Opinions

An endangered species is one in danger of extinction in all or a significant portion of its range; a threatened species is one likely to become endangered. The federal Endangered Species Act (ESA; Title 16, United States Code Sections 1531–1544 [1973]) and the California Endangered Species Act (CESA; California Fish and Game Code Sections 2050–2100 [1984]) are designed to protect threatened and endangered species by ensuring federal and State agencies adopt measures to protect the species during the design, construction, and operation of projects, or for other forms of agency action, and prohibit the unauthorized take of endangered species. Biological opinions and incidental take permits are issued to protect ESA- and CESA-listed species.

ESA Section 7 requires federal agencies to ensure that any action they authorize, fund, or carry out is not likely to jeopardize the continued existence of listed species or modify their critical habitat, otherwise formal consultation is required. Federal agencies must consult with the U.S. Fish and Wildlife Service and/or the National Marine Fisheries Service (the wildlife agencies). As part of the consultation process, the wildlife agency issues a biological opinion which states the agency's determination of whether the action is likely to jeopardize a species or adversely modify critical habitat. If the wildlife agency determines an action will jeopardize or adversely modify, it will specify reasonable and prudent alternatives that the "action agency" may take to avoid the likely jeopardy or adverse modification. In the biological opinion, the wildlife agency includes an incidental take statement that estimates the amount or extent of incidental take likely to result from the action and specifies terms and conditions to implement to minimize the impacts of the incidental take.

CESA is substantially similar to ESA in all aspects. Under CESA, an incidental take permit issued by the Department of Fish and Wildlife can allow for the take of State-listed species if specific criteria are met, including measures to minimize and mitigate the impacts of authorized take.

In 2016, the Collaborative Adaptive Management Team's focus was completing the studies initiated in 2014, informing the Policy Group of the results of those studies, identifying new initiatives, and developing a 5-year plan.

Long-term Operations Biological Opinions Annual Science Review

The NOAA Fisheries BiOp requires Reclamation and NOAA Fisheries to host a workshop no later than November 30 of each year. The purpose of the annual workshop is to review the effectiveness of the prior year's water operations and regulatory actions prescribed in the BiOps' reasonable and prudent alternatives. The review was expanded to include a review of the implementation of the USFWS BiOp's reasonable and prudent alternatives. The review will enable NOAA Fisheries and USFWS to use lessons learned, incorporate new science, and make appropriate, scientifically justified adjustments to the reasonable and prudent alternatives and their implementation. The annual reviews have been conducted since 2010.

In April 2016, Reclamation and NOAA Fisheries agreed to temporarily modify the frequency of the Long-term Operations Biological Opinions Annual Science Review from annual to biennial from 2016 through 2020. At that time, Reclamation and NOAA Fisheries will evaluate whether to make this change permanent or consider additional changes. The next science review will be held in November 2017. In December 2016, Reclamation held an informational and update meeting to allow stakeholders and the public to provide input regarding implementation of the NOAA Fisheries BiOp.

Delta Operations for Delta Smelt and Longfin Smelt

The Smelt Working Group (an interagency team of experts on Delta Smelt and Longfin Smelt [*Spirinchus thaleichthys*] biology) meets regularly from December through June to assess the risk to Delta Smelt and Longfin Smelt from CVP and SWP export facilities. Based on near real-time technical information, such as fish distribution, salvage, and physical water conditions, the Smelt Working Group makes recommendations on export operations to the USFWS and DFW with the goal of reducing entrainment of the two species. Recommendations are based on guidelines outlined in the 2008 USFWS BiOp and the 2009 DFW Longfin Smelt incidental take permit (see Bulletin 132-10). The fisheries agencies consider the Smelt Working Group's recommendations and make a determination whether to initiate an action, consistent with the reasonable and prudent alternative in the 2008 BiOp or conditions in the incidental take permit.

During the 2015–2016 water year, the USFWS issued determinations to reduce export operations based on input from the working group, data from fish surveys, physical conditions in the Delta, and the historically low abundance of Delta Smelt.

A January 21, 2016, determination was issued to reduce average Old and Middle River flows to not be more negative than –2,500 cubic feet per second (cfs) to protect pre-spawning adult Delta Smelt. Another determination was issued on March 24, 2016, to protect Delta Smelt larvae and juveniles present in the system. Restrictions were relaxed on May 3, 2016, allowing Old and Middle River flows to be no more negative than -3,000 cfs, and again on June 1, 2016, to be no more negative than -5,000 cfs through the end of the water year.

Fish Restoration Program

Pursuant to the USFWS and NOAA Fisheries BiOps and the DFW Longfin Smelt incidental take permit (see Bulletin 132-11), the Fish Restoration Program (FRP) continued to make progress towards fulfilling its restoration requirements.

Prospect Island

The administrative draft EIR for the Prospect Island tidal habitat restoration project was revised heavily in 2015 based on several revisions to construction details in the project description. Three alternative restoration designs were analyzed for the EIR. All alternatives involve the use of wide breaches, excavation of central dendritic channels, and construction of an intertidal toe berm along the interior Miner Slough levee. In the alternative selected and presented in the draft EIR, the Miner Slough levee would be breached in both the north and south property, and the internal cross levee would be partially removed. The public draft EIR was released in 2016, and public comments were being reviewed and considered.

Modeling for the project design was completed, and construction plans were being finalized. A pre-application meeting with permitting agencies was scheduled.

DWR's North Central Region Office has completed a site characterization and groundwater monitoring study, which began in January 2010. The final project report was completed in the early part of 2014. Monitoring continued on 20 groundwater wells and one surface water gauge on Prospect Island and nine groundwater wells and three surface water gauges on Ryer Island. Wells were checked twice each month.

Using a combination of boom mowers and goat herds, DWR continued to clear vegetation on the Miner Slough levee to facilitate levee inspections. Monitoring of priority levee repair sites continued, and small repairs will be conducted as needed. Planning continued for a larger Miner Slough levee repair effort. DWR acquired the southern portion of Prospect Island from the Port of West Sacramento in August 2015. A California Conservation Corps crew began work in 2015 to clear the vegetation from the levee crown and work continued in 2016 to clear the entire Miner Slough levee, from the southern cross-levee to the old levee breach site. DWR is coordinating with Pacific Gas & Electric Company to facilitate the removal of power poles and a transmission tower in conjunction with the restoration work. After these facilities are removed, Pacific Gas & Electric Company easements on the property will be cleared.

Decker Island

Restoration planning for Decker Island progressed with the development of goals and objectives, initial topography, and cultural resources, and the completion of vegetation surveys. Several conceptual designs were selected and evaluated; a single project design was chosen in early 2016. The chosen project design includes degrading 300 feet of the northern levee, widening the existing southern breach, and reconfiguring the internal berms to better allow water to flow onto the island. DWR submitted permit applications in late summer 2016 in anticipation of going to construction in August 2017.

Bradmoor Island

Located within the Suisun Marsh, Bradmoor Island includes 730 acres of managed wetlands, tidal berms, and associated uplands in three parcels. DWR purchased the 245-acre Overlook Club in February 2013 and the 257-acre Flying D Club (Property 329) in February 2016. Negotiations to purchase the remaining 242-acre parcel (Property 330) continued in 2016. Restoration of the property was initially planned for 2016, but will be delayed 1 to 3 years to allow for ongoing real estate negotiations with the remaining property on Bradmoor Island. Restoring the properties together would allow for greater connectivity and substantial cost savings, and would reduce the need to fill wetlands to reinforce interior levees.

Winter Island

DWR is planning to implement the Winter Island tidal habitat restoration project, which will restore tidal connectivity to the interior of Winter Island to create aquatic habitat at intertidal and shallow sub-tidal elevations, associated high marsh, and riparian habitat on the site to benefit native fish species. DWR acquired approximately 589 acres on Winter Island in 2016 for tidal wetland restoration.

Suisun Marsh

The State and Federal Contractors Water Agency (SFCWA) is undertaking the Tule Red Tidal habitat restoration project in Suisun Marsh to provide restoration acreage credit to DWR's 8,000-acre tidal habitat restoration requirement pursuant to Reasonable and Prudent Alternative 4 in the 2008 USFWS Delta Smelt BiOp. Through a non-competitive bid public entity contract with SFCWA, DWR will provide project oversight and purchase an estimated 610 habitat acreage credits through phased project progress payments to reimburse SFCWA for project deliverables. In mid-September 2016,

SFCWA started construction on the initial restoration activities.

Expanding Restoration Activities

The FRP continues efforts to acquire more restoration properties. In an effort to reach its BiOp restoration requirements, DWR is developing a process to solicit proposals for restoration projects in which private and nonprofit entities would acquire property and develop and implement tidal habitat restoration projects that meet DWR criteria. DWR began discussions with Reclamation to develop a joint, cost-shared process for soliciting proposals and awarding contracts. The solicitation period ends in February 2017, at which time FRP will evaluate submitted proposals.

Outreach

In 2016, the FRP continued its outreach efforts, primarily by sending out eNews updates and updating the website with new documents. The FRP website provides an overview of the program and serves as a publicly accessible repository for documents that are relevant to the program's efforts, including links to project-specific documents for each separate restoration project under the FRP. The website also provides a means by which the public can contact the program. Stakeholders and members of the public can request to receive emails containing general updates of the program and announcements of significant events such as the release of environmental documents for the individual projects.

Monitoring and Research

The FRP monitoring team continued to lead the Interagency Ecological Program's Tidal Wetland Monitoring Project Work Team. Activities in 2016 focused on completion of a standardized framework for tidal wetland monitoring in the Delta and Suisun Marsh, as well as preparation of a suite of conceptual models of tidal wetland function for publication in an Interagency Ecological Program technical report. The intent in using a common framework is to increase data comparability across projects and provide more power to detect the effects of restoration. The FRP monitoring team revised the preliminary monitoring plan for the Prospect Island project to reflect the hypotheses and metrics included in the framework. Additionally, the team developed databases, and metadata standards that will be applied to all future monitoring.

Decisions on Endangered Species

Table 3-1 lists fish species of concern found in the Delta. No status changes were made in 2016.

Trends in Fish Abundance

Abundance indices for Longfin Smelt and Delta Smelt are based on DFW fall midwater trawl sampling conducted every year from September through December. Index calculations are based on average catch per trawl for 100 core index stations, which are partitioned into 14 geographic areas. The average monthly catch per tow in each area is multiplied by a weighting factor that is based on the estimated volume of water in each area. The resulting values are then summed over all areas and months to obtain the annual index. This fall abundance index serves as an indicator for adult Longfin and Delta Smelt populations over a relatively long period of time.

The fall midwater trawl abundance index for Longfin Smelt is shown on Figure 3-1. The index for 2016 increased slightly from the previous year, but was still the second lowest value on record.

Figure 3-2 shows the fall midwater trawl abundance index for Delta Smelt. In 2016, the index was similar to the prior year. Indices for the last 3 years have remained

Table 3-1 Special Status Delta Fish Species

Common Name	Scientific Name	Listing or Action	
		ESA	CESA
Delta Smelt	*Hypomesus transpacificus*	threatened[a] (4/5/1993)	endangered (1/20/2010)
Longfin Smelt	*Spirinchus thaleichthys*	candidate[b] (4/2/2012)	threatened (4/9/2010)
Chinook Salmon (winter-run)	*Oncorhynchus tshawytscha*	endangered (2/3/1994)	endangered (9/22/1989)
Chinook Salmon (spring-run)	*Oncorhynchus tshawytscha*	threatened (11/15/1999)	threatened (2/5/1999)
Chinook Salmon (fall-/late fall-run)	*Oncorhynchus tshawytscha*	species of concern (4/15/2004)	none
Steelhead (Central Valley DPS)	*Oncorhynchus mykiss*	threatened (5/18/1998)	none
Green Sturgeon (Southern DPS)	*Acipenser medirostris*	threatened (6/6/2006)	none
Sacramento Splittail	*Pogonichthys macrolepidotus*	none	species of concern
Pacific Lamprey	*Entosphenus tridentata*	species of concern	none
River Lamprey	*Lampetra ayresii*	none	species of concern

ESA = federal Endangered Species Act; CESA = California Endangered Species Act; DPS = distinct population segment

[a] In April 2010, the USFWS found that reclassification of Delta Smelt from threatened to endangered was warranted but precluded by other higher priority listing actions.

[b] On April 2, 2012, the USFWS found that listing the San Francisco Bay-Delta DPS as threatened or endangered was warranted but precluded by other higher priority listing actions and has added the San Francisco Bay-Delta DPS of Longfin Smelt to its list of candidate species.

at the lowest levels observed since the inception of the survey.

Figure 3-3 shows estimates of returning adult winter-run Chinook Salmon from 1970 through 2016. These estimates, referred to as escapement estimates, are the number of adults that escape mortality and return to spawn. The Sacramento River winter-run Chinook Salmon escapement estimates are generated from the DFW carcass survey. DFW has been using the carcass survey data to generate escapement estimates since 2001, prior to which Red Bluff Diversion Dam counts were used. The estimated winter-run Chinook Salmon escapement for 2016 was 1,546, which was less than half of the 2015 escapement estimate.

Figure 3-4 shows estimates of returning adult spring-run Chinook Salmon from 1985 through 2016. Individual estimates are shown for the Feather River Fish Hatchery (FRFH) and the principal spring-run spawning streams: Battle Creek, Clear Creek, Mill Creek, Deer Creek, and Butte Creek. The escapement estimates are shown separately for each stream because the Feather River estimate is based on returns to the FRFH, where the genetic integrity of spring-run Chinook Salmon is uncertain. The estimated escapement for 2016 was 1,659 for the FRFH and 6,446 for the other streams combined. The 2016 escapement estimate was 2.6 times lower than the 2013 parent stock estimate for the FRFH, but 3 times lower than the 2013 parent stock estimate for naturally spawned fish in Battle, Clear, Mill, Deer, and Butte creeks.

Due to the lack of comprehensive monitoring programs, there are no reliable escapement estimates for wild Central Valley steelhead.

Pelagic Organism Decline in the Upper San Francisco Estuary

By the early 2000s, long-term monitoring by the Interagency Ecological Program revealed marked declines in numerous pelagic (open water) fish species in the upper San Francisco Estuary (the Delta and Suisun Bay). This decline has collectively become known as pelagic organism decline.

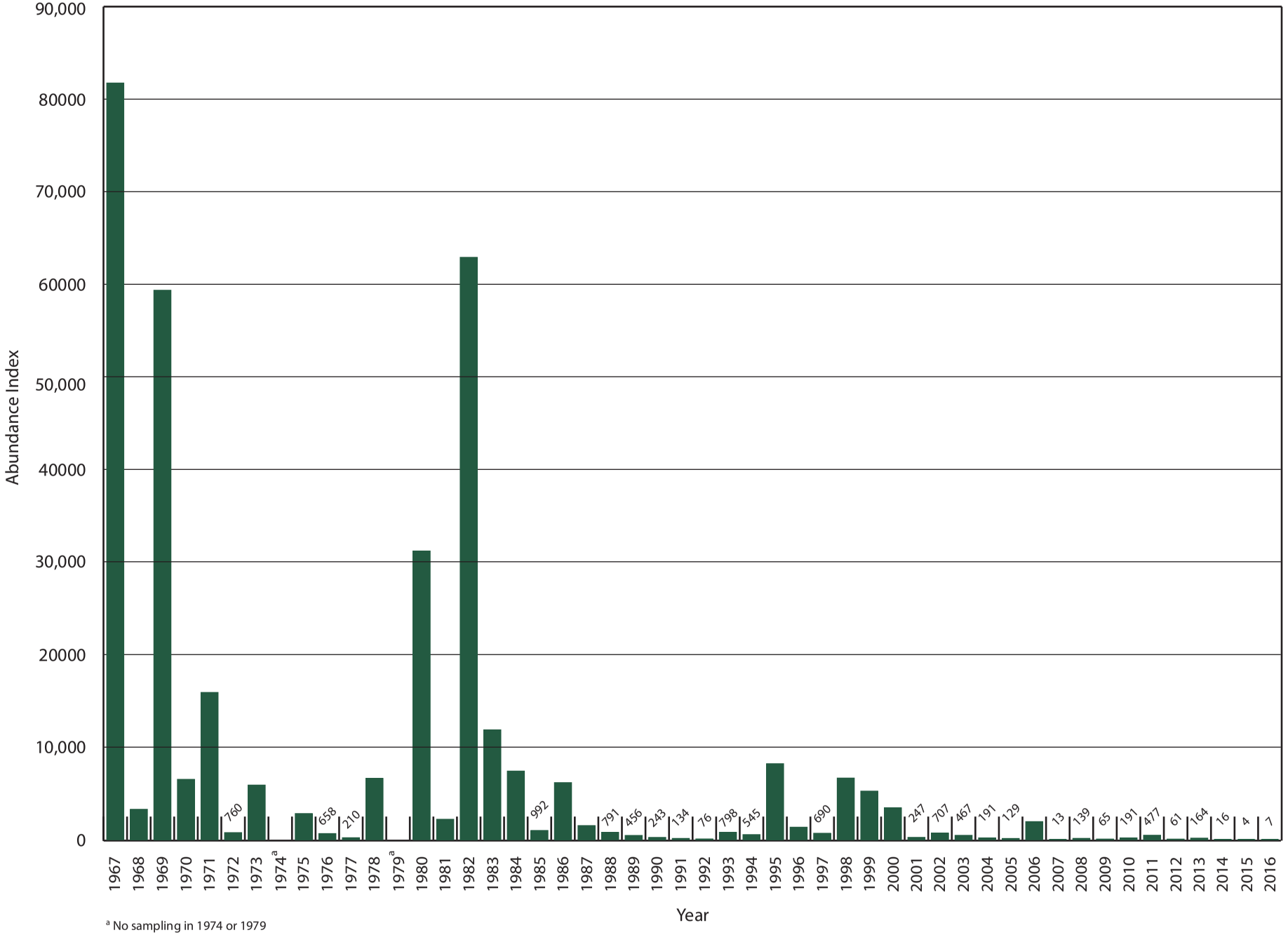
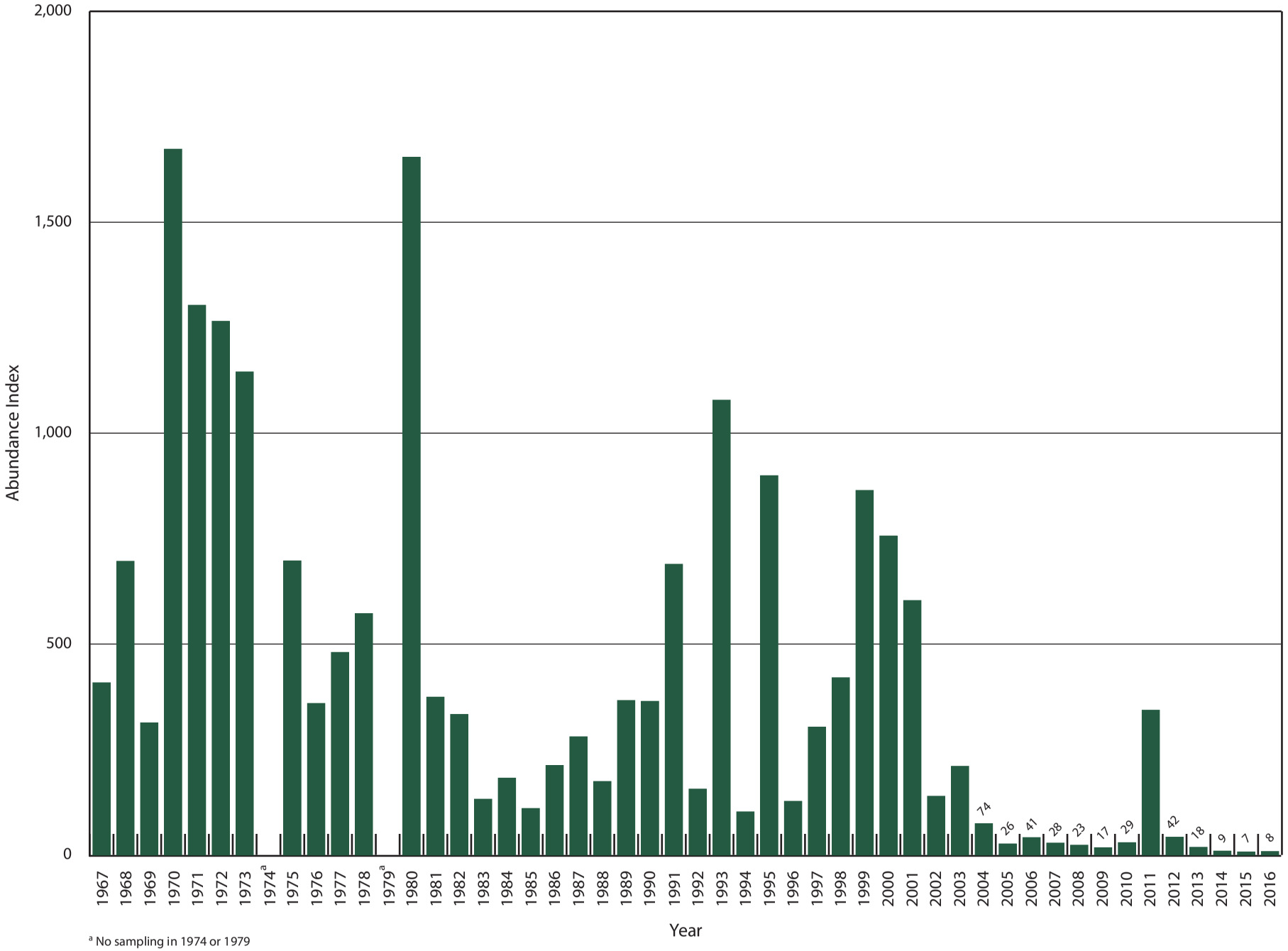


Figure 3-1 Longfin Smelt Fall Midwater Trawl Abundance Index, 1967–2016



[a] No sampling in 1974 or 1979

Figure 3-2 **Delta Smelt Fall Midwater Trawl Abundance Index, 1967–2016**

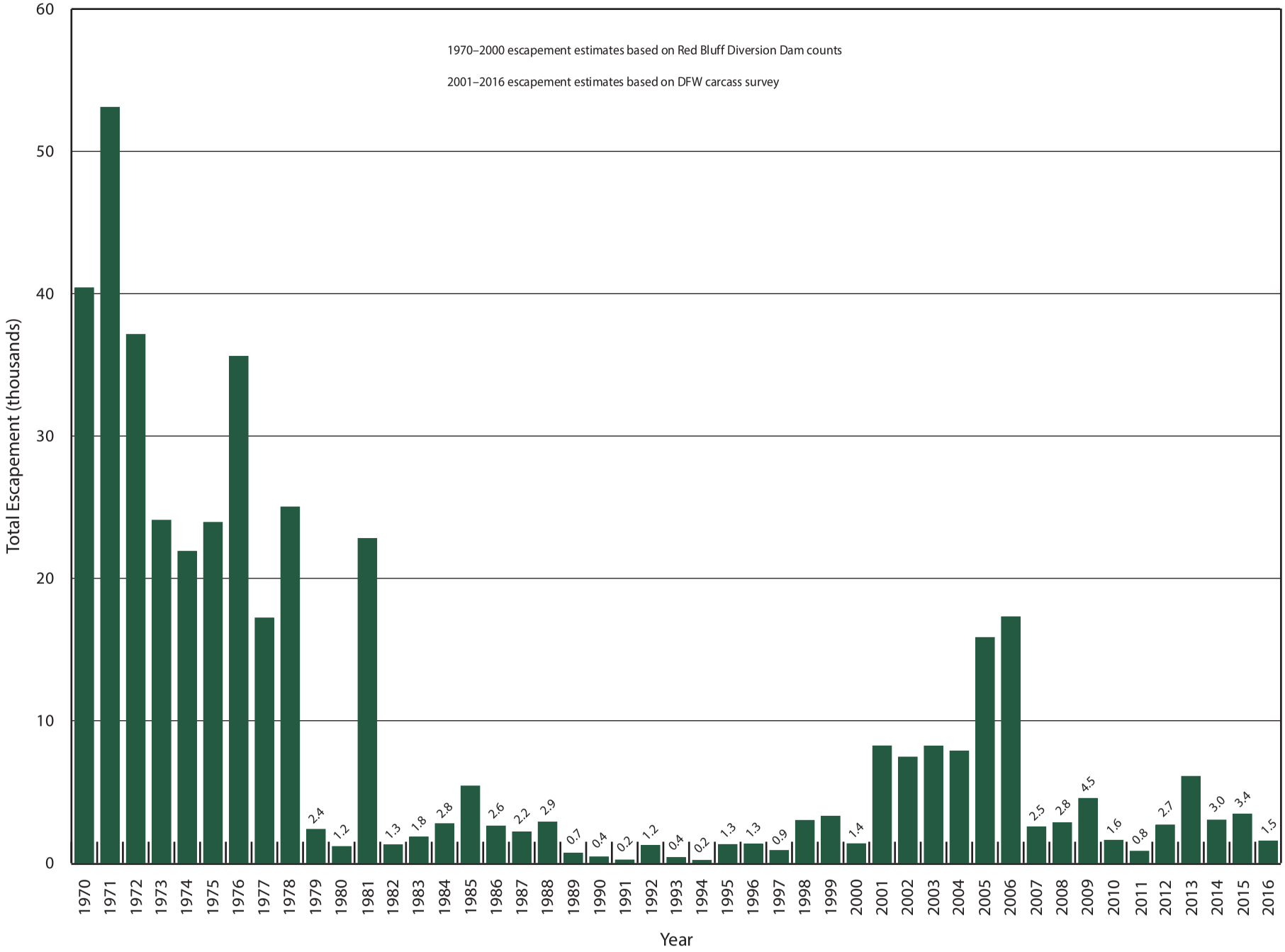
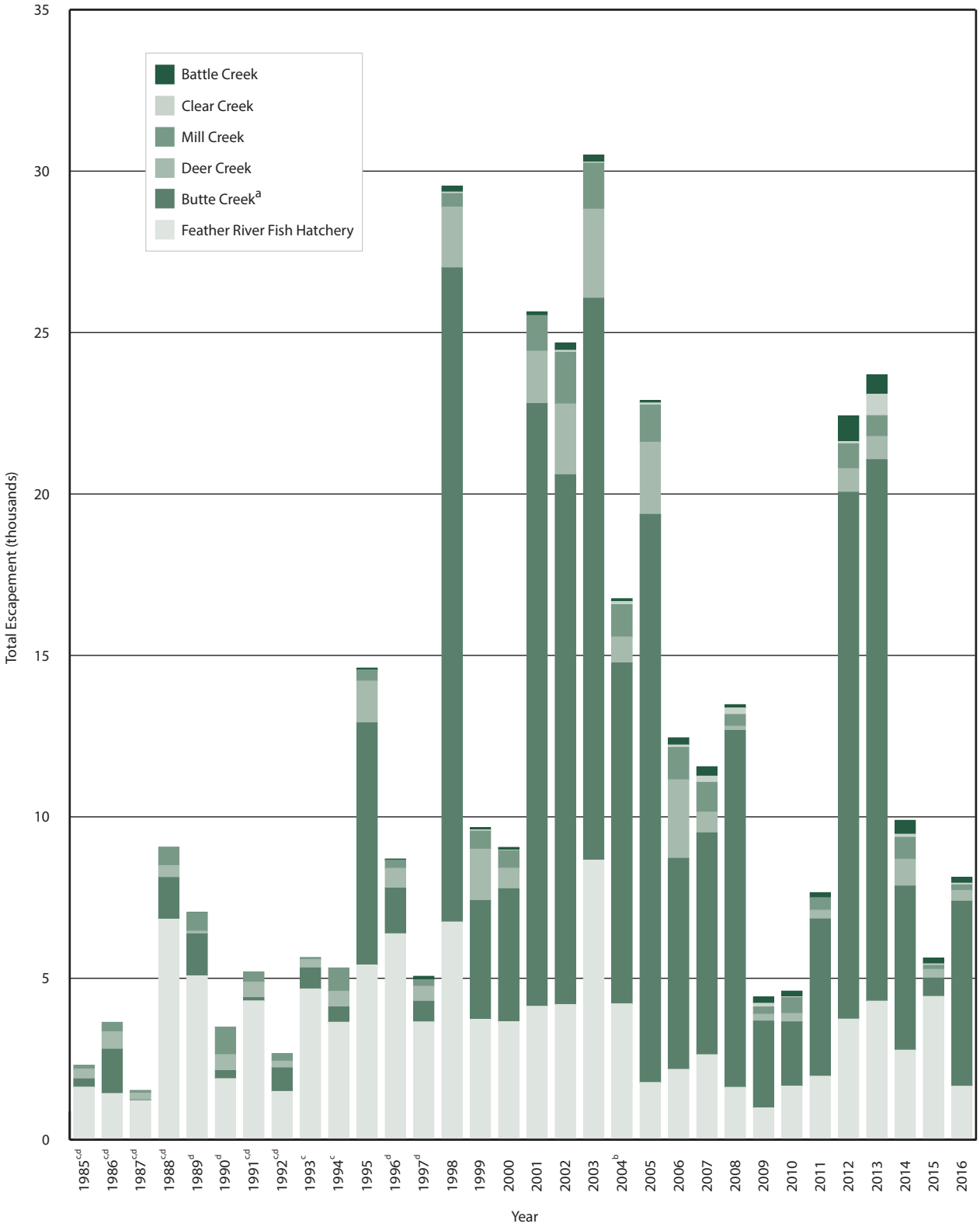


Figure 3-3 **Estimated Total Adult Winter-run Chinook Salmon Escapement, 1970–2016**



[a] From 1985–2000, Butte Creek estimates were based on snorkel surveys.
From 2001–2016, Butte Creek estimates were based on carcass surveys.

[b] In 2004, the Feather River Fish Hatchery ladder was only open September 15–30 instead of the typical 30 days.

[c] Zero count or no data for Battle Creek

[d] Zero count or no data for Clear Creek

Figure 3-4 Estimated Total Adult Spring-run Chinook Salmon Escapement, 1985–2016

Pelagic fish species in decline include Delta Smelt, Longfin Smelt, Striped Bass (*Morone saxatilis*), and Threadfin Shad (*Dorosoma petenense*). These declines resulted in significant management consequences, including limits on SWP and CVP pumping operations for the protection of Delta Smelt (listed as threatened under ESA and endangered under CESA) and Longfin Smelt (listed as threatened under CESA).

Since 2005, Interagency Ecological Program scientists have been coordinating studies investigating potential causes of pelagic organism decline. In 2010, an "ecosystem regime shift" conceptual model was put forward, hypothesizing that pelagic organism decline was caused by changes to multiple and interacting environmental variables, such as outflow, turbidity, and salinity, which led to fundamental changes to the Delta ecosystem. This conceptual model has served as a working hypothesis for continuing pelagic organism decline investigations since 2011. In early 2012, the Interagency Ecological Program formed the Management, Analysis, and Synthesis Team to synthesize scientific datasets with the goal of addressing these pressing management information needs.

Based largely on an updated conceptual model for Delta Smelt biology produced by the Management, Analysis, and Synthesis Team, the *Delta Smelt Resiliency Strategy* was released by the California Natural Resources Agency in July 2016. The strategy proposes several actions to improve ecosystem conditions for Delta Smelt, which remain near record low population levels. Actions include aquatic weed control, Delta outflow augmentation, and food web management.

During summer 2016, State and federal agencies and local water districts partnered to implement a food web management action that sent a pulse of water from the Colusa Basin into the Yolo Bypass. Monitoring data indicate that the action was effective, resulting in a downstream phytoplankton bloom which is a key component of the food web for Delta Smelt.

Feather River Fish Studies

In the early 1990s, the Feather River fish studies were initiated to document and monitor fish populations in the lower Feather River. Early efforts focused on studies to identify flow requirements for Chinook Salmon and steelhead. The program has progressively expanded since the mid-1990s, in preparation for the Federal Energy Regulatory Commission relicensing of the Oroville Facilities and then to satisfy the NOAA Fisheries BiOp for CVP and SWP long-term operations. More recently, efforts have been focused on satisfying the NOAA Fisheries BiOp with the Oroville Facilities license issuance in mind by developing baseline information that satisfies current requirements and will also directly benefit planning and implementation of license requirements. Field program elements have included operation of rotary screw traps (RSTs), acoustic and radio telemetry, salmon and steelhead spawning surveys, salmon escapement surveys, spring-run Chinook Salmon tagging, otolith thermal marking studies, snorkel and beach seining surveys, Green Sturgeon studies, steelhead passive integrated transponder and acoustic tagging, hatchery juvenile Chinook Salmon movement and survival studies, and salmonid predator studies.

The study area is generally divided into the low-flow channel, from the Fish Barrier Dam downstream to the Thermalito Afterbay Outlet, and the high-flow channel, from the Thermalito Afterbay Outlet downstream to the confluence with the Sacramento River at Verona (see Figure 3-5).

Rotary Screw Fish Traps

RSTs capture juvenile salmon and steelhead as they emigrate from the Feather River.

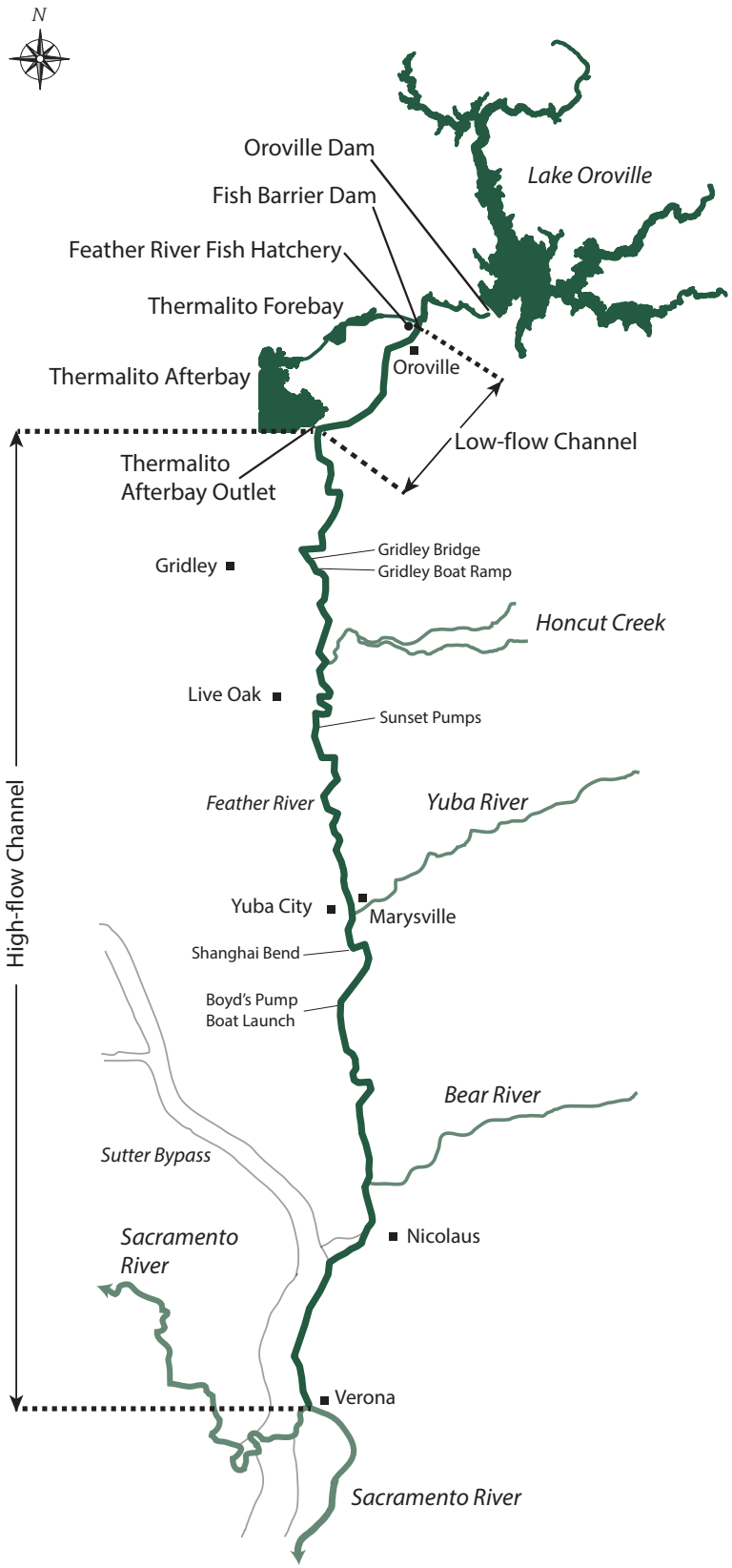


Figure 3-5 **The Lower Feather River**

Over the last 19 years, DWR has used RSTs as the primary method to assess the general abundance and timing of emigrating juvenile salmon and steelhead in the lower Feather River. In addition, large numbers of naturally produced (wild) salmon have been coded wire tagged in an effort to examine their return success. Although adult returns have been too small to evaluate, the tagging effort in five of those years has led to the first estimates of fry survival through the upper reaches of the high-flow channel. This data will be presented in an upcoming report.

Emigration timing and travel times confirm that most wild juvenile Chinook Salmon move rapidly through the upper reaches of the lower Feather River as fry. However, little information exists regarding rearing behavior in the lower Feather River downstream of the town of Live Oak (see the beach seining data below). Additionally, trapping larger individuals that may be exhibiting alternative life-history strategies is difficult and not likely to be well documented without targeted trapping efforts (not currently employed).

In 2016, the RSTs fished throughout the majority of the emigration period, with salmon emigration observed from December through April, with the greatest abundance occurring in January and February. Trapping was stopped earlier than in most years due to concerns that high debris loads could cause increased mortalities. In 2016, trapping locations included both the low-flow and high-flow channels. In the low-flow channel, one RST was stationed at Gateway Riffle (River Mile [RM] 59.5), a half mile above the Thermalito Afterbay Outlet. Within the high-flow channel, one RST was stationed at Herringer Riffle (RM 45.8). Within the low-flow channel, approximately 9,778,135 juvenile salmon were estimated to have passed the RST. Within the high-flow channel, approximately 2,994,935 were estimated to have passed the Herringer Riffle RST.

Although Chinook Salmon and steelhead were the primary targets of trapping efforts, records were kept on all fish species caught. Twenty species, including three races of Chinook Salmon (fall-run, spring-run, and late fall-run), were caught during the 2016 season. Chinook Salmon was the dominant species, comprising 97 percent of the catch. A total of 326,601 Chinook Salmon were caught in the RSTs with 312,741 (96 percent) of those captured in the low-flow channel and 13,860 (4 percent) caught in the high-flow channel.

Acoustic Telemetry

Acoustic telemetry gathers baseline information on the migration and holding patterns of adult spring-run Chinook Salmon in the lower Feather River. A telemetry study was conducted to collect additional data to better understand migration of prespawning adult Chinook Salmon.

Chinook Salmon with a spring-run life history enter freshwater in spring and hold in the river up to several months before spawning. In order to collect additional data to evaluate straying, migration patterns, and potential passage barriers for spring-run Chinook Salmon, adults were captured and tagged with acoustic tags.

Between March 30 and June 30, 2016, three adult spring-run Chinook Salmon were captured at Shanghai Bend (downstream of the Yuba River confluence) using hook-and-line sampling and implanted with acoustic tags. These fish were monitored along the 67-mile stretch of river from the Fish Barrier Dam near the FRFH to the confluence with the Sacramento River at Verona. Twenty-six submersible hydrophone receivers positioned at various locations along this stretch picked up the signals from the implanted tags as fish passed the receivers. All salmon tagged in 2016 swam to the uppermost extent of the Feather River near the FRFH (RM 67).

Spawning Surveys

To better understand Feather River salmon and steelhead spawning distribution and response to restoration actions, redd surveys (a redd is a shallow depression in a streambed, excavated by a salmonid and containing deposited fish eggs) are performed to identify the location, timing, magnitude, and physical characteristics of natural spawning sites in the lower Feather River. The surveys are generally performed weekly, and, depending on the survey type, much of the available spawning area between the Fish Barrier Dam and Gridley Bridge is searched.

Salmon

In June and July 2014, DWR implemented a project to strategically place 8,300 cubic yards of salmon and steelhead spawning gravel in the lower Feather River near the FRFH. The spawning gravel used was in the ideal size range for salmon and steelhead, and the project was designed to optimize depth, flow, and velocity for immediate use. In selected areas with significant armoring and large cobble, the riverbed was also scarified to increase permeability and to break up the armoring that had occurred over the past 50 years. Redd mapping and hydraulic modeling occurred before the project to document existing use and to inform the design of each new feature. Post-project redd mapping and modeling were performed to document use of the newly restored sites and to validate predictions, respectively.

In 2016, Chinook salmon redd surveys were conducted within the gravel augmentation project boundary to monitor the response to the restored areas.

Ground surveys for the 2016 Chinook Salmon redd survey began on September 20 and continued until November 18. The redd survey consisted of a total of 18 days over 9 survey weeks. The surveys were concentrated in lower, middle, and upper Auditorium Riffle as well as the section between upper Cottonwood Riffle and upper Moe's Side Channel. Hatchery Riffle and upper Hatchery Riffle (RM 66.6) were also sampled. Redd surveys were not performed in the high-flow channel in 2016.

During the 9 weekly surveys, 1,573 redds were found within the spawning area between upper Hatchery Riffle and lower Auditorium Riffle (RM 66.4). This area included all of the newly restored spawning sites as well as Cottonwood Riffle and Moe's Side Channel. Since 2014, the restored areas continue to see significant spawning activity, indicating that the project was successful.

The week 5 survey (October 17, 19, and 21) covering the area between upper Hatchery Riffle and lower Auditorium Riffle revealed the highest number of redds with 353. The second highest total was 328 redds for the survey conducted the week of October 10 in the same areas. The locations with the largest number of redds were the lower Auditorium Riffle area with 701 (45 percent) and Upper Hatchery Riffle with 169 (11 percent). The average depth for all salmon redds was 0.47 meters (m) (1.54 feet [ft]), and the average water velocity was 0.45 m (1.48 ft) per second. The average redd length and width was 2.0 m (6.6 ft) by 1.2 m (3.9 ft), respectively.

Salmon Escapement Survey

The salmon escapement survey provides information crucial to monitoring, managing, and conserving Feather River salmon populations. The primary purpose of the salmon escapement survey is to evaluate the abundance of Chinook Salmon spawning in the lower Feather River. Other important objectives include: (1) understanding the distribution and success of spawning, (2) estimating the number of hatchery salmon spawning in the river, and (3) identifying trends in population and age structure.

The Chinook Salmon spawning escapement survey began September 8 and continued through December 21, 2016. The survey was conducted in the low-flow channel and the high-flow channel from the Table Mountain Bridge downstream to the Gridley Bridge. Due to the low numbers of returning fish in the high-flow channel, the data were pooled with the low-flow channel data to generate one estimate for the entire lower Feather River.

The carcass mark-recapture study resulted in a spawning population estimate of 38,746 adult Chinook Salmon for the lower Feather River. The total spawning population consisted of an estimated 34,030 adult salmon and 4,716 grilse (presumably 2-year-old fish less than 66 centimeters in fork length). These estimates include both fall-run and spring-run Chinook Salmon since their spawning is currently not fully segregated on the Feather River.

Approximately 97 percent of the spawning population utilized the low-flow channel. Since 2000, the long-term average for the low-flow channel's spawning population is 83.6 percent. In the low-flow channel, survey section 8 (RM 66.5) had the most carcasses followed by section 12 (RM 63.0).

FRFH Spring-run Chinook Salmon Tagging

To better manage broodstock selection at the FRFH, a program was developed in 2003 to mark spring-run Chinook Salmon entering the FRFH in the spring. The spring-run Chinook Salmon tagging program allows DFW to segregate the spawning of spring- and fall-run Chinook Salmon in the hatchery in the fall when the populations are mixed together in the fish ladder. The program also investigates potential differences in spawning distribution and timing of the early arriving spring-run Chinook Salmon in the river.

Early arriving spring-run Chinook Salmon entering the hatchery in May and June were marked with individually numbered Hallprint dart tags for identification. Once marked, the fish were released back into the river. During the hatchery spawning season, the tags enabled hatchery staff to distinguish the early arriving spring-run fish from fall-run, allowing segregated spawning for each run. The tags also enabled the escapement survey crew to differentiate spring- and fall-run salmon, so that any potential differences in spawning success, distribution, or behavior of the two runs can be analyzed.

In 2016, 2,917 Central Valley spring-run Chinook Salmon were tagged at the FRFH. Tagging began on May 18 and ended on July 6. When spawning commenced in the fall, a total of 1,987 tagged fish were recaptured: 1,586 at the FRFH and 401 in the river escapement survey.

Snorkel Surveys

In 2016, the Feather River Program collected data to determine the relative abundance and distribution of age-0 (less than 1 year old) steelhead and salmon prior to potential habitat improvements required under the Federal Energy Regulatory Commission *Settlement Agreement for Licensing of the Oroville Facilities*. More specifically, DWR conducted the lower Feather River snorkeling survey with the following objectives:

(1) determine the relative abundance and distribution of juvenile spring-run Chinook Salmon and steelhead prior to habitat improvements;
(2) identify habitat conditions (depth, substrate, velocity, and cover) where juvenile Chinook Salmon and steelhead occur; and
(3) identify potential sites for channel improvement and structural habitat restoration.

Nonsalmonid species were also identified and enumerated. The program also succeeded in quantifying habitat characteristics where juvenile steelhead and salmon occur as well as identifying other high-use areas of the low-flow channel that may benefit from habitat improvements.

Snorkel surveys were conducted from April through August 2016. These surveys were conducted at 21 permanent sites, 12 in the low-flow channel and 9 in the high-flow channel. A total of 2,087 Chinook Salmon were identified during the snorkel surveys. A total of 1,830 steelhead were identified and enumerated; 1,776 were considered to be juveniles (≤200 millimeters in length).

Beach Seining

DWR conducted beach seining surveys in the lower Feather River between January 1997 and August 2001 to document fish distribution. Since then, beach seining has occurred in five of the eight years since 2008 to further document the distribution and condition of steelhead and salmon in both the low-flow and high-flow channel during the primary emigration and rearing period (roughly December through July).

Although targeted at steelhead and salmon, beach seining is useful to augment screw trapping for the purpose of documenting the distribution and relative abundance of all fish species found in the Feather River. Since 2015, the objectives for beach seining included two relatively new components: (1) capturing spring-run smolts released from the FRFH to augment survival study and emigration rate data collected via acoustic tagging, and (2) collecting random samples of juvenile Chinook Salmon for an ongoing *Ceratonova shasta* study. This study is looking at the rate of infection and disease from the parasite *C. shasta* experienced by juvenile Chinook Salmon rearing or emigrating in the lower Feather River.

Beach seining surveys were conducted from February through August 2016. A total of 110 seine hauls and 19,501 individual fishes were sampled during the 2016 surveys. Native fishes dominated the beach seine catch (18,530 fish) and represented 95 percent of the overall catch. Sacramento Sucker (5,543), juvenile Chinook Salmon (5,296), and juvenile minnows (5,132) were the most abundant groups captured. Steelhead were encountered less frequently than Chinook Salmon. A total of 5 steelhead were captured by beach seine in 2016.

Green Sturgeon Studies

The primary objective of the sturgeon study is to provide DWR management with data to make long-term management decisions concerning future monitoring programs, operational changes to the facilities, and/or habitat enhancement within the lower Feather River. Specific studies focus on the following components of Green Sturgeon life-history in the lower Feather River:

- potential adult migration barriers;
- migration patterns;
- distribution and habitat preferences;
- annual abundance of adults; and
- identification of spawning grounds.

Sturgeon Sonar Surveys

In 2016, 79 sonar surveys were completed from January 4 to December 20 at eight locations as follows:

- Beer Can Beach (RM 7), 1;
- below Star Bend Boat Ramp (RM 17), 1;
- Star Bend (RM 19), 1
- Lower Shanghai (RM 24.7), 24;
- Upper Shanghai (RM 25.5), 4;
- Sunset Pumps (RM 38.5), 21;
- Lower McFarland (RM 52.0), 1; and
- Thermalito Afterbay Outlet (RM 59), 26.

A total of 17 sturgeon detections were made during the survey season. Since individuals are detected multiple times, analysis of the 17 detections suggests that at least 3 to 5 individuals were within the study area. Most of the detections occurred at Sunset Dam (9), Shanghai (6), Upper Shanghai (1), and Beer Can Beach (1).

Egg Mat and D-net Surveys

Sampling locations were determined based on the presence of multiple sturgeon detected with sonar, observation of angler-caught Green Sturgeon, or field observations of breaching sturgeon. Ten sturgeon egg mats were deployed in the vicinity of Shanghai Bench from May 31 through July 19, 2016. The mats were hauled to the surface and checked for eggs every 3 to 4 days. Larval D-nets were deployed from June 1 through July 18 from Sunset Pumps to just below the mouth of the Bear River. D-nets were deployed at dusk and checked every hour until being pulled at sunrise. Temperatures during sampling ranged from 14.9–20.5°C (58.8–68.9°F) with an average temperature of 18.5°C (65.3°F). Flows during sampling ranged from 4,393 cfs to 12,408 cfs with an average flow of 8,638 cfs. No sturgeon eggs or larvae were captured during the 2016 sampling season.

Sturgeon Angling/Telemetry

During 2016, one Green Sturgeon was tagged June 15 and another was tagged June 16 just upstream of Shanghai Bench in the Feather River. The first sturgeon remained in the area of tagging until June 23 and then moved downstream. It was last detected September 27 just upstream of the confluence with the Bear River. The second Feather River Green Sturgeon was detected near the tag site until June 21 then moved downstream into the Sacramento River just above the confluence of the Feather River on June 25. It was last detected in the Sacramento River above Verona on October 31.

In 2016, four sturgeon that were not tagged in the Feather River were detected in the system. The first was a Green Sturgeon tagged in Oregon/Washington on July 8, 2011. It entered the Feather River on March 31. On April 1, it was detected further upstream before it migrated back downstream in the Feather and into the Sacramento River, a trip taking 23 hours. It was last detected on April 3 in the Sacramento River below Verona. A second Green Sturgeon, tagged in the Sacramento River in 2009, was detected meandering between the Sacramento and Feather River from March 15 to March 16. On March 17, it moved into the Sacramento River above Verona and was last detected there on November 4. A White Sturgeon, tagged in the San Joaquin River during 2013, was detected in the Sacramento River above Verona on March 15. On March 18, it was detected in the Bear River approximately 0.4 miles from the Feather River confluence. It re-entered the Feather River and then the Sacramento River on March 18 with no further detections. A second White Sturgeon tagged in 2010 (tag location unknown) was detected March 6 in the Sacramento River. On March 9, it was in the Bear River, and then it returned to and stayed in the Feather River from May 15–18. Later, it migrated between the Bear and Feather rivers until May 27 when it was last detected in the Sacramento River above Verona.

Ceratonova shasta Sampling

Ceratonova (synonym *Ceratomyxa*) *shasta* is a myxozoan parasite that infects salmonid fishes and is native to anadromous fish tributaries of the Pacific Northwest in North America, including the Feather River. *Ceratonova shasta* has a complex life cycle involving an invertebrate polychaete worm host (*Manayunkia speciosa*) as well as the vertebrate salmon host. Infected worms release actinospores into the water that infect fish by attaching to the gills. The parasite spreads through the blood into the intestine and other organs and tissues.

Myospores are released into the water when the fish dies and infect the worms, completing the life cycle.

A high prevalence of severe *Ceratonova shasta* infection (45–83 percent) was observed in natural Feather River juvenile Chinook Salmon sampled in the high-flow channel between 2012–2016. Juveniles collected in the low-flow channel were far less likely to be infected (<10 percent prevalence of infection). In 2016, DWR again partnered with the USFWS Coleman National Fish Health Laboratory to better understand the problem observed in the lower Feather River. The objectives of this study were to:

(1) compare prevalence and severity of *Ceratonova shasta* and *Parvicapsula minibicornis* (myxozoan kidney parasite) infection in natural Chinook Salmon juveniles in the low- and high-flow channels of the Feather River from late January until outmigration ends in late spring;
(2) collect juvenile Chinook Salmon by beach seine in the lower Feather River below the confluence of the Yuba River during the prime infectivity period of March and April (the lower river sample could provide information on tributary input and prognosis of infections acquired up-river);
(3) collect environmental DNA samples from the Feather River at several different locations to better determine the locations where actinospores are of highest density;
(4) collect water samples from the low-flow channel of the Feather River during late fall through winter to sample for myxospore input from adult carcasses; and
(5) collect monthly longitudinal water samples starting above the confluence with the Sacramento River up to the Thermalito Afterbay Outlet during the peak infectivity period to identify infectious zones.

Results from 2016 *Ceratonova shasta* sampling from natural Chinook Salmon and sentinel fish and *Ceratonova shasta* environmental DNA testing confirm that there is a zone of high C*eratonova shasta* infectivity in the high-flow channel from the Thermalito Afterbay Outlet (RM 59) to the Herringer Riffle RST (RM 45.8). Infection was detected as early as late January when the water temperature was 11–12°C (51.8–53.6°F). Levels of actinospore concentrations declined downstream of the Herringer site. These fish were also infected with the myxozoan kidney parasite, *Parvicapsula minibicornis*. Salmon sampled from the low-flow channel showed little to no *Ceratonova shasta* infection.

Salmonid Predator Studies

Releasing all hatchery-origin salmonids as close to the hatchery as possible is one of the goals of the draft Hatchery and Genetics Management Plans for the FRFH as well as one of several reforms recommended by the California Hatchery Scientific Review Group in 2012.

However, results from acoustic studies on hatchery-origin spring-run Chinook Salmon and Central Valley steelhead smolts in the Feather River (and out to the ocean) reveal their downstream migration success is very poor. Various release techniques have been implemented to improve migration success but very little improvement has been observed and the direct cause of mortality has not been identified. Predation is one likely source of mortality that may explain poor survival of outmigrating smolts in the Feather River.

In an effort to better understand the role of predation, a fish predator study was conducted, focusing on movements and diet. Predators such as Striped Bass (*Morone saxatilis*), Largemouth Bass (*Micropterus*

salmoides), Smallmouth Bass (*Micropterus dolomieu*), White Catfish (*Ameiurus catus*), Channel Catfish (*Ictalurus punctatus*), and Sacramento Pikeminnow (*Ptychocheilus grandis*) were tagged with acoustic tags and monitored over the course of 2 years. Stomachs from these species were collected, and the stomach contents were analyzed and compared to identify prey selection in the Lower Feather River throughout the entire year. Seasonal diets were compared and presence and absence of certain species found in the stomach contents were noted. Using angling and acoustic tag data, 'predator hotspots' were identified. Identifying these hot spots may provide an opportunity to adjust hatchery release strategies to minimize predator success.

In 2016, 105 Striped Bass and 15 non-striped bass predators' stomachs were removed and dissected. Results from dissections showed that the main prey species for striped bass were juvenile salmonids and unidentified finfish. The non-striped bass predators also contained juvenile salmonids and unidentified finfish, however they contained more invertebrates than the Striped Bass that were sampled.

In order to study salmonid predator movement, 29 striped bass and 9 non-striped bass predators were surgically implanted with acoustic tags. An array of acoustic receivers placed along the Feather River, Sacramento River, and San Francisco Bay detected the signal from the implanted tags. The data from the receivers was uploaded monthly and a history of each fish's movement is being compiled and will be included in an upcoming report.

Steelhead Mark Recapture Study

An abundance estimate of the wild steelhead population spawning in the Feather River is currently lacking. FRFH data suggest that nearly all steelhead are of hatchery origin. Redd survey, snorkeling, and angling data suggest that steelhead also spawn in the upper river but abundance data is difficult to gather. Redd surveys provide information on habitat preferences, spawn timing, and general location of spawners, but are not useful for estimating abundance. Although the FRFH has useful long-term data on abundance and origin, it is only half of the information necessary to understand population size and structure (hatchery versus natural origin, size, etc.) in the Feather River. Additional methods are needed to better understand the size and structure of the steelhead population spawning in the river.

Passive integrated transponder tags allow for all steelhead encountered during any sampling activity (electrofishing, seining, weir operations, or hatchery operations) to be individually identified. This allows movement and growth patterns of both juveniles and adults to be monitored for years instead of weeks or months. It also allows DWR to more closely monitor when juvenile and adult steelhead are present in the system and how operations may affect their behavior. Furthermore, because each fish is individually marked, details can be gained about short- and long-term growth and overall life-history behavior.

In 2016, a pilot study was conducted to see if it would be possible to estimate the population size and the ratio of natural to hatchery origin steelhead in the mile long section just below the FRFH (RM 67). During December 5–30, steelhead caught by hook and line were passive integrated transponder tagged and then released back to the river. A total of 66 fish were captured, 3 of which were subsequently recaptured. Of those 66 fish, 21 were of hatchery origin, leaving the remaining 45 as natural origin. Although this effort did not generate enough data to make a reliable population estimate, it is the first assessment of the population of steelhead potentially spawning in the Feather River and demonstrates there may

be more natural origin steelhead in the river than previously thought based on hatchery data alone. Increasing this effort in future years or operating count weirs will provide the best data possible.

Fish-related Mitigation Projects

In 1986, DWR and DFW signed the Delta Pumping Plant Fish Protection Agreement (Delta Fish Agreement) to annually provide funds to offset direct losses of Chinook Salmon, steelhead, and Striped Bass at Banks Pumping Plant. The Delta Fish Agreement is commonly referred to as the Four Pumps Agreement because it was adopted as part of the mitigation for four additional pumps at Banks Pumping Plant. Direct losses are defined as losses of fish that occur from the time fish are drawn into Clifton Court Forebay until the surviving fish are returned to the Delta. In principle, DFW and DWR intended this agreement to offset direct losses of all fish caused by the diversion of water by the pumping plant starting in 1986. However, at that time, information on impacts and measures to offset those impacts was sufficient only to deal with Chinook Salmon, steelhead, and Striped Bass. The agreement allowed for addressing impacts on other fish species once impacts could be identified and measures could be developed that would offset such impacts.

The agreement formalized the Delta Pumping Plant Fish Advisory Committee consisting of representatives from interest groups concerned with fish resources affected by the SWP, including, but not limited to, representatives of the SWP water contractors, sport and commercial fishing groups, and environmental groups. DWR and DFW work with the Delta Pumping Plant Fish Advisory Committee to review the success of the agreement in offsetting the direct effects of diversions at Banks Pumping Plant.

To mitigate fish loss, mitigation projects are selected and funded by the Delta Fish Agreement. The agreement outlines how project proposals are reviewed and selected for funding and gives priority to mitigation measures for habitat restoration and other nonhatchery measures. Under the agreement, DWR calculates fish loss as prescribed in the agreement, and approved mitigation projects earn fish mitigation credits to satisfy the fish loss mitigation provisions in the agreement. Mitigation is on a fish-for-fish basis.

The agreement provides for two funding components. One component is the Annual Mitigation Account for compensating the annual fish loss. It has no expiration date and is funded annually. The second is a $15 million Lump Sum Account provided by DWR for additional projects to compensate for post-1986 fish loss. This account was closed on December 31, 2016, per the Delta Fish Agreement.

Since 1986, DWR has spent $75.3 million on mitigation projects developed under the Delta Fish Agreement. Mitigation fund expenditures through December 31, 2016, were $60.8 million for the Annual Mitigation Account and $14.59 million for the $15 million Lump Sum Account. Funds approved but unspent from each account were $2.3 million and $410,000, respectively. Funds for the Delta Fish Agreement's Lump Sum Account are no longer available for expenditure now that this Delta Fish Agreement component is closed.

Climate Change

California's climate is changing. The Sierra Nevada mountain range has seen the warmest winter temperatures ever recorded. Peak snowmelt events occur almost a month earlier than average. Globally, 2016 ranked as the warmest year on record since 1880, with 2015 and 2014 being the second and third warmest. Prolonged droughts in

the West are costing billions of dollars in battling wildfires, lost agriculture revenue, and groundwater impacts. Projections show the trend of warming and earlier runoff will continue through the 21st century. Increasingly, flood control priorities will result in early runoff being released to maintain flood protection storage space in reservoirs. Reduced late season runoff will result in less runoff captured for storage, increasing the potential for water shortages when demand is high. Other impacts to California resulting from climate change are already occurring and are projected to continue, including rising seas, longer, more frequent droughts, reduced snowpack, and higher temperatures. These hydrologic changes will challenge current and future operation of the SWP.

The State has played a critical role in mitigating the impacts of climate change. Recent policies such as the *Short Lived Climate Pollutants Reduction Strategy* and Senate Bill 32 (Pavley; Chapter 249, Statutes of 2016) show the heightened awareness of impacts from climate change. DWR remains committed to contributing to statewide, national, and international efforts to mitigate the future impacts of climate change by reducing greenhouse gas (GHG) emissions from its activities and adapting to unavoidable climate change impacts. More information is available in the booklet, California Climate Science and Data, published by DWR in June 2015.

DWR's efforts throughout 2016 represent the continuation of its multipronged approach to addressing these issues by conducting research to better understand potential future impacts; monitoring and reporting GHG emissions; developing plans, strategies, and actions to improve the resiliency of DWR/SWP facilities and operations; reviewing and consulting with outside experts; and developing and managing climate data.

Completed in 2016

Data Development and Distribution

Hydroclimate Report Water Year 2015. Following the reports, Climate Change Impacts in the United States (National Climate Assessment, 2014) and Indicators of Climate Change in California (Office of Environmental Health Hazard Assessment, 2013), and DWR's Hydroclimate Report Water Year 2015, published in 2016, documents the characteristics of a changing climate on California's water resources. The report included climate tracking indicators such as precipitation, temperature, snowpack, and streamflow in order to visualize long-term climate trends. The hydroclimate report will continue to be issued yearly and will document annual observations of California's climate and water resources. By tracking change through a collection of indicators on an annual basis, DWR hopes to better identify changes in climate to better understand how climate changes may effect water resources and anticipate future changes.

Ongoing during 2016

Planning

Data Collection and Climate Services. Since 2011, DWR has continued developing the Flood Emergency Response Information Exchange. Information in the exchange has been linked to the climate data in the California Climate Data Archive. Additionally, seasonal forecasting tools and a storms database have been developed. The exchange will also house a new server for providing depth-duration-frequency curves and annual extremes data sets that make up Bulletin 195 (*Rainfall Analysis for Drainage Design*) in a map-based format. Beta testing is currently underway in DWR's Hydrology and Flood Operations Office.

For observing data systems, DWR is continuing its partnership with the Earth System Research Laboratory of the National Oceanic and Atmospheric Administration and Scripps Institution of Oceanography to deploy new monitoring equipment for extreme precipitation events. For this network, water vapor measurements, wind profilers, soil moisture sensors, and freezing-level radar are being deployed across the state. The data from this network are currently served through the National Oceanic and Atmospheric Administration's Hydrometeorology Testbed website and the Center for Western Weather and Water Extremes website. Other observing opportunities include elements of the Forecast-Coordinated Operations program, the Forecast Informed Reservoir Operations Project at Lake Mendocino in the Russian River watershed, and the University of California, Merced/University of California, Berkeley, observing system in the American River and Feather River watersheds. A remote sensing monitoring effort using airborne LIDAR (light detection and ranging) measurements of the snowpack is continuing under a joint project between DWR, the California Cooperative Snow Survey Program, and the National Aeronautics and Space Administration's Jet Propulsion Laboratory. In the San Francisco Bay Area, new observations for precipitation will be part of the Advanced Quantitative Precipitation Information System, a regional project funded through the Integrated Water Resources Management Program.

Sustainable Groundwater Management Act Implementation (Climate Change Objectives). DWR's initial role in the Sustainable Groundwater Management Act is to provide regulations to revise basin boundaries, prioritize the alluvial groundwater basins, provide technical assistance, and evaluate groundwater sustainability plans. Considering that the act requires applicable basins achieve their sustainability goals by year 2040 (or 2042, depending on the basin), DWR recognizes that climate change has the potential to exacerbate many ongoing issues with groundwater within the planning horizon. Climate change assessments will be a requirement and a key component of groundwater sustainability plans to assess future risk and to avoid undesirable results within defined basins under the Sustainable Groundwater Management Act.

DWR will provide technical guidance and data including a climate change assessment of projected future conditions for individual Sustainable Groundwater Management Act groundwater sub-basins.

In 2016, several team meetings were held to discuss and plan the development of datasets and analytical methods needed to conduct analysis of future water budgets and groundwater conditions. The team tentatively agreed to start with the datasets and approaches developed for the Water Storage Investment Program and to refine and further develop methodologies to use these datasets and tools in groundwater analyses.

Research

Reoperation of Water Supply and Flood Protection Systems. The System Reoperation Study is being conducted in cooperation with stakeholders to identify strategies for reoperation of the statewide flood protection and water supply systems to improve water supply reliability, ecosystem protection, and flood management.

Development of the system reoperation study is a multiphased effort that includes:

- Phase I, Plan of Study (completed in 2011);
- Phase II, Strategy Formulation and Refinement (completed in 2014); and
- Phase III, Assessments of Reoperation Strategies (draft completed in 2016).

In 2016, DWR completed an administrative draft of the Phase III report on assessments of reoperation strategies.

The next phase of the system reoperation study will support sustainable groundwater management by looking into the recharge of groundwater basins using flood flows, and investigate the feasibility of existing spillways and reservoir outlets to handle changing hydrology. It will take into consideration efforts such as the Water Storage Investment Program, California WaterFix, the California Water Action Plan, Central Valley Flood Protection Plan, and the work on water available for groundwater replenishment.

Paleohydrology. In September 2015, DWR executed a contract with the University of Arizona to develop long-term streamflow or precipitation reconstructions using tree ring data for larger Southern California watersheds, the Kern River, and Colorado River inflow to Lake Powell. The work, which includes preparation of a guidebook for water managers on using the data, entails field data collection, sample processing, and statistical modeling.

During 2016 field data collection and laboratory analysis of the collected samples were completed for almost all of the tree-ring chronology sites. Data quality control and assimilation into the statistical reconstruction models were well underway.

Data Development and Curation

Hydroclimate Report Water Year 2016. This report, first published in 2016, will be updated annually with the newest available data to track important trends, provide a compilation of indicators, and provide graphical visualization of data trends that are of interest to water managers, the media, State government, and the research community. Content was developed for the water year 2015–2016 report which will include additional indicators relating to atmospheric rivers and precipitation balance between rain and snow.

Policy

Development of Internal DWR Policies on Climate Change Mitigation, Analysis, and Adaptation. In 2010, the DWR California Environmental Quality Act Climate Change Committee began a three-phase process to develop a comprehensive DWR Climate Action Plan that will contain internal policies to address climate change mitigation, effects analysis, and adaptation.

Climate Action Plan Phase I. Completed in 2012, Climate Action Plan Phase I is the comprehensive DWR-wide *Greenhouse Gas Emissions Reduction Plan* that covers mitigation of GHG emissions. The plan lays out steps to cut DWR's GHG emissions by 50 percent below 1990 levels by 2020 and 80 percent below 1990 levels by 2050.

DWR's 5-year average of GHG emissions spanning years 2011–2015 is 52 percent below 1990 levels and 49 percent below 2010 levels. This level of emissions is the lowest ever recorded by DWR and represents substantial and consistent reductions in emissions over the last decade. DWR is already well ahead of schedule for achieving its 2020 and 2050 GHG emissions reduction goals. The *Greenhouse Gas Emissions Reduction Plan* projected that 2015 emissions should be approximately 2.1 million metric tons of carbon dioxide equivalent (mtCO2e) to be on track to achieve the reduction goals by 2020. DWR achieved its target emissions reductions for 2020 in 2015, five years ahead of schedule.

Climate Action Plan Phase II. Started in 2012, Phase II is a framework and data toolbox to guide analysis of the effects of climate change on DWR projects and activities. Phase II will ensure that all DWR projects meet standards for consistency, quality, and adequacy in climate change analysis for

planning activities. This guidance may also provide assistance to local water managers.

During 2016, substantial progress was made on development of a draft guidance document, expected to be circulated for review in 2017.

Phase II is expected to be completed in 2018.

Climate Action Plan Phase III. Phase III of the Climate Action Plan evaluates the vulnerability of DWR facilities and operations to key climate change impacts and develops adaptation strategies to improve DWR's resiliency to climate change.

The DWR Climate Change Vulnerability Assessment builds on studies of global, regional, and SWP-specific climate change impacts to evaluate, describe, and where possible, quantify DWR's vulnerabilities to expected changes in temperature, precipitation, and humidity. Specifically, this assessment looks at how changes in hydrology (precipitation, snowpack runoff, and flooding), extreme heat, wildfire, and sea-level rise will threaten DWR's infrastructure, maintenance activities, and operations. This comprehensive assessment is highly analytical using an array of geographic information system and modeling tools that goes beyond what any resource agency has previously employed for climate change vulnerability assessment. DWR-owned facilities and properties are considered, including those associated with the SWP, flood facilities, regional offices, and managed lands.

It is intended that the climate change vulnerability assessment will serve as a foundation for the development of a climate change adaptation plan for impacted operations, infrastructure, and staff work. Together the climate change vulnerability assessment and climate change adaptation plan will help prioritize DWR's adaptation and resiliency efforts such as additional water storage projects, infrastructure improvements, enhanced maintenance and operation procedures, and improved habitat management.

The vulnerability assessment portion of Phase III was completed in 2016 and is awaiting management review and approval. The adaptation plan is currently in development and is expected to be completed in 2018.

Reporting

Emissions Reports to The Climate Registry. DWR's emissions are primarily the result of electricity generation at DWR-owned power plants and power purchase transactions to provide power for operation of the SWP.

In April 2016, DWR received final acceptance of its third-party verified 2015 GHG emissions from The Climate Registry. Annual reports to the California Air Resources Board have been submitted and accepted for years up to and including 2015 pursuant to California mandatory GHG emissions reporting regulations (California Code of Regulations, Title 17, Sections 95100–95158).

For 2015, DWR's GHG emissions totaled 611,738 metric tons of carbon dioxide equivalent. This resulted in a 5-year running average of emissions (the metric used to measure progress toward achieving DWR's GHG emissions reduction goals) of 1,307,060 metric tons of carbon dioxide equivalent. This level of emissions is 52 percent below 1990 levels and 49 percent below 2010 levels indicating that DWR has already achieved its goal of reducing GHG emissions by 50 percent below 1990 levels by 2020. DWR achieved the emissions reductions in part by serving 56 percent of its SWP operational energy supplies with clean zero-emissions renewable energy resources including wind, solar, and hydroelectric.

The report included energy generated and consumed by the SWP and sulfur

hexafluoride emissions associated with the SWP's switchyard circuit breakers. The report did not include emissions from the Reid Gardner coal-fired power plant, which previously supplied DWR with up to 235 megawatts of power. (DWR's purchasing contract with Reid Gardner expired in 2013 and was not renewed in an effort to reduce GHG emissions from DWR activities.) In addition, to meet its compliance obligation for the Cap and Trade Program, DWR participated in GHG allowance auctions conducted by the California Air Resources Board.

Environmental Document Review

Some environmental documents handled by the State Clearinghouse (a division in the Governor's Office of Planning and Research) concern proposed activities that could affect the SWP. Such documents are regularly reviewed to identify any public safety or liability issues arising from the proposed activities.

During 2016, the Division of Environmental Services, Environmental Document Review Section tracked documents related to development along the California Aqueduct, highway projects with potential for conflict related to multiple crossings of aqueduct facilities and competing drainage improvements, multiuse trails within SWP right-of-way, land management related to wildlife habitat, levee encroachment, dam safety issues, water transfers and other water supply issues, wastewater treatment and conveyance, quarry development, solar and wind power facilities, and climate change issues. The number of environmental documents addressing significant climate change issues increased from 2, in 2010, to 26 in 2013 (after the California Environmental Quality Act guidelines were amended to address GHG emissions pursuant to Senate Bill 97 [Dutton; Chapter 185, Statutes of 2007]). However, in 2014, climate change issues began to be addressed in the general plan process, resulting in only 10 documents clearly dealing with climate change being processed that year. By 2016, 16 documents primarily related to climate change issues were processed.

DWR comments submitted through the California Environmental Quality Act and/or National Environmental Policy Act processes addressed a number of issues, including safety and water supply; encroachment on physical facilities; impacts to cross-drainage facilities; potential damage to SWP pipelines and aqueducts; wildlife issues, including migration, setbacks, and habitat conservation lands; DWR's status as a cooperating or responsible agency; development and operation of small-scale and utility-scale wind and solar projects; and jurisdictional dams.

In 2016, the Environmental Document Review Section screened 2,693 State Clearinghouse documents. After screening, 998 documents were referred for information, including notices of preparation and various final documents. Additionally, 119 formal referrals were made for negative declarations, notices of preparation, EIRs, and National Environmental Policy Act documents.

One hundred formal referrals were made related to SWP issues with the majority sent to the Division of Operations and Maintenance and 11 were sent to the State Water Project Analysis Office.

The total number of referrals and requests sent to the Division of Operations and Maintenance and the State Water Project Analysis Office increased slightly over 2015 when 93 referrals were made.

In 2016, formal referrals to all other DWR reviewers, including the Central Valley Flood Protection Board and the Division of Safety

of Dams, decreased by about 25 percent from 2014. This decrease is relatively insignificant since the total number of referrals was small when compared to the total number of documents (31 referred in 2015 and 27 in 2016). In addition, Central Valley Flood Protection Board referrals by the Environmental Document Review Section are made only if the State Clearinghouse does not directly assign an appropriate document to the board.

Chapter 4
Water Quality Programs

DWR's new state-of-the-art research vessel, Sentinel, was commissioned on December 19, 2016.

Significant Events in 2016

As part of a long series of drought-related actions, the Governor issued Executive Order B-37-16 on May 9 to establish long-term water conservation measures by building on existing temporary statewide emergency water restrictions. The Department of Water Resources (DWR) is part of a group of five State agencies tasked with implementation of the order.

Pyramid Lake and Silverwood Lake each experienced a potentially harmful algal bloom in the summer. On July 13 (for Pyramid Lake) and August 4 (for Silverwood Lake), DWR issued a public advisory to avoid body contact with algal scum or visible blooms and to take precautions during recreation at the lake. The blooms subsided and the advisories were lifted at Pyramid Lake on July 25 and at Silverwood Lake on August 19.

On December 16, DWR commissioned a new research vessel as a state-of-the-art replacement for the San Carlos, the research vessel used for monitoring water quality in the Sacramento-San Joaquin Delta and upper San Francisco Estuary since 1976. The Sentinel enables DWR's Environmental Monitoring Program to conduct water quality, nutrient, phytoplankton, zooplankton and benthos monitoring in the Delta. The research vessel plays a critical role helping to meet mandated water quality objectives and requirements of biological opinions. The Sentinel will also be a resource to the Interagency Ecological Program.

Information in this chapter was contributed by the Division of Environmental Services, the Division of Operations and Maintenance, and the State Water Project Analysis Office.

The Department of Water Resources (DWR), Division of Operations and Maintenance currently maintains 16 automated water quality monitoring stations at key locations along the State Water Project (SWP). This network of automated stations continuously monitors a variety of water quality parameters throughout the system and provides real-time data to SWP water contractors. In addition, field grab samples collected weekly, monthly, quarterly, or annually from more than 30 SWP locations are routinely analyzed for a broad range of constituents at the State's Bryte Chemical Laboratory.

Delta Water Quality

Maintaining adequate water quality to support multiple beneficial uses of water from the San Francisco Bay (Bay)/ Sacramento-San Joaquin Delta Estuary (Delta) is of concern to DWR as well as other resource agencies. The State Water Resources Control Board (State Water Board) establishes water quality objectives to protect a variety of beneficial uses of water within the Bay-Delta. The objectives are contained within the water quality control plans (WQCPs) adopted by the State Water Board. In July 2014, the Drinking Water Program was transitioned from the California Department of Public Health (CDPH) to the State Water Board. The State Water Board is now the primary enforcement authority for federal and State safe drinking water acts and is responsible for the regulatory oversight of public water systems throughout the state.

Water delivered through SWP facilities is subject to quality objectives contained in Article 19 of the long-term SWP water supply contracts. (See Chapter 9, Water Contracts and Deliveries.)

The State Water Board adopted the current *Water Quality Control Plan for the San Francisco Bay/Sacramento-San Joaquin Delta Estuary* (Bay-Delta Plan) on December 13, 2006 (Resolution No. 2006-0098).

The State Water Board adopted Water Right Decision 1641 (D-1641) in December 1999 (amended March 15, 2000). D-1641 implements the objectives of the Bay-Delta Plan. D-1641 amends the water rights of a number of water rights holders—primarily those for the SWP and Central Valley Project (CVP)—to help achieve the Bay-Delta Plan objectives.

For additional background information about the State Water Board's activities and the Bay-Delta Plan, see the sidebar, State Water Resources Control Board, and Chapter 7, Water Supply Development and Reliability.

2016 Drought Actions

In January 2014, the Governor declared a state of emergency due to severe drought conditions and directed State and local agencies to take all necessary actions to conserve water, enhance and protect water supplies, and reduce harmful effects of the drought. Subsequent proclamations and executive orders extended provisions and added new provisions. On November 13, 2015, the Governor issued Executive Order B-36-15, which requires the orders and provisions contained in the January 17, 2014 Proclamation; the April 25, 2014 Proclamation; and Executive Orders B-28-14 (December 22, 2014) and B-29-15 (April 1, 2015) to remain in full force and effect.

The Governor issued Executive Order B-37-16 on May 9, 2016, to establish long-term water conservation measures by building on existing temporary statewide emergency water restrictions. DWR is part

State Water Resources Control Board

The State Water Resources Control Board (State Water Board), established by the California Legislature in 1967, oversees water rights and protects water quality by setting and implementing statewide policy, administering appropriative water rights, coordinating with and supporting Regional Water Quality Control Board (Regional Water Board) efforts, and reviewing petitions that contest Regional Water Board actions. The five State Water Board members are appointed by the Governor and confirmed by the Senate. The State Water Board is responsible for four major programs.

Water quality: to preserve, protect, enhance, and restore water quality.

Water rights: to issue permits for water rights specifying amounts, conditions, and construction timetables for diversion and storage.

Financial assistance: to assist local agencies and individuals with pollution prevention or clean-up.

Enforcement: to enforce water rights and water quality laws and regulations.

Under their water quality authority, the State Water Board and Regional Water Boards adopt water quality control plans (WQCPs). The WQCPs contain water quality objectives necessary for the protection of designated beneficial uses, such as municipal and industrial, agricultural, and fish and wildlife. The State Water Board and Regional Water Boards implement these objectives in a number of ways, depending on the circumstances.

Current water quality objectives for the Sacramento-San Joaquin Delta and Suisun Marsh are contained in the *Water Quality Control Plan for the San Francisco Bay/ Sacramento-San Joaquin Delta Estuary* (Bay-Delta Plan), adopted December 13, 2006. The State Water Board is required to conduct periodic updates of the Bay-Delta Plan. As part of the update process, the State Water Board conducts proceedings to gather information, receive recommendations, consider public comments, and facilitate detailed discussions to evaluate new information relevant to potential changes to the water quality objectives. Recent issues of concern related to the WQCP include drought, pelagic organism decline, special status fish species, Delta inflow, San Joaquin River flows, and southern Delta salinity.

Water Right Decision 1641 (D-1641), adopted by the State Water Board in December 1999 and amended in March 2000, implemented the objectives in the 1995 Bay-Delta Plan and continues to implement the objectives in the 2006 Bay-Delta Plan. D-1641 places terms and conditions on a number of water rights, primarily those for the State Water Project (SWP) and Central Valley Project (CVP). The Department of Water Resources and the Bureau of Reclamation operate the SWP and CVP in coordination to meet the terms in D-1641 and other applicable regulatory requirements relevant to each project.

of a group of five State agencies tasked with implementation of the order. The agencies will establish a long-term water conservation framework that will be part of the implementation of the California Water Action Plan.

Drought Contingency Planning

Since 2014, State and federal agencies that supply water, regulate water quality, and protect fish and wildlife have closely coordinated CVP and SWP operations. Cooperative efforts such as drought operations planning and weekly Real-time Drought Operations Management Team meetings have allowed State and federal Agencies to collectively provide the necessary information to the State Water Board to support its evaluation of the Bureau of Reclamation (Reclamation) and DWR's requests for modifications to operational standards required under Water Rights Decision 1641.

On January 15, 2016, DWR and Reclamation submitted the Drought Contingency Plan for the period February through November 2016, to the State Water Board as required in the State Water Board's water right order 2015-0043. Monthly updates were submitted for February through June. The plan was developed in coordination with the fish and wildlife agencies and addressed projected water operations based on various hydrologic scenarios and potential adjustments to regulatory requirements. Proposed operations in the Drought Contingency Plan consider water quality, fish protection, and water supply. The Drought Contingency Plan serves as the framework to develop proposed modifications to D-1641 requirements during the drought. Reclamation and DWR will continue to work closely with the fish and wildlife agencies and the State Water Board to update the Drought Contingency Plan as necessary based on changing circumstances.

Reclamation and DWR submitted the final working draft of the CVP and SWP Fall 2016 Drought Preparedness Plan to the State Water Board on October 28, 2016.

The Drought Preparedness Plan provided an overview of current reservoir storage and forecasted hydrology, reviewed historic actions taken in 2014 and 2015 that requested modifications to D-1641 and adjustments to the biological opinions (BiOps), and assessed projected water operations based on various hydrologic scenarios through January 31, 2017.

Despite the potential for dry conditions to persist into water year 2016–2017, the CVP and SWP were not anticipating the need to seek D-1641 modifications or BiOp adjustments through January 31, 2017, based on upstream reservoir storage in the Sacramento and San Joaquin river basins.

State Water Board Actions

In response to the ongoing drought, the State Water Board continued cooperative efforts with State and federal agencies; gathering information; and performing outreach, expanded monitoring, and field investigations.

On April 1, 2016, Reclamation filed a temporary urgency change petition to temporarily modify requirements in its water right permits and license conditions imposed pursuant to D-1641. Reclamation requested temporary changes to conditions of its permits that require Reclamation to meet the San Joaquin River spring base flow and pulse flow objectives from April through June. On April 19, 2016, State Water Board issued an order approving parts of the temporary urgency change petition, subject to conditions.

More information about current and past years' SWP and CVP temporary urgency change petitions is available on the State Water Board's website.

Water Quality Standards

Water quality objectives in the Bay-Delta Plan are categorized by the beneficial uses they are intended to protect, including municipal and industrial, agricultural, and fish and wildlife. DWR operators adjust upstream releases and Delta exports to meet D-1641 operational requirements for meeting water quality and flow standards.

2015–2016 Water Year Hydrologic Classifications

The Bay-Delta Plan contains water quality and flow standards that are conditioned by water year type and generally become less stringent in years with less precipitation. The water year classification system provides relative estimates of a basin's available water supply based on the amounts of rainfall and snowmelt runoff and rates of groundwater accretion. Water year types are classified as "wet," "above normal," "below normal," "dry," or "critical."

The Sacramento Valley Water Year Hydrologic Classification (Sacramento Valley 40-30-30 Index) forecast on May 1 of each year determines the water year type for the implementation of flow and water quality criteria contained in the Bay-Delta Plan.

The Sacramento Valley 40-30-30 Index was below normal, and the San Joaquin Valley Water Year Hydrologic Classification (San Joaquin Valley 60-20-20 Index) was dry, based on observed data for water year 2015–2016.

For a detailed discussion of water year 2015–2016, see Chapter 8, Water Supply.

2006 Bay-Delta Plan Review

California Water Code Section 13240 requires that the WQCP be periodically reviewed. Federal Clean Water Act Section 303(c) (33 U.S.C. Section 1313(c)) requires a triennial review of State water quality "standards," as defined in the act.

The WQCP review and amendment process consists of review of the Bay-Delta Plan to identify elements that may need to be amended or new elements that may need to be added. The process also provides for staff preparation of any amendments or revision of the entire WQCP and State Water Board adoption of some or all of the amendments or revisions. State Water Board information-gathering activities may affect the scope of the WQCP review and may include a series of evidentiary hearings on critical issues concerning the Delta's ecology. The review includes both the review and update of water quality objectives (including flow objectives) and the program of implementation in the Bay-Delta Plan, as well as changes to water rights and water quality regulation consistent with the program of implementation.

The State Water Board is conducting the WQCP review in four phases:

- Phase I involves updating San Joaquin River flow and southern Delta water quality requirements for salinity.
- Phase II involves other comprehensive changes to the Bay-Delta Plan to protect beneficial uses not addressed in Phase I (e.g., objectives for Delta outflows, Sacramento River inflows, export constraints, Delta Cross Channel gate closure requirements, and Suisun Marsh protection).
- Phase III will involve changes to water rights and other measures to implement changes to the Bay-Delta Plan in Phases I and II.
- Phase IV involves developing and implementing flow criteria and flow objectives for priority Delta tributaries with a focus on the Sacramento River watershed.

Phase I began in 2009, Phase II began in 2012, and Phase IV began in 2013.

The formal review and amendment process for the 2006 Bay-Delta Plan that began in October 2008 continued in 2016.

Phase I

Phase I (initiated in 2008) includes review and potential modification of the San Joaquin River flow objectives for the protection of fish and wildlife beneficial uses, the southern Delta water quality objectives for the protection of agricultural beneficial uses, and the program of implementation for those objectives.

On September 15, 2016, the State Water Board released proposed plan amendments and a draft revised substitute environmental document for proposed (Phase I) updates to the Bay-Delta Plan. This recirculated substitute environmental document contains substantial changes to the draft released in December 2012 (see Bulletin 132-13). The changes resulted from the large number of public comments received on the 2012 document and additional information that became available since its release. Additional changes made in the draft document reflect the adoption of a State policy for sustainable groundwater management (California Water Code section 113) and passage of the Sustainable Groundwater Management Act (California Water Code section 10720 et seq) in 2014. The public hearing to receive public comments on the proposed plan amendments and draft revised substitute environmental document began on November 29, 2016, and continued into December.

Phase II

Initiated in 2012, Phase II focuses on issues such as: (1) Delta flow objectives, (2) export/inflow objectives, (3) Delta Cross Channel gate closure objectives, (4) Suisun Marsh objectives, (5) potential new reverse flow objectives for Old and Middle rivers, (6) potential new flood plain habitat flow objectives, (7) potential changes to the monitoring and special studies program, and (8) other potential changes to the program of implementation.

On October 19, 2016, the State Water Board released a working draft Scientific Basis Report prepared to support the Phase II updates of the Bay-Delta Plan. A public workshop on the report was held December 7, and the public comment period closed December 16.

SWP Operations to Meet Delta Water Quality Requirements

In 2016, DWR and Reclamation jointly operated the SWP and CVP in accordance with D-1641, which includes water quality, flow, and operational criteria for the SWP and CVP Delta operations. SWP and CVP operations were coordinated to meet the various objectives of the Bay-Delta Plan, Central Valley Project Improvement Act, and BiOps for listed species, as well as other regulatory requirements. Fish species currently listed under the Endangered Species Act and the California Endangered Species Act include the winter and spring runs of Chinook Salmon, Delta Smelt, steelhead, and Green Sturgeon.

Real-time monitoring of fish movement and conditions in the estuary aids daily water management and provides timely protection of targeted fish species from entrainment at the Delta pumping facilities.

The Bay-Delta Plan includes the requirement to monitor a number of stations within the Delta for specific water quality constituents. DWR conducts extensive monitoring in the Delta and the Suisun Marsh. Figure 4-1 shows water quality compliance and monitoring stations throughout the Delta specified in the Bay-Delta Plan.

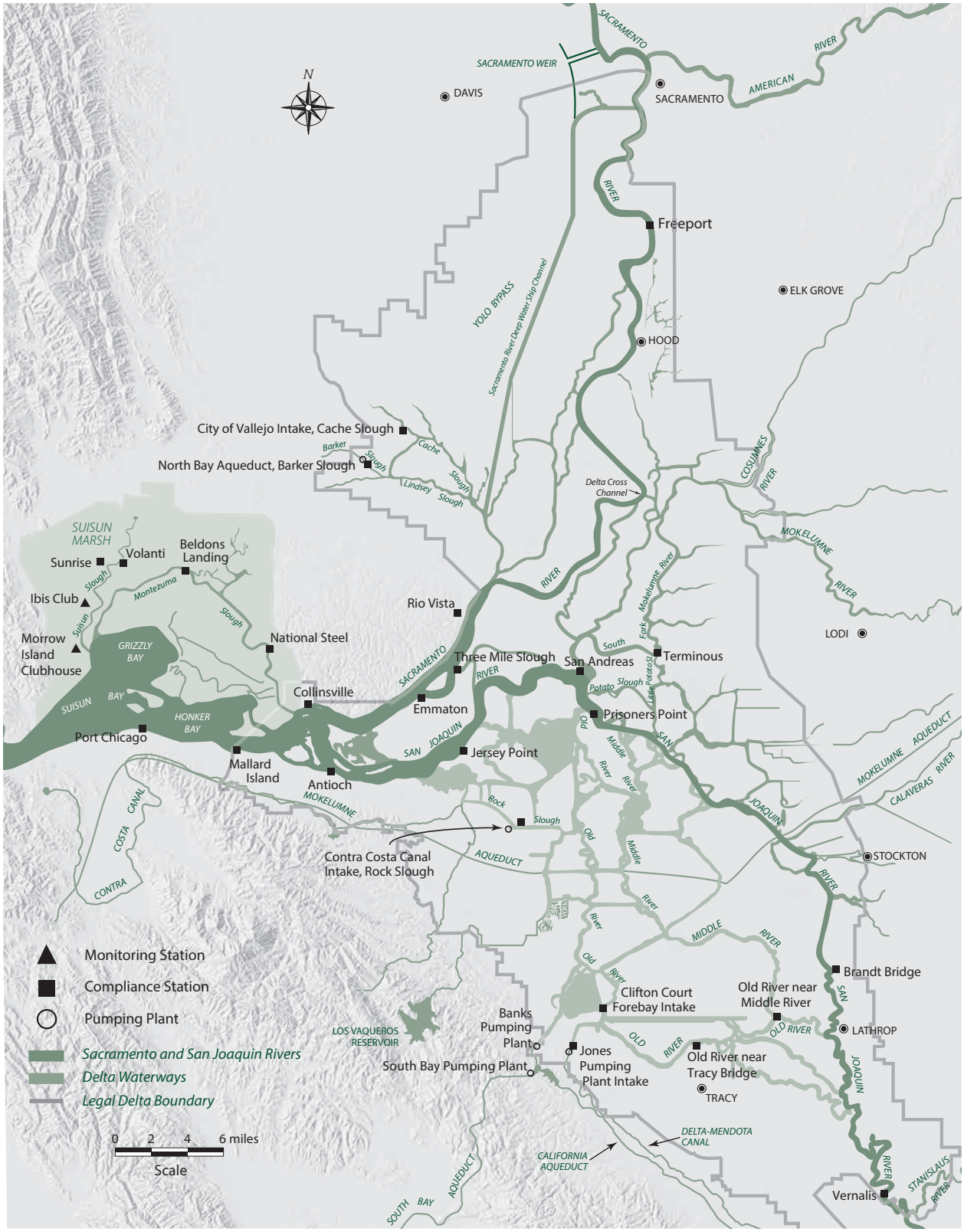


Figure 4-1 D-1641 Water Quality Compliance and Monitoring Stations in the Sacramento-San Joaquin Delta

For a discussion of other environmental issues, see Chapter 3, Environmental Programs.

Delta Cross Channel Gates

The Delta Cross Channel gates are operated in accordance with the Bay-Delta Plan/D-1641 and other regulatory requirements. In 2016, the gates were open for 167 days to allow fresher Sacramento River water to flow into interior Delta channels toward the SWP and CVP export facilities. Reclamation's standard operating procedures call for gate closure when flow on the Sacramento River at Freeport reaches between 20,000 cubic feet per second (cfs) and 25,000 cfs to reduce flooding potential on the Mokelumne River and to prevent scouring on the downstream side of the gate structure. D-1641 contains measures that require gate closure under certain conditions from November 1 through May 20 for fisheries protection as requested by the U.S. Fish and Wildlife Service (USFWS), National Marine Fisheries Service, and Department of Fish and Wildlife (DFW).

Municipal and Industrial Objectives

The Bay-Delta Plan includes a year-round 250 milligrams per liter (mg/L) (maximum mean daily) chloride objective that is in effect at Delta export locations (Contra Costa Canal Pumping Plant No. 1, Clifton Court Forebay, Jones Pumping Plant, and Barker Slough). Chloride levels remained below the objective for all days in 2016.

An additional municipal and industrial water quality objective for chloride at the Contra Costa Canal Intake, near Rock Slough, specifies that the chloride level must be below 150 mg/L (maximum mean daily) for a minimum number of days during the year, dependent upon the water year forecast. For calendar year 2016, the objective of 175 days was met.

Agricultural Salinity Objectives

The Bay-Delta Plan contains agricultural salinity objectives, which vary by location. The salinity objectives, specified as electrical conductivity (EC), are based on both water year type and a 14-day running average during the irrigation season, from April to mid-August, at established compliance stations at Emmaton, Jersey Point, Terminous, and San Andreas in the West and Central Delta. The agricultural salinity objectives at these Delta locations become less stringent under dryer conditions. The Terminous, San Andreas, and Emmaton below normal water year objectives were met for calendar year 2016. However, the objective was not met at Jersey Point for 3 days for calendar year 2016.

In the South Delta, salinity may be influenced by San Joaquin River flows, in-Delta diversions, and SWP exports, and water circulation may be influenced by the annual placement of South Delta barriers. South Delta salinity objectives are based on a 30-day running average. The 1.0 millisiemens per centimeter (mS/cm) objective for the South Delta was met at Vernalis, Old River near Middle River, and San Joaquin River at Brandt Bridge. The objective was not met at Old River near Tracy Road Bridge for 28 days. The 0.7 mS/cm objective for the South Delta (April through August) was not met at Vernalis for 19 days, Old River near Middle River for 54 days, Old River near Tracy Road Bridge for 142 days, and San Joaquin River at Brandt Bridge for 59 days. The SWP and CVP share responsibility for meeting the agricultural EC objectives imposed at these South Delta compliance locations.

State Water Board Actions Related to South Delta Salinity Objectives

In May 2005, the State Water Board issued a draft cease and desist order to DWR and Reclamation for the threat of non-compliance with the 0.7 mS/cm EC interior

southern Delta salinity objective in D-1641. After numerous proceedings, the State Water Board issued the final cease and desist order in water right order WR 2006-0006. The order required DWR and Reclamation to take actions to correct the threat of violation of the D-1641 interior southern Delta salinity objective by July 1, 2009; submit a plan for compliance and regular progress reports; and promptly report any potential or actual exceedance of South Delta water quality objectives to the State Water Board along with a description of corrective actions that DWR and Reclamation would use to avoid or curtail the exceedance. A number of actions, such as the State Water Board's review of the 2006 Bay-Delta Plan and the issuance of the USFWS and National Marine Fisheries Service BiOps for the long-term operation of the SWP and CVP, required the State Water Board to extend the July 1, 2009 deadline. The State Water Board adopted water right order WR 2010-0002 in January 2010, modifying order WR 2006-0006 to extend the deadline for compliance; to require additional studies by DWR and Reclamation to evaluate alternatives for salinity control in the South Delta; and to require DWR and Reclamation to assist with analyses to inform the Bay-Delta Plan update process. From 2010 to 2015, DWR continued to submit to the State Water Board the required monitoring and status reports and notifications of potential and actual exceedances of South Delta water quality objectives. In December 2016, a letter from the Delta Watermaster informed DWR and Reclamation that the State Water Board had determined that the compliance plan specified in order WR 2010-0002 was due by June 19, 2017.

Estuarine Habitat Protection Standard

The estuarine habitat protection standard incorporates modified X2 criteria (geographic isohaline) first established in the 1994 Delta Smelt BiOp. The upstream movement of 2 parts per thousand isohaline (2 parts per thousand of salt in the water), measured as 2.64 mS/cm at the surface, is maintained within a certain range of positions in the estuary by adequate Delta outflow. These positions (Collinsville, Chipps Island, Port Chicago, or Martinez) are associated with an abundance of fish and biota.

The requirement for meeting X2 criteria at Collinsville applies to all days from February through June. The number of days per month when the daily average EC maximum (2.64 mS/cm) is in effect at Chipps Island or Port Chicago is conditioned by the previous month's Eight River Index. (The Eight River Index is the sum of the estimated unimpaired runoff from eight rivers—four in the Sacramento Valley [Sacramento River Region runoff] and four in the San Joaquin Valley [San Joaquin 4 Rivers runoff]. For more about runoff estimates, see Chapter 8, Water Supply.) This requirement may alternately be met with a maximum 14-day running average EC of 2.64 mS/cm or with specific Delta outflow, set as a 3-day average Net Delta Outflow Index (NDOI) of 7,100 cfs, 11,400 cfs, or 29,200 cfs, when the X2 position is at Collinsville, Chipps Island, or Port Chicago, respectively. As allowed by D-1641, the May and June X2 flow objective is reduced to a 14-day running average flow of 4,000 cfs when the best available estimate for the Sacramento River Index is less than 8.1 million acre-feet (af) at the 90 percent exceedance level. The Port Chicago standard becomes effective when the Port Chicago 14-day EC average, immediately prior to the first day of the month, is less than or equal to 2.64 mS/cm.

The Eight River Index for the months of January through May 2016, in million af, was 1.25, 3.62, 2.10, 6.51, and 2.92, respectively. The X2 habitat protection objective at Chipps Island was 28 days in February, 31 days in March, 30 days in April, 25 days in May, and 1 day in June. The X2 habitat protection

objective at Port Chicago was 28 days in April.

The X2 objectives were met in calendar year 2016.

Net Delta Outflow Index Standard

Delta outflow cannot be measured directly due to the tidal influence in the Delta. Instead, an approximation of Delta outflow is calculated using measured inflows, exports, and estimated Delta water use. The NDOI was introduced in the 1995 Bay-Delta Plan/D-1641 and remains the same in the 2006 Bay-Delta Plan. NDOI calculates Delta outflow using inflows of the Sacramento River, the Yolo Bypass system, the eastside stream system (consisting of the Mokelumne, Cosumnes, and Calaveras rivers), the Sacramento Regional Treatment Plant, and a measurement of San Joaquin River flow at Vernalis.

Specific minimum monthly NDOI standards for the protection of fish and wildlife are based on water year type. In 2016, the monthly mean NDOI was highest in March, averaging 61,102 cfs. The lowest monthly mean NDOI occurred in September with 5,442 cfs, which was above the objective of 3,000 cfs. All monthly NDOI objectives were met in 2016.

River Flow Standards

Water quality objectives include minimum flow requirements measured in the Sacramento River at Rio Vista. These flow standards, incorporated from the winter-run salmon BiOp, set flow requirements based on the Sacramento Valley water year classification. Water year 2015–2016 was below normal, requiring mean monthly flows of 3,000 cfs for September, 4,000 cfs for October, and 4,500 cfs for November and December. During these periods, the 7-day running average could not be more than 1,000 cfs below the monthly standard. The actual mean monthly flows were 9,503 cfs in September; 6,406 cfs in October; 9,587 cfs in November; and 35,805 cfs in December. The monthly and 7-day average Rio Vista flow requirements were met for calendar year 2016.

Water quality objectives also specify minimum flow requirements measured in the San Joaquin River at Vernalis. These flow standards are based on the San Joaquin Valley 60-20-20 Index, which was dry for water year 2015–2016. If the position of X2 is required to be at or west of Chipps Island, the required minimum monthly average Vernalis flow is 2,280 cfs from February to April 14 and May 16 to June. Otherwise the Vernalis base-flow objective is 1,420 cfs.

A San Joaquin River spring pulse flow (a short-term increase in stream flow) is required from April 15 to May 15 at Vernalis. This spring pulse flow requirement varies based on the location of X2 during April. However, the CALFED Operations Group may vary the actual timing and duration of the pulse attraction flow based on real-time monitoring data. (For background on the CALFED Bay-Delta Program, see Bulletins 132-95 through 132-11.) A temporary urgency change petition order issued by the State Water Board in April 2016 allowed a temporary change to the spring pulse flow requirements for mid-April through June.

Additional information about San Joaquin River water quality can be found in Chapter 5, Local Assistance.

Export Standards

Water quality objectives and D-1641 include an export limitation for the SWP and CVP. It limits Delta exports based on a ratio of combined water project exports to Delta inflow (export/inflow ratio) and is expressed as a maximum export rate as a percentage of Delta inflow.

The actual export amount is calculated using the 3-day average that combines the inflow rate for Clifton Court Forebay (excluding Byron Bethany Irrigation District diversions from Clifton Court Forebay) added to the Jones Pumping Plant diversion. The export-to-inflow ratio limit is reported as either a 3-day or 14-day running average. A 14-day running average of inflows is used unless storage withdrawals from upstream reservoirs are being made for export, in which case a 3-day average of inflows is used. For all water year types, the maximum combined export rate from February through June is 35 percent of Delta inflow. This rate may be relaxed in February during years with less precipitation to between 35 and 45 percent. From July through January, the export-to-inflow ratio rises to 65 percent.

The 2008 USFWS and the 2009 National Marine Fisheries Service BiOps typically control the export rate for most of the winter and spring. Under these conditions, the Delta can be pushed into excess conditions more often. Additional information about the BiOps can be found in Chapter 3, Environmental Programs.

During 2016, the Delta was in excess conditions from January 6 to May 4, November 1 to November 7, November 27 to December 5, and December 11 to December 31, for a total of 157 days. Within this period, the 14-day export/inflow ratio averaged 25 percent, meeting both the 35 percent and 65 percent export limitations for the year.

The Delta was in balanced conditions from January 1 to January 5, May 5 to October 31, November 8 to November 26, and December 6 to December 10, for a total of 209 days. Within this period, the 3-day export/inflow ratio averaged about 38 percent. However, the export/inflow ratio met the 35 percent limitation within the months from February to June accounting for higher ratios in other months, when the limitation is 65 percent.

South Delta Temporary Barriers Project

The South Delta Temporary Barriers Project, initiated as a test project in 1991. The project was created partially in response to a 1982 lawsuit filed by the South Delta Water Agency and consists of rock barriers across four South Delta channels.

These temporary seasonal barriers are designed to improve local water levels and circulation patterns, protect fishery resources, and improve water quality. They are placed across Middle River, Old River near Tracy, Grant Line Canal, and at the Head of Old River.

For more information about the temporary barriers, see Chapter 2, Delta Resources, and Chapter 3, Environmental Programs, and previous bulletins.

Delta Mercury Control Program and Mercury Monitoring and Evaluation

DWR's Mercury Monitoring and Evaluation (MME) Section was established in 2012 in the Division of Environmental Services to carry out DWR's regulatory compliance responsibilities for the Delta Mercury Control Program (DMCP). The program conducts regulatory required studies for wetlands, open water, and dredging, as well as overseeing in-kind support for educational outreach.

The DMCP was adopted by the Regional Water Quality Control Board, Central Valley Region (Central Valley Water Board) in 2010 to address mercury and methylmercury (MeHg) water quality impairments in the

Delta. For more background information about the program, see Bulletin 132-14.

Completed and continuing work in 2016 included:

- completion of a second tidal wetland control study and the initiation of a third study to characterize mercury dynamics in tidal wetlands;
- data collection from field and laboratory open water studies to provide information for the open water modeling control study;
- ongoing DWR and consultant collaboration to create mercury models for the Delta;
- first model run for the Yolo Bypass mercury model;
- presentation of preliminary results at the Bay-Delta Science Conference;
- production of permanent signs for posting throughout the Delta as part of the Mercury Exposure Reduction Program; and
- work on the Statewide Mercury Control Policy and Mercury Control Program for Reservoirs.

The Central Valley Water Board approved a timeline extension, changing the DMCP phase I reporting deadline for completion of all modeling and wetland control study activities and submittal of final reports from October 20, 2018, to December 31, 2019.

Tidal Wetlands

The second tidal wetland control study was completed in June 2016 and focused on the Blacklock Restoration Area of Suisun Marsh. There are two breaches associated with the Blacklock property. Water level and flow into and out of the two breaches were measured continuously using two acoustic doppler current profilers. Water quality samples were collected approximately once a month, with a gap during the winter due to biofouling of the acoustic doppler current profiler instruments. Autosamplers stationed at each breach collected hourly water samples over the course of a full tidal cycle. In the laboratory, hourly samples were flow-weight composited into two sets of ebb tide and two sets of flood tide samples for each breach. Water samples were analyzed for total and dissolved mercury and MeHg, as well as other water quality parameters. Bryte Chemical Laboratory analyzed all samples except MeHg, which was analyzed by Moss Landing Marine Laboratories. The data collected during these events were entered by Bryte Chemical Laboratory into their Field and Laboratory Information Management System database, which was uploaded to DWR's Water Data Library. Loads were calculated from acoustic doppler current profiler flow data and concentration data from composited water quality samples.

Preliminary analysis of the Blacklock data indicated that for the year of the study, the tidal wetland was generally a net sink for total mercury and for about 8 months of the year, a net sink for MeHg. MeHg had a strong seasonal pattern associated with these results. During 4 months in summer, the wetland was a slight source of MeHg, but otherwise remained primarily a sink for total mercury. These results, as well as those from the first tidal wetland studied (see Bulletin 132-15 for details) were presented at the 2016 Bay-Delta Science Conference.

Site selection for a third tidal wetland began in 2016. In consultation with the Central Valley Water Board, the third wetland selected was Lindsey Slough.

An acoustic doppler current profiler was installed at Lindsey Slough in 2016 to measure flow. An instrument probe was installed to collect real-time measurements of dissolved oxygen, specific conductivity, turbidity, temperature, and chlorophyll *a*. Grab samples for total suspended solids and chlorophyll were collected approximately every week to be analyzed for use with

the real-time measurements. The first set of mercury samples were collected in December 2016.

The timeline extension to extend the DMCP phase I reporting period to December 31, 2019 will provide additional time to either sample a fourth wetland or to resample a previously sampled wetland.

Open Water

Field Work

Prior to 2016, samples had only been collected at Yolo Bypass inlet and outlet sites during a "mini-flood" event in December 2014 (see Bulletin 132-15). In March 2016, the Fremont Weir overtopped. It was the first time during the open water study period that a major flooding event occurred in the Yolo Bypass. On March 15, samples were collected from all inlets to the Yolo Bypass as well as along the northern section of the Toe Drain. On March 16, samples were collected at the most southerly points of the Toe Drain and from all major outflow points from the Yolo Bypass. Samples were analyzed for total and dissolved mercury and MeHg, as well as a number of other parameters. Sample and flow data are used to calculate the mass of a parameter entering and leaving the Yolo Bypass.

From a water balance perspective, the Fremont Weir was the largest contributor of water into the Yolo Bypass (93 percent) followed by the Cache Creek Settling Basin, Knight's Landing Ridge Cut, and Putah Creek, respectively. During this sampling event, the Yolo Bypass was a net sink for water. Water balance calculations indicated that only 54 percent of the total water entering the Yolo Bypass actually exited. Sample data show that Fremont Weir was the source of water for the Toe Drain down through the most southerly Toe Drain sampling point on Prospect Slough. Similarly, Fremont Weir water predominated in Liberty Cut while water exiting Shag Slough came primarily from the Cache Creek Settling Basin.

During this event, the Yolo Bypass was a net sink for total mercury and total suspended solids. It was a net source for MeHg. Approximately 77 percent of the total MeHg load was in the dissolved fraction. Inlet and outlet water samples will be collected over the next few years to provide validation data for the Yolo Bypass mercury model in development.

In 2016, soil samples were also collected in the Yolo Bypass under non-flood conditions. Samples representing all major land uses were collected in the spring and fall and analyzed for total mercury, MeHg, and organic content to document any soil changes in these parameters over the summer growing season and to provide information about pre-existing soil conditions prior to the winter flooding season. Additionally, in the fall and winter, monthly soil samples were collected to chronicle any soil changes in these parameters over the winter flood season. Samples will be analyzed in 2017 and provided to DWR mercury modeling consultants. Additionally, the Fremont Weir began to spill in December 2016. Water samples were collected on non-irrigated pasture as flood waters began covering these fields. The purpose is to gather more information on the mercury/MeHg contributions from highly vegetated, farmed areas.

In 2016, the U.S. Geological Survey, under contract to DWR, completed their erosion experiments studying the most common land uses in the Yolo Bypass. The final sets of samples were collected on fallow and row cropped lands and underwater from the Toe Drain and Liberty Island. Preliminary results suggested that irrigated pasture lands were the least erodible while sediment in the Toe Drain was the most erodible. However, since only two cores were collected for each land

use, these results must be interpreted with caution and are still considered provisional pending U.S. Geological Survey internal review. The U.S. Geological Survey worked with DWR mercury modeling consultants to apply field experiment results to the Yolo Bypass mercury model and quantify erosion rates as a function of flow. A final report will be produced in 2017.

The Moss Landing Marine Laboratories (MLML) provides analytical and technical support to the open water project. In addition to continuing to analyze MeHg samples for DWR in 2016, MLML completed experiments to investigate how the movement of MeHg between sediments and water differs among different land uses in the Yolo Bypass. An important pathway for dissolved MeHg is from the sediments to the overlying water column. The data are used directly in the Yolo Bypass mercury model. Preliminary calculations suggest that the Toe Drain and Liberty Island sample sites were net sinks for MeHg in the sediments. The highest movement of MeHg out of the sediments occurred from the seasonal wetland site. Total mercury movement from the sediment showed a different pattern. With the exception of three land uses (fallow, mixed/other, and seasonal wetlands), all other sampled sediment sites were net sinks for total mercury. These results must be interpreted with caution. In general, four cores for each land use were collected in one location, therefore any variation in mercury movement associated with a particular land use was not captured.

Based on the areal land use map developed for the Yolo Bypass mercury model, pasture land for grazing is the largest land use in the Yolo Bypass, however the MeHg impact of the largest land-use in the Yolo Bypass has not been studied. Unlike rice or row crops, this vegetation remains on the soil surface throughout the flood season. MLML began investigating the hypothesis that this vegetation could serve as a carbon source for bacteria to create MeHg. The first pilot study confirmed that flooded pasture land could produce high concentrations of MeHg.

A second experiment examined MeHg production in irrigated and nonirrigated pasture lands. Concentrations of MeHg were approximately twice as high in unaerated experimental treatments of the nonirrigated pasture lands as concentrations recorded in the unaerated irrigated pasture treatments. In 2017, with support from DWR, MLML plans to build on this work to better understand the MeHg contributions from pasture land.

Results associated with most of the open water field studies were presented at the 2016 Bay-Delta Science Conference, and at the conference of the American Geophysical Union.

The timeline extension to extend the DMCP phase I reporting period to December 2019 will provide the time required to complete all modeling products and experimental and field data collection for model validation and calibration.

Modeling work

To fulfill phase I open water regulatory requirements, DWR is developing mercury models for the Delta and the Yolo Bypass (see discussion in Bulletin 132-13 and 132-14). Data from the open water field studies provides some of the information for the development of the Yolo Bypass model. DWR's Delta Simulation Model 2 (DSM2) is being used for mercury modeling in the Delta. The Dynamic Mercury Cycling Model is being used to model mercury in the Yolo Bypass. Additionally, the Bay Delta Office has been funding a separate effort to modernize the DSM2, via the development of the General Transport Model.

A number of modeling milestones were completed in 2016 for the Delta mercury

model, the General Transport Model, and the Yolo Bypass Dynamic Mercury Cycling Model.

Dredging

DWR is required to submit study work plans to the Central Valley Water Board to evaluate management practices to minimize increases in MeHg and mercury discharges from dredging and dredge material reuse.

As discussed in Bulletin 132-14, no dredging activity was identified during the Phase I period of the regulation. Therefore, DWR was not required to submit control study work plans for dredging. In 2016, the MME Section continued to provide mercury guidance to DWR staff for proposed projects involving dredging or spoils usage.

Delta Mercury Exposure Reduction Program

Elevated concentrations of mercury in fish pose a human health threat. The objective of the Delta Mercury Exposure Reduction Program is to provide educational outreach to reduce human exposure to mercury from consumption of contaminated Delta fish. All entities regulated under the DMCP are required to participate in a mercury exposure reduction program. DWR is providing up to $20,000 per year through 2019 of in-kind support for brochure and sign production. In 2016, DWR's Public Affairs Office facilitated the production of 145 permanent signs using funding provided by the MME Section. These permanent signs were given to the Central Valley Water Board, which will work with stakeholders to post them throughout the Delta compliance area.

Statewide Mercury Control Policy and Mercury Control Program for Reservoirs

The State Water Board is developing a statewide mercury policy to control mercury in California's waters. It is anticipated that the policy and its regulations will be presented to the State Water Board for adoption in 2017. Eight DWR reservoirs or inland water bodies will be regulated under this new regulation: Castaic Lake, Frenchman Lake, Lake Del Valle, Lake Oroville, Lake Perris, Mile Long Pond (Oroville Wildlife Area), O'Neill Forebay, Pyramid Lake, San Luis Reservoir, Silverwood Lake, and Thermalito Afterbay.

In 2016, the MME Section continued to track developments associated with the Statewide Mercury Control Program for Reservoirs and attended all reservoir owner/operator meetings convened by the State Water Board.

Stakeholder meetings have focused on gathering information about individual reservoirs, determining what reservoir water quality improvement projects are already underway, and soliciting reservoir owner/operator feedback on reservoirs that might be suitable for pilot studies.

In anticipation of conducting pilot studies on "representative" reservoirs, the Central Valley Water Board sent a draft questionnaire to all stakeholders, asking for information about their reservoirs. This was a comprehensive survey designed to understand operational parameters, reservoir characteristics, specialized management, and fisheries management in the reservoir. A multidisciplinary staff, across multiple divisions within DWR, completed an internal online questionnaire to provide a more complete picture of reservoir operations.

Special Studies and Biological Surveys

DWR conducts several special studies and biological surveys each year. This includes a special study in the Stockton Deep Water Ship Channel during the late summer and early fall to monitor the occurrence of low dissolved oxygen (DO) levels. Low DO levels

potentially cause physiological stress to fish and block the migration of salmon into the San Joaquin River. DWR also conducts biological surveys of benthic organism density and diversity and of phytoplankton biomass and community composition in the Delta, Suisun Bay, and San Pablo Bay.

Fall Dissolved Oxygen Study in the Stockton Deep Water Ship Channel

Historically, during the late summer and early fall, DO levels in the eastern and central portions of the Stockton Deep Water Ship Channel have dropped below both the 5.0 mg/L and 6.0 mg/L water quality objectives set by the State Water Board and the Central Valley Water Board, respectively. These low DO levels are a result of several factors, including low San Joaquin River inflows, high water temperatures, high biochemical oxygen demand, reduced tidal circulation, and intermittent reverse flow conditions in the San Joaquin River at Stockton.

To help reduce the severity of these low DO conditions, DWR normally installs a temporary rock barrier across the Head of Old River during periods of projected low fall flows in the San Joaquin River.

In 2016, installation of the spring barrier began on March 10. Removal of the spring barrier was completed by June 14. Installation of the fall barrier began on September 15, and removal of the fall barrier was completed on November 21.

Methods

In 2016, DO concentration monitoring in the Stockton Deep Water Ship Channel was conducted by boat on 12 monitoring runs, from June 2 to November 14. During each run, 14 sites were sampled at low-water slack tide from Prisoners Point in the Central Delta to the Stockton Turning Basin at the terminus of the ship channel. Because monitoring results differ within the channel, sampling stations were grouped into western, central, and eastern regions. The western region of the channel begins at Prisoners Point and ends at Columbia Cut. The central region of the channel begins one-half mile east of Columbia Cut and ends at Fourteen Mile Slough. Finally, the eastern region of the channel begins at Buckley Cove and ends at Rough and Ready Island. The turning basin is unique within the channel because it is east of the entry point of the San Joaquin River into the channel and isolated from down-channel flows.

Results

During the period of this study, DO levels varied by season and exhibited similar ranges between regions within the channel excluding the turning basin. The overall study period range was 4.99 to 10.13 mg/L at the surface and 4.73 to 9.90 mg/L at the bottom. In the western portion of the channel, DO concentrations ranged from 7.47 to 10.13 mg/L at the surface and 7.31 to 9.90 mg/L at the bottom. In the central portion of the channel, DO concentrations were variable, ranging from 6.36 to 9.79 mg/L at the surface and 6.00 to 9.64 mg/L at the bottom. In the eastern portion of the channel, DO levels were lower compared to the other regions, ranging from 4.99 to 8.53 mg/L at the surface and 4.73 to 7.70 mg/L at the bottom. In 2016, bottom DO concentrations fell below the objectives on June 6 at two locations, Light 43 and Light 48.

Large storms in late fall 2016 improved DO conditions, and monitoring operations for the fall 2016 special study were suspended after November 14.

Benthic Survey

The operation of the SWP can impact flow characteristics of the upper San Francisco Estuary and subsequently influence the density and distribution of benthic biota. Benthic biota are relatively long-lived and

can respond to changes in physical factors within the estuary, such as fresh water inflows, salinity, and substrate composition. The benthic monitoring program documents changes in the composition, abundance, density, and distribution of the benthic biota within the estuary. Biological surveys conducted under the benthic monitoring program provide an indication of physical changes occurring within the upper estuary. In addition, benthic monitoring data are also used to detect and document the presence of newly introduced species within the upper estuary.

Benthic monitoring was conducted at 10 sampling sites distributed throughout the major habitat types within the estuary:

- Clifton Court Forebay Intake;
- San Joaquin River at Buckley Cove and at Twitchell Island;
- Old River opposite Rancho del Rio;
- Sacramento River below the Rio Vista Bridge and above Point Sacramento;
- Suisun Bay at Bulls Head Point;
- Grizzly Bay at Dolphin near Suisun Slough; and
- San Pablo Bay near Pinole Point and near the mouth of the Petaluma River.

Four bottom grab samples for benthic analysis and one sample for sediment analysis were collected monthly at each site during 2016. Samples were analyzed to identify organisms to the lowest possible identifiable taxon and to count all organisms collected.

DWR maintains a database of benthic organisms located within the upper estuary. The benthic database is dynamic and regularly undergoes peer review and update. When a new organism is identified at any of the sampling stations it is added to the database. In addition, the taxonomic names of organisms on the list are updated when sufficient evidence is produced to warrant such changes.

The benthic monitoring program collects a large number of organisms, but a relatively small number of species. A total of 208 species of benthic macrofauna were collected in 2016 at the 10 sampling sites. Of the 208 species, 10 represented 78.9 percent of all organisms collected:

- amphipods: *Americorophium spinicorne*, *Ampelisca abdita*, *Corophium alienense*, and *Gammarus daiberi*;
- Asian clams: *Corbicula fluminea* and *Potamocorbula amurensis*;
- sabellid polychaete: *Manayunkia speciosa*;
- tubificid worms: *Limnodrilus hoffmeisteri* and *Varichaetadrilus angustipenis*; and
- cumacean: *Nippoleucon hinumensis*.

Of the 10 dominant species, *Potamocorbula amurensis* and *Ampelisca abdita* represent macrofauna that inhabit a typically high saline environment and were found in San Pablo Bay, Suisun Bay, and Grizzly Bay. *Corophium alienense*, *Americorophium spinicorne*, and *Nippoleucon hinumensis* tolerate a wider range of salinity. They were collected both in the higher saline western sites and the more brackish to fresh water eastern sites such as the San Joaquin River at Twitchell Island and the Sacramento River above Point Sacramento. The remaining five species, *Gammarus daiberi*, *Manayunkia speciosa*, *Limnodrilus hoffmeisteri*, *Varichaetadrilus angustipenis*, and *Corbicula fluminea* are predominantly fresh water species and were collected at sites east of Suisun Bay.

Phytoplankton and Chlorophyll *a* Survey

Phytoplankton are small, free-floating or attached algae that can be tiny, single-celled organisms (less than 5 micrometers in diameter) or larger colonial organisms.

Phytoplankton are an important source of food in the estuary for zooplankton, invertebrates, and some species of fish. Phytoplankton biomass is an indicator of the status of primary productivity in the estuary. Chlorophyll *a* is one of the main groups of pigments contained in the algal species that make up phytoplankton.

Monthly sampling of chlorophyll *a* concentrations and phytoplankton was conducted in 2016 by DWR's Bay-Delta Monitoring Branch at 13 stations throughout the upper San Francisco Estuary:

- Sacramento River at Greene's Landing/ Hood and above Point Sacramento;
- San Joaquin River at Vernalis, Buckley Cove, and Potato Point;
- Old River opposite Rancho del Rio;
- Disappointment Slough near Bishop Cut;
- Frank's Tract near Russo's Landing;
- Suisun Bay at Bulls Head Point near Martinez and off Middle Point near Nichols;
- Grizzly Bay at Dolphin near Suisun Slough; and
- San Pablo Bay near Pinole Point and near the mouth of the Petaluma River.

Chlorophyll *a* concentration was measured at the 13 monitoring stations to estimate overall phytoplankton biomass in the estuary. Phytoplankton samples were collected and analyzed separately to determine which species were present in the estuary.

Monthly chlorophyll *a* concentrations throughout much of the estuary were relatively low. Of the 156 samples taken in 2016, 91.0 percent (142 samples) had chlorophyll *a* levels below 10 micrograms per liter (µg/L). Chlorophyll *a* levels below 10 µg/L are considered limiting for zooplankton growth. Of the 14 samples with chlorophyll *a* concentrations above 10 µg/L, six were from the San Joaquin River at Vernalis in March through July and September; one was from Franks Tract near Russo's Landing in May; two were from the San Joaquin River at Potato Point in May and July; two were from Disappointment Slough near Bishop Cut in July and August; one was from Old River opposite Rancho del Rio in May; one was from the San Joaquin River at Buckley Cove in July; and one was from the Sacramento River above Point Sacramento in May. The mean chlorophyll *a* concentration for all samples in 2016 was 5.89 µg/L; the median value was 2.09 µg/L. In 2015, the mean was slightly lower (3.86 µg/L), but the median was similar (2.16 µg/L). The maximum chlorophyll *a* concentration in 2016 was 71.01 µg/L, recorded in July on the San Joaquin River at Vernalis. It was much lower than the maximum in 2015 (94.09 µg/L). The minimum chlorophyll *a* concentration was 0.51 µg/L, recorded in February at Disappointment Slough near Bishop Cut.

Phytoplankton biomass and resulting chlorophyll *a* concentrations in some areas of the estuary may be influenced by extensive filtration of the water column by the introduced Asian clam, *Potamocorbula amurensis*. Well-established benthic populations of *P. amurensis* in Suisun and San Pablo bays are thought to have contributed to the low chlorophyll *a* concentrations (and increased water clarity) measured in these westerly bays since the mid-1980s.

In addition to monitoring for chlorophyll *a*, water samples were analyzed for pheophytin *a*.

Pheophytin *a* is a primary degradation product of chlorophyll *a*, and its relative concentration is useful for estimating the general physiological state of phytoplankton populations. When phytoplankton are actively growing, the concentrations of pheophytin *a* are normally expected to be low in relation to chlorophyll *a*. The mean

pheophytin *a* concentration for all samples in 2016 was 2.70 µg/L, and the median value was 0.99 µg/L. The maximum pheophytin *a* concentration was 143.75 µg/L, recorded on the San Joaquin River at Vernalis in April. The minimum pheophytin *a* concentration was 0.51 µg/L, recorded in Suisun Bay off Middle Point near Nichols in October.

Cyanobacteria and green algae constituted 97.8 percent of the organisms collected in 2016. Cyanobacteria alone constituted 95.9 percent due to the presence of small-celled but numerically dominant genera such as *Chroococcus* and *Synechococcus*.

All organisms collected fell into these 10 categories (in order of abundance):

(1) cyanobacteria (class Cyanophyceae);
(2) centric diatoms (class Coscinodiscophyceae);
(3) pennate diatoms (classes Bacillariophyceae and Fragilariophyceae);
(4) cryptomonad flagellates (class Cryptophyceae);
(5) green algae (classes Chlorophyceae and Prasinophyceae);
(6) chrysophyte flagellates (class Chrysophyceae);
(7) euglenoid flagellates (class Euglenophyceae);
(8) dinoflagellates (class Dinophyceae);
(9) charophytes (class Klebsormidiophyceae); and
(10) synurophyte flagellates (class Synurophyceae).

The 10 most common genera collected were:

(1) *Chroococcus* (cyanobacterium);
(2) *Synechococcus* (cyanobacterium);
(3) *Chlorella* (green alga);
(4) *Cyclotella* (centric diatom);
(5) *Plagioselmis* (cryptomonad flagellate);
(6) *Ochromonas* (chrysophyte flagellate);
(7) *Aulacoseira* (centric diatom);
(8) *Microcystis* (cyanobacterium);
(9) *Nitzschia* (pennate diatom); and
(10) *Hemiselmis* (cryptomonad flagellate).

The cyanobacterium genus *Chroococcus* dominated samples throughout the year, and cyanobacteria numbers overall were high compared to other phytoplankton. However, a large bloom of the centric diatom *Aulacoseira* was seen at several stations in May, driving chlorophyll *a* values to 30 µg/L or more.

Activities Outside the Delta

Routine SWP water quality monitoring activities and special studies are conducted outside the Delta. The special studies are in response to regulations facing water purveyors who rely on DWR to deliver high-quality raw water.

Water Quality Monitoring in the SWP

DWR's Division of Operations and Maintenance monitors water quality throughout the SWP. This monitoring program has more than 30 sampling stations and analyzes more than 200 chemical, biological, and physical constituents.

The Division of Operations and Maintenance operates monitoring stations at SWP storage and conveyance facilities located throughout the state, from the Feather River watershed in the north to Lake Perris in the south. Conveyance facilities include the Oroville Facilities, California Aqueduct with the East and West Branches, North Bay Aqueduct, South Bay Aqueduct, Coastal Branch Aqueduct, and the San Luis Joint-Use Complex. DWR collects and analyzes samples monthly at most stations, although the frequency can vary from weekly to annually depending on location, time of year, or special events. DWR sends the water samples to its Bryte Chemical Laboratory in

West Sacramento for analysis. Constituents analyzed include dissolved solids; nutrients; minerals such as chloride, sulfate, and sodium; trace metals; herbicides; pesticides; and organic substances.

In addition, the Division of Operations and Maintenance water quality monitoring program also uses a network of 16 automated monitoring stations at key locations along the SWP. This network provides real-time data by continuously monitoring a variety of physicochemical parameters such as specific conductance (also referred to as electrical conductivity or EC), turbidity (a measurement of suspended particles), pH (a measurement of how acidic or basic water is), UV_{254} (254 nanometer ultraviolet absorbance; a measurement of dissolved organic carbon), and fluorometry (a measurement of algal biomass). SWP water contractors rely on this essential data to assess the quality of water delivered by the SWP.

The water quality monitoring program is an important operational component of the SWP. DWR uses the program's data to evaluate water quality changes in the SWP, short- and long-term trends, and impacts from emergencies such as spills and pipe ruptures. DWR also utilizes the data to influence operations and to determine the quality of drinking water as defined by the State Water Board's Division of Drinking Water. DWR periodically conducts special studies to investigate the impacts of specific incidents affecting SWP water quality. The special studies include non-SWP water turn-ins, floodwater inflows, hydrology, and Delta hydrodynamics.

During 2016, water quality was assessed monthly at eight SWP facilities and at the CVP's Delta-Mendota Canal. Table 4-1 provides mean concentrations for 27 water quality parameters at these facilities.

Specific Conductance

Specific conductance (EC) is an important water quality measurement that estimates the amount of total dissolved salts in a water body. Examples of typical EC concentrations include a range of 30 to 1,500 microsiemens per centimeter (µS/cm) for potable water and over 50,000 µS/cm for sea water. Mean annual EC was 90 µS/cm at Thermalito Afterbay; 335 µS/cm at the North Bay Aqueduct, Barker Slough Pumping Plant; and 539 µS/cm at the Delta-Mendota Canal. Mean EC ranged from 458 to 566 µS/cm in the California Aqueduct.

Dissolved Organic Carbon

Dissolved organic carbon measures the amount of organic matter in water. Monitoring of dissolved organic carbon is important to water treatment facility operators as dissolved organic carbon has the potential to facilitate the formation of trihalomethanes (potential toxins) during the chlorination process. Dissolved organic carbon was highest at the North Bay Aqueduct, Barker Slough Pumping Plant at 8.3 mg/L, while concentrations in the California Aqueduct ranged from 3.2 to 4.2 mg/L.

Turbidity

Turbidity monitoring is important because of the potential of increased turbidity to increase the cost of water treatment. The North Bay Aqueduct, Barker Slough Pumping Plant exhibited the highest level of turbidity with an annual mean of 24 NTU (nephelometric turbidity units) compared with other locations, which had mean turbidity values ranging from 1 to 9 NTU.

Arsenic

Mean arsenic concentrations ranged from <0.001 mg/L at Thermalito Afterbay to 0.004 mg/L at Check 41 and Devil Canyon Second Afterbay. These surface water values fall below the 0.010 mg/L maximum

Table 4-1 Mean Water Quality at Selected SWP Grab Sample[a] Locations in 2016

Constituent	Units[b]	Reporting Limit	Thermalito Afterbay at Outlet	North Bay Aqueduct, Barker Slough Pumping Plant	Delta-Mendota Canal Upstream of McCabe Road	California Aqueduct					
						Banks Pumping Plant	O'Neill Forebay Outlet (Check 13)	Kettleman City (Check 21)	Near Highway 119 (Check 29)	Tehachapi Afterbay (Check 41)	Devil Canyon Second Afterbay
Alkalinity	mg/L as $CaCO_3$	1	41	93	74	66	76	75	69	78	76
Antimony	mg/L	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.003	<0.001	<0.001	<0.001
Arsenic	mg/L	0.001	<0.001	0.003	0.002	0.002	0.002	0.002	0.003	0.004	0.004
Beryllium	mg/L	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Boron	mg/L	0.1	<0.1	0.2	0.2	0.1	0.2	0.2	0.1	0.2	0.2
Bromide	mg/L	0.01	<0.01	0.04	0.24	0.23	0.28	0.27	0.21	0.24	0.27
Calcium	mg/L	1	8	15	21	18	21	20	19	23	24
Chloride	mg/L	1	1	27	80	77	95	90	71	75	85
Chromium	mg/L	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.001	<0.001
Copper	mg/L	0.001	<0.001	0.002	0.002	0.002	0.002	0.001	0.002	0.002	0.002
Hardness	mg/L as $CaCO_3$	1	36	96	108	99	114	109	101	108	108
Iron	mg/L	0.005	0.013	0.081	0.022	0.025	0.018	0.012	0.008	0.010	0.008
Lead	mg/L	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Magnesium	mg/L	1	4	14	14	13	15	14	12	12	12
Manganese	mg/L	0.005	<0.005	0.026	<0.005	0.006	<0.005	<0.005	<0.005	<0.005	<0.005
Nitrite + Nitrate	mg/L as N	0.01	0.02	0.30	0.59	0.41	0.49	0.30	0.28	0.52	0.39
Organic Carbon, Dissolved	mg/L as C	0.5	NR	8.3	4.3	4.1	4.2	4.2	4.2	3.2	3.5
Organic Carbon, Total	mg/L as C	0.5	NR	9.0	4.6	4.3	4.2	4.0	4.3	3.4	3.4
Phosphate-Ortho	mg/L as P	0.01	<0.01	0.19	0.08	0.08	0.07	0.08	0.06	0.05	0.06
Phosphorus, Total	mg/L	0.01	<0.01	0.32	0.14	0.13	0.12	0.11	0.11	0.10	0.08
Selenium	mg/L	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Sodium	mg/L	1	4	34	59	55	65	63	56	62	68
Specific Conductance	µS/cm	1	90	335	539	465	566	545	458	527	560
Sulfate	mg/L	1	2	29	43	30	40	40	38	48	54
Total Dissolved Solids	mg/L	1	56	203	289	269	317	303	258	289	309
Turbidity	NTU	1	3	24	9	8	4	4	5	5	1
Zinc	mg/L	0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005

[a] A grab sample is a single sample chosen to represent the conditions in a given matrix (usually natural water) at a specific location, depth, and time. All reported constituents are the annual mean of laboratory analytical values of water sampled monthly from January through December, with the exception of Barker Slough Pumping Plant and Check 29. Barker Slough was sampled all months except November. Check 29 was sampled from March to November. When an analytical result for a constituent is a "non-detect," the mean is calculated using "0" for the non-detect result.

[b] mg/L = milligrams per liter; µS/cm = microsiemens per centimeter; NTU = nephelometric turbidity unit; NR = No data recorded at this location.

contaminant level (MCL) for arsenic in drinking water. (The MCL is the maximum level of a contaminant in drinking water at which no known or anticipated adverse effect on human health would occur.)

Bromide

Bromide is another parameter that, when present in the water, has the potential to form trihalomethanes during water treatment. Bromide concentrations ranged from less than 0.01 mg/L at Thermalito Afterbay to 0.28 mg/L at O'Neill Forebay Outlet (Check 13).

Pesticides, Herbicides, and Other Organic Compounds

In 2016, DWR sampled for pesticides, herbicides, and other organic compounds in March and June at seven SWP facilities and at the CVP's Delta-Mendota Canal (see Table 4-2). The concentrations of the detected herbicides ranged from 0.02 to 0.15 µg/L. No pesticides, herbicides, or other organic compounds were detected at Barker Slough Pumping Plant in March or at Check 21 in June. In March, the insecticide dimethoate was detected at the following concentrations: 0.02 µg/L at

Table 4-2 Pesticides, Herbicides, and Other Organic Substances Detected in the SWP in 2016

Sampling Location[a]	Sampling Station ID Number	Sample Date	Chemical Detected[b]	Concentration (micrograms per liter)
North Bay Aqueduct, Barker Slough Pumping Plant	KG000000	3/15/16	(none)	
		6/17/16	Atrazine	0.02
		6/17/16	Metolachlor	0.06
Delta-Mendota Canal upstream of McCabe Road	DMC06716	3/15/16	Dimethoate	0.03
		3/15/16	Simazine	0.04
		6/14/16	Metolachlor	0.15
California Aqueduct at Banks Pumping Plant	KA000331	3/15/16	Dimethoate	0.02
		3/15/16	Simazine	0.06
		6/17/16	Atrazine	0.03
California Aqueduct at O'Neill Forebay Outlet (Check 13)	KA007089	3/15/16	Dimethoate	0.02
		3/15/16	Simazine	0.02
		6/14/16	Simazine	0.03
California Aqueduct near Kettleman City (Check 21)	KA017226	3/15/16	Dimethoate	0.03
		3/15/16	Simazine	0.05
		6/14/16	(none)	
California Aqueduct near Highway 119 (Check 29)	KA024454	3/15/16	Simazine	0.05
		6/14/16	Simazine	0.03
California Aqueduct at Tehachapi Afterbay (Check 41)	KA030341	3/14/16	Simazine	0.05
		6/14/16	Simazine	0.03
California Aqueduct at Devil Canyon Second Afterbay	KA041323	3/14/16	Simazine	0.02
		6/15/16	Simazine	0.03

[a] Water at these locations was sampled in March and June 2016.

[b] Only chemicals found in detectable amounts at the sampling stations are included in this table. Refer to the document entitled *Analytical Methods for Organic Chemicals* for a complete listing of all organic chemicals included in the laboratory analysis.

Banks Pumping Plant and O'Neill Forebay Outlet (Check 13) and 0.03 µg/L at Delta-Mendota Canal and Check 21. The herbicide simazine was also detected in March. In June, the detected herbicides were atrazine, metalochlor, and simazine. The detected amounts of herbicides in 2016 were below established MCLs.

Taste and Odor

DWR routinely monitors taste and odor compounds produced by algae. Chemical substances in water that are often associated with earthy, musty smelling or tasting water include geosmin and 2-methylisoborneol (MIB), which are produced in water bodies by cyanobacteria. Geosmin and MIB are natural by-products of algal chlorophyll production.

DWR's evaluation of a taste and odor event is based on microscopic examination of samples, and most importantly, the chemical analysis of MIB and geosmin. When sampling results indicate that concentrations of these compounds in SWP waters are increasing within the 10 nanograms per liter range, DWR responds by searching for the location of the source of the geosmin or MIB. To do this, water quality samples are collected and analyzed to ascertain the presence of possible algal sources. If an algal source is identified, DWR develops an aquatic herbicide application plan to control the specific algae that are associated with the elevated geosmin and/or MIB concentrations. In 2016, DWR conducted aquatic herbicide applications to control taste- and odor-producing cyanobacteria in the South Bay Aqueduct, Coastal Branch Aqueduct, East Branch Aqueduct, Pyramid Lake, Castaic Lake, and Lake Perris.

Non-SWP Turn-ins

Non-SWP water can be admitted to the California Aqueduct for conveyance and redistribution. Non-SWP water is considered to be any input to the SWP for conveyance that is not directly diverted from the Delta. According to California Water Code Section 1810, no agency may deny a transferor of water the use of a water conveyance facility which has unused capacity, for the period of time for which that capacity is available, if fair compensation is paid. Inputs to the California Aqueduct from these sources are called turn-ins.

Turn-in water may be used for local redistribution or transfer to other water contractors. Participants of an approved turn-in program can use available aqueduct capacity to move candidate waters from a point of availability to a point of need. Groundwater substitutions can also be made whereby surface water diversions are reduced by replacing that water with a like amount of groundwater. In this manner, more surface water is made available for transfer to other users. These voluntary water transfers aid in supplying water to areas experiencing shortages, usually during periods of drought or years with below-normal runoff.

Participants of turn-in programs include both SWP and non-SWP contractors that bank groundwater and routinely convey it into the California Aqueduct at various locations. Although most non-SWP turn-ins to the California Aqueduct originate as groundwater from Kern and Kings counties, other waters include excess surface flows or floodwaters typically from southern Sierra Nevada watersheds. Surface water turn-ins have included excess floodwaters from the Kings River redirected through the Mendota Pool and pumped into the California Aqueduct.

Certain conditions must be met before a turn-in proponent can be given approval to convey water into the California Aqueduct. In accordance with California Water Code Section 1810, water may be conveyed or transferred via any unused capacity of the California Aqueduct provided that the commingled water does not result in

degradation of water quality. The transfer must also be made without unreasonably affecting fish, wildlife, or other instream beneficial uses.

DWR, therefore, established interim procedures and criteria to review turn-in proposals and determine their approval for acceptance into the California Aqueduct using a two-tiered approach. According to the policy, the proponent of any turn-in proposal shall demonstrate that the water is of consistent, predictable, and acceptable quality. Prospective turn-in entities are required to submit proposals describing their turn-ins, including information such as detailed water quality monitoring and analyses, source water description, identification of wells, inflow rates, and duration. Tier 1 programs have "no adverse impacts" based on historical water quality in the California Aqueduct. Tier 2 programs are those with constituent concentrations higher than historical California Aqueduct conditions and have the potential to cause adverse impacts. Tier 2 programs are referred to the State Water Contractor Facilitation Group for review. The facilitation group consists of DWR staff and representatives from each water contractor that chooses to participate. The group reviews Tier 2 proposals based on merits, impacts, mitigation, water quality monitoring, cost, benefits, and other issues. The group then provides recommendations to DWR regarding proposal approval. DWR considers all factors before making a decision on any turn-in proposal. Programs meeting Tier 1 criteria are approved by DWR without referral to the State Water Contractor Facilitation Group.

A total of 200,016 af of non-SWP turn-in water was admitted to the California Aqueduct during 2016. Most of it (85 percent) originated from groundwater pumping in the San Joaquin Field Division; the remainder came from pumping in the San Luis and Southern field divisions (see Table 4-3).

Monitoring showed water quality in the California Aqueduct was affected, both positively and negatively, but the effects were sometimes inconsistent and depended on a variety of factors such as water quality parameter, upstream concentration, turn-in source, and relative flows.

Both the California Department of Public Health (CDPH) regulations (California Code of Regulations, Title 22) parameters and a short list of constituents of concern, as determined via the DWR *Water Quality Policy and Implementation process for Acceptance of Non-Project Water into the State Water Project* (October 2012), are regularly monitored. Data are compared to MCLs. Since MCLs apply to drinking water and not surface water, they are used for turn-ins as a tangible goal for concentrations of constituents of concern in the aqueduct.

In the San Luis Field Division, 28,657 af of groundwater was pumped into the California Aqueduct from Westlands Water District. Sulfate and turbidity were the only constituents with reported increases between upstream and downstream stations for the majority of samples. These parameters can cause taste and odor problems in drinking water but are not considered human health threats. Less frequent increases were observed for arsenic, salinity, manganese, nitrate, and total organic carbon. Bromide and chloride both consistently decreased, and the remaining constituents showed no consistent increases or decreases. Two manganese samples downstream of turn-ins exceeded the secondary MCL of 0.05 mg/L; no other constituents of concern exceeded the MCL in California Aqueduct sampling.

In the San Joaquin Field Division, 170,303 af of groundwater was admitted to the aqueduct from Kern Water Bank Authority, Kern County Water Agency, Semitropic Water Storage District, Arvin-Edison Water Storage District, Wheeler Ridge-Maricopa Water Storage District, and West Kern Water

District (see Table 4-3). These turn-ins comprised 8.3 percent of the total volume of water entering the aqueduct (turn-ins plus Check 21)—much lower than the amount in 2015 (34 percent).

Table 4-3 Turn-ins to the California Aqueduct in 2016

Groundwater Source	Amount (acre-feet)
Antelope Valley-East Kern Water Agency	1,056
Arvin-Edison Water Storage District	29,819
Cross Valley Canal	81,075
Kern Water Bank Canal	25,861
Semitropic Water Storage District	14,512
West Kern Water District	2,172
Westlands Water District	28,657
Wheeler Ridge-Maricopa Water Storage District	16,864
Total	**200,016**

Arsenic and total chromium consistently increased in the aqueduct due to San Joaquin Field Division turn-ins. These are undesirable parameters in drinking water because of their potential threat to human health. Rising concentrations of constituents like arsenic and other co-occurring contaminants are a concern because they can accumulate in biosolids as a byproduct of drinking water production, potentially increasing disposal costs. Sulfate concentrations varied throughout the San Joaquin Field Division, with slightly more occurrences of increasing concentrations overall. This result is undesirable because sulfate can cause taste and odor problems in drinking water, however, it is not considered a human health threat. No drinking water MCLs were exceeded for constituents of concern in the San Joaquin Field Division.

Bromide and organic carbon primarily decreased in the aqueduct downstream of the San Joaquin Field Division turn-ins. This provided a net benefit to SWP water contractors because high levels of these constituents can increase both the cost of producing drinking water and the potential for creating harmful trihalomethanes during the treatment process.

Chloride and salinity also decreased downstream of most turn-ins, providing a benefit to aqueduct water quality as these parameters have the potential to cause taste and odor problems in drinking water. There are other benefits of lower concentrations of salt and salt-related parameters not necessarily associated with drinking water. Salinity in treated or reclaimed wastewater must meet regulatory limits upon discharge and can become a limiting factor for groundwater recharge. Salinity can also affect some crops, and it remains an ongoing concern for agricultural users of aqueduct water.

In the Southern Field Division, 1,056 af of groundwater was pumped into the aqueduct from Antelope Valley-East Kern Water Agency. This turn-in had very little influence on aqueduct water quality due to the relatively small inflow volume and good water quality.

San Joaquin Valley Agricultural Water Quality Programs

There are a number of programs that conduct or support monitoring, research, training, or demonstration projects related to San Joaquin Valley agricultural water quality. For information about these programs, see Chapter 5, Local Assistance.

Municipal Water Quality Program Branch

The Municipal Water Quality Program Branch includes the Municipal Water Quality Investigations (MWQI) Program and the Quality Assurance/Quality Control Program (Quality Assurance Program).

Municipal Water Quality Investigations Program

The MWQI Program conducts water quality monitoring (both real time and discrete) in the Delta for municipal and industrial uses and is the most comprehensive drinking water quality monitoring program in the Delta. Since its inception in 1983, information derived from this program has been supplied to the SWP water contractors and other agencies delivering Delta-sourced drinking water. This information is used extensively by federal, State, and local agencies and the public in water supply planning studies. Data from this program are used to identify long-term trends in water quality changes in the Delta and the SWP. Monitoring data also help MWQI and other agencies develop research and mitigation measures to reduce drinking water contaminants in Delta waters. In collaboration with the Division of Operations and Maintenance, and through modeling, monitoring data derived from this program are used as an "early warning" system of changing conditions in source water, which can be used to provide advance notice to Delta water users of possible drinking water quality problems. Additionally, the MWQI Program provides technical water quality expertise to other units within DWR, local municipal water agencies, the State Water Board, and the Regional Water Boards. The program contributes water quality expertise while participating in regulatory, planning, and data sharing efforts.

Real Time Data and Forecasting Comprehensive Program

The Real Time Data and Forecasting Comprehensive Program is the central element of the MWQI Program. The program provides real-time water quality monitoring data and associated modeled water quality forecast data to urban SWP water contractors. The information enables contractors to know in advance the condition or potential condition of Delta and SWP water before it reaches their treatment facilities. The program also works to further develop real-time system capabilities and improve Delta and SWP forecast modeling for short- and long-term source water quality conditions. The Real Time Data and Forecasting Comprehensive Program entails the following elements:

- real-time water quality monitoring at key locations, providing stakeholders and interested parties with timely data;
- field operations that ensure proper operation of all automated sampling equipment;
- consistent modeling with continuous updates providing the best forecasts possible;
- quality assurance/quality control of the instruments and data; and
- centralized information management and dissemination.

The real-time monitoring network includes stations located at Banks Pumping Plant, Jones Pumping Plant, the Sacramento River at Hood, the San Joaquin River near Vernalis (McCune Station), and the Gianelli Pumping-Generating Plant at San Luis Reservoir.

MWQI Program Special Studies

Special studies focus on specific aspects of source waters, contaminant loading, measurement methods and instrumentation, and climate and hydrology. They are conducted to:

- investigate the origins, fate, transport, and, in some cases, loads of current and emerging contaminants of concern;
- investigate seasonal patterns and trends of constituents and examine circulation patterns of contaminants;
- refine modeling assumptions; and
- assess the impacts of increasing urbanization on levels of water quality constituents of concern.

The following studies were in progress during 2016:

- fluoresence of dissolved organic matter proof of concept study;
- DSM2 nutrient monitoring study;
- Cache Slough Complex prerestoration baseline monitoring;
- LT2 (Long Term 2 Enhanced Surface Water Treatment Rule) pathogen special project monitoring; and
- SWP limnology studies: nutrient budget study, nutrient and nutrient ratio influence on community species composition, light limitation in the SWP, and wide swings in canal pH study.

Accomplishments for the 2015–2016 MWQI Work Plan

During 2016, the MWQI accomplished the following goals:

- continuous operation of five real-time water quality stations;
- continuous data dissemination of water quality reports;
- weekly distribution of short-term water quality forecasts;
- monthly distribution of volumetric, EC, and organic carbon source fingerprints; and
- development of several projects to assess historical conditions for the Delta and aqueduct models (DSM2 and DSM2 Aqueduct Extension Model of the SWP).

Quality Assurance Program

The Quality Assurance Program is responsible for ensuring that all DWR water-related data are collected in a way that is scientifically sound, legally defensible, properly documented, and are comparable and compatible with data from State and federal agencies and other partners. This program identifies quality assurance principles and quality control practices necessary to ensure valid data from the time a sample is collected through the final stages of data interpretation, dissemination, and reporting. The program also provides quality assurance/quality control documentation support, guidance manuals, and training to employees who conduct environmental measurements. The guiding policy for the program is the Quality Assurance/ Control Policy for Water-Related Monitoring Programs (Water Resources Engineering Memorandum No. 60, September 18, 1992). Monitoring programs are encouraged to follow standardized procedures including quality control measurements in their sampling protocols.

The Quality Assurance Program integrates planned quality control activities at all levels of environmental monitoring programs through:

- standardized project design and organization;
- establishment of data quality objectives;
- defined sampling, analysis, and quality control procedures;
- practices for data assessment and validation;
- guidelines for report preparation; and
- means to assess progress, feedback, and process improvement.

In 2016, the Quality Assurance Program worked closely with various environmental monitoring programs and provided technical support in the development and review of quality assurance project plans, field manuals, and standard operating procedures. The program also provided assistance with statistical analysis and review of data to ensure compliance with quality assurance objectives and with review of field and laboratory activities to ensure comparable and consistent sample handling and quality control procedures.

Quality Assurance Program Special Studies

Special studies focus on specific aspects of water quality measurement methods and instrumentation and assessments of quality assurance/quality control in current use in DWR for department-wide consistency and data quality improvement.

Studies in 2016 included:

- in-situ fluorometer measurements of dissolved organic matter;
- a Quality Assurance Program revitalization project; and
- a Division of Environmental Services pilot project (completed).

Bryte Chemical Laboratory

Established in 1951, Bryte Chemical Laboratory is DWR's primary analytical laboratory. Its main function is to analyze drinking, surface, waste, and groundwater for the various water quality programs within DWR. Since 1990, the laboratory has been certified biennially by the State Water Board's Environmental Laboratory Accreditation Program to perform water quality analyses following U.S. Environmental Protection Agency or American Water Works Association procedures and analytical methods. This certification allows the laboratory to perform analyses that generate legally defensible data that can be used for regulatory or compliance purposes. The laboratory continues to perform the majority of chemical and other related analyses required to support DWR's water quality programs. Each year, thousands of water samples are routinely analyzed for inorganic and organic constituents such as standard minerals, cations, anions, nutrients, metals, chlorophyll, pesticides, herbicides, and volatile organic compounds.

In 2016, the laboratory upgraded its capability and capacity to detect and analyze dissolved nutrients (ammonia, nitrate, nitrite, and orthophosphate) with the purchase of a flow injection analysis system. It is a fully automated and computer-controlled spectroscopic instrument that generates data that are highly stable, accurate, and reproducible. The instrument's detection limit has been established at 10 parts per billion.

The laboratory has continued to manage a variety of analytical contracts with other State agencies and several outside laboratories in accordance with the master contract policy approved in fiscal year 1994–1995. These contracts are used to perform analyses that are beyond the capability and capacity of the laboratory, such as solids and fish tissues. The laboratory works in conjunction with the Quality Assurance Program to replace these contracts as they expire each fiscal year. On July 1, 2016, the interagency agreement with Department of Fish and Wildlife (DFW) for sediment and fish tissue analyses was renewed for $750,000 over 3 years.

With SWP security and protection as an ongoing priority, Bryte Laboratory continues to be an active member in a group of laboratories called the California Association of Mutual Aid Laboratories Network headed by CDPH. The laboratory network's main objective is to voluntarily assist CDPH in the analysis of chemical agents in water quality samples should a natural disaster or biochemical or chemical event occur in California. The assistance is only required should the analytical capacity of CDPH be exceeded or to confirm the presence or absence of chemical agents in water quality samples provided by CDPH. In 2007, Bryte Chemical Laboratory was classified as a Level II participating laboratory in the California Association of Mutual Aid Laboratories Network organization. Level II only allows the laboratory to receive samples that are prescreened and determined nonhazardous to laboratory personnel.

Suisun Marsh Program Activities

Suisun Marsh consists of approximately 59,000 acres of tidal and managed brackish water wetlands and 30,000 acres of bays and sloughs. It is the largest contiguous brackish marsh remaining in the United States. Situated in southern Solano County, west of the Delta and north of Suisun Bay, the marsh encompasses more than 10 percent of California's remaining natural wetlands. The marsh is the resting and feeding ground for thousands of waterfowl and shorebirds migrating on the Pacific Flyway. It provides important habitat for more than 221 bird species, 45 mammal species, 16 reptile and amphibian species, and more than 40 fish species.

DWR became involved in the Suisun Marsh in response to State Water Board Water Right Decision 1485, which required DWR and Reclamation to operate the SWP and CVP to meet salinity standards as specified in the State Water Board's 1978 *Water Quality Control Plan for the Delta and Suisun Marsh*, which established revised water quality objectives for flow and salinity in the Delta and Suisun Marsh. Water Right Decision 1485 also required DWR and Reclamation, in cooperation with other agencies, to develop a plan for Suisun Marsh that would ensure that the long-term standards for full protection of Suisun Marsh would be met. The 1984 *Plan of Protection for Suisun Marsh*, completed by DWR, included construction of a series of facilities to distribute lower-salinity water to managed wetlands and monitoring in relation to these facilities. Today, DWR operates and maintains these water management facilities, including the Roaring River Slough Distribution System, Morrow Island Distribution System (MIDS), Goodyear Slough Outfall, and the Suisun Marsh Salinity Control Gates (SMSCG). Figure 4-2 shows the water quality compliance and monitoring sampling locations and the water management facilities.

Through agreements and plans, DWR has been working in coordination with Reclamation, DFW, Suisun Resource Conservation District, USFWS, and other agencies, on habitat management, preservation, and restoration of the Suisun Marsh.

Revised Suisun Marsh Preservation Agreement

In 1987, DWR, Reclamation, DFW, and the Suisun Resource Conservation District signed the *Suisun Marsh Preservation Agreement* (SMPA), a contractual framework for implementation of the *Plan of Protection for Suisun Marsh*. It required Reclamation and DWR to meet salinity standards as specified in the State Water Board's 1978 WQCP, set a timeline for implementing the *Plan of Protection for the Suisun Marsh*, and delineated monitoring and mitigation requirements. A revised SMPA and *Revised Mitigation and Monitoring Agreement* were signed in 2005 to include actions to meet channel water salinity standards consistent with D-1641 and to implement landowner-based management activities in lieu of the western marsh facilities proposed in the plan of protection.

The revised SMPA included the following actions: operate facilities to meet channel water salinity standards consistent with D-1641; implement a Water Manager Program; provide portable pumps; update Individual Ownership Adaptive Management Habitat Plans; establish a Drought Response Fund; and replace turnouts on the Roaring River Slough Distribution System. The monitoring agreement included monitoring for the Salt Marsh Harvest Mouse (*Reithrodontomys raviventris*) and Ridgway's Rail (*Rallus obsoletus*; formerly known as the California Clapper Rail), fish, vegetation, and other biological monitoring.

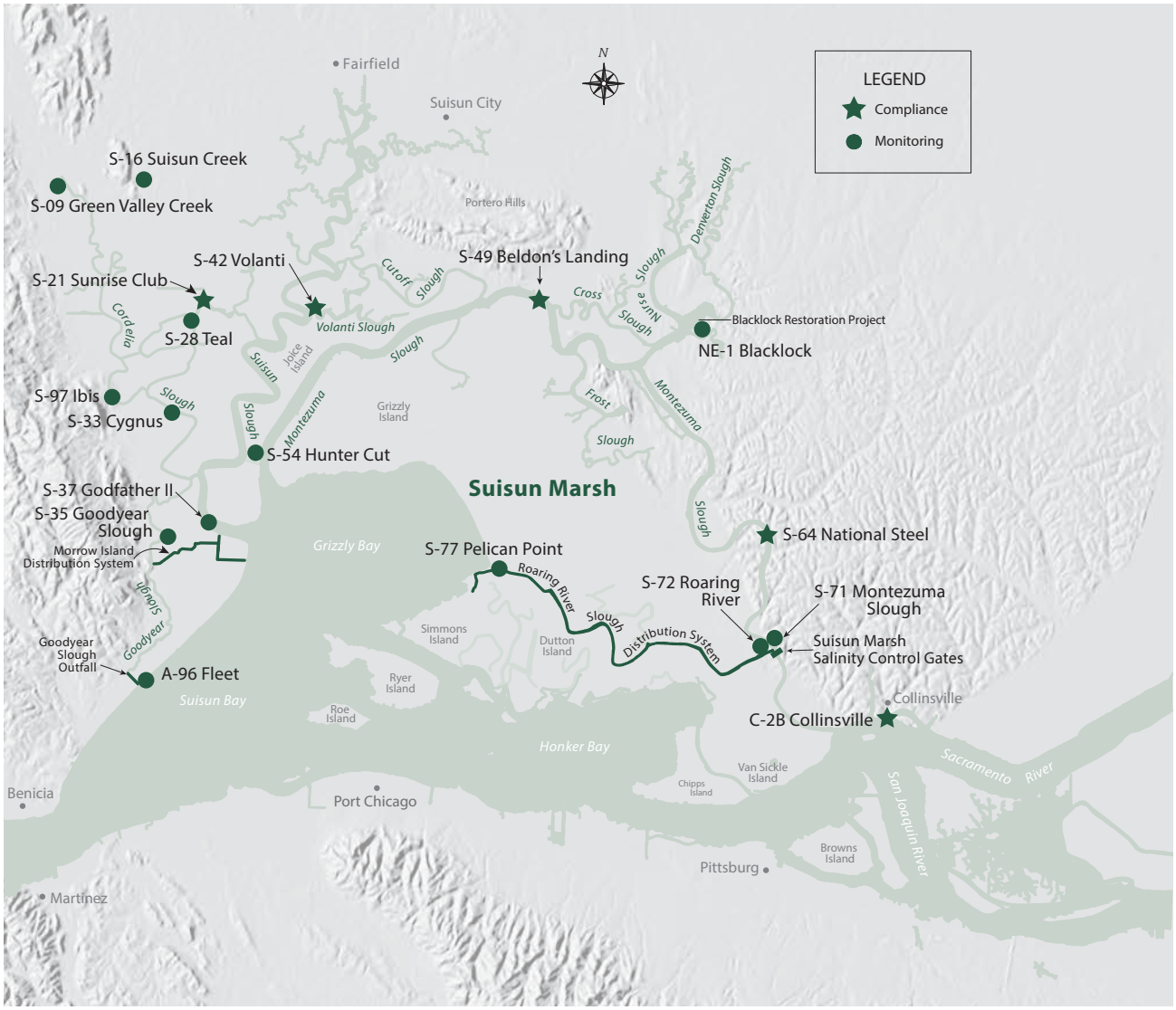


Figure 4-2 Compliance and Monitoring Stations and Water Management Facilities in the Suisun Marsh

SMPA 2015

SMPA 2015 is the newest revision of the SMPA, which includes new provisions, including September SMSCG operation and the preservation agreement implementation funding. Preservation agreement implementation funds are provided by DWR and Reclamation to improve managed wetlands infrastructure for flooding and draining and joint-use facilities infrastructure.

Facility Operations, Maintenance, and Related Activities

Morrow Island Distribution System

MIDS is an interior ditch bordered by levees that was created to distribute water to managed wetlands on the western edge of Suisun Marsh. Water with relatively lower salinity is taken from Goodyear Slough in the west through water control structures that transport the water into MIDS. Water is then distributed to managed wetlands through private landowner water control

structures along the ditch. Water not used by the landowners exits into Grizzly Bay through water control structures in the east (see Figure 4-2). Routine maintenance during 2016 included mowing, spraying, and levee road regrading and winterizing. A ditch cleaning project to remove sediment and vegetation began in April. *Phragmites australis*, an invasive weed was sprayed on the managed wetland side and removed from the ditch and placed in piles to dry. The drying piles were sprayed again to discourage new *P. australis* growth.

Fish Screen and Alternatives. Based on previous study results, a fish screen at MIDS would likely have negligible benefits to sensitive fish populations (see Bulletin 132-07, Chapter 4, Water Quality). DWR and Reclamation are proposing to fulfill the outstanding terms and conditions of the USFWS 1997 BiOp for the MIDS maintenance project by acquiring and protecting, in perpetuity, aquatic habitat in Suisun Marsh. (For additional information about the BiOp, see Bulletin 132-08.) This proposal is ongoing.

Longfin Smelt Incidental Take Permit. On February 23, 2009, DFW issued an incidental take permit for the ongoing and long-term operation of existing SWP facilities in the Delta for the protection of Longfin Smelt. MIDS is included as one of these facilities.

To minimize the take of Longfin Smelt at the MIDS diversion, DFW specifies the average intake velocities each year to adequately protect these fish.

Also, as a requirement of the incidental take permit, DWR is developing a study to confirm that the aforementioned operation prevents or substantially reduces the entrainment of Longfin Smelt at MIDS.

Morrow Lane Bridge Repair. In July 2012, the Division of Engineering inspected the Morrow Lane Bridge over Goodyear Slough and found the bridge was severely deteriorated. As a result, access and maintenance of MIDS were suspended.

DWR worked with a landowner and consultant to determine how to proceed with bridge repairs. The landowner decided to address the deficiency in two phases. The first was a repair to extend the life of the bridge one to two years, and the second is a full replacement of the bridge (anticipated in 2018).

Suisun Marsh Salinity Control Gates

The SMSCG are operated as needed to meet salinity standards. When they are not in operation, they are placed in an open position to minimize fish concerns related to predation and impedance. Installation or removal of the flashboards and operation of the gates vary depending on salinity conditions, fisheries agencies' requests for sensitive species concerns, or repairs.

Status of SMSCG in 2015–2016. The control season started in September 2015. The flashboards were installed and the boat locks became operational on August 28, 2015. The SMSCG were tidally operated from August 28 to November 19. Salinity was within the 12–14 mS/cm range for the compliance stations, so operations ceased until December 3, 2015, when salinity increased at the Sunrise Club and Beldon's Landing stations. Operations continued until May 23, 2016. The flashboards were removed and the gates were closed.

Other Facility Operation and Maintenance

The Roaring River Slough Distribution System and Goodyear Slough Outfall are operated and maintained as needed to provide lower-salinity water to managed wetland properties.

In July and August 2016, DWR removed sediment from the Roaring River Slough

Distribution System fish screens to improve the screens' performance. Other Roaring River Slough Distribution System activities included mowing and spraying, levee coring, and bank stabilization. Goodyear Slough Outfall 2016 maintenance activities included mowing, spraying, and removing floating debris. The bulkhead at the outfall was also backfilled to allow for more effective floating debris removal. The intakes were cleaned in September.

Water Quality and Compliance

Salinity levels for the 2015–2016 control season were below monthly standards for all five compliance stations.

Details about salinity levels in the marsh are available in a monthly report entitled *Suisun Marsh Monitoring Program Channel Water Salinity Report*.

Blacklock Restoration Project

DWR received CALFED Ecosystem Restoration Program grant funds in 2001 to acquire the 70-acre Blacklock property in December 2003. DWR, in cooperation with Reclamation, DFW, USFWS, and Suisun Resource Conservation District, implemented the Blacklock Restoration Project (location shown on Figure 4-2). This project restored diked, managed wetlands to tidal wetlands. Although a natural breach in the levee occurred in July 2006, it was determined that the planned breach should still be constructed to allow for full tidal flow and optimum sediment transportation. The planned breach construction occurred on October 3 and 4, 2006.

The project goals and objectives were to:

- restore the area to a fully functioning, self-sustaining marsh ecosystem created through restoration of natural hydrologic, sedimentation, and biological processes;
- increase the area and contiguity of emergent wetlands providing habitat for tidal marsh species; and
- assist the recovery of at-risk species.

The final restoration plan for the project was published in June 2007.

In 2016, DWR ended the 10-year monitoring program at the Blacklock site. DWR will put together a long-term management plan using the monitoring data collected.

Suisun Marsh Expenditure History

Suisun Marsh expenditures and reimbursements administered by DWR for calendar years 1968 through 2016 are summarized in Table 4-4. From 1968 through December 31, 2016, DWR disbursed more than $170.2 million of SWP funds for planning, design, environmental documentation, construction, maintenance, monitoring, mitigation, and permit compliance in support of implementing the *Plan of Protection for the Suisun Marsh* through the SMPA and for meeting standards set by the State Water Board. Reclamation has reimbursed DWR approximately $61.6 million (36 percent), and the State's General Fund has reimbursed approximately $9.5 million (5.6 percent). These figures do not include up-front payments made by Reclamation for staff and other direct costs, as well as approximately $5.7 million in Reclamation interest payments during 1988 and 1989.

Annual figures are reported in Table 4-4 for DWR's up-front payments, Reclamation's reimbursements, General Fund reimbursements, and DWR's cumulative expenditure balance.

Table 4-4 Suisun Marsh Expenditures and Reimbursements Administered by DWR, Calendar Years 1968–2016 (in dollars)

Year [1]	Reach 305 Costs [2]	General Fund Payment [3]	Adjustment for General Fund Payment[a] [4]	Reclamation Invoice Payment[d] [5]	Interest Payment Credited Back to Contractors [6]	Net SWP Costs [2] through [6] [7]	Recreation Costs[c] [8]	SWP Water Contractors' Costs [7] minus [8] [9]
1968	10,571					10,571	359	10,212
1969	34,181					34,181	1,162	33,019
1970	23,343					23,343	794	22,549
1971	1,042					1,042	35	1,007
1972	47					47	2	45
1973	0					0	0	0
1974	0					0	0	0
1975	2,709					2,709	92	2,617
1976	32,960					32,960	1,121	31,839
1977	37,475					37,475	1,274	36,201
1978	350,831					350,831	11,928	338,903
1979	3,660,099					3,660,099	124,618	3,535,481
1980	5,005,759					5,005,759	170,772	4,834,987
1981	2,964,974					2,964,974	101,311	2,863,663
1982	2,955,705			(2,500,000)		455,705	101,111	354,594
1983	2,754,094					2,754,094	93,643	2,660,451
1984	2,418,344					2,418,344	82,388	2,335,956
1985	2,332,773					2,332,773	79,432	2,253,341
1986	6,495,322					6,495,322	220,843	6,274,479
1987	13,600,701					13,600,701	462,424	13,138,277
1988	7,456,364			(17,368,725)[b]	(2,039,752)	(11,952,113)	253,516	(12,205,629)
1989	2,341,960	(9,478,000)	6,634,600	(1,219,691)[b]	(283,857)	(2,004,988)	79,643	(2,084,631)
1990	3,030,010			(695,450)		2,334,560	101,460	2,233,100
1991	6,223,042			(2,925,429)		3,297,613	210,454	3,087,159
1992	2,737,259			(1,174,655)		1,562,604	91,951	1,470,653
1993	2,979,255			(238,130)		2,741,125	99,897	2,641,228
1994	3,192,213			(1,962,549)		1,229,664	107,281	1,122,383
1995	2,721,978			(647,138)		2,074,840	91,218	1,983,622
1996	3,391,678			(1,482,396)		1,909,282	113,244	1,796,038
1997	3,634,267			(1,520,219)		2,114,048	121,132	1,992,916
1998	5,342,834			(1,107,501)		4,235,333	177,132	4,058,201
1999	8,867,742			(2,696,200)		6,171,542	301,424	5,870,118
2000	2,857,534			(3,300,053)		(442,519)	98,146	(540,665)
2001	2,621,301			(444,009)		2,177,292	89,431	2,087,861
2002	3,752,486			(791,319)		2,961,167	124,387	2,836,780
2003	3,258,583			(2,389,979)		868,604	107,566	761,038
2004	2,874,629			(952,940)		1,921,689	94,885	1,826,804
2005	3,940,876			(1,409,296)		2,531,580	130,049	2,401,531
2006	5,795,538			(868,449)		4,927,089	193,462	4,733,627
2007	4,112,556			(939,879)		3,172,677	135,721	3,036,956
2008	3,826,847			(1,670,278)		2,156,569	125,771	2,030,798
2009	4,701,814			(1,123,705)		3,578,109	155,161	3,422,949

Table 4-4 Suisun Marsh Expenditures and Reimbursements Administered by DWR, Calendar Years 1968–2016 (in dollars)

Year [1]	Reach 305 Costs [2]	General Fund Payment [3]	Adjustment for General Fund Payment[a] [4]	Reclamation Invoice Payment[d] [5]	Interest Payment Credited Back to Contractors [6]	Net SWP Costs [2] through [6] [7]	Recreation Costs[c] [8]	SWP Water Contractors' Costs [7] minus [8] [9]
2010	2,835,110			(1,663,530)		1,171,580	93,558	1,078,021
2011	3,772,364			(1,748,136)		2,024,228	124,448	1,899,740
2012	6,371,395			(1,860,585)		4,510,810	210,256	4,300,555
2013	5,619,858			0		5,619,858	185,455	5,434,403
2014	4,997,228			0		4,997,228	164,911	4,832,318
2015	5,568,320			(6,538,766)		(970,446)	183,754	(1,154,201)
2016	8,772,098			(388,253)		8,383,845	289,601	8,094,244
Total	**170,278,069**	**(9,478,000)**	**6,634,600**	**(61,627,260)**	**(2,323,609)**	**103,483,800**	**5,708,264**	**97,775,537**

[a] Under California Water Code section 12912.5 (Chapter 716, Statutes of 1989 [Assembly Bill 1442, Baker]), the General Fund paid 20 percent of the Suisun Marsh costs through June 1988, which totaled $9,478,000. This $9,478,000 payment included $2,843,000 which represents 5.6 percent of the Suisun Marsh costs through June 1988 paid by the General Fund. The Suisun Marsh costs billed to the SWP water contractors have been reduced by $2,843,000. The remaining $6,634,600 received from the General Fund represents DWR's recreation project purpose share of 14 percent.

[b] Excludes interest payments made by Reclamation.

[c] Allocation factors for capital recreation costs have changed from 14 percent to 3.4 percent, and operations and maintenance recreation costs from 14 percent to 3.3 percent.

[d] No payments were made by Reclamation in 2013 and 2014 due to disputed invoices. All disputed charges were resolved and paid in July 2015.

Chapter 5
Local Assistance

Turf removal in Corona, California.

Significant Events in 2016

The Department of Water Resources (DWR), in coordination with four other State agencies, led a series of stakeholder meetings to advance the Governor's May 9 Executive Order B-37-16, Making Water Conservation a California Way of Life. Recommendations were developed that will serve as the foundation for a long-term water use efficiency framework, guiding urban water management into the foreseeable future.

The High-Efficiency Toilet Rebate Program was successfully completed, supporting the replacement of more than 44,000 toilets. The Turf Replacement Rebate Program continued, converted 7.6 million square feet of high water-use turf to low water-use landscapes.

The California Irrigation Management Information System (CIMIS) experienced an all-time high number of website hits, and approximately 14.3 million reports were generated from the CIMIS database.

Information in this chapter was contributed by the Division of Statewide Integrated Water Management, the Division of Environmental Services, and the Division of Integrated Regional Water Management.

The Department of Water Resources (DWR) manages the Davis-Grunsky Act program, water use efficiency, agricultural drainage, and Water Conservation Bond Law programs, and participates in several other programs that assist local agencies and benefit State Water Project water contractors.

Davis-Grunsky Act Program

The Davis-Grunsky Act, authorized in 1960 as part of the Burns-Porter Act, provides construction loans for local domestic water projects and agricultural water supply. It also provides grants for recreation and fish and wildlife enhancement. Additionally, loans and grants may be given to rehabilitate dams and reservoirs.

DWR's ongoing administration of Davis-Grunsky Act program loans and grants includes management and oversight of recreation projects and contracts. Administration costs are recovered from revenues generated by repayment of Davis-Grunsky Act loans. Recreation grant contracts are amended to reflect modification of DWR's fee oversight functions and actual construction of recreation facilities.

The Davis-Grunsky Act requires participating State agencies to operate and maintain the recreation projects, while DWR inspects the recreation facilities, monitors the recreation contracts, and maintains a list of the recreation projects.

Water Use Efficiency

Activities of the Water Use and Efficiency Branch in DWR's Division of Statewide Integrated Water Management include providing technical assistance to local agencies; managing water use efficiency financial assistance programs; managing the California Irrigation Management Information System (CIMIS); reviewing, tracking, and reporting on urban and agricultural water management plans; and promoting water recycling and desalination projects.

California Irrigation Management Information System

CIMIS is a network of automated agro-climatic weather stations that collects weather data and transmits it to a central repository in Sacramento. After performing quality control and calculations, data are made available to the public for such diverse purposes as irrigation scheduling, resource planning, research, and modeling.

In 2016, DWR's CIMIS network collected data from 146 stations, with approximately 60 percent of the stations on the network belonging to local cooperators. The demand for CIMIS data has been increasing steadily since its establishment in 1982. The number of registered data users has grown to more than 57,000 in 2016.

Approximately 14.3 million reports were generated from the database using the CIMIS website in 2016. This number of reports is a significant increase from the average annual data query of about two million in normal years. The trend of increased CIMIS data use is attributed to both active outreach efforts and the 5-year drought.

In 2016, DWR conducted numerous outreach activities at farm shows and conferences to promote the use of CIMIS data. CIMIS continued providing the spatially distributed

reference evapotranspiration (ET_0) data, known as Spatial CIMIS.

CIMIS data are used to increase water use efficiency in agricultural operations and in support of California Water Code (CWC) requirements pertaining to conservation, development, and utilization of State water resources and the Model Water Efficient Landscape Ordinance (California Code of Regulations, Title 23, Sections 490–494).

In anticipation of increased future demand, the CIMIS program is continually expanding the network and upgrading its systems. In 2016, six new CIMIS stations were installed. Five of these stations were installed in the Sacramento-San Joaquin Delta to provide data for a multiagency investigation aiming to quantify consumptive water use in the Delta. Agencies involved in this investigation include the State Water Resources Control Board; the University of California, Davis; NASA's Ames Research Center; the U.S. Department of Agriculture; and several local agencies. A preliminary report has been released. The investigation is continuing, and the final report is expected later in 2017.

Executive Order B-37-16: Making Water Conservation a California Way of Life

DWR and four other State agencies, including the State Water Resources Control Board, California Public Utilities Commission, California Department of Food and Agriculture, and California Energy Commission, undertook a comprehensive stakeholder process to develop a long-term framework to make water conservation a California way of life, as directed by the Governor's Executive Order B-37-16, issued on May 9, 2016.

Starting with a series of public listening sessions in June 2016, stakeholder meetings were held and written comments were received. The framework discussions covered topics on new water use targets for urban water suppliers based on a water budget approach; strengthened urban water shortage contingency plans; and updated agricultural water management plan requirements. The new water use targets will be based on statewide standards for indoor water use; an outdoor water use standard that is specific to local conditions; commercial, industrial, and institutional use; and distribution system water loss. Urban water shortage contingency plans will be more robust by incorporating improved planning elements and annual assessments.

The executive order also requires improvements to agricultural water use efficiency. Discussions have centered around the need to develop annual water budgets for individual service areas, identify water management objectives and implementation plans, quantify measures to increase water use efficiency, and develop adequate drought plans. The recommendations developed during the stakeholder process will be included in a report to the California Legislature in 2017.

Water Loss Audit Reporting

DWR initiated development of regulations that will satisfy the requirements of CWC Section 10608.34, created by Senate Bill 555 (Wolk; Chapter 679, Statutes of 2015). The statute requires that, beginning in 2017, all urban retail water suppliers perform water loss audits of their water distribution systems, validate those audits, and submit them annually to DWR by October 1. The regulations will specify the minimum standard for conducting a water loss audit and the minimum requirement for how water loss auditors must conduct validation of those audits. The regulations will also specify the qualifications of those who validate water audits. In addition, the proposed regulations will specify what is required for submitting validated water loss audit reports and standards for report acceptance.

DWR developed proposed regulations based largely on statutory requirements and input from several stakeholder meetings. In preparation for public circulation, a fiscal and economic impact statement was prepared for the proposed regulations, and DWR presented an introductory informational briefing to the California Water Commission in November.

Recycling and Water Desalination

The goal of the Division of Statewide Integrated Water Management's Recycling and Water Desalination Section is to improve water management by promoting the increased use of nonconventional water sources—namely recycled water and desalinated brackish and ocean waters—through planning, technical, and financial assistance. As part of a balanced water portfolio, nonconventional water sources help meet existing and future water supply and environmental needs. The section's mission consists of increasing safe and beneficial reuse of treated municipal wastewater, advancing energy-efficient treatment and desalination technologies, and encouraging economically and environmentally acceptable use of desalinated brackish and ocean waters.

A primary activity of this section is to manage the Water Desalination Grant Program, funded by Propositions 50 and 1. There have been three rounds of Proposition 50 funding supporting 51 completed and ongoing projects. These projects were awarded $47.7 million for planning, construction, pilot studies, and research. All Proposition 50 funds have been obligated. Proposition 1 will provide $93.1 million in local assistance, for which the first round of funding is planned for 2017.

Agricultural Water Management Plans

The Agricultural Water Management Planning Act (CWC Section 10800, et seq.) requires all water suppliers to increase water use efficiency. Agricultural water suppliers are responsible for preparing, implementing, and updating an agricultural water management plan (AWMP), measuring the volume of water delivered to customers, adopting a pricing structure, and implementing efficient water management practices. Agricultural water suppliers that fail to meet the specified water management planning requirements are not eligible for water grants or loans awarded or administered by the State.

Agricultural water suppliers were required to prepare and adopt an AWMP on or before December 31, 2012, and to update the AWMP on December 31, 2015, and every 5 years thereafter. Updated AWMPs must be submitted to DWR within 30 days of adoption.

"Agricultural water supplier" is defined in CWC Section 10608.12(a) as a publicly or privately owned water supplier that provides water to 10,000 or more irrigated acres, excluding acreage that receives recycled water. An agricultural water supplier is a supplier of or contractor for water that distributes or sells water for resale. Every water supplier that becomes an agricultural water supplier after December 31, 2012, and provides water to 25,000 or more irrigated acres, excluding recycled water, is responsible for preparing and adopting an AWMP within one year of becoming an agricultural water supplier.

Under the Emergency Services Act, and in response to the declared Drought Emergency, the Governor issued Executive Order B-29-15 on April 1, 2015. The order required all midsized agricultural water suppliers (those that provide water to 10,000 to 25,000 irrigated acres of land) to develop AWMPs that include a detailed drought management plan and quantification of water supplies and demands for 2013, 2014, and 2015, to the extent data is available.

These AWMPs were required to be submitted to DWR by July 1, 2016. The executive order also directed DWR to prioritize grant funding for midsized agricultural water suppliers' AWMPs.

In 2016, DWR received AWMPs from 60 agricultural water suppliers: 37 large suppliers (serving more than 25,000 acres of irrigated land) and 23 mid-sized suppliers (serving 10,000 to 25,000 acres of irrigated land).

Agricultural Water Management Planning Grants

In response to the Governor's April 1, 2015 Executive Order B-29-15, which directed DWR to prioritize grant funding for AWMPs for mid-sized agricultural water suppliers (agricultural water suppliers that provide water to 10,000 to 25,000 irrigated acres of land),DWR administered a noncompetitive grant program to fund AWMPs.

One million dollars in grant funding was made available with a $50,000 cap for suppliers preparing new plans, a $10,000 cap for suppliers updating plans, and a $5,000 cap for suppliers who already submit plans to the Bureau of Reclamation. In 2016, thirteen mid-sized agricultural water suppliers applied for and received a total of about $370,000 in funding for the preparation of their AWMPs.

Urban Water Management Plans

In accordance with the Urban Water Management Planning Act (CWC Section 10610 et seq.), California urban water suppliers are required to adopt and submit urban water management plans to DWR every 5 years. The plans support long-term resource planning, and ensure adequate water supplies are available to meet existing and future water demands.

CWC Section 10617 defines "urban water supplier" as a supplier, either publicly or privately owned, providing water for municipal purposes either directly or indirectly to more than 3,000 customers or supplying more than 3,000 acre-feet of water annually.

In 2016, 389 urban water suppliers submitted urban water management plans to DWR. The urban water management plans and their associated data are available online. DWR is reviewing the plans for consistency with the CWC.

Water Use Efficiency Grants and Loans Program

Proposition 50 Water Use Efficiency Grant Program

Proposition 50 has provided approximately $105 million for the Water Use Efficiency Grant Program since 2005. The grant program funds implementation of urban best management practices and agricultural efficient water management practices that result in local, regional, and statewide benefits. Benefits include water conservation, improved in-stream flows, improved water quality, and energy efficiency, among others.

A competitive proposal solicitation package was developed for all grant cycles, along with a comprehensive review and evaluation of the project proposals. The proposal solicitation package defined project benefits, eligible projects, eligible applicants, funding caps, reporting, and other contract requirements.

In 2016, DWR's Water Use Efficiency Grant Program continued to manage close to 140 grant agreements from previous proposal solicitations funded by Proposition 50, pursuant to CWC Section 79550(g).

Proposition 1 CalConserve Water Use Efficiency Revolving Fund Loan Program

The CalConserve Water Use Efficiency Revolving Fund is a sustainable funding source for water use efficiency projects. One of the purposes of this fund is to provide measurable reductions in urban per capita potable water use.

This loan program implements CWC Sections 81000–81046, Assembly Bill 2636, (Gatto; Chapter 825; Statutes of 2014) which authorizes DWR to provide $10 million in available funding to assist local agencies in implementing water use efficiency and leak repair projects.

Of the $10 million in the CalConserve fund, $5 million is designated for a pilot project for local agencies to provide water efficiency upgrades to eligible residents, and $5 million is slated for loans that local agencies can offer customers to repair or replace cracked or leaking water pipes.

In June 2016, DWR released the CalConserve guidelines and proposal solicitation package. Two loan applications for water use efficiency upgrades were received and awarded funding. The loan awards for the two proposals totaled $3.25 million, leaving $6.75 million in loan funds available to be awarded on a first-come, first-served basis.

Proposition 1 Agricultural Water Use Efficiency 2016 Grants Program

This grant program implements CWC Section 79746(a)(2), created by Proposition 1 (2014), which authorizes DWR to provide funding for agricultural water management planning and agricultural water use efficiency projects and programs developed pursuant to the Agricultural Water Management Planning Act (CWC Section 10800, et seq.).

The grant program funds agricultural water use efficiency projects that produce benefits including: water savings, improved in-stream flow, improved water quality, increased energy conservation, reduction of greenhouse gas emissions, and increased local water supply reliability.

Funding allocated for the agricultural water use efficiency grants totals $30 million. DWR released a proposal solicitation package in January 2016 and received 50 proposals. In December 2016, DWR announced the final funding awards allocating $24.5 million for 16 implementation and infrastructure improvement projects, and $5.27 million for 22 other projects (including Research and Development; technical assistance; and training, education, and outreach) with total awards of $29.8 million. The grant awards were matched by applicants' local cost-share of approximately $32.3 million.

The remaining $3 million is allocated to fund a joint request for proposal between DWR and the California Department of Food and Agriculture for a water use efficiency pilot project. The water use efficiency pilot project encourages partnerships between agricultural water suppliers and growers. The project's goals are to improve water use efficiency by saving water and reducing greenhouse gas emissions related to on-farm and agricultural water supplier's water conveyance activities. A separate proposal solicitation package and guidelines are being developed and a draft is expected to be released in 2017.

Turf Replacement and High-Efficiency Toilet Rebate Programs

In August 2015, DWR announced two rebate programs to help Californians further conserve water during the state's historic drought. The rebate programs are financed by the Proposition 1 water bond, approved by voters in 2014. The programs helped implement Executive Order B-29-15 directives to bolster the State's drought response. The order called for the collective replacement of 50 million square feet of

lawns and ornamental turf in partnership with local agencies. The rebate programs contributed to the reduction of water use in homes by providing funds toward the replacement of more than 12 million square feet of lawns and upgrade of more than 60,000 water-wasting toilets.

With $24 million in Proposition 1 funding, the Turf Replacement Rebate Program will rebate $2 per square foot of turf replaced, up to $2,000 per household, and the rebate may be used in tandem with other State or local turf replacement programs. Consumers are eligible to replace turf that is living or dead at the time of the rebate application. The turf rebate program is estimated to benefit more than 10,000 homes, with half of the allocated funds initially reserved for disadvantaged communities hardest hit by the drought. Twelve million dollars of the lawn removal funds is targeted for residents in disadvantaged communities with areas of depleted groundwater basins. The turf rebate program is monitored by DWR and administered by the Electric & Gas Industries Association. Approximately $1 million is targeted for lawn removal in institutional properties, such as schools, through an interagency agreement with the California Conservation Corps. In 2016, 7.6 million square feet of high water use turf was converted to low water use landscapes with funding from the Turf Replacement Rebate Program. More than 12 million square feet of turf has been converted since the program's inception in 2015.

The $6 million High-Efficiency Toilet Rebate Program, also funded by Proposition 1, helped Californians replace inefficient toilets by offering a $100 customer rebate, per household, to replace them with high-efficiency toilets. Another $6 million was available to fund the direct installation of high-efficiency toilets in disadvantaged communities through an interagency agreement with the Department of Community Services and Development. In 2016, more than 42,000 inefficient toilets were replaced through this program. The High-Efficiency Toilet Rebate Program was successfully completed in 2016.

Integrated Regional Water Management Grant Programs

DWR's Division of Integrated Regional Water Management (IRWM) manages grant programs funded by voter-approved bonds Propositions 84 and 1, and the Water-Energy Grant Program funded by Greenhouse Gas Reduction (Cap-and-Trade revenue). In 2016 the following activities were conducted, in addition to routine grant administration and management for previously awarded grants.

Proposition 84 IRWM Grant Program

On January 21, 2016, DWR awarded the remaining $232 million in Proposition 84 IRWM grant funding to 26 of the State's established 48 regional water management groups. The grants are funding approximately 130 projects with total project costs in excess of $1 billion and are matched by $737 million in local cost share. Approximately $52 million (more than 20 percent) of the grant funding is supporting projects that directly benefit disadvantaged communities (Legislatively-defined populations with less than 80 percent California mean household income). With the award of these funds, DWR successfully concluded the grant solicitation phase of the Proposition 84 IRWM Grant Program.

Proposition 1 IRWM Grant Program

In 2016, DWR formally launched the Proposition 1 IRWM Grant Program by releasing the following documents:

- 2016 IRWM Grant Program Guidelines;
- IRWM Planning Grant proposal solicitation package; and
- IRWM Disadvantaged Communities Involvement Program Request for Proposal.

The guidelines presented an overview of the grant program and described program requirements, guidance for grantees, and general processes. The proposal solicitation package and request for proposal contained more specific information regarding the process, eligibility, and required content for grant proposals or applications. DWR made $5 million available for planning grants (development and update of IRWM plans) and made at least $51 million available for the IRWM Disadvantaged Communities Involvement Program, to ensure the involvement of disadvantaged communities, economically distressed areas, and underrepresented communities in IRWM planning efforts.

Greenhouse Gas Reduction Funds—Water-Energy Grant Program

On September 2, 2016, DWR released the 2016 Water-Energy Grant Program Guidelines and proposal solicitation package. The goals of the 2016 Water-Energy Grant solicitation were to reduce greenhouse gas emissions and water and energy use, by funding commercial and institutional water-energy efficiency programs or projects and residential water-energy efficiency programs or projects that benefit disadvantaged communities. A total of $19 million was made available under this grant program.

The 2016 solicitation focused on the eligible programs/projects listed below:

- commercial water efficiency or institutional water efficiency programs;
- residential water efficiency programs that benefit disadvantaged communities;
- projects that reduce greenhouse gas, reduce water, and reduce energy use; and
- projects with water conservation measures that also save energy.

Applications were due November 14, 2016. DWR expects to award grants in 2017.

Sustainable Groundwater Planning Grant Program

The Sustainable Groundwater Planning Grant Program was established by Proposition 1 (CWC Section 79775). The Legislature appropriated $100 million for competitive grants for projects that develop and implement groundwater plans and projects in accordance with groundwater planning requirements established in the CWC under Division 6 (commencing with Section 10000). The grants will assist county governments to develop or update groundwater ordinances and develop plans that protect groundwater basins and their beneficial uses, and facilitate basin-wide sustainable groundwater management.

On March 18, 2016, DWR awarded $6.7 million in Proposition 1 Sustainable Groundwater Planning grant funding to 21 counties with stressed basins. These awards were the first round of funding from DWR's Proposition 1 Sustainable Groundwater Planning Grant Program. The grants assist California counties with developing/updating groundwater ordinances, developing plans that protect basins and their beneficial uses, and facilitating basin-wide sustainability.

Agricultural Drainage Program

The Agricultural Drainage Program's mission is to seek in-valley solutions to surface and subsurface agricultural drainage water problems, particularly in the San Joaquin Valley, and to improve water quality in the San Joaquin River. This will be accomplished by promoting newer technologies and management practices that can reduce or eliminate off-site discharge of saline water and by collaborating with regulatory and drainage agencies.

This program consists of several activities, including drainage monitoring and

evaluation, drainage treatment, integrated on-farm drainage management, drainage reduction and reuse, environmental services, and the San Joaquin River Water Quality Improvement Program.

In 2016, the following activities were conducted:

- monitoring shallow groundwater levels and flows and collecting water quality data for drainage water from west side San Joaquin Valley tile drain sumps;
- preparing shallow groundwater and irrigation methods maps of drainage-impaired areas for 2012–2013, using drainage monitoring data in conjunction with land use and irrigation methods data;
- maintaining equipment to collect flow, electrical conductivity, and temperature data from several satellite-linked and web-accessible stations on the mainstem of the San Joaquin River and its major eastside tributaries for the Real-Time Water Quality Monitoring Program;
- producing weekly forecasts of salinity and flow conditions on the San Joaquin River near Vernalis and other upstream stations using the San Joaquin River Input-Output Day model and publishing them on DWR's website;
- collaborating with the Central Valley Regional Water Quality Control Board and State Water Resources Control Board's initiative, the Central Valley Salinity Alternatives for Long-term Sustainability, by providing data, attending committee meetings, and reviewing program documents; and
- preparing to replace the San Joaquin River Input-Output Day model with the Watershed Analysis Risk Management Framework model, (a decision support system developed jointly by the University of California, Merced, and the Bureau of Reclamation) that can be applied to any watershed and can guide stakeholders to a consensus watershed management plan.

San Joaquin River Water Quality Grant Program

The program provides funding to support projects that will result in direct, measurable water quality improvements to the San Joaquin River by reducing or eliminating discharges of subsurface agricultural drainage, a significant water quality concern for the San Joaquin River. In 2016, applications were submitted in accordance with the guidelines and the proposal solicitation package for the program that were released in November 2015. The applications were reviewed, and scored with draft funding recommendations. These recommendations are expected to be released in 2017. The amount of Proposition 84 available funding is $36.6 million.

Water Conservation Bond Laws

To help local agencies obtain financing for their water management programs, California voters have approved a number of bond laws authorizing DWR to provide grants and low-interest loans to fund project feasibility studies or construction activities. Recent bond laws are summarized below, with focus on funds administered by DWR.

- The Water Security, Clean Drinking Water, Coastal and Beach Protection Act of 2002 (Proposition 50; CWC Section 79500–79591) authorized $500 million for the Integrated Regional Water Management (IRWM) Grant Program to be implemented jointly by DWR and the State Water Resources Control Board and $50 million for water desalination projects.
- The Safe Drinking Water, Water Quality and Supply, Flood Control, River and Coastal Protection Bond Act of 2006

(Proposition 84; Public Resources Code Sections 75001–75130) authorized $1 billion to continue the IRWM Grant Program. Under this program, grants and construction loans are available with repayment periods of up to 20 years at reduced interest rates for most programs.

- The Water Quality, Supply, and Infrastructure Improvement Act of 2014 (Proposition 1; CWC Sections 79700–79798) authorized the appropriation of $510 million in IRWM funding for implementation and planning efforts. Funds for water use efficiency and desalination projects are also authorized.

Information about previous water bond laws can be found in earlier bulletins.

Chapter 6
Legislation and Litigation

San Luis Reservoir in July 2016.

Significant Events in 2016

A number of court cases were initiated or continued in 2016, related to the Sacramento-San Joaquin River Delta, Oroville Facilities relicensing, water contracts, construction, federal law, and water rights.

Information for this chapter was provided by the Legislative Affairs Office and the Office of the Chief Counsel.

The Department of Water Resources (DWR) monitors State and federal legislation that affects management of the State Water Project (SWP). Legislative bill tracking involves reviewing legislation at its introduction, evaluating amendments in State Assembly and Senate committee hearings, and monitoring its enactment into law. The DWR Assistant Director for Legislation monitors proposed legislation. The Office of the Chief Counsel tracks State and federal litigation that impacts management of the SWP. The DWR Chief Counsel also manages legal cases that involve SWP operations.

Legislation

There was no significant State or federal legislation in 2016 affecting management of the SWP.

Litigation

As of December 31, 2016, DWR was involved in, or closely monitored, a number of court cases and other actions related to the management of the SWP.

Sacramento-San Joaquin Delta

State Water Resources Control Board

***California Sportfishing Protection Alliance, et al. v. California State Water Resources Control Board, et al.*, California Department of Water Resources and United States Bureau of Reclamation, Real Parties in Interest (Case No. RG15-780498).** On August 4, 2015, the California Sportfishing Protection Alliance filed a petition for writ of mandate challenging the State Water Resources Control Board's (State Water Board) orders granting temporary urgency change petitions (TUCPs) to DWR and the Bureau of Reclamation (Reclamation) in 2014 and 2015. (For information about the TUCPs, see Bulletin 132-16, Chapter 4, Water Quality Programs.) DWR and Reclamation are named as real parties in interest.

On September 16, 2015, the California Sportfishing Protection Alliance filed a first amended complaint claiming that the State Water Board's orders violate the federal Clean Water Act, the Central Valley Basin Plan, and the Public Trust Doctrine. On October 21, 2015, the State Water Board filed a demurrer to dismiss the action. A hearing on the matter was held in January 2016. In April 2016, a second amended complaint was filed by the California Sportfishing Protection Alliance,et al. A trial date was set for August 7, 2017.

***California Water Impact Network, California Sportfishing Protection Alliance, and AquAlliance v. California State Water Resources Control Board and California Department of Water Resources* (Super. Ct. Sacramento County, No. 34-2010-80000653).** These conservation groups allege that permit approvals and enforcement failure by the State Water Board has allowed DWR to cause extensive damage to the San Francisco Bay/Sacramento-San Joaquin Delta Estuary (Delta) and the fish and wildlife that live there. The administrative record was prepared.

In 2016, the case was dismissed after a motion and requests to dismiss were filed by all parties.

Bay Delta Conservation Plan

***Property Reserve, Inc. v. The Superior Court of San Joaquin County* (C067758); *Department of Water Resources, real party in interest; The Carolyn Nichols Revocable Living Trust v. The Superior Court of San Joaquin County* (C067765); Department of Water Resources, real party in interest; Coordinated Proceedings Special Title (Rule 3.550) *Department of Water Resources Cases* (C068469); (Judicial Council Coordination Proceeding No. 4594); (2016) 1 Cal.5th 151).** Twenty-four Delta property owners declined DWR's request to gain temporary entry onto their properties to perform environmental and geological surveys. DWR sought orders for temporary entry onto the respondents' properties under Code of Civil Procedure Section 1245.010 et seq. (More information about this litigation is available in Bulletin 132-14 and earlier bulletins.)

On March 13, 2014, the Third District Court of Appeal determined that the precondemnation entry order process was not sufficient to give DWR access to private properties to conduct the surveys. The court ruled that both the geotechnical studies and less disruptive environmental surveys would constitute takings, and therefore, DWR would need to bring condemnation actions to get the access it sought. By the end of 2014, an appeal had been filed with the Supreme Court of California, where briefing was completed in early 2015. On August 22, 2016, the Supreme Court reversed the Court of Appeal decision and remanded the case for further proceedings. Supplemental briefs were submitted by the parties. The Court of Appeal issued the opinion on remand in December 2016.

***Delta Stewardship Council Cases* (Super. Ct. Sacramento County, Coordinated Proceedings Special Title (Rule 3.550), Judicial Council Coordination Proceeding No. 4758; C082944, app. pending).** The following cases were coordinated into this proceeding: (1) *San Luis & Delta-Mendota Water Authority v. Delta Stewardship Council* (Super. Ct. Sacramento County, No. 34-2013-80001500); (2) *State Water Contractors, et al. v. Delta Stewardship Council* (Super. Ct. Sacramento County, No. 34-2013-80001530); (3) *North Coast Rivers Alliance, et al. v. Delta Stewardship Council* (Super. Ct. Sacramento County, No. 34-2013-80001534); (4) *California Water Impact Network, et al. v. Delta Stewardship Council* (Super. Ct. San Francisco County, No. CPF13513047); (5) *Central Delta Water Agency, et al. v. Delta Stewardship Council* (Super. Ct. San Francisco County, No. CPF13513048); (6) *Save the California Delta Alliance v. Delta Stewardship Council* (Super. Ct. San Francisco County, No. CPF13513049); (7) *City of Stockton v. Delta Stewardship Council* (Super. Ct. San Joaquin County, No. 39201300298188).

In May 2013, the Delta Stewardship Council adopted its *Delta Plan* after approving and certifying a programmatic environmental impact report (EIR) for the plan. Subsequently, the Delta Stewardship Council adopted the implementing regulations to make the *Delta Plan*'s 14 policies legally-enforceable. The regulations were approved by the Office of Administrative Law (California Code of Regulations, Title 23, Sections 5001–5016) and became legally effective on September 1, 2013. In May and June 2013, several public water agencies, environmental organizations, and the City of Stockton filed seven separate lawsuits challenging the *Delta Plan*, the programmatic EIR, and the associated regulations. The cases were consolidated in Sacramento County Superior Court.

In June 2016, the court ruled that the *Delta Plan* did not comply with the Delta Reform Act, failed to promote options for conveyance and storage, and failed to include quantified or measurable targets for achieving reduced Delta reliance. The Delta Stewardship Council and the State and federal water contractors filed appeals in November and December 2016 with

the Third District Court of Appeal. The filing of the appeals means that the lower court's judgment vacating the *Delta Plan* is automatically stayed pending the outcome of the appeals.

Hydropower

Oroville Facilities Relicensing—Federal Energy Regulatory Commission Project No. 2100

***Butte County et al. v. Department of Water Resources* (C071785, app. pending).** DWR is seeking renewal of the Federal Energy Regulatory Commission (FERC) license for its hydroelectric generation facilities at Oroville (Project No. 2100). DWR filed its relicensing application in 2005. The original 50-year FERC license expired on January 31, 2007. In February 2008, FERC authorized continued operation by issuing an annual license—under the same terms and conditions—that renews each year until FERC issues a new license. (Details of the license renewal negotiations and earlier litigation are described in previous bulletins.)

In January 2012, the court denied the petitioners' requests to set aside the EIR prepared by DWR and upheld the award to DWR of $675,087 in charges for the administrative record required to proceed with the suit. The court found that the EIR was legally adequate and noted that the record preparation complied with the California Environmental Quality Act and was reasonable and necessary. The petitioners, Butte and Plumas counties, appealed the judgment in August 2012, and the appellate briefs were filed in 2013 and 2014.

In 2016, the court of appeal ordered the parties to file supplemental briefs on the issue of whether federal law (Federal Power Act) preempts state law (California Environmental Quality Act). All parties filed briefs, and Friends of the River and the California Sportfishing Protection Alliance filed amicus curiae briefs. The plaintiffs/appellants and the defendant/respondent filed a response to the amicus curiae briefs.

Other Cases

The Monterey Amendment

***Central Delta Water Agency et al. v. California Department of Water Resources* (Super. Ct. Sacramento County, No. 34-2010-80000561) (Central Delta I) (C078249 and C080572, app. pending); *Central Delta Water Agency et al. v. Kern County Water Agency et al.*, DWR et al., real parties in interest (Super. Ct. Kern County, No. S-1500-CV-270965) (Central Delta II); *Rosedale-Rio Bravo Water Storage District and Buena Vista Water Storage District v. DWR* (Super. Ct. Kern County, No. S-1500-CV-270635-KCT/Super Ct. Sacramento County, No. 34-2010-80000703) (Rosedale-Rio Bravo).** After lengthy negotiations conducted in Monterey, the Monterey Agreement was signed in December 1994 by DWR, five SWP water contractors, and the Central Coast Water Authority. The agreement contained principles to guide the amendment of SWP water contracts to address water allocation and issues related to SWP management and financing.

From 1995 to 1999, 27 of the 29 SWP water contractors executed Monterey Amendments. The Monterey Agreement EIR was certified in October 1995, and in December 1995, a lawsuit was filed (*Planning and Conservation League v. DWR*) challenging the EIR. A new "Monterey Plus EIR" was prepared, certified in 2010, and challenged in court (*Central Delta I*, *Central Delta II*, and *Rosedale-Rio Bravo*).

In November 2014, the court ordered DWR to decertify the Monterey Plus EIR and revise and certify it by December 31, 2015 (*Central Delta I* and *Rosedale-Rio Bravo*). In October and December 2014, appeals were filed in *Central Delta I*. On August 10, 2015, the court granted DWR's request for an extension and set a new deadline of June 30, 2016, for completion of a revised Monterey Plus EIR.

(For more information about the Monterey Agreement, the Monterey amendments, and related litigation, see Bulletins 132-95 through 132-04 and 132-10 through 132-16.)

In April 2016, a draft revised Monterey Plus EIR was released, and in May 2016, at DWR's request, the court extended the deadline for completion of the revised Monterey Plus EIR to September 28, 2016. In September 2016, DWR certified the revised Monterey Plus EIR and filed a notice of decision.

For more information about the revised Monterey Plus EIR, see Chapter 9, Water Contracts and Deliveries.

***Center for Food Safety, et al. v. California Department of Water Resources* (Super. Ct. Sacramento County, No. 34-2016-800002469).** After DWR certified the revised Monterey Plus EIR in September 2016, the Center for Food Safety, Center for Biological Diversity, California Sportfishing Protection Alliance, California Water Impact Network, Central Delta Water Agency, and South Delta Water Agency filed a new lawsuit on October 21, 2016, challenging the revised Monterey Plus EIR.

Construction Arbitration

***D.A. McCosker Construction Co., dba Independent Construction Company v. Department of Water Resources* (OAH/PWCA No. A-0021-2013).** This dispute arose out of the construction of Dyer Reservoir under a contract for $11 million. The work concluded in 2012, nearly 2 years behind schedule. In September 2013, the contractor brought a binding arbitration action seeking additional compensation in the amount of $12 million due to alleged defective specifications, differing site conditions, and owner-caused delay. DWR withheld over $1 million in liquidated damages for late completion. Limited discovery was conducted in 2014, and a mediation that took place in December 2014 was unsuccessful.

An eleven day arbitration commenced on January 11, 2016. The arbitrator issued a decision on November 21, 2016, finding DWR responsible for $1.5 million of Independent Construction Company's contract claims.

Clean Water Act

***Catskill Mountains Chapter of Trout Unlimited, Inc., et al. v. United States Environmental Protection Agency, et al.* (N.Y.Dist.Ct., No. 7:08-CV-05606-KMK, app. pending).** A number of environmental groups, private entities, and governmental agencies controlling or utilizing water filed an action challenging the application of the Environmental Protection Agency's Water Transfer Rule under the Clean Water Act (CWA). The CWA provides that the discharge of any pollutant by any person without a National Pollution Discharge Elimination System Permit is unlawful. (33 U.S.C. Section 1311(a)). The federal statute defines a discharge of a pollutant to mean any addition of any pollutant to navigable water from any point source. The Environmental Protection Agency has applied the CWA provisions to transfers of water between navigable bodies of water and not to "water transfers." According to the CWA, "water transfers" are "an activity that conveys or connects waters of the United States without subjecting the transferred water to intervening industrial, municipal, or commercial use."

On March 28, 2014, the court found the Environmental Protection Agency Water Transfer Rule to be inconsistent with the CWA. The case has been appealed. As the outcome of the case will have a direct and material effect on the operations of the SWP, in June 2014, DWR filed a friend of the court brief (an amicus curiae brief) to advise the court of relevant information and arguments the court might wish to consider. Following oral argument on December 1, 2015, the appellate court decision is pending.

Drought-related Actions

***San Joaquin River Exchange Contractors Water Authority, et al. v. State of California, SWRCB, et al.*, California Department of Water Resources and United States Bureau of Reclamation, Real Parties in Interest (Super. Ct. Sacramento County, No. 34-2016-80002277).** In 2014 and 2015, due to severe drought, the Governor issued various executive orders, declarations, and emergency proclamations directing State and local agencies to take all necessary actions to conserve water, enhance and protect water supplies, and reduce harmful effects of the drought. In 2015, DWR and Reclamation submitted TUCPs to the State Water Board, requesting temporary modification of certain requirements in Water Right Decision 1641 to allow management of reservoir releases on a pattern that would conserve upstream storage for fish and wildlife protection and provide for Delta salinity control later in the year while providing critical water supply needs.

The State Water Board issued orders in response to the TUCPs. The State Water Board received numerous comments and objections to the TUCP orders and 10 petitions for reconsideration. In December 2015, the State Water Board issued water right order WR 2015-0043 affirming the TUCP orders and renewing them for another 180 days. The order also denied in part and granted in part the petitions for reconsideration. A petition for writ of administrative mandamus and complaint for declaratory relief was filed January 14, 2016.

DWR is a real party in interest in this case as well as the U.S. Department of the Interior and Reclamation. The issues include impacts to fish and wildlife and the exchange contractors' and others' water supply and whether the State Water Board acted outside its authority in authorizing the changes specified in the TUCP orders.

***California Water Curtailment Cases* (Super. Ct. Santa Clara County, No. 1-15-CV-285182, Coordinated Proceedings Special Title (Rule 3.550), Judicial Council Coordination Proceeding No. 4838).** The following cases were coordinated into this proceeding: (1) *Byron-Bethany Irrigation District v. California State Water Resources Control Board, et al*. (Super. Ct. Contra Costa County, No. N150967); (2) *West Side Irrigation District, Central Delta Water Agency, South Delta Water Agency, and Woods Irrigation Company v. California State Water Resources Control Board, et al.* (Super. Ct. Sacramento County, No. 34201580002121); (3) *Banta-Carbona Irrigation District v. California State Water Resources Control Board, et al.* (Super. Ct. San Joaquin County, No. 39201500326421); (4) *Patterson Irrigation District v. California State Water Resources Control Board, et al.* (Super. Ct. Stanislaus County, No. 2015307); (5) *San Joaquin Tributaries Authority, Oakdale Irrigation District, and South San Joaquin Irrigation District. v. California State Water Resources Control Board, et al.* (Super. Ct. Stanislaus County, No. 2015366).

On January 17, 2014, the Governor proclaimed a state of emergency to address the record dry conditions around the state. On the same day, as directed by the proclamation, the State Water Board issued a statewide notice of water shortages and potential for future curtailment of water right diversions. If necessary, the State Water Board would curtail diversions of water on a water right priority basis to prevent unreasonable diversion or use of water so that appropriate minimum amounts of water would be available for public trust needs for minimum flows for State- and federally-listed anadromous fish; to protect senior water rights; and for minimum health and safety needs.

In May 2014, the State Water Board issued curtailment notices. A statewide notice of water shortages and potential for future curtailment of water right diversions was

issued again in January 2015, followed by curtailment notices issued in April, May, and June 2015. In July 2015, the State Water Board began rescinding the curtailment notices and all notices were rescinded by the end of the year.

In June and September 2015, five complaints were filed by different water districts in several different county superior courts. The plaintiffs requested a writ of mandate, declaratory and injunctive relief, and damages. The cases were consolidated in Santa Clara County Superior Court. After the State Water Board's first round of demurrers, which were partially granted (allowed: issues related to due process violations and the scope of the State Water Board's authority; not allowed: takings claims, claims for declaratory and injunctive relief, and the Delta pool) the plaintiffs amended their complaints, and the State Water Board filed another round of demurrers, which were set for hearing on January 27, 2017. DWR has intervened in the litigation.

Chapter 7
Water Supply Development and Reliability

Harvey O. Banks Delta Pumping Plant.

Significant Events in 2016

The 2016 Drought Contingency Plan For Water Project Operations, February - November 2016, was submitted to the State Water Resources Control Board (State Water Board) on January 15.

The Governor issued Executive Order B-37-16 on May 9 to establish long-term water conservation measures by building on existing temporary statewide emergency water restrictions. The Department of Water Resources (DWR) is part of a group of five State agencies tasked with implementation of the order.

Surface storage investigation efforts in 2016 were focused on preparing to apply for funding from the Water Storage Investment Program administered by the California Water Commission.

Information in this chapter was contributed by the State Water Project Analysis Office, the Division of Integrated Regional Water Management, the Division of Statewide Integrated Water Management, and the Bay-Delta Office.

The Department of Water Resources (DWR) works to improve the reliability of State Water Project (SWP) water supplies and the long-term water contract annual Table A water allocations delivered to SWP water contractors. DWR is engaged in planning activities to develop additional water supplies and storage capacity.

Developing new water supplies and storage projects that are economically, environmentally, and technically sound, while satisfying institutional requirements and political concerns, presents significant challenges. Many concerns center on possible adverse effects that additional storage and delivery facilities may have locally and on the San Francisco Bay/ Sacramento-San Joaquin Delta (Bay-Delta or Delta). In the SWP conveyance system, the Delta is the critical link between water supplies in the Sacramento Valley and deliveries to the rest of the Central Valley and Southern California.

DWR works with State and federal governments, local agencies, and public interest stakeholder groups to ensure water supply reliability now and in the future. To meet SWP water contractors' needs for sufficient water supplies, DWR is engaged in planning, developing, and providing local assistance with the objective of augmenting future SWP water supplies.

Supply Development and Reliability

Activities DWR is engaged in to augment future SWP supplies include:

- facilitating transfers between SWP water contractors and other agencies, including Central Valley Project (CVP) contractors;
- funding studies on the Giant Garter Snake, a protected species known to inhabit rice growing regions of the Sacramento Valley, and on rice evapotranspiration, to better understand issues related to the transfer of water made available by crop idling;
- supporting the planning and implementation of local and regional conjunctive-use projects in the Sacramento Valley;
- constructing, operating, and maintaining groundwater and land subsidence monitoring networks to detect potential impacts caused by groundwater substitution transfers and other groundwater management activities in the Sacramento Valley;
- assisting with the development and implementation of restoration projects in the Feather River watershed to reduce sedimentation in Lake Oroville and preserve watershed storage capacity; and
- investigating and evaluating storage projects.

Water Conveyance Through the SWP

DWR encourages and facilitates temporary transfers of water using SWP conveyance facilities for SWP water contractors and other agencies to help meet local, State, and environmental water supply needs. As a practical matter, SWP facilities are often needed to convey transfer water from the existing place of use to the place of use of the transferee. State law requires DWR to make unused SWP capacity available for transfers upon payment of fair compensation, provided that (1) no legal user of water will be injured; (2) there will be no unreasonable effect on fish, wildlife, or

other instream beneficial uses; and (3) there will be no unreasonable effect on the overall economy or the environment of the county from which the water is being transferred (California Water Code [CWC] Section 1810). Water transfers can involve transfers and exchanges among SWP water contractors, between SWP water contractors and non-SWP entities, or between two or more non-SWP entities.

Transfer and Exchange Evaluations

An important element of any water transfer is to determine what quantity of water, if any, is transferable.

The transferability of water depends on many factors including the source of the water being transferred, what is being done to make water available, when the water can be made available, and the type of water right the existing user holds. Several CWC provisions authorize temporary transfers of water under rights issued by the State Water Resources Control Board (State Water Board) (appropriative water rights issued after 1914) and placed conditions on the transfers to protect those not involved in them.

Short-term transfers, of less than one year, are authorized under CWC Sections 1725–1732. Long-term transfers, for periods greater than one year, are authorized by CWC Sections 1735–1737. Other CWC sections specify conditions under which water can be transferred and legal protections for those transferring water.

Transfers based on water rights obtained before 1914 are not under State Water Board jurisdiction but must comply with the requirements of the California Environmental Quality Act (CEQA) and possibly the National Environmental Policy Act (NEPA).

The CWC sections noted above contain provisions intended to protect other legal users of water and fish and wildlife from the possible adverse effects of a water transfer. These provisions reflect the concept that changes can be made to the authorized place and purpose of use or point of diversion of a water supply as long as there is no injury to others as a result of the change (the "no injury rule"). The no injury rule in State water law is intended to protect other legal users from the potential expansion of water use beyond what would have been consumed by the original users in the absence of the transfer. Hence, under the no injury rule, only "new water" is transferable (i.e., water added to the downstream water supply only as a result of the transfer). To protect other users, a transfer would not be authorized to the extent that it would reduce the amount or timing of water that would otherwise be available to downstream users, regardless of the water right priority of those users.

CWC Section 1810(d) requires DWR to consider potential impacts of a transfer on legal users, instream uses, and the economy of the area from which the water would be transferred. DWR must determine whether to allow the use of any unused available water conveyance capacity for a transfer under this section. DWR reviews each request to transfer water through SWP facilities to assure that only new water will be transferred. This requirement applies to transfers based on both pre-1914 and post-1914 water rights.

Transfer water is most commonly developed through one of four methods: surplus water release from storage facilities, substituting groundwater for transferred surface water, idling agricultural land, and undertaking conservation activities that reduce consumptive use of water. Because transfers may result in direct impacts and third-party impacts (impacts to parties not involved in the transfer), certain CWC provisions were enacted to limit potential impacts. For example, since additional groundwater pumping from a groundwater substitution project may potentially affect

other groundwater users in the area, CWC Section 1745.10 requires that the groundwater substitution project: (1) be consistent with a groundwater management plan adopted pursuant to State law for the affected area or (2) if a management plan has not been adopted, the transfer project proponent determines the transfer would not create or contribute to conditions of long-term overdraft in the affected groundwater basin.

Injury can also occur due to streamflow depletion induced by increased pumping from wells for groundwater substitution transfers. Consequently, to mitigate possible impacts from groundwater substitution transfers, DWR assesses a streamflow depletion factor, which represents an estimate of the potential effects of the additional groundwater pumping on the surface water system. Each type of transfer has its own set of potential impacts that must be evaluated to protect parties not involved in the transfer.

With the exception of short-term transfers under CWC Section 1725 et seq. (which provides for an expedited process for water transfers based on rights issued by the State Water Board), water transfers are subject to compliance with CEQA and, possibly, NEPA. The CEQA/NEPA and State Water Board processes provide opportunities for public review and comment on water transfer proposals. The Governor's January 17, 2014, Drought Emergency Proclamation directed DWR and the State Water Board to expedite the review and approval of water transfer proposals and suspended the provisions of CEQA for actions taken by DWR related to transfers. The proclamation did not suspend CEQA for local agencies.

Staff in DWR's State Water Project Analysis Office, Division of Operations and Maintenance, Division of Integrated Regional Water Management, and the Office of the Chief Counsel evaluate proposed water transfers to determine whether the transfers will impact the SWP, other water users, the environment, or the area from which the water will be transferred. In 2016, DWR and the Bureau of Reclamation (Reclamation) issued a white paper providing technical information about water transfers requiring use of water project facilities.

For information about 2016 water transfers, see Chapter 9, Water Contracts and Deliveries.

SWP Delivery Capability Report

The State Water Project Final Delivery Capability Report 2015 was released in July 2015. The next update of this report is expected in June 2017.

Delivery capability depends on three factors:

(1) the availability of water at the source;
(2) the ability to convey water from the source to the desired point of delivery; and
(3) the level of demand.

To assist local water supply agencies plan for reliable supplies and assess their overall water supply needs and the amount of deliveries that they can expect from the SWP, the report presents the existing overall delivery capability of the SWP system and the allocation of that capacity to each of the contractors under a range of hydrologic conditions. The 2015 report and its appendices provide information on the annual SWP deliveries in the 10-year historical sequence preceding the publication date (2005–2014); simulation model results on the current (2015) level of development; and a range of future conditions (2035 level of development and climate change with varying regulations and facilities).

In order to provide a conservative estimate of water delivery capability for current conditions, no planned facility improvements

to the SWP infrastructure are assumed, and the analysis of the ability to convey water from the source to the points of delivery assumes only current SWP facilities, regulations, and water rights permits existing in 2015. The level of demand for SWP water assumes the maximum Table A amounts and reflects current trends in demand from SWP water contractors.

Executive Order B-37-16

The Governor issued Executive Order B-37-16 on May 9, 2016, to establish long-term water conservation measures by building on existing temporary statewide emergency water restrictions. DWR is part of a group of five State agencies tasked with implementation of the order. The agencies will establish a long-term water conservation framework that will be part of the implementation of the California Water Action Plan.

SWP Future Water Supply Program

The Future Water Supply Program's goal is to improve and protect the water supply reliability of the SWP while protecting the environment and other legal users of water. The program consists of two main components; Sacramento Valley groundwater and upper Feather River watershed management. The Sacramento Valley groundwater component provides technical support for the Lower Yuba River Accord and to monitor other groundwater and conjunctive-use projects and assess conditions of the Sacramento Valley Groundwater Basin that may affect SWP yield. The four primary objectives of the Sacramento Valley groundwater component are to: (1) collect, analyze, and report data to determine the effects of groundwater substitution transfers on the SWP; (2) analyze and report on groundwater substitution transfers that use SWP facilities; (3) monitor groundwater management planning and implementation activities that may affect SWP yield; and (4) develop and utilize analytical tools to support and enhance sustainable groundwater management in the Sacramento Valley.

The upper Feather River watershed management component of the program evaluates the Feather River watershed above Lake Oroville with respect to watershed management and restoration actions being planned or implemented. These actions are intended to improve the ecological and hydrologic functions of watersheds, thus affecting base flow, improving flood attenuation, and reducing erosion and sedimentation. DWR continued collaborative efforts with local stakeholders in 2016 to implement and enhance monitoring activities for assessing the immediate and long-term hydrologic effects of these actions.

SWP Water Rights Activities

Water Right Permits

SWP operations are governed by the terms and conditions contained in DWR's water right permits and licenses along with other State and federal regulatory restrictions, including biological opinions (BiOps) for the protection of endangered species. DWR holds water right permits authorizing SWP operations at each of the SWP facilities, including the Oroville and Delta facilities (which include the North Bay Aqueduct), for water supply purposes. Each permit specifies the authorized maximum quantities of direct diversion and diversion to storage, point of diversion, place of use, and purpose of use. A change in the terms and conditions contained in the water right permits and licenses, including a change in the place or purpose of use or point of diversion, requires State Water Board approval.

Diversion and use of SWP water throughout the SWP service area continues to be developed. However, due to a number of

factors, including operational and regulatory constraints, water deliveries have not yet reached the maximum quantities anticipated.

Drought Contingency Plan

Since December 2013, Reclamation, DWR, the U.S. Fish and Wildlife Service (USFWS), National Marine Fisheries Service (NOAA Fisheries), Department of Fish and Wildlife, and State Water Board have continued closely coordinated water operations and regulatory adjustments for the CVP and SWP. The adjustments to existing water quality requirements in Water Right Decision 1641 (State Water Board) and federal Endangered Species Act requirements in the BiOps (USFWS and NOAA Fisheries) have allowed the CVP and SWP to support water deliveries and transfers and to maximize upstream water storage while minimizing adverse effects on listed fish species and protecting water quality.

In 2016, Reclamation and DWR continued to work closely with the fish and wildlife agencies and the State Water Board to develop operational and contingency plans and conduct real-time coordinated operations and monitoring, in order to responsibly manage the state's limited water supplies.

The 2016 Drought Contingency Plan For Water Project Operations, February - November 2016, was submitted to the State Water Board on January 15, 2016. The plan builds on the foundation of the State and federal agencies' previous planning work over the last few years and fulfills the condition of Water Right Order 2015-0043 adopted by the State Water Board on December 15, 2015. In accordance with the order, the 2016 Drought Contingency Plan was prepared by DWR and Reclamation, in coordination with other State and federal Agencies. Monthly updates to the Drought Contingency Plan were submitted for February through June. DWR and Reclamation submitted the final working draft of the Fall 2016 Drought Preparedness Plan, November 2016 - January 2017 on October 28, 2016.

The Drought Preparedness Plan provided an overview of current reservoir storage and forecasted hydrology, reviewed historic actions taken in 2014 and 2015 that requested modifications to Water Right Decision 1641 and adjustments to the BiOps, and assessed projected water operations based on various hydrologic scenarios through January 31, 2017.

Petition for Temporary Change — Consolidated Place of Use

The past four years represented the driest 4-year period recorded in California, with 2015 having the lowest snowpack ever recorded. Water project storage was severely depleted due to the critically dry conditions. The extremely low initial water project storage and low south-of-Delta storage affected the initial allocations to SWP water contractors in 2016.

On March 28, 2016, DWR and Reclamation submitted a petition for temporary change under CWC Section 1725, et seq., to the State Water Board. In the petition, DWR and Reclamation requested changes to their water right permits that would temporarily consolidate the SWP and CVP authorized places of use.

The consolidated place of use was requested to help alleviate the impacts of the water shortages to users within the SWP and CVP service areas downstream of the Delta pumping facilities and to facilitate the most efficient use of the project water that was available. The State Water Board order issued on May 17, 2016, approved the requested changes and remained in effect for 1 year. The total amount delivered under the 2016 consolidated place of use order was 152,429 acre-feet (af). For more information

about transfers and exchanges, please see Chapter 9, Water Contracts and Deliveries.

Water Right Change Petition for California WaterFix

The California WaterFix will construct new Delta conveyance facilities in compliance with the federal Endangered Species Act and California Endangered Species Act. The conveyance facilities would allow greater flexibility in water diversions and better balancing of the associated water quality and hydrodynamic benefits for fish, drinking water, agriculture, and other beneficial uses.

On August 25, 2015, DWR and Reclamation submitted a joint petition to the State Water Board requesting changes in SWP and CVP water right permit conditions. The petition proposes adding points of diversion of water for the SWP and CVP associated with California WaterFix. In October, the State Water Board issued a public notice for the petition and the hearing for the petition. Part 1A of the State Water Board change petition hearing for California WaterFix began on July 26, 2016, and is expected to continue into 2017.

For additional information about California WaterFix, see Chapter 3, Environmental Programs.

Water Quality Control Plan for the San Francisco Bay/ Sacramento-San Joaquin Delta Estuary

The Delta and Suisun Marsh are located where California's two major river systems, the Sacramento and the San Joaquin, converge and flow westward to meet incoming seawater tides flowing through the San Francisco Bay. The watershed of the Delta is a critical source of water supply for much of California. It's a source of drinking water for two-thirds of the state's population; it supplies some of the state's most productive agricultural areas; and it provides water for fish, wildlife, and other public trust uses of water within and upstream of the Delta.

Water originating in the Delta watershed is delivered to areas within the watershed and to areas south and west of the Delta. The largest water distribution systems that release stored water into the Delta and directly divert water from the Delta are the SWP, operated by DWR, and the federal CVP, operated by Reclamation. Numerous other water storage and diversion projects also influence Delta inflows, outflows, water quality, and other hydrologic characteristics.

The State Water Board regulates the quality of water in the Delta, the diversion and use of water within the Delta, and the diversion of water from the Delta for water supply. The State Water Board coordinates its regulatory authorities under State laws governing water quality and water rights, ensuring that water quality is protected for all beneficial uses when water is diverted from the Delta. The State Water Board establishes water quality objectives to protect a variety of beneficial uses of water. The objectives are contained in a water quality control plan adopted by the State Water Board.

The State Water Board adopted the current *Water Quality Control Plan for the San Francisco Bay/Sacramento-San Joaquin Delta Estuary* (Bay-Delta Plan) on December 13, 2006 (Resolution No. 2006-0098). Water Right Decision 1641, adopted by the State Water Board in 1999, implements the objectives of the Bay-Delta Plan by placing conditions on water right permits and licenses for the SWP and CVP that require the projects to meet certain objectives in the Bay-Delta Plan.

2006 Bay-Delta Plan Review

CWC Section 13240 requires that the water quality control plan be periodically reviewed. Federal Clean Water Act Section 303(c) (33 U.S.C. Section 1313(c)) requires a triennial review of State water quality "standards," as defined in the act. Formal review of the 2006 Bay-Delta Plan began in October 2008. The review consists of a four-phased process to develop and implement updates to the Bay-Delta Plan and flow objectives for priority tributaries to the Delta.

The review and amendment process for the 2006 Bay-Delta Plan includes:

- identifying elements that may need to be amended or new elements that may need to be added;
- preparing any amendments to or revisions of the entire water quality control plan; and
- State Water Board's adoption of some or all of the amendments or revisions.

State Water Board information-gathering activities may affect the scope of the 2006 Bay-Delta Plan review and may include evidentiary hearings on critical issues concerning the Delta's ecology.

In 2016, State Water Board continued its review and update of the 2006 Bay-Delta Plan.

For more information about water quality objectives and compliance monitoring in the South Delta, see Chapter 4, Water Quality Programs.

Storage Program

DWR has stepped back from its role as the State lead agency for the Storage Program due to lack of funding. The Storage Program began under the CALFED Bay-Delta Program. (For background on the CALFED Bay-Delta Program, see Bulletins 132-95 through 132-11.)

The Storage Program is a comprehensive program with potential benefit for the SWP consisting of actions related to surface and groundwater storage. DWR's Division of Statewide Integrated Water Management and Division of Integrated Regional Water Management have been working with State and federal agencies to enhance storage and conjunctive-use programs that support local project development via loans and grants. The Storage Program is part of an ongoing evaluation of how storage, both groundwater conjunctive use and surface storage, can help meet California's urban, agricultural, and environmental water supply reliability, ecosystem restoration, and water quality needs. DWR continues to participate in these planning efforts in a limited manner as described below.

Surface Storage Investigations

Surface storage investigations are developing environmental documentation and feasibility studies for four of the five surface storage projects identified for further study in the CALFED record of decision. The four projects are discussed below. Efforts in 2016 were focused on preparing to apply for funding from the Water Storage Investment Program administered by the California Water Commission.

Los Vaqueros Reservoir Expansion Project

Contra Costa Water District owns and operates the 160,000 af Los Vaqueros Reservoir just southwest of the Sacramento-San Joaquin Delta. The Los Vaqueros Reservoir Expansion Project involves analysis of increasing the size of the reservoir to 275,000 af (increasing the storage by 115,000 af).

The project objectives are: (1) to develop water supplies for environmental water management; (2) to increase water supply

reliability within the San Francisco Bay Area; and (3) to the extent possible, improve the quality of water deliveries to municipal and industrial customers without impairing the project's ability to meet the first two objectives.

The Contra Costa Water District Board certified a final environmental impact report and approved an expansion from 100,000 af to 160,000 af in March 2010. The expansion was completed and dedicated in July 2012.

Contra Costa Water District and local, State, and federal partners continue to study the feasibility of a 275,000 af expansion alternative in the context of other Delta initiatives to improve Delta conveyance and Delta fisheries protection, including long-term programs being explored in California WaterFix and California EcoRestore.

Shasta Lake Water Resources Investigation

Reclamation, in coordination with other agencies, is studying the feasibility of expanding Shasta Dam and Lake, primarily to promote increased survival of anadromous fish populations in the upper Sacramento River and to increase water supply reliability. An enlargement of Shasta Dam would inundate additional lands around the existing reservoir and affect a portion of the McCloud River. California Public Resources Code Section 5093.542(c), the Wild and Scenic Rivers Act, states that, "except for participation by the Department of Water Resources in studies involving the technical and economic feasibility of enlargement of Shasta Dam, no department or agency of the State shall assist or cooperate with, whether by loan, grant, license, or otherwise, any agency of the federal, State, or local government in the planning or construction of any dam, reservoir, diversion, or other water impoundment facility that could have an adverse effect on the free-flowing condition of the McCloud River, or on its wild trout fishery."

The State budget does not include funding for DWR to continue participating in this study. However, Reclamation's planning is ongoing. Expansion of Shasta Lake is not eligible for funding under the Water Storage Investment Program.

North-of-the-Delta Offstream Storage Investigation

The Sites Project Authority and Reclamation are working in partnership with local, State, and federal agencies to further study north-of-the-Delta offstream storage opportunities. The North-of-the-Delta Offstream Storage Investigation focuses on potential projects on the west side of the Sacramento Valley, including Sites Reservoir.

Storing water in offstream reservoirs during excess flow periods could provide opportunities to increase water storage in an environmentally sensitive manner. The stored water can then be made available to enhance water management flexibility in the Sacramento Valley and the Bay-Delta Estuary, reducing water diversions on the Sacramento River during critical fish migration periods, increasing the reliability of supplies for the Sacramento Valley and statewide, and providing storage and operational flexibility to support environmental enhancement actions and adapt to climate change.

In 2016, the SWP provided funding for DWR to continue participation in the investigation. Funding has been provided for transition support from the DWR-led study to the locally-led study and to evaluate potential effects of the Sites project implementation on the SWP. This may include a potential Sites project coordinated operations plan and potential benefits to participating SWP water contractors and Bay-Delta water quality and ecosystems. Partners are planning to apply

to the Water Storage Investment Program for funding.

Upper San Joaquin River Basin Storage Investigation

Reclamation, in coordination with other State and federal agencies, is evaluating opportunities for increased storage in the upper San Joaquin River watershed. The objectives of the Upper San Joaquin River Basin Storage Investigation are to: (1) increase water supply reliability and operational flexibility in the CVP's Friant Division, other San Joaquin Valley areas, and other regions, and (2) enhance water temperature and flow conditions in the San Joaquin River in support of San Joaquin River restoration efforts. Other opportunities include additional hydropower generation, reduction of flood damages, water quality improvements, and recreation site development.

Reclamation has continued working to complete the final feasibility study report and environmental impact statement. The feasibility report examines potential construction of a new dam and reservoir on the San Joaquin River. The environmental impact statement documents the potential environmental effects of alternatives to increased storage of water from the upper San Joaquin River watershed. Local water interests are considering establishment of a joint powers authority to complete planning documents and support application to the Water Storage Investment Program for funding.

Delta Conveyance Program

The Delta Conveyance Program previously consisted of projects proposed in the North and South Delta. As a result of the efforts associated with the Bay Delta Conservation Plan and the Delta Stewardship Council's *Delta Plan*, many of these efforts were suspended as staff was redirected to work on the SWP Delta Compliance Program. The remaining projects are discussed briefly below; more detailed information about the Delta can be found in Chapter 2, Delta Resources.

SWP Delta Compliance Program

The SWP obtained take authorization for federal and California Endangered Species Act listed species through the December 2008 USFWS BiOp for Delta Smelt; the February 2009 Department of Fish and Wildlife incidental take permit for Longfin Smelt; and the June 2009 NOAA Fisheries BiOp for salmon, steelhead, and Green Sturgeon. Many of the regulatory requirements require studies and projects, which are currently underway.

North Delta

With the North Delta Flood Control and Ecosystem Restoration Project, solutions to improve flood management and the ecosystem are being considered, including setback levees, detention basins, dredging, and levee degradation for floodplain expansion. For more information about this project, see Chapter 2, Delta Resources.

South Delta

Actions in the South Delta include monitoring and assessment of the South Delta Improvements Program (SDIP), implementing flood control and ecosystem improvements in the lower San Joaquin River, and continuation of DWR's Temporary Barriers Project.

SDIP is a two-stage project. Stage 1 proposes to reduce the movement of San Joaquin River watershed Central Valley fall-run and late fall-run juvenile Chinook Salmon into the South Delta via Old River and to maintain adequate water levels and water quality for agricultural diversions in the South Delta. Stage 2 would increase water deliveries and delivery reliability to SWP and CVP

contractors south of the Delta and increase the maximum permitted level of diversion through the existing intake gates at Clifton Court Forebay.

DWR deferred both the increase in diversions and the associated new fish screens as components of the SDIP due to funding issues and technical uncertainties associated with the design and construction of the new fish screens.

The SDIP final environmental impact report/environmental impact statement (2006) evaluated alternatives and proposed continuing with SDIP Stage 1. This component involves constructing permanent operable gates and channel dredging in the South Delta. DWR is proposing installation of these permanent gates to replace temporary rock barriers currently installed and removed each year under DWR's Temporary Barriers Project.

Reclamation and DWR's 2008 biological assessment for the SWP and CVP Long-term Operations Criteria and Plan included operation of the SDIP permanent operable gates.

The USFWS BiOp, issued in December 2008, concluded that coordinated operations of the CVP and SWP would jeopardize Delta Smelt. The USFWS provided a reasonable and prudent alternative under which SDIP could move forward.

The NOAA Fisheries BiOp, issued in June 2009, concluded that CVP and SWP operations would jeopardize a number of anadromous species, in particular Chinook Salmon. NOAA Fisheries provided no reasonable and prudent alternative for SDIP. DWR initiated discussion with NOAA Fisheries in late 2009 to establish what actions could lead to a reasonable and prudent alternative under which SDIP could move forward; however, NOAA Fisheries stated an interest in holding off on further discussion until completion of an on-going multiyear South Delta Temporary Barriers Project fisheries study. Field data collection for the study has been completed, data analysis is in progress, and the final study report is expected in summer 2018. Data from the study will be useful in considering permanent barrier design options and operation strategies to minimize fish impacts. Other than the on-going temporary barriers project fisheries study, no work on Stage 1 of SDIP took place in 2016.

Any action regarding SDIP Stage 2 will require further study and public input. Stage 2 planning continued to be suspended in 2016.

For additional information about the South Delta Temporary Barriers Project, see Chapter 2, Delta Resources.

Lower Yuba River Accord

The Lower Yuba River Accord continued to provide water to enhance SWP and CVP water supply reliability in 2016 with the delivery of Component 1 water (Water Purchase Agreement).

For background information about the Lower Yuba River Accord and additional details about 2016 water transfer activities related to the accord, see Chapter 9, Water Contracts and Deliveries.

Chapter 8
Water Supply

The California Aqueduct in Alameda County just north of Bethany Reservoir.

Significant Events in 2016

Water year 2015–2016 turned out to be an above average year for precipitation and slightly below average for mountain snowpack. It marked an increase after four consecutive years with significantly less than average precipitation and mountain snowpack. The state received precipitation at 104 percent of average in water year 2015–2016 compared to 74 and 56 percent of average in water years 2014–2015 and 2013–2014, respectively. Overall, annual precipitation, snow, and runoff followed a decreasing gradient from north to south. The Northern Sierra 8-Station Precipitation Index had 57.8 inches of precipitation, which represents 116 percent of the index average. Rainfall in the months of December, January, and March represented 77 percent of this total. The San Joaquin 5-Station Precipitation and Tulare Basin 6-Station Precipitation indices totaled 40.1 inches (98 percent of average), and 25.8 inches (88 percent of average), respectively. The statewide mountain snowpack on April 1 was 85 percent of average, but peaked a few weeks earlier on March 15–16 at 90 percent (25.5 inches of snow water equivalent) of the April 1 average.

Statewide river runoff totaled 97 percent of average in the 2015–2016 water year, which was a dramatic increase over the previous water year's total of 46 percent of average. The Feather River runoff totaled 96 percent of average. Water year runoff totals for the Sacramento River Region (SRR), San Joaquin 4 Rivers (SJR), and Tulare Lake Region (TLR) were 98, 87, and 65 percent of average, respectively.

The Sacramento Valley Water Year Hydrologic Classification (Sacramento Valley 40-30-30 Index) and the San Joaquin Valley Water Year Hydrologic Classification (San Joaquin Valley 60-20-20 Index) were "below normal" and "dry," respectively, based on observed data for water year 2015–2016.

A net increase in average reservoir storage was realized in water year 2015–2016. The year began at 54 percent of average on October 1 and finished at 82 percent of average at the end of September.

Information in this chapter was contributed by the Division of Flood Management and the Division of Operations and Maintenance.

The Department of Water Resources (DWR) monitors precipitation, estimates mountain snowpack, calculates river runoff, and operates storage facilities during each water year. The official California water year runs from October 1 through September 30.

California's Hydrology

DWR divides California into 10 hydrologic regions. Each hydrologic region corresponds to the state's major water drainage basins. Annual precipitation, mountain snowpack, and runoff data are collected and analyzed for the hydrologic regions and used to determine water year type classifications and forecasts for the state's water supply outlook.

The state's precipitation is measured using three primary indices, the Northern Sierra 8-Station Precipitation Index, the San Joaquin 5-Station Precipitation Index, and the Tulare Basin 6-Station Precipitation Index. For more information, see the sidebar, Precipitation Estimates.

Runoff estimates are determined for the Sacramento River Region (SRR), the San Joaquin 4 Rivers (SJR), and the Tulare Lake Region (TLR). For more information, see the sidebar, Runoff Estimates.

The Eight River Index is used to determine the duration of fish and wildlife salinity and flow standards at Chipps Island or Port Chicago from February through June (see Chapter 4, Water Quality Programs). This index is the sum of the unimpaired runoff from the eight rivers in the SRR and SJR.

Two water supply indices, the Sacramento Valley Water Year Hydrologic Classification (Sacramento Valley 40-30-30 Index) and the San Joaquin Valley Water Year Hydrologic Classification (San Joaquin Valley 60-20-20 Index), are used to derive the water year classification for the Sacramento Valley and the San Joaquin Valley, respectively. The water supply indices are used by various water agencies to formulate water supply decisions. For more information, see the sidebar, Water Supply Indices.

DWR continually updates hydrologic data and information. If your research requires more current data than was available at the time of publication of this bulletin, please consult the most recent edition of Bulletin 120, and/or contact DWR staff in the Hydrology and Flood Operations Office.

Water Year 2015–2016

Precipitation

California experienced above average rainfall (104 percent of average) for the water year, and regionally, precipitation varied widely. Figure 8-1 presents water year precipitation for the various regions of the state.

Table 8-1 presents monthly precipitation totals for water year 2015–2016 at various gauges located throughout the state, listed north to south. Statewide, the wettest months, as measured by inches of precipitation, were January and March when most stations in the list received well above average precipitation. Fresno measured about 220 percent of average in January, while Blue Canyon measured 251 percent of average in March.

October was a warm, dry month for California. However, in mid-October, a cutoff low interacting with a surge of Pacific moisture led to intense convective events north of the Los Angeles Basin and the Southern Sierra, causing some mudflows that closed a few highways, including Interstate 5. November was a

Figure 8-1 Statewide Precipitation by Hydrologic Region, 2015–2016 Water Year, as Percent of Average

Table 8-1 Monthly Precipitation Totals at Various Locations in California, Water Year[a] 2015–2016

	Monthly Precipitation (inches)															
	Water Year 2015–2016													Water Year 2016–2017		
	2015			2016												
Station[b]	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	WY Total	Oct	Nov	Dec
Mount Shasta City	0.59	1.44	7.46	12.77	3.03	10.89	1.88	0.90	2.37	0.00	0.00	0.08	**41.41**	11.84	4.60	4.54
percent of average	*25*	*31*	*127*	*199*	*54*	*248*	*67*	*53*	*224*	*0*	*0*	*10*	***115***	*506*	*100*	*77*
Eureka Woodley Island	1.18	4.88	14.66	12.06	2.98	8.11	2.84	0.76	0.02	0.54	0.04	0.01	**48.08**	10.92	6.98	7.87
percent of average	*39*	*88*	*229*	*186*	*58*	*156*	*99*	*42*	*3*	*491*	*17*	*1*	***126***	*365*	*126*	*123*
Blue Canyon (DWR-2)	1.80	5.67	16.57	20.32	2.76	21.35	4.61	3.91	0.13	0.00	0.00	0.06	**77.18**	17.97	7.30	15.94
percent of average	*48*	*72*	*158*	*164*	*28*	*251*	*92*	*144*	*15*	*0*	*0*	*8*	***123***	*479*	*93*	*152*
Sacramento WB City	0.44	1.35	1.83	5.85	0.85	4.65	1.48	0.59	0.00	0.00	0.00	0.00	**17.04**	4.41	1.33	3.71
percent of average	*48*	*67*	*57*	*156*	*26*	*195*	*100*	*128*	*0*	*0*	*0*	*0*	***95***	*479*	*66*	*116*
San Francisco WB AP	0.00	1.42	3.37	5.58	0.85	5.14	0.82	0.05	0.00	0.00	0.00	0.00	**17.23**	2.43	2.21	4.39
percent of average	*0*	*51*	*76*	*114*	*20*	*171*	*51*	*13*	*0*	*0*	*0*	*0*	***76***	*238*	*80*	*99*
Yosemite Headquarters	3.37	3.74	9.05	9.53	1.87	7.46	2.70	0.54	0.51	0.00	0.00	0.03	**38.80**	6.58	2.20	8.34
percent of average	*196*	*89*	*138*	*142*	*30*	*151*	*83*	*38*	*89*	*0*	*0*	*5*	***106***	*383*	*52*	*127*
Fresno WB AP	0.49	1.74	2.97	4.42	0.33	2.93	1.06	0.29	0.06	0.00	0.00	0.00	**14.29**	0.67	1.38	2.51
percent of average	*102*	*157*	*169*	*220*	*16*	*158*	*98*	*104*	*86*	*0*	*0*	*0*	***131***	*140*	*124*	*143*
Grant Grove	2.82	5.18	6.09	8.55	2.02	7.65	3.32	0.66	0.41	0.00	0.10	0.02	**36.82**	4.41	1.18	9.51
percent of average	*144*	*100*	*78*	*114*	*28*	*101*	*77*	*56*	*146*	*0*	*143*	*4*	***84***	*225*	*23*	*122*
Los Angeles WSO AP	0.10	0.06	1.08	2.94	0.73	1.46	0.29	0.59	0.00	0.00	0.00	0.01	**7.26**	0.36	1.11	2.78
percent of average	*26*	*4*	*51*	*109*	*25*	*78*	*32*	*421*	*0*	*0*	*0*	*6*	***57***	*95*	*79*	*132*
San Diego NWS Lindbergh Field	0.43	1.54	0.88	3.21	0.05	0.76	0.55	0.44	0.00	0.00	0.00	0.32	**8.18**	0.07	0.61	4.22
percent of average	*102*	*136*	*46*	*157*	*3*	*47*	*72*	*210*	*0*	*0*	*0*	*178*	***79***	*17*	*54*	*221*

[a] Water Year = October 1–September 30

[b] AP = Airport; NWS = National Weather Service; WB = Weather Bureau; WSO = Weather Service Office

cool, dry month with the state receiving about 65 percent of the statewide average. December was a cool, wet month with precipitation falling heavier in the northern part of the state. January proved to be wetter and warmer than average throughout the state, with statewide precipitation just under 150 percent of average. February was a very warm and dry month, setting many new high maximum temperature records in locations throughout the state. March, while warm, marked a return to wetter conditions with two atmospheric river storm events in the first two weeks of the month. April, May, and June were all warmer and drier than average, with some precipitation accumulating on a gradient north to south, with some local exceptions. July, August, and September were all warm and extremely dry as is usual in the California summer.

Eureka Woodley Island on the north coast of California and Mount Shasta City in the north central part of the state received 48.1 and 41.4 inches of precipitation, respectively. For the 2015–2016 water year, precipitation for those stations was well above normal for December, January, and March. Over 75 percent of the water year total precipitation fell in December through March at both stations.

Blue Canyon experienced precipitation above normal in December, January, March, and May of water year 2015–2016. The station totals for the water year were 77.2 inches and 123 percent of average. The month of March accumulated the largest precipitation and percent of normal for the water year—21.3 inches, which was 251 percent of average.

Precipitation Estimates

Northern Sierra 8-Station Precipitation Index (8SI)

In the northern Sierra Nevada, precipitation is indexed by averaging rain gauge totals at eight representative stations, creating what is known as the Northern Sierra 8-Station Precipitation Index. The index provides a representative sample of the major watersheds (upper Sacramento, Feather, Yuba, and American rivers) and serves as a wetness index for the Sacramento River hydrologic region.

The rain gauge stations are:

(1) Mount Shasta City
(2) Shasta Dam
(3) Mineral
(4) Quincy
(5) Brush Creek
(6) Sierraville Ranger Station
(7) Blue Canyon
(8) Pacific House

San Joaquin 5-Station Precipitation Index (5SI)

In the central Sierra Nevada, precipitation is indexed by averaging rain gauge totals at five representative stations, creating what is known as the San Joaquin 5-Station Precipitation Index. The index provides a representative sample of the major watersheds (Stanislaus, Tuolumne, Merced, and San Joaquin rivers) and serves as a wetness index for the San Joaquin River hydrologic region.

The rain gauge stations are:

(1) Calaveras Big Trees
(2) Hetch Hetchy Reservoir
(3) Yosemite Headquarters
(4) North Fork Ranger Station
(5) Huntington Lake

Tulare Basin 6-Station Precipitation Index (6SI)

In the southern Sierra Nevada, precipitation is indexed by averaging rain gauge totals at six representative stations, creating what is known as the Tulare Basin 6-Station Precipitation Index. The index provides a representative sample of the Kings, Kaweah, Tule, and Kern river watersheds.

The rain gauge stations are:

(1) Balch Power House
(2) Springville
(3) Giant Forest
(4) Pascoes
(5) Ash Mountain
(6) Isabella

Areas of the Central Valley and the San Francisco Bay Area received the largest amount of precipitation in January. Precipitation totals were 5.9 inches (156 percent of average) for Sacramento, 4.4 inches (220 percent of average) for Fresno, and 5.6 inches (114 percent of average) for San Francisco. For the water year, Sacramento received 95 percent of its annual precipitation average, Fresno received 131 percent of its annual average, and San Francisco received 76 percent of average. Fresno received above average precipitation in 6 out of 12 months of the water year, while San Francisco was above average for only 2 months.

In the San Joaquin and Tulare Lake watersheds, water year total precipitation was near average for the water year. The largest amounts of precipitation fell in these watersheds during December, January, and March, which is similar to what transpired in the northern parts of California. Approximately two-thirds of the water year precipitation fell during those 3 months for Yosemite Headquarters and Grant Grove. Water year precipitation totals at those two sites were 106 and 84 percent of their respective annual averages.

Further south, Los Angeles and San Diego were below average for the 2015–2016 water year, totaling 7.3 inches (57 percent of average) and 8.2 inches, respectively. The heaviest month was January, when Los Angeles received 2.94 inches and San Diego received 3.2 inches of precipitation. Both cities received well above average precipitation in May as well—421 percent and 210 percent of average for Los Angeles and San Diego, respectively.

The monthly totals for the Northern Sierra 8-Station, the San Joaquin 5-Station, and the Tulare Basin 6-Station precipitation indices for the water year are presented in Table 8-2. Precipitation for the three indices totaled 57.8 inches (116 percent of average), 40.1 inches (98 percent of average), and 25.8 inches (88 percent of average), respectively.

For the Northern Sierra 8-Station Precipitation Index, January and March

Table 8-2 Regional Monthly Precipitation for Water Year 2015–2016

		Northern Sierra 8-Station Precipitation Index		San Joaquin 5-Station Precipitation Index		Tulare Basin 6-Station Precipitation Index	
	Month	Precipitation (inches)	Percent of Monthly Average	Precipitation (inches)	Percent of Monthly Average	Precipitation (inches)	Percent of Monthly Average
2015	October	1.20	40	1.90	90	1.50	125
	November	3.70	58	5.10	108	3.60	116
	December	11.80	140	8.80	141	4.80	109
2016	January	16.10	178	10.00	133	8.60	156
	February	2.70	33	1.40	20	1.10	21
	March	16.40	237	8.70	142	4.10	87
	April	2.80	71	2.80	77	1.60	61
	May	2.20	104	1.10	61	0.40	36
	June	0.90	90	0.30	50	0.10	25
	July	0.00	0	0.00	0	0.00	0
	August	0.00	0	0.00	0	0.00	0
	September	0.00	0	0.00	0	0.00	0
Total		**57.80**	**116**	**40.10**	**98**	**25.80**	**88**

were quite wet, registering 16.1 inches, 178 percent of average and 16.4 inches (237 percent of average), respectively. The 4-month period, December through March, typically the wettest period in the Sierra Nevada, accumulated 47.0 inches, which is 81 percent of the water year total for the index and 146 percent of the average (32.3 inches) that accumulates during those 4 months for the index. However, February was dry, accumulating only 33 percent of the monthly average.

For the San Joaquin 5-Station Precipitation Index, the total accumulated precipitation during December through March was 28.9 inches, which represents 72 percent of the water year total for the index and 108 percent of the average (26.7 inches)

Runoff Estimates

Unimpaired runoff represents the natural water production in a river basin, unaltered by upstream diversions, storage, or export of water to or import of water from other basins.

Sacramento River Region (SRR)

The runoff estimate for the SRR is the sum of unimpaired flow in million acre-feet (maf) at the following gauging stations:

(1) Sacramento River above Bend Bridge
(2) Feather River at Oroville (inflow to Lake Oroville)
(3) Yuba River near Smartville
(4) American River below Folsom Lake

San Joaquin 4 Rivers (SJR)

The runoff estimate for the SJR is the sum of unimpaired flow in maf at the following gauging stations:

(1) Stanislaus River below Goodwin Dam (inflow to New Melones Reservoir)
(2) Tuolumne River below La Grange (inflow to New Don Pedro Reservoir)
(3) Merced River below Merced Falls (inflow to Lake McClure)
(4) San Joaquin River below Millerton Lake (inflow to Millerton Lake)

Tulare Lake Region (TLR)

The runoff estimate for the TLR is the sum of unimpaired flow in maf at the following gauging stations:

(1) Kings River below Pine Flat Reservoir
(2) Kaweah River below Terminus Reservoir
(3) Tule River below Lake Success
(4) Kern River below Lake Isabella

Eight River Index

The Eight River Index is the sum of the unimpaired runoff from the eight rivers in the SRR and the SJR.

that accumulates during those 4 months for the index.

The Tulare Basin 6-Station Precipitation Index accumulated a total of 18.6 inches during December through March, which represents 72 percent of the water year total for the index and 94 percent of the average (19.8 inches) that accumulates during those 4 months for the index.

Mountain Snowpack

Precipitation that fell during water year 2015–2016 consisted of rain and snow; snow accumulation was near normal as of April 1. Monthly statewide snowpack for the water year is shown in Table 8-3. Snow water equivalents shown in the table were obtained from daily snow sensor reports corresponding to the first day of each month. The statewide average snow water equivalent reported for April 1 was 24.1 inches or 86 percent of average. This was a tremendous improvement relative to last year which was only 5 percent of average, the all-time historic low. April 1 is typically the average annual date of peak snow accumulation. In 2016, the mountain snowpack peaked during the middle of March at approximately 25.5 inches of snow water content or 90 percent of its April 1 average.

Table 8-3 Statewide Mountain Snowpack for Water Year 2015–2016

	Date	Snow Water Equivalent (inches)	Percent of Average	Percent of April 1 Average[a]
2015	October 1	0.0	0	0
	November 1	0.1	0	0
	December 1	2.6	55	9
2016	January 1	10.5	103	37
	February 1	20.6	116	72
	March 1	20.7	84	74
	April 1	24.1	86	86
	May 1	13.0	59	46
	June 1	2.0	23	7
	July 1	0.0	0	0
	August 1	0.0	0	0
	September 1	0.0	0	0

[a] April 1 is the average date of peak statewide mountain snowpack.
This table is based on snow pillow (a device for measuring mountain snowpack at automated reporting stations) data.

River Runoff

Statewide river runoff totaled 97 percent of average in the 2015–2016 water year. The monthly runoff totals for the SRR, the SJR, the TLR, and the Feather River are shown in Table 8-4. As shown, the water year runoff totals for these areas ranged from near 65 to almost 100 percent of average.

Table 8-4 Unimpaired Runoff for Water Year 2015–2016 (million acre-feet)

	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	WY
SRR runoff	0.29	0.32	1.04	3.30	1.73	5.56	1.98	1.48	0.74	0.40	0.32	0.32	17.48
percent of average	*62*	*37*	*62*	*135*	*73*	*191*	*86*	*68*	*60*	*68*	*79*	*81*	*98*
SJR runoff	0.03	0.08	0.22	0.37	0.37	0.95	0.95	1.05	0.83	0.16	0.04	0.02	5.06
percent of average	*46*	*64*	*93*	*85*	*86*	*149*	*113*	*76*	*78*	*35*	*32*	*35*	*87*
TLR runoff	0.02	0.04	0.06	0.11	0.15	0.25	0.34	0.47	0.41	0.10	0.03	0.02	1.98
percent of average	*41*	*53*	*50*	*62*	*82*	*91*	*86*	*65*	*67*	*34*	*34*	*32*	*65*
Feather River runoff	0.06	0.07	0.23	0.68	0.43	1.51	0.54	0.36	0.16	0.08	0.07	0.07	4.25
percent of average	*58*	*33*	*60*	*121*	*80*	*206*	*87*	*59*	*48*	*55*	*70*	*75*	*96*
Statewide runoff percent of average	*54*	*30*	*83*	*134*	*75*	*184*	*91*	*69*	*65*	*51*	*63*	*70*	*97*

SRR: Sacramento River Region
Sacramento River above Bend Bridge, Feather River at Oroville, Yuba River near Smartville, American River below Folsom Lake

SJR: San Joaquin 4 Rivers
Stanislaus River below Goodwin Dam, Tuolumne River below La Grange, Merced River below Merced Falls, San Joaquin River below Millerton Lake

TLR: Tulare Lake Region
Kings River below Pine Flat Reservoir, Kaweah River below Terminus Reservoir, Tule River below Lake Success, Kern River below Lake Isabella

WY: Water Year (October 1–September 30)

From a water supply perspective, the most closely monitored period is April through July. By the end of July, the April–July runoff was 73, 80, and 65 percent of average, for the SRR, SJR, and TLR regions, respectively.

Water Supply Indices

The Sacramento Valley 40-30-30 Index and the San Joaquin Valley 60-20-20 Index were "below normal" and "dry," respectively, based on observed data for water year 2015–2016.

For more information, see the sidebar, Water Supply Indices.

Water Supply Indices

Sacramento Valley 40-30-30 Index

State Water Resources Control Board, Water Right Decision 1641 (D-1641) defines the Sacramento Valley Water Year Hydrologic Classification (Sacramento Valley 40-30-30 Index), a water supply forecasting tool used to derive the water year type for the Sacramento Valley. The State Water Resources Control Board first introduced the Sacramento Valley 40-30-30 Index in the 1991 Water Quality Control Plan for the San Francisco Bay/Sacramento-San Joaquin Delta Estuary (Bay-Delta Plan), and continued using it with the 1995 and 2006 Bay-Delta Plans. D-1641 implements portions of the 2006 Bay-Delta Plan with respect to the operation of the State Water Project and the Central Valley Project.

The Sacramento Valley 40-30-30 Index is used to determine the Sacramento Valley water year type for the purpose of implementing water quality objectives defined in D-1641. It also provides an estimate of the potential water supply originating in the basin from rainfall and snowmelt runoff, groundwater accretion, and reservoir carryover storage. The index incorporates seasonal differences in water contribution for the year and includes the prior year's conditions in order to establish a more reliable index of water availability. The 40-30-30 factors represent the percentage weight given to the following:

(1) 40%—the current year's April through July Sacramento Valley unimpaired runoff;

(2) 30%—the current year's October through March Sacramento Valley unimpaired runoff; and

(3) 30%—the previous year's index with a cap of 10 million acre-feet (to account for required flood control reservoir releases during wet years).

The water year type is determined by the index value on a scale specific to the Sacramento Valley (as defined in D-1641).

Classification	Index (million acre-feet)
Wet	Equal to or greater than 9.2
Above Normal	Greater than 7.8 and less than 9.2
Below Normal	Equal to or less than 7.8 and greater than 6.5
Dry	Equal to or less than 6.5 and greater than 5.4
Critical	Equal to or less than 5.4

Water year type forecasts are made beginning in December. The Sacramento Valley 40-30-30 Index May 1 forecast (at the 50 percent exceedance level) determines the "official" water year type for implementing water quality and flow requirements contained in D-1641. The D-1641 objectives are conditioned by water year type and generally become less stringent during dryer years.

San Joaquin Valley 60-20-20 Index

D-1641 uses a similar method in the San Joaquin Valley Water Year Hydrologic Classification (San Joaquin Valley 60-20-20 Index) to determine the water year type for the San Joaquin Valley. The 60-20-20 factors represent the percentage weight given to the following:

(1) 60%—the current year's April through July San Joaquin Valley unimpaired runoff;

(2) 20%—the current year's October through March San Joaquin Valley unimpaired runoff; and

(3) 20%—the previous year's index with a cap of 4 million acre-feet (to account for required flood control reservoir releases during wet years).

The water year type is determined by the index value on a scale specific to the San Joaquin Valley (as defined in D-1641).

Classification	Index (million acre-feet)
Wet	Equal to or greater than 3.8
Above Normal	Greater than 3.1 and less than 3.8
Below Normal	Equal to or less than 3.1 and greater than 2.5
Dry	Equal to or less than 2.5 and greater than 2.1
Critical	Equal to or less than 2.1

The San Joaquin Valley 60-20-20 Index May 1 forecast (at the 75 percent exceedance level) determines the "official" water year type for implementing D-1641 San Joaquin River Vernalis flow standards.

Water Year 2016–2017 October through December Water Conditions

The last 3 months of calendar year 2016 mark the beginning of a new water year, 2016–2017. October was warmer than average and wet for California.

Statewide, the October average precipitation for the month was 283 percent of average and was the third wettest October in 122 years. November was a warmer-than-average and drier-than-average month for California. Statewide, November precipitation was 70 percent of average. December was a cooler-than-average and wetter-than-average month for California. The average precipitation statewide was 119 percent of the long-term average.

At the end of December, water year runoff totals were 172 percent of average for the

SRR, 224 percent of average for the SJR, and 75 percent of average for the TLR.

Storage

Statewide Storage

Monthly storage totals for the major Sierra Nevada reservoirs are shown in Table 8-5. Water year 2015–2016 began at 54 percent of average reservoir storage. The percent of average storage remained below 55 percent through December 2015. Thereafter, the percent of average increased for each month until May 1. For the remaining months of the water year, the percent of average dropped gradually until the end of September when the percent of average was 82 percent.

State Water Project Storage

The State Water Project (SWP) operates a complex system of dams, canals, and reservoirs to collect and store water for future deliveries. Lake Oroville is the first of two primary SWP conservation facilities. Lake Oroville inflow comes from tributaries of the Feather River.

San Luis Reservoir is the second primary SWP conservation facility. This Central California joint-use facility derives its inflow from pumping at the Gianelli Pumping-Generating Plant. San Luis is an off-stream storage reservoir. Most of the water is pumped into the reservoir from late fall to early spring. This water is temporarily

Table 8-5 Monthly Reservoir Storage for Water Year 2015–2016 (thousand acre-feet)

Reservoir	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Shasta	1,416	1,329	1,427	2,346	2,766	4,027	4,233	4,167	3,920	3,544	3,132	2,811
percent of average	*54*	*50*	*51*	*77*	*84*	*110*	*109*	*109*	*110*	*112*	*112*	*106*
Oroville	1,007	929	1,017	1,534	1,865	3,060	3,400	3,307	2,958	2,334	1,840	1,619
percent of average	*48*	*44*	*47*	*67*	*76*	*115*	*119*	*112*	*104*	*92*	*81*	*76*
Folsom	148	137	239	529	606	691	826	826	715	485	347	306
percent of average	*30*	*30*	*51*	*106*	*113*	*109*	*114*	*103*	*92*	*73*	*58*	*56*
San Luis	348	396	436	693	888	1,059	957	677	363	195	322	510
percent of average	*33*	*33*	*32*	*44*	*52*	*59*	*54*	*43*	*29*	*20*	*38*	*55*
Pardee	108	107	127	163	175	194	180	196	187	189	187	183
percent of average	*62*	*61*	*72*	*91*	*97*	*106*	*98*	*103*	*97*	*100*	*101*	*101*
New Melones	271	267	310	393	459	617	622	624	631	583	544	528
percent of average	*20*	*20*	*23*	*28*	*32*	*41*	*42*	*42*	*42*	*41*	*40*	*41*
Don Pedro	642	648	707	818	944	1,218	1,363	1,534	1,562	1,460	1,367	1,319
percent of average	*49*	*49*	*53*	*59*	*66*	*83*	*93*	*100*	*99*	*96*	*98*	*99*
Millerton	174	163	177	208	268	345	295	360	452	353	259	231
percent of average	*85*	*72*	*64*	*63*	*80*	*95*	*82*	*91*	*110*	*107*	*106*	*105*
Pine Flat	119	133	151	202	269	387	520	629	580	328	197	160
percent of average	*34*	*36*	*37*	*43*	*51*	*69*	*86*	*88*	*86*	*66*	*53*	*48*
Kaweah	16	21	22	32	36	76	106	149	126	23	13	10
percent of average	*138*	*156*	*128*	*147*	*139*	*175*	*136*	*123*	*118*	*44*	*61*	*77*
Success	3	4	10	11	21	37	47	53	53	18	8	6
percent of average	*36*	*43*	*76*	*61*	*85*	*112*	*109*	*102*	*112*	*55*	*42*	*52*
Isabella	30	30	33	36	43	61	88	134	162	134	106	96
percent of average	*18*	*19*	*21*	*20*	*23*	*30*	*38*	*45*	*52*	*50*	*50*	*52*
Statewide percent of average	*54*	*52*	*54*	*66*	*71*	*87*	*90*	*89*	*87*	*84*	*83*	*82*

stored, then released into the California Aqueduct to meet SWP water contractor peaking demands in the summer months. The remaining SWP dams and reservoirs regulate the stored water supply with delivery patterns that are designed to fit local water demands.

2016 Storage Totals in Major SWP Reservoirs

End-of-year storage on December 31, 2016, in major SWP reservoirs and the State's share of joint-use reservoirs was 3.24 million acre-feet (maf) or 61 percent of maximum storage, compared to 1.6 maf or 30 percent of maximum storage at the end of 2015. The average end-of-month total storage in major SWP reservoirs for 2016 was 3.2 maf.

Lake Oroville

Lake Oroville has a maximum water storage capacity of 3,537,580 acre-feet (af). Runoff from the upper Feather River drainage is collected and stored in this reservoir and released to the Sacramento-San Joaquin Delta through Oroville Dam, Thermalito Diversion Dam, and Thermalito Afterbay.

2016 Inflow. Total Lake Oroville inflow for 2016 was 4.2 maf, which was 116 percent of the average (3.62 maf) over the last 30 years. Maximum daily inflow occurred on March 14 at 107,829 af. Minimum daily inflow occurred on July 7 at 449 af. Peak monthly total inflow occurred in March at 1.3 maf, 31 percent of the 2016 total. The highest total inflow in the last 30 years (1987–2016) was in 1995 at 8,996,242 af. The lowest total inflow for the same period was in 2015 at 1,295,451 af.

Figure 8-2 shows monthly Lake Oroville inflow for 2014, 2015, and 2016.

Figure 8-3 shows historical maximum and minimum cumulative Lake Oroville inflow and the current cumulative inflow for 2016.

2016 Storage. Minimum storage occurred on January 1 at 1,017,557 af, 29 percent of lake capacity. Maximum storage occurred on May 12 at 3,408,743 af, 96 percent of lake capacity. End-of-year Lake Oroville storage was 1,981,686 af. Figure 8-4 shows storage in Lake Oroville for 2015 and 2016.

2016 San Luis Reservoir Operations

San Luis Reservoir is operated jointly by DWR and the Bureau of Reclamation pursuant to operating procedures adopted in June 1981. San Luis Reservoir has a normal operating capacity of 2,027,840 af. The SWP share of this capacity is 1,062,183 af.

San Luis Reservoir reached its maximum storage on December 31 at 1,249,284 af, 62 percent of its normal maximum operating capacity. At the beginning of 2016, San Luis Reservoir contained 436,272 af, 22 percent of its capacity. The SWP storage share was 369,787 af. The highest end-of-month SWP share of water storage occurred in December at 791,746 af. Figure 8-5 shows the SWP share of storage and total storage in San Luis Reservoir for 2015 and 2016.

2016 Lake del Valle Operations

Lake del Valle, located off the South Bay Aqueduct, functions primarily as a storage facility for water delivery to Santa Clara and Alameda counties. At the beginning of 2016, Lake del Valle held 26,181 af, which was about 34 percent of its maximum capacity of 77,111 af. Its highest storage occurred on May 12 at 40,891 af. Its lowest storage occurred on January 5 at 25,979 af.

On December 31, storage in Lake del Valle was 31,739 af, 41 percent of its maximum capacity. There was 21,231 af of natural inflow into Lake del Valle, and 1,427 af of inflow from the South Bay Aqueduct. There were no releases to Arroyo Valle, and releases for 2016 to the South Bay Aqueduct from Lake del Valle totaled 14,015 af.

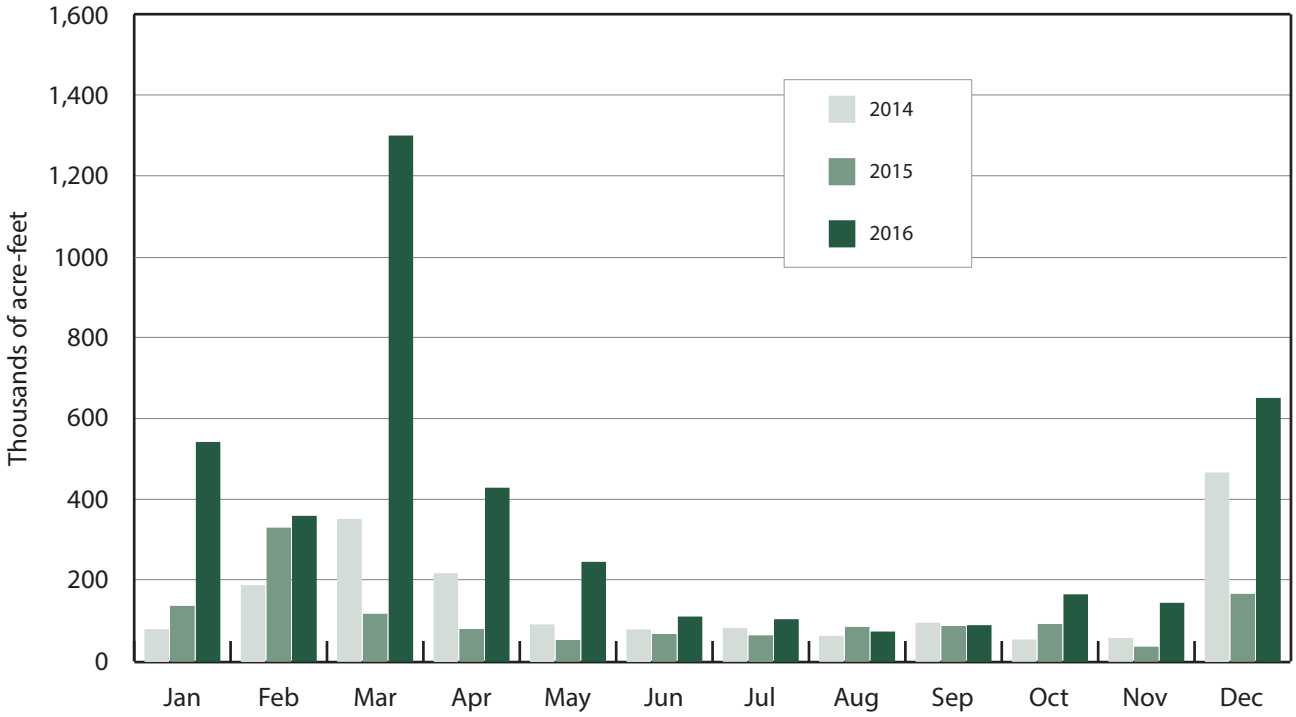


Figure 8-2 Monthly Inflow into Lake Oroville from the Feather River, 2014–2016

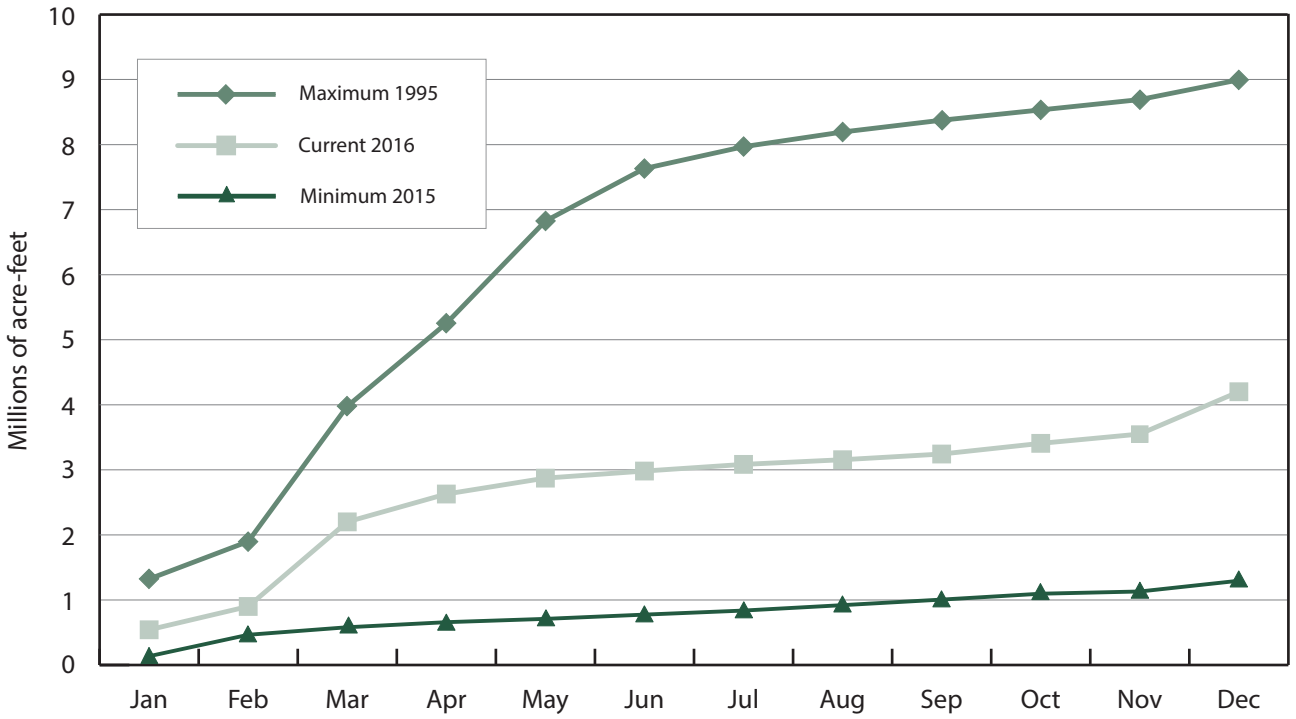


Figure 8-3 Lake Oroville Cumulative Inflow over the Last 30 Years—Current and Historical Maximum and Minimum

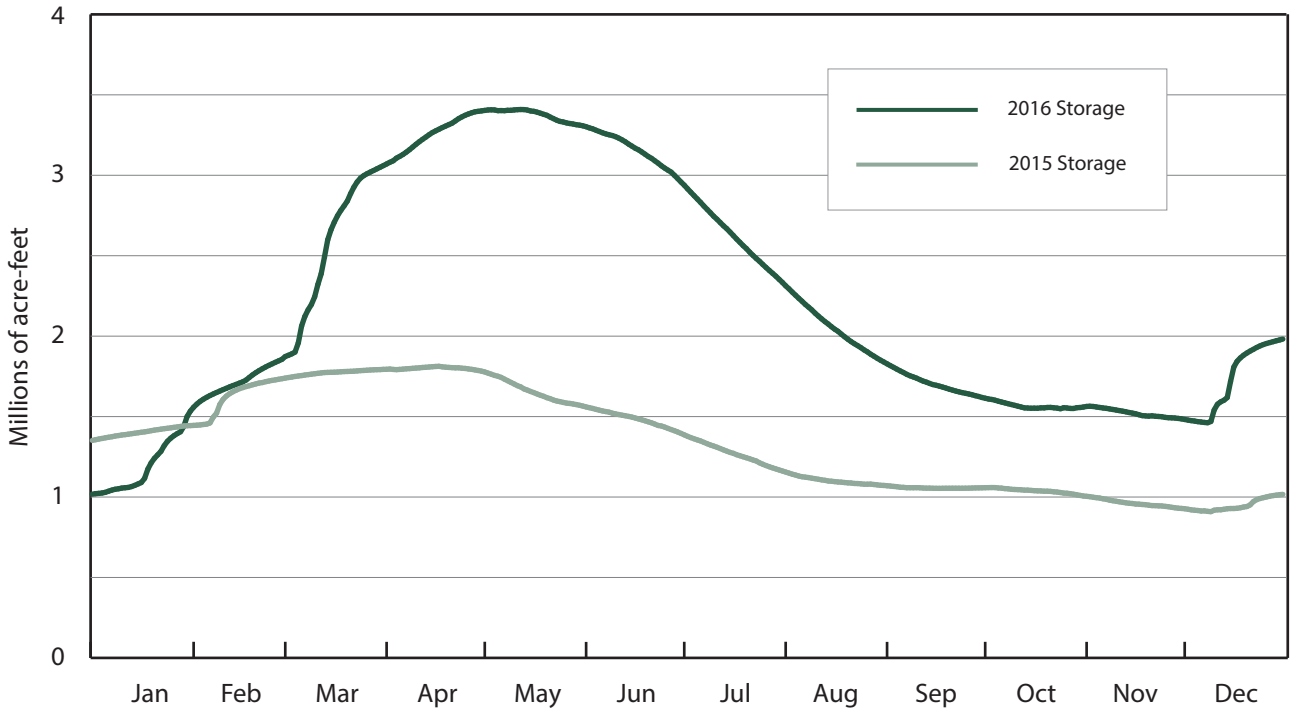


Figure 8-4 **Storage in Lake Oroville, 2015 and 2016**

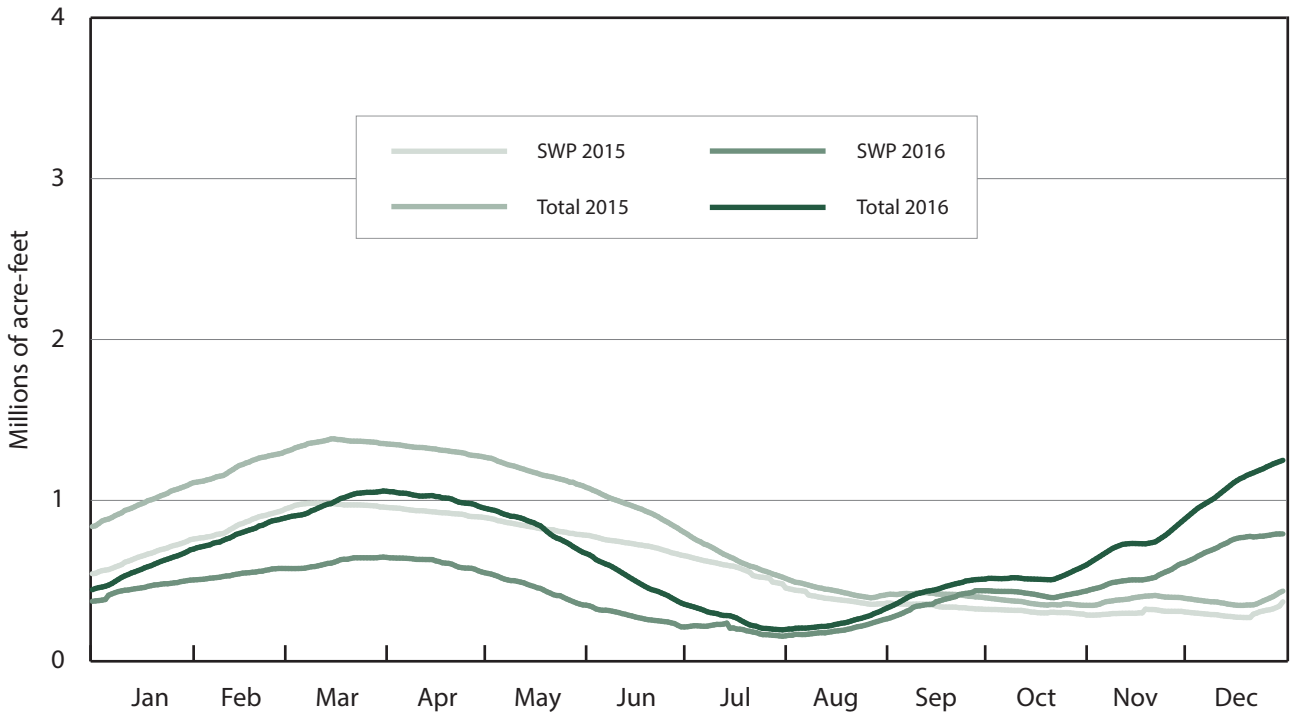


Figure 8-5 **SWP Share of Storage and Total Storage in San Luis Reservoir, 2015 and 2016**

2016 Southern Reservoir Operations

During normal operating conditions, DWR maintains its four southern reservoirs—Pyramid, Castaic, Silverwood, and Perris—at or near full operating capacity to ensure uninterrupted delivery of water to Southern California SWP water contractors.

At the beginning of 2016, these reservoirs held 409,546 af, which is 59 percent of their combined normal maximum operating capacity of 689,021 af. At the end of 2016, the reservoirs held 468,256 af, 68 percent of combined normal maximum operating capacity.

Diversions from the Delta

The SWP diverts water from the Sacramento-San Joaquin Delta, through the Barker Slough and Banks pumping plants, for delivery to SWP water contractors' storage facilities. The SWP diverts water from Barker Slough Pumping Plant to the North Bay Aqueduct. Water is delivered from Banks Pumping Plant to the South Bay Area through the South Bay Aqueduct, and to the San Joaquin Valley, Central Coastal, and Southern California areas through the California Aqueduct. The Central Valley Project (CVP) diverts water to similar areas from the Delta through Jones Pumping Plant and Contra Costa Pumping Plant.

In 2016, the North Bay Aqueduct received 33,150 af of water from the Barker Slough Pumping Plant.

Figure 8-6 shows the amounts of water pumped each month for 2016 at Banks Pumping Plant, totaling 2,595,218 af. Of this amount, the SWP diverted 2,591,228 af. There was 3,990 af pumped for the Cross Valley Canal, and no water was wheeled for the CVP.

The CVP diverted 1,749,325 af at Jones Pumping Plant and 137,244 af at Contra Costa Pumping Plant in 2016.

The combined Delta exports include all of these plants. Figure 8-7 shows the monthly amounts of water diverted from the Delta in 2016 by the SWP and CVP. Maximum daily Delta exports occurred on September 7 at 23,580 af. Combined SWP and CVP monthly Delta exports in 2016 varied from a low of 116,211 af in April, to a high of 604,503 af in August. Delta exports totaled approximately 4.5 maf in 2016.

Figure 8-8 shows monthly total amounts pumped at Dos Amigos Pumping Plant for 2016. Dos Amigos Pumping Plant diverts water from O'Neill Forebay to the California Aqueduct. Dos Amigos pumped the largest amount in June at 365,112 af.

Figure 8-9 shows the amount of water pumped each month in 2016 at Edmonston Pumping Plant. Water pumped through the Edmonston Pumping Plant for delivery to Southern California totaled 1,310,458 af.

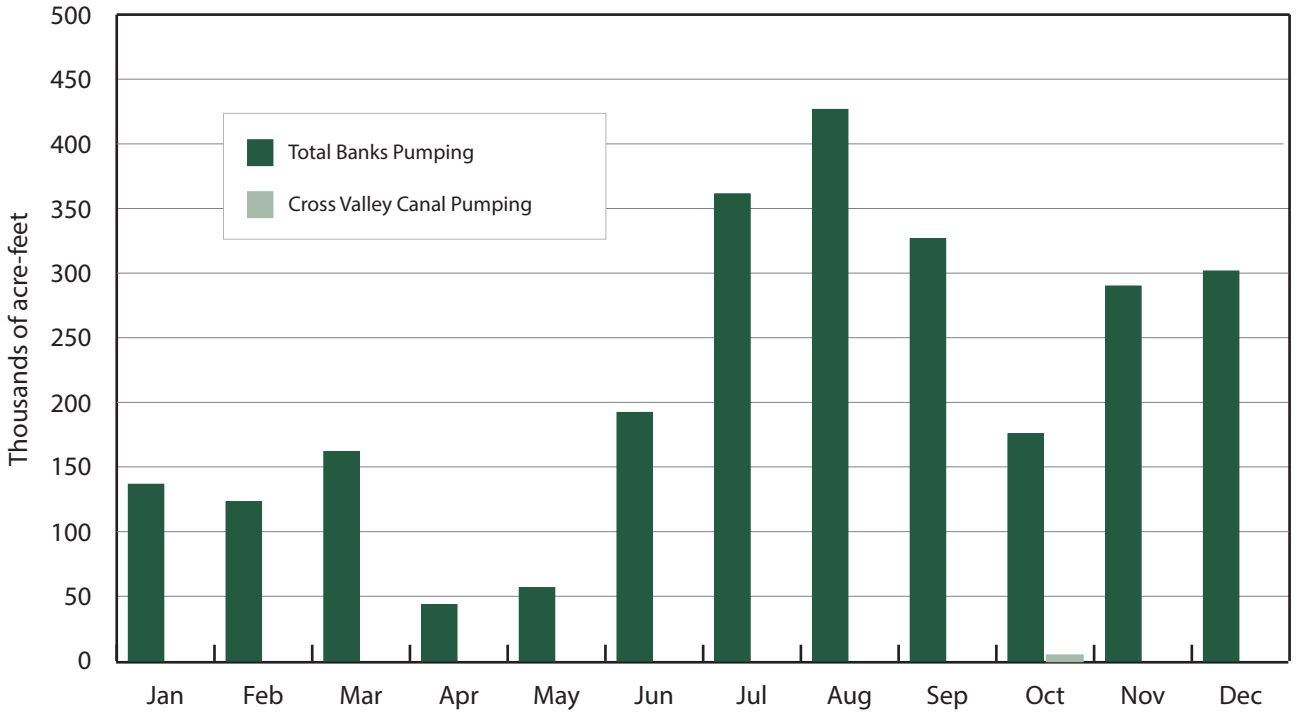


Figure 8-6 **Water Pumped at Banks Pumping Plant, 2016**

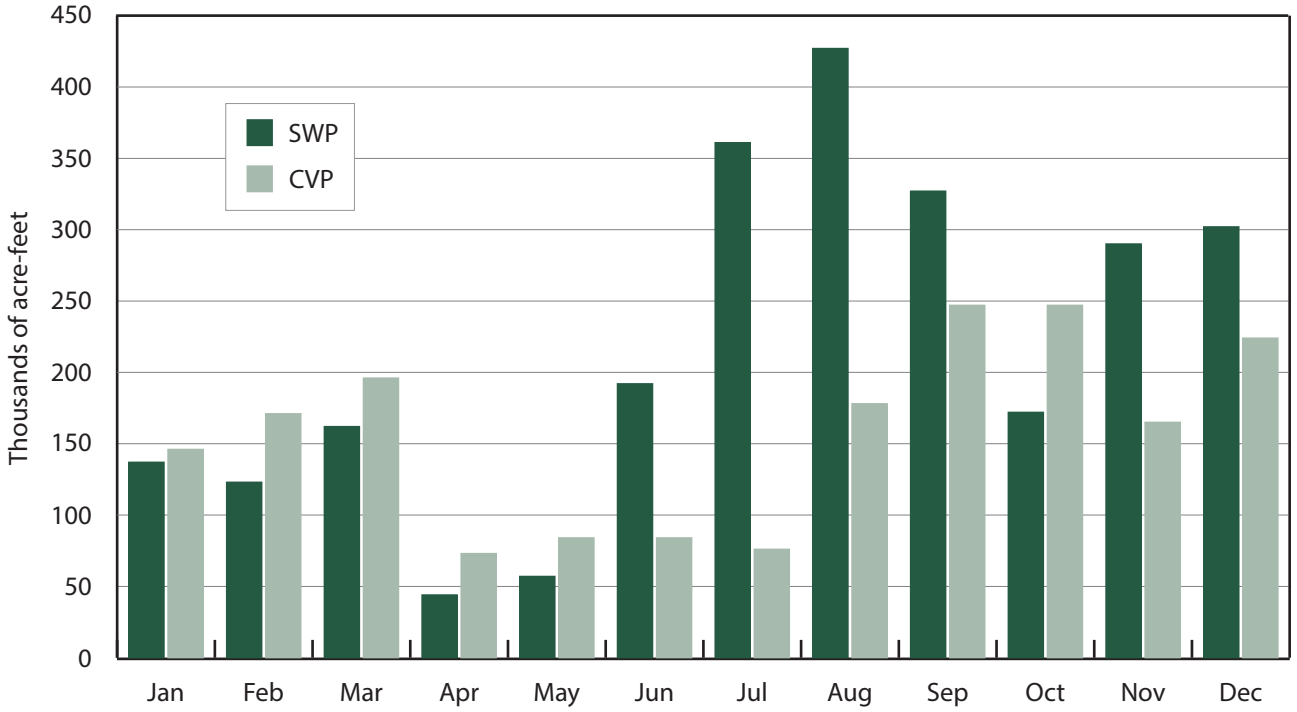


Figure 8-7 **Sacramento-San Joaquin Delta Exports by State Water Project and Central Valley Project, 2016**

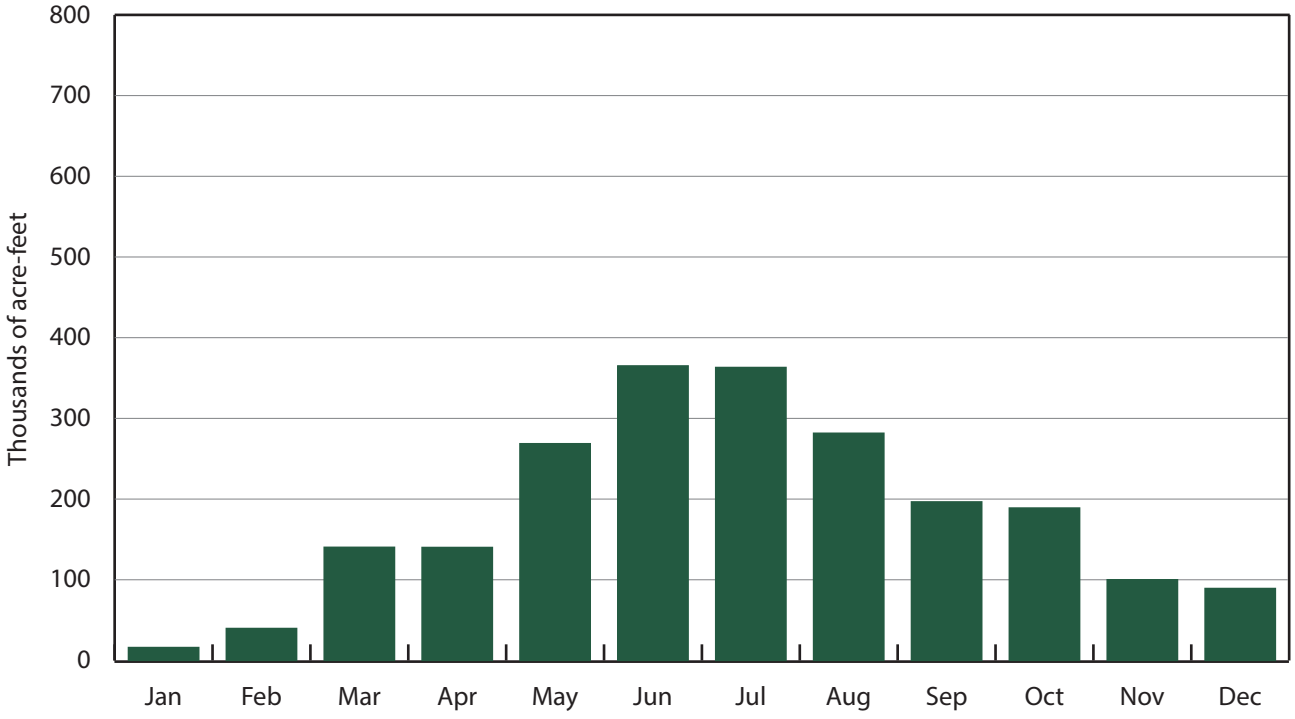


Figure 8-8 Water Pumped at Dos Amigos Pumping Plant, 2016

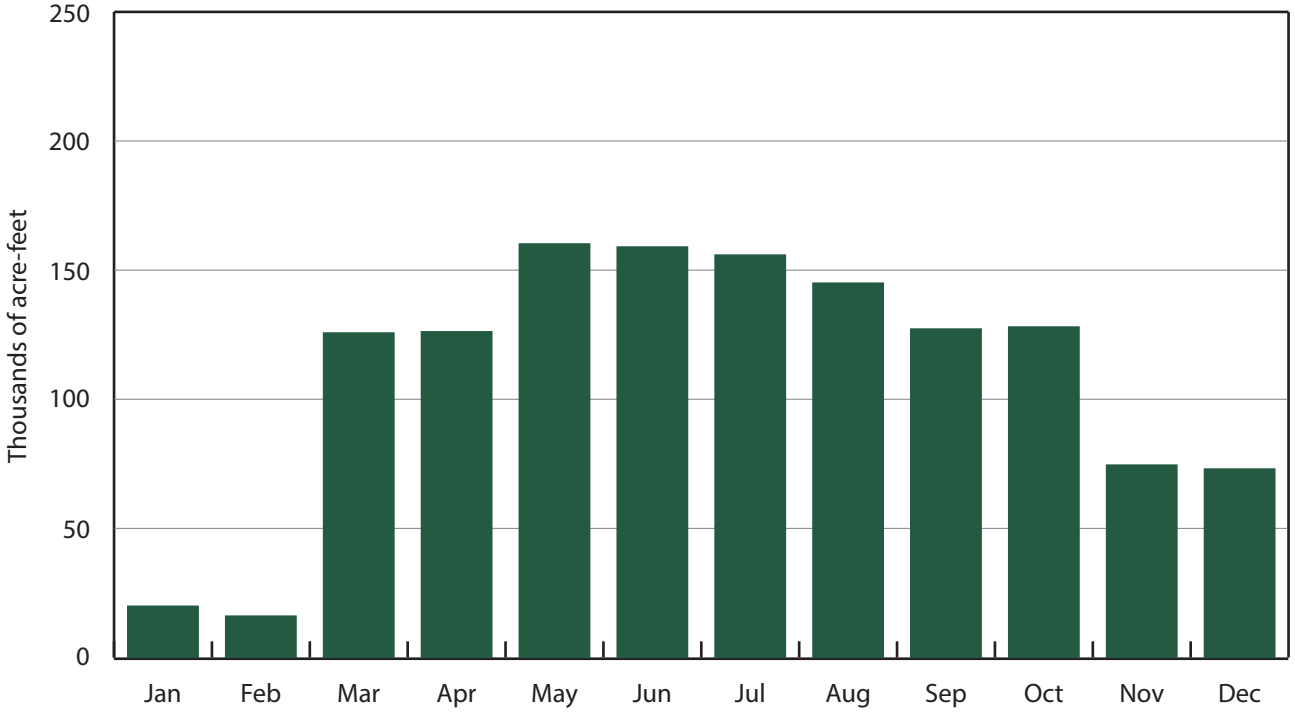


Figure 8-9 Water Pumped at Edmonston Pumping Plant, 2016

Chapter 9
Water Contracts and Deliveries

Antelope Lake.

Significant Events in 2016

A total of 3,338,083 acre-feet (af) of State Water Project (SWP) and non-SWP water was delivered to 29 long-term SWP water contractors and 21 other agencies. The portion delivered to SWP water contractors was 2,180,626 af; the portion delivered to non-SWP agencies was 1,157,457 af.

The hydrologic conditions in the Sacramento and San Joaquin river watersheds were classified as "below normal" and "dry," respectively. As a result, the Department of Water Resources (DWR) approved 60 percent of the SWP water contractors' Table A allocation requests.

Six SWP water contractors recovered approximately 124,812 af of water from water banks.

Information for this chapter was provided by the State Water Project Analysis Office.

Long-term water supply contracts between the Department of Water Resources (DWR) and 29 public agencies and local water districts provide for water service from the State Water Project (SWP) and are the basis for the SWP's construction and on-going operations. The State provides SWP financing, capital construction, improvements, and all operations and maintenance of SWP facilities, and the agencies and local districts have contractually agreed to repay all associated costs.

Long-term Water Supply Contracts

The long-term water supply contracts set forth the maximum amount of water a contractor may request each year from the SWP, and these water amounts are written within the contracts in a list format known as Table A. "Table A" or "Table A water" represents a portion or all of the annual Table A amount requested by SWP water contractors and approved for delivery by DWR based on hydrologic conditions, current reservoir storage, and combined requests from the SWP water contractors. Under certain water year conditions, DWR is not able to deliver the quantity of water requested by SWP water contractors. In those years, a proportional amount is allocated and delivered according to the long-term water supply contracts by prorating the amount in proportion to each SWP water contractor's annual Table A amount. Table A amounts may also be used as a factor to allocate other available water supplies to each contractor. Approved Table A amounts may also be referred to in this chapter as "approved amounts," "approved water," or "allocated water."

SWP water provided under the long-term water supply contracts include current year Table A amounts, transfer and exchange of Table A water, carryover water, Turn-Back Pools A and B water, Multiyear Water Pool Program water, and Article 21 water.

DWR enters into agreements with SWP water contractors and non-SWP agencies; these agreements may be amended periodically, to convey SWP and non-SWP water through the California Aqueduct. Using SWP facilities, DWR conveys non-SWP water for various agencies according to the terms of water rights and water transfer and exchange agreements. DWR also enters into agreements to approve construction, operation, and maintenance of SWP facilities, including turnouts and turn-ins.

The State Water Project Analysis Office (SWPAO) uses a numbering system for contracts, amendments, and agreements executed by DWR. These numbers, referred to as SWPAO numbers, are designated in Chapter 9 text as "SWPAO #XXXXX" and are located in parentheses in descending order, after each contract, amendment, or agreement description. These numbers can be used as identifiers to contact DWR staff for more detailed information on a particular document.

Contract Extension Negotiations

In May 2013, DWR and the SWP water contractors began negotiations in a public forum to develop contract amendments to extend the term and change certain financial provisions of the long-term water supply contracts. In June 2014, the negotiators for DWR and the SWP water contractors reached a general agreement on principles for such an amendment (the "Agreement in Principle").

State Water Project Long-term Water Supply Contracts

The first long-term water supply contract was signed with The Metropolitan Water District of Southern California (Metropolitan) on November 4, 1960. The contract was negotiated by the Department of Water Resources (DWR) and Metropolitan according to terms of the contracting principles for water service contracts announced by the Governor on January 20, 1960.

The Metropolitan contract became the prototype for all long-term water supply contracts; by the end of 1967, 31 agencies had contracted for water. In addition, a long-term water supply contract was executed with the City of West Covina in December 1963, but it was terminated in August 1965, and the city's Table A amount was transferred to Metropolitan through an amendment to its long-term contract with DWR. Long-term contracts with Hacienda Water District and Devil's Den Water District were also terminated when those districts transferred their Table A amounts, through contract amendments, to Tulare Lake Basin Water Storage District (1981) and Castaic Lake Water Agency (1992), respectively. Today the State Water Project (SWP) has long-term water supply contracts with 29 SWP water contracting agencies. Those contracts have been amended periodically, and as needed, to incorporate mutually agreed upon modifications.

All water contracts signed in the 1960s included an estimated date for initial water deliveries and a schedule of the water delivery amount the SWP water contractor could expect annually (annual Table A amounts). That amount was designed to increase gradually until the maximum amount of annual Table A was reached. The total combined maximum annual Table A amount for all SWP water contracting agencies was initially 4,230,000 acre-feet (af), assuming full development of the SWP.

The contracts were executed for 75 years or until all bonds sold as part of the California Water Resources Development Bond Act were repaid, whichever period was longer. As a result of amendments to contracts in the 1990s, the current combined maximum annual Table A amount totals 4,172,786 af, and the contracts are in effect for the longest of the following periods: (1) the project repayment period, which extends to December 31, 2035; (2) 75 years from the date of the contract; or (3) the period ending with the latest maturity date of any bond used to finance the construction costs of project facilities.

Currently, the long-term water supply contracts remain in effect for whichever period is longest: (1) the project repayment period, which extends to December 31, 2035, 75 years from the effective date of the contract; or (2) until all bonds issued to finance construction costs of SWP facilities are repaid. Each SWP water contractor may elect to receive continued service under its long-term water supply contract contingent upon certain specified terms and conditions and other reasonable and equitable terms mutually agreed upon by DWR and the SWP water contractors.

The 75-year long-term water supply contract term results in the contracts having varying termination dates that range between

December 31, 2035, and December 31, 2042. Under the Agreement in Principle, each SWP water contractor that signs an amendment would extend its contract term to December 31, 2085.

Also under the Agreement in Principle, payment provisions for capital costs and certain other costs will be amended from an amortized basis to an annual "pay as you go" basis. The "pay as you go" provisions will provide revenues needed by DWR to operate the SWP in a fiscally sound manner. The long-term water supply contracts' current provisions authorizing DWR to charge the SWP water contractors annually for the full amount of required annual debt service and coverage on the bonds will continue in any extended long-term water supply contract.

The Agreement in Principle also provides for, among other things, the following:

- an increase in DWR's operating reserves—a mechanism for financing capital projects with interest from the SWP water contractors;
- the establishment of accounts to fund certain State Water Resources Development System expenses not chargeable to the SWP water contractors; and
- the establishment of a finance committee consisting of DWR and contractor representatives to serve as a forum for discussions and to provide a channel for recommendations concerning SWP financial policies.

Before any long-term water supply contract amendment is adopted, DWR must accomplish the following as part of the contract amendment process: (1) complete an environmental review pursuant to the California Environmental Quality Act and (2) deliver a presentation in an informational hearing to the California Legislature. In 2016, DWR released the draft environmental impact report (EIR) on August 17, 2016, and held a public hearing on September 12, 2016 in Sacramento. The public comment period closed on October 17, 2016.

Amendments to Long-term SWP Water Supply Contracts

All of the original long-term water supply contracts signed by DWR and the 29 long-term SWP water contractors have been amended to incorporate mutually desired changes. Most amendments fall under the following general categories:

(1) permanent transfers of Table A amounts from one SWP water contractor to another;
(2) allocation of costs and benefits for the addition or enlargement of SWP facilities;
(3) purchase of excess capacity in the California Aqueduct; and
(4) provisions to implement Monterey Agreement principles.

2016 Amendments to Long-term SWP Water Supply Contracts

There were no amendments to the long-term water supply contracts in 2016.

Monterey Amendments

The Monterey Amendments increased the reliability of existing water supplies and water management flexibility, providing more tools for the long-term SWP water contractors to maximize use of existing facilities.

The Monterey Amendments included changes in allocation of Table A water, the transfer of Table A amounts and land, financial restructuring, and increased operational flexibility. The Monterey Amendments are discussed in detail in Bulletin 132-95, Chapter 1, Summary of Significant Events, available on the DWR website.

In 2016, DWR continued to operate the SWP according to the long-term water supply contracts, the Monterey Amendments, and the May 5, 2003, settlement agreement for the *Planning and Conservation League v. DWR* (1995) lawsuit. The May 2003 settlement agreement is discussed in detail in Bulletin 132-04, Chapter 9, Water Contracts and Deliveries. As required by the settlement agreement, the Monterey Plus EIR was prepared and eventually certified by DWR in 2010. The adequacy of the Monterey Plus EIR was challenged, and the court found that the Monterey Plus EIR complied with the California Environmental Quality Act in all respects except with regard to its discussion/analysis of the development, use, and operation of the Kern Water Bank (KWB), located within Kern County, near Bakersfield, California. In November 2014, the court ordered DWR to correct the deficiencies in a revised Monterey Plus EIR and to recertify the revised Monterey Plus EIR by December 31, 2015. In July 2015, the court granted DWR's request for a 6-month extension, changing the deadline to June 30, 2016.

DWR developed the Monterey Plus draft revised EIR making changes to the 2010 Monterey Plus EIR as a result of DWR's re-analysis of the Kern Fan Element property transfer and a new analysis of the KWB development and continued use and operation. Since DWR decertified the Monterey Plus EIR, pursuant to the Court's order, the final revised EIR also includes, without modification, the 2007 Draft EIR, and the 2010 final EIR. The revised EIR supplements and does not supersede the analysis of the Monterey Plus EIR.

The revised EIR did not identify any new impacts or changes to impacts caused by the transfer of the Kern Fan Element property; therefore, the Monterey Plus EIR fully disclosed all impacts caused by the transfer of the Kern Fan Element property. Consequently, the major focus of the revised EIR is on the development and continued use and operation of the KWB as a locally owned and operated groundwater banking and recovery project.

The draft revised EIR describes and analyzes the development and continued use and operations of the KWB. The analysis identified potentially significant impacts, before mitigation, related to groundwater levels and quality, Kern River water quality, the Cross Valley Canal, terrestrial biological resources, erosion, hazardous materials, waterborne disease, cultural and paleontological resources, greenhouse gas emissions, and cumulative impacts. Potentially significant and unavoidable impacts were found only related to cumulative growth-related impacts.

As a responsible agency, the Kern Water Bank Authority adopted a resolution on May 25, 2016 that approved a long-term recovery operations plan, which includes monitoring and reporting groundwater conditions, implementing proactive measures, implementing actions to certain triggers, and other conditions. The resolution also includes an agreement to implement the Monterey revised EIR mitigation measures that apply to the Kern Water Bank Authority.

DWR circulated the draft revised EIR for public and agency comment from April 28, 2016 through June 13, 2016. During the comment period, DWR held public hearings in Fresno and Bakersfield on June 1 and 2, 2016, respectively.

The Final revised EIR consists of the response to comments, the comments, the draft revised EIR, and related appendices, including without modification—the 2007 draft EIR, and the 2010 final EIR. On September 20, the Director of DWR made a decision to carry out the proposed project by continuing the use and operation of the KWB by the Kern Water Bank Authority. DWR filed a notice of determination with

the State Clearinghouse on September 22, 2016. (The revised EIR has the same State Clearinghouse number as the Monterey Plus EIR, 2003011118.)

See Chapter 6, Legislation and Litigation, for the current status of the Monterey Amendment litigation.

Miscellaneous Agreements with Long-term SWP Water Contractors

2016 Water Conveyance and Exchange Agreements

Water conveyance and exchange agreements that were executed or pending execution with SWP water contractors during 2016 are described below.

Castaic Lake/Santa Barbara

A letter agreement among DWR, Castaic Lake, and Santa Barbara, dated December 28, 2016, and executed December 29, 2016, approved the delivery of up to 1,500 acre-feet (af) of Castaic Lake's SWP water supplies to Santa Barbara by December 31, 2016. In exchange and based on an unbalanced exchange ratio of 2:1, Santa Barbara will return up to 750 af of its future SWP water supplies to Castaic Lake by December 31, 2026. During 2016, a total of 1,500 af of Castaic Lake's Table A water was delivered to Santa Barbara under this agreement. (SWPAO #16034)

Napa/Santa Clara

A letter agreement among DWR, Napa, and Santa Clara, dated December 12, 2016, and executed December 21, 2016, approved the delivery of up to 8,259 af of Napa's 2016 SWP water supplies to Santa Clara by December 31, 2016. Napa's water may be delivered to Santa Clara's turnouts located on the South Bay Aqueduct, or to San Luis Reservoir and/or at Turnout 59. In exchange, Santa Clara will return up to 4,130 af, based on an unbalanced exchange ratio of 2:1, of its future SWP water supplies to Napa by December 31, 2026. During 2016, a total of 8,259 af of Napa's Table A water was delivered to Santa Clara in San Luis Reservoir under this agreement. (SWPAO #16031)

AVEK/Littlerock

A letter agreement, pending execution, among DWR, AVEK, and Littlerock provided for the delivery of up to 1,380 af of Littlerock's Table A water to AVEK by December 31, 2016. In exchange, AVEK will return an equal amount, up to 1,380 af, of its future Table A water to Littlerock by December 31, 2026. There will be no monetary payments between AVEK and Littlerock for this 1:1 exchange. During 2016, a total of 1,380 af of Littlerock's Table A water was delivered to AVEK under this agreement. (SWPAO #16029)

Kern/Westlands

A change in point of delivery agreement among DWR, Kern, and Westlands Water District (Westlands), executed October 12, 2016, approved the delivery of up to 7,553 af of Kern's approved 2016 Table A water to Westlands through May 16, 2017. This is to facilitate the delivery of up to 7,553 af of Nickel Family, LLC's pre-1914 water rights water on Kern River that DMB Pacific LLC acquired and previously stored in the Semitropic Groundwater Banking Program. DWR filed a petition with the State Water Resources Control Board (State Water Board) and received a 1-year approval effective May 17, 2016 for the consolidation of SWP and Central Valley Project (CVP) places of use. In 2016, a total of 7,553 af of Kern's Table A water was delivered to Westlands under this agreement. (SWPAO #16024)

Kern

A change in point of delivery agreement between DWR and Kern, executed July 22,

2016, approved the delivery of up to 45,000 af of Kern's approved SWP water supplies to O'Neill Forebay for transfer to The Bureau of Reclamation (Reclamation) through February 28, 2017. This is to facilitate a CVP-SWP water exchange between Kern and Reclamation. DWR received approval from the State Water Board on July 21, 2016, for additional exchange of water under State Water Board's Division of Water Rights May 17, 2016 order that approved the consolidation of SWP and CVP places of use. During 2016, a total of 45,000 af of Kern's Table A water was made available to Reclamation at O'Neill Forebay under this agreement. (SWPAO #16023)

Mojave/Santa Clara

A letter agreement among DWR, Mojave, and Santa Clara, dated December 22, 2016, and executed December 29, 2016, approved the delivery of up to 8,000 af of Mojave's SWP water supplies to Santa Clara by December 31, 2016. In exchange, Santa Clara will return to Mojave up to 4,000 af, based on an unbalanced exchange ratio of 2:1, of its future SWP water supplies by December 31, 2026. During 2016, a total of 8,000 af of Mojave's Table A water was delivered to Santa Clara under this agreement. (SWPAO #16022)

Tulare

A letter agreement between DWR and Tulare, dated August 3, 2016, and executed August 5, 2016, approved the conveyance of up to 5,000 af of Lower Tule River Irrigation District's CVP water to Tulare through December 31, 2016. This non-SWP water will be made available in San Luis Reservoir for DWR to convey to Tulare under Article 55 of Tulare's long-term water supply contract. During 2016, no water was conveyed under this Agreement. (SWPAO #16021)

AVEK/Santa Clara

A letter agreement among DWR, AVEK, and Santa Clara, dated August 10, 2016, and executed August 24, 2016, approved the delivery of up to 10,000 af of AVEK's SWP water supplies to Santa Clara by December 31, 2016. In exchange, Santa Clara will return to Mojave up to 5,000 af, based on an unbalanced exchange ratio of 2:1, of its future SWP water supplies by December 31, 2026. During 2016, a total of 10,000 af of AVEK's Table A water was delivered to Santa Clara under this agreement. (SWPAO #16019)

Kern

A change in point of delivery agreement between DWR and Kern, executed August 1, 2016, allows for the delivery of up to 5,000 af of Kern's approved Table A water to O'Neil Forebay for subsequent delivery by Reclamation to Westlands through February 29, 2017. This is to facilitate the return of Kern-Tulare Water District's (Kern-Tulare) CVP water previously stored in the Rosedale-Rio Bravo Water Storage District, a member unit of Kern. The return and delivery of Kern-Tulare's previously stored water was accomplished through a series of exchanges listed below.

- DWR made available up to 5,000 af of Kern's Table A water to Reclamation at O'Neill Forebay for subsequent delivery by Reclamation to Westlands.
- In exchange, Kern retained a like amount of Kern-Tulare's previously stored water for use in Kern's service area.
- Kern-Tulare will in turn receive a like amount of Friant-Kern CVP water, normally delivered to Westlands, which will instead be released by Reclamation from Millerton Lake for delivery to Kern-Tulare.

DWR received approval from the State Water Board on July 8, 2016 for additional exchange of water under State Water Board's Division of Water Rights May 17, 2016 order that approved consolidation of SWP and CVP places of use. During 2016, a total of 5,000 af of Kern's Table A water was made available

to Reclamation at O'Neill Forebay under this agreement. (SWPAO #16018)

AVEK/Santa Barbara

A letter agreement among DWR, AVEK, and Santa Barbara, dated August 9, 2016, and executed August 11, 2016, approved the delivery of up to 10,000 af of AVEK's SWP water supplies to Santa Barbara by December 31, 2016. In exchange, Santa Barbara will return to AVEK, based on an unbalanced exchange ratio of 2:1, up to 5,000 af, of its future SWP water supplies by December 31, 2026. The agreement allows storage of a portion of AVEK's SWP water supplies in San Luis Reservoir that Santa Barbara was unable to take to its service area by December 31, 2016. The water stored in San Luis Reservoir is identified as carryover water and will be delivered to Santa Barbara in years 2017 and/or 2018. During 2016, a total of 10,000 af of AVEK's Table A water was made available to Santa Barbara, out of which 3,526 af was delivered to Santa Barbara, and 6,474 af was stored in San Luis Reservoir as carryover water. (SWPAO #16017)

Kern/Tulare

A letter agreement among DWR, Kern, and Tulare, dated June 27, 2016, and executed July 22, 2016, approved the transfer of up to 4,000 af of Tulare's Table A water to Kern through December 31, 2016, on behalf of J.G. Boswell Company which farms in both Kern's and Tulare's service areas. During 2016, no water was delivered to Kern under this Agreement. (SWPAO #16016)

Crestline/San Gorgonio

A letter agreement among DWR, Crestline, and San Gorgonio, dated May 31, 2016, and executed June 7, 2016, approved the delivery of up to 1,200 af of Crestline's Table A water to San Gorgonio by December 31, 2016. In exchange, San Gorgonio will return up to 600 af, based on an unbalanced exchange ratio of 2:1, of its future Table A water to AVEK by December 31, 2026. During 2016, a total of 1,200 af of Crestline's Table A water was delivered to San Gorgonio under this agreement. (SWPAO #16013)

Kern

A letter agreement between DWR and Kern, dated July 26, 2016, and executed August 22, 2016, approved the conveyance of up to 55,300 af per year for a combined total of up to 110,600 af of Kern-Tulare's 2016 and 2017 CVP water supplies to Kern. Reclamation will make this non-SWP water available to DWR at O'Neill Forebay and/or Banks Pumping Plant. DWR will convey the non-SWP water to Kern under Article 55 of Kern's long-term water supply contract. In exchange, Kern-Tulare will receive an equal amount of Kern's 2016 and 2017 Table A water. This agreement is effective through February 28, 2018. During 2016, a total of 2,055 af of water was conveyed to Kern under this agreement. (SWPAO #16012)

AVEK/Kern

A letter agreement among DWR, AVEK, and Kern, dated June 14, 2016, and executed August 17, 2016, approved the transfer of up to 5,000 af of AVEK's Table A water to Kern, on behalf of WDS California II, which farms in both AVEK's and Kern's service areas. During 2016, a total of 1,489 af of AVEK's Table A water was delivered to Kern under this agreement. (SWPAO #16011)

Tulare/Westlands/San Luis Water District

A change in point of delivery agreement among DWR, Tulare, San Luis Water District (San Luis), and Westlands, executed June 16, 2016, approved the delivery of up to 35,000 af of Tulare's SWP water supplies to Westlands and San Luis through May 16, 2017. This is to facilitate the delivery of Westlands' and San Luis' acquired Kings River pre-1914 water rights water from J.G. Boswell Company, a landowner in Tulare, to Westlands' and San Luis' service areas. In exchange, up to 35,000 af of

J.G. Boswell Company's pre-1914 Kings River water will be delivered to Tulare for use in its service area. DWR filed a petition with the State Water Board and received a 1-year approval effective May 17, 2016, for the consolidation of SWP and CVP places of use. During 2016, a total of 5,000 af was delivered to San Luis. Additionally, a total of 30,000 af was delivered under this agreement to Westlands; 29,813 af was Table A water, and 187 af was Article 56(c) carryover water. (SWPAO #16009)

Tulare/Westlands

A letter agreement among DWR, Tulare, and Westlands, dated January 13, 2016, and executed January 22, 2016, approved the transfer of up to 4,000 af of Tulare's 2016 Table A water allocation to Westlands on behalf of Westlake Farms Incorporated, which has farms in both Tulare's and Westlands' service areas. During 2016, no water was delivered to Westlands under this agreement. (SWPAO #16001)

AVEK/Santa Barbara

An amendment (SWPAO #15005-B) among DWR, AVEK and Santa Barbara, dated March 16, 2016, and executed March 22, 2016, increased the maximum water exchange amount, from up to 7,500 af, to up to 10,000 af. The original agreement (SWPAO #15005) among DWR, AVEK, and Santa Barbara, executed on April 10, 2015, approved the delivery of up to 7,500 af of AVEK's approved SWP water supplies to Santa Barbara by December 31, 2015. In exchange, Santa Barbara will return up to 7,500 af, based on an even exchange ratio of 1:1, of its future approved SWP water supplies to AVEK by December 31, 2025.

Subsequently, an amendment (SWPAO #15005-A) executed on August 31, 2015, allowed to have a portion of AVEK's SWP water supplies that Santa Barbara was unable to take full delivery to its service area by December 31, 2015, to be stored in San Luis Reservoir as carryover water for later delivery to Santa Barbara by December 31, 2017. During 2016, a total of 3,997 af of AVEK's Article 56(c) carryover water was delivered to Santa Barbara, and a total of 756 af was stored in San Luis Reservoir under this agreement. (SWPAO #15005, #15005-A, and #15005-B)

Napa/Solano

An amendment (SWPAO #10005-A) among DWR, Napa, and Solano, executed December 15, 2016, increased the annual amount of City of Vallejo's non-SWP water delivered to Napa's turnouts in Reach 3B of the North Bay Aqueduct, from 500 af under the original agreement (SWPAO #10005) to 1,000 af, retroactive to January 1, 2014. The original long-term change in point of delivery agreement, executed October 11, 2010, approved the conveyance of up to 500 af per year of the City of Vallejo's non-SWP water from Solano's service area to Napa's turnouts located on the North Bay Aqueduct, under Article 55 of Napa's long-term water supply contract. The City of Vallejo, a member agency of Solano, has water rights to this non-SWP water originating from Cache Slough and Lindsay Slough (tributaries of the Sacramento River). This agreement is effective through December 31, 2035. During 2016, a total of 500 af of non-SWP water was conveyed under this agreement. (SWPAO #10005 and #10005-A)

Water Conveyance and Exchange Agreements Prior to 2016

Santa Clara

An agreement between DWR and Santa Clara, executed September 21, 2015, allows for additional temporary points of delivery of a portion of Santa Clara's SWP water supplies at San Luis Reservoir and/or O'Neill Forebay through December 31, 2017. Santa Clara's water, delivered to San Luis Reservoir and/or O'Neill Forebay under this agreement, will be used within the SWP

place of use. During 2016, a total of 20,619 af of Santa Clara's Table A water was delivered to San Luis Reservoir. (SWPAO #15016)

Kern/Westlands

A change in point of delivery agreement among DWR, Kern, and Westlands, executed August 12, 2015, provided for a same landowner transfer by Poso Creek Water Company that has farming operations in both Kern's and Westlands' service areas. This agreement approved the delivery of up to 12,819 af of Kern's 2015 and/or 2016 Table A water to Westlands through April 30, 2016. In exchange, Kern will retain a like amount of Poso Creek Water Company's CVP water previously stored in Kern's service area. DWR filed a petition with the State Water Board and received a 1-year approval order, effective May 1, 2015, for the consolidation of SWP and CVP places of use. During 2016, a total of 1,047 af of Kern's Table A water was delivered to Westlands under this agreement. (SWPAO #15007)

Mojave/Santa Barbara

A letter agreement among DWR, Mojave, and Santa Barbara, dated September 18, 2014, and executed September 24, 2014, approved the delivery of up to 500 af of Mojave's SWP water supplies to Santa Barbara by December 31, 2014. In exchange, Santa Barbara will return to Mojave, up to 1,125 af, based on an unbalanced exchange ratio of 1:2.25, of its future SWP water supplies by December 31, 2024. During 2016, a total of 1,125 af of Santa Barbara's Table A water was delivered to Mojave, completing this agreement. (SWPAO #14015)

Palmdale/San Bernardino

A letter agreement among DWR, Palmdale, and San Bernardino, dated August 1, 2014, and executed August 14, 2014, approved the delivery of up to 2,500 af of San Bernardino's SWP water supplies to Palmdale by December 31, 2014. In exchange, Palmdale will return up to 5,625 af, based on an unbalanced exchange ratio of 1:2.25, of its future SWP water supplies to San Bernardino through December 31, 2018. During 2016, a total of 2,500 af of Palmdale's Table A water was delivered to San Bernardino under this agreement. (SWPAO #14013)

Butte

A letter agreement between DWR and Butte, dated July 7, 2014, and executed July 29, 2014, approved the conveyance of up to 3,000 af per year of non-SWP water to California Water Service Company, a member agency of Butte, through December 31, 2017. This non-SWP water is made available by Pacific Gas & Electric Company for DWR to convey to California Water Service's turnouts at the Thermalito Power Canal, under Article 55 of Butte's long-term water supply contract. During 2016, a total of 2,361 af of non-SWP water was conveyed under this agreement. (SWPAO #14011)

Mojave/Santa Barbara

A letter agreement among DWR, Mojave, and Santa Barbara, dated September 18, 2014, and executed September 24, 2014, approved the delivery of up to 500 af of Mojave's SWP water supplies to Santa Barbara by December 31, 2014. In exchange, Santa Barbara will return to Mojave, up to 500 af, based on an exchange ratio of 1:1, of its future SWP water supplies by December 31, 2019. During 2016, a total of 500 af of Santa Barbara's Table A water was delivered to Mojave, thereby completing this agreement. (SWPAO #14009)

Butte

Three multiyear agreements (SWPAO #13013, SWPAO #13014, and SWPAO #13015) were executed in 2014 among DWR, Butte, and several participating SWP contractors. Butte's long-term water supply contract with DWR provides for Butte to have a maximum Table A amount of 27,500 af per year. Butte determined that 24,000 af per year of its Table A amount is

not needed to meet its in-county demands for 2014 through 2021 and requested a transfer of up to 24,000 af per year of its Table A water to Palmdale, Dudley Ridge, and Kern. Up to 10,000 af of Butte's allocated Table A water is made available to transfer to Palmdale. Up to 14,000 af of Butte's allocated Table A water is shared on a percentage basis of 85.66 and 14.34 percent for transfer to Kern and Dudley Ridge respectively. Butte also determined that the difference of 3,500 af per year (27,500 af minus 24,000 af) may not be fully utilized by Butte for its in-county needs and requested transfer of a portion of the 3,500 af per year on a percentage basis to Palmdale, Dudley Ridge, and Kern when it becomes available (Butte's Additional Water). In 2016, Butte's allocated Table A water was transferred as follows.

Butte/Kern. A multiyear agreement among DWR, Butte, and Kern, executed August 5, 2014, approved the annual delivery of a portion of Butte's allocated Table A water plus a portion of Butte's Additional Water when it becomes available to four of Kern's member units (Belridge Water Storage District, Berrenda Mesa Water Storage District, Lost Hills Water District, and Wheeler Ridge-Maricopa Water Storage District) in years 2014 through 2021. During 2016, a total of 7,990 af of Butte's Table A water was delivered to Kern under this agreement. (SWPAO #13015)

Butte/Dudley Ridge. A multiyear agreement among DWR, Butte, and Dudley Ridge, executed August 5, 2014, approved the annual delivery of a portion of Butte's allocated Table A water, plus a portion of Butte's Additional Water when it becomes available, to Dudley Ridge in years 2014 through 2021. During 2016, a total of 1,276 af of Butte's Table A water was delivered to Dudley Ridge under this agreement. (SWPAO #13014)

Butte/Palmdale. A multiyear agreement among DWR, Butte, and Palmdale, executed August 5, 2014, approved the annual delivery of a portion of Butte's allocated Table A water, plus a portion of Butte's Additional Water when it becomes available, to Palmdale in years 2014 through 2021. During 2016, a total of 6,211 af of Butte's Table A water was delivered to Palmdale under this agreement. (SWPAO #13013)

Dudley Ridge/Kern/Metropolitan

A multiyear exchange and change in point of delivery agreement among DWR, Dudley Ridge, Kern, and Metropolitan, executed December 16, 2013, approved the delivery of up to 8,700 af of Dudley Ridge's SWP water supplies to Metropolitan by December 31, 2017. In exchange, Metropolitan will return up to 4,350 af, based on an unbalanced exchange ratio of 2:1, of its future SWP water supplies to Dudley Ridge by December 31, 2022. This agreement allows for the delivery of a portion of Dudley Ridge's SWP water supplies to either Metropolitan's service area and/or to Kern's turnouts for storage in Rosedale Rio-Bravo Water Storage District, a member unit of Kern, for later use by Metropolitan in its own service area. During 2016, a total of 1,049 af of Dudley Ridge's Table A water was delivered to Metropolitan under this agreement. (SWPAO #13012)

Coachella/Kern

A multiyear change in point of delivery and conveyance agreement among DWR, Coachella, and Kern, executed July 30, 2013, approved the annual delivery of up to 16,500 af of water to Coachella through December 31, 2035. Glorious Land Company (GLC) and Rosedale-Rio Bravo Water Storage District (Rosedale-Rio Bravo) executed an agreement in 2005 to provide a water supply from Rosedale-Rio Bravo to GLC's development project in Riverside County. GLC was not yet ready to receive the water to which it was entitled under the 2005 Rosedale-Rio Bravo/GLC agreement. In 2012, GLC and Coachella

executed an assignment agreement that allowed Coachella to annually acquire up to 16,500 af of Rosedale-Rio Bravo's water under the 2005 Rosedale Rio-Bravo/GLC agreement (Assigned Water). This agreement allows for the delivery of the Assigned Water to Coachella by (1) a change in point of delivery of a portion of Rosedale-Rio Bravo's allocation of Kern's Table A water as an exchange for a like amount of Assigned Water and (2) conveyance of the Assigned Water to Coachella under Article 55 of Coachella's long-term water supply contract by direct pump-in of the water into the California Aqueduct. During 2016, a total of 16,500 af was delivered to Coachella under this agreement. (SWPAO #12023)

Dudley Ridge/Tulare

A same landowner agreement among DWR, Dudley Ridge, and Tulare, executed September 7, 2012, approved multiyear transfers between Dudley Ridge and Tulare through December 31, 2035. This agreement allows for the delivery of up to 15,000 af per year of a portion of Dudley Ridge's and/or a portion of Tulare's approved Table A water for same landowner transfers to the other party without any expected return. During 2016, a total of 2,295 af of Tulare's Table A water was delivered to Dudley Ridge's turnouts. (SWPAO #12011)

Kern/Santa Barbara

A letter agreement among DWR, Kern, and Santa Barbara, dated November 10, 2011, and executed January 16, 2012, and an amendment executed on August 2, 2012, approved the delivery of up to 17,000 af of Santa Barbara's SWP water supplies to Kern. In exchange, Kern will return two-thirds, minus losses, of its future approved SWP water supplies to Santa Barbara by December 31, 2021. During 2016, a total of 5,864 af of Kern's Table A water was delivered to Santa Barbara under this agreement. (SWPAO #11018 and #11018-A)

Palmdale/Santa Barbara

A letter agreement among DWR, Palmdale and Santa Barbara, dated February 28, 2011, and executed May 16, 2011, approved the exchange of up to 7,000 af of Santa Barbara's 2010 carryover water with Palmdale's future SWP Table A water. To prevent the potential loss in the event that San Luis Reservoir would spill, Santa Barbara's 2010 carryover water was provided to Palmdale at O'Neil Forebay and subsequently delivered to Kern to facilitate a partial return of a previous water exchange between Kern and Palmdale (SWPAO #07029, Bulletin 132-09). Palmdale will return all water to Santa Barbara by December 31, 2021. During 2016, a total of 1,000 af of Palmdale's Table A water was delivered to Santa Barbara under this agreement. (SWPAO #11006)

Dudley Ridge/Kern

A multiyear same landowner transfer agreement among DWR, Dudley Ridge, and Kern, executed June 13, 2011, provides for the delivery of a portion of Dudley Ridge's Table A water for same landowner transfers to Kern through December 31, 2020 without any expected return. During 2016, a total of 9,505 af of Dudley Ridge's Table A water was delivered to Kern under this agreement. (SWPAO #10030)

Dudley Ridge/San Gabriel

A multiyear exchange agreement among DWR, Dudley Ridge, and San Gabriel, executed September 14, 2010, approved the delivery of a portion of Dudley Ridge's SWP water supplies to San Gabriel, effective January 1, 2010, through December 31, 2020. San Gabriel will provide for the return of its SWP water supplies to Dudley Ridge through December 31, 2030. This agreement also covers Dudley Ridge's Table A water deliveries to San Gabriel in 2008. During 2016, a total of 1,192 af of San Gabriel's Table A water was delivered to Dudley Ridge under this agreement. (SWPAO #10013)

Empire West/Westlands

A long-term change in place of use agreement among DWR, Empire, and Westlands, executed March 3, 2011, approved the annual delivery of up to 2,000 af of Empire's Table A water to Westlands through April 1, 2027. This transfer was made on behalf of two landowners, Brooks Farms and Newton Brothers Farms, that farm in both Empire's and Westlands' service areas. DWR received the State Water Board's approval on November 21, 2011 for the long-term change in place of use. During 2016, a total of 871 af of Empire's Table A water was delivered to Westlands under this agreement. (SWPAO #10008)

Tulare/Westlands

A long-term change in place of use agreement among DWR, Tulare, and Westlands, executed January 7, 2011, approved the annual delivery of up to 8,000 af of Tulare's Table A water to Westlands' turnouts through April 1, 2027. The transfer was made on behalf of two landowners, Hansen Ranches and Newton Brothers Farms, that farm in both Tulare's and Westlands' service areas. The State Water Board issued an order authorizing the long-term change in place of use on November 21, 2011. In 2016, a total of 4,406 af of Tulare's SWP water supplies was delivered to Westlands under this agreement. (SWPAO #10006)

Crestline/San Bernardino

A letter agreement among DWR, Crestline, and San Bernardino, dated December 7, 2009, and executed December 8, 2009, provided for the delivery of up to 1,000 af of Crestline's Table A water to San Bernardino by December 31, 2009. In exchange, San Bernardino will return, up to 650 af, of its future Table A water to Crestline by December 31, 2018. There will be no monetary payments between Crestline and San Bernardino for this unbalanced water exchange. During 2016, a total of 260 af of Crestline's Table A water was delivered to San Bernardino under this agreement. (SWPAO # 09079)

A letter agreement (SWPAO #08063) among DWR, Crestline, and San Bernardino, dated December 17, 2008, and executed December 22, 2008, approved the delivery of up to 1,000 af of Crestline's approved Table A water to San Bernardino by December 31, 2008. In exchange, San Bernardino will return an equal amount of its future Table A water to Crestline by December 31, 2011. There is no monetary payment between Crestline and San Bernardino for this 1:1 exchange. An amendment (SWPAO #08063-A) executed on February 16, 2010, among DWR, Crestline, and San Bernardino, extended the term of the delivery of San Bernardino's Table A water to Crestline through December 31, 2018. During 2016, a total of 151 af of San Bernardino's Table A water was delivered to Crestline, completing this agreement. (SWPAO #08063 and #08063-A)

Dudley Ridge/Tulare

A long-term change in point of delivery agreement among DWR, Dudley Ridge, and Tulare, executed April 5, 2009, approved the delivery of a portion of Dudley Ridge's SWP water supplies through Tulare's turnouts, and conversely, a portion of Tulare's SWP water supplies through Dudley Ridge's turnouts. This allows SWP water supplies to be delivered to lands within Dudley Ridge's and Tulare's service areas not otherwise serviceable using their respective conveyance facilities. This agreement is effective through December 31, 2035. During 2016, under this agreement, a total of 152 af of Tulare's water was delivered to Dudley Ridge, of which 32 af was Table A water and 120 af was Article 56(c) carryover water. (SWPAO #08062)

Crestline/San Bernardino

A point of delivery agreement among DWR, Crestline, and San Bernardino, executed April 17, 2008, approved the delivery of a portion of San Bernardino's approved Table A water to Crestline. This is to provide for an emergency water supply totaling 7,600 af to Lake Arrowhead Community Services District through December 31, 2020 or until all water has been delivered under this agreement, whichever comes first. During 2016, a total of 76 af of San Bernardino's Table A water was delivered to Crestline under this agreement. (SWPAO #07025)

Kern

An amendment (SWPAO #06013-D) between DWR and Kern, dated February 12, 2016, and executed May 11, 2016, approved the delivery of up to 5,182 af of Kern's Table A water to Westlands' service area outside of Kings County for 2015—2016. The original agreement (SWPAO #06013) executed April 26, 2007, allowed return water to be delivered only in the Kings County portion of Westlands' service area, which is within the SWP place of use. DWR filed a petition with the State Water Board and received a 1-year approval order, effective May 1, 2015, for the consolidation of SWP places of use. During 2016, a total of 3,155 af of Kern's Table A water was delivered to Westlands under this agreement. (SWPAO #06013-D and #06013)

Kern/Santa Clara

An amendment (SWPAO #06012-B) to a letter agreement among DWR, Santa Clara, and Kern, dated February 12, 2016, and executed February 25, 2016, formalizes the pumping of Santa Clara's previously stored CVP water in the Semitropic Groundwater Banking Program into the California Aqueduct at Reach 13B in July 2015. The original agreement (SWPAO #06012), executed January 26, 2009, provided for the conveyance of a portion of Santa Clara's CVP water for storage in the Semitropic Groundwater Banking Program. The original agreement also provided for the future return of stored water to Santa Clara in Reach 9 of the South Bay Aqueduct by December 31, 2035. An amendment (SWPAO #06012-A), executed February 14, 2013, approved an additional point of delivery for the return of CVP water to Santa Clara in Reach 3 of the California Aqueduct. No water was moved in 2016 under this agreement. (SWPAO #06012-B, #06012-A and #06012)

Kings/Westlands

A long-term change in point of delivery agreement among DWR, Kings, and Westlands, executed March 24, 2004, provides for the delivery of up to 5,000 af of Kings' annual Table A water through Westlands' turnouts for use at Lemoore Naval Air Station. This agreement is effective through December 31, 2035. During 2016, a total of 950 af of Kings' Article 56(c) carryover water was delivered to Westlands' turnouts under this agreement. (SWPAO #04005)

Solano/Cities of Fairfield, Vacaville and Benicia

A settlement agreement among DWR, Solano, and the cities of Fairfield, Vacaville, and Benicia, which includes conveyance service by Solano, was executed on May 19, 2003. The agreement provides for annual delivery of up to 31,620 af of settlement water through December 31, 2035. The settlement water is provided to Solano for delivery through the North Bay Aqueduct to the three cities to help meet their current and future municipal and industrial water needs. During 2016, a total of 1,090 af of settlement water was delivered to Solano for conveyance to the three cities. (SWPAO #03017)

Kings/Tulare

A long-term change in point of delivery agreement among DWR, Kings, and Tulare, executed March 10, 2006, provides for the

delivery of up to 200 af of Kings' annual Table A water to Westlands' turnouts. The water is conveyed to GWF Energy LLC for use within Kings' service area. This agreement is effective through December 31, 2035. During 2016, a total of 3 af of Kings' Table A water was delivered to Westlands' turnouts. (SWPAO #02031)

Kern/Metropolitan

An amendment (SWPAO #01013-B) among DWR, Kern, and Metropolitan, executed July 22, 2016, approved the transfer of up to 12,000 af of Metropolitan's SWP water supplies to Reclamation at O'Neill Forebay by February 28, 2017. This amendment is to facilitate the return of 12,000 af of water that was delivered to Metropolitan in 2016 from Arvin-Edison Water Storage District's groundwater (Arvin-Edison) basin under the Water Quality Sub Account between Metropolitan and Arvin-Edison. Reclamation will deliver an equal amount of CVP water from Millerton Lake to Arvin-Edison through the Friant-Kern Canal District. DWR filed a petition with the State Water Board and received a 1-year approval effective May 17, 2016 for the consolidation of SWP and CVP places of use. The original long-term point of delivery agreement (SWPAO #01013), executed March 18, 2004, approved the delivery of a portion of Metropolitan's approved SWP water supplies for storage and later recovery from groundwater basins within Arvin-Edison through December 31, 2035. During 2016, a total of 12,000 af of Metropolitan's Table A water was made available to Reclamation at O'Neill Forebay under this amendment. (SWPAO #01013 and SWPAO #01013-B)

Kern

A long-term change in point of delivery agreement between DWR and Kern, executed June 8, 2000, approved the delivery of a portion of Kern's annual Table A water to Western Hills Water District (Western Hills). In exchange, Kern will receive a like amount of local water acquired by Western Hills in the Pioneer Groundwater Bank. The State Water Board approved Western Hills' service area to be included within the authorized SWP place of use on April 21, 2000. During 2016, a total 677 af of Kern's Table A water was delivered to Western Hills. (SWPAO #01001)

Napa/Solano

A change in point of delivery agreement among DWR, Napa, and Solano, executed December 26, 2001, approved the delivery of up to 628 af of Napa's annual Table A water to the City of Vallejo's Water Treatment Plant in Solano's service area. This water is further conveyed to the City of American Canyon, a member agency of Napa. The agreement is effective through December 31, 2035. During 2016, a total of 46 af of Napa's Table A water was delivered to Solano's turnouts. (SWPAO #00029)

AVEK/Mojave

An amendment (SWPAO #97003-B) among DWR, Mojave, and AVEK, executed April 30, 2015, approved an additional point of delivery of Mojave's Table A water to AVEK's turnout in Reach 20A of the California Aqueduct. The 1997 agreement (SWPAO #97003) executed on November 13, 1997, and the amendment (SWPAO #97003-A) executed on January 12, 2012, approved the annual delivery of up to 1,800 af of Mojave's approved Table A water for use by a solar power generating plant, operated by Luz Solar Partners, Ltd. III-VII. The agreement also approved delivery of up to 3,000 af of Mojave's approved Table A water in AVEK's groundwater basin as a backup water supply to the plant in the event of an SWP outage. In 2016, a total of 984 af of Mojave's Table A water was delivered to AVEK under this agreement. (SWPAO #97003-B, #97003-A, and #97003)

Introduction of Local Water Agreement

AVEK

An agreement between DWR and AVEK, executed April 7, 2015, approved the introduction and conveyance of up to 27,000 af of AVEK's local groundwater into the California Aqueduct within AVEK's service area. During 2016, AVEK introduced a total of 1,056 af of its local groundwater into the California Aqueduct; DWR conveyed and delivered 1,056 af to AVEK's turnouts under this agreement. (SWPAO #16026)

Turnout Agreements

Central Coast Water Authority

On August 19, 2016, the Department of General Services approved Amendment No. 2 to the Joint Exercise of Powers Agreement Between the Department of Water Resources, State of California, and the Central Coast Water Authority Relating to the Operation and Maintenance of the Coastal Branch, Phase II. The amendment extended the term of the Joint Exercise of Powers Agreement an additional ten years. The agreement expires on December 31, 2026.

Dudley Ridge

On October 12, 2016, the State Water Project Analysis Office executed an agreement with Dudley Ridge for modification, operation and maintenance of the Wonderful Orchards Turnout (formerly known as the Paramount Turnout). The turnout, located at Milepost 184.02 of the California Aqueduct, has a maximum design capacity of 2 cfs.

San Gorgonio Pass Water Agency

On July 8, 2016, the State Water Project Analysis Office executed an agreement with San Gorgonio for construction, operation and maintenance of the Mountain View Turnout. The turnout, located at Station 656+60 of the California Aqueduct's East Branch Extension, will have a maximum design capacity of 20 cfs.

Activities Related to the Monterey Amendments

Storage of Water Outside SWP Contractor Service Areas

Pursuant to Article 56(c) of the Monterey Amendments, seven SWP water contractors have separate agreements with DWR to convey approved water supplies outside their service areas for storage in existing and operational groundwater storage programs and for future recovery of water to use within their service areas. These change in point of delivery agreements are listed in Table 9-1. These agreements include provisions for conveyance to and from storage, and recovery methods by exchange and/or pump-in to the California Aqueduct. During 2016, a total of 45,667 af was conveyed to storage, including losses, and 68,950 af was recovered from storage.

Turn-Back Water Pool Program

Pursuant to Article 56(d) of the Monterey Amendments, SWP water contractors who signed the Monterey Amendments are permitted to participate annually in the Turn-Back Water Pool Program. In 2016, SWP water contractors did not buy or sell water under Pool A or Pool B of the Turn-Back Water Pool Program due to their participation in the Multiyear Water Pool Program.

Multiyear Water Pool Program

The 2015–2016 Multiyear Water Pool was initiated through a program letter, dated February 2, 2015, and was sent to all SWP water contractors. All SWP water contractors were permitted to participate in the program as either buyers or sellers in 2015 and/or 2016. The program allowed SWP water contractors to offer portions of their approved 2015 Table A water for sale in a water pool for use by interested SWP water contractors.

Table 9-1 Storage of Water Outside SWP Contractor Service Areas in 2016 (acre-feet)[a]

Contractor	Contract Status	Storage Provider	To Storage (includes losses, if any)	From Storage	Return By
Alameda-Zone 7					
SWPAO #99018	Continuing	Semitropic	0	0	2035
SWPAO #00037[b]	Continuing	Semitropic	0	324	2035
SWPAO #01035[b]	Continuing	Semitropic	0	0	2035
SWPAO #02010[b]	Continuing	Semitropic	0	0	2035
SWPAO #03008[b]	Continuing	Semitropic	0	0	2035
SWPAO #04017	Continuing	Semitropic	8,500	0	2035
SWPAO #06010	Continuing	Cawelo	3,500	0	2035
Alameda County					
SWPAO #99017	Continuing	Semitropic	0	0	2035
SWPAO #00030	Continuing	Semitropic	0	0	2035
SWPAO #07005	Continuing	Semitropic	0	0	2035
SWPAO #10009	Continuing	Semitropic	18,272	0	2035
Castaic Lake					
SWPAO #02015[b]	Continuing	Semitropic	0	0	2022
SWPAO #03060[b]	Continuing	Semitropic	0	0	2024
SWPAO #05016	Continuing	Rosedale-Rio Bravo	0	0	2035
Dudley Ridge					
SWP Water					
SWPAO #08050	Continuing	Kern Water Bank	0	140	2035
SWPAO #09002	Continuing	Semitropic	0	0	2035
Non-SWP Water					
SWPAO #09040[b]	Continuing	Kern Water Bank	0	0	2020
SWPAO #03053	Continuing	Cawelo	0	0	2035
Metropolitan					
SWPAO #95010	Continuing	Semitropic	0	12,440	2035
SWPAO #01013[b]	Continuing	Arvin-Edison	5,761	33,365	2035
SWPAO #03019	Continuing	Kern Delta	0	19,843	2035
SWPAO #11011	Continuing	Mojave	0	1,716	2035
SWPAO #11022	Continuing	Rosedale-Rio Bravo	0	0	2017
San Bernardino					
SWPAO #11015	Continuing	Kern Delta	0	0	2035
Santa Clara					
SWP Water					
SWPAO #99016	Continuing	Semitropic	0	0	2035
SWPAO #00031	Continuing	Semitropic	0	0	2035
SWPAO #06011	Continuing	Semitropic	0	1,122	2035
SWPAO #10012	Continuing	Semitropic	9,634	0	2035
Non-SWP Water					
SWPAO #06012[b]	Continuing	Semitropic	0	0	2035
SWPAO #10029	Continuing	Semitropic	0	0	2035
SWPAO #11012	Continuing	Semitropic	0	0	2035
Total[c]			**45,667**	**68,950**	

[a] Storage amounts in this table may differ from the amounts in Table 9-4 due to water-type reclassification.
[b] Indicates amendments to agreement.
[c] Total acre-feet indicates all water recovered from various water banks. Some of the recovered water may be temporarily stored in SWP facilities. Amounts include losses, if any.

Based on Table A supply and demand, the pool water was allocated among the purchasing SWP water contractors into one of the two buyer pools. The "69 Percent Pool" consisted of water purchased by Metropolitan and Kern, which together take up 69.37 percent of the total SWP Table A amount. The remaining 30.63 percent of the total SWP Table A amount was available for the other SWP water contractors to purchase in the "31 Percent Pool."

The Multiyear Water Pool Program participation started in June 2016, with 15,000 af purchased under this program. Multiyear Water Pool Program water was sold for $138.00 per af, for a Table A allocation of 60 percent on June 1, 2016. The 2016 Multiyear Water Pool Program closed on June 15, 2016.

Table 9-2 lists SWP water contractors that participated in the 2016 Multiyear Water Pool Program.

Table 9-2 2016 Multiyear Water Pool Program (acre-feet)

Contractor	Sold	Purchased
Alameda-Zone 7		819
AVEK		1,471
Kings		95
Desert		566
Dudley Ridge		461
Kern-Agriculture		3,533
Metropolitan		6,871
Mojave	6,000	
Napa		295
Tulare		889
Ventura	9,000	
Total	15,000	**15,000**

Article 21 Water Program

Pursuant to the Monterey Amendments, Article 21 water replaces surplus, wet weather, and Article 12(d) water. The Article 21 Water Program allows an SWP water contractor to take delivery of water over the approved and scheduled Table A amounts for the current year. Article 21 water is only available for delivery on a short-term basis as determined by DWR when water is still available after operational requirements for SWP water deliveries, water quality, and Sacramento-San Joaquin Delta (Delta) requirements are met. During 2016, a total of 3,319 af of Article 21 water was delivered.

Flexible Storage Program

Pursuant to Article 54 of the Monterey Amendments, the Flexible Storage Program provides the option to SWP water contractors participating in the repayment of the capital costs of Castaic Lake and Lake Perris to withdraw water in excess of approved deliveries. The program objective is to provide additional flexibility to benefit local water management activities. Participating SWP water contractors are given 5 years to replace withdrawn stored water with approved SWP or non-SWP water.

Flexible storage allows for withdrawal of up to 160,000 af at Castaic Lake and 65,000 af at Lake Perris. SWP water contractors participating in the Castaic Lake Flexible Storage Program include Metropolitan, Ventura, and Castaic. These contractors are allowed to withdraw up to a maximum of 153,940 af, 1,377 af, and 4,683 af, respectively. Metropolitan is the only SWP water contractor allowed to withdraw water, up to a maximum of 65,000 af, from Lake Perris.

In 2016, Metropolitan started with a balance of -188,797 af in flexible storage. Metropolitan did not withdraw any water in 2016. Metropolitan repaid 123,797 af of

water, leaving them with an end-of-year balance of -65,000 af. Castaic started the year with a balance of -85 af in flexible storage. Castaic did not withdraw or repay any flexible storage water, leaving them with an end-of-year balance of -85 af.

Extended Carryover Program

Pursuant to Article 56 of the Monterey Amendments, SWP water contractors can elect to store SWP water outside of their service areas and carry it over to the following year for use within their service areas. Qualified SWP water contractors can request the carryover of Table A water for delivery in the following year to the extent that such deliveries do not adversely affect current or future project operations. Factors that influence how much extended carryover water can be delivered include operational constraints of project facilities, filling of SWP conservation storage facilities, flood control releases, and water quality restrictions.

If storage requests exceed the available storage capacity, the amount available is allocated among the SWP water contractors requesting storage in proportion to their annual Table A amount for that year. Fifteen SWP water contractors took delivery of Article 56(c) water in the amount of 71,248 af of previously approved Table A water carried over into 2016. A total of 1,613 af of SWP water contractors' carryover water was delivered to non-SWP contractors for a total of 72,861 af of water delivered.

2016 Water Transfers

When dry or critical hydrologic conditions result in significant water supply shortages, DWR enters into water transfer conveyance agreements with SWP water contractors and non-SWP agencies. Transfer water is made available from a combination of reservoir releases and groundwater substitution. Conveyance losses and carriage water losses are a component of water transfer deliveries. In 2016, there were no water transfers.

Lower Yuba River Accord

For Lower Yuba River Accord background information, see the sidebar, Lower Yuba River Accord.

Component 1 Water Deliveries

In 2016, Yuba delivered 60,000 acre-feet of Component 1 water to DWR and Reclamation to benefit the SWP and the CVP under the 2007 DWR/Yuba Water Purchase Agreement and a 2016 DWR-Reclamation agreement.

In addition to 60,000 af of Component 1 water, Yuba released and had 8,234 af of surface water backed into Lake Oroville from mid-September through October 15, 2016. All of the backed water was later released when Lake Oroville began flood control releases.

Yuba also provided a repayment of 60,000 af of Component 1 water for water owed dating back to calendar year 2011. In 2011, excess conditions in the Delta prevented accounting of Yuba releases as transfer water for the entire summer transfer period. The 60,000 af of Component 1 water was owed to DWR for SWP project purposes, but was shared equally with Reclamation for CVP purposes. DWR exported its share of Component 1 water at Banks Pumping Plant during the July 1 through September 30 transfer period. Reclamation exported its share of the water at the Jones Pumping Plant during the same period.

A shortfall of 869 af of prepaid Component 1 water from 2015 still remains and must be repaid by Yuba in the next year that is not classified as dry or critical.

No Component 2, 3, or 4 water was provided in 2016.

Lower Yuba River Accord

The Lower Yuba River Accord (Yuba Accord) settled long standing litigation over instream flow issues associated with the operation of the Yuba River Development Project. Operated by the Yuba County Water Agency (Yuba), the Yuba River Development Project's primary purposes are water supply, flood control, power generation, recreation, and environmental protection and enhancement.

The Yuba Accord was developed collaboratively by fisheries, environmental, and agricultural interests and local, state, and federal agencies. It provides a framework for a comprehensive, science-based, consensus-oriented program to protect and enhance 24 miles of the lower Yuba River extending from Englebright Dam downstream to the Yuba River's confluence with the Feather River. It establishes instream flow requirements to provide sufficient flows in the river for fisheries and to allow Yuba to meet local water needs and transfer water to other users; provides Yuba with a source of revenue for local activities, including a comprehensive conjunctive use program, flood control improvements, and a lower Yuba River fisheries program; and improves water supply reliability for the State Water Project (SWP) and Central Valley Project (CVP).

The Yuba Accord is based on three separate but related agreements: a water purchase agreement, a set of conjunctive use agreements; and a fisheries agreement. The agreements were executed in late 2007 and early 2008, and the State Water Resources Control Board (State Water Board) approved the Yuba Accord on March 25, 2008. The Yuba Accord has been amended five times and will expire in 2020.

Fisheries Agreement

The Fisheries Agreement is between DWR, Yuba, the Department of Fish and Wildlife, Friends of the River, South Yuba Citizens League, The Bay Institute, and Trout Unlimited. The U.S. Fish and Wildlife Service and National Marine Fisheries Service participate under the Statement of Support for Proposed Lower Yuba River Fisheries Agreement. The Fisheries Agreement establishes instream flow requirements to benefit salmon, steelhead, and other fish species in the lower Yuba River by improving instream habitat conditions. The agreement also establishes a long-term fisheries monitoring, studies, and enhancement program for the lower Yuba River.

Conjunctive Use Agreements

The conjunctive use agreements between Yuba and its member units establish a comprehensive conjunctive use program that integrates surface water and groundwater supplies with the local irrigation districts and mutual water companies that Yuba serves in Yuba County. Groundwater supplies will help meet local water supply needs in dry years, facilitating Yuba's operation of its storage facilities to meet the instream flow requirements called for in the Fisheries Agreement and commitments of water transfer in the Water Purchase Agreement.

Lower Yuba River Accord (*continued*)

Water Purchase Agreement

The Water Purchase Agreement is between Yuba and DWR. It creates a long-term water transfer program, allowing Yuba River water to be transferred to other users in California and to provide 60,000 acre-feet per year to offset Delta SWP and CVP export reductions for the protection and restoration of Delta fisheries. The Water Purchase Agreement has been amended five times, and 24 agencies have agreed to continue their participation through 2020.

Under the agreement, the range of transfer volumes is segregated into four components which reflect variations in pricing, purpose of use, and schedule:

Component 1 water includes 60,000 af purchased by DWR and Reclamation annually.

Component 2 water includes water that DWR and Reclamation purchase from Yuba—15,000 af in a dry year and 30,000 af in a critical year.

Component 3 water supplies include 40,000 af of water that Yuba makes available for purchase by DWR and Reclamation under certain SWP and CVP delivery allocation scenarios.

Component 4 water includes any additional water available from surface and groundwater supplies that Yuba may offer to DWR and Reclamation for purchase.

Carriage Water Losses

At the end of the transfer season, DWR performed a computer-aided study to simulate the water quality conditions that prevailed during the transfer period (July through September), and to estimate the amount of water necessary to prevent further salinity intrusion (i.e., carriage water losses) due to the higher exports. The 2016 carriage water cost was determined to be 30 percent of the 60,000 af of Yuba's transferable releases that were accounted for as Delivered Transfer Water.

For additional information about the Lower Yuba River Accord, see previous Bulletin 132 editions.

Agreements with Non-SWP Agencies

In addition to negotiating agreements with SWP water contractors to provide for specified water deliveries, DWR also enters into agreements with non-SWP agencies to provide water conveyance service.

South San Joaquin Irrigation District/Oakdale Irrigation District/ San Luis & Delta-Mendota Water Authority

An agreement among DWR, San Luis & Delta-Mendota Water Agency, South San Joaquin Irrigation District, and Oakdale Irrigation District, executed

September 29, 2016, allowed DWR and San Luis & Delta-Mendota Water Agency to share the purchase of up to 16,000 af of water made available to Reclamation at New Melones Reservoir by Oakdale Irrigation District and South San Joaquin Irrigation District and later released by Reclamation. The water released from new Melones will assist in meeting the pulse flow objective at Vernalis in October 2016 under the State Water Board's Water Right Decision 1641 (D-1641). (SWPAO #16027)

An agreement among DWR, San Luis & Delta-Mendota Water Agency, South San Joaquin Irrigation District, and Oakdale Irrigation District, executed April 8, 2016, allowed DWR and San Luis & Delta-Mendota Water Agency to purchase up to 75,000 af of water made available to Reclamation by Oakdale Irrigation District and South San Joaquin Irrigation District and later released by Reclamation. This is to meet the flow requirement for the San Joaquin river at Vernalis under D-1641. (SWPAO #16010)

Del Puerto Water District

An exchange agreement among DWR, Reclamation, Del Puerto Water District (Del Puerto), and Oak Flat, executed September 6, 2016, approved the exchange of up to 2,000 af of Del Puerto's CVP water supplies for an equivalent amount of Oak Flat's SWP water supplies through April 28, 2017. DWR will deliver up to 2,000 af of SWP water supplies to Del Puerto using Oak Flat's turnouts in the California Aqueduct. In exchange, Reclamation will make an equivalent amount of Del Puerto's CVP water available to DWR at O'Neill Forebay. DWR filed a petition with the State Water Board, and received a 1-year approval order, effective May 17, 2016, for the consolidation of SWP and CVP places of use. During 2016, a total of 150 af was delivered to Oak Flat's turnouts. (SWPAO #16003)

An exchange agreement among DWR, Reclamation, Del Puerto, and Oak Flat, executed April 11, 2016, approved the exchange of up to 2,000 af of Del Puerto's CVP water supplies for an equivalent amount of Oak Flat's SWP water supplies through April 30, 2016. DWR will deliver up to 2,000 af of SWP water supplies to Del Puerto using Oak Flat's turnouts in the California Aqueduct. In exchange, Reclamation will make an equivalent amount of Del Puerto's CVP water available to DWR at O'Neill Forebay. DWR filed a petition with the State Water Board, and received a 1-year approval order, effective May 1, 2015, for the consolidation of SWP and CVP places of use. During 2016, a total of 42 af was delivered to Oak Flat's turnouts. (SWPAO #15010)

Westlands Water District

An agreement between DWR and Westlands, executed April 1, 2016, allowed for the introduction of up to 30,000 af of Westlands' local groundwater within Westlands' service area in Reaches 4-7 of the California Aqueduct through October 31, 2016. During 2016, a total of 28,657 af of Westlands' groundwater was introduced into the California Aqueduct under this agreement. (SWPAO #16007)

Reclamation and Kern National Wildlife Refuge—U.S. Fish and Wildlife Service

A letter agreement sent by DWR on September 17, 2012, and accepted by Reclamation on September 21, 2012, provided for DWR to deliver up to 30,500 af of CVP water to the Kern National Wildlife Refuge from June 1, 2012, through September 30, 2028. Under this agreement, DWR conveys CVP water from the end of Reach 7 of the California Aqueduct to Buena Vista Water Storage District's turnouts in Reaches 10A and 12E. DWR conveyed a total of 22,216 af during 2016. (SWPAO #12309)

Reclamation—Joint Point of Diversion

On March 24, 2016, DWR renewed the joint point of diversion agreement with Reclamation. Under this agreement, DWR makes excess SWP conveyance capacity available to Reclamation for the conveyance of water from the Delta at Banks Pumping Plant. This includes: (1) making up for curtailed water exports from Jones Pumping Plant associated with improving conditions for fish in the Delta; (2) replacing water exports foregone during maintenance and repair of CVP facilities between the Delta and O'Neill Forebay; and (3) conveying Reclamation's share of Component 1 water provided under the Yuba Accord. As part of the joint point of diversion agreement, the first 21,000 af conveyed through Banks Pumping Plant for July, August, and September of each year include a charge for the temporary barriers in the Delta. In 2016, no joint point of diversion water was conveyed by DWR. (SWPAO #12300 and SWPAO #16300)

Reclamation and San Joaquin Valley National Cemetery—U.S. Department of Veterans Affairs

A pending letter agreement among DWR, Reclamation, and the U.S. Department of Veterans Affairs provides for the conveyance of up to 850 af of CVP water to Reach 2B of the California Aqueduct for the U.S. Department of Veterans Affairs' San Joaquin Valley National Cemetery. DWR delivered a total of 394 af to the national cemetery through Reach 2B of the California Aqueduct in 2016 under this pending agreement. (SWPAO #10310)

Reclamation and Byron Bethany Irrigation District—Musco Family Olive Company

A pending agreement among DWR, Byron Bethany Irrigation District (Byron Bethany), and Reclamation provides for the conveyance of up to 800 af of Byron Bethany's CVP water to repayment Reach 2A of the California Aqueduct for use by Musco Family Olive Company. DWR delivered a total of 439 af in 2016 under this pending agrement. (SWPAO #04300)

Reclamation and Cross Valley Canal Contractors

Through eight, 3-party contracts, and the corresponding changes in points of delivery associated with Cross Valley Canal (CVC) contracts with Reclamation and CVC water contractors, DWR conveys CVP water for CVC water contractors. The following eight CVP water contractors are defined as CVC water contractors: the County of Fresno, County of Tulare, Hills Valley Irrigation District, Kern-Tulare Water District, Lower Tule River Irrigation District, Pixley Irrigation District, Rag Gulch Water District, and the Tri-Valley Water District.

Kern-Tulare requested a change in point of delivery for their 2016 CVP water from the Delta to Reaches 3 through 7 of the California Aqueduct. DWR approved the request and conveyed 610 af of Kern-Tulare's water to Westlands Water District during 2016. (SWPAO #16302)

Delta Settlement Agreements

DWR negotiated contracts with various Delta agencies to settle adverse impact claims by the agencies against DWR due to operation of the SWP. Water deliveries to these agencies in 2016 are reported in the sections covering deliveries to non-SWP agencies later in this chapter.

Byron Bethany Irrigation District

Byron Bethany executed an agreement with DWR on May 28, 2003, that describes the nature and extent of Byron Bethany's right for the diversion of water from the Delta for agricultural, municipal, and industrial

uses within the district. This agreement terminated a 1993 exchange agreement.

City of Antioch

DWR and the City of Antioch executed an agreement on April 11, 1968, that requires DWR to reimburse the City of Antioch for decreases in usable San Joaquin River water availability caused by operation of the SWP. The agreement was amended October 29, 2013 to update boundaries and clarify measurement definitions. DWR reimburses the City of Antioch for the purchase of substitute water when the number of usable days, as defined by the contract, is below 208. Credits for the number of usable days above 208 in this same period accrue to offset the water-day deficiencies in future years.

In 2016, DWR determined that 117 usable days were available to the City of Antioch, and there were no credits to offset the deficiency of 91 days. DWR reimbursed the City of Antioch $810,294 for the purchase of substitute untreated water.

Contra Costa Water District

DWR and Contra Costa Water District (Contra Costa) executed an agreement on April 21, 1967, that requires DWR to reimburse Contra Costa for decreases in availability of usable river water in Mallard Slough caused by operation of the SWP. DWR reimburses Contra Costa for the purchase of substitute water when the number of usable days, as defined by the contract, is below 142. Credits for the number of usable days above 142 in this same period accrue to offset the water-day deficiencies in future years.

In 2016, DWR determined that 43 usable days were available to Contra Costa, and there were no credits to offset the deficiency of 99 days. DWR reimbursed Contra Costa $252,162 for the purchase of substitute untreated water. The reimbursement included energy costs for pumping water into Los Vaqueros Reservoir for later release as substitute water.

East Contra Costa Irrigation District

East Contra Costa Irrigation District (East Contra Costa) executed an agreement with DWR on January 7, 1981, that requires East Contra Costa to make payments to DWR for the assurance of adequate water supply and specific water quality from Delta channels. An agreement executed April 11, 1991, with DWR, East Contra Costa, and Contra Costa allows for intake at Rock Slough on Contra Costa Canal by Contra Costa to treat water for municipal and industrial users within East Contra Costa's service area. It was amended February 7, 2000, to allow diversions under both contracts at the Rock Slough intake of the Contra Costa Canal and the Los Vaqueros Reservoir intake at Old River.

East Contra Costa paid DWR $38,145 for the assurance of adequate water supply and specific water quality in 2016.

North Delta Water Agency

North Delta Water Agency's (North Delta) agreement with DWR, executed January 28, 1981, requires North Delta to make payments to DWR for the assurance of adequate water supply and specific water quality from Delta channels. An amendment signed on January 21, 1997, changed the monitoring station at Emmaton to Three Mile Slough and reduced North Delta's payments in lieu of assessments on land DWR owns within North Delta's jurisdiction. A memorandum of understanding was executed on May 26, 1998, to establish the joint position with respect to implementation of water quality objectives contained in the 1995 Bay-Delta water quality control plan.

An agreement executed on May 21, 2008, resolved a lawsuit regarding the Department of Fish and Wildlife's land within North Delta boundaries. The 2008 agreement expired

May 4, 2011. DWR had discussions with the Department of Fish and Wildlife and North Delta for a new agreement to replicate the functionality of the 2008 agreement.

North Delta paid DWR $369,067.12 for the assurance of adequate water supply and specific water quality in 2016.

In 2015, North Delta experienced a drought emergency as defined by the 1981 contract. In 2016, DWR paid $542,729.61 to claimants within North Delta's service area under a special claims procedure.

South Delta Water Agency

In September 1990, DWR completed negotiations for a long-term agreement with South Delta Water Agency and Reclamation. The parties agreed to proceed with the design, construction, and operation of certain barrier facilities in South Delta channels. These facilities resolved portions of the lawsuit that South Delta Water Agency filed in 1982 regarding the alleged effects of export pumping by the SWP and CVP on water levels, quality, and circulation in the South Delta.

DWR annually installs and operates temporary barrier facilities in the South Delta to improve area conditions and collect data needed to design and operate permanent barrier facilities. Ongoing efforts are being made to improve water levels, circulation, and quality in South Delta channels. These efforts have included modifying and dredging around local diverters' intakes, conducting a series of computer modeling studies, and modifying barrier flap gate operations.

For more information about the temporary barriers in the South Delta, see Chapter 2, Delta Resources.

Water Deliveries

The SWP delivers water for a variety of beneficial uses. In addition to delivering Table A water to SWP water contractors, the SWP:

- conveys water to other public and local agencies through special contracts and agreements;
- provides water for wildlife and recreational uses; and
- stores, releases, and delivers local runoff water from SWP facilities to agencies that hold local water rights.

SWP Water

DWR conveys SWP water, as defined in the long-term water supply contracts. SWP water includes current year Table A water, transfer and exchange of Table A water, carryover of Table A water, Turn-Back Pools A and B water, Multiyear Water Pool Program water, and Article 21 water.

Non-SWP Water

DWR conveys non-SWP water to various non-SWP agencies according to the terms of water rights and water transfer and exchange agreements. Non-SWP water may include contracted supply; water bank recovery water; local water; recreation water; fish and wildlife enhancement water; water delivered to Cross Valley Canal contractors, Reclamation, and Delta agencies; and annual contracts.

2016 Water Deliveries

In 2016, a total of 3,338,083 af of SWP and non-SWP water was delivered to 29 long-term SWP water contractors and 21 non-SWP agencies. The SWP portion totaled 2,180,626 af, and the non-SWP portion totaled 1,157,457 af.

Figure 9-1 shows amounts of water delivered to various locations during 2016.

Figure 9-1 Water Delivered in 2016 and Delivery Locations of Long-term SWP Water Supply Contractors and Feather River Area Districts with Water Rights Agreements with DWR

SWP

The 2,180,626 af delivered to SWP water contractors was categorized as follows:

- 1,701,425 af of Table A water;
- 115,013 af of transfers and exchanges of Table A water among SWP water contractors;
- 14,237 af of Multiyear Water Pool Program water;
- 71,248 af of 2015 carryover water;
- 3,319 af of Article 21 water;
- 124,812 af of water bank recovery;
- 81,123 af of delivery of backup water;
- 2,070 af of settlement water;
- 11,692 af of local water;
- 6,290 af of permit water; and
- 49,397 af of other non-SWP programs.

Non-SWP

The 1,157,457 af portion delivered to 21 non-SWP agencies was categorized accordingly:

- 112,521 af of SWP contracted supply;
- 28,612 af of water bank recovery;
- 990,983 af of regulated delivery of local supply;
- 1,064 af for parks and recreation;
- 618 af for fish and wildlife;
- 610 af for Cross Valley Canal Contractors;
- 22,216 af for Kern National Wildlife Refuge; and
- 833 af for annual contracts.

2016 Water Deliveries to Long-term SWP Water Contractors

Allocation of Table A Water

Each year, by October 1, the SWP water contractors submit initial requests for Table A deliveries allocated to them for use in the subsequent calendar year. Initial Table A allocation amounts for the coming year are made by DWR in December. The Table A allocations are based on operations studies that assume 90 percent exceedance of historical water supply (where exceedance refers to the possibility that water supply in the coming year will be less than the historical average annual water supply), current reservoir storage, and total requests by the SWP water contractors. Forecasts for the year are updated as hydrologic conditions change. Table A amounts are increased or decreased depending on both actual and projected hydrologic conditions, though decreases are rare as the 90 percent exceedance criterion is fairly conservative.

On October 1, 2015, SWP water contractors submitted initial requests for 2016 totaling 4.17 million acre-feet (maf).

DWR approved delivery of 0.42 maf on December 1, 2015, resulting in initial Table A amounts of 10 percent of SWP water contractor requests. DWR increased the 2016 Table A amounts to 2.5 maf, for a final allocation of 60 percent, on April 21, 2016.

Table 9-3 lists the changes in Table A amounts that were approved by DWR based on updated hydrologic conditions.

Table 9-3 2016 Allocated Table A Amounts

Notice to SWP Contractors No.	Allocation Amount (maf)	Percentage of Requested Water
15-07	0.42	10
16-01	0.63	15
16-04	1.3	30
16-05	1.9	45
16-06	2.5	60

Water Delivery Tables

Specific information about water deliveries made to SWP water contractors and other agencies during 2016, and historical deliveries from 1962 through 2016, is presented in the following four sections,

each with a corresponding table located at the end of the chapter:

- Water Delivered to Long-term SWP Water Contractors in 2016, by Service Area (Table 9-4);
- Total Amounts of Water Delivered in 2016, by Month (Table 9-5);
- Total Amounts of Annual Table A Water and Water Conveyed, by Type, 1962–2016 (Table 9-6); and
- SWP Water Delivered by Category, 1962–2016 (Table 9-7).

Please note that the water delivery figures listed are accurate at the time of this Bulletin 132 publication, but small volumes of water may be reclassified over time pursuant to long-term water supply contract provisions. If your research requires more current data than was available at the time of publication, please consult the most recent edition of Bulletin 132 and/or contact DWR staff in the State Water Project Analysis Office.

SWP Water Deliveries

Table 9-4 shows SWP water delivered in 2016 by service area. The following information is arranged by column number.

Table A Water Delivered. Columns 1 through 5 show a detailed breakdown of Table A water delivered to SWP water contractors in 2016. (The amounts also include SWP water that was delivered to non-SWP agencies.)

Multiyear Water Pool Program. Column 3 shows 14,237 af of Multiyear Water Pool Program water delivered to SWP water contractors in 2016.

Carryover Table A Water Delivered in 2016. Column 4 shows a total of 72,861 af was carried over from previous years for delivery in 2016, which includes deliveries to non-SWP agencies.

The carryover program was designed to encourage the most effective and beneficial use of water and to avoid obligating the SWP water contractors to use or lose water by December 31 of each year. The SWP water contractors' long-term water supply contracts and amendments state the criteria for carrying over Table A water from one year to the next under Articles 12(e), 14(b), and 56(c).

Total Table A Water Delivered. Column 5 shows all Table A water delivered in 2016—a total of 2,014,444 af.

Article 21. Column 6 shows Article 21 water delivered to SWP water contractors. In 2016, 3,319 af of Article 21 water was delivered.

Other SWP Water. Column 7 shows 2,070 af of other SWP water. Other SWP water consists of settlement water delivered to Solano.

Total SWP Water Delivered. Column 8 shows a total of 2,019,833 af of SWP water was delivered in 2016. This includes total Table A water not transferred, exchanged or stored; Table A water transferred or exchanged; Multiyear Water Pool Program water; carryover; and other SWP water consisting of settlement water.

Non-SWP Water Deliveries

Columns 9, 10, and 11 include deliveries of non-SWP water to SWP water contractors. Column 9 shows delivery of 81,123 af of backup water, Column 10 shows 124,812 af of water bank recovery, and Column 11 shows 67,379 af of other non-SWP water. Other non-SWP water is local and permit water that an SWP water contractor has a water right to, or has purchased from, exchanged with, or transferred from non-SWP agencies.

Total Deliveries

Column 12 shows total amounts of water delivered to SWP water contractors. In 2016, the SWP delivered 2,293,147 af of water to the 29 SWP water contractors.

Water Delivered in 2016 by Month

Table 9-5 shows water delivery amounts by month. During 2016, the SWP provided water service to 50 agencies, including 29 SWP water contractors. The following discussion summarizes the SWP and non-SWP water deliveries.

SWP Water

SWP water, as defined in the long-term water supply contracts, includes current year Table A amounts, transfer and exchange of Table A water, carryover of Table A water, Turn-Back Pools A and B water, Multiyear Water Pool Program water, and Article 21 water. Detailed information concerning those conveyances for 2016 is found under the "Miscellaneous Agreements with Long-term SWP Water Contractors" section in this chapter's preceding pages or is listed below.

North Bay Area. Deliveries in the North Bay area included 500 af of Vallejo permit water delivered to Napa, and 2,070 af of settlement water delivered pursuant to the May 19, 2003, *Settlement Agreement among DWR, Solano County Water Agency, and the Cities of Fairfield, Vacaville, and Benicia*.

South Bay Area. In the South Bay area, a total of 11,272 af of local water was delivered to Alameda-Zone 7 and Alameda County. These two South Bay Aqueduct SWP water contractors hold water rights to runoff from the Lake del Valle watershed.

Southern California Area. In the Southern California area, 420 af of local runoff from the Houston Creek watershed was stored and delivered to Crestline under water rights held by DWR on Houston Creek. The authorized place of use is limited to the Crestline area.

Non-SWP Water

In 2016, DWR used SWP facilities to convey non-SWP water for various non-SWP agencies according to the terms of water rights and water transfer and exchange agreements. Detailed information concerning those deliveries is in this chapter's preceding pages or is listed below.

Last Chance Creek Water District. Under the water supply agreement between DWR and Last Chance Creek Water District, dated April 29, 2013, a total of 4,821 af was supplied from Frenchman Lake to Last Chance Creek Water District.

Water Rights Water. Water in this category is transported through SWP facilities to agencies with settlement agreements with DWR. Some water passes through SWP transportation facilities; some is stored in SWP reservoirs for release later. In 2016, the following water was delivered to the Feather River, North Bay, South Bay, Delta, and Southern California areas, as summarized below.

Feather River Area. Seven non-SWP agencies received 963,457 af, under their water right settlement agreements, as follows:

- Garden Highway Mutual Water Company, 17,753 af;
- Joint Water Districts, 641,667 af;
- Oswald Water District, 1,363 af;
- Plumas Mutual Water Company, 10,152 af;
- Tudor Mutual Water Company, 2,733 af;
- Western Canal Water District, 289,156 af; and
- Valberde and Ramelli, 633 af.

DWR conveyed local water totaling 6,235 af through SWP facilities on behalf of two non-SWP agencies:

- South Feather Water and Power Agency (formerly Oroville-Wyandotte Irrigation District), 4,479 af; and
- Thermalito Water and Sewer District (formerly Thermalito Irrigation District), 1,756 af.

Delta. In the Delta, 16,470 af of water was delivered to Byron Bethany pursuant to the May 28, 2003, *Agreement Between the Department of Water Resources of the State of California and the Byron-Bethany Irrigation District Regarding the Diversion of Water from the Delta*.

East Contra Costa diverted 18,200 af of water in 2016 pursuant to the January 7, 1981, *Contract Between the State of California Department of Water Resources and the East Contra Costa Irrigation District for the Assurance of a Dependable Water Supply of Suitable Quality*.

Annual Table A Water and Water Delivered Since 1962

Table 9-6 shows information on annual Table A water and water conveyed, by type, for the previous 55 years. The following discussion is arranged according to column numbers.

Annual Table A Water

Columns 1 through 7 show the amount of SWP water contractors' annual maximum Table A water by area for years 1962 through 2016 as specified in the Table A schedules of the long-term water supply contracts.

In some instances, Table A schedules—projections of each contractor's need for water to 2035—have been amended to meet the needs of individual contractors. The amounts of annual Table A water each SWP water contractor may request for years 1962 through 2035 can be found in Table B-4 of Appendix B in the back of this bulletin.

Water Delivered

Columns 8 through 16 show water delivered or conveyed, including initial fill water and operational losses and storage changes.

Table A Water. Column 8 shows amounts of Table A water delivered each year from 1962 through 2016. In 2016, a total of 2,014,444 af of Table A water was delivered.

Article 21 and Unscheduled Water. Column 9 shows amounts of Article 21 water, as defined under SWP deliveries, and unscheduled water delivered from 1962 through 2016. Article 21 and unscheduled water are water in excess of that required to meet all demands for the year's Table A water and water to be stored in SWP reservoirs. In 2016, a total of 3,319 af of Article 21 or unscheduled water was delivered.

Other Water. Column 10 includes amounts of water classified as other water delivered in 2016, including non-SWP water conveyed through SWP facilities and regulated delivery of local supply. In 2016, a total of 344,408 af of other water was delivered.

Feather River Diversions. Column 11 includes amounts of water from the Feather River delivered according to agreements with non-SWP agencies on the Feather River, including Last Chance Creek Water District. In 2016, a total of 974,513 af in this category was delivered to agencies in the Feather River area.

Recreation and Fish and Wildlife Water. Column 12 shows water conveyed for recreational use or to improve water quality for fish and wildlife. In 2016, a total of 1,399 af of SWP water was conveyed for this purpose.

Initial Fill Water. The quantities listed in Column 14 represent the amounts used to initially fill the aqueducts and reservoirs south of the Delta to maximum operating capacities. Initial filling began in 1962, with the filling of the South Bay Aqueduct, and was completed in 1979, when Lake Perris reached its maximum operating capacity of 127,000 af. In 1996 and 1997, the Coastal Aqueduct was initially filled.

Operational Losses. Column 15 includes the total amounts of water lost through evaporation and seepage, net storage changes in reservoirs south of the Delta, and amounts of inflow from local drainage areas, including inflows into San Luis Canal and from the Kern River Intertie. Negative values are indicated for years when withdrawals and evaporation from reservoirs south of the Delta exceed the amounts of water added to the reservoirs.

Historical Water Delivered

Table 9-7 shows SWP water delivered by category from 1962 to 2016.

Table 9-4 Water Delivered to Long-term SWP Water Contractors in 2016, by Service Area (acre-feet)[a, b]

Service Area and SWP Contractor	Table A Water Deliveries					SWP Water			Non-SWP Water			Total Water Delivered [12]
	2016 Table A Not Transferred, Exchanged, or Stored [1]	2016 Table A Transferred or Exchanged [2]	2016 Multiyear Water Pool Program [3]	Carryover Water [4]	Total Table A [5]	2016 Article 21 [6]	Other SWP Water [7]	Total SWP Water [8]	Delivery of Backup Water [9]	Water Bank Recovery [10]	Other Non-SWP Water [11]	
Feather River												
Butte	157	15,477	-	-	15,634	-	-	15,634	-	-	2,361	17,995
Plumas	387	-	-	-	387	-	-	387	-	-	-	387
Yuba City	1,229	-	-	-	1,229	-	-	1,229	-	-	-	1,229
North Bay												
Napa	4,833	8,305	295	-	13,433	3,319	-	16,752	-	-	-	16,752
Solano	11,615	-	-	4,130	15,745	-	2,070	17,815	-	-	6,290	24,105
South Bay												
Alameda-Zone 7	29,987	12,000	819	8,450	51,256	-	-	51,256	1,904	324	3,038	56,522
Alameda County	4,408	9,872	-	8,400	22,680	-	-	22,680	4,677	-	8,234	35,591
Santa Clara	30,580	9,634	-	32,863	73,077	-	-	73,077	6,706	1,122	-	80,905
San Joaquin Valley												
Oak Flat	832	-	-	1,023	1,855	-	-	1,855	-	-	-	1,855
Kings	2,463	3	95	1,095	3,656	-	-	3,656	-	-	4	3,660
Dudley Ridge	6,818	10,554	461	1,656	19,489	-	-	19,489	-	140	-	19,629
Empire	929	871	-	22	1,822	-	-	1,822	-	-	-	1,822
Kern	354,435	65,141	3,533	-	423,109	-	-	423,109	67,836	80,198	30,532	601,675
Tulare	56	41,070	126	1,135	42,387	-	-	42,387	-	-	-	42,387
Central Coastal												
San Luis Obispo	4,199	-	-	-	4,199	-	-	4,199	-	-	-	4,199
Santa Barbara	10,378	1,625	-	917	12,920	-	-	12,920	-	-	-	12,920
Southern California												
AVEK	35,392	15,015	1,471	6,054	57,932	-	-	57,932	-	947	-	58,879
Castaic Lake	29,647	1,500	-	2,241	33,388	-	-	33,388	-	-	-	33,388
Coachella	52,922	-	-	-	52,922	-	-	52,922	-	-	16,500	69,422
Crestline	673	1,200	-	-	1,873	-	-	1,873	-	-	420	2,293
Desert	21,327	-	566	-	21,893	-	-	21,893	-	-	-	21,893
Littlerock	-	-	-	-	-	-	-	-	-	-	-	-
Metropolitan	989,125	17,775	6,871	-	1,013,771	-	-	1,013,771	-	42,081	-	1,055,852
Mojave	19,629	10,700	-	1,170	31,499	-	-	31,499	-	-	-	31,499
Palmdale	4,305	3,500	-	-	7,805	-	-	7,805	-	-	-	7,805
San Bernardino	57,328	487	-	2,772	60,587	-	-	60,587	-	-	-	60,587
San Gabriel	16,088	1,192	-	-	17,280	-	-	17,280	-	-	-	17,280
San Gorgonio	8,683	-	-	933	9,616	-	-	9,616	-	-	-	9,616
Ventura	3,000	-	-	-	3,000	-	-	3,000	-	-	-	3,000
Total	**1,701,425**	**225,921**	**14,237**	**72,861**	**2,014,444**	**3,319**	**2,070**	**2,019,833**	**81,123**	**124,812**	**67,379**	**2,293,147**

[a] Please note that the water delivery figures listed are accurate at the time of this Bulletin 132 publication, but small volumes of water may be reclassified over time pursuant to long-term water supply contract provisions. If your research requires more current data than was available at the time of publication, please consult the most recent publication of Bulletin 132 and/or contact DWR staff in the State Water Project Analysis Office.

[b] This table includes SWP water that was delivered to non-SWP agencies. Transfers and exchanges shown in Column 2 include SWP water deliveries to non-SWP agencies.

Table 9-5 Total Amounts of Water Delivered in 2016, by Month (acre-feet)

Contracting Agency and Type of Service	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	2016 Total Deliveries
FEATHER RIVER AREA													
SWP Agencies													
City of Yuba City													
Table A	0	0	0	0	0	0	611	618	0	0	0	0	1,229
Yuba Total	0	0	0	0	0	0	611	618	0	0	0	0	1,229
County of Butte													
Table A	6	6	2	11	13	21	25	29	25	12	5	2	157
Table A Transferred to Others*	0	0	0	0	1,129	1,200	2,392	9,190	1,219	287	60	0	15,477
Non-SWP Water	132	111	96	153	213	255	350	411	250	154	131	105	2,361
Butte Total (*excluded from total)	138	117	98	164	226	276	375	440	275	166	136	107	2,518
Plumas County Flood Control and Water Conservation District													
Table A	1	2	6	0	42	67	87	87	69	26	0	0	387
Plumas Total	1	2	6	0	42	67	87	87	69	26	0	0	387
Non-SWP Agencies													
Garden Highway Mutual Water Company													
Regulated delivery of local supply	0	0	0	1,503	2,291	3,167	3,703	2,131	997	3,961	0	0	17,753
Joint Water Districts Board													
Regulated delivery of local supply	781	0	0	19,622	102,777	103,858	118,843	93,846	33,270	51,120	67,250	50,300	641,667
Last Chance Creek Water District													
Regulated delvivery of local supply	0	0	0	0	117	1,123	1,753	1,137	270	169	196	56	4,821
Oswald Water District													
Regulated delivery of local supply	0	0	0	80	226	305	276	280	167	29	0	0	1,363
Plumas Mutual Water Company													
Regulated delivery of local supply	0	0	0	553	1,549	2,012	1,753	2,198	1,799	288	0	0	10,152
South Feather Water and Power Agency													
Regulated delivery of local supply	0	0	6	180	631	716	809	821	774	382	122	38	4,479
Thermalito Water and Sewer District													
Regulated delivery of local supply	72	37	48	127	192	194	211	258	299	155	106	57	1,756
Tudor Mutual Water Company													
Regulated delivery of local supply	0	0	0	183	465	640	573	581	291	0	0	0	2,733
Western Canal Water District													
Regulated delivery of local supply	0	0	0	5,740	53,610	48,883	64,700	42,477	9,764	30,103	24,542	9,337	289,156
Valberde and Ramelli													
Regulated delivery of local supply	0	8	7	4	46	134	131	123	119	61	0	0	633

Table 9-5 Total Amounts of Water Delivered in 2016, by Month (acre-feet)

Contracting Agency and Type of Service	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	2016 Total Deliveries
SWP	7	8	8	11	55	88	723	734	94	38	5	2	1,773
Non-SWP	913	119	109	28,018	161,969	161,192	193,014	144,128	47,820	86,327	92,241	59,836	975,686
Feather River Area Total	***920***	***127***	***117***	***28,029***	***162,024***	***161,280***	***193,737***	***144,862***	***47,914***	***86,365***	***92,246***	***59,838***	***977,459***
NORTH BAY AREA													
SWP Agencies													
Napa County Flood Control and Water Conservation District													
Table A	98	0	0	0	1,107	830	956	389	368	516	569	0	4,833
Table A Transferred to Others*	0	0	0	1	16	8	1	10	5	5	0	8,259	8,305
Pool Program Water	0	0	0	0	0	0	0	292	3	0	0	0	295
Article 21	743	826	30	395	129	0	0	0	0	0	330	866	3,319
Non-SWP Water Transferred from Others	46	0	0	0	0	0	0	0	263	191	0	0	500
Napa Total (*excluded from total)	887	826	30	395	1,236	830	956	681	634	707	899	866	8,947
Solano County Water Agency													
Table A	0	0	0	0	1,170	3,887	3,295	2,278	985	0	0	0	11,615
Table A Transferred from Others	0	0	0	1	16	8	1	10	5	5	0	0	46
Carryover Water	0	0	0	0	0	0	0	637	1,479	1,599	345	70	4,130
Other SWP Water	70	105	0	105	662	0	0	0	0	465	301	362	2,070
Non-SWP Water	0	0	0	0	0	0	1,256	1,176	1,074	850	982	452	5,790
Non-SWP Water Transferred to Others*	46	0	0	0	0	0	0	0	263	191	0	0	500
Solano Total (*excluded from total)	70	105	0	106	1,848	3,895	4,552	4,101	3,543	2,919	1,628	884	23,651
SWP	911	931	30	501	3,084	4,725	4,252	3,606	2,840	2,585	1,545	1,298	26,308
Non-SWP	46	0	0	0	0	0	1,256	1,176	1,337	1,041	982	452	6,290
North Bay Area Total	***957***	***931***	***30***	***501***	***3,084***	***4,725***	***5,508***	***4,782***	***4,177***	***3,626***	***2,527***	***1,750***	***32,598***
SOUTH BAY AREA													
SWP Agencies													
Alameda County Flood Control and Water Conservation District, Zone 7													
Table A	0	0	0	0	1,840	5,192	6,008	2,704	5,440	3,866	2,838	2,099	29,987
Table A Transferred to Others*	0	0	0	0	2,491	1,876	4,133	3,500	0	0	0	0	12,000
Pool Program Water	0	0	0	0	0	0	0	819	0	0	0	0	819
Carryover Water	821	1,092	1,508	1,883	2,349	0	0	797	0	0	0	0	8,450
Water Bank Recovery	324	0	0	0	0	0	0	0	0	0	0	0	324
Delivery of Backup Water	0	0	0	0	0	0	0	1,904	0	0	0	0	1,904
Non-SWP Water	192	561	107	408	463	235	244	102	115	306	178	127	3,038
Alameda-Zone 7 Total (*excluded from total)	1,337	1,653	1,615	2,291	4,652	5,427	6,252	6,326	5,555	4,172	3,016	2,226	44,522

Table 9-5 Total Amounts of Water Delivered in 2016, by Month (acre-feet)

Contracting Agency and Type of Service	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	2016 Total Deliveries
Alameda County Water District													
Table A	0	0	0	0	0	0	0	0	1,491	1,830	1,019	68	4,408
Table A Transferred to Others*	0	0	0	0	3,695	5,234	943	0	0	0	0	0	9,872
Carryover Water Transferred to Others*	0	0	0	0	0	0	8,400	0	0	0	0	0	8,400
Delivery of Backup Water	1,208	0	0	0	0	0	0	2,427	767	0	275	0	4,677
Non-SWP Water	134	669	2	773	1,283	1,909	2,119	0	0	0	0	1,345	8,234
Alameda County Total (*excluded from total)	1,342	669	2	773	1,283	1,909	2,119	2,427	2,258	1,830	1,294	1,413	17,319
Santa Clara Valley Water District													
Table A	0	0	0	0	0	9,082	879	0	0	8,680	11,939	0	30,580
Table A Transferred from Others	0	0	0	0	0	0	8,000	0	8,435	1,565	0	8,259	26,259
Table A Transferred to Others*	0	0	0	0	3,987	5,647	0	0	0	0	0	0	9,634
Carryover Water	0	2,372	5,652	6,832	6,836	0	0	9,782	0	1,389	0	0	32,863
Water Bank Recovery	1,122	0	0	0	0	0	0	0	0	0	0	0	1,122
Delivery of Backup Water	3,442	3,264	0	0	0	0	0	0	0	0	0	0	6,706
Santa Clara Total (*excluded from total)	4,564	5,636	5,652	6,832	6,836	9,082	8,879	9,782	8,435	11,634	11,939	8,259	97,530
Non-SWP Agencies													
Byron Bethany Irrigation District													
Regulated delivery of local supply	110	293	407	1,963	2,652	3,231	3,023	2,096	1,550	767	248	130	16,470
California State Parks/Fish and Wildlife (SWP Share)													
Lake del Valle	0	0	1	1	11	15	8	11	15	4	2	1	69
SWP	821	3,464	7,161	8,716	11,036	14,289	14,895	14,113	15,381	17,334	15,798	10,427	133,435
Non-SWP	6,532	4,787	516	3,144	4,398	5,375	5,386	6,529	2,432	1,073	701	1,602	42,475
South Bay Area Total	***7,353***	***8,251***	***7,677***	***11,860***	***15,434***	***19,664***	***20,281***	***20,642***	***17,813***	***18,407***	***16,499***	***12,029***	***175,910***
SAN JOAQUIN VALLEY AREA													
SWP Agencies													
County of Kings													
Table A	0	0	0	265	327	0	666	1,205	0	0	0	0	2,463
Table A Transferred to Others*	1	0	0	0	0	0	0	0	0	1	0	1	3
Pool Program Water	0	0	0	0	6	52	31	6	0	0	0	0	95
Carryover Water	0	43	0	0	0	0	102	0	0	0	0	0	145
Carryover Water Transferred to Others*	0	0	71	129	159	160	251	180	0	0	0	0	950
Non-SWP Water Transferred from Others	0	0	4	0	0	0	0	0	0	0	0	0	4
Kings Total (*excluded from total)	0	43	4	265	333	52	799	1,211	0	0	0	0	2,707

Table 9-5 Total Amounts of Water Delivered in 2016, by Month (acre-feet)

Contracting Agency and Type of Service	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	2016 Total Deliveries
Dudley Ridge Water District													
Table A	0	0	0	0	503	3,469	745	1,474	3	466	115	43	6,818
Table A Water Transferred from Others	0	0	0	0	1,830	32	2,459	0	370	104	0	0	4,795
Table A Transferred to Others*	0	0	0	6,400	0	0	0	0	1,000	2,649	0	505	10,554
Pool Program Water	0	0	0	0	0	0	421	40	0	0	0	0	461
Carryover Water	47	541	189	689	87	103	0	0	0	0	0	0	1,656
Carryover Water Transferred from Others	0	0	0	0	120	0	0	0	0	0	0	0	120
Water Bank Recovery Water Transferred to Others*	0	0	0	140	0	0	0	0	0	0	0	0	140
Dudley Ridge Total (*excluded from total)	47	541	189	689	2,540	3,604	3,625	1,514	373	570	115	43	13,850
Empire West Side Irrigation District													
Table A	0	0	0	0	34	349	517	29	0	0	0	0	929
Table A Transferred to Others*	0	0	0	0	0	0	0	0	0	0	871	0	871
Carryover Water	0	22	0	0	0	0	0	0	0	0	0	0	22
Empire Total (*excluded from total)	0	22	0	0	34	349	517	29	0	0	0	0	951
Kern County Water Agency													
Table A	0	0	1,665	3,466	923	98,857	109,644	71,655	29,298	22,010	7,953	8,964	354,435
Table A Transferred from Others	0	0	0	6,400	12,966	15,146	5,543	11,490	2,489	1,695	15	507	56,251
Table A Transferred to Others*	15	61	1,200	218	233	287	22,416	28,233	575	9,027	1,402	1,474	65,141
Pool Program Water	0	0	0	0	0	0	0	3,533	0	0	0	0	3,533
Carryover Water Transferred from Others	0	0	0	0	0	0	8,400	0	0	0	0	0	8,400
Water Bank Recovery	3,365	2,913	24,560	23,303	4,704	0	1,731	5,830	5,298	4,271	3,727	636	83,338
Delivery of Backup Water	0	8,331	0	0	45,839	12,624	0	0	0	0	1,042	0	67,836
Non-SWP Water Transferred from Others	0	0	0	0	0	0	2,763	13,783	11,931	2,055	0	0	30,532
Non-SWP Water Transferred to Others*	0	0	0	0	0	0	0	0	4,000	4,000	4,000	4,500	16,500
Kern Total (*excluded from total)	3,365	11,244	26,225	33,169	64,432	126,627	128,081	106,291	49,016	30,031	12,737	10,107	601,325
Oak Flat Water District													
Table A	1	0	0	0	87	64	179	304	173	20	1	3	832
Carryover Water	0	0	31	110	217	401	264	0	0	0	0	0	1,023
Oak Flat Total	1	0	31	110	304	465	443	304	173	20	1	3	1,855
Tulare Lake Basin Water Storage District													
Table A	0	0	0	14	16	26	0	0	0	0	0	0	56
Table A Transferred to Others*	0	0	200	0	1,830	2,032	12,017	20,296	4,307	95	293	0	41,070
Pool Program Water	0	0	0	32	0	0	0	94	0	0	0	0	126
Carryover Water	0	39	113	30	0	170	0	0	0	0	0	0	352
Carryover Water Transferrred to Others*	213	0	0	0	120	0	187	0	263	0	0	0	783
Tulare Total (*excluded from total)	0	39	113	76	16	196	0	94	0	0	0	0	534

Table 9-5 Total Amounts of Water Delivered in 2016, by Month (acre-feet)

Contracting Agency and Type of Service	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	2016 Total Deliveries
California State Parks/Fish and Wildlife (SWP Share)													
California Fish and Wildlife, O'Neill	0	9	0	17	2	38	49	63	53	34	29	47	341
California State Parks, O'Neill	0	1	0	1	1	0	0	0	0	0	1	0	4
California State Parks, San Luis	1	0	2	0	0	0	0	1	0	0	0	0	4
California State Parks/Fish and Wildlife (SWP Share) Total	1	10	2	18	3	38	49	64	53	34	30	47	349
Non-SWP Agencies													
Bureau of Reclamation													
Non-SWP Water Transferred to Others*	0	0	0	0	0	0	2,763	18,783	11,931	0	0	0	33,477
Kern National Wildlife Refuge	2,493	1,850	0	385	490	0	0	1,560	4,229	3,949	4,820	2,440	22,216
California Fish and Wildlife	0	6	0	14	0	31	41	50	42	29	24	40	277
California State Parks	0	1	0	0	0	0	2	0	1	0	1	1	6
Reclamation Total (*excluded from total)	2,493	1,857	0	399	490	31	43	1,610	4,272	3,978	4,845	2,481	22,499
CVP Annual Contractors													
Musco Family Olive Company	1	6	35	36	39	45	41	60	61	61	36	18	439
San Joaquin Valley National Cemetery	2	16	10	35	49	63	78	64	48	22	5	2	394
San Luis Water District	0	0	0	0	0	0	2,479	2,521	0	0	0	0	5,000
CVP Annual Contractors Total	3	22	45	71	88	108	2,598	2,645	109	83	41	20	5,833
Kern Tulare Water District													
Cross Valley Canal	0	0	0	0	0	0	0	0	0	610	0	0	610
Kern Tulare Total	0	0	0	0	0	0	0	0	0	610	0	0	610
Western Hills Water District													
Table A Point of Delivery from SWP	15	28	39	47	56	104	106	97	77	52	31	25	677
Western Hills Total	15	28	39	47	56	104	106	97	77	52	31	25	677
Westlands Water District													
Table A Transferred from Others	1	0	1,247	0	0	2,000	9,538	17,775	3,937	7,554	1,164	1	43,217
Carryover Water Transferred from Others	213	0	71	129	159	160	438	180	263	0	0	0	1,613
Water Bank Recovery	0	0	0	7,793	8,268	5,222	5,849	1,480	0	0	0	0	28,612
Non-SWP Water Transferred to Others*	0	0	0	0	0	0	0	0	0	610	0	0	610
Westlands Total (*excluded from total)	214	0	1,318	7,922	8,427	7,382	15,825	19,435	4,200	7,554	1,164	1	73,442
SWP	278	683	3,357	11,200	17,334	120,971	141,581	110,467	36,663	31,935	9,309	9,590	493,368
Non-SWP	5,861	13,123	24,609	31,566	59,389	17,985	10,505	22,827	21,610	10,997	9,655	3,137	231,264
San Joaquin Valley Area Total	***6,139***	***13,806***	***27,966***	***42,766***	***76,723***	***138,956***	***152,086***	***133,294***	***58,273***	***42,932***	***18,964***	***12,727***	***724,632***

Table 9-5 Total Amounts of Water Delivered in 2016, by Month (acre-feet)

Contracting Agency and Type of Service	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	2016 Total Deliveries
CENTRAL COASTAL AREA													
SWP Agencies													
San Luis Obispo County Flood Control and Water Conservation District													
Table A	235	232	275	328	417	427	467	452	399	398	311	258	4,199
San Luis Obispo Total	235	232	275	328	417	427	467	452	399	398	311	258	4,199
Santa Barbara County Flood Control and Water Conservation District													
Table A	0	0	766	824	1,386	1,439	1,505	1,494	1,631	543	375	415	10,378
Table A Transferred from Others	768	107	134	733	730	671	851	920	954	2,113	2,011	1,898	11,890
Table A Transferred to Others*	0	0	0	0	0	337	0	0	975	0	0	313	1,625
Carryover Water	88	364	151	39	30	118	110	5	4	3	2	3	917
Carryover Water Transferred from Others	333	691	467	465	485	469	475	477	95	40	0	0	3,997
Santa Barbara Total (*excluded from total)	1,189	1,162	1,518	2,061	2,631	2,697	2,941	2,896	2,684	2,699	2,388	2,316	27,182
SWP	1,424	1,394	1,793	2,389	3,048	3,124	3,408	3,348	3,083	3,097	2,699	2,574	31,381
Central Coastal Area Total	***1,424***	***1,394***	***1,793***	***2,389***	***3,048***	***3,124***	***3,408***	***3,348***	***3,083***	***3,097***	***2,699***	***2,574***	***31,381***
SOUTHERN CALIFORNIA AREA													
SWP Agencies													
Antelope Valley-East Kern Water Agency													
Table A	0	0	1,246	5,790	6,002	4,476	3,820	4,350	2,444	1,444	3,526	2,294	35,392
Table A Transferred from Others	16	46	47	71	112	140	177	137	122	77	34	5	984
Table A Tranferred to Others*	0	0	0	556	522	466	632	684	10,149	1,745	150	111	15,015
Pool Program Water	0	0	0	0	0	0	1,471	0	0	0	0	0	1,471
Carryover Water	266	361	1,357	73	0	0	0	0	0	0	0	0	2,057
Carryover Water Transferred to Others*	333	691	467	465	485	469	475	477	95	40	0	0	3,997
Water Bank Recovery	168	152	145	74	0	0	13	169	226	0	0	0	947
AVEK Total (*excluded from total)	450	559	2,795	6,008	6,114	4,616	5,481	4,656	2,792	1,521	3,560	2,299	40,851
Castaic Lake Water Agency													
Table A	0	0	1,536	1,744	2,389	3,529	4,247	4,559	3,900	3,380	2,359	2,004	29,647
Table A Transferred to Others*	0	0	0	0	0	0	0	0	161	511	490	338	1,500
Carryover Water	894	1,347	0	0	0	0	0	0	0	0	0	0	2,241
Castaic Lake Total (*excluded from total)	894	1,347	1,536	1,744	2,389	3,529	4,247	4,559	3,900	3,380	2,359	2,004	31,888
Coachella Valley Water District													
Table A	0	0	14,497	5,991	6,657	0	0	0	12,117	10,480	3,180	0	52,922
Non-SWP Water Transferred from Others	0	0	0	0	0	0	0	0	4,000	4,000	4,000	4,500	16,500
Coachella Total	0	0	14,497	5,991	6,657	0	0	0	16,117	14,480	7,180	4,500	69,422

Table 9-5 Total Amounts of Water Delivered in 2016, by Month (acre-feet)

Contracting Agency and Type of Service	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	2016 Total Deliveries
Crestline-Lake Arrowhead Water Agency													
Table A	5	0	0	57	106	149	171	163	0	0	22	0	673
Table A Transferred from Others	0	0	0	19	0	0	0	0	147	172	145	4	487
Table A Transferred to Others*	0	0	0	0	0	0	0	600	600	0	0	0	1,200
Non-SWP Water	107	65	80	11	0	0	0	0	0	0	0	157	420
Crestline Total (*excluded from total)	112	65	80	87	106	149	171	163	147	172	167	161	1,580
Desert Water Agency													
Table A	0	0	5,842	2,414	2,683	0	0	0	4,883	4,223	1,282	0	21,327
Pool Program Water	0	0	0	0	0	0	566	0	0	0	0	0	566
Desert Total	0	0	5,842	2,414	2,683	0	566	0	4,883	4,223	1,282	0	21,893
The Metropolitan Water District of Southern California													
Table A	29,766	50,208	40,777	91,539	109,953	117,135	114,378	121,452	90,247	90,456	69,834	63,380	989,125
Table A Transferred from Others	0	0	0	1,716	0	0	0	0	0	1,049	0	0	2,765
Table A Transferred to Others*	0	0	0	0	2,793	2,389	12,467	0	0	109	15	2	17,775
Pool Program Water	0	0	0	0	0	0	6,871	0	0	0	0	0	6,871
Water Bank Recovery	0	0	12,774	28,936	371	0	0	0	0	0	0	0	42,081
Metropolitan Total (*excluded from total)	29,766	50,208	53,551	122,191	110,324	117,135	121,249	121,452	90,247	91,505	69,834	63,380	1,040,842
Mojave Water Agency													
Table A	0	0	287	353	1,119	630	1,493	1,501	1,038	7,565	5,451	192	19,629
Table A Transferred from Others	0	0	0	0	0	337	0	0	975	0	0	313	1,625
Table A Transferred to Others*	16	46	47	1,787	112	140	8,177	137	122	77	34	5	10,700
Carryover Water	172	257	425	315	0	1	0	0	0	0	0	0	1,170
Mojave Total (*excluded from total)	172	257	712	668	1,119	968	1,493	1,501	2,013	7,565	5,451	505	22,424
Palmdale Water District													
Table A	741	256	650	947	0	242	418	339	0	0	712	0	4,305
Table A Transferred from Others	0	0	0	0	1,129	1,200	1,125	1,200	1,219	278	60	0	6,211
Table A Transferred to Others*	768	74	20	6	140	130	150	157	1,070	985	0	0	3,500
Palmdale Total	741	256	650	947	1,129	1,442	1,543	1,539	1,219	278	772	0	10,516
San Bernardino Valley Municipal Water District													
Table A	0	0	0	3,359	4,223	5,017	6,740	7,467	6,590	8,676	9,370	5,886	57,328
Table A Transferred from Others	0	0	0	0	109	108	141	157	1,000	985	0	0	2,500
Table A Transferred to Others*	0	0	0	19	0	0	0	0	147	172	145	4	487
Carryover Water	115	205	1,911	541	0	0	0	0	0	0	0	0	2,772
San Bernardino Total (*excluded from total)	115	205	1,911	3,900	4,332	5,125	6,881	7,624	7,590	9,661	9,370	5,886	62,600

Table 9-5 Total Amounts of Water Delivered in 2016, by Month (acre-feet)

Contracting Agency and Type of Service	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	2016 Total Deliveries
San Gabriel Valley Municipal Water District													
Table A	0	0	0	0	705	2,728	2,831	2,735	2,676	1,057	2,732	624	16,088
Table A Tranferred to Others*	0	0	0	0	0	0	1,192	0	0	0	0	0	1,192
San Gabriel Total (*excluded from total)	0	0	0	0	705	2,728	2,831	2,735	2,676	1,057	2,732	624	16,088
San Gorgonio Pass Water Agency													
Table A	0	0	6	11	1,219	1,207	953	646	617	1,329	1,275	1,420	8,683
Table A Transferred from Others	0	0	0	0	0	0	0	600	600	0	0	0	1,200
Carryover Water	0	0	0	933	0	0	0	0	0	0	0	0	933
San Gorgonio Total	0	0	6	944	1,219	1,207	953	1,246	1,217	1,329	1,275	1,420	10,816
Ventura County Watershed Protection District													
Table A	0	0	204	204	204	204	204	90	0	0	1,890	0	3,000
Ventura Total	0	0	204	204	204	204	204	90	0	0	1,890	0	3,000
California State Parks/Fish and Wildlife (SWP Share)													
Castaic Lagoon	4	4	5	3	70	198	242	234	32	3	0	0	795
Lake Perris—Parks and Recreation	0	0	0	3	0	23	24	18	0	30	9	0	107
Pyramid Lake	6	2	2	2	1	2	2	2	1	1	1	1	23
Silverwood Lake	3	1	2	3	5	7	9	9	7	4	4	2	56
California State Parks/Fish and Wildlife (SWP Share) Total	13	7	9	11	76	230	277	263	40	38	14	3	981
SWP	31,988	52,687	68,794	116,088	136,686	137,333	145,883	145,659	128,615	131,209	101,886	76,125	1,272,953
Non-SWP	275	217	12,999	29,021	371	0	13	169	4,226	4,000	4,000	4,657	59,948
Southern California Area Total	***32,263***	***52,904***	***81,793***	***145,109***	***137,057***	***137,333***	***145,896***	***145,828***	***132,841***	***135,209***	***105,886***	***80,782***	***1,332,901***
SWP WATER													
SWP Long-term Water Supply Contracts													
Table A	30,853	50,704	67,759	117,317	143,125	259,027	260,839	226,020	164,394	166,977	126,758	87,652	1,701,425
Table A Transfers and Exchanges	784	153	181	8,940	16,892	17,642	18,297	14,514	16,316	8,043	2,265	10,986	115,013
Pool Water	0	0	0	32	6	52	9,360	4,784	3	0	0	0	14,237
Carryover Water	2,736	7,334	11,804	11,910	10,124	1,262	9,351	11,698	1,578	3,031	347	73	71,248
Subtotal	*34,373*	*58,191*	*79,744*	*138,199*	*170,147*	*277,983*	*297,847*	*257,016*	*182,291*	*178,051*	*129,370*	*98,711*	*1,901,923*

Table 9-5 Total Amounts of Water Delivered in 2016, by Month (acre-feet)

Contracting Agency and Type of Service	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	2016 Total Deliveries
Other Water Supply Contracts													
Article 21	743	826	30	395	129	0	0	0	0	0	330	866	3,319
Settlement Water	70	105	0	105	662	0	0	0	0	465	301	362	2,070
Delivery of Backup Water	4,650	11,595	0	0	45,839	12,624	0	4,331	767	0	1,317	0	81,123
Water Bank Recovery	4,979	3,065	37,479	52,313	5,075	0	1,744	5,999	5,524	4,271	3,727	636	124,812
Subtotal	*10,442*	*15,591*	*37,509*	*52,813*	*51,705*	*12,624*	*1,744*	*10,330*	*6,291*	*4,736*	*5,675*	*1,864*	*211,324*
Non-SWP Water Supply Contracts													
Local Water	433	1,295	189	1,192	1,746	2,144	2,363	102	115	306	178	1,629	11,692
Vallejo Permit Water	46	0	0	0	0	0	1,256	1,176	1,337	1,041	982	452	6,290
Other Non-SWP Programs	132	111	100	153	213	255	3,113	14,194	16,181	6,209	4,131	4,605	49,397
Subtotal	*611*	*1,406*	*289*	*1,345*	*1,959*	*2,399*	*6,732*	*15,472*	*17,633*	*7,556*	*5,291*	*6,686*	*67,379*
SWP Total	***45,426***	***75,188***	***117,542***	***192,357***	***223,811***	***293,006***	***306,323***	***282,818***	***206,215***	***190,343***	***140,336***	***107,261***	***2,180,626***
NON-SWP WATER													
Non-SWP Agencies													
SWP Contracted Supply Delivered to Non-SWP Agencies	229	28	1,357	176	215	2,264	46,661	48,473	4,277	7,620	1,195	26	112,521
Water Bank Recovery	0	0	0	7,793	8,268	5,222	5,849	1,480	0	0	0	0	28,612
Regulated delivery of local supply	963	338	468	29,955	164,556	164,263	195,775	145,948	49,300	87,035	92,464	59,918	990,983
California State Parks	14	9	12	13	88	245	287	275	56	42	18	5	1,064
California Fish and Wildlife	0	15	0	31	2	69	90	113	95	63	53	87	618
CVP/Reclamation Contractors													
Cross Valley Canal Contractors	0	0	0	0	0	0	0	0	0	610	0	0	610
Kern National Wildlife Refuge	2,493	1,850	0	385	490	0	0	1,560	4,229	3,949	4,820	2,440	22,216
Annual Contracts	3	22	45	71	88	108	119	124	109	83	41	20	833
Non-SWP Total	***3,702***	***2,262***	***1,882***	***38,424***	***173,707***	***172,171***	***248,781***	***197,973***	***58,066***	***99,402***	***98,591***	***62,496***	***1,157,457***
Grand Total	**49,128**	**77,450**	**119,424**	**230,781**	**397,518**	**465,177**	**555,104**	**480,791**	**264,281**	**289,745**	**238,927**	**169,757**	**3,338,083**

Table 9-6 Total Amounts of Annual Table A Water and Water Conveyed, by Type, 1962–2016 (acre-feet)

Year	Annual Table A Amounts According to Long-term Water Supply Contracts							Water Conveyed								
								Deliveries								
	Upper Feather River Area [1]	North Bay Area [2]	South Bay Area [3]	San Joaquin Valley Area [4]	Central Coastal Area [5]	Southern California Area [6]	Total [7]	Table A Water [8]	Article 21, Surplus, and Unscheduled Water[a] [9]	Other Water[b] [10]	Feather River Diversions[c] [11]	Recreation/ Fish and Wildlife Water [12]	Subtotal [13]	Initial Fill Water [14]	Losses and Storage Changes[d] [15]	**Total** [16]
1962	-	-	-	-	-	-	-	-	-	9,704	7,499	-	17,203	9	272	17,484
1963	-	-	-	-	-	-	-	-	-	13,212	16,049	-	29,261	71	185	29,517
1964	-	-	-	-	-	-	-	-	-	21,743	17,891	-	39,634	171	152	39,957
1965	-	-	-	-	-	-	-	-	-	35,985	27,425	-	63,410	93	729	64,232
1966	-	-	-	-	-	-	-	-	-	59,599	33,361	-	92,960	-	1,746	94,706
1967	-	-	11,538	-	-	-	11,538	11,354	-	45,225	24,639	-	81,218	8,328	4,212	93,758
1968	550	-	109,900	77,350	-	3,700	191,500	171,709	121,534	1,214	903,367	-	1,197,824	498,926	117,906	1,814,656
1969	620	-	98,700	163,075	-	5,000	267,395	193,020	72,397	8,692	832,454	-	1,106,563	510,614	72,196	1,689,373
1970	700	-	114,200	202,000	-	5,700	322,600	233,993	131,848	25,401	804,320	-	1,195,562	23,947	2,435	1,221,944
1971	890	-	116,200	251,800	-	6,700	375,590	357,340	294,581	35,438	825,886	8	1,513,253	7,853	5,812	1,526,918
1972	970	-	118,300	413,066	-	209,423	741,759	611,801	422,322	53,848	875,529	6,489	1,969,989	100,274	53,062	2,123,325
1973	1,100	-	120,400	383,652	-	481,100	986,252	692,888	294,916	29,540	851,285	1,155	1,869,784	204,638	53,798	2,128,220
1974	1,230	-	122,400	460,650	-	597,920	1,182,200	874,075	412,453	31,493	963,956	2,118	2,284,095	237,554	10,657	2,532,306
1975	1,610	-	124,500	545,809	-	714,950	1,386,869	1,223,990	620,685	46,995	924,696	3,377	2,819,743	103,352	(94,606)	2,828,489
1976	1,990	-	126,500	543,417	-	836,480	1,508,387	1,373,002	551,685	103,546	1,018,653	1,745	3,048,631	61,122	(681,025)	2,428,728
1977	2,420	-	128,600	581,400	-	954,901	1,667,321	573,896	-	410,991	624,497	1,111	1,610,495	-	(131,151)	1,479,344
1978	1,850	-	130,700	635,900	-	1,049,584	1,818,034	1,312,365	16,215	177,245	836,864	1,691	2,344,380	64,443	717,370	3,126,193
1979	2,130	-	132,700	702,685	-	1,190,573	2,028,088	1,404,292	646,830	431,693	933,067	1,766	3,417,648	12,302	(83,430)	3,346,520
1980	1,810	500	134,800	758,100	1,946	1,317,614	2,214,770	1,511,491	402,217	40,269	925,750	2,131	2,881,858	-	(26,606)	2,855,252
1981	1,940	650	137,000	818,000	2,813	1,432,065	2,392,468	1,889,125	908,428	283,310	993,785	4,688	4,079,336	-	(802,263)	3,277,073
1982	1,970	800	139,200	876,500	5,626	1,550,449	2,574,545	1,738,056	215,134	144,267	819,586	4,646	2,921,689	-	480,752	3,402,441
1983	2,000	950	141,400	867,118	8,439	1,681,257	2,701,164	1,184,119	13,019	172,030	633,778	7,849	2,010,795	-	(90,997)	1,919,798
1984	3,630	1,100	143,600	979,211	12,698	1,744,098	2,884,337	1,587,593	262,917	366,273	891,128	7,040	3,114,951	-	(140,182)	2,974,769
1985	3,760	1,250	145,800	1,019,049	21,138	1,864,849	3,055,846	1,912,765	301,844	474,417	924,049	4,033	3,617,108	-	92,885	3,709,993
1986	4,190	1,400	148,100	1,091,946	28,210	1,983,890	3,257,736	2,007,906	24,350	177,176	843,040	3,865	3,056,337	-	284,380	3,340,717
1987	4,620	1,550	150,300	1,188,500	35,204	2,103,941	3,484,115	2,113,915	114,907	375,810	882,301	7,672	3,494,605	-	(390,413)	3,104,192
1988	5,060	15,471	152,500	1,246,100	43,722	2,225,482	3,688,335	2,376,373	-	520,375	884,877	4,889	3,786,514	-	(92,850)	3,693,664
1989	5,500	24,615	156,700	1,290,400	56,342	2,424,633	3,958,190	2,853,747	-	474,559	830,500	8,135	4,166,941	-	447,917	4,614,858
1990	6,040	28,190	160,900	1,313,450	70,486	2,500,600	4,079,666	2,582,151	90	424,697	875,099	9,262	3,891,299	-	(528,869)	3,362,430
1991	11,880	29,590	166,400	1,338,011	70,486	2,510,200	4,126,567	549,113	3,521	543,582	565,395	4,879	1,666,490	-	167,435	1,833,925

Table 9-6 Total Amounts of Annual Table A Water and Water Conveyed, by Type, 1962–2016 (acre-feet) *(Continued)*

Year	Annual Table A Amounts According to Long-term Water Supply Contracts							Water Conveyed								
								Deliveries								
	Upper Feather River Area [1]	North Bay Area [2]	South Bay Area [3]	San Joaquin Valley Area [4]	Central Coastal Area [5]	Southern California Area [6]	Total [7]	Table A Water [8]	Article 21, Surplus, and Unscheduled Water[a] [9]	Other Water[b] [10]	Feather River Diversions[c] [11]	Recreation/ Fish and Wildlife Water [12]	Subtotal [13]	Initial Fill Water [14]	Losses and Storage Changes[d] [15]	**Total** [16]
1992	11,920	32,010	171,900	1,342,300	70,486	2,510,200	4,138,816	1,410,799	1,156	166,992	613,978	2,605	2,195,530	-	(63,541)	2,131,989
1993	11,960	34,620	177,400	1,342,300	70,486	2,510,200	4,146,966	2,313,236	-	256,853	822,589	2,609	3,395,287	-	726,123	4,121,410
1994	12,000	37,215	182,000	1,342,300	70,486	2,510,200	4,154,201	1,749,351	112,625	236,739	874,018	8,200	2,980,933	-	(295,405)	2,685,528
1995	12,050	44,030	184,000	1,342,300	70,486	2,510,200	4,163,066	1,967,093	64,330	85,560	860,077	2,575	2,979,635	-	69,536	3,049,171
1996	12,100	48,225	186,000	1,301,630	70,486	2,492,900	4,111,341	2,514,824	28,647	252,346	1,005,148	3,907	3,804,872	86	491,550	4,296,508
1997	12,150	49,315	188,000	1,297,300	45,201	2,492,900	4,084,866	2,260,383	21,432	322,000	993,211	4,146	3,601,172	527	(11,806)	3,589,893
1998	12,200	50,420	188,000	1,272,300	45,201	2,517,900	4,086,021	1,726,519	20,288	127,405	872,738	2,108	2,749,058	-	(132,491)	2,616,567
1999	13,940	55,020	188,000	1,272,300	70,486	2,519,900	4,119,646	2,738,903	158,070	85,312	1,108,672	4,324	4,095,281	-	(189,525)	3,905,756
2000	14,000	55,945	210,000	1,205,300	70,486	2,565,900	4,121,631	3,172,407	308,785	353,584	1,085,886	4,096	4,924,758	-	(20,103)	4,904,655
2001	14,670	66,561	220,000	1,185,519	70,486	2,566,900	4,124,136	1,579,291	48,145	632,403	1,077,997	2,942	3,340,778	-	159,983	3,500,761
2002	14,730	67,396	220,000	1,182,519	70,486	2,569,900	4,125,031	2,634,672	43,115	311,976	1,131,880	3,712	4,125,355	-	80,709	4,206,064
2003	14,790	68,231	220,400	1,182,119	70,486	2,570,900	4,126,926	2,975,817	59,828	160,087	1,006,995	2,862	4,205,589	-	459,377	4,664,966
2004	13,100	69,056	222,619	1,170,000	70,486	2,581,800	4,127,061	2,644,787	218,496	403,542	1,171,835	2,887	4,441,547	-	108,840	4,550,387
2005	10,800	69,481	222,619	1,170,000	70,486	2,582,300	4,125,686	2,827,256	731,083	92,858	1,074,706	1,515	4,727,418	-	529,347	5,256,765
2006	11,124	69,856	222,619	1,170,000	70,486	2,582,800	4,126,885	2,973,349	621,339	143,774	1,094,944	3,628	4,837,034	-	(119,981)	4,717,053
2007	11,520	70,231	222,619	1,170,000	70,486	2,584,450	4,129,306	2,180,751	309,973	598,789	1,193,237	2,581	4,285,331	-	(524,851)	3,760,480
2008	39,120	70,606	222,619	1,170,000	70,486	2,593,100	4,165,931	1,244,240	2,729	769,517	1,087,669	2,778	3,106,933	-	(758,813)	2,348,120
2009	39,190	70,981	222,619	1,170,000	70,486	2,593,100	4,166,376	1,385,266	6,032	709,885	1,125,147	2,047	3,228,377	-	(31,319)	3,197,058
2010	13,491	76,531	222,619	1,140,000	70,486	2,623,100	4,146,227	2,010,672	7,505	790,602	978,172	1,167	3,788,118	-	461,751	4,249,869
2011	14,388	76,581	222,619	1,140,000	70,486	2,623,100	4,147,174	2,847,572	420,691	388,632	1,028,542	1,593	4,687,030	-	358,354	5,045,384
2012	39,420	76,631	222,619	1,140,000	70,486	2,623,100	4,172,256	2,593,699	-	367,609	1,047,832	1,609	4,010,749	-	(537,209)	3,473,540
2013	39,510	76,681	222,619	1,140,000	70,486	2,623,100	4,172,396	1,623,212	-	614,203	1,166,635	1,641	3,405,691	-	(256,889)	3,148,802
2014	39,600	76,731	222,619	1,136,556	70,486	2,626,544	4,172,536	475,533	1,444	698,035	839,792	677	2,015,481	-	(222,460)	1,793,021
2015	39,700	76,781	222,619	1,133,556	70,486	2,629,544	4,172,686	846,547	690	585,388	675,530	721	2,108,876	-	(419,759)	1,689,117
2016	39,800	76,781	222,619	1,133,556	70,486	2,629,544	4,172,786	2,014,444	3,319	344,408	974,513	1,399	3,338,083	-	(235,410)	3,102,673
Total	**575,733**	**1,671,982**	**8,461,085**	**47,999,044**	**2,068,690**	**93,628,691**	**154,405,225**	**84,050,702**	**9,021,615**	**15,036,828**	**45,502,469**	**156,878**	**153,768,492**	**1,834,310**	**(922,483)**	**154,680,319**

[a] Values include amounts of deliveries to short-term contractors (Mustang Water District, 1970–1972; Tracy Golf and Country Club, 1974, 1979, and 1980; Green Valley Water District, 1974, 1975, 1978, 1979, 1980, and 1985; and Granite Construction Company, 1980).

[b] Includes amounts of SWP and non-SWP water conveyed for SWP and non-SWP water contractors.

[c] Includes amounts of water diverted under various water rights agreements.

[d] Amounts reflect net effect of (1) operational losses from SWP transportation facilities; (2) changes in reservoir storage south of the Delta; (3) storable local inflows to SWP reservoirs; (4) side inflow to San Luis Canal; and (5) inflow into the California Aqueduct from the Kern River Intertie.

Table 9-7 SWP Water Delivered by Category, 1962–2016 (acre-feet)

Year	Table Water A			Article 21/Unscheduled			Other SWP Water Deliveries				Total Deliveries
	Municipal and Industrial	Agricultural	Total Table A[a]	Municipal and Industrial	Agricultural	Total Article 21/ Unscheduled	Other Water[b]	Feather River Diversions[c]	Fish & Wildlife/ Recreation Water	Total Other SWP Water Deliveries	
1962	0	0	0	0	0	0	9,704	7,499	0	17,203	17,203
1963	0	0	0	0	0	0	13,212	16,049	0	29,261	29,261
1964	0	0	0	0	0	0	21,743	17,891	0	39,634	39,634
1965	0	0	0	0	0	0	35,985	27,425	0	63,410	63,410
1966	0	0	0	0	0	0	59,599	33,361	0	92,960	92,960
1967	5,563	5,791	11,354	0	0	0	45,225	24,639	0	69,864	81,218
1968	86,541	85,168	171,709	10,000	111,534	121,534	1,214	903,367	0	904,581	1,197,824
1969	63,956	129,064	193,020	0	72,397	72,397	8,692	832,454	0	841,146	1,106,563
1970	83,415	150,578	233,993	0	131,848	131,848	25,401	804,320	0	829,721	1,195,562
1971	93,776	263,564	357,340	0	294,581	294,581	35,438	825,886	8	861,332	1,513,253
1972	186,796	425,005	611,801	0	422,322	422,322	53,848	875,529	6,489	935,866	1,969,989
1973	297,497	395,391	692,888	0	294,916	294,916	29,540	851,285	1,155	881,980	1,869,784
1974	423,982	450,093	874,075	0	412,453	412,453	31,493	963,956	2,118	997,567	2,284,095
1975	670,492	553,498	1,223,990	356	620,329	620,685	46,995	924,696	3,377	975,068	2,819,743
1976	631,876	741,126	1,373,002	4,147	547,538	551,685	103,546	1,018,653	1,745	1,123,944	3,048,631
1977	354,930	218,966	573,896	0	0	0	410,991	624,497	1,111	1,036,599	1,610,495
1978	782,625	529,740	1,312,365	0	16,215	16,215	177,245	836,864	1,691	1,015,800	2,344,380
1979	692,888	711,404	1,404,292	0	646,830	646,830	431,693	933,067	1,766	1,366,526	3,417,648
1980	726,545	784,946	1,511,491	52,200	350,017	402,217	40,269	925,750	2,131	968,150	2,881,858
1981	1,053,273	835,852	1,889,125	18,920	889,508	908,428	283,310	993,785	4,688	1,281,783	4,079,336
1982	916,014	822,042	1,738,056	140	214,994	215,134	144,267	819,586	4,646	968,499	2,921,689
1983	482,749	701,370	1,184,119	0	13,019	13,019	172,030	633,778	7,849	813,657	2,010,795
1984	725,799	861,794	1,587,593	3,663	259,254	262,917	366,273	891,128	7,040	1,264,441	3,114,951
1985	983,341	929,424	1,912,765	9,638	292,206	301,844	474,417	924,049	4,033	1,402,499	3,617,108
1986	998,611	1,009,295	2,007,906	2,595	21,755	24,350	177,176	843,040	3,865	1,024,081	3,056,337
1987	1,079,983	1,033,932	2,113,915	6,949	107,958	114,907	375,810	882,301	7,672	1,265,783	3,494,605
1988	1,308,071	1,068,302	2,376,373	0	0	0	520,375	884,877	4,889	1,410,141	3,786,514
1989	1,602,543	1,251,204	2,853,747	0	0	0	474,559	830,500	8,135	1,313,194	4,166,941
1990	1,876,072	706,079	2,582,151	0	90	90	424,697	875,099	9,262	1,309,058	3,891,299
1991	536,669	12,444	549,113	3,521	0	3,521	543,582	565,395	4,879	1,113,856	1,666,490
1992	955,687	455,112	1,410,799	1,156	0	1,156	166,992	613,978	2,605	783,575	2,195,530
1993	1,069,258	1,243,978	2,313,236	0	0	0	256,853	822,589	2,609	1,082,051	3,395,287
1994	1,134,992	614,359	1,749,351	48,150	64,475	112,625	236,739	874,018	8,200	1,118,957	2,980,933
1995	801,570	1,165,523	1,967,093	17,984	46,346	64,330	85,560	860,077	2,575	948,212	2,979,635
1996	1,143,638	1,371,186	2,514,824	12,091	16,556	28,647	252,346	1,005,148	3,907	1,261,401	3,804,872

Table 9-7 SWP Water Delivered by Category, 1962–2016 (acre-feet) *(Continued)*

Year	Table Water A			Article 21/Unscheduled			Other SWP Water Deliveries				Total Deliveries
	Municipal and Industrial	Agricultural	Total Table A[a]	Municipal and Industrial	Agricultural	Total Article 21/ Unscheduled	Other Water[b]	Feather River Diversions[c]	Fish & Wildlife/ Recreation Water	Total Other SWP Water Deliveries	
1997	1,220,200	1,040,183	2,260,383	2,814	18,618	21,432	322,000	993,211	4,146	1,319,357	3,601,172
1998	865,795	860,724	1,726,519	9,982	10,306	20,288	127,405	872,738	2,108	1,002,251	2,749,058
1999	1,405,311	1,333,592	2,738,903	61,191	96,879	158,070	85,312	1,108,672	4,324	1,198,308	4,095,281
2000	1,949,922	1,222,485	3,172,407	170,302	138,483	308,785	353,584	1,085,886	4,096	1,443,566	4,924,758
2001	1,171,986	407,305	1,579,291	14,971	33,174	48,145	632,403	1,077,997	2,942	1,713,342	3,340,778
2002	1,921,139	713,533	2,634,672	15,478	27,637	43,115	311,976	1,131,880	3,712	1,447,568	4,125,355
2003	2,188,647	787,170	2,975,817	23,019	36,809	59,828	160,087	1,006,995	2,862	1,169,944	4,205,589
2004	2,001,278	643,509	2,644,787	103,890	114,606	218,496	403,542	1,171,835	2,887	1,578,264	4,441,547
2005	1,923,222	904,034	2,827,256	186,787	544,296	731,083	92,858	1,074,706	1,515	1,169,079	4,727,418
2006	1,973,419	999,930	2,973,349	293,358	327,981	621,339	143,774	1,094,944	3,628	1,242,346	4,837,034
2007	1,670,711	510,040	2,180,751	186,570	123,403	309,973	598,789	1,193,237	2,581	1,794,607	4,285,331
2008	1,024,147	220,093	1,244,240	2,729	0	2,729	769,517	1,087,669	2,778	1,859,964	3,106,933
2009	1,036,052	349,214	1,385,266	6,032	0	6,032	709,885	1,125,147	2,047	1,837,079	3,228,377
2010	1,503,322	507,350	2,010,672	7,505	0	7,505	790,602	978,172	1,167	1,769,941	3,788,118
2011	1,871,986	975,586	2,847,572	207,307	213,384	420,691	388,632	1,028,542	1,593	1,418,767	4,687,030
2012	1,880,188	713,511	2,593,699	0	0	0	367,609	1,047,832	1,609	1,417,050	4,010,749
2013	1,198,284	424,928	1,623,212	0	0	0	614,203	1,166,635	1,641	1,782,479	3,405,691
2014	405,814	69,719	475,533	1,444	0	1,444	698,035	839,792	677	1,538,504	2,015,481
2015	620,511	226,036	846,547	690	0	690	585,388	675,530	721	1,261,639	2,108,876
2016	1,505,082	509,362	2,014,444	3,319	0	3,319	344,408	974,513	1,399	1,320,320	3,338,083
Total	**51,106,168**	**32,944,534**	**84,050,702**	**1,488,898**	**7,532,717**	**9,021,615**	**15,036,828**	**45,502,469**	**156,878**	**60,696,175**	**153,768,492**

[a] Includes Table A, Table A transfers, Table A exchanges, Carryover, and Pool Water.
[b] Includes water conveyed for SWP and non-SWP water contractors.
[c] Includes amounts of water diverted according to various water rights agreements.

Chapter 10
Power Resources

Gianelli Pumping-Generating Plant, part of the San Luis Complex near Los Banos, California.

Significant Events in 2016

Energy used at the 29 State Water Project (SWP) pumping and generating plants totaled 6.60 million megawatt hours (MWh). To meet SWP energy needs, the Department of Water Resources (DWR) purchased 2.60 million MWh of energy at a cost of $93.64 million. This included: (1) 1.70 million MWh of WSPP short-term energy from four energy marketers at a cost of $66.30 million; (2) 0.38 million MWh from four renewable energy electric utilities at a combined cost of $15.40 million; and (3) 0.52 million MWh of long-term energy at a cost of $11.94 million. Additional associated energy costs totaled $192.29 million. The total cost of energy-related costs for 2016 was $285.93 million.

Pursuant to WSPP bilateral trades, transactions made under the Lodi Energy Center Power Sales Agreement, transactions under the California Independent System Operator, and revenues from other long-term contracts, DWR received a total of $75.26 million.

On December 20, 2016, sPower's 85 megawatt (MW) Solverde 1 project located in the City of Lancaster, commenced commercial operation. This facility is expected to provide approximately 230,000 MWh of renewable generation annually to the SWP.

On December 29, 2016, Solar Star California XLIV, LLC's 9.5 MW Pearblossom Solar Facility project commenced commercial operation. This facility is expected to provide approximately 27,400 MWh of renewable generation to the SWP each year.

Information for this chapter was provided by the State Water Project Analysis Office, the SWP Power and Risk Office, the Hydropower License Planning and Compliance Office, and the SWP Operations Control Office.

State Water Project (SWP) water contractors depend on the SWP to obtain economical sources of power in order to deliver affordable water. Consequently, the Department of Water Resources (DWR) administers a comprehensive power resources program. Key elements of the program include studies of power resources for future needs, acquisition of long-term power resources and transmission services, short-term purchases or sales of power, and the strategic operation of generation and pumping facilities.

Power Resources Program

The goals of the SWP power resources program are to:

- obtain reliable, environmentally sensitive, and competitively priced power resources and transmission services sufficient to operate the SWP;
- develop and manage power resources to minimize the cost of water deliveries to SWP water contractors;
- meet responsibilities and criteria of the Western Electricity Coordinating Council (WECC); and
- conform to regulations of the Federal Energy Regulatory Commission (FERC).

To achieve these goals, DWR constructed its own power facilities. Additionally, DWR enters into long-term contracts and short-term arrangements with other electric utilities and with the California Independent System Operator (CAISO) for transmission access and for power purchases and sales. DWR's generators and pumps provide a mix of regulation, spinning, and nonspinning reserves to the CAISO's ancillary services market. DWR's power resources program also takes advantage of SWP water storage and conveyance capacities, which cost-effectively control pump loads and generation.

Major Electric Utility Industry Developments

In 2016, CAISO continued to address the impact of increasing renewable energy generation and the need for greater ramping capability to maintain grid reliability.

CAISO also continued working on several initiatives with the ultimate objective of developing a framework allowing for the expansion of the CAISO Balancing Authority Area to include utilities outside the current CAISO footprint, such as PacifiCorp. Among these initiatives are the Transmission Access Charge Options, Regional Resource Adequacy, and Regional Governance.

The Renewable Energy Transmission Initiative (RETI) 2.0 Team released the Transmission Capability and Requirements Report, dated October 24, 2016. The report describes the ability of California's current transmission system to meet the new renewable energy targets set forth in Senate Bill B 350 (Del Leon; Chapter 547, Statutes of 2015). Under CAISO's criteria for full deliverable capability by transmission area, there is sufficient capacity to meet a 33 percent Renewables Portfolio Standard, but not a 50 percent Renewables Portfolio Standard. However, under an energy-only capability requirement, there is sufficient transmission to accommodate resources beyond a 33 percent Renewables Portfolio Standard.

On November 1, 2016 CAISO implemented the Flexible Ramping Product which provides additional ramping capability in the real-time market. This market product accounts for uncertainties due to demand and renewable forecasting errors and replaces the Flexible Ramping Constraint.

DWR Participation in Electric Utility Industry Activities

DWR continued to participate in CAISO's stakeholder processes to help ensure that tariff and business practice manuals are compatible with SWP operations. DWR's participation in CAISO stakeholder processes focused on the following primary elements in 2016:

- Market Initiatives Roadmap;
- Stakeholder Initiatives Catalog;
- Demand Response and Energy Efficiency Roadmap;
- 2-Tier Real-Time Bid Cost Recovery;
- Bid Cost Recovery Enhancements;
- Aliso Canyon Gas-Electric Coordination;
- Energy Storage and Distributed Energy Resources, Phase 1 and Phase 2;
- Local Market Power Mitigation Enhancements;
- Transmission Access Charge Options;
- Transmission Access Charge Wholesale Billing Determinant;
- Generator Interconnection Driven Network Upgrade Cost Recovery;
- Renewable Energy Transmission Initiative (RETI) 2.0;
- Budget and Grid Management Charge rate structure for 2016;
- Bidding Rules Enhancements, FERC Order 809;
- FERC Order 764 (Integration of Variable Energy Resources)compliance;
- Commitment Cost Enhancements, Phase 3;
- Commitment Costs and Default Energy Bid Enhancements;
- Contingency Modeling Enhancements;
- Pricing Enhancements;
- Flexible Ramping Product;
- Energy Imbalance Market Enhancements;
- Generator Interconnection Process Enhancements;
- Reactive Power Requirements;
- Frequency Response Phase 2;
- Metering Rules Enhancements;
- Transmission planning;
- Regional Energy Market;
- Local capacity procurement for 2017 requirements;
- Annual Resource Adequacy processes including the Path 26 allocation, import allocation, and net qualifying capacity;
- Flexible Capacity Needs study process for 2017;
- Flexible Resource Adequacy Criteria and Must-Offer Obligation (Phase 2); and
- Reliability Services Initiative (Phase 2).

In addition, DWR participated in the California Energy Commission's planning processes by submitting a demand forecast to the commission.

Besides CAISO and the California Energy Commission stakeholder processes, DWR participated in FERC proceedings to help ensure that various market requirements or cost allocation mechanisms were appropriately structured. This included the following major processes and litigations (with FERC docket numbers given in parenthesis, if applicable):

- CAISO's Aliso Canyon Tariff Amendments (ER16-1649, ER17-110); CAISO's Demand Response Report (ER06-615);
- CAISO's Energy Imbalance Market (ER13-1372, ER14-1729, ER15-33, ER15-1919, ER16-1518);
- CAISO's Pricing Enhancements (ER16-1886, ER17-415);

- CAISO's Energy Storage Enhancements (ER16-1735);
- CAISO's Definition of Load Serving Entity (ER17-218);
- CAISO's Flexible Ramping Product (ER16-2023);
- CAISO's Frequency Response (ER16-1483);
- CAISO's Bidding Rules Enhancements (ER16-1265, ER16-2445, ER17-416);
- FERC Notice of Proposed Rulemaking on Connected Entity Reporting (RM15-23);
- FERC Electric Storage Participation and CAISO's Response to Data Request (AD16-20);
- Pacific Gas & Electric Company's (PG&E) TO18 proposal to increase transmission revenue requirement rates for retail and wholesale customers of CAISO (ER16-2320);
- San Diego Gas & Electric's TO4—Cycle 4 proposal to increase transmission revenue requirement rates for retail and wholesale customers of CAISO (ER17-470);
- Southern California Edison's fifth annual update to its approved formula rate (ER11-3697);
- PG&E's proposed annual update to its Transmission Revenue Balancing Account (ER17-39);
- San Diego Gas & Electric's proposed annual update to its Transmission Revenue Balancing Account Adjustment and Transmission Access Charge Balancing Account Adjustment (ER17-279);
- Southern California Edison's proposed annual update to its Transmission Revenue Balancing Account (ER17-250) and Reliability Services tariff (ER17-232);
- Trans Bay filed a revised transmission owner tariff sheet reflecting a proposed increase in annual base transmission revenue requirement (ER16-2632); and
- DesertLink filed their initial transmission owner tariff which includes a formula rate designed to calculate an annual transmission revenue requirement (ER17-135).

In April 2015, DWR submitted a motion to intervene in Case Nos. 15-1057 and 15-1241 (consolidated) before the U.S. Court of Appeals for the District of Columbia Circuit. The consolidated case was petitioned by the Transmission Agency of Northern California, Modesto Irrigation District, the City of Santa Clara, and the City of Redding. The petitioners are seeking to appeal FERC orders (EL14-44 and ER15-223) relating to a complaint against PG&E. The complaint alleges a breach of PG&E's contractual obligations under the operating agreement for the California-Oregon Intertie resulting from the loss of DWR's participation in PG&E's Pacific AC Intertie remedial action scheme and termination of the PG&E-DWR Comprehensive Agreement. Briefs were filed in 2016, and the Court's decision is pending.

Bulk Electric System Reliability Standards

Background

The Energy Policy Act of 2005 assigned FERC the responsibility for bulk electric system reliability and required the creation of an Electric Reliability Organization. The North American Electric Reliability Corporation (NERC) was named the Electric Reliability Organization by FERC in July 2006 and was tasked with establishing reliability standards for the bulk electric system. Compliance with NERC reliability standards is mandatory.

WECC was named by NERC and approved by FERC as the regional entity responsible for enforcing a reliable bulk electric system in the Western Interconnection, which includes both western Canada and the Western United States. WECC oversees implementation of standards and validation of compliance, including assessment of penalties and/or sanctions. Details of the NERC standards and the attributes of the compliance program can be found in Bulletin 132-11.

NERC Reliability Compliance—Internal Compliance Program Improvements

To ensure that DWR adheres to NERC's reliability standards, DWR conducted an internal audit of its compliance with twelve NERC reliability standards, which is 20 percent of the standards applicable to DWR. This audit helped gauge DWR's readiness for upcoming third party audits: a 2018 mock audit and the WECC audit that is expected to occur in February 2019.

NERC has a Risk-Based Compliance Monitoring and Enforcement Program in which entities that have effective internal controls and low reliability risks may receive fewer audits from NERC and WECC, reduced audit scope, and reduced penalties for noncompliance. To identify gaps and improve DWR's internal controls, the Compliance and Regulatory Office began conducting an internal risk assessment and internal controls evaluation. Additionally, the Compliance and Regulatory Office began an annual audit of its nine existing internal compliance program policies and associated processes to improve and strengthen the internal compliance program. Both of these are scheduled to be completed in 2017.

DWR is mandated to comply with NERC's Version 5 of the Critical Infrastructure Protection reliability standards (CIP Version 5), which are intended to further mitigate cyber risks to the bulk power system. In January 2016, DWR notified WECC of its transition to CIP Version 5 to ensure compliance prior to April 1, 2017, the enforceable date applicable to DWR.

DWR also submitted, in compliance with the requirements of the reliability standards, its annual self-certification to WECC in February 2016. The submittal certified DWR's compliance with the requirements of a WECC-determined subset of standards or provided a violation report supported by a mitigation plan to resolve the outstanding items. Violation of these standards can lead to financial penalties or reduced operating flexibility.

Greenhouse Gas Management

In 2016, DWR reported its calendar year 2015 pump load, generation, and sulfur hexafluoride emissions to the California Air Resources Board. DWR's sulfur hexafluoride emissions were below the maximum allowable limit; however, because the allowable limit will be lower in future years, DWR will continue to implement plans to further reduce its sulfur hexafluoride emissions. DWR also reported its 2015 greenhouse gas (GHG) emissions to The Climate Registry and submitted its fossil fuel report for 2015 to the Governor's Office.

To meet its contractual obligation for the Lodi Energy Center's (LEC's) Cap and Trade program compliance cost, DWR continued participating in allowance auctions conducted jointly by the California Air Resources Board and Québec's Ministry of Sustainable Development, Environment and the Fight against Climate Change.

Hydropower License Planning and Compliance

DWR holds three hydropower licenses and two conduit exemptions issued by FERC: Oroville Facilities, FERC Project No. 2100; South SWP Hydropower, FERC Project No. 2426; Pine Flat Transmission Line, FERC Project No. 2876; Alamo Powerplant Project, FERC Project No. 14579; and Mojave Siphon Powerplant Project, FERC Project No. 14580. FERC licenses and conduit exemptions may contain terms and conditions related to operations, maintenance, engineering, dam safety, security, environmental and cultural resources, recreation, and public safety. FERC also conducts safety, security, and environmental inspections, and DWR is required to comply with all findings of the inspections. Compliance with FERC requirements is an important function of

DWR organizations since FERC has the authority to levy fines for noncompliance. FERC also considers the record of compliance when considering the conditions of license renewals.

Oroville Facilities Relicensing

On January 26, 2005, DWR filed an application with FERC requesting a new license for the Oroville Facilities. (More detailed information about the relicensing process is available in previous editions of Bulletin 132.) The existing 50-year license expired January 31, 2007; FERC is issuing annual licenses under the same terms and conditions as the expired license until the new license is issued. Issuance of the new license had been delayed pending issuance of the National Marine Fisheries Service (NOAA Fisheries) biological opinion, which was completed and filed with FERC on December 5, 2016. With the filing of the NOAA Fisheries biological opinion, FERC now has all required documentation to issue a new license which is anticipated in 2018.

The Habitat Expansion Agreement (HEA) submitted by DWR and PG&E to NOAA Fisheries for Central Valley salmon and steelhead in 2010 required preparation of a Habitat Expansion Plan (HEP) (completed in 2010 with NOAA Fisheries consultation initiated in 2012) and annual reporting of activities undertaken to implement the HEA. On January 9, 2014, NOAA Fisheries provided DWR and PG&E with a letter explaining the bases for its determination that the measures contained in the HEP would not fulfill the fish enhancement goals of the HEA. On July 18, 2016, DWR submitted an annual report describing the activities of the previous 12 months toward implementing the HEA. On September 8, 2016, DWR and PG&E jointly submitted a letter in response to NOAA Fisheries disagreeing with NOAA Fisheries' earlier determination and providing additional clarification of the reasons the HEP would fulfill the fish enhancement objectives of the HEA. The letter also requested NOAA Fisheries work with DWR and PG&E to identify a mutually acceptable fish expert to independently evaluate the effectiveness of the proposed HEP measures toward achieving HEA fish enhancement goals. The SWP water contractors submitted a letter to NOAA Fisheries on September 19, 2016 expressing concurrence with the conclusions of the DWR and PG&E letter.

South SWP Hydropower

The existing FERC license for South SWP Hydropower covers the Warne, Castaic, and Devil Canyon Powerplants and expires on January 31, 2022.

In 2015, DWR initiated an extensive information gathering effort for the pre-application document for the FERC relicensing of South SWP Hydropower. As a part of this effort, on July 8, 2015, DWR mailed a notice and a questionnaire to agencies and potential stakeholders who may have an interest in the relicensing process. The questionnaire solicited information pertaining to the existing environment and potential effects of continued operation and maintenance of the South SWP Hydropower facilities. This information will be included in the preliminary application document (PAD). The PAD and notice of intent for relicensing are due to FERC by January 31, 2017.

On August 1, 2016, two PADs and notices of intent were filed with FERC for the relicensing of South SWP Hydropower. One PAD/notice of intent was filed on behalf of the Department of Water Resources (DWR) and the Los Angeles Department of Water and Power (LADWP) for the relicensing of Warne and Castaic Powerplants. Another PAD/notice of intent was filed on behalf of DWR for the relicensing of Devil Canyon Powerplant. With the August 1 submission of the Devil Canyon Project PAD, DWR also requested FERC's approval to use

the Traditional License Process in lieu of the Integrated Licensing Process, which is FERC's default relicensing process. DWR and LADWP will use the Traditional License Process process for the South SWP Hydropower relicensing.

Also on August 1, 2016, DWR submitted a Demand Analysis for Hardluck Campground Replacement to FERC. The Hardluck Campground was previously a recreational facility under the FERC license for South SWP Hydropower; however the facility has been closed since 2008 for protection of the federally listed, endangered Arroyo Toad. A FERC Order issued December 11, 2015 removed the facility from the license and required DWR to complete a demand analysis in consultation with the United States Forest Service to determine whether there is sufficient demand for a replacement. The analysis report concludes there is not sufficient demand to warrant development of a new campground. FERC will review the report and issue a determination on whether it agrees with the conclusion and if further action by DWR is needed.

On September 30, 2016, FERC issued a scoping document and notice to proceed for the South SWP Hydropower relicensing. Also on September 30, FERC issued a notice to proceed and approved DWR's request to use the Traditional License Process for the Devil Canyon Project relicensing.

DWR held the required site visit and joint agency and public meetings for the Devil Canyon Project relicensing on October 25 and 26, 2016, respectively, to allow all interested agencies and stakeholders an opportunity to discuss the information presented in DWR's PAD and data and studies to be developed by DWR, and express their views regarding resource issues that should be addressed in DWR's application for a new license.

FERC held the required environmental site review and scoping meetings for the South SWP Hydropower relicensing effort on November 2 and 3, 2016, respectively, to allow all interested agencies and stakeholders to assist FERC in identifying the scope of environmental issues to be analyzed in FERC's National Environmental Policy Act document.

Upon completion of the relicensing effort, FERC will issue one new license to DWR for the Devil Canyon Powerplant, to be assigned the name and number Devil Canyon Project, FERC Project No. 14797, and one new license to DWR and LADWP as co-licensees for the Warne and Castaic Powerplants which will retain the name and number South SWP Hydropower, Project No. 2426.

Existing SWP Power Facilities

Figure 10-1 shows the names, locations, and nameplate capacities of DWR's primary power facilities.

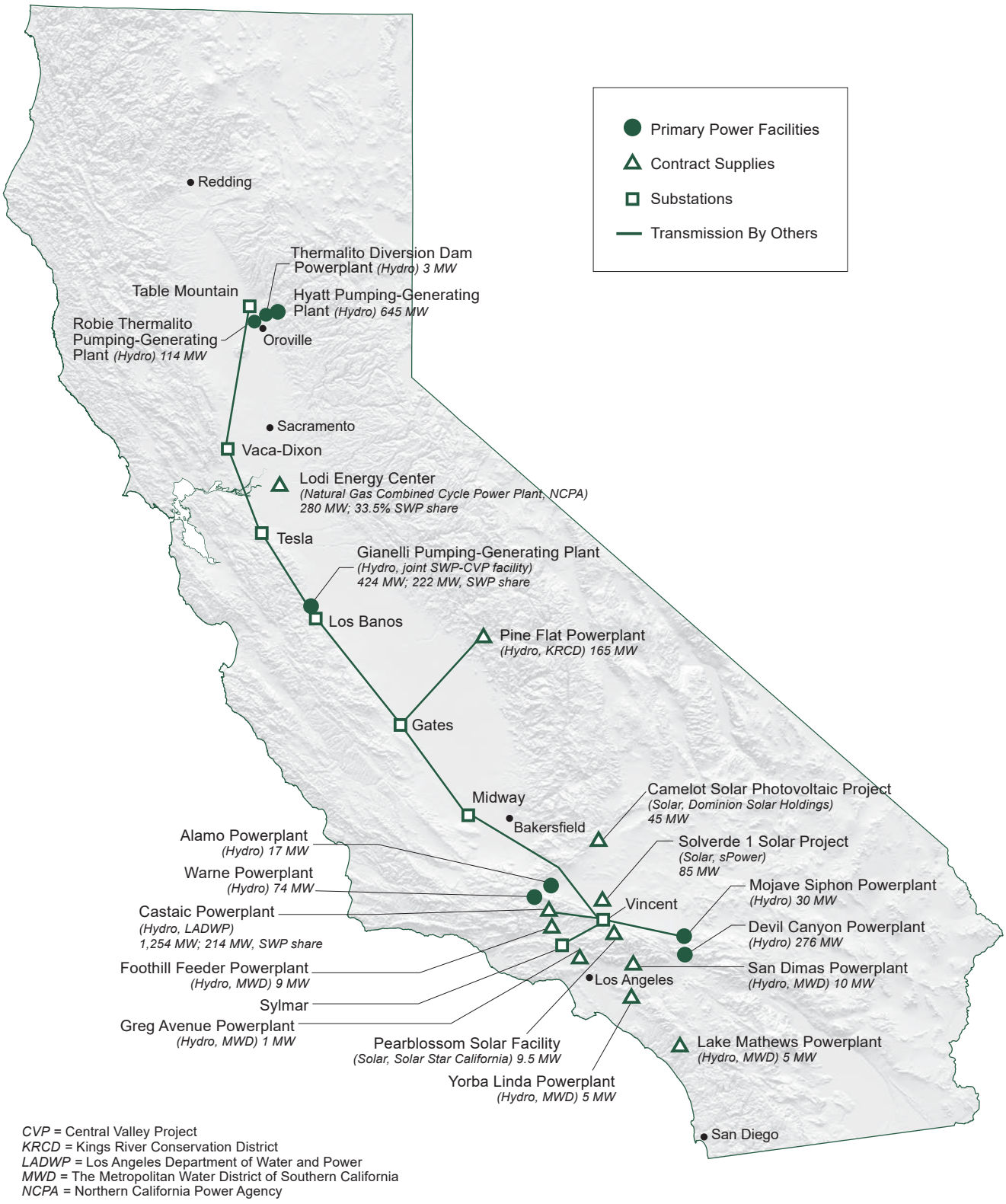
Hydroelectric

Hydroelectric generation provides the largest share of SWP power resources. The combined Hyatt Pumping-Generating Plant and Robie Thermalito Pumping-Generating Plant (Hyatt-Thermalito) generate about 2.2 billion kilowatt hours (kWh) of energy in a median water year, while the 3 megawatts (MW) from the Thermalito Diversion Dam Powerplant add another 24 million kWh per year.

Generation at California Aqueduct recovery plants—Alamo, Devil Canyon, Gianelli, Mojave Siphon, and Warne—varies with the amount of water conveyed. These five plants generate about one-sixth of the total energy used by the SWP.

Renewables

On December 20, 2016, sPower's Solverde 1 project commenced commercial operation.



CVP = Central Valley Project
KRCD = Kings River Conservation District
LADWP = Los Angeles Department of Water and Power
MWD = The Metropolitan Water District of Southern California
NCPA = Northern California Power Agency

Figure 10-1 Names, Locations, and Nameplate Capacities of Primary Long-term Power Facilities

The 85 MW solar farm is located in the City of Lancaster, California, in northern Los Angeles County. sPower installed more than 30,000 solar photovoltaic modules, and the project is expected to deliver approximately 230,000 MWh (megawatt hour) of annual renewable generation.

Solar Star California XLIV, LLC constructed the 9.5 MW Pearblossom Solar Facility adjacent to the DWR Pearblossom Pumping Plant in Pearblossom, California. The project began commercial operation on December 29, 2016. DWR will receive all of the energy and associated renewable energy credits from the facility. The plant is expected to deliver approximately 27,400 MWh of annual generation.

DWR Power Planning Activities

DWR does long-term power planning for the SWP through periodic development of an Integrated Resource Plan (IRP). The IRP concludes with plans for long-term and mid-term power procurements necessary to provide power to operate the SWP and ensures rate stability through energy market disruptions. IRP 2013 will be succeeded by IRP 2016; development of the new IRP began in the fall of 2015 and is expected to be completed in spring 2018. The IRP 2016 will look at current and future SWP operational scenarios, the corresponding power portfolio needs, and uncertainties. It will also make recommendations related to the quantity, timing, and energy products that should be utilized to protect against energy market volatility.

DWR completed a power planning study in 2011 of the economic viability of a second unit at the Alamo Powerplant, which would be a qualified renewable small hydroelectric facility. The project was shown to provide substantial energy and GHG emission reduction benefits to DWR. Following the power planning study, DWR initiated a design study in 2012 to determine whether a surge chamber would be required and to finalize the project cost estimates. Efforts are currently being made to secure funding for the project and to proceed with implementation.

In May 2012, DWR's California Environmental Quality Act Climate Change Committee oversaw the completion of DWR's Climate Action Plan Phase I: GHG Emissions Reduction Plan that established DWR's overall GHG emissions strategy. Climate Action Plan Phase I assesses GHG emissions from on-going activities, sets goals for GHG reductions that will exceed State GHG mandates, and presents plans for how emissions reductions will be achieved. It memorialized the previously approved SWP Renewable Energy Procurement Plan, which had been completed in February 2010, as the method to achieve the SWP's Climate Action Plan Phase I emission reduction goals. DWR initiated renewable energy procurements in late 2012 and 2013 in accordance with the Climate Action Plan Phase I and Renewable Energy Procurement Plan.

Contractual Resource Arrangements

Through joint development, DWR obtains a significant amount of capacity and energy for SWP operations from other utilities throughout California and the Southwest. However, with the implementation of the CAISO Market Redesign and Technology Upgrade in April 2009, and implementation of CAISO's power markets that provide access to affordable day-ahead and real-time energy, DWR is less reliant on marketers and other utilities to meet its net energy needs.

Joint Developments

In 1966, DWR entered into a contract with LADWP for joint development of the West Branch of the California Aqueduct. LADWP constructed and operates Castaic Powerplant, which is a pumped-storage facility connected to the LADWP transmission system at the Sylmar

Substation. DWR receives capacity and energy at the Sylmar Substation based on weekly water schedules through the West Branch.

Gianelli Pumping-Generating Plant is a joint-use facility owned and operated by DWR and the Bureau of Reclamation. DWR's share is 222 MW, and the Bureau of Reclamation's share is 202 MW.

Long-term Purchase Agreements

In 1979, DWR entered into a contract with Kings River Conservation District to receive the output of the 165 MW hydroelectric Pine Flat Powerplant. The power plant supplies the SWP with about 400,000 MWh of energy in median water years.

DWR also contracts for the energy output of five hydroelectric plants totaling 30 MW owned and operated by The Metropolitan Water District of Southern California (Metropolitan).

In May 2010, DWR entered into an agreement with the Northern California Power Agency (NCPA) and various public agencies to finance, construct, operate, and maintain the Lodi Energy Center (LEC)—a 280 MW natural gas combined cycle combustion turbine generation facility that NCPA would own and operate, and from which DWR would receive 33.5 percent of the output. The facility achieved its commercial operation date on November 27, 2012.

In an effort to add "green" generating resources to the SWP's energy portfolio, DWR entered into a renewable Power Purchase Agreement with Alameda Municipal Power that started in 2012. The contract provides certified renewable energy, with 28.3 MW from an existing geothermal project and 5.3 MW from landfill gas energy. Under this agreement, DWR receives an estimated 183,000 MWh of annual generation. The geothermal plants are owned and operated by NCPA and are located at The Geysers geothermal field in Middletown, California. The landfill gas energy under the new contract will come from the Republic Services Ox Mountain Landfill gas-to-energy plant in Half Moon Bay, California. The plant is owned and operated by a subsidiary of Ameresco, Inc. Landfill gas is created when organic waste decomposes, producing methane—the primary ingredient in natural gas and a GHG. The contract with Alameda Municipal Power helps DWR meet its goal of reducing emissions by 50 percent below 1990 levels by 2020. The agreement term is October 15, 2012, through December 31, 2016.

On March 13, 2014, DWR executed a consent and amendment agreement with RE Columbia and RE Camelot transferring the RE Columbia generation facility to RE Camelot. Under a 20-year power purchase agreement through 2034, the 45 MW plant is expected to deliver approximately 124,000 MWh of annual generation.

On October 19, 2015, a 20-year power purchase agreement, with an optional 10-year extension, was executed between DWR and Solar Star California XLIV, LLC. Under the purchase agreement solar photovoltaic renewable energy will be provided from the Pearblossom Solar Facility, located adjacent to the Pearblossom pumping facility. DWR will receive approximately 24,700 MWh of annual generation from the Pearblossom Solar facility.

On November 5, 2015, DWR executed a 20-year power purchase agreement, through 2036, with Solverde 1 for solar photovoltaic renewable energy. The 85 MW plant is expected to deliver approximately 230,000 MWh of annual generation.

On December 16, 2015, DWR executed a WSPP agreement with Metropolitan for the purchase of 51.4 MW of capacity and renewable energy credits bundled with energy. The contract provides certified renewable energy from five small hydro plants, owned and operated by Metropolitan. Under this agreement, DWR will receive an estimated 54,574 MWh of annual energy and renewable energy credits. The agreement term is January 1, 2016, through December 31, 2020.

The renewable energy procured under these agreements will further increase the amount of renewable and zero GHG emission energy used by the SWP and will help DWR meet its 2020 GHG reduction goals.

Short-term Purchase Agreements

DWR typically transacts with member utilities and energy marketers of the WSPP. In 2016, these transactions included energy and capacity to meet the requirements of resource adequacy, which is a planning and procurement process to ensure adequate resources.

In addition to transactions under the WSPP master agreement, DWR can purchase surplus energy from Metropolitan's Colorado River Aqueduct system according to the terms of the 1988 coordination agreement between DWR and Metropolitan. This agreement also provides for monthly surplus firm and economy energy sales from DWR to Metropolitan and energy exchanges between DWR and Metropolitan.

Load Management

DWR operates its pumps through an extensive computerized network. This control system, coupled with the operating flexibility of DWR's pumping and generating plants provided by storage reservoirs, allows DWR to maximize pumping during periods when power costs are lower and maximize power generation when power costs are higher. By taking advantage of this scheduling flexibility, when not restricted by operating requirements, SWP pump load and generation are optimized to reduce the net cost of power needed for SWP water deliveries.

Demand Response

DWR is the largest single supplier of demand response in the CAISO market via a participating load agreement under which DWR bids SWP load to be curtailed by CAISO when the price of energy in the CAISO market reaches DWR's bid price. Due to DWR's water delivery priority, these bids are normally restricted to contingency events.

Contractual Transmission Agreements

DWR has contracts with CAISO, PG&E, and Southern California Edison (SCE) for transmission interconnection and network transmission service for SWP power resources and pumping loads. Recent historical information on contractual transmission agreements is briefly discussed in the sidebar, Contractual Transmission Agreements. More detailed information about past contractual transmission agreements is available in previous editions of Bulletin 132.

In Southern California, DWR receives transmission service for SWP loads and resources through CAISO, and DWR has interconnection agreements with SCE. Additionally, DWR has wholesale distribution service agreements with SCE for service over SCE's distribution system from the CAISO interchange points to SWP loads and resources.

In 2016, DWR and SCE continued coordinating the engineering, design, and construction of the new interconnection facilities for Citrus, located in San Bernardino County. Clementine Substation, the SCE interconnection facility for Citrus, achieved

Contractual Transmission Agreements

The Pacific Gas & Electric Company (PG&E)-Department of Water Resources (DWR) Comprehensive Agreement (The Comprehensive Agreement—a bilateral transmission agreement with PG&E entered into in 1983 that covered transmission service, interconnection service, and other services—expired on December 31, 2014.

With the termination of the Comprehensive Agreement, all transmission service for DWR facilities in Northern and Central California transitioned to open-access transmission service under the California Independent System Operator's tariff. For continuation of interconnection service, DWR entered into a successor load interconnection agreement, generation interconnection agreements, and transmission facilities agreements, effective January 1, 2015.

Interconnection services for Pine Flat Powerplant are managed under a separate letter agreement with PG&E that does not expire until 2029. The letter agreement was revised, effective January 1, 2015, to remove references to the Comprehensive Agreement and other outdated provisions for consistency with current accepted practices.

The DWR/PG&E Midway-Wheeler Ridge Transmission System agreement was revised in November 2015 to remove references to the Comprehensive Agreement and to reflect transmission service is provided under the California Independent System Operator.

With the termination of the Comprehensive Agreement, DWR's historic participation in PG&E's remedial action system, which allowed PG&E to shed DWR load under certain conditions, was also terminated. Under the new load interconnection agreement, DWR agreed to continue using the remedial action system equipment for an interim period at a limited group of facilities to provide load shed only in the event of a triple line outage of the California-Oregon Intertie 500 kV transmission lines. DWR load shed in this scenario supports the Southern Island Load Tripping Plan and is in exchange for PG&E covering underfrequency load shedding requirements associated with SWP load under the Western Electricity Coordinating Council's coordinated plan.

commercial operation in May 2016. Citrus is expected to achieve commercial operation in early 2017.

In April 2016, DWR and SCE executed a new wholesale distribution service agreement for the provision of electric service for Citrus over SCE's distribution network. In December 2016, DWR and SCE executed an amendment to the Citrus Interconnection Facilities Agreement to true up the actual interconnection facilities' costs which yielded a reduction in the monthly interconnection facilities charge.

SWP Power Operations in 2016

Tables 10-1 through 10-4, at the end of the chapter, present historical information about SWP power operations for calendar year 2016, including energy consumed, generated, purchased, and sold. Note that in

some instances, these tables may not sum as expected due to rounding.

Energy Consumed

In 2016, energy used for SWP operations at the 29 SWP pumping and generating plants totaled 6.60 million MWh. According to the terms and conditions of various water conveyance contracts and exchange agreements, some water belonging to the Central Valley Project is pumped through Banks and Dos Amigos pumping plants and Gianelli Pumping-Generating Plant. The Bureau of Reclamation furnishes additional energy for this purpose.

Table 10-1 shows the amount of energy used each month at SWP pumping and power generating plants to operate the SWP in 2016.

Energy Generated and Purchased

Table 10-2 shows the amounts of energy generated at SWP facilities in 2016, as well as energy purchased for SWP operations.

Hydroelectric and Natural Gas

The Hyatt-Thermalito power complex in Oroville generated 1,711,581 MWh of energy in 2016.

Energy generated at SWP aqueduct recovery plants—Gianelli, Alamo, Mojave Siphon, Devil Canyon, and Warne—totaled 1,363,637 MWh.

The SWP received generation from the LEC. SWP's 33.5 percent share of the LEC's energy output for 2016 was 177,959 MWh.

Contractual Resource Arrangements in 2016

SWP power operations rely on contractual arrangements as well as SWP facilities. These contractual arrangements include joint development projects and energy purchases.

Joint Developments

Through the *West Branch Cooperative Development Agreement* with LADWP, DWR receives energy based on the amount of water scheduled through the West Branch. In 2016, LADWP provided 460,130 MWh for DWR's share of energy generated at Castaic Powerplant.

DWR's share of Gianelli Pumping-Generating Plant used 231,355 MWh and generated 86,712 MWh of energy in 2016.

Purchases and Costs

Table 10-3 shows the amounts of energy, transmission, and other services purchased in 2016. Amounts include contractual short-term and long-term energy trades and associated transactions of energy, transmission, capacity, and ancillary services with CAISO, and miscellaneous energy-related costs.

DWR transacted 2.60 million MWh of energy at a cost of $93.64 million. Other SWP-related costs include $4.17 million for transmission service outside CAISO and $188.12 million for operation, maintenance, and miscellaneous CAISO charges, among other things. Key costs associated with the latter amount are (1) $4.33 million for debt service and $3.70 million for operations and maintenance, both related to Pine Flat Powerplant; (2) $9.59 million for debt service and $6.79 million for capital improvement, management, operations, and maintenance, all connected to LEC. The $4.17 million for transmission service outside CAISO includes $0.42 million for PG&E, $2.66 million for SCE, and a total of $1.09 million related to LADWP and NCPA.

Long-term Purchase Agreements. According to terms of the Kings River Conservation District contract, DWR receives the total output of the 165 MW Pine Flat Powerplant. In 2016, the power plant provided

238,381 MWh of energy to the SWP at an energy component cost of $1.81 million.

Under the Metropolitan Small Hydro contract, DWR purchased 107,077 MWh of energy in 2016 from four small hydroelectric power plants on the Metropolitan system at a cost of $6.12 million.

Also, under the LEC Power Sales Agreement with NCPA, DWR received a purchase credit of $7.21 million based on 177,959 MWh generated at the LEC plant during 2016 and conveyed to the CAISO power grid. This amount is shown in Table 10-4.

Lastly, under renewable energy contracts with Alameda Municipal Power; RE Camelot, LLC; Metropolitan; and Solar Star California XLIV, LLC, DWR received a total of 377,620 MWh at a cost of $15.40 million.

Short-term Energy Purchase Agreements. Existing resources and long-term power and transmission contracts ensure that the SWP has enough power to meet long-term needs.

When SWP power requirements exceed resources during daily operations, short-term purchases make up the difference. In 2016, the SWP purchased 1.70 million MWh of short-term energy under the WSPP agreement from four WSPP marketers at a cost of $65 million. These purchases are reflected in Table 10-3.

Contractual Sales of Excess Power

In 2016, DWR received $75.26 million in energy revenues. This includes (1) $30.11 million connected to bilateral trades and $22.73 million for ancillary service transactions, both made through CAISO and (2) $22.40 million associated with long-term contracts, including among other things, $7.21 million related to the LEC Power Sales Agreement with NCPA. It also includes $562,440 for CAISO pass-through revenues collected from the U.S. Department of Energy, Western Area Power Administration, in accordance with a contract executed June 27, 2012, with DWR for CAISO scheduling coordinator services. Under the terms of this contract, DWR acts as a scheduling coordinator for the joint-use facilities of the San Luis Unit and certain DWR pumping facilities occasionally used to pump federal water.

Under this contract, CAISO associated costs are paid by DWR to Western Area Administration. Those costs are included in Table 10-3. See Table 10-4 for information about energy and other services sold and revenue received.

Forecasting Power Operations

Each year, after reviewing the SWP water contractors' water delivery requests and the construction schedule for future facilities, DWR forecasts the associated energy consumption and generation through 2035. Short-term power requirements, based on actual water supply and reservoir storage levels, are determined for the current and two ensuing years of operation. Long-term operational studies for the remaining years are based on median-year water supply conditions and optimal reservoir storage levels. The forecast also includes losses in reservoirs and aqueducts, recreation water, and water to replace storage in reservoirs south of the Delta.

Actual SWP power requirements may vary significantly from the forecast amounts. Those variations are due to the amount of water available and delivered in a given year. For example, dry conditions in Northern California could result in a reduction in the amount of water available for delivery and for generation. If full deliveries could not be made, less power would be used. Power requirements could also decrease during

Table 10-1 Energy Used at Pumping Plants and Power Plants in 2016, by Month (megawatt-hours)

Pumping Plants and Power Plants	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Hyatt-Thermalito Power Complex (station service)	6	12	5	1	0	0	0	0	0	366	320	5	715
North Bay Interim Pumping Plant	0	0	0	0	0	0	0	0	0	0	0	0	0
Cordelia Pumping Plant	463	431	22	270	1,147	1,586	1,149	916	771	794	786	694	9,029
Barker Slough Pumping Plant	183	176	12	101	570	903	1,082	905	773	671	461	320	6,156
South Bay Pumping Plant	4,578	5,226	3,944	7,927	9,932	12,884	13,431	14,975	13,250	6,743	1,636	1,701	96,228
Del Valle Pumping Plant	14	13	13	59	64	8	7	8	7	11	11	11	226
Banks Pumping Plant	38,314	34,446	45,267	12,383	16,161	54,068	101,090	120,014	91,438	48,185	81,327	85,053	727,746
Gianelli Pumping-Generating Plant (SWP share)	25,341	20,110	20,473	314	131	87	256	20,735	29,341	9,610	47,247	57,708	231,355
Dos Amigos Pumping Plant (SWP share)	2,522	5,732	12,517	16,611	33,742	42,196	42,800	36,928	21,895	22,990	13,935	12,772	264,639
Buena Vista Pumping Plant	2,249	2,669	30,525	30,770	43,406	45,493	44,940	40,953	33,904	33,487	19,042	18,260	345,698
Teerink Pumping Plant	5,843	4,918	34,995	35,215	44,953	46,708	45,343	42,261	36,483	36,061	20,996	20,402	374,179
Chrisman Pumping Plant	12,771	10,891	77,996	78,297	99,940	100,337	98,345	91,883	80,430	80,591	47,110	45,458	824,049
Edmonston Pumping Plant	45,524	37,789	282,843	283,292	359,790	355,852	349,101	325,595	286,348	287,732	167,149	164,103	2,945,119
Alamo Powerplant (station service)	37	29	16	25	18	2	1	0	0	28	1	13	172
Pearblossom Pumping Plant	5,447	8,240	22,750	39,756	50,455	54,502	71,746	72,334	65,544	48,715	41,489	25,062	506,039
Pine Flat Powerplant (station service)[a]	246	187	236	0	0	0	0	0	50	177	86	245	1,227
Mojave Siphon Powerplant (station service)	66	64	21	1	1	3	1	0	25	20	2	21	225
Devil Canyon Powerplant (station service)	236	154	33	13	0	0	0	0	1	71	2	21	531
Oso Pumping Plant	3,197	1,046	23,873	15,759	20,647	19,202	10,776	8,274	6,997	14,137	2,523	9,118	135,548
Warne Powerplant (station service)	346	178	30	177	1	3	364	517	445	148	198	125	2,531
Las Perillas Pumping Plant	165	394	572	745	1,127	1,552	1,776	1,463	998	635	241	202	9,870
Badger Hill Pumping Plant	420	1,029	1,509	1,858	2,752	3,794	4,200	3,651	2,484	1,580	614	523	24,414
Devil's Den Pumping Plant	1,028	988	1,249	1,679	2,158	2,215	2,411	2,385	2,221	2,206	1,900	1,819	22,259
Bluestone Pumping Plant	958	918	1,162	1,554	2,030	2,081	2,261	2,235	2,082	2,060	1,779	1,703	20,823
Polonio Pass Pumping Plant	1,043	997	1,265	1,690	2,176	2,218	2,407	2,372	2,221	2,201	1,898	1,829	22,316
Greenspot Pump Station	59	59	320	1,092	1,397	1,735	1,721	1,757	1,515	1,969	2,030	1,567	15,221
Crafton Hills Pump Station	12	0	368	1,432	1,764	1,814	1,695	1,896	1,628	2,003	2,018	1,822	16,454
Cherry Valley Pump Station	13	0	9	83	109	116	96	127	121	139	133	165	1,113
Total Energy Required for the SWP[b]	**151,083**	**136,699**	**562,029**	**531,106**	**694,472**	**749,359**	**796,996**	**792,183**	**680,973**	**603,328**	**454,934**	**450,720**	**6,603,883**

[a] Pine Flat station service energy provided by CAISO under Market Redesign and Technology Upgrade (MRTU) operation.
[b] Totals may not sum as expected due to rounding.

Table 10-2 Energy Generated and Purchased in 2016, by Month (megawatt-hours)

Sources of Energy	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
SWP Energy Sources													
Hyatt-Thermalito Power Complex	10,771	13,972	25,965	43,031	194,519	253,250	413,119	309,387	157,012	108,746	105,581	76,229	1,711,581
Gianelli Pumping-Generating Plant (SWP share)	0	0	0	18,126	37,321	21,409	9,196	0	0	659	0	0	86,712
Alamo Powerplant	824	1,199	4,306	2,745	5,899	8,296	9,357	9,768	8,107	4,994	6,873	3,890	66,259
Mojave Siphon Powerplant	289	782	2,485	4,546	5,541	5,936	7,759	8,308	5,540	4,606	4,582	2,675	53,051
Devil Canyon Powerplant	7,855	21,074	33,721	72,151	85,542	97,768	120,474	129,655	111,195	87,419	60,223	47,420	874,496
Warne Powerplant	5,204	1,751	51,058	32,583	44,431	41,431	22,385	16,791	14,410	28,641	5,469	18,965	283,120
Subtotal	*24,943*	*38,778*	*117,356*	*173,182*	*373,254*	*428,089*	*582,290*	*473,909*	*296,265*	*235,066*	*182,728*	*149,178*	*3,075,218*
Energy Sources from Long-term Agreements													
Castaic Powerplant	6,655	2,734	81,297	51,723	69,859	67,555	37,009	28,215	23,009	52,031	9,309	30,734	460,130
Metropolitan Small Hydro Generation	2,766	1,273	6,484	3,572	4,464	7,681	15,813	14,409	13,982	13,453	13,786	9,394	107,077
Pine Flat Powerplant (Kings River Conservation District)	0	0	46	9,222	39,833	84,857	79,656	20,298	4,469	0	0	0	238,381
Energy to Metropolitan for CRA[a] Pumping	0	0	0	0	0	0	0	0	0	0	0	0	0
Energy from Metropolitan for CRA[a]	0	0	0	0	0	0	0	0	0	0	0	0	0
Lodi Energy Center	32,572	9,099	30,679	15,221	1,147	22,310	25,463	10,604	8,575	6,913	5,858	9,520	177,959
Renewable Energy[b]	25,064	29,487	30,947	29,821	35,663	35,748	36,492	33,741	32,109	31,790	27,313	29,446	377,620
Purchases													
Purchases (Firm and WSPP Contracts)	146,200	125,800	163,275	129,200	146,200	129,200	146,200	163,800	136,000	139,400	136,425	139,400	1,701,100
CAISO Energy[c]	(54,547)	(51,372)	170,220	141,985	53,800	128,629	9,537	133,411	205,140	131,589	85,373	92,569	1,046,334
Subtotal	*158,712*	*117,020*	*482,947*	*380,744*	*350,965*	*475,979*	*350,170*	*404,478*	*423,283*	*375,176*	*278,064*	*311,062*	*4,108,601*
Total Resources	183,655	155,798	600,483	553,927	724,219	904,068	932,459	878,387	719,548	610,241	460,792	460,240	7,183,819
Less Energy Sales[d]	(32,572)	(19,099)	(38,454)	(22,821)	(29,747)	(154,710)	(135,463)	(86,204)	(38,575)	(6,913)	(5,858)	(9,520)	(579,934)
Total Energy Provided to the SWP[d,e]	**151,083**	**136,699**	**562,029**	**531,106**	**694,472**	**749,359**	**796,996**	**792,183**	**680,973**	**603,328**	**454,934**	**450,720**	**6,603,883**

[a] Contractual Resource Arrangement (CRA).
[b] Alameda Municipal Power, RE Camelot LLC, Solar Star California XLIV LLC, The Metropolitan Water District of Southern California, and Solverde 1 LLC.
[c] Energy provided by CAISO for balancing the total SWP loads and resources.
[d] Under the Lodi Energy Center Power Sales Agreement, 177,959 MWh was received as a purchase credit; the remaining 401,975 MWh was traded bilaterally with energy marketers. See Table 10-4.
[e] Totals may not sum as expected due to rounding.

Table 10-3 Energy, Transmission, and Related Costs in 2016

Category	Energy Trades (MWh)	Energy Cost (in dollars)	Transmission Cost Outside CAISO (in dollars)	Energy-Related Costs (in dollars)	Total Cost (in dollars)
CAISO–Bilateral Trades		1,302,963			1,302,963
CAISO–Other[a]				162,274,902	162,274,902
Energy Marketers–Bilaterals (WSPP)	1,701,100	65,001,304		160,890	65,162,194
Long-term Contracts[b]	523,417[c]	11,935,802	4,171,995	25,680,391	41,788,188
Long-term Energy Markets–Renewable Energy[d]	132,871	8,026,072			8,026,072
Long-term Energy Markets–Renewable Energy (WSPP)[e]	244,749	7,375,379			7,375,379
Total	**2,602,137**	**93,641,519**	**4,171,995**	**188,116,183**	**285,929,697**

[a] Transmission, capacity, imbalance energy, etc.
[b] California Power Exchange, Kings River Conservation District, Los Angeles Department of Water and Power, The Metropolitan Water District of Southern California, Northern California Power Agency, Pacific Gas & Electric Company, Southern California Edison, and Western Area Power Administration.
[c] Includes 177,959 MWh generated at the Lodi Energy Center.
[d] RE Columbia, LLC; and Solar Star California, XLIV, LCC.
[e] Alameda Municipal Power and Metropolitan.

Table 10-4 Energy and Energy-related Revenue in 2016 per Contract Agreements

Category	Energy Trades (MWh)	Energy Revenues (in dollars)	Other Energy-related Revenue (in dollars)	Total Revenues (in dollars)
CAISO–Bilateral Trades		30,112,773		30,112,773
CAISO–Other[a]			22,730,084	22,730,084
Energy Marketers–Bilaterals (WSPP)	401,975	12,014,598		12,014,598
Long-term Contracts[b]	177,959[c]	7,209,245	3,189,876	10,399,121
Total	**579,934**	**49,336,616**	**25,919,960**	**75,256,576**

[a] Transmission, capacity, imbalance energy, etc.
[b] Los Angeles Department of Water and Power, Northern California Power Agency, City of Santa Clara, and Western Area Power Administration.
[c] All from Northern California Power Agency's Lodi Energy Center.

a wet year because of the availability of local water in the San Joaquin Valley or Southern California.

Conversely, power requirements could exceed the amount originally forecast if actual water deliveries are greater than the amounts estimated. For example, if additional pumping is needed to refill reservoirs south of the Delta after an unexpectedly dry year, more power would be used.

Chapter 11
Facilities Maintenance

Sunset over Clifton Court Forebay.

Significant Events in 2016

Penstock No. 2 at the Devil Canyon Powerplant complex was dewatered and inspected.

At the San Luis Field Division, the Bureau of Reclamation (Reclamation) conducted Comprehensive Facility Reviews (CFRs) for the Los Banos and Little Panoche detention dams.

A submersible remotely operated vehicle (ROV) inspection of all of Thermalito Afterbay Dam's irrigation outlets was conducted to assess their underwater condition.

A submersible ROV inspection of Thermalito Diversion Dam's penstock No. 2 and penstock No. 3 was conducted to assess their structural condition.

The cement deep soil mixing foundation improvement work at Perris Dam, being conducted as part of the Perris Dam Seismic Remediation Project (Specification No. 14-03), was completed. Work to construct the downstream buttress is ongoing.

In April and May 2016, divers conducted required underwater inspections of the intake and outlet structures at Los Banos and Little Panoche detention dams.

In September 2016, an ROV inspection of the Cedar Springs Dam outlet works intake structure took place.

In November 2016, the Peace Valley Pipeline was dewatered and inspected.

Information for this chapter was provided by the Division of Operations and Maintenance, the Division of Safety of Dams, the Division of Integrated Regional Water Management, and the State Water Project Analysis Office.

The Department of Water Resources (DWR), through the Division of Operations and Maintenance (O&M), monitors all State Water Project (SWP) facilities to ensure safety and reliability. DWR is required, by federal and State law, to contract periodically with independent consultants to review the safety of SWP dams and power facilities.

Inspecting and Maintaining Project Dams

DWR conducts several types of inspections on SWP facilities to ensure that each dam is safe for continued operation. The Dam Safety Branch (DSB), Division of Safety of Dams (DSOD), Federal Energy Regulatory Commission (FERC), and the Bureau of Reclamation (Reclamation) conduct various inspections and safety analyses to ensure the safety of SWP dams.

O&M staff, through the DSB and field divisions, inspect, collect, and analyze data for all SWP dams and appurtenant structures. DSB also conducts performance and instrumentation analyses and prepares annual reports that are distributed to the field divisions for scheduling and maintenance. The reports are also sent to FERC and to DSOD for their review.

In accordance with Division 3 of the California Water Code, DSOD has regulatory authority over jurisdictional dams owned and operated by DWR.

DSOD is responsible for overseeing all design modifications and construction activities on jurisdictional SWP dams. In accordance with the California Code of Regulations, (Title 23, Division 2, Chapter 1, Article 5), DSOD also works to prepare and coordinate the Director's Safety Review Board (DSRB) events that include a periodic evaluation of SWP dam conditions with regard to safety and performance.

Additionally, DSOD engineers inspect SWP dams annually, on a fiscal year basis, to ensure they remain safe, are performing as intended, and are not developing problems. These annual inspections also include in-depth instrumentation review of dam surveillance data. DSOD engineers and geologists evaluate proposed modifications to existing dams, as well as designs for any proposed new jurisdictional dams. DSOD oversees construction activities to ensure work is performed in accordance with approved plans and specifications. DSOD also performs comprehensive independent reevaluations of dams and their appurtenant structures.

FERC inspects all FERC-licensed SWP facilities annually. These inspections include a review of significant events, instrumentation data, and the visual appearance of each dam, penstock, or power plant. Under FERC's requirements, consulting engineers and geologists are retained to evaluate SWP dam facilities every 5 years.

DWR contracts periodically with independent consultants to review the safety of SWP dams and power facilities, except for Pearblossom Spill Basin Dam. Pearblossom Spill Basin Dam was originally designed to be used during misoperation at the Pearblossom Pumping Plant; the spill basin was never fully completed, has never been used, and is not under DSOD jurisdiction.

Routine Inspections

During 2016, DSOD and O&M conducted routine periodic inspections of all SWP dams. These inspections included Antelope, Frenchman, Grizzly Valley, Oroville, Bidwell Canyon Saddle, Parish Camp Saddle, Thermalito Diversion, Thermalito Forebay,

Thermalito Afterbay, and Feather River Fish Barrier dams in the Oroville Field Division; Bethany, Clifton Court Forebay, Del Valle, Dyer, and Patterson dams in the Delta Field Division; and Castaic, Crafton Hills, Crafton Hills Reservoir Enlargement, Pyramid, Quail, Cedar Springs, Devil Canyon Second Afterbay, and Perris dams in the Southern Field Division. Table 11-1 shows SWP dam inspections conducted in 2016.

Joint-use Facility Inspection

The four dams in the San Luis Field Division (Sisk Dam, O'Neill Dam, Los Banos Detention Dam, and Little Panoche Detention Dam) are used jointly with Reclamation and are not under DSOD jurisdiction.

Reclamation conducts Comprehensive Facility Reviews (CFRs) of these joint-use facility dams every 8 years, a change in frequency from every 6 years. The CFRs for Sisk Dam and O'Neill Dam occurred in 2015; the CFRs for the Los Banos and Little Panoche detention dams occurred in 2016.

Periodic Facility Reviews are also conducted by Reclamation every 8 years using an alternate schedule spaced between the CFRs. Periodic Facility Reviews were conducted for the joint-use facilities in 2012. A joint annual inspection of the facilities with Reclamation, DSB, and San Luis Field Division was conducted in September 2016.

Independent Reviews

Director's Safety Review Board

Under California Water Code, Section 6056, DWR is required to retain a consulting board to review: (1) the adequacy of the design of any dam or reservoir DWR proposes to construct; and (2) the safety of the completed construction, including the terms and conditions for the certificate of approval. In accordance with this California Water Code requirement, DWR formed the DSRB.

The DSRB consists of three independent consultants that meet at least once every 5 years to review the operational performance of DWR-owned dams and more frequently when consulting on new dams. The DSRB independently reviews and assesses safety conditions of SWP dams.

DSRB consultants are selected based on their knowledge of geotechnical, structural, and civil engineering, including their experience evaluating dam performance. Their independent assessments include the review of dam performance during earthquakes, evaluation of instrumentation data, inspection of each dam, and evaluation of studies performed by DWR. The DSRB then prepares reports on each dam, approving dams as safe for continued operation and making recommendations. Based on DSRB recommendations, DWR prepares action plans. No DSRB inspections occurred on the SWP in 2016.

FERC Reviews

FERC conducts dam safety inspections in conjunction with O&M on an annual basis for SWP dams under its jurisdiction. Every 5 years, a FERC Part 12D inspection is also conducted. The last Part 12D inspections occurred in 2014. SWP dams under FERC jurisdiction are reviewed under FERC-defined northern section, Project 2100, and southern section, Project 2426. Project 2100 consists of dams associated with Oroville Field Division facilities. Project 2426 dams are associated with Pyramid, Quail, Cedar Springs, and Devil Canyon Second Afterbay facilities.

As a supplement to the FERC Part 12D safety inspection, FERC's Dam Safety Performance Monitoring Program requires that a Potential Failure Mode Analysis (PFMA) be performed for FERC-licensed dams. The PFMA involves document review and site visits to develop a comprehensive list of potential failure modes at each dam. From the FERC review process, two documents are generated: the FERC Part 12D safety inspection report and the PFMA Report. FERC-licensed facilities are also inspected annually by DSB and FERC's dam safety engineer.

Table 11-1 State Water Project Dam Inspections in 2016

Field Division	Facility	Type of Inspection						
		Operations & Maintenance-Dam Safety Branch	Division of Safety of Dams	Federal Energy Regulatory Commission	Bureau of Reclamation Annual Inspection	Bureau of Reclamation 8-Year Comprehensive Facility Review	Director's Safety Review Board	Part 12D 5-Year Review
Oroville								
	Antelope Dam	X	X	-	-	-	-	-
	Frenchman Dam	X	X	-	-	-	-	-
	Grizzly Valley Dam	X	X	-	-	-	-	-
	Oroville Dam	X	X	X	-	-	-	-
	Bidwell Canyon Saddle Dam	X	X	X	-	-	-	-
	Parish Camp Saddle Dam	X	X	X	-	-	-	-
	Thermalito Diversion Dam	X	X	X	-	-	-	-
	Thermalito Forebay Dam	X	X	X	-	-	-	-
	Thermalito Afterbay Dam	X	X	X	-	-	-	-
	Feather River Fish Barrier Dam	X	X	X	-	-	-	-
Delta								
	Bethany Dams	X	X	-	-	-	-	-
	Clifton Court Forebay Dam	X	X	-	-	-	-	-
	Del Valle Dam	X	X	-	-	-	-	-
	Dyer Reservoir	X	X	-	-	-	-	-
	Patterson Dam	X	X	-	-	-	-	-
San Luis								
	Little Panoche Detention Dam	X	N/A	-	X	X	-	-
	Los Banos Detention Dam	X	N/A	-	X	X	-	-
	O'Neill Dam	X	N/A	-	X	-	-	-
	Sisk Dam	X	N/A	-	X	-	-	-
Southern								
	West Branch							
	Castaic Dam	X	X	-	-	-	-	-
	Pyramid Dam	X	X	X	-	-	-	-
	Quail Canal and Dam	X	N/A	X	-	-	-	-
	East Branch							
	Cedar Springs Dam	X	X	X	-	-	-	-
	Devil Canyon Second Afterbay Dam	X	X	X	-	-	-	-
	Perris Dam	X	X	-	-	-	-	-
	Crafton Hills Dam	X	X	-	-	-	-	-
	Crafton Hills Reservoir Enlargement Dam	X	X	-	-	-	-	-

"X" indicates dam inspection was conducted at SWP facility.
"-" indicates dam inspection was not conducted at SWP facility.

Supporting Technical Information Document

The Supporting Technical Information Document is a separate report that summarizes SWP project elements and details that do not change significantly over time. The document is updated as required but is not generated as part of any of the dam safety inspections.

Arroyo Pasajero Program

The Arroyo Pasajero and its tributaries drain approximately 530 square miles of the Diablo Range of the coastal mountains west of the California Aqueduct in Fresno County. Its downstream juncture with the San Luis Canal segment of the California Aqueduct, between Highway 198 and Avenal Cutoff Road, poses a particularly difficult operational and maintenance problem for the SWP. Reclamation designed and constructed the San Luis Canal segment of the California Aqueduct, while DWR operates and maintains it, with all costs shared 45 percent and 55 percent, respectively.

During periods of heavy rainfall, high flows in the Arroyo Pasajero and its tributaries transport heavy sediment loads eroded from the Arroyo Pasajero watershed. Over a vast amount of time, sediment transported by arroyo floods formed a 450-square-mile alluvial fan extending from its apex at the eastern margin of Pleasant Valley (Anticline Ridge) to the San Joaquin Valley trough. The California Aqueduct traverses the arroyo's alluvial fan and forms a barrier to arroyo flood flows. Flood control facilities, designed to accommodate Arroyo Pasajero floodwater, include the West Side Detention Basin (designed to store floodwater and sediment west of the California Aqueduct), an evacuation culvert to release floodwater east of the California Aqueduct, and drain inlets to release floodwater into the California Aqueduct.

Since the floods of 1969, when nearly all of the detention basin's planned 50-year sediment storage capacity was filled by deposition, DWR and Reclamation have worked to mitigate the effects of heavy flooding and the diminished storage capacity of the detention basin. In 1980, asbestos discovered in The Metropolitan Water District of Southern California's water supply was traced to runoff from the Arroyo Pasajero and other Diablo Range streams. This discovery, in conjunction with the high cost of removing sediment from the California Aqueduct, led DWR to adjust operating procedures to minimize runoff entering the California Aqueduct. The volume of runoff and sediment transported by the Arroyo Pasajero is roughly 400 percent greater than was originally estimated during the design of the detention basin in the mid-1960s.

DWR and DWR/Reclamation Alternative Long-term Solution

Construction to restore the storage capacity of the West Side Detention Basin started in August 2004, and many of the designed improvements were completed by the summer of 2005. These improvements restored the storage capacity to the detention basin and added control over releases of floodwater into the California Aqueduct and onto private farmland. The intended 50-year level of protection was achieved by raising levees, adding a control structure equipped with an inflatable rubber dam, installing flood gates, and acquiring flood easements. As of 2016, the basin's flood control features continued to function as expected.

In 2009, DWR signed the certificate of acceptance for the deeds for easements and lands acquired via litigation. The deeds were recorded, and the process to transfer the rights to Reclamation, as required by the joint-use agreement, was initiated. Work to address the transfer documents continued in 2016.

The West Side Detention Basin is an area of interest in the U.S. Environmental Protection Agency (EPA) Atlas Mine Area Operable Unit Record of Decision issued by the EPA in 1991. Five-year reviews of the Atlas Mine Area Operable Unit began in 2001 and have continued every 5 years since. In fall 2010, as a part of the upcoming 2011 review cycle, DWR toured the basin with representatives from the EPA and inspected all of the basin flood control features as well as soil berms, gates, locks, and signs used to deter soil disturbing activities. The EPA released its Five-Year Review Report in August 2011. The report contained various recommendations for DWR to take into consideration while operating the basin. As of 2016, DWR continued its standard operating procedures within the basin to comply with the EPA's Comprehensive Environmental Response Compensation and Liability Act (Superfund law).

Related Activities

In September 2011, the California Department of Transportation informed DWR that it had funding through final design on the proposed bridge project at Lassen Avenue (State Route 269) over Arroyo Pasajero. DWR provided comments on the current project study report in October 2011, which focused on flood control and the ongoing operations and maintenance needs of DWR's field division staff to properly maintain the channel. Throughout 2016, the California Department of Transportation continued to advance the California Environmental Quality Act/National Environmental Policy Act process and design of the project.

Cantua Creek Stream Group

Planning for a restoration project similar to the West Side Detention Basin restoration project began in 2006 for the Cantua Creek Stream Group detention basins. The project's goal is to improve aqueduct flood protection and water quality between Mileposts 128.48 and 141.57.

A feasibility-level study for the Cantua Creek Stream Group Improvements Project, completed in April 2011, identified actions such as raising embankments, making modifications to structures, and acquiring flood easements to provide a 50-year level of protection for the California Aqueduct. Improving water quality in the aqueduct was a significant goal of the study, since currently, several of the existing drain inlets are not gated, and sediment-laden floodwater flows directly into the aqueduct with little detention and decanting. Increasing flood storage and detention of this floodwater prior to releasing it into the California Aqueduct would provide a significant benefit to water quality in the aqueduct.

In 2016, pre-construction processes were completed and construction began in the fall. Exceedingly wet weather conditions prevented the project from being completed in 2016.

Repairs, Modifications, and Inspections

DWR continually monitors all SWP facilities and performs repairs, modifications, and inspections as necessary to ensure safe, reliable water delivery.

Inspections

Condition Assessment Program inspections are scheduled biennially, every 5 years, or every 10 years. Future inspections intend to identify trends in maintenance and aging of the SWP.

In 2016, Condition Assessment Program inspections were performed on 31 different reaches of the SWP along more than 177 miles of canals. To aid in maintenance efforts, check structures, control buildings, compound grounds, roads, culverts, drain inlets, overchutes, turn-ins, turnouts, and utility crossings along the canal were inspected and rated.

Oroville Field Division

There were no Condition Assessment Program inspections completed in the Oroville Field Division during 2016.

The gate connection bolts of Thermalito Afterbay Dam's radial gates were replaced and recoated.

A submersible remotely operated vehicle (ROV) inspection of all the irrigation outlets of the Thermalito Diversion Dam was conducted to assess their underwater conditions.

A submersible ROV inspection of penstock No. 2 and penstock No. 3 at Thermalito Diversion Dam was conducted to assess their structural condition.

Refurbishment efforts continued at the Robie Thermalito Pumping-Generating Plant from the damage that occurred during a fire in November 2012.

Delta Field Division

In the Delta Field Division, 16 overchutes and the Suisun Marsh Facilities were inspected, including the Suisun Marsh Salinity Control Gates, Roaring River Slough Distribution System, Morrow Island Distribution System, and the Goodyear Slough Outfall.

The refurbishment of the Clifton Court Forebay Dam intake structure radial gates was approved in September 2016, and Gate No. 3 was removed for repairs.

San Luis Field Division

In the San Luis Field Division, features along 61 miles of the California Aqueduct were inspected. Two hundred seventy-seven California Aqueduct features were inspected, spanning five repayment reaches and nine aqueduct pools.

In February 2016, Reclamation performed CFRs for the Los Banos and Little Panoche detention dams.

In April and May 2016, underwater inspections of the intake and outlet structures were conducted at Los Banos and Little Panoche detention dams as part of Reclamation's review requirement every 8 years.

In 2016, improvements to the Sisk Dam toe drains were completed. Work began in 2015 and consisted of removing and replacing six weirs, six weir boxes, placing slope protection, and placing stairs for access.

San Joaquin Field Division

In the San Joaquin Field Division, features along 10 miles of the California Aqueduct were inspected. Nine California Aqueduct features were inspected, spanning two repayment reaches and one aqueduct pool.

Southern Field Division

In the Southern Field Division, features along 118 miles of the West and East branches of the California Aqueduct were inspected, including Peace Valley Pipeline, the Angeles Tunnel, Beartrap Road culverts in Tejon Ranch, and gauging stations for Castaic Lake inflow. Five hundred ninety-five California Aqueduct features were inspected, spanning 24 repayment reaches and 37 aqueduct pools.

The Peace Valley Pipeline, located in the West Branch of the Southern Field Division, was dewatered and inspected. The Peace Valley Pipeline is inspected approximately once every 3 years.

The Angeles Tunnel was dewatered and inspected. Minor spall repairs in the tunnel, anode replacement at the gate, and recoating of the gate and portals were completed. The Angeles Tunnel is inspected approximately once every 10 years.

The intake structures for the Angeles Tunnel, Pyramid Lake stream release, and Castaic Lake stream release were inspected by ROV.

In September 2016, an ROV inspection of the Cedar Springs Dam outlet works intake structure took place.

Penstock No. 2 at the Devil Canyon Powerplant complex was dewatered and inspected in October 2016.

In 2016, the cement deep soil mixing foundation improvement work at Perris Dam, being conducted as part of the Perris Dam Seismic Remediation Project (Specification No. 14-03), was completed. Work to construct the downstream buttress is ongoing. The project began in August 2014 and continued in 2016. This work was implemented to upgrade the seismic safety of Perris Dam. The outlet tower and penstock are on a 10-year inspection cycle.

Other Inspections

In addition to the conveyance facilities, 96 bridges and the roofs of eight SWP buildings were inspected as part of a regularly-scheduled maintenance program.

SWP access roads are routinely inspected by staff in each field division as they traverse hundreds of miles of paved and unpaved roadways daily. In addition, development of a Pavement Management System resulted in the inspection of 959 miles of roads (paved and unpaved) and 785,533 square yards of parking lots during 2016. These pavement condition assessments are planned to be completed Statewide every 5 years. Data from this system and staff reports of distressed and problematic areas are used to plan road repair projects.

Outages for Maintenance and Repair of Facilities

Table 11-2 presents information, arranged chronologically, about significant scheduled and unscheduled outages at SWP pumping and power plants in 2016. The table includes information about incidents resulting in outages of 14 days or more.

Table 11-2 Outages for Maintenance and Repair of Facilities in 2016, by Month 1 of 6

Month	Facility	Unit	Outage Description
January	Badger Hill Pumping Plant	3	January 1 to March 22 for inlet valve and pump replacement; continued from December 2, 2015
	Banks Pumping Plant	8	January 1 to January 15 for relay test and instrumentation calibration
	Barker Slough Pumping Plant	7	January 1 to December 31 for excessive vibration and motor trim balancing; continued from July 30, 2014
	Buena Vista Pumping Plant	1	January 12 to February 26 for Condition Assessment Program inspection and brush preventive maintenance
	Buena Vista Pumping Plant	2	January 12 to February 26 for Condition Assessment Program inspection and brush preventive maintenance
	Buena Vista Pumping Plant	3	January 12 to February 26 for Condition Assessment Program inspection and brush preventive maintenance
	Buena Vista Pumping Plant	4	January 11 to February 26 for Condition Assessment Program inspection and brush preventive maintenance
	Buena Vista Pumping Plant	5	January 11 to February 26 for Condition Assessment Program inspection and brush preventive maintenance
	Buena Vista Pumping Plant	6	January 11 to February 26 for Condition Assessment Program inspection and brush preventive maintenance
	Buena Vista Pumping Plant	7	January 12 to February 26 for Condition Assessment Program inspection and brush preventive maintenance
	Buena Vista Pumping Plant	8	January 12 to February 27 for Condition Assessment Program inspection and brush preventive maintenance
	Buena Vista Pumping Plant	9	January 12 to February 27 for Condition Assessment Program inspection and brush preventive maintenance
	Buena Vista Pumping Plant	10	January 12 to February 27 for Condition Assessment Program inspection and brush preventive maintenance
	Cherry Valley Pump Station	1	January 19 to March 30 for programmable logic controller upgrade, and 48 V battery replacement
	Cherry Valley Pump Station	2	January 19 to March 30 for programmable logic controller upgrade, and 48 V battery replacement
	Cherry Valley Pump Station	3	January 19 to March 30 for programmable logic controller upgrade, and 48 V battery replacement
	Chrisman Pumping Plant	4	January 13 to February 4 for transformer winding and insulator test
	Chrisman Pumping Plant	5	January 13 to February 4 for transformer winding and insulator test
	Chrisman Pumping Plant	6	January 13 to February 2 for transformer winding and insulator test
	Chrisman Pumping Plant	7	January 13 to February 2 for transformer winding and insulator test
	Chrisman Pumping Plant	8	January 13 to February 13 for transformer winding and insulator test

Table 11-2 Outages for Maintenance and Repair of Facilities in 2016, by Month 2 of 6

Month	Facility	Unit	Outage Description
	Chrisman Pumping Plant	9	January 13 to February 13 for transformer winding and insulator test
	Crafton Hills Pump Station	1	January 4 to March 7 for switchgear, programmable logic controller, and battery upgrade
	Crafton Hills Pump Station	2	January 4 to March 7 for switchgear, programmable logic controller, and battery upgrade
	Crafton Hills Pump Station	3	January 4 to March 7 for switchgear, programmable logic controller, and battery upgrade
	Crafton Hills Pump Station	4	January 4 to March 7 for switchgear, programmable logic controller, and battery upgrade
	Edmonston Pumping Plant	12	January 4 to February 13 for disconnects 1211 and 1411 replacement
	Edmonston Pumping Plant	14	January 4 to February 13 for disconnects 1211 and 1411 replacement
	Giannelli Pumping-Generating Plant	3	January 1 to December 31 for scroll case inspection and motor rewind; continued from February 27, 2015
	Hyatt Powerplant	1	January 1 to December 31 for river valve operation due to water temperature requirements
	Hyatt Powerplant	2	January 1 to March 29 for river valve operation due to water temperature requirements
	Hyatt Powerplant	4	January 1 to February 22 for low lake level
	Hyatt Powerplant	6	January 1 to February 29 for low lake level
	Mojave Siphon Powerplant	3	January 3 to February 28 for annual Condition Assessment Program inspection
	Oso Pumping Plant	3	January 1 to March 5 for refurbishment, rewinding, and discharge valve work; continued from December 4, 2013
	Oso Pumping Plant	4	January 1 to March 18 for refurbishment, rewinding, and discharge valve work; continued from December 4, 2013
	Pearblossom Pumping Plant	4	January 19 to May 11 for discharge line #2 repairs
	Pearblossom Pumping Plant	5	January 19 to May 6 for discharge line #2 repairs
	Pearblossom Pumping Plant	6	January 1 to May 6 for discharge line #2 repairs
	Pine Flat Powerplant	1	January 1 to April 4 for low lake level and insufficient downstream water demands
	Pine Flat Powerplant	2	January 1 to April 4 for low lake level and insufficient downstream water demands
	Pine Flat Powerplant	3	January 1 to April 4 for low lake level and insufficient downstream water demands

Table 11-2 Outages for Maintenance and Repair of Facilities in 2016, by Month 3 of 6

Month	Facility	Unit	Outage Description
	Robie Thermalito Pumping-Generating Plant	1	January 1 to December 31 for fire damage; continued from November 22, 2012
	Robie Thermalito Pumping-Generating Plant	2	January 1 to December 31 for fire damage; continued from November 22, 2012
	Robie Thermalito Pumping-Generating Plant	3	January 1 to December 31 for fire damage; continued from November 22, 2012
	Robie Thermalito Pumping-Generating Plant	4	January 1 to December 31 for fire damage; continued from November 22, 2012
	South Bay Pumping Plant	3	January 1 to December 31 for motor pump coupling balance and trip testing; continued from May 15, 2013
	South Bay Pumping Plant	6	January 1 to March 21 for vibration, balance and motor installation; continued from June 2, 2014
	South Bay Pumping Plant	7	January 1 to December 31 for excessive vibration; continued from March 4, 2014
	Teerink Pumping Plant	7	January 11 to January 27 for discharge valve hydraulic system work
February	Badger Hill Pumping Plant	1	February 8 to February 25 for blind flange removal
	Badger Hill Pumping Plant	2	February 8 to February 25 for blind flange removal
	Badger Hill Pumping Plant	4	February 8 to February 25 for blind flange removal
	Chrisman Pumping Plant	3	February 3 to February 26 for discharge valve leak
	Cordelia Pumping Plant	1	February 14 to April 25 for control power repairs
	Cordelia Pumping Plant	3	February 22 to March 18 for trip and load testing
	Devil Canyon Powerplant	1	February 15 to May 13 for Condition Assessment Program inspection and relay replacement
	Dos Amigos Pumping Plant	6	February 10 to March 4 for Condition Assessment Program inspection, exciter preventive maintenance, and discharge line inspection
	Mojave Siphon Powerplant	2	February 29 to April 2 for annual Condition Assessment Program inspection
	Teerink Pumping Plant	6	February 8 to March 18 for Condition Assessment Program inspection and brush preventive maintenance
March	Barker Slough Pumping Plant	1	March 1 to March 18 for transformer and bus relay test
	Barker Slough Pumping Plant	2	March 1 to March 18 for transformer and bus relay test
	Barker Slough Pumping Plant	3	March 1 to March 18 for transformer and bus relay test
	Barker Slough Pumping Plant	4	March 1 to March 18 for transformer and bus relay test
	Barker Slough Pumping Plant	5	March 1 to March 18 for transformer and bus relay test

Table 11-2 Outages for Maintenance and Repair of Facilities in 2016, by Month 4 of 6

Month	Facility	Unit	Outage Description
	Barker Slough Pumping Plant	6	March 1 to March 18 for transformer and bus relay test
	Barker Slough Pumping Plant	8	March 1 to March 18 for transformer and bus relay test
	Barker Slough Pumping Plant	9	March 1 to March 18 for transformer and bus relay test
	Hyatt Powerplant	3	March 8 to June 10 for upper wear ring failure
	Hyatt Powerplant	5	March 8 to May 6 for upper wear ring failure
	Oso Pumping Plant	3	March 5 to March 21 for refurbishment, rewinding, and discharge valve work; continued from December 4, 2013
April	Alamo Powerplant	1	April 18 to May 9 for governor oil head repair and penstock drain repair
	Chrisman Pumping Plant	6	April 4 to July 19 for Condition Assessment Program inspection and motor repair
	Del Valle Pumping Plant	2	April 21 to August 24 for commutator problem
	Dos Amigos Pumping Plant	4	April 4 to December 31 for discharge line repair and unit refurbishment
	Hyatt Powerplant	4	April 8 to May 1 for penstock #2 work
	Hyatt Powerplant	6	April 8 to May 1 for penstock #2 work
May	Banks Pumping Plant	9	May 3 to June 11 for Condition Assessment Program inspection and preventive maintenance
	Buena Vista Pumping Plant	10	May 9 to December 6 for 13.2 kV bus work
	Devil Canyon Powerplant	2	May 31 to July 1 for annual Condition Assessment Program inspection and programmable logic controller installation
	Edmonston Pumping Plant	13	May 3 to September 23 for pump upper seal replacement
	Hyatt Powerplant	2	May 6 to June 4 for penstock #1 work
	Mojave Siphon Powerplant	1	May 2 to May 29 for annual Condition Assessment Program inspection
	Pearblossom Pumping Plant	2	May 14 to June 9 for exciter lead repairs
	Pearblossom Pumping Plant	9	May 2 to June 24 for Condition Assessment Program inspection and mechanical seal work
	Warne Powerplant	2	May 23 to June 10 for annual Condition Assessment Program inspection
June	Edmonston Pumping Plant	7	June 30 to December 31 for thrust pump problem
	Pearblossom Pumping Plant	8	June 27 to August 6 for annual Condition Assessment Program inspection and discharge valve seat repair
	South Bay Pumping Plant	9	June 2 to June 21 for penstock water leak

Table 11-2 Outages for Maintenance and Repair of Facilities in 2016, by Month 5 of 6

Month	Facility	Unit	Outage Description
July	Banks Pumping Plant	1	July 11 to December 31 for refurbishment
	Mojave Siphon Powerplant	2	July 24 to August 13 for shaft seal leak
	Polonio Pass Pumping Plant	5	July 26 to December 31 for bad outboard bearing
August	Mojave Siphon Powerplant	1	August 13 to September 12 for mechanical seal leak
	Oso Pumping Plant	7	August 22 to September 9 for Condition Assessment Program inspection and discharge valve seat adjustment
	Pearblossom Pumping Plant	1	August 15 to November 17 for discharge valve work
	Pearblossom Pumping Plant	2	August 15 to November 18 for discharge valve work
	Pearblossom Pumping Plant	3	August 15 to November 17 for discharge valve work
	Teerink Pumping Plant	8	August 3 to December 31 for discharge valve refurbishment
September	Badger Hill Pumping Plant	5	September 6 to November 22 for discharge valve work
	Devils Den Pumping Plant	4	September 29 to October 14 for motor bearing heating problem
	Giannelli Pumping-Generating Plant	4	September 19 to December 31 for butterfly valve replacement and motor rewind
	Mojave Siphon Powerplant	2	September 4 to October 20 for mechanical seal leak
	Polonio Pass Pumping Plant	6	September 29 to December 31 for excitation issues
	Warne Powerplant	1	September 26 to October 13 for annual Condition Assessment Program inspection
October	Alamo Powerplant	1	October 17 to October 31 for Condition Assessment Program inspection, preventive maintenance, and repair of mechanical seal
	Bluestone Pumping Plant	4	October 3 to October 22 for discharge valve repair
	Chrisman Pumping Plant	6	October 3 to November 19 for refurbishment of transformer
	Chrisman Pumping Plant	7	October 3 to November 19 for refurbishment of transformer
	Devil Canyon Powerplant	3	October 10 to November 10 for penstock #2 drain and inspection
	Devil Canyon Powerplant	4	October 10 to October 28 for penstock #2 drain and inspection
	Giannelli Pumping-Generating Plant	1	October 19 to November 3 for penstock #1 repair to hydraulic system
	Giannelli Pumping-Generating Plant	2	October 19 to November 3 for penstock #1 repair to hydraulic system
	Hyatt Powerplant	5	October 31 to November 23 for fire system modernization
	Hyatt Powerplant	6	October 31 to November 22 for fire system modernization
	Thermalito Diversion Dam	1	October 10 to November 18 for annual maintenance

Table 11-2 Outages for Maintenance and Repair of Facilities in 2016, by Month 6 of 6

Month	Facility	Unit	Outage Description
November	Badger Hill Pumping Plant	2	November 23 to December 27 for discharge valve problem
	Banks Pumping Plant	6	November 1 to December 31 for discharge valve upstream seat repair
	Devil Canyon Powerplant	1	November 28 to December 16 for transformer KY2A repair
	Devil Canyon Powerplant	2	November 28 to December 16 for transformer KY2A repair
	Hyatt Powerplant	3	November 29 to December 22 for fire system modernization
	Hyatt Powerplant	4	November 29 to December 22 for fire system modernization
	Pearblossom Pumping Plant	7	November 28 to December 23 for Condition Assessment Program inspection
December	Oso Pumping Plant	2	December 5 to December 22 for brush preventive maintenance and amortisseur winding inspection

Chapter 12
Engineering, Construction, and Real Estate

Cherry Valley Pump Station.

Significant Events in 2016

Engineering, construction, and real estate activities continued to enhance, expand, repair, and protect State Water Project (SWP) and other facilities. Significant projects included the seismic remediation of Perris Dam, the East Branch Extension Phase II projects, the South Bay Aqueduct (SBA) Enlargement and Improvement projects, and habitat restoration projects.

Information for this chapter was provided by the Division of Engineering.

Initial construction of the State Water Project (SWP) facilities began in 1957 with the relocation of the Western Pacific Railroad facilities and Highway 70 near the City of Oroville. Oroville Dam was constructed between 1961 and 1967. Construction of the South Bay Aqueduct (SBA) facilities started in 1960, and the first SWP water deliveries through the SBA began in 1962 to Alameda County.

In 1963, work began on the California Aqueduct, and by 1968, the SWP was delivering water to SWP water contractors in the San Joaquin Valley. By 1973, the Department of Water Resources (DWR) had completed the Edmonston Pumping Plant at the foot of the Tehachapi Mountains and other East Branch conveyance facilities; and by that time, the SWP was delivering water to Lake Perris at the southernmost point in Riverside County.

Other water deliveries occurred as follows:

- 1968—the first SWP water was delivered through the first phase facilities of the North Bay Aqueduct and through the first phase facilities of the Coastal Branch;
- 1974—the first SWP water was delivered through the West Branch facilities to Los Angeles County;
- 1988—SWP water was delivered through the second phase facilities of the North Bay Aqueduct to Solano County; and
- 1997—SWP water was delivered through the second phase facilities of the Coastal Branch Aqueduct to San Luis Obispo and Santa Barbara counties.

Prior to the completion of the initial facilities in 1973, work began on the Upper Feather River facilities to supply local water, recreation, and fish enhancement. Power plants, additional pumping units, and turbine-generators that had previously been deferred were built to ensure water quality and fish enhancement in the Delta.

From 1974 through 2016, design and construction activities included repairing concrete lining failures or potential failures of the canal system and concrete pipeline sections, replacing equipment components of existing facilities, enlarging or extending aqueduct reaches, refurbishing pump-turbine units, and adding pumps and motors to existing facilities. Specific projects included constructing the Devil Canyon Second Afterbay, constructing Phase II of the Coastal Branch, extending the SWP through the East Branch Extension to the San Gorgonio Pass service area in San Bernardino and Riverside counties with enlargements and expansions in later years, SBA enlargement, Perris Dam seismic remediation, and assessing potential habitat restoration and water conveyance options in the Delta.

Design Activities

In 2016, work to enhance, expand, repair, and protect the SWP water delivery system continued. Engineering activities supported more efficient water deliveries within the confines of legal and environmental constraints and power availability. Significant projects included the Sisk Dam seismic reevaluation, North Bay Aqueduct alternate intake study, and Perris Dam emergency release facility design. Table 12-1 (at the end of the chapter) provides a list of completed and ongoing design work that was undertaken in 2016.

DWR's Division of Engineering (DOE) continued to design projects for development into the construction phase, including awarding construction contracts. DOE

worked with many DWR divisions and offices, as well as local, State, and federal agencies. DOE conducted special studies of dams, canal embankments, and other SWP facilities; prepared preliminary designs and estimates; developed and administered construction contract documents, and carried out construction projects.

Study and design activities continued from previous reporting periods, or initiated in 2016, included the following:

- Oroville, Thermalito Afterbay, and Thermalito Forebay dams radial gate programmatic refurbishment—design;
- Oroville, Thermalito Afterbay, and Thermalito Forebay dams radial gate nondestructive examination of tendons —study;
- Oroville and Thermalito Afterbay dams Vs30 exploration (Part 12)—study;
- Oroville Dam seepage and slope stability analyses—study;
- Prospect Island tidal habitat restoration—design;
- Winter Island tidal habitat restoration—design;
- Decker Island habitat restoration—design;
- Clifton Court Forebay dredging in depth —study;
- Santa Clara Pipeline Milepost 37.97 leak repair—design;
- Delta Field Division Milepost 62 embankment and liner repair—design;
- Delta Field Division inclinometer monitoring—study;
- Delta Field Division Lower Elkhorn Basin Levee Setback Project—design;
- Delta Field Division—seismic study;
- Gale Avenue rubber dam repair—design;
- San Luis Field Division inspect and repair irrigation crossings—design;
- San Joaquin Field Division Sycamore Island pond isolation project (San Joaquin River Pit 46e)—design;
- Buena Vista Pumping Plant replace water line—design;
- California Aqueduct Mileposts 230.88 and 231.25 exploration and engineering—study;
- Pyramid Lake bathymetry for West Fork Liebre culvert outlet and docks—study;
- Pyramid Lake 1–5 gulches—study;
- Castaic Dam outlet works feasible alternatives analysis—study;
- Castaic Dam left abutment analysis—study;
- Quail Lake differential settlement analysis of the Peace Valley Pipeline intake—study;
- Tehachapi East Afterbay—mitigation;
- Cottonwood Chutes Unit 2 generator—design;
- Perris Dam seepage recovery—design;
- Perris Dam emergency release facility—preliminary design and environmental documents;
- State Water Project seismic loading criteria—study;
- California Aqueduct subsidence—study; and
- Cedar Springs Dam, Pyramid Lake, Lower Quail Canal, and Devil Canyon Second Afterbay hydrology analysis—study.

In 2016, DOE staff completed the following projects:

- Antelope Dam stability analysis—study;
- Lake Oroville reservoir rim inspection—study;
- Oroville Dam flood control outlet Rapid Response and Recovery Plan—study;
- Bidwell Canyon Saddle Dam Miners Ranch dike investigation—study;
- Thermalito Afterbay Dam, well replacement, phase II—design;
- Roaring River Slough Distribution System fish screen evaluation—design;
- Wallace Weir fish rescue facility—design;
- Georgiana Slough barrier—study;

- North Bay Aqueduct alternate intake—study;
- South Bay Aqueduct reliability improvement project—design;
- Del Valle Dam conservation outlet works intake structure stability—study;
- Bethany Dam seismic re-evaluation—study;
- Delta Field Division—Byron Road Bridge replacement—design;
- North San Joaquin Milepost 6.6 aqueduct repair—design;
- Sisk Dam seismic re-evaluation—study;
- San Joaquin Field Division bridge hinge retrofits—design;
- San Joaquin Field Division Pool 30 emergency repair—study;
- Pyramid Lake Angeles Tunnel inspection —study;
- Castaic Dam tower nonlinear structural analysis—study;
- Perris Dam outlet tower improvements — design; and
- Suisun Marsh and North Bay Aqueduct center and control buildings roof replacement—design.

Construction Activities

DWR divides the California Aqueduct into the following construction divisions: North San Joaquin, San Luis, South San Joaquin, Tehachapi, Mojave, and Santa Ana divisions of the so-called "main line," and the West and Coastal branches.

DOE worked on 65 construction contracts in various SWP construction divisions in 2016. Contract projects included pipeline repair, control system upgrades, fire systems modernization, equipment refurbishments and upgrades, seismic upgrades of bridges, maintenance facility improvements at dam and reservoir sites, and the addition of new pumping units. Table 12-2 (at the end of the chapter) provides a list of completed, new, and ongoing construction contracts undertaken in 2016. Resolution of contract claims may extend the actual contract closeout beyond the completion or acceptance date.

Since the inception of the SWP, DWR has strived to develop and construct environmentally compliant and sustainable projects. DWR's environmental scientists work with designers during all phases of design and construction to produce projects that meet the SWP objectives while protecting, restoring, and enhancing the natural and human environments of the State.

The services provided by DWR's environmental scientists include review and development of project designs to minimize environmental impacts; perform preliminary site inspections to assess potential impacts; prepare California Environmental Quality Act documents; develop compliance strategies; draft and review contract specifications; and secure environmental permits. Ongoing construction activities are monitored for compliance with the requirements outlined in the specifications and permits for each construction contract and to ensure that specific mitigation measures are implemented to reduce or eliminate environmental impacts.

SWP—General

SWP Supervisory Control and Data Acquisition System

A contract (Specification No. 08-12) to replace portions of the aging SWP supervisory control and data acquisition system began in May 2009. This contract furnished and installed 176 controller assemblies for the replacement of remote terminal units located throughout the SWP and furnished 16 controller assemblies for Devil Canyon Powerplant and DWR's development lab at the Joint Operations Center. The controller assemblies were built from components furnished by the contractor

(programmable logic controllers, sequence-of-event recorders, fiber patch panels, modems, and other equipment). Work was completed in October 2015. Acceptance was in April 2016.

California Aqueduct Copper Communications Cable and Voice and Data Equipment

Work began on approximately 450 miles of California Aqueduct copper communications cable and voice data equipment in March 2014 (Specification No. 13-17). The project includes providing monitoring, testing, leak detection, and routine and nonroutine cable repairs. Work was completed in May 2016 and accepted in July 2016.

Oroville Division

Robie Thermalito Pumping-Generating Plant

Initial cleanup of the Robie Thermalito Pumping-Generating Plant (Specification No. 13-16) began in October 2013. The work involved cleaning and repairing all fire-impacted equipment; installing new roll-up doors; procedure testing essential systems; and installing a new heating, ventilation, and air-conditioning system. Work also included repairing spalled concrete, the roof, and skylights; cleaning electrical components in the switchyard; and other cleanup as deemed necessary by the engineer. Work was completed in May 2016 and accepted in July 2016.

Oroville Dam River Outlet Diversion Tunnel No. 2

Baffle ring installation work (Specification No. 15-11) began in December 2015. This contract project includes furnishing and installing two water-filled tunnel plugs, providing support work for fixed cone valve replacement, and installing 12 DWR-furnished baffle ring segments at the Oroville Dam River Outlet Diversion Tunnel No. 2. Work was completed in September 2016 and accepted in November 2016.

Bidwell Canyon Boat Ramp

The stage III boat ramp extension (Specification No. 15-13) began in December 2015. Work included a concrete paved boat ramp, earthwork, compacted backfill, reinforced concrete, rock slope protection, erosion control, and drill and bond dowels. Work was completed in January 2016 and accepted in May 2016.

Hyatt Powerplant, Thermalito Diversion Dam Powerplant, and Oroville Operations and Maintenance Center Fire Systems Modernization Project

The goals of the fire systems modernization project are to increase safety and property protection, while reducing business interruptions and environmental impacts. The project to furnish and install the new fire detection and evacuation system (Specification No. 15-06) began in October 2015 and continued through 2016.

Work includes:

- upgrading transformer, generator, high voltage tunnel, and Area Control Center communication room fire suppression systems;
- replacing Hyatt's oil purification/storage room and high voltage cable oil room carbon dioxide suppression system with a high pressure water mist system;
- installing water sprinkler and clean agent suppression at specific locations within Hyatt and the Area Control Center to meet probable maximum loss criteria;
- providing modifications within the plant and the dam core block that allow a safe outlet for staff during an emergency event and providing additional communications systems throughout the plant; and

- networking all fire detection and suppression systems at all facilities to remote workstations capable of monitoring and controlling the new and existing systems.

DWR assisted the contractor with the design work during the construction phase of the project. Work is scheduled to be completed in June 2017. Acceptance is expected in July 2017.

Robie Thermalito Pumping-Generating Plant and Annex, Hyatt Powerplant Air Intake and Access Tunnel Entrance, Feather River Fish Hatchery Buildings, and Operations and Maintenance Plant Maintenance Shop Building

A contract to replace roofing at several facilities began in May 2016 (Specification No. 16-04). This project included the removal and disposal of the existing roofing, roof insulation, and hazardous materials; and the installation of new roofing, skylights, and other roof accessories. The project was completed in December 2016 and is expected to be accepted in July 2017.

South Bay Aqueduct

SBA Enlargement and Improvement

The SBA Enlargement and Improvement projects restored the first 16.38 miles of the SBA to the 300 cubic feet per second (cfs) design flow and increased the design capacity by up to 130 cfs. This work enlarged the South Bay Pumping Plant to accommodate four additional 45 cfs units, constructed a third discharge line, constructed Dyer Reservoir, enlarged the canal, and modified associated structures. Projects during 2016 are described below.

Dyer Canal, Livermore Canal, Alameda Canal, and Del Valle Pipeline. Various modifications were performed along Dyer Canal, Livermore Canal, Alameda Canal, and Del Valle Pipeline under a contract that began in October 2010 (Specification No. 09-16). Work included raising the canal lining, canal embankment, and operating roads; removing, modifying, installing, and constructing various structures, including overchutes, inlets, pipes, bridges, trash racks, siphons, check structures, water-level measurement systems, radial gates, motors, control systems, flowmeters, and valves; and raising/refurbishing Patterson Reservoir. Work was completed in June 2015 and accepted in February 2016.

South Bay Pumping Plant. The following contracts for the SBA Enlargement project at South Bay Pumping Plant continued throughout 2016.

Specification No. 04-05: furnishing 45 cfs pump and motor units for Unit Nos. 10 through 13 and one spare pump and motor. Work began in November 2004. In February 2015, DWR and the contractor agreed to terms for closing out the contract. Work was accepted in January 2016.

Specification No. 04-20: furnishing valves, actuators, and hydraulic power units. Work began in May 2005. The equipment was furnished in June 2007. Repairs to the butterfly valves were added to this contract by change order. Work was completed in October 2015 and accepted in January 2016.

Specification No. 06-04: enlarging pumping plant initial facilities. Work began in August 2006 and was completed in October 2011. Work was accepted in January 2016.

Specification No. 07-18: complete pumping plant enlargement. Work began in December 2007. Added work included repairs to a water system pipeline adjacent to Banks Pumping Plant. Work was completed in April 2014 and accepted in January 2016.

Del Valle Dam. Work began in October 2012 to install and remove a bulkhead used for dewatering to seal cracks at Del Valle Dam (Specification No. 12-14). Original contract work included labor, materials, and construction equipment; hauling construction equipment for installation and removal of a DWR-furnished bulkhead gate; repairing cracks inside the flood control outlet works tunnel; applying coatings to the bulkhead gate and flood control outlet works tunnel slide gates; painting station markings on the inside of the Del Valle spillway tunnel; and installing a metal walkway.

In addition to the original contract work, additional tasks were performed under change order. These tasks included:

- urgent repair of leaks on the SBA Pipeline at Mileposts 38.90, 33.83, and 35.34;
- Thermalito Powerplant recovery efforts;
- Clifton Court Forebay gate repair;
- open channel flowmeter installation at Dyer Reservoir;
- Del Valle floodgate repair;
- Hyatt Powerplant clean-up; and
- furnishing WEKO-SEALs (internal joint seals).

Work was completed in April 2014 and was accepted in March 2016.

Santa Clara Pipeline

Storage Yard. A contract to improve the storage yard and to furnish pipe started in August 2016 (Specification No. 16-03). Work included fabricating new 85.5-inch and 73.5-inch steel pipe and appurtenances and transporting the newly-fabricated pipe (and existing DWR-furnished pipe) from Sunol, California to Fremont, California, for storage. The project was completed in November 2016 and is expected to be accepted in April 2017.

Mileposts 16.30, 28.90, 34.23, and 41.68. This project (Specification 16-09) included the following:

- modifying existing Pacific Gas & Electric Line 303 gas line at Milepost 16.30 (Station 859+58) on the SBA Alameda Canal to provide cathodic isolation of the gas line;
- modifying existing Bayside Valve Vault at Milepost 28.90: furnish and install lockout for existing 72-inch butterfly valve, 2-inch diameter PVC (polyvinyl chloride) conduit with control cable, pull boxes, wirings, raceways, and appurtenances;
- modifying the existing Santa Clara Pipeline at Milepost 34.23 blow-off discharge pipe: excavate, remove, and replace approximately 70 linear feet of existing 6-inch diameter steel discharge pipe; and
- modifying existing Grossmont Valve Vault at Milepost 41.68: furnish and install lockout for existing 54-inch butterfly valve.

Work began in October 2016 and is expected to be accepted in November 2017.

North San Joaquin Division

Clifton Court Forebay Dam

The refurbishment of radial gates 1, 2, 3, 4, and 5 on the Clifton Court Forebay Dam control structure (Specification No.16-06) started in October 2016. This project involves the sequential removal, refurbishment to original design at shop, transport back to the site, and reinstallation of the radial gates. Work is scheduled to be completed in October 2019 and expected to be accepted in November 2019.

Skinner Fish Science Building

The Delta Fish Survival Improvements Program (Specification No. 12-15) began in December 2012. Work consisted of construction of a cold-formed steel frame

building with restroom, office space, and break room facilities. The project included demolishing the following existing items:

- asphalt concrete paving;
- concrete and reinforcing steel;
- concrete curb and gutter;
- chain-link fencing;
- traffic gates;
- metal beam guardrail; and
- cathodic protection.

Work was completed in October 2014 and was accepted in January 2016.

Skinner Fish Facility

Work began in June 2014 to furnish fish count and transport buckets (Specification No. 14-08) for the Skinner Fish Facility. Work was completed in June 2015 and accepted in February 2016.

Sherman Island

Construction of the Little Baja and the Manzo Ranch fish release sites, on the northwest side of Sherman Island, began in August 2016 (Specification No. 16-01). The project complies with the 2009 National Marine Fisheries Service's biological opinion mandate to reduce predation and improve survival rates of fish salvaged from the Skinner Fish Facility. The project is expected to be completed by December 2017 and accepted in April 2018.

Curtis Landing Fish Release Site

Work for this project (Specification No. 14-02) began in March 2014. It involved two tasks related to the Curtis Landing fish release site. The first task included selective demolition of the existing fish release system piping, support framing and piles, electrical system, and other miscellaneous facilities, and relocation of passive integrated transponder antennas, a submersible pump, and articulated mats. The second task included construction of a concrete slab, wall, and foundation; construction of a steel platform with metal grating, piping, valves, flowmeter, and submersible pump; construction of the structural steel framework to support the piping; and electrical work for the fish screen pump, lights, and gates. Work was completed in May 2015 and accepted in February 2016.

San Luis Division

Milepost 86.69 to Milepost 138.29

Turnout structure modifications (Specification No. 15-03) began in November 2015. Work included installation of guide steel and thermoplastic polyolefin single-ply roofing at five locations and head panel modification. The project was completed in February 2016 and accepted in May 2016.

San Luis Canal

This work (Specification No. 16-07), which began in September 2016, is for the Cantua Creek Stream Group Improvements Project. This project will provide a 50-year level of flood protection for the San Luis Canal section of the California Aqueduct. Work includes improving storage in the ponding basins through flood easement acquisition; raising and constructing various sections of the San Luis Canal embankments; raising adjacent roads, constructing a concrete weir, and removing sediment buildup along several drainage features along the canal.

The project is expected to be completed in January 2017 and accepted in February 2017.

Mojave Division

Milepost 335.80

The emergency canal lining repair project (Specification No. 15-16) began in October 2015. Work included dewatering, removal of the concrete liner and unsuitable material, backfill, and concrete and joint sealant repair. Work was completed in June 2016, and acceptance is expected in February 2017.

Pearblossom Pumping Plant

A contract to construct a 20,600 square-foot administration building near Pearblossom Pumping Plant began in February 2011 (Specification No. 10-23). The new building, which received Leadership in Energy and Environmental Design platinum certification in May 2015, is occupied by Southern Field Division staff and Lancaster Project Headquarters personnel. Work was completed in August 2015 and accepted in April 2016.

Santa Ana Division

East Branch Extension Phase II

Phase II of the East Branch Extension will complete the planned capacity increase for the East Branch Extension. Phase II will allow San Gorgonio Pass Water Agency to receive its maximum annual Table A water and allow the San Bernardino Valley Municipal Water District to increase its distribution system capacity to its Redlands and Yucaipa Valley service areas. Principal Phase II features include approximately 6 miles of new 72-inch and 66-inch diameter pipe, a new reservoir (Citrus Reservoir), a new 160 cfs pump station (Citrus Pump Station), expansion of the existing Crafton Hills Pump Station, and installation of an additional pump at Cherry Valley Pump Station.

Mentone Pipeline. Construction of Mentone Pipeline (Specification No. 12-03) began in July 2012. The work included installation of approximately 2 miles of 72-inch buried steel pipe from Foothill Pump Station to Citrus Reservoir and approximately 3.5 miles of 66-inch buried steel pipe from Citrus Pump Station to Crafton Hills Pump Station. Site work was completed in August 2015 and accepted in March 2016.

Citrus Reservoir. Manufacturing, testing, and delivery of three energy dissipating valve assemblies (including electric actuators) for Citrus Reservoir (Specification No. 10-10) began in September 2010. The valves were delivered to the site in October 2012. Spare parts and special tools were included in the contract work. Work was completed in March 2013 and accepted in March 2016.

Citrus Pump Station. Transformers, accessories, tools, and spare parts were manufactured, tested, and delivered for Citrus Pump Station under a contract (Specification No. 10-20) that began in March 2011. The equipment was delivered to the completion contractor in December 2015. Acceptance is expected in July 2017.

Crafton Hills Pump Station, Cherry Valley Pump Station, and Mentone Pipeline

Manufacturing, testing, and delivery of 12 AWWA (American Water Works Association) butterfly valve assemblies with actuators for Crafton Hills Pump Station, Cherry Valley Pump Station, and Mentone Pipeline (Specification No. 10-17) began in February 2011. Spare parts and special tools were included in the contract work. Work was completed in mid-2013. Acceptance is expected in July 2017.

Crafton Hills and Citrus Pump Stations

Construction on the Crafton Hills Pump Station expansion and Citrus Pump Station initial work (Specification No. 12-10) began in October 2012. Work included construction of a prestressed concrete forebay water tank and pump station buildings; earthwork, shoring, and demolition; installation of a hydraulic asphalt concrete liner, steel pipe and appurtenances, DWR-furnished materials, and equipment; application of coatings; and testing. Work was completed in October 2014 and accepted in June 2016.

Work (Specification No. 13-12) on the Crafton Hills and Citrus pump stations included manufacturing, factory testing, and commissioning equipment for a prefabricated control building and associated

equipment, accessories, tools, special tools, and spare parts. Also included were 5 kilovolt (kV), 4,000 amperes (A) switchgear motor breaker cubicle assemblies; 5 kV, 4000 A main and tie breaker switchgear cubicle assemblies; 5 kV, 4,000 A station service breaker switchgear cubicle assemblies; and 5 kV-class surge protection equipment in the main incoming bus compartments. Fabrication began in June 2014 and was completed in October 2016. Acceptance is expected in October 2018.

Citrus, Crafton Hills, and Cherry Valley Pump Stations

Manufacturing, testing, and delivery of 14 ANSI (American National Standards Institute) butterfly valve assemblies with actuators for Citrus Pump Station, Crafton Hills Pump Station, and Cherry Valley Pump Station (Specification No. 10-16) began in January 2011. Spare parts and special tools were included in the contract work. Work was completed in July 2013. Acceptance is expected in July 2017.

Manufacturing, testing, and delivering 12 ANSI ball valve assemblies with actuators and 4 actuators for Citrus Pump Station, Crafton Hills Pump Station, and Cherry Valley Pump Station (Specification No. 10-18) began in January 2011. The valves were delivered to the site in October 2012. Spare parts and special tools were included in the contract work. Acceptance is expected in July 2017.

Work to provide pumps, motors, variable frequency drives, and excitation system equipment, and associated hardware, for the pump stations (Specification No. 13-01) began in June 2013. Units were delivered in December 2015. Acceptance is expected in July 2017.

In March 2015, work began on a contract for the following completion work (Specification No. 14-21) at Citrus, Crafton Hills, and Cherry Valley pump stations:

- install DWR-furnished pumps, motors, valves, switchgear equipment and materials, motor field supply equipment and materials; and
- replace existing station service transformer with new DWR-furnished station service transformer.

Work is expected to be completed in September 2017, and acceptance is expected in November 2017.

West Branch

Oso Pumping Plant

Work to construct a 14,400 square-foot civil maintenance and mobile equipment building at Oso Pumping Plant (Specification No. 07-22) began in December 2007. Work was completed in July 2012. Acceptance is expected in July 2017.

Perris Dam

The seismic remediation of Perris Dam (Specification No. 14-03) began in August 2014. The work involves construction of a new compacted berm; extension of the existing blanket drain; construction of a new drain line, a new toe drain, and a relief well system; cement deep soil mixing treatment of the alluvium beneath the footprint of the compacted berm; road work; and other related work. The rock material for the project is being produced on-site using blasting methods and a rock processing plant. In 2016, the cement deep soil mixing treatment was completed. Remaining work is scheduled to be completed in November 2017. Acceptance is expected in March 2018.

Oak Valley (Perris Dam). Mitigation work for the Perris Dam seismic remediation project (Specification No. 15-01) began in June 2015. The work involves:

- excavation, grading, and revegetation of a new channel and floodplain system;

- protection of native trees and vegetation;
- monitoring well destruction;
- earthwork, including excavation, transport, stockpile, and placement of fill and rock structures for grade control;
- installing biotechnical structures;
- installing erosion control devices;
- installing a hog exclusion fence and gate; and
- planting, seeding, irrigating, and plant establishment.

The work is scheduled to be completed in January 2017. Acceptance is expected in April 2017.

Coastal Branch

Devil's Den, Bluestone, and Polonio Pass Pumping Plants

The cathodic protection rehabilitation project Devil's Den, Bluestone, and Polonio Pass pumping plant facilities (Specification No. 13-13) began in September 2013. Work included removing encasement at insulating coupling flanges and installing new insulating sleeve couplings inside new cast-in-place vaults. A portion of the work was completed in January 2014 and accepted in September 2014. Acceptance of the rest of Specification No. 13-13 was in February 2016. Remaining work was completed under Specification No. 15-05. Remaining work done under Specification No. 15-05 on the cathodic protection rehabilitation and the installation of new insulated sleeve couplings, began in September 2015 and was completed in February 2016. The project was accepted in September 2016.

Construction Activities in Multiple Divisions

Middle River, Old River, and Grant Line Canal

Two tasks related to the South Delta Temporary Barriers Project (Specification No. 12-18) began in January 2013. The first task included the removal of temporary rock barriers and appurtenances at Middle River, Old River, and Grant Line Canal. Additional work included temporary pumping facilities, dredging in the South Delta, removing aquatic weeds in Clifton Court Forebay, installing stone protection in the South Delta, and structural maintenance and repair at the Curtis Landing and Horseshoe Bend fish release sites. The second task included furnishing, installing, and removing a nonphysical barrier at the head of Georgiana Slough on the east side of the Sacramento River (immediately downstream of the Walnut Grove Bridge). Work was completed in March 2016 and was accepted in May 2016.

West False River and Rio Vista Storage Area

The work (Specification No. 15-08) at West False River began in August 2015 and consisted of removal of the drought barrier, including:

- removing embankment rock and transporting the rock to the Rio Vista storage area;
- removing warning signs, warning buoys, ball floats, and lights;
- cutting and removing steel sheet; and
- applying seeding and erosion control methods.

The contract, which included work at the Rio Vista storage area that was not funded by the SWP, was completed in November 2015 and accepted in February 2016.

Suisun Marsh, North Bay Aqueduct, North San Joaquin Division, and San Luis Division

Montezuma Slough Control Buildings, Barker Slough Pumping Plant, Cordelia Pumping Plant, Gianelli Pumping-Generating Plant

Control House, and San Luis Operations and Maintenance Center Buildings. Roofing replacement at several DWR facilities began in November 2016 (Specification No. 16-10). Work includes: removing and disposing of existing roofing, roof insulation, and hazardous materials, and providing and installing a new roof, skylights, and other roof accessories. The project is expected to be completed in April 2017 and accepted in May 2017.

San Luis, San Joaquin, and Southern Field Divisions

The seismic retrofit of bridges addressed existing seismic deficiencies in 23 bridges (9 DWR and 14 Reclamation) located in the San Luis, San Joaquin, and Southern field divisions. There are 22 structures that carry local streets and roads over the California Aqueduct, and one that supports the aqueduct operational road over a local county road. The work included constructing shear keys at bridge piers and abutments, replacing some existing reinforced concrete bridge deck, installing hot mix asphalt pavement and dikes, and installing metal beam guard railing. The seismic retrofit was required to prevent potential collapse during an earthquake, and deck replacement work was required due to deterioration of the concrete decks from heavy truck traffic.

Phase I. Work on the Duncan Road Bridge, Goss Road (Goodwin Drive) Bridge, Maple Avenue Bridge, Mesquite Street Bridge, and the Ranchero Road Bridge in the Southern Field Division (Specification No. 14-09) began in August 2014. The bridge decks were replaced at the Maple Avenue and the Ranchero Road bridges. Work was completed in September 2015. Acceptance is expected in August 2017.

San Joaquin Field Division

Replacement of the existing standby engine generators with new liquefied petroleum gas and diesel standby engine generators (Specification No. 14-19) began at 21 check sites and 8 pumping plant sites in the San Joaquin Field Division in May 2015. Work also includes installing new fuel tanks, transfer switches, and load banks to support operation of the new standby engine generators. The sites include all of the Coastal Branch pumping plants and check sites; all check sites from Check 22 to 39 on the California Aqueduct; and Teerink, Buena Vista, and Edmonston pumping plants. Acceptance is expected in August 2017.

Badger Hill Pipeline and Mojave Siphon

Work began in the San Joaquin and Southern field divisions (Specification No. 13-14) in November 2013. Work includes removing and replacing the existing lining in manifolds and pipeline, constructing a flow metering vault, removing and replacing a joint seal at Mojave Siphon Check 66, and removing and reinstalling pipe spool pieces. Because of emergency work in Specification No. 15-16, work under this contract (Specification No. 13-14) is suspended through November 2017. Work is scheduled to be completed in June 2018. Acceptance is expected in September 2018.

Southern Field Division

This project (Specification No. 14-05) to seal and pave roads and parking areas, began in July 2014 and covered areas in Los Angeles and San Bernardino counties.

The work included:

- traffic stripes and pavement markings;
- pavement repairs;
- hot mix asphalt paving and overlays;
- earthwork including excavation and compacted backfill;
- wheelstops; and
- miscellaneous metalwork.

The work was completed in September 2015 and accepted in March 2016.

Real Estate Activities

DWR processed a net total of $8.93 million in payments in 2016 in support of right-of-way activities required for the construction, operation, and maintenance of the SWP. This amount represents direct payments made for the cost of real property rights, damages, temporary entry permits, licenses, leases, and relocation expenses.

DWR conducted the following real estate activities from January 1 through December 31, 2016.

SWP Acquisitions

Activities related to SWP acquisitions were as follows:

- executed six agreements for the California Irrigation Management Information System program;
- obtained three encroachment permits;
- processed 20 warrants for payment and reimbursement;
- issued two notices to property owners of planned construction activities;
- obtained State Lands Commission approval for the South Delta Improvement Program's Temporary Barriers Project as exempt under the terms of the Memorandum of Understanding between DWR and State Lands Commission;
- executed an appraisal cost reimbursement agreement with Winter Island Farms, LLC in the amount of $5,000 for an owner-initiated appraisal conducted by Kauttu Valuation for the property identified as DWR Parcel No. FSR-03, also known as Contra Costa County Assessor Parcel No. 074-020-001-9, as required for the Winter Island Tidal Habitat Restoration Project;
- processed payment from Stewart Title of Sacramento for overpayment of property taxes paid by DWR during the acquisition of DWR Parcel No. 3-6003, also identified as Riverside County Assessor Parcel Nos. 307-040-004 and 307-070-001. This property was acquired as mitigation for the Lake Perris Dam Remediation Project;
- executed four right-of-entry agreements to allow for ingress and egress and for construction activities to enhance Wallace Weir in the northern Yolo Bypass for the Wallace Weir Fish Rescue Facility Project;
- certified right-of-way for the Santa Clara Pipeline Modifications Blow Off Line Project;
- closed escrow on acquisition of the property identified as DWR Parcel No. SML-152, allowing DWR to complete the purchase of the property as part of the Bradmoor Island Tidal Restoration Project, a component of DWR's Fish Restoration Program;
- closed escrow on DWR Parcel Nos. NBA-353 (0.82 acre in fee) and NBA-354 Units A and B (0.23 acre access and 0.02 acre communication easements), and facilitated the recordation of two Director's easement deeds and two Director's quitclaim deeds;
- completed a memorandum of settlement package for the acquisition in fee simple of property owned by Oderj, LLC, identified as DWR Parcel No. APFC-44, for the purpose of raising the San Luis Canal embankment from one foot to four feet to provide 50-year flood protection, located in Fresno County as part of the Cantua Creek Stream Group Improvements Project;
- completed the acquisition of DWR Parcel No. FSR-03, Units A and B, as part of the Winter Island Tidal Habitat Restoration Project, a component of DWR's Fish Restoration Program;
- submitted the final acquisition documents for DWR Parcel No. APFC-42 (0.60+ acres in fee) to escrow for

the Cantua Creek Stream Group Improvements Project;
- executed a Director's deed and an agreement with the Riverside County Transportation Commission, for the sale of DWR Parcel No. 3-6003-A (4.377 acres) for the Lake Perris Dam Remediation Project, mitigation;
- submitted the final acquisition documents to escrow for processing and recordation for DWR Parcel No. APFC-40 (0.011+ acres in fee and a 0.055+ acre access easement) for Cantua Creek Stream Group Improvements Project;
- negotiated the acquisition of and closed escrow for Parcel No. EDF-44 (2.58+ acres in fee) from the City of Stockton;
- processed five Director's quitclaim deeds from private property owners, a private trust, and public agencies for temporary construction easements acquired as part of East Branch Extension Phase II;
- granted an exclusive easement to private land owners for equine trail purposes upon, over, and across real property identified as DWR Parcel No. SGP-85-A, San Bernardino County Assessor's Parcel No. 030-041-44, as part of the East Branch Extension, Phase I, mitigation project; and
- negotiated and acquired a 30-year right-of-way grant from the Bureau of Land Management for DWR access to the California Aqueduct and various roads, pumps, and drainage areas, covering 605 acres and 7,765 feet of aqueduct located on six separate parcels in three counties.

Temporary Entry Permits

In 2016, DWR obtained 60 temporary entry permits including:

- Clifton Court Forebay predation study, 1;
- Delta Field Division—erosion repair at SBA Milepost 15.27 to Milepost 15.72, 1;
- East Branch Extension Phase II Project, 1;
- Fish Restoration Program, Suisun Marsh restoration project, 2;
- irrigation undercrossing pipe inspection and repairs project, 19;
- Lake Perris Emergency release facility project, 2;
- Perris Dam recovery well study, 1;
- Prairie Creek Fault Phase II investigation, 10;
- Oroville Reservoir rim slope inspection—Phase II, 14;
- San Joaquin River Restoration Program, 1;
- South Delta Temporary Barriers Project, 2;
- Wallace Weir Fish Rescue Facility Project, 3;
- Yolo Bypass fish monitoring program, 1;
- Yolo Bypass habitat restoration, 1; and
- Yolo Bypass mercury studies, 1.

SWP Property Management

Property management activities during 2016 were as follows:

- managed leasing activities of SWP nonoperating properties, which produced $742,446;
- processed 39 and executed 25 encroachment permit applications;
- collected fees totaling $356,726 for review and inspection costs related to encroachment permit applications; and
- coordinated review of 22 tentative tract map developments within 1 mile of the California Aqueduct.

SWP Appraisals

In 2016, 58 percent of total appraisal assignments (42 of 73) completed by DWR were exclusively for the SWP. These assignments included the following:

- Wallace Weir Fish Rescue Facility Project —provided four appraisals and reviewed four appraisals;

- Fish Restoration Program agreement—provided nine appraisals and ten reviews;
- Chipps Island and Tidal Marsh Restoration—provided three appraisals and two appraisal reviews;
- Santa Clara modification project—provided one appraisal;
- salmonid survival program—provided one rental lease appraisal;
- Dutch Slough Tidal Marsh Restoration Project—provided one appraisal;
- SWP property management—provided one appraisal review of overhead power line appraisal for Sherman Island;
- SWP property management—provided three easement appraisals for highway levee improvement project on Sherman Island;
- Fish Restoration Program—contracted for and provided a technical white paper analyzing fish mitigation land values and alternate methods for determining values;
- Pace Preserve acquisition—processed one review of outside independent appraisal with the Department of General Services; and
- East Branch Extension Phase 1—provided one easement appraisal for terminus facility.

Table 12-1 Design Activities, 2016

Construction Division and Facility	Design Activity	Date Design Began	Design Actual/ Estimated Completion Date
Upper Feather River Division			
Antelope Dam	Stability analysis	June 2016	December 2016
Oroville Division			
Oroville, Thermalito Afterbay, and Thermalito Forebay dams	Radial gate nondestructive examination of tendons study	July 2015	December 2017
	Thermalito Vs30 exploration (Part 12)	February 2016	December 2017
Lake Oroville	Reservoir rim inspection study	November 2015	June 2016
Oroville Dam	Seepage and slope stability analyses	July 2016	September 2018
	Flood control outlet Rapid Response and Recovery Plan	April 2016	July 2016
Thermalito Afterbay Dam	Well replacement, phase II	June 2013	January 2016
	Radial gate programmatic refurbishment	December 2016	November 2018
Bidwell Canyon Saddle Dam	Miners Ranch dike investigation	March 2016	June 2016
Suisun Marsh Facilities			
Roaring River Slough Distribution System	Fish screen evaluation	March 2016	June 2016
Delta Facilities			
Wallace Weir	Fish rescue facility	April 2016	June 2016
Prospect Island	Tidal habitat restoration	November 2016	June 2018
Winter Island	Tidal habitat restoration	March 2015	October 2019
Georgiana Slough	Barrier study	March 2016	August 2016
Decker Island	Habitat restoration	January 2016	June 2018
Lower Elkhorn Basin	Levee setback	April 2016	July 2019
North Bay Aqueduct			
North Bay Aqueduct	Alternate intake study	October 2008	June 2016
South Bay Aqueduct			
South Bay Aqueduct	Reliability improvement project	January 2015	January 2016
Del Valle Dam	Conservation outlet works intake structure stability	February 2016	December 2016
	Foundation stability analysis	June 2016	October 2017
Bethany Dam	Seismic re-evaluation	April 2016	September 2016
North San Joaquin Division			
Clifton Court Forebay Dam	Dredging in depth study	June 2016	December 2018
Delta Field Division	Byron Road bridge replacement	January 2014	July 2016
	Inclinometer monitoring	December 2014	December 2017
	Milepost 62 embankment and liner repair	July 2015	January 2016
Santa Clara Pipeline	Milepost 37.97 leak repair	December 2016	January 2017
North San Joaquin	Milepost 6.6 aqueduct repair	September 2015	April 2016

Table 12-1 Design Activities, 2016 *(continued)*

Construction Division and Facility	Design Activity	Date Design Began	Design Actual/ Estimated Completion Date
San Luis Division			
Sisk Dam	Seismic re-evaluation	July 2007	September 2016
Gale Avenue	Rubber dam repair	April 2016	April 2017
San Luis Field Division	Inspect and repair irrigation crossings	July 2016	July 2017
South San Joaquin Division			
Buena Vista Pumping Plant	Replace water line	October 2016	June 2017
California Aqueduct	Mileposts 230.88 and 231.25 exploration and engineering study	May 2016	June 2017
San Joaquin Field Division	Bridge hinge retrofit	July 2015	September 2016
	Pool 30 emergency repair	January 2016	December 2016
	Sycamore Island pond isolation project (San Joaquin River Pit 46e)	July 2015	December 2017
West Branch			
Pyramid Lake	Bathymetry study for West Liebre culvert outlet and docks	September 2016	June 2017
	I-5 gulches study	October 2016	May 2017
	Angeles Tunnel inspection	November 2016	December 2016
Castaic Dam	Left abutment analysis study	November 2015	December 2017
	Tower nonlinear structural analysis study	January 2015	February 2016
	Outlet works feasible alternatives analysis	November 2011	December 2017
Quail Lake	Differential settlement analysis of Peace Valley Pipeline intake	August 2016	February 2017
Mojave Division			
Tehachapi East Afterbay	Mitigation	March 2012	October 2017
Cottonwood Chutes	Design unit 2 generator	March 2016	February 2019
Santa Ana Division			
Perris Dam	Seepage recovery	January 2016	December 2017
	Emergency release facility preliminary design and environmental documents	October 2006	January 2019
	Outlet tower improvements	July 2016	December 2016
Miscellaneous			
State Water Project	Seismic loading criteria	February 2015	June 2017
Suisun Marsh and North Bay Aqueduct	Replace roof	May 2015	August 2016
California Aqueduct	Subsidence study	September 2014	December 2017
Cedar Springs Dam, Pyramid Lake, Lower Quail Canal, Devil Canyon Second Afterbay Dam	Hydrology analysis (P2426)	June 2016	October 2017

Table 12-2 Construction Activities, 2016

Construction Division and Facility	Construction Contract (Specification Number)	Notice to Begin Work	Acceptance Date (expected or actual)	Estimated Total Contract Costs (in thousands of dollars)
State Water Project—General				
SWP Supervisory Control and Data Acquisition System	Replace remote terminal units (08-12)	May 2009	July 2016	10,380
California Aqueduct	Copper communications cable and voice and data equipment—monitoring, testing, and repair (13-17)	March 2014	May 2016	877
Oroville Division				
Robie Thermalito Pumping-Generating Plant	Initial cleanup and restoration—clean and repair fire-impacted equipment (13-16)	October 2013	July 2016	12,178
Oroville Dam Outlet Diversion Tunnel No. 2	Baffle ring installation (15-11)	December 2015	June 2016	2,621
Bidwell Canyon Boat Ramp	Stage III boat ramp extension (15-13)	December 2015	May 2016	319
Multiple Facilities				
Hyatt Powerplant, Thermalito Diversion Dam Powerplant, and Oroville Operations and Maintenance Center	Fire systems modernization (15-06)	October 2015	July 2017	14,875
Robie Thermalito Pumping-Generating Plant and Annex, Hyatt Powerplant Air Intake and Access Tunnel Entrance, Feather River Fish Hatchery Buildings, and Operations and Maintenance Plant Maintenance Shop Building	Installation of new roofing, skylights, and other roof accessories (16-04)	May 2016	July 2017	1,615
South Bay Aqueduct				
South Bay Aqueduct Enlargement and Improvement				
Dyer Canal, Livermore Canal, Alameda Canal, and Del Valle Pipeline	Perform canal modifications (09-16)	October 2010	February 2016	18,496
South Bay Pumping Plant	Furnish four 45 cfs pump and motor units and one spare pump and motor (04-05)	November 2004	January 2016	6,499
	Furnish valves, actuators, and hydraulic power unit (04-20)	May 2005	January 2016	1,979
	Construct pumping plant enlargement—initial facilities (06-04)	August 2006	January 2016	11,384
	Enlarge pumping plant (07-18)	December 2007	January 2016	9,833
Del Valle Dam	Install and remove bulkhead (12-14)	October 2012	March 2016	332
Santa Clara Pipeline				
Storage Yard	Improve storage yard and furnish pipe (16-03)	May 2016	April 2017	1,509
Mileposts 16.30, 28.90, 34.23, and 41.68	Modify the pipeline (16-09)	October 2016	November 2017	555

Table 12-2 Construction Activities, 2016

Construction Division and Facility	Construction Contract (Specification Number)	Notice to Begin Work	Acceptance Date (expected or actual)	Estimated Total Contract Costs (in thousands of dollars)
North San Joaquin Division				
Clifton Court Forebay Dam	Refurbish radial gates 1, 2, 3, 4, and 5 (16-06)	September 2016	November 2019	3,960
Skinner Fish Science Building	Construct fish science building (12-15)	December 2012	January 2016	4,998
Skinner Fish Facility	Furnish fish-transport and fish-count buckets (14-08)	June 2014	February 2016	146
Sherman Island	Construct fish release sites at Little Baja and Manzo Ranch (16-01)	April 2016	April 2018	2,268
Curtis Landing Fish Release Site	Site improvements (14-02)	March 2014	February 2016	1,179
San Luis Division				
Mileposts 86.69 to Milepost 138.29	Turnout structure modifications (15-03)	November 2015	May 2016	714
San Luis Canal	Improve flood protection along the canal (16-07).	July 2016)	February 2017	1,238
Mojave Division				
Milepost 335.80	Emergency canal lining repair (15-16)	October 2015	February 2017	1,052
Pearblossom Pumping Plant	Construct administration building (10-23)	February 2011	April 2016	9,896
Santa Ana Division				
East Branch Extension Phase II				
Mentone Pipeline	Construct 5.5 miles of pipeline (12-03)	July 2012	March 2016	38,656
Citrus Reservoir	Manufacture, test, and deliver 3 energy dissipating valves for Citrus Reservoir (10-10)	September 2010	March 2016	623
Citrus Pump Station	Manufacture, test, and deliver transformers and accessories (10-20)	March 2011	July 2017	721
Multiple Facilities				
Crafton Hills and Cherry Valley pump stations and Mentone Pipeline	Manufacture, test, and deliver 12 AWWA butterfly valves (10-17)	February 2011	July 2017	497
Crafton Hills and Citrus pump stations	Pump station expansion and initial construction (12-10)	October 2012	July 2016	23,106
	Furnish 5 kV switchgear (13-12)	June 2014	October 2018	4,547
Citrus, Crafton Hills, and Cherry Valley pump stations	Manufacture, test, and deliver 14 ANSI butterfly valves (10-16)	January 2011	July 2017	1,200
	Manufacture, test, and deliver 12 ANSI ball valves for Citrus, Crafton Hills, and Cherry Valley pump stations (10-18)	January 2011	July 2017	2,999
	Furnish equipment and hardware (13-01)	June 2013	July 2017	17,805
	Crafton Hills Pump Station Expansion (completion work), construct Citrus Pump Station (completion work), and install one additional pump/motor unit at Cherry Valley Pump Station (14-21)	March 2015	November 2017	23,871

Table 12-2 Construction Activities, 2016

Construction Division and Facility	Construction Contract (Specification Number)	Notice to Begin Work	Acceptance Date (expected or actual)	Estimated Total Contract Costs (in thousands of dollars)
West Branch				
Oso Pumping Plant	Construct civil maintenance and mobile equipment building (07-22)	December 2007	July 2017	2,811
Perris Dam	Seismic remediation of dam embankment (14-03)	August 2014	March 2018	75,539
Oak Valley (Perris Dam)	Mitigation for Perris Dam seismic remediation impacts (15-01)	June 2015	April 2017	2,357
Coastal Branch				
Devil's Den, Bluestone, and Polonio Pass pumping plants	Cathodic protection rehabilitation (13-13) [Remaining work will finish under 15-05]	September 2013	February 2016	743
	Cathodic protection rehabilitation (15-05)	September 2015	September 2016	180
Multiple Divisions				
Middle River, Old River, and Grant Line Canal.	Installation and removal of temporary rock barriers, 2013, 2014, and 2015 (12-18)	January 2013	May 2016	16,410
West False River and Rio Vista Storage Area	Emergency drought barrier removal and various work in the storage area (15-08)	August 2015	February 2016	14,618
Suisun Marsh, North Bay Aqueduct, North San Joaquin Division, and San Luis Division	Replace roofing at Montezuma Slough control buildings, Barker Slough Pumping Plant, Cordelia Pumping Plant, Gianelli Pumping-Generating Plant control house, and San Luis Operations and Maintenance center buildings (16-10)	August 2016	May 2017	1,530
San Luis, San Joaquin, and Southern field divisions	Phase I seismic retrofit of bridges (14-09)	August 2014	August 2017	1,564
San Joaquin Field Division	Replace standby engine generators (14-19)	May 2015	August 2017	4,450
Badger Hill Pipeline and Mojave Siphon	Pipeline repair (13-14)	November 2013	September 2018	3,325
Southern Field Division	Seal and pave roads and parking areas (14-05)	July 2014	March 2016	2,715

Chapter 13
Recreation

Fishing at sunrise at O'Neill Forebay.

Significant Events in 2016

The fifth year of drought in California continued to negatively impact recreation at many State Water Project (SWP) facilities despite some promising winter storms. Two Catch A Special Thrill (C.A.S.T.) for Kids events were cancelled due to low water levels.

Lake Perris experienced a record number of visitors despite the lowest water levels in its history due to the drought and because of water withdrawals taken in 2015. While the park was down to one launch ramp and dock for the whole facility, it attracted hundreds of boaters, possibly because other regional reservoirs were closed mid-summer due to low water levels or blue-green algal blooms.

Algae blooms affected Lake del Valle, San Luis Reservoir, Pyramid Lake, and Silverwood Lake during the summer months. The State Water Resources Control Board created a new public warning system about algae blooms in lakes with public access.

Information for this chapter was provided by the Division of Integrated Regional Water Management, the Public Affairs Office, the Division of Environmental Services, the Division of Operations and Maintenance, and the State Water Project Analysis Office.

The State Water Project (SWP) is a multipurpose project that provides recreational benefits to millions of Californians. In addition to providing water supply, flood control, and habitat for fish and wildlife, the SWP offers extensive and varied recreational opportunities—tours, sightseeing, fishing, hunting, picnicking, camping, boating, water skiing, bicycling, hiking, and swimming. Under the Davis-Dolwig Act (DDA), these recreational opportunities, as well as fish and wildlife enhancements, are not allocable as water and power costs to the SWP water contractors. The DDA, together with the Burns-Porter Act, provide financing for SWP recreational facilities and fish and wildlife enhancement projects, declaring that these projects benefit all the people of California and should be paid for by all Californians. The Department of Water Resources (DWR) coordinates with the California Department of Parks and Recreation (California State Parks) and the Department of Fish and Wildlife (DFW) to assure that the recreation and fish and wildlife enhancement potential at SWP facilities is fully realized.

Recreation Areas

The SWP has 37 developed recreation areas or sites throughout California, including 18 developed fishing access sites. Figure 13-1 shows the name and location of each area.

Recreation Use

Recreation Days

Since the SWP began delivering water in 1962, more than 247 million recreation days have been recorded at SWP recreation facilities. A recreation day is defined as one individual user visiting a recreation site along the SWP within all or part of a 1-day period.

In 2016, SWP facilities supported nearly 4.2 million recreation days of use, down slightly from the 4.4 million recorded in 2015. Most of the SWP recreation use was concentrated at the major reservoirs, with approximately 41 percent occurring in the Oroville Field Division and 36 percent occurring in the Southern Field Division.

California experienced a fifth year of significant drought in 2016, which continued to negatively impact recreation throughout the SWP. The major reservoirs in the Southern Field Division were especially impacted, with both low water levels and cancelled events. But despite the low water levels and draw-downs during dam repairs, recreation at Lake Perris remained steady throughout the year while other regional reservoirs, such as Diamond Valley Lake, remained closed to recreation through the season due to low water levels.

Invasive Species Issues

In 2016, there were two operation-related issues that will influence recreation in future years. One issue occurred at Lake Davis, where DWR announced resumption of normal operations at the reservoir, following years of keeping the lake level low as a precaution against the spread of Northern Pike beyond the lake. Because of the successful eradication of pike, the lake was allowed to fill to full elevation and capacity. The effects on recreation will be higher lake levels for boating, fishing, and other activities, and higher stream flows into Big Grizzly Creek below the lake.

The second and more serious issue was the discovery of six adult quagga mussels in the Angeles Tunnel during DWR's monthly quagga mussel inspections. The DFW, the

Figure 13-1 Names and Locations of SWP Recreation Areas

State's lead agency in invasive species management, designated Pyramid Lake as infested with the invasive species. Elderberry Forebay and Castaic Lake, both downstream from Pyramid Lake, are also presumed infested with the mussels. All boats and watercraft are subject to a mandatory exit inspection upon leaving both Pyramid and Castaic lake waters, and will not be granted a "clean boat" tag (which would indicate the vessels were in mussel-free waters). There are also changes to the procedures for fishing tournaments at Pyramid and Castaic lakes—both the tournament organizers and participants must properly clean, drain, and dry boats before and after the tournaments, and educational briefings and literature must be provided to all participants.

For more information about quagga mussels, see Chapter 3, Environmental Programs.

SWP Educational Visitors Centers

Visitation at DWR's three SWP educational visitors centers, in recreation days, totaled approximately 392,300. This included:

- 98,800 at Lake Oroville Visitors Center;
- 164,100 at Romero Overlook Visitors Center, San Luis Reservoir; and
- 129,400 at Vista del Lago Visitors Center, Pyramid Lake.

Overall, recreation usage of nearly 4.2 million recreation days at the SWP reservoirs listed in Table 13-1 contributed significantly to the total day-use visitors reported at the 280 units of the California State Park System.

Facilities

Planning

Lake del Valle State Recreation Area

In 2016, East Bay Regional Park District (EBRPD) had several capital improvements or major projects planned for Lake del Valle.

Restroom Project. DWR partnered with EBRPD to provide its share of the annual Land and Water Conservation Fund. As a result, EBRPD will be able to replace restroom buildings #10 and #19. EBRPD was awarded $337,973, a combination of both DWR and the California Wildlife Conservation Board's annual allocations, and is planning to replace restroom building #21 in 2017.

Visitor Center. EBRPD plans to remodel Rocky Ridge Visitor Center in 2017 with Land and Water Conservation Fund funds. DWR will provide displays to educate the public on Lake del Valle's role in the SWP and demonstrate how it fits into California's water system.

Cabins. EBRPD plans to construct six cabins near the campground's entrance as an alternative to tent and recreational vehicle camping.

New Trail. EBRPD plans to construct a trail to connect Lake de Valle and Shadow Cliffs Lake, part of Shadow Cliffs Regional Recreation Area.

Water Systems. There are plans to renovate and stabilize the existing water system at Lake del Valle.

San Luis Reservoir State Recreation Area

California State Parks and local district superintendents develop plans for future park needs and address issues such as removing overgrowth and improving visitor access and staff accommodations. The following planned improvements are scheduled to begin upon obtaining funding:

- install a kiosk at Dinosaur Point to be used for vessel examinations using a grant funded by the Quagga and Zebra Mussel Infestation Prevention Grant Program;

Table 13-1 Estimated Recreation Days in 2016, by Field Division and Facility

Field Division and Facility	Recreation Days (rounded)	
Oroville Field Division		
Frenchman Lake	23,100	e(1)
Antelope Lake	38,500	e(1)
Lake Davis	49,500	e(1)
Lake Oroville, Thermalito Diversion Pool, and Thermalito Forebay	891,700	
Thermalito Afterbay and Oroville Wildlife Area	331,100	
Feather River Fish Hatchery	266,800	
Lake Oroville Visitors Center	98,800	
Subtotal	***1,699,500***	
Delta Field Division		
Lake del Valle	516,000	
Bethany Reservoir	2,400	e(1)
Fishing Access Site:		
Niels Hansen	100	e(1)
California Aqueduct:		
Walk-in Fishing	100	e(1)
Bikeway	100	e(1)
White Slough Wildlife Area	9,100	e(1)
Subtotal	***527,800***	
San Luis Field Division		
San Luis Reservoir State Recreation Area: San Luis Reservoir, O'Neill Forebay, and Los Banos Reservoir	260,900	
Romero Overlook Visitors Center	164,100	
Subtotal	***425,000***	
San Joaquin Field Division		
Fishing Access Sites: Kettleman City, Lost Hills, Buttonwillow, and California Aqueduct Walk-in Fishing	23,900	e(1)
Subtotal	***23,900***	
Southern Field Division		
Silverwood Lake	285,800	
Lake Perris	532,600	
Vista del Lago Visitors Center	129,400	
Pyramid Lake	112,000	
Castaic Lake and Castaic Lagoon	414,400	
Fishing Access Sites:		
Quail Lake	2,400	e(1)
Longview Road	100	e(1)
California Aqueduct:		
Walk-in Fishing	3,300	e(1)
Bikeway	4,400	e(1)
Subtotal	***1,484,400***	
Total for Recreational Sites	**3,768,300**	
Total for Visitors Centers	**392,300**	
Grand Total	**4,160,600**	

Note: These values are provided by facility operators and numerous other sources and vary in their degree of accuracy. Recreation days are based on counts. Locations marked "e(1)" are not regularly monitored and are only visually monitored. It is likely that these areas are used significantly more than what is represented in this table, but it is difficult to ascertain a realistic annual use.

- provide electricity to the proposed Dinosaur Point kiosk location using funds from an existing grant; and
- resurface roads at the San Luis Creek South Beach parking area and the campground's north and south loop.

Silverwood Lake State Recreation Area

California State Parks researched adding a new entrance lane to their entrance station, and building a permanent concession store near the marina.

New Facilities

Lake del Valle State Recreation Area

EBRPD accomplished the following new projects at Lake del Valle in 2016:

- demolished and replaced restroom buildings #9 and #20 in the campgrounds with cement restrooms and showers with funding from a Land and Water Conservation Fund grant provided by DWR and the Wildlife Conservation Board;
- completed phase 1 of the Service Yard, the public safety storage building that houses two fire engines, one Gator rescue vehicle, one police boat, and one lifeguard boat; and
- completed three drought projects, including the installation of two volleyball courts on the east side of the park; a native plant garden in front of the campground store; and Kurapia (drought-tolerant groundcover) at the amphitheater.

San Luis Reservoir State Recreation Area

The following new projects were completed in 2016:

- added two trailer pads at the Basalt Area, north of the Basalt Campground, and contracted to supply electrical power to these new pads;
- installed "Next Exit" signs on Interstate 5 and State Route 33 for the San Luis Reservoir State Recreation Area; and
- installed a chain-link fence around the San Luis Creek water treatment plant, and the Basalt water storage tank.

Silverwood Lake State Recreation Area

The following new facilities were added in 2016:

- redesigned the park entrance station and recreational vehicle dump station; and
- redesigned the Campfire Center to accommodate users with disabilities, including demolishing old restrooms and constructing new ones.

Lake Perris State Recreation Area

A new electrical load center along with new electrical panels were installed to supply safe electrical service throughout the park. New air conditioning units in the entrance kiosks were also installed. To conserve water, low-flow plumbing was installed in the restrooms and showers throughout the park.

Improvements to Facilities

Lake del Valle State Recreation Area

In 2016, a total of 34 work orders were completed at Lake del Valle State Recreation Area by EBRPD. These included:

- removing hazardous trees that had been killed by dry conditions;
- applying gravel to the access road leading to the Eagles View group camp;
- repairing a leaking four-inch main water line in the campground across from building #19; and
- repairing a section of the Dog Run trail and the raw water line.

San Luis Reservoir State Recreation Area

In 2016, the following improvements were made at San Luis Reservoir State Recreation Area:

- refurbishing the Basalt Campground as part of an Earth Day grant, with sponsorship from the Four Rivers Association;
- replacing a broken raw water pump and an inefficient irrigation pump at the Basalt water treatment plant;
- removing graffiti from a cement parking stall at Medeiros Campground and a water tank at Los Banos Creek Reservoir; and
- raising the canopy on the trees in the day-use and campground areas to protect the parks from wildland fires.

Castaic Lake State Recreation Area

Los Angeles County Department of Parks and Recreation refurbished restroom building #15 at the Seven Acres campsite.

Silverwood Lake State Recreation Area

During 2016, California State Parks updated and improved restroom building #7 at the launch ramp, to accommodate users with disabilities. Additionally, the restroom of building #27 in the campground was replaced to accommodate users with disabilities.

The dock at the Cleghorn boat launch ramp was replaced. A new fish-cleaning station was also built in the boat lot.

Lake Perris State Recreation Area

California State Parks made a number of improvements to the Lake Perris State Recreation Area facilities, including:

- refurbishing 100 picnic tables and removing invasive trees with assistance from the California Department of Forestry and Fire Protection over a 45-day period;
- sealing cracks and repaving two miles of park roads; and
- replacing the Ya'i Heki' Regional Indian Museum flooring and entrance counter.

Recreation Activities

The SWP, with its many reservoirs and hundreds of miles of aqueducts, offers Californians extensive and varied recreational opportunities. From Antelope Lake in Northern California to Lake Perris in Southern California, the SWP includes facilities for anglers, boaters, campers, hikers, cyclists, and many others. While DWR manages the routing of water through the aqueducts and reservoirs, the recreational facilities are operated variously by federal, State, and local agencies and, in many cases, their private concessionaires. Visitors to SWP recreation facilities can swim, water ski, picnic, and enjoy many other recreational activities. See Figure 13-2 for the various types of recreation available along the SWP.

Antelope Lake Recreation Area

DWR co-hosted a kid's fishing derby with the U.S. Forest Service. Staff from the Public Affairs Office and the Northern Region Office handed out drought information, coloring books, and prizes that included fishing poles and reels.

Lake Oroville State Recreation Area

DWR, California State Parks, and other agencies sponsored a number of activities at Lake Oroville State Recreation Area in 2016.

DWR and California State Parks helped support, through a contract with the Oroville Chamber of Commerce, the annual Oroville Salmon Festival. This one-day event, held at the Feather River Fish Hatchery, downtown Oroville, and the Feather River Nature Center, was attended by an estimated 24,000 participants.

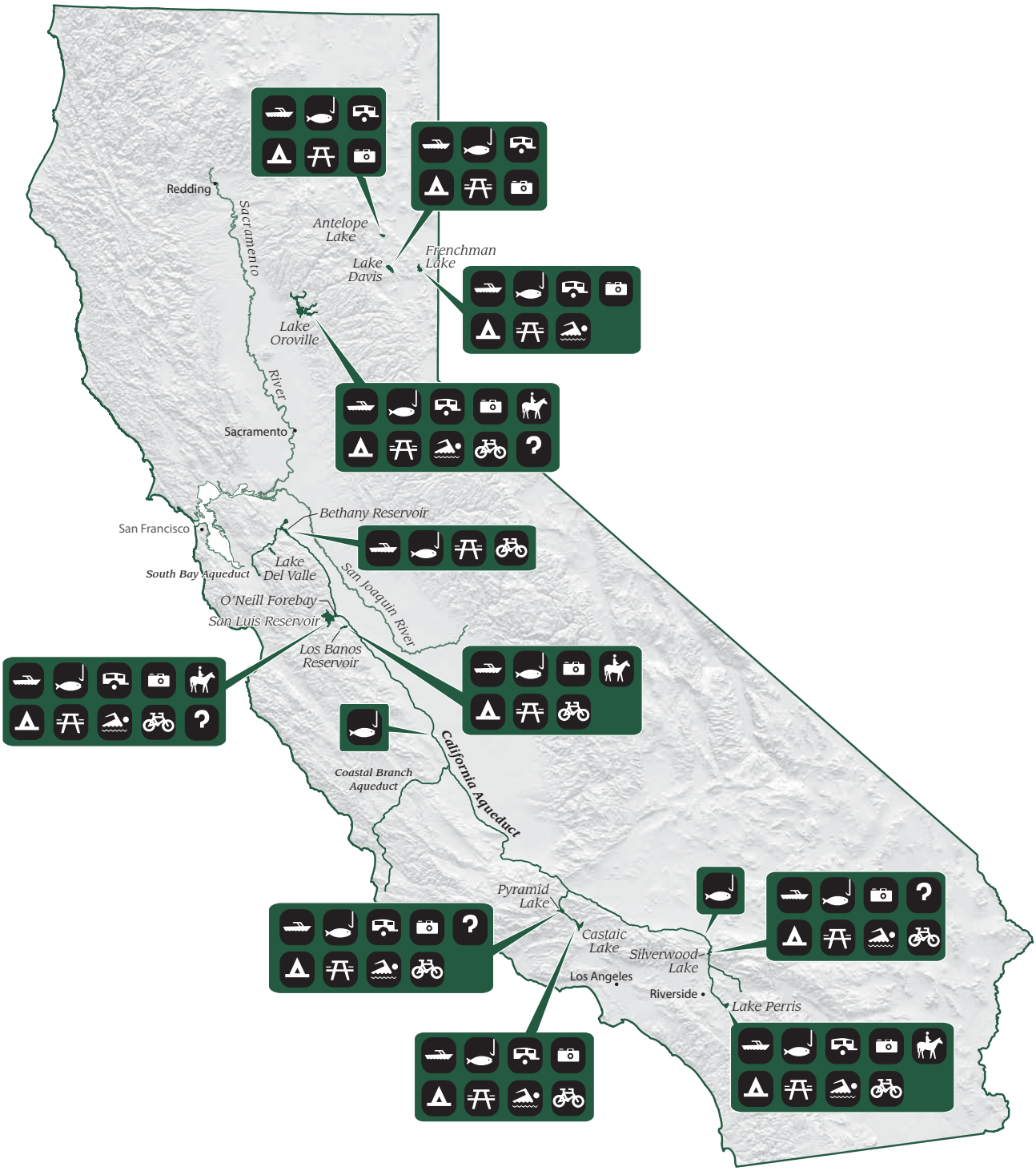


Figure 13-2 **Types of Recreation along the SWP**

California State Parks held a Native Ways Celebration, attended by 563 visitors, at the Lake Oroville Visitors Center.

California State Parks hosted Bidwell Bar Days at Bidwell Canyon Day Use Area's historic Toll House. The event treated 1,100 park visitors to a day in the life of the old west.

Kiwanis hosted a "Hooked on Fishing-Not on Drugs" free kids' fishing day at Bedrock Park with support from DWR staff. Approximately 1,000 people attended the half-day event.

The annual Harvest Day was celebrated with 640 visitors.

California State Parks hosted the annual Frontier Christmas at the Lake Oroville Visitors Center. Approximately 1,075 visitors learned how to make pioneer crafts and pan for gold.

DWR, California State Parks, and the California Department of Forestry and Fire Protection hosted a C.A.S.T. (Catch A Special Thrill) for Kids fishing event for children with special needs. The event, which treated 28 children to a day of fishing on the lake, had a reported attendance of more than 110 volunteers, including 15 experienced bass fishermen.

Lake del Valle State Recreation Area

The EBRPD sponsored or co-sponsored the following activities at the Lake del Valle State Recreation Area in 2016:

- five Aquatic Adventure Camps, co-sponsored by DWR and the Richmond Police Athletic League, served 110 children;
- Coastal Cleanup Day 2016, where 150 volunteers cleaned up the Lake del Valle shoreline, removing 300 pounds of trash and 500 pounds of recyclable materials;
- 87 Regional in Nature programs led by naturalists serving 1,633 individuals, and 33 other nature programs serving 847 individuals;
- 15 campfire programs, which served 1,968 attendees;
- 29 boat tours of Lake del Valle serving 489 attendees;
- 140 children from nine Youth Employment Programs participated in one of seven Community Outreach Overnight Programs throughout the summer, co-sponsored by the YMCA and other local agencies; and
- 8,106 attendees visited the Rocky Ridge Visitor Center to learn about the local fauna and flora.

San Luis Reservoir State Recreation Area

California State Parks sponsored the "Path of the Padres" hikes, funded by the Four Rivers Association. During March and April 2016, 650 hikers were exposed to wildflowers, geology, cultural and historic areas, and Native American sites along a 35-mile trail. Water conservation and the reservoir systems at Los Banos and San Luis reservoirs were discussed on a boat ride to the trailhead.

California State Parks provided 12 Junior Ranger programs at San Luis Creek Campground on weekends from June through September.

California State Parks provided five campfire programs to more than 300 park visitors at the refurbished Basalt Campground over three holiday weekends.

California State Parks added a fishing concession and a jet ski rental concession to provide additional activities for guests.

California State Parks hosted the Central Valley's second Junior Lifeguard Program

at San Luis Creek on O'Neill Forebay. The 3-week program provided training, activities, and education for the 16 young people that participated. The Junior Lifeguard Program provides children ages 9 to 14 with entry-level training to become a lifeguard. It promotes aquatic safety and awareness in addition to teaching water safety.

DWR and its partners, including California State Parks, the California Department of Forestry and Fire Protection, the San Joaquin River Exchange Contractors Water Authority, the San Luis & Delta-Mendota Water Authority, and the Bureau of Reclamation, hosted special-needs children at a C.A.S.T. for Kids fishing event at O'Neill Forebay. Twenty-two local children were treated to a day of fishing with 10 of the area's top Delta tournament fishermen.

Castaic Lake State Recreation Area

The County of Los Angeles Department of Parks and Recreation sponsored the following activities at Castaic Lake State Recreation Area in 2016:

- 10 "Splash in the Water" events with 636 children ages 7 to 14 who learned about water safety, kayaking, canoeing, standup paddleboarding, and sailing;
- 18 standup paddleboarding classes to a total of 212 participants;
- two Junior Lifeguard Program sessions, co-sponsored with Teague Custom Marine, for a total of 400 participants ages 9 to 17 who learned lifeguarding, first aid, CPR, and water safety skills;
- 16 sessions of FamCamp for 658 participants ages 17 and under, which taught boating safety, camping, and team-building principles;
- 40 drop-in kayak clinics provided to 1,270 participants ages 8 and up;
- 18 kayaking classes for 76 participants;
- 20 programs offering paddle sports demonstration activities with a total of 1,018 participants;
- 58 days of dragon boat paddling to 1,052 participants who learned how to paddle as a team;
- four moonlight kayak classes in which 81 participants learned about the environment at the lake, the SWP, water safety, and boating safety;
- a 1-day event for 1,800 participants that included kayaking, paddleboarding, hiking, swimming, and dragon boat racing; and
- nine dates of "Splash Party" offered to 460 participants.

Silverwood Lake State Recreation Area

In 2016, California State Parks sponsored the following activities at Silverwood Lake State Recreation Area:

- Bald Eagle barge tours for park visitors on Saturdays and Sundays from January through March, where monthly eagle counts were taken;
- an Adopt-a-School program serving more than 100 children;
- an Earth Day celebration enjoyed by 38 participants who provided assistance in performing minor maintenance in the park;
- the fifth annual Apple Festival held near the Silverwood Historic Apple Orchard, and a preview of exhibits in the Silverwood Lake Nature Center was available to the 81 participants; and
- a C.A.S.T. for Kids fishing event, which paired 25 special-needs children with 19 experienced bass fishermen for a day of fishing on the lake, co-hosted by DWR.

Lake Perris State Recreation Area

Lake Perris State Recreation Area experienced a record number of visitors despite the lowest water levels in its history, due to the drought and water withdrawals taken in 2015. While the park was down to one launch ramp and dock for the whole

facility, it attracted hundreds of boaters. In addition, park visitors were restricted from accessing the east section of the park due to the Perris Dam Remediation Project.

California State Parks and other agencies sponsored a number of activities at Lake Perris State Recreation Area in 2016, which included the following:

- in partnership with the City of Perris, hosted four hikes, beginning with a New Year's First-Day Hike, numerous activities and concerts;
- in cooperation with the San Bernardino Unified School District, a Summer Enhancement Program that hosted 500 students at Lake Perris, teaching them swimming, fishing, and other forms of outdoor activities;
- a Holiday Boat Parade that brought in 31 decorated boats for 400 visitors to enjoy;
- the U.S. Forest Service volunteer-assisted annual winter Bald Eagle counts;
- outdoor education activities, including geocaching, for 300 children;
- three sessions of Aquatic Adventure Camp, co-hosted by DWR, where more than 150 children enjoyed recreational activities;
- a three-week Junior Lifeguard program for children ages 8 to 15, which taught 33 participants about natural and cultural resources, first aid, CPR, and aquatic safety;
- 12 Junior Ranger Programs for children ages 3 to 15, and 12 Campfire Programs;
- a DFW program that helped children raise fish, which were later released into the lake; and
- a floating aquatic playground put in the lake for younger children to enjoy toward the end of the 2016 season.

Oroville Recreation Plan

The Oroville Facilities, including Lake Oroville State Recreation Area, Oroville Wildlife Area, and adjacent DWR facilities, are operated in conformance with the 1993 Amended Recreation Plan that was approved by the Federal Energy Regulatory Commission (FERC) in its 1994 Order 2100-054. In 2006, DWR and its Settlement Agreement signatories submitted the Settlement Agreement Recreation Management Plan (SARMP, March 2006) for FERC approval. The approved SARMP will be implemented when the new hydropower license is issued by FERC, currently expected sometime in 2018 or later.

Additional recreation improvements identified and proposed in the SARMP are anticipated to be constructed after the new FERC license is issued. The new license terms and conditions are expected to be consistent with the proposed SARMP. In the meantime, DWR, California State Parks, and DFW—Davis-Dolwig Act (DDA) collaborating partners—will continue to operate the Oroville Facilities recreation facilities consistent with the existing FERC license (renewed annually) and its associated 1993 Amended Recreation Plan.

Fish Plantings

In 2016, DFW planted 571,500 fish into SWP reservoirs (see Table 13-2). This was a 7 percent increase over the previous year's fish planting of 534,300, which had been the largest decrease in fish plantings in 10 years (67.6 percent decrease). Chinook Salmon were planted into both Lake Oroville and Thermalito Afterbay. In prior years, Thermalito Afterbay was primarily planted with steelhead trout.

Table 13-2 Fish Planted by the Department of Fish and Wildlife in 2016 (thousands)[a]

Location and Size	Eagle Lake Trout	Brook Trout	Rainbow Trout	Chinook Salmon	Steelhead Trout	Kokanee Salmon	Total for Lake
Antelope Lake							
Catchable	6.2	15.1	25.8				47.1
Lake Davis							
Fingerling	75.3						
Subcatchable	32.4						
Catchable			7.0				114.7
Frenchman Lake							
Fingerling	75.3						
Catchable	20.3						95.6
Lake Oroville							
Subcatchable				133.1			133.1
Thermalito Afterbay							
Subcatchable				9 . 6			9.6
Lake del Valle							
Catchable	3.8		23.7				27.5
Los Banos Reservoir							
Catchable	2.3		10.8				13.1
Pyramid Lake							
Catchable			25.6				25.6
Castaic Lake							
Catchable			37.3				
Supercatchable			3.0				40.3
Silverwood Lake							
Catchable			52.4				52.4
Lake Perris							
Catchable			3.5				
Subcatchable			9.0				12.5
Total	**215.6**	**15.1**	**198.1**	**142.7**	**0.0**	**0.0**	**571.5**

[a] Information provided by DFW, using the following size classes: yearling = a maximum of 20.0 fish per pound; fingerling = 16.1 fish per pound or smaller; subcatchable = between 16.0 and 6.1 fish per pound; catchable = between 6.0 and 1.0 fish per pound; supercatchable = larger than 1.0 fish per pound and up to 0.34 fish per pound; and trophy = 0.33 fish per pound or larger (or greater than 2.99 pounds per fish).

SWP Deliveries for Recreation

DWR has an agreement with California State Parks to provide onshore recreation water at several SWP facilities in an amount prorated to the yearly SWP Table A allocation. Per the 60 percent SWP Table A allocation for 2016, maximum diversion amounts under the onshore recreation agreement were allocated at 60 percent, or a total of 4,068 acre-feet (af), as follows: 1,650 af at San Luis Reservoir; 240 af at Lake del Valle; 1,398 af at Castaic Lake and Castaic Lagoon; 750 af at Lake Perris; and 30 af at Bethany Reservoir. Actual deliveries under the agreement totaled 979 af, as follows: 8 af at San Luis Reservoir; 69 af at Lake del Valle; 795 af at Castaic Lake and Castaic Lagoon; 107 af at Lake Perris; and 0 af at Bethany Reservoir. Additional SWP recreation

deliveries included 56 af at Silverwood Lake and 23 af at Pyramid Lake. Details about these deliveries are provided in Chapter 9, Water Contracts and Deliveries.

Recreation Financing

Prior to 2001, DWR reported capital costs allocated to fish and wildlife enhancement and recreation in Bulletin 132, Appendix D, *Costs of Recreation and Fish and Wildlife Enhancement*. With the passage of Senate Bill 1191 (Speier) in October 2001, this report was no longer mandated by the Legislature, but recreation capital cost information continued to be reported in Bulletin 132 starting with fiscal year 2000–2001.

The approach to financing recreation and fish and wildlife enhancement (RFWE) in connection with the SWP is provided in the DDA (California Water Code [CWC] Sections 11900–11925) and the Burns-Porter Act (CWC Section 12937). Additionally, as early as 1953, financing for RFWE was addressed in CWC Sections 233, 345, 346, 12581, and 12582. These statutes declare that recreation at the SWP is a benefit to all the people of California and that the associated costs should be borne by all Californians. While this intent is cited in the DDA, no specific appropriation or funding source was defined. Consequently, Assembly Bill 12 (Porter) in 1966; Senate Bill 1268 in 1970; and the Environmental Water Act—Assembly Bills 1441 and 1442—in 1989 were all enacted to provide the necessary State funding for this SWP purpose. The DDA does, however, explicitly preclude DWR from including RFWE costs in the SWP charges for water and power billed to SWP water contractors.

The Legislature has intermittently appropriated monies to meet State obligations to fund SWP RFWE. Assembly Bill 12 appropriated $5 million per year to DWR from $90 million in tidelands oil and gas revenues. By the early 1980s, DWR had expended the entire $90 million toward funding SWP RFWE obligations. Senate Bill 1268 appropriated $55 million to California State Parks and $5 million to DFW specifically for their responsibilities under the DDA at SWP facilities. Finally, Assembly Bill 1442 appropriated $172 million to reimburse DWR for SWP RFWE costs incurred over the previous 12 years as an offset to DWR's California Water Fund repayment, and an additional $30 million for SWP RFWE through 1994.

In 2012, the DDA was amended to continuously appropriate $10 million per year to DWR. The funding was sourced from the Harbors and Watercraft Revolving Fund that is funded by fuel taxes at marinas statewide; this continuous SWP RFWE funding is essentially a user-funded source. Of the $10 million, $2.5 million per year is for past unreimbursed SWP RFWE costs incurred by DWR through December 31, 2011, and the remaining $7.5 million per year is primarily intended to fund DWR's ongoing annual joint SWP RFWE costs that are generated through DWR's statutory mandate to allocate SWP costs to their respective purposes, including RFWE. These joint costs are those for facilities such as dams, which were constructed to provide multiple benefits such as flood control, water supply, power generation, and RFWE. DWR is required to determine and allocate shares of such facilities to all of the respective purposes. Moreover, the DDA prohibits SWP RFWE purpose costs from being included in charges for water and power to SWP water contractors so the 2012 amendment filled a long-standing shortfall in SWP RFWE funding.

The 2012 DDA amendment was the result of several years of close, cooperative solution development that involved the Natural Resources Agency, the Department of Finance, the Legislative Analyst's Office, legislative staff, DWR, and many of the SWP water contractors.

As another part of the cooperative solution to the long-standing DDA funding difficulties, DWR reexamined the joint RFWE allocation for SWP transportation facilities located south of Dos Amigos Pumping Plant, and beginning January 1, 2013, made revisions to the RFWE allocations described in Table 2 of Appendix B (located at the end of this bulletin).

Capital Cost Allocations

Table 13-3 shows capital costs allocated to RFWE and overall costs of lands acquired for recreation development through 2016. Total capital costs increased by $20,598,323 over those reported in Bulletin 132-16 due to an increase of $20,580,777 in 2016, and an upward adjustment of $17,546 in years prior to 2016. The increase in 2016 included $19,836,563 in joint costs and $744,214 in specific costs. These costs are budgeted by DWR from funds available for financing project construction costs. Recreation and enhancement costs not reported in this table are budgeted by several State departments and are financed by appropriations from a variety of funds.

Table 13-3 Recreation and Enhancement Capital Costs of the State Water Project (in dollars)

Facility	Joint Costs Allocated to Recreation and Enhancement			Specific Costs Allocated to Recreation and Enhancement			Total
	1952–2015 Updated	2016	Subtotal	1952–2015 Updated	2016	Subtotal	
Frenchman Dam and Lake (78.5%)[a]							
California Water Resources Development Bond Fund	102,997	0	102,997	3,379	0	3,379	106,376
All Other Funds	2,719,924	4,858	2,724,782	49,950	0	49,950	2,774,732
Antelope Dam and Lake (100%)[a]							
California Water Resources Development Bond Fund	1,033,261	0	1,033,261	3,167	0	3,167	1,036,428
All Other Funds	4,626,085	5,398	4,631,483	201,137	0	201,137	4,832,620
Grizzly Valley Dam and Lake Davis (99.0%)[a]							
California Water Resources Development Bond Fund	4,003,092	0	4,003,092	204,475	0	204,475	4,207,567
All Other Funds	4,191,198	3,837	4,195,035	554,246	0	554,246	4,749,281
Other Feather River Projects (100%)[a]							
California Water Resources Development Bond Fund	0	0	0	9	0	9	9
All Other Funds	746,174	0	746,174	9,921	0	9,921	756,095
Delta Facilities (3.4%)[a]							
California Water Resources Development Bond Fund	0	0	0	0	0	0	0
All Other Funds	14,566,497	684,692	15,251,189	0	0	0	15,251,189
San Luis Dam and Reservoir, O'Neill Forebay, and Los Banos Reservoir (3.4%)[a]							
California Water Resources Development Bond Fund	988,910	0	988,910	395,284	0	395,284	1,384,194
All Other Funds	4,729,969	441,508	5,171,477	867,243	0	867,243	6,038,720
California Aqueduct, Delta to Dos Amigos Pumping Plant (3.4%)[a]							
California Water Resources Development Bond Fund	4,467,667	0	4,467,667	422,681	0	422,681	4,890,348
All Other Funds	6,191,935	199,375	6,391,310	-91,879	0	-91,879	6,299,431
Oroville Division (2.9%)[a]							
California Water Resources Development Bond Fund	5,725,216	0	5,725,216	7,809,509	0	7,809,509	13,534,725
All Other Funds	7,070,734	249,504	7,320,238	6,335,381	637,410	6,972,791	14,293,029
Del Valle Dam and Lake del Valle (48.0%)[a]							
California Water Resources Development Bond Fund	10,546,762	0	10,546,762	519,425	0	519,425	11,066,187
All Other Funds	4,391,352	6,866	4,398,218	-32,202	0	-32,202	4,366,016
California Aqueduct, Dos Amigos Pumping Plant to Termini (0.4%–32.3%)[a,b]							
California Water Resources Development Bond Fund	48,382,162	0	48,382,162	3,880,547	0	3,880,547	52,262,709
All Other Funds	108,635,122	18,240,525	126,875,647	7,067,032	106,804	7,173,836	134,049,483
Total	**233,119,057**	**19,836,563**	**252,955,620**	**28,199,305**	**744,214**	**28,943,519**	**281,899,139**

[a] Percentages are the share of joint costs.

[b] Specific costs for Dos Amigos Pumping Plant to Termini include $2,905,649 for Castaic Dam and Lake, $795,130 for Cedar Springs Dam and Silverwood Lake, $6,455,545 for Perris Dam and Lake Perris, and $898,059 for the California Aqueduct.

Chapter 14
Financial Analysis

Thermalito Afterbay.

Significant Events in 2016

On May 24, the Department of Water Resources (DWR) delivered $106.530 million of Water System Revenue Bonds, Series AV. The proceeds were presold on May 10 to refinance commercial paper and pay bond financing costs.

On October 20, DWR delivered $428.130 million of Water System Revenue Bonds, Series AW. The proceeds were presold on October 13, to provide up-front financing of construction expenditures, to refinance commercial paper, to refinance previously sold bonds, and to pay bond financing costs.

Information for this chapter was provided by the State Water Project Analysis Office in conjunction with the Division of Fiscal Services.

This chapter presents both a summary and a detailed explanation of the State Water Project's (SWP) current financial analysis, capital costs and requirements, revenues and expenses, and bond activities for years 2016 through 2026.

The Department of Water Resources (DWR) performs a financial analysis annually to ensure the SWP financing program will have sufficient funds to meet construction obligations; project operation, maintenance, power, and replacement costs; and debt service payments for bonds expended for construction. The results of the current financial analysis, dated December 31, 2016, are presented in Tables 14-1 and 14-2, located at the end of this chapter. (Please note that, in some instances, the tables and text figures in this chapter may not sum as expected due to rounding.)

Future contingencies may change the financial analysis, some of which include:

- alterations in schedules of currently planned construction for future facilities;
- changes in economic conditions, including changes in interest rates and in SWP water contractor Table A amounts due to changes in amounts of water needed, conserved, or reclaimed;
- development of additional sources of water not foreseen at this time;
- deviations from the assumptions regarding actual rates of price escalations for future construction from those currently assumed for cost estimates;
- increases in capital costs related to additional conservation facilities; and
- outcome of lawsuits now pending before the courts.

Capital Requirements and Financing

In conducting the current financial analysis, DWR projected future construction costs through the year 2026 including borrowing of $119 million interim financing for prior expenditures will total $1.0 billion. Special capital requirements for revenue bond financing of these construction costs are projected at $92 million for a total capital requirement of $1.1 billion. This projection includes construction and financing costs for the following significant SWP projects planned for completion by 2026:

- Perris Dam remediation;
- Phase II enlargement of the East Branch of the California Aqueduct;
- Phase II of the East Branch Extension; and
- a new intake to the North Bay Aqueduct.

Most of these capital requirements will be financed from the projected sale of $1.0 billion of revenue bonds. SWP water contractors will directly be paying $1.5 million. The remaining $45 million of the total capital requirement of $1.1 billion will be financed from capital resources revenues and the transfer of revenues not needed for operation costs or debt service.

The analysis of capital requirements and financing presented in Table 14-1 does not include the costs and financing of all facilities needed to develop the remaining yield necessary to meet the total 4.2 million acre-foot contractual commitment to long-term SWP water

contractors. Table 14-1 also excludes the costs of associated facilities financed and constructed by local interests or State agencies other than DWR. Those facilities are essential for realizing full benefits from the SWP and include on-shore recreational developments at SWP facilities and local distribution facilities.

The allocation of capital expenditures for various SWP purposes is detailed in Table 14-3.

Capital Requirements

Lines 1 through 20 in Table 14-1 show actual and projected SWP capital requirements through 2026. Estimates of future capital expenditures include allowances for construction cost escalation of 5 percent per year from 2017 through 2026. Right-of-way costs are escalated at 4 percent per year from 2017 through 2026. Capital expenditures for the SWP also include requirements other than those for construction, such as disbursements made as part of the Davis-

Table 14-3 Allocation of Capital Expenditures (in thousands of dollars)

Facilities and Construction Divisions	Expenditures Incurred Through 2016	Future Expenditures	Total	Preliminary Allocation Among Project Purposes			
				Water Supply and Power Generation	Flood Control[a]	Recreation and Fish and Wildlife Enhancement	Other[b]
Project Construction Expenditures							
Upper Feather Division	20,022	0	20,022	1,560	0	18,463	0
Oroville Division (excludes Small Hydro)	896,333	239,411	1,135,745	1,036,167	71,690	27,888	0
Delta Facilities Division	479,180	344,784	823,964	788,775	0	35,189	0
North Bay Aqueduct	120,623	1,464	122,087	122,087	0	0	0
South Bay Aqueduct	402,386	1,600	403,986	380,250	8,304	15,432	0
California Aqueduct							
North San Joaquin Division	322,300	37,593	359,893	347,426	0	12,467	0
San Luis Division	346,905	52,235	399,140	384,220	0	14,920	0
South San Joaquin Division	360,463	56,220	416,683	398,681	0	18,002	0
Tehachapi Division	385,544	28,991	414,535	393,621	0	20,914	0
Mojave Division (excludes Small Hydro)	382,128	19,791	401,919	361,773	0	40,146	0
Santa Ana Division	412,765	102,059	514,824	423,216	0	91,608	0
West Branch	567,331	42,705	610,035	574,843	0	35,192	0
Coastal Branch	501,432	13,187	514,619	514,619	0	0	0
Subtotal, California Aqueduct	*3,278,868*	*352,781*	*3,631,649*	*3,398,399*	*0*	*233,249*	*0*
Other Project Facilities							
Small Hydroelectric Power Generating Facilities	100,176	24,520	124,696	124,696	0	0	0
Off-Aqueduct Power Generating Facilities	491,574	0	491,574	491,574	0	0	0
East Branch Enlargement	462,031	0	462,031	462,031	0	0	0
East Branch Extension	400,921	12,381	413,302	413,302	0	0	0
Coastal Power Allocation	30,708	0	30,708	30,708	0	0	0
Agricultural Drainage Facilities	87,876	18,200	106,076	0	0	0	106,076
Planning and Pre-operations	79,372	30,000	109,372	109,372	0	0	0
Unassigned/Miscellaneous	64,412	93,113	157,525	0	0	0	157,525
Subtotal, Project Construction Expenditures	*6,914,483*	*1,118,254*	*8,032,737*	*7,358,921*	*79,994*	*330,221*	*263,601*
Other Capital Requirements							
Davis-Grunsky Act Program	130,000	0	130,000	0	0	0	130,000
Total Capital Expenditures	**7,044,483**	**1,118,254**	**8,162,737**	**7,358,921**	**79,994**	**330,221**	**393,601**

[a] Reflects DWR's allocation to this purpose irrespective of federal payments.

[b] Includes costs currently unassigned to purpose, planning costs of deleted features of project facilities, initial costs of inventoried items, and costs assigned to the Davis-Grunsky Act Program.

Grunsky Act Program (Line 16) and special capital requirements under revenue bond financing (Line 17). DWR will decide whether to construct facilities only after examining alternatives and completing environmental documentation and other review processes.

Line 1, Initial Project Facilities, includes only those facilities completed in the initial construction program, which concluded December 31, 1973 (see Bulletin 132-74, Chapter 2). Additional costs after 1973, and estimated costs of remaining work on the initial SWP facilities, are not included.

Line 2, North Bay Aqueduct, consists of the costs for Phase II, improvements, and the Alternate Intake Project. Operational in May 1988, Phase II connected with the Phase I facilities, which were completed in 1968 (Phase I costs are included in the initial project facilities discussed in Line 1). Phase II included costs for pipelines, pumping plants, and a small reservoir necessary to divert water from the western Delta to Napa and Solano counties for urban use. The improvements consist of replacing the existing tank with two 5-million gallon tanks. Construction of the new tanks began in 2007 and was completed in 2010. The Alternate Intake Project, currently in the design phase, includes a new point of diversion along the Sacramento River or its tributaries, a new pumping plant, an in-line storage tank, and an underground pipeline connection to the existing North Bay Aqueduct.

Line 3, Delta and Suisun Marsh Facilities, shows historical costs that include planning for general Delta facilities and the previously planned peripheral canal and overland water delivery facilities for the western Delta. Also included are historical planning costs for Suisun Marsh as well as construction costs for the Suisun Marsh Salinity Control Gates and an access road. The projected amounts include projected planning costs plus projected costs for fish screens at Sherman and Twitchell islands.

Line 4, Final Four Units at Banks Pumping Plant, includes costs of the final four 1,067 cubic feet per second units, which became operational in spring 1992.

Line 5, Coastal Branch Aqueduct, includes all costs for the planning, design, and construction of Phase II of the Coastal Branch of the California Aqueduct. Phase II construction began in October 1993 and was completed in 1997. Water deliveries from Phase II facilities began in July 1997.

Line 6, West Branch Aqueduct, shows costs for all facilities on the West Branch except Warne Powerplant. Those costs are included in Line 11.

Line 7, East Branch Enlargement, includes expenditures for Phases I and II of the East Branch Enlargement. Phase I included the enlargement share of power plant costs at Mojave Siphon and Devil Canyon. (The remaining power plant costs are included in Line 11.) East Branch Enlargement costs for Phase I, by facility, are presented in Table 14-4. Costs for Alamo Powerplant consist of expenditures for Unit 1 facilities allocated to enlargement.

Work on the draft environmental impact report, mapping, and conceptual design for Phase II of the enlargement began in March 2007 and ceased in 2013 at the request of the participating contractors.

Table 14-4 East Branch Enlargement Capital Costs by Facility

Facility	Amount (in millions of dollars)
Aqueduct and Siphons	128.1
Pearblossom Pumping Plant	70.1
Alamo Powerplant	5.0
Mojave Siphon Powerplant	47.3
Devil Canyon Powerplant and Second Afterbay	202.9
Total	**453.4**

Project costs include raising the canal embankment and concrete lining, constructing additional siphon barrels, adding bays to check structures, constructing Unit 2 at Alamo Powerplant, and adding two pump/motor units and a discharge line at Pearblossom Pumping Plant. Construction of Unit 2 at Alamo Powerplant is expected to be completed in 2023, all other Phase II construction has been postponed indefinitely.

All costs in Line 7 are allocated to and repaid by the seven Southern California contractors participating in the East Branch Enlargement.

Line 8, East Branch Improvements, shows all aqueduct costs on the East Branch not allocated to the enlargement project. Those costs include improvements constructed concurrently with the enlargement work, the reconstruction of the San Bernardino Tunnel Intake, and the construction of the Tehachapi East Afterbay. Costs for power plant construction at Alamo, Mojave Siphon, and Devil Canyon are not included in this line.

Line 9, East Branch Extension, shows expenditures for Phases I and II of the extension of the East Branch of the California Aqueduct. The East Branch Extension extends the California Aqueduct east from the Devil Canyon Powerplant to a terminus at Noble Creek near Beaumont in Riverside County. The extension provides water service to the San Gorgonio Pass Water Agency and the San Bernardino Valley Municipal Water District. Construction of Phase I began in February 1999 and was completed in 2003. Phase I improvements include enlargement of the Crafton Hills Reservoir and construction of the Yucaipa Connector Pipeline. Construction of this phase was completed in 2014. Phase II will increase the pumping capacity to 100 percent of design capacity. Construction of Phase II began in 2012 and is scheduled to be completed in 2020. All costs in Line 9 will be allocated to and repaid by the two participating contractors.

Line 10, South Bay Aqueduct Improvements and Enlargement, shows expenditures for providing additional capacity required to meet increases in water demands for the service area of Alameda County Flood Control and Water Conservation District, Zone 7, and increasing the existing capacity of the South Bay Aqueduct (SBA) to its original design capacity. Construction began in 2006, and overall project work was completed in 2014.

Line 11, Power Generation and Transmission Facilities, does not include the East Branch Enlargement share of costs for Alamo, Mojave Siphon, and Devil Canyon powerplants shown in Line 7 of Table 14-1. The capital costs for facilities included in Line 11 are shown in Table 14-5.

Line 12, Additional Conservation Facilities, shows projected costs to plan and study additional conservation facilities. Specific planning activities and projected spending

Table 14-5 Estimated Capital Costs for Power Generation and Transmission Facilities

Power Plants and Transmission Lines	Amount (in millions of dollars)
Power Plants	
Reid Gardner, Unit 4	314.2
Bottle Rock	120.9
South Geyers	49.6
Devil Canyon	36.8
Warne	84.5
Alamo	44.9
Mojave Sipon	41.2
Hyatt	46.2
Robie Thermalito	124.9
Subtotal	*863.1*
Transmission Lines	
Midway-Wheeler Ridge	10.7
Geyers-Lakeville	6.9
Subtotal	*17.6*
Total	**880.6**

amounts for 2017 through 2026 are shown in Table 14-6. Expenditures for these items are being reviewed. Construction costs of additional conservation facilities are not included in the financial analysis.

Line 12 does not include the Bay Delta Conservation Plan/California WaterFix costs. DWR's share of the Bay Delta Conservation Plan/California WaterFix expenditures for preliminary planning and environmental impact report preparation are currently financed by participating contractors.

Table 14-6 Estimated Future Costs for Planning Additional Conservation Facilities

Activity	Amount (in millions of dollars)
SWP Future Water Supply	30.0
Other Planning Costs	0.0
Total	**30.0**

Line 13, Agricultural Drainage Facilities, includes projected costs of the Agricultural Drainage Program. The activities in this program are monitoring, evaluating, reducing, and treating drainage, as well as investigating treatment and reuse of drainage water.

DWR assumes that future costs of the drainage program will be financed by revenue transfers (Line 37).

Line 14, Other Costs, includes items such as general design and construction costs, costs of completing operation and maintenance facilities, and costs of other completion activities for the initial facilities of the California Aqueduct. Portions of those costs ultimately will be allocated to California Aqueduct units described in the preceding paragraphs.

Line 15, Total Project Construction Expenditures, is the total of Lines 1 through 14.

Line 16, Davis-Grunsky Act Program Costs, shows costs of the Davis-Grunsky Act Program, a financial assistance program to provide grants and loans to public agencies for constructing local water projects.

As of December 31, 2016, DWR had disbursed $130 million (including $8.5 million for administration) in grants and loans to local agencies throughout the state.

Line 17, Special Capital Requirements Under Revenue Bond Financing, presents special capital requirements at the time revenue bonds are sold. The financial analysis assumes that proceeds from any future revenue bonds will be used to pay for bond discounts, bond issuance costs, and debt service reserve requirements.

Information about the application of proceeds to these special requirements for actual and assumed revenue bond sales is presented in Table 14-7.

Line 18, Total Capital Requirements, is the total of Lines 15, 16, and 17.

Line 19, Power Facilities Capital Requirements, shows the total capital requirements for power facilities included in Line 18.

Line 20, Water Facilities Capital Requirements, shows the total capital requirements for water facilities included in Line 18.

Capital Financing

The SWP was constructed using three general types of financing: Burns-Porter Act, revenue bonds, and capital resources. Lines 21 through 37 of Table 14-1 present specific information about these financing sources.

Table 14-7 Application of Revenue Bond Proceeds (in millions of dollars)

Bond Series[a]	Construction Expenditures	Other Capital Requirements					Total Principal Amount of Bonds
		Reimbursement of General Fund	Capitalized Interest	Capitalized Operating Costs	Bond Financing and Refunding Costs[b]	*Subtotal*	
Oroville	218.0	2.6	19.9	1.5	3.0	*27.0*	245.0
Devil Canyon-Castaic	126.4	0.0	10.0	0.7	2.1	*12.8*	139.2
Pyramid Series A	74.0	0.0	19.2	1.0	1.6	*21.8*	95.8
Reid Gardner Series B	146.1	0.0	41.9	0.0	12.0	*53.9*	200.0
Reid Gardner Series C	91.1	0.0	17.9	7.9	8.1	*33.9*	125.0
Small Hydro-South Geysers Series D	49.6	0.0	19.9	0.0	5.5	*25.4*	75.0
Bottle Rock Series E	96.9	0.0	22.0	3.7	2.4	*28.1*	125.0
Alamo-South Geysers Series F	59.1	0.0	14.2	0.0	1.7	*15.9*	75.0
Reid Gardner Series G	1.6	0.0	0.0	0.0	237.9	*237.9*	239.5
Power Facilities Series H	22.2	0.0	0.0	0.0	184.5	*184.5*	206.7
East Branch Enlargement Series A	108.3	0.0	12.6	0.0	11.1	*23.7*	132.0
Water System Facilities Series B	97.4	0.0	0.0	0.0	2.6	*2.6*	100.0
Water System Facilities Series C	0.6	0.0	0.0	0.0	8.4	*8.4*	9.0
Water System Facilities Series D	95.9	0.0	2.9	0.0	1.2	*4.1*	100.0
Water System Facilities Series E	0.4	0.0	0.0	0.0	8.6	*8.6*	9.0
Water System Facilities Series F	0.0	0.0	0.0	0.0	160.0	*160.0*	160.0
Water System Facilities Series G	86.8	0.0	4.6	0.0	8.6	*13.2*	100.0
Water System Facilities Series H	85.5	0.0	5.7	0.0	8.8	*14.5*	100.0
Water System Facilities Series I	158.9	0.0	5.8	0.0	15.3	*21.1*	180.0
Water System Facilities Series J	0.0	0.0	0.0	0.0	649.8	*649.8*	649.8
Water System Facilities Series K	88.6	0.0	3.1	0.0	8.3	*11.4*	100.0
Water System Facilities Series L	0.0	0.0	0.0	0.0	537.8	*537.8*	537.8
Water System Facilities Series M	166.3	0.0	9.9	0.0	13.8	*23.7*	190.0
Water System Facilities Series N	137.4	0.0	6.0	0.0	8.6	*14.6*	152.0
Water System Facilities Series O	156.5	0.0	8.4	0.0	170.1	*178.5*	335.0
Water System Facilities Series P	141.6	0.0	5.2	0.0	13.2	*18.4*	160.0
Water System Facilities Series Q	135.0	0.0	8.0	0.0	123.6	*131.6*	266.6
Water System Facilities Series R	0.0	0.0	0.0	0.0	20.7	*20.7*	20.7
Water System Facilities Series S	78.2	0.0	5.8	0.0	116.2	*122.0*	200.2
Water System Facilities Series T	0.0	0.0	0.0	0.0	135.7	*135.7*	135.7
Water System Facilities Series U	98.7	0.0	5.3	0.0	103.2	*108.5*	207.2
Water System Facilities Series V	0.0	0.0	0.0	0.0	20.6	*20.6*	20.6
Water System Facilities Series W	41.0	0.0	1.3	0.0	218.7	*220.0*	261.0
Water System Facilities Series X	0.0	0.0	0.0	0.0	160.2	*160.2*	160.2
Water System Facilities Series Y	0.0	0.0	0.0	0.0	329.9	*329.9*	329.9
Water System Facilities Series Z	0.0	0.0	0.0	0.0	170.7	*170.7*	170.7
Water System Facilities Series AA	0.0	0.0	0.0	0.0	108.7	*108.7*	108.7
Water System Facilities Series AB	92.2	0.0	3.9	0.0	93.6	*97.5*	189.7
Water System Facilities Series AC	13.7	0.0	0.6	0.0	257.7	*258.3*	272.0
Water System Facilities Series AD	12.4	0.0	0.9	0.0	99.1	*100.0*	112.4
Water System Facilities Series AE	383.9	0.0	9.5	0.0	239.5	*249.0*	632.9
Water System Facilities Series AF	33.4	0.0	1.3	0.0	253.1	*254.4*	287.7
Water System Facilities Series AG	9.9	0.0	0.4	0.0	158.8	*159.2*	169.1
Water System Facilities Series AH	71.7	0.0	3.6	0.0	22.3	*26.0*	97.7
Water System Facilities Series AI	0.0	0.0	0.0	0.0	92.3	*92.3*	92.3

Table 14-7 Application of Revenue Bond Proceeds (in millions of dollars)

Bond Series[a]	Construction Expenditures	Other Capital Requirements					Total Principal Amount of Bonds
		Reimbursement of General Fund	Capitalized Interest	Capitalized Operating Costs	Bond Financing and Refunding Costs[b]	*Subtotal*	
Water System Facilities Series AJ	69.3	0.0	3.7	0.0	143.9	*147.6*	216.9
Water System Facilities Series AK	32.0	0.0	0.9	0.0	3.4	*4.3*	36.3
Water System Facilities Series AL	0.0	0.0	0.0	0.0	105.9	*105.9*	105.9
Water System Facilities Series AM	0.0	0.0	0.0	0.0	184.0	*184.0*	184.0
Water System Facilities Series AN	44.8	0.0	0.3	0.0	4.4	*4.7*	49.5
Water System Facilities Series AO	0.0	0.0	0.0	0.0	317.5	*317.5*	317.5
Water System Facilities Series AP	47.7	0.0	1.2	0.0	(3.5)	*(2.4)*	45.3
Water System Facilities Series AQ	122.6	0.0	7.2	0.0	(9.6)	*(2.4)*	120.2
Water System Facilities Series AR	168.1	0.0	5.4	0.0	(12.1)	*(6.7)*	161.4
Water System Facilities Series AS	0.0	0.0	0.0	0.0	645.8	*645.8*	645.8
Water System Facilities Series AT	139.5	0.0	5.9	0.0	3.9	*9.8*	149.2
Water System Facilities Series AU	104.6	0.0	3.4	0.0	1.3	*4.7*	109.3
Water System Facilities Series AV	120.9	0.0	7.3	0.0	(21.7)	(14.4)	106.5
Water System Facilities Series AW	363.0	0.0	29.5	0.0	35.7	*65.1*	428.1
Subtotal	*4,391.7*	*2.6*	*334.6*	*14.8*	*6,208.4*	*6,560.4*	*10,952.2*[c]
Future East Branch Enlargement Bonds	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Future East Branch Extension Bonds	12.4	0.0	0.5	0.0	0.6	1.1	13.5
Future SBA Enlargement Bonds	1.6	0.0	0.1	0.0	0.1	0.1	1.7
Future Water System Facilities Bonds	938.4	0.0	40.1	0.0	51.1	91.2	1,029.6
Total	**5,344.1**	**2.6**	**375.3**	**14.8**	**6,260.2**	**6,652.9**	**11,996.9**

[a] Actual bond issue for all except future East Branch Enlargement, future East Branch Extension, future South Bay Aqueduct Improvements and Enlargement, and future Water System Facilities bonds.

[b] Bond financing and refunding costs include funds applied to debt service reserve requirements.

[c] Includes $6,044.30 million of refunded principal, leaving a net principal obligation of $4,907.90 million.

Burns-Porter Act

Burns-Porter Act financing is derived from the sale of California Water Resources Development Bonds (general obligation bonds) and State tideland oil revenues deposited in the California Water Fund as authorized by the Burns-Porter Act (California Water Code Sections 12930–12944), approved by voters in November 1960. The Burns-Porter Act authorized an issuance of $1.75 billion of general obligation State bonds, which are repaid by revenues received according to the water supply contracts. Of that authorization, $130 million was reserved specifically for the Davis-Grunsky Act Program.

Proceeds from the sale of general obligation bonds were deposited in the California Water Resources Development Bond Fund—Bond Proceeds Account, from which monies were expended only for the construction of SWP facilities and for the Davis-Grunsky Act Program. Approximately 23 percent of the expenditures through 2016 for construction and the Davis-Grunsky Act Program were financed with general obligation bonds.

Monies deposited in the California Water Fund were appropriated for purposes outlined in the Burns-Porter Act. Such deposits were derived from a portion of the State tideland oil revenues, in accordance with a continuing authorization. The California Water Fund was used to finance $508 million, or approximately 7 percent, of the construction expenditures through 2016.

Revenue Bonds

Revenue bond financing is derived from the sale of revenue bonds as authorized by the Central Valley Project Act (California Water Code Sections 11100–11925). DWR's authority to issue revenue bonds was confirmed by a decision of the California Supreme Court in 1963 (*Warne v. Harkness*, 60 Cal. 2d 579).

Proceeds from the sale of revenue bonds are deposited in the Central Valley Water Project Construction Fund, from which money is expended only for purposes specified in the resolution authorizing each bond sale. Those purposes, in addition to paying construction, planning, and right-of-way costs, may include funding the Debt Service Reserve Account, paying interest on bonds, and paying water system operating expenses during a specified period.

As of December 31, 2016, DWR had sold $10.9 billion of revenue bonds. That amount includes $6.0 billion of refunded bonds, leaving a total principal obligation of $4.9 billion.

Capital Resources

Capital resources financing is derived from payments and appropriations (including a portion of the State tideland oil revenues) authorized by a variety of special contracts, cost-sharing agreements, and legislative actions concerning the SWP, plus accrued interest on these funds. Capital resources revenues are deposited in the Central Valley Water Project Construction Fund and may be expended for interest on general obligation bonds and costs of constructing SWP facilities.

According to DWR's financial management policy, the capital resources revenues are used first to cover any general obligation bond debt service that exceeds available revenues.

Capital Financing Sources

Capital financing sources include power revenue bonds, East Branch Enlargement bonds, East Branch Extension bonds, SBA Enlargement bonds, water system facilities bonds, initial project facilities bonds, bond proceeds from the Davis-Grunsky Act Program, California Water Fund monies, and capital resources revenues.

Line 21, Power Facilities Revenue Bonds through Series H, includes the proceeds applied from power revenue bonds for Oroville, Devil Canyon, Castaic, Warne, Reid Gardner, Bottle Rock, Alamo, South Geysers, and small hydro projects.

No future power revenue bond sales are projected for this financial analysis.

Line 22, East Branch Enlargement, Current Bonds, shows that $483 million of Water System Revenue Bond proceeds has been applied to the East Branch Enlargement project through December 31, 2016. Of this total, $425 million was used for construction expenditures and $56 million was used for bond discounts, interest costs, and debt service reserve requirements.

Line 23, East Branch Enlargement, Future Bonds, shows no projected bond sales for this financial analysis.

Line 24, East Branch Extension, Current Bonds, shows that $412 million of Water System Revenue Bond proceeds has been spent through December 31, 2016.

Line 25, East Branch Extension, Future Bonds, shows DWR's estimate of $13 million of additional bonds required to complete construction of the East Branch Extension and to pay for bond discounts, capitalized interest, and debt service reserve requirements.

Line 26, South Bay Aqueduct Enlargement, Current Bonds, shows that $224 million of Water System Revenue Bond proceeds had been spent through December 31, 2016.

Line 27, South Bay Aqueduct Enlargement, Future Bonds, shows DWR's estimate of $2 million of additional bonds required to complete construction of the SBA Enlargement and to pay for bond discounts, capitalized interest, and debt service reserve requirements.

Line 28, Water System Facilities, Current Bonds, shows that through December 31, 2016, $2.6 billion of proceeds from Water System Revenue Bonds, Series A through Series AW, was applied to SWP projects other than the East Branch Enlargement, the East Branch Extension, and the SBA Enlargement. Of this total, $2.5 billion was used to pay for construction expenditures and $0.1 billion was used to pay for bond discounts, capitalized interest, and debt service reserve requirements.

Line 29, Water System Facilities, Future Bonds, shows that $1.0 billion of future water revenue bonds is needed to provide $0.9 billion for construction of SWP water system facilities and $0.1 billion for bond discounts, interest costs, and debt service reserve requirements.

Line 30, Subtotal, Water System Revenue Bonds, is the total of Lines 22 through 29.

Line 31, Initial Project Facilities Bond Proceeds, shows the amount of general obligation bonds sold to provide financing costs for initial SWP facilities and for costs of planning certain additional conservation facilities.

Financing initial facilities from general obligation bonds was completed in mid-1972 and totaled $1.444 billion–$1.750 billion Burns-Porter Act authorization less $130 million reserved for the Davis-Grunsky Act Program and $176 million "offset" for additional conservation facilities. (The Burns-Porter Act provides that to the extent California Water Fund monies are expended, an equal amount of general obligation bonds are reserved [offset] for financing the construction of additional conservation facilities in certain watersheds.)

In mid-1972, the reservation of offset bonds was effectively limited to $176 million, the total amount of California Water Fund monies expended up to that time. By mid-1972, all general obligation bonds authorized by the Burns-Porter Act had been offset, reserved for the Davis-Grunsky Act Program, or used for SWP construction.

Approximately $8.5 million of the offset bonds was used to finance planning studies of the Middle Fork Eel River Development. This financial analysis is not based on the use of any offset bond proceeds to meet capital requirements. If, at some time, the State constructs an additional conservation facility, as specified in California Water Code Section 12938, the remaining offset bonds could be sold.

Line 32, Davis-Grunsky Act Program Bond Proceeds, shows, for simplification, the entire $130 million of capital expenditures authorized for the Davis-Grunsky Act Program, according to the Burns-Porter Act, as being funded by proceeds from the sale of general obligation bonds. In fact, $102 million originated from bond proceeds while $28 million from the California Water Fund was used for the program in lieu of bond proceeds prior to 1969. Since the final offset in 1994, DWR has accumulated $44.6 million in capital costs through fiscal year 2006–2007.

Line 33, Application of California Water Fund Monies, shows the amount of SWP costs financed under the Burns-Porter Act. The act provides that any available money in the California Water Fund must be used for

construction in lieu of proceeds from the sale of general obligation bonds.

When the Burns-Porter Act became effective in late 1960, approximately $97 million had been accumulated in the fund. That balance, plus subsequent appropriations, interest earnings, and other miscellaneous income to the fund through December 31, 2015, was used to finance a total of $508 million of SWP costs.

Line 34, Interim Financing, shows the net annual amounts of funds flowing into and out of the Water Revenue Commercial Paper Notes program. This program was established in March 1993 to provide an ongoing source of interim financing for water system projects prior to permanent financing from the sale of long-term revenue bonds. DWR has authority to issue up to $150 million of Water Revenue Commercial Paper Notes. A positive number indicates money borrowed from the program to finance construction costs. A negative number indicates money repaid to the program. The financial analysis assumes that all funds borrowed from the program will be repaid before the end of the analysis period.

Line 35, Direct Pay, shows the revenues received directly from the contractors rather than financing through bonds for certain SWP project construction expenditures. At this time, the North Bay Aqueduct Alternate Intake is funded this way.

Line 36, Application of Capital Resources Revenues to Construction, presents the Capital Resources Revenues applied for capital expenditures.

Line 37, Revenue Transfers Applied, shows monies assumed to be transferred to the California Water Fund, according to provisions of the Burns-Porter Act, and subsequently reappropriated to construction (see Line 40 of Table 14-2). Projected amounts for the years 2017 through 2026 include funds to finance expenditures for agricultural drainage facilities, as indicated in Line 13 of Table 14-1, and expenditures for additional conservation facilities, as indicated in Line 12.

Line 38, Subtotal, Other Capital Financing, is the total of Lines 31 through 37.

Line 39, Total Financing of Capital Requirements, totals Lines 21, 30, and 38.

Annual Revenues and Expenditures

After financial analysis of SWP operations, DWR concluded that projected payments by contractors and other revenues will be adequate to pay annual operations, maintenance, power, and replacement (OMP&R) costs and meet all repayment obligations on funds used to finance SWP construction and other authorized costs during the period 2017 through 2026. Data on annual revenues and expenditures are presented in Table 14-2. A detailed discussion of each line item follows.

Project Revenues

Project revenues primarily consist of SWP water contractor payments required under their individual long-term water supply contracts. Those revenues are deposited in two funds: the Central Valley Water Project Revenue Fund, where all revenues pledged to revenue bonds are placed, and the California Water Resources Development Bond Fund—Systems Revenue Account, where all other SWP operating revenues are placed. Use of those funds is limited to paying operating costs and debt service; except that revenues in excess of those costs may be deposited to a reserve for future SWP construction, since the California Water Fund has been repaid (see Line 39).

Line 1, Capital Resources Revenues, includes the following:

- federal payments for SWP capital expenditures;
- appropriations for capital costs allocated to recreation;
- appropriations for SWP capital expenditures prior to passage of the Burns-Porter Act and according to Senate Bill 261 (1968);
- payments from Los Angeles Department of Water and Power for Castaic power development;
- advances from contractors for construction of requested work;
- investment earnings on the Capital Resources Account; and
- investment earnings on unexpended revenue bond proceeds.

Historically, appropriations for capital costs allocated to recreation and fish and wildlife enhancement (RFWE) amounted to $5 million per year and were appropriated by the California Legislature from the State tideland oil revenues. There have been no appropriations from this fund since 1985.

Legislation enacted in 1989 offset a portion of the amount owed to the SWP by the State for costs allocated to RFWE against the amount the SWP owed to the California Water Fund (see Line 39). Since the final offset in 1994, DWR has accumulated $85.8 million in capital costs through December 31, 2016.

In 2012, the Davis-Dolwig Act was amended to appropriate $10 million per fiscal year from the Harbors and Watercraft Revolving Fund to cover a portion of the OMP&R and capital costs allocated to RFWE. Starting in fiscal year 2012–2013, $7.5 million is being appropriated for on-going OMP&R and capital costs and $2.5 million is being appropriated to reimburse for past unreimbursed OMP&R and capital costs.

Lines 2 through 12, Water Contractor Payments, show amounts of the separate elements of water contractor payments.

Amounts in Line 4 also include revenues sufficient to cover costs associated with sales of excess power. Appendix B of this bulletin presents a detailed explanation of payments identified in Lines 2 through 12.

OMP&R costs are repaid as they are incurred as part of the Transportation Charge; therefore, no interest charges are included. Construction costs included in the Transportation Charge, and all construction and annual OMP&R costs included in the Delta Water Charge, are to be repaid with interest at the Project Interest Rate.

The Project Interest Rate, as defined in Article 1(r) of the standard provisions of the long-term water supply contracts, is the weighted average of the rates paid on certain securities issued and loans obtained to finance SWP facilities.

According to the original water supply contract provisions, the basis for determining the Project Interest Rate was the weighted average of rates paid on general obligation bond sales only. In 1969, after Oroville Revenue Bonds were issued, the contracts were amended to expand the basis to include rates on all other securities sold and loans obtained thereafter for financing SWP facilities, including revenue bonds (see Bulletin 132-70, page 28).

However, not all proceeds from the sale of revenue bonds are melded into the calculation of the Project Interest Rate. Only those proceeds applied to construction costs (the only application of general obligation bonds permitted by law) and those consumed by the bond discount (a component of the total interest cost of a revenue bond issue) are included in the calculation (see Table 14-8).

Table 14-8 Revenue Bond Proceeds Affecting Project Interest Rate (in millions of dollars)

	Proceeds Included in Project Interest Rate					
Project	Applied to Construction Costs [1]	Less Portion of Proceeds Derived from Interest Earnings Prior to Delivery of Bonds [2]	Plus Bond Financing and Refunding Costs [3]	Subtotal, Proceeds Included in Calculating Project Interest Rate [1] - [2] + [3] [4]	**Total Principal Amount of Bonds** [5]	**Percentage of Total Amount Included in Calculating Project Interest Rate [4] / [5]** [6]
Devil Canyon-Castaic Project Revenue Bonds	125.3	1.5	1.4	125.2	139.2	90
Pyramid Project Revenue Bonds (Series A)	71.2	0.5	1.1	71.8	95.8	75
Alamo Project Bond Anticipation Note	16.8	0.1	0.3	17.0	24.4	70
Small Hydro Project I Revenue Bonds (Series D)	25.4	0.2	1.5	26.7	37.5	71
Alamo Project Revenue Bonds (Series F)	38.9	0.3	0.7	39.3	50.0	79
Power Facilities Revenue Bonds (Series H)						
Pyramid Project	5.0	0.0	0.1	5.1	5.1	100
Alamo Project	1.7	0.0	0.0	1.7	1.7	100
Small Hydro Project I	25.2[a]	0.2	0.4	25.4	35.6	71
Water System Revenue Bonds (Series J)						
Pyramid Project	0.0	0.0	75.9[b]	75.9	99.2[b]	77
Alamo Project	0.0	0.0	45.6[b]	45.6	57.1[b]	80
Small Hydro Project I	0.0	0.0	27.8[b]	27.8	38.8[b]	72
Water System Revenue Bonds (Series L)						
Small Hydro Project I	0.0	0.0	1.5[b]	1.5	2.1[b]	71
Water System Revenue Bonds (Series Q)						
Pyramid Project	0.0	0.0	3.0[b]	3.0	3.9[b]	77
Alamo Project	0.0	0.0	4.8[b]	4.8	6.0[b]	80
Water System Revenue Bonds (Series S)						
Pyramid Project	0.0	0.0	8.0[b]	8.0	10.4[b]	77
Alamo Project	0.0	0.0	7.6[b]	7.6	9.5[b]	80
Water System Revenue Bonds (Series U)						
Pyramid Project	0.0	0.0	2.4[b]	2.4	3.2[b]	75
Alamo Project	0.0	0.0	3.2[b]	3.2	4.0[b]	80
Water System Revenue Bonds (Series W)						
Pyramid Project	0.0	0.0	27.7[b]	27.7	36.0[b]	77
Alamo Project	0.0	0.0	11.8[b]	11.8	14.7[b]	80
Small Hydro Project (construction)	3.4	0.0	0.0	3.4	3.7	92
Small Hydro Project (refunding)	0.0	0.0	16.3[b]	16.3	22.7[b]	72
Water System Revenue Bonds (Series X)						
Pyramid Project	0.0	0.0	8.5[b]	8.5	11.0[b]	77
Alamo Project (Series H refunding)	0.0	0.0	0.3[b]	0.3	0.3[b]	100
Alamo Project (Series F refunding)	0.0	0.0	3.9[b]	3.9	4.9[b]	79
Small Hydro Project	0.0	0.0	4.6[b]	4.6	6.4[b]	72

[a] Amount consists of 71 percent of proceeds deposited in escrow to refund portion of Series D bonds ($35.1 million plus deposits to construction account [$0.3 million]).

[b] Represents amount of principal used to refund portions of prior bond issues.

Calculations for determining the Project Interest Rate do not include proceeds from the sale of revenue bonds for Off-Aqueduct Power facilities, the East Branch Enlargement facilities, SBA, or water system facilities defined in the Water Revenue Bond Amendment. Table 14-9 lists all bond sales by date and presents basic information used in the calculation of the Project Interest Rate.

Information about contractor water charges in Appendix B, which can be found in the back of this bulletin, is based on known conditions and substantiates DWR's determination of 2018 water charges to be billed on July 1, 2017. However, information about significant differences between the sum of future charges included in Lines 2 through 12 of Table 14-2 and the substantiation of 2017 charges included in Appendix B are as follows.

- Future capital costs in Appendix B are based on the prevailing prices as of December 31, 2016. Those costs presented in the financial analysis include allowances for price escalation.
- Pre-2017 charges in Appendix B represent charges as they should have been, according to currently known conditions. Pre-2017 charges included in Table 14-2 are those actually paid as part of previously determined bills.
- Charges in Appendix B are unadjusted for past overpayments or underpayments. Charges included in Table 14-2 for 2017 and thereafter have been adjusted for any apparent overpayments or underpayments of pre-2017 charges.
- Charges in Appendix B for East Branch Enlargement costs include the amounts for debt service and 25 percent cover for the East Branch Enlargement share of the Series A through Series AW bonds. Charges in Table 14-2 apply to Series A through Series AW bonds and also include amounts of the debt service and cover for assumed future bonds.
- The water revenue bond surcharge in Appendix B applies only to the Series B through Series AW bonds. Surcharge values included in Table 14-2 apply to Series B through Series AW bonds and to assumed future issues required to finance SWP construction costs included in Table 14-1.

Line 13, Subtotal, Water Contractor Payments, is the total of Lines 2 through 12.

Line 14, Revenue Bond Cover Adjustments, represents the credit to contractors resulting from the cover of 25 percent of the annual debt service for Power Facilities Revenue Bonds and Water System Revenue Bonds. Cover is collected as required by the bond resolutions to provide security to the bondholders. If not needed to meet annual bond service, the cover is credited to the contractors in the following year. The annual charges for the following cost components include an amount for bond cover:

- minimum OMP&R component of the Transportation Charge for Off-Aqueduct Power Facilities;
- Water System Revenue Bond Surcharge;
- capital cost component of the Transportation Charge for East Branch Enlargement Facilities;
- capital cost component of the Transportation Charge for Coastal Branch Extension Facilities;
- capital cost component of the Transportation Charge for East Branch Extension Facilities;
- capital cost component of the Transportation Charge for Tehachapi Afterbay; and
- capital cost component of the Transportation Charge for SBA Enlargement.

Line 15, Rate Management Adjustments, shows the projected amount of revenue reductions allocated to contractors after

Table 14-9 Actual Bond Sales and Project Interest Rates, by Date of Sale

Bond Sales	Date of Sale	Delivery Date	Dollar-Years[a] (thousands)	Interest Cost (thousands)	Issue Interest Rate[b] (percent)	Project Interest Rate[c] (percent)
$ 50,000,000 Bond Anticipation Notes	11/21/63	11/21/63	26,944	531	1.971	1.971
$100,000,000 Series A Water Bonds	2/18/64	2/18/64	3,402,000	119,750	3.520	3.508
$ 50,000,000 Series B Water Bonds	5/5/64	5/5/64	1,726,000	60,986	3.533	3.516
$100,000,000 Series C Water Bonds	10/7/64	10/7/64	3,452,000	123,764	3.585	3.544
$100,000,000 Series D Water Bonds	2/16/65	2/16/65	3,497,900	122,403	3.499	3.531
$100,000,000 Series E Water Bonds	11/23/65	11/23/65	3,497,900	130,029	3.717	3.573
$100,000,000 Series F Water Bonds	6/8/66	6/8/66	3,497,900	137,359	3.927	3.638
$100,000,000 Series G Water Bonds	11/22/66	11/22/66	3,497,900	143,788	4.111	3.711
$100,000,000 Series H Water Bonds	3/21/67	3/21/67	3,497,900	129,261	3.695	3.709
$100,000,000 Series J Water Bonds	7/18/67	7/18/67	3,497,900	143,199	4.094	3.754
$100,000,000 Series K Water Bonds	11/14/67	11/14/67	3,497,900	163,887	4.685	3.853
$150,000,000 Revenue Bonds, Oroville Division, Series A	4/3/68	4/3/68	5,228,700	270,289	5.169	
$100,000,000 Series L Water Bonds	7/11/68	7/11/68	3,497,900	166,918	4.772	3.941
$100,000,000 Series M Water Bonds	10/22/68	10/22/68	3,497,900	169,989	4.860	4.021
$ 94,995,000 Revenue Bonds, Oroville Division, Series B	4/1/69	4/1/69	3,423,460	195,902	5.722	
$ 46,761,000 Cumulative 1970 General Fund Borrowing, repaid 7/10/70	-		4,938	346	7.007	
$200,000,000 Series N and P Bond Anticipation Notes	6/16/70	6/16/70	200,000	11,660	5.830	4.030
$100,000,000 Series N Water Bonds	2/2/71	2/2/71	3,447,900	190,292	5.519	4.148
$100,000,000 Series Q Bond Anticipation Notes	3/10/71	3/10/71	100,000	2,349	2.349	4.143
$100,000,000 Series P Water Bonds	4/21/71	4/21/71	3,397,900	193,377	5.691	4.255
$150,000,000 Series Q and R Water Bonds	11/9/71	11/9/71	5,171,850	265,734	5.138	4.342
$ 40,000,000 Series S Water Bonds	3/28/72	3/28/72	1,399,160	76,509	5.468	4.371
$139,165,000 Devil Canyon-Castaic Revenue Bonds	8/8/72	8/8/72	4,776,204	258,839	5.419	4.457
$ 10,000,000 Series T Water Bonds	3/20/73	3/20/73	185,265	9,491	5.123	4.459
$ 10,000,000 Series U Water Bonds	1/13/76	1/13/76	158,750	8,731	5.500	4.462
$ 10,000,000 Series V Water Bonds	11/15/77	11/15/77	158,750	7,573	4.770	4.462
$ 95,800,000 Pyramid Hydroelectric Revenue Bonds	10/23/79	10/23/79	2,260,072	172,495	7.632	4.584
$150,000,000 Reid Gardner Project, Series A Bond Anticipation Notes	7/1/81	7/1/81	347,906	29,572	8.500	
$ 75,600,000 Bottle Rock Project, Bond Anticipation Notes	12/1/81	12/1/81	264,600	25,137	9.500	
$ 24,400,000 Alamo Project, Bond Anticipation Notes	12/1/81	12/1/81	24,266	2,305	9.499	4.589
$200,000,000 Reid Gardner Project, Series B Revenue Bonds	7/7/82	7/7/82	4,623,137	553,793	11.979	
$125,000,000 Reid Gardner Project, Series C Revenue Bonds	11/16/82	11/16/82	2,720,045	255,744	9.402	
$ 37,500,000 Small Hydro Project I, Series D Revenue Bonds	11/16/82	11/16/82	837,769	84,587	10.097	4.666
$ 37,500,000 South Geysers Project, Series D Revenue Bonds	11/16/82	11/16/82	930,325	90,021	9.676	
$125,000,000 Bottle Rock Project, Series E Revenue Bonds	4/27/83	4/27/83	2,624,805	225,102	8.576	
$ 50,000,000 Alamo Project, Series F Revenue Bonds	4/27/83	4/27/83	1,190,763	100,836	8.468	4.727
$ 25,000,000 South Geysers Project, Series F Revenue Bonds	4/27/83	4/27/83	608,550	52,578	8.640	
$239,505,000 Reid Gardner Project, Series G Revenue Bonds	3/15/85	3/15/85	4,524,136	425,840	9.413	
$206,690,000 Power Facilities Series H Revenue Bonds	6/20/86	6/20/86	4,430,520	347,745	7.849	4.713
$132,000,000 East Branch Enlargement, Series A Water System Revenue Bonds	7/15/86	7/15/86	3,427,165	254,915	7.438	

Table 14-9 Actual Bond Sales and Project Interest Rates, by Date of Sale

Bond Sales	Date of Sale	Delivery Date	Dollar-Years[a] (thousands)	Interest Cost (thousands)	Issue Interest Rate[b] (percent)	Project Interest Rate[c] (percent)
$100,000,000 Series B Water System Revenue Bonds	5/5/87	5/5/87	2,564,012	194,817	7.598	
$ 9,000,000 Series C Water System Revenue Bonds	12/1/87	12/1/87	324,000	31,995	9.875	
$100,000,000 Series D Water System Revenue Bonds	6/14/88	6/14/88	2,640,510	201,253	7.622	
$ 9,000,000 Series E Water System Revenue Bonds	11/29/88	12/5/88	324,000	31,995	9.875	
$160,030,000 Series F Water System Revenue Bonds	3/15/89	4/20/89	2,779,838	189,261	6.808	
$100,000,000 Series G Water System Revenue Bonds	3/6/90	3/6/90	2,434,175	172,277	7.077	
$100,000,000 Series H Water System Revenue Bonds	1/10/91	1/10/91	2,459,172	168,857	6.866	
$180,000,000 Series I Water System Revenue Bonds	5/14/91	5/14/91	4,366,680	294,090	6.735	
$649,835,000 Series J Water System Revenue Bonds	1/16/92	1/28/92	12,422,222	745,198	5.999	
$100,000,000 Series K Water System Revenue Bonds	5/12/92	6/4/92	2,366,783	147,064	6.214	
$ 9,000,000 Series W Water Bonds	8/19/92	8/19/92	95,250	6,172	6.480	4.621
$537,830,000 Series L Water System Revenue Bonds	5/19/93	6/2/93	11,414,859	640,518	5.611	4.620
$ 2,000,000 Series X Water Bonds	9/1/93	9/1/93	26,000	1,247	4.796	4.621
$ 1,400,000 Series Y Water Bonds	11/30/94	11/30/94	19,483	1,249	6.411	
$190,000,000 Series M Water System Revenue Bonds	12/9/93	12/21/93	3,911,846	194,981	4.984	
$152,000,000 Series N Water System Revenue Bonds	3/3/95	3/14/95	2,241,606	122,658	5.472	
$335,000,000 Series O Water System Revenue Bonds	12/5/95	12/20/95	7,528,890	375,667	4.990	
$160,000,000 Series P Water System Revenue Bonds	5/7/96	5/22/96	3,553,823	204,524	5.755	
$266,630,000 Series Q Water System Revenue Bonds	11/5/96	12/4/96	5,481,815	299,846	5.470	4.620
$ 20,700,000 Series R Water System Revenue Bonds	3/10/97	3/12/97	564,125	36,627	6.493	
$200,205,000 Series S Water System Revenue Bonds	7/30/97	8/13/97	4,093,110	203,755	4.978	4.615
$135,665,000 Series T Water System Revenue Bonds	7/30/97	3/4/98	1,310,620	66,942	5.108	
$207,180,000 Series U Water System Revenue Bonds	11/19/98	12/1/98	4,032,075	200,758	4.979	
$ 20,580,000 Series V Water System Revenue Bonds	11/19/98	12/1/98	525,100	32,819	6.250	
$260,995,000 Series W Water System Revenue Bonds	5/1/01	5/17/01	3,659,312	195,822	5.351	4.613
$160,225,000 Series X Water System Revenue Bonds	5/1/02	6/4/02	2,732,785	139,109	5.090	4.610
$329,885,000 Series Y Water System Revenue Bonds	7/25/02	3/5/03	4,422,973	222,654	5.034	
$170,655,000 Series Z Water System Revenue Bonds	10/1/02	10/16/02	1,706,132	75,696	4.437	
$108,705,000 Series AA Water System Revenue Bonds	10/4/02	3/5/03	2,114,341	104,220	4.929	
$189,625,000 Series AB Water System Revenue Bonds	3/9/04	3/18/04	4,344,942	173,788	4.000	
$272,070,000 Series AC Water System Revenue Bonds	12/15/04	1/6/05	4,479,436	209,150	4.669	
$112,390,000 Series AD Water System Revenue Bonds	6/14/05	7/7/05	1,827,449	90,461	4.950	4.608
$632,890,000 Series AE Water System Revenue Bonds	4/23/08	5/1/08	8,884,000	436,216	4.910	
$287,735,000 Series AF Water System Revenue Bonds	3/11/09	3/19/09	2,980,895	143,464	4.813	
$169,115,000 Series AG Water System Revenue Bonds	11/17/09	12/2/09	2,907,605	142,774	4.910	
$ 97,675,000 Series AH Water System Revenue Bonds	10/27/10	11/9/10	1,432,014	72,176	5.040	4.610
$ 92,275,000 Series AI Water System Revenue Bonds	10/27/10	9/7/11	698,716	34,936	5.000	
$216,930,000 Series AJ Water System Revenue Bonds	10/6/11	10/13/11	2,080,429	100,663	4.839	
$ 36,370,000 Series AK Water System Revenue Bonds	2/28/12	3/13/12	495,566	23,466	4.735	
$105,875,000 Series AL Water System Revenue Bonds	2/28/12	9/5/12	739,447	36,972	5.000	

Table 14-9 Actual Bond Sales and Project Interest Rates, by Date of Sale Sheet 3 of 3

Bond Sales	Date of Sale	Delivery Date	Dollar-Years[a] (thousands)	Interest Cost (thousands)	Issue Interest Rate[b] (percent)	Project Interest Rate[c] (percent)
$183,960,000 Series AM Water System Revenue Bonds	2/28/12	3/5/13	1,440,539	72,027	5.000	
$ 49,525,000 Series AN Water System Revenue Bonds	9/19/12	9/27/12	646,489	31,783	4.916	
$317,505,000 Series AO Water System Revenue Bonds	9/19/12	9/27/12	2,830,185	71,219	2.516	
$45,340,000 Series AP Water System Revenue Bonds	3/12/13	3/26/13	621,111	25,008	4.026	
$120,205,000 Series AQ Water System Revenue Bonds	5/21/13	6/18/13	2,120,496	85,993	4.055	
$161,445,000 Series AR Water System Revenue Bonds	2/25/14	3/6/14	2,126,626	91,827	4.318	
$645,795,000 Series AS Water System Revenue Bonds	9/30/14	10/30/14	7,285,936	363,246	4.986	
$149,245,000 Series AT Water System Revenue Bonds[d]	10/29/14	11/6/14	2,784,834	83,541	3.000	
$109,275,000 Series AU Water System Revenue Bonds[d]	8/25/15	9/2/15	1,946,180	40,285	2.070	
$106,530,000 Series AV Water System Revenue Bonds	5/10/16	5/24/16	1,302,906	56,488	4.336	
$428,130,000 Series AW Water System Revenue Bonds	10/13/16	10/20/16	5,454,047	259,585	4.759	
Total			**248,100,367**	**13,670,764**		
Portion allocated to Project Interest Rate			**63,903,487**	**2,945,789**	**4.610**	**4.610**

[a] A unit equivalent to one dollar of principal amount outstanding for one year.

[b] The total interest rate (without regard to discounts paid or to premiums received) divided by the total dollar-years, expressed as a percent.

[c] Cumulative interest costs divided by cumulative dollar-years, expressed as a percent. (Excluding Oroville Division bonds and revenue bonds for Off-Aqueduct Power Facilities, East Branch Enlargement Facilities, East Branch Extension Facilities, Water System Facilities as defined in the Water Revenue Bond Amendment, Coastal Branch Extension Facilities, or South Bay Aqueduct Enlargement Facilities.)

[d] Variable rate issue. Assumed an interest rate. Actual interest cost and rate will vary.

repayment of the California Water Fund (see Line 39). Under provisions of the Monterey Amendment, the reduction amount allocated to agricultural contractors is deposited into a trust fund to stabilize payments in water-short years. The urban contractor allocation is applied as a direct reduction in charges.

Line 16, Federal Payments for Project Operating Costs, shows federal payments made in accordance with the December 31, 1961, agreement between California and the United States providing for DWR to operate and maintain the San Luis Joint-Use Facilities. According to the January 12, 1972, supplement to the agreement, the Bureau of Reclamation (Reclamation) initially paid 45 percent of operations, maintenance, and replacement (OM&R) costs for those activities. (The percentage does not apply to power costs; Reclamation and DWR each provide their own power to pump water through the joint facilities.)

The percentage paid by Reclamation is periodically reviewed by Reclamation and DWR. A review of the percentage paid by Reclamation was completed in 1987 and resulted in a federal share of 44.09 percent. During the most recent review concluded in August 2015, DWR agreed to reevaluate Reclamation's percentage every five years based on the preceding five years of actual operating expenditures. Operating expenditures for calendar years 2006 through 2010 were reviewed, and the percentage paid by Reclamation for calendar years 2011 through 2015 was retroactively reduced to 39.72 percent. The amounts in Line 16 are based on the assumption that the federal share will continue at this level for calendar years 2016 through 2026. However, it is anticipated that the percentage paid by Reclamation for calendar years 2016–2020 will be revised once all expenditures through 2015 are known and a new percentage can be determined.

Line 17, Appropriations for Operating Costs Allocated to Recreation, shows appropriations made under the Davis-Dolwig Act. In passing the Davis-Dolwig Act, the California Legislature declared its intent that, except for funds provided according to Assembly Bill 12 (1966), DWR's budget will include appropriations of monies from the General Fund necessary for RFWE in connection with State water projects.

Annual OMP&R costs allocated to RFWE are to be paid by annual appropriations from the General Fund. Through fiscal year 1982–1983, these appropriations totaled $16.7 million. No additional appropriations have been made from this fund since fiscal year 1982–1983.

Legislation enacted in 1989 offset a portion of the amount owed to the SWP by the State for costs allocated to RFWE against the amount the SWP owed to the California Water Fund (see line 39). Since the final offset in 1994, DWR has accumulated $214 million in OMP&R costs through December 31, 2016.

In 2012, the Davis-Dolwig Act was amended to appropriate $10 million per fiscal year from the Harbors and Watercraft Revolving Fund to cover a portion of the OMP&R and capital costs allocated to RFWE. Starting in fiscal year 2012–2013, $7.5 million is being appropriated for ongoing OM&R and capital RFWE costs and $2.5 million is being appropriated to reimburse DWR for past unreimbursed OMP&R and capital costs.

Line 18, Davis-Grunsky Loan Repayments, shows the repayments by local agencies of $77.5 million of loans disbursed as of December 31, 2016. Repayment on any future loans was assumed to be beyond the period covered by the financial analysis.

Line 19, Revenue Bond Proceeds, includes bond proceeds classified as special reserves according to the description of revenue bond financing in Line 17 of Table 14-1. Those proceeds, used for capitalized OMP&R costs, revenue bond debt service, and debt service reserves, are not classified as revenue but are included in this line to simplify the financial presentation.

Line 20, Interest Earnings on Operating Revenues, includes interest earnings on unexpended proceeds from the sale of general obligation bonds, interest on operating reserves, and other short-term investment earnings on SWP revenues.

Line 21, Oroville-Thermalito Payments, shows payments from Pacific Gas & Electric Company, Southern California Edison, and San Diego Gas & Electric Company for power generation at the Oroville facilities. Those utilities purchased all power generation from Hyatt and Thermalito powerplants before April 1, 1983, in accordance with a power sale contract dated November 29, 1967. The historic amount includes the amounts of final settlement of payments made according to the contract.

Line 22, Miscellaneous Revenues, includes all other operating revenues not included in Lines 2 through 21.

Line 23, Subtotal, Other Revenues, is the total of Lines 16 through 22.

Line 24, Total Operating Revenues, is the total of Lines 13, 14, 15, and 23.

Line 25, Total Operating Revenues and Capital Resources Revenues, is the total of Lines 1 and 24.

Project Expenses

Project expenses include the following:

- operations, maintenance, and power costs;
- deposits to replacement reserves;
- deposits to special reserves;

- capital resources expenditures; and
- debt service.

Revenue bond proceeds earmarked for debt service during construction and the first year's operating expenses are deposited in the Central Valley Water Project Construction Fund and disbursed in accordance with resolutions authorizing the issuance of such bonds.

Water contractor revenues associated with operating costs and debt service attributable to projects financed by revenue bonds are deposited in the Central Valley Water Project Revenue Fund for appropriate disbursement. All other operating revenues are deposited in the California Water Resources Development Bond Fund—Systems Revenue Account and are disbursed in accordance with the following four priorities of use, as specified in the Burns-Porter Act:

- SWP OMP&R costs;
- general obligation bond debt service;
- repayment of expenditures from the California Water Fund; and
- deposits to a reserve for future SWP construction.

Project expenses are presented in Lines 26 through 36 of Table 14-2.

Line 26, Project Operations, Maintenance, Power, and Replacement Costs, shows the OMP&R portion of the historical and projected costs presented in Table 14-10.

Table 14-10 and Line 26 of Table 14-2 also include the amounts of the operations and maintenance costs for the federal share of joint facilities and those OMP&R costs allocated to recreation, which are intended to be offset by revenues listed in Lines 16 and 17.

Allowances for cost escalations are included in OMP&R costs through 2016. Allowances for additional long-term price escalations in the future are not included in these estimates, because changes in OMP&R costs do not substantially affect the overall results of the financial analysis. (For the most part, changes in OMP&R costs cause direct offsetting changes in operating revenues.)

Power costs make up the largest component of annual operating expenses for the SWP. Assumptions about future power sources and costs are discussed in Chapter 10, Power Resources. Line 26 also includes costs associated with power transactions that result in the sale of power not required for the delivery of water.

Line 27, Deposits to Replacement Reserves, shows funds set aside as required by contract for replacing existing SWP facilities. By December 31, 2016, a net deposit (which includes returned deposits) of $103.2 million had been made; $94.8 million had been spent for replacement costs. The balance of the replacement reserve as of that date was $30 million.

Line 28, Deposits to Special Reserves Under Revenue Bond Financing, includes two significant components: special reserve deposits related to revenue bonds and capital resources revenue carryover from prior years used for construction in the current year. Special reserve deposits are the net of several income and expenditure items. Income items related to revenue bonds are:

- proceeds set aside to pay bond interest during construction (capitalized interest);
- proceeds set aside for first year operating costs (capitalized operations and maintenance);
- water contractor payments or bond proceeds set aside for debt service reserves;
- water contractor payments for revenue bond cover requirements; and

Table 14-10 Operations, Maintenance, Power, and Replacement Costs by Facility, Composition, and Purpose (in thousands of dollars)

	Calendar Year															
Feature	1962–2014	2015	2016	1962–2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027–2035	**TOTAL**
Project Facility																
Feather River facilities	1,568,960	73,229	72,134	1,714,323	69,828	70,622	73,402	74,557	73,406	75,601	75,572	76,371	77,012	77,499	715,351	3,173,544
North Bay Aqueduct	107,740	7,569	8,808	124,117	7,455	8,783	8,399	7,889	7,827	8,034	8,016	8,080	8,128	8,161	74,422	279,311
Delta Facilities	914,538	71,469	85,926	1,071,933	50,977	69,011	64,495	61,691	53,037	54,623	54,602	55,179	55,642	55,995	516,855	2,164,040
Suisun Marsh	63,258	(1,350)	5,881	67,789	8,912	8,836	9,481	9,090	8,950	9,217	9,214	9,311	9,389	9,449	87,217	246,855
South Bay Aqueduct	380,953	23,591	27,443	431,987	24,110	19,024	20,141	21,192	20,886	21,439	21,392	21,566	21,694	21,782	198,692	843,905
California Aqueduct																
Delta to Edmonston	4,377,189	186,317	240,577	4,804,083	256,909	259,699	264,132	272,637	248,081	279,968	266,321	263,100	273,502	262,957	2,432,659	9,884,047
Edmonston to Perris	3,934,616	201,356	241,782	4,377,754	202,936	232,223	228,285	244,197	241,809	248,941	249,163	244,388	248,103	243,461	2,247,529	9,008,789
West Branch	141,266	28,953	31,535	201,754	57,156	47,019	45,221	49,279	48,926	50,182	50,279	50,670	51,437	52,169	473,619	1,177,711
Coastal Branch	332,020	24,100	23,611	379,731	17,845	18,038	18,627	18,829	18,567	19,040	18,989	19,131	19,232	19,298	175,457	742,784
East Branch Enlargement	127,149	10,607	10,619	148,375	9,242	9,315	9,934	9,991	9,739	9,931	9,829	9,834	9,819	9,783	85,889	331,681
East Branch Extension	46,772	4,437	5,638	56,847	4,631	3,777	3,640	4,139	4,079	4,189	4,180	4,215	4,241	4,259	38,895	137,092
Off-Aqueduct power-generating facilities	1,589,822	111	109	1,590,042	109	110	110	111	111	112	113	113	114	114	1,054	1,592,213
Recreation, planning, and Central Valley Project negotiations	8,658	572	550	9,780	1,100	1,100	1,100	1,100	1,100	1,100	1,100	1,100	1,100	1,100	9,900	30,680
Water quality monitoring	424,976	12,683	12,683	450,342	12,683	12,683	12,683	11,379	11,379	11,379	11,379	11,379	11,379	11,379	102,411	670,455
Davis-Grunsky Act Program	5,964	131	272	6,366	288	288	288	288	288	288	288	288	288	288	2,592	11,838
Subtotal	*14,023,881*	*643,775*	*767,568*	*15,435,223*	*724,181*	*760,528*	*759,938*	*786,369*	*748,185*	*794,044*	*780,437*	*774,725*	*791,080*	*777,694*	*7,162,542*	*30,294,945*
Payments to/credits from PG&E under Comprehensive Agreement	(59,848)	0	0	(59,848)	0	0	0	0	0	0	0	0	0	0	0	(59,848)
Total OMP&R Costs	**13,964,033**	**643,775**	**767,568**	**15,375,375**	**724,181**	**760,528**	**759,938**	**786,369**	**748,185**	**794,044**	**780,437**	**774,725**	**791,080**	**777,694**	**7,162,542**	**30,235,097**
Composition																
Salaries and expenses of headquarters personnel	3,956,579	147,456	208,696	4,312,731	178,739	202,382	193,574	206,071	183,450	208,741	198,578	198,346	208,687	198,342	1,855,860	8,145,501
Salaries and expenses of field personnel	5,515,170	158,903	217,512	5,891,585	186,290	210,932	201,752	214,777	191,200	217,560	206,967	206,725	217,503	206,721	1,934,262	9,886,274
Pumping power																
Used by pumping plants	3,743,360	345,497	377,935	4,466,791	401,793	390,673	393,940	390,775	396,036	390,247	397,411	394,453	389,465	397,322	3,555,845	11,964,750
Produced by generation plants	(668,962)	(8,192)	(36,684)	(713,838)	(42,750)	(43,569)	(29,438)	(25,365)	(22,612)	(22,616)	(22,632)	(24,912)	(24,689)	(24,805)	(184,479)	(1,181,705)
Off-Aqueduct power-generating facilities requirement	1,589,822	111	109	1,590,042	109	110	110	111	111	112	113	113	114	114	1,054	1,592,213
Oroville-Thermalito insurance premiums	8,963	0	0	8,963	0	0	0	0	0	0	0	0	0	0	0	8,963
Less portion of costs incurred during construction	(121,051)	0	0	(121,051)	0	0	0	0	0	0	0	0	0	0	0	(121,051)
Payments to/credits from PG&E under Comprehensive Agreement	(59,848)	0	0	(59,848)	0	0	0	0	0	0	0	0	0	0	0	(59,848)
Total OMP&R Costs	**13,964,033**	**643,775**	**767,568**	**15,375,375**	**724,181**	**760,528**	**759,938**	**786,369**	**748,185**	**794,044**	**780,437**	**774,725**	**791,080**	**777,694**	**7,162,542**	**30,235,097**
Project Purpose																
Water supply and power generation	13,321,634	609,482	731,160	14,662,275	687,513	723,737	723,146	749,577	711,393	757,252	743,645	737,933	754,288	740,902	6,831,416	28,823,077
Recreation and fish and wildlife enhancement	276,509	16,281	18,005	310,795	18,005	18,005	18,005	18,005	18,005	18,005	18,005	18,005	18,005	18,005	162,047	652,893
Flood control	10,882	729	735	12,346	735	735	735	735	735	735	735	735	735	735	6,618	26,317
Miscellaneous purposes																
Federal share: San Luis and Delta facilities	376,960	15,743	15,991	408,695	15,867	15,991	15,991	15,991	15,991	15,991	15,991	15,991	15,991	15,991	143,922	712,406
Other (Davis-Grunsky, drainage, City of Los Angeles)	37,896	1,539	1,676	41,112	2,060	2,060	2,060	2,060	2,060	2,060	2,060	2,060	2,060	2,060	18,540	80,252
Payments to/credits from PG&E under Comprehensive Agreement	(59,848)	0	0	(59,848)	0	0	0	0	0	0	0	0	0	0	0	(59,848)
Total OMP&R Costs	**13,964,033**	**643,775**	**767,568**	**15,375,375**	**724,181**	**760,528**	**759,938**	**786,369**	**748,185**	**794,044**	**780,437**	**774,725**	**791,080**	**777,694**	**7,162,542**	**30,235,097**

- deposits to and withdrawals from operating reserves to meet day-to-day cash flow requirements.

The 1952–2016 column also includes advances to DWR's revolving fund for working funds to purchase mobile equipment and to meet day-to-day operating expenses.

The expenditure items related to revenue bonds include:

- debt service cover payments returned to contractors;
- debt service reserve interest payments returned to contractors;
- surplus account funds returned to contractors or applied to meet expenses;
- total capitalized interest paid out; and
- total capitalized operations and maintenance paid out.

Special reserves, reduced over time as reserved amounts, are used for their respective purposes. The amount indicated each year in Line 28 reflects the change from the previous year. A negative number indicates a withdrawal of special reserves to meet expenses, while a positive number indicates a deposit.

Line 29, Capital Resources Expenditures, includes the amount of capital resources revenues applied to construction that is shown in Line 36 of Table 14-1. In Table 14-2, these expenditures are funded out of withdrawals from the reserves in Line 28 and do not affect net revenues shown in Line 38.

Lines 30 and 31, Payment of Debt Service on Bonds Sold through December 31, 2016, show the total principal and interest payments, respectively, on bonds sold to date. Table 14-11, at the end of this chapter, summarizes payments on general obligation bonds (Series A through Y water bonds), power revenue bonds by project, and water system revenue bonds (Series A through AW).

Lines 32 and 33, Payments on Projected Future Water Bonds, include the projected annual bond debt service amounts for future water revenue bonds included on Lines 23, 25, 27, and 29 of Table 14-1 for the East Branch Enlargement, East Branch Extension, SBA Enlargement, and other water system facilities. Assumptions about the bond debt service on these future bonds are that interest costs for the water revenue bonds average 3.15 percent; and that bonds are to be repaid by the end of the project repayment period (2035) or sooner, with maturities commencing in the year following the date of sale and with equal annual bond debt service for the principal repayment period.

Lines 34 and 35, Total Payments of Bond Debt Service, show the total of principal payments indicated on Lines 30 and 32, and the total of interest repayments indicated on Lines 31 and 33.

Line 36, Subtotal, Bond Debt Service, is the total of Lines 34 and 35.

Line 37, Total Operating Expenses and Bond Debt Service, is the total of Lines 26, 27, 28, 29, and 36.

Line 38, Net System Revenues, shows the annual amounts of revenues remaining after the payment of operating costs and bond debt service costs.

Line 39, California Water Fund Repayment, shows the total amount of repayments made to the California Water Fund to reimburse the fund for monies expended for construction of the State Water Resources Development System.

Repayment of the California Water Fund was completed in 1998. The $508 million includes the $306 million of repayments

shown in Line 39 and the $202 million of reimbursement that was credited to the SWP as offsets for recreation and fish and wildlife enhancement expenditures.

Line 40, Revenues Used for Capital Expenditures, includes the amounts required annually for financing scheduled capital expenditures. Revenues not needed for operating costs or bond debt services are available for financing SWP capital expenditures.

Future Costs of Water Service

Estimates of future water costs are useful to contractors for short-range and long-range planning of water needs, operations, and budgets. Unit water charges shown in Table 14-12 represent estimated costs of water delivery by service area for calendar years 2018 and 2023. The unit rates include costs of existing and future SWP facilities accounted for in Table 14-1 and Table 14-7. The unit water charges are based on the assumption that in 2018 and 2023, the SWP will be able to deliver the entire amount of water requested by each contractor. The unit water charges included in Table 14-12 are listed both as 2018 dollars and as escalated rates reflecting assumed future inflation of 5.5 percent in 2017 and 4.5 percent from 2018 through 2023.

Table 14-12 Estimated Unit Water Charges for 2018 and 2023, by Service Area (in dollars per acre-foot)

Service Area and Charge	2018 (in 2018 dollars)	2023 (in 2023 dollars)
Feather River Area		
Capital; Operations, Maintenance, and Replacement (OM&R)	**460**	**504**
North Bay Area		
Capital; OM&R	427	461
Power	55	46
Total	**482**	**507**
South Bay Area		
Capital; OM&R	321	379
Power	53	56
Total	**374**	**435**
Coastal Area		
Capital; OM&R	1,113	1,159
Power	129	166
Total	**1,242**	**1,325**
San Joaquin Area		
Capital; OM&R	194	213
Power	28	27
Total	**222**	**240**
Southern California Area		
Capital; OM&R	401	424
Power	146	177
Total	**547**	**601**

Table 14-1 Capital Requirements and Financing, December 31, 2016 (in thousands of dollars)

Line Number/Item	Calendar Year															
	1952–2014	2015	2016	1952–2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2017–2026	1952–2026
CAPITAL REQUIREMENTS																
1. Initial Project Facilities	2,202,316	0	0	2,202,316	0	0	0	0	0	0	0	0	0	0	0	2,202,316
2. North Bay Aqueduct	114,513	1,272	626	117,086	1,094	370	0	0	0	0	0	0	0	0	1,464	117,874
3. Delta and Suisun Marsh Facilities	309,186	12,773	20,816	342,775	41,948	83,372	58,878	42,516	37,438	32,438	23,898	15,398	8,898	0	344,784	687,559
4. Final Four Units at Banks Pumping Plant	43,673	0	0	43,673	0	0	0	0	0	0	0	0	0	0	0	43,673
5. Coastal Branch Aqueduct	514,050	2,089	2,113	518,253	2,314	1,015	0	0	0	0	0	0	0	0	3,329	521,582
6. West Branch Aqueduct	212,651	4,534	3,329	220,514	6,578	5,295	6,900	19,150	0	0	0	0	0	0	37,923	258,437
7. East Branch Enlargement	461,974	57	0	462,031	0	0	0	0	0	0	0	0	0	0	0	462,031
8. East Branch Improvements	426,396	35,029	61,140	522,565	26,474	24,068	45,264	24,417	0	0	0	0	0	0	120,223	642,788
9. East Branch Extension	325,379	35,397	40,146	400,921	11,811	313	155	102	0	0	0	0	0	0	12,381	413,302
10. South Bay Aqueduct Improvements and Enlargement	259,931	8,232	5,160	273,323	1,600	0	0	0	0	0	0	0	0	0	1,600	274,923
11. Power Generation and Transmission Facilities	857,877	11,401	11,368	880,645	52,075	58,273	12,068	5,943	4,943	0	0	0	0	0	133,303	1,013,948
12. Additional Conservation Facilities	167,004	3,100	2,829	172,933	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	30,000	202,933
13. Agricultural Drainage Facilities	85,062	1,409	1,405	87,876	1,683	1,772	1,802	1,849	1,849	1,849	1,849	1,849	1,849	1,849	18,200	106,076
14. Other Costs	531,706	41,457	97,085	669,573	93,762	86,197	127,445	107,644	0	0	0	0	0	0	415,047	1,085,296
15. Total Project Construction Expenditures	**6,511,718**	**156,748**	**246,017**	**6,914,483**	**242,339**	**263,676**	**255,512**	**204,621**	**47,230**	**37,287**	**28,747**	**20,247**	**13,747**	**4,849**	**1,118,254**	**8,032,737**
16. Davis-Grunsky Act Program Costs	130,000	0	0	130,000	0	0	0	0	0	0	0	0	0	0	0	130,000
17. Special Capital Requirements Under Revenue Bond Financing	578,353	4,654	(43,125)	539,882	20,463	22,363	21,686	17,280	3,666	2,806	2,067	1,332	770	0	92,433	632,315
18. Total Capital Requirements	**7,220,070**	**161,403**	**202,892**	**7,584,365**	**262,802**	**286,039**	**277,198**	**221,901**	**50,896**	**40,093**	**30,814**	**21,579**	**14,517**	**4,849**	**1,210,687**	**8,795,052**
19. Power Facilities Capital Requirements	857,877	11,401	11,368	880,645	52,075	58,273	12,068	5,943	4,943	0	0	0	0	0	133,303	1,013,948
20. Water Facilities Capital Requirements	6,362,194	150,002	191,524	6,703,720	210,726	227,765	265,130	215,958	45,953	40,093	30,814	21,579	14,517	4,849	1,077,384	7,781,104
FINANCING OF CAPITAL REQUIREMENTS																
Power Facilities Revenue Bond Proceeds																
21. Power Facilities Revenue Bonds through Series H	1,162,458	0	0	1,162,458	0	0	0	0	0	0	0	0	0	0	0	1,162,458
Water System Revenue Bond Proceeds																
22. East Branch Enlargement, Current Bonds	482,484	155	0	482,639	0	0	0	0	0	0	0	0	0	0	0	482,639
23. East Branch Enlargement, Future Bonds	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24. East Branch Extension, Current Bonds	382,745	0	29,175	411,920	0	0	0	0	0	0	0	0	0	0	0	411,920
25. East Branch Extension, Future Bonds	0	0	0	0	12,833	340	168	111	0	0	0	0	0	0	13,452	13,452
26. South Bay Aqueduct Enlargement, Current Bonds	215,008	4,035	5,375	224,418	0	0	0	0	0	0	0	0	0	0	0	224,418
27. South Bay Aqueduct Enlargement, Future Bonds	0	0	0	0	1,706	0	0	0	0	0	0	0	0	0	1,706	1,706
28. Water System Facilities, Current Bonds	2,123,919	105,085	406,205	2,635,209	0	0	0	0	0	0	0	0	0	0	0	2,635,209
29. Water System Facilities, Future Bonds	0	0	0	0	213,700	210,944	251,918	217,290	46,396	35,593	26,314	17,079	10,017	349	1,029,600	1,029,600
30. Subtotal, Water System Revenue Bonds	*3,204,157*	*109,275*	*440,755*	*3,754,187*	*228,239*	*211,284*	*252,087*	*217,401*	*46,396*	*35,593*	*26,314*	*17,079*	*10,017*	*349*	*1,044,758*	*4,798,944*
Other Capital Financing																
31. Initial Project Facilities Bond Proceeds	1,452,452	0	0	1,452,452	0	0	0	0	0	0	0	0	0	0	0	1,452,452
32. Davis-Grunsky Act Program Bond Proceeds	130,000	0	0	130,000	0	0	0	0	0	0	0	0	0	0	0	130,000
33. Application of CA Water Fund Monies (Tideland Oil Revenues)	508,056	0	0	508,056	0	0	0	0	0	0	0	0	0	0	0	508,056
34. Interim Financing	76,462	46,811	(242,738)	(114,965)	28,969	69,884	20,612	0	0	0	0	0	0	0	119,465	0
35. Direct Pay	6,726	817	375	7,918	1,094	370	0	0	0	0	0	0	0	0	1,464	9,382
36. Application of Capital Resources Revenues to Construction	566,269	0	0	566,269	0	0	0	0	0	0	0	0	0	0	0	566,269
37. Revenue Transfers Applied	113,490	4,500	4,500	122,490	4,500	4,500	4,500	4,500	4,500	4,500	4,500	4,500	4,500	4,500	45,000	167,490
38. Subtotal, Other Capital Financing	*2,853,456*	*52,128*	*(237,863)*	*2,667,720*	*34,563*	*74,754*	*25,112*	*4,500*	*4,500*	*4,500*	*4,500*	*4,500*	*4,500*	*4,500*	*165,929*	*2,833,649*
39. Total Financing of Capital Requirements	**7,220,070**	**161,403**	**202,892**	**7,584,365**	**262,802**	**286,039**	**277,198**	**221,901**	**50,896**	**40,093**	**30,814**	**21,579**	**14,517**	**4,849**	**1,210,687**	**8,795,052**

Table 14-2 State Water Project Revenues and Expenditures, December 31, 2016 (in thousands of dollars)

	Calendar Year															
Line Number/Item	1952–2014	2015	2016	1952–2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2017–2026	1952–2026
PROJECT REVENUES																
1. Capital Resources Revenues	814,701	0	0	814,701	0	0	0	0	0	0	0	0	0	0	0	814,701
Water Contractor Payments																
2. Transportation Capital	4,982,355	179,093	183,301	5,344,748	187,058	184,193	180,575	179,365	176,635	168,528	165,870	163,567	162,333	161,256	1,729,380	7,074,128
3. Transportation Minimum	4,482,163	245,427	251,559	4,979,150	283,961	307,169	309,449	301,259	304,271	307,314	310,387	313,491	316,626	319,792	3,073,719	8,052,868
4. Transportation Variable	6,009,312	236,021	309,365	6,554,699	244,566	256,694	257,329	288,455	273,267	299,039	289,206	278,773	291,338	276,479	2,755,146	9,309,845
5. Off-Aqueduct Power Facilities	2,963,292	20,267	4,649	2,988,208	4,140	3,720	7,220	200	200	200	200	200	200	200	16,480	3,004,687
6. Delta Water Charge	3,364,922	249,669	298,433	3,913,024	287,567	289,898	289,898	289,898	289,898	289,898	289,898	289,898	289,898	289,898	2,896,644	6,809,669
7. East Branch Enlargement	976,500	46,588	45,987	1,069,076	47,150	46,576	47,309	46,376	47,189	45,806	39,267	40,769	45,077	23,493	429,012	1,498,088
8. East Branch Extension	174,994	33,471	33,485	241,950	35,232	38,901	38,741	39,000	39,018	39,056	39,033	39,075	39,097	38,534	385,686	627,636
9. Coastal Extension	55,622	4,607	4,596	64,826	4,349	3,347	2,536	3,533	3,658	4,535	3,413	3,412	2,769	2,773	34,324	99,150
10. South Bay Aqueduct Improvements and Enlargement	83,072	21,136	20,266	124,474	20,653	21,209	21,255	21,163	21,092	21,067	21,306	21,320	21,159	22,358	212,583	337,057
11. Tehachapi East Afterbay	38,802	6,755	6,764	52,321	6,306	6,095	6,104	6,161	6,149	6,151	6,222	6,230	6,119	6,849	62,387	114,708
12. Water Revenue Bond Surcharge	733,628	45,204	45,130	823,961	85,949	80,571	92,131	90,318	92,538	89,965	90,858	88,821	84,462	80,256	875,870	1,699,831
13. Subtotal, Water Contractor Payments	*23,864,662*	*1,088,239*	*1,203,535*	*26,156,436*	*1,206,931*	*1,238,373*	*1,252,546*	*1,265,727*	*1,253,916*	*1,271,558*	*1,255,660*	*1,245,556*	*1,259,078*	*1,221,887*	*12,471,231*	*38,627,667*
14. Revenue Bond Cover Adjustments	(1,010,311)	(57,444)	(55,249)	(1,123,004)	(56,802)	(56,752)	(57,992)	(56,662)	(55,505)	(55,332)	(52,274)	(51,559)	(50,190)	(44,382)	(537,450)	(1,660,454)
15. Rate Management Adjustments	(502,091)	(40,470)	(40,470)	(583,032)	40,471	40,471	40,471	40,471	40,471	40,471	40,471	40,471	40,471	40,471	404,706	(178,326)
Other Revenues																
16. Federal Payments for Project Operating Costs	408,251	8,175	16,367	432,794	16,367	16,367	16,367	16,367	16,367	16,367	16,367	16,367	16,367	16,367	163,673	596,467
17. Appropriations for Operating Costs Allocated to Recreation	37,534	7,055	3,566	48,154	3,566	3,566	3,566	3,566	3,566	3,566	3,566	3,566	3,566	3,566	35,656	83,811
18. Davis-Grunsky Loan Repayments	74,893	1,359	1,295	77,547	1,195	1,004	958	889	882	871	866	789	726	693	8,873	86,420
19. Revenue Bond Proceeds	652,977	0	0	652,977	0	0	0	0	0	0	0	0	0	0	0	652,977
20. Interest Earnings on Operating Revenues	576,862	487	1,385	578,735	940	940	940	940	940	940	940	940	940	940	9,400	588,135
21. Oroville-Thermalito Payments	249,279	0	0	249,279	0	0	0	0	0	0	0	0	0	0	0	249,279
22. Miscellaneous Revenues	184,264	0	0	184,264	0	0	0	0	0	0	0	0	0	0	0	184,264
23. Subtotal, Other Revenues	*2,184,060*	*17,076*	*22,613*	*2,223,750*	*22,068*	*21,877*	*21,831*	*21,762*	*21,755*	*21,744*	*21,739*	*21,662*	*21,599*	*21,566*	*217,602*	*2,441,352*
24. Total Operating Revenues	**24,536,319**	**1,007,401**	**1,130,429**	**26,674,150**	**1,212,668**	**1,243,968**	**1,256,855**	**1,271,297**	**1,260,636**	**1,278,441**	**1,265,596**	**1,256,129**	**1,270,957**	**1,239,541**	**12,556,089**	**39,230,238**
25. Total Operating Revenues and Capital Resources Revenues	**25,351,020**	**1,007,401**	**1,130,429**	**27,488,851**	**1,212,668**	**1,243,968**	**1,256,855**	**1,271,297**	**1,260,636**	**1,278,441**	**1,265,596**	**1,256,129**	**1,270,957**	**1,239,541**	**12,556,089**	**40,044,939**
PROJECT EXPENSES																
26. Project Operations, Maintenance, Power, and Replacement Costs	13,964,033	643,775	767,568	15,375,375	724,181	760,528	759,938	786,369	748,185	794,044	780,437	774,725	791,080	777,694	7,697,180	23,072,555
27. Deposits to Replacement Reserves	96,620	1,607	4,947	103,174	0	0	0	0	0	0	0	0	0	0	0	103,174
28. Deposits to Special Reserves Under Revenue Bond Financing	628,282	59,015	64,887	752,184	167,179	169,843	170,402	142,727	167,438	142,068	160,925	159,489	161,183	165,622	1,606,875	2,359,059
29. Capital Resources Expenditures	686,932	0	0	686,932	0	0	0	0	0	0	0	0	0	0	0	686,932
Payments of Bond Debt Service																
30. Principal Repayments on Bonds Sold Through December 31, 2015 (Current Bonds)	3,325,752	186,252	182,029	3,694,033	175,238	158,872	161,412	162,990	154,999	154,898	140,361	142,676	143,400	127,112	1,521,958	5,215,991
31. Interest on Bonds Sold Through December 31, 2015 (Current Bonds)	6,230,146	112,253	106,498	6,448,897	110,122	101,969	96,105	89,553	81,946	75,214	68,276	60,975	55,168	47,806	787,134	7,236,031
32. Future Water Bond Principal Repayments	0	0	0	0	17,445	27,612	38,069	51,847	65,041	69,779	74,233	78,411	82,204	85,661	590,302	590,302
33. Future Water Bond Interest Payments	0	0	0	0	14,003	20,644	26,429	33,312	38,527	37,939	36,864	35,353	33,422	31,147	307,640	307,640
34. Total Principal	**3,325,752**	**186,252**	**182,029**	**3,694,033**	**192,683**	**186,484**	**199,481**	**214,837**	**220,040**	**224,677**	**214,594**	**221,087**	**225,604**	**212,773**	**2,112,260**	**5,806,293**
35. Total Interest	**6,230,146**	**112,253**	**106,498**	**6,448,897**	**124,125**	**122,613**	**122,534**	**122,865**	**120,473**	**113,153**	**105,140**	**96,328**	**88,590**	**78,953**	**1,094,774**	**7,543,671**
36. Subtotal, Bond Debt Service	*9,555,898*	*298,505*	*288,527*	*10,142,930*	*316,808*	*309,097*	*322,015*	*337,702*	*340,513*	*337,830*	*319,734*	*317,415*	*314,194*	*291,726*	*3,207,034*	*13,349,964*
NET REVENUES																
37. Total Operating Expenses and Bond Debt Service	**24,931,765**	**1,002,901**	**1,125,929**	**27,060,596**	**1,208,168**	**1,239,468**	**1,252,355**	**1,266,797**	**1,256,136**	**1,273,941**	**1,261,096**	**1,251,629**	**1,266,457**	**1,235,041**	**12,511,089**	**39,571,684**
38. Net System Revenues	419,255	4,500	4,500	428,255	4,500	4,500	4,500	4,500	4,500	4,500	4,500	4,500	4,500	4,500	45,000	473,255
Application of Net System Revenues																
39. California Water Fund Repayment	305,765	0	0	305,765	0	0	0	0	0	0	0	0	0	0	0	305,765
40. Revenues Used for Capital Expenditures	113,490	4,500	4,500	122,490	4,500	4,500	4,500	4,500	4,500	4,500	4,500	4,500	4,500	4,500	45,000	167,490

Table 14-11 Annual Debt Service on Bonds Sold through December 31, 2016 (in thousands of dollars)

Calendar Year	Series A through Y Water Bonds		Oroville Revenue Bonds[a]		Pyramid Project Revenue Bonds[b]		Alamo Project Revenue Bonds[b]		Small Hydro Project Revenue Bonds[b]		Water System Facilities Water System Revenue Bonds[c]		*Subtotal*		Devil Canyon-Castaic Project Revenue Bonds		Reid Gardner Project Revenue Bonds[b,c]		South Geysers Project Revenue Bonds[b]		Bottle Rock Project Revenue Bonds[b]		East Branch Enlargement Project Water System Revenue Bonds[c]		Coastal Extension Facilities Water System Revenue Bonds		East Branch Extension Facilities Water System Revenue Bonds[c]		South Bay Enlargement Facilities Water System Revenue Bonds[c]		Tehachapi East Afterbay Facilities Water System Revenue Bonds[c]		Grand Total	
	Principal	Interest	Principal	Interest	Principal	Interest	Principal	Interest	Principal	Interest	Principal	Interest	*Principal*	*Interest*	Principal	Interest	Principal	Interest	Principal	Interest	Principal	Interest	Principal	Interest	Principal	Interest	Principal	Interest	Principal	Interest	Principal	Interest	Principal	Interest
1964	0	2,803	0	0	0	0	0	0	0	0	0	0	*0*	*2,803*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2,803
1965	0	11,114	0	0	0	0	0	0	0	0	0	0	*0*	*11,114*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	11,114
1966	0	16,742	0	0	0	0	0	0	0	0	0	0	*0*	*16,742*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	16,742
1967	0	26,912	0	0	0	0	0	0	0	0	0	0	*0*	*26,912*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	26,912
1968	0	37,760	0	3,876	0	0	0	0	0	0	0	0	*0*	*41,636*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	41,636
1969	0	47,461	0	10,448	0	0	0	0	0	0	0	0	*0*	*57,909*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	57,909
1970	0	53,198	0	13,145	0	0	0	0	0	0	0	0	*0*	*66,343*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	66,343
1971	0	62,898	0	13,145	0	0	0	0	0	0	0	0	*0*	*76,043*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	76,043
1972	0	67,974	1,260	13,112	0	0	0	0	0	0	0	0	*1,260*	*81,086*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,260	81,086
1973	1,200	69,348	1,330	13,042	0	0	0	0	0	0	0	0	*2,530*	*82,390*	0	7,708	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2,530	90,098
1974	3,000	69,532	1,400	12,969	0	0	0	0	0	0	0	0	*4,400*	*82,501*	0	7,708	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4,400	90,209
1975	5,000	69,366	1,475	12,893	0	0	0	0	0	0	0	0	*6,475*	*82,259*	0	7,708	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6,475	89,967
1976	7,000	69,407	1,555	12,811	0	0	0	0	0	0	0	0	*8,555*	*82,218*	0	7,708	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8,555	89,926
1977	10,200	69,323	1,635	12,727	0	0	0	0	0	0	0	0	*11,835*	*82,050*	0	7,708	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	11,835	89,758
1978	12,700	69,312	5,775	12,537	0	0	0	0	0	0	0	0	*18,475*	*81,849*	0	7,708	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	18,475	89,557
1979	13,650	68,690	11,585	12,275	0	0	0	0	0	0	0	0	*25,235*	*80,965*	0	7,708	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	25,235	88,673
1980	16,050	67,968	3,265	11,739	0	7,900	0	0	0	0	0	0	*19,315*	*87,607*	0	7,708	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	19,315	95,315
1981	18,050	67,109	4,885	11,444	0	7,292	0	0	0	0	0	0	*22,935*	*85,845*	0	7,708	0	5,312	0	0	0	0	0	0	0	0	0	0	0	0	0	0	22,935	98,865
1982	19,250	66,162	17,920	10,968	0	7,292	0	0	0	0	0	0	*37,170*	*84,422*	0	7,708	0	14,347	0	0	0	0	0	0	0	0	0	0	0	0	0	0	37,170	106,477
1983	20,520	65,148	21,110	10,147	0	7,292	0	2,449	0	3,727	0	0	*41,630*	*88,763*	900	7,708	0	35,719	0	4,777	0	6,017	0	0	0	0	0	0	0	0	0	0	42,530	142,984
1984	21,785	64,068	10,005	9,013	640	7,292	0	4,198	0	3,727	0	0	*32,430*	*88,298*	955	7,647	0	35,719	0	5,647	0	10,315	0	0	0	0	0	0	0	0	0	0	33,385	147,626
1985	22,555	62,932	12,700	8,628	675	7,238	0	4,198	0	3,727	0	0	*35,930*	*86,723*	1,010	7,583	9,425	27,209	0	5,647	0	10,315	0	0	0	0	0	0	0	0	0	0	46,365	137,477
1986	23,830	61,742	11,435	7,859	715	7,377	0	4,263	0	3,537	0	0	*35,980*	*84,778*	1,070	7,515	3,805	32,882	0	5,516	1,240	10,315	0	4,021	0	0	0	0	0	0	0	0	42,095	145,027
1987	25,495	60,492	11,715	7,188	790	7,513	265	4,329	0	3,348	0	4,952	*38,265*	*87,822*	1,135	7,442	4,860	32,605	0	5,386	1,305	10,253	0	9,651	0	0	0	0	0	0	0	0	45,565	153,159
1988	26,770	59,165	6,685	6,664	830	7,447	280	4,314	345	3,348	710	11,037	*35,620*	*91,975*	1,205	7,366	5,065	32,295	580	5,521	1,390	10,849	995	9,875	0	0	0	0	0	0	0	0	44,855	157,881
1989	28,145	57,825	33,705	5,513	875	7,378	295	4,298	365	3,328	1,148	14,373	*64,533*	*92,715*	1,275	7,284	7,820	27,557	709	5,646	1,565	11,592	1,078	10,104	0	0	0	0	0	0	0	0	76,980	154,898
1990	29,385	56,473	10,385	4,301	930	7,305	320	4,279	405	3,304	1,227	19,555	*42,652*	*95,217*	1,355	7,198	6,675	29,781	761	5,596	1,678	11,491	1,134	10,048	0	0	0	0	0	0	0	0	54,255	159,331
1991	30,365	55,070	12,055	3,922	980	7,227	335	4,257	430	3,276	2,129	27,569	*46,294*	*101,321*	1,435	7,107	7,170	29,302	818	5,535	1,791	11,376	1,197	16,856	0	0	0	0	0	0	0	0	58,705	171,497
1992	31,745	54,233	14,135	2,985	2,395	5,308	1,260	3,086	960	2,553	5,108	28,412	*55,603*	*96,577*	1,520	7,010	8,950	27,188	1,934	4,136	4,575	7,942	2,583	22,241	0	0	0	0	0	0	0	0	75,165	165,094
1993	33,390	52,707	13,755	2,237	1,525	5,688	755	3,300	445	2,640	4,576	29,965	*54,446*	*96,537*	1,610	6,907	8,820	26,953	901	4,256	3,264	8,385	3,040	21,428	0	0	0	0	0	0	0	0	72,081	164,466
1994	35,075	51,273	35,225	934	1,580	5,634	780	3,274	695	2,569	5,910	38,223	*79,265*	*101,907*	1,705	6,799	77,105	26,273	1,588	4,072	3,374	8,270	4,567	20,752	0	0	0	0	0	0	0	0	167,604	168,073
1995	36,280	49,747	0	0	1,635	5,570	805	3,242	745	2,536	8,064	37,879	*47,529*	*98,974*	1,810	6,684	5,420	19,230	1,695	4,004	3,521	8,133	4,979	20,499	0	0	0	0	0	0	0	0	64,954	157,524
1996	37,520	48,069	0	0	2,320	5,486	1,055	3,203	3,135	2,464	10,459	58,171	*54,489*	*117,393*	1,920	6,561	49,465	18,130	3,043	3,908	3,682	7,974	4,771	23,240	0	0	0	0	0	0	0	0	117,370	177,206
1997	37,215	46,410	0	0	1,695	5,274	875	3,073	585	2,283	14,375	67,909	*54,745*	*124,949*	2,035	6,432	7,515	15,255	1,825	3,696	3,861	7,741	6,300	23,702	0	1,981	0	76	0	0	0	0	76,281	183,832
1998	37,295	44,782	0	0	1,770	5,237	910	3,059	625	2,258	16,755	68,584	*57,355*	*123,920*	2,155	6,295	5,045	16,144	1,935	3,637	4,030	7,509	6,760	23,966	0	1,829	0	229	0	0	0	0	77,280	183,529
1999	38,220	43,177	0	0	1,845	5,141	960	3,004	680	2,229	18,701	68,086	*60,406*	*121,637*	2,285	6,160	9,310	11,660	2,081	3,549	4,240	7,318	7,518	25,032	0	1,808	65	2,930	0	0	0	0	85,905	180,094
2000	39,510	41,521	0	0	1,925	5,045	1,010	2,955	610	2,197	19,536	66,900	*62,591*	*118,618*	2,420	6,040	9,870	11,194	1,950	3,448	4,470	7,098	8,974	24,651	0	1,808	915	2,928	0	0	0	0	91,190	175,785
2001	40,600	39,805	0	0	2,250	4,949	1,155	2,902	780	2,272	20,945	66,417	*65,730*	*116,345*	2,565	5,912	10,365	10,758	2,045	3,344	4,720	6,856	9,425	24,188	0	2,131	950	2,889	0	0	0	0	95,800	172,423
2002	41,740	38,037	0	0	2,460	4,619	1,280	2,758	950	2,192	23,918	63,126	*70,348*	*110,732*	2,720	5,773	11,185	10,010	2,225	3,074	5,265	6,323	9,817	23,099	335	2,311	1,245	3,481	0	0	0	0	103,140	164,803
2003	43,590	36,215	0	0	2,500	4,429	1,315	2,671	940	2,110	23,441	60,465	*71,786*	*105,890*	2,885	5,626	2,135	9,313	2,335	2,890	5,445	5,939	9,988	18,479	245	2,310	1,105	4,278	0	0	0	0	95,924	154,725
2004	45,730	34,302	0	0	2,500	4,291	1,330	2,598	970	2,059	26,396	58,988	*76,926*	*102,238*	3,055	5,470	2,210	9,214	2,425	2,758	5,610	5,633	9,883	20,583	220	2,298	2,045	4,747	0	91	0	55	102,374	153,087
2005	46,985	32,302	0	0	2,727	4,097	1,461	2,487	1,327	1,987	23,064	58,061	*75,564*	*98,934*	3,240	5,305	8,825	9,112	2,759	2,598	5,959	5,289	3,669	20,046	305	2,163	2,124	5,345	0	435	0	171	102,445	149,398
2006	48,275	30,248	0	0	2,868	3,985	1,527	2,437	1,371	1,924	28,901	59,149	*82,942*	*97,743*	3,435	5,130	9,340	8,617	2,920	2,453	6,326	4,958	11,627	20,182	240	2,235	2,222	5,731	82	669	0	287	119,134	148,004
2007	49,765	28,126	0	0	3,023	3,817	1,622	2,346	1,451	1,846	30,267	58,239	*86,128*	*94,374*	3,640	4,945	9,835	8,079	3,101	2,278	6,731	4,578	12,229	19,664	1,015	2,225	2,305	5,825	239	698	75	306	125,298	142,972
2008	51,755	25,937	0	0	2,794	3,525	1,618	2,147	1,161	1,763	25,352	60,365	*82,680*	*93,737*	3,860	4,749	23,689	8,084	2,765	2,037	5,637	4,096	10,602	18,753	179	2,167	51	7,036	247	2,926	80	1,961	129,790	145,546
2009	54,095	23,654	0	0	2,947	3,391	1,743	2,042	1,168	1,699	33,484	62,154	*93,437*	*92,940*	4,090	4,540	25,475	5,581	2,908	1,915	5,981	3,787	12,289	18,007	200	1,943	2,629	7,580	2,604	5,354	1,843	3,160	151,456	144,807
2010	55,785	21,278	0	0	3,525	3,249	2,078	2,000	1,399	1,610	31,016	61,546	*93,803*	*89,683*	4,335	4,319	33,201	5,547	3,221	1,750	6,611	3,439	12,644	17,746	2,790	2,059	2,803	7,780	3,334	6,045	1,911	3,094	164,653	141,462
2011	57,275	18,827	0	0	2,599	2,795	1,465	1,749	1,045	1,335	40,105	60,528	*102,489*	*85,234*	4,595	4,085	33,105	4,344	2,917	1,510	6,366	3,066	14,115	15,805	1,237	1,802	2,826	7,869	3,782	7,343	1,992	3,062	173,424	134,120
2012	58,615	16,278	0	0	2,761	2,596	1,574	1,600	1,060	1,313	43,169	56,395	*107,179*	*78,182*	4,875	3,837	35,031	2,558	3,116	1,274	6,845	2,500	14,853	15,051	1,294	1,483	2,955	7,929	4,527	8,298	2,094	2,948	182,769	124,060
2013	60,455	13,731	0	0	4,214	2,385	2,601	1,471	2,191	1,242	48,284	54,026	*117,745*	*72,855*	5,165	3,574	8,657	860	4,825	1,049	10,997	2,035	13,816	11,472	1,482	1,381	4,605	10,946	5,737	8,684	2,200	2,880	175,229	115,736
2014	57,985	11,296	0	0	4,831	2,129	3,107	1,301	2,405	1,122	56,254	48,391	*124,582*	*64,239*	5,475	3,303	260	427	4,164	787	8,619	1,460	15,082	11,821	2,106	1,217	4,835	13,224	6,147	6,910	2,296	1,901	173,566	105,289
2015	53,775	8,885	0	0	5,272	1,907	3,126	1,178	2,741	993	71,571	54,891	*136,485*	*67,854*	5,805	3,015	860	444	3,795	567	2,556	1,000	14,691	12,001	2,492	1,194	9,249	15,164	7,503	8,453	2,816	2,561	186,252	112,253
2016	**46,215**	**6,666**	**0**	**0**	**5,671**	**1,665**	**3,211**	**1,038**	**3,084**	**860**	**74,865**	**55,159**	***133,046***	***65,388***	**6,150**	**2,710**	**0**	**199**	**0**	**193**	**0**	**438**	**19,939**	**11,304**	**2,518**	**1,159**	**9,659**	**14,913**	**7,798**	**7,740**	**2,919**	**2,454**	**182,029**	**106,498**
2017	38,145	4,652	0	0	6,445	1,388	3,654	884	3,246	706	76,134	62,062	*127,624*	*69,692*	6,520	2,388	0	0	0	0	0	0	18,743	10,680	2,400	1,079	10,089	15,652	7,240	8,250	2,622	2,381	175,238	110,122

Table 14-11 Annual Debt Service on Bonds Sold through December 31, 2016 (in thousands of dollars) *(continued)*

Calendar Year	Series A through Y Water Bonds		Oroville Revenue Bonds[a]		Pyramid Project Revenue Bonds[b]		Alamo Project Revenue Bonds[b]		Small Hydro Project Revenue Bonds[b]		Water System Facilities Water System Revenue Bonds[c]		*Subtotal*		Devil Canyon-Castaic Project Revenue Bonds		Reid Gardner Project Revenue Bonds[b,c]		South Geysers Project Revenue Bonds[b]		Bottle Rock Project Revenue Bonds[b]		East Branch Enlargement Project Water System Revenue Bonds[c]		Coastal Extension Facilities Water System Revenue Bonds		East Branch Extension Facilities Water System Revenue Bonds[c]		South Bay Enlargement Facilities Water System Revenue Bonds[c]		Tehachapi East Afterbay Facilities Water System Revenue Bonds[c]		Grand Total	
	Principal	Interest	Principal	Interest	Principal	Interest	Principal	Interest	Principal	Interest	Principal	Interest	*Principal*	*Interest*	Principal	Interest	Principal	Interest	Principal	Interest	Principal	Interest	Principal	Interest	Principal	Interest	Principal	Interest	Principal	Interest	Principal	Interest	Principal	Interest
2018	25,435	3,011	0	0	4,870	1,086	2,866	723	2,516	541	73,683	58,354	*109,370*	*63,715*	6,910	2,045	0	0	0	0	0	0	19,314	9,821	1,680	998	11,470	15,223	7,553	7,911	2,575	2,256	158,872	101,969
2019	16,975	1,804	0	0	4,537	884	2,766	609	2,184	430	82,707	56,144	*109,169*	*59,871*	7,325	1,682	0	0	0	0	0	0	21,500	9,058	1,094	935	11,864	14,752	7,790	7,639	2,670	2,168	161,412	96,105
2020	17,405	956	0	0	5,518	681	3,327	491	2,797	323	78,459	53,231	*107,506*	*55,682*	7,765	1,298	0	0	0	0	0	0	22,383	8,149	1,926	900	12,442	14,190	8,127	7,293	2,841	2,041	162,990	89,553
2021	8,595	318	0	0	2,641	446	1,683	354	1,153	197	83,702	49,355	*97,774*	*50,670*	8,230	890	0	0	0	0	0	0	22,462	7,155	2,090	836	13,012	13,601	8,461	6,892	2,970	1,902	154,999	81,946
2022	1,885	59	0	0	5,247	339	4,965	289	1,208	146	81,287	45,786	*94,592*	*46,619*	8,725	458	0	0	0	0	0	0	23,139	6,140	2,853	774	13,639	12,979	8,834	6,487	3,116	1,757	154,898	75,214
2023	85	7	0	0	1,028	96	552	55	638	91	88,235	42,276	*90,538*	*42,525*	0	0	0	0	0	0	0	0	20,746	5,089	2,056	675	14,254	12,321	9,442	6,061	3,325	1,605	140,361	68,276
2024	35	2	0	0	664	51	381	31	429	61	89,788	37,491	*91,297*	*37,636*	0	0	0	0	0	0	0	0	20,856	4,110	2,139	591	14,969	11,614	9,919	5,584	3,496	1,440	142,676	60,975
2025	0	0	0	0	149	23	106	16	171	41	86,086	34,136	*86,512*	*34,216*	0	0	0	0	0	0	0	0	25,703	3,138	1,712	503	15,678	10,896	10,225	5,138	3,570	1,277	143,400	55,168
2026	0	0	0	0	154	18	110	13	178	34	83,607	29,588	*84,049*	*29,653*	0	0	0	0	0	0	0	0	9,292	1,865	1,791	428	15,954	10,145	11,694	4,617	4,332	1,098	127,112	47,806
2027	0	0	0	0	397	13	283	9	264	26	95,081	25,663	*96,025*	*25,711*	0	0	0	0	0	0	0	0	8,632	1,424	1,785	347	19,798	9,350	12,779	4,042	4,859	884	143,878	41,758
2028	0	0	0	0	0	0	0	0	140	15	79,919	21,317	*80,059*	*21,332*	0	0	0	0	0	0	0	0	8,903	1,014	2,729	281	25,486	8,364	14,299	3,411	5,611	643	137,087	35,045
2029	0	0	0	0	0	0	0	0	149	8	89,377	16,936	*89,526*	*16,944*	0	0	0	0	0	0	0	0	7,291	594	2,885	144	26,608	7,098	14,981	2,694	5,879	362	147,170	27,836
2030	0	0	0	0	0	0	0	0	0	0	61,233	13,216	*61,233*	*13,216*	0	0	0	0	0	0	0	0	1,315	257	0	0	21,326	5,787	7,995	1,989	323	75	92,192	21,324
2031	0	0	0	0	0	0	0	0	0	0	62,895	11,544	*62,895*	*11,544*	0	0	0	0	0	0	0	0	1,335	231	0	0	22,196	4,912	8,347	1,647	333	66	95,106	18,400
2032	0	0	0	0	0	0	0	0	0	0	65,472	9,028	*65,472*	*9,028*	0	0	0	0	0	0	0	0	1,395	174	0	0	23,119	4,002	8,736	1,260	348	51	99,070	14,515
2033	0	0	0	0	0	0	0	0	0	0	67,647	6,846	*67,647*	*6,846*	0	0	0	0	0	0	0	0	1,435	132	0	0	24,068	3,053	6,772	870	363	39	100,285	10,940
2034	0	0	0	0	0	0	0	0	0	0	69,905	4,591	*69,905*	*4,591*	0	0	0	0	0	0	0	0	1,480	90	0	0	25,063	2,065	7,070	580	377	26	103,895	7,352
2035	0	0	0	0	0	0	0	0	0	0	72,113	2,364	*72,113*	*2,364*	0	0	0	0	0	0	0	0	1,525	45	0	0	26,071	1,058	7,334	314	386	14	107,429	3,795
Total	**1,582,400**	**2,384,309**	**244,995**	**246,522**	**107,717**	**195,790**	**60,811**	**100,980**	**49,141**	**81,997**	**2,197,060**	**2,059,443**	**4,242,124**	**5,069,041**	**139,165**	**283,872**	**440,493**	**567,902**	**65,341**	**114,454**	**137,654**	**224,290**	**486,014**	**613,433**	**43,798**	**45,995**	**399,694**	**307,963**	**219,598**	**146,324**	**68,222**	**44,925**	**6,242,103**	**7,418,198**

[a] Principal and interest schedule adjusted to reflect early redemption of bonds.
[b] Allocated portions of Power Facilities Revenue Bonds and Water System Revenue Bonds.
[c] Interest includes a minimum fee for Water System Revenue Bonds Series AB.

Chapter 15
SWP Education and Information

Children learn about water safety at the 2016 Aquatic Adventure Camp, held at the Huron Fishing Access Site in Huron, California.

Significant Events in 2016

In May, the Governor issued Executive Order B-37-16. The order directed five state agencies, including the Department of Water Resources (DWR), to establish a long-term framework for water conservation and drought planning. The order builds on the conservation accomplished during the historic drought and the implementation of the Governor's *California Water Action Plan.*

Save Our Water, a partnership between DWR and the Association of California Water Agencies, developed a new statewide campaign, *Water Conservation: It's For Life.* The campaign's message was related to outdoor landscaping, adjusting sprinklers, and fixing leaks. It featured radio, weather and traffic sponsorships, and outdoor advertisements that encouraged continued water conservation efforts.

During a scheduled inspection in December, quagga mussels were found in the Angeles Tunnel, which connects Pyramid Lake to the Elderberry Forebay and nearby Castaic Lake. DWR distributed a media release noting that no evidence of mussel reproduction had been found during DWR's routine monthly detection monitoring.

Information for this chapter was provided by the Public Affairs Office.

The Department of Water Resources' (DWR) Public Affairs Office (PAO) produces and distributes news and program information describing California's water resources and DWR's mission, programs, and activities. PAO disseminates information by way of news releases, interviews, Internet posts, and both printed and electronic publications. Other avenues include artwork, films, graphics, exhibits, press conferences, photography, public meetings, social media, and special events.

News Topics

Selected highlights below provide examples of PAO's 2016 outreach efforts and news media responses related to DWR's water policy, programs, and activities related to the State Water Project (SWP).

Drought

Following one of the driest years in modern California history, 2016 was the fifth consecutive year of drought. California's snowpack failed to reach its average water content for the winter season, and rainfall in the three regions monitored by DWR exceeded their collective water year average by only 1 percent. California residents were reminded of the drought's severity and activities that conserve and manage water.

Conservation

Water conservation and the efficient use of the water supply are major priorities for the SWP. Through various water conservation measures and water use efficiency efforts, water waste is minimized, groundwater tables are rebuilt, climate change preparations are addressed, and the harmful effects of multiple drought years are curtailed.

California State Fair

DWR's participation in the California State Fair showcased water conservation in three exhibits. One of the two outdoor exhibits displayed a variety of native or drought-tolerant plants, as well as fruits, vegetables, and herbs that require minimal water. The second outdoor exhibit demonstrated water-wise landscaping through the State's turf rebate program. The indoor exhibit provided educational materials on methods to reduce water use, both inside and outside of the home.

Executive Order B-37-16

In May, the Governor issued Executive Order B-37-16, Making Water Conservation a California Way of Life, to establish long-term water conservation measures and improved planning for more frequent and severe droughts. The order's four primary objectives are to: (1) use water more wisely; (2) eliminate water waste; (3) strengthen local drought resilience; and (4) improve agricultural water use efficiency and drought planning.

DWR, the State Water Resources Control Board, the California Public Utilities Commission, the California Department of Food and Agriculture, and the California Energy Commission, worked to draft a framework to make long-term water conservation a California way of life, as directed by the Governor's Executive Order. This collaborative framework will enhance the resiliency of California communities against climate change and drought, and meet drought preparedness goals that reflect California's diverse climate, landscape, and demographic conditions. The agencies' final report is expected in 2017.

Save Our Water

Save Our Water is a 7-year partnership between DWR and the Association of California Water Agencies. In 2016, *Save Our Water* developed a new statewide campaign, *Water Conservation. It's For Life.* The campaign's messaging is related to outdoor landscaping, adjusting sprinklers, and fixing leaks. *Save Our Water* also expanded its collaboration with water agencies and business partners. The campaign featured radio, weather and traffic sponsorships, and outdoor advertisements that encouraged continued water conservation efforts.

Quagga Mussel Infestation

On December 8, six adult quagga mussels were found in the Angeles Tunnel during a scheduled inspection. The Angeles Tunnel conveys water from Pyramid Lake to Castaic Powerplant and Elderberry Forebay in generating mode; and conveys water to Pyramid Lake from Castaic Powerplant and Elderberry Forebay in pumping mode. The California Department of Fish and Wildlife determined that Pyramid Lake was infested, and both Elderberry Forebay and Castaic Lake were presumed infested. DWR distributed a media release noting that no evidence of mussel reproduction had been found during DWR's routine monthly detection monitoring. For more information, see Chapter 3, Environmental Programs.

New Research Vessel

DWR commissioned a new research vessel, the *Sentinel*, a state-of-the-art replacement for the *San Carlos*, which had been monitoring water quality in the Sacramento-San Joaquin Delta and upper San Francisco Estuary for 40 years. The new vessel was named to honor the late Laura King Moon, DWR's former Chief Deputy Director, who passed away in 2015. The commissioning took place December 19 aboard the *Delta King* on the Sacramento River. Design and construction of the *Sentinel* were accomplished with funding from the 29 SWP water contractors. Construction began in February 2015, and the vessel was launched in October 2016.

Snow Surveys

In 2016, the continued severity of California's drought heightened public and media interest in the Sierra Nevada snowpack. DWR's media-oriented snow surveys at Phillips Station near Lake Tahoe were well attended. PAO broadcast the surveys via live video on DWR social media channels.

In 2016, as in 2015, no May snow survey was conducted due to the warm weather and the melt-off of snow at the Phillips Station survey site.

Media interest was high for all manual snow surveys. PAO distributed news releases on the snow survey findings, historical data, and video and photo links. PAO spoke to many media outlets about the severity of the drought and California's water supply. PAO also shared snow survey results on DWR's main website and various social media platforms.

SWP Allocations

On December 1, 2015, DWR announced an initial allocation of 10 percent for the 29 SWP water contractors that collectively serve more than 27 million Californians and about 750,000 acres of irrigated farmland. DWR announced increases in the allocation: 15 percent on January 26; 30 percent on February 24; 45 percent on March 17; and a final allocation of 60 percent on April 21.

News Media

Publications

PAO creates and maintains approximately 40 brochures describing the SWP, its mission and facilities. The brochures are periodically updated and distributed statewide to educate the public about the SWP.

Brochures distributed to stakeholders, the public, and DWR's Visitors Centers during 2016 included updated versions of the *California's State Water Project, California's State Water Project at a Glance*, *Upper Feather River Lakes*, *the North Bay Aqueduct, Harvey O. Banks Delta Pumping Plant, John E. Skinner Delta Fish Protective Facility, South Bay Aqueduct, Edmonston Pumping Plant, and Pyramid Lake.*

Spanish translations were completed for the Turf and Toilet rebates flyer, Aquatic Adventure Camp's "*Vamos a Aprender" (We Are Going To Learn)* brochure, *The Water Cycle,* and *What You Need to Know about Swimmer's Itch* flyers.

Published three times a year, *DWR Magazine* features articles describing DWR programs, staff, and activities.

In 2016, articles covered DWR's 60th anniversary, Sherman Island fish release sites under construction, and the Preliminary Application Documents for South SWP Hydropower Relicensing.

E-News

Each weekday, PAO compiles and electronically distributes news articles, blogs, and commentaries on water-related issues to more than 5,000 subscribers. These news clips inform DWR staff of water issues relevant to DWR and its programs.

Topics highlighted in the weekday news clips include water supply, water quality, drought, watersheds and programs, and agencies and people.

Spotlight Stories and Social Media

In 2016, more than 50 Spotlight Stories were featured on DWR's main website and on DWR's Facebook page. Subjects included how California withstood the fifth year of drought, teaching children about water safety at Lake del Valle, snow surveys, improving Delta Smelt survival, installation of a new California Irrigation Management Information System weather station in Southern California, and restoring the Suisun Marsh.

DWR increased its social media messaging in 2016. PAO posted multiple messages per week on Facebook, Twitter, and Instagram about various DWR projects, updates, and activities of interest both to the public and DWR employees. Subjects included DWR's new research vessel, quagga mussels, algal bloom information, and water conservation, among others. In 2016, DWR's Facebook followers increased from 5,577 to 9,319.

Community Relations and Outreach

In 2016, PAO staff continued to educate the public about the drought, water conservation, and the *Save Our Water* program. DWR's award-winning, water-efficient gardens and exhibits featured "Conservation: the California Lifestyle" at the California State Fair, which ran July 8–July 24.

PAO staff also provided exhibits at the following events:

- San Francisco Flower & Garden Show;
- International Sportsmen's Exposition, Sacramento;
- Healthy Kids Day, Oroville;
- Sacramento Area Creeks Council Creek Week Event;
- Feather Fiesta Days, Oroville;
- YMCA Kids Adventure Day, Oroville;
- Sacramento Earth Day;
- California Environmental Protection Agency Earth Day, Sacramento;
- Walk on the Wildside, Sacramento;
- Hooked on Fishing, Not on Drugs, Oroville;
- Drought Resource Fair, Tulare;

- Tulare County Fair;
- California State Fair, Sacramento;
- 7th Annual Sacramento Banana Festival;
- Antelope Lake Fishing Derby;
- California Flood Preparedness Week, Sacramento;
- Department of Social Services Emergency Preparedness Fair 2016, Sacramento;
- Office of Emergency Services, 11th Annual California Day of Preparedness, Old Sacramento;
- The Garden Faire, Scotts Valley;
- Sacramento Home & Garden Show;
- California Conservation Corps 40th Anniversary, Sacramento and Los Angeles;
- 49th Annual Native American Day, California State Capitol, Sacramento;
- Oroville Salmon Festival; and
- Grape, Raisin & Nut Expo, Fresno.

DWR Tours Program

The DWR tours program regularly attracts foreign and domestic tour groups. The SWP and its water supply mission is the major attraction.

Strong interest in SWP operations from domestic and foreign groups continued in 2016. Additionally, California's ongoing drought attracted attention of organizations with their own water-related issues. Members of the Upper Big Blue Natural Resources District, which is comprised of 23 regional groundwater districts in Nebraska, visited DWR to discuss groundwater management and to tour the Delta.

In 2016, teachers, students, and educators visited DWR to learn more about the SWP and California's water issues. They came from the Teachers College of San Joaquin; the Plumas County Office of Education; California State University, Chico; Independence High School from Brentwood; and the Urban School of San Francisco.

During 2016, some of the foreign visitors to DWR and the SWP included: a delegation of water experts and officials from Afghanistan; a Chinese delegation representing the nation's major South-to-North Water Diversion Project; and two delegations from the Republic of Korea.

The Society of Environmental Journalists held its annual conference in Sacramento and included a tour of the Delta in its agenda. Approximately two dozen journalists were guided through the Delta's islands and waterways, which concluded with a visit to Banks Pumping Plant.

Several environmental scientists with the California Department of Fish and Wildlife's Water Branch requested a Delta tour and Banks Pumping Plant visit to allow them to discuss water-related issues and the SWP.

SWP Visitors Centers

DWR's three visitors centers house exhibits and information related to the SWP and its water supply mission. They are located at Lake Oroville, San Luis Reservoir (Romero Overlook), and Pyramid Lake (Vista del Lago). Figure 15-1 shows the SWP visitors centers locations.

In 2016, an interpretive planner joined PAO to coordinate with staff at these locations and to plan new programs, displays, and exhibits. DWR continues to collaborate with partners and stakeholders on long-range interpretive master plans. These plans will address recommendations to meet the current needs of the sites and their visitors.

The visitors centers regularly host domestic and international groups. In 2016, specialty and school groups participated in guided tours.

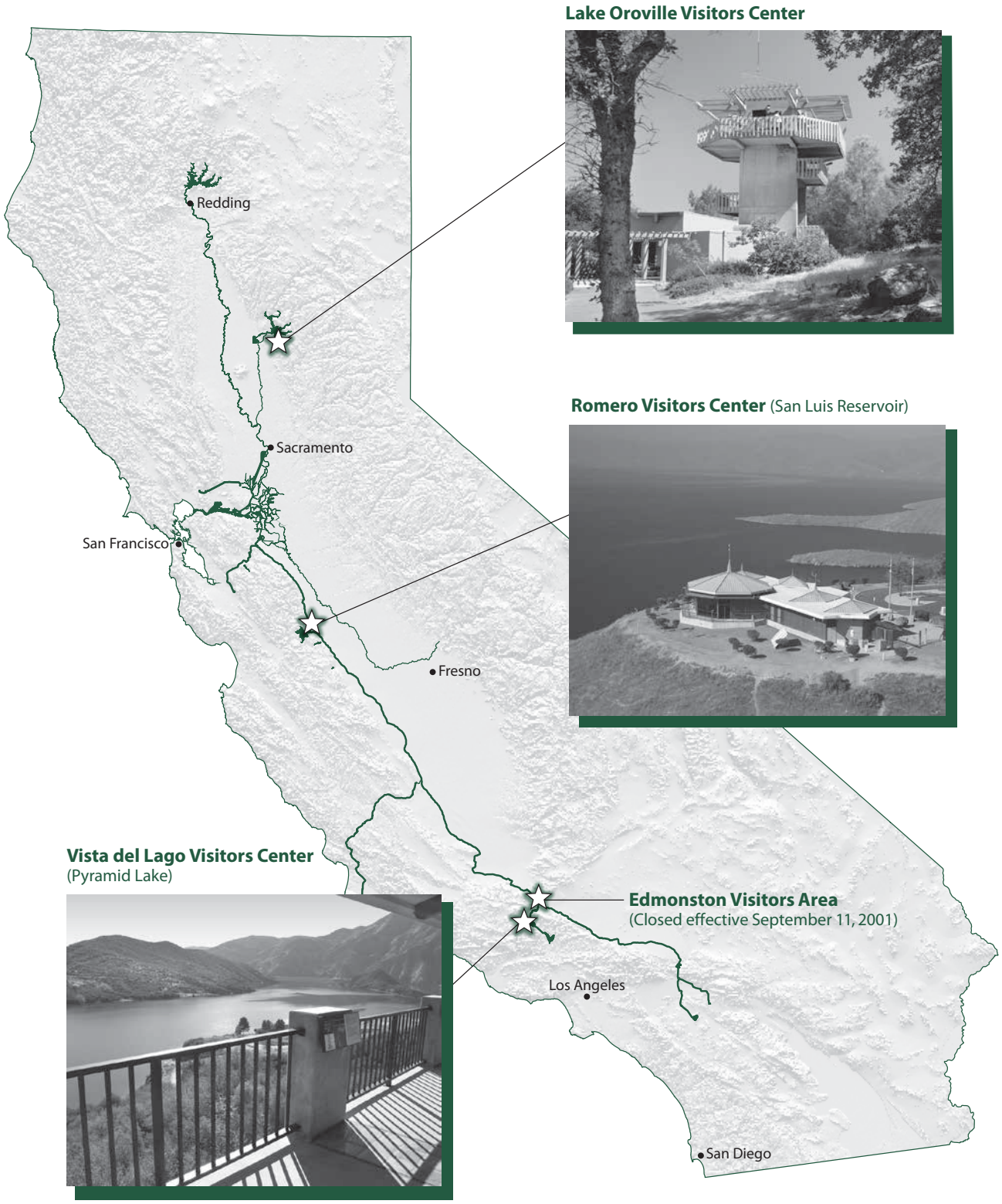


Figure 15-1 Visitors Centers on the SWP

SWP Recreation Outreach Program

The goal of the SWP Recreation Outreach Program is to educate the public about the many recreational opportunities available at SWP facilities. PAO staff attends community events; state and county fairs; state and federally sponsored events; and forms partnerships with state, federal, and community groups.

In 2016, PAO's Education and Outreach Branch formed a new partnership with East Bay Regional Park District at Lake del Valle. "Vamos a Aprender," a water safety education program, helped disseminate water safety information. Bilingual lifeguards provided 45-minute water safety sessions, which taught the proper way to wear a life vest, how to stay afloat, beach rules, and basic water safety with a focus on life jacket safety.

DWR also co-sponsors and coordinates "Catch A Special Thrill" (C.A.S.T.) fishing events for children with special needs. During 2016, C.A.S.T. events were held at Lake Oroville, Brannan Island State Recreation Area near Rio Vista, O'Neill Forebay at San Luis State Recreation Area, and Silverwood Lake.

DWR continued its partnerships with communities to offer 20 Aquatic Adventure Camps throughout the summer months, teaching water safety to young people. In 2016, the camps utilized SWP facilities at Lake Perris, Lake del Valle, Huron Fishing Access Site, O'Neill Forebay, and San Luis Reservoir.

SWP Recreation Outreach Events

DWR, the California Department of Parks and Recreation, and several partner agencies co-sponsored or attended the following recreation outreach events in 2016:

- International Sportsmen's Exposition, Sacramento;
- Feather Fiesta Days, Oroville;
- Healthy Kids Day, Oroville;
- Walk on the Wildside, Sacramento;
- Hooked on Fishing-Not on Drugs, Oroville; and
- Oroville Salmon Festival.

School Education Program

The School Education Program's goal is to provide students and educators with a statewide perspective on water issues such as conservation, conveyance systems, and the water cycle. PAO staff develops and promotes high-quality materials, providing them free of charge to schools, educators, and water districts. Program achievements for 2016 are described below.

Public Events and Outreach

In 2016, PAO staff spoke with more than 2,000 children, teachers, and family members, and provided materials at multiple events including:

- San Joaquin County AgVenture, Stockton, Lodi, and Manteca;
- California Environmental Protection Agency Earth Day, Sacramento;
- State Scientist Day, Sacramento;
- YMCA Family Day, Sacramento;
- Bring Your Kids to Work Day, Sacramento;
- Children's Water Education Festival, Orange County; and
- 2016 California Science Teachers Association Annual Conference, Palm Springs.

PAO staff organized a team of DWR judges from multiple divisions and provided a special award at the Sacramento Regional Science and Engineering Fair in Sacramento.

Supplementary Teaching Materials

Supplementary teaching materials included handouts, workbooks, and children's videos. These were provided to California teachers, water agencies, and other nonformal educators through the *Water Facts & Fun* online catalog and at outreach events. In 2016, approximately 80,000 materials were sent to educators throughout California. The most popular materials included:

- *California Water Works and Why It Does*;
- Water Conservation class pledges and stickers;
- Project Water Education for Teachers (WET) *Discover Drought* and *Conserve Water;*
- Hamburger activity sheet;
- Project WET *Discover Floods* and *Discover Groundwater and Springs;* and
- California's Amazing Delta book covers.

In 2016, PAO and the California Department of Fish and Wildlife completed a new children's video about water conservation, *Water We Do—It's Up to Me and You*, which was distributed to elementary school teachers throughout California.

Collaboration and Partnerships

DWR's School Education Program collaborates with other entities with similar interests and goals to pool resources in educating California's youth on the importance of water resources. During 2016, PAO staff participated in the following collaborative activities/meetings:

- Project WET Advisory Committee, the California Environmental Education Interagency Network Committee;
- Water Education Committee meeting, hosted in June by the Santa Clara Valley Water District and hosted in November by the Chino Basin Water Conservation District;
- California Environmental Education Interagency Network monthly meetings;
- Creek Week Planning Committee and the Kids' Art Contest Winner Selection Subcommittee; and Splash Off, sponsored by the Sacramento Area Creeks Council; and
- Caring for Our Watersheds contest, sponsored by Agrium Inc. and the Center for Land-Based Learning.

Additional collaborative efforts included PAO staff assistance for the following programs:

- California Department of Education's California Regional Environmental Education Community network;
- California Environmental Education Foundation Teacher Institute;
- California Project WET program;
- Floodplain and Delta Ecology Institute for teachers, co-sponsored with the San Joaquin County Office of Education;
- Sacramento River Floodplain Ecology Institute for teachers, co-sponsored with California State University, Chico;
- Central Valley Floodplain Ecology Institute for educators, co-sponsored with the SAM Academy and the Central Valley Science Project, California State University, Fresno;
- Sacramento Floodplain Ecology Institute, co-sponsored with the Yolo County Office of Education; and
- Delta Studies Institute for teachers, co-sponsored with the San Joaquin County Office of Education.

In 2016, PAO staff attended two workshops on climate change: *Climate Change Science and Communication: A Regional Approach*, offered through the Earth to Sky Partnership; and the National Network for Ocean and Climate Change Interpretation study circle. The development of new materials on climate change and California's water resources is planned for 2017.

Glossary

This glossary contains terms used in the text of Bulletin 132-17 as well as additional terms related to water resources.

A

abundance The number of organisms of a particular kind in a population. (See also, abundance index.)

abundance index (fisheries) A relative measure of the weight or number of fish in a stock, a segment of the stock (e.g. the spawners), or an area. Often available in time series, the information is collected through scientific surveys or inferred from fishery data.

acre-foot The volume of water that would cover one acre to a depth of one foot; equal to 43,560 cubic feet or 325,851 gallons.

adaptive management The process of improving management effectiveness by learning from the results of carefully designed decisions or experiments.

adipose fin A small fleshy fin with no rays on the topside of a fish located between the fin on the back and the tail fin.

afterbay A storage reservoir downstream of a power plant or large reservoir that regulates fluctuating discharges from a spillway, hydroelectric power plant, or a pumping plant.

agricultural drainage (1) The process of directing excess water away from root zones by natural or artificial means, such as by using a system of drains placed below ground surface level (also called subsurface drainage); (2) the water drained away from irrigated farmland.

alluvium Unconsolidated soil strata deposited over time by flowing water.

amphipod A small crustacean with a flat (laterally compressed) body belonging to the group Amphipoda, found in both marine and freshwater environments.

anadromous Fish that live the majority of their life cycle in the sea and return to freshwater streams to spawn.

anion An atom or a molecule in which the total number of electrons is greater than the total number of protons, giving it a net negative electrical charge.

aquifer A geologic formation that stores water underground (called groundwater), especially one that yields significant quantities of water to wells or springs.

arid Describes a climate or region in which precipitation is so deficient in quantity or occurs so infrequently that intensive agricultural production is not possible without irrigation.

artificial recharge The addition of surface water to a groundwater basin by human activity, such as putting surface water into spreading basins.

atmospheric river A short-lived, narrow stream of high-velocity wind that carries large amounts of water vapor from tropical oceans to mid-latitude land areas resulting in large amounts of precipitation in those areas.

average annual runoff The average value of annual runoff volume calculated for a selected period of record, at a specified location, such as a dam or stream gauge.

average year water demand Demand for water under average hydrologic conditions for a defined level of development.

B

balanced water conditions These exist when upstream reservoir storage releases, plus other inflows, approximately equal the water supply needed to (1) satisfy Sacramento Valley and Sacramento-San Joaquin Delta in-basin needs, including Delta water quality requirements, and (2) meet export needs. DWR and the Bureau of Reclamation jointly decide when balanced or excess water conditions exist.

beach seine A rectangular net with poles attached to the ends that is held vertically in the water and dragged through the water a short distance to capture fish.

beneficial use Water quality beneficial use categories for water are designated by State law. Beneficial uses of the waters of the State that may be protected against water quality degradation include, but are not limited to, domestic, municipal, agricultural, and industrial supply; power generation; recreation; aesthetic enjoyment; navigation; and preservation and enhancement of fish, wildlife, and other aquatic resources or preserves.

benthic organisms Aquatic animals without backbones that dwell on or in the bottom sediments of fresh or salt water.

biological assessment A document prepared as part of the Endangered Species Act, Section 7 process to determine whether a proposed major construction activity under the authority of a federal action agency is likely to adversely affect listed species, proposed species, or designated critical habitat.

biological opinion A scientific assessment issued by the U.S. Fish and Wildlife Service or National Marine Fisheries Service, required by the Endangered Species Act for listed species. Determines the likelihood of a federal action to jeopardize the continued existence of listed species or result in the destruction or adverse modification of critical habitat.

biota Living organisms of a region, as in a stream or other body of water.

brackish water Water containing dissolved minerals in amounts that exceed normally acceptable standards for municipal, domestic, and irrigation uses. Considerably less saline than seawater.

bromide A salt which naturally occurs in small quantities in seawater; a compound of bromine.

Burns-Porter Act (California Water Code Section 12930 et seq.) Formally known as the California Water Resources Development Bond Act, this act passed the Legislature in 1959 and was approved by voters in 1960. It provided initial funding of $1.75 billion in general obligation bonds and authorized construction of the State Water Project facilities.

bypass As part of a flood management system, a natural overflow area or channel that allows excessive floodwaters to flow or be diverted from a main river channel to prevent water from overflowing the main river channel.

C

CALFED Bay-Delta Program (CALFED) A federal and State multiagency program established by the 1994 Bay-Delta Accord. CALFED's mission was to develop and implement a long-term comprehensive plan that would restore ecological health and improve water management in the Bay-Delta system. In 2010, all functions and responsibilities of CALFED were assumed by the Delta Stewardship Council.

California Data Exchange Center (CDEC) CDEC installs, maintains, and operates an extensive hydrologic data collection network including automatic snow reporting gauges for the DWR Cooperative Snow Surveys Program and precipitation and river stage sensors for flood forecasting. CDEC provides a centralized location to store and process real-time hydrologic information gathered cooperatively throughout the State.

California Irrigation Management Information System (CIMIS) A network of automated weather stations that are owned and operated cooperatively between DWR and local agencies. The stations are installed in most of the agricultural and urban areas of the State and provide farm and large landscape irrigation managers and researchers with "real-time" weather

data to estimate crop and landscape evapotranspiration rates and make irrigation management decisions.

California Water Resources Simulation Model (CALSIM) A computer model that simulates operations of SWP and Central Valley Project water delivery systems. CALSIM II is a planning tool that was jointly developed by DWR and the Bureau of Reclamation. The model's inputs include hydrologic data for specified study planning years, water demands, infrastructure and regulatory change, and other factors. Outputs include deliveries to water contractors, river flows, reservoir changes, Delta hydrologic parameters, and other data.

cation An atom or a molecule in which the total number of protons is greater than the total number of electrons, giving it a net positive electrical charge.

Central Valley Project deliveries The volume of water imported to a given area through the Central Valley Project.

ciliates Single-celled organisms, characterized by the presence of many hair-like structures called cilia used for locomotion and for feeding.

climate change Any significant change in the measures of climate lasting for an extended period of time. This includes major changes in temperature, precipitation, or wind patterns, among other things, that occur over several decades or longer.

coded wire tag A small piece of stainless steel wire injected into the snout of juvenile salmon and steelhead. Each tag is etched with a binary code that identifies a fish release group.

conjunctive use Application of surface water and groundwater to meet the demand for a beneficial use. Coordinated and planned management of both surface water and groundwater resources to maximize the efficient use of the resources; that is, the planned and managed operation of a groundwater basin and a surface water storage system combined through a coordinated conveyance infrastructure. Water is stored in the groundwater basin for later planned use by intentionally recharging the basin during years of above-average surface water supply.

conservation facilities Reservoir facilities that store water and make it available for later use.

consultation The process required of a federal agency under Section 7 of the Endangered Species Act when any activity authorized, carried out, or conducted by that agency may affect a listed species or designated critical habitat; consultation is with the U.S. Fish and Wildlife Service or National Marine Fisheries Service and may be either informal or formal.

conveyance Provides for the movement of water and includes the use of natural watercourses and constructed facilities including open channels, pipelines, diversions, fish screens, distribution systems, and pump lifts.

conveyance facilities Canals, pipelines, pump lifts, ditches, etc., used to move water from one area to another.

cryptomonad A single-celled, photosynthetic organism with two flagella that inhabits both marine and freshwater environments.

cyanobacteria Photosynthetic, nitrogen-fixing, colonial bacteria found in a wide variety of terrestrial and aquatic habitats, often referred to as "blue-green algae."

D

Davis-Grunsky Act Authorized in 1960 as part of the Burns-Porter Act, this act provides construction loans for local domestic water projects and agricultural water conservation projects.

Delta outflow Freshwater outflow from the Sacramento-San Joaquin Delta to protect the beneficial uses within the Delta from the incursion of saline water.

Delta outflow index A calculated approximation of the seaward freshwater outflow as it passes Chipps Island near Pittsburg, beyond the confluence of the Sacramento and San Joaquin rivers.

desalting A process to reduce the salt concentration of seawater or brackish water.

diatom Microscopic marine or freshwater colonial algae that have cell walls made out of silica.

dinoflagellate A small, single-celled organism with flagella and an internal skeleton of cellulose-like plates found in both marine and freshwater environments and best known as causers of harmful algal blooms.

discount rate The interest rate used to calculate the present value of future benefits and future costs or to convert benefits and costs to a common time basis.

dissolved organic compounds Carbon-based substances dissolved in water.

dissolved oxygen The amount of oxygen dissolved in water or wastewater, usually expressed in milligrams per liter, parts per million, or percent of saturation.

distinct population segment A subdivision of a species that is treated as a species for purposes of listing under the Endangered Species Act. The smallest division of a taxonomic species that can be protected under the Endangered Species Act.

drainage area The area of land from which water drains into a river; for example, the Sacramento River Basin, in which all land area drains into the Sacramento River. Also called a watershed, drainage basin, or river basin.

drought preparedness The magnitude and probability of economic, social, or environmental consequences that would occur as a result of a sustained drought under a given study plan.

drought condition Hydrologic conditions during a defined period, greater than one dry year, when precipitation and runoff are much less than average.

drought year supply The average annual supply of a water development system during a defined drought period.

Delta Simulation Model 2 (DSM2) A hydrodynamic and water quality simulation model used to simulate water flow and quality conditions in the Sacramento-San Joaquin Delta. The model is frequently used to evaluate potential changes in Delta conditions (salinity, flow, and water level) associated with changes in flow patterns in the Delta.

E

ecosystem restoration The activity of improving the condition of natural landscapes and biotic communities.

effluent Wastewater or other liquid, treated or in its natural state, flowing from a treatment plant or process.

electrical conductivity The measure of the ability of water to conduct an electrical current, the magnitude of which depends on the dissolved mineral content of the water.

endangered species An animal or plant species in danger of extinction throughout all or a significant portion of its range.

entrainment The unintended diversion of fish (or other aquatic organisms) into an unsafe passage route. The incidental trapping of any life stage of fish within waterways or structures that carry water being diverted for use

elsewhere. Fish are considered "entrained" when they enter a diversion point, which for the SWP is Clifton Court Forebay.

environmental impact report A report done to analyze project or program impacts on a variety of resources under the California Environmental Quality Act.

environmental impact statement A report done to analyze project or program impacts on a variety of resources under the National Environmental Policy Act.

environmental water The water for wetlands, for the instream flow in a major river or the Bay-Delta, or for a designated wild and scenic river.

escapement The portion of an anadromous fish population that escapes commercial and recreational fisheries and reaches its freshwater spawning grounds.

estuary A semi-closed coastal body of water where the lower course of a river enters the sea, influenced by tidal action where the tide meets the river flow, resulting in brackish water.

evapotranspiration The amount of water transpired by plants, retained in plant tissues, and evaporated from plant tissues and surrounding soil surfaces. (See also, reference evapotranspiration.)

excess water conditions Periods when it is agreed that releases from upstream reservoirs plus unregulated flow exceeds Sacramento Valley in-basin uses plus exports. DWR and the Bureau of Reclamation jointly decide when balanced or excess water conditions exist. During excess water conditions, sufficient water is available to meet all beneficial needs, and the SWP and Central Valley Project are not required to supplement the supply with water from reservoir storage.

export An amount of water transported from one source or location to another.

F

firm yield The maximum annual supply of a water development project under drought conditions, for some specified level of demand.

flagellates Organisms with one or more whip-like structures called flagella, which are used for locomotion or feeding.

floodplain A strip of relatively level land bordering a stream or river that is often inundated during times of high water.

forages Food for animals, especially crops grown to feed horses, cattle, and other livestock.

forebay A reservoir at the intake of a pumping plant or power plant to stabilize water levels; also a storage basin for regulating water for percolation into groundwater basins.

fork length A measurement used frequently for fish length when the tail has a fork shape; projected straight distance between the tip of the snout and the fork of the tail.

freeboard The height of the physical top of a levee above a specified water surface elevation. This serves as a factor of safety for containing water in the stream or reservoir without overtopping the levee or dam.

fry Young, recently hatched fish that are able to swim and catch their own food.

G

greenhouse gas emissions Also referred to as carbon intensity or carbon footprint, greenhouse gases trap heat in the atmosphere and contribute to climate change. They include carbon dioxide, methane, nitrous oxide, and fluorinated gases.

grilse A term that generally refers to young adult salmonids of a certain length and age. Grilse are often 55–65 centimeters (22–26 inches) in length. They are assumed to be two years old, and adults are assumed to be age three and older.

groundwater Water located beneath the land surface that fills the pore spaces of the alluvium, soil, or rock formation in which it is situated. It excludes soil moisture, which refers to water held by capillary action in the upper unsaturated zones of soil or rock.

groundwater bank Groundwater banking refers to the practice of recharging specific amounts of water in a groundwater basin during wet or above-average years, which can later be withdrawn and used by the depositing entity.

groundwater basin An alluvial aquifer or a stacked series of alluvial aquifers with reasonably well-defined boundaries in a lateral direction and having a definable bottom.

groundwater recharge The natural or intentional infiltration of surface water into the zone of saturation of an aquifer (i.e., into groundwater).

groundwater storage capacity The volume of void space that can be occupied by water in a given volume of a formation, aquifer, or groundwater basin.

groundwater table The upper surface of the zone of saturation in an unconfined aquifer.

H

habitat The place or environment where a plant or animal naturally lives and grows with a group of particular environmental conditions.

habitat conservation plan A plan that outlines ways of maintaining, enhancing, and protecting a given habitat type needed to protect species; it usually includes measures to minimize impacts, and may include provisions for permanently protecting land, restoring habitat, and relocating plants or animals to another area. Required before a federal Endangered Species Act incidental take permit may be issued.

halophyte A plant capable of growing in salty soil.

haptophyte A kind of unicellular marine phytoplankton typically covered in tiny scales or plates composed of carbohydrates and calcium deposits.

hydraulic barrier (1) A barrier created by injecting fresh water to control seawater intrusion in an aquifer, or created by water injection to control migration of contaminants in an aquifer. (2) A barrier developed in the estuary (the Delta) by release of fresh water from upstream reservoirs to prevent intrusion of seawater into the body of fresh water.

hydrologic balance An accounting of all water inflow to, water outflow from, and changes in water storage within a hydrologic unit over a specified period of time.

hydrologic basin Where, conceptually, any drop of water that falls in the basin will flow to a stream or groundwater basin within it. It is a larger set of which a subset is the groundwater basin that can be within a hydrologic basin. DWR's hydrologic regions are collections of the larger hydrologic basins.

hydrologic region DWR divides California into 10 hydrologic regions, corresponding to the state's major water drainage basins: North Coast, San Francisco Bay, Central Coast, South Coast, Sacramento River, San Joaquin River, Tulare Lake, North Lahontan, South Lahontan, and Colorado River.

hydrology The science dealing with the occurrence, circulation, distribution, and properties of the waters of the earth and its atmosphere.

I

in-lieu recharge The practice of providing surplus surface water to historic groundwater users, thereby leaving groundwater in storage for later use.

ion exchange Processes of purification, separation, and decontamination of aqueous and other ion-containing solutions with solid ion exchangers (such as sodium carbonate used for water softening).

instream use Use of water within its natural watercourse as specified in an agreement, water rights permit, etc. For example, the use of water for navigation, recreation, fish and wildlife, aesthetics, and scenic enjoyment.

integrated regional water management A comprehensive approach for determining the appropriate mix of demand and supply management options to provide long-term, reliable water supply at the lowest reasonable cost and with the highest possible benefits to customers, economic development, environmental quality, and other social objectives.

invertebrate An animal that lacks a backbone.

J

joint points of diversion The ability of the SWP to use Jones Pumping Plant as a point of diversion and the Central Valley Project to use Banks Pumping Plant as a point of diversion. The SWP and Central Valley Project may use one another's diversion facilities under certain conditions.

joint powers agreement An agreement entered into by two or more public agencies that allows them to jointly exercise any power common to the contracting parties. This is defined in Chapter 5 (commencing with Section 6500) of Division 7 of Title 1 of the California Government Code.

joint-use facilities Those portions of the SWP that serve both SWP and Central Valley Project functions, and in which both State and federal agencies participate in the construction and use; specifically, the San Luis complex and Reaches 3, 4, 5, 6, and 7 of the California Aqueduct.

jurisdictional dam Artificial barriers, together with appurtenant works, which are 25 feet or more in height or have an impounding capacity of 50 acre-feet or more, which are regulated by the DWR Division of Safety of Dams.

K

kathablepharid A specific type of cryptomonad.

L

land subsidence The lowering of the natural land surface in response to: earth movements; the lowering of fluid pressure or groundwater level; consolidation of underlying soils; removal of underlying supporting materials by mining (e.g., oil and gas extraction); compaction caused by wetting; or oxidation of organic matter in soils (e.g., peat soil being converted to gas).

legal Delta The legal geographical boundaries of the Sacramento-San Joaquin Delta, as established by the Delta Protection Act of 1959, and as defined in California Water Code Section 12220.

listed species A species, subspecies, or distinct population segment that has been added to the federal list of endangered and threatened wildlife and plants. The term also applies to a species or subspecies added to the California list of endangered or threatened plants and animals.

M

maximum contaminant level The highest drinking water contaminant concentration allowed under federal and State Safe Drinking Water Act regulations.

mitigation (1) An action or set of actions designed to avoid, minimize, reduce, eliminate, or compensate for adverse environmental impacts due to an agency activity or program. (2) Reduction of human activities that affect global climate change, including strategies to reduce greenhouse gas emissions.

Monterey Agreement An agreement executed in December 1994 among DWR and the SWP water contractors to address fundamental contract issues by amending the long-term water supply contracts.

Monterey Amendments Amendments to the long-term water supply contracts for the SWP entered into by DWR and most (27 of 29) of the SWP water contractors in 1995 and 1996 as implementation of the terms of the Monterey Agreement.

multipurpose project A project, usually a reservoir, designed to serve more than one purpose, whose costs are normally allocated among the different functions it provides. For example, a project that provides water supply, flood control, and generates hydroelectricity.

N

natural community conservation planning (NCCP) A process that promotes multispecies and multihabitat management and conservation through cooperative efforts among public agencies, private landowners, and other interests within a plan area. It provides a framework for minimizing impacts on plant communities and wildlife from proposed development projects.

natural recharge Natural replenishment of an aquifer generally from snowmelt and runoff through seepage from the surface.

net groundwater The amount of groundwater extraction in excess of deep percolation.

nonreimbursable costs The part of project costs allocated to general statewide or national beneficial purposes and funded from general revenues, rather than by water users.

normalized demand The process of adjusting actual water use in a given year to account for unusual events such as dry weather conditions, government price support programs for agriculture, rationing programs, or other unusual conditions.

O

operational yield An optimal amount of groundwater that should be withdrawn from an aquifer system or a groundwater basin each year. It is a dynamic quantity that must be determined from a set of alternative groundwater management decisions subject to goals, objectives, and constraints of the management plan.

Operations Criteria and Plan (OCAP) (1) The document titled, "Long-Term Central Valley Project Operations Criteria and Plan," that serves as a baseline description of the facilities and operating environment of the Central Valley Project and the SWP and identifies factors influencing the physical and institutional conditions and decision-making processes under which the projects currently operate. Regulatory and legal requirements are explained and alternative operating models and strategies described. (2) The document titled, "Central Valley Project Operations Criteria and Plan" (CVP-OCAP, 2004), that describes the laws, regulations, and other criteria applicable to operations of the Central Valley Project that were in effect from 1991 through 2003.

Operations Criteria and Plan biological opinion (1) The document titled, "Biological Opinion and Conference Opinion on the Long-Term Operations of the Central Valley Project and the State Water Project" (NOAA Fisheries, 2009).

(2) The December 15, 2008, memorandum from the U.S. Fish and Wildlife Service to the Bureau of Reclamation that comprises the U.S. Fish and Wildlife Service biological opinion on the coordinated operations of the Central Valley Project and the SWP.

ostracod A type of bivalve (with a hinged, two-part shell) crustacean, mostly microscopic to small in size, found in aquatic and marine habitats occurring as benthic or planktonic organisms.

otolith Ear bone of a fish. Otoliths often show seasonal or annual rings that can be used to determine age.

outflow The amount of applied water and conveyance water leaving the service area. Also conveyance outflow.

P

parr The developmental life stage of salmon and trout when the young have developed parr marks (vertical bars or spots on the sides of the fish) and are actively feeding in fresh water.

pelagic Inhabiting the water column as opposed to being associated with the bottom; generally occurring anywhere from the water's surface down to, but not including, the bottom.

pelagic fish Fish that live in open water, often near the surface.

perched groundwater Groundwater supported by a zone of material of low permeability located above an underlying main body of groundwater.

perennial yield The maximum quantity of water that can be annually withdrawn from a groundwater basin over a long period of time without developing an overdraft condition.

permeability The capability of soil or other geologic formations to transmit water.

phytoplankton Minute plants, such as algae, that live suspended in bodies of water and drift with the current.

precipitation A deposit on the earth of hail, rain, mist, sleet, or snow. It is the common process by which atmospheric water becomes surface or subsurface water.

project yield The water supply attributed to all features of a project, including integrated operation.

proposal solicitation package As part of the formal solicitation for grant applications, a proposal solicitation package provides detailed instructions on the mechanics of submitting proposals and specific information on submittal requirements.

public trust doctrine A legal doctrine recognizing public rights in the beds, banks, and waters of navigable waterways, and the State's power and duty to exercise continued supervision over them as trustee for the benefit of the people.

pump lift (1) The vertical distance that a pump will raise water. (2) The distance between the groundwater table and the overlying land surface.

pumped storage project A hydroelectric power plant and reservoir system using an arrangement whereby water released for generating energy during peak load periods is stored and pumped back into the upper reservoir, usually during periods of reduced power demand.

pumping-generating plant A plant that can either pump water or generate electricity, depending on the direction of water flow.

punch list A list of tasks or "to-do" items necessary for the completion of a construction project.

Q

Quantification Settlement Agreement A complex package of agreements that defines the rights to a portion of Colorado River water for four water agencies in Southern California, provides for water transfers, and establishes a Joint Powers Authority to oversee restoration of the Salton Sea. The *Colorado River Water Delivery Agreement: Federal Quantification Settlement Agreement* was signed in October 2003 by Coachella Valley Water District, Imperial Irrigation District, The Metropolitan Water District of Southern California, the San Diego County Water Authority, and the federal government.

R

radial gates Gates used to control the flow of water into or from a reservoir, canal, or pipeline, or through a channel. Each gate can close under its own weight and is operated independently by remote control.

radio-telemetry Automatic measurement and transmission of data from remote sources via radio to a receiving station for recording and analysis.

rate structure Designates the rate basis for cost recovery (e.g., flat, uniform, tiered, etc.). Block/tiered rates are assumed to provide cost signals to

consumers. Costs can include capital, operation and maintenance, financing, environmental compliance (documentation, permitting, and mitigation), etc.

raw water Water found in the environment, such as rainwater, surface water (e.g., lakes, streams, and the ocean), or groundwater, that has not been treated. Most water is considered raw until it is treated for consumption or used for agriculture or industry.

reach On the California Aqueduct, a specific segment of the canal, identified by a number, which is the smallest unit of the SWP identified in water supply contracts for cost allocation and repayment purposes.

rearing Refers to the amount of time that juvenile fish spend feeding in nursery areas of rivers, lakes, streams, and estuaries before migration.

reasonable and prudent alternatives Alternative actions that can be implemented in a manner consistent with the intended purpose and scope of a project, are economically and technologically feasible, and would avoid the likelihood of jeopardizing the continued existence of listed species or resulting in the destruction or adverse modification of critical habitat.

recharge Water added to an aquifer or the process of adding water to an aquifer. Groundwater recharge occurs either naturally as the net gain from precipitation or artificially as the result of human influence.

recharge basin A surface facility constructed to infiltrate surface water into a groundwater basin.

recreation Water-dependent recreation activities that are consumptive (e.g., parks), flat-water (e.g., boating), or flow-based (e.g., whitewater rafting).

recycled water (1) The application of treated water/reclaimed water to meet a beneficial use, supplanting a potable or potentially potable supply. (2) Treated municipal, industrial, or agricultural wastewater to produce water that can be reused.

redd A shallow nest of fish eggs covered with gravel in a streambed.

reference evapotranspiration (ET_o) The evapotranspiration rate from an extended surface of 3 to 6 inch (8 to 15 centimeter) tall green grass cover of uniform height, actively growing, completely shading the ground, and not short on water.

reliability planning Water reliability management planning is done by comparing the costs of taking actions to maintain or increase reliability to the costs of accepting less reliability. On this basis, accepting the costs of the adverse effects of less than 100 percent reliability could be a legitimate planning decision. Providing full water supply to meet 100 percent of

projected future water demand is not the planning goal, rather, the goal is to find the justified level of reliability.

reoperation See system reoperation.

repayment reach California Aqueduct reaches are delineated for the purpose of making project repayment as equitable as possible. The reaches are generally numbered consecutively from the Delta, with Reach 1 being first. Repayment reaches vary greatly in length. (See also, reach.)

required instream flow The amount of water required for instream use by agreement, water rights permit, or State/federal acts.

reused water The application of previously used water to meet a beneficial use, whether treated or not prior to the subsequent use. (See also, recycled water.)

return flow The portion of withdrawn water not consumed by evapotranspiration or system losses which returns to its source or to another body of water.

reverse osmosis A method to remove salts and other constituents from water by forcing water through membranes.

riparian area The area of land adjacent to a stream, lake, or wetland with vegetation that, due to the presence of water, is distinctly different from the vegetation of adjacent upland areas. Riparian areas provide important fish and wildlife habitat.

riparian (water) right A right to use surface water derived from the fact that the land in question abuts the banks of a stream or other water source (lake or pond). These rights are senior to most appropriative water rights.

riprap A layer of large uncoursed stones, broken rock, boulders, or precast blocks placed in random fashion on the upstream and downstream faces of embankment dams, stream banks, on a reservoir shore, on the sides of a channel, or other land surfaces to protect them from erosion caused by current, wind, wave, and/or ice action. Very large riprap is sometimes referred to as "armoring."

run (of fish) A group of fish of the same species whose upstream spawning migration timing is associated with the seasons, e.g., fall, spring, summer, and winter runs. Members of a run may interbreed with fish of another run.

runoff The volume of surface flow from an area during a specified period. Natural runoff is the portion of precipitation that runs off the land and makes up the natural flow in rivers. Incidental runoff is the portion of precipitation that would have been used by natural vegetation but now contributes to

runoff. This is a result of roads, paved areas, building roofs, land drainage systems, fields developed for irrigation, and other changes in land use.

S

sabellid polychaete A segmented marine worm that lives in a tube that it builds.

saline intrusion The movement of salt water into a body of fresh water. It can occur in either surface water or groundwater bodies.

salinity Generally, the concentration of mineral salts dissolved in water. Salinity may be expressed in terms of a concentration, weight (total dissolved solids), electrical conductivity, or osmotic pressure. When describing salinity influenced by seawater, salinity often refers to the concentration of chlorides in the water. (See also, total dissolved solids.)

salmonid A fish species belonging to the salmon family, including salmon and trout.

salt-water barrier A physical facility or method of operation designed to prevent the intrusion of salt water into a body of fresh water.

salvage (fish) At the SWP and Central Valley Project fish protective facilities, fish are removed from export water, transported, and released away from the influence of the water diversion facilities.

sediment Soil or mineral material transported by water and deposited in streams or other bodies of water.

seepage The gradual movement of water into, through, or from a porous medium. Also, the infiltration of water into the soil from canals, ditches, laterals, watercourses, reservoirs, storage facilities, or other bodies of water, or from a field.

service area The geographic area served by a water agency.

smolt A juvenile salmonid fish that has assumed the silvery color of the adult and, while migrating toward the ocean, is undergoing physiological changes that will allow it to live in salt water.

snowpack The annual accumulation of snow in mountain areas.

soluble minerals Naturally occurring substances capable of being dissolved.

special status species Plants or animals legally protected under either the federal or California Endangered Species Act or the California Fish and Game Code; those species not currently protected by statute but considered to be rare or endangered under the California Environmental Quality Act; and species considered by the scientific community to be sufficiently rare to qualify for legal protection (e.g., candidate species for listing as threatened or endangered, species of concern to the Department of Fish and Wildlife or U.S. Fish and Wildlife Service, or rare plants identified by the California Native Plant Society).

species of concern An informal term referring to a species that might be in need of conservation action.

spillway The section of a dam designed to permit water to pass over its crest; a weir or channel taking overflow from the dam. The spillway serves as a safety channel to prevent erosion or overtopping of the dam.

sprinkler irrigation A method of irrigation in which the water is sprayed, or sprinkled, through the air to the ground surface.

stakeholder Individuals or groups who can affect or be affected by an organization's activities; individuals or groups with an interest or "stake" in what happens as a result of a decision or action.

State Water Project deliveries The volume of water imported to a given area through the State Water Project.

statewide water management systems These include physical facilities (more than 1,200 State, federal, and local reservoirs, as well as canals, treatment plants, and levees), which make up the backbone of water management in California; and statewide water management programs, which include water-quality standards, monitoring programs, economic incentives, water-pricing policies, and statewide water-efficiency programs such as appliance standards, labeling, and education.

strategic plan The long-term goals of an organization or program and an outline of how the goals will be achieved (e.g., adopting specific strategies, approaches, and methodologies).

stocking Releasing hatchery-raised fish into a water body for the purposes of supplementing existing populations or creating new ones for fishing (also referred to as "planting").

streamflow The rate of water flow past a specified point in a channel.

subsidence See land subsidence.

surface storage Surface storage uses reservoirs to collect water for later release and use.

surface supply Water supply obtained from streams, rivers, lakes, and reservoirs.

system reoperation Changes to existing water system operations and management procedures for existing reservoirs and conveyance facilities to increase their water-related benefits.

T

take (federal Endangered Species Act) To harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct; may include significant habitat modification or degradation if it kills or injures wildlife by significantly impairing essential behavioral patterns including breeding, feeding, or sheltering.

temporary urgency change petition A formal request to the State Water Resources Control Board for conditional, temporary changes to the terms and conditions of a water right. Temporary urgency change orders issued by the State Water Resources Control Board allow water right holders to temporarily deviate from the terms of their existing water right.

threatened species An animal or plant species that is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range.

tidal wetlands The margins of an estuary that are periodically inundated by tides; includes all habitats within the elevation range between the lowest and highest tides: intertidal mudflats, regularly inundated tidal marsh plains, tidal channels within the marsh, and infrequently inundated wetland-upland transition zones at the edge of the upland.

total capital cost The total monetary cost of options required for "turnkey" implementation, including environmental and third-party impact mitigation, storage, conveyance, energy, capitalized operations and maintenance, administrative costs, planning costs, legal costs, and engineering costs.

total dissolved solids The quantity of the residual minerals dissolved in water that remain after evaporation of a solution.

transpiration An essential physiological process in which plant tissues give off water vapor into the atmosphere.

tributary A stream that flows into a larger stream or other body of water.

tubificid worm An aquatic worm with a small, thin, segmented body.

turbidity A measure of the cloudiness of water caused by the presence of suspended particles in the water that attenuate or reduce light penetration. Turbidity in natural waters may be composed of organic and/or inorganic constituents and may have direct implications to drinking water treatment.

turnout The point at which water is diverted from a main channel or water delivery facility to a distributing facility; a structure through which a water contractor takes delivery of water.

U

unimpaired flow The flow past a specified point on a natural stream that is unaffected by stream diversion, storage, import, export, return flow, or change in use caused by modifications in land use.

unimpaired runoff A representation of the natural water production of a river basin, unaltered by upstream diversions, storage, or by export or import of water to or from other watersheds.

Urban Water Management Planning Act Sections 10610 through 10657 of the California Water Code. The act requires urban water suppliers to prepare urban water management plans that describe and evaluate sources of water supplies, efficient uses of water, demand management measures, implementation strategies and schedules, and other relevant information and programs within their water service areas. Urban water suppliers (Section 10617) are either publicly or privately owned and provide water for municipal purposes, either directly or indirectly, to more than 3,000 customers or supply more than 3,000 acre-feet of water annually.

urban water use The use of water for urban purposes, including residential, commercial, industrial, recreation, energy production, military, and institutional classes. The term is applied in the sense that it is a kind of use rather than a place of use.

urban water use efficiency Methods or technologies resulting in the same beneficial residential, commercial, industrial, and institutional uses with less water or increased beneficial uses from existing water quantities.

V

vernal pools A type of wetland that occurs in shallow foothill and valley depressions. Water remains in pools and swales until it evaporates, usually within a few days to a few months, mainly in late winter and spring.

volatile organic compound (VOC) A man-made organic compound that readily vaporizes in the atmosphere. These compounds are often highly mobile in the groundwater system and are generally associated with industrial activities.

W

wastewater Domestic or municipal sewage or effluent from an industrial process.

water demand The desired quantity of water that would be used if the water were available and if a number of other factors, such as price, did not change. Demand is not static.

water exchange Typically, water delivered by one water user to another water user; the receiving water user will return the water at a specified time or when the conditions of the parties' agreement are met. (See also, water transfer.)

water quality Description of the chemical, physical, and biological characteristics of water, usually with regard to its suitability for a particular purpose or use.

water quality objectives Specific, legally enforced levels of water quality desired for identified uses including drinking, recreation, fish production or propagation of other aquatic life, agriculture, industry, and urban use.

water recycling The process of treating wastewater, rendering it suitable for beneficial use.

water right In water law, the right of a user to use water from a water source (e.g., a river, stream, pond, or source of groundwater).

water service reliability The degree to which a water service system can successfully manage water shortages.

water supply exports The amount of water that a region transfers to another to meet needs.

water table See groundwater table.

water transfer A temporary or long-term change in the point of diversion, place of use, or purpose of use due to a transfer or exchange of water or water rights. A more general definition is that water transfers are a voluntary change in the way water is usually distributed among water users in response to water scarcity.

water year A continuous 12-month period for which hydrologic records are compiled and summarized. Different agencies may use different calendar periods for their water years. For DWR, a water year is October 1 through September 30.

watershed The land area from which water drains into a stream, river, or reservoir. Also called drainage area, drainage basin, or river basin.

watershed management The process of evaluating, planning, managing, restoring, and organizing land and other resource use within an area that has a single common drainage point.

weir (1) Any structure across a watercourse used to control, raise, or measure flows. (2) A barrier constructed to catch upstream migrating adult fish. (3) Flood management weirs are lowered sections of levees that allow flood flows in excess of downstream channel capacity to escape into a bypass channel or basin.

wetlands Lands including swamps, marshes, bogs, and similar areas such as wet meadows, river overflows, mud flats, and natural ponds. An area characterized by periodic inundation or saturation, certain types of soils, and vegetation adapted for life in saturated soil conditions.

Wild and Scenic River systems State and federally designated river systems under the 1968 national Wild and Scenic Rivers Act and the 1972 California Wild and Scenic Rivers Act. Seventeen rivers in California, including many forks and tributaries, are designated wild, scenic, or recreational.

wheel As applied to water and power, to provide the use of one agency's conveyance facilities for the purpose of transporting another agency's supply.

X

X2 Delta outflow interaction with tides determines the location of the X2 isohaline salinity gradient. X2 is the location in the Bay-Delta where the tidally averaged bottom salinity is 2 parts per thousand. It is expressed as the distance in kilometers from the Golden Gate Bridge. X2 is used as a primary indicator in managing Delta outflow.

Z

zooplankton Small aquatic animals that are suspended or swimming in water.

Bulletin 132-17
Appendix B

Data and Computations Used to Determine 2018 Water Charges

Appendix B
Data and Computations
Used to Determine 2018 Water Charges

Contents

Figures

Tables

Computational Tables

SWP Water Contractors

The State Water Project water supply contractors are listed below, followed by shortened forms of their names that are used in Bulletin 132.

Alameda County Flood Control and Water Conservation District, Zone 7	Alameda-Zone 7
Alameda County Water District	Alameda County
Antelope Valley-East Kern Water Agency	AVEK
Castaic Lake Water Agency	Castaic Lake
City of Yuba City	Yuba City
Coachella Valley Water District	Coachella
County of Butte	Butte
County of Kings	Kings
Crestline-Lake Arrowhead Water Agency	Crestline
Desert Water Agency	Desert
Dudley Ridge Water District	Dudley Ridge
Empire West Side Irrigation District	Empire
Kern County Water Agency	Kern
Littlerock Creek Irrigation District	Littlerock
The Metropolitan Water District of Southern California	Metropolitan
Mojave Water Agency	Mojave
Napa County Flood Control and Water Conservation District	Napa
Oak Flat Water District	Oak Flat
Palmdale Water District	Palmdale
Plumas County Flood Control and Water Conservation District	Plumas
San Bernardino Valley Municipal Water District	San Bernardino
San Gabriel Valley Municipal Water District	San Gabriel
San Gorgonio Pass Water Agency	San Gorgonio
San Luis Obispo County Flood Control and Water Conservation District	San Luis Obispo
Santa Barbara County Flood Control and Water Conservation District	Santa Barbara
Santa Clara Valley Water District	Santa Clara
Solano County Water Agency	Solano
Tulare Lake Basin Water Storage District	Tulare
Ventura County Watershed Protection District	Ventura

Appendix B
Data and Computations
Used to Determine 2018 Water Charges

The Department of Water Resources (DWR) annually furnishes Statements of Charges to the 29 State Water Project (SWP) water supply contractors. Article 29(e) of the *Standard Provisions for Water Supply Contract*, approved August 3, 1962, describes those statements:

> "All such statements shall be accompanied by the latest revised copies of the document amendatory to Article 22 and of Tables B, C, D, E, F, and G of this contract, together with such other data and computations used by the State in determining the amounts of the above charges as the State deems appropriate."

To comply with Article 29(e), DWR performs an annual comprehensive review and redetermination of all water supply and financial aspects of the SWP for the entire project repayment period. This annual redetermination is performed in accordance with Article 22(f) and Article 28 of the water supply contracts, which concern the Delta Water Rate and annual transportation charges, respectively.

Appendix B includes data used to document the redetermination of water charges to be paid by contractors during calendar year 2018. The information is based on established data about the SWP, both known and projected, as of June 2017; however, small volumes of water may be reclassified over time pursuant to water supply contract provisions. If research requires more current data than was available at the time of production of Bulletin 132, please contact the State Water Project Analysis Office. Where applicable, the projected data values shown in this appendix are shaded and the bill year data are in **bold** type.

The computational procedures and interrelationships between tabulations in this appendix are outlined on *Figures B-1* and *B-2*. All tables referenced on Figures B-1 and B-2 follow this text.

Types of Water Charges

Charges to SWP water supply contractors include the costs of facilities for the conservation and development of a water supply and the conveyance of such supply to SWP service areas. These facilities are classified as "Project Conservation Facilities" and "Project Transportation Facilities" in the *Standard Provisions for Water Supply Contract*. Names of the main facilities in each classification follow.

Project Conservation Facilities

- Frenchman Dam and Lake
- Grizzly Valley Dam and Lake Davis
- Antelope Dam and Lake
- Oroville Dam and Lake Oroville
- Oroville power facilities
- Delta facilities
- Suisun Marsh facilities
- Yolo Bypass
- A portion of the California Aqueduct from the Delta to Dos Amigos Pumping Plant
- Sisk Dam, San Luis Reservoir, and Gianelli Pumping-Generating Plant

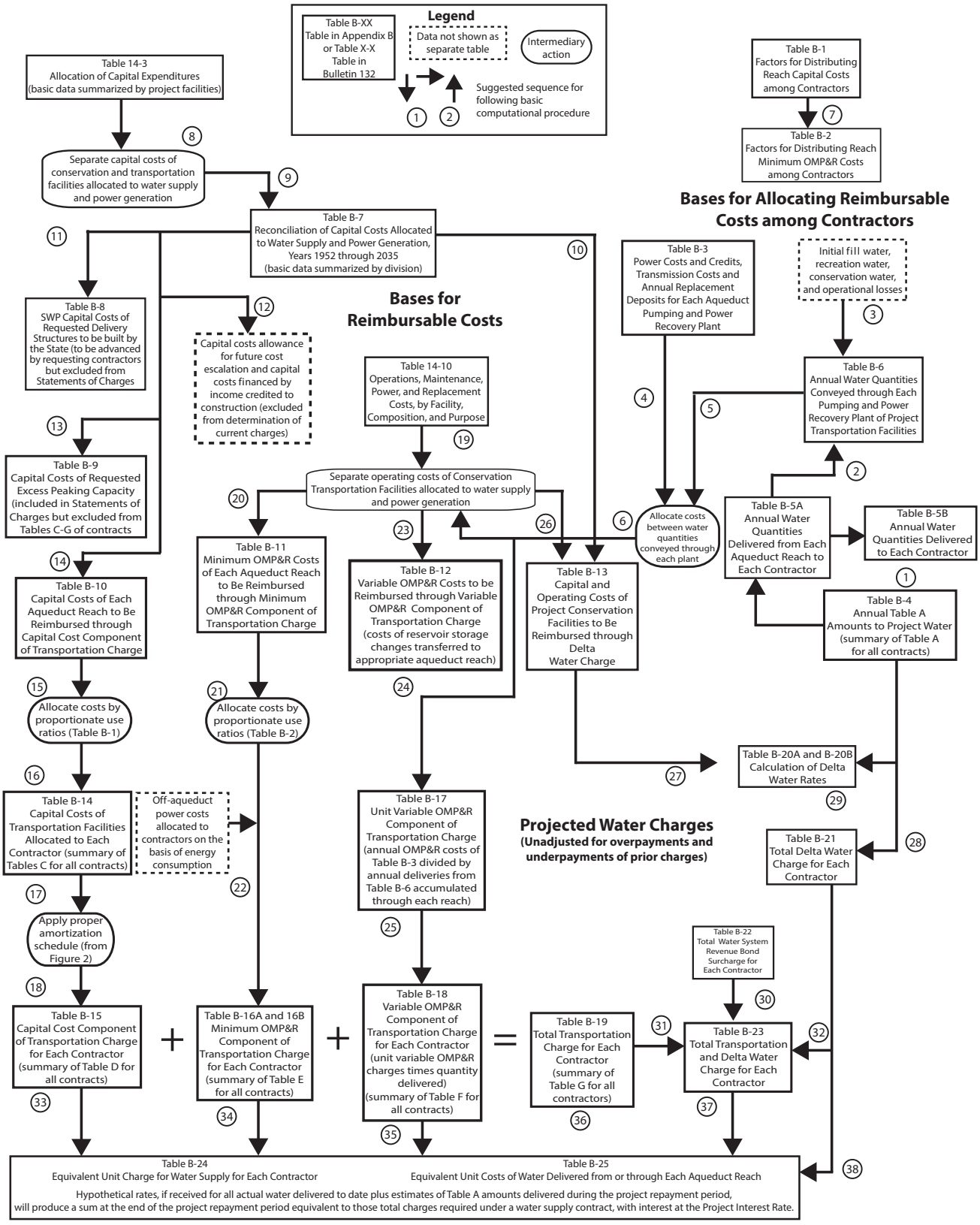


Figure B-1 Relationships of Data Used to Substantiate Statements of Charges

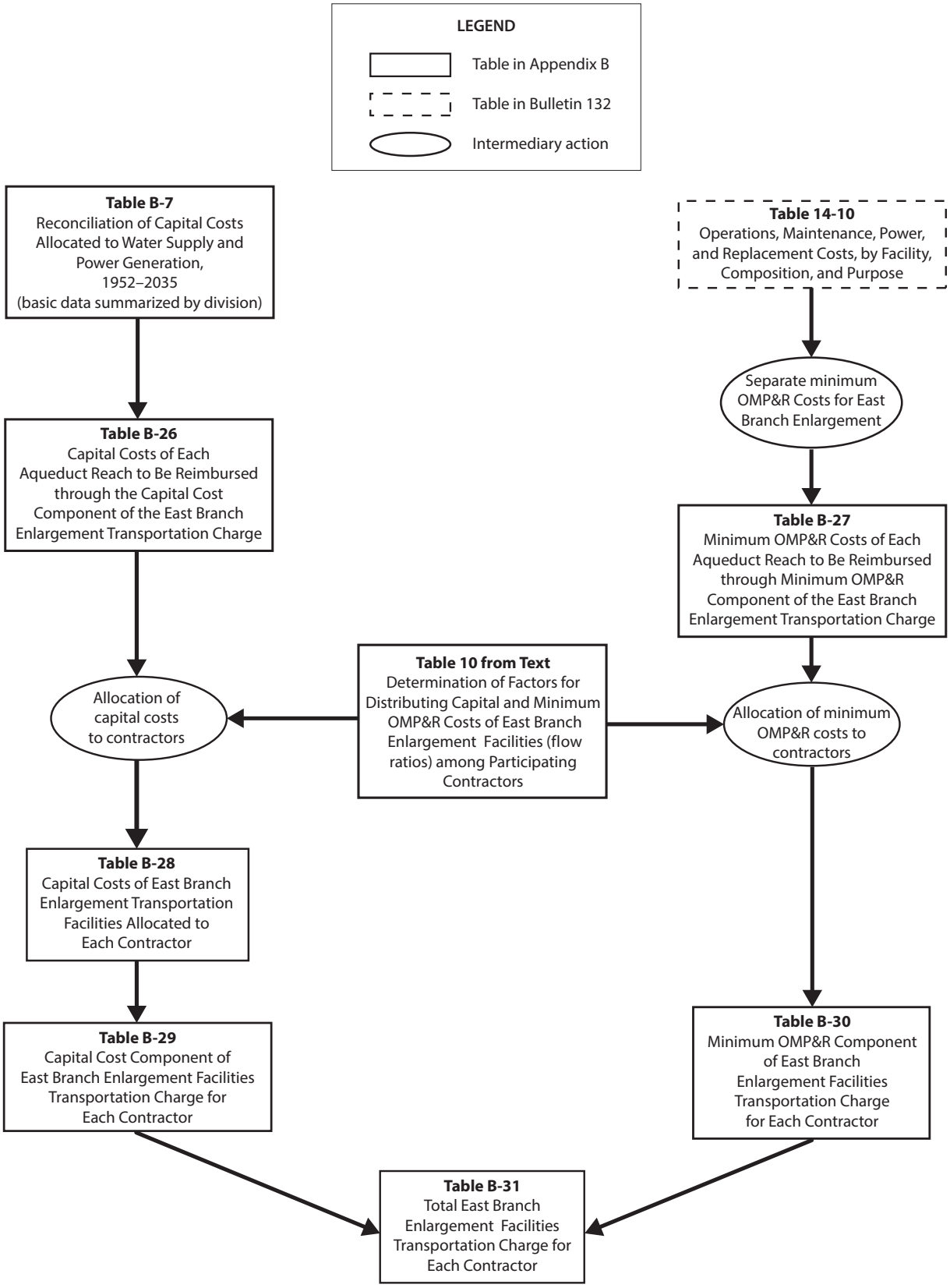


Figure B-2 Relationships of Data Used to Substantiate East Branch Enlargement Charges

Project Transportation Facilities

- Grizzly Valley Pipeline
- North Bay Aqueduct
- South Bay Aqueduct, including Del Valle Dam and Lake del Valle
- the remainder of the California Aqueduct from the Delta to Dos Amigos Pumping Plant and all facilities south, including dams and lakes in Southern California
- Off-Aqueduct Power Facilities (Reid Gardner Unit No. 4, Bottlerock Powerplant, and South Geysers Powerplant)

The standard provisions provide for a Delta Water Charge and a Transportation Charge for project water.

The Delta Water Charge is a unit charge applied to each acre-foot of SWP water the contractors are to receive, in accordance with their contracts. The unit charge, if applied to each acre-foot of all such allocations for the remainder of the project repayment period, is calculated to result in repayment of all outstanding reimbursable costs of the Project Conservation Facilities, with appropriate interest, by the end of the repayment period (2035).

The Transportation Charge is for use of facilities to transport water to the vicinity of each contractor's turnout(s). Generally, the annual charge represents each contractor's proportionate share of the reimbursable capital costs and operating costs of the Project Transportation Facilities.

Each contractor's allocated share of those reimbursable capital costs is amortized for repayment to the State, and certain variations are allowed in the amortization methods. Contractors' shares of reimbursable operating costs are repaid in the year such costs are incurred by the State.

The East Branch Enlargement Transportation Charge is paid by the seven Southern California contractors participating in the enlargement. San Bernardino Valley Municipal Water District advanced funds to pay the district's allocated capital costs for the East Branch Enlargement. The remaining six contractors pay an allocated share of the debt service on revenue bonds sold to finance the enlargement. Each contractor will also pay an allocated share of the minimum operation, maintenance, power, and replacement (OMP&R) costs of the East Branch Enlargement.

Transportation charges for the Coastal Branch Extension, East Branch Extension, and South Bay Enlargement are being repaid by contractors in their respective service areas.

Transportation charges for the Tehachapi Afterbay are repaid by those contractors using electrical power for delivery of their Table A water downstream of the Tehachapi Afterbay.

Composition and Timing of Water Charges

As shown on *Figure B-3*, the Delta Water Charge and the Transportation Charge consist of the following three components:

(1) conservation and transportation capital cost components, which will return to the State all reimbursable capital costs;
(2) conservation and transportation minimum OMP&R components, which will return to the State all reimbursable operating costs that do not depend on or vary with quantities of water actually delivered to the contractors; and
(3) a transportation variable OMP&R component, which will return to the State all reimbursable operating costs that depend on and vary with quantities of water actually delivered to the contractors.

Delta Water Charge

Capital Cost Component

1. Planning, design, right-of-way, and construction costs of Conservation Facilities
2. Operations and maintenance (O&M) costs for newly constructed Conservation Facilities prior to initial operations
3. Activation costs for newly constructed Conservation Facilities
4. Power costs allocated to initial filling of San Luis Reservoir
5. Capitalized O&M costs (major repair work and so forth) for Conservation Facilities
6. Program costs (portion) to mitigate impacts on current Delta fishery population due to State Water Project (SWP) pumping prior to 1986 (Department of Water Resources-Department of Fish and Wildlife agreement)

Minimum Operations, Maintenance, Power, and Replacement (OMP&R) Component

1. Direct O&M costs of Conservation Facilities
2. General O&M costs allocated to Conservation Facilities
   a. Contractor Accounting Office (portion)
   b. Financial and contract administration (portion)
   c. Water rights
   d. Power planning for SWP facilities (portion)
3. Replacement deposits for SWP control centers (portion)
4. Credits for a portion of Hyatt-Thermalito power generation
5. Power costs and credits related to pumping water to San Luis Reservoir for project operations (storage changes)
6. Value of power used and generated by Gianelli Pumping-Generating Plant
7. Program costs (portion) to offset annual fish losses resulting from pumping at Banks Pumping Plant (Department of Water Resources-Department of Fish and Wildlife agreement)

Transportation Charge

Capital Cost Component

1. Planning, design, right-of-way, and construction costs of Transportation Facilities
2. Operations and maintenance (O&M) costs for newly constructed Transportation Facilities prior to initial operation
3. Activation costs for newly constructed Transportation Facilities
4. Power costs allocated to initial filling of Southern California reservoirs
5. Capitalized O&M costs (e.g., major repair work) for Transportation Facilities
6. Program costs (portion) to mitigate impacts on current Delta fishery population due to SWP pumping prior to 1986 (Department of Water Resources-Department of Fish and Wildlife agreement)

Minimum OMP&R Component

1. Direct O&M costs of Transportation Facilities
   a. Headquarters and field divisions (portion)
   b. Insurance and Federal Energy Regulatory Commission (FERC) costs (portion)
2. General O&M costs related to Transportation Facilities
   a. Contractor Accounting Office (portion)
   b. Financial and contract administration (portion)
   c. Power planning for SWP facilities (portion)
3. Power costs and credits related to pumping water to Southern California reservoirs for project operations (storage changes)
4. Power costs for pumping water to replenish losses from Transportation Facilities (downstream costs)
5. Other power costs
   a. Station service at Transportation Facility power and pumping plants
   b. Certain transmission service costs (transmission access charges, downstream costs, etc.)
6. Replacement deposits for SWP control centers (portion)
7. Off-Aqueduct Power Facility costs—bond service, bond cover costs (25 percent of bond service), bond reserves, transmission service costs, fuel costs, taxes, and O&M—less power sales allocated to Off-Aqueduct Power Facilities
8. Program costs (portion to offset annual fish losses resulting from pumping at Banks Pumping Plant (Department of Water Resources-Department of Fish and Wildlife agreement)

Variable OMP&R Component

1. Power purchase costs
   a. Capacity
   b. Energy
   c. Pine Flat Powerplant bond service, O&M, and transmission costs allocated to aqueduct pumping plants
2. Alamo, Devil Canyon, Warne, and Castaic power generation credited at the power plant reach and charged to aqueduct pumping plants
3. Hyatt-Thermalito Diversion Dam Powerplant generation charged to aqueduct pumping plants (credits for this generation are reflected in the Delta Water Rate)
4. Replacement deposits for equipment at pumping plants and power plants
5. Credits from sale of excess SWP system power
6. Program costs (portion) to offset annual fish losses resulting from pumping at Banks Pumping Plant (Department of Water Resources-Department of Fish and Wildlife agreement)

Note: Excludes costs recovered under the East Branch Enlargement Transportation Charge.

Figure B-3 Composition of Delta Water Charge and Transportation Charge

The formula for computing the Delta Water Rate, Article 22(f) of the *Standard Provisions for Water Supply Contract*, was designed to ensure that all adjustments for prior overpayments or underpayments of the Delta Water Charge are accounted for in a redetermination of the rate. Since the redetermined rate applies to all future allocations, such adjustments are amortized during the remainder of the project repayment period. This appendix includes a redetermination of the Delta Water Rate for 2018.

Article 28 of the standard provisions stipulates that Transportation Charges be redetermined each year. The tables in Appendix B include the numerical data used in this redetermination. Transportation Charges for prior years through 2017, included in those tables, are the redetermined amounts and do not equal the amounts actually paid by contractors.

As provided under the Water System Revenue Bond Amendment to the water supply contracts, differences between actual payments under the Transportation capital cost component and amounts computed in this redetermination are accumulated with interest and amortized during the remaining years of the contract repayment period. All computations for adjustments are included in the attachments accompanying each contractor's Statement of Charges and are reflected in revised copies of Table C through Table G of the contract, which are also furnished to each SWP contractor in its annual Statement of Charges.

These redeterminations exclude four charges associated with water service other than the Delta Water Charge and the Transportation Charge. The excluded charges (and the manner in which they are treated in this appendix) are outlined below.

(1) Advances of funds pursuant to Article 24(d) of the standard provisions for excess capacity constructed by the State at the request of contractors.

(2) Advances of funds pursuant to Article 10(d) of the standard provisions for delivery structures (turnouts) constructed by the State at the request of contractors. Partial information concerning actual and projected capital costs of such delivery structures is included in this appendix. Statements concerning these costs and data are furnished to the appropriate contractors at various times and are not part of the annual statements.

(3) Payments for sale and service of surplus water to entities other than contractors, pursuant to Article 21 of the standard provisions, are also excluded. Those payments are generally based on the unit rates shown in Table B-25. Net revenues resulting from noncontractor service are applied as indicated on page 24 of Bulletin 132-71.

(4) Payments under the Devil Canyon-Castaic contract for costs of the Devil Canyon-Castaic facilities allocable to power generation. Charges billed as a result of the contract are billed separately from those billed as a result of the water supply contract. Information about the treatment of such charges in relation to redetermined Transportation Charges is included in special attachments to the bills of the six participating contractors.

Time and method of payment for corresponding components of the Delta Water Charge and the Transportation Charge are as follows.

(1) The capital cost components of the Delta Water Charge and the Transportation Charge are paid in two semiannual installments, due January 1 and July 1 of each year, based on statements furnished by the State on or before July 1 of the preceding year.

(2) The minimum OMP&R components of the Delta Water Charge and the Transportation Charge are paid in 12 equal installments due the first of each month and based on statements furnished by the State on or before July 1 of the preceding year.
(3) The variable OMP&R component of the Transportation Charge is paid in varying monthly amounts and is due the fifteenth day of the second month following actual water delivery. The charges are projected based on a unit charge per acre-foot established on or before July 1 of the preceding year. Those unit charges may be revised during the year to reflect current power costs and revenues. The unit charges are applied to actual monthly delivery quantities as determined by the State on or before the fifteenth day of the month following actual water delivery.

Bases for Allocating Reimbursable Costs among Contractors

This section describes procedures for allocating reimbursable costs of Project Transportation Facilities among contractors (see upper right portion of Figure B-1). Those costs do not include annual costs of Off-Aqueduct Power Facilities, which are explained in the "Project Water Charges" section.

Capital and Minimum OMP&R Costs

Figure B-4 includes information about the repayment reaches that form the basis for allocating reimbursable costs of the Project Transportation Facilities among contractors.

Allocations of reimbursable capital costs and minimum OMP&R costs of each reach are based on the proportionate maximum use of that reach by respective contractors under planned conditions of full development.

The derivation of ratios that represent the proportionate maximum use of each aqueduct reach by the respective contractors was first reported in Bulletin 132-70. The ratios in Bulletin 132-70 were subsequently revised for the North Bay Aqueduct, the South Bay Aqueduct, the California Aqueduct from the Delta to Castaic Lake, and the Coastal Branch.

All the revisions reported in previous bulletins regarding the derivation of ratios that represent the proportionate maximum use of each aqueduct reach by the respective contractors were last reported in Tables B-1 and B-2 of Bulletin 132-91. Under Article 53 of the Monterey Amendment, agricultural contractors may sell up to 130,000 acre-feet of aqueduct capacity to municipal and industrial contractors. The first permanent transfer occurred in 1998. Currently, 114,000 acre-feet of the allowable capacity has been transferred. *Table 1* shows the permanent capacity transfers that have taken place since the Monterey Amendment was implemented in 1995.

Table B-1 presents the reach ratios currently applicable to reimbursable capital costs. These reach ratios do not reflect the permanent capacity transfers.

Table B-2 presents corresponding ratios for allocating 2018 and after reimbursable minimum OMP&R costs among contractors. Requested excess capacity is omitted when deriving ratios applicable to capital costs because the capital costs for the excess capacity are paid on an incremental-cost basis and not a proportionate-use basis. However, requested excess capacity is accounted for in the ratios applicable to minimum OMP&R costs.

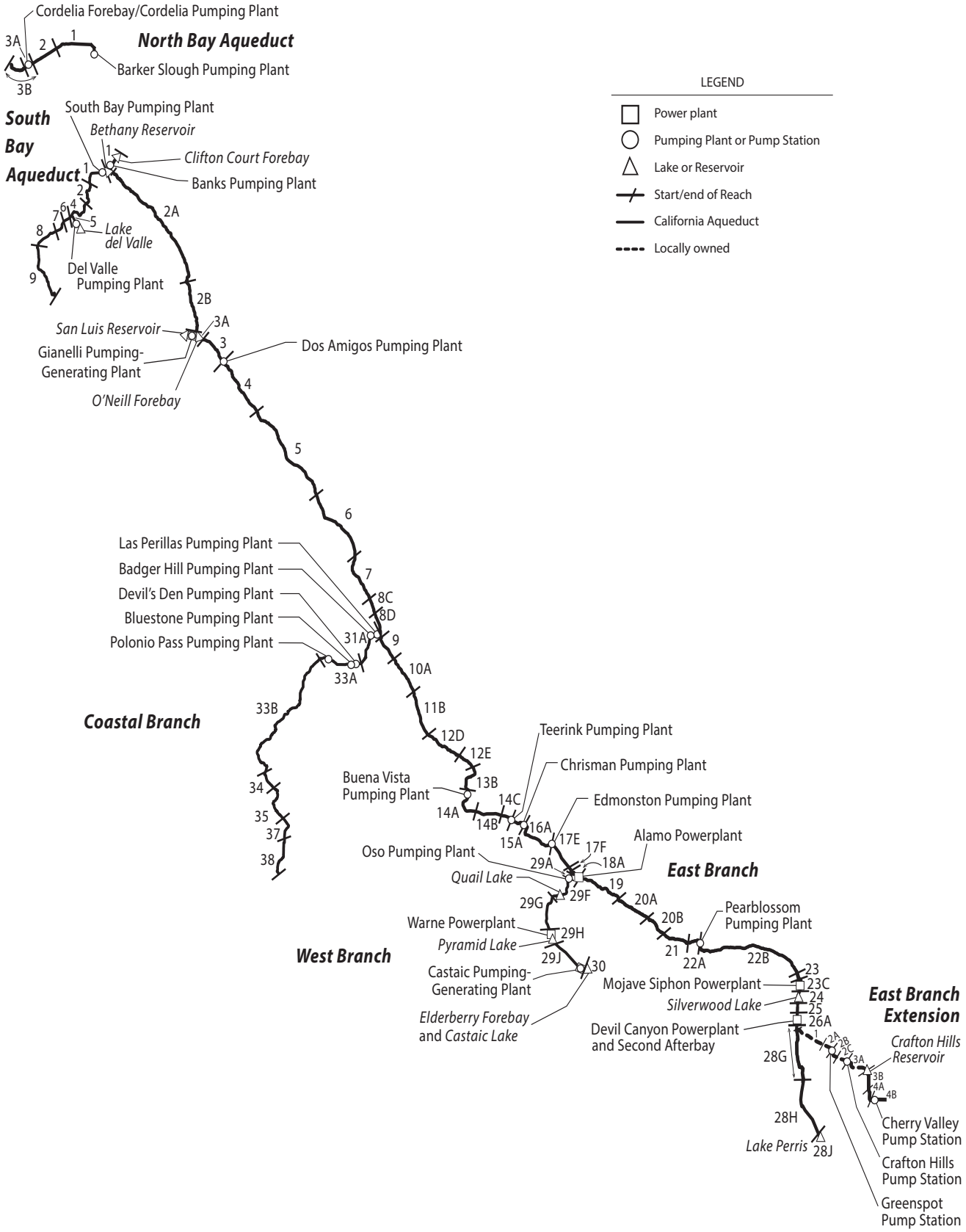


Figure B-4 Repayment Reaches and Descriptions

North Bay Aqueduct

1	Barker Slough through Fairfield/Vacaville Turnout
2	Fairfield/Vacaville Turnout to Cordelia Forebay
3A	Cordelia Forebay through Benicia and Vallejo Turnouts
3B	Cordelia Forebay through Napa Turnout Reservoir

South Bay Aqueduct

1	Bethany Reservoir through Altamont Turnout
2	Altamont Turnout through Patterson Reservoir
4	Patterson Reservoir to Del Valle Junction
5	Del Valle Junction through Lake del Valle
6	Del Valle Junction through South Livermore Turnout
7	South Livermore Turnout through Vallecitos Turnout
8	Vallecitos Turnout through Alameda-Bayside No. 1 Turnout
9	Alameda-Bayside No. 1 Turnout through Santa Clara Terminal Facilities

California Aqueduct

North San Joaquin Division

1	Delta through Bethany Reservoir
2A	Bethany Reservoir to Orestimba Creek
2B	Orestimba Creek to O'Neill Forebay

San Luis Division

3A	Sisk Dam, San Luis Reservoir, and Gianelli Pumping-Generating Plant
3	O'Neill Forebay to Dos Amigos Pumping Plant
4	Dos Amigos Pumping Plant to Panoche Creek
5	Panoche Creek to Five Points
6	Five Points to Arroyo Pasajero
7	Arroyo Pasajero to Kettleman City

South San Joaquin Division

8C	Kettleman City through Milham Avenue
8D	Milham Avenue through Avenal Gap
9	Avenal Gap through Twisselman Road
10A	Twisselman Road through Lost Hills
11B	Lost Hills to 7th Standard Road
12D	7th Standard Road through Elk Hills Road
12E	Elk Hills Road through Tupman Road
13B	Tupman Road to Buena Vista Pumping Plant
14A	Buena Vista Pumping Plant through Santiago Creek
14B	Santiago Creek through Old River Road
14C	Old River Road to Teerink Pumping Plant
15A	Teerink Pumping Plant to Chrisman Pumping Plant
16A	Chrisman Pumping Plant to Edmonston Pumping Plant

Coastal Branch, California Aqueduct

31A	Avenal Gap to Devil's Den Pumping Plant
33A	Devil 's Den Pumping Plant through Tank 1
33B	Tank 1 through Chorro Valley Turnout
34	Chorro Valley Turnout through Lopez Turnout
35	Lopez Turnout through Guadalupe Turnout
37	Guadalupe Turnout to SPRR crossing near Casmalia
38	SPRR crossing near Casmalia through terminous at Tank 5 (Outlet Vault)

Tehachapi Division

17E	Edmonston Pumping Plant to Porter Tunnel
17F	Porter Tunnel to Junction, West Branch

Mojave Division

18A	Junction, West Branch through Alamo Powerplant
19	Alamo Powerplant to Fairmont
19C	Buttes Junction through Buttes Reservoir
20A	Fairmont through 70th Street West
20B	70th Street West to Palmdale
21	Palmdale to Littlerock Creek
22A	Littlerock Creek to Pearblossom Pumping Plant
22B	Pearblossom Pumping Plant to West Fork Mojave River
23	West Fork Mojave River to Silverwood Lake (excluding Mojave Siphon Powerplant)
23C	Mojave Siphon Powerplant
24	Cedar Springs Dam and Silverwood Lake

Santa Ana Division

25	Silverwood Lake to South Portal, San Bernardino Tunnel
26A	South Portal, San Bernardino Tunnel through Devil Canyon Powerplant and Second Afterbay
28G	Devil Canyon Powerplant and Second Afterbay to Barton Road
28H	Barton Road to Lake Perris
28J	Perris Dam and Lake Perris

East Branch Extension

1	Devil Canyon Powerplant to Junction, Foothill Pipeline near Cone Camp Road
2A	Junction, Foothill Pipeline near Cone Camp Road to Greenspot Pump Station
2B	Greenspot Pump Station to Morton Canyon Valve Vault
2C	Morton Canyon Valve Vault to Crafton Hills Pump Station
2D	Junction, Foothill Pipeline Near Cone Camp Road to Citrus Pump Station
3A	Crafton Hills Pump Station to Crafton Hills Reservoir
3B	Crafton Hills Reservoir to Carter Street Valve Vault
4A	Garden Air Creek to Cherry Valley Pump Station
4B	Cherry Valley Pump Station to Terminus at Noble Creek

West Branch, California Aqueduct

29A	Junction, California Aqueduct through Oso Pumping Plant
29F	Oso Pumping Plant through Quail Embankment
29G	Quail Embankment through Warne Powerplant
29H	Pyramid Dam and Lake
29J	Pyramid Lake through Castaic Powerplant
30	Castaic Dam and Lake

Table 1 Summary of Permanent Aqueduct Capacity Transfers

Contractor		Capacity Transfer		
Seller	Buyer	Amount (acre-feet)	Effective Year	Transfer Description
Transfers under Monterey Amendment				
Kern	Mojave	25,000	1998	Purchased capacity upstream of Reach 31A
Kern	Castaic Lake	41,000	2000	Purchased capacity upstream of Reach 16A
Kern	Palmdale	4,000	2000	Purchased capacity upstream of Reach 11B
Kern	Alameda-Zone 7	7,000	2000	Purchased capacity upstream of Reach 10A
Kern	Alameda-Zone 7	15,000	2000	Purchased capacity upstream of Reach 10A
Kern	Alameda-Zone 7	10,000	2001	Purchased capacity upstream of Reach 11B
Kern	Solano	5,756	2001	Purchased capacity upstream of Reach 11B and Reach 31A
Kern	Napa	4,025	2001	Purchased capacity upstream of Reach 11B and Reach 31A
Kern	Alameda-Zone 7	2,219	2004	Purchased capacity upstream of Reach 11B
Subtotal under Article 53		*114,000*		
Transfers outside of Monterey Amendment				
Tulare	Dudley Ridge	3,973	2002	Purchased capacity upstream of Reach 8D
Tulare	AVEK	3,000	2002	Purchased capacity upstream of Reach 8D
Tulare	Alameda-Zone 7	400	2003	Purchased capacity upstream of Reach 8D
Tulare	Kings	5,000	2004	Purchased capacity upstream of Reach 8D
Tulare	Coachella	9,900	2004	Purchased capacity upstream of Reach 8D
Metropolitan	Coachella	88,100	2005	Purchased capacity upstream of Reach 28J
Metropolitan	Desert	11,900	2005	Purchased capacity upstream of Reach 28J
Tulare	Kings	305	2006	Purchased capacity upstream of Reach 31A
Tulare	Desert	1,750	2010	Purchased capacity upstream of Reach 17F
Tulare	Coachella	5,250	2010	Purchased capacity upstream of Reach 17F
Kern	Desert	4,000	2010	Purchased capacity upstream of Reach 17F and Reach 31A
Kern	Coachella	12,000	2010	Purchased capacity upstream of Reach 17F and Reach 31A
Dudley Ridge	Mojave	7,000	2010	Purchased capacity upstream of Reach 8D
Dudley Ridge	AVEK	1,993	2014	Purchased capacity upstream of Reach 8D
Tulare	AVEK	1,451	2014	Purchased capacity upstream of Reach 8D
Dudley Ridge	Mojave	3,000	2015	Purchased capacity upstream of Reach 8D
Subtotal outside of Article 53		*159,022*		

Variable OMP&R Costs

Article 26(a) includes provisions to ensure that the variable OMP&R component of the Transportation Charge will result in a return to the State of those costs that depend on and vary with the amount of SWP water deliveries. (The minimum OMP&R component results in a return of those operating costs that do not vary with deliveries.) Under Article 26(a) all such costs for a reach for a given year will be allocated among contractors in proportion to the actual annual use of that reach by the respective contractors.

Table B-3 summarizes the total power costs, credits, and transmission costs for each aqueduct pumping and power recovery plant. Variable costs are as follows.

- Costs of capacity and energy used exclusive of associated power transmission and station service charges (transmission and station service costs that are independent and vary with power usage are classified as minimum OMP&R costs).
- Credits for capacity and energy produced at aqueduct power recovery plants (treated as negative costs).
- Payments for replacement of major plant machinery components having economic lives shorter than the project repayment period. (In 1997, DWR discontinued charging for a sinking fund for replacements. Replacement costs, for 1999 and thereafter, are to be paid on an annual basis as the costs are incurred.)
- Beginning in 2005, a portion of transmission expenditures that will depend on and vary with water and power usage. These costs will be included as part of the variable component.

Table B-3 excludes plant capacity and energy costs associated with surplus and unscheduled water service after May 1, 1973. Prior to that date, surplus water service was charged the same unit variable OMP&R component as allocated water service. An amendment to the water supply contracts in 1973 significantly changed the rate structure for surplus water service. Capacity and energy costs for pumping surplus and unscheduled water were allocated directly to those SWP contractors receiving surplus and unscheduled water service. A contract amendment in 1991 again revised the rate structure to provide for payment of costs through a melded power rate. These revisions to charges for surplus and unscheduled water are effective from the date of the amendments and are not applied to past charges.

An interruptible water program was established in 1994. This program, later renamed as the Article 21 program, is based on individual annual contracts; costs for Article 21 water actually delivered are included in Table B-3.

Water Conveyance

Tables B-4, B-5A, B-5A-Adj, B-5B, and B-6 present water conveyance quantities that form the basis for allocating costs.

Table B-4 presents the schedules of annual allocations as set forth in Table A and Article 6(a) of each water supply contract.

Table B-5A shows amounts of actual and projected allocated water quantities delivered from each aqueduct reach to each contractor. Projected deliveries for years 2017 through 2035 are based on contractors' requests for future water deliveries. The quantities included in Table B-5A also include nonproject water delivered to contractors, surplus water deliveries prior to May 1, 1973, and actual Article 21 water deliveries in 1994 and thereafter.

Table B-5A-Adj presents a summary of accounting adjustments that result from water deliveries not originating from the Sacramento-San Joaquin Delta. The methodologies used to calculate various components are based on cumulative charges from the Delta through facilities conveying water to a specific repayment reach. When water is introduced to the SWP downstream of the Delta, contractors require an adjustment, or credit, for those facilities not used to convey the water.

Table B-5B presents a summary of actual and projected annual allocated water quantities for each contractor. The quantities also include amounts of nonproject water and surplus water delivered prior to May 1, 1973, and actual deliveries of Article 21 water in 1994 and thereafter.

Table B-6 summarizes the annual allocated water quantities conveyed or to be conveyed through each aqueduct pumping plant or power plant for each of the following functions.

- *Deliveries–Water Supply.* Water made available to contractors at down-aqueduct delivery structures, including certain hypothetical quantities to facilitate cost allocations, for those years when deliveries are made from net annual storage withdrawals. The net annual amounts of storage withdrawals are hypothetically added to the actual amounts conveyed from the Delta to the reservoirs, since deliveries made from storage withdrawals bear the same variable OMP&R costs per acre-foot as they would if the deliveries were actually conveyed from the Delta in that year. The hypothetical increases in the deliveries made from reservoir storage withdrawals are offset by equal credits to the minimum OMP&R costs of the respective reservoirs. Thus, the variable OMP&R components per acre-foot (Table B-17) may be applied to the total annual quantities delivered either from aqueduct reservoir storage or from the Delta.
- *Initial Fill Water.* Water required for initial filling of down-aqueduct reaches and reservoirs or for repayment of pre-consolidation water used during construction.
- *Deliveries–Recreation.* Water delivered to down-aqueduct recreation developments or used for fish and wildlife enhancement.
- *Operational Losses.* Water lost through evaporation and seepage from all down-aqueduct reaches.
- *Reservoir Storage Changes.* Water placed in down-aqueduct reservoir storage after initial filling of the reservoirs, including projected net annual storage accretions (positive values) and withdrawals (negative values) for all down-aqueduct reservoirs of the Project Transportation Facilities.

Variable OMP&R costs (Table B-12) that are allocable to storage accretions are assigned to the minimum OMP&R costs of the respective reservoirs. With the exception of Banks Pumping Plant, "Reservoir Storage Changes" also includes SWP water placed into Southern California groundwater storage from 1978 through 1982 (as positive amounts); and water withdrawn from storage and delivered to contractors in 1979, 1982, 1987, 1988, and 1989 (as negative amounts). At Banks Pumping Plant, groundwater additions and withdrawals are included in "Conservation Water."

Table B-6 also summarizes the following two amounts under the heading *Conservation Water* (Column 25):

(1) Net annual water amounts stored and projected to be stored in San Luis Reservoir.
(2) Water lost and projected to be lost through evaporation and seepage from San Luis Reservoir and from the water conservation portion of the California Aqueduct.

"Conservation Water" includes initial fill water, operational losses, and net annual storage changes associated with San Luis Reservoir and the portion of the California Aqueduct that is allocated to conservation. The same allocation procedure outlined previously for Transportation Facilities also applies to water delivered from storage in Conservation Facilities, except that the hypothetical cost increases are added to the variable OMP&R cost to be reimbursed through the Transportation Charge and deducted from the minimum OMP&R costs to be reimbursed through the Delta Water Charge.

San Luis Reservoir is operated to conserve water for future delivery to downstream contractors. To account for costs associated with reservoir storage, the power and replacement costs of Banks Pumping

Plant (a joint Transportation-Conservation Facility) that are allocated to the conveyance of annual conservation water quantities are transferred to the capital costs of San Luis Reservoir (during initial fill) or to the minimum OMP&R costs of San Luis Reservoir (following initial fill).

In years of net storage withdrawal from San Luis Reservoir, a portion of the minimum OMP&R cost of the reservoir is transferred to the variable OMP&R cost of Banks Pumping Plant. That transfer is equal to the variable OMP&R cost per acre-foot of delivery through Banks Pumping Plant for that year, multiplied by the acre-feet of deliveries derived from San Luis Reservoir storage for that year. Table B-6 also includes amounts of nonproject water and surplus water delivered prior to May 1, 1973, and actual deliveries of Article 21 water in 1994 and thereafter.

Bases for Reimbursable Costs

This section describes the methods used to derive the costs allocated by the procedures outlined in the preceding section. A diagram of the cost derivation process is shown in the upper-left quadrant of Figure B-1.

First, the capital and minimum OMP&R costs of all SWP facilities are allocated among the various project purposes in accordance with the allocation percentages in *Table 2*. Those percentages may be subject to revision in the future.

The redeterminations in this appendix involve only the SWP costs that are allocated to water supply and power generation.

Capital Costs

Capital costs used in the redeterminations in this appendix reflect prices prevailing on December 31, 2016; future cost escalation will be reflected in subsequent bulletins.

Table B-7 presents a reconciliation of estimated total capital costs of each Project Conservation Facility and each Project Transportation Facility. This table shows the relationship of Project Conservation and Transportation costs allocated to contractors (Tables B-8, B-9, B-10, and B-13) to the total SWP capital costs projected by DWR.

Table B-8 shows costs incurred and projected to be incurred by the State in connection with each contractor's turnouts. Costs incurred by the State for both State-constructed and contractor-constructed delivery structures are paid directly by the contractors for which the structures are built. The State incurs design review and construction inspection costs in connection with contractor-constructed turnouts.

Table B-9 lists costs and payments for excess capacity built into SWP Transportation Facilities in accordance with amendments to contracts with The Metropolitan Water District of Southern California (Metropolitan), San Gabriel Valley Municipal Water District, and Antelope Valley-East Kern Water Agency, including the following:

- additional costs incurred by the State for requested excess capacity;
- advances by SWP contractors of funds for such costs; and
- credits for advances in excess of costs which were applied to respective contractors' installments of the capital cost component of the Transportation Charge in 1981.

Under Amendment 2 of Metropolitan's contract, 809 cubic feet per second of excess capacity was originally constructed in reaches of the West Branch at Metropolitan's request. That capacity was reclassified as basic capacity of SWP Transportation Facilities under Amendment 7. Metropolitan paid $16.3 million as a prepayment of the capital cost component of the Transportation Charge in lieu of advancing funds for the original requested capacity.

Table 2 Project Purpose Cost Allocation Factors (percentages)[a]

PROJECT FACILITIES	Water Supply and Power Generation		All Other Purposes (Nonreimbursable)	
	Capital Costs	Minimum OMP&R Costs	Capital Costs	Minimum OMP&R Costs
Project Conservation Facilities				
Frenchman Dam and Lake	21.5	0.0	78.5	100.0
Antelope Dam and Lake	0.0	0.0	100.0	100.0
Grizzly Valley Dam and Lake Davis	1.0	1.8	99.0	98.2
Oroville Division[b]	97.1	99.5	2.9	0.5
California Aqueduct, Delta to Dos Amigos Pumping Plant	96.6	96.7	3.4	3.3
Delta Facilities				
Peripheral Canal Related	86.0	86.0	14.0	14.0
Remaining of Delta Facilities	96.6	96.7	3.4	3.3
Transportation Facilities				
Grizzly Valley Pipeline	100.0	100.0	0.0	0.0
North Bay Aqueduct	100.0	100.0	0.0	0.0
South Bay Aqueduct				
Del Valle Dam and Lake del Valle	25.2	22.0	74.8[c]	78.0[d]
Remainder of South Bay Aqueduct	100.0	100.0	0.0	0.0
California Aqueduct				
Delta to Dos Amigos Pumping Plant	96.6	96.6	3.4	3.4
Dos Amigos Pumping Plant to termini (excluding Coastal Branch)[e,f]	94.3 / 99.6	96.9 / 99.6	5.7 / 0.4	3.1 / 0.4
Aqueduct and Plants[e,f]	94.3 / 99.6	96.9 / 99.6	5.7 / 0.4	3.1 / 0.4
Pyramid Dam and Lake[e,f]	94.3 / 96.1	96.9 / 96.1	5.7 / 3.9	3.1 / 3.9
Castaic Dam and Lake[e,f]	94.3 / 91.1	96.9 / 91.1	5.7 / 8.9	3.1 / 8.9
Silverwood Dam and Lake[e,f]	94.3 / 85.3	96.9 / 85.3	5.7 / 14.7	3.1 / 14.7
Perris Dam and Lake[e,f]	94.3 / 67.7	96.9 / 67.7	5.7 / 32.3	3.1 / 32.3
Coastal Branch	100.0	100.0	0.0	0.0

[a] Percentages indicated apply to the majority of the facilities with minor exceptions.
[b] Percentages indicated are applicable to the remaining costs of division after excluding costs allocated to flood control that are reimbursed by the federal government (22 percent of capital costs) and excluding specific power costs of Hyatt and Thermalito powerplants and switchyards.
[c] Percentage indicated consists of 48.0 percent of costs allocated to recreation and 26.8 percent to flood control.
[d] Percentage indicated consists of 44.9 percent of costs allocated to recreation and 33.1 percent to flood control.
[e] Percentage indicated is used for 2012 and previous years.
[f] Percentage indicated is used for 2013 and forward.

Amendment 5 to Metropolitan's contract requires that additional costs for modifications to the Santa Ana Pipeline (required for enlargement of Lake Perris) will be allocated to Metropolitan and returned to the State through payments of the Transportation Charge. The additional costs to be repaid through Metropolitan's capital cost component for the aqueduct reach from Devil Canyon Powerplant to Barton Road total about $6.7 million (see Bulletin 132-72, page 98).

Table B-10 presents the actual and projected annual capital costs of each aqueduct reach that will eventually be returned to the State, with interest, through contractors' payments of the capital cost component of the Transportation Charge and payment of debt service under the Devil Canyon-Castaic contracts.

Annual Operating Costs

Annual operating costs allocable to water supply and power generation are returned to the State through the minimum OMP&R components of the Delta Water Charge and the Transportation Charge and through a portion of the revenues from energy sales. All reimbursable operating costs of Conservation Facilities are included in the minimum OMP&R component of the Delta Water Charge.

Transportation and Devil Canyon-Castaic Contract Costs

Table B-11 shows the amounts of the actual and projected costs to be reimbursed through payments of the minimum OMP&R component of the Transportation Charge and allocated operating costs under the Devil Canyon-Castaic contract. The table includes the following seven types of operating costs incurred annually that do not vary with water quantities delivered to the contractors:

(1) all direct labor charges for field operation and maintenance personnel, including associated indirect costs;
(2) a distributed share of general operating costs that cannot be identified solely with one facility or aqueduct reach;
(3) all electric power transmission and station service costs up to 2004, and electric power transmission and station service costs for 2005 and after that do not vary with power usage allocable to aqueduct pumping and recovery plants;
(4) all costs for equipment, materials, and supplies;
(5) portions of the power and replacement costs of all pumping plants and power plants that are up-aqueduct from Devil Canyon Powerplant and Castaic Powerplant and that are allocable to the annual conveyance of water lost to evaporation and seepage from respective aqueduct reaches or placed into storage in respective reservoirs of the Project Transportation Facilities (after initial fill);
(6) credits, which offset those costs in (5) above, for deliveries drawn from reservoir storage; and
(7) escalation of projected operating costs (labor only) at 4.5 percent per year for 2018 and 2019, and escalation of certain projected operating costs (labor and operating expense) at 1 percent per year for 2020–2035.

Table B-12 shows the portions of variable OMP&R costs in Table B-3 that are allocable to the water supply delivery quantities included in Table B-6 and reimbursed through payments of the variable OMP&R component of the Transportation Charge.

To derive Table B-12 costs, the following adjustments are made to Table B-3 costs.

(1) Part of the variable OMP&R costs of each plant is allocated to recreation. The allocation to recreation is in proportion to the quantity of water conveyed through each plant each year for delivery to on-shore recreational developments. That portion of variable plant costs attributable to the initial fill of aqueduct reaches is allocated to the joint capital costs of respective down-aqueduct reaches and reservoirs.
(2) That portion of costs attributable to evaporation and seepage is allocated to the joint minimum OMP&R costs of respective down-aqueduct reaches and reservoirs.
(3) Adjustments are made for additions or withdrawals from storage in aqueduct reservoirs. In years when water is added to storage in aqueduct reservoirs, the cost of conveying this water into storage is charged to the minimum OMP&R costs of the corresponding reservoir. In years when storage in aqueduct reservoirs is decreased for the purpose of making deliveries, a credit

is applied to the minimum OMP&R costs of the reservoir from which the storage is released. This credit is equal to the number of acre-feet of storage reduction times the variable OMP&R unit rate for the year the storage is released. The unit rate is equal to the variable OMP&R unit rate for the year the water is taken from storage.

(4) That portion of costs attributable to pumping water to replace evaporation and seepage losses and for additions or withdrawals from storage in San Luis Reservoir is charged to the minimum OMP&R component of the Delta Water Rate.

The remaining costs are allocated to transportation water supply and repaid by the contractors.

Conservation Capital and Operating Costs

Table B-13 is a summary of actual and projected capital and operating costs of the initial Project Conservation Facilities. These costs are reimbursed through payments by contractors under the Delta Water Charge, Oroville power sales, and Gianelli Pumping-Generating Plant credits. Table B-13 also shows credits applied to the reimbursable capital costs of the initial Project Conservation Facilities in accordance with negotiated settlements concerning incurred planning costs for the period from 1952 through 1978.

Project Water Charges

This section describes the redetermination of past and projected components of the Transportation Charge for annual revision of Tables C through G of each water supply contract. This section also describes the derivation of the unit Delta Water Rates and the Water System Revenue Bond Surcharge.

A summary of equivalent unit charges for each acre-foot of allocated water service is also included for each contractor and each aqueduct reach. A diagram of all calculations may be found on the lower half of Figure B-1.

Transportation Charges

The accumulation of allocated costs of each aqueduct reach to each contractor is the basis for the Transportation Charge components.

Table B-14 summarizes each contractor's share of the capital costs of the aqueduct reaches presented in Table B-10. Those amounts are determined by applying proportionate-use ratios set forth in Table B-1 to the costs in Table B-10. The resulting allocated costs are set forth in Table C of the respective water supply contracts.

Prepayments of the capital cost component, required under Metropolitan's Amendment 7, are included as negative capital costs in Table B-14 and Table C of Metropolitan's Statement of Charges. Solano County Water Agency, Empire West Side Irrigation District, and Castaic Lake Water Agency also prepaid capital costs (see Table B-14 footnotes). Table B-14 includes costs of the East Branch Extension to provide water service to San Bernardino Valley Municipal Water District and San Gorgonio Pass Water Agency.

Both Table B-14 and Table C of the six contractors for project water service below Devil Canyon Powerplant and Castaic Powerplant include the capital costs reimbursable under the Devil Canyon-Castaic contract.

Table B-15 summarizes capital cost components of the Transportation Charge for each contractor for each year of the project repayment period. By the year 2035, the capital cost components shown in Table B-15 will recover the costs shown

in Table B-14, with interest at the Project Interest Rate of 4.610 percent per annum and based on the amortization schedules included in *Table 3*.

Those estimated components, subsequently adjusted for prior overpayments or underpayments, are included in Table D of the water supply contracts. Costs of excess capacity are billed separately and are not included in Table B-15.

Table B-15 includes the debt service payments due from the six contractors down-aqueduct from Devil Canyon Powerplant and Castaic Powerplant, in accordance with terms of the Devil Canyon-Castaic contract.

Table B-16A summarizes the minimum OMP&R components of the Transportation Charge for each year of the project repayment period. Those estimated components, subsequently adjusted for prior overpayments or underpayments, are included in Table E of the respective water supply contracts.

The total amounts included in Table B-16A are determined by applying the proportionate-use ratios in Table B-2 to the reach costs in Table B-11.

Table B-16A excludes Off-Aqueduct Power Facility charges, which are included separately in Table B-16B. Both Table B-16A and Table E include the operating costs payable under the Devil Canyon-Castaic contract for the six contractors down-aqueduct from Devil Canyon Powerplant and Castaic Powerplant.

As part of operating agreements with DWR, Kern County Water Agency was billed from 1963 through 1987 for any additional operating costs caused by early installation of units in Las Perillas and Badger Hill pumping plants by Berrenda Mesa Water Storage District (see Bulletin 132-71, page 7). Under those agreements, a portion

Table 3 Criteria for Amortizing Capital Costs of Transportation Facilities

Contractor	Year of Initial Payment[a]
Alameda County Flood Control and Water Conservation District, Zone 7	1963[b]
Alameda County Water District	1963
Antelope Valley-East Kern Water Agency	1963
Castaic Lake Water Agency	1964
City of Yuba City	[c]
Coachella Valley Water District	1964
County of Butte	[c]
County of Kings	1968
Crestline-Lake Arrowhead Water Agency	1964
Desert Water Agency	1963[d]
Dudley Ridge Water District	1968[e]
Empire West Side Irrigation District	1968[e]
Kern County Water Agency	
Agricultural Use	1968[e]
Municipal and Industrial Use	1968[e]
Littlerock Creek Irrigation District	1964
The Metropolitan Water District of Southern California	1963
Mojave Water Agency	1964
Napa County Flood Control and Water Conservation District	1966
Oak Flat Water District	1968
Palmdale Water District	1964
Plumas County Flood Control and Water Conservation District	1970
San Bernardino Valley Municipal Water District	1963
San Gabriel Valley Municipal Water District	1963[d]
San Gorgonio Pass Water Agency	1963[d]
San Luis Obispo County Flood Control and Water Conservation District	1964[f]
Santa Barbara County Flood Control and Water Conservation District	1964
Santa Clara Valley Water District	1963
Solano County Water Agency	1973
Tulare Lake Basin Water Storage District	1968[e]
Ventura County Watershed Protection District	1964

[a] Allocated capital costs of transportation facilities amortized in equal annual installments unless otherwise noted.
[b] Principal payments on each annual capital cost prior to 1971 delayed until calendar year 1972, except payments for 1963.
[c] For City of Yuba City and County of Butte, payments for Delta Water Charge only.
[d] Payment deferred for 1963 and added to 1964 payment with accrued interest.
[e] For Dudley Ridge Water District, Empire West Side Irrigation District, Kern County Water Agency (agricultural use), Oak Flat Water District, and Tulare Lake Basin Water Storage District, according to Article 45 of the contracts for supply of agricultural water, capital costs of transportation facilities allocated to agricultural water supply are amortized by using an equivalent unit rate per acre-foot applied to the annual allocations (Table B-4) through the project repayment period.
[f] For San Luis Obispo and Santa Barbara, all principal and interest payments for costs of the Coastal Stub were deferred until 1976.

of minimum OMP&R costs of Reach 31A were assigned directly to Kern, as shown in *Table 4*, with the remaining reach costs allocated by application of the proportionate-use ratios. DWR purchased the last unit, Unit No. 6, at Las Perillas and Badger Hill pumping plants in early 1997 to provide pumping capacity for deliveries to Coastal Area contractors, which began in 1997.

Table 4 Minimum OMP&R Costs of Reach 31A Assigned Directly to Kern County Water Agency (in dollars)

Year	Direct Charges
1969	46,511
1970	46,302
1971	140,074
1972	95,017
1973	72,454
1974	100,692
1975	127,456
1976	138,504
1977	120,753
1978	157,652
1979	121,231
1980	150,728
1981	75,866
1982	82,805
1983	90,007
1984	107,468
1985	159,406
1986	137,241
1987	127,073
1988	130,924
1989	128,468
1990	138,234
1991	139,527
1992	185,370
1993	219,334
1994	364,196
1995	272,341
1996	322,123
Total	**3,997,767**

As a result of the Monterey Amendment, the costs related to this settlement are to be allocated among all SWP contractors in proportion to their maximum Table A amounts. As costs are incurred, related charges will be included in the contractors' annual Statements of Charges as part of the minimum. Between 2002 and 2010, the Monterey Amendment litigation costs recovered from SWP contractors were $15.8 million.

Table B-16B summarizes annual Off-Aqueduct Power Facility charges allocated to each water contractor, adjusted for prior overpayments or underpayments. Those charges are to repay all Off-Aqueduct Power costs, including bond service, deposits for reserves, operation and maintenance costs, fuel costs, taxes, and insurance.

Adopted October 1, 1979, the General Bond Resolution requires that sufficient revenues be collected each year to repay all of those costs. In addition, an amount totaling 25 percent of the annual bond service is collected each year to ensure that sufficient funds are available to cover all annual costs. Any revenues collected and not needed during the year are refunded to the contractors in the next year.

Table 5 summarizes Off-Aqueduct Power Facility charges and credits related to deliveries for 2016. The ongoing Reid Gardner Powerplant closure costs related to the Reid Gardner Powerplant contract expiration in 2013 are tracked independently from annual Reid Gardner operating costs.

Table 6 shows projected Off-Aqueduct Power Facility charges. Defeasance of Off-Aqueduct Power facilities bonds occurred in June 2016, so no debt service charges or bond cover are included. Additionally, Reid Gardner, Unit 4 Powerplant remediation costs are projected for 2017, 2018, and 2019 and then only minor operating costs are projected post-2019.

Table 5 Summary of 2016 Off-Aqueduct Power Facility Charges and Credits (in dollars)

Charges by Item	
Reid Gardner Powerplant	248,402
Reid Gardner Closure Costs	3,709,861
Bottle Rock Powerplant	655,440
South Geysers Powerplant	241,255
Subtotal	*4,854,958*
Credits by Item	
Power Sales	0
Net Total Charge	**4,854,958**

Table 6 Projected Charges for Off-Aqueduct Power Facilities (in dollars)

Year	Total Annual Cost	25 Percent Bond Cover
2017	4,139,527	-
2018	**3,720,000**	**-**
2019	7,220,000	-
2020	200,000	-
2021	200,000	-
2022	200,000	-
2023	200,000	-
2024	200,000	-
2025	200,000	-
2026	200,000	-
2027	200,000	-
2028	200,000	-
2029	200,000	-
2030	200,000	-
2031	200,000	-
2032	200,000	-
2033	200,000	-
2034	200,000	-
2035	200,000	-

Annual Off-Aqueduct Power Facility charges are allocated among contractors in proportion to the electrical energy required to pump allocated water for the year. The initial allocation for the Statements of Charges is based on estimates of energy to pump requested allocated water deliveries, based on a 60-percent allocation.

An interim adjustment in the allocation of Off-Aqueduct Power costs may be made in May of each year, based on updated cost estimates and April revisions in water delivery schedules. An additional adjustment is made the following year based on actual water deliveries and actual costs for the year.

The energy required to pump each contractor's water is calculated using the kilowatt-hour per acre-foot factors shown in *Table 7* for the pumping plants upstream from the delivery turnouts. The amounts shown include transmission losses.

Table B-17 presents a summary of actual and projected total variable OMP&R costs for each acre-foot conveyed through each aqueduct pumping plant and power plant for each year of the project. The following provisions are for calculating the variable OMP&R component of the Transportation Charge.

- An annual charge per acre-foot of projected water deliveries to all contractors served from or through each reach is determined so the projected variable OMP&R costs to be incurred for each reach will be returned to the State.
- The total annual variable OMP&R component for any contractor for a given reach is obtained by multiplying the unit charge associated with that reach by the quantity of water actually delivered from or through the reach to the contractor.

The data summarized in Table B-17 are derived by dividing the costs shown in Table B-3 by the water quantities shown in

Table 7 Kilowatt-Hour per Acre-Foot Factors for Allocating Off-Aqueduct Power Facility Costs

	kWh per acre-foot[a]	
Pumping Plant	At Plant	Cumulative from Delta
Barker Slough	223	223
Cordelia-Benicia	434	657
Cordelia-Vallejo	178	401
Cordelia-Napa	563	786
Banks (Delta)	296	296
South Bay (including Del Valle)	869	1,165
Dos Amigos	138	434
Buena Vista	242	676
Teerink	295	971
Chrisman	639	1,610
Edmonston	2,236	3,846
Pearblossom	703	4,549
Greenspot	871	5,420
Crafton Hills	1,087	6,507
Cherry Valley	224	6,731
Oso	280	4,126
Las Perillas	77	511
Badger Hill	200	711
Devil's Den	705	1,416
Bluestone	705	2,121
Polonio Pass	705	2,826

[a] Includes transmission losses.

Table B-6. However, certain costs included in Table B-3 for extra peaking service, which would otherwise constitute variable OMP&R costs, are assigned directly to contractors requesting this type of service (see Bulletin 132-71, page 21, and Water Service Contractors Council Memo No. 593, July 10, 1970). Those costs are excluded from the unit charges shown in Table B-17. Peaking charges based on additional capacity ceased in 1983. Since 1984, costs are based on power market energy rates. The amounts of extra peaking charges for additional power costs are shown in *Tables 8 and 9*.

Unit rates shown in Table B-17 constitute the rates for the pumping plants and power plants listed. The cumulative rates constitute the total rates, cumulative from the Sacramento-San Joaquin Delta, and are applicable to deliveries from or downstream of the pumping plants and power plants. Extra peaking service costs are excluded.

Table B-18 shows the variable OMP&R components of the Transportation Charge for each contractor for each year of the project repayment period. Table B-18 is developed from the costs per acre-foot included in Table B-17 and the delivery quantities for each contractor from each reach as indicated in Table B-5A and Table B-5A-Adj, plus any costs for extra peaking service. Those estimated components, subsequently adjusted for prior overpayments or underpayments, are included in Table F of the respective water supply contracts.

Table B-19 summarizes the annual Transportation Charges for each contractor (the sum of the corresponding amounts included in Tables B-15, B-16A, B-16B, and B-18). Those estimated payments, subsequently adjusted for prior overpayments or underpayments, are set forth in Table G of the respective water supply contracts.

In accordance with provisions of the Devil Canyon-Castaic contract, Table B-19 and Table G include amounts of debt service and operating cost payments due from the six contractors located down-aqueduct from Devil Canyon and Castaic powerplants.

Delta Water Charges

Table B-20A presents the calculation of the Delta Water Rate for the initial Conservation Facilities applicable in 2018 in accordance with the amended Article 22(e) and 22(g) of all 29 water supply contracts. The Delta Water Rate was calculated at a Project Interest Rate of 4.610 percent, based on Conservation Facility costs shown in Table B-13. That Delta Water Rate is used

to compute projected Delta Water Charges under Article 53(i) for the contractors who have executed the Monterey Amendment. Included in Table B-20A is the Delta Water Rate for the two contractors who have not executed the Monterey Amendment: Plumas County Flood Control and Water Conservation District and Empire West Side Irrigation District.

Table B-20B shows each component of the 2018 Delta Water Rate from Table B-20A.

Table B-21 summarizes the annual Delta Water Charge for each contractor. The projected charges in Table B-21 are developed by multiplying the total rate per acre-foot, as shown in Table B-20A, by the amount of allocated water for each contractor, as shown in Table B-4.

The projected Delta Water Charges through 2035 include the assumption of escalation of projected operating costs at 1.0 percent per year for 2020–2035.

Water System Revenue Bond Surcharge

Table B-22 summarizes the Water System Revenue Bond (WSRB) Surcharge to the Delta Water Charge and the transportation capital cost component for each contractor. The surcharge shown in Table B-22 includes the financing costs of the WSRB Surcharge, Series B through Series AW. This surcharge is levied according to an amendment to the water supply contracts, which was signed by all of the water supply contractors.

Total Water Charges

Table B-23 summarizes the total annual charges to each contractor (the sum of the Transportation Charge in Table B-19, the Delta Water Charge in Table B-21, and the WSRB Surcharge in Table B-22). The charges do not reflect past payments by contractors and are unadjusted for prior overpayments or underpayments.

Equivalent Total Water Charges

Table B-24 presents the Transportation Charge and Delta Water Charge in terms of the equivalent unit charge for each acre-foot of allocated water now projected for delivery to the respective contractors.

These equivalent charges would provide the same principal sum at the end of the project repayment period as annual payments to be made as part of the Delta Water Charge and Transportation Charge, plus interest at the Project Interest Rate, if applied to each acre-foot of allocated water delivered to date; all surplus water delivered prior to May 1, 1973; all Article 21 water deliveries in 1994 and thereafter; and all allocated water now projected to be delivered during the remainder of the project repayment period (Table B-5B).

The equivalent unit Delta Water Charges included in Table B-24 are greater than those presented in Table B-20A because current projections of allocated water service are less for most contractors than the amounts shown in Table A.

Equivalent Water Costs by Reach

Table B-25 presents a summary of the equivalent unit transportation cost of conveying allocated water through respective aqueduct reaches of the Project Transportation Facilities.

Those unit costs provide the basis of charges assessed for extra service (such as delivery of allocations down-aqueduct from a contractor's turnout) and for wheeling service to entities other than the SWP contractors.

The cumulative unit conveyance costs indicated for reaches in Table B-25 do not necessarily equal the equivalent unit Transportation Charges to contractors served from such reaches. The unit charges in Table B-24 account for the rate of water

Table 8 Extra Peaking Charges for Additional Power, by Pumping Plant (in dollars)

Year	Cordelia Napa	Cordelia Solano	Barker Slough	South Bay	Banks	Dos Amigos	Las Perillas and Badger Hill	Buena Vista	Teerink	Chrisman	Edmonston	Pearblossom	Oso	Total
1972	0	0	0	0	0	10,579	24,700	0	0	0	0	0	0	35,279
1973	0	0	0	0	0	0	6,016	0	0	0	0	0	0	6,016
1974	0	0	0	0	0	0	7,140	0	0	0	0	0	0	7,140
1975	0	0	0	0	0	494	6,397	0	0	0	0	0	0	6,891
1976	0	0	0	0	0	0	1,981	0	0	0	0	0	0	1,981
1977	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1978	0	0	0	0	0	45,145	3,680	0	0	0	0	0	0	48,825
1979	0	0	0	0	0	0	3,306	0	0	0	0	0	0	3,306
1980	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1981	0	0	0	0	0	12,126	0	0	0	0	0	0	0	12,126
1982	0	0	0	0	0	89,339	0	0	0	0	0	0	0	89,339
1983	0	0	0	35	7,594	3,534	152	0	0	0	0	0	0	11,315
1984	0	0	0	2,096	84,396	38,607	7,203	11,173	3,823	3,593	0	0	0	150,891
1985	0	0	0	1,480	19,612	8,841	763	4,488	4,412	8,929	28,353	0	0	76,878
1986	0	0	0	0	1,864	863	0	291	354	766	2,683	0	0	6,821
1987	0	0	0	604	17,129	7,838	835	2,295	1,806	3,460	11,058	0	0	45,025
1988	639	39	287	894	43,475	20,082	2,213	5,792	4,367	8,272	25,886	0	0	111,946
1989	2,491	566	1,483	70	40,251	18,642	1,935	3,401	1,531	2,058	3,793	0	0	76,221
1990	45	0	18	343	19,524	9,044	0	150	145	314	643	0	0	30,226
1991	903	0	281	0	21	8	0	15	17	39	139	41	0	1,464
1992	208	117	203	0	7,070	2,502	0	182	190	435	0	0	0	10,907
1993	0	681	889	4,483	123,080	54,741	0	8,898	5,458	10,900	35,068	11,139	0	255,337
1994	0	366	393	679	6,566	2,795	454	1,083	155	357	1,121	0	132	14,101
1995	0	0	0	1,717	24,464	9,422	27	1,865	3,475	782	1,104	400	0	43,256
1996	4	0	1	1,983	10,031	4,976	0	391	432	1,015	3,404	1,160	0	23,397
1997	0	1,780	2,152	3,107	337,357	165,774	1,753	34,604	12,296	15,910	21,028	0	0	595,761
1998	0	0	0	20,966	235,693	106,251	2,354	697	848	1,836	6,426	0	0	375,071
1999	0	0	0	0	63,196	26,235	0	3,394	4,136	8,959	31,350	7,740	0	145,010
2000–2016	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	**4,290**	**3,549**	**5,707**	**38,457**	**1,041,323**	**637,838**	**70,909**	**78,719**	**43,445**	**67,625**	**172,056**	**20,480**	**132**	**2,184,530**

Table 9 Extra Peaking Charges for Additional Power, by Contractor (in dollars)

Year	Napa	Solano	Alameda-Zone 7	Alameda County	Santa Clara	Dudley Ridge	Empire	Kern	Kings	Oak Flat	Tulare	AVEK	Castaic Lake	Coachella	Desert	Littlerock	Palmdale	San Gabriel	Total
1972	0	0	0	0	0	0	0	35,269	0	0	10	0	0	0	0	0	0	0	35,279
1973	0	0	0	0	0	0	0	6,016	0	0	0	0	0	0	0	0	0	0	6,016
1974	0	0	0	0	0	0	0	7,140	0	0	0	0	0	0	0	0	0	0	7,140
1975	0	0	0	0	0	0	0	6,891	0	0	0	0	0	0	0	0	0	0	6,891
1976	0	0	0	0	0	0	0	1,981	0	0	0	0	0	0	0	0	0	0	1,981
1977	0	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0	0	0
1978	0	0	0	0	0	2,035	0	44,484	42	0	0	2,264	0	0	0	0	0	0	48,825
1979	0	0	0	0	0	0	0	2,821	0	0	0	0	485	0	0	0	0	0	3,306
1980	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1981	0	0	0	0	0	0	0	11,951	0	0	0	0	0	0	0	175	0	0	12,126
1982	0	0	0	0	0	2,173	0	80,945	0	0	0	4,671	1,128	0	0	0	0	422	89,339
1983	0	0	0	0	48	9,511	0	0	1,365	0	0	0	391	0	0	0	0	0	11,315
1984	0	0	0	0	2,874	0	0	144,021	281	809	0	0	2,906	0	0	0	0	0	150,891
1985	0	0	0	2,029	0	0	64	25,664	0	98	0	48,767	256	0	0	0	0	0	76,878
1986	0	0	0	0	0	0	0	0	0	13	2,194	4,614	0	0	0	0	0	0	6,821
1987	0	0	229	0	599	313	84	24,141	0	95	0	18,207	545	0	0	812	0	0	45,025
1988	892	73	665	561	0	1,853	1,404	58,905	0	72	2,368	44,526	627	0	0	0	0	0	111,946
1989	3,478	1,062	96	0	0	13	403	55,085	0	239	8,278	0	1,043	0	0	1,035	5,489	0	76,221
1990	63	0	470	0	0	0	0	28,587	0	0	0	0	0	0	0	81	1,025	0	30,226
1991	1,184	0	0	0	0	0	0	0	0	0	0	0	0	0	0	280	0	0	1,464
1992	271	257	0	0	0	0	49	10,109	221	0	0	0	0	0	0	0	0	0	10,907
1993	0	1,570	6,122	0	0	0	3,757	97,812	504	0	74,577	0	0	24,983	41,156	0	4,856	0	255,337
1994	0	759	896	0	0	0	7	9,933	0	0	0	0	2,450	0	0	56	0	0	14,101
1995	0	0	2,353	0	0	10,197	0	28,085	310	0	0	0	27	0	0	0	2,284	0	43,256
1996	5	0	81	2,612	0	334	205	4,552	969	0	7,809	0	0	0	0	0	3,598	3,232	23,397
1997	0	3,932	3,999	0	0	6,190	0	546,733	0	40	0	0	0	0	0	0	34,867	0	595,761
1998	0	0	19,666	8,442	0	22,631	1	312,626	0	651	0	0	0	0	0	0	11,054	0	375,071
1999	0	0	0	0	0	0	0	76,425	0	0	6,922	0	0	0	0	0	11,576	50,087	145,010
2000–2016	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	**5,893**	**7,653**	**34,577**	**13,644**	**3,521**	**55,250**	**5,974**	**1,620,176**	**3,692**	**2,017**	**102,158**	**123,049**	**9,858**	**24,983**	**41,156**	**2,439**	**74,749**	**53,741**	**2,184,530**

demand buildup and cost allocation factors of the individual contractors; however, the unit costs included in Table B-25 reflect the effect of melding the respective buildups and allocation criteria of all contractors whose allocations are conveyed through a given reach. Table B-25 also includes surplus water delivered prior to May 1, 1973, and Article 21 water deliveries in 1994 and thereafter.

East Branch Enlargement Charges

Table B-26 reflects DWR's projection of annual capital costs of the East Branch Enlargement for each aqueduct reach. These projections will be redetermined in future bulletins to include the following:

- a reallocation of costs of constructing the present East Branch facilities between Alamo Powerplant and Silverwood Lake;
- a reallocation of costs of Silverwood Lake to reflect additional use as a result of East Branch Enlargement operation;
- a reallocation of costs of San Bernardino Tunnel to reflect redistribution of flow capacities necessary for the East Branch Enlargement facilities; and
- actual enlargement construction costs.

These costs will be recovered with interest from the seven Southern California SWP contractors participating in the enlargement, in accordance with their amended water supply contracts (see *Table 10*).

Table B-27 lists the projected minimum OMP&R costs for each reach of the enlargement to be repaid by the seven East Branch Enlargement participating contractors. Currently, this table includes only minimum OMP&R costs attributable to the East Branch Enlargement. In accordance with Article 49(e)(1), the contractors participating in the East Branch Enlargement will also share in the remaining minimum OMP&R costs of the affected reaches, in accordance with a formula developed by DWR in consultation with the affected contractors.

Table B-28 shows each participating contractor's share of the estimated capital costs of the East Branch Enlargement shown in Table B-26.

Table B-29 shows the amounts of the annual capital cost components of the East Branch Enlargement Transportation Charge for each participating contractor. This component consists of each contractor's allocated share of debt service on bonds sold to finance the enlargement.

Table B-30 shows the minimum OMP&R components of the East Branch Enlargement Transportation Charge for each participating contractor for each year of the project repayment period. The amounts shown in Table B-30 will recover the minimum OMP&R costs shown in Table B-27.

Table B-31 shows the annual East Branch Enlargement Transportation Charge for each participating contractor (the sum of the corresponding amounts included in Tables B-29 and B-30).

East Branch Extension Charges

The East Branch Extension charges recover associated costs for East Branch Extension facilities beginning at Devil Canyon Powerplant Afterbay and extending to the terminus at Noble Creek in the vicinity of Beaumont, Riverside County. These costs, separated into 3 phases: Phase 1 Original, Phase 1 Improvements, and Phase 2, will be recovered from two contractors—San Bernardino Valley Municipal Water District and San Gorgonio Pass Water Agency—in accordance with their amended water supply contracts. The factors for distributing minimum costs are shown in *Table 11*. *Table 12* shows the capital factors and the corresponding debt service for each of the phases in 2018.

Table 10 Determination of Factors for Distributing Capital and Minimum OMP&R Costs of East Branch Enlargement Facilities among Participating Contractors

Reach Number	Description
18A	Junction, West Branch, California Aqueduct through Alamo Powerplant
19	Alamo Powerplant to Fairmont
20A	Fairmont through 70th Street West
20B	70th Street West to Palmdale
21	Palmdale to Littlerock Creek
22A	Littlerock Creek to Pearblossom Pumping Plant
22B	Pearblossom Pumping Plant to West Fork Mojave River
23B	West Fork Mojave River to Silverwood Lake (excluding Mojave Siphon Powerplant facilities)
23C	Mojave Siphon Powerplant facilities
24	Cedar Springs Dam and Silverwood Lake
25	Silverwood Lake to South Portal, San Bernardino Tunnel
26A	South Portal, San Bernardino Tunnel through Devil Canyon Powerplant and Second Afterbay
26B	Devil Canyon Powerplant Bypass

Share of Enlargement Capacity (cubic feet per second)

Reach Number	AVEK	Coachella	Desert	Mojave	Palmdale	San Bernardino	Metropolitan	Total
18A		151	13	136	6		1,200	1,506
19		151	13	136	6		1,200	1,506
20A	35	151	13	136	6		1,200	1,541
20B	35	151	13	136	6		1,200	1,541
21	35	151	13	136			1,200	1,535
22A	35	151	13	136			1,200	1,535
22B		151	13	136			1,200	1,500
23B		184	67	212			1,200	1,663
23C		184	67				1,200	1,451
24		190	78				1,200	1,468
25		193	83			63	1,200	1,539
26A		193	83			63	1,200	1,539
26B							300	300

Factors for Distributing Capital and Minimum OMP&R Costs of East Branch Enlargement Facilities (flow ratios)

Reach Number	AVEK	Coachella	Desert	Mojave	Palmdale	San Bernardino	Metropolitan	Total
18A	0.00000000	0.10026560	0.00863214	0.09030544	0.00398406	0.00000000	0.79681276	1.00000000
19	0.00000000	0.10026560	0.00863214	0.09030544	0.00398406	0.00000000	0.79681276	1.00000000
20A	0.02271252	0.09798832	0.00843608	0.08825438	0.00389358	0.00000000	0.77871512	1.00000000
20B	0.02271252	0.09798832	0.00843608	0.08825438	0.00389358	0.00000000	0.77871512	1.00000000
21	0.02280130	0.09837134	0.00846906	0.08859935	0.00000000	0.00000000	0.78175895	1.00000000
22A	0.02280130	0.09837134	0.00846906	0.08859935	0.00000000	0.00000000	0.78175895	1.00000000
22B	0.00000000	0.10066667	0.00866667	0.09066667	0.00000000	0.00000000	0.79999999	1.00000000
23B	0.00000000	0.11064342	0.04028863	0.12748046	0.00000000	0.00000000	0.72158749	1.00000000
23C	0.00000000	0.12680910	0.04617505	0.00000000	0.00000000	0.00000000	0.82701585	1.00000000
24	0.00000000	0.12942779	0.05313351	0.00000000	0.00000000	0.00000000	0.81743870	1.00000000
25	0.00000000	0.12540611	0.05393112	0.00000000	0.00000000	0.04093567	0.77972710	1.00000000
26A	0.00000000	0.12540611	0.05393112	0.00000000	0.00000000	0.04093567	0.77972710	1.00000000
26B	0.00000000	0.00000000	0.00000000	0.00000000	0.00000000	0.00000000	1.00000000	1.00000000

Table 11 Factors for Distributing Minimum OMP&R Costs of the East Branch Extension Facilities

For Calendar Year 2012 and Previous Years

Reach Number	Reach Description	San Bernardino	San Gorgonio	Total
1	Devil Canyon Powerplant to Junction, Foothill Pipeline near Cone Camp Road	0.557330	0.442670	1.000000
2A	Junction Foothill Pipeline near Cone Camp Road to Greenspot Pump Station	0.557330	0.442670	1.000000
2B	Greenspot Pump Station to Morton Canyon Valve Vault	0.777778	0.222222	1.000000
2C	Morton Canyon Valve Vault to Crafton Hills Pump Station	0.777778	0.222222	1.000000
2D	Junction, Foothill Pipeline Near Cone Camp Road to Citrus Pump Station	0.777778	0.222222	1.000000
3A	Crafton Hills Pump Station to Crafton Hills Reservoir	0.557330	0.442670	1.000000
3B	Crafton Hills Reservoir to Carter Street Valve Vault	0.557330	0.442670	1.000000
4A	Garden Air Creek to Cherry Valley Pump Station		1.000000	1.000000
4B	Cherry Valley Pump Station to Terminus at Noble Creek		1.000000	1.000000

For Calendar Year 2013 and Forward

Reach Number	Reach Description	San Bernardino	San Gorgonio	Total
1	Devil Canyon Powerplant to Junction, Foothill Pipeline near Cone Camp Road	0.81674544	0.18325456	1.000000
2A	Junction Foothill Pipeline near Cone Camp Road to Greenspot Pump Station	0.85193106	0.14806894	1.000000
2B	Greenspot Pump Station to Morton Canyon Valve Vault	0.77144744	0.22855256	1.000000
2C	Morton Canyon Valve Vault to Crafton Hills Pump Station	0.77144744	0.22855256	1.000000
2D	Junction, Foothill Pipeline Near Cone Camp Road to Citrus Pump Station	0.76227575	0.23772425	1.000000
3A	Crafton Hills Pump Station to Crafton Hills Reservoir	0.60766673	0.39233327	1.000000
3B	Crafton Hills Reservoir to Carter Street Valve Vault	0.58333333	0.41666667	1.000000
4A	Garden Air Creek to Cherry Valley Pump Station		1.000000	1.000000
4B	Cherry Valley Pump Station to Terminus at Noble Creek		1.000000	1.000000

Short-term Agreements

DWR and the water supply contractors execute short-term agreements that affect the contractors' charges.

Municipal Water Quality Investigations

DWR executed a 5-year agreement in 1997 with 16 municipal and industrial contractors, who agreed to pay for allocated shares of DWR's Municipal Water Quality Investigations costs. Additional amendments were executed in 2002, 2006, 2008, 2010, 2014, and 2017 to extend the program. The Municipal Water Quality Investigations charges under this agreement are included in the transportation minimum OMP&R components shown in Table B-16A.

Feasibility Study

Nine contractors executed a short-term agreement (1997 and 1998) to participate in the feasibility study for the American Basin conjunctive-use program. Feasibility study costs are included in Table B-16A.

Table 12 East Branch Extension Facilities Debt Service for 2018

Contractor	Share of Participation (percent)	Total Debt Service Charge (in dollars)
Phase 1 Original		
San Bernardino	45.8417	**4,775,849**
San Gorgonio	54.1583	**5,642,282**
Subtotal	*100.0000*	***10,418,131***
Phase 1 Improvements		
San Bernardino	63.3410	**3,645,320**
San Gorgonio	36.6590	**2,109,752**
Subtotal	*100.0000*	***5,755,072***
Phase 2		
San Bernardino	64.4210	**11,076,029**
San Gorgonio	35.5790	**6,117,166**
Subtotal	*100.0000*	***17,193,195***
Total		**33,366,398**

Delta Programs

Contractors have agreed to participate in several Delta improvement programs that started in 2007 and that will possibly extend into the future.

The first agreement pertains to the Bay Delta Conservation Plan (BDCP) which was agreed to in the Memorandum of Agreement (MOA) for Supplemental Funding for Certain Ecosystem Actions and Support for Implementation of Near-Term Water Supply, Water Quality, Ecosystem, and Levee Actions. The BDCP comprises two elements: fishery costs and consultation costs. These costs were added to the contractors' transportation minimum component for bill years 2007 through 2012.

The second agreement pertains to the non-BDCP costs of the MOA, comprising the Delta Vision and pelagic organism decline research costs. These costs were added to the contractors' conservation minimum component for bill years 2007 and 2008.

The third set of agreements pertains to the Delta Habitat Conservation and Conveyance Program (DHCCP). The agreements are between DWR and 20 participating SWP contractors to provide 50 percent of the funding for the preliminary planning phase of an improved Delta water conveyance facility. (The remaining 50 percent is provided by the Bureau of Reclamation.) This program will assess potential habitat restoration and water conveyance options in the Delta. For bill years 2008 through 2011, nearly $70 million in charges associated with the DHCCP were billed directly to the 20 participating SWP contractors as a separate line item in the Statements of Charges and are not reflected in the tables in this appendix.

A fourth set of agreements pertains to both DHCCP and BDCP. For bill years 2012 and 2013, an Agreement for Supplemental Funding for the Costs of Environmental Analysis, Planning and Design of Delta Conservation Measures, Including Delta Conveyance Options, was executed in 2012 between DWR and 16 participating SWP contractors to provide 50 percent of the project funding. In 2012, $22 million was billed and in 2013, $28 million was billed directly to the 16 participating contractors as a separate line item in the Statements of Charges.

During 2013, SWP water supply contractors agreed to participate in the 2013 San Joaquin River Flow Augmentation Program. The costs of the $4 million program were recovered in the 2014 Statements of Charges.

During 2015 and 2016, the SWP water supply contractors requested DWR to enter into agreements for San Joaquin River flow release purchases with Oakdale Irrigation District and South San Joaquin Irrigation District. The 2015 purchases of $5.75 million and the 2016 purchases of $13.75 million ($2 million invoiced in 2017) were included in the 2017 and 2018 Statements of Charges.

TABLE B-1 Factors for Distributing Reach Capital Costs Among Contractors[a]

Sheet 1 of 2

Reach No.	Reach Description	NORTH BAY AREA		SOUTH BAY AREA				Total
		Napa	Solano	Alameda-Zone 7	Alameda County	Santa Clara	Future Contractor South Bay	
	NORTH BAY AQUEDUCT							
1	Barker Slough through Fairfield/Vacaville Turnout	0.29667896	0.70332104					1.00000000
2	Fairfield/Vacaville Turnout to Cordelia Forebay	0.38414552	0.61585448					1.00000000
3A	Cordelia Forebay through Benicia and Vallejo Turnouts		1.00000000					1.00000000
3B	Cordelia Forebay through Napa Turnout Reservoir	1.00000000						1.00000000
	SOUTH BAY AQUEDUCT							
1	Bethany Reservoir through Altamont Turnout			0.22599612	0.20663021	0.49237700	0.07499667	1.00000000
2	Altamont Turnout through Patterson Reservoir			0.22599658	0.20663059	0.49237783	0.07499500	1.00000000
4	Patterson Reservoir to Del Valle Junction			0.19504795	0.21450017	0.51113249	0.07931939	1.00000000
5	Del Valle Junction through Lake del Valle			0.14436367	0.12972254	0.33715573	0.38875806	1.00000000
6	Del Valle Junction through South Livermore Turnout			0.14599918	0.21144710	0.50574745	0.13680627	1.00000000
7	South Livermore Turnout through Vallecitos Turnout				0.25176680	0.60218448	0.14604872	1.00000000
8	Vallecitos Turnout through Alameda-Bayside Turnout				0.27934645	0.72065355		1.00000000
9	Alameda-Bayside Turnout through Santa Clara Terminal Facilities					1.00000000		1.00000000
	CALIFORNIA AQUEDUCT							
1	Delta through Bethany Reservoir			0.00954737	0.00872917	0.02080118	0.00342507	N/A

Reach No.	Reach Description	CENTRAL COASTAL AREA		SOUTHERN CALIFORNIA AREA				
		San Luis Obispo	Santa Barbara	AVEK	Castaic Lake	Coachella	Crestline	Desert
	CALIFORNIA AQUEDUCT							
1	Delta through Bethany Reservoir	0.00533010	0.00983337	0.02939084	0.01285827	0.00528315	0.00133612	0.00871300
2A	Bethany Reservoir to Orestimba Creek	0.00557213	0.01027988	0.03072531	0.01343201	0.00552068	0.00139620	0.00910474
2B	Orestimba Creek to O'Neill Forebay	0.00557824	0.01029119	0.03075915	0.01345351	0.00552831	0.00139814	0.00911733
3	O'Neill Forebay to Dos Amigos Pumping Plant	0.00557719	0.01028923	0.03075332	0.01345294	0.00552772	0.00139798	0.00911637
4	Dos Amigos Pumping Plant to Panoche Creek	0.00557607	0.01028717	0.03074719	0.01345233	0.00552710	0.00139784	0.00911536
5	Panoche Creek to Five Points	0.00557467	0.01028462	0.03073954	0.01345157	0.00552633	0.00139763	0.00911409
6	Five Points to Arroyo Pasajero	0.00557257	0.01028074	0.03072799	0.01345042	0.00552517	0.00139733	0.00911216
7	Arroyo Pasajero to Kettleman City	0.00557189	0.01027949	0.03072428	0.01345006	0.00552480	0.00139723	0.00911154
8C	Kettleman City through Milham Avenue	0.00557103	0.01027792	0.03071961	0.01344960	0.00552432	0.00139712	0.00911076
8D	Milham Avenue through Avenal Gap	0.00568611	0.01049020	0.03135418	0.01373353	0.00563986	0.00142632	0.00930130
9	Avenal Gap through Twisselman Road			0.03426625	0.01356094	0.00616886	0.00156011	0.01017373
10A	Twisselman Road through Lost Hills			0.03481391	0.01377767	0.00626946	0.00158556	0.01033963
11B	Lost Hills to 7th Standard Road			0.03835043	0.01517717	0.00691699	0.00174933	0.01140749
12D	7th Standard Road through Elk Hills Road			0.04031661	0.01595523	0.00727790	0.00184059	0.01200265
12E	Elk Hills Road through Tupman Road			0.04037074	0.01597665	0.00728878	0.00184332	0.01202059
13B	Tupman Road to Buena Vista Pumping Plant			0.04379882	0.01733322	0.00791595	0.00200194	0.01305492
14A	Buena Vista Pumping Plant through Santiago Creek			0.04599268	0.01820137	0.00831952	0.00210399	0.01372049
14B	Santiago Creek through Old River Road			0.04682530	0.01853084	0.00847388	0.00214303	0.01397505
14C	Old River Road to Wheeler Ridge Pumping Plant			0.04825217	0.01909545	0.00873768	0.00220973	0.01441013
15A	Wheeler Ridge Pumping Plant to Chrisman Pumping Plant			0.04905609	0.01941356	0.00888679	0.00224744	0.01465600
16A	Chrisman Pumping Plant to Edmonston Pumping Plant			0.05089794	0.02014241	0.00922722	0.00233351	0.01521742
17E	Edmonston Pumping Plant to Porter Tunnel			0.05329388	0.02109050	0.00967107	0.00244575	0.01594937
17F	Porter Tunnel to Junction, West Branch, California Aqueduct			0.05340725	0.02113537	0.00969176	0.00245098	0.01598349
18A	Junction, West Branch, California Aqueduct through Alamo Powerplant			0.13238112		0.02399391	0.00606795	0.03957043
19	Alamo Powerplant to Fairmont			0.13237766		0.02399451	0.00606811	0.03957141
19C	Buttes Junction through Buttes Reservoir			1.00000000				
20A	Fairmont through 70th Street West			0.06847931		0.02576425	0.00651573	0.04249001
20B	70th Street West to Palmdale			0.02276024		0.02702917	0.00683555	0.04457607
21	Palmdale to Littlerock Creek			0.02318952		0.02754716	0.00696651	0.04543034
22A	Littlerock Creek to Pearblossom Pumping Plant			0.01181870		0.02794143	0.00706621	0.04608043
22B	Pearblossom Pumping Plant to West Fork Mojave River					0.02827552	0.00715074	0.04663153
23	West Fork Mojave River to Silverwood Lake					0.00324449	0.00818122	0.00535117
24	Cedar Springs Dam and Silverwood Lake					0.01024605	0.01251569	0.01690478
25	Silverwood Lake to South Portal San Bernardino Tunnel							
26A	South Portal, San Bernardino Tunnel through Devil Canyon Powerplant							
28G	Devil Canyon Powerplant to Barton Road							
28H	Barton Road to Lake Perris							
28J	Perris Dam and Lake Perris							
29A	Junction, West Branch, California Aqueduct through Oso Pumping Plant				0.03544337			
29F	Oso Pumping Plant through Quail Embankment				0.03544339			
29G	Quail Embankment through Warne Powerplant				0.03544339			
29H	Pyramid Dam and Lake				0.02817144			
29J	Pyramid Lake through Castaic Powerplant				0.03544338			
30	Castaic Dam and Lake				0.02927284			
31A	Avenal Gap to Devil's Den Pumping Plant	0.10560301	0.19482503		0.07364766			
33A	Devil's Den Pumping Plant through Tank 1	0.10101221	0.89898779					
33B	Tank 1 through Chorro Valley Turnout	0.09912818	0.90087182					
34	Chorro Valley Turnout through Lopez Turnout	0.05479573	0.94520427					
35	Lopez Turnout through Guadalupe Turnout		1.00000000					

[a] Proportionate use factors do not reflect permanent water transfers as a result of the Monterey Amendment and after.

TABLE B-1 Factors for Distributing Reach Capital Costs Among Contractors[a]

Reach No.	SAN JOAQUIN VALLEY AREA							
				Kern				
	Dudley Ridge	Empire	Future Contractor San Joaquin Valley	Municipal and Industrial	Agricultural	Kings	Oak Flat	Tulare
	CALIFORNIA AQUEDUCT							
1	0.01707770	0.00088678	0.00254693	0.02741768	0.30629913	0.00090695	0.00167121	0.03504975
2A	0.01781031	0.00092482	0.00266258	0.02864263	0.31945188	0.00094747	0.00174288	0.03655331
2B	0.01785838	0.00092731	0.00266550	0.02868743	0.32030556	0.00094896		0.03665201
3	0.01786337	0.00092757	0.00266499	0.02868589	0.32039254	0.00094892		0.03666225
4	0.01786863	0.00092785	0.00266446	0.02868428	0.32048398	0.00094886		0.03667303
5	0.01787517	0.00092819	0.00266380	0.02868227	0.32059816	0.00094879		0.03668649
6	0.01788508	0.00092870	0.00266279	0.02867923	0.32077093	0.00094868		0.03670685
7	0.01788826	0.00092887	0.00266246	0.02867825	0.32082633	0.00094864		0.03671338
8C	0.01789228	0.00092909	0.00266205	0.02867702	0.32089625	0.00094859		0.03672162
8D	0.01828779		0.00271703	0.02928147	0.32798200			0.01820857
9				0.03204523	0.32739538			
10A				0.03257442	0.31658608			
11B				0.03597398	0.24684668			
12D				0.03787171	0.20804762			
12E				0.03793198	0.20695175			
13B				0.01458796	0.16600071			
14A				0.00620338	0.13319181			
14B				0.00632023	0.11741558			
14C				0.00651962	0.09039633			
15A				0.00663252	0.07516317			
16A				0.00688973	0.04028829			
17E				0.00212516				
31A			0.05046240		0.57546190			

Reach No.	SOUTHERN CALIFORNIA AREA (continued)								California Aqueduct Total
	Littlerock	Mojave	Palmdale	San Bernardino	San Gabriel	San Gorgonio	Metropolitan	Ventura	
	CALIFORNIA AQUEDUCT								
1	0.00049180	0.01101147	0.00369131	0.02362857	0.00650354	0.00398392	0.43929350	0.00429212	1.00000000
2A	0.00051413	0.01151136	0.00385891	0.02469101	0.00679699	0.00416304	0.45921072	0.00448701	1.00000000
2B	0.00051469	0.01152409	0.00386317	0.02472511	0.00680570	0.00416880	0.45973548	0.00449194	1.00000000
3	0.00051461	0.01152193	0.00386244	0.02472246	0.00680478	0.00416835	0.45965407	0.00449108	1.00000000
4	0.00051451	0.01151965	0.00386167	0.02471968	0.00680380	0.00416787	0.45956848	0.00449019	1.00000000
5	0.00051440	0.01151681	0.00386070	0.02471620	0.00680259	0.00416730	0.45946161	0.00448907	1.00000000
6	0.00051419	0.01151251	0.00385926	0.02471095	0.00680076	0.00416640	0.45929991	0.00448738	1.00000000
7	0.00051413	0.01151113	0.00385879	0.02470927	0.00680016	0.00416612	0.45924807	0.00448685	1.00000000
8C	0.00051405	0.01150938	0.00385821	0.02470716	0.00679941	0.00416576	0.45918261	0.00448616	1.00000000
8D	0.00052466	0.01174718	0.00393793	0.02522383	0.00694100	0.00425288	0.46868533	0.00457883	1.00000000
9	0.00057339	0.01283841	0.00430367	0.02758959	0.00758975	0.00465175	0.51227887	0.00500407	1.00000000
10A	0.00058254	0.01304366	0.00437246	0.02803943	0.00771262	0.00472760	0.52049091	0.00508405	1.00000000
11B	0.00064171	0.01436906	0.00481665	0.03093503	0.00850448	0.00521581	0.57349473	0.00560046	1.00000000
12D	0.00067463	0.01510596	0.00506361	0.03254889	0.00894541	0.00548790	0.60297374	0.00588755	1.00000000
12E	0.00067553	0.01512626	0.00507040	0.03259749	0.00895830	0.00549608	0.60379667	0.00589546	1.00000000
13B	0.00073290	0.01641098	0.00550099	0.03540212	0.00972547	0.00596896	0.65516902	0.00639604	1.00000000
14A	0.00076961	0.01723325	0.00577656	0.03720681	0.01021819	0.00627322	0.68807273	0.00671639	1.00000000
14B	0.00078354	0.01754538	0.00588113	0.03789703	0.01040613	0.00638960	0.70057530	0.00683798	1.00000000
14C	0.00080743	0.01808019	0.00606036	0.03907670	0.01072763	0.00658850	0.72199174	0.00704634	1.00000000
15A	0.00082089	0.01838154	0.00616135	0.03974336	0.01090913	0.00670088	0.73406357	0.00716371	1.00000000
16A	0.00085171	0.01907194	0.00639271	0.04126559	0.01132404	0.00695754	0.76170731	0.00743264	1.00000000
17E	0.00089182	0.01997003	0.00669365	0.04325018	0.01186455	0.00729213	0.79767940	0.00778251	1.00000000
17F	0.00089372	0.02001251	0.00670788	0.04334270	0.01188988	0.00730773	0.79937767	0.00779906	1.00000000
18A	0.00221525	0.04960424	0.01662680	0.10730448	0.02944860	0.01809192	0.57469530		1.00000000
19	0.00221522	0.04960300	0.01662640	0.10730707	0.02944876	0.01809230	0.57469556		1.00000000
19C									1.00000000
20A	0.00237800	0.05324853	0.01784830	0.11522152	0.03161798	0.01942666	0.61700971		1.00000000
20B	0.00249470	0.05586076	0.01872390	0.12087843	0.03316986	0.02038045	0.64729087		1.00000000
21	0.00254199	0.05692053		0.12319480	0.03380324	0.02077093	0.65963498		1.00000000
22A		0.05773082		0.12495766	0.03428605	0.02106816	0.66905054		1.00000000
22B		0.05842136		0.12645207	0.03469614	0.02132008	0.67705256		1.00000000
23				0.14467451	0.03969010	0.02439237	0.77446614		1.00000000
24				0.22243002	0.04339444	0.02843498	0.66607404		1.00000000
25				0.14947726	0.03997502	0.02520426	0.78534346		1.00000000
26A				0.14947726	0.03997502	0.02520426	0.78534346		1.00000000
28G				0.05126137			0.94873863		1.00000000
28H							1.00000000		1.00000000
28J							1.00000000		1.00000000
29A							0.95147783	0.01307880	1.00000000
29F							0.95147785	0.01307876	1.00000000
29G							0.95147785	0.01307876	1.00000000
29H							0.96278381	0.00904475	1.00000000
29J							0.95147787	0.01307875	1.00000000
30							0.96212388	0.00860328	1.00000000
31A									1.00000000
33A									1.00000000
33B									1.00000000
34									1.00000000
35									1.00000000

[a] Proportionate use factors do not reflect permanent water transfers as a result of the Monterey Amendment and after.

TABLE B-2 Factors for Distributing Reach Minimum OMP&R Costs Among Contractors[a]

Sheet 1 of 2

Reach No.	Reach Description	NORTH BAY AREA		SOUTH BAY AREA				Total
		Napa	Solano	Alameda-Zone 7	Alameda County	Santa Clara	Future Contractor South Bay	
	NORTH BAY AQUEDUCT							
1	Barker Slough through Fairfield/Vacaville Turnout	0.29251728	0.70748272					1.00000000
2	Fairfield/Vacaville Turnout to Cordelia Forebay	0.42000793	0.57999207					1.00000000
3A	Cordelia Forebay through Benicia and Vallejo Turnouts		1.00000000					1.00000000
3B	Cordelia Forebay through Napa Turnout Reservoir	1.00000000						1.00000000
	SOUTH BAY AQUEDUCT							
1	Bethany Reservoir through Altamont Turnout			0.33980110	0.19515838	0.46504052	0.00000000	1.00000000
2	Altamont Turnout through Patterson Reservoir			0.33978741	0.19516252	0.46505007	0.00000000	1.00000000
4	Patterson Reservoir to Del Valle Junction			0.31610985	0.20216089	0.48172926	0.00000000	1.00000000
5	Del Valle Junction through Lake del Valle			0.53312173	0.12972254	0.33715573	0.00000000	1.00000000
6	Del Valle Junction through South Livermore Turnout			0.32478705	0.19906896	0.47614399	0.00000000	1.00000000
7	South Livermore Turnout through Vallecitos Turnout			0.14604872	0.25176680	0.60218448	0.00000000	1.00000000
8	Vallecitos Turnout through Alameda-Bayside Turnout				0.27934645	0.72065355		1.00000000
9	Alameda-Bayside Turnout through Santa Clara Terminal Facilities					1.00000000		1.00000000
	CALIFORNIA AQUEDUCT							
1	Delta through Bethany Reservoir				0.00870518	0.02074403		N/A

Reach No.	Reach Description	CENTRAL COASTAL AREA		SOUTHERN CALIFORNIA AREA				
		San Luis Obispo	Santa Barbara	AVEK	Castaic Lake	Coachella	Crestline	Desert
	CALIFORNIA AQUEDUCT							
1	Delta through Bethany Reservoir	0.00531721	0.00980965	0.03130358	0.02543338	0.03261213	0.00133220	0.01285646
2A	Bethany Reservoir to Orestimba Creek	0.00556969	0.01027545	0.03278434	0.02659653	0.03414259	0.00139484	0.01346045
2B	Orestimba Creek to O'Neill Forebay	0.00557578	0.01028673	0.03282389	0.02665383	0.03419149	0.00139677	0.01347932
3	O'Neill Forebay to Dos Amigos Pumping Plant	0.00557472	0.01028476	0.03281870	0.02665705	0.03418834	0.00139663	0.01347795
4	Dos Amigos Pumping Plant to Panoche Creek	0.00557360	0.01028270	0.03281323	0.02666041	0.03418504	0.00139648	0.01347652
5	Panoche Creek to Five Points	0.00557222	0.01028014	0.03280640	0.02666463	0.03418091	0.00139630	0.01347474
6	Five Points to Arroyo Pasajero	0.00557012	0.01027626	0.03279609	0.02667100	0.03417466	0.00139599	0.01347205
7	Arroyo Pasajero to Kettleman City	0.00556944	0.01027501	0.03279278	0.02667304	0.03417265	0.00139589	0.01347118
8C	Kettleman City through Milham Avenue	0.00551362	0.01017203	0.03245613	0.02634257	0.03380450	0.00138102	0.01332696
8D	Milham Avenue through Avenal Gap	0.00562578	0.01037893	0.03311929	0.02690184	0.03450165	0.00140943	0.01360147
9	Avenal Gap through Twisselman Road			0.03490917	0.02761987	0.03509927	0.00151717	0.01432230
10A	Twisselman Road through Lost Hills			0.03544917	0.02807208	0.03564408	0.00154110	0.01454684
11B	Lost Hills to 7th Standard Road			0.03880671	0.03085710	0.03902944	0.00168938	0.01593968
12D	7th Standard Road through Elk Hills Road			0.04066779	0.03241328	0.04090687	0.00177180	0.01671325
12E	Elk Hills Road through Tupman Road			0.04071899	0.03246787	0.04095940	0.00177429	0.01673594
13B	Tupman Road to Buena Vista Pumping Plant			0.04402054	0.03519674	0.04428760	0.00191991	0.01810442
14A	Buena Vista Pumping Plant through Santiago Creek			0.04611560	0.03675967	0.04640153	0.00201279	0.01897599
14B	Santiago Creek through Old River Road			0.04676624	0.03303687	0.04706094	0.00204236	0.01925135
14C	Old River Road to Wheeler Ridge Pumping Plant			0.04794869	0.03181987	0.04825630	0.00209534	0.01974685
15A	Wheeler Ridge Pumping Plant to Chrisman Pumping Plant			0.04864100	0.03227919	0.04895597	0.00212631	0.02003668
16A	Chrisman Pumping Plant to Edmonston Pumping Plant			0.05024161	0.03334119	0.05057226	0.00219758	0.02070455
17E	Edmonston Pumping Plant to Porter Tunnel			0.05223186	0.03466168	0.05258256	0.00228636	0.02153594
17F	Porter Tunnel to Junction, West Branch, California Aqueduct			0.05233552	0.03473046	0.05268698	0.00229092	0.02157880
18A	Junction, West Branch, California Aqueduct through Alamo Powerplant			0.13774725		0.11306511	0.00603056	0.05137695
19	Alamo Powerplant to Fairmont			0.13774370		0.11306344	0.00603069	0.05137766
19C	Buttes Junction through Buttes Reservoir			1.00000000				
20A	Fairmont through 70th Street West			0.06855702		0.12212506	0.00651522	0.05550243
20B	70th Street West to Palmdale			0.02284441		0.12811683	0.00683511	0.05822670
21	Palmdale to Littlerock Creek			0.02327543		0.13055246	0.00696606	0.05933989
22A	Littlerock Creek to Pearblossom Pumping Plant			0.01190663		0.13241285	0.00706574	0.06018798
22B	Pearblossom Pumping Plant to West Fork Mojave River			0.00195128		0.13374659	0.00713697	0.06079440
23	West Fork Mojave River to Silverwood Lake					0.12416451	0.00818135	0.02168414
24	Cedar Springs Dam and Silverwood Lake					0.02651510	0.01251569	0.01910229
25	Silverwood Lake to South Portal San Bernardino Tunnel					0.09751351		0.01317145
26A	South Portal, San Bernardino Tunnel through Devil Canyon Powerplant					0.12013473		0.01622697
28G	Devil Canyon Powerplant to Barton Road					0.30672992		0.04143095
28H	Barton Road to Lake Perris					0.32330286		0.04366951
28J	Perris Dam and Lake Perris					0.32330202		0.04366970
29A	Junction, West Branch, California Aqueduct through Oso Pumping Plant			0.00296720	0.05726734			
29F	Oso Pumping Plant through Quail Embankment			0.00296796	0.05726649			
29G	Quail Embankment through Warne Powerplant				0.05742327			
29H	Pyramid Dam and Lake				0.03349572			
29J	Pyramid Lake through Castaic Powerplant				0.05740996			
30	Castaic Dam and Lake				0.03248607			
31A	Avenal Gap to Devil's Den Pumping Plant	0.10542164	0.19449108		0.07351496	0.05400251		0.01800084
33A	Devil's Den Pumping Plant through Tank 1	0.10101221	0.89898779					
33B	Tank 1 through Chorro Valley Turnout	0.10101221	0.89898779					
34	Chorro Valley Turnout through Lopez Turnout	0.05271277	0.94728723					
35	Lopez Turnout through Guadalupe Turnout		1.00000000					

[a] Proportionate use factors apply to 2018 and reflect permanent capacity water transfers that have been signed as of February 1, 2017.

TABLE B-2 Factors for Distributing Reach Minimum OMP&R Costs Among Contractors[a]

Reach No.	SAN JOAQUIN VALLEY AREA										
	Napa	Solano	Alameda-Zone 7	Dudley Ridge	Empire	Future Contractor San Joaquin Valley	Kern		Kings	Oak Flat	Tulare
							Municipal and Industrial	Agricultural			
	CALIFORNIA AQUEDUCT										
1	0.00101482	0.00145895	0.02319903	0.01467673	0.00088461	0.00254076	0.02734568	0.27096833	0.00247145	0.00166714	0.02580275
2A	0.00106145	0.00152591	0.00868253	0.01533481	0.00092428	0.00266141	0.02862314	0.28310687	0.00258398	0.00174185	0.02695973
2B	0.00106360	0.00152905	0.00869823	0.01537617	0.00092676	0.00266432	0.02866783	0.28387747	0.00258988		0.02703241
3	0.00106370	0.00152920	0.00869838	0.01538045	0.00092702	0.00266381	0.02866629	0.28395878	0.00259028		0.02703994
4	0.00106379	0.00152934	0.00869854	0.01538495	0.00092729	0.00266328	0.02866467	0.28404425	0.00259071		0.02704786
5	0.00106390	0.00152952	0.00869876	0.01539058	0.00092763	0.00266262	0.02866263	0.28415100	0.00259125		0.02705775
6	0.00106409	0.00152980	0.00869909	0.01539909	0.00092815	0.00266161	0.02865956	0.28431251	0.00259206		0.02707272
7	0.00106415	0.00152990	0.00869920	0.01540183	0.00092832	0.00266127	0.02865857	0.28436430	0.00259232		0.02707752
8C	0.00105126	0.00151129	0.00859813	0.01519240	0.00091570	0.00263462	0.02834154	0.28048179	0.00255949		0.02670939
8D	0.00107347	0.00154326	0.00877817	0.01552187		0.00268820	0.02892910	0.28657021	0.00165698		0.00825002
9	0.00079148	0.00109219	0.00779740				0.03115978	0.29020213			
10A	0.00080441	0.00110983	0.00792269				0.03165722	0.27906723			
11B	0.00064433	0.00094350	0.00351417				0.03473359	0.21569759			
12D							0.03644652	0.18305822			
12E							0.03650093	0.18194750			
13B							0.01398402	0.14058058			
14A							0.00593078	0.10814827			
14B							0.00602009	0.09952426			
14C							0.00617876	0.07848396			
15A							0.00627144	0.06500426			
16A							0.00648410	0.03392037			
17E							0.00198506				
31A	0.00628695	0.00977801	0.02617705			0.05037550		0.36716813	0.00176551		

Reach No.	SOUTHERN CALIFORNIA AREA (continued)								California Aqueduct Total
	Littlerock	Mojave	Palmdale	San Bernardino	San Gabriel	San Gorgonio	Metroplitan	Ventura	
	CALIFORNIA AQUEDUCT								
1	0.00049038	0.02116470	0.00458381	0.02355980	0.00648455	0.00397230	0.41532271	0.00427768	1.00000000
2A	0.00051367	0.02214484	0.00480091	0.02466751	0.00679050	0.00415906	0.43501287	0.00448079	1.00000000
2B	0.00051423	0.02218483	0.00480654	0.02470151	0.00679919	0.00416478	0.43550968	0.00448571	1.00000000
3	0.00051414	0.02218522	0.00480573	0.02469885	0.00679827	0.00416433	0.43543260	0.00448486	1.00000000
4	0.00051405	0.02218564	0.00480489	0.02469606	0.00679730	0.00416387	0.43535156	0.00448397	1.00000000
5	0.00051393	0.02218616	0.00480382	0.02469256	0.00679607	0.00416328	0.43525035	0.00448285	1.00000000
6	0.00051372	0.02218693	0.00480221	0.02468729	0.00679422	0.00416240	0.43509723	0.00448115	1.00000000
7	0.00051366	0.02218719	0.00480171	0.02468559	0.00679362	0.00416212	0.43504813	0.00448061	1.00000000
8C	0.00050851	0.02192962	0.00475278	0.02442260	0.00672277	0.00411777	0.44211780	0.00443571	1.00000000
8D	0.00051885	0.02238875	0.00484976	0.02492516	0.00686055	0.00420251	0.45117880	0.00452595	1.00000000
9	0.00055796	0.02061192	0.00521674	0.02683029	0.00738240	0.00452372	0.48549902	0.00486719	1.00000000
10A	0.00056659	0.02092935	0.00529783	0.02725335	0.00749802	0.00459505	0.49310270	0.00494246	1.00000000
11B	0.00062024	0.02290463	0.00580164	0.02987521	0.00821533	0.00503710	0.54027985	0.00541051	1.00000000
12D	0.00064998	0.02399884	0.00599767	0.03133251	0.00861365	0.00528280	0.56647688	0.00566994	1.00000000
12E	0.00065079	0.02402828	0.00600523	0.03137638	0.00862529	0.00529020	0.56724183	0.00567708	1.00000000
13B	0.00070354	0.02597118	0.00649222	0.03395142	0.00933012	0.00572435	0.61359604	0.00613732	1.00000000
14A	0.00073704	0.02720257	0.00680126	0.03559402	0.00977890	0.00600130	0.64311092	0.00642936	1.00000000
14B	0.00074743	0.02758281	0.00689726	0.03611670	0.00992049	0.00608943	0.65242374	0.00652003	1.00000000
14C	0.00076634	0.02827615	0.00707171	0.03705347	0.01017549	0.00624735	0.66919487	0.00668485	1.00000000
15A	0.00077741	0.02868221	0.00717384	0.03760115	0.01032464	0.00633968	0.67900489	0.00678133	1.00000000
16A	0.00080298	0.02962205	0.00740997	0.03886148	0.01066844	0.00655218	0.70161679	0.00700445	1.00000000
17E	0.00083480	0.03079028	0.00770356	0.04043105	0.01109636	0.00681681	0.72976182	0.00728186	1.00000000
17F	0.00083646	0.03085132	0.00771884	0.04051162	0.01111844	0.00683040	0.73121394	0.00729630	1.00000000
18A	0.00220155	0.04929713	0.01652427	0.10664131	0.02926634	0.01798005	0.46986948		1.00000000
19	0.00220151	0.04929585	0.01652388	0.10664396	0.02926656	0.01798044	0.46987231		1.00000000
19C									1.00000000
20A	0.00237787	0.05324421	0.01784728	0.11521174	0.03161525	0.01942494	0.50757898		1.00000000
20B	0.00249455	0.05585607	0.01872278	0.12086783	0.03316690	0.02037859	0.53249023		1.00000000
21	0.00254183	0.05691567		0.12318381	0.03380017	0.02076901	0.54265567		1.00000000
22A		0.05772584		0.12494639	0.03428290	0.02106619	0.55040548		1.00000000
22B		0.05830722		0.12620561	0.03462835	0.02127845	0.55595113		1.00000000
23				0.14467451	0.03969010	0.02439237	0.63721302		1.00000000
24				0.22243002	0.04339445	0.02843498	0.64760747		1.00000000
25				0.11825184	0.03722720	0.01993915	0.71389685		1.00000000
26A				0.14947726	0.03997501	0.02520426	0.64898177		1.00000000
28G				0.05126136			0.60057777		1.00000000
28H							0.63302763		1.00000000
28J							0.63302828		1.00000000
29A							0.92702291	0.01274255	1.00000000
29F							0.92702302	0.01274253	1.00000000
29G							0.92979606	0.01278067	1.00000000
29H							0.95753173	0.00897255	1.00000000
29J							0.92980918	0.01278086	1.00000000
30							0.95895422	0.00855971	1.00000000
31A		0.09301782							1.00000000
33A									1.00000000
33B									1.00000000
34									1.00000000
35									1.00000000

[a] Proportionate use factors apply to 2018 and reflect permanent capacity water transfers that have been signed as of February 1, 2017.

TABLE B-3 Power Costs and Credits, Transmission Costs and Annual Replacement Deposits for Each Aqueduct Pumping and Power Recovery Plant[a] (in dollars)

	NORTH BAY AQUEDUCT			SOUTH BAY AQUEDUCT	CALIFORNIA AQUEDUCT			
	Reach 1	Reach 3A	Reach 3B	Reach 1[c]	Reach 1	Reach 4	Reach 14A	Reach 15A
Calendar Year	Barker Slough Pumping Plant	Cordelia Pumping Plant Solano	Cordelia Pumping Plant Napa[b]	South Bay and Del Valle Pumping Plants	Banks Pumping Plant	Dos Amigos Pumping Plant	Buena Vista Pumping Plant	Teerink Pumping Plant
	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]
1961	0	0	0	0	0	0	0	0
1962	0	0	0	36,771	0	0	0	0
1963	0	0	0	55,654	0	0	0	0
1964	0	0	0	73,240	0	0	0	0
1965	0	0	0	137,665	0	0	0	0
1966	0	0	0	186,064	0	0	0	0
1967	0	0	0	216,515	15,453	0	0	0
1968	0	0	6,989	336,671	452,630	202,947	0	0
1969	0	0	8,551	257,579	293,741	135,425	0	0
1970	0	0	13,598	396,358	346,215	211,197	1	0
1971	0	0	10,609	381,662	574,015	225,188	115,801	2,564
1972	0	0	14,434	598,702	933,292	492,633	198,914	68,304
1973	0	0	14,449	493,490	688,030	381,232	263,468	236,623
1974	0	0	17,473	565,575	783,562	447,772	315,939	324,966
1975	0	0	14,779	349,758	1,341,019	518,322	508,060	552,952
1976	0	0	20,856	571,361	1,638,453	641,115	712,947	713,875
1977	0	0	22,635	512,996	1,013,307	277,439	265,169	300,985
1978	0	0	21,692	586,355	2,339,502	560,759	689,236	616,104
1979	0	0	16,237	605,136	3,554,256	1,008,564	776,016	749,188
1980	0	0	19,945	523,369	2,083,336	1,129,152	1,051,629	1,047,495
1981	0	0	23,842	567,692	3,952,931	1,939,189	1,336,867	1,319,739
1982	0	0	12,157	605,780	3,082,031	1,363,705	1,200,226	1,213,660
1983	0	0	2,342	82,222	1,001,612	396,086	450,801	432,165
1984	0	0	4,822	271,543	1,856,959	976,773	823,681	770,618
1985	0	0	10,188	451,020	3,186,029	1,621,418	1,409,980	1,411,621
1986	0	0	15,501	807,984	6,601,752	2,627,407	2,405,224	2,432,322
1987	0	0	27,223	886,956	5,820,699	2,555,341	2,295,575	2,286,066
1988	17,813	0	24,020	909,300	6,365,669	2,648,986	2,628,985	2,636,224
1989	29,819	43,846	26,519	1,161,160	9,964,956	4,002,409	4,130,033	4,159,440
1990	52,210	67,109	40,775	1,834,626	10,554,762	4,541,508	5,855,196	6,099,412
1991	10,429	10,118	5,252	378,966	1,994,449	510,781	944,445	1,077,662
1992	13,319	13,070	9,406	311,251	3,385,375	1,235,571	1,366,433	1,441,966
1993	(11,941)	(8,753)	(5,392)	(158,214)	537,591	348,409	(127,617)	(104,923)
1994	46,791	39,624	29,189	799,624	6,013,464	2,450,174	2,778,971	2,823,137
1995	20,014	20,620	11,791	247,645	4,066,595	1,532,502	952,304	877,047
1996	57,320	47,288	23,483	619,160	8,385,766	4,056,188	2,565,655	2,378,677
1997	67,416	52,935	21,955	986,312	7,010,228	2,870,194	2,637,433	2,469,147
1998	(11,427)	(10,141)	(4,879)	(133,721)	204,374	(365,361)	(319,014)	(295,861)
1999	36,054	26,104	11,921	521,799	6,462,089	2,482,790	1,749,495	1,508,344
2000	60,770	42,270	15,522	738,749	8,139,852	3,158,037	3,023,609	3,191,600
2001	370,971	247,499	211,786	4,203,321	27,319,774	10,577,923	14,853,220	15,739,675
2002	192,540	104,564	61,470	2,036,126	17,666,689	7,284,182	8,870,415	9,554,380
2003	198,411	118,387	97,762	2,591,352	24,686,904	9,172,710	10,694,766	11,529,669
2004	262,243	139,241	107,251	2,420,894	22,910,295	9,450,923	12,600,249	13,757,895
2005	291,101	147,895	149,083	2,791,021	33,776,092	12,750,371	11,843,712	12,615,882
2006	241,049	116,778	147,811	2,557,031	24,216,617	10,493,253	11,500,379	12,300,658
2007	461,136	228,029	257,116	4,809,380	23,665,366	11,668,533	17,485,162	18,965,848
2008	430,953	196,005	307,994	3,431,329	14,724,072	6,683,618	11,681,300	13,416,895
2009	221,684	103,270	164,922	2,501,591	13,814,314	4,320,317	7,109,228	7,916,544
2010	265,335	112,286	219,619	2,505,891	27,498,618	9,983,235	11,243,941	11,839,551
2011	276,020	116,080	232,703	3,365,711	40,411,543	15,518,876	14,819,012	15,531,425
2012	277,032	123,848	193,634	3,787,506	24,413,685	12,628,353	14,645,654	14,990,240
2013	443,661	206,710	330,213	5,250,011	23,312,901	9,674,367	13,289,762	13,706,201
2014	388,235	184,440	475,611	4,470,912	18,411,297	4,765,415	8,564,994	8,918,120
2015	383,935	234,927	354,948	5,215,370	16,343,549	6,043,384	10,379,087	11,726,021
2016	279,372	157,250	261,910	4,628,895	37,787,715	12,352,013	16,501,391	17,886,966
2017	608,992	873,393	32,951	4,760,354	44,384,226	16,612,497	17,254,382	17,776,275
2018	**890,294**	**772,483**	**849,673**	**5,171,029**	**33,769,587**	**14,801,740**	**18,500,809**	**18,958,676**
2019	873,985	796,213	834,108	5,170,212	41,010,868	14,198,999	17,942,137	18,356,342
2020	539,040	521,553	811,713	5,176,577	42,984,807	15,484,548	19,814,559	20,315,429
2021	546,934	555,647	846,872	5,250,373	22,358,646	15,763,232	20,197,124	20,713,143
2022	544,994	553,676	843,868	5,231,751	44,287,828	15,707,324	20,125,490	20,639,679
2023	546,412	555,117	846,064	5,245,365	35,413,621	15,748,197	20,177,860	20,693,388
2024	546,438	555,144	846,105	5,245,619	32,515,054	15,748,959	20,178,836	20,694,388
2025	546,369	555,073	845,998	5,244,953	35,601,946	15,746,960	20,176,275	20,691,761
2026	546,687	555,396	846,489	5,248,001	34,076,230	15,756,112	20,188,001	20,703,788
2027	546,583	555,291	846,329	5,247,007	34,069,772	15,753,126	20,184,176	20,699,864
2028	546,407	555,111	846,056	5,245,314	33,307,451	15,748,043	20,177,663	20,693,185
2029	546,427	555,132	846,088	5,245,510	34,811,411	15,748,633	20,178,419	20,693,961
2030	546,430	555,135	846,092	5,245,534	34,060,210	15,748,705	20,178,511	20,694,055
2031	546,449	555,154	846,121	5,245,718	34,061,407	15,749,259	20,179,220	20,694,782
2032	546,490	555,197	846,186	5,246,118	32,518,152	15,750,459	20,180,759	20,696,360
2033	546,189	554,890	845,719	5,243,224	35,469,382	15,741,768	20,169,622	20,684,940
2034	546,436	555,141	846,101	5,245,592	34,181,467	15,748,880	20,178,735	20,694,285
2035	547,743	556,469	848,125	5,258,139	21,617,658	15,786,547	20,226,998	20,743,780
TOTAL	**16,481,563**	**14,172,514**	**19,302,375**	**174,307,505**	**1,166,103,147**	**497,895,313**	**615,297,308**	**638,975,170**

[a] Starting with 2005, transmission costs that vary and depend on power usage are included, therefore recovered through the variable component.

[b] Power costs for the period 1968 through 1987 are for an interim facility.

[c] The costs of Del Valle Pumping Plant are combined with those of South Bay Pumping Plant to simplify the cost allocations.

TABLE B-3 Power Costs and Credits, Transmission Costs and Annual Replacement Deposits for Each Aqueduct Pumping and Power Recovery Plant[a] (in dollars)

	CALIFORNIA AQUEDUCT (continued)							
	Reach 16A	Reach 17E	Reach 18A	Reach 22B	Reach 23	Reach 26A	Reach 2B (EBX)	Reach 3A (EBX)
Calendar Year	Chrisman Pumping Plant	Edmonston Pumping Plant	Alamo Pumping Plant	Pearblossom Pumping Plant	Mojave Siphon Powerplant	Devil Canyon Powerplant	Greenspot Pump Station	Crafton Hills Pump Station
	[9]	[10]	[11]	[12]	[13]	[14]	[15]	[16]
1961	0	0	0	0	0	0	0	0
1962	0	0	0	0	0	0	0	0
1963	0	0	0	0	0	0	0	0
1964	0	0	0	0	0	0	0	0
1965	0	0	0	0	0	0	0	0
1966	0	0	0	0	0	0	0	0
1967	0	0	0	0	0	0	0	0
1968	0	0	0	0	0	0	0	0
1969	0	0	0	0	0	0	0	0
1970	0	0	0	0	0	0	0	0
1971	0	0	0	0	0	0	0	0
1972	142,902	542,625	0	3,468	0	(3,024)	0	0
1973	387,198	1,548,428	0	202,289	0	(461,268)	0	0
1974	564,464	2,164,223	0	324,993	0	(546,156)	0	0
1975	1,095,331	4,010,395	0	575,061	0	(1,095,523)	0	0
1976	1,506,985	5,443,936	0	889,544	0	(1,566,056)	0	0
1977	652,643	2,345,033	0	315,128	0	(1,222,866)	0	0
1978	1,132,296	4,180,131	0	1,508,115	0	(3,085,094)	0	0
1979	1,526,850	5,475,688	0	1,838,687	0	(3,466,481)	0	0
1980	2,102,439	7,028,235	0	1,762,063	0	(3,318,152)	0	0
1981	2,838,773	9,351,931	0	2,296,771	0	(3,842,971)	0	0
1982	2,424,920	8,352,207	0	1,498,620	0	(2,736,072)	0	0
1983	793,915	2,375,225	0	397,766	0	(5,478,830)	0	0
1984	1,479,784	4,585,198	0	624,213	0	(7,350,989)	0	0
1985	2,812,461	9,365,591	0	1,226,515	0	(10,748,103)	0	0
1986	4,999,949	16,956,023	(1,013,756)	2,359,599	0	(11,484,996)	0	0
1987	4,586,919	15,121,886	(1,064,827)	1,907,854	0	(11,151,140)	0	0
1988	5,284,130	17,342,811	(744,374)	2,375,784	0	(14,495,967)	0	0
1989	8,772,733	29,455,330	(789,392)	4,235,981	0	(18,688,631)	0	0
1990	13,814,150	49,027,449	(841,172)	6,559,548	0	(21,045,321)	0	0
1991	2,535,180	9,033,684	(269,625)	996,352	0	(4,884,013)	0	0
1992	2,907,026	9,754,469	(975,679)	1,225,121	0	(9,782,946)	0	0
1993	(598,008)	(2,721,158)	(58,116)	(260,035)	0	(7,502,549)	0	0
1994	5,941,789	20,657,617	(60,125)	2,644,592	0	(11,998,949)	0	0
1995	1,752,212	5,829,425	(1,324,810)	1,106,460	0	(9,742,248)	0	0
1996	5,050,986	17,658,964	(2,955,178)	2,833,791	(979,429)	(12,358,465)	0	0
1997	5,545,919	19,859,875	(2,572,220)	3,156,995	(1,748,195)	(13,830,356)	0	0
1998	(664,843)	(2,312,472)	(2,016,390)	(443,482)	(1,253,110)	(10,108,555)	0	0
1999	3,755,592	14,466,419	(2,980,122)	1,910,542	(2,587,958)	(15,232,207)	0	0
2000	7,198,298	25,885,224	(5,123,988)	3,787,674	(4,402,610)	(25,758,437)	0	0
2001	35,022,118	127,851,427	(3,383,762)	18,669,512	(3,714,425)	(20,062,834)	0	0
2002	21,173,346	77,461,814	(5,057,760)	10,849,297	(5,371,837)	(25,292,454)	0	0
2003	25,596,032	94,010,922	(3,408,979)	14,573,122	(6,565,620)	(27,777,638)	0	0
2004	30,537,142	112,157,127	(6,431,864)	17,022,676	(7,858,117)	(32,044,505)	78,555	68,914
2005	27,845,084	97,798,938	(5,880,165)	17,454,941	(6,454,740)	(28,818,797)	69,542	48,909
2006	26,890,476	84,676,722	(4,091,143)	15,805,919	(6,391,206)	(34,897,387)	123,143	144,018
2007	41,386,558	138,617,059	(3,029,048)	19,242,314	(5,896,486)	(28,814,592)	248,626	256,313
2008	26,302,538	82,316,382	(3,426,928)	10,847,852	(3,300,797)	(16,968,293)	243,110	327,193
2009	16,500,988	75,435,159	(3,266,008)	9,230,210	(2,288,833)	(13,842,660)	360,373	391,267
2010	26,190,699	95,977,666	(5,115,083)	16,898,107	(5,653,201)	(24,769,829)	313,550	431,074
2011	33,961,887	118,911,608	(6,536,645)	23,389,212	(7,792,422)	(32,285,174)	372,514	500,595
2012	33,053,035	115,577,292	(2,492,869)	17,438,260	(8,905,115)	(23,525,846)	451,864	551,811
2013	29,946,165	105,406,881	(2,081,221)	12,263,715	(4,915,165)	(14,305,918)	484,575	567,013
2014	19,591,197	67,791,612	(1,786,122)	7,152,271	(1,465,644)	(5,391,598)	315,568	438,094
2015	25,993,579	92,504,509	(2,289,717)	9,035,527	(2,103,231)	(6,675,218)	336,513	449,455
2016	39,443,392	141,241,973	(7,801,980)	23,957,968	(8,723,634)	(21,862,397)	696,498	771,555
2017	39,875,405	144,607,494	(10,395,652)	21,074,588	(12,614,584)	(19,662,753)	408,105	471,130
2018	**43,244,698**	**158,013,351**	**(10,364,617)**	**30,396,847**	**(14,049,104)**	**(27,375,859)**	**286,657**	**307,280**
2019	41,849,828	152,834,203	(9,854,155)	28,725,963	(13,310,276)	(25,923,337)	280,044	300,191
2020	46,280,224	169,116,640	(8,922,637)	28,687,947	(12,712,631)	(24,906,995)	479,833	327,761
2021	47,190,420	172,457,870	(8,984,174)	29,251,424	(12,775,237)	(24,980,779)	486,860	332,561
2022	47,023,048	171,846,209	(8,984,174)	29,147,678	(12,775,237)	(24,980,778)	485,133	331,382
2023	47,145,412	172,293,387	(8,995,675)	29,223,525	(12,775,237)	(24,980,778)	486,396	332,244
2024	47,147,692	172,301,720	(11,162,938)	29,224,939	(12,775,237)	(24,980,779)	486,419	332,260
2025	47,141,707	172,279,851	(11,162,938)	29,221,229	(12,775,237)	(24,980,779)	486,357	332,218
2026	47,169,105	172,379,977	(11,162,938)	29,238,213	(12,775,237)	(24,980,779)	486,640	332,411
2027	47,160,167	172,347,311	(11,162,938)	29,232,672	(12,775,237)	(24,980,779)	486,548	332,348
2028	47,144,949	172,291,698	(11,162,938)	29,223,238	(12,775,237)	(24,980,778)	486,391	332,241
2029	47,146,717	172,298,157	(11,162,938)	29,224,334	(12,775,237)	(24,980,778)	486,409	332,253
2030	47,146,933	172,298,944	(11,162,938)	29,224,468	(12,775,237)	(24,980,779)	486,411	332,255
2031	47,148,589	172,304,999	(11,162,938)	29,225,495	(12,775,237)	(24,980,779)	486,428	332,266
2032	47,152,183	172,318,134	(11,162,938)	29,227,723	(12,775,237)	(24,980,779)	486,465	332,292
2033	47,126,164	172,223,046	(11,162,938)	29,211,595	(12,775,237)	(24,980,778)	486,197	332,108
2034	47,147,456	172,300,859	(11,162,938)	29,224,792	(12,775,237)	(24,980,778)	486,417	332,258
2035	47,260,221	172,712,956	(11,162,938)	29,294,690	(12,775,237)	(24,980,778)	487,580	333,053
TOTAL	**1,428,278,145**	**5,149,748,287**	**(289,325,408)**	**838,972,272**	**(342,686,925)**	**(1,072,902,127)**	**12,845,719**	**11,336,723**

[a] Starting with 2005, transmission costs that vary and depend on power usage are included, therefore recovered through the variable component.

TABLE B-3 Power Costs and Credits, Transmission Costs and Annual Replacement Deposits for Each Aqueduct Pumping and Power Recovery Plant[a] (in dollars)

	CALIFORNIA AQUEDUCT (continued)						
	Reach 4B (EBX)	Reach 29A	Reach 29G	Reach 29J	Reach 31A	Reach 33A	
Calendar Year	Cherry Valley Pump Station	Oso Pumping Plant	Warne Powerplant	Castaic Powerplant	Las Perillas and Badger Hill Pumping Plants	Devil's Den, Bluestone, and Polonio Pass Pumping Plants	Grand Total
	[17]	[18]	[19]	[20]	[21]	[22]	[23]
1961	0	0	0	0	0	0	0
1962	0	0	0	0	0	0	36,771
1963	0	0	0	0	0	0	55,654
1964	0	0	0	0	0	0	73,240
1965	0	0	0	0	0	0	137,665
1966	0	0	0	0	0	0	186,064
1967	0	0	0	0	0	0	231,968
1968	0	0	0	0	118,676	0	1,117,913
1969	0	0	0	0	78,350	0	773,646
1970	0	0	0	0	136,429	0	1,103,798
1971	0	0	0	0	166,296	0	1,476,135
1972	0	79,315	0	(211,144)	212,938	0	3,073,359
1973	0	122,787	0	(1,057,564)	114,897	0	2,934,059
1974	0	157,511	0	(1,547,884)	111,442	0	3,683,880
1975	0	314,636	0	(2,455,461)	88,451	0	5,817,780
1976	0	326,967	0	(2,827,557)	139,279	0	8,211,705
1977	0	75,335	0	(3,734,462)	63,079	0	886,421
1978	0	89,383	0	(1,542,479)	176,153	0	7,272,153
1979	0	102,584	0	(2,776,030)	188,881	0	9,599,576
1980	0	236,768	0	(3,415,486)	168,458	0	10,419,251
1981	0	444,280	0	(2,834,322)	169,177	0	17,563,899
1982	0	539,245	(783,626)	(3,463,971)	168,390	0	13,477,272
1983	0	214,069	(1,488,439)	(6,649,718)	17,920	0	(7,452,864)
1984	0	484,239	(4,088,209)	(4,710,802)	112,679	0	(4,159,491)
1985	0	874,069	(5,930,176)	(15,698,638)	146,843	0	(9,861,182)
1986	0	1,269,590	(5,579,301)	(11,072,448)	297,886	0	11,622,736
1987	0	1,355,533	(6,445,265)	(11,726,458)	245,082	0	6,701,444
1988	0	1,515,349	(7,457,050)	(13,026,992)	214,519	0	6,239,207
1989	0	2,156,915	(8,822,367)	(15,535,849)	282,180	0	24,585,082
1990	0	2,913,030	(11,225,401)	(20,510,539)	416,832	0	48,154,174
1991	0	576,721	(3,882,595)	(6,579,194)	3,610	0	2,462,222
1992	0	829,862	(6,369,339)	(10,976,538)	101,665	0	(5,509,968)
1993	0	70,836	(4,665,393)	(9,531,404)	(111,306)	0	(24,907,973)
1994	0	1,503,796	(7,249,239)	(13,126,331)	206,086	(1,127)	13,499,083
1995	0	247,869	(1,934,202)	(4,049,615)	243,434	0	(142,957)
1996	0	895,929	(4,248,531)	(8,457,232)	296,170	0	15,870,542
1997	0	902,690	(4,824,488)	(8,776,260)	298,483	208,816	14,336,879
1998	0	(67,399)	(1,811,154)	(4,644,120)	(55,491)	(92,902)	(24,405,948)
1999	0	757,085	(5,831,573)	(9,811,777)	170,445	241,369	(2,343,588)
2000	0	1,307,386	(10,161,472)	(17,729,381)	228,532	378,042	(6,020,323)
2001	0	6,412,531	(7,918,467)	(13,370,061)	1,061,695	2,140,040	216,231,944
2002	0	4,246,409	(11,349,183)	(19,513,997)	547,531	1,344,783	94,808,314
2003	0	4,642,103	(10,436,535)	(17,134,431)	637,936	1,538,955	134,765,827
2004	7,290	5,682,375	(12,281,228)	(21,354,179)	675,724	1,804,179	149,713,081
2005	2,544	3,705,184	(7,106,531)	(13,339,416)	858,232	1,749,845	162,298,726
2006	16,224	2,751,150	(7,208,025)	(12,042,760)	866,658	1,540,830	129,758,195
2007	11,163	7,582,778	(11,444,524)	(21,845,299)	1,341,242	2,345,146	217,541,819
2008	7,446	4,778,398	(7,762,363)	(14,997,326)	1,168,590	1,735,082	132,143,048
2009	7,529	4,624,245	(6,997,502)	(15,725,766)	710,827	1,018,536	102,310,234
2010	19,508	3,835,926	(6,643,531)	(11,641,405)	939,667	1,507,295	155,958,918
2011	33,173	3,575,569	(5,996,974)	(10,892,193)	1,151,846	2,176,627	210,840,991
2012	49,817	5,698,868	(8,863,057)	(15,797,149)	1,075,445	2,072,358	187,444,665
2013	68,886	6,781,045	(9,189,037)	(15,851,695)	1,449,809	2,077,112	178,915,991
2014	51,887	4,806,430	(4,376,621)	(7,912,327)	1,668,186	2,532,504	129,594,461
2015	14,768	7,182,089	(6,599,051)	(11,183,098)	1,653,620	1,958,657	160,959,623
2016	48,482	6,503,047	(7,078,001)	(12,085,744)	1,602,690	3,102,403	249,671,761
2017	81,754	7,449,602	(8,410,108)	(13,645,662)	1,378,389	3,717,521	256,638,299
2018	**77,492**	**5,267,601**	**(6,075,171)**	**(9,279,826)**	**1,285,773**	**3,697,819**	**269,147,232**
2019	75,704	5,271,400	(6,097,898)	(9,314,321)	1,292,203	3,780,456	269,092,869
2020	82,657	6,193,157	(6,655,893)	(10,274,178)	590,368	5,115,232	299,049,711
2021	83,867	6,284,850	(6,655,061)	(10,274,178)	598,807	5,191,667	284,440,868
2022	83,570	6,262,559	(6,655,061)	(10,274,178)	596,680	5,173,254	305,214,695
2023	83,787	6,278,856	(6,655,061)	(10,274,178)	597,767	5,186,716	297,173,185
2024	83,791	6,279,159	(6,655,893)	(10,274,178)	598,548	5,186,967	292,123,013
2025	83,781	6,278,362	(6,655,061)	(10,274,178)	598,355	5,186,308	295,169,310
2026	83,829	6,282,011	(6,655,061)	(10,274,178)	598,751	5,189,322	293,832,770
2027	83,814	6,280,821	(6,655,061)	(10,274,178)	598,423	5,188,339	293,764,398
2028	83,787	6,278,794	(6,655,893)	(10,274,178)	597,868	5,186,665	292,895,837
2029	83,790	6,279,030	(6,655,061)	(10,274,178)	598,345	5,186,859	294,413,283
2030	83,790	6,279,058	(6,655,061)	(10,274,178)	598,432	5,186,883	293,663,653
2031	83,793	6,279,279	(6,655,061)	(10,274,178)	598,443	5,187,065	293,676,274
2032	83,799	6,279,758	(6,655,893)	(10,274,178)	598,345	5,187,461	292,156,856
2033	83,753	6,276,292	(6,655,061)	(10,274,178)	597,989	5,184,598	294,929,284
2034	83,791	6,279,128	(6,655,061)	(10,274,178)	597,793	5,186,941	293,787,880
2035	83,991	6,294,146	(6,655,061)	(10,274,178)	599,785	5,199,346	282,003,035
TOTAL	**1,913,255**	**221,478,391**	**(361,115,931)**	**(649,793,159)**	**36,147,227**	**125,497,968**	**8,252,929,332**

[a] Starting with 2005, transmission costs that vary and depend on power usage are included, therefore recovered through the variable component.

Tables B-4 through B-31

Note: Where applicable, the projected data values shown in this appendix are shaded and the bill year data are in **bold** type.

TABLE B-4 Maximum Contractual Table A Amounts (acre-feet)

Calendar Year	NORTH BAY AREA			SOUTH BAY AREA[a]				CENTRAL COASTAL AREA		
	Napa[b]	Solano	Total	Alameda-Zone 7	Alameda County	Santa Clara	Total	San Luis Obispo	Santa Barbara	Total
	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]
1962	0	0	0	0	0	0	0	0	0	0
1963	0	0	0	0	0	0	0	0	0	0
1964	0	0	0	0	0	0	0	0	0	0
1965	0	0	0	0	0	0	0	0	0	0
1966	0	0	0	0	0	0	0	0	0	0
1967	0	0	0	507	5,248	5,783	11,538	0	0	0
1968	0	0	0	6,900	15,000	88,000	109,900	0	0	0
1969	0	0	0	8,200	15,500	75,000	98,700	0	0	0
1970	0	0	0	10,000	16,200	88,000	114,200	0	0	0
1971	0	0	0	11,200	17,000	88,000	116,200	0	0	0
1972	0	0	0	12,400	17,900	88,000	118,300	0	0	0
1973	0	0	0	13,600	18,800	88,000	120,400	0	0	0
1974	0	0	0	14,800	19,600	88,000	122,400	0	0	0
1975	0	0	0	16,000	20,500	88,000	124,500	0	0	0
1976	0	0	0	17,200	21,300	88,000	126,500	0	0	0
1977	0	0	0	18,400	22,200	88,000	128,600	0	0	0
1978	0	0	0	19,600	23,100	88,000	130,700	0	0	0
1979	0	0	0	20,800	23,900	88,000	132,700	0	0	0
1980	0	500	500	22,000	24,800	88,000	134,800	1,000	946	1,946
1981	0	650	650	23,000	26,000	88,000	137,000	1,000	1,813	2,813
1982	0	800	800	24,000	27,200	88,000	139,200	2,000	3,626	5,626
1983	0	950	950	25,000	28,400	88,000	141,400	3,000	5,439	8,439
1984	0	1,100	1,100	26,000	29,600	88,000	143,600	4,500	8,198	12,698
1985	0	1,250	1,250	27,000	30,800	88,000	145,800	7,500	13,638	21,138
1986	0	1,400	1,400	28,000	32,100	88,000	148,100	10,000	18,210	28,210
1987	0	1,550	1,550	29,000	33,300	88,000	150,300	12,500	22,704	35,204
1988	5,745	9,726	15,471	30,000	34,500	88,000	152,500	15,500	28,222	43,722
1989	6,195	18,420	24,615	31,000	35,700	90,000	156,700	20,000	36,342	56,342
1990	6,940	21,250	28,190	32,000	36,900	92,000	160,900	25,000	45,486	70,486
1991	7,290	22,300	29,590	34,000	38,400	94,000	166,400	25,000	45,486	70,486
1992	7,840	24,170	32,010	36,000	39,900	96,000	171,900	25,000	45,486	70,486
1993	8,490	26,130	34,620	38,000	41,400	98,000	177,400	25,000	45,486	70,486
1994	9,135	28,080	37,215	40,000	42,000	100,000	182,000	25,000	45,486	70,486
1995	9,780	34,250	44,030	42,000	42,000	100,000	184,000	25,000	45,486	70,486
1996	10,425	37,800	48,225	44,000	42,000	100,000	186,000	25,000	45,486	70,486
1997	11,065	38,250	49,315	46,000	42,000	100,000	188,000	6,215	38,986	45,201
1998	11,710	38,710	50,420	46,000	42,000	100,000	188,000	6,215	38,986	45,201
1999	15,850	39,170	55,020	46,000	42,000	100,000	188,000	25,000	45,486	70,486
2000	16,325	39,620	55,945	68,000	42,000	100,000	210,000	25,000	45,486	70,486
2001	20,725	45,836	66,561	78,000	42,000	100,000	220,000	25,000	45,486	70,486
2002	21,100	46,296	67,396	78,000	42,000	100,000	220,000	25,000	45,486	70,486
2003	21,475	46,756	68,231	78,400	42,000	100,000	220,400	25,000	45,486	70,486
2004	21,850	47,206	69,056	80,619	42,000	100,000	222,619	25,000	45,486	70,486
2005	22,225	47,256	69,481	80,619	42,000	100,000	222,619	25,000	45,486	70,486
2006	22,550	47,306	69,856	80,619	42,000	100,000	222,619	25,000	45,486	70,486
2007	22,875	47,356	70,231	80,619	42,000	100,000	222,619	25,000	45,486	70,486
2008	23,200	47,406	70,606	80,619	42,000	100,000	222,619	25,000	45,486	70,486
2009	23,525	47,456	70,981	80,619	42,000	100,000	222,619	25,000	45,486	70,486
2010	29,025	47,506	76,531	80,619	42,000	100,000	222,619	25,000	45,486	70,486
2011	29,025	47,556	76,581	80,619	42,000	100,000	222,619	25,000	45,486	70,486
2012	29,025	47,606	76,631	80,619	42,000	100,000	222,619	25,000	45,486	70,486
2013	29,025	47,656	76,681	80,619	42,000	100,000	222,619	25,000	45,486	70,486
2014	29,025	47,706	76,731	80,619	42,000	100,000	222,619	25,000	45,486	70,486
2015	29,025	47,756	76,781	80,619	42,000	100,000	222,619	25,000	45,486	70,486
2016	29,025	47,756	76,781	80,619	42,000	100,000	222,619	25,000	45,486	70,486
2017	29,025	47,756	76,781	80,619	42,000	100,000	222,619	25,000	45,486	70,486
2018	**29,025**	**47,756**	**76,781**	**80,619**	**42,000**	**100,000**	**222,619**	**25,000**	**45,486**	**70,486**
2019	29,025	47,756	76,781	80,619	42,000	100,000	222,619	25,000	45,486	70,486
2020	29,025	47,756	76,781	80,619	42,000	100,000	222,619	25,000	45,486	70,486
2021	29,025	47,756	76,781	80,619	42,000	100,000	222,619	25,000	45,486	70,486
2022	29,025	47,756	76,781	80,619	42,000	100,000	222,619	25,000	45,486	70,486
2023	29,025	47,756	76,781	80,619	42,000	100,000	222,619	25,000	45,486	70,486
2024	29,025	47,756	76,781	80,619	42,000	100,000	222,619	25,000	45,486	70,486
2025	29,025	47,756	76,781	80,619	42,000	100,000	222,619	25,000	45,486	70,486
2026	29,025	47,756	76,781	80,619	42,000	100,000	222,619	25,000	45,486	70,486
2027	29,025	47,756	76,781	80,619	42,000	100,000	222,619	25,000	45,486	70,486
2028	29,025	47,756	76,781	80,619	42,000	100,000	222,619	25,000	45,486	70,486
2029	29,025	47,756	76,781	80,619	42,000	100,000	222,619	25,000	45,486	70,486
2030	29,025	47,756	76,781	80,619	42,000	100,000	222,619	25,000	45,486	70,486
2031	29,025	47,756	76,781	80,619	42,000	100,000	222,619	25,000	45,486	70,486
2032	29,025	47,756	76,781	80,619	42,000	100,000	222,619	25,000	45,486	70,486
2033	29,025	47,756	76,781	80,619	42,000	100,000	222,619	25,000	45,486	70,486
2034	29,025	47,756	76,781	80,619	42,000	100,000	222,619	25,000	45,486	70,486
2035	29,025	47,756	76,781	80,619	42,000	100,000	222,619	25,000	45,486	70,486
TOTAL	**1,080,965**	**2,049,856**	**3,130,821**	**3,720,815**	**2,459,248**	**6,510,783**	**12,690,846**	**1,189,430**	**2,218,494**	**3,407,924**

[a] Table A amounts for the South Bay Area were supplied by non-project water for the period June 1962 through November 1967. Actual delivery quantities of project water are shown for 1967.

[b] Napa's Table A quantities exclude amounts during the period 1968 through 1987 that were supplied by non-project water.

TABLE B-4 Maximum Contractual Table A Amounts (acre-feet)

Calendar Year	SAN JOAQUIN VALLEY AREA								
			Kern						
	Dudley Ridge	Empire	Municipal and Industrial	Agricultural	Total	Kings	Oak Flat	Tulare	Total
	[11]	[12]	[13]	[14]	[15]	[16]	[17]	[18]	[19]
1962	0	0	0	0	0	0	0	0	0
1963	0	0	0	0	0	0	0	0	0
1964	0	0	0	0	0	0	0	0	0
1965	0	0	0	0	0	0	0	0	0
1966	0	0	0	0	0	0	0	0	0
1967	0	0	0	0	0	0	0	0	0
1968	14,300	1,000	0	46,600	46,600	900	2,300	12,250	77,350
1969	14,325	3,000	0	95,700	95,700	1,200	2,500	46,350	163,075
1970	15,700	3,000	28,700	116,400	145,100	1,300	2,600	34,300	202,000
1971	17,900	3,000	35,700	154,600	190,300	1,300	2,800	36,500	251,800
1972	20,000	3,000	39,200	231,500	270,700	1,400	5,366	112,600	413,066
1973	22,000	3,000	43,500	267,000	310,500	1,500	3,100	43,552	383,652
1974	33,390	3,000	48,000	299,000	347,000	1,500	3,471	72,289	460,650
1975	40,555	3,000	52,700	358,120	410,820	1,600	3,576	86,258	545,809
1976	30,921	3,000	56,100	386,050	442,150	1,600	4,039	61,707	543,417
1977	30,400	3,000	60,600	423,000	483,600	1,700	3,700	59,000	581,400
1978	32,500	0	64,100	470,200	534,300	1,900	3,900	63,300	635,900
1979	38,544	3,000	67,600	516,300	583,900	2,000	4,000	71,241	702,685
1980	41,000	3,000	71,100	563,400	634,500	2,200	5,700	71,700	758,100
1981	41,000	3,000	74,800	616,600	691,400	2,300	4,300	76,000	818,000
1982	41,000	3,000	79,600	665,700	745,300	2,500	4,500	80,200	876,500
1983	42,900	3,000	83,500	721,600	805,100	2,800	3,770	9,548	867,118
1984	45,100	3,000	103,600	757,000	860,600	3,100	4,800	62,611	979,211
1985	47,200	3,000	108,900	806,100	915,000	3,400	4,900	45,549	1,019,049
1986	49,300	3,000	113,400	820,246	933,646	3,700	5,100	97,200	1,091,946
1987	51,400	3,000	119,100	904,400	1,023,500	4,000	5,200	101,400	1,188,500
1988	53,500	3,000	123,900	950,700	1,074,600	4,000	5,400	105,600	1,246,100
1989	55,600	3,000	128,200	984,100	1,112,300	4,000	5,600	109,900	1,290,400
1990	28,850	3,000	134,600	1,018,800	1,153,400	4,000	5,700	118,500	1,313,450
1991	53,411	3,000	134,600	1,018,800	1,153,400	4,000	5,700	118,500	1,338,011
1992	57,700	3,000	134,600	1,018,800	1,153,400	4,000	5,700	118,500	1,342,300
1993	57,700	3,000	134,600	1,018,800	1,153,400	4,000	5,700	118,500	1,342,300
1994	57,700	3,000	134,600	1,018,800	1,153,400	4,000	5,700	118,500	1,342,300
1995	57,700	3,000	134,600	1,018,800	1,153,400	4,000	5,700	118,500	1,342,300
1996	53,370	3,000	134,600	982,460	1,117,060	4,000	5,700	118,500	1,301,630
1997	53,370	3,000	134,600	978,130	1,112,730	4,000	5,700	118,500	1,297,300
1998	53,370	3,000	134,600	953,130	1,087,730	4,000	5,700	118,500	1,272,300
1999	53,370	3,000	134,600	953,130	1,087,730	4,000	5,700	118,500	1,272,300
2000	53,370	3,000	134,600	886,130	1,020,730	4,000	5,700	118,500	1,205,300
2001	53,370	3,000	134,600	866,349	1,000,949	4,000	5,700	118,500	1,185,519
2002	57,343	3,000	134,600	866,349	1,000,949	4,000	5,700	111,527	1,182,519
2003	57,343	3,000	134,600	866,349	1,000,949	4,000	5,700	111,127	1,182,119
2004	57,343	3,000	134,600	864,130	998,730	9,000	5,700	96,227	1,170,000
2005	57,343	3,000	134,600	864,130	998,730	9,000	5,700	96,227	1,170,000
2006	57,343	3,000	134,600	864,130	998,730	9,305	5,700	95,922	1,170,000
2007	57,343	3,000	134,600	864,130	998,730	9,305	5,700	95,922	1,170,000
2008	57,343	3,000	134,600	864,130	998,730	9,305	5,700	95,922	1,170,000
2009	57,343	3,000	134,600	864,130	998,730	9,305	5,700	95,922	1,170,000
2010	50,343	3,000	134,600	848,130	982,730	9,305	5,700	88,922	1,140,000
2011	50,343	3,000	134,600	848,130	982,730	9,305	5,700	88,922	1,140,000
2012	50,343	3,000	134,600	848,130	982,730	9,305	5,700	88,922	1,140,000
2013	50,343	3,000	134,600	848,130	982,730	9,305	5,700	88,922	1,140,000
2014	48,350	3,000	134,600	848,130	982,730	9,305	5,700	87,471	1,136,556
2015	45,350	3,000	134,600	848,130	982,730	9,305	5,700	87,471	1,133,556
2016	45,350	3,000	134,600	848,130	982,730	9,305	5,700	87,471	1,133,556
2017	45,350	3,000	134,600	848,130	982,730	9,305	5,700	87,471	1,133,556
2018	**45,350**	**3,000**	**134,600**	**848,130**	**982,730**	**9,305**	**5,700**	**87,471**	**1,133,556**
2019	45,350	3,000	134,600	848,130	982,730	9,305	5,700	87,471	1,133,556
2020	41,350	3,000	134,600	848,130	982,730	9,305	5,700	87,471	1,129,556
2021	41,350	3,000	134,600	848,130	982,730	9,305	5,700	87,471	1,129,556
2022	41,350	3,000	134,600	848,130	982,730	9,305	5,700	87,471	1,129,556
2023	41,350	3,000	134,600	848,130	982,730	9,305	5,700	87,471	1,129,556
2024	41,350	3,000	134,600	848,130	982,730	9,305	5,700	87,471	1,129,556
2025	41,350	3,000	134,600	848,130	982,730	9,305	5,700	87,471	1,129,556
2026	41,350	3,000	134,600	848,130	982,730	9,305	5,700	87,471	1,129,556
2027	41,350	3,000	134,600	848,130	982,730	9,305	5,700	87,471	1,129,556
2028	41,350	3,000	134,600	848,130	982,730	9,305	5,700	87,471	1,129,556
2029	41,350	3,000	134,600	848,130	982,730	9,305	5,700	87,471	1,129,556
2030	41,350	3,000	134,600	848,130	982,730	9,305	5,700	87,471	1,129,556
2031	41,350	3,000	134,600	848,130	982,730	9,305	5,700	87,471	1,129,556
2032	41,350	3,000	134,600	848,130	982,730	9,305	5,700	87,471	1,129,556
2033	41,350	3,000	134,600	848,130	982,730	9,305	5,700	87,471	1,129,556
2034	41,350	3,000	134,600	848,130	982,730	9,305	5,700	87,471	1,129,556
2035	41,350	3,000	134,600	848,130	982,730	9,305	5,700	87,471	1,129,556
TOTAL	**3,008,632**	**199,000**	**7,693,900**	**51,855,303**	**59,549,203**	**403,050**	**352,822**	**5,959,901**	**69,472,608**

TABLE B-4 Maximum Contractual Table A Amounts (acre-feet)

Calendar Year	SOUTHERN CALIFORNIA AREA									
	AVEK	Castaic Lake	Coachella	Crestline	Desert	Littlerock	Mojave	Palmdale	San Bernardino	San Gabriel
	[20]	[21]	[22]	[23]	[24]	[25]	[26]	[27]	[28]	[29]
1962	0	0	0	0	0	0	0	0	0	0
1963	0	0	0	0	0	0	0	0	0	0
1964	0	0	0	0	0	0	0	0	0	0
1965	0	0	0	0	0	0	0	0	0	0
1966	0	0	0	0	0	0	0	0	0	0
1967	0	0	0	0	0	0	0	0	0	0
1968	0	3,700	0	0	0	0	0	0	0	0
1969	0	5,000	0	0	0	0	0	0	0	0
1970	0	5,700	0	0	0	0	0	0	0	0
1971	0	6,700	0	0	0	0	0	0	0	0
1972	20,000	8,936	5,200	526	8,000	170	8,400	1,620	1,677	122
1973	25,000	12,400	5,800	870	9,000	290	10,700	2,940	48,000	11,500
1974	30,000	15,400	6,400	1,160	10,000	400	13,100	4,260	50,000	12,300
1975	35,000	18,200	7,000	1,450	11,000	520	15,400	5,580	52,500	13,100
1976	44,000	21,200	7,600	1,740	12,000	640	17,800	6,900	55,000	14,000
1977	50,000	24,100	8,421	2,030	13,000	730	20,200	8,220	57,500	14,800
1978	57,000	24,762	9,242	2,320	14,000	920	0	9,340	60,000	15,700
1979	63,000	28,000	10,063	2,610	15,000	1,040	24,900	10,260	62,500	16,600
1980	69,200	30,400	10,884	2,900	17,000	1,150	27,200	11,180	65,500	17,400
1981	75,000	32,800	12,105	3,190	19,000	1,270	23,100	11,700	68,500	18,300
1982	81,300	34,800	13,326	3,480	21,000	1,380	22,843	12,320	71,500	19,100
1983	87,700	37,300	14,547	3,770	23,000	1,500	34,300	12,940	74,500	19,900
1984	35,000	39,600	15,768	4,060	25,000	1,610	36,700	13,560	78,000	20,700
1985	40,000	41,800	16,989	4,350	27,000	1,730	39,000	14,180	81,500	21,800
1986	42,000	43,600	18,210	4,640	29,000	1,840	41,400	14,800	85,000	23,200
1987	44,000	45,600	19,431	4,930	31,500	1,960	43,700	15,420	89,000	24,600
1988	46,000	48,000	20,652	5,220	34,000	2,070	46,000	16,040	93,000	26,000
1989	125,700	50,100	21,873	5,510	36,500	2,190	48,500	16,660	97,000	27,400
1990	132,100	52,000	23,100	5,800	38,100	2,300	50,800	17,300	101,500	28,800
1991	138,400	54,200	23,100	5,800	38,100	2,300	50,800	17,300	102,600	28,800
1992	138,400	54,200	23,100	5,800	38,100	2,300	50,800	17,300	102,600	28,800
1993	138,400	54,200	23,100	5,800	38,100	2,300	50,800	17,300	102,600	28,800
1994	138,400	54,200	23,100	5,800	38,100	2,300	50,800	17,300	102,600	28,800
1995	138,400	54,200	23,100	5,800	38,100	2,300	50,800	17,300	102,600	28,800
1996	138,400	54,200	23,100	5,800	38,100	2,300	50,800	17,300	102,600	28,800
1997	138,400	54,200	23,100	5,800	38,100	2,300	50,800	17,300	102,600	28,800
1998	138,400	54,200	23,100	5,800	38,100	2,300	75,800	17,300	102,600	28,800
1999	138,400	54,200	23,100	5,800	38,100	2,300	75,800	17,300	102,600	28,800
2000	138,400	95,200	23,100	5,800	38,100	2,300	75,800	21,300	102,600	28,800
2001	138,400	95,200	23,100	5,800	38,100	2,300	75,800	21,300	102,600	28,800
2002	141,400	95,200	23,100	5,800	38,100	2,300	75,800	21,300	102,600	28,800
2003	141,400	95,200	23,100	5,800	38,100	2,300	75,800	21,300	102,600	28,800
2004	141,400	95,200	33,000	5,800	38,100	2,300	75,800	21,300	102,600	28,800
2005	141,400	95,200	121,100	5,800	50,000	2,300	75,800	21,300	102,600	28,800
2006	141,400	95,200	121,100	5,800	50,000	2,300	75,800	21,300	102,600	28,800
2007	141,400	95,200	121,100	5,800	50,000	2,300	75,800	21,300	102,600	28,800
2008	141,400	95,200	121,100	5,800	50,000	2,300	75,800	21,300	102,600	28,800
2009	141,400	95,200	121,100	5,800	50,000	2,300	75,800	21,300	102,600	28,800
2010	141,400	95,200	138,350	5,800	55,750	2,300	82,800	21,300	102,600	28,800
2011	141,400	95,200	138,350	5,800	55,750	2,300	82,800	21,300	102,600	28,800
2012	141,400	95,200	138,350	5,800	55,750	2,300	82,800	21,300	102,600	28,800
2013	141,400	95,200	138,350	5,800	55,750	2,300	82,800	21,300	102,600	28,800
2014	144,844	95,200	138,350	5,800	55,750	2,300	82,800	21,300	102,600	28,800
2015	144,844	95,200	138,350	5,800	55,750	2,300	85,800	21,300	102,600	28,800
2016	144,844	95,200	138,350	5,800	55,750	2,300	85,800	21,300	102,600	28,800
2017	144,844	95,200	138,350	5,800	55,750	2,300	85,800	21,300	102,600	28,800
2018	**144,844**	**95,200**	**138,350**	**5,800**	**55,750**	**2,300**	**85,800**	**21,300**	**102,600**	**28,800**
2019	144,844	95,200	138,350	5,800	55,750	2,300	85,800	21,300	102,600	28,800
2020	144,844	95,200	138,350	5,800	55,750	2,300	89,800	21,300	102,600	28,800
2021	144,844	95,200	138,350	5,800	55,750	2,300	89,800	21,300	102,600	28,800
2022	144,844	95,200	138,350	5,800	55,750	2,300	89,800	21,300	102,600	28,800
2023	144,844	95,200	138,350	5,800	55,750	2,300	89,800	21,300	102,600	28,800
2024	144,844	95,200	138,350	5,800	55,750	2,300	89,800	21,300	102,600	28,800
2025	144,844	95,200	138,350	5,800	55,750	2,300	89,800	21,300	102,600	28,800
2026	144,844	95,200	138,350	5,800	55,750	2,300	89,800	21,300	102,600	28,800
2027	144,844	95,200	138,350	5,800	55,750	2,300	89,800	21,300	102,600	28,800
2028	144,844	95,200	138,350	5,800	55,750	2,300	89,800	21,300	102,600	28,800
2029	144,844	95,200	138,350	5,800	55,750	2,300	89,800	21,300	102,600	28,800
2030	144,844	95,200	138,350	5,800	55,750	2,300	89,800	21,300	102,600	28,800
2031	144,844	95,200	138,350	5,800	55,750	2,300	89,800	21,300	102,600	28,800
2032	144,844	95,200	138,350	5,800	55,750	2,300	89,800	21,300	102,600	28,800
2033	144,844	95,200	138,350	5,800	55,750	2,300	89,800	21,300	102,600	28,800
2034	144,844	95,200	138,350	5,800	55,750	2,300	89,800	21,300	102,600	28,800
2035	144,844	95,200	138,350	5,800	55,750	2,300	89,800	21,300	102,600	28,800
TOTAL	**7,507,768**	**4,545,098**	**4,782,511**	**321,556**	**2,626,000**	**127,210**	**4,069,043**	**1,127,720**	**5,909,177**	**1,641,322**

TABLE B-4 Maximum Contractual Table A Amounts (acre-feet)

Calendar Year	SOUTHERN CALIFORNIA AREA (continued)				FEATHER RIVER AREA					
	San Gorgonio	Metropolitan	Ventura	Total	Yuba City	Butte	Plumas	Total	South Bay Area Future Contractor	Grand Total
	[30]	[31]	[32]	[33]	[34]	[35]	[36]	[37]	[38]	[39]
1962	0	0	0	0	0	0	0	0	0	0
1963	0	0	0	0	0	0	0	0	0	0
1964	0	0	0	0	0	0	0	0	0	0
1965	0	0	0	0	0	0	0	0	0	0
1966	0	0	0	0	0	0	0	0	0	0
1967	0	0	0	0	0	0	0	0	0	11,538
1968	0	0	0	3,700	0	300	250	550	0	191,500
1969	0	0	0	5,000	0	350	270	620	0	267,395
1970	0	0	0	5,700	0	400	300	700	0	322,600
1971	0	0	0	6,700	0	450	440	890	0	375,590
1972	0	154,772	0	209,423	0	500	470	970	0	741,759
1973	0	354,600	0	481,100	0	600	500	1,100	0	986,252
1974	0	454,900	0	597,920	0	700	530	1,230	0	1,182,200
1975	0	555,200	0	714,950	0	1,050	560	1,610	0	1,386,869
1976	0	655,600	0	836,480	0	1,400	590	1,990	0	1,508,387
1977	0	755,900	0	954,901	0	1,800	620	2,420	0	1,667,321
1978	0	856,300	0	1,049,584	0	1,200	650	1,850	0	1,818,034
1979	0	956,600	0	1,190,573	0	1,450	680	2,130	0	2,028,088
1980	6,800	1,057,000	1,000	1,317,614	0	1,100	710	1,810	0	2,214,770
1981	7,800	1,157,300	2,000	1,432,065	0	1,200	740	1,940	0	2,392,468
1982	8,800	1,257,600	3,000	1,550,449	0	1,200	770	1,970	0	2,574,545
1983	9,800	1,358,000	4,000	1,681,257	0	1,200	800	2,000	0	2,701,164
1984	10,800	1,458,300	5,000	1,744,098	1,600	1,200	830	3,630	0	2,884,337
1985	11,800	1,558,700	6,000	1,864,849	1,700	1,200	860	3,760	0	3,055,846
1986	12,900	1,659,300	8,000	1,983,890	2,100	1,200	890	4,190	0	3,257,736
1987	14,000	1,759,800	10,000	2,103,941	2,500	1,200	920	4,620	0	3,484,115
1988	15,100	1,860,400	13,000	2,225,482	2,900	1,200	960	5,060	0	3,688,335
1989	16,200	1,961,000	16,000	2,424,633	3,300	1,200	1,000	5,500	0	3,958,190
1990	17,300	2,011,500	20,000	2,500,600	3,800	1,200	1,040	6,040	0	4,079,666
1991	17,300	2,011,500	20,000	2,510,200	9,600	1,200	1,080	11,880	0	4,126,567
1992	17,300	2,011,500	20,000	2,510,200	9,600	1,200	1,120	11,920	0	4,138,816
1993	17,300	2,011,500	20,000	2,510,200	9,600	1,200	1,160	11,960	0	4,146,966
1994	17,300	2,011,500	20,000	2,510,200	9,600	1,200	1,200	12,000	0	4,154,201
1995	17,300	2,011,500	20,000	2,510,200	9,600	1,200	1,250	12,050	0	4,163,066
1996	0	2,011,500	20,000	2,492,900	9,600	1,200	1,300	12,100	0	4,111,341
1997	0	2,011,500	20,000	2,492,900	9,600	1,200	1,350	12,150	0	4,084,866
1998	0	2,011,500	20,000	2,517,900	9,600	1,200	1,400	12,200	0	4,086,021
1999	2,000	2,011,500	20,000	2,519,900	9,600	2,890	1,450	13,940	0	4,119,646
2000	3,000	2,011,500	20,000	2,565,900	9,600	2,890	1,510	14,000	0	4,121,631
2001	4,000	2,011,500	20,000	2,566,900	9,600	3,500	1,570	14,670	0	4,124,136
2002	4,000	2,011,500	20,000	2,569,900	9,600	3,500	1,630	14,730	0	4,125,031
2003	5,000	2,011,500	20,000	2,570,900	9,600	3,500	1,690	14,790	0	4,126,926
2004	6,000	2,011,500	20,000	2,581,800	9,600	3,500	0	13,100	0	4,127,061
2005	6,500	1,911,500	20,000	2,582,300	9,600	1,200	0	10,800	0	4,125,686
2006	7,000	1,911,500	20,000	2,582,800	9,600	1,200	324	11,124	0	4,126,885
2007	8,650	1,911,500	20,000	2,584,450	9,600	1,200	720	11,520	0	4,129,306
2008	17,300	1,911,500	20,000	2,593,100	9,600	27,500	2,020	39,120	0	4,165,931
2009	17,300	1,911,500	20,000	2,593,100	9,600	27,500	2,090	39,190	0	4,166,376
2010	17,300	1,911,500	20,000	2,623,100	9,600	1,731	2,160	13,491	0	4,146,227
2011	17,300	1,911,500	20,000	2,623,100	9,600	2,548	2,240	14,388	0	4,147,174
2012	17,300	1,911,500	20,000	2,623,100	9,600	27,500	2,320	39,420	0	4,172,256
2013	17,300	1,911,500	20,000	2,623,100	9,600	27,500	2,410	39,510	0	4,172,396
2014	17,300	1,911,500	20,000	2,626,544	9,600	27,500	2,500	39,600	0	4,172,536
2015	17,300	1,911,500	20,000	2,629,544	9,600	27,500	2,600	39,700	0	4,172,686
2016	17,300	1,911,500	20,000	2,629,544	9,600	27,500	2,700	39,800	0	4,172,786
2017	17,300	1,911,500	20,000	2,629,544	9,600	27,500	2,700	39,800	0	4,172,786
2018	**17,300**	**1,911,500**	**20,000**	**2,629,544**	**9,600**	**27,500**	**2,700**	**39,800**	**0**	**4,172,786**
2019	17,300	1,911,500	20,000	2,629,544	9,600	27,500	2,700	39,800	0	4,172,786
2020	17,300	1,911,500	20,000	2,633,544	9,600	27,500	2,700	39,800	0	4,172,786
2021	17,300	1,911,500	20,000	2,633,544	9,600	27,500	2,700	39,800	0	4,172,786
2022	17,300	1,911,500	20,000	2,633,544	9,600	27,500	2,700	39,800	0	4,172,786
2023	17,300	1,911,500	20,000	2,633,544	9,600	27,500	2,700	39,800	0	4,172,786
2024	17,300	1,911,500	20,000	2,633,544	9,600	27,500	2,700	39,800	0	4,172,786
2025	17,300	1,911,500	20,000	2,633,544	9,600	27,500	2,700	39,800	0	4,172,786
2026	17,300	1,911,500	20,000	2,633,544	9,600	27,500	2,700	39,800	0	4,172,786
2027	17,300	1,911,500	20,000	2,633,544	9,600	27,500	2,700	39,800	0	4,172,786
2028	17,300	1,911,500	20,000	2,633,544	9,600	27,500	2,700	39,800	0	4,172,786
2029	17,300	1,911,500	20,000	2,633,544	9,600	27,500	2,700	39,800	0	4,172,786
2030	17,300	1,911,500	20,000	2,633,544	9,600	27,500	2,700	39,800	0	4,172,786
2031	17,300	1,911,500	20,000	2,633,544	9,600	27,500	2,700	39,800	0	4,172,786
2032	17,300	1,911,500	20,000	2,633,544	9,600	27,500	2,700	39,800	0	4,172,786
2033	17,300	1,911,500	20,000	2,633,544	9,600	27,500	2,700	39,800	0	4,172,786
2034	17,300	1,911,500	20,000	2,633,544	9,600	27,500	2,700	39,800	0	4,172,786
2035	17,300	1,911,500	20,000	2,633,544	9,600	27,500	2,700	39,800	0	4,172,786
TOTAL	**748,350**	**109,260,272**	**988,000**	**143,654,027**	**449,900**	**775,559**	**106,474**	**1,331,933**	**0**	**233,688,159**

TABLE B-5A Annual Water Quantities Delivered from Each Aqueduct Reach to Each Contractor (acre-feet)

	UPPER FEATHER AREA			NORTH BAY AQUEDUCT							
				Reach 1	Reach 3A		Reach 3A-T		Reach 3B		
Calendar Year	Butte	Grizzly Valley Pipeline Plumas	Yuba City	Solano	Napa	Solano	Napa	Solano	Napa[a]	Solano	Total
	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]
1962	0	0	0	0	0	0	0	0	0	0	0
1963	0	0	0	0	0	0	0	0	0	0	0
1964	0	0	0	0	0	0	0	0	0	0	0
1965	0	0	0	0	0	0	0	0	0	0	0
1966	0	0	0	0	0	0	0	0	0	0	0
1967	0	0	0	0	0	0	0	0	0	0	0
1968	0	0	0	0	0	0	0	0	1,214	0	1,214
1969	0	0	0	0	0	0	0	0	2,687	0	2,687
1970	0	70	0	0	0	0	0	0	3,618	0	3,618
1971	192	64	0	0	0	0	0	0	2,521	0	2,521
1972	186	505	0	0	0	0	0	0	3,647	0	3,647
1973	53	679	0	0	0	0	0	0	3,792	0	3,792
1974	127	648	0	0	0	0	0	0	4,870	0	4,870
1975	253	405	0	0	0	0	0	0	6,840	0	6,840
1976	527	382	0	0	0	0	0	0	7,122	0	7,122
1977	706	303	0	0	0	0	0	0	8,226	0	8,226
1978	579	278	0	0	0	0	0	0	6,034	0	6,034
1979	302	329	0	0	0	0	0	0	6,561	0	6,561
1980	267	295	0	0	0	0	0	0	6,707	0	6,707
1981	221	355	0	0	0	0	0	0	9,001	0	9,001
1982	334	305	0	0	0	0	0	0	1,213	0	1,213
1983	325	262	0	0	0	0	0	0	2,287	0	2,287
1984	177	272	108	0	0	0	0	0	2,923	0	2,923
1985	308	254	62	0	0	0	0	0	4,039	0	4,039
1986	313	317	328	1,400	0	0	0	0	3,519	0	4,919
1987	459	452	88	1,550	0	0	0	0	7,693	0	9,243
1988	385	523	303	1	0	9,725	0	0	5,392	0	15,118
1989	300	486	403	10	0	17,246	0	0	6,195	0	23,451
1990	380	548	494	3,275	0	15,856	0	0	6,940	0	26,071
1991	328	420	265	3,117	0	3,855	0	0	1,380	0	8,352
1992	117	485	642	5,553	0	9,220	0	0	4,001	0	18,774
1993	256	444	746	14,709	0	14,471	0	0	5,286	0	34,466
1994	329	492	1,035	10,343	0	14,913	0	0	6,792	0	32,048
1995	203	308	910	5,452	0	15,893	0	0	5,182	0	26,527
1996	257	360	820	12,930	0	17,069	0	0	4,893	0	34,892
1997	185	231	1,005	16,029	0	17,501	0	0	4,341	0	37,871
1998	527	0	1,054	11,562	0	18,204	0	0	5,359	0	35,125
1999	286	0	1,096	15,191	0	19,562	0	0	5,304	0	40,057
2000	586	0	901	15,490	0	11,290	0	10,235	4,958	0	41,973
2001	513	0	1,065	14,849	0	11,377	0	8,360	9,345	0	43,931
2002	419	0	1,181	18,841	0	11,130	0	8,589	6,875	0	45,435
2003	551	0	1,324	17,260	0	9,682	9	7,009	7,637	0	41,597
2004	1,440	0	1,434	20,951	0	10,691	135	10,860	7,999	500	51,136
2005	527	0	1,894	18,290	0	10,585	160	8,444	7,509	500	45,488
2006	468	0	5,342	16,573	0	10,865	208	7,578	7,581	500	43,305
2007	956	0	2,327	19,187	0	12,301	180	15,312	10,777	500	58,257
2008	451	243	1,923	21,436	15	11,410	37	7,974	13,240	500	54,612
2009	581	200	2,114	15,004	0	8,651	27	6,795	10,877	500	41,854
2010	807	243	2,331	17,598	0	8,231	70	4,487	12,347	500	43,233
2011	1,092	98	2,297	15,202	0	7,761	39	5,032	11,275	0	39,309
2012	1,374	79	2,695	16,508	0	8,298	47	4,541	9,860	0	39,254
2013	908	366	4,850	16,525	0	10,082	60	9,262	12,478	0	48,407
2014	1,617	251	4,237	7,354	0	6,856	41	5,469	14,123	0	33,843
2015	2,763	285	3,004	8,581	0	6,538	66	8,717	11,133	0	35,035
2016	2,518	387	1,229	10,802	1	6,464	45	6,339	8,947	0	32,598
2017	2,968	768	3,649	13,784	0	10,608	100	13,346	11,066	0	48,904
2018	**268**	**731**	**5,760**	**8,115**	**0**	**20,539**	**0**	**0**	**17,415**	**0**	**46,069**
2019	268	731	5,760	7,089	0	21,565	0	0	17,415	0	46,069
2020	268	731	5,760	6,011	0	22,643	0	0	17,415	0	46,069
2021	268	731	5,760	4,879	0	23,775	0	0	17,415	0	46,069
2022	268	731	5,760	4,879	0	23,775	0	0	17,415	0	46,069
2023	268	731	5,760	4,879	0	23,775	0	0	17,415	0	46,069
2024	268	731	5,760	4,879	0	23,775	0	0	17,415	0	46,069
2025	268	731	5,760	4,879	0	23,775	0	0	17,415	0	46,069
2026	268	731	5,760	4,879	0	23,775	0	0	17,415	0	46,069
2027	268	731	5,760	4,879	0	23,775	0	0	17,415	0	46,069
2028	268	731	5,760	4,879	0	23,775	0	0	17,415	0	46,069
2029	268	731	5,760	4,879	0	23,775	0	0	17,415	0	46,069
2030	268	731	5,760	4,879	0	23,775	0	0	17,415	0	46,069
2031	268	731	5,760	4,879	0	23,775	0	0	17,415	0	46,069
2032	268	731	5,760	4,879	0	23,775	0	0	17,415	0	46,069
2033	268	731	5,760	4,879	0	23,775	0	0	17,415	0	46,069
2034	268	731	5,760	4,879	0	23,775	0	0	17,415	0	46,069
2035	268	731	5,760	4,879	0	23,775	0	0	17,415	0	46,069
TOTAL	**34,245**	**26,550**	**156,836**	**479,757**	**16**	**767,707**	**1,224**	**148,349**	**647,076**	**3,500**	**2,047,629**

[a] For the period 1968 through 1987, deliveries were non-project water pumped through an interim facility.

TABLE B-5A Annual Water Quantities Delivered from Each Aqueduct Reach to Each Contractor (acre-feet)

	SOUTH BAY AQUEDUCT[b]										
	Reach 1		Reach 2	Reach 4	Reach 5		Reach 6	Reach 7	Reach 8	Reach 9	
Calendar Year	Alameda-Zone 7	Alameda County	Alameda-Zone 7	Alameda-Zone 7	Alameda-Zone 7	Alameda County	Alameda-Zone 7	Alameda County	Alameda County	Santa Clara	Total
	[12]	[13]	[14]	[15]	[16]	[17]	[18]	[19]	[20]	[21]	[22]
1962	141	8,412	353	0	0	0	0	0	0		8,906
1963	814	10,914	917	0	0	0	0	0	0		12,645
1964	248	19,238	1,425	0	0	0	0	0	0		20,911
1965	637	15,280	1,830	138	0	0	0	1,127	0	15,014	34,026
1966	2,475	0	2,537	499	0	0	0	14,864	0	34,538	54,913
1967	1,527	0	2,391	862	0	0	0	12,882	0	39,101	56,763
1968	1,608	0	3,799	721	5	0	0	24,817	0	70,105	101,055
1969	1,165	0	3,459	1,851	160	0	0	813	0	62,264	69,712
1970	1,345	0	4,558	3,182	164	0	0	0	0	80,311	89,560
1971	546	0	1,908	2,403	160	0	0	5,961	0	87,606	98,584
1972	1,066	0	4,605	2,041	2,777	1,489	0	26,182	0	100,266	138,426
1973	430	0	1,123	1,193	229	0	0	2,521	0	88,582	94,078
1974	177	0	0	975	162	0	0	0	4	88,000	89,318
1975	137	0	1,783	1,864	120	0	714	393	593	88,000	93,604
1976	265	0	7,204	3,384	817	0	5,461	13,774	7,526	88,000	126,431
1977	210	0	4,491	2,213	524	0	5,206	11,284	7,556	76,220	107,704
1978	422	0	2,426	3,754	2,034	0	2,348	854	5,009	95,727	112,574
1979	197	0	4,283	5,567	3,937	0	5,341	3,430	7,444	91,991	122,190
1980	77	0	3,883	6,686	0	1,508	6,144	2,824	6,702	88,000	115,824
1981	1,250	0	4,648	5,273	1,157	5,752	7,262	7,595	8,570	88,000	129,507
1982	473	0	3,043	4,406	630	0	4,571	1,776	4,540	88,000	107,439
1983	179	0	2,712	1,714	50	0	111	0	3,157	86,733	94,656
1984	165	0	4,219	2,219	55	0	126	0	3,338	88,000	98,122
1985	213	0	5,199	2,060	63	0	7,537	11,203	7,813	88,000	122,088
1986	200	0	6,052	2,062	212	0	2,083	5,311	7,068	88,000	110,988
1987	218	0	7,538	2,372	285	0	12,993	15,488	9,902	88,000	136,796
1988	222	0	8,302	4,681	189	0	12,436	24,259	9,205	87,961	147,255
1989	222	0	8,051	6,562	418	0	10,974	17,340	8,702	90,000	142,269
1990	256	0	8,160	8,347	593	0	15,678	22,149	9,554	91,800	156,537
1991	162	0	3,676	3,269	359	0	1,945	9,155	3,493	28,200	50,259
1992	217	0	5,177	2,188	154	0	6,933	12,621	6,532	42,839	76,661
1993	190	0	5,843	8,430	5,964	1,650	13,208	1,792	6,829	62,065	105,971
1994	132	0	4,482	5,427	822	0	9,679	3,379	19,532	57,115	100,568
1995	278	0	6,236	7,195	955	0	15,427	21	17,772	28,756	76,640
1996	277	0	6,151	5,119	388	0	6,968	1,871	11,591	44,850	77,215
1997	138	0	6,647	6,501	1,582	1,323	12,654	1,876	10,864	60,601	102,186
1998	106	0	3,748	2,493	1,277	0	8,347	3,817	11,478	39,610	70,876
1999	148	0	5,048	8,227	1,444	0	13,133	5,326	16,226	52,945	102,497
2000	110	0	7,464	9,761	946	0	16,396	4,498	18,100	78,258	135,533
2001	105	0	7,822	4,879	3,010	0	13,593	0	18,004	47,922	95,335
2002	93	0	7,758	11,619	2,446	0	17,058	5,112	20,616	58,875	123,577
2003	108	0	7,916	11,348	2,887	0	16,684	5,037	12,753	75,981	132,714
2004	72	0	11,754	9,737	3,763	0	21,260	4,968	14,916	59,458	125,928
2005	1,430	0	11,520	10,100	1,826	0	16,597	4,139	10,160	52,364	108,136
2006	830	0	11,546	4,097	2,123	0	19,870	2,708	12,924	64,174	118,272
2007	179	0	10,066	2,563	3,107	0	23,205	8,255	15,107	71,690	134,172
2008	238	0	11,424	2,206	1,899	0	25,363	4,421	18,481	52,530	116,562
2009	211	0	7,054	5,437	1,987	0	16,398	2,551	16,945	66,364	116,947
2010	160	0	7,788	7,528	1,824	0	17,043	330	15,241	45,888	95,802
2011	1,541	0	6,282	6,887	2,173	0	20,098	7	15,203	60,761	112,952
2012	262	0	7,598	9,987	2,972	0	14,112	0	13,331	63,794	112,056
2013	237	0	11,253	9,998	3,171	0	20,197	31	23,609	78,623	147,119
2014	206	0	7,517	4,321	975	0	15,469	8,989	13,669	39,970	91,116
2015	182	0	6,136	3,640	4,594	0	15,520	6,389	14,838	65,773	117,072
2016	53	0	6,677	10,488	3,480	0	20,786	21	9,064	68,652	119,221
2017	277	0	9,175	11,384	3,438	0	13,270	0	7,078	58,807	103,429
2018	**0**	**0**	**9,340**	**11,510**	**2,650**	**0**	**18,104**	**0**	**19,188**	**62,502**	**123,294**
2019	0	0	9,224	11,510	2,650	0	18,220	0	21,600	60,000	123,204
2020	0	0	9,400	10,744	2,650	0	18,810	0	21,648	60,000	123,252
2021	0	0	9,610	9,884	2,650	0	19,460	0	21,600	60,000	123,204
2022	0	0	9,610	9,884	2,650	0	19,460	0	21,600	60,000	123,204
2023	0	0	9,610	9,884	2,650	0	19,460	0	21,600	60,000	123,204
2024	0	0	9,610	9,884	2,650	0	19,460	0	21,600	60,000	123,204
2025	0	0	9,610	9,884	2,650	0	19,460	0	21,600	60,000	123,204
2026	0	0	9,610	9,884	2,650	0	19,460	0	21,600	60,000	123,204
2027	0	0	9,610	9,884	2,650	0	19,460	0	21,600	60,000	123,204
2028	0	0	9,610	9,884	2,650	0	19,460	0	21,600	60,000	123,204
2029	0	0	9,610	9,884	2,650	0	19,460	0	21,600	60,000	123,204
2030	0	0	9,610	9,884	2,650	0	19,460	0	21,600	60,000	123,204
2031	0	0	9,610	9,884	2,650	0	19,460	0	21,600	60,000	123,204
2032	0	0	9,610	9,884	2,650	0	19,460	0	21,600	60,000	123,204
2033	0	0	9,610	9,884	2,650	0	19,460	0	21,600	60,000	123,204
2034	0	0	9,610	9,884	2,650	0	19,460	0	21,600	60,000	123,204
2035	0	0	9,610	9,884	2,650	0	19,460	0	21,600	60,000	123,204
TOTAL	**24,827**	**53,844**	**486,771**	**443,882**	**122,007**	**11,722**	**857,232**	**324,161**	**867,475**	**4,687,586**	**7,879,507**

[b] For the period June 1962 through November 1967, deliveries were supplied by non-project water.

TABLE B-5A Annual Water Quantities Delivered from Each Aqueduct Reach to Each Contractor (acre-feet)

	CALIFORNIA AQUEDUCT											
	NORTH SAN JOAQUIN DIVISION						SAN LUIS DIVISION					
	Reach 1	Reach 2A					Reach 3		Reach 3A			
Calendar Year	Kern (Agricultural)	Alameda-Zone 7	Kern (Agricultural)	Oak Flat[c]	Santa Clara	Tulare	Dudley Ridge	Metropolitan	Alameda-Zone 7	Alameda County	AVEK	Castaic Lake
	[23]	[24]	[25]	[26]	[27]	[28]	[29]	[30]	[31]	[32]	[33]	[34]
1962	0	0	0	0	0	0	0	0	0	0	0	0
1963	0	0	0	0	0	0	0	0	0	0	0	0
1964	0	0	0	0	0	0	0	0	0	0	0	0
1965	0	0	0	0	0	0	0	0	0	0	0	0
1966	0	0	0	0	0	0	0	0	0	0	0	0
1967	0	0	0	0	0	0	0	0	0	0	0	0
1968	0	0	0	3,084	0	0	0	0	0	0	0	0
1969	0	0	0	3,016	0	0	0	0	0	0	0	0
1970	0	0	0	5,911	0	0	0	0	0	0	0	0
1971	0	0	0	7,212	0	0	0	0	0	0	0	0
1972	0	0	0	8,166	0	0	0	0	0	0	0	0
1973	0	0	0	3,214	0	0	0	0	0	0	0	0
1974	0	0	0	3,471	0	0	0	0	0	0	0	0
1975	0	0	0	3,576	0	0	0	0	0	0	0	0
1976	0	0	0	4,112	0	0	0	0	0	0	0	0
1977	0	0	0	1,472	0	0	0	0	0	0	0	0
1978	0	0	0	3,906	0	0	0	0	0	0	0	0
1979	0	0	0	6,149	0	0	0	0	0	0	0	0
1980	0	0	0	5,700	0	0	0	0	0	0	0	0
1981	0	0	0	4,300	0	0	0	0	0	0	0	0
1982	0	0	0	3,838	0	0	0	0	0	0	0	0
1983	0	0	0	3,822	0	0	0	0	0	0	0	0
1984	0	0	0	5,700	0	0	0	0	0	0	0	0
1985	0	0	0	5,433	0	0	0	0	0	0	0	0
1986	0	0	0	5,107	0	0	0	0	0	0	0	0
1987	0	0	0	5,625	0	0	0	0	0	0	0	0
1988	0	0	0	4,412	0	0	0	0	0	0	0	0
1989	0	0	0	6,091	0	300	602	0	0	0	0	0
1990	0	0	0	2,922	200	0	0	0	0	0	0	0
1991	0	0	0	141	0	0	0	0	0	0	0	0
1992	0	0	0	2,239	0	0	0	0	0	0	0	0
1993	0	0	0	2,858	0	0	0	0	0	0	0	0
1994	0	0	0	3,071	0	0	0	0	0	0	0	0
1995	0	0	0	5,169	0	0	0	0	0	0	0	0
1996	0	0	0	4,904	0	0	0	0	0	0	0	0
1997	0	0	0	5,238	0	0	0	11,100	0	0	0	0
1998	0	0	0	4,401	0	0	0	(11,100)	0	0	0	0
1999	0	0	0	4,871	0	0	0	0	0	0	0	0
2000	0	0	0	4,508	0	0	0	0	0	0	0	0
2001	0	0	638	3,592	0	0	0	0	0	0	0	0
2002	0	0	773	4,885	0	0	0	0	0	0	0	0
2003	0	7	917	4,266	0	0	0	0	0	0	0	0
2004	0	38	786	4,629	0	0	0	0	0	0	0	0
2005	0	299	1,046	4,194	0	0	0	0	0	0	0	0
2006	0	321	1,103	4,242	0	0	0	0	0	0	0	0
2007	0	320	1,031	3,567	0	0	0	0	0	0	0	0
2008	8,885	56	1,744	1,985	0	0	0	0	0	0	5,873	0
2009	0	0	1,169	1,993	0	0	0	0	0	0	0	3,300
2010	0	0	1,124	2,906	0	0	0	0	0	0	0	0
2011	0	0	1,112	2,715	0	0	0	0	0	0	0	0
2012	0	0	1,258	3,208	0	0	0	0	0	0	0	0
2013	0	0	1,156	2,820	0	0	0	0	0	0	0	0
2014	0	0	609	1,520	0	0	0	0	5,808	7,408	0	0
2015	0	0	718	1,077	0	0	0	0	2,360	6,032	0	0
2016	0	0	677	1,855	0	0	0	0	0	0	0	5,940
2017	0	0	68	1,974	0	0	0	0	0	0	0	30,000
2018	**0**	**0**	**1,300**	**3,420**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
2019	0	0	1,300	3,420	0	0	0	0	0	0	0	0
2020	0	0	1,300	3,420	0	0	0	0	0	0	0	0
2021	0	0	1,300	3,420	0	0	0	0	0	0	0	0
2022	0	0	1,300	3,420	0	0	0	0	0	0	0	0
2023	0	0	1,300	3,420	0	0	0	0	0	0	0	0
2024	0	0	1,300	3,420	0	0	0	0	0	0	0	0
2025	0	0	1,300	3,420	0	0	0	0	0	0	0	0
2026	0	0	1,300	3,420	0	0	0	0	0	0	0	0
2027	0	0	1,300	3,420	0	0	0	0	0	0	0	0
2028	0	0	1,300	3,420	0	0	0	0	0	0	0	0
2029	0	0	1,300	3,420	0	0	0	0	0	0	0	0
2030	0	0	1,300	3,420	0	0	0	0	0	0	0	0
2031	0	0	1,300	3,420	0	0	0	0	0	0	0	0
2032	0	0	1,300	3,420	0	0	0	0	0	0	0	0
2033	0	0	1,300	3,420	0	0	0	0	0	0	0	0
2034	0	0	1,300	3,420	0	0	0	0	0	0	0	0
2035	0	0	1,300	3,420	0	0	0	0	0	0	0	0
TOTAL	**8,885**	**1,041**	**39,329**	**256,627**	**200**	**300**	**602**	**0**	**8,168**	**13,440**	**5,873**	**39,240**

[c] Includes 425 af of 1988 advance allocation and 141 af of 1992 advance allocation.

TABLE B-5A Annual Water Quantities Delivered from Each Aqueduct Reach to Each Contractor (acre-feet)

	CALIFORNIA AQUEDUCT (continued)											
	SAN LUIS DIVISION (continued)											
	Reach 3A (continued)							Reach 4				
		Kern								Kern		
Calendar Year	Dudley Ridge	Municipal and Industrial	Agricultural	Metropolitan	Santa Barbara	Santa Clara	Tulare	Castaic Lake	Dudley Ridge	Municipal and Industrial	Agricultural	Tulare
	[35]	[36]	[37]	[38]	[39]	[40]	[41]	[42]	[43]	[44]	[45]	[46]
1962	0	0	0	0	0	0	0	0	0	0	0	0
1963	0	0	0	0	0	0	0	0	0	0	0	0
1964	0	0	0	0	0	0	0	0	0	0	0	0
1965	0	0	0	0	0	0	0	0	0	0	0	0
1966	0	0	0	0	0	0	0	0	0	0	0	0
1967	0	0	0	0	0	0	0	0	0	0	0	0
1968	0	0	0	0	0	0	0	0	0	0	0	0
1969	0	0	0	0	0	0	0	0	0	0	0	0
1970	0	0	0	0	0	0	0	0	0	0	0	0
1971	0	0	0	0	0	0	0	0	0	0	0	0
1972	0	0	0	0	0	0	0	0	0	0	0	0
1973	0	0	0	0	0	0	0	0	0	0	0	0
1974	0	0	0	0	0	0	0	0	0	0	0	0
1975	0	0	0	0	0	0	0	0	0	0	0	0
1976	0	0	0	0	0	0	0	0	0	0	0	0
1977	0	0	0	0	0	0	0	0	0	0	0	0
1978	0	0	0	0	0	0	0	0	0	0	0	0
1979	0	0	0	0	0	0	0	0	0	0	0	0
1980	0	0	0	0	0	0	0	0	0	0	0	0
1981	0	0	0	0	0	0	0	0	0	0	0	0
1982	0	0	0	0	0	0	0	0	0	0	0	0
1983	0	0	0	0	0	0	0	0	0	0	0	0
1984	0	0	0	0	0	0	0	0	0	0	0	0
1985	0	0	0	0	0	0	0	0	0	0	0	0
1986	0	0	0	0	0	0	0	0	0	0	0	0
1987	0	0	0	0	0	0	0	0	0	0	0	0
1988	0	0	0	0	0	0	0	0	0	0	0	0
1989	0	0	0	0	0	0	0	0	1,898	0	12,647	0
1990	0	0	0	0	0	0	0	0	0	0	0	1,500
1991	0	0	0	0	0	0	0	0	0	0	0	0
1992	0	0	0	0	0	0	0	0	0	0	0	0
1993	0	0	0	0	0	0	0	0	0	0	0	0
1994	0	0	0	0	0	0	0	0	0	0	0	0
1995	0	0	0	0	0	0	0	0	14,446	0	3,500	0
1996	0	0	0	0	0	0	0	0	0	1,125	4,162	0
1997	0	0	0	0	0	0	0	0	0	0	0	0
1998	0	0	0	0	0	0	0	0	0	0	0	0
1999	0	0	0	0	0	0	0	0	0	0	0	1,300
2000	0	3,320	68,960	0	0	0	0	0	0	1,517	878	0
2001	0	0	140,242	0	0	30,000	0	0	0	0	0	0
2002	0	6,000	62,024	0	0	0	0	0	0	0	0	0
2003	0	0	151,044	29,596	0	0	0	0	0	0	1,351	0
2004	0	0	44,877	0	0	0	0	0	0	0	0	0
2005	0	0	109,712	50,000	0	8,804	277	0	0	0	7,000	0
2006	0	0	19,575	0	0	0	0	0	0	0	0	0
2007	0	71,567	116,272	0	0	0	0	0	0	0	0	0
2008	0	0	94,562	0	0	0	0	0	0	0	10,721	0
2009	0	0	164,653	52,933	0	9,999	0	0	0	0	0	0
2010	0	0	35,896	120,274	0	9,993	0	0	0	0	0	0
2011	0	0	0	78,324	0	1,825	0	0	0	0	0	0
2012	6,068	0	23,401	0	0	0	0	0	0	0	0	0
2013	0	0	64,524	0	0	6,000	0	6,000	0	0	0	0
2014	16,789	0	104,689	15,000	0	27,476	0	0	0	0	0	0
2015	14,460	0	105,549	0	0	17,115	0	0	0	0	3,278	8,166
2016	0	0	54,247	37,283	7,230	28,878	0	0	0	0	1,047	7,723
2017	0	0	0	2,436	15,584	10,497	0	0	0	0	0	0
2018	**0**	**0**	**0**	**254,657**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
2019	0	0	0	172,063	0	0	0	0	0	0	0	0
2020	0	0	0	172,063	0	0	0	0	0	0	0	0
2021	0	0	0	172,063	0	0	0	0	0	0	0	0
2022	0	0	0	172,063	0	0	0	0	0	0	0	0
2023	0	0	0	172,063	0	0	0	0	0	0	0	0
2024	0	0	0	172,063	0	0	0	0	0	0	0	0
2025	0	0	0	172,063	0	0	0	0	0	0	0	0
2026	0	0	0	172,063	0	0	0	0	0	0	0	0
2027	0	0	0	172,063	0	0	0	0	0	0	0	0
2028	0	0	0	172,063	0	0	0	0	0	0	0	0
2029	0	0	0	172,063	0	0	0	0	0	0	0	0
2030	0	0	0	172,063	0	0	0	0	0	0	0	0
2031	0	0	0	172,063	0	0	0	0	0	0	0	0
2032	0	0	0	172,063	0	0	0	0	0	0	0	0
2033	0	0	0	172,063	0	0	0	0	0	0	0	0
2034	0	0	0	172,063	0	0	0	0	0	0	0	0
2035	0	0	0	172,063	0	0	0	0	0	0	0	0
TOTAL	**37,317**	**80,887**	**1,360,227**	**3,565,574**	**22,814**	**150,587**	**277**	**6,000**	**16,344**	**2,642**	**44,584**	**18,689**

TABLE B-5A Annual Water Quantities Delivered from Each Aqueduct Reach to Each Contractor (acre-feet)

	CALIFORNIA AQUEDUCT (continued)											
	SAN LUIS DIVISION (continued)								SOUTH SAN JOAQUIN DIVISION			
	Reach 5								Reach 6			
				Kern						Kern		
Calendar Year	Castaic Lake	Dudley Ridge	Empire	Municipal and Industrial	Agricultural	Metropolitan	Oak Flat	Tulare	Empire	Municipal and Industrial	Agricultural	Kings
	[47]	[48]	[49]	[50]	[51]	[52]	[53]	[54]	[55]	[56]	[57]	[58]
1962	0	0	0	0	0	0	0	0	0	0	0	0
1963	0	0	0	0	0	0	0	0	0	0	0	0
1964	0	0	0	0	0	0	0	0	0	0	0	0
1965	0	0	0	0	0	0	0	0	0	0	0	0
1966	0	0	0	0	0	0	0	0	0	0	0	0
1967	0	0	0	0	0	0	0	0	0	0	0	0
1968	0	0	0	0	0	0	0	0	0	0	0	0
1969	0	0	0	0	0	0	0	0	0	0	0	0
1970	0	0	0	0	0	0	0	0	0	0	0	0
1971	0	0	0	0	0	0	0	0	0	0	0	0
1972	0	0	0	0	0	0	0	0	0	0	0	0
1973	0	0	0	0	0	0	0	0	0	0	0	0
1974	0	0	0	0	0	0	0	0	0	0	0	0
1975	0	0	0	0	0	0	0	0	0	0	0	0
1976	0	0	0	0	0	0	0	0	0	0	0	0
1977	0	0	0	0	0	0	0	0	0	0	0	0
1978	0	0	0	0	0	0	0	0	0	0	0	0
1979	0	0	0	0	0	0	0	0	0	0	0	0
1980	0	0	0	0	0	0	0	0	0	0	0	0
1981	0	0	0	0	0	0	0	0	0	0	0	0
1982	0	0	0	0	0	0	0	0	0	0	0	0
1983	0	0	0	0	0	0	0	0	0	0	0	0
1984	0	0	0	0	0	0	0	0	0	0	0	0
1985	0	0	0	0	0	0	0	0	0	0	0	0
1986	0	0	0	0	0	0	0	0	0	0	0	0
1987	0	0	0	0	0	0	0	0	0	0	0	0
1988	0	0	0	0	0	0	0	1,550	0	0	0	0
1989	0	0	0	0	18,831	0	0	0	0	0	8,260	0
1990	0	0	0	0	0	0	0	0	0	0	0	0
1991	0	0	0	0	0	0	0	0	0	0	0	0
1992	0	10,823	0	0	0	0	0	0	0	0	0	0
1993	5,095	27,200	0	0	28,200	0	2,000	1,624	0	0	31,200	0
1994	0	0	0	0	0	0	0	0	0	0	0	0
1995	0	0	0	0	21,776	0	0	0	0	0	3,932	0
1996	0	0	0	1,125	81,507	0	0	4,000	0	0	0	0
1997	0	0	0	9,080	154,940	0	0	3,500	0	0	0	0
1998	0	0	0	0	0	0	0	0	0	20,400	33,340	0
1999	0	0	0	0	0	21,500	0	8,000	0	0	33,776	0
2000	0	0	0	8,130	57,647	0	0	0	0	1,457	35,847	0
2001	0	0	0	0	0	0	0	2,457	0	0	0	0
2002	0	0	0	0	0	0	0	3,000	0	0	0	0
2003	0	0	0	0	0	0	0	3,900	0	0	0	0
2004	0	0	0	0	0	0	0	3,850	0	0	0	3,250
2005	0	0	0	0	0	0	0	1,000	0	0	0	6,954
2006	0	0	0	0	0	0	0	3,000	0	0	0	2,659
2007	0	0	0	0	0	0	0	3,600	0	0	0	3,119
2008	0	0	0	0	0	0	0	1,355	0	0	0	2,159
2009	0	0	870	0	0	0	0	1,490	0	0	0	1,779
2010	0	0	431	0	0	0	0	0	0	0	0	2,477
2011	0	0	0	0	0	0	0	0	400	0	0	2,964
2012	0	0	449	0	0	0	0	2,800	514	0	0	2,706
2013	0	0	692	0	8,393	0	0	5,350	280	0	0	2,666
2014	0	0	303	0	0	0	0	661	38	0	0	1,109
2015	0	0	142	0	1,349	0	0	7,576	120	0	0	391
2016	0	0	425	0	7,553	0	0	24,251	446	0	0	1,009
2017	0	0	0	0	0	0	0	1,000	0	0	0	3,109
2018	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**3,120**
2019	0	0	0	0	0	0	0	0	0	0	0	3,120
2020	0	0	0	0	0	0	0	0	0	0	0	3,120
2021	0	0	0	0	0	0	0	0	0	0	0	3,120
2022	0	0	0	0	0	0	0	0	0	0	0	3,120
2023	0	0	0	0	0	0	0	0	0	0	0	3,120
2024	0	0	0	0	0	0	0	0	0	0	0	3,120
2025	0	0	0	0	0	0	0	0	0	0	0	3,120
2026	0	0	0	0	0	0	0	0	0	0	0	3,120
2027	0	0	0	0	0	0	0	0	0	0	0	3,120
2028	0	0	0	0	0	0	0	0	0	0	0	3,120
2029	0	0	0	0	0	0	0	0	0	0	0	3,120
2030	0	0	0	0	0	0	0	0	0	0	0	3,120
2031	0	0	0	0	0	0	0	0	0	0	0	3,120
2032	0	0	0	0	0	0	0	0	0	0	0	3,120
2033	0	0	0	0	0	0	0	0	0	0	0	3,120
2034	0	0	0	0	0	0	0	0	0	0	0	3,120
2035	0	0	0	0	0	0	0	0	0	0	0	3,120
TOTAL	**5,095**	**38,023**	**3,312**	**18,335**	**380,196**	**21,500**	**2,000**	**83,964**	**1,798**	**21,857**	**146,355**	**92,511**

TABLE B-5A Annual Water Quantities Delivered from Each Aqueduct Reach to Each Contractor (acre-feet)

	CALIFORNIA AQUEDUCT (continued)											
	SOUTH SAN JOAQUIN DIVISION (continued)											
	Reach 6 (continued)		Reach 7							Reach 8C		
					Kern							Kern
Calendar Year	Metropolitan	Tulare	Castaic Lake	Dudley Ridge	Municipal and Industrial	Agricultural	Kings	Metropolitan	Tulare	Dudley Ridge	Empire	Municipal and Industrial)
	[59]	[60]	[61]	[62]	[63]	[64]	[65]	[66]	[67]	[68]	[69]	[70]
1962	0	0	0	0	0	0	0	0	0	0	0	0
1963	0	0	0	0	0	0	0	0	0	0	0	0
1964	0	0	0	0	0	0	0	0	0	0	0	0
1965	0	0	0	0	0	0	0	0	0	0	0	0
1966	0	0	0	0	0	0	0	0	0	0	0	0
1967	0	0	0	0	0	0	0	0	0	0	0	0
1968	0	0	0	0	0	0	0	0	0	0	1,978	0
1969	0	0	0	0	0	0	0	0	0	0	56	0
1970	0	0	0	0	0	0	0	0	0	0	3,942	0
1971	0	0	0	0	0	0	0	0	0	0	5,990	0
1972	0	0	0	0	0	0	0	0	0	0	5,795	0
1973	0	0	0	0	0	0	0	0	0	0	3,000	0
1974	0	0	0	0	0	0	0	0	0	0	3,000	0
1975	0	0	0	0	0	0	0	0	0	0	3,000	0
1976	0	0	0	0	0	0	0	0	0	0	3,000	0
1977	0	0	0	0	0	0	0	0	0	0	738	0
1978	0	0	0	0	0	0	0	0	0	0	454	0
1979	0	0	0	0	0	0	0	0	0	0	1,739	0
1980	0	0	0	0	0	0	0	0	0	0	894	0
1981	0	0	0	0	0	0	0	0	0	0	5,859	0
1982	0	0	0	0	0	0	0	0	0	0	361	0
1983	0	0	0	0	0	0	0	0	0	0	0	0
1984	0	0	0	0	0	0	0	0	0	0	0	0
1985	0	0	0	0	0	0	0	0	0	0	5,197	0
1986	0	0	0	0	0	0	0	0	0	0	1,170	0
1987	0	0	0	0	0	0	0	0	0	0	2,525	0
1988	0	0	0	0	0	0	0	0	0	0	3,475	0
1989	0	0	0	0	0	5,262	0	0	0	2,391	3,000	0
1990	0	0	0	0	0	0	0	0	0	0	1,279	0
1991	0	0	0	0	0	0	0	0	0	0	221	0
1992	0	0	0	0	0	0	0	0	0	280	1,354	0
1993	0	0	0	0	18,157	10,043	0	0	0	0	2,741	0
1994	0	0	2,100	0	0	0	0	0	0	0	1,666	0
1995	0	0	0	0	10,875	20,595	0	0	0	0	1,631	989
1996	0	0	0	0	3,424	69,704	0	0	0	95	1,868	0
1997	0	0	0	0	27,079	32,463	0	0	0	0	0	0
1998	0	3,000	0	200	3,998	62,081	0	0	0	90	542	0
1999	11,000	23,000	0	0	7,923	19,500	0	500	4,470	86	3,176	0
2000	0	3,000	1,200	0	0	45,137	0	20,000	20,500	166	1,799	0
2001	0	600	0	0	0	0	0	0	0	14	1,360	0
2002	0	0	0	0	0	0	0	0	12,067	0	1,405	0
2003	0	0	0	0	0	0	0	0	15,103	0	1,436	0
2004	0	0	0	0	0	0	0	0	0	0	3,562	0
2005	0	0	0	0	0	0	6,904	0	4,000	0	3,834	0
2006	0	0	0	0	0	0	2,500	0	6,000	0	3,282	0
2007	0	0	0	0	0	16,214	0	0	2,545	0	2,084	0
2008	0	0	0	400	0	1,998	1,330	0	1,500	0	947	0
2009	0	2,100	0	1,400	0	0	0	0	600	0	164	0
2010	0	0	0	0	0	0	0	0	3,850	0	2,828	0
2011	0	0	0	0	0	0	0	0	2,500	0	1,515	0
2012	0	500	0	0	0	0	2,000	0	0	0	1,279	0
2013	0	1,159	0	500	0	0	0	0	1,121	0	595	0
2014	0	275	0	0	0	0	0	0	0	0	175	0
2015	0	0	0	850	0	0	0	0	0	0	362	0
2016	0	4,257	0	0	0	0	0	0	3,175	0	951	0
2017	0	0	0	0	0	0	0	0	0	0	1,800	0
2018	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1,800**	**0**
2019	0	0	0	0	0	0	0	0	0	0	1,800	0
2020	0	0	0	0	0	0	0	0	0	0	1,800	0
2021	0	0	0	0	0	0	0	0	0	0	1,800	0
2022	0	0	0	0	0	0	0	0	0	0	1,800	0
2023	0	0	0	0	0	0	0	0	0	0	1,800	0
2024	0	0	0	0	0	0	0	0	0	0	1,800	0
2025	0	0	0	0	0	0	0	0	0	0	1,800	0
2026	0	0	0	0	0	0	0	0	0	0	1,800	0
2027	0	0	0	0	0	0	0	0	0	0	1,800	0
2028	0	0	0	0	0	0	0	0	0	0	1,800	0
2029	0	0	0	0	0	0	0	0	0	0	1,800	0
2030	0	0	0	0	0	0	0	0	0	0	1,800	0
2031	0	0	0	0	0	0	0	0	0	0	1,800	0
2032	0	0	0	0	0	0	0	0	0	0	1,800	0
2033	0	0	0	0	0	0	0	0	0	0	1,800	0
2034	0	0	0	0	0	0	0	0	0	0	1,800	0
2035	0	0	0	0	0	0	0	0	0	0	1,800	0
TOTAL	**11,000**	**37,891**	**3,300**	**3,350**	**71,456**	**282,997**	**12,734**	**20,500**	**77,431**	**3,122**	**131,429**	**989**

TABLE B-5A Annual Water Quantities Delivered from Each Aqueduct Reach to Each Contractor (acre-feet)

	CALIFORNIA AQUEDUCT (continued)											
	SOUTH SAN JOAQUIN DIVISION (continued)											
	Reach 8C (continued)			Reach 8D						Reach 9		
	Kern				Kern						Kern	
Calendar Year	Agricultural	Kings	Tulare	Dudley Ridge	Municipal and Industrial	Agricultural	Kings	San Luis Obispo	Tulare	Dudley Ridge	Municipal and Industrial	Agricultural
	[71]	[72]	[73]	[74]	[75]	[76]	[77]	[78]	[79]	[80]	[81]	[82]
1962	0	0	0	0	0	0	0	0	0	0	0	0
1963	0	0	0	0	0	0	0	0	0	0	0	0
1964	0	0	0	0	0	0	0	0	0	0	0	0
1965	0	0	0	0	0	0	0	0	0	0	0	0
1966	0	0	0	0	0	0	0	0	0	0	0	0
1967	0	0	0	0	0	0	0	0	0	0	0	0
1968	0	900	25,100	26,360	0	0	0	0	0	0	0	30,951
1969	0	100	7,081	31,375	0	0	0	0	0	0	0	24,489
1970	0	0	0	40,407	0	0	0	0	3,408	0	0	46,114
1971	0	3,700	80,906	41,053	0	0	0	0	41,579	0	0	58,356
1972	0	1,400	144,843	42,443	0	0	0	0	113,550	0	0	75,464
1973	0	1,500	26,317	22,057	0	1,500	0	0	24,147	0	0	54,583
1974	0	1,500	32,603	33,390	0	0	0	0	39,686	0	0	63,814
1975	0	1,600	41,536	40,555	0	0	0	0	44,722	0	0	50,021
1976	0	1,600	26,595	41,421	0	0	0	0	32,216	0	0	53,465
1977	0	1,530	12,984	11,153	0	0	0	0	5,097	0	0	24,668
1978	0	2,070	3,934	51,747	0	0	0	0	8,119	0	0	72,231
1979	0	2,000	74,758	38,544	0	0	0	0	80,363	0	0	74,524
1980	0	2,200	35,140	41,000	0	0	0	0	40,304	0	0	79,946
1981	0	2,300	50,888	41,000	0	0	0	0	32,550	0	0	76,508
1982	0	1,536	4,405	41,000	0	0	214	0	14,146	0	0	76,877
1983	0	3,550	1,001	42,900	0	0	0	0	5	0	2,217	84,573
1984	0	3,100	3,677	45,100	0	0	0	0	2,066	0	4,100	85,732
1985	0	3,400	68,638	46,251	0	0	0	0	41,153	0	0	67,696
1986	0	3,700	40,017	50,249	0	0	0	0	39,338	0	0	79,943
1987	0	4,000	30,359	46,288	0	0	0	0	62,725	0	0	97,732
1988	0	4,000	46,281	47,994	0	0	0	0	48,035	0	1,100	83,858
1989	0	4,000	63,703	52,158	0	0	0	0	63,947	0	0	91,134
1990	0	2,000	23,504	36,296	0	161	0	0	32,066	0	0	83,108
1991	0	0	1,697	927	0	0	0	0	483	0	13,683	601
1992	0	1,806	15,982	12,667	0	0	0	0	30,746	0	28	40,183
1993	0	4,000	57,112	23,221	0	0	0	0	65,732	197	5,945	53,597
1994	0	2,116	21,510	28,793	0	1,726	0	0	40,852	0	0	44,994
1995	10,527	4,000	40,934	45,240	2,959	27,270	0	0	57,435	0	0	64,076
1996	1,500	4,000	84,130	52,722	0	1,455	0	100	148,745	0	2,236	89,291
1997	1,500	0	9,467	57,496	0	0	0	100	9,402	4,900	0	72,013
1998	1,000	15	8,956	49,435	0	20,000	0	0	8,721	0	0	57,530
1999	400	4,000	90,334	58,290	0	9,000	0	0	162,631	0	0	72,734
2000	400	3,600	63,842	57,920	0	0	0	0	113,952	0	0	73,562
2001	0	1,560	23,300	40,155	0	6,089	0	0	58,369	0	0	54,198
2002	0	2,854	34,009	48,179	0	7,522	0	0	47,426	0	0	60,957
2003	0	3,692	25,317	45,732	0	8,350	0	0	61,521	0	0	54,724
2004	0	5,803	30,546	45,823	0	4,979	0	0	55,625	0	0	54,330
2005	0	4,057	42,450	58,627	0	0	1,891	0	92,552	0	0	53,206
2006	0	1,105	34,367	61,410	0	0	3,266	0	64,840	0	0	56,909
2007	0	657	31,305	39,974	0	7,740	1,921	0	49,633	0	0	66,018
2008	0	240	14,146	18,974	0	21,242	107	0	16,903	0	0	63,315
2009	0	1,612	13,522	12,037	0	19,684	0	0	16,794	5,500	0	64,007
2010	0	26	14,005	17,346	0	14,094	1,900	0	40,609	0	0	76,357
2011	0	2,160	23,814	22,427	0	65	1,194	0	30,827	292	0	78,177
2012	0	2,699	25,847	17,122	0	2,168	0	0	56,570	3,400	0	69,395
2013	0	1,029	16,490	19,605	0	4,239	950	0	24,241	1,941	0	82,005
2014	0	81	2,880	12,960	0	3,554	66	0	5,118	1,000	0	67,754
2015	0	838	977	9,473	0	2,000	0	0	617	1,250	0	64,809
2016	0	2,651	534	11,403	0	140	0	0	2,447	3,430	0	68,699
2017	0	962	20,745	33,539	0	1,352	1,365	0	39,277	0	0	58,787
2018	**0**	**912**	**20,993**	**28,568**	**0**	**0**	**1,368**	**0**	**31,490**	**0**	**0**	**60,816**
2019	0	912	20,993	28,568	0	0	1,368	0	31,490	0	0	60,816
2020	0	912	20,993	28,568	0	0	1,368	0	31,490	0	0	60,816
2021	0	912	20,993	28,568	0	0	1,368	0	31,490	0	0	60,816
2022	0	912	20,993	28,568	0	0	1,368	0	31,490	0	0	60,816
2023	0	912	20,993	28,568	0	0	1,368	0	31,490	0	0	60,816
2024	0	912	20,993	28,568	0	0	1,368	0	31,490	0	0	60,816
2025	0	912	20,993	28,568	0	0	1,368	0	31,490	0	0	60,816
2026	0	912	20,993	28,568	0	0	1,368	0	31,490	0	0	60,816
2027	0	912	20,993	28,568	0	0	1,368	0	31,490	0	0	60,816
2028	0	912	20,993	28,568	0	0	1,368	0	31,490	0	0	60,816
2029	0	912	20,993	28,568	0	0	1,368	0	31,490	0	0	60,816
2030	0	912	20,993	28,568	0	0	1,368	0	31,490	0	0	60,816
2031	0	912	20,993	28,568	0	0	1,368	0	31,490	0	0	60,816
2032	0	912	20,993	28,568	0	0	1,368	0	31,490	0	0	60,816
2033	0	912	20,993	28,568	0	0	1,368	0	31,490	0	0	60,816
2034	0	912	20,993	28,568	0	0	1,368	0	31,490	0	0	60,816
2035	0	912	20,993	28,568	0	0	1,368	0	31,490	0	0	60,816
TOTAL	**15,327**	**123,665**	**1,970,362**	**2,326,462**	**2,959**	**164,330**	**37,498**	**200**	**2,638,110**	**21,910**	**29,309**	**4,292,703**

TABLE B-5A Annual Water Quantities Delivered from Each Aqueduct Reach to Each Contractor (acre-feet)

	CALIFORNIA AQUEDUCT (continued)											
	SOUTH SAN JOAQUIN DIVISION (continued)											
	Reach 9	Reach 10A										Reach 11B
						Kern						
Calendar Year	Tulare	Alameda-Zone 7	Alameda County	Castaic Lake	Dudley Ridge	Municipal and Industrial	Agricultural	Metropolitan	San Bernardino	Santa Clara	Tulare	Castaic Lake
	[83]	[84]	[85]	[86]	[87]	[88]	[89]	[90]	[91]	[92]	[93]	[94]
1962	0	0	0	0	0	0	0	0	0	0	0	0
1963	0	0	0	0	0	0	0	0	0	0	0	0
1964	0	0	0	0	0	0	0	0	0	0	0	0
1965	0	0	0	0	0	0	0	0	0	0	0	0
1966	0	0	0	0	0	0	0	0	0	0	0	0
1967	0	0	0	0	0	0	0	0	0	0	0	0
1968	0	0	0	0	0	0	0	0	0	0	0	0
1969	0	0	0	0	0	0	0	0	0	0	2,842	0
1970	1,855	0	0	0	0	0	158	0	0	0	4,315	0
1971	0	0	0	0	0	0	9,973	0	0	0	0	0
1972	0	0	0	0	0	0	5,876	0	0	0	0	0
1973	0	0	0	0	0	0	22,948	0	0	0	0	0
1974	0	0	0	0	0	10,019	22,719	0	0	0	0	0
1975	0	0	0	0	0	2,791	72,121	0	0	0	0	0
1976	0	0	0	0	0	74	50,444	0	0	0	0	0
1977	0	0	0	0	0	201	34,451	0	0	0	0	0
1978	0	0	0	0	0	0	161,889	0	0	0	0	0
1979	0	0	0	0	0	285	153,245	0	0	0	0	0
1980	0	0	0	0	0	3,780	131,836	0	0	0	0	0
1981	0	0	0	0	0	341	133,500	0	0	0	0	0
1982	0	0	0	0	0	4,700	164,832	0	0	0	0	0
1983	0	0	0	0	0	0	146,493	0	0	0	0	0
1984	0	0	0	0	0	6,910	150,302	0	0	0	0	0
1985	0	0	0	0	0	6,495	153,473	0	0	0	0	0
1986	0	0	0	0	0	5,065	198,099	0	0	0	0	0
1987	0	0	0	0	0	900	226,521	0	0	0	0	0
1988	0	0	0	0	0	9,529	212,495	0	0	0	0	0
1989	0	0	0	0	0	21,038	251,979	0	0	0	0	0
1990	0	0	0	0	0	25,189	47,472	0	0	0	0	0
1991	0	0	0	0	0	1,142	6,820	0	0	0	0	0
1992	0	0	0	0	0	3,685	89,390	0	0	0	0	0
1993	0	0	0	0	0	775	233,862	44,496	0	0	0	0
1994	0	0	0	0	0	5,227	126,792	0	0	0	0	0
1995	0	0	0	0	0	366	229,448	50,000	0	0	0	0
1996	0	0	6,200	0	0	6,666	199,854	95,000	0	45,000	0	0
1997	0	0	10,000	0	900	3,577	157,385	125,000	0	35,000	0	0
1998	0	1,970	3,780	0	0	2,603	163,587	39,500	0	23,800	0	0
1999	0	22,910	16,100	0	0	1,657	190,787	75,850	0	30,000	0	0
2000	0	23,940	13,380	0	0	7,672	283,208	0	0	23,730	0	0
2001	0	5,000	0	0	0	160	98,175	0	0	0	0	0
2002	0	14,287	2,083	24,000	0	145	171,498	0	0	3,311	0	0
2003	0	6,500	18,800	0	0	217	174,674	70,940	0	33,000	0	0
2004	0	5,740	8,000	32,522	0	65,751	117,286	0	0	0	0	0
2005	0	0	28,422	0	0	146	232,519	31,210	0	55,448	0	0
2006	0	5,740	27,447	0	5,000	0	237,623	0	0	64,036	0	0
2007	0	717	1,029	0	3,000	0	203,794	0	0	3,692	0	0
2008	0	0	0	0	2,800	1,702	103,176	0	0	4,306	0	0
2009	2,330	0	0	0	2,000	690	95,798	0	0	0	0	0
2010	0	3,000	7,000	0	2,000	14	102,773	74,000	0	51,990	800	0
2011	2,000	3,414	16,020	0	2,908	26	137,476	149,012	0	65,770	500	0
2012	2,000	0	7,500	0	1,660	29	201,876	45,000	2,868	0	0	5,500
2013	0	0	0	0	2,500	2,057	116,190	0	0	0	0	5,500
2014	0	0	0	0	0	0	40,332	0	0	0	0	0
2015	0	0	0	0	0	3,751	49,953	0	0	0	0	0
2016	0	5,000	18,272	0	1,075	817	101,875	0	0	9,634	0	0
2017	0	3,472	16,428	340	221	0	86,910	55,822	0	7,025	0	0
2018	**0**	**767**	**6,012**	**0**	**0**	**0**	**140,388**	**0**	**0**	**0**	**0**	**0**
2019	0	767	3,600	0	0	0	140,388	0	0	0	0	0
2020	0	767	3,552	0	0	0	140,388	0	0	0	0	0
2021	0	767	3,600	0	0	0	140,388	0	0	0	0	0
2022	0	767	3,600	0	0	0	140,388	0	0	0	0	0
2023	0	767	3,600	0	0	0	140,388	0	0	0	0	0
2024	0	767	3,600	0	0	0	140,388	0	0	0	0	0
2025	0	767	3,600	0	0	0	140,388	0	0	0	0	0
2026	0	767	3,600	0	0	0	140,388	0	0	0	0	0
2027	0	767	3,600	0	0	0	140,388	0	0	0	0	0
2028	0	767	3,600	0	0	0	140,388	0	0	0	0	0
2029	0	767	3,600	0	0	0	140,388	0	0	0	0	0
2030	0	767	3,600	0	0	0	140,388	0	0	0	0	0
2031	0	767	3,600	0	0	0	140,388	0	0	0	0	0
2032	0	767	3,600	0	0	0	140,388	0	0	0	0	0
2033	0	767	3,600	0	0	0	140,388	0	0	0	0	0
2034	0	767	3,600	0	0	0	140,388	0	0	0	0	0
2035	0	767	3,600	0	0	0	140,388	0	0	0	0	0
TOTAL	**8,185**	**115,496**	**267,625**	**56,862**	**24,064**	**206,192**	**8,830,871**	**855,830**	**2,868**	**455,742**	**8,457**	**11,000**

TABLE B-5A Annual Water Quantities Delivered from Each Aqueduct Reach to Each Contractor (acre-feet)

	CALIFORNIA AQUEDUCT (continued)										
	SOUTH SAN JOAQUIN DIVISION (continued)										
	Reach 11B (continued)					Reach 12D		Reach 12E			
		Kern				Kern					
Calendar Year	Dudley Ridge	Municipal and Industrial	Agricultural	Metropolitan	Tulare	Municipal and Industrial	Agricultural	Alameda-Zone 7	Alameda County	Castaic Lake	Dudley Ridge
	[95]	[96]	[97]	[98]	[99]	[100]	[101]	[102]	[103]	[104]	[105]
1962	0	0	0	0	0	0	0	0	0	0	0
1963	0	0	0	0	0	0	0	0	0	0	0
1964	0	0	0	0	0	0	0	0	0	0	0
1965	0	0	0	0	0	0	0	0	0	0	0
1966	0	0	0	0	0	0	0	0	0	0	0
1967	0	0	0	0	0	0	0	0	0	0	0
1968	0	0	24,776	0	0	0	0	0	0	0	0
1969	0	0	64,682	0	0	0	0	0	0	0	0
1970	0	0	72,279	0	0	0	0	0	0	0	0
1971	0	0	63,773	0	0	0	0	0	0	0	0
1972	0	0	72,358	0	0	0	0	0	0	0	0
1973	0	0	67,544	0	0	0	0	0	0	0	0
1974	0	0	87,476	0	0	0	0	0	0	0	0
1975	0	0	85,675	0	0	0	0	0	0	0	0
1976	0	0	85,067	0	0	0	0	0	0	0	0
1977	0	3,981	29,603	0	0	0	0	0	0	0	0
1978	0	0	88,753	0	0	0	0	0	0	0	0
1979	0	484	108,379	0	0	0	0	0	0	0	0
1980	0	3,112	103,207	0	0	0	0	0	0	0	0
1981	0	494	104,395	0	0	0	0	0	0	0	0
1982	0	798	99,081	0	0	0	0	0	0	0	0
1983	0	2,069	94,117	0	0	0	0	0	0	0	0
1984	0	2,349	124,819	0	0	0	0	0	0	0	0
1985	0	10,666	118,646	0	0	0	0	0	0	0	0
1986	0	8,673	124,836	0	0	0	0	0	0	0	0
1987	0	13,074	111,877	0	0	0	0	0	0	0	0
1988	0	13,509	114,031	0	0	0	0	0	0	0	0
1989	0	9,986	127,058	0	0	0	0	0	0	0	0
1990	0	9,319	104,107	0	0	0	0	0	0	0	0
1991	0	6,099	118	0	0	0	0	0	0	0	0
1992	0	7,419	35,093	0	0	0	0	0	0	0	0
1993	0	2,696	72,645	0	0	0	0	0	0	0	0
1994	0	3,506	71,202	0	0	0	0	0	0	0	0
1995	0	1,154	97,072	0	0	0	0	0	0	0	1,000
1996	0	1,185	96,250	0	0	0	0	0	0	0	4,131
1997	0	1,111	104,823	0	0	0	0	0	0	0	8,012
1998	0	1,311	72,646	0	0	0	0	0	0	0	5,925
1999	0	2,127	92,262	0	0	0	0	0	0	0	1,321
2000	1,500	3,793	89,622	0	0	21	0	0	0	0	953
2001	0	636	73,105	0	0	41	0	0	0	0	0
2002	0	1,457	91,123	0	0	760	6	0	0	0	0
2003	0	1,379	87,174	0	0	2,431	152	0	0	0	0
2004	0	1,299	97,722	0	0	3,419	768	0	0	0	1,600
2005	0	824	93,554	0	0	2,841	644	3,419	1,878	20,000	1,154
2006	0	0	98,417	0	0	2,513	1,556	10,000	0	20,000	0
2007	0	4,030	94,334	0	0	2,164	2,284	0	0	8,200	0
2008	0	263	93,417	0	0	1,514	3,000	0	0	0	0
2009	300	127	96,776	0	0	564	4,274	0	0	0	0
2010	5,350	381	92,220	0	974	1,904	2,206	10,000	0	25,844	0
2011	0	1,160	105,682	0	3,500	973	65	10,000	1,960	0	0
2012	2,000	1,019	94,519	0	0	3,128	939	20,308	0	6,416	200
2013	2,500	1,167	110,418	0	0	3,473	1,531	0	0	0	0
2014	9,786	0	87,728	0	0	0	5,225	0	0	0	0
2015	8,200	4,553	84,288	0	0	985	3,486	0	0	0	0
2016	5,000	1,037	91,735	942	0	2,225	1,442	7,000	0	0	0
2017	0	19,122	75,883	0	0	18,447	255	6,000	0	0	9,151
2018	**0**	**9,000**	**59,164**	**0**	**0**	**4,226**	**0**	**6,000**	**0**	**0**	**0**
2019	0	9,000	59,164	0	0	4,226	0	6,000	0	0	0
2020	0	9,000	59,164	0	0	4,226	0	6,000	0	0	0
2021	0	9,000	59,164	0	0	4,226	0	6,000	0	0	0
2022	0	9,000	59,164	0	0	4,226	0	6,000	0	0	0
2023	0	9,000	59,164	0	0	4,226	0	6,000	0	0	0
2024	0	9,000	59,164	0	0	4,226	0	6,000	0	0	0
2025	0	9,000	59,164	0	0	4,226	0	6,000	0	0	0
2026	0	9,000	59,164	0	0	4,226	0	6,000	0	0	0
2027	0	9,000	59,164	0	0	4,226	0	6,000	0	0	0
2028	0	9,000	59,164	0	0	4,226	0	6,000	0	0	0
2029	0	9,000	59,164	0	0	4,226	0	6,000	0	0	0
2030	0	9,000	59,164	0	0	4,226	0	6,000	0	0	0
2031	0	9,000	59,164	0	0	4,226	0	6,000	0	0	0
2032	0	9,000	59,164	0	0	4,226	0	6,000	0	0	0
2033	0	9,000	59,164	0	0	4,226	0	6,000	0	0	0
2034	0	9,000	59,164	0	0	4,226	0	6,000	0	0	0
2035	0	9,000	59,164	0	0	4,226	0	6,000	0	0	0
TOTAL	**34,636**	**309,369**	**5,441,319**	**942**	**4,474**	**123,471**	**27,833**	**174,727**	**3,838**	**80,460**	**33,447**

TABLE B-5A Annual Water Quantities Delivered from Each Aqueduct Reach to Each Contractor (acre-feet)

	CALIFORNIA AQUEDUCT (continued)										
	SOUTH SAN JOAQUIN DIVISION (continued)										
	Reach 12E (continued)					Reach 13B					
	Kern								Kern		
Calendar Year	Municipal and Industrial	Agricultural	Metropolitan	San Bernardino	Santa Clara	Alameda-Zone 7	Alameda County	Dudley Ridge	Municipal and Industrial	Agricultural	Metropolitan
	[106]	[107]	[108]	[109]	[110]	[111]	[112]	[113]	[114]	[115]	[116]
1962	0	0	0	0	0	0	0	0	0	0	0
1963	0	0	0	0	0	0	0	0	0	0	0
1964	0	0	0	0	0	0	0	0	0	0	0
1965	0	0	0	0	0	0	0	0	0	0	0
1966	0	0	0	0	0	0	0	0	0	0	0
1967	0	0	0	0	0	0	0	0	0	0	0
1968	0	0	0	0	0	0	0	0	0	0	0
1969	0	0	0	0	0	0	0	0	0	0	0
1970	0	9,279	0	0	0	0	0	0	0	4,891	0
1971	0	28,056	0	0	0	0	0	0	0	0	0
1972	0	62,342	0	0	0	0	0	0	0	17,388	0
1973	0	13,082	0	0	0	0	0	0	0	9,297	0
1974	2,651	4,248	0	0	0	0	0	0	8,038	4,246	0
1975	0	10,787	0	0	0	0	0	0	8,538	7,059	0
1976	37,519	20,555	0	0	0	0	0	0	5,626	8,855	0
1977	20,280	1,737	0	0	0	0	0	0	0	5,024	0
1978	47,133	15,011	0	0	0	0	0	0	21,773	7,601	0
1979	50,740	61,567	0	0	0	0	0	0	5,663	17,766	0
1980	32,039	22,252	0	0	0	0	0	0	0	22,515	0
1981	59,917	58,470	0	0	0	0	0	0	7,844	14,037	0
1982	36,139	75,587	0	0	0	0	0	0	0	25,553	0
1983	0	10,950	0	0	0	0	0	0	0	3,491	0
1984	63,941	39,929	0	0	0	0	0	0	12,117	26,178	0
1985	69,839	84,117	0	0	0	0	0	0	0	67,711	0
1986	62,109	51,540	0	0	0	0	0	0	0	66,551	0
1987	95,297	86,223	0	0	0	0	0	0	5,609	40,374	0
1988	86,390	123,249	0	0	0	0	0	0	9,298	47,167	0
1989	83,965	146,544	0	0	0	0	0	0	5,504	57,114	0
1990	82,164	38,973	0	0	0	0	0	0	7,645	20,423	0
1991	8,842	303	0	0	0	0	0	0	0	0	0
1992	47,181	57,048	0	0	0	0	0	0	789	17,449	0
1993	84,822	285,554	5,504	0	0	0	0	0	12,798	88,157	0
1994	66,188	77,839	0	0	0	0	0	0	2,494	33,148	0
1995	107,130	181,097	0	0	0	0	0	0	8,751	110,685	0
1996	89,257	134,138	0	0	0	0	0	0	28,063	64,849	0
1997	32,061	128,329	1,486	0	0	0	0	0	43,803	49,312	0
1998	28,258	88,998	24,234	0	0	0	0	0	29,444	40,085	5,500
1999	110,161	255,343	62,162	0	0	0	0	0	12,969	92,998	0
2000	11,772	156,215	149,731	0	0	0	0	0	0	102,202	0
2001	385	51,076	0	0	0	0	0	1,733	0	33,925	0
2002	0	135,335	0	0	0	0	0	736	0	71,444	0
2003	39,479	112,056	45,989	0	0	0	0	350	2,396	124,582	1,865
2004	52,303	95,893	0	0	0	0	0	1,657	1,922	73,801	0
2005	43,835	340,281	15,384	0	2,619	2,321	0	14,540	21,781	269,631	192
2006	82,207	296,230	5,065	0	0	0	0	5,670	11,787	196,116	0
2007	1,179	87,764	0	0	0	0	0	2,161	0	72,240	0
2008	0	58,983	0	0	0	0	0	0	200	9,785	0
2009	0	82,434	0	0	0	0	0	0	0	12,060	0
2010	4,851	72,809	134,855	0	0	0	0	304	0	63,966	22,000
2011	26,249	313,619	109,787	8,066	706	2,331	3,420	34,733	4,896	273,275	25,845
2012	19,423	102,054	92,803	19,066	0	0	0	0	448	70,805	1,950
2013	26,652	60,295	0	0	0	0	0	0	0	14,189	0
2014	0	500	0	0	0	0	0	0	0	2,246	0
2015	280	2,750	0	0	0	0	0	0	0	481	0
2016	1,225	57,929	3,908	0	0	0	0	0	3,005	12,815	0
2017	17,809	159,439	66,326	0	0	0	0	16,402	0	94,561	0
2018	**50,704**	**67,584**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**22,200**	**0**
2019	50,704	67,584	0	0	0	0	0	0	0	22,200	0
2020	50,704	67,584	0	0	0	0	0	0	0	22,200	0
2021	50,704	67,584	0	0	0	0	0	0	0	22,200	0
2022	50,704	67,584	0	0	0	0	0	0	0	22,200	0
2023	50,704	67,584	0	0	0	0	0	0	0	22,200	0
2024	50,704	67,584	0	0	0	0	0	0	0	22,200	0
2025	50,704	67,584	0	0	0	0	0	0	0	22,200	0
2026	50,704	67,584	0	0	0	0	0	0	0	22,200	0
2027	50,704	67,584	0	0	0	0	0	0	0	22,200	0
2028	50,704	67,584	0	0	0	0	0	0	0	22,200	0
2029	50,704	67,584	0	0	0	0	0	0	0	22,200	0
2030	50,704	67,584	0	0	0	0	0	0	0	22,200	0
2031	50,704	67,584	0	0	0	0	0	0	0	22,200	0
2032	50,704	67,584	0	0	0	0	0	0	0	22,200	0
2033	50,704	67,584	0	0	0	0	0	0	0	22,200	0
2034	50,704	67,584	0	0	0	0	0	0	0	22,200	0
2035	50,704	67,584	0	0	0	0	0	0	0	22,200	0
TOTAL	**2,644,344**	**5,575,321**	**717,234**	**27,132**	**3,325**	**4,652**	**3,420**	**78,286**	**283,201**	**2,867,648**	**57,352**

TABLE B-5A Annual Water Quantities Delivered from Each Aqueduct Reach to Each Contractor (acre-feet)

	CALIFORNIA AQUEDUCT (continued)											
	SOUTH SAN JOAQUIN DIVISION (continued)											
	Reach 13B (continued)			Reach 14A		Reach 14B		Reach 14C			Reach 15A	
				Kern		Kern		Kern			Kern	
Calendar Year	Palmdale	Santa Clara	Tulare	Municipal and Industrial	Agricultural	Municipal and Industrial	Agricultural	Municipal and Industrial	Agricultural	Metropolitan	Municipal and Industrial	Agricultural
	[117]	[118]	[119]	[120]	[121]	[122]	[123]	[124]	[125]	[126]	[127]	[128]
1962	0	0	0	0	0	0	0	0	0	0	0	0
1963	0	0	0	0	0	0	0	0	0	0	0	0
1964	0	0	0	0	0	0	0	0	0	0	0	0
1965	0	0	0	0	0	0	0	0	0	0	0	0
1966	0	0	0	0	0	0	0	0	0	0	0	0
1967	0	0	0	0	0	0	0	0	0	0	0	0
1968	0	0	0	0	0	0	0	0	0	0	0	0
1969	0	0	0	0	0	0	0	0	0	0	0	0
1970	0	0	0	0	0	0	3	0	0	0	0	0
1971	0	0	0	0	23,844	0	49,929	0	24,187	0	0	3,552
1972	0	0	0	0	26,621	0	77,034	0	35,016	0	0	6,064
1973	0	0	0	0	15,328	0	47,040	0	19,043	0	0	19,916
1974	0	0	0	0	7,794	0	32,356	0	12,601	0	0	18,000
1975	0	0	0	0	10,306	0	27,736	0	12,783	0	0	35,420
1976	0	0	0	0	268	0	35,296	0	9,005	0	0	39,551
1977	0	0	0	0	8,299	0	13,539	0	3,757	0	0	6,158
1978	0	0	0	0	34,029	0	72,351	0	24,542	0	0	31,148
1979	0	0	0	3,012	27,356	0	59,413	0	22,372	0	0	38,602
1980	0	0	0	4,312	16,876	0	40,513	0	19,953	0	0	37,817
1981	0	0	0	4,511	13,007	8	42,753	7	18,729	0	0	39,033
1982	0	0	0	3,735	24,240	184	57,739	0	26,479	0	0	47,782
1983	0	0	0	1,168	20,302	0	57,922	0	26,613	0	0	37,426
1984	0	0	0	137	35,369	10	79,179	2	34,996	0	0	49,848
1985	0	0	0	206	33,103	0	72,855	0	31,758	0	0	44,078
1986	0	0	0	180	26,384	0	70,864	0	34,566	0	0	42,461
1987	0	0	0	610	30,098	9	67,710	10	31,019	0	0	34,748
1988	0	0	0	622	32,778	19	75,968	1	37,165	0	16	41,978
1989	0	0	0	721	29,292	7	82,201	5	37,800	0	2	43,239
1990	0	0	0	673	26,800	13	81,076	9	34,174	0	6	36,347
1991	0	0	0	768	0	0	0	0	0	0	0	0
1992	0	0	0	673	16,238	464	41,143	0	18,084	0	0	24,243
1993	0	0	0	629	17,832	0	62,493	0	28,103	0	0	27,997
1994	0	0	0	2,513	16,760	3,000	54,011	1,000	22,624	0	0	29,511
1995	0	0	3,500	3	21,234	0	67,391	0	31,285	0	0	26,134
1996	0	0	0	0	26,978	0	85,936	0	38,879	0	0	36,186
1997	0	0	0	0	23,035	0	79,790	0	33,512	0	0	36,281
1998	0	0	0	0	15,706	0	58,132	0	23,097	0	0	28,712
1999	0	0	0	0	21,153	0	67,576	0	31,489	0	0	36,801
2000	0	0	0	0	19,264	0	70,585	0	33,716	0	0	40,063
2001	0	0	0	0	12,452	0	49,602	0	23,557	0	0	31,192
2002	0	0	0	0	11,161	0	52,762	0	27,138	0	0	41,552
2003	0	0	0	0	13,685	0	44,576	0	24,783	12,911	0	36,602
2004	0	0	0	0	13,030	0	52,012	0	30,313	0	0	40,184
2005	0	9,014	0	0	15,663	0	56,739	0	21,979	0	0	39,870
2006	0	0	0	0	17,779	0	65,142	1,413	20,193	5,440	0	46,244
2007	0	0	0	0	21,435	0	67,955	0	24,947	1,881	0	47,390
2008	0	2,324	0	0	20,087	0	63,497	0	27,847	0	0	33,029
2009	0	0	0	0	22,281	0	60,726	0	27,185	0	0	26,007
2010	0	0	10,000	0	21,964	0	58,110	0	25,477	29,818	0	22,045
2011	7,000	0	0	0	24,131	0	61,859	0	27,061	27,326	0	42,158
2012	2,500	0	8,000	0	25,982	0	64,489	0	23,446	31,703	0	27,920
2013	0	0	0	0	29,414	0	62,137	0	25,004	6,592	0	28,147
2014	0	0	0	0	28,172	0	50,337	0	20,992	0	0	10,784
2015	0	0	0	0	25,886	0	48,996	0	17,267	0	0	10,202
2016	0	0	0	0	27,686	0	55,147	0	23,159	911	0	15,901
2017	0	0	0	0	48,334	0	46,882	0	46,663	0	0	39,694
2018	**0**	**0**	**0**	**0**	**17,000**	**0**	**42,800**	**0**	**20,500**	**0**	**0**	**25,800**
2019	0	0	0	0	17,000	0	42,800	0	20,500	0	0	25,800
2020	0	0	0	0	17,000	0	42,800	0	20,500	0	0	25,800
2021	0	0	0	0	17,000	0	42,800	0	20,500	0	0	25,800
2022	0	0	0	0	17,000	0	42,800	0	20,500	0	0	25,800
2023	0	0	0	0	17,000	0	42,800	0	20,500	0	0	25,800
2024	0	0	0	0	17,000	0	42,800	0	20,500	0	0	25,800
2025	0	0	0	0	17,000	0	42,800	0	20,500	0	0	25,800
2026	0	0	0	0	17,000	0	42,800	0	20,500	0	0	25,800
2027	0	0	0	0	17,000	0	42,800	0	20,500	0	0	25,800
2028	0	0	0	0	17,000	0	42,800	0	20,500	0	0	25,800
2029	0	0	0	0	17,000	0	42,800	0	20,500	0	0	25,800
2030	0	0	0	0	17,000	0	42,800	0	20,500	0	0	25,800
2031	0	0	0	0	17,000	0	42,800	0	20,500	0	0	25,800
2032	0	0	0	0	17,000	0	42,800	0	20,500	0	0	25,800
2033	0	0	0	0	17,000	0	42,800	0	20,500	0	0	25,800
2034	0	0	0	0	17,000	0	42,800	0	20,500	0	0	25,800
2035	0	0	0	0	17,000	0	42,800	0	20,500	0	0	25,800
TOTAL	**9,500**	**11,338**	**21,500**	**24,473**	**1,305,436**	**3,714**	**3,461,902**	**2,447**	**1,563,358**	**116,582**	**24**	**1,942,417**

TABLE B-5A Annual Water Quantities Delivered from Each Aqueduct Reach to Each Contractor (acre-feet)

	CALIFORNIA AQUEDUCT (continued)											
	SOUTH SAN JOAQUIN DIVISION (continued)			TEHACHAPI DIVISION	MOJAVE DIVISION							
	Reach 16A			Reach 17E	Reach 18A	Reach 19			Reach 20A			Reach 20B
		Kern		Kern								
Calendar Year	AVEK	Municipal and Industrial	Agricultural	(Municipal and Industrial)	AVEK	AVEK	Metropolitan	Mojave	AVEK	Mojave	Palmdale	AVEK
	[129]	[130]	[131]	[132]	[133]	[134]	[135]	[136]	[137]	[138]	[139]	[140]
1962	0	0	0	0	0	0	0	0	0	0	0	0
1963	0	0	0	0	0	0	0	0	0	0	0	0
1964	0	0	0	0	0	0	0	0	0	0	0	0
1965	0	0	0	0	0	0	0	0	0	0	0	0
1966	0	0	0	0	0	0	0	0	0	0	0	0
1967	0	0	0	0	0	0	0	0	0	0	0	0
1968	0	0	0	0	0	0	0	0	0	0	0	0
1969	0	0	0	0	0	0	0	0	0	0	0	0
1970	0	0	0	0	0	0	0	0	0	0	0	0
1971	0	0	0	0	0	0	0	0	0	0	0	0
1972	0	0	4,768	0	0	0	0	0	0	0	0	0
1973	0	0	1,961	0	0	0	0	0	0	0	0	0
1974	0	3,000	1,564	0	0	1,223	0	0	0	0	0	0
1975	0	3,200	9,867	0	0	7,622	0	0	420	0	0	0
1976	0	3,500	11,667	0	3,808	23,063	0	0	471	0	0	416
1977	0	3,420	685	0	1,231	8,927	0	0	773	0	0	271
1978	0	7,989	1,655	0	1,321	36,333	0	0	5,549	0	0	934
1979	0	2,813	15,808	0	2,098	49,910	0	0	7,555	0	0	930
1980	0	2,700	16,145	0	2,610	61,534	0	0	7,605	0	0	655
1981	0	2,636	18,156	0	2,340	65,690	0	0	10,333	0	0	966
1982	0	1,921	16,577	0	1,669	41,127	0	0	7,313	0	0	8
1983	0	1,400	17,907	0	43	26,377	0	0	6,253	0	0	20
1984	0	1,338	24,246	0	90	22,462	0	0	9,558	0	0	2
1985	0	1,309	16,820	0	8	23,440	0	0	11,613	0	1,510	217
1986	0	1,213	15,559	0	8	16,898	0	0	13,808	0	3,041	0
1987	0	1,665	10,170	0	0	15,958	0	0	15,493	0	2,389	151
1988	0	1,925	8,987	0	0	13,471	0	0	17,117	0	366	281
1989	0	2,668	8,649	0	0	18,007	0	0	23,481	0	381	112
1990	0	2,819	8,608	0	0	17,281	0	0	25,843	0	282	84
1991	2,000	2,588	343	0	0	728	0	0	4,282	1,391	84	131
1992	0	2,087	8,275	0	0	7,238	0	0	18,518	1,310	185	650
1993	0	2,494	9,167	0	0	13,340	0	0	23,662	1,514	164	996
1994	0	3,011	13,877	0	0	19,122	0	0	25,250	1,399	299	124
1995	0	3,188	15,042	0	0	20,222	0	0	22,385	1,227	328	0
1996	0	2,573	18,142	0	0	23,919	0	0	26,979	1,316	354	0
1997	0	3,997	17,048	0	0	28,834	0	64	27,999	1,272	313	0
1998	0	3,751	17,032	0	0	22,466	0	1,345	25,985	0	195	0
1999	0	3,316	24,071	0	0	30,944	0	1,439	32,409	0	377	36
2000	0	3,015	20,919	0	0	34,786	0	1,361	37,819	0	0	80
2001	0	1,894	13,476	0	0	24,370	0	1,385	33,216	0	0	282
2002	0	4,227	14,520	0	0	14,297	0	1,370	36,311	0	0	1,662
2003	0	1,168	16,799	0	0	12,145	0	1,285	39,532	0	0	2,289
2004	0	2,239	19,714	0	0	11,201	0	1,223	40,408	0	0	1,774
2005	0	167	18,353	0	11	11,804	0	1,051	41,496	0	0	1,336
2006	0	279	22,570	0	0	18,438	0	1,021	53,878	0	0	1,415
2007	0	204	26,229	0	0	22,916	0	1,176	47,639	0	0	1,349
2008	0	3,834	18,426	0	0	9,096	0	1,238	33,919	0	0	792
2009	0	1,531	19,517	0	0	5,717	0	1,345	35,402	0	0	366
2010	0	1,033	19,829	0	0	10,825	0	1,181	43,122	0	0	643
2011	0	3,808	17,957	0	0	55,707	0	2,184	35,543	0	0	507
2012	0	3,453	19,842	0	0	41,053	0	1,306	33,390	0	0	901
2013	0	148	21,311	4	16	13,414	0	1,095	33,507	0	0	693
2014	0	0	18,673	1	0	621	0	41	15,761	1,004	0	744
2015	0	2,407	16,214	0	0	0	0	0	12,447	1,023	0	447
2016	0	1,324	21,278	0	11	15,374	14	0	20,506	984	0	677
2017	0	9,959	34,213	0	2,050	61,350	25	846	40,356	117	250	1,882
2018	**0**	**8,777**	**14,733**	**0**	**568**	**4,762**	**0**	**1,032**	**66,260**	**0**	**0**	**819**
2019	0	8,777	14,733	0	627	5,240	0	1,032	67,817	0	0	902
2020	0	8,777	14,733	0	689	5,765	0	1,032	69,529	0	0	992
2021	0	8,777	14,733	0	758	6,341	0	1,032	71,414	0	0	1,092
2022	0	8,777	14,733	0	758	6,341	0	1,032	71,414	0	0	1,092
2023	0	8,777	14,733	0	758	6,341	0	1,032	71,414	0	0	1,092
2024	0	8,777	14,733	0	758	6,341	0	1,032	71,414	0	0	1,092
2025	0	8,777	14,733	0	758	6,341	0	1,032	71,414	0	0	1,092
2026	0	8,777	14,733	0	758	6,341	0	1,032	71,414	0	0	1,092
2027	0	8,777	14,733	0	758	6,341	0	1,032	71,414	0	0	1,092
2028	0	8,777	14,733	0	758	6,341	0	1,032	71,414	0	0	1,092
2029	0	8,777	14,733	0	758	6,341	0	1,032	71,414	0	0	1,092
2030	0	8,777	14,733	0	758	6,341	0	1,032	71,414	0	0	1,092
2031	0	8,777	14,733	0	758	6,341	0	1,032	71,414	0	0	1,092
2032	0	8,777	14,733	0	758	6,341	0	1,032	71,414	0	0	1,092
2033	0	8,777	14,733	0	758	6,341	0	1,032	71,414	0	0	1,092
2034	0	8,777	14,733	0	758	6,341	0	1,032	71,414	0	0	1,092
2035	0	8,777	14,733	0	758	6,341	0	1,032	71,414	0	0	1,092
TOTAL	**2,000**	**271,197**	**957,830**	**5**	**30,568**	**1,090,132**	**39**	**40,532**	**2,279,722**	**12,557**	**10,518**	**43,916**

TABLE B-5A Annual Water Quantities Delivered from Each Aqueduct Reach to Each Contractor (acre-feet)

Calendar Year	CALIFORNIA AQUEDUCT (continued)											
	MOJAVE DIVISION (continued)											
	Reach 20B (continued)		Reach 21			Reach 22A		Reach 22B				
	Littlerock	Palmdale	AVEK	Littlerock	Palmdale	AVEK	Littlerock	AVEK[d]	Coachella[e]	Desert[e]	Metropolitan[e]	Mojave
	[141]	[142]	[143]	[144]	[145]	[146]	[147]	[148]	[149]	[150]	[151]	[152]
1962	0	0	0	0	0	0	0	0	0	0	0	0
1963	0	0	0	0	0	0	0	0	0	0	0	0
1964	0	0	0	0	0	0	0	0	0	0	0	0
1965	0	0	0	0	0	0	0	0	0	0	0	0
1966	0	0	0	0	0	0	0	0	0	0	0	0
1967	0	0	0	0	0	0	0	0	0	0	0	0
1968	0	0	0	0	0	0	0	0	0	0	0	0
1969	0	0	0	0	0	0	0	0	0	0	0	0
1970	0	0	0	0	0	0	0	0	0	0	0	0
1971	0	0	0	0	0	0	0	0	0	0	0	0
1972	0	0	0	338	0	0	0	0				55
1973	0	0	0	290	0	0	0	0	5,800	9,000	(14,800)	0
1974	0	0	0	400	0	0	0	0	6,400	10,000	(16,400)	0
1975	0	0	0	520	0	0	0	0	7,000	11,000	(18,000)	0
1976	0	0	0	589	0	0	0	0	7,600	12,000	(19,600)	0
1977	0	0	0	111	0	0	0	0	0	0	0	22
1978	0	0	0	208	0	0	0	0	10,084	15,300	(25,384)	0
1979	0	0	0	133	0	0	0	0	10,063	15,000	(25,063)	4,000
1980	0	0	0	191	0	3	0	0	10,884	17,000	(27,884)	4,000
1981	0	0	0	1,270	0	46	0	0	12,105	19,000	(31,105)	4,000
1982	0	0	0	0	0	174	0	0	13,326	21,000	(34,326)	10,500
1983	0	0	0	38	0	268	0	0	14,547	23,000	(37,547)	0
1984	0	0	0	1	0	550	0	0	15,768	25,000	(40,768)	0
1985	0	32	0	0	16	1,786	0	0	16,989	27,000	(43,989)	0
1986	0	45	0	163	10	1,735	0	0	18,210	29,000	(47,210)	0
1987	0	1,624	0	1,080	1,366	2,273	5	214	19,431	31,500	(50,931)	17
1988	0	1,261	0	419	143	3,210	0	0	20,652	34,000	(54,652)	9
1989	0	7,848	0	971	780	3,591	0	89	21,873	36,500	(58,373)	0
1990	0	8,292	0	1,747	34	3,988	0	10	23,100	38,100	(61,200)	0
1991	0	3,830	0	522	0	2,427	0	0	6,930	11,430	(18,360)	0
1992	0	3,850	0	251	0	3,859	0	0	10,427	17,197	(27,624)	42
1993	0	7,597	0	734	0	5,098	0	0	0	0	0	0
1994	0	8,119	0	1,098	0	4,657	0	0	0	0	0	14,634
1995	0	6,633	0	480	0	4,679	0	0	0	0	0	7,495
1996	0	11,080	0	494	0	5,458	0	0	0	0	0	6,111
1997	0	11,548	0	444	0	5,549	0	0	0	0	0	9,038
1998	0	8,557	0	404	0	4,468	0	0	0	0	0	2,580
1999	0	12,901	0	342	0	5,684	0	0	0	0	0	6,705
2000	0	9,060	5,002	0	0	5,890	0	0	0	0	0	10,019
2001	0	10,427	0	0	0	4,989	0	0	0	0	0	3,048
2002	0	18,496	0	0	0	5,404	0	497	0	0	0	2,976
2003	0	11,547	0	0	0	6,063	0	0	0	0	7,625	13,150
2004	0	12,139	0	0	23	6,095	0	253	0	0	0	11,953
2005	0	11,678	0	0	34	5,184	0	0	0	0	5,942	12,169
2006	0	12,487	0	0	5	6,653	0	0	0	0	0	32,993
2007	0	19,609	0	0	25	7,711	0	588	0	0	0	27,684
2008	25	14,255	0	0	0	4,756	0	0	0	0	0	20,479
2009	42	15,339	0	0	0	4,185	0	0	0	0	0	20,214
2010	0	10,969	0	0	0	3,899	0	0	0	0	0	27,640
2011	0	9,881	0	0	0	2,289	0	0	0	0	30,907	2,915
2012	0	16,397	0	0	0	2,328	0	0	0	0	12,025	9,938
2013	0	10,567	0	0	0	3,227	0	118	0	0	0	5,888
2014	0	8,406	0	0	0	1,318	0	88	0	0	0	2,536
2015	0	5,836	0	0	0	1,298	0	116	0	0	0	7,807
2016	0	10,516	0	0	0	3,155	0	144	0	0	0	12,950
2017	0	14,733	0	1,182	0	2,579	0	126	0	0	0	9,358
2018	**0**	**19,588**	**0**	**1,380**	**0**	**2,882**	**0**	**53**	**0**	**0**	**0**	**39,719**
2019	0	19,588	0	1,380	0	3,169	0	59	0	0	0	40,769
2020	0	19,588	0	1,380	0	3,486	0	65	0	0	0	40,769
2021	0	19,588	0	1,380	0	3,835	0	71	0	0	0	40,769
2022	0	19,588	0	1,380	0	3,835	0	71	0	0	0	40,769
2023	0	19,588	0	1,380	0	3,835	0	71	0	0	0	40,769
2024	0	19,588	0	1,380	0	3,835	0	71	0	0	0	40,769
2025	0	19,588	0	1,380	0	3,835	0	71	0	0	0	40,769
2026	0	19,588	0	1,380	0	3,835	0	71	0	0	0	40,769
2027	0	19,588	0	1,380	0	3,835	0	71	0	0	0	40,769
2028	0	19,588	0	1,380	0	3,835	0	71	0	0	0	40,769
2029	0	19,588	0	1,380	0	3,835	0	71	0	0	0	40,769
2030	0	19,588	0	1,380	0	3,835	0	71	0	0	0	40,769
2031	0	19,588	0	1,380	0	3,835	0	71	0	0	0	40,769
2032	0	19,588	0	1,380	0	3,835	0	71	0	0	0	40,769
2033	0	19,588	0	1,380	0	3,835	0	71	0	0	0	40,769
2034	0	19,588	0	1,380	0	3,835	0	71	0	0	0	40,769
2035	0	19,588	0	1,380	0	3,835	0	71	0	0	0	40,769
TOTAL	**67**	**668,143**	**5,002**	**39,260**	**2,436**	**203,588**	**5**	**3,485**	**251,189**	**402,027**	**(596,717)**	**1,035,717**

[d] 1988 advance allocation.

[e] In accordance with the exchange agreement between the noted agencies, Metropolitan assumed responsibility for payment of variable OMP&R costs on the exchange water in reaches beyond Reach 22B, and Desert and Coachella for such costs from the Delta through Reach 22B. The adjustment in deliveries in Reach 22B provides for compliance with provisions for the repayment of costs under the agreement. In 1993 and after, the exchange takes place in Reach 26A.

TABLE B-5A Annual Water Quantities Delivered from Each Aqueduct Reach to Each Contractor (acre-feet)

	CALIFORNIA AQUEDUCT (continued)										
	MOJAVE DIVISION (continued)						SANTA ANA DIVISION				
	Reach 22B	Reach 23	Reach 24				Reach 26A				
Calendar Year	Santa Barbara	Mojave	Crestline	Metropolitan[e]	Mojave	San Bernardino	Coachella[e]	Desert[e]	Metropolitan[e]	San Bernardino[f]	San Gabriel
	[153]	[154]	[155]	[156]	[157]	[158]	[159]	[160]	[161]	[162]	[163]
1962	0	0	0	0	0	0	0	0	0	0	0
1963	0	0	0	0	0	0	0	0	0	0	0
1964	0	0	0	0	0	0	0	0	0	0	0
1965	0	0	0	0	0	0	0	0	0	0	0
1966	0	0	0	0	0	0	0	0	0	0	0
1967	0	0	0	0	0	0	0	0	0	0	0
1968	0	0	0	0	0	0	0	0	0	0	0
1969	0	0	0	0	0	0	0	0	0	0	0
1970	0	0	0	0	0	0	0	0	0	0	0
1971	0	0	0	0	0	0	0	0	0	0	0
1972	0	0	464	0	0	0	0	0	0	1,275	0
1973	0	0	389	0	0	0	0	0	444	32,426	0
1974	0	14	627	0	0	0	0	0	84,981	16,605	612
1975	0	0	825	0	0	0	0	0	169,960	13,865	5,450
1976	0	0	1,002	0	0	0	0	0	215,312	12,273	6,071
1977	0	58	1,109	0	0	0	0	0	64,823	24,833	8,996
1978	0	0	1,209	0	0	0	0	0	297,708	4,055	7,771
1979	0	0	1,260	0	0	0	0	0	260,903	18	290
1980	0	0	1,239	0	0	0	0	0	300,345	0	1,085
1981	0	0	1,485	0	0	0	0	0	395,678	16,021	3,619
1982	0	0	1,238	0	0	0	0	0	214,566	8,409	12,599
1983	0	0	911	0	0	0	0	0	175,288	5,994	734
1984	0	0	1,128	0	0	0	0	0	122,311	5,556	7,656
1985	0	0	1,422	0	0	0	0	0	147,599	7,390	5,028
1986	0	0	1,506	0	0	0	0	0	215,265	6,421	9,454
1987	0	0	1,849	0	0	0	0	0	175,012	18,751	10,630
1988	0	0	2,006	0	0	0	0	0	247,101	21,386	8,948
1989	0	200	2,170	0	0	0	0	0	326,217	20,782	12,839
1990	0	0	1,827	0	0	0	0	0	399,387	18,831	16,649
1991	0	0	849	0	2,032	0	0	0	107,182	3,661	5,399
1992	0	0	519	0	9,334	0	0	0	219,524	3,358	7,908
1993	0	0	439	0	10,000	0	23,100	38,100	98,291	4,361	14,397
1994	0	0	785	0	819	0	14,102	23,257	192,979	9,135	15,230
1995	0	0	409	0	0	0	23,100	38,100	107,299	696	12,922
1996	0	0	485	0	0	0	62,219	102,622	73,438	6,064	15,989
1997	0	0	651	0	0	0	58,100	53,100	157,215	9,654	18,175
1998	0	0	187	0	0	0	78,100	58,100	36,770	1,878	9,310
1999	0	0	1,132	0	0	0	50,480	58,100	139,752	12,874	21,729
2000	0	0	1,194	0	0	0	42,323	58,234	326,647	0	15,140
2001	0	0	1,057	0	0	0	9,100	15,010	284,007	0	2,360
2002	0	0	2,189	0	0	0	16,755	27,640	301,700	26,399	24,851
2003	0	0	1,563	17,249	0	0	14,443	23,819	464,719	5,000	21,934
2004	0	0	2,006	0	0	0	15,465	21,190	428,316	40,000	12,541
2005	0	0	807	14,058	341	0	34,356	49,089	361,976	15,834	13,984
2006	0	0	641	0	0		121,100	50,000	404,594	20,000	16,284
2007	0	0	1,768	0	17,249	710	66,007	27,253	370,971	10,022	4,024
2008	0	0	848	0	3,679	411	40,171	24,643	210,520	187	7,212
2009	0	0	894	0	7,488	149	45,074	17,872	138,216	0	11,520
2010	0	0	357	0	9,331	26	53,866	18,398	463,654	20,008	19,180
2011	0	0	474	14,141	0	31	84,566	34,076	610,454	368	23,591
2012	0	0	624	2,994	0	0	98,793	33,806	362,047	50,723	22,058
2013	0	0	1,368	0	500	0	33,551	17,611	234,576	1,120	9,252
2014	0	0	1,233	0	0	202	9,966	3,049	95,402	1,345	1,200
2015	0	0	1,253	0	0	0	26,600	67	110,774	2,100	5,760
2016	1,124	0	1,084	0	8,350	76	59,654	21,893	427,649	3,974	16,088
2017	0	0	1,950	0	0	314	71,864	26,864	706,425	54	20,291
2018	**0**	**0**	**3,480**	**0**	**0**	**400**	**81,568**	**0**	**289,538**	**0**	**17,280**
2019	0	0	3,480	0	0	400	81,568	0	372,132	0	17,280
2020	0	0	3,480	0	0	400	81,568	0	372,132	0	17,280
2021	0	0	3,480	0	0	0	81,568	0	372,132	0	17,280
2022	0	0	3,480	0	0	0	81,568	0	372,132	0	17,280
2023	0	0	3,480	0	0	0	81,568	0	372,132	0	17,280
2024	0	0	3,480	0	0	0	81,568	0	372,132	0	17,280
2025	0	0	3,480	0	0	0	81,568	0	372,132	0	17,280
2026	0	0	3,480	0	0	0	81,568	0	372,132	0	17,280
2027	0	0	3,480	0	0	0	81,568	0	372,132	0	17,280
2028	0	0	3,480	0	0	0	81,568	0	372,132	0	17,280
2029	0	0	3,480	0	0	0	81,568	0	372,132	0	17,280
2030	0	0	3,480	0	0	0	81,568	0	372,132	0	17,280
2031	0	0	3,480	0	0	0	81,568	0	372,132	0	17,280
2032	0	0	3,480	0	0	0	81,568	0	372,132	0	17,280
2033	0	0	3,480	0	0	0	81,568	0	372,132	0	17,280
2034	0	0	3,480	0	0	0	81,568	0	372,132	0	17,280
2035	0	0	3,480	0	0	0	81,568	0	372,132	0	17,280
TOTAL	**1,124**	**272**	**113,072**	**48,442**	**69,123**	**3,119**	**2,621,079**	**841,893**	**17,863,779**	**483,706**	**797,800**

[e] In accordance with the exchange agreement between the noted agencies, Metropolitan assumed responsibility for payment of variable OMP&R costs on the exchange water in reaches beyond Reach 22B, and Desert and Coachella for such costs from the Delta through Reach 22B. The adjustment in deliveries in Reach 22B provides for compliance with provisions for the repayment of costs under the agreement. In 1993 and after, the exchange takes place in Reach 26A.

[f] Includes 1,650 acre-feet recaptured from groundwater storage in 1982, 10,000 acre-feet in 1987, and 8,749 acre-feet in 1988. This water was stored under DWR's Ground Water Demonstration Program.

TABLE B-5A Annual Water Quantities Delivered from Each Aqueduct Reach to Each Contractor (acre-feet)

	CALIFORNIA AQUEDUCT (continued)										
	SANTA ANA DIVISION (continued)										
	Reach 28G	Reach 28H			Reach 28J			Reach EBX1			Reach EBX2C
Calendar Year	Metropolitan	Coachella	Desert	Metropolitan	Coachella	Desert	Metropolitan	Coachella	Metropolitan	San Bernardino	San Bernardino
	[164]	[165]	[166]	[167]	[168]	[169]	[170]	[171]	[172]	[173]	[174]
1962	0	0	0	0	0	0	0	0	0	0	0
1963	0	0	0	0	0	0	0	0	0	0	0
1964	0	0	0	0	0	0	0	0	0	0	0
1965	0	0	0	0	0	0	0	0	0	0	0
1966	0	0	0	0	0	0	0	0	0	0	0
1967	0	0	0	0	0	0	0	0	0	0	0
1968	0	0	0	0	0	0	0	0	0	0	0
1969	0	0	0	0	0	0	0	0	0	0	0
1970	0	0	0	0	0	0	0	0	0	0	0
1971	0	0	0	0	0	0	0	0	0	0	0
1972	0	0	0	0	0	0	0	0	0	0	0
1973	18,942	0	0	0	0	0	0	0	0	0	0
1974	0	0	0	0	0	0	0	0	0	0	0
1975	0	0	0	0	0	0	251	0	0	0	0
1976	0	0	0	55	0	0	2,000	0	0	0	0
1977	0	0	0	43	0	0	2,442	0	0	0	0
1978	0	0	0	48	0	0	64,054	0	0	0	0
1979	0	0	0	1,290	0	0	94,353	0	0	0	0
1980	0	0	0	3,013	0	0	91,532	0	0	0	0
1981	0	0	0	4,365	0	0	149,405	0	0	0	0
1982	0	0	0	3,961	0	0	155,629	0	0	0	0
1983	0	0	0	6,645	0	0	41,616	0	0	0	0
1984	0	0	0	109,743	0	0	5,672	0	0	0	0
1985	0	0	0	182,781	0	0	6,538	0	0	0	0
1986	0	0	0	131,439	0	0	30,071	0	0	0	0
1987	0	0	0	144,743	0	0	26,315	0	0	0	0
1988	0	0	0	199,641	0	0	22,209	0	0	0	0
1989	0	0	0	247,430	0	0	51,462	0	0	0	0
1990	0	0	0	257,796	0	0	36,060	0	0	0	0
1991	0	0	0	38,832	0	0	5,958	0	0	0	0
1992	0	0	0	85,341	0	0	12,223	0	0	0	0
1993	0	0	0	61,841	0	0	4,588	0	0	0	0
1994	0	0	0	134,262	0	0	4,725	0	0	0	0
1995	0	0	0	117,762	0	0	21,099	0	0	0	0
1996	0	0	0	144,906	0	0	12,418	0	0	0	0
1997	0	0	0	107,853	0	0	47,777	0	0	0	0
1998	0	6,582	7,708	77,473	1,027	4,839	50,411	0	0	0	0
1999	0	0	0	206,689	0	0	8,163	0	0	0	0
2000	0	0	0	379,713	0	0	7,864	0	5,466	18,399	0
2001	0	0	0	260,984	0	0	33,414	0	0	26,488	0
2002	0	0	0	340,635	0	0	41,552	0	1,427	37,069	0
2003	0	0	0	246,485	0	0	50,776	0	74,496	16,703	1,793
2004	0	0	0	357,995	0	0	20,437	0	120,338	13,229	1,430
2005	0	0	0	242,245	0	0	114,499	8,163	153,700	12,715	966
2006	0	0	0	342,734	0	0	32,242	0	147,432	11,832	885
2007	0	7,221	2,981	271,874	0	0	48,923	0	94,208	38,151	3,130
2008	0	6,620	1,785	175,460	0	0	10,432	0	16,745	25,038	686
2009	0	948	391	126,265	0	0	5,849	0	18,314	25,041	4,090
2010	0	30,415	12,257	129,145	1,311	528	65,439	0	0	19,190	617
2011	0	5,713	2,303	213,215	0	0	51,638	0	0	19,578	699
2012	0	16,575	8,266	86,266	2,219	3,029	36,875	0	0	27,534	3,177
2013	0	28,232	3,180	45,039	4,756	0	40,494	0	0	19,850	3,034
2014	0	1,103	0	0	1,801	0	998	0	0	4,610	375
2015	0	10,996	9,611	25,883	0	1,539	977	0	0	15,970	382
2016	0	9,768	0	72,825	0	0	30,785	0	0	46,546	3,649
2017	0	4,301	0	339,724	11,959	4,817	52,825	0	0	61,207	244
2018	**0**	**1,442**	**33,450**	**233,504**	**0**	**0**	**0**	**0**	**0**	**58,658**	**0**
2019	0	1,442	33,450	233,504	0	0	0	0	0	61,160	0
2020	0	1,442	33,450	233,504	0	0	0	0	0	61,160	0
2021	0	1,442	33,450	233,504	0	0	0	0	0	61,560	0
2022	0	1,442	33,450	233,504	0	0	0	0	0	61,560	0
2023	0	1,442	33,450	233,504	0	0	0	0	0	61,560	0
2024	0	1,442	33,450	233,504	0	0	0	0	0	61,560	0
2025	0	1,442	33,450	233,504	0	0	0	0	0	61,560	0
2026	0	1,442	33,450	233,504	0	0	0	0	0	61,560	0
2027	0	1,442	33,450	233,504	0	0	0	0	0	61,560	0
2028	0	1,442	33,450	233,504	0	0	0	0	0	61,560	0
2029	0	1,442	33,450	233,504	0	0	0	0	0	61,560	0
2030	0	1,442	33,450	233,504	0	0	0	0	0	61,560	0
2031	0	1,442	33,450	233,504	0	0	0	0	0	61,560	0
2032	0	1,442	33,450	233,504	0	0	0	0	0	61,560	0
2033	0	1,442	33,450	233,504	0	0	0	0	0	61,560	0
2034	0	1,442	33,450	233,504	0	0	0	0	0	61,560	0
2035	0	1,442	33,450	233,504	0	0	0	0	0	61,560	0
TOTAL	**18,942**	**154,430**	**650,582**	**10,127,511**	**23,073**	**14,752**	**1,592,990**	**8,163**	**632,126**	**1,543,528**	**25,157**

TABLE B-5A Annual Water Quantities Delivered from Each Aqueduct Reach to Each Contractor (acre-feet)

	CALIFORNIA AQUEDUCT (continued)											
	SANTA ANA DIVISION (continued)			WEST BRANCH								
	Reach EBX3A	Reach EBX4B-G	Reach EBX4B	Reach 29A	Reach 29F	Reach 29H		Reach 30				
Calendar Year	San Bernardino	San Gorgonio	San Gorgonio	AVEK	AVEK	Castaic Lake	Ventura	Castaic Lake	Coachella	Desert	Metropolitan[9]	San Bernardino
	[175]	[176]	[177]	[178]	[179]	[180]	[181]	[182]	[183]	[184]	[185]	[186]
1962	0	0	0	0	0	0	0	0	0	0	0	0
1963	0	0	0	0	0	0	0	0	0	0	0	0
1964	0	0	0	0	0	0	0	0	0	0	0	0
1965	0	0	0	0	0	0	0	0	0	0	0	0
1966	0	0	0	0	0	0	0	0	0	0	0	0
1967	0	0	0	0	0	0	0	0	0	0	0	0
1968	0	0	0	0	0	0	0	0	0	0	0	0
1969	0	0	0	0	0	0	0	0	0	0	0	0
1970	0	0	0	0	0	0	0	0	0	0	0	0
1971	0	0	0	0	0	0	0	0	0	0	0	0
1972	0	0	0	0	53	0	0	0	0	0	71,938	0
1973	0	0	0	0	20	0	0	0	0	0	155,297	0
1974	0	0	0	0	36	0	0	0	0	0	209,136	0
1975	0	0	0	0	26	0	0	0	0	0	374,280	0
1976	0	0	0	0	24	0	0	0	0	0	420,684	0
1977	0	0	0	0	0	0	0	0	0	0	122,447	0
1978	0	0	0	0	0	0	0	0	0	0	171,139	0
1979	0	0	0	0	0	0	0	7	0	0	145,591	0
1980	0	0	0	0	0	0	0	1,210	0	0	164,721	0
1981	0	0	0	0	0	0	0	5,761	0	0	277,503	0
1982	0	0	0	0	0	0	0	9,516	0	0	351,362	0
1983	0	0	0	0	0	0	0	9,476	0	0	157,519	0
1984	0	0	0	0	0	0	0	11,477	0	0	260,624	0
1985	0	0	0	0	0	0	0	12,401	0	0	390,696	0
1986	0	0	0	0	0	0	0	13,928	0	0	379,275	0
1987	0	0	0	0	0	0	0	16,167	0	0	417,285	0
1988	0	0	0	0	0	0	0	18,904	0	0	488,265	0
1989	0	0	0	0	0	0	0	21,719	0	0	589,962	0
1990	0	0	0	0	0	0	4,836	22,139	0	0	764,380	0
1991	0	0	0	0	0	0	988	3,846	0	0	257,835	0
1992	0	0	0	0	0	0	0	14,812	0	0	420,849	0
1993	0	0	0	0	6	0	0	13,787	0	0	437,470	0
1994	0	0	0	0	0	0	0	14,919	0	0	475,900	0
1995	0	0	0	0	0	0	0	17,747	0	0	139,882	0
1996	0	0	0	0	0	0	0	18,448	0	0	267,618	0
1997	0	0	0	0	11	0	0	22,842	10,240	16,890	271,379	0
1998	0	0	0	0	7	0	0	19,782	0	0	187,277	0
1999	0	0	0	0	0	0	0	28,813	0	0	327,001	0
2000	0	0	0	0	0	0	2,200	31,085	0	0	632,991	0
2001	0	0	0	0	0	0	0	30,701	0	0	444,764	0
2002	0	0	0	0	0	0	3,148	42,080	0	0	723,605	8,601
2003	2,617	0	116	0	0	6,768	3,150	44,967	0	0	678,964	0
2004	2,371	0	841	0	0	0	4,047	47,463	0	0	797,294	0
2005	2,035	0	692	0	0	0	0	36,747	0	0	538,839	0
2006	2,614	3,471	807	0	0	0	0	40,017	0	0	574,679	0
2007	5,103	3,758	177	0	0	0	1,890	45,919	0	0	711,831	0
2008	8,823	3,863	1,042	0	0	0	1,980	42,878	0	0	485,156	0
2009	10,066	4,499	1,898	0	0	0	3,150	38,784	0	0	589,294	0
2010	9,538	2,555	5,685	0	0	0	3,150	31,288	0	0	376,877	0
2011	9,384	1,213	9,290	0	0	0	2,520	31,445	0	0	375,921	0
2012	9,604	0	11,010	0	24	0	3,150	36,153	0	0	553,244	0
2013	8,081	0	9,445	0	47	0	2,242	44,126	0	0	565,849	0
2014	4,424	0	5,044	0	0	0	0	29,448	0	0	275,992	0
2015	5,928	0	3,481	0	0	0	630	29,189	0	0	435,892	0
2016	8,431	0	10,816	0	0	0	1,890	31,888	0	0	509,583	0
2017	2,154	0	11,970	388	517	0	1,890	54,527	0	0	168,709	0
2018	**0**	**1,200**	**9,180**	**0**	**568**	**0**	**1,890**	**55,120**	**0**	**0**	**369,201**	**0**
2019	0	1,600	8,780	0	627	0	1,890	55,120	0	0	369,201	0
2020	0	2,000	8,380	0	689	0	1,890	55,120	0	0	369,201	0
2021	0	2,400	7,980	0	758	0	1,890	55,120	0	0	369,201	0
2022	0	2,400	7,980	0	758	0	1,890	55,120	0	0	369,201	0
2023	0	2,400	7,980	0	758	0	1,890	55,120	0	0	369,201	0
2024	0	2,400	7,980	0	758	0	1,890	55,120	0	0	369,201	0
2025	0	2,400	7,980	0	758	0	1,890	55,120	0	0	369,201	0
2026	0	2,400	7,980	0	758	0	1,890	55,120	0	0	369,201	0
2027	0	2,400	7,980	0	758	0	1,890	55,120	0	0	369,201	0
2028	0	2,400	7,980	0	758	0	1,890	55,120	0	0	369,201	0
2029	0	2,400	7,980	0	758	0	1,890	55,120	0	0	369,201	0
2030	0	2,400	7,980	0	758	0	1,890	55,120	0	0	369,201	0
2031	0	2,400	7,980	0	758	0	1,890	55,120	0	0	369,201	0
2032	0	2,400	7,980	0	758	0	1,890	55,120	0	0	369,201	0
2033	0	2,400	7,980	0	758	0	1,890	55,120	0	0	369,201	0
2034	0	2,400	7,980	0	758	0	1,890	55,120	0	0	369,201	0
2035	0	2,400	7,980	0	758	0	1,890	55,120	0	0	369,201	0
TOTAL	**91,173**	**60,159**	**218,354**	**388**	**14,025**	**6,768**	**74,881**	**1,978,566**	**10,240**	**16,890**	**24,782,417**	**8,601**

[9] Deliveries exclude 6,171 acre-feet of 1982 exchange water.

TABLE B-5A Annual Water Quantities Delivered from Each Aqueduct Reach to Each Contractor (acre-feet)

	CALIFORNIA AQUEDUCT (continued)											
	WEST BRANCH		COASTAL BRANCH									
	Reach 30 (continued)		Reach 31A						Reach 33A			
						Kern						
Calendar Year	Santa Barbara	Ventura	AVEK	Castaic Lake	Dudley Ridge	Municipal and Industrial	Agricultural	Kings	San Luis Obispo	Santa Barbara	Total	GRAND TOTAL
	[187]	[188]	[189]	[190]	[191]	[192]	[193]	[194]	[195]	[196]	[197]	[198]
1962	0	0	0	0	0	0	0	0	0	0	0	8,906
1963	0	0	0	0	0	0	0	0	0	0	0	12,645
1964	0	0	0	0	0	0	0	0	0	0	0	20,911
1965	0	0	0	0	0	0	0	0	0	0	0	34,026
1966	0	0	0	0	0	0	0	0	0	0	0	54,913
1967	0	0	0	0	0	0	0	0	0	0	0	56,763
1968	0	0	0	7,382	0	0	71,657	0	0	0	192,188	294,457
1969	0	0	0	9,970	0	0	52,094	0	0	0	195,705	268,104
1970	0	0	0	11,739	0	0	71,910	0	0	0	276,211	369,459
1971	0	0	0	12,490	0	0	98,481	0	0	0	553,081	654,442
1972	0	0	0	13,905	0	0	107,850	0	0	0	895,006	1,037,770
1973	0	0	0	9,418	0	0	69,227	0	0	0	638,930	737,532
1974	0	0	0	9,700	0	0	68,474	0	0	0	783,984	878,947
1975	0	0	0	10,700	0	0	74,516	0	0	0	1,129,728	1,230,830
1976	0	0	0	11,700	0	0	78,358	0	0	0	1,245,662	1,380,124
1977	0	0	0	5,075	0	0	35,504	0	0	0	465,442	582,381
1978	0	0	0	11,362	0	0	81,242	0	0	0	1,339,268	1,458,733
1979	0	0	0	19,138	0	0	104,017	0	0	0	1,537,075	1,666,457
1980	0	0	0	13,882	0	0	97,497	0	0	0	1,413,363	1,536,456
1981	0	0	0	12,700	0	0	97,054	0	0	0	1,779,479	1,918,563
1982	0	0	0	12,700	0	0	83,076	0	0	0	1,641,571	1,750,862
1983	0	0	0	12,659	0	0	87,859	0	0	0	1,089,626	1,187,156
1984	0	0	0	12,741	0	0	119,098	0	0	0	1,489,814	1,591,416
1985	0	0	0	12,099	0	0	110,124	0	0	0	1,863,544	1,990,295
1986	0	0	0	13,301	0	0	118,298	0	0	0	1,882,290	1,999,155
1987	0	0	0	11,821	0	0	116,259	0	0	0	1,984,570	2,131,608
1988	0	0	0	11,534	0	0	109,435	0	0	0	2,221,538	2,385,122
1989	0	0	0	14,645	0	0	102,156	0	0	0	2,686,838	2,853,747
1990	0	0	0	6,440	0	0	103,362	0	0	0	2,398,121	2,582,151
1991	1,240	0	0	716	0	0	780	0	0	0	489,489	549,113
1992	0	0	0	5,887	0	0	73,748	0	0	0	1,374,775	1,471,454
1993	0	0	0	4,157	0	0	90,764	0	0	0	2,173,352	2,315,235
1994	0	0	0	9,422	0	200	77,536	0	0	0	1,727,504	1,861,976
1995	0	0	0	9,486	0	0	85,050	0	0	0	1,926,835	2,031,423
1996	0	0	0	14,052	0	0	100,578	0	0	0	2,429,928	2,543,472
1997	0	1,850	0	4,870	0	0	97,020	0	1,099	7,439	2,263,966	2,405,444
1998	0	1,850	0	311	0	0	86,879	0	3,592	18,618	1,657,381	1,764,963
1999	0	1,850	0	4,086	0	0	92,095	0	3,743	20,137	2,755,025	2,898,961
2000	0	1,850	0	8,395	0	0	85,215	0	3,962	22,741	3,390,079	3,569,072
2001	0	1,850	0	1,238	0	0	63,448	0	4,283	18,946	2,034,350	2,175,194
2002	0	1,850	0	2,737	0	0	65,055	0	4,355	27,636	2,738,943	2,909,555
2003	0	1,850	0	4,001	0	0	65,691	0	4,453	26,968	3,151,625	3,327,811
2004	0	1,203	0	3,776	0	0	66,498	0	4,165	29,705	3,050,652	3,230,590
2005	0	1,665	0	2,709	4,684	0	68,190	0	4,251	23,344	3,597,829	3,753,874
2006	0	1,850	0	2,735	0	0	85,214	0	4,209	23,275	3,526,551	3,693,938
2007	0	1,110	0	6,071	0	0	93,954	49	3,776	27,740	3,088,763	3,284,475
2008	0	1,818	0	0	0	17,059	68,385	0	3,402	18,393	1,978,428	2,152,219
2009	0	741	0	1	0	0	83,255	0	3,801	15,452	2,065,868	2,227,564
2010	0	925	0	768	2,967	0	81,047	276	3,757	17,775	2,690,242	2,832,658
2011	0	1,480	0	1,746	200	0	86,594	238	3,819	21,050	3,510,684	3,666,432
2012	0	1,203	33,511	2,404	0	0	50,050	0	3,944	19,474	2,726,325	2,881,783
2013	0	648	0	6,128	0	0	82,887	0	3,681	18,018	2,023,225	2,224,875
2014	0	93	0	0	0	0	74,406	0	3,206	16,757	1,111,222	1,242,286
2015	0	370	0	0	7,500	0	71,616	0	3,438	11,673	1,339,811	1,497,970
2016	0	1,110	1,489	0	0	0	86,363	0	4,199	27,182	2,197,340	2,353,293
2017	0	1,110	0	990	0	0	42,827	778	4,559	37,889	2,867,854	3,027,572
2018	**0**	**1,110**	**0**	**2,000**	**0**	**0**	**52,810**	**183**	**12,477**	**27,291**	**2,293,512**	**2,469,634**
2019	0	1,110	0	2,000	0	0	52,810	183	13,269	27,291	2,297,973	2,474,005
2020	0	1,110	0	2,000	0	0	52,810	183	13,345	27,291	2,300,775	2,476,855
2021	0	1,110	0	2,000	0	0	52,810	183	13,357	27,291	2,303,889	2,479,921
2022	0	1,110	0	2,000	0	0	52,810	183	13,357	27,291	2,303,889	2,479,921
2023	0	1,110	0	2,000	0	0	52,810	183	13,357	27,291	2,303,889	2,479,921
2024	0	1,110	0	2,000	0	0	52,810	183	13,357	27,291	2,303,889	2,479,921
2025	0	1,110	0	2,000	0	0	52,810	183	13,357	27,291	2,303,889	2,479,921
2026	0	1,110	0	2,000	0	0	52,810	183	13,357	27,291	2,303,889	2,479,921
2027	0	1,110	0	2,000	0	0	52,810	183	13,357	27,291	2,303,889	2,479,921
2028	0	1,110	0	2,000	0	0	52,810	183	13,357	27,291	2,303,889	2,479,921
2029	0	1,110	0	2,000	0	0	52,810	183	13,357	27,291	2,303,889	2,479,921
2030	0	1,110	0	2,000	0	0	52,810	183	13,357	27,291	2,303,889	2,479,921
2031	0	1,110	0	2,000	0	0	52,810	183	13,357	27,291	2,303,889	2,479,921
2032	0	1,110	0	2,000	0	0	52,810	183	13,357	27,291	2,303,889	2,479,921
2033	0	1,110	0	2,000	0	0	52,810	183	13,357	27,291	2,303,889	2,479,921
2034	0	1,110	0	2,000	0	0	52,810	183	13,357	27,291	2,303,889	2,479,921
2035	0	1,110	0	2,000	0	0	52,810	183	13,357	27,291	2,303,889	2,479,921
TOTAL	**1,240**	**48,256**	**35,000**	**399,787**	**15,351**	**17,259**	**5,033,273**	**4,635**	**319,140**	**941,450**	**135,041,675**	**145,186,442**

Tables B-5A-Adj through B-31

Note: Where applicable, the projected data values shown in this appendix are shaded and the bill year data are in **bold** type.

TABLE B-5A-Adj Annual Water Quantity Adjustments to Water Delivered from Each Aqueduct Reach to Each Contractor (acre-feet)

	CALIFORNIA AQUEDUCT												
	SAN LUIS DIVISION												
	Reach 1	Reach 3A											
Calendar Year	Santa Clara	Alameda-Zone 7	Alameda County	AVEK	Castaic Lake	Crestline	Dudley Ridge	Kern (Agricultural)	Kings	Metropolitan	Mojave	Palmdale	San Bernardino
	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]	[12]	[13]
1962	0	0	0	0	0	0	0	0	0	0	0	0	0
1963	0	0	0	0	0	0	0	0	0	0	0	0	0
1964	0	0	0	0	0	0	0	0	0	0	0	0	0
1965	0	0	0	0	0	0	0	0	0	0	0	0	0
1966	0	0	0	0	0	0	0	0	0	0	0	0	0
1967	0	0	0	0	0	0	0	0	0	0	0	0	0
1968	0	0	0	0	0	0	0	0	0	0	0	0	0
1969	0	0	0	0	0	0	0	0	0	0	0	0	0
1970	0	0	0	0	0	0	0	0	0	0	0	0	0
1971	0	0	0	0	0	0	0	0	0	0	0	0	0
1972	0	0	0	0	0	0	0	0	0	0	0	0	0
1973	0	0	0	0	0	0	0	0	0	0	0	0	0
1974	0	0	0	0	0	0	0	0	0	0	0	0	0
1975	0	0	0	0	0	0	0	0	0	0	0	0	0
1976	0	0	0	0	0	0	0	0	0	0	0	0	0
1977	0	0	0	0	0	0	0	0	0	0	0	0	0
1978	0	0	0	0	0	0	0	0	0	0	0	0	0
1979	0	0	0	0	0	0	0	0	0	0	0	0	0
1980	0	0	0	0	0	0	0	0	0	0	0	0	0
1981	0	0	0	0	0	0	0	0	0	0	0	0	0
1982	0	0	0	0	0	0	0	0	0	0	0	0	0
1983	0	0	0	0	0	0	0	0	0	0	0	0	0
1984	0	0	0	0	0	0	0	0	0	0	0	0	0
1985	0	0	0	0	0	0	0	0	0	0	0	0	0
1986	0	0	0	0	0	0	0	0	0	0	0	0	0
1987	0	0	0	0	0	0	0	0	0	0	0	0	0
1988	0	0	0	0	0	0	0	0	0	0	0	0	0
1989	0	0	0	0	0	0	0	0	0	0	0	0	0
1990	0	0	0	0	0	0	0	0	0	0	0	0	0
1991	0	0	0	0	0	0	0	0	0	0	0	0	0
1992	0	0	0	0	0	0	0	0	0	0	0	0	0
1993	0	0	0	0	0	0	0	0	0	0	0	0	0
1994	0	0	0	0	0	0	0	0	0	0	0	0	0
1995	0	0	0	0	0	0	0	0	0	0	0	0	0
1996	0	0	0	0	0	0	0	0	0	0	0	0	0
1997	0	0	0	0	0	0	0	0	0	0	0	0	0
1998	0	0	0	0	0	0	0	0	0	0	0	0	0
1999	0	0	0	0	0	0	0	0	0	0	0	0	0
2000	0	0	0	0	0	0	0	(11,135)	0	0	0	0	0
2001	0	0	0	0	0	0	0	(11,487)	0	0	0	0	0
2002	0	0	0	0	0	0	0	(9,332)	0	0	0	0	0
2003	0	0	0	0	0	0	0	(18,428)	0	0	0	0	0
2004	0	0	0	0	0	0	0	(866)	0	0	0	0	0
2005	0	0	0	0	0	0	(576)	(20,082)	0	0	0	0	0
2006	0	0	0	0	0	0	0	(20,239)	0	0	0	0	0
2007	0	0	0	0	0	0	0	(9,867)	0	0	0	0	0
2008	(8,885)	0	0	0	0	0	0	(99,439)	0	0	0	0	0
2009	0	0	0	(5,926)	(38)	(1)	(28)	(88,699)	0	(815)	(5)	(15)	(21)
2010	0	0	0	0	(3,300)		0	(87,370)	0	(177,476)	0	0	0
2011	0	0	0	0	0	0	0	(56,909)	0	(106,423)	0	0	0
2012	0	0	0	0	0	0	(6,068)	(60,762)	0	0	0	0	0
2013	0	0	0	0	0	0	0	(11,846)	0	0	0	0	0
2014	0	0	0	(32)	(34)	(5)	(36)	(114,007)	(2)	(789)	(6)	(14)	(23)
2015	0	(6,264)	(8,763)	(6)	(7)	(1)	(16,796)	(76,141)	0	(159)	(1)	(3)	(5)
2016	0	(1,904)	(4,677)	0	0	0	0	(69,891)	0	0	0	0	0
2017	0	0	0	0	(8,376)	0	(14,831)	(3,695)	0	(69,151)	0	0	0
2018	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
2019	0	0	0	0	0	0	0	0	0	0	0	0	0
2020	0	0	0	0	0	0	0	0	0	0	0	0	0
2021	0	0	0	0	0	0	0	0	0	0	0	0	0
2022	0	0	0	0	0	0	0	0	0	0	0	0	0
2023	0	0	0	0	0	0	0	0	0	0	0	0	0
2024	0	0	0	0	0	0	0	0	0	0	0	0	0
2025	0	0	0	0	0	0	0	0	0	0	0	0	0
2026	0	0	0	0	0	0	0	0	0	0	0	0	0
2027	0	0	0	0	0	0	0	0	0	0	0	0	0
2028	0	0	0	0	0	0	0	0	0	0	0	0	0
2029	0	0	0	0	0	0	0	0	0	0	0	0	0
2030	0	0	0	0	0	0	0	0	0	0	0	0	0
2031	0	0	0	0	0	0	0	0	0	0	0	0	0
2032	0	0	0	0	0	0	0	0	0	0	0	0	0
2033	0	0	0	0	0	0	0	0	0	0	0	0	0
2034	0	0	0	0	0	0	0	0	0	0	0	0	0
2035	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	**(8,885)**	**(8,168)**	**(13,440)**	**(5,964)**	**(11,755)**	**(7)**	**(38,335)**	**(770,195)**	**(2)**	**(354,813)**	**(12)**	**(32)**	**(49)**

TABLE B-5A-Adj Annual Water Quantity Adjustments to Water Delivered from Each Aqueduct Reach to Each Contractor (acre-feet)

	CALIFORNIA AQUEDUCT (continued)												
	SAN LUIS DIVISION (continued)									SOUTH SAN JOAQUIN DIVISION			
	Reach 3A (continued)							Reach 4		Reach 7		REACH 10A	
Calendar Year	San Gabriel	San Gorgonio	San Luis Obispo	Santa Barbara	Santa Clara	Tulare	Ventura	Kern (Agricultural)	Tulare	Kern (Agricultural)	Tulare	Alameda-Zone 7	Alameda County
	[14]	[15]	[16]	[17]	[18]	[19]	[20]	[21]	[22]	[23]	[24]	[25]	[26]
1962	0	0	0	0	0	0	0	0	0	0	0	0	0
1963	0	0	0	0	0	0	0	0	0	0	0	0	0
1964	0	0	0	0	0	0	0	0	0	0	0	0	0
1965	0	0	0	0	0	0	0	0	0	0	0	0	0
1966	0	0	0	0	0	0	0	0	0	0	0	0	0
1967	0	0	0	0	0	0	0	0	0	0	0	0	0
1968	0	0	0	0	0	0	0	0	0	0	0	0	0
1969	0	0	0	0	0	0	0	0	0	0	0	0	0
1970	0	0	0	0	0	0	0	0	0	0	0	0	0
1971	0	0	0	0	0	0	0	0	0	0	0	0	0
1972	0	0	0	0	0	0	0	0	0	0	0	0	0
1973	0	0	0	0	0	0	0	0	0	0	0	0	0
1974	0	0	0	0	0	0	0	0	0	0	0	0	0
1975	0	0	0	0	0	0	0	0	0	0	0	0	0
1976	0	0	0	0	0	0	0	0	0	0	0	0	0
1977	0	0	0	0	0	0	0	0	0	0	0	0	0
1978	0	0	0	0	0	0	0	0	0	0	0	0	0
1979	0	0	0	0	0	0	0	0	0	0	0	0	0
1980	0	0	0	0	0	0	0	0	0	0	0	0	0
1981	0	0	0	0	0	0	0	0	0	0	0	0	0
1982	0	0	0	0	0	0	0	0	0	0	0	0	0
1983	0	0	0	0	0	0	0	0	0	0	0	0	0
1984	0	0	0	0	0	0	0	0	0	0	0	0	0
1985	0	0	0	0	0	0	0	0	0	0	0	0	0
1986	0	0	0	0	0	0	0	0	0	0	0	0	0
1987	0	0	0	0	0	0	0	0	0	0	0	0	0
1988	0	0	0	0	0	0	0	0	0	0	0	0	0
1989	0	0	0	0	0	0	0	0	0	0	0	0	0
1990	0	0	0	0	0	0	0	0	0	0	0	0	0
1991	0	0	0	0	0	0	0	0	0	0	0	0	0
1992	0	0	0	0	0	0	0	0	0	0	0	0	0
1993	0	0	0	0	0	0	0	0	0	0	0	0	0
1994	0	0	0	0	0	0	0	0	0	0	0	0	0
1995	0	0	0	0	0	0	0	0	0	0	0	0	0
1996	0	0	0	0	0	0	0	0	0	0	0	0	0
1997	0	0	0	0	0	0	0	0	0	0	0	0	0
1998	0	0	0	0	0	0	0	0	0	0	0	0	0
1999	0	0	0	0	0	0	0	0	0	0	0	0	0
2000	0	0	0	0	0	0	0	(12,806)	0	(24,167)	(2,981)	0	0
2001	0	0	0	0	0	0	0	0	0	0	(25,164)	(1,807)	0
2002	0	0	0	0	0	0	0	0	0	0	0	0	0
2003	0	0	0	0	0	0	0	0	0	0	0	0	0
2004	0	0	0	0	0	(4,000)	0		(6,020)	0	0	0	0
2005	0	0	0	0	(20,000)	(277)	0	0	0	0	0	0	0
2006	0	0	0	0	(53,573)	0	0	0	0	0	0	0	0
2007	0	0	0	0	0	0	0	0	0	0	0	0	(5,000)
2008	0	0	0	0	(3,681)	0	0	0	0	0	0	(7,000)	(10,000)
2009	(4)	(4)	(2)	(19)	(1,000)	(49)	(1)	0	0	0	0	0	(3,083)
2010	0	0	0	0	(44,668)	(17,551)	0	0	0	0	0	0	0
2011	0	0	0	0	(51,404)	(11,096)	0	0	0	0	0	0	0
2012	0	0	0	0	0	(9,366)	0	0	0	0	0	0	0
2013	0	0	0	0	0	(6,054)	0	0	0	0	0	(4,000)	(4,000)
2014	(6)	(13)	(134)	(926)	0	(8)	0	0	0	0	0	(8,074)	(13,652)
2015	(1)	(3)	(27)	(187)	(21,076)	0	0	0	0	0	0	(11,185)	(14,115)
2016	0	0	0	0	(6,706)	0	0	0	0	0	0	(324)	0
2017	0	0	0	(7,230)	0	0	0	0	0	0	0	0	0
2018	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
2019	0	0	0	0	0	0	0	0	0	0	0	0	0
2020	0	0	0	0	0	0	0	0	0	0	0	0	0
2021	0	0	0	0	0	0	0	0	0	0	0	0	0
2022	0	0	0	0	0	0	0	0	0	0	0	0	0
2023	0	0	0	0	0	0	0	0	0	0	0	0	0
2024	0	0	0	0	0	0	0	0	0	0	0	0	0
2025	0	0	0	0	0	0	0	0	0	0	0	0	0
2026	0	0	0	0	0	0	0	0	0	0	0	0	0
2027	0	0	0	0	0	0	0	0	0	0	0	0	0
2028	0	0	0	0	0	0	0	0	0	0	0	0	0
2029	0	0	0	0	0	0	0	0	0	0	0	0	0
2030	0	0	0	0	0	0	0	0	0	0	0	0	0
2031	0	0	0	0	0	0	0	0	0	0	0	0	0
2032	0	0	0	0	0	0	0	0	0	0	0	0	0
2033	0	0	0	0	0	0	0	0	0	0	0	0	0
2034	0	0	0	0	0	0	0	0	0	0	0	0	0
2035	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	**(11)**	**(20)**	**(163)**	**(8,362)**	**(202,108)**	**(48,401)**	**(1)**	**(12,806)**	**(6,020)**	**(24,167)**	**(28,145)**	**(32,390)**	**(49,850)**

TABLE B-5A-Adj Annual Water Quantity Adjustments to Water Delivered from Each Aqueduct Reach to Each Contractor (acre-feet)

	CALIFORNIA AQUEDUCT (continued)											
	SOUTH SAN JOAQUIN DIVISION (continued)											
	Reach 10A (continued)						Reach 12E					
Calendar Year	Castaic Lake	Desert	Kern (Agricultural)	Metropolitan	San Bernardino	Santa Clara	Alameda-Zone 7	AVEK	Castaic Lake	Coachella	Desert	Kern (Agricultural)
	[27]	[28]	[29]	[30]	[31]	[32]	[33]	[34]	[35]	[36]	[37]	[38]
1962	0	0	0	0	0	0	0	0	0	0	0	0
1963	0	0	0	0	0	0	0	0	0	0	0	0
1964	0	0	0	0	0	0	0	0	0	0	0	0
1965	0	0	0	0	0	0	0	0	0	0	0	0
1966	0	0	0	0	0	0	0	0	0	0	0	0
1967	0	0	0	0	0	0	0	0	0	0	0	0
1968	0	0	0	0	0	0	0	0	0	0	0	0
1969	0	0	0	0	0	0	0	0	0	0	0	0
1970	0	0	0	0	0	0	0	0	0	0	0	0
1971	0	0	0	0	0	0	0	0	0	0	0	0
1972	0	0	0	0	0	0	0	0	0	0	0	0
1973	0	0	0	0	0	0	0	0	0	0	0	0
1974	0	0	0	0	0	0	0	0	0	0	0	0
1975	0	0	0	0	0	0	0	0	0	0	0	0
1976	0	0	0	0	0	0	0	0	0	0	0	0
1977	0	0	0	0	0	0	0	0	0	0	0	0
1978	0	0	0	0	0	0	0	0	0	0	0	0
1979	0	0	0	0	0	0	0	0	0	0	0	0
1980	0	0	0	0	0	0	0	0	0	0	0	0
1981	0	0	0	0	0	0	0	0	0	0	0	0
1982	0	0	0	0	0	0	0	0	0	0	0	0
1983	0	0	0	0	0	0	0	0	0	0	0	0
1984	0	0	0	0	0	0	0	0	0	0	0	0
1985	0	0	0	0	0	0	0	0	0	0	0	0
1986	0	0	0	0	0	0	0	0	0	0	0	0
1987	0	0	0	0	0	0	0	0	0	0	0	0
1988	0	0	0	0	0	0	0	0	0	0	0	0
1989	0	0	0	0	0	0	0	0	0	0	0	0
1990	0	0	0	0	0	0	0	0	0	0	0	0
1991	0	0	0	0	0	0	0	0	0	0	0	0
1992	0	0	0	0	0	0	0	0	0	0	0	0
1993	0	0	0	0	0	0	0	0	0	0	0	0
1994	0	0	0	0	0	0	0	0	0	0	0	0
1995	0	0	0	0	0	0	0	0	0	0	0	0
1996	0	0	0	0	0	0	0	0	0	0	0	0
1997	0	0	0	0	0	0	0	0	0	0	0	0
1998	0	0	0	0	0	0	0	0	0	0	0	0
1999	0	0	0	0	0	0	0	0	0	0	0	0
2000	0	0	0	0	0	0	0	0	0	0	0	0
2001	0	0	(1,813)	(31,500)	0	(30,000)	0	0	0	0	0	0
2002	0	0	0	0	0	0	0	0	0	0	0	(14,638)
2003	0	0	0	(10,000)	0	0	0	0	0	0	0	(5,170)
2004	0	0	(3)	(93,555)	0	0	0	0	0	0	0	0
2005	0	0	0	0	0	0	0	0	0	0	0	0
2006	0	0	0	0	0	0	0	0	0	0	0	0
2007	0		(12,469)	(93,986)	0	(20,000)	0		(11,000)	0		(16,618)
2008	0	(4,864)	0	(99,024)	0	(10,000)	0	(8,393)	(11,000)	(3,000)	(3,486)	(103,683)
2009	(4,950)	0	(7,733)	(65,499)	0	(27,319)	0	(6,393)	(11,000)	(3,000)	0	(105,145)
2010		0	(56)	0		0	0	0	(2,750)	(8,393)	0	(43,833)
2011	0	0	0	0	0	0	0	0	0	0	0	(14,223)
2012	0	0	0	0	0	(17,000)	0	0	0	(4,000)	0	(12,815)
2013	0	0	(24,626)	(37,544)	0	(27,308)	0	0	0	(16,500)	0	(34,355)
2014	(4,951)	0	(7,476)	(30,049)	(694)	(29,134)	(5,901)	0	(13,824)	(5,000)	0	(90,996)
2015	0	0	(20,190)	(32,517)	0	(40,572)	(5,029)	0	(13,993)	(9,500)	0	(56,927)
2016	0	0	(626)	(12,440)	0	(1,122)	0	0	(5,940)	(16,500)	0	(64,384)
2017	0	0	0	0	0	0	0	0	0	0	0	0
2018	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
2019	0	0	0	0	0	0	0	0	0	0	0	0
2020	0	0	0	0	0	0	0	0	0	0	0	0
2021	0	0	0	0	0	0	0	0	0	0	0	0
2022	0	0	0	0	0	0	0	0	0	0	0	0
2023	0	0	0	0	0	0	0	0	0	0	0	0
2024	0	0	0	0	0	0	0	0	0	0	0	0
2025	0	0	0	0	0	0	0	0	0	0	0	0
2026	0	0	0	0	0	0	0	0	0	0	0	0
2027	0	0	0	0	0	0	0	0	0	0	0	0
2028	0	0	0	0	0	0	0	0	0	0	0	0
2029	0	0	0	0	0	0	0	0	0	0	0	0
2030	0	0	0	0	0	0	0	0	0	0	0	0
2031	0	0	0	0	0	0	0	0	0	0	0	0
2032	0	0	0	0	0	0	0	0	0	0	0	0
2033	0	0	0	0	0	0	0	0	0	0	0	0
2034	0	0	0	0	0	0	0	0	0	0	0	0
2035	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	**(9,901)**	**(4,864)**	**(74,992)**	**(506,114)**	**(694)**	**(202,455)**	**(10,930)**	**(14,786)**	**(69,507)**	**(65,893)**	**(3,486)**	**(562,787)**

TABLE B-5A-Adj Annual Water Quantity Adjustments to Water Delivered from Each Aqueduct Reach to Each Contractor (acre-feet)

	CALIFORNIA AQUEDUCT (continued)											
	SOUTH SAN JOAQUIN DIVISION (continued)											
	Reach 12E (continued)			Reach 13B								Reach 14B
Calendar Year	Metropolitan	San Bernardino	Santa Clara	Alameda-Zone 7	Alameda County	Dudley Ridge	Kern (Agricultural)	Metropolitan	Palmdale	San Bernardino	Santa Clara	Kern (Agricultural)
	[39]	[40]	[41]	[42]	[43]	[44]	[45]	[46]	[47]	[48]	[49]	[50]
1962	0	0	0	0	0	0	0	0	0	0	0	0
1963	0	0	0	0	0	0	0	0	0	0	0	0
1964	0	0	0	0	0	0	0	0	0	0	0	0
1965	0	0	0	0	0	0	0	0	0	0	0	0
1966	0	0	0	0	0	0	0	0	0	0	0	0
1967	0	0	0	0	0	0	0	0	0	0	0	0
1968	0	0	0	0	0	0	0	0	0	0	0	0
1969	0	0	0	0	0	0	0	0	0	0	0	0
1970	0	0	0	0	0	0	0	0	0	0	0	0
1971	0	0	0	0	0	0	0	0	0	0	0	0
1972	0	0	0	0	0	0	0	0	0	0	0	0
1973	0	0	0	0	0	0	0	0	0	0	0	0
1974	0	0	0	0	0	0	0	0	0	0	0	0
1975	0	0	0	0	0	0	0	0	0	0	0	0
1976	0	0	0	0	0	0	0	0	0	0	0	0
1977	0	0	0	0	0	0	0	0	0	0	0	0
1978	0	0	0	0	0	0	0	0	0	0	0	0
1979	0	0	0	0	0	0	0	0	0	0	0	0
1980	0	0	0	0	0	0	0	0	0	0	0	0
1981	0	0	0	0	0	0	0	0	0	0	0	0
1982	0	0	0	0	0	0	0	0	0	0	0	0
1983	0	0	0	0	0	0	0	0	0	0	0	0
1984	0	0	0	0	0	0	0	0	0	0	0	0
1985	0	0	0	0	0	0	0	0	0	0	0	0
1986	0	0	0	0	0	0	0	0	0	0	0	0
1987	0	0	0	0	0	0	0	0	0	0	0	0
1988	0	0	0	0	0	0	0	0	0	0	0	0
1989	0	0	0	0	0	0	0	0	0	0	0	0
1990	0	0	0	0	0	0	0	0	0	0	0	0
1991	0	0	0	0	0	0	0	0	0	0	0	0
1992	0	0	0	0	0	0	0	0	0	0	0	0
1993	0	0	0	0	0	0	0	0	0	0	0	0
1994	0	0	0	0	0	0	0	0	0	0	0	0
1995	0	0	0	0	0	0	0	0	0	0	0	0
1996	0	0	0	0	0	0	0	0	0	0	0	0
1997	0	0	0	0	0	0	0	0	0	0	0	0
1998	0	0	0	0	0	0	0	0	0	0	0	0
1999	0	0	0	0	0	0	0	0	0	0	0	0
2000	0	0	0	0	0	0	0	0	0	0	0	0
2001	(20,800)	0	0	0	0	0	(132,228)	0	0	0	0	(396)
2002	0	0	0	0	0	0	(22,161)	0	0	0	0	0
2003	(5,073)	0	0	0	0	0	(15,316)	(24,523)	0	0	0	0
2004	(17,765)	0	0	0	0	0	(43,985)	(4,813)	0	0	0	0
2005	0	0	0	0	0	0	0	0	0	0	0	0
2006	0	0	0	0	0	0	0	0	0	0	0	0
2007	(5,000)	0	0	0	0	0	(257,750)	0	(4,926)	0	0	0
2008	(8,402)	0	0	0	0	0	(228,579)	(25,721)	0	0	0	0
2009	(14,516)	0	(6,134)	0	0	0	(186,044)	0	0	0	0	(1,706)
2010	(52,413)	0	0	0	0	0	(59,451)	0	0	0	0	(1,867)
2011	(23,419)	0	0	0	0	0	(29,041)	0	0	0	0	0
2012	0	0	0	0	0	(6,068)	(103,364)	0	0	0	0	(73)
2013	(31,478)	(1,500)	0	0	0	0	(160,286)	(1,033)	0	0	(17,692)	(264)
2014	(9,882)	(400)	0	(931)	(1,088)	(16,789)	(161,077)	(17,184)	0	(3,906)	(5,253)	(6,898)
2015	(6,899)	0	(288)	(1,600)	(2,097)	(14,460)	(112,780)	(21,935)	0	0	(4,625)	(10,554)
2016	(23,389)	0	0	0	0	0	(28,033)	0	0	0	0	(8,376)
2017	(6,400)	0	0	0	0	0	(6,841)	0	0	0	0	0
2018	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
2019	0	0	0	0	0	0	0	0	0	0	0	0
2020	0	0	0	0	0	0	0	0	0	0	0	0
2021	0	0	0	0	0	0	0	0	0	0	0	0
2022	0	0	0	0	0	0	0	0	0	0	0	0
2023	0	0	0	0	0	0	0	0	0	0	0	0
2024	0	0	0	0	0	0	0	0	0	0	0	0
2025	0	0	0	0	0	0	0	0	0	0	0	0
2026	0	0	0	0	0	0	0	0	0	0	0	0
2027	0	0	0	0	0	0	0	0	0	0	0	0
2028	0	0	0	0	0	0	0	0	0	0	0	0
2029	0	0	0	0	0	0	0	0	0	0	0	0
2030	0	0	0	0	0	0	0	0	0	0	0	0
2031	0	0	0	0	0	0	0	0	0	0	0	0
2032	0	0	0	0	0	0	0	0	0	0	0	0
2033	0	0	0	0	0	0	0	0	0	0	0	0
2034	0	0	0	0	0	0	0	0	0	0	0	0
2035	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	**(225,436)**	**(1,900)**	**(6,422)**	**(2,531)**	**(3,185)**	**(37,317)**	**(1,546,936)**	**(95,209)**	**(4,926)**	**(3,906)**	**(27,570)**	**(30,134)**

TABLE B-5A-Adj Annual Water Quantity Adjustments to Water Delivered from Each Aqueduct Reach to Each Contractor (acre-feet)

Sheet 5 of 5

	CALIFORNIA AQUEDUCT (continued)									
	SOUTH SAN JOAQUIN DIVISION (continued)				MOJAVE DIVISION				SANTA ANA DIVISION	
	Reach 14C		Reach 15A	Reach 16A	Reach 22A	Reach 22B		Reach 24	Reach EBX2C	
Calendar Year	Kern (Agricultural)	Metropolitan	Kern (Agricultural)	Kern (Agricultural)	AVEK	AVEK	Metropolitan	Metropolitan	San Bernardino	GRAND TOTAL
	[51]	[52]	[53]	[54]	[55]	[56]	[57]	[58]	[59]	[60]
1962	0	0	0	0	0	0	0	0	0	0
1963	0	0	0	0	0	0	0	0	0	0
1964	0	0	0	0	0	0	0	0	0	0
1965	0	0	0	0	0	0	0	0	0	0
1966	0	0	0	0	0	0	0	0	0	0
1967	0	0	0	0	0	0	0	0	0	0
1968	0	0	0	0	0	0	0	0	0	0
1969	0	0	0	0	0	0	0	0	0	0
1970	0	0	0	0	0	0	0	0	0	0
1971	0	0	0	0	0	0	0	0	0	0
1972	0	0	0	0	0	0	0	0	0	0
1973	0	0	0	0	0	0	0	0	0	0
1974	0	0	0	0	0	0	0	0	0	0
1975	0	0	0	0	0	0	0	0	0	0
1976	0	0	0	0	0	0	0	0	0	0
1977	0	0	0	0	0	0	0	0	0	0
1978	0	0	0	0	0	0	0	0	0	0
1979	0	0	0	0	0	0	0	0	0	0
1980	0	0	0	0	0	0	0	0	0	0
1981	0	0	0	0	0	0	0	0	0	0
1982	0	0	0	0	0	0	0	0	0	0
1983	0	0	0	0	0	0	0	0	0	0
1984	0	0	0	0	0	0	0	0	0	0
1985	0	0	0	0	0	0	0	0	0	0
1986	0	0	0	0	0	0	0	0	0	0
1987	0	0	0	0	0	0	0	0	0	0
1988	0	0	0	0	0	0	0	0	0	0
1989	0	0	0	0	0	0	0	0	0	0
1990	0	0	0	0	0	0	0	0	0	0
1991	0	0	0	0	0	0	0	0	0	0
1992	0	0	0	0	0	0	0	0	0	0
1993	0	0	0	0	0	0	0	0	0	0
1994	0	0	0	0	0	0	0	0	0	0
1995	0	0	0	0	0	0	0	0	0	0
1996	0	0	0	0	0	0	0	0	0	0
1997	0	0	0	0	0	0	0	0	0	0
1998	0	0	0	0	0	0	0	0	0	0
1999	0	0	0	0	0	0	0	0	0	0
2000	0	0	0	0	0	0	0	0	0	(51,089)
2001	(242)	0	0	0	0	(152)	0	0	0	(255,589)
2002	0	0	0	0	0	0	0	0	0	(46,131)
2003	0	(12,380)	0	0	0	0	0	0	0	(90,890)
2004	0	(25,512)	0	0	0	0	0	0	(844)	(197,363)
2005	0	0	0	0	0	0	0	0	(7)	(40,942)
2006	0	0	0	0	0	0	0	0	(2)	(73,814)
2007	0	(24,225)	0	0	0	0	(8,751)	(17,249)	0	(486,841)
2008	0	(37,602)	0	0	0	0	(4,816)	(3,679)	(6)	(681,260)
2009	(5,168)	(54,948)	(2,788)	(444)	0	0	0	(7,488)	(11)	(609,996)
2010	(4,761)	(32,758)	(2,913)	0	0	0	0	(2,891)	0	(542,451)
2011	0	(16,065)	0	0	0	0	0	0	0	(308,580)
2012	(862)	(10,010)	(405)	0	0	0	0	0	0	(230,793)
2013	(4,691)	(33,205)	(406)	0	0	0	0	0	0	(416,788)
2014	(10,773)	(47,358)	(5,962)	0	(1,046)	0	0	0	0	(614,333)
2015	(11,108)	(70,200)	(5,560)	0	(1,516)	0	0	0	0	(597,090)
2016	(4,939)	(29,819)	(3,549)	0	(947)	0	0	0	0	(283,566)
2017	0	(5,863)	0	0	0	0	0	0	0	(122,387)
2018	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
2019	0	0	0	0	0	0	0	0	0	0
2020	0	0	0	0	0	0	0	0	0	0
2021	0	0	0	0	0	0	0	0	0	0
2022	0	0	0	0	0	0	0	0	0	0
2023	0	0	0	0	0	0	0	0	0	0
2024	0	0	0	0	0	0	0	0	0	0
2025	0	0	0	0	0	0	0	0	0	0
2026	0	0	0	0	0	0	0	0	0	0
2027	0	0	0	0	0	0	0	0	0	0
2028	0	0	0	0	0	0	0	0	0	0
2029	0	0	0	0	0	0	0	0	0	0
2030	0	0	0	0	0	0	0	0	0	0
2031	0	0	0	0	0	0	0	0	0	0
2032	0	0	0	0	0	0	0	0	0	0
2033	0	0	0	0	0	0	0	0	0	0
2034	0	0	0	0	0	0	0	0	0	0
2035	0	0	0	0	0	0	0	0	0	0
TOTAL	**(42,544)**	**(399,945)**	**(21,583)**	**(444)**	**(3,509)**	**(152)**	**(13,567)**	**(31,307)**	**(870)**	**(5,649,903)**

Tables B-5B through B-31

Note: Where applicable, the projected data values shown in this appendix are shaded and the bill year data are in **bold** type.

TABLE B-5B Annual Water Quantities Delivered to Each Contractor (acre-feet)

Calendar Year	NORTH BAY AREA			SOUTH BAY AREA[a]				CENTRAL COASTAL AREA		
	Napa[b]	Solano	Total	Alameda-Zone 7	Alameda County	Santa Clara	Total	San Luis Obispo	Santa Barbara	Total
	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]
1962	0	0	0	494	8,412	0	8,906	0	0	0
1963	0	0	0	1,731	10,914	0	12,645	0	0	0
1964	0	0	0	1,673	19,238	0	20,911	0	0	0
1965	0	0	0	2,605	16,407	15,014	34,026	0	0	0
1966	0	0	0	5,511	14,864	34,538	54,913	0	0	0
1967	0	0	0	4,780	12,882	39,101	56,763	0	0	0
1968	1,214	0	1,214	6,133	24,817	70,105	101,055	0	0	0
1969	2,687	0	2,687	6,635	813	62,264	69,712	0	0	0
1970	3,618	0	3,618	9,249	0	80,311	89,560	0	0	0
1971	2,521	0	2,521	5,017	5,961	87,606	98,584	0	0	0
1972	3,647	0	3,647	10,489	27,671	100,266	138,426	0	0	0
1973	3,792	0	3,792	2,975	2,521	88,582	94,078	0	0	0
1974	4,870	0	4,870	1,314	4	88,000	89,318	0	0	0
1975	6,840	0	6,840	4,618	986	88,000	93,604	0	0	0
1976	7,122	0	7,122	17,131	21,300	88,000	126,431	0	0	0
1977	8,226	0	8,226	12,644	18,840	76,220	107,704	0	0	0
1978	6,034	0	6,034	10,984	5,863	95,727	112,574	0	0	0
1979	6,561	0	6,561	19,325	10,874	91,991	122,190	0	0	0
1980	6,707	0	6,707	16,790	11,034	88,000	115,824	0	0	0
1981	9,001	0	9,001	19,590	21,917	88,000	129,507	0	0	0
1982	1,213	0	1,213	13,123	6,316	88,000	107,439	0	0	0
1983	2,287	0	2,287	4,766	3,157	86,733	94,656	0	0	0
1984	2,923	0	2,923	6,784	3,338	88,000	98,122	0	0	0
1985	4,039	0	4,039	15,072	19,016	88,000	122,088	0	0	0
1986	3,519	1,400	4,919	10,609	12,379	88,000	110,988	0	0	0
1987	7,693	1,550	9,243	23,406	25,390	88,000	136,796	0	0	0
1988	5,392	9,726	15,118	25,830	33,464	87,961	147,255	0	0	0
1989	6,195	17,256	23,451	26,227	26,042	90,000	142,269	0	0	0
1990	6,940	19,131	26,071	33,034	31,703	92,000	156,737	0	0	0
1991	1,380	6,972	8,352	9,411	12,648	28,200	50,259	0	1,240	1,240
1992	4,001	14,773	18,774	14,669	19,153	42,839	76,661	0	0	0
1993	5,286	29,180	34,466	33,635	10,271	62,065	105,971	0	0	0
1994	6,792	25,256	32,048	20,542	22,911	57,115	100,568	0	0	0
1995	5,182	21,345	26,527	30,091	17,793	28,756	76,640	0	0	0
1996	4,893	29,999	34,892	18,903	19,662	89,850	128,415	100	0	100
1997	4,341	33,530	37,871	27,522	24,063	95,601	147,186	1,199	7,439	8,638
1998	5,359	29,766	35,125	17,941	19,075	63,410	100,426	3,592	18,618	22,210
1999	5,304	34,753	40,057	50,910	37,652	82,945	171,507	3,743	20,137	23,880
2000	4,958	37,015	41,973	58,617	35,978	101,988	196,583	3,962	22,741	26,703
2001	9,345	34,586	43,931	34,409	18,004	77,922	130,335	4,283	18,946	23,229
2002	6,875	38,560	45,435	53,261	27,811	62,186	143,258	4,355	27,636	31,991
2003	7,646	33,951	41,597	45,450	36,590	108,981	191,021	4,453	26,968	31,421
2004	8,134	43,002	51,136	52,364	27,884	59,458	139,706	4,165	29,705	33,870
2005	7,669	37,819	45,488	47,512	44,599	128,249	220,360	4,251	23,344	27,595
2006	7,789	35,516	43,305	54,527	43,079	128,210	225,816	4,209	23,275	27,484
2007	10,957	47,300	58,257	40,157	24,391	75,382	139,930	3,776	27,740	31,516
2008	13,292	41,320	54,612	41,186	22,902	59,160	123,248	3,402	18,393	21,795
2009	10,904	30,950	41,854	31,087	19,496	76,363	126,946	3,801	15,452	19,253
2010	12,417	30,816	43,233	47,343	22,571	107,871	177,785	3,757	17,775	21,532
2011	11,314	27,995	39,309	52,726	36,610	129,062	218,398	3,819	21,050	24,869
2012	9,907	29,347	39,254	55,239	20,831	63,794	139,864	3,944	19,474	23,418
2013	12,538	35,869	48,407	44,856	23,640	84,623	153,119	3,681	18,018	21,699
2014	14,164	19,679	33,843	34,296	30,066	67,446	131,808	3,206	16,757	19,963
2015	11,199	23,836	35,035	32,432	27,259	82,888	142,579	3,438	11,673	15,111
2016	8,993	23,605	32,598	53,484	27,357	107,164	188,005	4,199	35,536	39,735
2017	11,166	37,738	48,904	47,016	23,506	76,329	146,851	4,559	53,473	58,032
2018	**17,415**	**28,654**	**46,069**	**48,371**	**25,200**	**62,502**	**136,073**	**12,477**	**27,291**	**39,768**
2019	17,415	28,654	46,069	48,371	25,200	60,000	133,571	13,269	27,291	40,560
2020	17,415	28,654	46,069	48,371	25,200	60,000	133,571	13,345	27,291	40,636
2021	17,415	28,654	46,069	48,371	25,200	60,000	133,571	13,357	27,291	40,648
2022	17,415	28,654	46,069	48,371	25,200	60,000	133,571	13,357	27,291	40,648
2023	17,415	28,654	46,069	48,371	25,200	60,000	133,571	13,357	27,291	40,648
2024	17,415	28,654	46,069	48,371	25,200	60,000	133,571	13,357	27,291	40,648
2025	17,415	28,654	46,069	48,371	25,200	60,000	133,571	13,357	27,291	40,648
2026	17,415	28,654	46,069	48,371	25,200	60,000	133,571	13,357	27,291	40,648
2027	17,415	28,654	46,069	48,371	25,200	60,000	133,571	13,357	27,291	40,648
2028	17,415	28,654	46,069	48,371	25,200	60,000	133,571	13,357	27,291	40,648
2029	17,415	28,654	46,069	48,371	25,200	60,000	133,571	13,357	27,291	40,648
2030	17,415	28,654	46,069	48,371	25,200	60,000	133,571	13,357	27,291	40,648
2031	17,415	28,654	46,069	48,371	25,200	60,000	133,571	13,357	27,291	40,648
2032	17,415	28,654	46,069	48,371	25,200	60,000	133,571	13,357	27,291	40,648
2033	17,415	28,654	46,069	48,371	25,200	60,000	133,571	13,357	27,291	40,648
2034	17,415	28,654	46,069	48,371	25,200	60,000	133,571	13,357	27,291	40,648
2035	17,415	28,654	46,069	48,371	25,200	60,000	133,571	13,357	27,291	40,648
TOTAL	**648,316**	**1,399,313**	**2,047,629**	**2,238,803**	**1,545,525**	**5,308,778**	**9,093,106**	**319,340**	**966,628**	**1,285,968**

[a] For the period June 1962 through November 1967, deliveries were supplied by non-project water.

[b] For the period 1968 through 1987, deliveries are non-project water pumped through an interim facility.

TABLE B-5B Annual Water Quantities Delivered to Each Contractor (acre-feet)

Calendar Year	SAN JOAQUIN VALLEY AREA								
			Kern						
	Dudley Ridge	Empire	Municipal and Industrial	Agricultural	Total	Kings	Oak Flat	Tulare	Total
	[11]	[12]	[13]	[14]	[15]	[16]	[17]	[18]	[19]
1962	0	0	0	0	0	0	0	0	0
1963	0	0	0	0	0	0	0	0	0
1964	0	0	0	0	0	0	0	0	0
1965	0	0	0	0	0	0	0	0	0
1966	0	0	0	0	0	0	0	0	0
1967	0	0	0	0	0	0	0	0	0
1968	26,360	1,978	0	127,384	127,384	900	3,084	25,100	184,806
1969	31,375	56	0	141,265	141,265	100	3,016	9,923	185,735
1970	40,407	3,942	0	204,634	204,634	0	5,911	9,578	264,472
1971	41,053	5,990	0	360,151	360,151	3,700	7,212	122,485	540,591
1972	42,443	5,795	0	490,781	490,781	1,400	8,166	258,393	806,978
1973	22,057	3,000	0	341,469	341,469	1,500	3,214	50,464	421,704
1974	33,390	3,000	23,708	323,292	347,000	1,500	3,471	72,289	460,650
1975	40,555	3,000	14,529	396,291	410,820	1,600	3,576	86,258	545,809
1976	41,421	3,000	46,719	392,531	439,250	1,600	4,112	58,811	548,194
1977	11,153	738	27,882	163,425	191,307	1,530	1,472	18,081	224,281
1978	51,747	454	76,895	590,452	667,347	2,070	3,906	12,053	737,577
1979	38,544	1,739	62,997	683,049	746,046	2,000	6,149	155,121	949,599
1980	41,000	894	45,943	588,557	634,500	2,200	5,700	75,444	759,738
1981	41,000	5,859	75,758	615,642	691,400	2,300	4,300	83,438	828,297
1982	41,000	361	47,477	697,823	745,300	1,750	3,838	18,551	810,800
1983	42,900	0	6,854	587,653	594,507	3,550	3,822	1,006	645,785
1984	45,100	0	90,904	769,696	860,600	3,100	5,700	5,743	920,243
1985	46,251	5,197	88,515	800,381	888,896	3,400	5,433	109,791	1,058,968
1986	50,249	1,170	77,240	829,101	906,341	3,700	5,107	79,355	1,045,922
1987	46,288	2,525	117,174	852,731	969,905	4,000	5,625	93,084	1,121,427
1988	47,994	3,475	122,409	887,111	1,009,520	4,000	4,412	95,866	1,165,267
1989	57,049	3,000	123,896	1,022,166	1,146,062	4,000	6,091	127,950	1,344,152
1990	36,296	1,279	127,837	584,611	712,448	2,000	2,922	57,070	812,015
1991	927	221	33,122	8,965	42,087	0	141	2,180	45,556
1992	23,770	1,354	62,326	420,894	483,220	1,806	2,239	46,728	559,117
1993	50,618	2,741	128,316	1,039,614	1,167,930	4,000	4,858	124,468	1,354,615
1994	28,793	1,666	87,139	570,020	657,159	2,116	3,071	62,362	755,167
1995	60,686	1,631	135,415	1,016,114	1,151,529	4,000	5,169	101,869	1,324,884
1996	56,948	1,868	135,654	1,049,409	1,185,063	4,000	4,904	236,875	1,489,658
1997	71,308	0	120,708	987,451	1,108,159	0	5,238	22,369	1,207,074
1998	55,650	542	89,765	768,825	858,590	15	4,401	20,677	939,875
1999	59,697	3,176	138,153	1,039,985	1,178,138	4,000	4,871	289,735	1,539,617
2000	60,539	1,799	40,697	1,183,440	1,224,137	3,600	4,508	201,294	1,495,877
2001	41,902	1,360	3,116	651,175	654,291	1,560	3,592	84,726	787,431
2002	48,915	1,405	12,589	812,870	825,459	2,854	4,885	96,502	980,020
2003	46,082	1,436	47,070	917,160	964,230	3,692	4,266	105,841	1,125,547
2004	49,080	3,562	126,933	712,193	839,126	9,053	4,629	90,021	995,471
2005	79,005	3,834	69,594	1,328,387	1,397,981	19,806	4,194	140,279	1,645,099
2006	72,080	3,282	98,199	1,164,671	1,262,870	9,530	4,242	108,207	1,460,211
2007	45,135	2,084	79,144	949,601	1,028,745	5,746	3,567	87,083	1,172,360
2008	22,174	947	24,572	702,099	726,671	3,836	1,985	33,904	789,517
2009	21,237	1,034	2,912	779,826	782,738	3,391	1,993	36,836	847,229
2010	27,967	3,259	8,183	689,917	698,100	4,679	2,906	70,238	807,149
2011	60,560	1,915	37,112	1,169,231	1,206,343	6,556	2,715	63,141	1,341,230
2012	30,450	2,242	27,500	778,144	805,644	7,405	3,208	95,717	944,666
2013	27,046	1,567	33,501	711,840	745,341	4,645	2,820	48,361	829,780
2014	40,535	516	1	516,001	516,002	1,256	1,520	8,934	568,763
2015	41,733	624	11,976	508,842	520,818	1,229	1,077	17,336	582,817
2016	20,908	1,822	9,633	627,693	637,326	3,660	1,855	42,387	707,958
2017	59,313	1,800	65,337	735,868	801,205	6,214	1,974	61,022	931,528
2018	**28,568**	**1,800**	**72,707**	**525,095**	**597,802**	**5,583**	**3,420**	**52,483**	**689,656**
2019	28,568	1,800	72,707	525,095	597,802	5,583	3,420	52,483	689,656
2020	28,568	1,800	72,707	525,095	597,802	5,583	3,420	52,483	689,656
2021	28,568	1,800	72,707	525,095	597,802	5,583	3,420	52,483	689,656
2022	28,568	1,800	72,707	525,095	597,802	5,583	3,420	52,483	689,656
2023	28,568	1,800	72,707	525,095	597,802	5,583	3,420	52,483	689,656
2024	28,568	1,800	72,707	525,095	597,802	5,583	3,420	52,483	689,656
2025	28,568	1,800	72,707	525,095	597,802	5,583	3,420	52,483	689,656
2026	28,568	1,800	72,707	525,095	597,802	5,583	3,420	52,483	689,656
2027	28,568	1,800	72,707	525,095	597,802	5,583	3,420	52,483	689,656
2028	28,568	1,800	72,707	525,095	597,802	5,583	3,420	52,483	689,656
2029	28,568	1,800	72,707	525,095	597,802	5,583	3,420	52,483	689,656
2030	28,568	1,800	72,707	525,095	597,802	5,583	3,420	52,483	689,656
2031	28,568	1,800	72,707	525,095	597,802	5,583	3,420	52,483	689,656
2032	28,568	1,800	72,707	525,095	597,802	5,583	3,420	52,483	689,656
2033	28,568	1,800	72,707	525,095	597,802	5,583	3,420	52,483	689,656
2034	28,568	1,800	72,707	525,095	597,802	5,583	3,420	52,483	689,656
2035	28,568	1,800	72,707	525,095	597,802	5,583	3,420	52,483	689,656
TOTAL	**2,632,914**	**136,539**	**4,114,130**	**43,742,141**	**47,856,271**	**271,043**	**258,627**	**4,869,640**	**56,025,034**

TABLE B-5B Annual Water Quantities Delivered to Each Contractor (acre-feet)

	SOUTHERN CALIFORNIA AREA									
Calendar Year	AVEK	Castaic Lake[c]	Coachella	Crestline	Desert	Littlerock	Mojave	Palmdale	San Bernardino	San Gabriel
	[20]	[21]	[22]	[23]	[24]	[25]	[26]	[27]	[28]	[29]
1962	0	0	0	0	0	0	0	0	0	0
1963	0	0	0	0	0	0	0	0	0	0
1964	0	0	0	0	0	0	0	0	0	0
1965	0	0	0	0	0	0	0	0	0	0
1966	0	0	0	0	0	0	0	0	0	0
1967	0	0	0	0	0	0	0	0	0	0
1968	0	7,382	0	0	0	0	0	0	0	0
1969	0	9,970	0	0	0	0	0	0	0	0
1970	0	11,739	0	0	0	0	0	0	0	0
1971	0	12,490	0	0	0	0	0	0	0	0
1972	53	13,905	0	464	0	338	55	0	1,275	0
1973	20	9,418	5,800	389	9,000	290	0	0	32,426	0
1974	1,259	9,700	6,400	627	10,000	400	14	0	16,605	612
1975	8,068	10,700	7,000	825	11,000	520	0	0	13,865	5,450
1976	27,782	11,700	7,600	1,002	12,000	589	0	0	12,273	6,071
1977	11,202	5,075	0	1,109	0	111	80	0	24,833	8,996
1978	44,137	11,362	10,084	1,209	15,300	208	0	0	4,055	7,771
1979	60,493	19,145	10,063	1,260	15,000	133	4,000	0	18	290
1980	72,407	15,092	10,884	1,239	17,000	191	4,000	0	0	1,085
1981	79,375	18,461	12,105	1,485	19,000	1,270	4,000	0	16,021	3,619
1982	50,291	22,216	13,326	1,238	21,000	0	10,500	0	8,409	12,599
1983	32,961	22,135	14,547	911	23,000	38	0	0	5,994	734
1984	32,662	24,218	15,768	1,128	25,000	1	0	0	5,556	7,656
1985	37,064	24,500	16,989	1,422	27,000	0	0	1,558	7,390	5,028
1986	32,449	27,229	18,210	1,506	29,000	163	0	3,096	6,421	9,454
1987	34,089	27,988	19,431	1,849	31,500	1,085	17	5,379	18,751	10,630
1988	34,079	30,438	20,652	2,006	34,000	419	9	1,770	21,386	8,948
1989	45,280	36,364	21,873	2,170	36,500	971	200	9,009	20,782	12,839
1990	47,206	28,579	23,100	1,827	38,100	1,747	0	8,608	18,831	16,649
1991	9,568	4,562	6,930	849	11,430	522	3,423	3,914	3,661	5,399
1992	30,265	20,699	10,427	519	17,197	251	10,686	4,035	3,358	7,908
1993	43,102	23,039	23,100	439	38,100	734	11,514	7,761	4,361	14,397
1994	49,153	26,441	14,102	785	23,257	1,098	16,852	8,418	9,135	15,230
1995	47,286	27,233	23,100	409	38,100	480	8,722	6,961	696	12,922
1996	56,356	32,500	62,219	485	102,622	494	7,427	11,434	6,064	15,989
1997	62,393	27,712	68,340	651	69,990	444	10,374	11,861	9,654	18,175
1998	52,926	20,093	85,709	187	70,647	404	3,925	8,752	1,878	9,310
1999	69,073	32,899	50,480	1,132	58,100	342	8,144	13,278	12,874	21,729
2000	83,577	40,680	42,323	1,194	58,234	0	11,380	9,060	18,399	15,140
2001	62,857	31,939	9,100	1,057	15,010	0	4,433	10,427	26,488	2,360
2002	58,171	68,817	16,755	2,189	27,640	0	4,346	18,496	72,069	24,851
2003	60,029	55,736	14,443	1,563	23,819	0	14,435	11,547	26,113	21,934
2004	59,731	83,761	15,465	2,006	21,190	0	13,176	12,162	57,030	12,541
2005	59,831	59,456	42,519	807	49,089	0	13,561	11,712	31,550	13,984
2006	80,384	62,752	121,100	641	50,000	0	34,014	12,492	35,331	16,284
2007	80,203	60,190	73,228	1,768	30,234	0	46,109	19,634	57,116	4,024
2008	54,436	42,878	46,791	848	26,428	25	25,396	14,255	35,145	7,212
2009	45,670	42,085	46,022	894	18,263	42	29,047	15,339	39,346	11,520
2010	58,489	57,900	85,592	357	31,183	0	38,152	10,969	49,379	19,180
2011	94,046	33,191	90,279	474	36,379	0	5,099	16,881	38,126	23,591
2012	111,207	50,473	117,587	624	45,101	0	11,244	18,897	112,972	22,058
2013	51,022	61,754	66,539	1,368	20,791	0	7,483	10,567	32,085	9,252
2014	18,532	29,448	12,870	1,233	3,049	0	3,581	8,406	10,956	1,200
2015	14,308	29,189	37,596	1,253	11,217	0	8,830	5,836	24,380	5,760
2016	41,356	37,828	69,422	1,084	21,893	0	22,284	10,516	62,676	16,088
2017	109,248	85,857	88,124	1,950	31,681	1,182	10,321	14,983	63,973	20,291
2018	**75,912**	**57,120**	**83,010**	**3,480**	**33,450**	**1,380**	**40,751**	**19,588**	**59,058**	**17,280**
2019	78,441	57,120	83,010	3,480	33,450	1,380	41,801	19,588	61,560	17,280
2020	81,215	57,120	83,010	3,480	33,450	1,380	41,801	19,588	61,560	17,280
2021	84,269	57,120	83,010	3,480	33,450	1,380	41,801	19,588	61,560	17,280
2022	84,269	57,120	83,010	3,480	33,450	1,380	41,801	19,588	61,560	17,280
2023	84,269	57,120	83,010	3,480	33,450	1,380	41,801	19,588	61,560	17,280
2024	84,269	57,120	83,010	3,480	33,450	1,380	41,801	19,588	61,560	17,280
2025	84,269	57,120	83,010	3,480	33,450	1,380	41,801	19,588	61,560	17,280
2026	84,269	57,120	83,010	3,480	33,450	1,380	41,801	19,588	61,560	17,280
2027	84,269	57,120	83,010	3,480	33,450	1,380	41,801	19,588	61,560	17,280
2028	84,269	57,120	83,010	3,480	33,450	1,380	41,801	19,588	61,560	17,280
2029	84,269	57,120	83,010	3,480	33,450	1,380	41,801	19,588	61,560	17,280
2030	84,269	57,120	83,010	3,480	33,450	1,380	41,801	19,588	61,560	17,280
2031	84,269	57,120	83,010	3,480	33,450	1,380	41,801	19,588	61,560	17,280
2032	84,269	57,120	83,010	3,480	33,450	1,380	41,801	19,588	61,560	17,280
2033	84,269	57,120	83,010	3,480	33,450	1,380	41,801	19,588	61,560	17,280
2034	84,269	57,120	83,010	3,480	33,450	1,380	41,801	19,588	61,560	17,280
2035	84,269	57,120	83,010	3,480	33,450	1,380	41,801	19,588	61,560	17,280
TOTAL	**3,713,699**	**2,587,078**	**3,068,174**	**113,072**	**1,926,144**	**39,332**	**1,158,201**	**690,597**	**2,185,284**	**797,800**

[c] Devil's Den Water District merged with Castaic Lake Water Agency effective January 1, 1992.

TABLE B-5B Annual Water Quantities Delivered to Each Contractor (acre-feet)

Calendar Year	SOUTHERN CALIFORNIA AREA (continued)				FEATHER RIVER AREA					
	San Gorgonio	Metropolitan	Ventura	Total	Yuba City	Butte	Plumas	Total	South Bay Area Future Contractor	GRAND TOTAL
	[30]	[31]	[32]	[33]	[34]	[35]	[36]	[37]	[38]	[39]
1962	0	0	0	0	0	0	0	0	0	8,906
1963	0	0	0	0	0	0	0	0	0	12,645
1964	0	0	0	0	0	0	0	0	0	20,911
1965	0	0	0	0	0	0	0	0	0	34,026
1966	0	0	0	0	0	0	0	0	0	54,913
1967	0	0	0	0	0	0	0	0	0	56,763
1968	0	0	0	7,382	0	0	0	0	0	294,457
1969	0	0	0	9,970	0	0	0	0	0	268,104
1970	0	0	0	11,739	0	0	70	70	0	369,459
1971	0	0	0	12,490	0	192	64	256	0	654,442
1972	0	71,938	0	88,028	0	186	505	691	0	1,037,770
1973	0	159,883	0	217,226	0	53	679	732	0	737,532
1974	0	277,717	0	323,334	0	127	648	775	0	878,947
1975	0	526,491	0	583,919	0	253	405	658	0	1,230,830
1976	0	618,451	0	697,468	0	527	382	909	0	1,380,124
1977	0	189,755	0	241,161	0	706	303	1,009	0	582,381
1978	0	507,565	0	601,691	0	579	278	857	0	1,458,733
1979	0	477,074	0	587,476	0	302	329	631	0	1,666,457
1980	0	531,727	0	653,625	0	267	295	562	0	1,536,456
1981	0	795,846	0	951,182	0	221	355	576	0	1,918,563
1982	0	691,192	0	830,771	0	334	305	639	0	1,750,862
1983	0	343,521	0	443,841	0	325	262	587	0	1,187,156
1984	0	457,582	0	569,571	108	177	272	557	0	1,591,416
1985	0	683,625	0	804,576	62	308	254	624	0	1,990,295
1986	0	708,840	0	836,368	328	313	317	958	0	1,999,155
1987	0	712,424	0	863,143	88	459	452	999	0	2,131,608
1988	0	902,564	0	1,056,271	303	385	523	1,211	0	2,385,122
1989	0	1,156,698	0	1,342,686	403	300	486	1,189	0	2,853,747
1990	0	1,396,423	4,836	1,585,906	494	380	548	1,422	0	2,582,151
1991	0	391,447	988	442,693	265	328	420	1,013	0	549,113
1992	0	710,313	0	815,658	642	117	485	1,244	0	1,471,454
1993	0	652,190	0	818,737	746	256	444	1,446	0	2,315,235
1994	0	807,866	0	972,337	1,035	329	492	1,856	0	1,861,976
1995	0	436,042	0	601,951	910	203	308	1,421	0	2,031,423
1996	0	593,380	0	888,970	820	257	360	1,437	0	2,543,472
1997	0	721,810	1,850	1,003,254	1,005	185	231	1,421	0	2,405,444
1998	0	410,065	1,850	665,746	1,054	527	0	1,581	0	1,764,963
1999	0	852,617	1,850	1,122,518	1,096	286	0	1,382	0	2,898,961
2000	0	1,522,412	4,050	1,806,449	901	586	0	1,487	0	3,569,072
2001	0	1,023,169	1,850	1,188,690	1,065	513	0	1,578	0	2,175,194
2002	0	1,408,919	4,998	1,707,251	1,181	419	0	1,600	0	2,909,555
2003	116	1,701,615	5,000	1,936,350	1,324	551	0	1,875	0	3,327,811
2004	841	1,724,380	5,250	2,007,533	1,434	1,440	0	2,874	0	3,230,590
2005	692	1,528,045	1,665	1,812,911	1,894	527	0	2,421	0	3,753,874
2006	4,278	1,512,186	1,850	1,931,312	5,342	468	0	5,810	0	3,693,938
2007	3,935	1,499,688	3,000	1,879,129	2,327	956	0	3,283	0	3,284,475
2008	4,905	898,313	3,798	1,160,430	1,923	451	243	2,617	0	2,152,219
2009	6,397	930,871	3,891	1,189,387	2,114	581	200	2,895	0	2,227,564
2010	8,240	1,416,062	4,075	1,779,578	2,331	807	243	3,381	0	2,832,658
2011	10,503	1,686,570	4,000	2,039,139	2,297	1,092	98	3,487	0	3,666,432
2012	11,010	1,224,907	4,353	1,730,433	2,695	1,374	79	4,148	0	2,881,783
2013	9,445	892,550	2,890	1,165,746	4,850	908	366	6,124	0	2,224,875
2014	5,044	387,392	93	481,804	4,237	1,617	251	6,105	0	1,242,286
2015	3,481	573,526	1,000	716,376	3,004	2,763	285	6,052	0	1,497,970
2016	10,816	1,083,900	3,000	1,380,863	1,229	2,518	387	4,134	0	2,353,293
2017	11,970	1,392,292	3,000	1,834,872	3,649	2,968	768	7,385	0	3,027,572
2018	**10,380**	**1,146,900**	**3,000**	**1,551,309**	**5,760**	**268**	**731**	**6,759**	**0**	**2,469,634**
2019	10,380	1,146,900	3,000	1,557,390	5,760	268	731	6,759	0	2,474,005
2020	10,380	1,146,900	3,000	1,560,164	5,760	268	731	6,759	0	2,476,855
2021	10,380	1,146,900	3,000	1,563,218	5,760	268	731	6,759	0	2,479,921
2022	10,380	1,146,900	3,000	1,563,218	5,760	268	731	6,759	0	2,479,921
2023	10,380	1,146,900	3,000	1,563,218	5,760	268	731	6,759	0	2,479,921
2024	10,380	1,146,900	3,000	1,563,218	5,760	268	731	6,759	0	2,479,921
2025	10,380	1,146,900	3,000	1,563,218	5,760	268	731	6,759	0	2,479,921
2026	10,380	1,146,900	3,000	1,563,218	5,760	268	731	6,759	0	2,479,921
2027	10,380	1,146,900	3,000	1,563,218	5,760	268	731	6,759	0	2,479,921
2028	10,380	1,146,900	3,000	1,563,218	5,760	268	731	6,759	0	2,479,921
2029	10,380	1,146,900	3,000	1,563,218	5,760	268	731	6,759	0	2,479,921
2030	10,380	1,146,900	3,000	1,563,218	5,760	268	731	6,759	0	2,479,921
2031	10,380	1,146,900	3,000	1,563,218	5,760	268	731	6,759	0	2,479,921
2032	10,380	1,146,900	3,000	1,563,218	5,760	268	731	6,759	0	2,479,921
2033	10,380	1,146,900	3,000	1,563,218	5,760	268	731	6,759	0	2,479,921
2034	10,380	1,146,900	3,000	1,563,218	5,760	268	731	6,759	0	2,479,921
2035	10,380	1,146,900	3,000	1,563,218	5,760	268	731	6,759	0	2,479,921
TOTAL	**278,513**	**59,836,043**	**123,137**	**76,517,074**	**156,836**	**34,245**	**26,550**	**217,631**	**0**	**145,186,442**

TABLE B-6 Annual Water Quantities Conveyed through Each Pumping and Power Recovery Plant of Project Transportation Facilities (acre-feet)

	NORTH BAY AQUEDUCT											
	Barker Slough Pumping Plant				Cordelia Pumping Plant Solano				Cordelia Pumping Plant Napa			
Calendar Year	Initial Fill Water	Operational Losses	Water Supply Delivery	Total	Initial Fill Water	Operational Losses	Water Supply Delivery	Total	Initial Fill Water	Operational Losses	Water Supply Delivery[a]	Total
	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]	[12]
1961	0	0	0	0	0	0	0	0	0	0	0	0
1962	0	0	0	0	0	0	0	0	0	0	0	0
1963	0	0	0	0	0	0	0	0	0	0	0	0
1964	0	0	0	0	0	0	0	0	0	0	0	0
1965	0	0	0	0	0	0	0	0	0	0	0	0
1966	0	0	0	0	0	0	0	0	0	0	0	0
1967	0	0	0	0	0	0	0	0	0	0	0	0
1968	0	0	0	0	0	0	0	0	24	(10)	1,214	1,228
1969	0	0	0	0	0	0	0	0	0	2	2,687	2,689
1970	0	0	0	0	0	0	0	0	0	18	3,618	3,636
1971	0	0	0	0	0	0	0	0	0	4	2,521	2,525
1972	0	0	0	0	0	0	0	0	0	(10)	3,647	3,637
1973	0	0	0	0	0	0	0	0	0	1	3,792	3,793
1974	0	0	0	0	0	0	0	0	0	10	4,870	4,880
1975	0	0	0	0	0	0	0	0	0	10	6,840	6,850
1976	0	0	0	0	0	0	0	0	0	4	7,122	7,126
1977	0	0	0	0	0	0	0	0	0	2	8,226	8,228
1978	0	0	0	0	0	0	0	0	0	(6)	6,034	6,028
1979	0	0	0	0	0	0	0	0	0	1	6,561	6,562
1980	0	0	0	0	0	0	0	0	0	(3)	6,707	6,704
1981	0	0	0	0	0	0	0	0	0	8	9,001	9,009
1982	0	0	0	0	0	0	0	0	0	(8)	1,213	1,205
1983	0	0	0	0	0	0	0	0	0	(12)	2,287	2,275
1984	0	0	0	0	0	0	0	0	0	(15)	2,923	2,908
1985	0	0	0	0	0	0	0	0	0	13	4,039	4,052
1986	0	0	0	0	0	0	0	0	0	(4)	3,519	3,515
1987	0	0	0	0	0	0	0	0	0	0	7,693	7,693
1988	1	283	15,118	15,402	0	0	9,725	9,725	1	(1)	5,392	5,392
1989	0	758	23,451	24,209	0	0	17,246	17,246	0	(4)	6,195	6,191
1990	0	3	26,071	26,074	0	(634)	15,856	15,222	0	3	6,940	6,943
1991	0	667	8,352	9,019	0	124	3,855	3,979	0	198	1,380	1,578
1992	0	1,643	18,774	20,417	0	0	9,220	9,220	0	0	4,001	4,001
1993	0	1,153	34,466	35,619	0	0	14,471	14,471	0	0	5,286	5,286
1994	0	780	32,048	32,828	0	(6)	14,913	14,907	0	0	6,792	6,792
1995	0	908	26,527	27,435	0	0	15,893	15,893	0	0	5,182	5,182
1996	0	1,354	34,892	36,246	0	0	17,069	17,069	0	0	4,893	4,893
1997	0	1,422	37,871	39,293	0	0	17,501	17,501	0	0	4,341	4,341
1998	0	1,343	35,125	36,468	0	0	18,204	18,204	0	0	5,359	5,359
1999	0	2,522	40,057	42,579	0	0	19,562	19,562	0	0	5,304	5,304
2000	0	1,853	41,973	43,826	0	4	21,525	21,529	0	180	4,958	5,138
2001	0	1,760	43,931	45,691	0	0	19,737	19,737	0	0	9,345	9,345
2002	0	496	45,435	45,931	0	0	19,719	19,719	0	0	6,875	6,875
2003	0	3,991	41,597	45,588	0	0	16,700	16,700	0	0	7,637	7,637
2004	0	2,181	51,136	53,317	0	0	21,686	21,686	0	0	8,499	8,499
2005	0	935	45,488	46,423	0	0	19,189	19,189	0	0	8,009	8,009
2006	0	1,005	43,305	44,310	0	0	18,651	18,651	0	0	8,081	8,081
2007	0	1,189	58,257	59,446	0	0	27,793	27,793	0	0	11,277	11,277
2008	0	845	54,612	55,457	0	0	19,436	19,436	0	255	13,740	13,995
2009	0	537	41,854	42,391	0	0	15,473	15,473	0	130	11,377	11,507
2010	0	809	43,233	44,042	0	0	12,788	12,788	0	254	12,847	13,101
2011	0	803	39,309	40,112	0	0	12,832	12,832	0	213	11,275	11,488
2012	0	686	39,254	39,940	0	0	12,886	12,886	0	196	9,860	10,056
2013	0	1,150	48,407	49,557	0	0	19,404	19,404	0	350	12,478	12,828
2014	0	2,597	33,843	36,440	0	0	12,366	12,366	0	970	14,123	15,093
2015	0	144	35,035	35,179	0	0	15,321	15,321	0	76	11,133	11,209
2016	0	552	32,598	33,150	0	0	12,849	12,849	0	278	8,947	9,225
2017	0	51	48,904	48,955	0	0	24,054	24,054	0	5	11,066	11,071
2018	**0**	**51**	**46,069**	**46,120**	**0**	**0**	**20,539**	**20,539**	**0**	**5**	**17,415**	**17,420**
2019	0	51	46,069	46,120	0	0	21,565	21,565	0	5	17,415	17,420
2020	0	51	46,069	46,120	0	0	22,643	22,643	0	5	17,415	17,420
2021	0	51	46,069	46,120	0	0	23,775	23,775	0	5	17,415	17,420
2022	0	51	46,069	46,120	0	0	23,775	23,775	0	5	17,415	17,420
2023	0	51	46,069	46,120	0	0	23,775	23,775	0	5	17,415	17,420
2024	0	51	46,069	46,120	0	0	23,775	23,775	0	5	17,415	17,420
2025	0	51	46,069	46,120	0	0	23,775	23,775	0	5	17,415	17,420
2026	0	51	46,069	46,120	0	0	23,775	23,775	0	5	17,415	17,420
2027	0	51	46,069	46,120	0	0	23,775	23,775	0	5	17,415	17,420
2028	0	51	46,069	46,120	0	0	23,775	23,775	0	5	17,415	17,420
2029	0	51	46,069	46,120	0	0	23,775	23,775	0	5	17,415	17,420
2030	0	51	46,069	46,120	0	0	23,775	23,775	0	5	17,415	17,420
2031	0	51	46,069	46,120	0	0	23,775	23,775	0	5	17,415	17,420
2032	0	51	46,069	46,120	0	0	23,775	23,775	0	5	17,415	17,420
2033	0	51	46,069	46,120	0	0	23,775	23,775	0	5	17,415	17,420
2034	0	51	46,069	46,120	0	0	23,775	23,775	0	5	17,415	17,420
2035	0	51	46,069	46,120	0	0	23,775	23,775	0	5	17,415	17,420

[a] For the period 1968 through 1987, deliveries are non-SWP water pumped through an interim facility.

TABLE B-6 Annual Water Quantities Conveyed through Each Pumping and Power Recovery Plant of Project Transportation Facilities (acre-feet)

	SOUTH BAY AQUEDUCT						CALIFORNIA AQUEDUCT							
							NORTH SAN JOAQUIN DIVISION							
	South Bay Pumping Plant						Banks Pumping Plant							
				Deliveries			Transportation Water							
										Deliveries				
Calendar Year	Initial Fill Water	Operational Losses	Reservoir Storage Changes	Water Supply[b]	Recreation	Total	Initial Fill Water	Operational Losses	Reservoir Storage Changes	Water Supply	Recreation	Total	Conservation Water	Total
	[13]	[14]	[15]	[16]	[17]	[18]	[19]	[20]	[21]	[22]	[23]	[24]	[25]	[26]
1961	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1962	9	272	0	8,906	0	9,187	0	0	0	0	0	0	0	0
1963	71	185	0	12,645	0	12,901	0	0	0	0	0	0	0	0
1964	171	152	0	20,911	0	21,234	0	0	0	0	0	0	0	0
1965	93	729	0	34,026	0	34,848	0	0	0	0	0	0	0	0
1966	0	1,746	0	54,913	0	56,659	0	0	0	0	0	0	0	0
1967	0	1,677	0	56,763	0	58,440	5,746	1,183	0	11,538	0	18,467	2,957	21,424
1968	0	1,847	0	101,055	0	102,902	11,079	74,464	0	293,243	0	378,786	531,275	910,061
1969	3,449	2,668	0	69,712	0	75,829	7,336	44,287	0	265,417	0	317,040	531,185	848,225
1970	16,279	1,086	(5,355)	89,560	0	101,570	23,947	20,767	(5,355)	365,771	0	405,130	(12,995)	392,135
1971	0	1,815	8,854	98,584	0	109,253	23,207	(10,754)	8,854	651,665	8	672,980	7,708	680,688
1972	0	3,557	2,273	138,426	0	144,256	145,066	9,057	(4,285)	1,033,432	6,489	1,189,759	48,300	1,238,059
1973	0	(33)	(1,510)	94,078	0	92,535	214,941	(4,951)	2,902	733,008	1,155	947,055	55,846	1,002,901
1974	0	1,287	(10,056)	89,318	0	80,549	247,894	(11,526)	(32,510)	873,302	2,118	1,079,278	54,683	1,133,961
1975	0	320	8,550	93,604	0	102,474	110,149	(8,092)	16,101	1,223,332	3,377	1,344,867	(102,625)	1,242,242
1976	0	2,431	1,391	126,431	141	130,394	67,834	5,443	(244,124)	1,372,093	1,745	1,202,991	(442,348)	760,643
1977	0	2,866	2,685	107,704	112	113,367	0	39,897	(157,543)	573,146	1,111	456,611	(13,507)	443,104
1978	0	2,165	(11,249)	112,574	126	103,616	67,457	(36,898)	35,129	1,451,842	1,177	1,518,707	752,075	2,270,782
1979	0	2,401	1,069	122,190	89	125,749	17,397	60,958	(32,307)	1,659,265	1,398	1,706,711	(112,053)	1,594,658
1980	0	1,758	(6,563)	115,824	123	111,142	3,159	58,484	(275,538)	1,529,187	2,131	1,317,423	186,601	1,504,024
1981	0	2,627	13,742	129,507	121	145,997	46,060	85,350	40,536	1,908,986	4,974	2,085,906	(931,878)	1,154,028
1982	0	2,344	(23,928)	107,439	129	85,984	5,979	61,556	99,897	1,743,145	4,646	1,915,223	347,983	2,263,206
1983	0	2,151	(22,886)	94,656	132	74,053	6,071	47,022	(310,477)	1,184,282	7,853	934,751	835,771	1,770,522
1984	0	2,088	8,442	98,122	158	108,810	38,649	97,143	(108,548)	1,587,936	5,874	1,621,054	21,875	1,642,929
1985	0	2,817	(1,607)	122,088	152	123,450	0	110,469	137,783	1,985,632	5,452	2,239,336	(110,569)	2,128,767
1986	0	2,299	(1,850)	110,988	130	111,567	0	90,799	20,177	1,993,278	3,865	2,108,119	200,298	2,308,417
1987	0	2,625	(584)	136,796	137	138,974	0	91,427	(23,116)	2,121,366	7,672	2,197,349	(458,725)	1,738,624
1988	0	2,884	(698)	147,255	142	149,583	0	107,249	(35,484)	2,368,793	4,889	2,445,447	(303,583)	2,141,864
1989	0	2,673	3,296	142,269	152	148,390	0	117,603	(38,058)	2,829,107	8,135	2,916,787	421,131	3,337,918
1990	0	894	1,982	156,537	168	159,581	0	99,059	(290,965)	2,554,658	9,262	2,372,014	(374,027)	1,997,987
1991	0	2,637	(4,532)	50,259	150	48,514	0	80,106	(79,038)	539,748	4,879	545,695	554,904	1,100,599
1992	0	2,881	756	76,661	147	80,445	0	91,391	(218,170)	1,451,436	2,605	1,327,262	61,343	1,388,605
1993	0	1,940	(20,051)	105,971	143	88,003	0	149,372	(273,789)	2,279,323	2,609	2,157,515	849,249	3,006,764
1994	0	1,981	1,714	100,568	168	104,431	0	148,712	(120,985)	1,828,072	3,803	1,859,602	(324,640)	1,534,962
1995	0	1,188	(12,333)	76,640	146	65,641	0	173,074	(397,605)	2,003,475	2,575	1,781,519	293,159	2,074,678
1996	0	981	(1,990)	77,215	150	76,356	0	123,502	78,123	2,507,143	3,902	2,712,670	288,576	3,001,246
1997	0	1,575	5,016	102,186	155	108,932	527	135,106	(98,334)	2,366,152	2,594	2,406,045	(50,000)	2,356,045
1998	0	1,551	3,595	70,876	114	76,136	0	91,319	(346,039)	1,728,257	2,107	1,475,644	120,886	1,596,530
1999	0	2,166	12,313	100,497	139	115,115	0	135,809	(17,569)	2,855,522	4,301	2,978,063	(307,839)	2,670,224
2000	0	2,346	(20,958)	135,533	145	117,066	0	115,895	(13,232)	3,474,523	5,182	3,582,368	(15,487)	3,566,881
2001	0	2,784	1,301	95,335	196	99,616	0	222,144	(17,529)	1,874,096	1,978	2,080,689	86,928	2,167,617
2002	0	2,534	(13,938)	123,577	146	112,319	0	225,032	36,404	2,816,389	4,672	3,082,497	(151,719)	2,930,778
2003	0	2,920	(1,399)	132,714	131	134,366	0	329,699	(49,580)	3,193,449	11,362	3,484,930	225,348	3,710,278
2004	0	2,982	(7,240)	125,928	150	121,820	0	83,788	(4,079)	2,979,217	1,337	3,060,263	103,811	3,164,074
2005	0	2,823	(3,565)	108,136	154	107,548	0	151,931	(163,243)	3,665,023	1,270	3,654,981	535,754	4,190,735
2006	0	2,989	(9,645)	118,272	169	111,785	0	67,040	(129,767)	3,571,009	1,208	3,509,490	43,481	3,552,971
2007	0	2,840	14,928	134,172	146	152,086	0	73,956	133,124	2,736,094	830	2,944,004	(398,297)	2,545,707
2008	0	2,215	880	116,562	166	119,823	0	130,066	(3,350)	1,413,730	1,082	1,541,528	(397,949)	1,143,579
2009	0	1,999	(1,134)	116,947	108	117,920	0	111,805	(1,860)	1,572,819	2,023	1,684,787	928,666	2,613,453
2010	0	1,727	3,436	95,802	117	101,082	0	224,076	51,667	2,243,593	1,163	2,520,499	454,585	2,975,084
2011	0	1,534	(2,332)	112,952	122	112,276	0	314,282	(21,148)	3,315,056	1,588	3,609,778	165,312	3,775,090
2012	0	2,025	5,931	112,056	150	120,162	0	143,580	20,504	2,607,588	1,606	2,773,278	(473,745)	2,299,533
2013	0	2,753	(5,596)	147,119	137	144,413	0	173,145	(6,654)	1,753,556	1,641	1,921,688	(123,957)	1,797,731
2014	0	3,285	4,951	91,116	46	99,398	0	114,127	36,033	588,005	650	738,815	301,102	1,039,917
2015	0	2,727	(8,482)	117,072	43	111,360	0	109,951	(41,424)	859,793	690	929,010	(140,538)	788,472
2016	0	2,031	5,558	119,221	69	126,879	0	106,956	(57,641)	2,032,995	1,399	2,083,709	503,353	2,587,062
2017	0	3,462	0	103,429	400	107,291	0	130,033	55,915	2,848,508	8,660	3,043,116	11,873	3,054,989
2018	**0**	**3,462**	**0**	**123,294**	**400**	**127,156**	**0**	**133,235**	**48,000**	**2,416,806**	**8,660**	**2,606,701**	**(395,499)**	**2,211,202**
2019	0	3,462	0	123,204	400	127,066	0	133,725	0	2,421,177	8,660	2,563,562	106,195	2,669,757
2020	0	3,351	0	123,252	400	127,003	0	128,690	(366)	2,424,027	8,660	2,561,011	(8,687)	2,552,324
2021	0	3,351	0	123,204	400	126,955	0	128,769	10,725	2,427,093	8,660	2,575,247	(1,095)	2,574,152
2022	0	3,351	0	123,204	400	126,955	0	128,846	(3,483)	2,427,093	8,660	2,561,116	(185,907)	2,375,209
2023	0	3,351	0	123,204	400	126,955	0	128,818	(18,971)	2,427,093	8,660	2,545,600	115,791	2,661,391
2024	0	3,351	0	123,204	400	126,955	0	128,625	11,289	2,427,093	8,660	2,575,667	79,858	2,655,525
2025	0	3,351	0	123,204	400	126,955	0	130,380	(12,518)	2,427,093	8,660	2,553,615	(247,205)	2,306,410
2026	0	3,351	0	123,204	400	126,955	0	128,700	24,308	2,427,093	8,660	2,588,761	246,850	2,835,611
2027	0	3,351	0	123,204	400	126,955	0	128,692	(17,799)	2,427,093	8,660	2,546,646	(12,304)	2,534,342
2028	0	3,351	0	123,204	400	126,955	0	128,783	12,291	2,427,093	8,660	2,576,827	15,430	2,592,257
2029	0	3,351	0	123,204	400	126,955	0	128,671	(9,046)	2,427,093	8,660	2,555,378	(10,778)	2,544,600
2030	0	3,351	0	123,204	400	126,955	0	128,777	20,756	2,427,093	8,660	2,585,286	124,586	2,709,872
2031	0	3,351	0	123,204	400	126,955	0	128,134	(97,726)	2,427,093	8,660	2,466,161	(259,831)	2,206,330
2032	0	3,351	0	123,204	400	126,955	0	128,005	84,999	2,427,093	8,660	2,648,757	138,527	2,787,284
2033	0	3,351	0	123,204	400	126,955	0	127,876	(94,652)	2,427,093	8,660	2,468,977	(184,372)	2,284,605
2034	0	3,351	0	123,204	400	126,955	0	127,725	69,593	2,427,093	8,660	2,633,071	120,375	2,753,446
2035	0	3,351	0	123,204	400	126,955	0	127,379	(242,659)	2,427,093	8,660	2,320,473	(587,531)	1,732,942

[b] For the period June 1962 through November 1967, deliveries were supplied by non-SWP water.

TABLE B-6 Annual Water Quantities Conveyed through Each Pumping and Power Recovery Plant of Project Transportation Facilities (acre-feet)

	CALIFORNIA AQUEDUCT (continued)											
	SAN LUIS DIVISION						SOUTH SAN JOAQUIN DIVSION					
	Dos Amigos Pumping Plant						Buena Vista Pumping Plant					
				Deliveries						Deliveries		
Calendar Year	Initial Fill Water	Operational Losses	Reservoir Storage Changes	Water Supply	Recreation	Total	Initial Fill Water	Operational Losses	Reservoir Storage Changes	Water Supply	Recreation	Total
	[27]	[28]	[29]	[30]	[31]	[32]	[33]	[34]	[35]	[36]	[37]	[38]
1961	0	0	0	0	0	0	0	0	0	0	0	0
1962	0	0	0	0	0	0	0	0	0	0	0	0
1963	0	0	0	0	0	0	0	0	0	0	0	0
1964	0	0	0	0	0	0	0	0	0	0	0	0
1965	0	0	0	0	0	0	0	0	0	0	0	0
1966	0	0	0	0	0	0	0	0	0	0	0	0
1967	0	0	0	0	0	0	0	0	0	0	0	0
1968	11,079	25,126	0	189,104	0	225,309	0	0	0	0	0	0
1969	3,887	9,922	0	192,689	0	206,498	0	0	0	0	0	0
1970	7,668	1,901	0	270,300	0	279,869	4,779	1,012	0	3	0	5,794
1971	23,207	(12,030)	0	545,869	0	557,046	7,853	8,399	0	101,512	0	117,764
1972	145,066	(6,635)	(6,558)	886,840	6,481	1,025,194	100,274	20,044	(6,558)	223,626	6,481	343,867
1973	214,941	(6,778)	1,329	635,716	1,147	846,355	204,638	35,695	1,329	311,096	1,147	553,905
1974	247,894	(16,765)	(15,295)	780,513	2,108	998,455	237,554	19,672	(15,295)	388,949	2,108	632,988
1975	110,149	(12,144)	(693)	1,126,152	3,358	1,226,822	103,352	26,342	(693)	672,531	3,358	804,890
1976	67,834	(456)	(152,171)	1,241,550	1,581	1,158,338	61,122	29,428	(152,171)	785,055	1,581	725,015
1977	0	26,359	(116,219)	463,970	737	374,847	0	25,173	(116,219)	271,944	560	181,458
1978	67,457	1,905	79,308	1,335,362	680	1,484,712	65,027	17,751	121,904	762,043	674	967,399
1979	17,397	33,884	(51,299)	1,530,926	685	1,531,593	12,302	46,157	(51,299)	737,714	502	745,376
1980	3,159	34,391	(272,825)	1,407,663	1,514	1,173,902	0	49,025	(134,009)	778,059	1,262	694,337
1981	46,060	36,962	23,359	1,775,179	4,348	1,885,908	0	38,942	23,359	1,077,322	4,112	1,143,735
1982	5,979	57,146	116,086	1,631,868	4,205	1,815,284	0	29,059	117,174	990,863	4,045	1,141,141
1983	6,071	63,583	(101,155)	1,085,804	7,475	1,061,778	0	40,205	(101,155)	593,920	7,291	540,261
1984	38,649	109,263	(112,744)	1,484,114	5,391	1,524,673	0	38,487	(114,984)	781,955	5,244	710,702
1985	0	86,772	138,898	1,858,111	4,936	2,088,717	0	42,838	139,689	992,606	4,804	1,179,937
1986	0	51,963	19,989	1,877,183	3,426	1,952,561	0	36,751	37,546	1,014,294	3,285	1,091,876
1987	0	64,827	(25,707)	1,978,945	7,121	2,025,186	0	30,495	(25,522)	1,027,361	6,937	1,039,271
1988	0	72,679	(34,592)	2,217,126	4,490	2,259,703	0	38,804	(29,747)	1,244,196	4,360	1,257,613
1989	0	90,090	(29,411)	2,679,845	7,652	2,748,176	0	29,594	(60,826)	1,532,625	7,490	1,508,883
1990	0	115,074	(11,323)	2,394,999	8,922	2,507,672	0	46,865	(15,092)	1,769,991	8,879	1,810,643
1991	0	92,227	9,325	489,348	4,605	595,505	0	39,274	96,506	446,916	4,560	587,256
1992	0	118,796	(225,603)	1,372,536	2,079	1,267,808	0	28,138	(98,271)	920,978	1,995	852,840
1993	0	136,432	(220,537)	2,170,494	1,864	2,088,253	0	14,186	(128,363)	908,200	1,676	795,699
1994	0	152,414	(78,957)	1,724,433	3,098	1,800,988	0	35,083	(88,211)	1,107,122	2,918	1,056,912
1995	0	137,937	(12,473)	1,921,666	1,711	2,048,841	0	33,963	(16,431)	706,742	1,669	725,943
1996	0	45,591	14,927	2,425,024	2,998	2,488,540	0	31,304	15,438	988,612	2,928	1,038,282
1997	527	107,033	(66,814)	2,247,628	2,090	2,290,464	0	42,670	40,852	1,054,461	2,076	1,140,059
1998	0	95,185	(338,076)	1,664,080	1,589	1,422,778	0	41,910	(106,487)	753,731	1,585	690,739
1999	0	95,262	(2,778)	2,750,154	3,285	2,845,923	0	48,502	(2,807)	1,131,826	3,279	1,180,800
2000	0	134,231	7,726	3,273,337	4,222	3,419,516	0	37,514	7,726	1,814,685	4,216	1,864,141
2001	0	150,830	(18,830)	1,615,776	1,218	1,748,994	0	31,361	(18,830)	1,318,835	1,211	1,332,577
2002	0	92,905	50,342	2,628,462	3,968	2,775,677	0	41,565	50,342	1,831,874	3,961	1,927,742
2003	0	85,360	(48,181)	2,893,333	10,656	2,941,168	0	43,352	(48,181)	1,909,192	10,645	1,915,008
2004	0	25,865	3,161	2,807,825	652	2,837,503	0	41,551	3,161	2,102,371	649	2,147,732
2005	0	62,569	(159,678)	3,423,490	581	3,326,962	0	35,019	(159,678)	1,846,180	559	1,722,080
2006	0	(12,341)	(120,122)	3,501,308	504	3,369,349	0	30,271	(120,122)	2,077,130	504	1,987,783
2007	0	47,736	118,196	2,419,032	312	2,585,276	0	43,400	118,196	2,002,793	305	2,164,694
2008	0	103,375	(4,230)	1,296,068	361	1,395,574	0	39,056	(4,230)	1,275,174	327	1,310,327
2009	0	76,206	(726)	1,318,452	1,367	1,395,299	0	32,900	(726)	1,217,847	1,295	1,251,316
2010	0	75,028	48,231	2,307,963	636	2,431,858	0	41,741	48,231	1,505,105	603	1,595,680
2011	0	66,937	(18,816)	3,343,960	870	3,392,951	0	39,914	(18,816)	1,820,268	742	1,842,108
2012	0	113,586	14,573	2,537,793	942	2,666,894	0	95,029	14,573	1,672,197	938	1,782,737
2013	0	174,857	(1,058)	1,549,837	836	1,724,472	0	105,771	(1,058)	1,275,717	795	1,381,225
2014	0	105,741	31,082	433,625	214	570,662	0	72,181	31,082	523,726	172	627,161
2015	0	103,380	(32,942)	724,850	155	795,443	0	46,903	(32,942)	738,410	151	752,522
2016	0	100,424	(63,199)	1,860,842	981	1,899,048	0	63,781	(63,199)	1,429,290	981	1,430,853
2017	0	71,906	55,915	2,787,803	7,210	2,922,834	0	42,444	55,915	1,898,452	7,010	2,003,821
2018	**0**	**75,495**	**48,000**	**2,034,135**	**7,210**	**2,164,840**	**0**	**46,033**	**48,000**	**1,424,262**	**7,010**	**1,525,305**
2019	0	75,565	0	2,121,190	7,210	2,203,965	0	46,103	0	1,512,937	7,010	1,566,050
2020	0	70,628	(366)	2,123,992	7,210	2,201,464	0	41,166	(366)	1,515,711	7,010	1,563,521
2021	0	70,711	10,725	2,127,106	7,210	2,215,752	0	41,249	10,725	1,518,765	7,010	1,577,749
2022	0	70,705	(3,483)	2,127,106	7,210	2,201,538	0	41,243	(3,483)	1,518,765	7,010	1,563,535
2023	0	70,696	(18,971)	2,127,106	7,210	2,186,041	0	41,234	(18,971)	1,518,765	7,010	1,548,038
2024	0	70,575	11,289	2,127,106	7,210	2,216,180	0	41,113	11,289	1,518,765	7,010	1,578,177
2025	0	70,638	(12,518)	2,127,106	7,210	2,192,436	0	41,176	(12,518)	1,518,765	7,010	1,554,433
2026	0	70,650	24,308	2,127,106	7,210	2,229,274	0	41,188	24,308	1,518,765	7,010	1,591,271
2027	0	70,563	(17,799)	2,127,106	7,210	2,187,080	0	41,101	(17,799)	1,518,765	7,010	1,549,077
2028	0	70,703	12,291	2,127,106	7,210	2,217,310	0	41,241	12,291	1,518,765	7,010	1,579,307
2029	0	70,630	(9,046)	2,127,106	7,210	2,195,900	0	41,168	(9,046)	1,518,765	7,010	1,557,897
2030	0	70,694	20,756	2,127,106	7,210	2,225,766	0	41,232	20,756	1,518,765	7,010	1,587,763
2031	0	70,566	(97,726)	2,127,106	7,210	2,107,156	0	41,104	(97,726)	1,518,765	7,010	1,469,153
2032	0	70,168	84,999	2,127,106	7,210	2,289,483	0	40,706	84,999	1,518,765	7,010	1,651,480
2033	0	70,373	(94,652)	2,127,106	7,210	2,110,037	0	40,911	(94,652)	1,518,765	7,010	1,472,034
2034	0	69,865	69,593	2,127,106	7,210	2,273,774	0	40,403	69,593	1,518,765	7,010	1,635,771
2035	0	69,205	(242,659)	2,127,106	7,210	1,960,862	0	39,743	(242,659)	1,518,765	7,010	1,322,859

TABLE B-6 Annual Water Quantities Conveyed through Each Pumping and Power Recovery Plant of Project Transportation Facilities (acre-feet)

	CALIFORNIA AQUEDUCT (continued)											
	SOUTH SAN JOAQUIN DIVSION (continued)											
	Teerink Pumping Plant						Chrisman Pumping Plant					
				Deliveries						Deliveries		
Calendar Year	Initial Fill Water	Operational Losses	Reservoir Storage Changes	Water Supply	Recreation	Total	Initial Fill Water	Operational Losses	Reservoir Storage Changes	Water Supply	Recreation	Total
	[39]	[40]	[41]	[42]	[43]	[44]	[45]	[46]	[47]	[48]	[49]	[50]
1961	0	0	0	0	0	0	0	0	0	0	0	0
1962	0	0	0	0	0	0	0	0	0	0	0	0
1963	0	0	0	0	0	0	0	0	0	0	0	0
1964	0	0	0	0	0	0	0	0	0	0	0	0
1965	0	0	0	0	0	0	0	0	0	0	0	0
1966	0	0	0	0	0	0	0	0	0	0	0	0
1967	0	0	0	0	0	0	0	0	0	0	0	0
1968	0	0	0	0	0	0	0	0	0	0	0	0
1969	0	0	0	0	0	0	0	0	0	0	0	0
1970	198	2	0	0	0	200	0	0	0	0	0	0
1971	7,533	(112)	0	3,552	0	10,973	7,366	(159)	0	0	0	7,207
1972	100,274	12,765	(6,558)	84,955	6,481	197,917	100,274	13,160	(6,558)	78,891	6,481	192,248
1973	204,638	21,543	1,329	229,685	1,147	458,342	204,638	32,414	1,329	209,769	1,147	449,297
1974	237,554	11,843	(15,295)	336,198	2,108	572,408	237,554	17,655	(15,295)	318,198	2,108	560,220
1975	103,352	19,763	(693)	621,706	3,358	747,486	103,352	25,326	(693)	586,286	3,358	717,629
1976	61,122	18,552	(152,171)	740,486	1,581	669,570	61,122	21,468	(152,171)	700,935	1,581	632,935
1977	0	16,415	(116,219)	246,349	560	147,105	0	15,698	(116,219)	240,191	560	140,230
1978	65,027	28,820	121,904	631,121	674	847,546	65,027	26,705	121,904	599,973	674	814,283
1979	12,302	50,663	(51,299)	625,561	502	637,729	12,302	50,580	(51,299)	586,959	502	599,044
1980	0	48,825	(134,009)	696,405	1,262	612,483	0	58,085	(134,009)	658,588	1,262	583,926
1981	0	51,600	23,359	998,307	4,112	1,077,378	0	48,844	23,359	959,274	4,112	1,035,589
1982	0	44,353	117,332	878,486	4,045	1,044,216	0	33,541	117,277	830,704	4,045	985,567
1983	0	43,961	(101,155)	487,915	7,291	438,012	0	34,698	(101,155)	450,489	7,291	391,323
1984	0	45,999	(115,088)	632,262	5,244	568,417	0	33,132	(115,092)	582,414	5,244	505,698
1985	0	50,106	139,973	854,684	4,804	1,049,567	0	54,831	139,954	810,606	4,804	1,010,195
1986	0	38,747	37,546	882,300	3,285	961,878	0	41,421	37,546	839,839	3,285	922,091
1987	0	47,815	(25,522)	897,905	6,937	927,135	0	33,195	(25,522)	863,157	6,937	877,767
1988	0	53,815	(29,747)	1,097,643	4,360	1,126,071	0	39,775	(29,747)	1,055,649	4,360	1,070,037
1989	0	49,088	(60,826)	1,382,599	7,490	1,378,351	0	42,307	(60,826)	1,339,358	7,490	1,328,329
1990	0	66,868	(15,092)	1,627,246	8,879	1,687,901	0	56,663	(15,092)	1,590,893	8,879	1,641,343
1991	0	40,564	105,176	446,148	4,560	596,448	0	34,016	105,176	446,148	4,560	589,900
1992	0	31,820	(92,123)	844,376	1,995	786,068	0	34,477	(92,123)	820,133	1,995	764,482
1993	0	27,158	(127,738)	799,143	1,676	700,239	0	28,614	(127,738)	771,146	1,676	673,698
1994	0	50,802	(88,211)	1,007,214	2,918	972,723	0	57,203	(88,211)	977,703	2,918	949,613
1995	0	48,705	(16,431)	586,829	1,669	620,772	0	36,309	(16,431)	560,695	1,669	582,242
1996	0	58,437	15,438	836,819	2,928	913,622	0	43,710	15,438	800,633	2,928	862,709
1997	0	73,656	40,852	918,124	2,076	1,034,708	0	62,275	40,852	881,843	2,076	987,046
1998	0	61,137	(106,487)	656,796	1,585	613,031	0	47,523	(106,487)	628,084	1,585	570,705
1999	0	77,334	(2,807)	1,011,608	3,279	1,089,414	0	55,514	(2,807)	974,807	3,279	1,030,793
2000	0	87,084	7,726	1,691,120	4,216	1,790,146	0	49,690	7,726	1,651,057	4,216	1,712,689
2001	0	71,588	(18,830)	1,233,862	1,211	1,287,831	0	54,742	(18,830)	1,202,670	1,211	1,239,793
2002	0	108,309	50,342	1,740,813	3,961	1,903,425	0	69,443	50,342	1,699,261	3,961	1,823,007
2003	0	106,973	(48,181)	1,825,617	10,645	1,895,054	0	57,291	(48,181)	1,789,015	10,645	1,808,770
2004	0	122,559	3,161	2,032,528	649	2,158,897	0	60,847	3,161	1,992,344	649	2,057,001
2005	0	99,523	(159,678)	1,751,799	559	1,692,203	0	53,502	(159,678)	1,711,929	559	1,606,312
2006	0	128,022	(120,122)	1,967,163	504	1,975,567	0	46,463	(120,122)	1,920,919	504	1,847,764
2007	0	139,502	118,196	1,910,800	305	2,168,803	0	59,454	118,196	1,863,410	305	2,041,365
2008	0	97,209	(4,230)	1,201,345	327	1,294,651	0	51,709	(4,230)	1,168,316	327	1,216,122
2009	0	88,574	(726)	1,169,477	1,295	1,258,620	0	43,229	(726)	1,146,258	1,295	1,190,056
2010	0	90,711	48,231	1,409,122	603	1,548,667	0	58,174	48,231	1,389,990	603	1,496,998
2011	0	114,286	(18,816)	1,695,956	742	1,792,168	0	67,210	(18,816)	1,653,798	742	1,702,934
2012	0	114,502	14,573	1,537,522	938	1,667,535	0	70,999	14,573	1,510,007	938	1,596,517
2013	0	116,975	(1,058)	1,190,730	795	1,307,442	0	69,572	(1,058)	1,162,989	795	1,232,298
2014	0	70,655	31,082	489,254	172	591,163	0	52,458	31,082	484,432	172	568,144
2015	0	67,819	(32,942)	738,123	151	773,151	0	56,466	(32,942)	733,481	151	757,156
2016	0	106,907	(63,199)	1,365,521	981	1,410,210	0	83,653	(63,199)	1,353,169	981	1,374,604
2017	0	38,814	55,915	1,762,436	7,010	1,864,175	0	38,564	55,915	1,722,742	7,010	1,824,231
2018	**0**	**42,403**	**48,000**	**1,343,962**	**7,010**	**1,441,375**	**0**	**42,153**	**48,000**	**1,318,162**	**7,010**	**1,415,325**
2019	0	42,473	0	1,432,637	7,010	1,482,120	0	42,223	0	1,406,837	7,010	1,456,070
2020	0	37,536	(366)	1,435,411	7,010	1,479,591	0	37,286	(366)	1,409,611	7,010	1,453,541
2021	0	37,619	10,725	1,438,465	7,010	1,493,819	0	37,369	10,725	1,412,665	7,010	1,467,769
2022	0	37,613	(3,483)	1,438,465	7,010	1,479,605	0	37,363	(3,483)	1,412,665	7,010	1,453,555
2023	0	37,604	(18,971)	1,438,465	7,010	1,464,108	0	37,354	(18,971)	1,412,665	7,010	1,438,058
2024	0	37,483	11,289	1,438,465	7,010	1,494,247	0	37,233	11,289	1,412,665	7,010	1,468,197
2025	0	37,546	(12,518)	1,438,465	7,010	1,470,503	0	37,296	(12,518)	1,412,665	7,010	1,444,453
2026	0	37,558	24,308	1,438,465	7,010	1,507,341	0	37,308	24,308	1,412,665	7,010	1,481,291
2027	0	37,471	(17,799)	1,438,465	7,010	1,465,147	0	37,221	(17,799)	1,412,665	7,010	1,439,097
2028	0	37,611	12,291	1,438,465	7,010	1,495,377	0	37,361	12,291	1,412,665	7,010	1,469,327
2029	0	37,538	(9,046)	1,438,465	7,010	1,473,967	0	37,288	(9,046)	1,412,665	7,010	1,447,917
2030	0	37,602	20,756	1,438,465	7,010	1,503,833	0	37,352	20,756	1,412,665	7,010	1,477,783
2031	0	37,474	(97,726)	1,438,465	7,010	1,385,223	0	37,224	(97,726)	1,412,665	7,010	1,359,173
2032	0	37,076	84,999	1,438,465	7,010	1,567,550	0	36,826	84,999	1,412,665	7,010	1,541,500
2033	0	37,281	(94,652)	1,438,465	7,010	1,388,104	0	37,031	(94,652)	1,412,665	7,010	1,362,054
2034	0	36,773	69,593	1,438,465	7,010	1,551,841	0	36,523	69,593	1,412,665	7,010	1,525,791
2035	0	36,113	(242,659)	1,438,465	7,010	1,238,929	0	35,863	(242,659)	1,412,665	7,010	1,212,879

TABLE B-6 Annual Water Quantities Conveyed through Each Pumping and Power Recovery Plant of Project Transportation Facilities (acre-feet)

	CALIFORNIA AQUEDUCT (continued)											
	TEHACHAPI DIVSION						MOJAVE DIVISION					
	Edmonston Pumping Plant						Alamo Pumping Plant					
				Deliveries						Deliveries		
Calendar Year	Initial Fill Water	Operational Losses	Reservoir Storage Changes	Water Supply	Recreation	Total	Initial Fill Water	Operational Losses	Reservoir Storage Changes	Water Supply	Recreation	Total
	[51]	[52]	[53]	[54]	[55]	[56]	[57]	[58]	[59]	[60]	[61]	[62]
1961	0	0	0	0	0	0	0	0	0	0	0	0
1962	0	0	0	0	0	0	0	0	0	0	0	0
1963	0	0	0	0	0	0	0	0	0	0	0	0
1964	0	0	0	0	0	0	0	0	0	0	0	0
1965	0	0	0	0	0	0	0	0	0	0	0	0
1966	0	0	0	0	0	0	0	0	0	0	0	0
1967	0	0	0	0	0	0	0	0	0	0	0	0
1968	0	0	0	0	0	0	0	0	0	0	0	0
1969	0	0	0	0	0	0	0	0	0	0	0	0
1970	0	0	0	0	0	0	0	0	0	0	0	0
1971	5,446	8	0	0	0	5,454	0	0	0	0	0	0
1972	100,274	16,067	(6,558)	74,123	6,481	190,387	0	0	0	0	0	0
1973	204,638	34,051	1,329	207,808	1,147	448,973	0	0	0	0	0	0
1974	237,554	18,181	(15,295)	313,634	2,108	556,182	0	0	0	0	0	0
1975	103,352	20,183	(693)	573,219	3,358	699,419	0	0	0	0	0	0
1976	61,122	21,096	(152,171)	685,768	1,581	617,396	0	0	0	0	0	0
1977	0	18,424	(116,219)	236,086	560	138,851	0	0	0	0	0	0
1978	65,027	20,887	121,904	590,329	674	798,821	0	0	0	0	0	0
1979	12,302	46,332	(51,299)	568,338	502	576,175	0	0	0	0	0	0
1980	0	52,967	(134,009)	639,743	1,262	559,963	0	0	0	0	0	0
1981	0	40,602	23,359	938,482	4,112	1,006,555	0	0	0	0	0	0
1982	0	37,244	117,296	812,206	4,045	970,791	0	0	0	0	0	0
1983	0	40,690	(101,155)	431,182	7,291	378,008	0	0	0	0	0	0
1984	0	42,112	(115,214)	556,830	5,244	488,972	0	0	0	0	0	0
1985	0	45,265	139,988	792,477	4,804	982,534	0	0	0	0	0	0
1986	0	36,918	37,546	823,067	3,285	900,816	0	14,735	12,258	429,864	1,508	458,365
1987	0	29,580	(25,522)	851,322	6,937	862,317	0	11,665	(15,270)	417,870	1,239	415,504
1988	0	42,017	(29,747)	1,044,737	4,360	1,061,367	0	21,696	1,101	537,568	971	561,336
1989	0	32,270	(60,826)	1,328,041	7,490	1,306,975	0	4,686	(20,363)	716,360	1,407	702,090
1990	0	42,198	(15,092)	1,579,466	8,879	1,615,451	0	8,898	(5,916)	788,111	1,388	792,481
1991	0	33,999	105,176	441,217	4,560	584,952	0	17,908	34,422	177,308	394	230,032
1992	0	23,121	(92,123)	809,771	1,995	742,764	0	14,873	(17,115)	374,110	423	372,291
1993	0	11,946	(127,738)	759,485	1,676	645,369	0	9,304	(3,455)	308,222	443	314,514
1994	0	40,808	(88,211)	960,815	2,918	916,330	0	21,837	3,395	469,996	430	495,658
1995	0	36,001	(16,431)	542,465	1,669	563,704	0	14,139	(30,761)	384,836	427	368,641
1996	0	37,357	15,438	779,918	2,928	835,641	0	7,247	(11,410)	493,852	565	490,254
1997	0	51,475	40,852	860,798	2,076	955,201	0	20,725	38,960	537,586	507	597,778
1998	0	48,601	(106,487)	607,301	1,585	551,000	0	21,456	16,361	398,385	363	436,565
1999	0	52,726	(2,807)	947,420	3,279	1,000,618	0	26,644	(8,486)	589,756	396	608,310
2000	0	43,072	7,726	1,627,123	4,216	1,682,137	0	8,983	(10,472)	958,997	449	957,957
2001	0	39,544	(18,830)	1,187,300	1,211	1,209,225	0	14,526	3,478	709,985	452	728,441
2002	0	60,037	50,342	1,680,514	3,961	1,794,854	0	15,190	8,398	901,230	490	925,308
2003	0	53,320	(48,181)	1,771,048	10,645	1,786,832	0	13,676	(20,787)	1,035,349	355	1,028,593
2004	0	57,962	3,161	1,970,391	649	2,032,163	0	15,581	17,207	1,120,384	171	1,153,343
2005	0	40,949	(159,678)	1,693,409	559	1,575,239	0	2,561	(50,014)	1,116,158	84	1,068,789
2006	0	52,291	(120,122)	1,898,070	504	1,830,743	0	13,170	8,653	1,281,524	98	1,303,445
2007	0	65,423	118,196	1,836,977	305	2,020,901	0	17,957	(5,091)	1,076,227	103	1,089,196
2008	0	50,959	(4,230)	1,146,056	327	1,193,112	0	14,592	5,383	614,224	80	634,279
2009	0	59,186	(726)	1,125,654	1,295	1,185,409	0	25,599	(5,619)	493,685	1,100	514,765
2010	0	60,181	48,231	1,369,128	603	1,478,143	0	32,025	6,964	956,888	363	996,240
2011	0	64,370	(18,816)	1,632,033	742	1,678,329	0	34,783	(1,405)	1,220,667	500	1,254,545
2012	0	65,684	14,573	1,486,712	938	1,567,907	0	22,523	(229)	892,938	550	915,782
2013	0	69,789	(1,058)	1,141,530	795	1,211,056	0	20,563	3,278	528,614	501	552,956
2014	0	43,179	31,082	465,759	172	540,192	0	16,120	41,923	160,225	81	218,349
2015	0	43,312	(32,942)	714,860	151	725,381	0	10,834	(7,059)	248,779	71	252,625
2016	0	41,071	(63,199)	1,330,567	981	1,309,420	0	6,898	7,625	786,096	163	800,782
2017	0	37,014	55,915	1,678,570	7,010	1,778,509	0	20,479	(37,000)	1,451,817	1,630	1,436,926
2018	**0**	**40,603**	**48,000**	**1,294,652**	**7,010**	**1,390,265**	**0**	**23,138**	**48,000**	**866,763**	**1,630**	**939,531**
2019	0	40,673	0	1,383,327	7,010	1,431,010	0	23,208	0	955,379	1,630	980,217
2020	0	35,736	(366)	1,386,101	7,010	1,428,481	0	20,947	(3,398)	958,091	1,630	977,270
2021	0	35,819	10,725	1,389,155	7,010	1,442,709	0	20,946	(1,117)	961,076	1,630	982,535
2022	0	35,813	(3,483)	1,389,155	7,010	1,428,495	0	20,940	(3,434)	961,076	1,630	980,212
2023	0	35,804	(18,971)	1,389,155	7,010	1,412,998	0	20,939	(18,638)	961,076	1,630	965,007
2024	0	35,683	11,289	1,389,155	7,010	1,443,137	0	20,881	21,309	961,076	1,630	1,004,896
2025	0	35,746	(12,518)	1,389,155	7,010	1,419,393	0	20,965	(11,624)	961,076	1,630	972,047
2026	0	35,758	24,308	1,389,155	7,010	1,456,231	0	20,930	13,030	961,076	1,630	996,666
2027	0	35,671	(17,799)	1,389,155	7,010	1,414,037	0	20,861	(6,161)	961,076	1,630	977,406
2028	0	35,811	12,291	1,389,155	7,010	1,444,267	0	20,961	4,006	961,076	1,630	987,673
2029	0	35,738	(9,046)	1,389,155	7,010	1,422,857	0	20,955	(913)	961,076	1,630	982,748
2030	0	35,802	20,756	1,389,155	7,010	1,452,723	0	20,930	8,528	961,076	1,630	992,164
2031	0	35,674	(97,726)	1,389,155	7,010	1,334,113	0	20,956	(31,057)	961,076	1,630	952,605
2032	0	35,276	84,999	1,389,155	7,010	1,516,440	0	20,865	43,953	961,076	1,630	1,027,524
2033	0	35,481	(94,652)	1,389,155	7,010	1,336,994	0	20,854	(37,929)	961,076	1,630	945,631
2034	0	34,973	69,593	1,389,155	7,010	1,500,731	0	20,769	28,588	961,076	1,630	1,012,063
2035	0	34,313	(242,659)	1,389,155	7,010	1,187,819	0	20,892	(49,219)	961,076	1,630	934,379

TABLE B-6 Annual Water Quantities Conveyed through Each Pumping and Power Recovery Plant of Project Transportation Facilities (acre-feet)

	CALIFORNIA AQUEDUCT (continued)											
	MOJAVE DIVISION (continued)											
	Pearblossom Pumping Plant						Mojave Siphon Powerplant					
				Deliveries						Deliveries		
Calendar Year	Initial Fill Water	Operational Losses	Reservoir Storage Changes	Water Supply	Recreation	Total	Initial Fill Water	Operational Losses	Reservoir Storage Changes	Water Supply	Recreation	Total
	[63]	[64]	[65]	[66]	[67]	[68]	[69]	[70]	[71]	[72]	[73]	[74]
1961	0	0	0	0	0	0	0	0	0	0	0	0
1962	0	0	0	0	0	0	0	0	0	0	0	0
1963	0	0	0	0	0	0	0	0	0	0	0	0
1964	0	0	0	0	0	0	0	0	0	0	0	0
1965	0	0	0	0	0	0	0	0	0	0	0	0
1966	0	0	0	0	0	0	0	0	0	0	0	0
1967	0	0	0	0	0	0	0	0	0	0	0	0
1968	0	0	0	0	0	0	0	0	0	0	0	0
1969	0	0	0	0	0	0	0	0	0	0	0	0
1970	0	0	0	0	0	0	0	0	0	0	0	0
1971	21	0	0	0	0	21	0	0	0	0	0	0
1972	35,243	5,282	(153)	1,794	0	42,166	0	0	0	0	0	0
1973	80,177	21,522	(2,700)	52,201	72	151,272	0	0	0	0	0	0
1974	76,694	10,847	(11,149)	102,839	44	179,275	0	0	0	0	0	0
1975	10,000	2,364	(8,397)	190,351	70	194,388	0	0	0	0	0	0
1976	4,168	7,040	(16,055)	236,713	152	232,018	0	0	0	0	0	0
1977	0	11,398	(17,534)	102,326	580	96,770	0	0	0	0	0	0
1978	19,922	5,696	69,130	374,845	498	470,091	0	0	0	0	0	0
1979	12,302	6,836	(32,518)	362,114	502	349,236	0	0	0	0	0	0
1980	0	16,200	6,159	401,214	781	424,354	0	0	0	0	0	0
1981	0	4,992	(36,278)	574,573	933	544,220	0	0	0	0	0	0
1982	0	5,251	55,232	401,037	1,919	463,439	0	0	0	0	0	0
1983	0	11,745	(26,847)	231,188	1,180	217,266	0	0	0	0	0	0
1984	0	18,228	23,230	252,066	1,494	295,018	0	0	0	0	0	0
1985	0	25,292	(2,815)	350,758	1,076	374,311	0	0	0	0	0	0
1986	0	30,876	12,258	394,156	1,508	438,798	0	0	0	0	0	0
1987	0	27,552	(15,270)	377,531	1,239	391,052	0	0	0	0	0	0
1988	0	32,209	1,101	501,300	971	535,581	0	1,977	1,101	501,291	971	505,340
1989	0	31,500	(20,363)	661,189	1,407	673,733	0	29,110	(20,363)	661,100	1,407	671,254
1990	0	32,672	(5,916)	730,560	1,388	758,704	0	23,692	(5,916)	730,550	1,388	749,714
1991	0	15,209	34,774	163,913	394	214,290	0	(543)	34,774	163,913	394	198,538
1992	0	13,989	(17,451)	338,249	423	335,210	0	(13,193)	(17,451)	338,207	423	307,986
1993	0	9,779	(3,455)	255,117	443	261,884	0	(11,922)	(3,455)	255,117	443	240,183
1994	0	150	3,395	409,928	430	413,903	0	1,601	3,395	395,294	430	400,720
1995	0	6,820	(29,282)	328,882	427	306,847	0	10,458	(29,282)	321,387	427	302,990
1996	0	9,514	(11,410)	424,252	565	422,921	0	(5,577)	(11,410)	418,141	565	401,719
1997	0	(1,124)	38,960	461,563	507	499,906	0	5,171	38,960	452,525	507	497,163
1998	0	(2,087)	16,361	334,965	363	349,602	0	11,496	16,361	332,385	363	360,605
1999	0	(1,154)	(8,486)	505,624	396	496,380	0	11,065	(8,486)	498,919	396	501,894
2000	0	(23,296)	(10,472)	864,999	449	831,680	0	4,896	(10,472)	854,980	449	849,853
2001	0	(9,304)	3,478	635,316	452	629,942	0	7,403	3,478	632,420	452	643,753
2002	0	3,810	8,398	823,690	490	836,388	0	9,300	8,398	820,217	490	838,405
2003	0	2,814	(20,787)	962,488	355	944,870	0	(6,586)	(20,787)	941,713	355	914,695
2004	0	(15,558)	17,207	1,047,521	171	1,049,341	0	5,034	17,207	1,035,315	171	1,057,727
2005	0	(18,967)	(50,014)	1,043,564	84	974,667	0	827	(50,014)	1,025,453	84	976,350
2006	0	(21,986)	8,653	1,187,627	98	1,174,392	0	(845)	8,653	1,154,634	98	1,162,540
2007	0	(13,055)	(5,091)	975,802	103	957,759	0	3,060	(5,091)	956,281	103	954,353
2008	0	723	5,383	550,143	80	556,329	0	8,380	5,383	534,480	80	548,323
2009	0	3,807	(5,619)	431,289	1,100	430,577	0	10,520	(5,619)	411,075	1,100	417,076
2010	0	1,854	6,964	886,249	363	895,430	0	9,649	6,964	858,609	363	875,585
2011	0	7,953	(1,405)	1,114,556	500	1,121,604	0	13,506	(1,405)	1,080,734	500	1,093,335
2012	0	3,499	(229)	797,563	550	801,383	0	3,492	(229)	775,600	550	779,413
2013	0	6,273	3,278	466,095	501	476,147	0	12,172	3,278	460,089	501	476,040
2014	0	11,143	41,923	133,376	81	186,523	0	13,671	41,923	130,752	81	186,427
2015	0	7,067	(7,059)	229,244	71	229,323	0	9,953	(7,059)	221,321	71	224,286
2016	0	8,750	7,625	735,806	163	752,344	0	5,792	7,625	721,588	163	735,168
2017	0	15,129	(37,000)	1,326,447	1,430	1,306,006	0	11,659	(37,000)	1,316,963	1,430	1,293,052
2018	**0**	**17,788**	**48,000**	**769,472**	**1,430**	**836,690**	**0**	**14,318**	**48,000**	**729,700**	**1,430**	**793,448**
2019	0	17,858	0	855,624	1,430	874,912	0	14,388	0	814,796	1,430	830,614
2020	0	15,597	(3,398)	855,630	1,430	869,259	0	12,127	(3,398)	814,796	1,430	824,955
2021	0	15,596	(1,117)	855,636	1,430	871,545	0	12,126	(1,117)	814,796	1,430	827,235
2022	0	15,590	(3,434)	855,636	1,430	869,222	0	12,120	(3,434)	814,796	1,430	824,912
2023	0	15,589	(18,638)	855,636	1,430	854,017	0	12,119	(18,638)	814,796	1,430	809,707
2024	0	15,531	21,309	855,636	1,430	893,906	0	12,061	21,309	814,796	1,430	849,596
2025	0	15,615	(11,624)	855,636	1,430	861,057	0	12,145	(11,624)	814,796	1,430	816,747
2026	0	15,580	13,030	855,636	1,430	885,676	0	12,110	13,030	814,796	1,430	841,366
2027	0	15,511	(6,161)	855,636	1,430	866,416	0	12,041	(6,161)	814,796	1,430	822,106
2028	0	15,611	4,006	855,636	1,430	876,683	0	12,141	4,006	814,796	1,430	832,373
2029	0	15,605	(913)	855,636	1,430	871,758	0	12,135	(913)	814,796	1,430	827,448
2030	0	15,580	8,528	855,636	1,430	881,174	0	12,110	8,528	814,796	1,430	836,864
2031	0	15,606	(31,057)	855,636	1,430	841,615	0	12,136	(31,057)	814,796	1,430	797,305
2032	0	15,515	43,953	855,636	1,430	916,534	0	12,045	43,953	814,796	1,430	872,224
2033	0	15,504	(37,929)	855,636	1,430	834,641	0	12,034	(37,929)	814,796	1,430	790,331
2034	0	15,419	28,588	855,636	1,430	901,073	0	11,949	28,588	814,796	1,430	856,763
2035	0	15,542	(49,219)	855,636	1,430	823,389	0	12,072	(49,219)	814,796	1,430	779,079

TABLE B-6 Annual Water Quantities Conveyed through Each Pumping and Power Recovery Plant of Project Transportation Facilities (acre-feet)

	CALIFORNIA AQUEDUCT (continued)									
	SANTA ANA DIVISION									
	Devil Canyon Powerplant						Greenspot Pump Station			
				Deliveries						
Calendar Year	Initial Fill Water	Operational Losses	Reservoir Storage Changes	Water Supply	Recreation	Total	Initial Fill Water	Operational Losses	Water Supply Delivery	Total
	[75]	[76]	[77]	[78]	[79]	[80]	[81]	[82]	[83]	[84]
1961	0	0	0	0	0	0	0	0	0	0
1962	0	0	0	0	0	0	0	0	0	0
1963	0	0	0	0	0	0	0	0	0	0
1964	0	0	0	0	0	0	0	0	0	0
1965	0	0	0	0	0	0	0	0	0	0
1966	0	0	0	0	0	0	0	0	0	0
1967	0	0	0	0	0	0	0	0	0	0
1968	0	0	0	0	0	0	0	0	0	0
1969	0	0	0	0	0	0	0	0	0	0
1970	0	0	0	0	0	0	0	0	0	0
1971	0	0	0	0	0	0	0	0	0	0
1972	37	0	0	1,275	0	1,312	0	0	0	0
1973	40,848	14,745	0	51,812	0	107,405	0	0	0	0
1974	74,666	8,367	(4,925)	102,198	0	180,306	0	0	0	0
1975	10,000	1,995	(6,719)	189,526	0	194,802	0	0	0	0
1976	4,168	5,180	(9,182)	235,711	23	235,900	0	0	0	0
1977	0	8,082	(5,235)	101,137	469	104,453	0	0	0	0
1978	14,820	3,754	21,686	373,636	481	414,377	0	0	0	0
1979	12,302	5,620	(27,107)	356,854	485	348,154	0	0	0	0
1980	0	9,468	12,714	395,975	742	418,899	0	0	0	0
1981	0	8,401	(23,448)	569,088	807	554,848	0	0	0	0
1982	0	6,012	44,469	399,799	1,798	452,078	0	0	0	0
1983	0	8,597	5,188	230,277	1,078	245,140	0	0	0	0
1984	0	12,861	(850)	250,938	1,414	264,363	0	0	0	0
1985	0	14,325	(8,791)	349,336	956	355,826	0	0	0	0
1986	0	9,486	8,339	392,650	1,378	411,853	0	0	0	0
1987	0	7,923	(11,335)	375,451	1,118	373,157	0	0	0	0
1988	0	11,090	2,238	499,285	861	513,474	0	0	0	0
1989	0	13,116	(5,487)	658,730	1,301	667,660	0	0	0	0
1990	0	13,439	(4,622)	728,723	1,281	738,821	0	0	0	0
1991	0	10,836	18,308	161,032	340	190,516	0	0	0	0
1992	0	9,157	(9,084)	328,354	371	328,798	0	0	0	0
1993	0	5,602	5,593	244,678	364	256,237	0	0	0	0
1994	0	10,915	(11,045)	393,690	357	393,917	0	0	0	0
1995	0	11,268	2,331	320,978	358	334,935	0	0	0	0
1996	0	9,496	13,015	417,656	494	440,661	0	0	0	0
1997	0	8,087	(19,685)	451,874	416	440,692	0	0	0	0
1998	0	6,700	16,643	332,198	310	355,851	0	0	0	0
1999	0	9,784	(4,177)	497,787	341	503,735	0	0	0	0
2000	0	7,407	(11,040)	853,786	375	850,528	0	0		0
2001	0	9,324	8,183	631,363	374	649,244	0	0	0	0
2002	0	10,315	9,682	818,028	413	838,438	0	0	0	0
2003	0	9,198	(18,298)	922,901	260	914,061	0	0	4,526	4,526
2004	0	11,166	15,150	1,033,309	85	1,059,710	0	0	3,798	3,798
2005	0	4,500	(63,441)	1,010,247	0	951,306	0	0	3,686	3,686
2006	0	8,208	7,571	1,153,993	0	1,169,772	0	0	7,775	7,775
2007	0	8,216	(5,872)	953,803	0	956,147	0	0	12,168	12,168
2008	0	10,599	7,759	533,221	0	551,579	0	0	14,408	14,408
2009	0	10,035	(5,600)	410,032	1,025	415,492	0	0	20,542	20,542
2010	0	6,275	5,344	851,786	307	863,712	0	0	18,395	18,395
2011	0	7,359	2,371	1,066,088	417	1,076,235	0	0	20,586	20,586
2012	0	(1,942)	(2,225)	771,982	459	768,274	0	0	23,791	23,791
2013	0	3,306	3,042	458,221	416	464,985	0	0	20,560	20,560
2014	0	9,919	42,495	129,317	27	181,758	0	0	9,843	9,843
2015	0	8,923	(3,561)	220,068	35	225,465	0	0	9,791	9,791
2016	0	(2,942)	3,074	712,078	107	712,317	0	0	22,896	22,896
2017	0	7,412	(37,000)	1,314,699	1,250	1,286,361	0	0	14,368	14,368
2018	**0**	**10,071**	**48,000**	**725,820**	**1,250**	**785,141**	**0**	**0**	**10,380**	**10,380**
2019	0	10,141	0	810,916	1,250	822,307	0	0	10,380	10,380
2020	0	8,483	(17,305)	810,916	1,250	803,344	0	0	10,380	10,380
2021	0	8,486	(398)	811,316	1,250	820,654	0	0	10,380	10,380
2022	0	8,486	13,735	811,316	1,250	834,787	0	0	10,380	10,380
2023	0	8,482	(8,417)	811,316	1,250	812,631	0	0	10,380	10,380
2024	0	8,462	689	811,316	1,250	821,717	0	0	10,380	10,380
2025	0	8,489	4,591	811,316	1,250	825,646	0	0	10,380	10,380
2026	0	8,475	(3,819)	811,316	1,250	817,222	0	0	10,380	10,380
2027	0	8,479	745	811,316	1,250	821,790	0	0	10,380	10,380
2028	0	8,481	(5,355)	811,316	1,250	815,692	0	0	10,380	10,380
2029	0	8,481	2,909	811,316	1,250	823,956	0	0	10,380	10,380
2030	0	8,480	296	811,316	1,250	821,342	0	0	10,380	10,380
2031	0	8,475	(1,976)	811,316	1,250	819,065	0	0	10,380	10,380
2032	0	8,449	18,821	811,316	1,250	839,836	0	0	10,380	10,380
2033	0	8,449	(23,419)	811,316	1,250	797,596	0	0	10,380	10,380
2034	0	8,443	21,651	811,316	1,250	842,660	0	0	10,380	10,380
2035	0	8,451	(31,434)	811,316	1,250	789,583	0	0	10,380	10,380

TABLE B-6 Annual Water Quantities Conveyed through Each Pumping and Power Recovery Plant of Project Transportation Facilities (acre-feet)

	CALIFORNIA AQUEDUCT (continued)													
	SANTA ANA DIVISION (continued)								WEST BRANCH					
	Crafton Hills Pump Station				Cherry Valley Pump Station				Oso Pumping Plant					
												Deliveries		
Calendar Year	Initial Fill Water	Operational Losses	Water Supply Delivery	Total	Initial Fill Water	Operational Losses	Water Supply Delivery	Total	Initial Fill Water	Operational Losses	Reservoir Storage Changes	Water Supply	Recreation	Total
	[85]	[86]	[87]	[88]	[89]	[90]	[91]	[92]	[93]	[94]	[95]	[96]	[97]	[98]
1961	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1962	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1963	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1964	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1965	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1966	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1967	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1968	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1969	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1970	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1971	0	0	0	0	0	0	0	0	2,444	133	0	0	0	2,577
1972	0	0	0	0	0	0	0	0	63,883	6,557	(6,405)	71,991	6,481	142,507
1973	0	0	0	0	0	0	0	0	124,461	16,995	4,029	155,317	1,075	301,877
1974	0	0	0	0	0	0	0	0	160,860	12,702	(4,146)	209,172	2,064	380,652
1975	0	0	0	0	0	0	0	0	93,352	23,008	7,704	374,306	3,288	501,658
1976	0	0	0	0	0	0	0	0	56,954	15,845	(136,116)	420,708	1,429	358,820
1977	0	0	0	0	0	0	0	0	0	4,407	(98,685)	122,447	(20)	28,149
1978	0	0	0	0	0	0	0	0	45,105	9,061	52,774	171,139	176	278,255
1979	0	0	0	0	0	0	0	0	0	25,355	(18,781)	145,598	0	152,172
1980	0	0	0	0	0	0	0	0	0	24,576	(140,168)	165,931	481	50,820
1981	0	0	0	0	0	0	0	0	0	15,254	59,637	283,264	3,179	361,334
1982	0	0	0	0	0	0	0	0	0	23,824	61,685	360,878	2,126	448,513
1983	0	0	0	0	0	0	0	0	0	23,601	(74,308)	166,995	6,111	122,399
1984	0	0	0	0	0	0	0	0	0	12,461	(138,146)	272,101	3,750	150,166
1985	0	0	0	0	0	0	0	0	0	28,257	142,219	403,097	3,728	577,301
1986	0	0	0	0	0	0	0	0	0	22,387	25,288	393,203	1,777	442,655
1987	0	0	0	0	0	0	0	0	0	18,164	(10,252)	433,452	5,698	447,062
1988	0	0	0	0	0	0	0	0	0	20,461	(30,848)	507,169	3,389	500,171
1989	0	0	0	0	0	0	0	0	0	27,914	(40,463)	611,681	6,083	605,215
1990	0	0	0	0	0	0	0	0	0	33,666	(9,176)	791,355	7,491	823,336
1991	0	0	0	0	0	0	0	0	0	16,460	70,754	263,909	4,166	355,289
1992	0	0	0	0	0	0	0	0	0	8,238	(75,008)	435,661	1,572	370,463
1993	0	0	0	0	0	0	0	0	0	2,674	(124,283)	451,263	1,233	330,887
1994	0	0	0	0	0	0	0	0	0	18,688	(91,606)	490,819	2,488	420,389
1995	0	0	0	0	0	0	0	0	0	21,775	14,330	157,629	1,242	194,976
1996	0	0	0	0	0	0	0	0	0	30,121	26,848	286,066	2,363	345,398
1997	0	0	0	0	0	0	0	0	0	30,468	1,892	323,212	1,569	357,141
1998	0	0	0	0	0	0	0	0	0	26,851	(122,848)	208,916	1,222	114,141
1999	0	0	0	0	0	0	0	0	0	25,690	5,679	357,664	2,883	391,916
2000	0	0		0	0	0		0	0	33,658	18,198	668,126	3,767	723,749
2001	0	0	0	0	0	0		0	0	24,551	(22,308)	477,315	759	480,317
2002	0	0	0	0	0	0		0	0	44,692	41,944	779,284	3,471	869,391
2003	0	0	2,733	2,733	0	0	116	116	0	39,495	(27,394)	735,699	10,290	758,090
2004	0	0	3,212	3,212	0	0	841	841	0	41,947	(14,046)	850,007	478	878,386
2005	0	0	2,727	2,727	0	0	692	692	0	38,154	(109,664)	577,251	475	506,216
2006	0	0	6,892	6,892	0	0	807	807	0	38,534	(128,775)	616,546	406	526,711
2007	0	0	9,038	9,038	0	0	177	177	0	46,921	123,287	760,750	202	931,160
2008	0	0	13,728	13,728	0	0	1,042	1,042	0	36,204	(9,613)	531,832	247	558,670
2009	0	0	16,463	16,463	0	0	1,898	1,898	0	33,295	4,893	631,969	195	670,352
2010	0	0	17,778	17,778	0	0	5,685	5,685	0	27,788	41,267	412,240	240	481,535
2011	0	0	19,887	19,887	0	0	9,290	9,290	0	29,227	(17,411)	411,366	242	423,424
2012	0	0	20,614	20,614	0	0	11,010	11,010	0	42,913	14,802	593,774	388	651,877
2013	0	0	17,526	17,526	0	0	9,445	9,445	0	49,029	(4,336)	612,912	294	657,899
2014	0	0	9,468	9,468	0	0	5,044	5,044	0	27,005	(10,841)	305,533	91	321,788
2015	0	0	9,409	9,409	0	0	3,481	3,481	0	32,430	(25,883)	466,081	80	472,708
2016	0	0	19,247	19,247	0	0	10,816	10,816	0	34,186	(70,824)	544,471	818	508,651
2017	0	0	14,124	14,124	0	0	11,970	11,970	0	16,485	92,915	226,753	5,380	341,533
2018	**0**	**0**	**10,380**	**10,380**	**0**	**0**	**9,180**	**9,180**	**0**	**17,415**	**0**	**427,889**	**5,380**	**450,684**
2019	0	0	10,380	10,380	0	0	8,780	8,780	0	17,415	0	427,948	5,380	450,743
2020	0	0	10,380	10,380	0	0	8,380	8,380	0	14,739	3,032	428,010	5,380	451,161
2021	0	0	10,380	10,380	0	0	7,980	7,980	0	14,823	11,842	428,079	5,380	460,124
2022	0	0	10,380	10,380	0	0	7,980	7,980	0	14,823	(49)	428,079	5,380	448,233
2023	0	0	10,380	10,380	0	0	7,980	7,980	0	14,815	(333)	428,079	5,380	447,941
2024	0	0	10,380	10,380	0	0	7,980	7,980	0	14,752	(10,020)	428,079	5,380	438,191
2025	0	0	10,380	10,380	0	0	7,980	7,980	0	14,731	(894)	428,079	5,380	447,296
2026	0	0	10,380	10,380	0	0	7,980	7,980	0	14,778	11,278	428,079	5,380	459,515
2027	0	0	10,380	10,380	0	0	7,980	7,980	0	14,760	(11,638)	428,079	5,380	436,581
2028	0	0	10,380	10,380	0	0	7,980	7,980	0	14,800	8,285	428,079	5,380	456,544
2029	0	0	10,380	10,380	0	0	7,980	7,980	0	14,733	(8,133)	428,079	5,380	440,059
2030	0	0	10,380	10,380	0	0	7,980	7,980	0	14,822	12,228	428,079	5,380	460,509
2031	0	0	10,380	10,380	0	0	7,980	7,980	0	14,668	(66,669)	428,079	5,380	381,458
2032	0	0	10,380	10,380	0	0	7,980	7,980	0	14,361	41,046	428,079	5,380	488,866
2033	0	0	10,380	10,380	0	0	7,980	7,980	0	14,577	(56,723)	428,079	5,380	391,313
2034	0	0	10,380	10,380	0	0	7,980	7,980	0	14,154	41,005	428,079	5,380	488,618
2035	0	0	10,380	10,380	0	0	7,980	7,980	0	13,371	(193,440)	428,079	5,380	253,390

TABLE B-6 Annual Water Quantities Conveyed through Each Pumping and Power Recovery Plant of Project Transportation Facilities (acre-feet)

	CALIFORNIA AQUEDUCT (continued)											
	WEST BRANCH (continued)											
	Warne Powerplant						Castaic Powerplant					
				Deliveries						Deliveries		
Calendar Year	Initial Fill Water	Operational Losses	Reservoir Storage Changes	Water Supply	Recreation	Total	Initial Fill Water	Operational Losses	Reservoir Storage Changes	Water Supply	Recreation	Total
	[99]	[100]	[101]	[102]	[103]	[104]	[105]	[106]	[107]	[108]	[109]	[110]
1961	0	0	0	0	0	0	0	0	0	0	0	0
1962	0	0	0	0	0	0	0	0	0	0	0	0
1963	0	0	0	0	0	0	0	0	0	0	0	0
1964	0	0	0	0	0	0	0	0	0	0	0	0
1965	0	0	0	0	0	0	0	0	0	0	0	0
1966	0	0	0	0	0	0	0	0	0	0	0	0
1967	0	0	0	0	0	0	0	0	0	0	0	0
1968	0	0	0	0	0	0	0	0	0	0	0	0
1969	0	0	0	0	0	0	0	0	0	0	0	0
1970	0	0	0	0	0	0	0	0	0	0	0	0
1971	0	0	0	0	0	0	0	0	0	0	0	0
1972	0	0	0	0	0	0	57,364	1,788	(6,162)	71,938	6,481	131,409
1973	0	0	0	0	0	0	37,198	6,430	4,542	155,297	1,075	204,542
1974	0	0	0	0	0	0	82,364	1,772	(950)	209,136	541	292,863
1975	0	0	0	0	0	0	90,460	5,002	(1,534)	374,280	1,563	469,771
1976	0	0	0	0	0	0	55,990	(7,695)	(132,036)	420,684	1,429	338,372
1977	0	0	0	0	0	0	0	(1,485)	(102,532)	122,447	(20)	18,410
1978	0	0	0	0	0	0	45,105	(2,264)	129,523	171,139	176	343,679
1979	0	0	0	0	0	0	0	(2,339)	(20,400)	145,598	0	122,859
1980	0	0	0	0	0	0	0	991	(118,026)	165,931	481	49,377
1981	0	0	0	0	0	0	0	(44,416)	47,244	283,264	2,704	288,796
1982	0	24,468	61,169	360,878	2,126	448,641	0	(60,135)	59,069	360,878	1,187	360,999
1983	0	20,780	(74,308)	166,995	6,111	119,578	0	(33,418)	(46,904)	166,995	2,618	89,291
1984	0	13,572	(139,219)	275,212	2,208	151,773	0	(29,618)	(139,545)	275,212	2,201	108,250
1985	0	29,286	141,492	403,097	874	574,749	0	(4,622)	135,007	403,097	844	534,326
1986	0	21,579	25,288	393,203	1,777	441,847	0	(6,664)	21,520	393,203	623	408,682
1987	0	20,885	(10,252)	433,452	5,698	449,783	0	(519)	(6,241)	433,452	2,734	429,426
1988	0	23,253	(31,453)	507,169	3,389	502,358	0	12,650	(28,498)	507,169	1,359	492,680
1989	0	27,131	(40,463)	611,681	6,083	604,432	0	634	(40,154)	611,681	3,161	575,322
1990	0	34,208	(9,176)	791,355	7,491	823,878	0	(14,012)	(15,101)	786,519	3,419	760,825
1991	0	16,908	70,754	263,909	4,166	355,737	0	(871)	89,637	262,921	2,283	353,970
1992	0	9,638	(75,008)	435,661	1,572	371,863	0	(609)	(71,795)	435,661	1,543	364,800
1993	0	1,922	(124,283)	451,257	1,233	330,129	0	21,959	(77,428)	451,257	1,211	396,999
1994	0	23,151	(91,606)	490,819	2,488	424,852	0	5,205	(95,738)	490,819	2,465	402,751
1995	0	15,860	14,330	157,629	1,242	189,061	0	20,400	75,863	157,629	1,223	255,115
1996	0	21,191	26,848	286,066	2,363	336,468	0	(5,621)	19,088	286,066	2,362	301,895
1997	0	23,437	1,892	323,201	1,569	350,099	0	11,119	(1,802)	323,201	1,566	334,084
1998	0	26,864	(122,848)	208,909	1,222	114,147	0	24,544	(57,726)	208,909	1,222	176,949
1999	0	21,822	8,120	357,664	2,883	390,489	0	(3,670)	6,280	357,664	2,865	363,139
2000	0	27,237	18,198	668,126	3,767	717,328	0	(19,645)	9,320	665,926	1,556	657,157
2001	0	17,404	(22,308)	477,315	759	473,170	0	(5,949)	(16,588)	477,315	746	455,524
2002	0	35,058	41,944	779,284	3,471	859,757	0	10,071	35,623	776,136	305	822,135
2003	0	28,167	(27,394)	735,699	10,290	746,762	0	9,075	(17,034)	725,781	356	718,178
2004	0	31,034	(14,046)	850,007	478	867,473	0	9,120	(11,440)	845,960	456	844,096
2005	0	29,111	(109,664)	577,251	475	497,173	0	21,155	(61,490)	577,251	472	537,388
2006	0	23,453	(128,775)	616,546	406	511,630	0	4,173	(121,607)	616,546	396	499,508
2007	0	29,978	123,287	760,750	202	914,217	0	(1,664)	117,880	758,860	196	875,272
2008	0	36,744	(9,613)	531,832	247	559,210	0	498	(14,279)	529,852	211	516,282
2009	0	30,564	4,893	631,969	195	667,621	0	(2,825)	9,194	628,819	164	635,352
2010	0	26,930	41,267	412,240	240	480,677	0	(4,135)	40,284	409,090	207	445,446
2011	0	29,363	(17,411)	411,366	242	423,560	0	(9,084)	(22,531)	408,846	221	377,452
2012	0	28,769	14,802	593,750	388	637,709	0	10,210	16,335	590,600	375	617,520
2013	0	30,918	(4,336)	612,865	294	639,741	0	13,114	(3,811)	610,623	196	620,122
2014	0	17,555	(10,841)	305,533	91	312,338	0	4,742	(11,327)	305,533	47	298,995
2015	0	22,165	(25,883)	466,081	80	462,443	0	4,268	(25,001)	465,451	63	444,781
2016	0	28,991	(70,824)	544,471	818	503,456	0	5,995	(68,486)	542,581	795	480,885
2017	0	14,575	92,915	226,236	5,380	339,106	0	8,898	92,915	224,346	2,330	328,489
2018	**0**	**15,505**	**0**	**427,321**	**5,380**	**448,206**	**0**	**9,828**	**0**	**425,431**	**2,330**	**437,589**
2019	0	15,505	0	427,321	5,380	448,206	0	9,828	0	425,431	2,330	437,589
2020	0	12,829	3,032	427,321	5,380	448,562	0	6,544	3,032	425,431	2,330	437,337
2021	0	12,913	11,842	427,321	5,380	457,456	0	6,628	11,842	425,431	2,330	446,231
2022	0	12,913	(49)	427,321	5,380	445,565	0	6,628	(49)	425,431	2,330	434,340
2023	0	12,905	(333)	427,321	5,380	445,273	0	6,620	(333)	425,431	2,330	434,048
2024	0	12,842	(10,020)	427,321	5,380	435,523	0	6,557	(10,020)	425,431	2,330	424,298
2025	0	12,821	(894)	427,321	5,380	444,628	0	6,536	(894)	425,431	2,330	433,403
2026	0	12,868	11,278	427,321	5,380	456,847	0	6,583	11,278	425,431	2,330	445,622
2027	0	12,850	(11,638)	427,321	5,380	433,913	0	6,565	(11,638)	425,431	2,330	422,688
2028	0	12,890	8,285	427,321	5,380	453,876	0	6,605	8,285	425,431	2,330	442,651
2029	0	12,823	(8,133)	427,321	5,380	437,391	0	6,538	(8,133)	425,431	2,330	426,166
2030	0	12,912	12,228	427,321	5,380	457,841	0	6,627	12,228	425,431	2,330	446,616
2031	0	12,758	(66,669)	427,321	5,380	378,790	0	6,473	(66,669)	425,431	2,330	367,565
2032	0	12,451	41,046	427,321	5,380	486,198	0	6,166	41,046	425,431	2,330	474,973
2033	0	12,667	(56,723)	427,321	5,380	388,645	0	6,382	(56,723)	425,431	2,330	377,420
2034	0	12,244	41,005	427,321	5,380	485,950	0	5,959	41,005	425,431	2,330	474,725
2035	0	11,461	(193,440)	427,321	5,380	250,722	0	5,176	(193,440)	425,431	2,330	239,497

TABLE B-6 Annual Water Quantities Conveyed through Each Pumping and Power Recovery Plant of Project Transportation Facilities (acre-feet)

	CALIFORNIA AQUEDUCT (continued)							
	COASTAL BRANCH							
	Las Perillas and Badger Hill Pumping Plants				Devil's Den, Bluestone, and Polonio Pass Pumping Plants			
Calendar Year	Initial Fill Water	Operational Losses	Water Supply Delivery	Total	Initial Fill Water	Operational Losses	Water Supply Delivery	Total
	[111]	[112]	[113]	[114]	[115]	[116]	[117]	[118]
1961	0	0	0	0	0	0	0	0
1962	0	0	0	0	0	0	0	0
1963	0	0	0	0	0	0	0	0
1964	0	0	0	0	0	0	0	0
1965	0	0	0	0	0	0	0	0
1966	0	0	0	0	0	0	0	0
1967	0	0	0	0	0	0	0	0
1968	210	873	79,039	80,122	0	0	0	0
1969	0	1,042	62,064	63,106	0	0	0	0
1970	0	638	83,649	84,287	0	0	0	0
1971	0	3,455	110,971	114,426	0	0	0	0
1972	0	1,745	121,755	123,500	0	0	0	0
1973	0	5,479	78,645	84,124	0	0	0	0
1974	0	7,344	78,174	85,518	0	0	0	0
1975	0	5,819	85,216	91,035	0	0	0	0
1976	0	6,562	90,058	96,620	0	0	0	0
1977	0	5,777	40,579	46,356	0	0	0	0
1978	0	9,085	92,604	101,689	0	0	0	0
1979	0	10,896	123,155	134,051	0	0	0	0
1980	0	9,449	111,379	120,828	0	0	0	0
1981	0	13,232	109,754	122,986	0	0	0	0
1982	0	7,984	95,776	103,760	0	0	0	0
1983	0	5,710	100,518	106,228	0	0	0	0
1984	0	5,740	126,387	132,127	0	0	0	0
1985	0	7,563	120,823	128,386	0	0	0	0
1986	0	8,719	131,599	140,318	0	0	0	0
1987	0	11,363	128,080	139,443	0	0	0	0
1988	0	12,831	120,969	133,800	0	0	0	0
1989	0	11,454	116,801	128,255	0	0	0	0
1990	0	13,022	109,802	122,824	0	0	0	0
1991	0	5,802	1,496	7,298	0	0	0	0
1992	0	7,893	79,635	87,528	0	0	0	0
1993	0	9,282	94,921	104,203	0	0	0	0
1994	0	8,515	87,158	95,673	0	0	0	0
1995	0	6,986	94,536	101,522	0	0	0	0
1996	0	9,663	114,630	124,293	0	0	0	0
1997	527	8,343	110,428	119,298	527	0	8,538	9,065
1998	0	8,415	109,400	117,815	0	0	22,210	22,210
1999	0	2,453	120,061	122,514	0	303	23,880	24,183
2000	0	(429)	120,313	119,884	0	0	26,703	26,703
2001	0	(742)	87,915	87,173	0	0	23,229	23,229
2002	0	638	99,783	100,421	0	(151)	31,991	31,840
2003	0	161	101,113	101,274	0	284	31,421	31,705
2004	0	492	104,144	104,636	0	480	33,870	34,350
2005	0	1,484	103,178	104,662	0	573	27,595	28,168
2006	0	1,994	115,433	117,427	0	2,034	27,484	29,518
2007	0	3,355	131,590	134,945	0	293	31,516	31,809
2008	0	3,696	107,239	110,935	0	(30)	21,795	21,765
2009	0	2,242	102,509	104,751	0	(3,078)	19,253	16,175
2010	0	4,265	106,590	110,855	0	272	21,532	21,804
2011	0	3,994	113,647	117,641	0	533	24,869	25,402
2012	0	7,411	109,383	116,794	0	589	23,418	24,007
2013	0	7,637	110,714	118,351	0	295	21,699	21,994
2014	0	6,636	94,369	101,005	0	4,018	19,963	23,981
2015	0	5,458	94,227	99,685	0	378	15,111	15,489
2016	0	6,851	119,233	126,084	0	827	31,381	32,208
2017	0	802	87,043	87,845	0	212	42,448	42,660
2018	**0**	**802**	**94,761**	**95,563**	**0**	**212**	**39,768**	**39,980**
2019	0	802	95,553	96,355	0	212	40,560	40,772
2020	0	802	95,629	96,431	0	212	40,636	40,848
2021	0	802	95,641	96,443	0	212	40,648	40,860
2022	0	802	95,641	96,443	0	212	40,648	40,860
2023	0	802	95,641	96,443	0	212	40,648	40,860
2024	0	802	95,641	96,443	0	212	40,648	40,860
2025	0	802	95,641	96,443	0	212	40,648	40,860
2026	0	802	95,641	96,443	0	212	40,648	40,860
2027	0	802	95,641	96,443	0	212	40,648	40,860
2028	0	802	95,641	96,443	0	212	40,648	40,860
2029	0	802	95,641	96,443	0	212	40,648	40,860
2030	0	802	95,641	96,443	0	212	40,648	40,860
2031	0	802	95,641	96,443	0	212	40,648	40,860
2032	0	802	95,641	96,443	0	212	40,648	40,860
2033	0	802	95,641	96,443	0	212	40,648	40,860
2034	0	802	95,641	96,443	0	212	40,648	40,860
2035	0	802	95,641	96,443	0	212	40,648	40,860

TABLE B-7 Reconciliation of Capital Costs Allocated to Water Supply and Power Generation (in thousands of dollars)

Item	Project Costs Allocated to Water Supply and Power Generation							Capital Costs Allocated to Other Purposes	Total State Water Project Capital Cost
	Miscellaneous Income Credited to Construction[a]	Allowance for Future Price Escalation[b]	Costs of Construction of Delivery Structures[c]	Costs of Requested Excess Capacity and Future Enlargement[d]	Capital Cost Component of Delta Water Charge[e]	Capital Cost Component of Transportation Water Charge[f]	Water Supply and Power Total		
	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]
CONSERVATION FACILITIES									
Upper Feather Division									
Frenchman Dam and Lake	180	0	0	0	601	0	781	2,881	3,663
Grizzly Valley Dam and Lake Davis	65	0	0	0	55	0	120	8,957	9,077
Antelope Dam and Lake	1	0	0	0	0	0	1	5,869	5,870
Abbey Bridge Dam and Reservoir	0	0	0	0	0	0	0	520	520
Dixie Refuge Dam and Reservoir	0	0	0	0	0	0	0	236	236
Total, Upper Feather Division	***246***	***0***	***0***	***0***	***657***	***0***	***903***	***18,463***	***19,365***
Oroville Division									
Multipurpose Facilities	3,152	0	0	0	784,723	0	787,875	100,450	888,325
Specific Power Facilities	230	0	0	0	248,061	0	248,291	(872)	247,419
Total, Oroville Division	***3,382***	***0***	***0***	***0***	***1,032,785***	***0***	***1,036,167***	***99,578***	***1,135,745***
California Aqueduct									
North San Joaquin Division	1,210	0	0	0	105,432	0	106,642	3,865	110,507
San Luis Division	13,152	0	0	0	182,343	0	195,495	6,093	201,588
Total, California Aqueduct	***14,362***	***0***	***0***	***0***	***287,776***	***0***	***302,137***	***9,958***	***312,095***
Delta Facilities	37,311	0	0	0	716,778	0	754,089	35,189	789,278
Planning and Preoperation	5,302	0	0	0	104,070	0	109,372	0	109,372
TOTAL, CONSERVATION FACILIITES	**60,603**	**0**	**0**	**0**	**2,142,065**	**0**	**2,202,668**	**163,188**	**2,365,855**
TRANSPORTATION FACILITIES									
Upper Feather Division									
Grizzly Valley Pipeline	0	0	315	0	0	342	657	0	657
North Bay Aqueduct	266	0	676	0	0	121,145	122,087	0	122,087
South Bay Aqueduct	1,791	0	3,655	0	0	374,804	380,250	23,736	403,986
California Aqueduct									
North San Joaquin Division	2,462	0	108	0	0	238,214	240,784	8,602	249,385
San Luis Division	9,201	0	0	0	0	179,523	188,725	8,827	197,552
South San Joaquin Division	386	0	4,800	13,152	0	380,343	398,681	18,002	416,683
Tehachapi Division	27	0	0	5,230	0	388,364	393,621	20,914	414,535
Mojave Division	918	0	2,153	0	0	358,702	361,773	40,146	401,919
Santa Ana Division	1,184	0	6,060	5,331	0	410,641	423,216	91,608	514,824
West Branch	37,592	0	455	37	0	536,759	574,843	35,192	610,035
Coastal Branch	(279)	0	216	0	0	514,682	514,619	0	514,619
Total, California Aqueduct	***51,491***	***0***	***13,792***	***23,750***	***0***	***3,007,228***	***3,096,262***	***223,292***	***3,319,553***
TOTAL, TRANSPORTATION FACILITIES	**53,548**	**0**	**18,438**	**23,750**	**0**	**3,503,520**	**3,599,256**	**247,028**	**3,846,284**
East Branch Enlargement	0	0	0	0	0	462,031	462,031	0	462,031
East Branch Extension	0	0	0	0	0	413,302	413,302	0	413,302
Coastal Power Allocation	0	0	0	0	0	30,708	30,708	0	30,708
Agricultural Drainage Facilities	0	0	0	0	0	0	0	106,076	106,076
Off-Aqueduct Power Generation Facilities	0	0	0	0	0	491,574	491,574	0	491,574
Small Hydro Power Generation Facilities	0	0	0	0	14,095	110,601	124,696	0	124,696
Land Purchase—Kern Water Bank	0	0	0	0	34,686	0	34,686	0	34,686
Unassigned/Miscellaneous	0	0	0	0	0	0	0	157,525	157,525
Davis-Grunsky	0	0	0	0	0	0	0	130,000	130,000
TOTAL THROUGH 2025	**114,151**	**0**	**18,438**	**23,750**	**2,190,846**	**5,011,736**	**7,358,921**	**803,816**	**8,162,737**

[a] Miscellaneous project receipts that are applied for accounting purposes to reduce the capital costs of the particular facilities.
[b] These allowances are included for planning the future financial program, but not for determining current water charges.
[c] See Table B-8.
[d] See Table B-9.
[e] See Table B-13.
[f] See Table B-10. Mojave Division total reduced by $86,081,000 for costs included in "Small Hydro Power Generation Facilities" line.

TABLE B-8 SWP Capital Costs of Requested Delivery Structures (in dollars)

Project Service Area and Water Supply Contractors	Calendar Year Capital Costs[a]						
	1952-2014	2015	2016	2017	2018	2019	Total
	[1]	[2]	[3]	[4]	[5]	[6]	[7]
FEATHER RIVER AREA							
County of Butte	261,979	0	0	0	0	0	261,979
Plumas County Flood Control and Water Conservation District	8,723	0	0	0	0	0	8,723
Thermalito Irrigation District[b]	43,939	0	0	0	0	0	43,939
Subtotal	*314,641*	*0*	*0*	*0*	*0*	*0*	*314,641*
NORTH BAY AREA							
Napa County Flood Control and Water Conservation District	13,590	0	0	0	0	0	13,590
Solano County Water Agency	662,113	0	0	0	0	0	662,113
Subtotal	*675,703*	*0*	*0*	*0*	*0*	*0*	*675,703*
SOUTH BAY AREA							
Alameda County Flood Control and Water Conservation District, Zone 7	1,887,889	23,461	0	0	0	0	1,911,350
Alameda County Water District	630,576	0	0	0	0	0	630,576
Santa Clara Valley Water District	22,715	10,816	0	0	0	0	33,531
San Francisco Water Department[b]	1,066,680	0	0	0	0	0	1,066,680
Subtotal	*3,607,860*	*34,277*	*0*	*0*	*0*	*0*	*3,642,137*
CENTRAL COASTAL AREA							
San Luis Obispo County Flood Control and Water Conservation District	26,408	15,010	13,323	3,000	0	0	57,741
Santa Barbara County Flood Control and Water Conservation District	67,058	0	0	0	0	0	67,058
Subtotal	*93,466*	*15,010*	*13,323*	*3,000*	*0*	*0*	*124,799*
SAN JOAQUIN VALLEY AREA							
Castaic Lake Water Agency	82,567	0	0	0	0	0	82,567
County of Kings	33,941	1,450	623	15,000	15,000	0	66,014
Dudley Ridge Water District[c]	323,712	2,235	10,952	10,000	0	0	346,899
Empire West Side Irrigation District	6,358	0	0	0	0	0	6,358
Green Valley Water District[b]	5,292	0	0	0	0	0	5,292
Kern County Water Agency	4,013,417	15,999	87	0	10,000	0	4,039,503
Oak Flat Water District	97,643	0	0	0	0	0	97,643
Tracy Golf and Country Club[b]	6,932	0	0	0	0	0	6,932
Tulare Lake Basin Water Storage District	277,483	0	0	0	0	0	277,483
Veterans Administration Cemetery[b]	3,342	0	0	0	0	0	3,342
Subtotal	*4,850,687*	*19,684*	*11,662*	*25,000*	*25,000*	*0*	*4,932,033*
SOUTHERN CALIFORNIA AREA							
Antelope Valley-East Kern Water Agency	1,214,328	289,003	82,962	90,000	100,000	0	1,776,293
Castaic Lake Water Agency	375,593	0	0	0	0	0	375,593
Coachella Valley Water District	14,206	0	0	0	0	0	14,206
Crestline-Lake Arrowhead Water Agency	25,298	0	0	0	0	0	25,298
Desert Water Agency	23,438	0	0	0	0	0	23,438
Littlerock Creek Irrigation District	23,732	0	0	0	0	0	23,732
Mojave Water Agency	309,054	0	0	0	0	0	309,054
Palmdale Water District	34,173	0	0	0	0	0	34,173
San Bernardino Valley Municipal Water District	960,685	0	0	0	0	0	960,685
San Gabriel Valley Municipal Water District	131,052	0	0	0	0	0	131,052
San Gorgonio Pass Water Agency	122,717	2,768	13,638	10,000	15,000	0	164,123
The Metropolitan Water District of Southern California	4,817,610	0	0	0	0	0	4,817,610
Ventura County Flood Control District	79,699	0	0	0	0	0	79,699
Subtotal	*8,131,585*	*291,771*	*96,600*	*100,000*	*115,000*	*0*	*8,734,956*
TOTAL	**17,673,942**	**360,742**	**121,585**	**128,000**	**140,000**	**0**	**18,424,269**

[a] Approximate only, not to be construed as invoice amounts.

[b] Not a SWP water supply contractor.

[c] The majority of 2015 costs were from the proposed reverse flow program; to be split among Dudley Ridge, Kern and four Kern member units.

Table B-9 Capital Costs of Requested Excess Peaking Capacity (in dollars unless otherwise indicated) Sheet 1 of 2

Calendar Year	Total Advance Payments and Credits for Excess Capacity	Total Incremental Costs for Excess Capacity	Overpayment (+) or Underpayment (-)[a]	Annual Surplus Money Investment Fund Interest Rate[b]		Net Over- or Underpayment With Interest[c]
				January–June	July–December	
	[1]	[2]	[3]	[4]	[5]	[6]
	THE METROPOLITAN WATER DISTRICT OF SOUTHERN CALIFORNIA					
1965	0	158,000	(158,000)	3.968%	4.184%	(163,412)
1966	8,056,000	435,800	7,620,200	4.540%	5.057%	7,701,103
1967	9,094,963	1,878,270	7,216,693	4.815%	4.744%	15,524,533
1968	1,523,252	2,887,351	(1,364,099)	5.330%	5.540%	14,959,187
1969	8,310,651	3,059,310	5,251,341	5.946%	6.389%	21,369,973
1970	3,426,736	2,397,102	1,029,634	7.071%	7.125%	23,986,083
1971	1,086,045	1,146,648	(60,603)	5.154%	5.580%	25,238,017
1972	(4,244,807)	487,394	(4,732,201)	4.477%	4.977%	21,532,965
1973	(15,913,829)	25,041	(15,938,870)	6.023%	8.717%	6,014,116
1974	0	37,775	(37,775)	9.222%	10.351%	6,576,393
1975	0	2,085	(2,085)	7.089%	6.791%	7,038,515
1976	0	0	0	6.048%	6.021%	7,469,662
1977	0	0	0	5.788%	6.182%	7,923,403
1978	0	0	0	7.171%	8.096%	8,539,736
1979	0	0	0	8.979%	9.671%	9,354,605
1980	0	0	0	11.500%	11.500%	10,461,314
Total	**11,339,011**	**12,514,776**	**(1,175,765)**	**—**	**—**	**10,461,314**
	SAN GABRIEL VALLEY MUNICIPAL WATER DISTRICT					
1967	0	25,730	(25,730)	4.815%	4.744%	(26,611)
1968	184,422	44,053	140,369	5.330%	5.540%	117,587
1969	49,052	38,075	10,977	5.946%	6.389%	136,751
1970	44,911	17,959	26,952	7.071%	7.125%	175,186
1971	61,588	5,900	55,688	5.154%	5.580%	242,927
1972	(20,263)	6,835	(27,098)	4.477%	4.977%	226,230
1973	(180,465)	0	(180,465)	6.023%	8.717%	49,198
1974	0	0	0	9.222%	10.351%	54,130
1975	0	0	0	7.089%	6.791%	57,952
1976	0	0	0	6.048%	6.021%	61,501
1977	0	0	0	5.788%	6.182%	65,237
1978	0	0	0	7.171%	8.096%	70,312
1979	0	0	0	8.979%	9.671%	77,021
1980	0	0	0	11.500%	11.500%	86,133
Total	**139,245**	**138,552**	**693**	**—**	**—**	**86,133**
	ANTELOPE VALLEY-EAST KERN WATER AGENCY					
1968	85,495	1,645	83,850	5.330%	5.540%	86,962
1969	52,625	6,326	46,299	5.946%	6.389%	140,964
1970	101,648	15,076	86,572	7.071%	7.125%	243,222
1971	34,062	11,748	22,314	5.154%	5.580%	279,673
1972	(12,794)	2,018	(14,812)	4.477%	4.977%	277,552
1973	(205,354)	308	(205,662)	6.023%	8.717%	77,288
1974	0	96	(96)	9.222%	10.351%	84,933
1975	0	0	0	7.089%	6.791%	90,929
1976	0	190	(190)	6.048%	6.021%	96,300
1977	0	0	0	5.788%	6.182%	102,150
1978	0	0	0	7.171%	8.096%	110,096
1979	0	0	0	8.979%	9.671%	120,601
1980	0	0	0	11.500%	11.500%	134,869
Total	**55,682**	**37,407**	**18,275**	**—**	**—**	**134,869**

[a] Overpayment or underpayment for each calendar year—column [1] minus column [2].

[b] Interest rates shown are annual rates. Interest is credited daily at applicable rates on funds deposited in the State's Surplus Money Investment Fund.

[c] Amounts shown are end-of-year balances. Interest on overpayments is credited at applicable Surplus Money Investment Fund interest rates shown in columns [4] and [5]. Interest on underpayments is charged at the 1980 Project Interest Rate of 4.584 percent.

Table B-9 Capital Costs of Requested Excess Peaking Capacity (in dollars)

Reach Number	ANNUAL REQUIRED ADVANCE OF FUNDS Incremental Costs and Advance Payments by Calendar Year 1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1981	Reach Total
	[7]	[8]	[9]	[10]	[11]	[12]	[13]	[14]	[15]	[16]	[17]	[18]	[19]	[20]
	THE METROPOLITAN WATER DISTRICT OF SOUTHERN CALIFORNIA													
	Incremental Costs													
8C		1,000	1,000											2,000
8D		43,500	43,500											87,000
9		27,000	27,000	13,500										67,500
10A		29,700	29,700	14,800										74,200
11B	10,100	18,300	18,300	9,200										55,900
12D	1,800		19,300	25,800	12,900									59,800
12E	1,800		12,400	18,800	10,800									43,800
13B			12,600	37,800	31,600									82,000
14A	2,500	500	11,100	80,216	107,504	124,069	37,519	6,413	381	87				370,289
14B	1,200	1,800		19,100	19,100	12,800								54,000
14C	1,800	900		13,500	13,500	9,000								38,700
15A	700		14,000	66,947	133,357	128,099	54,821	5,327	946	2,076				406,273
16A	700		18,900	137,894	182,000	211,608	133,927	26,203	5,767	6,156				723,155
17E		51,500	444,600	537,247	860,024	998,985	699,281	193,286	17,947	29,456	2,085			3,834,411
17F	109,100	261,600	261,600	261,600	261,600	239,500								1,395,000
25			964,270	1,650,947	1,426,925	673,041	221,100	256,165						5,192,448
28J		304,612	13,706	296,668	65,966	230,169	1,209,586	2,017,134	235,900	4,900				4,378,641
Total	129,700	740,412	1,891,976	3,184,019	3,125,276	2,627,271	2,356,234	2,504,528	260,941	42,675	2,085			16,865,117
	Current Adjustments													
8C through 25	1. Advance Payments Applied to Incremental Costs Amendment 2[d]													
	0	8,056,000	9,094,963	1,523,252	8,310,651	3,426,736	1,086,045	(4,244,807)	(14,381,396)				(356,668)	12,514,776
	2. Interest Credits-Amendment 2[e]													
									(1,532,433)				(10,104,646)	(11,637,079)
28J														
	3. Advance Payments Applied to Incremental Costs Amendment 5[f]													
	0	1,240,000	1,483,180	2,469,325	(927,035)	1,729,160	3,215,258	2,967,475	1,690,000	(9,488,722)				4,378,641
	4. Interest Credits-Amendment 5[g]													
										(2,721,803)				(2,721,803)
	5. Net Required Advance of Funds												[h]	
	0	9,296,000	10,578,143	3,992,577	7,383,616	5,155,896	4,301,303	(1,277,332)	(14,233,829)	(12,210,525)			(10,461,314)	2,524,535
	SAN GABRIEL VALLEY MUNICIPAL WATER DISTRICT													
	Incremental Costs													
25			25,730	44,053	38,075	17,959	5,900	6,835						138,552
	Total Unadjusted Incremental Costs for Past Payments													
			25,730	44,053	38,075	17,959	5,900	6,835						138,552
	Current Adjustments													
	1. Advance Payments Applied to Incremental Costs[d]													
			0	184,422	49,052	44,911	61,588	(20,263)	(174,133)				(7,025)	138,552
	2. Interest Credit													
									(6,332)				(79,108)	(85,440)
	3. Net Required Advance of Funds												[h]	
			0	184,422	49,052	44,911	61,588	(20,263)	(180,465)				(86,133)	53,112
	ANTELOPE VALLEY-EAST KERN WATER AGENCY													
	Incremental Costs													
29A				1,645	6,326	13,376	10,048	2,018	308	96		190		34,007
29F						1,700	1,700							3,400
	Total Unadjusted Incremental Costs for Past Payments													
				1,645	6,326	15,076	11,748	2,018	308	96		190		37,407
	Current Adjustments													
	1. Advance Payments Applied to Incremental Costs[d]													
				85,495	52,625	101,648	34,062	(12,794)	(189,120)	0		0	(34,509)	37,407
	2. Interest Credit													
									(16,234)				(100,360)	(116,594)
	3. Net Required Advance of Funds												[h]	
				85,495	52,625	101,648	34,062	(12,794)	(205,354)	0		0	(134,869)	(79,187)

[d] Actual payments are shown for 1965 through 1976 with 1981 adjusted to reflect overpayments and underpayments without interest for prior years.

[e] Interest for overpayments and underpayments under provisions of Amendment 2 of the contract.

[f] Actual payments are shown for 1965 through 1973 with 1974 adjusted to reflect overpayments and underpayments without interest for prior years.

[g] Interest for overpayments and underpayments under provisions of Amendment 5 of the contract.

[h] Amounts in excess of incremental costs, under the provisions of the contract, reduce the Transportation Charge capital cost component of the agency's Statement of Charges for January 1981.

TABLE B-10 Capital Costs of Each Aqueduct Reach to be Reimbursed through Capital Cost Component of Transportation Charge (in dollars)

Calendar Year	UPPER FEATHER DIVISION	NORTH BAY AQUEDUCT					SOUTH BAY AQUEDUCT			
		Reach 1	Reach 2	Reach 3A	Reach 3B	Total	Reach 1	Reach 2	Reach 4	Reach 5
	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]
1952	0	0	0	0	0	0	97	34	30	57
1953	0	0	0	0	0	0	477	166	144	297
1954	0	0	0	0	0	0	1,466	508	437	959
1955	0	0	0	0	0	0	1,944	674	560	1,266
1956	0	0	0	0	0	0	18,789	6,515	5,090	12,545
1957	0	13,290	3,391	0	9,953	26,634	45,090	15,639	12,285	33,218
1958	2	19,202	5,011	0	25,798	50,011	195,985	80,961	7,714	21,930
1959	14	7,517	2,118	0	17,653	27,288	496,140	148,516	24,945	17,118
1960	28	8,797	4,292	0	4,838	17,927	1,130,378	67,351	71,779	68,028
1961	10	1,551	10,318	0	2,526	14,395	3,273,247	180,596	307,885	74,398
1962	32	217	(1,751)	0	414	(1,120)	1,548,884	203,535	695,446	35,102
1963	51	2,510	(1,063)	0	983	2,430	480,716	69,182	2,284,291	206,587
1964	7,791	39,879	12,046	0	21,934	73,859	2,549,118	15,903	181,900	264,410
1965	3,139	72,793	17,900	0	170,361	261,054	807,505	153,454	85,425	447,830
1966	(48)	59,615	12,972	0	438,949	511,536	898,074	149,529	142,096	1,690,200
1967	47	47,257	11,597	0	1,551,023	1,609,877	607,614	50,423	293,304	3,496,284
1968	51,573	70,586	19,560	0	831,158	921,304	965,119	19,543	89,300	2,931,101
1969	234,232	63,650	23,628	0	46,428	133,706	455,173	9,618	3,860	896,727
1970	16,227	59,090	42,733	0	9,415	111,238	52,481	3,380	10,517	154,358
1971	27,204	20,819	31,516	0	8,480	60,815	24,505	4,645	5,035	20,395
1972	9	15,538	12,952	0	10,058	38,548	26,918	825	2,945	26,090
1973	25	18,488	29,018	0	39,878	87,384	24,468	4,010	6,016	12,708
1974	45	67,352	29,978	0	134,332	231,662	17,108	1,192	1,765	65,587
1975	21	62,855	73,112	0	45,091	181,058	57,619	561	1,165	7,291
1976	51	52,419	75,611	218	13,168	141,416	104,242	2,846	8,915	12,701
1977	28	53,274	65,662	2,240	23,138	144,314	176,062	3,625	3,225	16,158
1978	38	61,936	57,158	2,955	28,987	151,036	264,581	4,494	3,668	14,028
1979	23	316,620	91,367	3,953	62,240	474,180	111,106	17,151	8,515	31,725
1980	26	422,804	111,600	19,910	96,125	650,439	368,942	17,708	8,249	38,045
1981	34	430,992	147,295	(10,752)	43,157	610,692	(145,428)	3,600	6,533	12,448
1982	11	934,812	357,720	(7,165)	134,408	1,419,775	(44,778)	18,971	7,451	37,824
1983	19	1,091,091	1,076,627	2,628	517,615	2,687,961	429,225	73,925	38,185	72,415
1984	26	1,875,968	2,317,661	3,290	1,068,363	5,265,282	506,951	36,354	9,610	92,846
1985	29	2,248,491	7,849,886	27,815	3,416,370	13,542,562	34,103	2,822	5,034	27,138
1986	31	16,420,238	10,020,277	1,309,599	1,819,349	29,569,463	85,732	14,715	17,144	13,982
1987	32	11,873,826	7,214,307	1,628,932	1,670,596	22,387,661	126,377	15,693	27,881	32,931
1988	55	3,287,756	1,648,431	1,015,971	686,821	6,638,979	290,505	36,744	51,786	25,078
1989	44	1,056,583	950,985	224,567	374,886	2,607,021	130,609	16,848	35,518	12,582
1990	63	493,522	537,881	145,694	71,938	1,249,035	275,732	32,387	99,251	40,263
1991	54	76,599	17,130	24,846	70,542	189,117	1,153,109	26,900	53,613	21,889
1992	42	56,492	6,525	18,333	37,778	119,128	401,906	53,036	61,799	51,386
1993	30	104,317	24,579	40,129	82,032	251,057	313,476	55,679	79,149	39,293
1994	14	68,065	13,463	27,107	45,909	154,544	(211,712)	29,017	362,585	36,350
1995	3	26,002	5,920	7,337	20,617	59,876	265,751	42,516	48,189	21,436
1996	0	14,790	3,334	6,614	14,606	39,344	139,573	13,049	25,751	10,677
1997	3	67,264	35,545	38,585	(13,571)	127,823	203,476	31,135	36,986	16,906
1998	7	15,410	6,392	6,797	10,396	38,995	67,974	6,120	14,731	4,616
1999	2	71,950	35,515	33,879	32,613	173,957	162,161	25,329	35,716	24,347
2000	24	29,992	8,327	11,710	4,156	54,185	100,654	15,688	24,144	19,652
2001	20	10,597	3,904	3,892	1,954	20,347	436,756	4,272	118,836	4,207
2002	14	27,018	18,971	15,254	4,614	65,857	3,068,535	5,648	329,244	64,425
2003	0	14,733	9,243	4,658	46,313	74,947	4,465,569	200,125	199,457	360,387
2004	0	23,929	2,214	2,341	145,290	173,774	1,257,335	120,340	131,702	99,547
2005	0	89,369	216	9	33,947	123,541	1,224,486	119,298	260,893	(81)
2006	5	28,222	237	90	879,428	907,978	1,234,636	68,374	259,542	523
2007	0	61,330	1	0	3,219,041	3,280,372	3,406,319	15,183	70,776	1,884
2008	4	75,107	6,065	5,318	7,878,424	7,964,914	6,248,064	35,890	169,891	5,098
2009	6	26,191	154	0	1,188,559	1,214,905	10,200,386	1,397,365	1,834,913	1,815
2010	(2)	4,652	(45)	(1)	395,328	399,934	7,061,360	104,208	468,313	14,865,982
2011	0	57,075	12	0	175,912	232,999	10,255,032	1,863,342	4,089,221	3,416,710
2012	0	585,216	3	15,163	311,585	911,967	7,800,110	1,379,855	3,102,674	104,555
2013	0	870,300	27	67,533	394,181	1,332,041	2,392,878	1,228,777	1,071,752	328,413
2014	0	781,566	3	109,243	355,488	1,246,300	(122,873)	(1,111,982)	(319,804)	127,441
2015	0	263,641	2	81,504	109,412	454,560	1,779,546	117,701	716,517	127,708
2016	0	142,630	1,260	61,753	45,733	251,375	273,581	105,271	407,238	71,071
2017	0	154,531	5,216	109,072	20,716	289,535	275,148	22,817	30,073	139,937
2018	**0**	**121,933**	**8,448**	**49,839**	**25,848**	**206,068**	**299,158**	**23,777**	**37,085**	**61,667**
2019	0	326,228	135,951	147,070	41,161	650,410	1,792,644	321,849	121,433	228,359
2020	0	73,116	5,332	27,296	14,113	119,857	182,722	140,881	24,338	480,704
2021	0	0	0	0	0	0	0	0	0	0
2022	0	0	0	0	0	0	0	0	0	0
2023	0	0	0	0	0	0	0	0	0	0
2024	0	0	0	0	0	0	0	0	0	0
2025	0	0	0	0	0	0	0	0	0	0
2026	0	0	0	0	0	0	0	0	0	0
2027	0	0	0	0	0	0	0	0	0	0
2028	0	0	0	0	0	0	0	0	0	0
2029	0	0	0	0	0	0	0	0	0	0
2030	0	0	0	0	0	0	0	0	0	0
2031	0	0	0	0	0	0	0	0	0	0
2032	0	0	0	0	0	0	0	0	0	0
2033	0	0	0	0	0	0	0	0	0	0
2034	0	0	0	0	0	0	0	0	0	0
2035	0	0	0	0	0	0	0	0	0	0
TOTAL	**341,139**	**45,539,604**	**33,215,740**	**5,285,227**	**28,988,557**	**113,029,128**	**82,520,636**	**7,946,103**	**18,431,656**	**31,701,555**

TABLE B-10 Capital Costs of Each Aqueduct Reach to be Reimbursed through Capital Cost Component of Transportation Charge (in dollars)

Calendar Year	SOUTH BAY AQUEDUCT (continued)					CALIFORNIA AQUEDUCT NORTH SAN JOAQUIN DIVISION			
	Reach 6	Reach 7	Reach 8	Reach 9	Total	Reach 1	Reach 2A	Reach 2B	Subtotal
	[11]	[12]	[13]	[14]	[15]	[16]	[17]	[18]	[19]
1952	8	66	72	132	496	4,012	3,279	1,499	8,790
1953	38	327	336	640	2,425	10,559	8,589	3,964	23,112
1954	123	1,005	1,003	1,954	7,455	13,796	11,163	5,179	30,138
1955	160	1,293	1,149	2,454	9,500	7,370	5,952	2,760	16,082
1956	1,559	11,959	11,043	28,372	95,872	9,880	5,020	2,398	17,298
1957	3,659	28,675	27,385	563,114	729,065	11,953	5,456	2,612	20,021
1958	2,243	17,872	17,385	560,904	904,994	18,585	17,191	7,994	43,770
1959	357	3,200	3,568	149,874	843,718	123,170	100,306	45,510	268,986
1960	1,102	2,944	4,498	359,749	1,705,829	191,408	102,136	48,968	342,512
1961	4,726	18,325	22,765	(1,367)	3,880,575	153,765	195,947	42,843	392,555
1962	17,295	160,939	178,242	209,042	3,048,485	612,258	491,225	168,218	1,271,701
1963	265,414	1,250,386	939,832	129,902	5,626,310	1,993,284	1,525,734	684,095	4,203,113
1964	100,603	1,716,371	2,327,770	2,947,522	10,103,597	4,674,280	2,369,858	700,074	7,744,212
1965	42,345	368,476	637,266	1,921,844	4,464,145	5,877,189	6,873,699	2,975,719	15,726,607
1966	17,663	34,915	140,350	777,887	3,850,714	8,553,362	14,112,820	5,677,099	28,343,281
1967	(41,567)	137,856	147,183	379,764	5,070,861	9,678,607	10,672,113	6,646,739	26,997,459
1968	84,553	2,130	68,057	253,152	4,412,955	6,392,664	891,681	1,303,186	8,587,531
1969	4,279	11,572	162,300	32,000	1,575,529	3,542,767	792,259	443,924	4,778,950
1970	2,487	6,820	20,086	(15,718)	234,411	2,236,607	149,692	115,578	2,501,877
1971	4,350	6,923	17,750	39,084	122,687	98,138	215,512	69,410	383,060
1972	1,084	203	4,800	32,199	95,064	159,608	43,721	7,744	211,073
1973	288	989	7,449	9,693	65,621	105,581	25,496	22,418	153,495
1974	527	6,020	30,628	11,433	134,260	177,700	16,627	45,707	240,034
1975	126	679	1,086	3,464	71,991	239,144	14,680	169,676	423,500
1976	701	3,529	8,362	26,186	167,482	641,860	45,533	65,943	753,336
1977	270	1,310	8,651	24,938	234,239	274,381	20,283	22,568	317,232
1978	231	1,204	1,631	17,123	306,960	801,265	36,221	9,714	847,200
1979	1,367	1,721	2,134	7,322	181,041	1,051,792	59,695	26,106	1,137,593
1980	1,321	1,718	2,182	7,102	445,267	4,173,603	96,760	38,789	4,309,152
1981	308	1,462	1,398	5,077	(114,602)	(502,921)	1,487,516	38,451	1,023,046
1982	716	1,561	1,746	6,074	29,565	700,738	46,501	22,308	769,547
1983	407	5,721	8,143	23,367	651,388	706,104	84,435	211,619	1,002,158
1984	269	1,853	1,667	13,301	662,851	1,559,539	41,352	48,478	1,649,369
1985	402	1,657	2,129	6,750	80,035	677,955	24,812	19,404	722,171
1986	1,119	2,744	3,313	12,234	150,983	398,788	63,830	35,420	498,038
1987	1,496	3,081	3,560	21,842	232,861	799,672	88,945	41,659	930,276
1988	5,706	6,689	7,603	33,728	457,839	2,898,156	(128,051)	(56,448)	2,713,657
1989	2,641	3,878	4,755	14,489	221,320	6,898,872	346,589	173,993	7,419,454
1990	5,092	19,899	36,584	87,796	597,004	13,483,785	112,002	2,446,232	16,042,019
1991	1,942	5,059	7,357	31,682	1,301,551	13,914,632	133,121	114,981	14,162,734
1992	1,184	2,042	2,250	35,464	609,067	6,260,482	241,456	239,437	6,741,375
1993	3,618	6,028	8,873	42,200	548,316	2,542,869	257,330	200,072	3,000,271
1994	2,897	4,781	5,346	89,991	319,255	1,145,666	148,396	88,357	1,382,419
1995	11,556	3,635	14,769	24,750	432,602	1,462,211	217,940	131,995	1,812,146
1996	3,092	2,271	2,699	12,522	209,634	874,227	74,153	41,215	989,595
1997	1,454	4,141	3,655	20,589	318,342	2,064,446	146,851	84,303	2,295,600
1998	363	1,134	(6,005)	5,776	94,709	729,475	33,695	16,670	779,840
1999	1,533	3,304	12,727	31,634	296,751	2,208,776	88,951	90,639	2,388,366
2000	2,406	4,944	5,331	10,755	183,575	(706,517)	57,503	40,185	(608,829)
2001	91,721	68,849	404,226	1,190,653	2,319,521	371,407	91,792	8,926	472,124
2002	229,409	453,259	1,107,580	2,977,939	8,236,039	833,187	44,543	22,639	900,369
2003	67,216	509,964	477,926	1,409,228	7,689,872	228,767	22,779	13,565	265,112
2004	3,193	3,100	39,326	3,276,907	4,931,451	892,456	15,333	77,640	985,430
2005	5,341	5,271	4,848	731,512	2,351,567	294,112	40,135	98,505	432,751
2006	1,286	1,342	1,352	15,393	1,582,447	422,511	15,048	177,980	615,539
2007	7,470	7,471	7,471	10,731	3,527,304	490,384	58,152	121,987	670,522
2008	8,415	8,730	8,932	12,419	6,497,439	1,202,812	39,742	85,604	1,328,158
2009	3,042	3,187	3,266	4,591	13,448,565	553,705	40,289	29,613	623,608
2010	732	716	711	1,006	22,503,029	181,161	8,175	2,311	191,646
2011	6,513	7,659	6,472	9,164	19,654,113	813,521	51,565	3,937	869,023
2012	51,903	117,364	68,876	393,352	13,018,689	1,570,134	226,476	75,111	1,871,721
2013	130,731	137,199	384,922	875,282	6,549,953	6,957,464	800,204	237,566	7,995,234
2014	102,374	121,005	107,609	207,301	(888,929)	5,789,004	3,238,636	167,361	9,195,000
2015	26,053	37,802	38,192	62,844	2,906,365	5,857,605	930,778	373,501	7,161,884
2016	1,764	2,488	2,147	14,246	877,805	2,721,640	894,583	411,576	4,027,799
2017	2,360	2,902	2,130	27,426	502,793	3,896,277	415,166	1,699,113	6,010,556
2018	**4,314**	**5,309**	**3,824**	**52,272**	**487,406**	**4,873,374**	**857,858**	**57,431**	**5,788,663**
2019	18,915	23,403	24,081	70,245	2,600,929	8,494,613	1,500,721	69,522	10,064,856
2020	2,855	3,531	2,566	35,805	873,402	2,583,866	1,454,606	36,623	4,075,095
2021	0	0	0	0	0	0	0	0	0
2022	0	0	0	0	0	0	0	0	0
2023	0	0	0	0	0	0	0	0	0
2024	0	0	0	0	0	0	0	0	0
2025	0	0	0	0	0	0	0	0	0
2026	0	0	0	0	0	0	0	0	0
2027	0	0	0	0	0	0	0	0	0
2028	0	0	0	0	0	0	0	0	0
2029	0	0	0	0	0	0	0	0	0
2030	0	0	0	0	0	0	0	0	0
2031	0	0	0	0	0	0	0	0	0
2032	0	0	0	0	0	0	0	0	0
2033	0	0	0	0	0	0	0	0	0
2034	0	0	0	0	0	0	0	0	0
2035	0	0	0	0	0	0	0	0	0
TOTAL	**1,331,121**	**5,405,861**	**7,619,320**	**20,388,103**	**175,344,354**	**158,973,542**	**53,222,554**	**27,155,915**	**239,352,011**

TABLE B-10 Capital Costs of Each Aqueduct Reach to be Reimbursed through Capital Cost Component of Transportation Charge (in dollars)

Calendar Year	CALIFORNIA AQUEDUCT (continued)									
	SAN LUIS DIVISION						SOUTH SAN JOAQUIN DIVISION			
	Reach 3	Reach 4	Reach 5	Reach 6	Reach 7	Subtotal	Reach 8C	Reach 8D	Reach 9	Reach 10A
	[20]	[21]	[22]	[23]	[24]	[25]	[26]	[27]	[28]	[29]
1952	2,492	3,549	3,987	1,010	1,390	12,428	13	727	1,109	695
1953	6,999	10,144	10,986	2,834	3,869	34,832	45	2,671	4,185	2,569
1954	8,704	12,545	13,693	3,520	4,766	43,228	50	2,719	4,026	2,821
1955	4,273	6,055	6,813	1,728	2,325	21,194	19	888	1,100	1,097
1956	3,295	5,600	5,857	1,445	3,556	19,753	98	3,850	4,376	4,428
1957	3,543	6,115	6,357	1,565	3,998	21,578	234	10,604	13,209	13,269
1958	11,927	19,393	22,037	5,509	7,512	66,378	375	19,033	25,073	25,086
1959	21,979	37,358	39,689	9,813	19,679	128,518	436	20,578	25,697	25,787
1960	207,025	45,419	41,044	12,074	37,633	343,195	1,673	44,565	25,290	47,492
1961	184,443	292,639	170,559	38,338	70,068	756,047	3,949	75,726	30,852	68,505
1962	495,836	549,984	252,698	22,397	26,967	1,347,882	6,131	159,481	62,375	57,705
1963	2,772,189	2,034,351	2,498,712	66,353	30,647	7,402,252	5,861	161,252	81,343	52,585
1964	4,348,311	4,932,301	1,053,227	161,422	251,461	10,746,722	4,014	90,622	117,907	124,014
1965	3,860,997	5,688,252	2,869,931	1,072,111	667,768	14,159,059	15,049	491,042	564,036	622,257
1966	2,312,372	8,527,843	5,765,798	4,230,221	7,708,334	28,544,568	201,274	5,197,322	2,539,278	2,800,056
1967	(44,527)	2,062,305	6,942,522	222,885	6,675,398	15,858,583	212,285	4,982,844	3,363,650	3,652,342
1968	119,884	395,689	973,956	179,917	461,031	2,130,477	64,234	611,192	940,074	1,025,969
1969	(6,065)	126,946	98,492	107,486	160,668	487,527	58,960	116,146	85,130	145,111
1970	32,387	(20,243)	105,385	(827,457)	1,215,966	506,038	23,011	106,810	84,116	74,366
1971	99,945	230,624	305,227	26,995	341,010	1,003,801	8,813	33,099	23,088	15,595
1972	15,990	90,852	17,053	14,621	281,343	419,859	10,818	13,349	16,603	19,736
1973	6,753	103,707	41,549	13,810	41,427	207,246	5,145	11,089	13,249	14,283
1974	6,618	117,165	55,978	16,199	71,796	267,756	5,434	24,433	16,567	22,111
1975	18,921	107,275	23,671	8,797	152,574	311,238	5,424	15,960	12,966	15,865
1976	17,485	79,554	13,041	5,138	41,687	156,905	19,931	76,280	62,164	76,202
1977	35,707	84,669	9,412	4,028	9,655	143,471	21,096	70,005	97,952	75,628
1978	8,539	428,395	7,006	3,536	6,994	454,470	7,584	40,453	17,395	48,754
1979	(35,394)	543,225	19,463	9,485	(242,253)	294,526	10,474	6,181	6,227	241
1980	66,622	3,450,695	191,307	75,209	185,384	3,969,217	2,158	17,492	17,706	18,165
1981	28,491	(2,244,127)	(44,017)	(15,456)	918,984	(1,356,125)	1,151	9,642	9,541	10,309
1982	100,629	(1,616,569)	20,184	10,359	3,525,738	2,040,341	2,469	8,283	6,956	8,237
1983	75,639	33,881	11,785	6,638	1,811,638	1,939,581	7,955	13,782	11,090	14,488
1984	31,748	87,083	26,712	12,754	3,053,662	3,211,959	26,489	9,959	6,268	7,533
1985	53,251	56,732	13,685	6,934	582,910	713,512	7,220	9,762	7,688	9,215
1986	73,979	201,509	50,668	19,223	1,282,469	1,627,848	8,902	25,011	20,503	22,335
1987	(7,829)	116,268	40,009	15,946	518,349	682,743	12,744	18,927	56,042	16,704
1988	(149,385)	224,154	(406,398)	(137,353)	923,622	454,640	9,833	(119,741)	(60,639)	(159,357)
1989	39,652	594,894	232,852	80,090	575,855	1,523,343	5,279	91,501	278,061	70,153
1990	39,270	259,895	79,589	29,606	461,219	869,579	5,814	41,345	2,016,434	34,841
1991	4,916,134	397,959	98,847	35,860	511,519	5,960,319	4,588	43,140	41,348	36,888
1992	(757,001)	545,729	211,854	74,544	396,398	471,524	3,546	103,695	109,225	103,321
1993	110,233	724,929	186,271	70,815	720,283	1,812,531	15,016	101,634	90,929	90,291
1994	1,151,976	288,018	63,862	27,812	710,770	2,242,438	6,770	42,455	40,696	65,737
1995	285,776	441,479	130,761	58,640	1,914,186	2,830,842	12,548	49,963	43,251	435,909
1996	31,942	(110,471)	34,529	12,219	588,712	556,931	6,444	29,863	27,050	253,433
1997	73,224	513,793	(277,781)	42,881	5,016,215	5,368,332	11,497	49,111	43,799	73,458
1998	19,692	304,115	34,319	16,542	2,819,556	3,194,224	2,562	11,115	8,955	14,618
1999	18,187	158,902	100,061	41,691	1,901,382	2,220,222	5,706	25,179	23,510	47,359
2000	101,618	373,699	78,036	36,186	1,139,073	1,728,613	3,922	23,591	29,281	43,459
2001	(10,513)	(47,112)	519,031	(3,546)	61,595	519,455	2,280	17,030	21,196	42,731
2002	12,237	24,434	6,079,343	3,454	(1,812,639)	4,306,829	3,627	44,010	20,221	87,805
2003	8,864	79,647	(5,377,004)	7,923	6,118,421	837,852	2,130	18,793	16,716	22,946
2004	(16,126)	(14,365)	(50,563)	(2,487)	147,468	63,927	22,520	5,980	3,879	5,493
2005	261	11,360	129,470	3,529	2,533,886	2,678,506	26,301	11,593	6,323	7,316
2006	1,421	27,658	(10,639)	1,444	(28,549)	(8,664)	6,106	2,942	1,621	1,872
2007	2	87,855	39,476	7,718	34,608	169,659	13,352	21,920	11,909	13,807
2008	14,780	16,097	46,719	13,920	2,107,019	2,198,535	9,017	13,020	7,277	8,919
2009	610	216,166	44,901	4,909	(44,365)	222,221	2,362	15,880	8,710	10,301
2010	(75)	1,560,318	130,846	609	(355,963)	1,335,734	(4)	1,773	956	1,111
2011	7,037	644,158	481,685	1,297	78,291	1,212,468	1	6,354	1,748	13,984
2012	44,540	213,896	2,999	29,658	170,358	461,451	1,139	114,545	36,447	73,710
2013	810,117	299,508	906,259	120,865	215,316	2,352,064	42,393	383,194	323,185	342,033
2014	843,003	317,107	461,093	67,178	207,794	1,896,174	20,475	181,707	136,459	158,996
2015	(624,058)	145,444	228,671	15,444	153,006	(81,492)	46,037	141,597	95,579	123,549
2016	238,925	1,504,796	2,389,576	161,532	382,567	4,677,396	41,047	187,181	88,578	142,425
2017	239,261	3,884,148	2,068,949	61,275	1,043,126	7,296,759	28,852	153,162	47,176	124,881
2018	**168,503**	**8,456,119**	**1,810,887**	**82,141**	**329,755**	**10,847,405**	**69,135**	**176,471**	**98,365**	**194,912**
2019	137,636	7,178,968	2,167,474	86,529	214,842	9,785,449	336,561	1,173,769	620,994	1,485,910
2020	66,857	488,852	136,406	42,312	65,075	799,502	125,020	774,032	773,691	1,724,190
2021	0	0	0	0	0	0	0	0	0	0
2022	0	0	0	0	0	0	0	0	0	0
2023	0	0	0	0	0	0	0	0	0	0
2024	0	0	0	0	0	0	0	0	0	0
2025	0	0	0	0	0	0	0	0	0	0
2026	0	0	0	0	0	0	0	0	0	0
2027	0	0	0	0	0	0	0	0	0	0
2028	0	0	0	0	0	0	0	0	0	0
2029	0	0	0	0	0	0	0	0	0	0
2030	0	0	0	0	0	0	0	0	0	0
2031	0	0	0	0	0	0	0	0	0	0
2032	0	0	0	0	0	0	0	0	0	0
2033	0	0	0	0	0	0	0	0	0	0
2034	0	0	0	0	0	0	0	0	0	0
2035	0	0	0	0	0	0	0	0	0	0
TOTAL	**22,767,758**	**56,419,332**	**34,456,857**	**6,642,624**	**59,236,803**	**179,523,374**	**1,653,395**	**16,439,585**	**13,387,763**	**14,838,557**

TABLE B-10 Capital Costs of Each Aqueduct Reach to be Reimbursed through Capital Cost Component of Transportation Charge (in dollars)

Calendar Year	CALIFORNIA AQUEDUCT (continued)									
	SOUTH SAN JOAQUIN DIVISION (continued)									
	Reach 11B	Reach 12D	Reach 12E	Reach 13B	Reach 14A	Reach 14B	Reach 14C	Reach 15A	Reach 16A	Subtotal
	[30]	[31]	[32]	[33]	[34]	[35]	[36]	[37]	[38]	[39]
1952	1,279	1,980	995	1,663	794	212	212	1,911	4,440	16,030
1953	4,790	7,480	3,745	6,236	2,599	733	741	7,016	16,513	59,323
1954	4,855	7,565	3,792	6,319	2,880	810	817	7,073	16,601	60,328
1955	1,557	2,404	1,211	2,025	1,183	325	327	2,253	5,223	19,612
1956	6,223	9,233	4,737	8,054	7,026	1,638	1,584	9,939	21,754	82,940
1957	18,772	29,082	14,615	24,411	15,651	3,834	3,864	26,871	62,657	237,073
1958	48,191	78,564	39,087	61,715	33,726	12,330	11,813	49,499	133,083	537,575
1959	67,246	107,781	53,836	86,478	64,824	22,102	21,828	70,838	205,748	773,179
1960	66,317	77,936	39,867	63,517	84,363	23,260	22,305	73,305	204,788	774,678
1961	46,073	88,274	51,457	28,015	242,753	91,290	65,565	150,205	206,305	1,148,969
1962	56,056	69,189	44,851	49,179	208,180	61,489	47,608	133,653	171,396	1,127,293
1963	91,914	173,985	86,405	67,733	425,626	104,436	77,970	102,072	481,941	1,913,123
1964	333,621	291,013	174,469	86,271	1,093,795	684,005	485,033	571,173	1,778,952	5,834,889
1965	1,053,029	1,524,848	1,044,851	196,487	3,385,205	1,655,024	1,436,258	476,830	1,268,176	13,733,092
1966	3,709,779	673,429	466,228	418,141	4,916,319	974,862	724,354	1,829,852	2,896,274	27,347,168
1967	4,636,627	1,881,333	1,244,265	1,238,428	2,788,299	525,653	400,183	1,721,304	3,442,021	30,089,234
1968	1,323,302	4,726,074	3,145,775	8,343,706	10,210,266	1,330,361	1,405,117	7,522,015	7,578,498	48,226,583
1969	229,185	706,272	529,080	3,704,065	15,112,041	1,223,457	1,134,395	9,523,012	13,136,056	45,702,910
1970	85,151	70,725	72,798	320,797	11,031,255	987,213	738,955	8,836,897	13,890,751	36,322,845
1971	45,006	43,988	42,624	339,078	2,925,191	193,255	36,514	3,275,227	7,903,937	14,885,415
1972	32,657	43,939	24,748	81,937	1,388,348	101,784	20,165	1,003,380	3,025,555	5,783,019
1973	16,448	9,980	16,320	25,090	680,834	19,584	13,469	798,805	1,472,313	3,096,609
1974	14,951	19,555	32,240	29,582	524,504	30,735	16,333	778,696	1,031,843	2,546,984
1975	13,479	10,793	13,678	25,827	269,197	25,164	21,048	370,265	489,545	1,289,211
1976	54,217	37,464	59,842	105,332	507,519	59,753	42,776	434,574	618,049	2,154,103
1977	52,919	22,826	54,444	81,293	301,515	49,972	30,152	235,514	580,209	1,673,525
1978	16,469	(2,816)	27,331	43,126	348,674	(653)	1,500	297,817	582,775	1,428,409
1979	6,906	13,401	14,229	25,411	293,786	9,846	7,856	245,590	542,554	1,182,702
1980	18,813	15,608	27,498	34,190	1,676,267	29,169	23,023	1,719,775	3,772,498	7,372,362
1981	14,885	26,473	20,972	25,515	(1,076,221)	27,551	33,674	(1,142,721)	(2,527,211)	(4,566,440)
1982	6,608	7,680	8,346	16,339	(745,914)	9,886	29,393	(804,147)	(1,850,736)	(3,296,600)
1983	9,792	14,174	13,050	35,872	419,650	17,389	24,933	115,983	166,232	864,390
1984	27,613	87,907	49,271	22,732	54,590	75,453	63,060	63,537	119,387	613,799
1985	6,949	5,263	8,013	8,875	(49,408)	9,523	5,867	54,782	82,117	165,866
1986	16,664	16,014	25,031	20,483	140,642	25,960	13,913	154,089	186,348	675,895
1987	13,512	12,369	20,023	15,435	101,453	20,411	8,581	227,047	194,936	718,184
1988	(73,648)	(151,040)	(51,401)	(120,104)	161,077	(75,276)	(75,307)	144,369	262,334	(308,900)
1989	65,216	63,382	120,925	73,037	2,778,880	119,559	36,660	2,952,046	5,955,356	12,610,055
1990	29,230	27,269	49,082	34,048	715,031	44,187	14,537	440,017	640,283	4,092,118
1991	32,195	30,146	55,119	34,144	423,235	50,345	12,116	353,596	774,129	1,890,989
1992	99,765	98,178	192,455	97,638	991,603	185,311	9,210	387,615	731,512	3,113,074
1993	70,131	63,247	118,440	80,530	687,462	109,792	38,960	942,211	857,038	3,265,681
1994	29,221	26,997	50,234	35,154	400,534	44,481	17,426	324,942	853,328	1,937,975
1995	32,487	25,516	49,885	41,733	524,524	48,740	29,125	450,952	628,941	2,373,574
1996	19,489	15,020	30,202	29,333	403,125	26,945	16,405	253,622	388,064	1,498,995
1997	30,890	25,368	48,767	40,900	451,910	47,815	29,878	809,848	481,458	2,144,699
1998	7,107	5,773	10,697	9,676	288,667	10,799	6,819	119,562	440,746	937,096
1999	17,022	13,362	34,410	31,539	260,623	24,634	14,826	264,538	361,516	1,124,225
2000	21,186	32,480	40,180	25,119	168,825	15,243	11,006	151,512	372,997	938,802
2001	14,471	22,325	34,995	8,027	71,645	4,537	3,988	66,918	167,694	477,837
2002	19,626	7,157	78,600	47,505	276,160	22,632	34,980	164,596	286,748	1,093,668
2003	9,280	8,935	18,115	15,308	136,433	6,671	9,686	110,492	159,978	535,484
2004	3,291	4,188	7,001	5,787	52,563	5,588	1,490	50,520	322,068	490,368
2005	6,332	12,579	6,307	6,354	21,617	12,567	44	9,079	43,887	170,299
2006	1,680	3,146	1,618	1,736	5,936	3,109	108	2,695	11,294	43,863
2007	11,909	23,818	11,909	11,910	40,392	23,818	1	16,745	82,675	284,166
2008	6,999	12,960	8,044	8,187	35,363	13,537	568	22,711	63,596	210,197
2009	8,661	16,743	9,057	9,223	34,427	16,975	302	17,919	66,302	216,862
2010	937	1,943	957	920	3,103	1,955	(34)	1,212	6,625	21,454
2011	1,753	3,487	1,747	1,758	40,339	3,484	10	13,658	134,210	222,531
2012	33,065	62,348	34,901	34,973	393,561	64,937	3,511	494,940	686,555	2,034,633
2013	196,084	263,911	240,567	240,749	1,246,859	349,608	127,458	1,544,197	1,678,853	6,979,091
2014	98,155	149,649	112,143	112,254	867,288	175,751	46,203	632,842	1,189,256	3,881,178
2015	80,934	97,658	101,657	109,082	825,914	119,583	58,535	671,279	829,782	3,301,185
2016	76,003	71,923	129,771	14,321,724	872,281	102,756	57,483	834,337	1,360,422	18,285,931
2017	33,472	823,190	59,817	284,048	772,077	81,652	22,952	659,946	1,251,199	4,342,424
2018	**64,691**	**2,680,950**	**102,781**	**236,809**	**2,443,564**	**211,028**	**56,579**	**602,877**	**1,018,733**	**7,956,895**
2019	330,456	3,454,285	64,183	82,033	3,631,035	51,201	18,215	1,144,769	4,149,822	16,543,233
2020	403,170	748,576	1,135,297	2,487,174	6,426,944	2,244,429	403,404	3,407,686	6,723,972	27,377,585
2021	0	0	0	0	0	0	0	0	0	0
2022	0	0	0	0	0	0	0	0	0	0
2023	0	0	0	0	0	0	0	0	0	0
2024	0	0	0	0	0	0	0	0	0	0
2025	0	0	0	0	0	0	0	0	0	0
2026	0	0	0	0	0	0	0	0	0	0
2027	0	0	0	0	0	0	0	0	0	0
2028	0	0	0	0	0	0	0	0	0	0
2029	0	0	0	0	0	0	0	0	0	0
2030	0	0	0	0	0	0	0	0	0	0
2031	0	0	0	0	0	0	0	0	0	0
2032	0	0	0	0	0	0	0	0	0	0
2033	0	0	0	0	0	0	0	0	0	0
2034	0	0	0	0	0	0	0	0	0	0
2035	0	0	0	0	0	0	0	0	0	0
TOTAL	**13,933,117**	**19,657,255**	**10,388,186**	**34,087,665**	**83,840,409**	**12,576,206**	**7,978,330**	**57,008,177**	**94,892,899**	**380,681,543**

TABLE B-10 Capital Costs of Each Aqueduct Reach to be Reimbursed through Capital Cost Component of Transportation Charge (in dollars)

Calendar Year	CALIFORNIA AQUEDUCT (continued)									
	TEHACHAPI DIVISION			MOJAVE DIVISION						
	Reach 17E	Reach 17F	Subtotal	Reach 18A	Reach 19	Reach 19C	Reach 20A	Reach 20B	Reach 21	Reach 22A
	[40]	[41]	[42]	[43]	[44]	[45]	[46]	[47]	[48]	[49]
1952	9,703	4,072	13,775	4,090	1,520	0	2,561	892	5,788	35
1953	31,337	13,284	44,621	12,610	4,685	0	7,246	3,402	17,846	71
1954	46,243	20,010	66,253	16,642	6,184	0	9,506	4,548	23,558	369
1955	25,880	11,362	37,242	5,612	2,086	0	2,529	2,213	7,947	178
1956	47,487	17,609	65,096	6,038	2,244	0	2,440	2,655	8,542	216
1957	119,673	49,130	168,803	22,348	8,304	0	9,035	9,826	31,616	800
1958	164,056	72,091	236,147	37,917	14,166	123	15,391	16,752	53,569	1,397
1959	151,389	57,883	209,272	38,620	23,450	1,102	23,605	18,604	56,724	1,844
1960	203,222	45,323	248,545	21,356	26,093	5,318	40,523	37,179	43,893	11,029
1961	387,819	85,558	473,377	35,664	32,281	2,262	34,918	37,102	21,532	14,517
1962	353,119	82,610	435,729	68,508	266,284	1,841	10,323	10,730	8,197	4,186
1963	1,191,633	124,757	1,316,390	37,379	435,881	4,137	39,706	40,865	26,670	17,081
1964	1,866,000	775,005	2,641,005	95,693	706,369	8,564	43,342	71,116	33,912	22,793
1965	2,574,824	2,284,869	4,859,693	121,060	716,092	9,156	108,519	343,506	91,095	65,689
1966	5,537,412	9,323,517	14,860,929	366,116	1,644,699	13,373	159,282	1,311,628	160,388	178,538
1967	26,239,390	12,398,708	38,638,098	1,312,022	903,880	24,103	645,078	1,718,942	498,257	367,961
1968	33,363,479	7,416,464	40,779,943	136,804	7,109,653	71,388	1,889,601	2,291,691	1,141,929	1,145,768
1969	40,368,425	6,883,206	47,251,631	213,805	2,465,641	7,423	5,939,151	5,626,284	2,358,737	1,515,147
1970	35,446,706	6,786,231	42,232,937	2,211,077	1,210,665	6,217	3,652,478	5,304,372	3,232,911	2,081,810
1971	20,141,395	6,835,303	26,976,698	1,496,843	284,738	6,994	1,074,759	1,091,123	825,070	432,464
1972	10,002,935	34,791	10,037,726	129,417	409,903	3,620	471,963	635,507	484,772	324,865
1973	3,090,140	36,207	3,126,347	23,931	75,638	2,539	88,416	83,840	63,774	36,179
1974	4,798,348	152,494	4,950,842	28,399	205,581	2,703	138,673	118,639	103,545	54,198
1975	2,144,178	411,404	2,555,582	44,774	70,652	5,066	68,157	169,294	167,240	19,453
1976	1,124,357	174,629	1,298,986	121,043	84,593	6,786	59,967	102,909	44,896	24,732
1977	655,047	31,512	686,559	261,400	133,767	7,521	117,878	120,160	71,389	49,445
1978	1,900,843	27,956	1,928,799	553,014	57,150	5,872	51,615	68,838	32,855	18,183
1979	2,099,385	61,381	2,160,766	626,615	339,536	10,831	37,085	36,225	18,948	10,675
1980	17,433,610	6,046	17,439,656	1,130,429	1,073,430	3,604	308,188	284,545	133,526	121,171
1981	(3,848,206)	6,908	(3,841,298)	1,218,824	845,702	4,498	48,625	32,214	13,223	6,466
1982	11,370,112	6,054	11,376,166	6,968,683	746,900	3,920	33,869	77,988	13,158	14,459
1983	8,862,914	8,269	8,871,183	10,909,386	64,660	2,596	40,793	58,714	25,900	10,363
1984	3,227,937	31,701	3,259,638	8,340,371	309,491	3,124	17,505	35,378	845,423	6,052
1985	1,926,289	10,460	1,936,749	5,264,156	227,986	3,885	68,422	(232,549)	(481,017)	1,945,477
1986	1,381,955	33,788	1,415,743	2,049,111	2,069,663	4,261	2,331,707	(2,046,222)	(1,334,975)	3,260,280
1987	671,183	13,807	684,990	1,347,722	(6,453)	4,684	562,540	(344,829)	55,519	64,264
1988	1,408,760	(49,734)	1,359,026	847,954	(104,961)	13,409	(159,892)	(147,290)	(70,564)	351,489
1989	504,715	64,660	569,375	376,980	207,150	50,953	31,173	60,657	30,217	534,658
1990	783,219	25,218	808,437	202,065	(402,573)	61,192	(637,062)	(403,413)	(635,623)	(97,841)
1991	691,578	33,405	724,983	273,021	22,218	81,545	(188,732)	(18,809)	(147,369)	(17,234)
1992	741,986	24,369	766,355	620,962	384,568	86,644	225,398	338,098	(263,897)	75,210
1993	1,223,402	35,370	1,258,772	1,131,166	248,287	72,746	110,869	180,598	133,941	49,144
1994	806,213	16,681	822,894	998,126	164,096	60,147	51,340	114,273	65,260	26,546
1995	1,538,497	19,443	1,557,940	390,433	157,481	45,990	92,925	121,499	66,503	30,918
1996	2,571,039	10,797	2,581,836	91,593	69,281	22,188	35,656	48,699	44,953	17,787
1997	1,009,249	18,265	1,027,514	135,402	92,607	13,590	65,433	39,973	55,881	27,865
1998	925,574	6,843	932,417	47,486	36,170	4,164	29,900	27,626	20,285	12,816
1999	662,144	12,166	674,310	113,232	49,150	5,329	171,935	58,392	37,660	17,874
2000	408,352	14,333	422,685	120,267	90,145	936	83,478	75,230	44,857	20,181
2001	266,815	10,891	277,706	65,580	186,973	2,223	343,775	121,907	77,799	54,526
2002	247,986	9,586	257,572	35,787	(139,334)	1,374	(111,675)	(82,663)	(7,369)	(43,431)
2003	189,022	12,339	201,361	84,434	(19,049)	0	(11,367)	(7,564)	(3,238)	(3,009)
2004	372,622	4,637	377,259	19,723	17,430	0	18,763	12,619	13,744	5,414
2005	2,264,602	6,587	2,271,188	27,020	18,910	0	25,134	18,874	25,074	6,335
2006	5,855,349	2,353	5,857,702	7,062	4,978	0	6,373	4,511	5,983	1,500
2007	3,829,554	11,915	3,841,469	49,382	35,729	0	47,637	35,725	47,634	11,908
2008	640,715	7,591	648,306	20,474	19,644	0	28,901	19,526	25,456	6,477
2009	9,982,682	9,158	9,991,840	22,893	25,186	0	33,292	24,677	32,865	8,223
2010	11,125,921	725	11,126,646	24,906	2,833	0	3,861	2,980	3,984	994
2011	4,980,108	1,812	4,981,920	4,507	5,253	0	6,981	5,212	6,947	1,737
2012	875,243	32,877	908,120	95,936	114,523	0	152,679	114,484	152,651	38,158
2013	704,335	156,471	860,806	234,199	314,887	0	419,827	314,845	419,785	104,949
2014	3,010,683	79,990	3,090,674	1,077,259	203,219	0	270,945	203,188	270,922	67,726
2015	9,052,843	37,215	9,090,057	678,429	91,309	0	1,520,944	91,309	121,745	30,436
2016	2,732,637	22,186	2,754,823	105,153	35,846	0	641,765	30,678	38,755	11,825
2017	7,706,393	12,784	7,719,177	365,252	216,973	0	286,961	204,732	269,203	72,671
2018	**5,200,677**	**5,928**	**5,206,605**	**1,031,020**	**253,778**	**0**	**379,472**	**233,704**	**297,829**	**85,282**
2019	7,194,705	2,543	7,197,248	224,166	167,456	0	362,249	159,431	185,151	56,874
2020	8,620,621	247,296	8,867,917	188,922	52,249	0	234,009	49,083	34,347	18,785
2021	0	0	0	0	0	0	0	0	0	0
2022	0	0	0	0	0	0	0	0	0	0
2023	0	0	0	0	0	0	0	0	0	0
2024	0	0	0	0	0	0	0	0	0	0
2025	0	0	0	0	0	0	0	0	0	0
2026	0	0	0	0	0	0	0	0	0	0
2027	0	0	0	0	0	0	0	0	0	0
2028	0	0	0	0	0	0	0	0	0	0
2029	0	0	0	0	0	0	0	0	0	0
2030	0	0	0	0	0	0	0	0	0	0
2031	0	0	0	0	0	0	0	0	0	0
2032	0	0	0	0	0	0	0	0	0	0
2033	0	0	0	0	0	0	0	0	0	0
2034	0	0	0	0	0	0	0	0	0	0
2035	0	0	0	0	0	0	0	0	0	0
TOTAL	**333,238,459**	**55,241,100**	**388,479,559**	**54,988,270**	**25,195,524**	**759,941**	**22,728,344**	**19,196,872**	**10,307,726**	**13,414,948**

TABLE B-10 Capital Costs of Each Aqueduct Reach to be Reimbursed through Capital Cost Component of Transportation Charge (in dollars)

Calendar Year	CALIFORNIA AQUEDUCT (continued)									
	MOJAVE DIVISION (continued)				SANTA ANA DIVISION					
	Reach 22B	Reach 23	Reach 24	Subtotal	Reach 25	Reach 26A	Reach 28G[a]	Reach 28H	Reach 28J	Subtotal
	[50]	[51]	[52]	[53]	[54]	[55]	[56]	[57]	[58]	[59]
1952	2,013	2,074	2,413	21,386	3,334	5,599	4,785	4,055	3,020	20,793
1953	5,752	6,886	7,438	65,936	10,275	17,264	15,580	11,511	9,476	64,106
1954	8,560	7,849	9,820	87,036	13,566	22,790	18,015	18,100	12,160	84,631
1955	2,754	2,725	3,313	29,357	4,575	7,687	6,052	6,081	4,151	28,546
1956	2,905	2,961	3,561	31,562	4,917	8,264	6,496	6,525	4,480	30,682
1957	10,757	10,962	13,177	116,825	18,205	30,586	24,044	24,156	16,585	113,576
1958	18,717	18,578	22,627	199,237	31,001	52,019	40,844	41,033	28,470	193,367
1959	25,421	20,372	45,646	255,388	39,325	58,137	45,746	45,946	44,331	233,485
1960	136,751	17,152	109,816	449,110	65,655	93,700	59,102	58,548	118,969	395,974
1961	215,859	9,546	373,473	777,154	26,979	56,734	32,226	34,382	674,787	825,108
1962	164,168	4,336	279,421	817,994	9,964	36,235	21,383	20,530	47,484	135,596
1963	237,695	7,228	358,503	1,205,145	31,013	112,271	43,884	41,698	1,506,440	1,735,306
1964	262,996	6,863	244,003	1,495,651	69,669	202,642	89,710	45,762	98,569	506,352
1965	827,655	11,836	621,566	2,916,174	279,237	206,356	96,956	76,899	146,095	805,543
1966	1,746,245	31,078	1,018,628	6,629,975	415,066	364,004	170,878	308,756	589,107	1,847,811
1967	3,146,128	62,135	2,331,106	11,009,612	3,184,296	638,539	233,968	283,126	987,832	5,327,761
1968	4,588,850	102,207	2,600,293	21,078,184	8,264,126	1,268,194	871,337	266,295	780,587	11,450,539
1969	7,750,478	260,659	11,131,406	37,268,731	6,807,783	1,768,456	1,117,873	1,444,654	756,442	11,895,208
1970	23,451,612	1,240,798	16,885,193	59,277,133	2,169,051	7,229,429	1,843,621	1,013,468	2,829,523	15,085,092
1971	16,772,680	1,922,115	5,385,721	29,292,507	1,135,248	9,811,736	16,095,702	6,401,303	12,111,623	45,555,612
1972	3,788,894	48,049	788,479	7,085,469	1,095,740	5,528,987	1,537,880	11,960,791	21,542,747	41,666,145
1973	1,623,274	24,333	4,225,877	6,247,801	136,994	1,810,729	209,664	247,769	3,673,344	6,078,500
1974	5,699,605	130,567	766,562	7,248,472	68,180	1,922,999	162,178	101,638	1,980,991	4,235,986
1975	4,793,580	19,467	373,783	5,731,466	166,653	3,787,797	157,365	124,399	1,626,274	5,862,488
1976	3,103,916	84,188	204,705	3,837,735	475,176	1,494,750	178,287	118,748	1,497,465	3,764,426
1977	1,654,122	60,112	232,230	2,708,024	76,255	776,085	127,106	89,036	323,091	1,391,573
1978	677,448	36,484	210,198	1,711,657	57,463	131,076	147,112	153,867	347,482	837,000
1979	560,506	10,634	103,615	1,754,670	29,960	80,482	29,723	19,225	225,947	385,337
1980	2,239,224	60,229	559,963	5,914,309	31,462	181,638	137,833	154,821	1,077,900	1,583,654
1981	(774,614)	138,917	203,941	1,737,796	5,864	69,031	28,815	22,654	61,349	187,713
1982	432,274	346,905	79,819	8,717,975	9,224	159,280	16,069	58,900	55,841	299,314
1983	451,428	2,029,405	58,989	13,652,234	4,304	528,764	18,213	89,581	(264,804)	376,058
1984	(83,811)	1,290,740	34,764	10,799,037	3,850	270,455	14,462	12,259	49,547	350,573
1985	608,583	966,160	51,634	8,422,737	5,555	62,571	17,816	11,481	54,070	151,493
1986	1,097,122	230,510	51,994	7,713,451	9,927	114,561	31,564	25,037	86,794	267,883
1987	3,631,282	146,850	91,223	5,552,802	4,908	27,208	17,141	8,005	45,528	102,790
1988	552,546	558,557	197,761	2,039,009	7,358	161,957	41,892	21,113	90,784	323,104
1989	4,161,037	1,496,776	433,072	7,382,673	8,092	(2,297,399)	28,708	12,619	51,556	(2,196,424)
1990	8,794,258	1,394,698	344,367	8,620,068	176,854	(1,657,576)	27,478	12,817	55,408	(1,385,019)
1991	7,985,326	3,624,824	139,105	11,753,895	202,286	(1,316,160)	142,139	15,524	62,794	(893,417)
1992	4,849,560	8,364,426	127,829	14,808,798	333,934	(1,878,502)	34,185	13,422	69,479	(1,427,482)
1993	2,094,764	15,390,366	159,211	19,571,092	1,506,787	3,979,221	44,300	27,047	162,854	5,720,209
1994	933,021	8,082,401	81,869	10,577,079	2,104,588	2,493,097	16,351	11,673	54,581	4,680,290
1995	1,096,953	5,924,175	123,653	8,050,530	3,310,564	500,791	35,402	28,202	164,254	4,039,213
1996	1,736,686	2,181,669	96,339	4,344,851	19,019,751	(100,474)	76,723	73,629	344,747	19,414,376
1997	809,666	(342,563)	102,390	1,000,244	7,645,602	(662,524)	50,662	20,720	268,293	7,322,753
1998	273,139	3,392,776	36,135	3,880,497	993,619	1,613,505	10,268	8,970	479,138	3,105,500
1999	1,006,721	2,208,657	123,472	3,792,421	224,119	843,638	84,683	45,293	324,223	1,521,955
2000	724,837	1,251,684	83,871	2,495,486	129,156	1,285,637	64,095	41,331	114,224	1,634,443
2001	550,843	342,964	26,780	1,773,369	73,031	447,282	20,193	13,635	88,656	642,797
2002	270,386	269,139	71,793	264,008	54,815	1,753,554	53,787	12,619	196,949	2,071,724
2003	382,025	146,659	30,255	599,147	86,731	350,997	1,096,665	2,482,179	179,466	4,196,038
2004	262,810	48,570	12,285	411,358	13,577	275,709	1,736,308	856,587	24,559	2,906,739
2005	62,967	104,838	144,149	433,303	16,962	120,279	2,049,655	410,021	270,894	2,867,810
2006	15,163	294,318	577,859	917,747	21,932	16,665	2,302,259	406,071	2,544,382	5,291,309
2007	151,063	919,040	69,935	1,368,052	12,905	55,918	(246)	1,099,958	3,664,344	4,832,879
2008	346,638	3,113,899	2,019,852	5,600,869	2,481	82,555	835,530	899,508	682,829	2,502,902
2009	940,063	448,123	1,834,293	3,369,615	2,907	260,913	4,202,482	976,816	2,819,007	8,262,125
2010	2,207,072	26,729	1,373,244	3,646,603	(15)	119,952	43,378	930,155	3,865,713	4,959,184
2011	5,924,592	6,284	99,888	6,061,399	4	(64,870)	1,173,977	571	1,955,675	3,065,357
2012	10,149,651	95,175	28,760	10,942,016	8,715	3,359	2,750,751	214,702	2,760,048	5,737,575
2013	6,331,413	334,524	74,035	8,548,463	36,624	250,567	3,313,512	1,342,565	6,139,955	11,083,223
2014	2,576,361	184,199	28,491	4,882,309	15,952	1,643,482	79,084	64,672	3,933,527	5,736,717
2015	1,890,532	120,722	15,298	4,560,724	10,156	1,230,241	19,721	20,406	20,412,533	21,693,057
2016	678,408	162,124	14,072	1,718,627	1,685	999,708	5,407	3,186	40,342,559	41,352,545
2017	1,334,410	419,552	80,465	3,250,219	520,804	3,354,254	152,258	487,794	15,902,165	20,417,275
2018	**1,335,127**	**1,678,030**	**134,342**	**5,428,584**	**512,637**	**3,813,389**	**182,750**	**1,086,720**	**25,402,836**	**30,998,332**
2019	2,503,497	2,514,672	135,620	6,309,116	62,529	6,419,752	183,616	6,790,256	20,476,850	33,933,003
2020	2,554,079	1,563,532	108,231	4,803,237	6,454	3,405,721	33,567	12,477	13,252,406	16,710,625
2021	0	0	0	0	0	0	0	0	0	0
2022	0	0	0	0	0	0	0	0	0	0
2023	0	0	0	0	0	0	0	0	0	0
2024	0	0	0	0	0	0	0	0	0	0
2025	0	0	0	0	0	0	0	0	0	0
2026	0	0	0	0	0	0	0	0	0	0
2027	0	0	0	0	0	0	0	0	0	0
2028	0	0	0	0	0	0	0	0	0	0
2029	0	0	0	0	0	0	0	0	0	0
2030	0	0	0	0	0	0	0	0	0	0
2031	0	0	0	0	0	0	0	0	0	0
2032	0	0	0	0	0	0	0	0	0	0
2033	0	0	0	0	0	0	0	0	0	0
2034	0	0	0	0	0	0	0	0	0	0
2035	0	0	0	0	0	0	0	0	0	0
TOTAL	**164,366,444**	**75,693,450**	**58,413,623**	**445,065,140**	**61,888,396**	**66,441,694**	**44,560,970**	**41,794,297**	**220,311,382**	**434,996,738**

[a] Includes excess capacity costs (not shown in Table B-9) allocated to Metropolitan in the following years and repaid under Article 24(c) of its contract: 1970 - $362,000; 1971 - $6,198,000; 1972 - $139,000.

TABLE B-10 Capital Costs of Each Aqueduct Reach to be Reimbursed through Capital Cost Component of Transportation Charge (in dollars)

Calendar Year	CALIFORNIA AQUEDUCT (continued)									
	WEST BRANCH							COASTAL BRANCH		
	Reach 29A	Reach 29F	Reach 29G	Reach 29H	Reach 29J	Reach 30	Subtotal	Reach 31A	Reach 33A	Reach 33B
	[60]	[61]	[62]	[63]	[64]	[65]	[66]	[67]	[68]	[69]
1952	2,924	136	175	459	553	1,408	5,655	0	0	0
1953	9,093	344	237	1,754	1,683	4,346	17,457	0	0	0
1954	7,389	1,201	2,229	2,350	4,162	5,743	23,074	0	0	0
1955	1,019	585	1,086	1,147	2,029	1,943	7,809	0	0	0
1956	490	698	1,297	1,366	2,420	2,077	8,348	0	0	0
1957	1,809	2,583	4,792	5,057	8,952	7,684	30,877	0	0	0
1958	3,256	4,516	8,714	8,878	15,847	13,931	55,142	0	0	0
1959	7,953	9,150	19,414	18,243	35,583	44,384	134,727	28,046	49,114	0
1960	21,753	14,990	34,447	29,764	69,752	84,703	255,409	34,404	70,450	0
1961	22,442	12,775	21,559	20,086	39,761	123,330	239,953	13,801	17,868	0
1962	40,237	28,729	86,938	58,215	108,962	348,366	671,447	10,121	7,798	0
1963	91,959	69,162	163,347	110,015	211,592	521,491	1,167,566	20,470	14,299	0
1964	150,670	66,420	207,977	143,340	291,404	1,372,464	2,232,275	315,418	26,963	0
1965	361,811	77,914	403,115	127,430	589,638	3,383,950	4,943,858	747,023	36,178	0
1966	489,512	203,497	1,233,640	348,918	3,231,797	9,364,753	14,872,117	2,258,915	35,864	0
1967	1,589,715	882,096	1,117,243	891,607	31,088,491	17,618,827	53,187,979	6,310,419	38,331	0
1968	3,899,363	300,921	396,190	1,104,832	36,157,768	15,736,691	57,595,765	2,707,580	30,784	0
1969	6,592,580	336,480	693,348	1,184,454	9,655,871	16,228,175	34,690,908	423,797	26,549	0
1970	7,986,733	6,089,401	2,624,747	3,002,968	8,463,475	22,330,328	50,497,652	269,194	24,368	0
1971	4,247,037	3,768,699	1,120,231	8,244,651	5,844,024	16,890,503	40,115,145	164,446	32,230	0
1972	1,871,831	426,932	985,512	18,787,722	(23,015,734)	3,818,001	2,874,264	131,332	17,601	0
1973	775,824	168,064	399,856	9,408,706	1,821,206	13,426,222	25,999,878	182,493	16,154	0
1974	560,657	168,878	169,717	3,901,261	(3,454,239)	2,988,318	4,334,592	190,866	18,799	0
1975	353,670	421,176	925,693	664,113	609,891	1,808,235	4,782,778	64,582	36,012	0
1976	396,809	650,417	1,274,484	706,244	650,209	1,253,067	4,931,230	198,266	68,898	0
1977	390,637	3,018,637	2,152,961	196,012	1,135,148	345,023	7,238,418	918,473	81,305	0
1978	1,427,190	2,219,135	6,694,615	57,817	149,932	763,445	11,312,134	52,994	83,300	0
1979	940,013	2,168,382	19,813,742	597,858	331,313	282,145	24,133,453	38,182	108,951	0
1980	1,276,793	4,108,143	24,537,814	550,337	204,751	2,055,206	32,733,044	189,070	376,036	0
1981	(711,751)	2,699,873	19,806,531	94,944	28,852	275,460	22,193,909	19,897	(157,537)	0
1982	(465,217)	351,251	17,964,617	215,678	42,587	351,376	18,460,292	(16,381)	(96,449)	0
1983	100,394	180,971	6,751,649	220,029	24,295	566,545	7,843,883	85,496	67,106	0
1984	71,759	68,930	2,870,259	335,942	17,285	1,118,954	4,483,129	28,568	54,074	0
1985	142,244	25,386	2,126,670	102,366	21,971	284,243	2,702,880	36,834	54,314	0
1986	133,914	62,294	274,660	141,894	36,149	213,353	862,264	82,358	223,134	0
1987	13,936	453,949	711,773	192,511	27,931	158,313	1,558,413	53,817	1,061,939	0
1988	427,544	118,010	1,660,959	203,130	95,930	222,068	2,727,641	183,853	1,141,272	0
1989	207,067	430,662	584,186	241,811	97,472	148,674	1,709,872	84,678	893,765	0
1990	197,428	355,480	386,882	813,211	54,269	119,438	1,926,708	133,868	1,100,167	0
1991	219,321	344,386	453,336	1,132,520	55,176	229,315	2,434,054	164,610	1,635,283	0
1992	541,026	295,312	464,421	4,402,524	47,182	206,495	5,956,960	183,240	1,220,510	1,495,646
1993	464,987	320,182	643,189	3,361,457	74,198	296,349	5,160,362	344,928	5,274,657	5,052,431
1994	203,666	231,527	362,717	306,148	33,758	168,426	1,306,242	282,150	15,905,886	21,341,196
1995	344,358	392,647	536,253	468,656	34,007	304,983	2,080,904	1,196,326	45,172,271	62,947,362
1996	150,901	161,394	427,223	203,201	15,357	98,522	1,056,598	948,730	42,987,442	54,300,990
1997	298,002	71,310	432,940	276,180	50,095	233,956	1,362,483	562,583	11,209,633	13,893,576
1998	346,973	21,003	2,028,979	181,951	49,377	67,874	2,696,157	248,671	2,355,322	4,159,441
1999	296,520	37,641	1,080,682	125,373	51,213	118,013	1,709,442	288,236	2,906,010	4,398,935
2000	212,174	33,747	238,676	116,588	13,241	187,926	802,352	132,435	228,901	2,965,936
2001	43,281	6,448	104,127	110,850	10,737	23,847	299,290	103,281	(7,057)	568,968
2002	171,190	30,767	252,912	60,146	7,881	62,684	585,581	98,021	147,827	105,972
2003	50,519	9,141	103,160	57,712	51,000	34,282	305,814	42,075	43,753	31,706
2004	47,768	6,780	27,718	107,695	215,925	16,535	422,421	26,667	13,644	21,479
2005	273,482	12,706	54,409	6,642	52,413	594,136	993,789	29,337	(261,476)	38,618
2006	660,664	3,017	115,825	1,557	2,299,565	164,739	3,245,367	7,046	6,303	37,583
2007	107,460	23,817	1,958,512	269,569	347	31,047	2,390,752	37,460	32,702	42,774
2008	2,090,139	13,683	103,704	1,001,788	2,089	60,186	3,271,589	41,227	34,997	10,865
2009	1,931,357	16,656	22,763	1,463,455	395	46,904	3,481,529	19,419	17,140	2,357
2010	864,327	1,982	24,650	231,950	(54)	16,969	1,139,825	633,614	3,110	0
2011	426,177	3,476	(28,722)	40,720	15	3,492	445,157	894,062	39,626	0
2012	615,441	76,325	(62,404)	55,362	18,910	79,163	782,798	337,039	271,933	0
2013	182,443	231,925	(50,165)	172,032	51,955	257,967	846,156	840,207	1,113,962	0
2014	300,223	264,332	80,295	96,090	39,531	1,677,183	2,457,655	1,315,805	1,327,525	0
2015	154,787	112,785	473,011	48,982	27,813	3,378,758	4,196,137	812,626	1,259,985	0
2016	177,114	128,685	287,933	30,648	32,746	2,427,910	3,085,035	1,178,776	918,450	0
2017	428,796	1,285,406	1,811,870	586,650	144,930	1,989,555	6,247,207	3,580,451	1,327,860	0
2018	**1,269,454**	**1,569,011**	**1,214,476**	**1,909,002**	**115,275**	**526,194**	**6,603,412**	**1,479,923**	**576,182**	**0**
2019	602,672	890,241	1,620,182	1,208,238	90,679	4,468,233	8,880,245	748,200	722,685	0
2020	656,624	2,345,746	3,688,078	1,915,720	57,130	12,310,369	20,973,667	2,626,324	2,124,847	0
2021	0	0	0	0	0	0	0	0	0	0
2022	0	0	0	0	0	0	0	0	0	0
2023	0	0	0	0	0	0	0	0	0	0
2024	0	0	0	0	0	0	0	0	0	0
2025	0	0	0	0	0	0	0	0	0	0
2026	0	0	0	0	0	0	0	0	0	0
2027	0	0	0	0	0	0	0	0	0	0
2028	0	0	0	0	0	0	0	0	0	0
2029	0	0	0	0	0	0	0	0	0	0
2030	0	0	0	0	0	0	0	0	0	0
2031	0	0	0	0	0	0	0	0	0	0
2032	0	0	0	0	0	0	0	0	0	0
2033	0	0	0	0	0	0	0	0	0	0
2034	0	0	0	0	0	0	0	0	0	0
2035	0	0	0	0	0	0	0	0	0	0
TOTAL	**47,770,333**	**38,908,946**	**136,704,056**	**72,686,528**	**78,345,867**	**164,365,195**	**538,780,925**	**35,166,350**	**144,169,548**	**171,415,834**

TABLE B-10 Capital Costs of Each Aqueduct Reach to be Reimbursed through Capital Cost Component of Transportation Charge (in dollars)

Calendar Year	CALIFORNIA AQUEDUCT (continued)						GRAND TOTAL
	COASTAL BRANCH (continued)						
	Reach 34	Reach 35	Reach 37	Reach 38	Subtotal	Total	
	[70]	[71]	[72]	[73]	[74]	[75]	[76]
1952	0	0	0	0	0	98,857	99,353
1953	0	0	0	0	0	309,387	311,812
1954	0	0	0	0	0	394,688	402,143
1955	0	0	0	0	0	159,842	169,342
1956	0	0	0	0	0	255,679	351,551
1957	0	0	0	0	0	708,753	1,464,452
1958	0	0	0	0	0	1,331,616	2,286,623
1959	7,441	8,236	0	0	92,837	2,096,392	2,967,412
1960	8,507	14,265	0	0	127,626	2,937,049	4,660,833
1961	1,501	3,931	0	0	37,101	4,650,264	8,545,244
1962	524	1,689	0	0	20,132	5,827,774	8,875,171
1963	880	2,943	0	0	38,592	18,981,487	24,610,278
1964	1,687	5,639	0	0	349,707	31,550,813	41,736,060
1965	2,118	7,060	0	0	792,379	57,936,405	62,664,743
1966	1,736	5,764	0	0	2,302,279	124,748,128	129,110,330
1967	1,891	6,213	0	0	6,356,854	187,465,580	194,146,365
1968	1,324	4,369	0	0	2,744,057	192,593,079	197,978,911
1969	907	2,905	0	0	454,158	182,530,023	184,473,490
1970	851	2,787	0	0	297,200	206,720,774	207,082,650
1971	1,315	3,804	0	0	201,795	158,414,033	158,624,739
1972	522	1,660	0	0	151,115	68,228,670	68,362,291
1973	542	1,758	0	0	200,947	45,110,823	45,263,853
1974	463	1,405	0	0	211,533	24,036,199	24,402,166
1975	2,255	6,656	0	0	109,505	21,065,768	21,318,838
1976	5,088	14,988	0	0	287,240	17,183,961	17,492,910
1977	1,834	5,387	0	0	1,006,999	15,165,801	15,544,382
1978	1,302	3,852	0	0	141,448	18,661,117	19,119,151
1979	1,505	4,433	0	0	153,071	31,202,118	31,857,362
1980	1,152	3,449	0	0	569,707	73,891,101	74,986,833
1981	1,427	4,261	0	0	(131,952)	15,246,649	15,742,773
1982	588	1,787	0	0	(110,455)	38,256,580	39,705,931
1983	794	2,398	0	0	155,794	34,705,281	38,044,649
1984	986	2,959	0	0	86,587	24,454,091	30,382,250
1985	2,111	6,263	0	0	99,522	14,914,930	28,537,556
1986	17,458	51,279	0	0	374,229	13,435,351	43,155,828
1987	92,506	272,968	0	0	1,481,230	11,711,428	34,331,982
1988	99,456	293,612	0	0	1,718,193	11,026,370	18,123,243
1989	77,283	228,038	0	0	1,283,764	30,302,112	33,130,497
1990	103,785	277,889	0	0	1,615,709	32,589,619	34,435,721
1991	123,603	363,889	0	320	2,287,705	38,321,262	39,811,984
1992	566,230	240,553	102,051	74,162	3,882,392	34,312,996	35,041,233
1993	1,345,211	688,935	268,937	358,367	13,333,466	53,122,384	53,921,787
1994	8,915,445	2,363,238	678,753	1,315,559	50,802,227	73,751,564	74,225,377
1995	23,975,738	20,849,939	7,029,108	7,117,196	168,287,940	191,033,089	191,525,570
1996	26,475,298	18,790,572	7,213,823	6,616,309	157,333,164	187,776,346	188,025,324
1997	10,456,863	4,149,105	545,378	798,606	41,615,744	62,137,369	62,583,537
1998	3,368,320	952,615	192,567	280,778	11,557,714	27,083,445	27,217,156
1999	2,616,574	356,318	36,749	51,719	10,654,542	24,085,483	24,556,192
2000	2,746,120	17,830	126	130	6,091,478	13,505,029	13,742,813
2001	3,960	(1,112)	1,103	878	670,019	5,132,597	7,472,485
2002	77,266	13,119	902	880	443,986	9,923,736	18,225,645
2003	25,734	6,272	2,030	1,931	153,501	7,094,308	14,859,126
2004	3,142	1,942	613	634	68,121	5,725,623	10,830,848
2005	526	327	103	107	(192,459)	9,655,187	12,130,295
2006	4	18,012	(3)	(3)	68,943	16,031,806	18,522,237
2007	0	152	0	0	113,088	13,670,587	20,478,263
2008	24	14,163	0	0	101,277	15,861,831	30,324,188
2009	19	19,626	0	0	58,560	26,226,360	40,889,836
2010	(6)	(5,643)	0	0	631,075	23,052,168	45,955,128
2011	2	1,568	0	0	935,257	17,793,113	37,680,225
2012	96	1,455	0	0	610,523	23,348,837	37,279,493
2013	209	1,590	0	0	1,955,967	40,621,005	48,503,000
2014	114	1,113	0	0	2,644,556	33,784,264	34,141,636
2015	1,286	0	0	0	2,073,897	51,995,449	55,356,373
2016	2,899	0	0	0	2,100,124	78,002,280	79,131,461
2017	444	0	0	0	4,908,755	60,192,372	60,984,700
2018	**0**	**0**	**0**	**0**	**2,056,105**	**74,886,001**	**75,579,475**
2019	0	0	0	0	1,470,885	94,184,035	97,435,374
2020	0	0	0	0	4,751,171	88,358,799	89,352,058
2021	0	0	0	0	0	0	0
2022	0	0	0	0	0	0	0
2023	0	0	0	0	0	0	0
2024	0	0	0	0	0	0	0
2025	0	0	0	0	0	0	0
2026	0	0	0	0	0	0	0
2027	0	0	0	0	0	0	0
2028	0	0	0	0	0	0	0
2029	0	0	0	0	0	0	0
2030	0	0	0	0	0	0	0
2031	0	0	0	0	0	0	0
2032	0	0	0	0	0	0	0
2033	0	0	0	0	0	0	0
2034	0	0	0	0	0	0	0
2035	0	0	0	0	0	0	0
TOTAL	**81,146,858**	**50,100,223**	**16,072,240**	**16,617,573**	**514,688,627**	**3,121,567,917**	**3,410,282,538**

TABLE B-11 Minimum OMP&R Costs of Each Aqueduct Reach to be Reimbursed through Minimum OMP&R Component of Transportation Charge (in dollars)

Calendar Year	UPPER FEATHER DIVISION	NORTH BAY AQUEDUCT					SOUTH BAY AQUEDUCT			
		Reach 1	Reach 2	Reach 3A	Reach 3B	Total	Reach 1	Reach 2	Reach 4	Reach 5
	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]
1961	0	0	0	0	0	0	0	0	0	0
1962	0	0	0	0	0	0	37,396	5,522	0	0
1963	0	0	0	0	0	0	147,719	20,639	0	0
1964	0	0	0	0	0	0	149,750	15,574	19,405	0
1965	0	0	0	0	0	0	259,939	45,718	46,485	0
1966	0	0	0	0	0	0	270,890	23,799	63,921	0
1967	0	0	0	0	0	0	438,050	32,798	108,127	0
1968	0	0	0	0	130	130	410,919	44,277	66,973	706
1969	0	0	0	0	80,875	80,875	487,377	48,339	75,644	706
1970	0	0	0	0	94,872	94,872	381,734	44,852	64,833	71,376
1971	54	0	0	0	45,579	45,579	357,850	25,666	50,344	38,735
1972	40	0	0	0	37,895	37,895	347,941	30,606	56,800	100,106
1973	1	0	0	0	32,993	32,993	386,897	36,172	58,288	28,810
1974	143	0	0	0	46,498	46,498	456,381	57,081	83,120	61,623
1975	1,069	0	0	0	37,707	37,707	624,989	46,111	81,361	36,682
1976	139	0	0	0	60,786	60,786	614,362	47,862	123,838	91,096
1977	892	0	0	0	78,400	78,400	511,065	48,926	104,280	102,083
1978	39	0	0	0	56,318	56,318	671,195	125,224	176,855	50,289
1979	3,235	0	0	0	73,852	73,852	650,826	76,849	212,826	91,380
1980	416	0	0	0	81,769	81,769	1,128,840	212,974	242,118	110,786
1981	3,847	0	0	0	101,340	101,340	884,763	130,126	167,118	204,772
1982	11,075	0	0	0	191,987	191,987	1,156,605	141,718	249,447	96,020
1983	1,928	0	0	0	80,215	80,215	1,258,144	84,360	373,875	152,255
1984	3,765	0	0	0	139,121	139,121	1,998,984	113,797	340,344	34,461
1985	2,888	0	0	0	259,515	259,515	2,044,121	207,478	427,930	247,308
1986	2,787	0	0	0	229,508	229,508	1,834,838	285,908	305,149	159,054
1987	2,388	0	0	0	310,683	310,683	2,118,974	163,714	400,547	283,067
1988	545	0	(94)	0	330,156	330,062	2,068,655	186,275	299,934	370,212
1989	1,800	473,408	178,069	237,480	373,427	1,262,384	2,164,688	163,481	320,734	497,038
1990	788	556,610	244,897	123,144	427,257	1,351,908	2,233,036	251,434	355,022	571,415
1991	3,654	651,307	302,327	205,516	428,470	1,587,620	1,806,699	152,509	95,745	93,986
1992	647	443,912	189,330	265,462	280,505	1,179,209	2,064,907	405,932	409,435	363,964
1993	3,630	435,240	294,416	213,267	289,206	1,232,129	3,925,050	621,712	480,832	399,558
1994	2,279	430,112	198,322	206,594	365,646	1,200,674	4,673,275	302,115	404,709	408,066
1995	2,906	428,313	282,898	151,703	295,326	1,158,240	3,849,620	316,905	566,447	330,706
1996	8,007	796,526	272,743	240,106	260,001	1,569,376	3,526,989	254,075	664,485	493,300
1997	7,449	504,476	210,763	213,211	315,374	1,243,824	3,010,809	189,269	591,540	230,371
1998	798	404,834	227,562	204,821	251,154	1,088,371	2,965,219	426,872	532,042	303,263
1999	416	678,159	332,340	298,066	289,895	1,598,459	3,748,823	478,982	437,660	463,868
2000	505	919,507	254,331	658,043	414,242	2,246,122	3,810,261	541,683	440,845	549,043
2001	314	1,072,602	229,536	456,017	181,422	1,939,577	2,907,864	272,655	289,843	390,435
2002	3,627	1,586,248	415,635	410,985	398,645	2,811,513	3,853,092	341,500	466,141	537,905
2003	393	1,776,808	545,849	567,701	354,209	3,244,568	2,347,693	365,740	575,369	963,063
2004	455	1,601,515	635,339	738,083	818,164	3,793,101	3,338,899	510,171	746,544	697,984
2005	452	1,059,791	322,691	767,313	412,453	2,562,248	3,309,594	262,581	427,595	807,600
2006	3,899	784,493	232,957	602,049	431,498	2,050,998	3,471,291	377,106	752,671	588,662
2007	(8)	1,079,092	231,688	467,032	275,104	2,052,916	5,011,723	689,977	587,135	788,661
2008	3,578	819,741	215,933	525,026	599,653	2,160,353	5,193,171	674,966	739,733	920,309
2009	88	1,225,447	275,115	618,683	552,505	2,671,750	4,030,719	673,593	711,130	1,353,370
2010	25	2,676,540	112,175	1,103,807	276,623	4,169,145	4,485,409	580,398	806,812	718,763
2011	63	2,637,478	583,727	1,238,015	415,489	4,874,709	5,162,553	838,191	874,313	501,600
2012	(24)	2,611,089	143,106	1,450,942	1,125,141	5,330,277	5,301,031	1,112,307	749,304	833,618
2013	277	3,322,074	133,604	476,016	371,297	4,302,990	6,164,436	1,214,893	681,610	1,103,618
2014	111	4,105,989	177,006	616,781	552,914	5,452,690	7,428,598	634,067	646,203	1,318,300
2015	114	2,879,006	250,589	1,223,994	1,083,067	5,436,656	8,537,798	662,943	631,247	856,180
2016	5,400	4,841,517	320,576	606,503	1,019,321	6,787,917	6,937,643	682,676	665,894	1,209,298
2017	295	3,601,163	222,677	710,746	844,207	5,378,793	8,157,077	716,222	713,336	1,232,072
2018	**284**	**3,924,338**	**260,396**	**826,942**	**869,486**	**5,881,162**	**8,980,643**	**705,238**	**596,638**	**1,244,092**
2019	293	3,711,970	246,327	783,462	823,558	5,565,317	9,562,539	795,172	680,989	1,430,037
2020	293	3,783,281	245,564	781,454	854,209	5,664,508	8,989,087	746,267	670,291	1,315,088
2021	296	3,821,114	248,020	789,269	862,751	5,721,154	9,078,978	753,729	676,993	1,328,239
2022	299	3,859,325	250,500	797,161	871,378	5,778,364	9,169,768	761,267	683,763	1,341,521
2023	302	3,897,918	253,005	805,133	880,092	5,836,148	9,261,465	768,879	690,601	1,354,936
2024	305	3,936,898	255,535	813,184	888,893	5,894,510	9,354,080	776,568	697,507	1,368,486
2025	308	3,976,267	258,091	821,316	897,782	5,953,456	9,447,621	784,334	704,482	1,382,170
2026	311	4,016,029	260,671	829,529	906,760	6,012,989	9,542,097	792,177	711,527	1,395,992
2027	314	4,056,190	263,278	837,825	915,827	6,073,120	9,637,518	800,099	718,642	1,409,952
2028	317	4,096,751	265,911	846,203	924,985	6,133,850	9,733,893	808,100	725,829	1,424,052
2029	320	4,137,719	268,570	854,665	934,235	6,195,189	9,831,232	816,181	733,087	1,438,292
2030	324	4,179,096	271,256	863,212	943,578	6,257,142	9,929,544	824,343	740,418	1,452,675
2031	327	4,220,887	273,968	871,844	953,013	6,319,712	10,028,840	832,586	747,822	1,467,202
2032	330	4,263,096	276,708	880,562	962,544	6,382,910	10,129,128	840,912	755,300	1,481,874
2033	333	4,305,727	279,475	889,368	972,169	6,446,739	10,230,419	849,321	762,853	1,496,692
2034	337	4,348,784	282,270	898,261	981,891	6,511,206	10,332,724	857,814	770,482	1,511,659
2035	340	4,392,272	285,093	907,244	991,710	6,576,319	10,436,051	866,393	778,187	1,526,776
TOTAL	**92,821**	**117,330,661**	**12,780,746**	**30,693,739**	**32,507,273**	**193,312,418**	**318,792,800**	**31,396,699**	**33,409,349**	**47,227,279**

TABLE B-11 Minimum OMP&R Costs of Each Aqueduct Reach to be Reimbursed through Minimum OMP&R Component of Transportation Charge (in dollars)

Calendar Year	SOUTH BAY AQUEDUCT (continued)					CALIFORNIA AQUEDUCT			
						NORTH SAN JOAQUIN DIVISION			
	Reach 6	Reach 7	Reach 8	Reach 9	Total	Reach 1	Reach 2A	Reach 2B	Subtotal
	[11]	[12]	[13]	[14]	[15]	[16]	[17]	[18]	[19]
1961	0	0	0	0	0	0	0	0	0
1962	0	0	0	0	42,918	0	0	0	0
1963	0	0	0	0	168,358	0	0	0	0
1964	0	0	0	0	184,729	0	0	0	0
1965	2,634	6,490	4,704	12,904	378,874	0	0	0	0
1966	4,707	10,328	9,233	25,519	408,397	0	0	0	0
1967	2,712	7,659	10,812	34,347	634,505	0	0	0	0
1968	3,109	7,960	10,166	40,372	584,482	1,001,998	228,359	103,116	1,333,473
1969	3,944	5,975	8,795	38,566	669,346	933,116	301,596	188,194	1,422,906
1970	2,464	(1,991)	6,870	28,210	598,348	971,602	306,198	151,539	1,429,339
1971	3,116	9,394	9,895	31,068	526,068	1,103,021	254,786	113,694	1,471,501
1972	5,125	10,247	12,054	44,699	607,578	1,107,855	230,906	110,109	1,448,870
1973	4,178	7,500	4,890	43,816	570,551	1,150,864	221,445	100,221	1,472,530
1974	7,812	7,564	5,523	48,054	727,158	1,272,034	231,383	117,156	1,620,573
1975	18,120	14,683	18,325	68,377	908,648	1,434,736	455,110	201,075	2,090,921
1976	10,873	5,557	19,920	49,921	963,429	1,519,801	217,348	453,400	2,190,549
1977	(240)	2,228	8,391	89,579	866,312	1,913,643	292,380	196,564	2,402,587
1978	(1,404)	16,766	(5,313)	104,078	1,137,690	1,860,456	306,503	188,214	2,355,173
1979	1,269	29,294	7,351	106,835	1,176,630	1,848,109	231,339	145,205	2,224,653
1980	3,621	24,270	17,404	110,852	1,850,865	2,365,292	472,660	247,608	3,085,560
1981	4,038	20,109	17,586	98,143	1,526,655	2,649,730	435,226	154,191	3,239,147
1982	2,236	22,870	21,919	202,590	1,893,405	3,192,710	599,793	244,664	4,037,167
1983	(2,047)	48,781	45,573	216,434	2,177,375	4,244,937	802,908	273,081	5,320,926
1984	4,449	44,017	23,563	455,054	3,014,669	4,373,157	808,917	290,728	5,472,802
1985	13,097	74,565	57,920	238,067	3,310,486	4,717,323	629,825	189,199	5,536,347
1986	11,614	31,084	46,864	363,350	3,037,861	5,217,491	929,919	359,365	6,506,775
1987	15,273	25,182	37,949	416,375	3,461,081	5,292,200	958,927	362,065	6,613,192
1988	30,207	41,047	49,156	335,408	3,380,894	5,329,317	822,300	360,336	6,511,953
1989	9,740	54,881	114,203	179,323	3,504,088	5,753,966	851,745	907,609	7,513,320
1990	31,161	69,416	119,309	247,781	3,878,574	6,788,986	1,066,314	883,822	8,739,122
1991	22,434	(18,690)	99,577	262,052	2,514,312	6,796,247	1,067,078	585,008	8,448,333
1992	26,787	332,012	98,670	186,640	3,888,347	9,415,121	1,419,603	673,833	11,508,557
1993	24,845	181,592	94,169	316,045	6,043,803	10,274,070	1,371,074	900,996	12,546,140
1994	28,383	90,791	80,942	416,061	6,404,342	8,451,199	1,325,511	802,217	10,578,927
1995	29,298	64,012	80,278	373,657	5,610,923	10,406,784	2,386,507	959,685	13,752,976
1996	(1,020)	60,610	11,672	312,097	5,322,208	10,246,985	2,604,651	628,177	13,479,813
1997	18,428	95,321	15,691	335,566	4,486,995	10,429,338	1,098,381	2,084,859	13,612,578
1998	26,323	54,255	611,290	658,090	5,577,354	11,409,135	1,449,411	5,364,368	18,222,914
1999	50,555	36,519	430,229	2,035,938	7,682,573	11,604,989	1,444,270	1,338,751	14,388,009
2000	135,741	87,477	185,352	640,391	6,390,795	12,609,887	900,319	643,835	14,154,042
2001	112,954	188,920	197,678	1,047,945	5,408,295	17,554,493	1,378,254	753,349	19,686,097
2002	143,673	171,046	500,788	2,780,034	8,794,180	14,389,040	859,538	618,090	15,866,667
2003	77,999	97,782	247,719	987,204	5,662,570	16,518,135	1,742,176	753,175	19,013,487
2004	156,564	179,006	205,095	453,634	6,287,896	13,885,738	1,210,241	678,472	15,774,451
2005	143,052	202,176	135,131	223,699	5,511,428	12,444,177	1,941,010	872,985	15,258,172
2006	143,887	120,447	74,503	377,771	5,906,338	13,724,468	1,917,328	1,251,039	16,892,835
2007	78,472	114,775	67,246	241,583	7,579,572	11,964,017	1,697,728	625,210	14,286,955
2008	170,414	155,374	232,012	234,253	8,320,233	15,510,187	1,442,735	801,463	17,754,384
2009	84,148	140,755	113,641	617,474	7,724,829	13,693,083	1,056,431	855,259	15,604,773
2010	52,529	575,097	23,916	454,681	7,697,604	12,751,913	2,061,995	1,416,207	16,230,115
2011	82,579	77,065	58,503	472,481	8,067,285	16,647,013	2,809,547	1,443,210	20,899,771
2012	56,084	133,087	61,910	2,495,870	10,743,210	15,589,580	1,325,851	1,307,724	18,223,155
2013	82,232	174,851	98,621	1,181,909	10,702,169	16,688,111	1,737,918	2,414,425	20,840,454
2014	187,903	171,800	58,789	2,061,710	12,507,371	23,769,844	2,784,866	2,013,469	28,568,179
2015	121,708	193,803	144,139	3,165,231	14,313,049	24,862,095	1,641,254	1,915,573	28,418,922
2016	137,149	302,365	76,172	8,924,746	18,935,943	24,443,606	2,618,191	2,188,557	29,250,355
2017	147,106	217,614	209,677	6,313,243	17,706,347	32,669,502	2,698,180	2,192,179	37,559,861
2018	**141,265**	**209,044**	**76,630**	**1,209,775**	**13,163,325**	**35,960,702**	**2,891,136**	**2,343,712**	**41,195,550**
2019	162,965	241,006	87,939	1,374,875	14,335,522	35,151,492	3,034,293	2,461,738	40,647,523
2020	151,949	224,781	125,996	2,995,624	15,219,083	34,939,837	2,903,281	2,355,868	40,198,986
2021	153,469	227,028	127,256	3,025,580	15,371,272	35,289,235	2,932,314	2,379,427	40,600,976
2022	155,004	229,299	128,529	3,055,836	15,524,987	35,642,128	2,961,637	2,403,221	41,006,986
2023	156,554	231,592	129,814	3,086,394	15,680,235	35,998,549	2,991,254	2,427,254	41,417,057
2024	158,119	233,908	131,112	3,117,258	15,837,038	36,358,534	3,021,166	2,451,526	41,831,226
2025	159,700	236,247	132,424	3,148,431	15,995,409	36,722,120	3,051,378	2,476,041	42,249,539
2026	161,297	238,609	133,748	3,179,915	16,155,362	37,089,341	3,081,892	2,500,802	42,672,035
2027	162,910	240,995	135,085	3,211,714	16,316,915	37,460,234	3,112,711	2,525,810	43,098,755
2028	164,539	243,405	136,436	3,243,831	16,480,085	37,834,837	3,143,838	2,551,068	43,529,743
2029	166,185	245,839	137,801	3,276,269	16,644,886	38,213,185	3,175,276	2,576,579	43,965,040
2030	167,847	248,298	139,179	3,309,032	16,811,336	38,595,317	3,207,029	2,602,344	44,404,690
2031	169,525	250,781	140,570	3,342,122	16,979,448	38,981,270	3,239,099	2,628,368	44,848,737
2032	171,220	253,288	141,976	3,375,544	17,149,242	39,371,083	3,271,490	2,654,652	45,297,225
2033	172,933	255,821	143,396	3,409,299	17,320,734	39,764,794	3,304,205	2,681,198	45,750,197
2034	174,662	258,379	144,830	3,443,392	17,493,942	40,162,442	3,337,247	2,708,010	46,207,699
2035	176,409	260,963	146,278	3,477,826	17,668,883	40,564,066	3,370,620	2,735,090	46,669,776
TOTAL	**5,458,588**	**9,125,021**	**7,235,469**	**95,482,443**	**548,127,648**	**1,138,890,267**	**113,675,800**	**87,885,980**	**1,340,452,047**

TABLE B-11 Minimum OMP&R Costs of Each Aqueduct Reach to be Reimbursed through Minimum OMP&R Component of Transportation Charge (in dollars)

Calendar Year	CALIFORNIA AQUEDUCT (continued)									
	SAN LUIS DIVISION						SOUTH SAN JOAQUIN DIVISION			
	Reach 3	Reach 4	Reach 5	Reach 6	Reach 7	Subtotal	Reach 8C	Reach 8D	Reach 9	Reach 10A
	[20]	[21]	[22]	[23]	[24]	[25]	[26]	[27]	[28]	[29]
1961	0	0	0	0	0	0	0	0	0	0
1962	0	0	0	0	0	0	0	0	0	0
1963	0	0	0	0	0	0	0	0	0	0
1964	0	0	0	0	0	0	0	0	0	0
1965	0	0	0	0	0	0	0	0	0	0
1966	0	0	0	0	0	0	0	0	0	0
1967	0	0	0	0	0	0	0	0	0	0
1968	120,038	428,308	130,105	44,591	104,033	827,075	0	0	0	0
1969	90,033	460,907	184,467	35,696	235,322	1,006,425	22,013	134,760	86,103	83,706
1970	89,547	484,300	226,002	66,070	192,582	1,058,501	26,207	156,981	128,273	118,046
1971	99,917	541,574	175,592	64,193	158,170	1,039,446	32,312	190,753	118,372	129,811
1972	116,708	647,979	174,519	73,670	154,783	1,167,659	35,031	187,242	130,396	117,625
1973	116,791	611,705	158,145	58,344	153,955	1,098,940	51,150	225,747	127,530	117,706
1974	120,309	671,455	150,835	63,905	150,230	1,156,734	34,752	199,127	131,298	141,658
1975	133,593	839,285	178,974	81,478	157,586	1,390,916	78,523	250,377	159,006	207,908
1976	54,938	883,956	220,832	90,305	174,835	1,424,866	39,348	133,933	123,424	139,134
1977	73,331	1,114,465	270,734	98,132	196,311	1,752,973	38,086	121,348	178,078	194,086
1978	45,867	898,992	203,261	106,938	203,079	1,458,137	45,552	178,805	129,928	168,634
1979	223,973	842,508	144,055	99,670	180,734	1,490,940	69,973	150,679	129,756	175,107
1980	243,507	1,176,463	222,942	127,625	281,860	2,052,397	57,726	274,848	185,155	284,207
1981	265,766	1,065,358	193,048	90,533	1,612,157	3,226,862	80,121	198,256	144,187	199,927
1982	279,250	1,241,285	209,371	114,421	1,433,180	3,277,507	59,424	269,086	233,494	264,947
1983	214,468	1,949,017	339,809	131,377	2,143,678	4,778,349	49,448	383,476	223,078	308,801
1984	241,273	2,233,969	335,166	163,858	2,111,386	5,085,652	42,062	458,489	300,924	396,448
1985	322,068	2,882,583	360,431	176,577	1,603,532	5,345,191	58,820	495,500	213,368	298,337
1986	416,027	2,996,792	472,551	252,188	601,250	4,738,808	90,730	478,786	596,800	422,493
1987	362,738	3,104,592	424,107	236,349	439,232	4,567,018	113,962	412,042	446,067	488,226
1988	365,209	2,954,186	456,864	231,754	639,242	4,647,255	96,728	379,073	417,991	532,489
1989	263,171	3,182,472	393,589	332,986	633,419	4,805,637	83,282	389,698	400,853	733,030
1990	397,353	4,011,110	579,073	464,639	729,132	6,181,307	111,019	436,849	515,611	651,465
1991	256,473	4,388,184	543,760	728,156	765,765	6,682,338	104,414	496,794	465,940	716,328
1992	302,021	3,792,401	795,587	363,134	815,590	6,068,733	118,315	511,982	417,871	574,145
1993	439,725	4,337,616	1,008,394	551,849	734,796	7,072,380	230,338	745,885	490,159	723,450
1994	282,579	4,376,461	816,129	396,768	492,860	6,364,797	125,398	602,404	572,557	703,493
1995	107,995	5,026,076	1,066,971	440,006	1,356,668	7,997,716	185,681	657,282	432,072	881,902
1996	1,003,229	4,738,221	931,944	683,323	1,034,376	8,391,093	112,062	416,294	472,350	984,784
1997	859,665	5,761,996	924,289	254,934	646,209	8,447,093	128,190	449,316	728,436	1,864,113
1998	690,845	5,520,206	1,242,589	534,931	654,538	8,643,109	115,748	457,845	429,433	1,011,284
1999	601,726	5,793,961	1,220,810	540,364	679,483	8,836,344	107,647	426,289	440,869	1,161,363
2000	708,286	5,827,739	1,028,615	525,016	871,632	8,961,288	103,886	465,559	511,640	921,482
2001	(566,076)	7,151,927	850,787	372,374	677,824	8,486,836	58,346	553,100	602,903	870,228
2002	1,074,504	5,158,928	663,437	249,531	731,367	7,877,767	54,621	729,615	416,199	1,308,232
2003	1,033,869	6,035,487	744,447	301,820	617,486	8,733,109	62,399	676,784	645,931	819,094
2004	619,555	6,864,923	679,549	337,720	578,318	9,080,065	35,365	474,152	334,451	604,816
2005	553,163	5,984,035	984,716	401,930	799,290	8,723,134	28,347	403,804	296,577	898,100
2006	(89,498)	6,125,766	1,586,011	633,408	900,570	9,156,257	46,574	531,815	790,907	481,625
2007	1,133,181	7,671,160	1,958,920	686,050	932,092	12,381,403	242,397	854,700	535,098	632,244
2008	881,532	10,616,655	2,143,076	658,995	962,087	15,262,344	71,546	454,690	657,197	942,402
2009	959,884	8,163,810	1,220,690	506,135	1,139,555	11,990,074	36,431	762,126	473,327	925,282
2010	1,007,751	9,456,443	1,573,685	558,390	1,295,020	13,891,290	67,285	746,706	552,899	729,822
2011	1,230,413	7,622,917	2,863,843	601,267	1,661,192	13,979,632	12,925	599,675	794,152	1,162,568
2012	1,678,611	10,837,664	2,395,432	636,294	1,229,424	16,777,425	36,116	660,975	806,263	813,189
2013	1,827,610	11,535,337	2,877,059	1,354,155	3,275,800	20,869,961	39,466	615,407	612,674	1,015,244
2014	1,377,108	11,782,133	2,604,152	802,704	1,321,268	17,887,366	4,043	1,145,206	253,803	1,982,548
2015	1,168,246	11,853,889	2,426,021	857,902	2,071,084	18,377,141	6,950	565,647	264,346	1,451,096
2016	1,605,639	12,351,370	2,094,810	698,612	2,046,732	18,797,163	87,534	232,045	263,239	1,131,304
2017	1,531,425	12,465,299	2,276,791	751,189	1,689,834	18,714,538	42,407	800,849	296,511	1,884,478
2018	**1,752,077**	**12,962,230**	**3,099,481**	**925,831**	**1,918,945**	**20,658,564**	**48,827**	**935,607**	**343,888**	**2,208,010**
2019	1,833,861	15,182,288	2,958,239	979,930	2,033,777	22,988,095	51,533	987,542	361,250	2,334,740
2020	1,722,846	13,671,972	2,805,952	894,507	1,899,661	20,994,938	48,065	917,079	337,222	2,163,833
2021	1,740,074	13,808,692	2,834,011	903,452	1,918,657	21,204,886	48,546	926,250	340,594	2,185,471
2022	1,757,475	13,946,779	2,862,351	912,486	1,937,844	21,416,935	49,031	935,512	344,000	2,207,326
2023	1,775,050	14,086,246	2,890,975	921,611	1,957,222	21,631,104	49,521	944,867	347,440	2,229,399
2024	1,792,800	14,227,109	2,919,885	930,827	1,976,794	21,847,415	50,017	954,316	350,914	2,251,693
2025	1,810,728	14,369,380	2,949,083	940,135	1,996,562	22,065,888	50,517	963,859	354,424	2,274,210
2026	1,828,836	14,513,074	2,978,574	949,537	2,016,528	22,286,549	51,022	973,498	357,968	2,296,952
2027	1,847,124	14,658,205	3,008,360	959,032	2,036,693	22,509,414	51,532	983,233	361,547	2,319,922
2028	1,865,595	14,804,787	3,038,444	968,622	2,057,060	22,734,508	52,047	993,065	365,163	2,343,121
2029	1,884,251	14,952,834	3,068,828	978,309	2,077,631	22,961,853	52,568	1,002,996	368,815	2,366,552
2030	1,903,094	15,102,363	3,099,516	988,092	2,098,407	23,191,472	53,094	1,013,026	372,503	2,390,218
2031	1,922,125	15,253,386	3,130,511	997,973	2,119,391	23,423,386	53,624	1,023,156	376,228	2,414,120
2032	1,941,346	15,405,920	3,161,817	1,007,952	2,140,585	23,657,620	54,161	1,033,388	379,990	2,438,261
2033	1,960,759	15,559,980	3,193,435	1,018,032	2,161,991	23,894,197	54,702	1,043,721	383,790	2,462,644
2034	1,980,367	15,715,579	3,225,369	1,028,212	2,183,611	24,133,138	55,249	1,054,159	387,628	2,487,270
2035	2,000,171	15,872,735	3,257,623	1,038,494	2,205,447	24,374,470	55,802	1,064,700	391,504	2,512,143
TOTAL	**60,253,915**	**500,557,424**	**100,209,439**	**35,975,288**	**81,007,358**	**778,003,423**	**4,510,558**	**39,892,776**	**25,202,364**	**75,254,293**

TABLE B-11 Minimum OMP&R Costs of Each Aqueduct Reach to be Reimbursed through Minimum OMP&R Component of Transportation Charge (in dollars)

Calendar Year	CALIFORNIA AQUEDUCT (continued)									
	SOUTH SAN JOAQUIN DIVISION (continued)									
	Reach 11B	Reach 12D	Reach 12E	Reach 13B	Reach 14A	Reach 14B	Reach 14C	Reach 15A	Reach 16A	Subtotal
	[30]	[31]	[32]	[33]	[34]	[35]	[36]	[37]	[38]	[39]
1961	0	0	0	0	0	0	0	0	0	0
1962	0	0	0	0	0	0	0	0	0	0
1963	0	0	0	0	0	0	0	0	0	0
1964	0	0	0	0	0	0	0	0	0	0
1965	0	0	0	0	0	0	0	0	0	0
1966	0	0	0	0	0	0	0	0	0	0
1967	0	0	0	0	0	0	0	0	0	0
1968	0	0	0	0	0	0	0	0	0	0
1969	59,077	0	0	0	0	0	0	0	0	385,659
1970	85,758	94,171	123,374	152,424	0	0	0	0	0	885,234
1971	80,282	95,075	91,389	167,142	691,791	151,979	111,623	529,723	10,291	2,400,543
1972	84,287	98,647	115,592	146,096	877,535	124,831	101,479	609,058	1,106,884	3,734,703
1973	92,257	74,238	114,843	221,385	961,855	120,106	99,429	692,748	1,243,941	4,142,935
1974	98,103	74,914	193,523	141,540	898,272	143,866	115,649	853,098	1,343,972	4,369,772
1975	124,105	61,799	117,194	108,154	1,156,757	180,614	119,889	988,045	1,537,862	5,090,233
1976	69,715	33,655	147,908	134,063	1,124,051	177,086	114,133	1,037,799	1,727,428	5,001,677
1977	108,644	91,547	175,039	137,975	1,397,006	203,837	119,467	1,339,196	1,961,081	6,065,390
1978	106,702	72,585	170,578	151,120	1,254,043	139,662	132,224	1,265,813	1,922,950	5,738,596
1979	85,942	56,331	174,147	150,029	1,490,461	201,935	260,981	1,216,126	1,798,566	5,960,033
1980	120,896	123,120	167,249	164,749	1,988,619	189,132	238,607	1,437,614	2,231,456	7,463,378
1981	76,965	33,322	113,202	171,669	1,741,488	163,934	161,182	1,799,832	2,762,773	7,646,858
1982	158,178	142,631	224,170	224,051	1,793,867	195,086	15,768	1,933,859	2,961,383	8,475,944
1983	136,350	124,724	203,733	217,324	2,421,794	199,708	181,879	2,550,842	4,302,165	11,303,322
1984	163,331	108,212	188,724	245,764	3,312,127	329,490	204,332	3,215,901	5,077,824	14,043,628
1985	198,368	154,995	194,327	360,308	3,463,178	237,127	180,068	3,427,049	5,683,454	14,964,899
1986	248,170	242,660	346,410	349,369	3,781,427	320,984	360,156	3,574,451	5,780,666	16,593,102
1987	334,059	325,697	469,378	322,824	3,731,912	463,757	238,813	4,080,465	5,636,043	17,063,245
1988	290,881	220,658	374,653	318,253	3,451,893	411,110	313,806	3,746,920	5,150,238	15,704,693
1989	268,025	207,487	595,433	380,883	3,512,884	333,996	220,978	3,751,081	5,458,633	16,336,263
1990	363,652	225,171	480,738	677,729	4,021,727	439,953	212,851	4,381,643	6,440,643	18,959,051
1991	328,683	269,873	371,312	433,313	4,309,082	424,704	273,169	4,566,702	5,805,189	18,565,503
1992	334,579	270,768	409,314	423,717	4,734,368	729,211	571,412	4,270,793	6,471,964	19,838,439
1993	413,722	278,375	496,851	594,201	5,182,830	664,063	423,780	5,266,124	7,583,165	23,092,943
1994	346,600	239,873	482,301	445,909	4,012,614	414,899	254,393	3,727,019	7,142,378	19,069,838
1995	405,045	242,253	622,654	507,102	4,607,154	309,283	315,905	3,973,757	6,540,575	19,680,665
1996	367,570	238,622	519,560	604,736	4,892,967	214,773	187,784	4,331,630	7,065,052	20,408,184
1997	309,696	254,080	516,115	429,771	5,094,202	261,221	275,610	4,011,366	7,387,904	21,710,020
1998	295,927	170,556	384,226	484,072	4,752,549	309,440	248,178	4,694,822	7,530,927	20,885,007
1999	395,036	195,417	423,158	542,097	5,103,420	342,515	221,942	4,894,215	8,835,442	23,089,410
2000	405,494	328,900	649,652	564,437	5,942,037	341,230	140,009	5,370,216	12,465,033	28,209,574
2001	415,298	895,341	520,889	660,008	4,700,135	(133,493)	(94,172)	6,003,710	15,778,861	30,831,154
2002	380,410	296,713	958,335	860,292	5,941,389	31,558	251,205	5,589,127	11,451,902	28,269,598
2003	339,986	236,306	691,422	613,937	6,164,628	(137,397)	18,246	6,989,179	11,502,301	28,622,818
2004	245,238	176,391	624,811	585,891	7,238,227	(139,901)	(165,858)	8,913,604	14,633,859	33,561,046
2005	211,328	118,730	849,764	466,735	6,234,813	(183,109)	(192,435)	5,882,666	13,847,844	28,863,166
2006	190,155	53,874	763,282	501,094	5,087,861	(182,152)	(182,682)	8,383,919	13,741,524	30,207,796
2007	258,148	292,090	550,990	550,387	6,671,889	(434,503)	(343,051)	10,899,632	8,474,657	29,184,679
2008	425,763	236,936	422,093	719,656	11,075,488	(267,321)	(207,486)	13,012,694	10,910,996	38,454,655
2009	410,097	210,440	617,355	546,769	7,834,170	581,930	(48,232)	8,758,254	13,410,197	34,518,147
2010	448,811	116,937	425,876	707,214	7,823,215	(149,584)	(49,322)	6,576,689	9,525,639	27,522,185
2011	622,182	312,430	873,267	1,582,096	8,791,693	(232,642)	(43,079)	6,232,915	15,895,413	36,603,595
2012	792,574	280,013	1,047,242	3,224,787	11,198,262	389,999	446,850	8,865,474	12,806,484	41,368,228
2013	484,617	455,715	901,265	828,637	11,772,279	276,694	165,047	9,553,182	14,490,574	41,210,801
2014	114,319	75,180	564,626	336,300	15,193,656	208,846	330,662	10,414,793	16,031,664	46,655,646
2015	688,861	299,121	642,086	860,335	11,098,232	112,975	212,836	11,924,772	16,384,230	44,511,487
2016	635,989	68,840	1,286,705	839,421	10,185,815	(57,524)	(336,824)	12,964,398	18,887,240	46,188,182
2017	530,011	114,680	946,711	775,525	16,926,256	389,738	236,784	13,396,268	16,939,721	53,279,939
2018	**618,802**	**130,572**	**1,107,523**	**882,589**	**17,989,642**	**451,225**	**274,390**	**15,412,100**	**19,830,143**	**60,233,318**
2019	653,375	135,514	1,170,697	929,066	18,299,555	474,766	288,462	16,355,935	21,692,268	63,734,703
2020	606,736	128,191	1,085,727	871,018	17,915,869	442,962	269,210	15,205,316	19,682,251	59,673,479
2021	612,804	129,473	1,096,584	879,728	18,095,028	447,391	271,903	15,357,369	19,879,073	60,270,214
2022	618,932	130,768	1,107,550	888,525	18,275,978	451,865	274,622	15,510,943	20,077,864	60,872,916
2023	625,121	132,076	1,118,625	897,411	18,458,738	456,384	277,368	15,666,052	20,278,643	61,481,645
2024	631,372	133,396	1,129,812	906,385	18,643,325	460,948	280,141	15,822,712	20,481,429	62,096,460
2025	637,686	134,730	1,141,110	915,449	18,829,758	465,557	282,943	15,980,940	20,686,243	62,717,426
2026	644,063	136,078	1,152,521	924,603	19,018,056	470,213	285,772	16,140,749	20,893,106	63,344,601
2027	650,503	137,438	1,164,046	933,849	19,208,236	474,915	288,630	16,302,156	21,102,037	63,978,044
2028	657,008	138,813	1,175,687	943,188	19,400,319	479,664	291,516	16,465,178	21,313,057	64,617,826
2029	663,579	140,201	1,187,443	952,619	19,594,322	484,461	294,432	16,629,830	21,526,188	65,264,006
2030	670,214	141,603	1,199,318	962,146	19,790,265	489,305	297,376	16,796,128	21,741,450	65,916,646
2031	676,916	143,019	1,211,311	971,767	19,988,168	494,198	300,350	16,964,089	21,958,864	66,575,810
2032	683,686	144,449	1,223,424	981,485	20,188,049	499,140	303,353	17,133,730	22,178,453	67,241,569
2033	690,522	145,894	1,235,658	991,300	20,389,930	504,132	306,387	17,305,068	22,400,237	67,913,985
2034	697,428	147,353	1,248,015	1,001,213	20,593,829	509,173	309,450	17,478,118	22,624,240	68,593,125
2035	704,402	148,826	1,260,495	1,011,225	20,799,768	514,265	312,545	17,652,899	22,850,482	69,279,056
TOTAL	**25,893,033**	**11,868,487**	**43,359,013**	**41,474,857**	**591,120,752**	**17,384,211**	**11,622,835**	**536,078,496**	**756,875,018**	**2,180,536,692**

TABLE B-11 Minimum OMP&R Costs of Each Aqueduct Reach to be Reimbursed through Minimum OMP&R Component of Transportation Charge (in dollars)

Calendar Year	CALIFORNIA AQUEDUCT (continued)								
	TEHACHAPI DIVISION			MOJAVE DIVISION					
	Reach 17E	Reach 17F	Subtotal	Reach 18A	Reach 19	Reach 20A	Reach 20B	Reach 21	Reach 22A
	[40]	[41]	[42]	[43]	[44]	[45]	[46]	[47]	[48]
1961	0	0	0	0	0	0	0	0	0
1962	0	0	0	0	0	0	0	0	0
1963	0	0	0	0	0	0	0	0	0
1964	0	0	0	0	0	0	0	0	0
1965	0	0	0	0	0	0	0	0	0
1966	0	0	0	0	0	0	0	0	0
1967	0	0	0	0	0	0	0	0	0
1968	0	0	0	0	0	0	0	0	0
1969	0	0	0	0	0	0	0	0	0
1970	0	0	0	0	0	0	0	0	0
1971	3,471	0	3,471	0	0	0	0	0	0
1972	1,424,782	28,127	1,452,909	36,699	135,675	130,711	120,271	75,768	80,436
1973	1,777,260	49,949	1,827,209	36,207	146,739	161,838	148,631	60,641	66,539
1974	2,298,091	16,259	2,314,350	30,525	90,404	115,571	88,200	65,007	77,667
1975	2,403,430	35,193	2,438,623	40,588	122,584	137,684	118,898	135,462	77,825
1976	2,776,194	126,653	2,902,847	118,610	201,215	182,927	151,555	106,314	131,007
1977	3,845,464	83,936	3,929,400	93,565	226,906	180,884	112,589	98,757	86,279
1978	2,954,313	42,637	2,996,950	91,815	200,759	215,673	120,584	109,271	71,763
1979	3,539,402	45,997	3,585,399	99,670	307,386	261,205	194,104	203,078	121,586
1980	4,749,245	54,806	4,804,051	116,487	446,175	290,719	237,250	156,794	117,274
1981	5,485,957	64,886	5,550,843	316,590	585,003	325,112	292,081	181,062	119,602
1982	6,349,080	55,997	6,405,077	447,739	638,615	275,763	330,502	186,109	125,429
1983	14,153,033	96,397	14,249,430	345,229	564,698	368,139	326,767	219,943	140,523
1984	18,448,383	77,201	18,525,584	267,497	563,588	413,443	329,933	266,919	146,866
1985	18,134,698	137,928	18,272,626	298,932	475,028	450,444	388,327	799,514	125,780
1986	19,297,129	109,938	19,407,067	703,413	350,906	347,690	315,566	242,158	178,847
1987	17,398,908	98,355	17,497,263	1,261,056	558,996	818,475	357,971	298,190	236,263
1988	17,697,838	138,405	17,836,243	1,242,139	560,911	585,014	400,005	331,099	149,876
1989	17,641,151	88,488	17,729,639	1,049,615	283,065	366,590	345,614	194,047	138,825
1990	19,995,760	99,868	20,095,628	1,298,537	229,083	469,502	202,412	273,748	49,174
1991	19,903,346	131,558	20,034,904	1,432,360	665,443	1,025,089	516,257	478,555	231,223
1992	18,194,788	279,610	18,474,398	1,167,898	738,238	666,181	696,623	585,072	168,251
1993	19,051,939	199,640	19,251,579	1,868,745	606,763	1,232,409	818,675	509,309	207,818
1994	17,354,702	204,963	17,559,665	1,699,479	763,493	1,145,700	957,350	873,215	241,679
1995	19,360,033	191,516	19,551,549	1,284,146	614,314	1,941,939	2,411,412	355,198	179,930
1996	19,041,451	237,846	19,279,297	1,163,708	576,674	1,335,804	1,713,145	790,618	136,397
1997	19,724,881	176,120	19,901,001	1,330,450	730,628	1,401,562	2,043,179	640,177	189,241
1998	23,227,152	182,754	23,409,906	1,513,656	309,052	7,568,901	508,030	297,621	115,100
1999	19,935,886	160,568	20,096,454	3,153,935	732,113	5,398,788	1,667,027	1,395,062	188,629
2000	23,227,369	244,410	23,471,779	1,870,490	737,293	1,378,795	1,434,507	972,081	165,502
2001	24,052,191	617,689	24,669,880	2,438,339	2,543,535	1,838,032	1,521,485	1,068,195	474,308
2002	20,727,872	472,353	21,200,225	1,398,669	800,734	757,147	584,168	1,156,409	282,326
2003	20,832,780	283,154	21,115,934	3,732,959	677,475	710,041	624,601	469,225	279,922
2004	26,586,558	245,847	26,832,405	1,821,744	1,375,487	1,322,272	1,044,918	1,054,543	413,437
2005	16,373,205	1,498,514	17,871,718	2,840,486	1,501,877	1,540,619	879,549	677,058	353,179
2006	14,694,172	272,415	14,966,587	4,455,420	1,307,686	1,196,586	2,917,260	960,406	756,822
2007	15,858,224	344,960	16,203,184	5,890,687	1,627,833	1,793,571	1,820,301	828,762	653,777
2008	23,104,435	315,302	23,419,737	2,245,712	1,362,761	1,251,537	824,184	497,389	704,148
2009	23,052,556	155,651	23,208,207	2,530,958	1,535,555	1,337,355	1,164,607	775,901	537,385
2010	14,055,060	263,707	14,318,767	3,389,392	1,606,917	2,615,197	1,730,827	787,159	696,897
2011	18,646,887	139,104	18,785,991	2,544,240	1,773,259	2,314,817	2,216,395	624,924	579,608
2012	21,004,341	219,478	21,223,818	5,055,139	1,480,684	1,614,482	2,714,615	1,812,534	658,082
2013	33,780,129	262,985	34,043,114	5,804,313	1,658,459	1,288,453	3,039,728	1,396,064	528,825
2014	38,305,526	223,964	38,529,490	3,994,353	2,653,235	1,375,628	2,969,161	628,799	763,154
2015	27,050,379	145,706	27,196,085	4,656,820	2,072,632	2,846,028	864,605	2,589,819	1,108,865
2016	27,633,449	128,399	27,761,848	4,283,941	2,273,316	1,425,623	1,214,325	875,267	281,111
2017	24,927,544	167,565	25,095,109	4,200,606	2,384,549	1,812,761	1,043,164	939,150	485,473
2018	**24,560,116**	**1,655,533**	**26,215,649**	**4,730,548**	**2,571,645**	**1,952,017**	**1,118,526**	**1,012,558**	**520,050**
2019	25,493,642	173,201	25,666,843	5,159,936	2,913,887	2,213,182	1,256,601	1,147,816	584,488
2020	25,243,705	672,087	25,915,792	4,744,000	2,649,594	2,012,580	1,150,824	1,043,506	535,304
2021	25,496,142	678,808	26,174,950	4,791,440	2,676,090	2,032,705	1,162,333	1,053,941	540,657
2022	25,751,103	685,596	26,436,699	4,839,355	2,702,850	2,053,032	1,173,956	1,064,480	546,064
2023	26,008,614	692,452	26,701,066	4,887,748	2,729,879	2,073,563	1,185,695	1,075,125	551,524
2024	26,268,700	699,377	26,968,077	4,936,626	2,757,178	2,094,298	1,197,552	1,085,876	557,040
2025	26,531,387	706,371	27,237,758	4,985,992	2,784,750	2,115,241	1,209,528	1,096,735	562,610
2026	26,796,701	713,434	27,510,135	5,035,852	2,812,597	2,136,394	1,221,623	1,107,702	568,236
2027	27,064,668	720,569	27,785,237	5,086,210	2,840,723	2,157,758	1,233,839	1,118,779	573,918
2028	27,335,315	727,774	28,063,089	5,137,073	2,869,130	2,179,335	1,246,178	1,129,967	579,658
2029	27,608,668	735,052	28,343,720	5,188,443	2,897,821	2,201,129	1,258,640	1,141,267	585,454
2030	27,884,755	742,403	28,627,158	5,240,328	2,926,800	2,223,140	1,271,226	1,152,680	591,309
2031	28,163,602	749,827	28,913,429	5,292,731	2,956,068	2,245,371	1,283,938	1,164,206	597,222
2032	28,445,238	757,325	29,202,563	5,345,658	2,985,628	2,267,825	1,296,778	1,175,848	603,194
2033	28,729,691	764,898	29,494,589	5,399,115	3,015,485	2,290,503	1,309,745	1,187,607	609,226
2034	29,016,988	772,547	29,789,535	5,453,106	3,045,640	2,313,408	1,322,843	1,199,483	615,318
2035	29,307,157	780,273	30,087,430	5,507,637	3,076,096	2,336,542	1,336,071	1,211,478	621,471
TOTAL	**1,255,786,636**	**22,644,324**	**1,278,430,960**	**177,425,356**	**93,009,603**	**95,130,724**	**66,757,254**	**48,211,446**	**23,965,389**

TABLE B-11 Minimum OMP&R Costs of Each Aqueduct Reach to be Reimbursed through Minimum OMP&R Component of Transportation Charge (in dollars)

Calendar Year	CALIFORNIA AQUEDUCT (continued)									
	MOJAVE DIVISION (continued)				SANTA ANA DIVISION					
	Reach 22B	Reach 23	Reach 24	Subtotal	Reach 25	Reach 26A	Reach 28G	Reach 28H	Reach 28J	Subtotal
	[49]	[50]	[51]	[52]	[53]	[54]	[55]	[56]	[57]	[58]
1961	0	0	0	0	0	0	0	0	0	0
1962	0	0	0	0	0	0	0	0	0	0
1963	0	0	0	0	0	0	0	0	0	0
1964	0	0	0	0	0	0	0	0	0	0
1965	0	0	0	0	0	0	0	0	0	0
1966	0	0	0	0	0	0	0	0	0	0
1967	0	0	0	0	0	0	0	0	0	0
1968	0	0	0	0	0	0	0	0	0	0
1969	0	0	0	0	0	0	0	0	0	0
1970	0	0	0	0	0	0	0	0	0	0
1971	0	0	0	0	0	0	0	0	0	0
1972	1,036,831	51,520	362,153	2,030,064	26	578	109	30	0	743
1973	1,283,816	65,475	353,262	2,323,148	20,541	679,328	136,352	79	0	836,300
1974	1,477,946	96,340	334,302	2,375,962	24,380	799,400	155,262	34,693	854,637	1,868,372
1975	1,630,554	111,141	419,450	2,794,186	29,337	885,021	110,729	69,082	723,814	1,817,983
1976	1,598,071	107,787	304,638	2,902,124	51,356	1,103,139	138,575	100,400	635,853	2,029,323
1977	1,882,080	71,228	48,359	2,800,647	62,584	1,412,740	127,543	92,647	825,880	2,521,394
1978	2,211,965	72,179	637,401	3,731,410	67,186	1,159,950	166,919	68,363	835,082	2,297,500
1979	2,104,832	76,960	202,566	3,571,387	84,462	1,235,189	142,586	92,812	265,525	1,820,574
1980	2,670,387	147,009	688,605	4,870,700	72,651	1,532,535	158,340	129,897	1,120,131	3,013,554
1981	3,030,407	134,895	47,750	5,032,502	35,662	1,575,444	160,053	111,722	333,550	2,216,431
1982	3,248,883	299,712	623,755	6,176,507	26,852	1,822,250	205,350	135,463	1,518,759	3,708,674
1983	3,899,769	223,626	384,292	6,472,986	19,017	1,663,599	244,720	124,651	412,806	2,464,793
1984	4,783,997	59,337	1,104,149	7,935,729	11,319	2,325,661	240,496	190,924	769,068	3,537,468
1985	5,330,501	261,135	811,346	8,941,007	17,764	2,707,662	451,600	182,242	871,492	4,230,760
1986	6,190,812	156,053	515,945	9,001,390	31,012	2,768,728	439,048	256,526	982,332	4,477,646
1987	5,731,239	151,796	732,607	10,146,593	19,362	2,847,390	278,094	218,717	1,118,529	4,482,092
1988	6,910,472	253,833	970,052	11,403,401	36,576	3,087,873	271,868	200,811	1,176,659	4,773,787
1989	5,963,386	349,544	1,242,144	9,932,830	30,881	3,190,809	230,953	281,861	1,130,035	4,864,539
1990	6,905,442	436,785	1,891,053	11,755,736	25,518	3,330,913	437,812	308,144	1,538,449	5,640,836
1991	7,488,366	263,723	1,561,051	13,662,067	32,172	3,847,589	843,388	632,912	1,630,321	6,986,382
1992	7,076,997	317,042	622,116	12,038,418	55,819	4,043,878	281,864	5,636,464	1,102,519	11,120,544
1993	7,765,751	359,632	1,708,915	15,078,017	72,464	5,638,325	382,195	570,563	994,721	7,658,268
1994	7,691,548	1,220,795	1,245,936	15,839,195	105,373	5,139,991	617,136	415,603	1,022,412	7,300,515
1995	6,994,639	842,041	746,371	15,369,990	96,781	4,357,648	1,308,828	704,154	894,338	7,361,749
1996	8,590,347	889,842	(78,782)	15,117,753	156,395	4,051,744	1,001,063	1,041,697	1,316,493	7,567,392
1997	8,138,580	1,586,227	3,355,446	19,415,490	177,217	4,585,198	493,841	949,188	953,590	7,159,034
1998	8,887,728	1,924,868	1,134,837	22,259,793	142,703	4,856,225	379,997	991,426	(67,444)	6,302,907
1999	9,516,356	2,034,226	1,222,891	25,309,026	190,302	6,039,135	503,433	1,970,921	1,084,943	9,788,735
2000	9,524,751	1,711,065	1,514,074	19,308,557	353,556	4,194,994	842,570	1,003,213	1,124,399	7,518,730
2001	7,695,659	1,891,901	31,234	19,502,687	296,461	2,442,119	1,667,660	810,577	5,658,124	10,874,941
2002	11,246,902	1,693,570	934,872	18,854,797	509,111	3,398,320	1,250,266	422,611	2,236,036	7,816,343
2003	13,350,815	2,095,918	(452,530)	21,488,425	368,521	3,729,470	545,107	375,520	1,281,528	6,300,147
2004	10,500,182	2,128,188	1,087,045	20,747,817	427,774	5,435,324	1,238,040	439,722	3,578,697	11,119,557
2005	7,608,361	2,414,926	2,241,009	20,057,064	452,675	5,608,440	1,518,256	683,607	(1,905,129)	6,357,849
2006	10,107,536	1,923,592	573,603	24,198,910	301,102	5,201,209	636,924	319,642	5,194,972	11,653,850
2007	10,002,694	2,949,653	648,999	26,216,278	226,419	8,063,914	821,630	703,569	3,270,894	13,086,427
2008	14,597,173	2,387,767	991,458	24,862,129	302,769	6,584,519	800,557	771,444	4,550,654	13,009,942
2009	12,213,339	3,458,376	1,507,045	25,060,520	504,213	7,175,901	624,097	674,845	2,749,919	11,728,975
2010	12,851,292	3,242,927	2,506,223	29,426,830	608,364	6,560,225	475,035	424,085	3,556,482	11,624,191
2011	13,488,068	4,100,642	3,059,831	30,701,785	431,886	5,564,611	884,022	565,077	4,858,902	12,304,497
2012	13,558,701	2,838,345	4,722,646	34,455,227	244,083	6,320,459	1,704,676	545,373	4,046,690	12,861,282
2013	14,532,698	3,493,702	3,602,757	35,344,998	438,327	7,896,097	855,331	731,267	2,324,092	12,245,114
2014	18,217,069	4,393,180	2,915,526	37,910,103	320,743	9,240,779	1,191,567	336,251	9,660,832	20,750,172
2015	19,346,513	4,539,191	2,756,249	40,780,721	177,702	11,928,706	823,260	496,634	2,353,029	15,779,331
2016	21,094,845	5,112,680	4,337,369	40,898,476	486,913	10,851,855	610,301	632,805	2,677,120	15,258,995
2017	18,908,847	4,549,076	4,052,475	38,376,101	315,326	10,026,098	976,367	481,020	(2,017,567)	9,781,244
2018	**22,326,513**	**5,055,290**	**4,397,205**	**43,684,352**	**345,764**	**11,142,436**	**1,083,068**	**527,745**	**11,572,802**	**24,671,815**
2019	24,342,660	5,686,218	4,275,568	47,580,356	747,330	11,768,840	1,134,518	559,733	4,237,233	18,447,654
2020	22,077,933	5,147,830	4,284,166	43,645,737	474,168	11,088,916	1,075,298	528,061	4,643,464	17,809,907
2021	22,298,713	5,199,308	4,327,008	44,082,195	478,909	11,199,805	1,086,050	533,342	4,689,899	17,988,005
2022	22,521,700	5,251,301	4,370,278	44,523,016	483,699	11,311,803	1,096,911	538,675	4,736,798	18,167,886
2023	22,746,917	5,303,814	4,413,981	44,968,246	488,535	11,424,922	1,107,880	544,062	4,784,165	18,349,564
2024	22,974,386	5,356,852	4,458,121	45,417,929	493,421	11,539,171	1,118,959	549,503	4,832,007	18,533,061
2025	23,204,130	5,410,421	4,502,702	45,872,109	498,355	11,654,562	1,130,148	554,998	4,880,327	18,718,390
2026	23,436,171	5,464,525	4,547,729	46,330,829	503,339	11,771,108	1,141,450	560,548	4,929,130	18,905,575
2027	23,670,533	5,519,170	4,593,206	46,794,136	508,372	11,888,819	1,152,864	566,153	4,978,422	19,094,630
2028	23,907,238	5,574,362	4,639,138	47,262,079	513,456	12,007,707	1,164,393	571,815	5,028,206	19,285,577
2029	24,146,311	5,630,105	4,685,530	47,734,700	518,590	12,127,784	1,176,037	577,533	5,078,488	19,478,432
2030	24,387,774	5,686,406	4,732,385	48,212,048	523,776	12,249,062	1,187,797	583,308	5,129,273	19,673,216
2031	24,631,651	5,743,271	4,779,709	48,694,167	529,014	12,371,553	1,199,675	589,141	5,180,566	19,869,949
2032	24,877,968	5,800,703	4,827,506	49,181,108	534,304	12,495,268	1,211,672	595,033	5,232,371	20,068,648
2033	25,126,748	5,858,710	4,875,781	49,672,920	539,647	12,620,221	1,223,789	600,983	5,284,695	20,269,335
2034	25,378,015	5,917,297	4,924,539	50,169,649	545,044	12,746,423	1,236,027	606,993	5,337,542	20,472,029
2035	25,631,795	5,976,470	4,973,784	50,671,344	550,494	12,873,888	1,248,387	613,063	5,390,917	20,676,749
TOTAL	**806,574,303**	**167,071,502**	**142,830,830**	**1,620,976,407**	**17,737,876**	**411,193,271**	**48,148,743**	**36,129,943**	**175,190,472**	**688,400,304**

TABLE B-11 Minimum OMP&R Costs of Each Aqueduct Reach to be Reimbursed through Minimum OMP&R Component of Transportation Charge (in dollars)

Calendar Year	CALIFORNIA AQUEDUCT (continued)									
	SANTA ANA DIVISION - EAST BRANCH EXTENSION									
	Reach 1	Reach 2A	Reach 2B	Reach 2C	Reach 2D	Reach 3A	Reach 3B	Reach 4A	Reach 4B	Subtotal
	[59]	[60]	[61]	[62]	[63]	[64]	[65]	[66]	[67]	[68]
1961	0	0	0	0	0	0	0	0	0	0
1962	0	0	0	0	0	0	0	0	0	0
1963	0	0	0	0	0	0	0	0	0	0
1964	0	0	0	0	0	0	0	0	0	0
1965	0	0	0	0	0	0	0	0	0	0
1966	0	0	0	0	0	0	0	0	0	0
1967	0	0	0	0	0	0	0	0	0	0
1968	0	0	0	0	0	0	0	0	0	0
1969	0	0	0	0	0	0	0	0	0	0
1970	0	0	0	0	0	0	0	0	0	0
1971	0	0	0	0	0	0	0	0	0	0
1972	0	0	0	0	0	0	0	0	0	0
1973	0	0	0	0	0	0	0	0	0	0
1974	0	0	0	0	0	0	0	0	0	0
1975	0	0	0	0	0	0	0	0	0	0
1976	0	0	0	0	0	0	0	0	0	0
1977	0	0	0	0	0	0	0	0	0	0
1978	0	0	0	0	0	0	0	0	0	0
1979	0	0	0	0	0	0	0	0	0	0
1980	0	0	0	0	0	0	0	0	0	0
1981	0	0	0	0	0	0	0	0	0	0
1982	0	0	0	0	0	0	0	0	0	0
1983	0	0	0	0	0	0	0	0	0	0
1984	0	0	0	0	0	0	0	0	0	0
1985	0	0	0	0	0	0	0	0	0	0
1986	0	0	0	0	0	0	0	0	0	0
1987	0	0	0	0	0	0	0	0	0	0
1988	0	0	0	0	0	0	0	0	0	0
1989	0	0	0	0	0	0	0	0	0	0
1990	0	0	0	0	0	0	0	0	0	0
1991	0	0	0	0	0	0	0	0	0	0
1992	0	0	0	0	0	0	0	0	0	0
1993	0	0	0	0	0	0	0	0	0	0
1994	0	0	0	0	0	0	0	0	0	0
1995	0	0	0	0	0	0	0	0	0	0
1996	0	0	0	0	0	0	0	0	0	0
1997	0	0	0	0	0	0	0	0	0	0
1998	0	0	0	0	0	0	0	0	0	0
1999	0	0	0	0	0	0	0	0	0	0
2000	0	0	0	0	0	0	0	0	0	0
2001	0	0	0	0	0	0	0	0	0	0
2002	0	0	0	0	0	0	0	0	0	0
2003	1,022	84,351	375,153	2,329	0	627,038	360	93,305	33,614	1,217,171
2004	10,740	40,841	509,089	2,340	0	276,019	337	13,434	71,444	924,242
2005	9,849	15,079	526,273	4,153	0	496,547	9,036	27,330	216,418	1,304,685
2006	10,208	10,233	547,575	9,252	57,222	403,039	1,267	14,835	72,624	1,126,254
2007	27,119	9,819	657,783	5,082	124,796	616,238	58,536	39,166	138,296	1,676,836
2008	76,886	34,526	847,770	1,323	208,729	1,316,836	92,649	76,305	230,399	2,885,423
2009	79,138	17,691	995,701	909	230,913	1,012,865	24,612	139,469	230,654	2,731,953
2010	53,770	3,530	812,668	15,902	261,541	1,268,364	9,493	165,194	358,769	2,949,230
2011	21,406	5,387	700,542	4,440	117,190	1,102,065	10,972	75,145	545,184	2,582,332
2012	5,708	15,613	750,232	15,695	171,346	1,605,915	26,654	18,390	198,644	2,808,196
2013	1,119	6,019	603,250	171,349	288,370	1,611,366	4,274	6,145	183,028	2,874,920
2014	8,268	9,524	828,652	104,766	163,531	1,829,712	3,979	2,436	321,857	3,272,727
2015	(140)	7,978	823,494	11,282	89,645	1,509,283	105,462	19,697	387,923	2,954,624
2016	1,046	12,049	740,793	106,257	34,176	1,849,741	34,925	7,321	481,022	3,267,328
2017	3,080	10,604	1,066,872	75,737	105,328	1,663,660	40,487	9,548	346,558	3,321,874
2018	**3,303**	**9,736**	**581,673**	**81,058**	**95,933**	**1,752,238**	**43,355**	**10,227**	**359,860**	**2,937,383**
2019	3,415	10,143	422,792	83,794	98,241	1,795,174	44,819	10,573	371,423	2,840,374
2020	3,299	10,263	697,350	80,999	100,832	1,754,394	43,316	10,217	362,873	3,063,543
2021	3,332	10,365	704,324	81,809	101,841	1,771,938	43,749	10,319	366,502	3,094,179
2022	3,365	10,469	711,367	82,627	102,859	1,789,658	44,187	10,423	370,167	3,125,122
2023	3,399	10,574	718,481	83,453	103,888	1,807,554	44,628	10,527	373,868	3,156,372
2024	3,433	10,679	725,666	84,288	104,927	1,825,630	45,075	10,632	377,607	3,187,937
2025	3,467	10,786	732,922	85,131	105,976	1,843,886	45,525	10,738	381,383	3,219,814
2026	3,502	10,894	740,252	85,982	107,036	1,862,325	45,981	10,846	385,197	3,252,015
2027	3,537	11,003	747,654	86,842	108,106	1,880,948	46,440	10,954	389,049	3,284,533
2028	3,572	11,113	755,131	87,710	109,187	1,899,758	46,905	11,064	392,939	3,317,379
2029	3,608	11,224	762,682	88,587	110,279	1,918,755	47,374	11,174	396,869	3,350,552
2030	3,644	11,336	770,309	89,473	111,382	1,937,943	47,848	11,286	400,837	3,384,058
2031	3,680	11,450	778,012	90,368	112,495	1,957,322	48,326	11,399	404,846	3,417,898
2032	3,717	11,564	785,792	91,272	113,620	1,976,895	48,809	11,513	408,894	3,452,076
2033	3,754	11,680	793,650	92,184	114,757	1,996,664	49,298	11,628	412,983	3,486,598
2034	3,792	11,797	801,586	93,106	115,904	2,016,631	49,790	11,744	417,113	3,521,463
2035	3,830	11,915	809,602	94,037	117,063	2,036,797	50,288	11,862	421,284	3,556,678
TOTAL	**372,867**	**480,233**	**23,825,092**	**2,093,535**	**3,787,114**	**51,013,198**	**1,258,756**	**904,847**	**10,810,127**	**94,545,769**

TABLE B-11 Minimum OMP&R Costs of Each Aqueduct Reach to be Reimbursed through Minimum OMP&R Component of Transportation Charge (in dollars)

Calendar Year	CALIFORNIA AQUEDUCT (continued)						
	WEST BRANCH						
	Reach 29A	Reach 29F	Reach 29G	Reach 29H	Reach 29J	Reach 30	Subtotal
	[69]	[70]	[71]	[72]	[73]	[74]	[75]
1961	0	0	0	0	0	0	0
1962	0	0	0	0	0	0	0
1963	0	0	0	0	0	0	0
1964	0	0	0	0	0	0	0
1965	0	0	0	0	0	0	0
1966	0	0	0	0	0	0	0
1967	0	0	0	0	0	0	0
1968	0	0	0	0	0	0	0
1969	0	0	0	0	0	0	0
1970	0	0	0	0	0	0	0
1971	0	0	0	0	0	0	0
1972	719,255	159,249	199,145	234,196	88,198	420,789	1,820,832
1973	779,949	339,363	122,664	264,850	119,743	621,431	2,248,000
1974	883,312	158,366	112,458	350,160	(4,525)	723,949	2,223,720
1975	1,049,990	176,676	194,724	801,457	75,870	841,991	3,140,708
1976	1,220,429	215,588	202,591	624,614	98,268	(650,944)	1,710,546
1977	1,268,813	116,939	218,129	684,679	184	634,581	2,923,325
1978	1,174,708	342,479	267,308	415,641	17,764	3,088,954	5,306,854
1979	1,366,942	285,575	284,188	972,584	29,850	958,068	3,897,207
1980	1,698,215	224,472	455,619	874,259	288,303	222,549	3,763,417
1981	1,783,405	123,264	615,047	2,305,110	8,794	1,093,897	5,929,517
1982	1,919,979	190,500	702,265	2,208,264	414,230	978,624	6,413,862
1983	2,739,814	149,333	888,475	745,939	579,882	3,698,681	8,802,124
1984	3,463,038	81,260	2,358,495	537,207	719,282	755,136	7,914,418
1985	3,866,946	295,836	3,047,591	975,729	614,735	1,753,355	10,554,192
1986	3,791,427	457,604	2,893,171	1,480,015	1,032,216	1,338,657	10,993,090
1987	3,423,494	213,106	2,933,342	944,604	459,398	1,406,519	9,380,463
1988	3,447,403	255,113	3,017,463	883,714	446,468	1,452,589	9,502,750
1989	4,025,641	405,583	2,738,143	1,398,165	865,738	1,505,029	10,938,299
1990	4,088,481	383,655	3,232,445	3,153,869	777,713	847,500	12,483,663
1991	3,862,056	304,143	3,550,063	639,527	763,037	1,191,090	10,309,916
1992	4,286,050	327,802	3,892,480	1,014,551	872,953	2,259,032	12,652,868
1993	3,969,075	343,304	4,515,385	1,670,952	852,208	1,157,876	12,508,800
1994	3,649,861	293,376	3,359,381	1,879,417	872,624	1,674,576	11,729,235
1995	4,137,046	883,315	4,750,275	1,588,080	754,904	(421,879)	11,691,741
1996	4,511,858	966,044	3,593,671	4,208,195	877,111	1,574,098	15,730,977
1997	4,543,506	1,030,809	2,429,066	3,755,901	1,597,361	1,521,491	14,878,134
1998	4,871,761	464,376	3,473,405	2,398,630	1,996,114	1,291,185	14,495,471
1999	4,859,457	4,249,651	4,989,423	1,764,943	1,005,565	1,911,025	18,780,064
2000	5,446,494	780,366	4,265,642	2,349,816	170,222	1,524,046	14,536,587
2001	5,905,961	1,526,938	5,136,328	4,375,496	240,595	(923,056)	16,262,262
2002	5,322,898	1,489,777	4,065,555	4,477,074	(53,068)	3,470,537	18,772,772
2003	4,454,323	1,314,151	3,721,548	3,350,502	(628,046)	951,874	13,164,353
2004	8,912,349	1,376,812	3,481,196	5,121,099	(616,073)	1,506,356	19,781,738
2005	5,758,956	2,597,096	7,383,506	(596,347)	2,649,206	(1,245,748)	16,546,669
2006	6,915,258	2,293,073	5,106,702	3,561,421	(561,503)	(4,267,795)	13,047,156
2007	5,694,458	2,716,124	10,404,536	7,814,450	352,923	12,023,069	39,005,560
2008	8,257,144	824,619	16,166,484	7,410,084	(117,379)	410,998	32,951,950
2009	7,839,626	883,891	8,625,485	5,621,722	242,442	2,820,839	26,034,005
2010	10,039,113	793,756	8,866,201	6,230,490	431,251	5,301,507	31,662,318
2011	6,943,567	934,224	9,608,528	8,039,045	43,541	(265,438)	25,303,467
2012	7,465,499	2,945,473	9,412,688	6,236,276	106,984	6,618,575	32,785,496
2013	8,783,984	3,760,476	12,273,121	7,182,444	400,469	3,654,082	36,054,576
2014	10,930,187	3,100,373	7,398,828	7,314,215	400,883	5,527,595	34,672,080
2015	9,343,757	3,688,274	7,575,282	8,789,096	295,782	398,680	30,090,871
2016	11,600,971	3,657,818	8,210,570	8,721,945	1,256,217	(5,340,639)	28,106,881
2017	14,685,912	4,088,503	10,562,674	10,073,386	812,662	22,621,216	62,844,353
2018	**17,656,106**	**3,903,841**	**12,287,598**	**10,513,128**	**794,371**	**9,583,612**	**54,738,656**
2019	17,587,387	4,129,016	11,878,807	10,313,020	821,444	8,576,502	53,306,176
2020	16,809,566	4,080,858	11,692,124	10,402,843	817,587	13,729,715	57,532,693
2021	16,977,662	4,121,666	11,809,045	10,506,872	825,763	13,867,012	58,108,020
2022	17,147,439	4,162,883	11,927,135	10,611,941	834,020	14,005,682	58,689,100
2023	17,318,913	4,204,512	12,046,407	10,718,060	842,361	14,145,739	59,275,992
2024	17,492,102	4,246,557	12,166,871	10,825,241	850,784	14,287,196	59,868,751
2025	17,667,023	4,289,022	12,288,539	10,933,493	859,292	14,430,068	60,467,437
2026	17,843,693	4,331,912	12,411,425	11,042,828	867,885	14,574,369	61,072,112
2027	18,022,130	4,375,232	12,535,539	11,153,256	876,564	14,720,113	61,682,834
2028	18,202,352	4,418,984	12,660,894	11,264,789	885,329	14,867,314	62,299,662
2029	18,384,375	4,463,174	12,787,503	11,377,437	894,183	15,015,987	62,922,659
2030	18,568,219	4,507,806	12,915,378	11,491,211	903,125	15,166,147	63,551,886
2031	18,753,901	4,552,884	13,044,532	11,606,123	912,156	15,317,808	64,187,404
2032	18,941,440	4,598,412	13,174,978	11,722,184	921,277	15,470,986	64,829,277
2033	19,130,855	4,644,397	13,306,727	11,839,406	930,490	15,625,696	65,477,571
2034	19,322,163	4,690,840	13,439,795	11,957,800	939,795	15,781,953	66,132,346
2035	19,515,385	4,737,749	13,574,193	12,077,378	949,193	15,939,773	66,793,671
TOTAL	**551,043,078**	**130,668,269**	**427,248,776**	**345,204,477**	**37,376,716**	**343,742,221**	**1,835,283,536**

TABLE B-11 Minimum OMP&R Costs of Each Aqueduct Reach to be Reimbursed through Minimum OMP&R Component of Transportation Charge (in dollars)

Calendar Year	CALIFORNIA AQUEDUCT (continued)							GRAND TOTAL
	COASTAL BRANCH						Total	
	Reach 31A[a]	Reach 33A	Reach 33B	Reach 34	Reach 35	Subtotal		
	[76]	[77]	[78]	[79]	[80]	[81]	[82]	[83]
1961	0	0	0	0	0	0	0	0
1962	0	0	0	0	0	0	0	42,918
1963	0	0	0	0	0	0	0	168,358
1964	0	0	0	0	0	0	0	184,729
1965	0	0	0	0	0	0	0	378,874
1966	0	0	0	0	0	0	0	408,397
1967	0	0	0	0	0	0	0	634,505
1968	0	0	0	0	0	0	2,160,548	2,745,160
1969	509,728	0	0	0	0	509,728	3,324,718	4,074,939
1970	609,988	0	0	0	0	609,988	3,983,062	4,676,282
1971	699,052	0	0	0	0	699,052	5,614,013	6,185,714
1972	697,576	0	0	0	0	697,576	12,353,356	12,998,869
1973	641,626	0	0	0	0	641,626	14,590,688	15,194,233
1974	669,279	0	0	0	0	669,279	16,598,762	17,372,561
1975	806,429	0	0	0	0	806,429	19,569,999	20,517,423
1976	840,927	0	0	0	0	840,927	19,002,859	20,027,213
1977	872,169	0	0	0	0	872,169	23,267,885	24,213,489
1978	934,119	0	0	0	0	934,119	24,818,739	26,012,786
1979	871,688	0	0	0	0	871,688	23,421,881	24,675,598
1980	1,047,396	4,790	0	30	75	1,052,291	30,105,348	32,038,398
1981	1,037,469	4,790	0	30	75	1,042,364	33,884,524	35,516,366
1982	1,015,555	4,790	0	30	75	1,020,450	39,515,188	41,611,655
1983	1,146,269	4,957	0	30	77	1,151,333	54,543,263	56,802,781
1984	1,427,192	5,051	0	31	78	1,432,352	63,947,633	67,105,188
1985	1,849,827	5,051	0	31	78	1,854,987	69,700,009	73,272,898
1986	1,714,723	5,051	0	31	78	1,719,883	73,437,761	76,707,917
1987	1,689,141	4,324	0	26	67	1,693,558	71,443,424	75,217,576
1988	1,964,428	4,509	0	28	70	1,969,035	72,349,117	76,060,618
1989	1,768,942	4,509	0	28	70	1,773,549	73,894,076	78,662,348
1990	2,274,772	0	0	0	0	2,274,772	86,130,115	91,361,385
1991	2,187,841	0	0	0	0	2,187,841	86,877,284	90,982,870
1992	2,465,364	0	0	0	0	2,465,364	94,167,321	99,235,524
1993	2,811,441	0	0	0	0	2,811,441	100,019,568	107,299,130
1994	3,894,639	0	0	0	0	3,894,639	92,336,811	99,944,106
1995	3,481,049	0	0	0	0	3,481,049	98,887,435	105,659,504
1996	5,144,684	0	0	0	0	5,144,684	105,119,193	112,018,784
1997	2,523,741	(33)	0	0	0	2,523,708	107,647,058	113,385,326
1998	4,302,712	1,878,365	1,386	160,400	88,026	6,430,889	120,649,996	127,316,519
1999	4,235,897	1,957,943	16,646	184,325	87,373	6,482,183	126,770,225	136,051,673
2000	2,879,294	2,533,879	20,786	253,538	109,328	5,796,825	121,957,382	130,594,805
2001	3,114,729	2,233,473	14,426	151,374	57,878	5,571,880	135,885,738	143,233,923
2002	3,174,176	2,686,500	49,511	189,458	81,857	6,181,501	124,839,671	136,448,991
2003	3,333,349	2,780,276	44,211	200,986	85,015	6,443,837	126,099,281	135,006,812
2004	3,535,885	2,673,184	69,895	240,426	109,830	6,629,220	144,450,542	154,531,993
2005	3,837,238	2,979,942	120,379	292,354	137,878	7,367,791	122,350,247	130,424,375
2006	2,515,982	3,182,680	56,543	154,568	78,445	5,988,216	127,237,862	135,199,097
2007	3,214,194	2,947,240	24,929	13,664	15,094	6,215,120	158,256,442	167,888,922
2008	5,599,502	4,234,967	10,299	5,521	3,997	9,854,286	178,454,852	188,939,016
2009	5,181,613	3,720,825	20,503	8,770	8,179	8,939,890	159,816,542	170,213,210
2010	6,471,669	6,416,354	77,603	19,136	21,693	13,006,454	160,631,380	172,498,154
2011	6,174,247	5,762,901	39,858	13,760	12,291	12,003,057	173,164,127	186,106,184
2012	5,317,928	6,434,535	24,816	11,514	8,937	11,797,729	192,300,557	208,374,021
2013	5,956,827	7,955,679	54,228	26,376	22,836	14,015,945	217,499,883	232,505,319
2014	7,961,028	4,177,166	15,209	7,392	15,843	12,176,638	240,422,402	258,382,574
2015	10,292,578	6,629,682	(1,296)	7,644	22,009	16,950,617	225,059,801	244,809,620
2016	4,934,304	10,567,789	(5,127)	2,323	12,418	15,511,708	225,040,936	250,770,196
2017	5,750,877	5,685,980	0	0	0	11,436,857	260,409,876	283,495,311
2018	**6,014,051**	**6,267,468**	**0**	**0**	**0**	**12,281,519**	**286,616,806**	**305,661,577**
2019	6,268,785	6,582,713	0	0	0	12,851,498	288,063,222	307,964,354
2020	6,071,350	6,240,507	0	0	0	12,311,857	281,146,932	302,030,816
2021	6,132,064	6,302,912	0	0	0	12,434,976	283,958,401	305,051,123
2022	6,193,385	6,365,941	0	0	0	12,559,326	286,797,986	308,101,636
2023	6,255,318	6,429,601	0	0	0	12,684,919	289,665,965	311,182,650
2024	6,317,872	6,493,897	0	0	0	12,811,769	292,562,625	314,294,478
2025	6,381,050	6,558,836	0	0	0	12,939,886	295,488,247	317,437,420
2026	6,444,861	6,624,424	0	0	0	13,069,285	298,443,136	320,611,798
2027	6,509,309	6,690,668	0	0	0	13,199,977	301,427,560	323,817,909
2028	6,574,402	6,757,575	0	0	0	13,331,977	304,441,840	327,056,092
2029	6,640,146	6,825,151	0	0	0	13,465,297	307,486,259	330,326,654
2030	6,706,548	6,893,402	0	0	0	13,599,950	310,561,124	333,629,926
2031	6,773,613	6,962,336	0	0	0	13,735,949	313,666,729	336,966,216
2032	6,841,350	7,031,960	0	0	0	13,873,310	316,803,396	340,335,878
2033	6,909,763	7,102,279	0	0	0	14,012,042	319,971,434	343,739,240
2034	6,978,861	7,173,302	0	0	0	14,152,163	323,171,147	347,176,632
2035	7,048,649	7,245,035	0	0	0	14,293,684	326,402,858	350,648,400
TOTAL	**262,442,458**	**208,035,156**	**654,803**	**1,943,823**	**979,669**	**474,055,910**	**10,290,685,048**	**11,032,217,936**

[a] Includes certain costs to be assigned directly to Kern County Water Agency. Refer to Appendix B text discussion of Table B-16A under "Project Water Charges."

Tables B-12 through B-31

Note: Where applicable, the projected data values shown in this appendix are shaded and the bill year data are in **bold** type.

TABLE B-12 Variable OMP&R Costs to be Reimbursed through Variable OMP&R Component of Transportation Charge[a] (in dollars)

	NORTH BAY AQUEDUCT				SOUTH BAY AQUEDUCT	CALIFORNIA AQUEDUCT		
	Reach 1	Reach 3A	Reach 3B		Reach 1	Reach 1	Reach 4	Reach 14A
Calendar Year	Barker Slough Pumping Plant	Cordelia Pumping Plant (Solano)	Cordelia Pumping Plant (Napa)[b]	Total	South Bay and Del Valle Pumping Plants[c]	Banks Pumping Plant	Dos Amigos Pumping Plant	Buena Vista Pumping Plant
	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]
1962	0	0	0	0	36,970	0	0	0
1963	0	0	0	0	57,711	0	0	0
1964	0	0	0	0	74,134	0	0	0
1965	0	0	0	0	142,609	0	0	0
1966	0	0	0	0	192,605	0	0	0
1967	0	0	0	0	223,117	13,881	0	0
1968	0	0	6,989	6,989	336,671	452,630	202,947	0
1969	0	0	8,551	8,551	257,579	293,741	135,425	0
1970	0	0	13,598	13,598	396,358	346,215	211,197	1
1971	0	0	10,609	10,609	381,662	574,015	225,188	115,801
1972	0	0	14,434	14,434	598,702	933,292	502,196	198,914
1973	0	0	14,449	14,449	493,490	688,030	381,232	263,468
1974	0	0	17,473	17,473	565,575	783,562	447,772	315,939
1975	0	0	14,779	14,779	349,758	1,341,019	518,816	508,060
1976	0	0	20,856	20,856	571,361	1,638,453	641,115	712,947
1977	0	0	22,635	22,635	512,996	1,013,307	284,828	267,467
1978	0	0	21,692	21,692	586,355	2,339,502	607,042	689,236
1979	0	0	16,237	16,237	605,136	3,554,256	1,008,564	776,016
1980	0	0	19,945	19,945	523,369	2,083,336	1,129,152	1,051,629
1981	0	0	23,842	23,842	567,692	3,952,931	1,939,189	1,336,867
1982	0	0	12,157	12,157	605,780	3,082,031	1,363,705	1,200,226
1983	0	0	2,342	2,342	82,222	1,001,612	396,086	450,801
1984	0	0	4,822	4,822	271,543	1,856,959	976,773	823,681
1985	0	0	10,188	10,188	451,020	3,186,029	1,621,418	1,409,980
1986	0	0	15,501	15,501	814,111	6,595,625	2,627,407	2,405,224
1987	0	0	27,223	27,223	888,558	5,740,403	2,518,308	2,231,491
1988	17,813	0	24,020	41,833	911,176	6,276,214	2,610,048	2,560,122
1989	29,819	43,846	26,519	100,184	1,163,619	9,847,706	3,953,735	4,042,211
1990	52,210	67,109	40,775	160,094	1,834,626	10,460,533	4,498,260	5,779,750
1991	10,429	10,118	5,252	25,799	420,688	1,882,952	491,071	904,541
1992	13,319	13,070	9,406	35,795	339,021	3,129,419	1,147,502	1,221,282
1993	(11,941)	(8,753)	(5,392)	(26,086)	(150,856)	497,455	326,100	(108,089)
1994	46,791	39,624	29,189	115,604	801,374	5,677,009	2,305,603	2,523,572
1995	20,014	20,620	11,791	52,425	302,558	3,805,713	1,451,578	815,572
1996	57,320	47,288	23,483	128,091	718,807	8,192,821	4,009,531	2,493,264
1997	67,416	52,935	21,955	142,306	1,038,568	6,900,694	2,845,506	2,589,077
1998	(11,427)	(10,141)	(4,879)	(26,447)	(130,734)	185,756	(336,341)	(263,072)
1999	32,592	26,104	11,921	70,617	422,816	6,881,085	2,368,056	1,639,887
2000	58,200	42,262	14,978	115,441	903,391	7,901,803	3,012,840	2,925,486
2001	356,682	247,499	211,786	815,967	4,022,683	23,537,500	9,608,845	14,398,956
2002	190,460	104,564	61,470	356,494	2,324,926	17,025,395	6,894,223	8,423,374
2003	181,041	118,387	97,762	397,190	2,568,901	21,144,026	8,873,171	10,393,208
2004	251,516	139,241	107,251	498,008	2,555,185	21,511,700	9,305,291	12,251,722
2005	285,238	147,895	149,083	582,216	2,835,209	28,306,243	12,456,894	11,506,677
2006	235,554	116,778	147,715	500,048	2,771,143	23,390,987	10,502,528	11,271,801
2007	451,874	228,029	257,003	936,906	4,242,890	25,193,715	10,890,726	16,129,285
2008	424,387	196,005	302,382	922,774	3,337,945	17,301,200	6,127,107	11,219,442
2009	218,875	103,270	163,059	485,204	2,487,645	9,220,733	4,051,527	6,862,717
2010	260,461	112,286	215,361	588,108	2,374,996	21,169,149	9,474,295	10,605,705
2011	270,494	116,080	228,389	614,963	3,410,623	35,600,954	15,174,317	14,431,689
2012	272,274	123,848	189,860	585,982	3,532,005	27,402,758	11,998,712	13,706,381
2013	433,366	206,710	321,203	961,279	5,421,186	22,683,408	8,669,438	12,232,320
2014	360,566	184,440	445,044	990,050	4,098,389	11,256,153	3,520,480	6,989,348
2015	382,363	234,927	352,542	969,832	5,655,730	16,676,840	5,255,421	9,729,168
2016	274,720	157,250	254,017	685,987	4,349,510	29,370,082	11,642,182	15,665,967
2017	608,358	873,393	32,936	1,514,687	4,589,002	41,379,124	15,842,919	16,343,912
2018	**889,310**	**772,483**	**849,429**	**2,511,222**	**5,013,974**	**36,909,582**	**13,908,066**	**17,275,233**
2019	873,019	796,213	833,869	2,503,101	5,013,070	37,192,363	13,665,723	17,333,625
2020	538,444	521,553	811,480	1,871,477	5,023,688	40,824,101	14,939,629	19,208,661
2021	546,329	555,647	846,629	1,948,605	5,095,246	21,081,316	15,132,589	19,442,056
2022	544,391	553,676	843,626	1,941,693	5,077,174	45,255,250	15,176,274	19,549,220
2023	545,808	555,117	845,821	1,946,746	5,090,386	32,295,950	15,323,630	19,796,302
2024	545,834	555,144	845,862	1,946,840	5,090,632	29,718,063	15,115,968	19,419,184
2025	545,765	555,073	845,755	1,946,593	5,089,986	37,464,819	15,277,734	19,713,310
2026	546,082	555,396	846,246	1,947,724	5,092,944	29,166,970	15,034,007	19,268,138
2027	545,979	555,291	846,086	1,947,356	5,091,979	32,627,998	15,321,145	19,789,216
2028	545,803	555,111	845,813	1,946,727	5,090,336	31,185,288	15,107,385	19,404,162
2029	545,823	555,132	845,845	1,946,800	5,090,527	33,203,856	15,255,254	19,671,568
2030	545,826	555,135	845,849	1,946,810	5,090,550	30,505,979	15,050,623	19,301,631
2031	545,845	555,154	845,878	1,946,877	5,090,729	37,469,555	15,898,369	20,860,654
2032	545,886	555,197	845,943	1,947,026	5,091,117	28,315,945	14,633,389	18,559,008
2033	545,585	554,890	845,476	1,945,951	5,088,308	37,681,564	15,869,110	20,809,924
2034	545,832	555,141	845,858	1,946,831	5,090,606	30,130,099	14,733,011	18,735,359
2035	547,137	556,469	847,882	1,951,488	5,102,783	30,276,874	17,124,948	23,222,472
TOTAL	**16,329,482**	**14,172,507**	**19,227,550**	**49,729,539**	**171,154,139**	**1,106,585,525**	**479,276,778**	**595,402,747**

[a] Excludes extra peaking costs assigned directly to contractors. Refer to Appendix B text discussion of Table B-17 under "Project Water Charges."

[b] Costs for the period 1968 through 1987 are for an interim facility.

[c] The relatively minor costs of Del Valle Pumping Plant have been combined with those of South Bay Pumping Plant to simplify the allocation procedures.

TABLE B-12 Variable OMP&R Costs to be Reimbursed through Variable OMP&R Component of Transportation Charge[a] (in dollars)

	CALIFORNIA AQUEDUCT (continued)						
	Reach 15A	Reach 16A	Reach 17E	Reach 18A	Reach 22B	Reach 23	Reach 24
Calendar Year	Wheeler Ridge Pumping Plant	Chrisman Pumping Plant	Edmonston Pumping Plant	Alamo Pumping Plant	Pearblossom Pumping Plant	Mojave Siphon Powerplant	Silverwood Lake[d]
	[9]	[10]	[11]	[12]	[13]	[14]	[15]
1962	0	0	0	0	0	0	0
1963	0	0	0	0	0	0	0
1964	0	0	0	0	0	0	0
1965	0	0	0	0	0	0	0
1966	0	0	0	0	0	0	0
1967	0	0	0	0	0	0	0
1968	0	0	0	0	0	0	0
1969	0	0	0	0	0	0	0
1970	0	0	0	0	0	0	0
1971	2,564	0	0	0	0	0	0
1972	68,304	142,902	542,625	0	3,468	0	0
1973	236,623	387,198	1,548,428	0	202,289	0	0
1974	324,966	564,464	2,164,223	0	324,993	0	0
1975	552,952	1,095,331	4,010,395	0	575,061	0	0
1976	713,875	1,506,985	5,443,936	0	889,544	0	0
1977	303,107	657,108	2,360,624	0	315,128	0	0
1978	616,104	1,132,296	4,180,131	0	1,508,115	0	0
1979	749,188	1,526,850	5,475,688	0	1,838,687	0	0
1980	1,047,495	2,102,439	7,028,235	0	1,762,063	0	0
1981	1,319,739	2,838,773	9,351,931	0	2,296,771	0	0
1982	1,213,660	2,424,920	8,352,207	0	1,498,620	0	0
1983	432,165	793,915	2,375,225	0	397,766	0	0
1984	770,618	1,479,784	4,585,198	0	624,213	0	0
1985	1,411,621	2,812,461	9,365,591	0	1,226,515	0	0
1986	2,432,322	4,999,949	16,956,023	(1,013,756)	2,359,599	0	0
1987	2,213,047	4,434,510	14,612,448	(1,017,868)	1,814,728	0	243,983
1988	2,557,952	5,120,998	16,801,811	(742,800)	2,370,395	0	37,927
1989	4,061,396	8,559,270	28,732,499	(788,139)	4,228,697	0	50,884
1990	6,013,924	13,616,111	48,319,508	(832,947)	6,490,357	0	187,259
1991	1,032,050	2,427,880	8,647,065	(269,625)	996,352	0	0
1992	1,274,895	2,560,253	8,575,989	(916,154)	1,142,454	0	317,172
1993	(86,676)	(490,235)	(2,223,221)	(55,346)	(245,059)	0	(79,954)
1994	2,537,943	5,323,430	18,470,003	(59,356)	2,605,813	0	0
1995	725,389	1,435,098	4,738,967	(1,187,312)	972,086	0	777,343
1996	2,299,388	4,875,010	17,027,386	(2,788,262)	2,647,473	(914,092)	1,053,254
1997	2,417,154	5,424,334	19,413,834	(2,488,338)	3,037,087	(1,680,469)	0
1998	(236,322)	(524,933)	(1,809,182)	(1,969,187)	(431,135)	(1,217,950)	(149,186)
1999	1,349,435	3,454,259	13,349,865	(2,851,993)	1,933,516	(2,533,429)	76,199
2000	2,995,367	6,892,863	24,868,765	(5,070,499)	3,889,138	(4,371,978)	0
2001	14,749,926	33,210,381	122,677,209	(3,276,174)	18,689,339	(3,621,886)	919,165
2002	8,731,692	19,721,183	72,471,745	(4,919,131)	10,667,928	(5,247,076)	95,265
2003	10,814,071	24,634,664	90,645,519	(3,362,477)	14,524,245	(6,610,346)	231,996
2004	12,863,080	29,368,759	107,972,655	(6,248,061)	16,993,152	(7,691,613)	0
2005	11,769,639	26,675,193	94,388,290	(5,791,742)	17,552,651	(6,359,950)	0
2006	11,446,002	26,079,864	81,830,583	(4,022,339)	15,984,047	(6,347,742)	0
2007	16,657,505	37,657,877	125,592,420	(2,976,651)	19,486,841	(5,872,118)	0
2008	12,277,333	24,908,362	77,920,768	(3,305,736)	10,680,902	(3,203,162)	321,113
2009	7,293,452	15,756,149	71,001,293	(3,096,612)	9,125,019	(2,225,065)	2,053
2010	10,772,730	24,318,543	88,899,186	(4,913,035)	16,724,848	(5,543,596)	0
2011	14,469,641	32,457,315	113,767,599	(6,340,454)	23,163,495	(7,675,700)	496,271
2012	13,787,396	31,183,496	109,312,720	(2,424,628)	17,306,719	(8,836,129)	0
2013	12,436,626	28,155,154	98,973,325	(1,989,602)	12,004,814	(4,750,469)	0
2014	7,200,568	16,292,682	56,951,238	(1,305,981)	5,092,403	(1,023,443)	136,646
2015	10,694,074	24,047,435	86,952,896	(2,190,877)	8,754,284	(2,009,231)	838,571
2016	16,421,140	36,794,594	135,878,205	(7,658,895)	23,431,324	(8,562,491)	0
2017	16,802,622	37,648,975	136,451,858	(10,503,383)	21,404,438	(12,847,852)	0
2018	**17,677,385**	**40,275,921**	**147,146,264**	**(9,561,863)**	**27,954,825**	**(12,920,357)**	**0**
2019	17,743,485	40,434,791	147,741,581	(9,604,458)	28,092,681	(13,056,799)	0
2020	19,708,818	44,881,509	164,099,308	(8,747,530)	28,238,152	(12,556,080)	0
2021	19,945,610	45,418,765	166,056,157	(8,787,956)	28,717,475	(12,583,138)	0
2022	20,065,799	45,700,241	167,113,655	(8,808,782)	28,692,098	(12,618,573)	0
2023	20,330,955	46,312,926	169,386,100	(8,959,031)	29,278,925	(12,855,529)	0
2024	19,921,842	45,364,412	165,856,600	(10,676,161)	27,973,758	(12,251,955)	0
2025	20,240,948	46,104,262	168,609,692	(11,036,948)	29,037,259	(12,744,720)	0
2026	19,757,755	44,983,831	164,439,919	(10,764,320)	28,246,523	(12,371,800)	0
2027	20,322,896	46,293,973	169,314,614	(10,976,433)	28,868,957	(12,661,642)	0
2028	19,905,631	45,326,887	165,717,193	(10,862,332)	28,521,660	(12,505,466)	0
2029	20,195,526	45,998,850	168,217,078	(10,916,768)	28,683,869	(12,579,899)	0
2030	19,794,534	45,069,420	164,759,517	(10,813,164)	28,377,491	(12,438,356)	0
2031	21,490,200	49,004,182	179,413,851	(11,262,204)	29,712,381	(13,055,496)	0
2032	18,992,051	43,211,313	157,854,315	(10,441,052)	27,285,722	(11,934,104)	0
2033	21,435,398	48,877,271	178,942,094	(11,345,262)	29,946,399	(13,170,699)	0
2034	19,182,381	43,651,824	159,490,675	(10,600,557)	27,751,119	(12,149,465)	0
2035	24,084,674	55,044,947	201,987,901	(11,481,885)	30,441,980	(13,360,920)	0
TOTAL	**611,333,628**	**1,378,440,173**	**4,981,100,223**	**(282,024,066)**	**824,682,455**	**(336,960,785)**	**5,555,962**

[a] Excludes extra peaking costs assigned directly to contractors. Refer to Appendix B text discussion of Table B-17 under "Project Water Charges."

[d] These values represent a proportionate allocation of the total variable OMP&R costs of pumping and recovery plants (Table B-3) associated with net annual withdrawals from storage for Project Transportation Facilities. The allocation is determined annually by applying the following ratio, calculated from the data shown in Table B-6: "Reservoir Storage Changes" (withdrawals, as a positive value) conveyed through each plant, divided by "Total" annual quantity conveyed through each plant, in acre-feet. The costs so determined are accumulated for all upstream plants for each year, for each respective reservoir.

TABLE B-12 Variable OMP&R Costs to be Reimbursed through Variable OMP&R Component of Transportation Charge[a] (in dollars)

	CALIFORNIA AQUEDUCT (continued)						
	Reach 26A	Reach 2B (EBX)	Reach 3A (EBX)	Reach 4B (EBX)	Reach 28J	Reach 29A	Reach 29G
Calendar Year	Devil Canyon Powerplant	Greenspot Pump Station	Crafton Hills Pump Station	Cherry Valley Pump Station	Lake Perris[d]	Oso Pumping Plant	Warne Powerplant
	[16]	[17]	[18]	[19]	[20]	[21]	[22]
1962	0	0	0	0	0	0	0
1963	0	0	0	0	0	0	0
1964	0	0	0	0	0	0	0
1965	0	0	0	0	0	0	0
1966	0	0	0	0	0	0	0
1967	0	0	0	0	0	0	0
1968	0	0	0	0	0	0	0
1969	0	0	0	0	0	0	0
1970	0	0	0	0	0	0	0
1971	0	0	0	0	0	0	0
1972	(3,024)	0	0	0	0	79,315	0
1973	(461,268)	0	0	0	0	122,787	0
1974	(546,156)	0	0	0	0	157,511	0
1975	(1,095,523)	0	0	0	0	314,636	0
1976	(1,566,056)	0	0	0	0	326,967	0
1977	(1,222,866)	0	0	0	0	75,335	0
1978	(3,085,094)	0	0	0	0	89,383	0
1979	(3,466,481)	0	0	0	0	102,584	0
1980	(3,318,152)	0	0	0	0	236,768	0
1981	(3,842,971)	0	0	0	0	444,280	0
1982	(2,736,072)	0	0	0	0	539,245	(783,626)
1983	(5,478,830)	0	0	0	0	214,069	(1,488,439)
1984	(7,350,989)	0	0	0	0	484,239	(4,088,209)
1985	(10,748,103)	0	0	0	0	874,069	(5,930,176)
1986	(11,484,996)	0	0	0	0	1,269,590	(5,579,301)
1987	(10,814,483)	0	0	0	53,242	1,323,472	(6,292,822)
1988	(14,495,967)	0	0	0	0	1,421,372	(6,994,588)
1989	(18,688,631)	0	0	0	0	2,046,005	(8,368,716)
1990	(20,911,839)	0	0	0	147,163	2,857,442	(11,011,193)
1991	(4,884,013)	0	0	0	0	535,456	(3,604,791)
1992	(9,513,281)	0	0	0	(61,233)	686,984	(5,272,726)
1993	(7,502,549)	0	0	0	0	51,327	(3,380,473)
1994	(11,815,745)	0	0	0	80,824	1,210,469	(5,835,219)
1995	(9,742,248)	0	0	0	0	151,109	(1,179,155)
1996	(12,358,465)	0	0	0	0	895,929	(4,248,531)
1997	(13,293,791)	0	0	0	111,776	897,657	(4,797,589)
1998	(10,108,555)	0	0	0	0	(27,767)	(746,113)
1999	(14,952,833)	0	0	0	(41,318)	680,911	(5,341,364)
2000	(25,522,757)	0	0	0	(110,900)	1,206,908	(9,464,490)
2001	(19,510,278)	0	0	0	0	6,074,627	(7,614,510)
2002	(24,676,763)	0	0	0	0	3,806,295	(10,286,903)
2003	(27,490,216)	0	0	0	1,149,466	4,337,249	(9,899,070)
2004	(31,246,167)	78,555	68,914	7,290	0	5,407,923	(11,835,098)
2005	(28,682,474)	69,542	48,909	2,544	5,151,512	3,422,443	(6,683,632)
2006	(34,389,659)	123,143	144,018	16,224	0	2,547,393	(6,870,988)
2007	(28,529,045)	248,626	256,313	11,163	589,895	6,194,316	(9,522,236)
2008	(16,403,544)	243,110	327,193	7,446	0	4,426,718	(7,184,125)
2009	(13,474,182)	360,373	391,267	7,529	418,666	4,329,801	(6,578,744)
2010	(24,427,811)	313,550	431,074	19,508	0	3,283,919	(5,697,650)
2011	(31,980,782)	372,514	500,595	33,173	0	3,283,485	(5,505,320)
2012	(23,571,258)	451,864	551,811	49,817	231,111	5,177,314	(8,230,796)
2013	(14,097,814)	484,575	567,013	68,886	0	6,272,208	(8,740,718)
2014	(3,836,008)	315,568	438,094	51,887	0	4,393,821	(4,122,547)
2015	(6,410,003)	336,513	449,455	14,768	748,246	6,687,053	(6,280,593)
2016	(21,855,062)	696,498	771,555	48,482	0	6,054,743	(6,658,921)
2017	(20,095,915)	408,105	471,130	81,754	0	4,940,380	(5,610,839)
2018	**(25,307,487)**	**286,657**	**307,280**	**77,492**	**0**	**5,001,173**	**(5,792,087)**
2019	(25,564,234)	280,044	300,191	75,704	0	5,004,814	(5,813,755)
2020	(25,141,758)	479,833	327,761	82,657	0	5,875,360	(6,340,713)
2021	(24,696,529)	486,860	332,561	83,867	0	5,847,146	(6,216,658)
2022	(24,278,415)	485,133	331,382	83,570	0	5,980,974	(6,382,564)
2023	(24,940,354)	486,396	332,244	83,787	0	6,000,447	(6,386,750)
2024	(24,664,581)	486,419	332,260	83,791	0	6,134,257	(6,530,546)
2025	(24,547,210)	486,357	332,218	83,781	0	6,008,627	(6,396,015)
2026	(24,800,245)	486,640	332,411	83,829	0	5,852,251	(6,224,945)
2027	(24,662,390)	486,548	332,348	83,814	0	6,158,508	(6,553,957)
2028	(24,846,762)	486,391	332,241	83,787	0	5,887,318	(6,266,476)
2029	(24,597,557)	486,409	332,253	83,790	0	6,108,092	(6,501,842)
2030	(24,675,842)	486,411	332,255	83,790	0	5,836,874	(6,211,430)
2031	(24,744,441)	486,428	332,266	83,793	0	7,046,719	(7,507,715)
2032	(24,132,456)	486,465	332,292	83,799	0	5,498,915	(5,849,886)
2033	(25,410,490)	486,197	332,108	83,753	0	6,865,984	(7,317,339)
2034	(24,051,581)	486,417	332,258	83,791	0	5,501,154	(5,852,140)
2035	(25,668,365)	487,580	333,053	83,991	0	10,633,378	(11,342,632)
TOTAL	**(1,058,419,416)**	**12,845,719**	**11,336,723**	**1,913,255**	**8,468,449**	**211,149,733**	**(341,217,661)**

[a] Excludes extra peaking costs assigned directly to contractors. Refer to Appendix B text discussion of Table B-17 under "Project Water Charges."

[d] These values represent a proportionate allocation of the total variable OMP&R costs of pumping and recovery plants (Table B-3) associated with net annual withdrawals from storage for Project Transportation Facilities. The allocation is determined annually by applying the following ratio, calculated from the data shown in Table B-6: "Reservoir Storage Changes" (withdrawals, as a positive value) conveyed through each plant, divided by "Total" annual quantity conveyed through each plant, in acre-feet. The costs so determined are accumulated for all upstream plants for each year, for each respective reservoir.

TABLE B-12 Variable OMP&R Costs to be Reimbursed through Variable OMP&R Component of Transportation Charge[a] (in dollars)

Calendar Year	CALIFORNIA AQUEDUCT (continued)						
	Reach 29H	Reach 29J	Reach 30	Reach 31A	Reach 33A		
	Pyramid Lake[d]	Castaic Powerplant	Castaic Lake[d]	Las Perillas and Badger Hill Pumping Plants	Devil's Den, Bluestone, and Polonio Pass Pumping Plants	Total	Grand Total
	[23]	[24]	[25]	[26]	[27]	[28]	[29]
1962	0	0	0	0	0	0	36,970
1963	0	0	0	0	0	0	57,711
1964	0	0	0	0	0	0	74,134
1965	0	0	0	0	0	0	142,609
1966	0	0	0	0	0	0	192,605
1967	0	0	0	0	0	13,881	236,998
1968	0	0	0	118,676	0	774,253	1,117,913
1969	0	0	0	78,350	0	507,516	773,646
1970	0	0	0	136,429	0	693,842	1,103,798
1971	0	0	0	166,296	0	1,083,864	1,476,135
1972	0	(211,144)	0	237,638	0	2,494,486	3,107,622
1973	0	(1,057,564)	0	120,913	0	2,432,136	2,940,075
1974	0	(1,547,884)	0	118,582	0	3,107,972	3,691,020
1975	0	(2,455,461)	0	94,848	0	5,460,134	5,824,671
1976	0	(2,827,557)	0	141,260	0	7,621,469	8,213,686
1977	0	(3,734,462)	0	71,311	0	390,887	926,518
1978	0	(1,542,479)	0	179,925	0	6,714,161	7,322,208
1979	0	(2,773,323)	0	192,126	0	8,984,155	9,605,528
1980	0	(3,408,863)	0	168,458	0	9,882,560	10,425,874
1981	0	(2,834,322)	0	169,177	0	16,972,365	17,563,899
1982	0	(3,463,971)	0	168,390	0	12,859,335	13,477,272
1983	0	(6,649,626)	0	17,920	0	(7,537,336)	(7,452,772)
1984	0	(4,710,802)	0	112,679	0	(4,435,856)	(4,159,491)
1985	0	(15,698,638)	0	146,843	0	(10,322,390)	(9,861,182)
1986	0	(11,072,448)	0	297,886	0	10,793,124	11,622,736
1987	80,822	(11,557,616)	(43,085)	245,082	0	5,785,662	6,701,444
1988	54,038	(12,295,001)	(210,845)	214,519	0	5,286,197	6,239,206
1989	84,370	(14,812,039)	89,852	282,180	0	23,321,280	24,585,082
1990	0	(20,116,741)	245,034	416,832	0	46,159,454	48,154,174
1991	432,382	(6,579,194)	0	3,610	0	2,015,735	2,462,222
1992	29,879	(9,167,653)	(1,141,229)	101,665	0	(5,884,783)	(5,509,967)
1993	(675,438)	(7,895,978)	(2,751,590)	(111,306)	0	(24,731,032)	(24,907,974)
1994	0	(10,565,940)	(81,262)	206,086	0	12,583,232	13,500,210
1995	544,099	(4,049,615)	0	243,434	0	(497,940)	(142,957)
1996	0	(8,457,232)	0	296,170	0	15,023,644	15,870,542
1997	0	(8,727,328)	(897)	298,483	208,816	13,156,005	14,336,879
1998	(965,988)	(3,360,851)	(2,139,549)	(55,491)	(92,902)	(24,248,768)	(24,405,949)
1999	0	(9,672,802)	0	164,612	235,962	(3,259,953)	(2,766,520)
2000	0	(17,958,033)	0	229,350	378,042	(8,198,096)	(7,179,264)
2001	988,149	(13,495,346)	2,379,745	1,070,732	2,140,040	202,926,420	207,765,070
2002	0	(18,455,025)	0	544,053	1,351,160	86,147,416	88,828,837
2003	833,202	(16,903,355)	963,704	636,922	1,525,171	126,441,150	129,407,241
2004	222,007	(21,110,644)	685,188	672,547	1,778,968	141,056,166	144,109,359
2005	4,755,989	(12,763,664)	4,548,906	846,063	1,714,250	162,934,283	166,351,708
2006	529,562	(11,822,176)	6,079,441	850,922	1,427,028	128,770,639	132,041,829
2007	0	(19,017,327)	0	1,306,516	2,313,454	196,611,274	201,791,070
2008	0	(14,961,833)	1,324,015	1,129,223	1,735,661	124,891,191	129,151,910
2009	408,125	(15,570,055)	0	695,228	1,211,003	90,190,277	93,163,126
2010	0	(10,738,810)	0	902,260	1,484,505	137,078,369	140,041,473
2011	0	(11,102,175)	1,993,071	1,112,193	2,128,379	196,380,259	200,405,845
2012	186,601	(15,133,885)	0	1,006,706	2,018,454	176,175,163	180,293,150
2013	76,649	(15,520,329)	458,926	1,354,887	2,043,551	161,382,847	167,765,312
2014	0	(7,773,330)	2,164,456	1,557,465	2,102,514	100,402,014	105,490,452
2015	193,769	(11,048,588)	4,865,386	1,557,393	1,891,651	151,753,631	158,379,192
2016	423,101	(11,849,796)	10,681,932	1,513,291	3,009,246	235,817,178	240,852,674
2017	0	(9,319,489)	0	1,365,805	3,699,047	238,462,591	244,566,280
2018	**0**	**(9,021,995)**	**0**	**1,274,982**	**3,678,211**	**249,169,282**	**256,694,478**
2019	0	(9,055,531)	0	1,281,447	3,760,799	249,812,471	257,328,642
2020	0	(9,994,475)	0	585,458	5,088,684	281,559,375	288,454,540
2021	0	(9,795,272)	0	593,827	5,164,730	266,223,406	273,267,257
2022	0	(10,063,438)	0	591,718	5,146,413	292,019,955	299,038,822
2023	0	(10,070,208)	0	592,796	5,159,805	282,168,391	289,205,523
2024	0	(10,301,613)	0	593,571	5,160,055	271,735,324	278,772,796
2025	0	(10,085,195)	0	593,379	5,159,399	284,301,697	291,338,276
2026	0	(9,808,658)	0	593,772	5,162,397	269,438,475	276,479,143
2027	0	(10,340,851)	0	593,447	5,161,420	280,159,611	287,198,946
2028	0	(9,874,492)	0	592,896	5,159,754	273,355,065	280,392,128
2029	0	(10,256,458)	0	593,369	5,159,947	279,137,337	286,174,664
2030	0	(9,786,828)	0	593,456	5,159,971	271,426,332	278,463,692
2031	0	(11,891,649)	0	593,466	5,160,152	299,090,511	306,128,117
2032	0	(9,202,531)	0	593,369	5,160,546	259,447,100	266,485,243
2033	0	(11,581,140)	0	593,016	5,157,698	298,255,586	305,289,845
2034	0	(9,207,339)	0	592,822	5,160,029	263,969,857	271,007,294
2035	0	(18,250,558)	0	594,797	5,172,369	319,384,604	326,438,875
TOTAL	**8,201,319**	**(634,378,625)**	**30,111,199**	**35,436,724**	**124,236,382**	**7,773,076,442**	**7,993,960,120**

[a] Excludes extra peaking costs assigned directly to contractors. Refer to Appendix B text discussion of Table B-17 under "Project Water Charges."

[d] These values represent a proportionate allocation of the total variable OMP&R costs of pumping and recovery plants (Table B-3) associated with net annual withdrawals from storage for Project Transportation Facilities. The allocation is determined annually by applying the following ratio, calculated from the data shown in Table B-6: "Reservoir Storage Changes" (withdrawals, as a positive value) conveyed through each plant, divided by "Total" annual quantity conveyed through each plant, in acre-feet. The costs so determined are accumulated for all upstream plants for each year, for each respective reservoir.

TABLE B-13 Capital and Operating Costs of Project Conservation Facilities to be Reimbursed through Delta Water Charge (in dollars)

Calendar Year	Initial Project Conservation Facilities (Portions of Upper Feather Lakes, Oroville-Thermalito, and California Aqueduct Facilities)					Planning and Pre-operating Costs[a,f]	Total
				Application of Oroville Power Revenues to:			
	Capital Costs[a]	Capital Cost Credits[b]	Operating Costs[c]	Capital Costs[d]	Operating Costs[e]		
	[1]	[2]	[3]	[4]	[5]	[6]	[7]
1952	171,322	0	0	0	0	0	171,322
1953	312,190	0	0	0	0	0	312,190
1954	308,624	0	0	0	0	0	308,624
1955	194,645	0	0	0	0	0	194,645
1956	1,357,077	0	0	0	0	0	1,357,077
1957	6,210,709	0	0	0	0	0	6,210,709
1958	9,510,916	0	0	0	0	0	9,510,916
1959	11,390,586	0	0	0	0	0	11,390,586
1960	14,463,274	(4,850,000)	0	0	0	0	9,613,274
1961	18,729,965	(431,527)	0	0	0	0	18,298,438
1962	9,099,967	(479,280)	0	0	0	0	8,620,687
1963	73,098,107	(478,743)	(14,000)	0	0	0	72,605,364
1964	62,629,003	(751,330)	(14,000)	0	0	107,780	61,971,453
1965	71,048,877	(763,541)	(14,000)	0	0	551,850	70,823,186
1966	125,376,541	(748,649)	(14,000)	0	0	1,081,023	125,694,915
1967	94,481,603	(812,145)	(13,446)	0	0	1,189,212	94,845,224
1968	39,986,145	(431,574)	1,303,821	(951,000)	0	793,399	40,700,791
1969	5,367,865	(259,015)	2,890,772	(11,007,000)	0	601,867	(2,405,511)
1970	4,208,411	(203,733)	4,818,634	(14,650,000)	(1,500,000)	516,659	(6,810,029)
1971	3,956,703	(193,631)	6,026,480	(14,650,000)	(1,500,000)	408,754	(5,951,694)
1972	4,662,255	(196,361)	5,393,011	(14,650,000)	(1,500,000)	287,374	(6,003,721)
1973	4,090,078	(136,997)	6,135,774	(14,650,000)	(1,500,000)	203,384	(5,857,761)
1974	6,852,718	(137,503)	6,944,723	(17,950,000)	(1,500,000)	201,907	(5,588,155)
1975	8,343,833	(234,567)	7,697,390	(14,650,000)	(1,500,000)	146,188	(197,156)
1976	6,189,618	(204,944)	7,067,037	(14,650,000)	(1,500,000)	205,234	(2,893,055)
1977	21,554,452	(150,214)	10,547,977	(14,650,000)	(1,500,000)	857,419	16,659,634
1978	8,031,393	(64,566)	12,851,158	(14,650,000)	(1,500,000)	2,131,286	6,799,271
1979	9,751,861	0	9,547,014	(14,650,000)	(1,500,000)	2,131,884	5,280,759
1980	11,345,574	0	13,258,298	(14,650,000)	(1,500,000)	3,638,851	12,092,723
1981	11,921,267	0	10,326,538	(14,650,000)	(1,500,000)	4,597,474	10,695,279
1982	17,479,059	0	16,154,872	(14,650,000)	(1,500,000)	4,594,682	22,078,613
1983	12,763,378	0	22,251,331	(34,705,000)	(8,735,000)	3,751,993	(4,673,298)
1984	9,367,268	0	22,700,224	(14,650,000)	(10,348,000)	2,979,126	10,048,618
1985	12,538,173	0	23,462,283	(14,650,000)	(8,198,000)	2,069,024	15,221,480
1986	21,586,488	0	26,479,379	(14,650,000)	(9,107,000)	1,602,419	25,911,286
1987	32,734,633	0	23,479,839	(14,650,000)	(9,451,000)	1,762,179	33,875,651
1988	33,028,679	0	25,832,491	(14,650,000)	(8,677,000)	1,808,899	37,343,069
1989	11,075,132	0	28,442,946	(14,650,000)	(8,102,000)	2,678,007	19,444,085
1990	28,764,328	0	37,430,776	(14,650,000)	(8,498,000)	1,436,712	44,483,816
1991	37,462,303	0	76,586,450	(14,650,000)	(9,487,000)	1,727,664	91,639,417
1992	29,169,134	0	32,280,229	(14,650,000)	(8,526,000)	1,707,822	39,981,185
1993	22,366,873	0	36,884,103	(14,650,000)	(8,768,000)	1,708,490	37,541,465
1994	14,709,626	0	41,193,693	(14,650,000)	(7,484,000)	2,134,392	35,903,711
1995	15,120,856	0	46,162,374	(14,650,000)	(4,976,939)	2,042,481	43,698,773
1996	11,003,975	0	50,885,567	(14,650,000)	(5,503,289)	2,448,692	44,184,945
1997	15,281,018	0	51,788,497	(14,650,000)	(5,740,515)	1,699,730	48,378,730
1998	3,866,877	0	54,726,293	(14,650,000)	(8,155,000)	1,193,198	36,981,368
1999	7,776,449	0	56,095,722	(14,650,000)	(9,198,000)	9,686	40,033,857
2000	10,849,819	0	56,042,129	(14,688,338)	(10,297,482)	13,491	41,919,619
2001	10,950,774	0	75,778,041	(16,223,803)	(14,328,482)	23,866	56,200,395
2002	20,392,407	0	67,977,990	(19,498,891)	(20,826,560)	24,426	48,069,371
2003	23,661,304	0	77,724,424	(20,605,664)	(29,982,088)	9,833	50,807,808
2004	21,656,196	0	91,159,331	(17,530,688)	(35,845,422)	7,548	59,446,965
2005	6,613,010	0	104,208,826	(15,354,462)	(22,004,805)	0	73,462,569
2006	11,472,605	0	102,904,994	(15,210,585)	(21,412,577)	0	77,754,437
2007	8,513,337	0	87,559,146	(14,734,855)	(17,033,961)	0	64,303,667
2008	7,368,459	0	105,465,829	(14,968,129)	(19,570,602)	0	78,295,557
2009	7,609,659	0	114,975,150	(15,959,419)	(20,921,647)	0	85,703,742
2010	8,248,853	0	124,016,204	(15,958,194)	(20,222,025)	0	96,084,837
2011	13,238,273	0	127,545,998	(15,958,715)	(19,207,013)	0	105,618,543
2012	28,037,642	0	127,291,422	(16,032,565)	(22,105,563)	0	117,190,935
2013	101,196,155	0	135,964,416	(16,034,532)	(20,414,514)	0	200,711,525
2014	83,357,722	0	144,648,437	(15,841,275)	(18,597,043)	0	193,567,842
2015	46,912,564	0	150,893,706	(20,657,953)	(17,587,782)	0	159,560,535
2016	98,493,674	0	192,631,252	(20,867,882)	(16,990,228)	0	253,266,815
2017	132,031,821	0	180,386,967	(21,978,371)	(14,647,695)	0	275,792,722
2018	**168,332,187**	**0**	**186,137,319**	**(23,575,903)**	**(16,941,315)**	**0**	**313,952,288**
2019	141,534,317	0	195,405,475	(35,061,614)	(18,889,674)	0	282,988,504
2020	106,826,467	0	200,129,762	(38,107,531)	(16,994,490)	0	251,854,208
2021	38,239,962	0	177,187,641	(41,057,022)	(17,164,435)	0	157,206,146
2022	412,999	0	194,346,946	(41,052,977)	(17,336,080)	0	136,370,888
2023	412,999	0	187,615,701	(41,048,683)	(17,509,440)	0	129,470,577
2024	412,999	0	189,242,997	(40,937,378)	(17,684,535)	0	131,034,083
2025	412,999	0	191,595,270	(41,159,216)	(17,861,380)	0	132,987,673
2026	412,999	0	190,038,780	(41,043,216)	(18,039,994)	0	131,368,569
2027	412,999	0	192,904,683	(41,037,644)	(18,220,394)	0	134,059,644
2028	412,999	0	196,983,468	(41,053,721)	(18,402,598)	0	137,940,148
2029	412,999	0	197,709,458	(40,934,886)	(18,586,624)	0	138,600,947
2030	412,999	0	199,060,176	(47,521,123)	(18,772,490)	0	133,179,562
2031	412,999	0	202,011,698	(47,526,033)	(18,960,215)	0	135,938,449
2032	412,999	0	202,622,048	(47,526,789)	(19,149,817)	0	136,358,441
2033	412,999	0	207,816,570	(47,519,260)	(19,341,315)	0	141,368,994
2034	412,999	0	205,783,940	(47,522,896)	(19,534,728)	0	139,139,315
2035	412,999	0	204,785,420	(47,514,272)	(19,730,076)	0	137,954,071
TOTAL	**2,082,059,018**	**(11,528,320)**	**6,366,127,863**	**(1,534,117,485)**	**(849,569,832)**	**57,085,905**	**6,110,057,149**

[a] Reimbursed through the capital cost component of the Delta Water Charge.

[b] Negotiated settlements as to the magnitude of SWP planning costs from 1952 through 1978.

[c] Reimbursed through the minimum OMP&R component of the Delta Water Charge. Credits for Gianelli power generation are reflected in these net costs.

[d] Revenues credited through the capital cost component of the Delta Water Charge.

[e] Revenues credited through the minimum OMP&R component of the Delta Water Charge.

[f] Under amendments of Articles 22(e) and 22(g), planning and pre-operating costs of additional Project Conservation Facilities incurred through the previous year reflected in the Delta Water Charge.

Tables B-14 through B-31

Note: Where applicable, the projected data values shown in this appendix are shaded and the bill year data are in **bold** type.

TABLE B-14 Capital Costs of Transportation Facilities Allocated to Each Contractor (in dollars)

Calendar Year	NORTH BAY AREA			SOUTH BAY AREA				CENTRAL COASTAL AREA		
	Napa	Solano[a]	Total	Alameda-Zone 7	Alameda County	Santa Clara	Total	San Luis Obispo	Santa Barbara	Total
	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]
1952	0	0	0	83	114	410	608	122	224	346
1953	0	0	0	323	479	1,808	2,610	336	620	956
1954	0	0	0	819	1,306	5,150	7,275	421	777	1,199
1955	0	0	0	977	1,570	6,297	8,844	211	390	601
1956	0	0	0	8,844	14,459	63,816	87,120	227	418	645
1957	15,199	11,436	26,634	21,564	35,240	649,596	706,401	291	536	827
1958	33,420	16,591	50,011	67,764	71,717	733,414	872,896	720	1,328	2,048
1959	20,697	6,591	27,288	154,255	143,730	493,050	791,035	10,636	69,139	79,775
1960	9,097	8,830	17,927	296,492	275,610	1,018,661	1,590,763	15,255	99,794	115,048
1961	6,950	7,445	14,395	853,506	802,675	1,914,709	3,570,890	10,163	36,681	46,843
1962	(194)	(926)	(1,120)	545,123	615,141	1,686,041	2,846,306	17,281	39,570	56,851
1963	1,319	1,111	2,430	657,426	1,281,271	3,243,838	5,182,534	68,821	140,841	209,662
1964	38,393	35,466	73,859	712,650	1,747,783	7,251,800	9,712,233	138,614	282,003	420,617
1965	198,833	62,221	261,054	360,779	606,025	3,414,457	4,381,262	250,706	497,152	747,859
1966	461,619	49,917	511,536	592,714	592,598	2,245,215	3,430,528	587,951	1,117,486	1,705,437
1967	1,569,498	40,379	1,609,877	796,995	803,951	2,401,862	4,002,808	936,412	1,762,694	2,699,106
1968	859,613	61,691	921,304	736,470	696,075	1,997,924	3,430,469	351,131	675,220	1,026,351
1969	74,388	59,318	133,706	269,698	293,275	764,950	1,327,923	76,966	164,583	241,550
1970	43,361	67,877	111,238	58,676	61,200	135,569	255,445	47,891	109,224	157,115
1971	26,763	34,052	60,815	12,086	18,227	84,089	114,402	28,638	80,715	109,353
1972	19,643	18,905	38,548	12,293	12,763	63,610	88,666	19,289	50,230	69,519
1973	56,510	30,874	87,384	10,494	12,136	39,380	62,010	23,010	56,178	79,189
1974	165,830	65,832	231,662	15,722	24,402	73,119	113,243	25,037	61,383	86,420
1975	91,824	89,234	181,058	16,730	15,806	41,394	73,930	14,740	61,416	76,156
1976	57,765	83,651	141,416	34,004	34,663	109,610	178,277	33,638	130,440	164,078
1977	64,167	80,147	144,314	46,229	45,115	133,375	224,720	108,324	264,720	373,044
1978	69,319	81,717	151,036	71,234	66,008	174,898	312,140	21,415	103,822	125,237
1979	191,273	282,907	474,180	45,468	42,943	110,665	199,077	22,941	125,669	148,610
1980	264,433	386,006	650,439	134,522	124,352	304,614	563,488	103,258	462,895	566,153
1981	227,606	383,086	610,692	(33,738)	(29,856)	(65,637)	(129,231)	(15,416)	(135,240)	(150,656)
1982	549,164	870,611	1,419,775	7,876	8,321	27,065	43,262	4,102	(58,882)	(54,780)
1983	1,254,900	1,433,061	2,687,961	138,413	131,515	339,246	609,175	32,196	110,287	142,483
1984	2,547,878	2,750,040	5,297,918	152,992	140,971	351,921	645,884	35,448	107,723	143,171
1985	7,143,123	6,443,613	13,586,736	19,776	19,245	53,491	92,512	17,424	78,896	96,319
1986	10,565,937	16,926,630	27,492,567	32,034	31,581	88,070	151,684	44,135	306,452	350,588
1987	7,979,832	12,599,507	20,579,339	50,153	48,675	138,959	237,787	126,995	1,342,116	1,469,110
1988	2,312,909	4,343,513	6,656,422	116,181	112,294	302,461	530,935	156,473	1,479,545	1,636,018
1989	1,224,538	1,553,352	2,777,890	108,320	102,804	260,092	471,217	152,173	1,210,940	1,363,112
1990	443,002	824,055	1,267,057	224,283	224,188	625,213	1,073,684	222,208	1,559,457	1,781,665
1991	99,848	89,269	189,117	413,426	383,368	946,246	1,743,040	298,398	2,184,088	2,482,487
1992	57,045	62,083	119,128	182,231	169,968	442,055	794,255	361,210	3,504,755	3,865,965
1993	122,423	128,634	251,057	129,344	125,312	342,416	597,071	1,170,649	11,997,953	13,168,602
1994	71,274	83,270	154,544	46,042	58,050	229,649	333,741	4,260,734	46,401,596	50,662,331
1995	30,605	29,271	59,876	97,808	97,063	257,484	452,355	12,268,787	155,255,850	167,524,637
1996	20,275	19,069	39,344	49,854	48,056	127,493	225,403	11,284,548	145,409,410	156,693,959
1997	20,039	107,784	127,823	82,598	78,996	209,517	371,111	3,184,506	38,158,718	41,343,224
1998	17,423	21,572	38,995	27,302	24,121	63,057	114,480	883,110	10,563,359	11,446,469
1999	67,602	106,355	173,957	74,165	73,552	208,296	356,013	928,738	9,596,058	10,524,796
2000	16,252	37,932	54,185	27,445	28,844	80,346	136,635	488,160	5,529,102	6,017,261
2001	6,598	13,750	20,347	140,394	270,055	1,856,845	2,267,294	72,358	539,206	611,564
2002	19,917	45,940	65,857	809,721	1,193,494	5,886,086	7,889,301	69,122	387,295	456,418
2003	54,235	20,712	74,947	1,157,357	1,331,716	4,620,228	7,109,301	19,610	118,117	137,728
2004	153,240	20,534	173,774	360,395	346,065	4,106,509	4,812,969	12,286	52,406	64,692
2005	60,543	62,997	123,541	358,153	339,995	1,541,971	2,240,119	(1,979)	(161,490)	(163,469)
2006	887,892	20,086	907,978	349,395	329,656	801,023	1,480,075	8,438	65,059	73,497
2007	3,237,236	43,135	3,280,372	793,095	732,240	1,756,072	3,281,407	16,262	84,170	100,432
2008	7,903,036	61,877	7,964,914	1,466,734	1,352,530	3,236,019	6,055,283	28,452	99,415	127,867
2009	1,196,389	18,516	1,214,905	2,984,936	2,797,462	6,670,882	12,453,281	8,700	49,599	58,300
2010	396,691	3,243	399,934	3,858,678	3,511,644	8,785,770	16,156,093	75,709	136,242	211,951
2011	192,850	40,149	232,999	4,038,267	3,836,600	9,247,564	17,122,431	109,860	232,486	342,346
2012	485,208	426,760	911,967	2,717,470	2,649,415	6,713,706	12,080,591	76,346	336,174	412,520
2013	652,391	679,649	1,332,041	1,160,446	1,251,281	3,887,891	6,299,619	259,660	1,274,653	1,534,313
2014	587,364	658,937	1,246,300	(252,836)	(174,519)	(198,598)	(625,953)	334,611	1,564,562	1,899,173
2015	187,630	266,930	454,560	646,691	639,115	1,591,607	2,877,413	252,257	1,364,376	1,616,633
2016	88,532	162,844	251,375	201,552	200,211	493,449	895,213	266,572	1,148,758	1,415,330
2017	68,566	220,969	289,535	130,950	122,008	322,212	575,171	586,531	2,028,731	2,615,263
2018	**65,268**	**140,800**	**206,068**	**136,276**	**128,540**	**360,531**	**625,347**	**307,432**	**977,782**	**1,285,214**
2019	190,171	460,239	650,410	618,382	583,358	1,468,145	2,669,886	269,149	1,011,556	1,280,705
2020	37,853	82,004	119,857	172,362	159,209	428,819	760,390	523,620	2,480,252	3,003,872
2021	0	0	0	0	0	0	0	0	0	0
2022	0	0	0	0	0	0	0	0	0	0
2023	0	0	0	0	0	0	0	0	0	0
2024	0	0	0	0	0	0	0	0	0	0
2025	0	0	0	0	0	0	0	0	0	0
2026	0	0	0	0	0	0	0	0	0	0
2027	0	0	0	0	0	0	0	0	0	0
2028	0	0	0	0	0	0	0	0	0	0
2029	0	0	0	0	0	0	0	0	0	0
2030	0	0	0	0	0	0	0	0	0	0
2031	0	0	0	0	0	0	0	0	0	0
2032	0	0	0	0	0	0	0	0	0	0
2033	0	0	0	0	0	0	0	0	0	0
2034	0	0	0	0	0	0	0	0	0	0
2035	0	0	0	0	0	0	0	0	0	0
TOTAL	**55,583,003**	**53,844,051**	**109,427,054**	**30,328,867**	**31,917,780**	**97,767,495**	**160,014,141**	**42,114,018**	**454,787,680**	**496,901,697**

Note: Allocated capital costs as a result of permanent water transfers under the Monterey Amendment are not reflected in this table.

[a] Costs from Table B-10 allocated to Solano County Water Agency are reduced herein by $2,102,700 in 1986 and $1,823,500 in 1987 under provisions of Amendment 10 to its water supply contract.

TABLE B-14 Capital Costs of Transportation Facilities Allocated to Each Contractor (in dollars)

	SAN JOAQUIN VALLEY AREA									
				Kern						
Calendar Year	Dudley Ridge	Empire[b]	Future Contractor San Joaquin Valley	Municipal and Industrial	Municipal and Industrial[c]	Agricultural	Kings	Oak Flat	Tulare	Total
	[11]	[12]	[13]	[14]	[15]	[16]	[17]	[18]	[19]	[20]
1952	389	20	58	938	119	9,129	20	12	785	11,470
1953	1,076	53	161	2,887	345	27,383	55	33	2,157	34,150
1954	1,350	68	201	3,373	417	32,369	69	43	2,718	40,608
1955	677	34	101	1,497	197	14,721	35	23	1,371	18,656
1956	726	34	108	2,702	273	24,255	35	25	1,416	29,575
1957	932	38	139	6,048	494	49,932	39	29	1,707	59,359
1958	2,308	102	344	14,374	1,153	119,049	104	61	4,368	141,862
1959	7,384	364	2,517	26,218	2,597	253,891	372	381	14,757	308,481
1960	12,940	630	3,666	34,054	4,155	352,166	644	498	25,696	434,448
1961	21,848	1,063	3,954	51,407	6,500	538,707	1,087	598	43,377	668,542
1962	49,320	2,410	7,867	94,933	13,834	1,017,146	2,465	1,879	98,141	1,287,996
1963	208,757	10,687	32,172	364,014	55,715	3,934,636	10,932	5,990	425,330	5,048,232
1964	328,286	16,961	64,890	600,152	88,904	6,636,279	17,350	11,942	672,013	8,436,776
1965	538,215	27,481	117,996	1,098,999	152,930	11,999,892	28,116	21,802	1,095,126	15,080,557
1966	1,107,757	52,586	279,172	2,218,832	339,222	24,857,487	53,789	38,891	2,173,090	31,120,826
1967	852,537	39,537	445,562	2,012,744	286,990	23,629,026	40,444	34,775	1,653,429	28,995,045
1968	198,739	9,739	166,267	1,104,132	70,086	11,544,942	9,962	12,238	396,075	13,512,180
1969	94,436	4,793	35,473	616,516	27,216	6,416,147	4,903	7,302	191,574	7,398,361
1970	54,344	2,720	21,686	414,659	15,520	4,145,046	2,782	3,999	109,470	4,770,226
1971	25,462	1,291	12,094	190,552	7,114	1,622,274	1,320	540	51,618	1,912,264
1972	11,589	589	8,354	82,886	3,409	723,623	602	343	23,526	854,921
1973	6,657	335	10,201	39,973	1,980	458,527	343	221	13,448	531,685
1974	9,478	469	11,044	45,420	2,766	483,866	479	326	18,979	572,828
1975	13,329	677	5,246	36,467	3,710	382,743	692	425	27,048	470,338
1976	17,506	837	12,615	53,085	5,621	654,026	856	1,152	34,455	780,152
1977	9,672	436	47,790	36,478	3,753	886,672	446	494	18,497	1,004,236
1978	23,499	(30,406)	6,178	54,219	6,579	575,169	1,209	1,402	47,446	685,296
1979	25,051	1,295	5,664	53,866	6,610	559,746	1,325	1,862	51,293	706,711
1980	144,980	(4,617)	31,160	321,890	38,126	3,211,810	7,682	7,144	297,215	4,055,391
1981	(5,427)	(15,464)	200	(44,773)	(1,223)	(385,275)	(296)	1,752	(11,324)	(461,830)
1982	49,916	2,584	6,600	83,283	13,142	654,692	2,638	1,252	102,287	916,395
1983	52,429	(35,295)	12,125	110,465	13,872	1,073,500	2,769	1,327	107,337	1,338,529
1984	86,345	4,474	14,303	154,799	22,764	1,617,225	4,572	2,678	177,020	2,084,180
1985	25,435	1,311	5,649	47,055	6,766	484,485	1,341	1,176	52,013	625,231
1986	38,309	(41,067)	9,862	71,661	10,320	796,097	2,009	778	78,142	966,110
1987	28,769	1,476	7,004	55,537	7,969	616,845	1,509	1,491	58,679	779,279
1988	52,329	2,831	17,078	70,572	12,049	909,046	2,894	4,620	109,713	1,181,132
1989	156,099	8,019	27,551	352,103	42,943	3,834,481	8,201	12,134	318,604	4,760,133
1990	292,361	15,142	50,360	553,394	87,199	6,094,021	15,487	22,729	599,233	7,729,927
1991	349,413	18,103	60,419	580,572	91,765	6,447,565	18,515	23,486	716,292	8,306,130
1992	125,891	6,439	28,019	241,559	34,559	2,711,639	6,585	10,883	256,370	3,421,943
1993	86,113	4,375	30,245	174,630	23,840	2,059,168	4,474	4,698	174,772	2,562,314
1994	64,762	3,323	23,894	124,518	17,633	1,488,418	3,398	2,173	132,095	1,860,213
1995	82,969	(1,000)	72,734	167,698	24,390	2,472,332	4,355	2,824	169,318	2,995,621
1996	27,611	(61,913)	51,990	68,870	8,812	1,233,548	1,437	1,590	56,092	1,388,037
1997	136,503	7,041	48,721	241,400	36,417	2,951,687	7,195	3,706	279,205	3,711,875
1998	70,737	(121,004)	23,083	122,934	18,622	1,474,568	3,742	1,278	144,963	1,738,923
1999	81,197	4,192	26,645	142,983	21,661	1,715,933	4,285	3,846	166,160	2,166,903
2000	21,089	1,073	9,822	45,704	6,013	547,927	1,096	(1,081)	42,826	674,466
2001	17,776	907	7,862	36,078	5,062	432,671	927	781	36,153	538,217
2002	93,258	4,801	18,852	163,537	25,021	1,835,443	4,909	1,470	190,549	2,337,839
2003	19,993	1,020	5,083	37,987	5,481	435,030	1,038	422	40,670	546,724
2004	18,558	958	4,113	34,437	4,911	374,948	980	1,518	37,972	478,394
2005	56,091	2,902	9,832	96,815	14,744	1,025,877	2,964	561	114,896	1,324,682
2006	10,670	551	1,947	30,110	2,812	197,248	564	732	21,841	266,475
2007	15,261	772	4,166	36,509	4,188	324,461	789	921	30,898	417,965
2008	62,504	3,233	11,391	104,213	16,434	1,151,588	3,304	2,079	128,030	1,482,775
2009	15,005	764	3,218	48,244	4,067	302,002	782	996	30,490	405,567
2010	27,175	1,409	36,027	67,589	7,106	847,559	1,442	317	55,738	1,044,363
2011	36,668	1,898	50,584	71,528	9,661	1,181,522	1,941	1,449	75,133	1,430,383
2012	42,554	2,101	23,353	90,014	11,882	1,139,946	2,149	3,019	85,122	1,400,140
2013	187,114	9,352	70,303	385,659	53,496	4,595,517	9,566	13,022	376,622	5,700,651
2014	197,108	10,063	95,812	366,806	53,569	4,666,940	10,296	15,319	401,027	5,816,940
2015	125,247	6,369	59,689	255,917	34,316	3,042,780	6,515	11,412	254,317	3,796,562
2016	157,523	8,002	82,973	506,802	42,771	6,223,884	8,183	6,108	319,678	7,355,924
2017	238,011	12,214	216,168	461,268	63,208	6,774,615	12,490	7,235	485,527	8,270,735
2018	**297,842**	**15,298**	**119,094**	**637,774**	**79,644**	**7,283,896**	**15,645**	**9,640**	**607,871**	**9,066,703**
2019	375,397	18,378	93,728	891,668	111,074	9,297,818	18,796	16,812	747,772	11,571,443
2020	101,368	4,529	147,648	509,830	42,082	6,672,654	4,634	6,853	193,087	7,682,686
2021	0	0	0	0	0	0	0	0	0	0
2022	0	0	0	0	0	0	0	0	0	0
2023	0	0	0	0	0	0	0	0	0	0
2024	0	0	0	0	0	0	0	0	0	0
2025	0	0	0	0	0	0	0	0	0	0
2026	0	0	0	0	0	0	0	0	0	0
2027	0	0	0	0	0	0	0	0	0	0
2028	0	0	0	0	0	0	0	0	0	0
2029	0	0	0	0	0	0	0	0	0	0
2030	0	0	0	0	0	0	0	0	0	0
2031	0	0	0	0	0	0	0	0	0	0
2032	0	0	0	0	0	0	0	0	0	0
2033	0	0	0	0	0	0	0	0	0	0
2034	0	0	0	0	0	0	0	0	0	0
2035	0	0	0	0	0	0	0	0	0	0
TOTAL	**7,687,214**	**50,384**	**2,920,827**	**17,781,060**	**2,237,375**	**201,764,961**	**392,274**	**358,438**	**15,459,318**	**248,651,852**

[b] Costs from Table B-10 allocated to Empire West Side Irrigation District are reduced herein by $31,588 in 1978; $12,129 in 1980; $15,173 in 1981; $38,004 in 1983; $43,033 in 1986; $5,261 in 1995; $63,318 in 1996; and $124,667 in 1998 in accordance with letters of agreement with the district.

[c] Costs related to maximum annual Table A of 15,000 acre-feet under Amendment 18 of the water supply contract with Kern County Water Agency.

TABLE B-14 Capital Costs of Transportation Facilities Allocated to Each Contractor (in dollars) Sheet 3 of 4

Calendar Year	SOUTHERN CALIFORNIA AREA									
	AVEK	Castaic Lake[d]	Coachella	Crestline	Desert	Littlerock	Mojave	Palmdale	San Bernardino	San Gabriel
	[21]	[22]	[23]	[24]	[25]	[26]	[27]	[28]	[29]	[30]
1952	3,158	1,042	850	254	1,402	70	1,695	418	6,079	1,550
1953	10,026	3,327	2,668	799	4,401	222	5,318	1,328	19,058	4,852
1954	12,742	4,193	3,465	1,031	5,714	285	6,908	1,691	24,608	6,290
1955	5,411	1,881	1,374	401	2,267	115	2,756	715	9,229	2,377
1956	9,775	3,590	2,196	612	3,622	191	4,449	1,267	13,138	3,438
1957	26,306	9,255	6,343	1,816	10,461	540	12,767	3,450	40,646	10,534
1958	49,204	17,599	11,581	3,290	19,099	991	23,360	6,414	72,708	18,898
1959	70,247	29,740	15,869	4,616	26,171	1,347	31,759	9,030	98,596	25,519
1960	84,552	38,760	22,068	6,797	36,395	1,547	43,260	10,772	147,170	37,469
1961	126,542	54,262	34,613	12,530	57,086	2,245	63,709	16,437	236,164	57,707
1962	198,558	85,352	43,719	13,861	72,102	3,344	84,709	24,943	253,435	64,330
1963	580,138	255,252	116,797	33,149	192,624	9,828	234,926	73,256	610,277	160,624
1964	1,094,365	501,858	209,462	55,445	345,446	18,442	429,605	137,769	1,026,066	276,118
1965	1,908,076	947,523	385,533	103,757	635,825	32,819	786,986	244,587	1,913,090	512,862
1966	3,960,302	2,150,972	812,655	215,858	1,340,235	69,325	1,664,584	517,269	3,943,586	1,062,417
1967	4,976,538	4,100,531	1,077,422	296,069	1,776,892	88,301	2,182,240	653,250	5,821,681	1,550,239
1968	5,924,474	3,998,942	1,350,742	368,156	2,227,646	107,350	2,738,009	783,940	7,982,824	2,122,940
1969	5,822,708	3,079,426	1,690,259	539,851	2,787,631	121,303	3,256,507	865,455	10,898,185	2,769,647
1970	5,032,959	3,277,778	2,050,788	695,345	3,382,251	106,381	3,872,367	736,775	13,795,809	3,457,109
1971	2,577,507	2,146,954	1,071,523	338,581	1,767,179	48,337	2,087,223	347,057	8,137,053	1,987,120
1972	973,436	283,257	331,759	92,079	547,138	19,134	668,550	134,360	2,691,137	697,957
1973	354,407	914,303	158,579	82,223	261,557	6,304	238,094	46,102	1,760,570	403,582
1974	451,450	280,861	259,175	74,113	427,433	8,143	518,453	59,145	1,617,394	425,927
1975	253,438	246,492	193,632	52,821	319,337	4,954	392,110	33,995	1,533,664	407,913
1976	237,539	255,238	136,751	37,235	225,529	4,245	277,807	31,002	962,280	255,901
1977	199,554	371,469	91,384	25,858	150,711	3,757	183,609	26,834	591,445	155,537
1978	302,111	470,176	78,573	22,226	129,584	5,233	157,815	38,654	428,989	111,769
1979	357,678	938,985	81,807	21,795	134,915	5,965	166,931	44,410	403,569	108,408
1980	1,867,517	1,777,294	423,755	113,166	698,855	32,435	864,104	240,899	2,040,757	548,085
1981	(158,728)	610,795	(47,102)	(8,865)	(77,678)	(2,576)	(102,568)	(19,588)	(143,875)	(43,557)
1982	1,557,934	861,928	298,770	78,903	492,728	26,237	613,587	196,672	1,421,407	388,261
1983	2,062,512	521,349	396,033	115,678	653,134	34,699	803,945	259,939	2,126,313	581,672
1984	1,518,361	295,783	297,559	85,097	490,731	27,272	606,124	188,562	1,546,628	423,408
1985	896,226	158,810	217,115	62,532	358,064	13,104	441,299	107,533	1,116,949	305,291
1986	841,555	104,860	221,194	58,152	364,790	9,038	454,702	93,309	1,048,625	286,302
1987	333,052	105,625	166,099	43,992	273,928	5,566	340,485	40,716	783,725	213,202
1988	259,234	174,155	65,831	22,723	108,570	3,384	128,339	26,743	429,498	113,644
1989	1,045,999	434,394	323,138	97,036	532,920	16,777	649,616	125,344	1,375,722	372,048
1990	678,053	374,313	332,566	97,789	548,468	7,335	672,344	67,179	1,509,745	409,710
1991	831,687	401,961	367,196	120,925	605,579	11,966	733,443	92,625	1,979,364	540,210
1992	633,272	356,952	270,826	131,328	446,647	9,556	501,634	76,760	2,093,387	573,386
1993	634,283	332,089	222,347	171,095	366,700	10,194	353,470	73,955	3,848,084	1,046,752
1994	467,409	165,607	132,599	93,839	218,685	7,255	218,494	53,209	2,347,599	637,733
1995	459,990	293,308	132,690	78,390	218,835	7,436	232,377	54,544	1,960,100	530,656
1996	299,764	206,742	110,520	44,965	182,270	4,885	211,872	35,808	4,024,655	972,829
1997	438,898	249,699	103,382	24,640	170,497	7,397	214,534	54,452	2,892,626	397,103
1998	234,379	202,650	62,492	41,136	103,063	3,989	106,009	29,551	3,683,353	303,255
1999	268,224	175,939	89,312	40,069	147,294	4,812	167,592	35,399	5,733,587	235,054
2000	139,035	77,889	54,795	23,903	90,369	2,665	103,194	19,150	14,346,200	171,107
2001	130,754	44,790	50,816	15,641	83,805	2,989	102,254	20,949	20,292,396	96,254
2002	199,807	121,849	40,293	12,884	66,452	3,001	80,478	22,664	9,868,237	133,675
2003	76,592	42,072	24,945	7,688	41,140	1,245	50,028	9,409	4,043,119	54,302
2004	81,688	46,992	23,476	6,416	38,716	1,445	48,028	10,585	2,163,304	42,507
2005	232,323	126,137	47,108	14,116	77,691	4,011	93,862	29,628	1,028,935	71,539
2006	334,422	246,722	68,325	25,180	112,684	5,626	126,956	42,114	2,038,034	113,701
2007	258,891	182,329	57,769	22,068	95,272	4,567	111,771	33,367	2,135,050	108,623
2008	159,067	175,464	70,874	60,890	116,900	2,792	83,144	20,471	3,370,729	263,890
2009	577,477	339,521	153,560	60,337	253,262	9,826	275,417	73,122	4,779,861	271,508
2010	644,764	340,756	193,723	62,817	319,495	10,809	371,033	81,051	5,464,064	285,792
2011	341,088	218,105	230,769	59,398	380,581	5,742	474,797	42,964	7,751,788	283,913
2012	257,613	138,909	343,375	87,824	566,289	5,062	708,509	35,082	11,938,942	426,177
2013	789,946	367,767	348,815	91,411	575,262	15,285	718,195	106,713	34,380,993	454,011
2014	875,295	454,442	248,206	64,409	409,340	15,980	512,246	114,774	30,840,744	378,630
2015	1,056,421	530,808	271,252	69,639	447,345	20,001	560,065	147,798	17,644,379	387,376
2016	1,286,420	675,903	262,767	67,786	433,353	22,463	543,297	167,861	19,752,285	369,071
2017	1,121,202	886,454	259,239	69,448	427,535	20,114	532,527	145,829	9,856,103	490,779
2018	**1,340,971**	**795,168**	**306,345**	**91,159**	**505,224**	**24,026**	**620,885**	**174,644**	**4,372,074**	**613,341**
2019	1,783,504	1,032,554	416,735	125,247	687,279	31,015	844,014	229,258	4,749,567	865,057
2020	1,913,676	1,591,694	430,262	121,394	709,584	32,485	877,701	243,168	2,793,751	723,855
2021	0	0	0	0	0	0	0	0	0	0
2022	0	0	0	0	0	0	0	0	0	0
2023	0	0	0	0	0	0	0	0	0	0
2024	0	0	0	0	0	0	0	0	0	0
2025	0	0	0	0	0	0	0	0	0	0
2026	0	0	0	0	0	0	0	0	0	0
2027	0	0	0	0	0	0	0	0	0	0
2028	0	0	0	0	0	0	0	0	0	0
2029	0	0	0	0	0	0	0	0	0	0
2030	0	0	0	0	0	0	0	0	0	0
2031	0	0	0	0	0	0	0	0	0	0
2032	0	0	0	0	0	0	0	0	0	0
2033	0	0	0	0	0	0	0	0	0	0
2034	0	0	0	0	0	0	0	0	0	0
2035	0	0	0	0	0	0	0	0	0	0
TOTAL	**64,373,777**	**40,709,596**	**18,331,357**	**5,772,816**	**30,232,309**	**1,152,627**	**36,186,308**	**8,454,536**	**320,467,253**	**32,139,187**

[d] Costs from Table B-10 allocated to Castaic Lake Water Agency are reduced herein by $14,088 in1978 in accordance with a letter of agreement with the agency.

TABLE B-14 Capital Costs of Transportation Facilities Allocated to Each Contractor (in dollars)

Calendar Year	SOUTHERN CALIFORNIA AREA (continued)				FEATHER RIVER AREA				South Bay Area Future Contractor	Grand Total
	San Gorgonio	Metropolitan[e]	Ventura	Total	Yuba City	Butte	Plumas	Total		
	[31]	[32]	[33]	[34]	[35]	[36]	[37]	[38]	[39]	[40]
1952	962	69,020	370	86,871	0	0	0	0	59	99,353
1953	3,011	217,634	1,187	273,833	0	0	0	0	264	311,812
1954	3,904	279,967	1,496	352,294	0	0	0	0	766	402,143
1955	1,474	111,602	670	140,272	0	0	0	0	969	169,342
1956	2,127	179,335	1,299	225,040	0	0	0	0	9,172	351,551
1957	6,526	516,050	3,367	648,059	0	0	0	0	23,172	1,464,452
1958	11,701	945,684	6,390	1,186,917	0	0	2	2	32,888	2,286,623
1959	15,815	1,364,298	9,894	1,702,901	0	0	14	14	57,918	2,967,412
1960	23,307	1,914,521	12,798	2,379,418	0	0	28	28	123,202	4,660,833
1961	36,153	3,212,125	18,770	3,928,343	0	0	10	10	316,220	8,545,244
1962	40,012	3,543,471	29,069	4,456,905	0	0	32	32	228,202	8,875,171
1963	99,266	11,185,928	86,807	13,638,873	0	0	51	51	528,496	24,610,278
1964	170,012	18,065,455	164,709	22,494,750	0	0	7,791	7,791	590,034	41,736,060
1965	316,082	33,763,577	307,475	41,858,192	0	0	3,139	3,139	332,680	62,664,743
1966	654,194	74,485,027	681,898	91,558,323	0	0	(48)	(48)	783,728	129,110,330
1967	958,406	130,599,417	1,279,076	155,360,062	0	0	47	47	1,479,421	194,146,365
1968	1,314,841	147,502,290	1,360,687	177,782,842	0	0	51,573	51,573	1,254,192	197,978,911
1969	1,726,891	140,096,646	1,085,026	174,739,535	0	0	234,232	234,232	398,183	184,473,490
1970	2,160,122	161,983,078	1,147,609	201,698,371	0	0	16,227	16,227	74,028	207,082,650
1971	1,237,573	133,903,316	738,822	156,388,246	0	0	27,204	27,204	12,457	158,624,739
1972	434,507	43,931,880	66,878	50,872,072	0	0	9	9	13,182	51,936,917
1973	256,711	39,723,010	290,020	44,495,462	0	0	25	25	8,099	45,263,853
1974	264,349	18,896,593	86,362	23,369,399	0	0	45	45	28,570	24,402,166
1975	253,838	16,732,939	83,975	20,509,109	0	0	21	21	8,226	21,318,838
1976	158,850	13,545,451	84,623	16,212,450	0	0	51	51	16,486	17,492,910
1977	96,517	11,769,352	110,833	13,776,859	0	0	28	28	21,181	15,544,382
1978	69,152	15,781,696	174,876	17,770,853	0	0	38	38	28,876	19,073,475
1979	66,847	27,627,424	343,361	30,302,093	0	0	23	23	26,668	31,857,362
1980	337,811	59,493,774	641,586	69,080,039	0	0	26	26	59,169	74,974,704
1981	(26,356)	15,661,179	224,257	15,865,338	0	0	34	34	(6,746)	15,727,602
1982	238,792	30,873,857	316,107	37,365,183	0	0	11	11	16,086	39,705,931
1983	357,812	25,056,047	187,121	33,156,253	0	0	19	19	72,225	38,006,645
1984	260,327	16,317,441	103,160	22,160,455	0	0	26	26	83,252	30,414,886
1985	187,699	10,243,779	56,162	14,164,564	0	0	29	29	16,338	28,581,730
1986	176,057	8,365,310	34,777	12,058,671	0	0	31	31	16,248	41,035,899
1987	131,163	6,955,356	36,142	9,429,050	0	0	32	32	29,062	32,523,660
1988	70,260	6,626,545	57,117	8,086,041	0	0	55	55	50,083	18,140,686
1989	227,772	18,531,680	153,200	23,885,645	0	0	44	44	43,324	33,301,366
1990	251,185	17,430,869	125,376	22,504,929	0	0	63	63	96,419	34,453,743
1991	331,235	20,792,168	132,558	26,940,915	0	0	54	54	149,922	39,811,664
1992	351,492	21,196,762	116,999	26,758,999	0	0	42	42	80,900	35,041,233
1993	646,980	29,471,748	105,693	37,283,389	0	0	30	30	59,324	53,921,787
1994	394,936	16,392,019	50,941	21,180,326	0	0	14	14	34,208	74,225,377
1995	331,286	16,078,395	72,214	20,450,221	0	0	3	3	42,395	191,525,108
1996	1,079,629	23,237,696	49,282	30,460,917	0	0	0	0	21,388	188,829,048
1997	1,914,804	13,530,777	72,335	20,071,144	0	0	3	3	34,976	65,660,155
1998	3,219,136	11,284,364	65,745	19,339,120	0	0	7	7	11,234	32,689,229
1999	5,888,075	9,063,618	54,504	21,903,479	0	0	2	2	34,616	35,159,766
2000	16,301,847	5,393,221	24,010	36,747,384	0	0	24	24	16,912	43,646,866
2001	23,613,431	2,988,800	13,047	47,455,926	0	0	20	20	68,013	50,961,381
2002	11,150,014	5,787,234	39,607	27,526,196	0	0	14	14	382,151	38,657,775
2003	4,505,927	5,783,732	13,689	14,653,890	0	0	0	0	590,294	23,112,883
2004	2,291,776	4,555,521	15,942	9,326,396	0	0	0	0	156,414	15,012,639
2005	816,407	7,322,277	42,941	9,906,976	0	0	0	0	123,949	13,555,798
2006	1,805,626	13,867,322	90,203	18,876,917	0	0	5	5	120,330	21,725,278
2007	2,116,022	11,723,751	65,425	16,914,905	0	0	0	0	266,740	24,261,822
2008	2,807,622	11,885,796	60,480	19,078,119	0	0	4	4	493,279	35,202,241
2009	4,253,221	22,108,510	122,280	33,277,902	0	0	6	6	1,018,818	48,428,779
2010	5,295,499	18,059,829	107,451	31,237,085	0	0	(2)	(2)	6,354,636	55,404,059
2011	8,031,978	12,617,752	55,149	30,494,023	0	0	0	0	2,566,258	52,188,441
2012	12,363,227	16,902,075	40,722	43,813,807	0	0	0	0	1,004,833	59,623,858
2013	38,736,265	27,407,310	107,114	104,099,086	0	0	0	0	546,046	119,511,757
2014	35,025,959	21,001,124	122,898	90,064,048	0	0	0	0	(16,925)	98,383,584
2015	19,409,017	41,022,928	162,974	81,730,001	0	0	0	0	277,916	90,753,084
2016	21,969,578	63,502,671	207,821	109,261,277	0	0	0	0	98,270	119,277,389
2017	4,768,100	42,850,067	218,324	61,645,721	0	0	0	0	93,225	73,489,649
2018	**1,593,261**	**56,965,771**	**241,570**	**67,644,439**	**0**	**0**	**0**	**0**	**69,191**	**78,896,962**
2019	1,433,391	70,887,912	339,273	83,424,806	0	0	0	0	292,088	99,889,337
2020	523,232	67,329,374	483,630	77,773,806	0	0	0	0	222,833	89,563,445
2021	0	0	0	0	0	0	0	0	0	0
2022	0	0	0	0	0	0	0	0	0	0
2023	0	0	0	0	0	0	0	0	0	0
2024	0	0	0	0	0	0	0	0	0	0
2025	0	0	0	0	0	0	0	0	0	0
2026	0	0	0	0	0	0	0	0	0	0
2027	0	0	0	0	0	0	0	0	0	0
2028	0	0	0	0	0	0	0	0	0	0
2029	0	0	0	0	0	0	0	0	0	0
2030	0	0	0	0	0	0	0	0	0	0
2031	0	0	0	0	0	0	0	0	0	0
2032	0	0	0	0	0	0	0	0	0	0
2033	0	0	0	0	0	0	0	0	0	0
2034	0	0	0	0	0	0	0	0	0	0
2035	0	0	0	0	0	0	0	0	0	0
TOTAL	**245,564,643**	**1,958,513,148**	**13,408,174**	**2,775,305,730**	**0**	**0**	**341,139**	**341,139**	**22,087,034**	**3,812,728,649**

[e] Costs from Table B-10 allocated to The Metropolitan Water District of Southern California are reduced herein by $16,425,374 in 1972 under provisions of Amendment 7 to its water supply contract.

TABLE B-15 Capital Cost Component of Transportation Charge for Each Contractor (in dollars)[a,b,c]

Calendar Year	NORTH BAY AREA			SOUTH BAY AREA				CENTRAL COASTAL AREA		
	Napa	Solano	Total	Alameda-Zone 7	Alameda County	Santa Clara	Total	San Luis Obispo	Santa Barbara	Total
	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]
1961	0	0	0	0	0	0	0	0	0	0
1962	0	0	0	0	0	0	0	0	0	0
1963	0	0	0	153,778	105,673	364,827	624,278	0	0	0
1964	0	0	0	216,203	170,929	530,036	917,168	6,696	21,667	28,363
1965	0	0	0	284,369	259,943	899,371	1,443,684	13,756	36,029	49,785
1966	18,063	0	18,063	320,384	290,808	1,073,270	1,684,462	26,524	61,349	87,873
1967	41,574	0	41,574	391,262	320,989	1,187,619	1,899,870	56,469	118,263	174,731
1968	121,509	0	121,509	508,006	361,935	1,309,946	2,179,887	104,160	208,037	312,197
1969	165,289	0	165,289	610,359	397,386	1,411,701	2,419,446	122,043	242,426	364,469
1970	169,077	0	169,077	644,774	412,322	1,450,660	2,507,756	125,963	250,808	376,771
1971	171,286	0	171,286	651,753	415,439	1,457,564	2,524,756	128,402	256,371	384,773
1972	172,649	0	172,649	653,387	416,368	1,461,847	2,531,601	129,861	260,482	390,343
1973	173,649	31,366	205,015	654,868	417,018	1,465,086	2,536,972	130,843	263,040	393,883
1974	176,527	32,938	209,466	655,986	417,636	1,467,092	2,540,713	132,015	265,901	397,916
1975	184,973	36,291	221,264	658,531	418,879	1,470,816	2,548,225	133,290	269,028	402,318
1976	189,650	40,836	230,485	659,968	419,684	1,472,924	2,552,575	134,041	272,155	406,196
1977	192,592	45,096	237,688	662,786	421,449	1,478,507	2,562,741	135,754	278,799	414,553
1978	195,860	49,178	245,038	666,555	423,747	1,485,299	2,575,601	141,271	292,281	433,552
1979	199,390	53,340	252,730	672,042	427,108	1,494,207	2,593,358	142,362	297,569	439,930
1980	209,132	67,748	276,880	676,024	429,296	1,499,843	2,605,162	143,530	303,969	447,499
1981	222,599	87,408	310,007	686,390	435,629	1,515,357	2,637,376	148,789	327,544	476,333
1982	234,191	106,918	341,110	684,469	434,108	1,512,014	2,630,592	148,004	320,657	468,660
1983	262,160	151,259	413,419	685,938	434,532	1,513,393	2,633,862	148,213	317,658	465,870
1984	326,072	224,245	550,317	697,176	441,230	1,530,671	2,669,077	149,853	323,275	473,127
1985	455,836	364,305	820,141	709,791	448,410	1,548,594	2,706,795	151,658	328,761	480,419
1986	819,636	692,479	1,512,115	711,882	449,390	1,551,318	2,712,591	152,545	332,779	485,324
1987	1,360,688	1,559,243	2,919,931	714,662	451,007	1,555,828	2,721,498	154,805	348,472	503,277
1988	1,771,651	2,208,121	3,979,772	719,068	453,514	1,562,985	2,735,567	161,346	417,591	578,937
1989	1,891,484	2,433,160	4,324,645	728,090	459,332	1,578,655	2,766,077	169,453	494,247	663,699
1990	1,955,330	2,514,151	4,469,481	736,280	464,692	1,592,216	2,793,188	177,387	557,384	734,771
1991	1,978,582	2,557,403	4,535,985	753,388	476,459	1,625,032	2,854,879	189,050	639,235	828,285
1992	1,983,860	2,562,121	4,545,981	783,987	496,722	1,675,047	2,955,756	204,822	754,678	959,500
1993	1,986,897	2,565,427	4,552,324	798,346	505,773	1,698,585	3,002,705	224,056	941,300	1,165,356
1994	1,993,467	2,572,330	4,565,797	808,777	512,498	1,716,961	3,038,236	286,878	1,585,162	1,872,040
1995	1,997,323	2,576,836	4,574,159	813,253	515,639	1,729,387	3,058,278	517,412	4,095,799	4,613,211
1996	1,998,994	2,578,433	4,577,427	821,157	520,936	1,743,439	3,085,533	1,187,010	12,569,247	13,756,257
1997	2,000,110	2,579,484	4,579,594	825,207	523,583	1,750,461	3,099,251	1,808,545	20,578,178	22,386,724
1998	2,001,225	2,585,478	4,586,703	831,937	527,976	1,762,113	3,122,027	1,985,644	22,700,288	24,685,933
1999	2,002,204	2,586,690	4,588,893	834,166	529,331	1,765,656	3,129,153	2,035,260	23,293,767	25,329,027
2000	2,006,043	2,592,730	4,598,773	995,721	533,508	1,777,485	3,306,715	2,088,005	23,838,744	25,926,748
2001	2,327,101	2,783,265	5,110,366	1,130,439	535,165	1,782,101	3,447,705	2,116,046	24,156,352	26,272,398
2002	2,327,540	2,784,105	5,111,645	1,144,841	550,866	1,890,059	3,585,766	2,120,253	24,187,702	26,307,955
2003	2,328,884	2,786,914	5,115,799	1,230,010	621,150	2,236,683	4,087,843	2,124,324	24,210,510	26,334,833
2004	2,332,568	2,788,208	5,120,776	1,364,074	700,643	2,512,474	4,577,191	2,125,494	24,217,560	26,343,054
2005	2,343,116	2,789,546	5,132,662	1,400,867	721,599	2,761,150	4,883,616	2,126,238	24,220,734	26,346,972
2006	2,347,368	2,793,779	5,141,146	1,436,384	742,505	2,855,962	5,034,851	2,126,116	24,210,804	26,336,921
2007	2,410,403	2,795,149	5,205,552	1,471,556	763,106	2,906,021	5,140,682	2,126,644	24,214,870	26,341,514
2008	2,644,218	2,798,146	5,442,364	1,552,058	809,662	3,017,673	5,379,394	2,127,678	24,220,221	26,347,899
2009	3,225,593	2,802,471	6,028,064	1,703,703	897,252	3,227,237	5,828,192	2,129,520	24,226,659	26,356,180
2010	3,315,348	2,803,807	6,119,155	2,020,455	1,081,998	3,667,787	6,770,240	2,130,095	24,229,935	26,360,030
2011	3,345,736	2,804,046	6,149,783	2,739,474	1,318,810	4,260,266	8,318,550	2,135,200	24,239,123	26,374,323
2012	3,360,859	2,807,072	6,167,932	3,261,172	1,583,384	4,897,983	9,742,540	2,142,776	24,255,155	26,397,931
2013	3,399,964	2,839,915	6,239,879	3,400,583	1,664,841	5,007,350	10,072,774	2,148,169	24,278,899	26,427,068
2014	3,453,934	2,893,288	6,347,221	3,475,822	1,690,262	5,123,884	10,289,969	2,160,289	24,349,603	26,509,892
2015	3,503,882	2,946,177	6,450,059	3,374,868	1,588,247	4,739,755	9,702,870	2,178,156	24,451,788	26,629,944
2016	3,499,750	2,967,982	6,467,732	3,430,357	1,599,411	4,671,276	9,701,043	2,184,745	24,531,165	26,715,910
2017	3,481,045	2,981,623	6,462,668	3,386,223	1,583,105	4,591,289	9,560,617	2,175,921	24,565,271	26,741,192
2018	**3,396,679**	**3,000,576**	**6,397,255**	**3,288,232**	**1,551,189**	**4,493,059**	**9,332,480**	**2,176,340**	**24,641,903**	**26,818,243**
2019	3,353,290	3,013,245	6,366,536	3,203,973	1,525,572	4,419,357	9,148,902	2,184,639	24,690,785	26,875,424
2020	3,368,312	3,055,967	6,424,279	3,273,087	1,555,253	4,493,643	9,321,983	2,204,597	24,772,143	26,976,740
2021	3,369,800	3,064,017	6,433,817	3,306,179	1,565,831	4,523,959	9,395,969	2,250,730	24,996,654	27,247,384
2022	3,368,240	3,064,017	6,432,256	3,304,803	1,564,903	4,519,677	9,389,382	2,249,271	24,992,544	27,241,815
2023	3,367,097	3,030,484	6,397,581	3,303,394	1,564,252	4,516,437	9,384,083	2,248,289	24,989,985	27,238,274
2024	3,363,817	3,028,850	6,392,667	3,302,331	1,563,634	4,514,431	9,380,397	2,247,117	24,987,124	27,234,241
2025	3,354,201	3,025,273	6,379,474	3,299,995	1,562,392	4,510,707	9,373,094	2,245,842	24,983,998	27,229,840
2026	3,348,858	3,020,519	6,369,377	3,298,522	1,561,587	4,508,599	9,368,708	2,245,091	24,980,870	27,225,961
2027	3,345,486	3,016,084	6,361,571	3,295,534	1,559,821	4,503,017	9,358,372	2,243,378	24,974,227	27,217,605
2028	3,341,746	3,011,825	6,353,572	3,291,525	1,557,523	4,496,224	9,345,273	2,237,861	24,960,745	27,198,605
2029	3,337,709	3,007,457	6,345,166	3,285,528	1,554,162	4,487,316	9,327,006	2,236,770	24,955,457	27,192,227
2030	3,326,552	2,991,995	6,318,548	3,281,331	1,551,975	4,481,680	9,314,986	2,235,602	24,949,057	27,184,658
2031	3,311,136	2,970,929	6,282,065	3,269,849	1,545,641	4,466,166	9,281,656	2,230,343	24,925,481	27,155,824
2032	3,297,839	2,949,984	6,247,823	3,272,365	1,547,162	4,469,509	9,289,036	2,231,128	24,932,369	27,163,497
2033	3,265,779	2,902,534	6,168,313	3,271,124	1,546,738	4,468,131	9,285,993	2,230,919	24,935,368	27,166,287
2034	3,192,683	2,825,917	6,018,600	3,258,701	1,540,040	4,450,853	9,249,594	2,229,279	24,929,751	27,159,030
2035	3,044,540	2,679,615	5,724,155	3,244,855	1,532,860	4,432,929	9,210,644	2,227,474	24,924,265	27,151,739
TOTAL	**141,030,648**	**138,279,795**	**279,310,442**	**121,654,936**	**62,543,417**	**196,590,457**	**380,788,811**	**90,428,047**	**979,752,015**	**1,070,180,062**

[a] Unadjusted for prior overpayments or underpayments of charges.

[b] Determined at the current Project Interest Rate of 4.610 percent per annum.

[c] Reflects the transfers of permanent aqueduct capacity among contractors.

TABLE B-15 Capital Cost Component of Transportation Charge for Each Contractor (in dollars) [a,b,c]

Calendar Year	SAN JOAQUIN VALLEY AREA									
				Kern						
	Dudley Ridge	Empire	Future Contractor San Joaquin Valley	Municipal and Industrial	Municipal and Industrial[d]	Agricultural	Kings	Oak Flat	Tulare	Total
	[11]	[12]	[13]	[14]	[15]	[16]	[17]	[18]	[19]	[20]
1961	0	0	0	0	0	0	0	0	0	0
1962	0	0	0	0	0	0	0	0	0	0
1963	0	0	0	0	0	0	0	0	0	0
1964	0	0	2,725	0	0	0	0	0	0	2,725
1965	0	0	6,029	64,284	9,284	0	0	0	0	79,598
1966	0	0	12,039	120,256	17,073	0	0	0	0	149,368
1967	0	0	26,257	233,262	34,350	0	0	0	0	293,869
1968	80,751	1,915	48,950	335,771	48,966	440,487	9,407	4,960	68,097	1,039,304
1969	80,892	5,745	57,418	392,005	52,536	904,619	10,158	5,392	257,656	1,766,420
1970	88,656	5,745	59,224	423,404	53,922	1,100,287	10,446	5,607	190,671	1,937,962
1971	101,079	5,745	60,329	444,522	54,712	1,461,372	10,612	6,039	202,901	2,347,311
1972	112,938	5,745	60,945	454,227	55,075	2,188,275	10,694	11,573	625,935	3,525,406
1973	124,232	5,745	61,370	458,449	55,248	2,523,844	10,736	6,686	242,102	3,488,412
1974	188,550	5,745	61,890	460,485	55,349	2,826,332	10,770	7,486	401,849	4,018,455
1975	229,010	5,745	62,452	462,798	55,490	3,385,166	10,812	7,712	479,502	4,698,687
1976	174,608	5,745	62,720	464,655	55,679	3,649,183	10,853	8,711	343,025	4,775,178
1977	171,665	5,745	63,362	467,359	55,965	3,998,453	10,914	7,980	327,977	5,109,420
1978	183,524	0	65,796	469,216	56,156	4,444,619	11,019	8,411	351,880	5,590,622
1979	217,654	5,745	66,111	471,978	56,491	4,880,387	11,086	8,627	396,024	6,114,103
1980	231,523	5,745	66,399	474,721	56,828	5,325,602	11,157	12,293	398,575	6,582,843
1981	231,523	5,745	67,986	491,115	58,770	5,828,474	11,565	9,274	422,479	7,126,931
1982	231,523	5,745	67,996	488,835	58,707	6,292,607	11,552	9,705	445,826	7,612,497
1983	242,252	5,745	68,332	493,076	59,377	6,821,006	11,685	8,131	53,077	7,762,682
1984	254,675	5,745	68,950	498,702	60,083	7,159,437	11,834	10,352	348,050	8,417,828
1985	266,533	5,745	69,678	506,586	61,243	7,623,556	12,069	10,568	253,204	8,809,183
1986	278,392	5,745	69,966	508,983	61,587	7,746,675	12,141	10,999	540,328	9,234,816
1987	290,250	5,745	70,471	512,652	62,116	8,552,750	12,251	11,215	563,675	10,081,125
1988	302,109	5,745	70,832	515,513	62,526	8,990,407	12,334	11,646	587,023	10,558,134
1989	313,967	5,745	71,717	519,169	63,150	9,306,118	12,501	12,077	610,926	10,915,370
1990	162,913	5,745	73,153	537,527	65,389	9,634,132	12,936	12,293	658,733	11,162,822
1991	301,606	5,745	75,796	566,573	69,966	9,634,132	13,762	12,293	658,733	11,338,607
1992	325,826	5,745	78,990	597,260	74,817	9,634,132	14,756	12,293	658,733	11,402,552
1993	325,826	5,745	80,482	610,123	76,657	9,634,132	15,124	12,293	658,733	11,419,115
1994	325,826	5,745	82,105	619,494	77,936	9,634,132	15,397	12,293	658,733	11,431,661
1995	325,826	5,745	83,398	626,231	78,890	9,634,132	15,608	12,293	658,733	11,440,856
1996	301,375	5,745	87,367	635,384	80,221	9,303,298	15,961	12,293	658,733	11,100,378
1997	301,375	5,745	90,231	639,177	80,707	9,235,232	16,133	12,293	658,733	11,039,625
1998	301,374	5,745	92,940	652,602	82,732	8,982,918	16,588	12,293	658,733	10,805,926
1999	301,374	5,745	94,237	659,509	83,778	8,982,918	16,823	12,293	658,733	10,815,411
2000	301,374	5,745	95,750	667,629	85,008	8,336,521	17,096	12,293	658,733	10,180,150
2001	301,374	5,745	96,315	670,255	85,354	8,200,861	17,172	12,293	658,733	10,048,101
2002	324,241	5,745	96,772	672,352	85,648	8,200,861	17,237	12,293	618,669	10,033,817
2003	324,241	5,745	97,882	681,983	87,121	8,200,861	17,536	12,293	616,383	10,044,045
2004	324,241	5,745	98,185	684,250	87,449	8,188,434	46,168	12,293	531,255	9,978,020
2005	324,241	5,745	98,434	686,336	87,746	8,188,434	46,231	12,293	531,255	9,980,714
2006	324,241	5,745	99,039	692,288	88,653	8,188,434	48,158	12,293	529,513	9,988,364
2007	324,241	5,745	99,161	694,170	88,828	8,188,434	48,194	12,293	529,513	9,990,579
2008	324,241	5,745	99,425	696,491	89,095	8,188,434	48,249	12,293	529,513	9,993,486
2009	324,241	5,745	100,163	703,240	90,159	8,188,434	48,467	12,293	529,513	10,002,255
2010	284,713	5,745	100,376	706,426	90,427	8,010,309	48,521	12,293	489,521	9,748,332
2011	284,713	5,745	102,805	710,984	90,907	8,010,309	48,694	12,293	489,521	9,755,971
2012	284,713	5,745	106,293	715,917	91,573	8,010,309	48,937	12,293	489,521	9,765,301
2013	284,713	5,745	107,943	722,275	92,412	8,010,309	49,131	12,293	489,521	9,774,341
2014	273,458	5,745	110,313	750,222	96,289	8,010,309	49,932	12,293	481,231	9,789,791
2015	256,518	5,745	114,145	713,262	90,995	8,010,309	50,872	12,293	481,231	9,735,370
2016	256,518	5,745	112,716	676,928	85,839	8,010,309	51,482	12,293	481,231	9,693,062
2017	256,518	5,745	105,072	604,078	71,952	8,010,309	52,296	12,293	481,231	9,599,494
2018	**280,970**	**5,745**	**100,111**	**539,404**	**62,520**	**8,398,856**	**44,433**	**12,293**	**481,231**	**9,925,562**
2019	280,970	5,745	101,785	537,486	65,733	8,398,856	45,237	12,293	481,231	9,929,336
2020	258,382	5,745	108,294	585,191	74,201	8,398,856	46,735	12,293	481,231	9,970,927
2021	258,382	5,745	120,885	611,365	77,314	8,398,856	47,429	12,293	481,231	10,013,501
2022	258,382	5,745	120,269	601,661	76,952	8,398,856	47,347	12,293	481,231	10,002,736
2023	258,382	5,745	119,844	597,439	76,778	8,398,856	47,305	12,293	481,231	9,997,873
2024	258,382	5,745	119,324	595,403	76,677	8,398,856	47,271	12,293	481,231	9,995,183
2025	258,382	5,745	118,762	593,090	76,536	8,398,856	47,229	12,293	481,231	9,992,125
2026	258,382	5,745	118,495	591,233	76,348	8,398,856	47,188	12,293	481,231	9,989,770
2027	258,382	5,745	117,852	588,529	76,061	8,398,856	47,127	12,293	481,231	9,986,076
2028	258,382	5,745	115,418	586,671	75,870	8,398,856	47,021	12,293	481,231	9,981,488
2029	258,382	5,745	115,104	583,910	75,535	8,398,856	46,955	12,293	481,231	9,978,011
2030	258,382	5,745	114,815	581,167	75,198	8,398,856	46,884	12,293	481,231	9,974,571
2031	258,382	5,745	113,228	564,773	73,257	8,398,856	46,476	12,293	481,231	9,954,240
2032	258,382	5,745	113,218	567,053	73,319	8,398,856	46,489	12,293	481,231	9,956,586
2033	258,382	5,745	112,882	562,811	72,650	8,398,856	46,356	12,293	481,231	9,951,206
2034	258,382	5,745	112,264	557,185	71,943	8,398,856	46,207	12,293	481,231	9,944,107
2035	258,382	5,745	111,536	549,301	70,784	8,398,856	45,972	12,293	481,231	9,934,100
TOTAL	**17,444,219**	**381,085**	**6,203,519**	**39,718,664**	**5,004,907**	**497,090,402**	**1,993,716**	**760,922**	**32,976,358**	**601,573,792**

[a] Unadjusted for prior overpayments or underpayments of charges.

[b] Determined at the current Project Interest Rate of 4.610 percent per annum.

[c] Reflects the transfers of permanent aqueduct capacity among contractors.

[d] Charges under Amendment No. 18 of the water supply contract with Kern County Water Agency.

TABLE B-15 Capital Cost Component of Transportation Charge for Each Contractor (in dollars) [a,b,c]

Calendar Year	SOUTHERN CALIFORNIA AREA									
	AVEK	Castaic Lake	Coachella	Crestline	Desert	Littlerock	Mojave	Palmdale	San Bernardino	San Gabriel
	[21]	[22]	[23]	[24]	[25]	[26]	[27]	[28]	[29]	[30]
1961	0	0	0	0	0	0	0	0	0	0
1962	0	0	0	0	0	0	0	0	0	0
1963	34,411	0	0	0	726	0	0	0	51,729	0
1964	64,494	27,447	19,542	4,370	38,211	1,143	30,324	8,205	82,811	34,987
1965	121,484	53,007	34,348	7,194	42,701	2,082	53,730	15,222	135,069	35,344
1966	221,012	101,264	62,476	12,478	76,886	3,753	96,944	27,679	232,502	61,465
1967	427,622	210,814	121,269	23,472	148,839	7,284	188,141	54,023	433,350	115,574
1968	689,327	420,633	206,952	38,551	245,877	11,781	311,913	87,293	729,849	194,527
1969	1,003,797	625,333	318,583	57,301	368,426	17,249	468,481	127,219	1,136,415	302,649
1970	1,312,832	782,603	451,031	84,796	520,243	23,427	651,997	171,297	1,691,461	443,708
1971	1,581,850	950,344	595,102	120,210	700,914	28,845	864,874	208,821	2,394,083	619,778
1972	1,720,363	1,061,306	671,098	137,454	795,465	31,306	981,160	226,497	2,808,504	720,983
1973	1,772,377	1,076,479	696,065	142,143	825,044	32,281	1,019,145	233,340	2,945,564	756,530
1974	1,791,355	1,123,717	707,278	146,331	839,031	32,602	1,033,290	235,688	3,035,230	777,084
1975	1,815,881	1,139,264	724,295	150,105	861,611	33,017	1,062,706	238,700	3,117,604	798,777
1976	1,829,760	1,152,406	736,112	152,796	878,290	33,269	1,084,149	240,431	3,195,714	819,552
1977	1,842,615	1,166,181	744,718	154,692	890,124	33,485	1,099,906	242,010	3,244,723	832,585
1978	1,853,320	1,186,093	750,463	156,009	898,031	33,676	1,110,933	243,377	3,274,845	840,506
1979	1,869,355	1,211,008	756,140	157,141	904,987	33,943	1,120,833	245,346	3,296,693	846,199
1980	1,888,324	1,259,821	762,012	158,251	912,220	34,247	1,131,241	247,607	3,317,247	851,720
1981	1,987,339	1,351,457	796,384	164,015	950,529	35,899	1,181,413	259,877	3,421,183	879,634
1982	1,978,809	1,383,597	789,720	163,563	945,667	35,768	1,175,935	258,879	3,413,856	877,416
1983	2,061,590	1,428,671	809,319	167,582	971,692	37,104	1,210,316	268,895	3,486,248	897,190
1984	2,171,231	1,455,967	834,564	173,473	1,006,034	38,871	1,250,284	282,134	3,594,542	926,815
1985	2,251,676	1,472,064	851,720	177,807	1,031,452	40,260	1,283,222	291,738	3,673,311	948,379
1986	2,299,323	1,481,175	863,875	180,992	1,049,921	40,927	1,316,198	297,214	3,730,198	963,927
1987	2,344,046	1,487,589	876,261	183,970	1,068,826	41,390	1,332,434	301,992	3,783,895	978,588
1988	2,362,143	1,494,002	885,509	186,235	1,083,080	41,677	1,351,476	304,089	3,824,257	989,568
1989	2,376,030	1,503,728	889,631	187,412	1,088,857	41,852	1,359,296	305,475	3,846,509	995,456
1990	2,432,706	1,527,105	912,986	192,472	1,118,024	42,727	1,396,498	312,010	3,918,238	1,014,854
1991	2,469,661	1,546,752	932,659	197,604	1,147,282	43,112	1,432,605	315,536	3,997,480	1,036,359
1992	2,514,880	1,567,998	953,475	203,996	1,179,589	43,744	1,471,892	320,432	4,102,102	1,064,912
1993	2,549,874	1,587,005	969,784	210,989	1,203,773	44,253	1,499,299	324,519	4,213,571	1,095,444
1994	2,585,113	1,604,827	983,985	220,171	1,223,934	44,800	1,519,105	328,488	4,420,076	1,151,617
1995	2,611,217	1,613,787	992,587	225,248	1,236,069	45,193	1,531,453	331,367	4,547,097	1,186,123
1996	2,637,094	1,629,795	1,001,843	229,526	1,248,440	45,599	1,544,879	334,344	4,654,074	1,215,084
1997	2,654,359	1,641,182	1,010,118	232,003	1,258,944	45,868	1,557,355	336,316	4,875,746	1,268,666
1998	2,679,335	1,655,069	1,017,568	233,373	1,268,786	46,279	2,082,836	339,344	5,036,613	1,290,750
1999	2,692,811	1,666,454	1,022,130	235,684	1,274,800	46,503	2,090,110	341,005	5,243,553	1,307,788
2000	2,708,447	2,820,411	1,028,194	237,960	1,283,376	46,776	2,100,865	405,651	5,569,174	1,321,137
2001	2,716,761	2,826,352	1,032,076	239,333	1,288,723	46,930	2,107,707	406,855	6,393,264	1,330,966
2002	2,741,808	2,829,645	1,035,440	240,242	1,293,682	47,103	2,114,157	408,129	7,573,077	1,336,562
2003	2,753,746	2,838,160	1,038,552	241,001	1,297,752	47,280	2,119,808	409,564	8,154,205	1,344,434
2004	2,758,482	2,841,383	1,097,013	241,460	1,300,295	47,354	2,123,305	410,183	8,395,547	1,347,676
2005	2,763,594	2,845,312	6,717,728	241,849	2,061,704	47,442	2,126,854	410,899	8,526,549	1,350,250
2006	2,778,266	2,856,064	6,786,735	242,717	2,075,530	47,688	2,134,555	412,946	8,589,816	1,354,649
2007	2,800,064	2,881,675	6,916,014	244,290	2,099,752	48,040	2,147,280	416,143	8,717,179	1,361,754
2008	2,817,203	2,900,334	7,040,811	245,693	2,122,376	48,330	2,157,742	418,658	8,852,927	1,368,660
2009	2,827,699	2,916,157	7,132,612	249,637	2,141,770	48,511	2,163,836	420,065	9,071,215	1,385,750
2010	2,867,604	2,952,542	7,520,018	253,621	2,242,423	49,160	2,230,288	425,922	9,386,880	1,403,681
2011	2,913,211	2,988,815	7,694,297	257,857	2,286,346	49,889	2,265,098	432,541	9,755,356	1,422,953
2012	2,938,404	3,010,075	7,841,248	261,954	2,330,577	50,285	2,302,501	436,052	10,289,924	1,442,532
2013	2,924,131	3,022,932	8,024,616	268,157	2,378,124	50,643	2,354,950	438,805	11,081,451	1,459,532
2014	2,973,151	3,020,157	8,334,948	270,411	2,451,202	50,608	2,378,343	438,309	13,541,847	1,484,252
2015	2,983,482	3,030,320	8,481,989	272,385	2,482,969	50,859	2,412,548	439,963	15,786,990	1,498,395
2016	2,967,877	3,028,617	9,000,555	272,444	2,554,873	50,722	2,416,734	439,085	17,043,519	1,502,000
2017	2,866,822	2,956,465	9,923,231	266,822	2,648,152	48,971	2,372,318	426,098	18,407,702	1,477,134
2018	**2,699,876**	**2,761,213**	**10,177,068**	**257,439**	**2,629,921**	**46,124**	**2,279,243**	**402,256**	**18,919,647**	**1,438,436**
2019	2,502,941	2,551,456	10,649,123	246,452	2,626,520	42,703	2,151,989	372,525	18,885,423	1,382,549
2020	2,357,090	2,437,100	11,173,617	230,069	2,620,832	39,276	2,082,547	344,423	18,751,737	1,318,234
2021	2,273,335	2,381,262	11,173,609	205,916	2,522,404	36,872	1,953,226	327,836	18,308,269	1,209,310
2022	2,134,822	2,221,726	10,265,670	188,672	2,315,478	34,410	1,816,789	306,986	17,893,848	1,108,105
2023	2,082,808	2,214,002	9,561,909	183,982	2,194,211	33,435	1,771,392	298,949	17,756,788	1,072,558
2024	2,063,830	2,155,128	9,445,342	179,795	2,165,993	33,114	1,754,857	296,138	17,667,122	1,052,004
2025	2,039,304	2,137,264	9,330,088	176,020	2,130,144	32,699	1,723,086	292,562	17,584,748	1,030,311
2026	2,025,425	2,119,016	9,226,219	173,330	2,101,031	32,447	1,700,370	290,543	17,506,638	1,009,536
2027	2,012,570	2,100,505	9,149,867	171,434	2,080,045	32,231	1,683,931	288,731	17,457,629	996,503
2028	2,001,865	2,072,669	9,112,650	170,117	2,067,887	32,040	1,673,070	287,214	17,427,507	988,582
2029	1,985,830	2,034,355	9,080,320	168,985	2,057,331	31,773	1,662,685	285,002	17,405,659	982,889
2030	1,966,861	1,957,141	9,053,733	167,875	2,047,300	31,469	1,651,785	282,488	17,385,105	977,368
2031	1,867,847	1,814,088	8,915,122	162,111	1,994,912	29,817	1,589,789	268,325	17,281,169	949,454
2032	1,876,376	1,762,583	8,927,925	162,563	2,000,603	29,949	1,601,018	269,958	17,288,496	951,672
2033	1,793,595	1,690,032	8,846,394	158,544	1,966,212	28,612	1,563,606	259,292	17,216,104	931,898
2034	1,683,954	1,647,796	8,733,838	152,653	1,920,077	26,845	1,515,528	245,303	17,107,811	902,274
2035	1,603,509	1,626,074	8,649,912	148,319	1,885,640	25,456	1,481,845	235,406	17,029,041	880,709
TOTAL	**155,572,007**	**132,894,772**	**303,870,086**	**13,321,516**	**106,969,489**	**2,671,078**	**111,582,014**	**21,656,218**	**616,915,303**	**73,515,249**

[a] Unadjusted for prior overpayments or underpayments of charges.

[b] Determined at the current Project Interest Rate of 4.610 percent per annum.

[c] Reflects the transfers of permanent aqueduct capacity among contractors.

TABLE B-15 Capital Cost Component of Transportation Charge for Each Contractor (in dollars) [a,b,c]

Calendar Year	SOUTHERN CALIFORNIA AREA (continued)				FEATHER RIVER AREA				South Bay Area Future Contractor	Grand Total
	San Gorgonio	Metropolitan	Ventura	Total	Yuba City	Butte	Plumas	Total		
	[31]	[32]	[33]	[34]	[35]	[36]	[37]	[38]	[39]	[40]
1961	0	0	0	0	0	0	0	0	0	0
1962	0	0	0	0	0	0	0	0	0	0
1963	0	690,812	0	777,678	0	0	0	0	0	1,401,957
1964	21,735	1,260,513	9,378	1,603,161	0	0	0	0	0	2,551,416
1965	21,866	2,180,589	17,766	2,720,401	0	0	405	405	0	4,293,872
1966	37,964	3,900,172	33,426	4,868,023	0	0	565	565	0	6,808,355
1967	71,283	7,693,703	68,155	9,563,529	0	0	562	562	0	11,974,135
1968	120,094	14,345,147	133,299	17,535,245	0	0	564	564	0	21,188,705
1969	187,059	21,857,456	202,599	26,672,567	0	0	3,191	3,191	0	31,391,381
1970	275,010	28,992,595	257,859	35,658,859	0	0	15,121	15,121	0	40,665,546
1971	385,025	37,242,413	316,307	46,008,567	0	0	15,947	15,947	0	51,452,640
1972	448,055	44,062,125	353,935	54,018,250	0	0	17,332	17,332	0	60,655,582
1973	470,185	46,299,581	357,342	56,626,073	0	0	17,333	17,333	0	63,267,689
1974	483,259	48,322,678	372,112	58,899,655	0	0	17,334	17,334	0	66,083,540
1975	496,722	49,285,084	376,511	60,100,277	0	0	17,337	17,337	0	67,988,107
1976	509,650	50,137,295	380,788	61,150,210	0	0	17,338	17,338	0	69,131,983
1977	517,741	50,827,166	385,097	61,981,044	0	0	17,340	17,340	0	70,322,786
1978	522,656	51,426,581	390,742	62,687,233	0	0	17,342	17,342	0	71,549,388
1979	526,178	52,230,344	399,649	63,597,815	0	0	17,344	17,344	0	73,015,280
1980	529,583	53,637,412	417,136	65,146,821	0	0	17,345	17,345	0	75,076,550
1981	546,787	56,667,437	449,812	68,691,766	0	0	17,346	17,346	0	79,259,759
1982	545,445	57,465,063	461,234	69,494,950	0	0	17,348	17,348	0	80,565,156
1983	557,607	59,037,472	477,333	71,411,020	0	0	17,348	17,348	0	82,704,201
1984	575,830	60,313,580	486,863	73,110,186	0	0	17,349	17,349	0	85,237,885
1985	589,089	61,144,629	492,117	74,247,463	0	0	17,351	17,351	0	87,081,350
1986	598,648	61,666,346	494,977	74,983,722	0	0	17,352	17,352	0	88,945,920
1987	607,664	62,094,710	496,758	75,598,123	0	0	17,354	17,354	0	91,841,308
1988	614,418	62,452,912	498,619	76,087,987	0	0	17,355	17,355	0	93,957,752
1989	618,059	62,796,236	501,579	76,510,120	0	0	17,358	17,358	0	95,197,269
1990	629,934	63,762,459	509,566	77,769,579	0	0	17,360	17,360	0	96,947,201
1991	643,118	64,677,355	516,147	78,955,671	0	0	17,364	17,364	0	98,530,790
1992	660,626	65,776,353	523,154	80,383,153	0	0	17,367	17,367	0	100,264,309
1993	679,343	66,905,041	529,383	81,812,279	0	0	17,369	17,369	0	101,969,148
1994	714,062	68,486,622	535,055	83,817,855	0	0	17,370	17,370	0	104,742,960
1995	735,431	69,373,540	537,812	84,966,923	0	0	17,371	17,371	0	108,670,798
1996	753,512	70,251,056	541,753	86,086,999	0	0	17,371	17,371	0	118,623,964
1997	812,976	71,530,953	544,467	87,768,954	0	0	17,371	17,371	0	128,891,520
1998	919,464	72,283,436	548,490	89,401,344	0	0	0	0	0	132,601,931
1999	1,100,324	72,917,423	552,184	90,490,769	0	0	0	0	0	134,353,252
2000	1,434,718	73,432,162	555,279	92,944,150	0	0	0	0	0	136,956,535
2001	2,371,146	73,741,965	556,658	95,058,735	0	0	0	0	0	139,937,305
2002	3,744,046	73,915,736	557,417	97,837,044	0	0	0	0	0	142,876,227
2003	4,400,656	74,256,539	559,749	99,461,446	0	0	17,375	17,375	0	145,061,341
2004	4,669,624	74,601,782	560,566	100,394,672	0	0	17,375	17,375	0	146,431,090
2005	4,808,406	68,499,909	561,532	100,962,028	0	0	17,375	17,375	0	147,323,368
2006	4,858,605	68,876,841	564,172	101,578,585	0	0	17,375	17,375	0	148,097,242
2007	4,971,445	69,605,880	569,809	102,779,325	0	0	17,376	17,376	0	149,475,028
2008	5,105,983	70,216,830	573,969	103,869,517	0	0	17,376	17,376	0	151,050,036
2009	5,287,804	70,888,202	577,886	105,111,144	0	0	17,376	17,376	0	153,343,211
2010	5,568,690	72,113,606	585,961	107,600,397	0	0	17,376	17,376	0	156,615,529
2011	5,925,798	73,157,328	593,207	109,742,698	0	0	17,376	17,376	0	160,358,701
2012	6,479,688	73,882,924	597,010	111,863,174	0	0	17,376	17,376	0	163,954,254
2013	7,344,760	74,207,499	599,887	114,155,487	0	0	17,376	17,376	0	166,686,925
2014	10,146,794	75,283,826	598,271	120,972,119	0	0	17,376	17,376	0	173,926,369
2015	12,747,302	75,771,062	599,037	126,557,300	0	0	16,972	16,972	0	179,092,515
2016	14,220,578	76,613,208	595,884	130,706,096	0	0	16,812	16,812	0	183,300,655
2017	15,927,974	76,777,443	577,621	134,676,752	0	0	16,814	16,814	0	187,057,538
2018	**16,270,264**	**73,290,540**	**530,385**	**131,702,411**	**0**	**0**	**16,812**	**16,812**	**0**	**184,192,763**
2019	16,338,987	70,008,513	481,658	128,240,838	0	0	14,185	14,185	0	180,575,221
2020	16,378,200	68,479,287	456,497	126,668,909	0	0	2,256	2,256	0	179,365,094
2021	16,316,721	66,391,440	442,911	123,543,109	0	0	1,429	1,429	0	176,635,210
2022	16,253,691	60,516,046	405,283	115,461,527	0	0	44	44	0	168,527,760
2023	16,231,561	59,049,073	401,877	112,852,547	0	0	43	43	0	165,870,402
2024	16,218,487	57,145,560	387,106	110,564,477	0	0	42	42	0	163,567,007
2025	16,205,024	56,294,660	382,708	109,358,619	0	0	40	40	0	162,333,192
2026	16,192,096	55,546,936	378,431	108,302,018	0	0	39	39	0	161,255,873
2027	16,184,006	54,933,960	374,121	107,465,533	0	0	36	36	0	160,389,193
2028	16,179,090	54,370,270	368,476	106,751,437	0	0	35	35	0	159,630,410
2029	16,175,568	53,596,759	359,570	105,826,726	0	0	33	33	0	158,669,169
2030	16,172,164	52,213,205	342,082	104,248,576	0	0	32	32	0	157,041,371
2031	16,154,959	49,301,498	309,406	100,638,497	0	0	30	30	0	153,312,313
2032	16,156,301	48,496,905	297,985	99,822,332	0	0	29	29	0	152,479,303
2033	16,144,139	46,994,793	281,886	97,875,108	0	0	28	28	0	150,446,934
2034	16,125,916	45,817,790	272,355	96,152,139	0	0	27	27	0	148,523,497
2035	16,112,658	45,062,529	267,101	95,008,199	0	0	26	26	0	147,028,862
TOTAL	**430,350,250**	**4,127,346,798**	**31,293,161**	**6,127,957,941**	**0**	**0**	**781,778**	**781,778**	**0**	**8,460,592,826**

[a] Unadjusted for prior overpayments or underpayments of charges.

[b] Determined at the current Project Interest Rate of 4.610 percent per annum.

[c] Reflects the transfers of permanent aqueduct capacity among contractors.

TABLE B-16A Minimum OMP&R Component of Transportation Charge for Each Contractor (in dollars)

	NORTH BAY AREA			SOUTH BAY AREA				CENTRAL COASTAL AREA		
Calendar Year	Napa	Solano	Total	Alameda-Zone 7	Alameda County	Santa Clara	Total	San Luis Obispo	Santa Barbara	Total
	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]
1961	0	0	0	0	0	0	0	0	0	0
1962	0	0	0	9,699	8,868	21,132	39,699	0	0	0
1963	0	0	0	38,048	34,788	82,896	155,732	0	0	0
1964	0	0	0	41,148	38,323	91,320	170,791	0	0	0
1965	0	0	0	78,529	75,616	195,793	349,937	0	0	0
1966	0	0	0	79,753	78,779	218,543	377,076	0	0	0
1967	0	0	0	127,896	123,667	335,224	586,787	0	0	0
1968	130	0	130	126,058	120,563	333,506	580,128	11,800	21,770	33,571
1969	80,875	0	80,875	145,411	138,050	372,585	656,046	63,113	116,435	179,548
1970	94,872	0	94,872	128,993	120,245	320,664	569,902	74,187	136,867	211,054
1971	45,579	0	45,579	113,071	108,346	296,004	517,421	74,011	136,541	210,552
1972	37,895	0	37,895	122,407	117,483	334,366	574,256	79,196	146,107	225,303
1973	32,993	0	32,993	122,738	116,785	325,726	565,250	75,714	139,683	215,398
1974	46,498	0	46,498	154,435	146,929	403,080	704,444	76,530	141,189	217,719
1975	37,707	0	37,707	189,175	182,087	513,823	885,086	92,605	170,845	263,450
1976	60,786	0	60,786	203,064	193,435	524,813	921,312	94,935	175,144	270,079
1977	78,400	0	78,400	179,869	169,065	500,101	849,035	102,945	189,922	292,867
1978	56,318	0	56,318	239,301	228,855	647,828	1,115,984	104,060	191,978	296,038
1979	73,852	0	73,852	236,986	232,105	666,742	1,135,833	100,748	185,868	286,617
1980	81,769	0	81,769	389,575	372,185	1,010,830	1,772,591	126,328	233,105	359,433
1981	101,340	0	101,340	317,408	302,272	834,257	1,453,937	140,208	258,712	398,920
1982	191,987	0	191,987	386,742	369,633	1,098,844	1,855,219	142,045	262,101	404,146
1983	80,215	0	80,215	438,536	428,973	1,269,373	2,136,882	171,001	315,523	486,524
1984	106,485	0	106,485	591,243	565,721	1,817,629	2,974,593	201,768	372,284	574,052
1985	215,341	0	215,341	674,975	655,490	1,840,211	3,170,677	242,935	448,233	691,167
1986	203,704	0	203,704	613,273	583,077	1,784,056	2,980,407	233,000	429,904	662,905
1987	295,505	0	295,505	687,629	652,468	2,000,817	3,340,914	230,484	463,838	694,322
1988	312,677	(58)	312,619	676,847	655,274	1,910,092	3,242,213	258,807	561,030	819,837
1989	403,330	688,185	1,091,515	716,831	712,354	1,897,149	3,326,335	244,772	668,476	913,248
1990	658,942	674,944	1,333,886	782,589	780,305	2,129,966	3,692,860	310,222	677,025	987,247
1991	726,717	860,903	1,587,620	543,178	524,741	1,520,569	2,588,488	302,369	673,858	976,227
1992	483,580	712,313	1,195,893	796,058	855,050	2,253,496	3,904,605	346,220	736,477	1,082,698
1993	524,000	708,129	1,232,129	1,280,736	1,261,431	3,338,742	5,880,908	386,060	734,138	1,120,197
1994	573,814	658,274	1,232,087	1,368,665	1,312,746	3,560,310	6,241,720	481,022	888,287	1,369,309
1995	539,407	660,770	1,200,177	1,232,272	1,187,201	3,216,470	5,635,943	477,929	881,323	1,359,251
1996	604,992	1,011,298	1,616,291	1,185,220	1,124,968	3,007,330	5,317,518	649,161	1,197,179	1,846,340
1997	563,579	741,881	1,305,460	1,029,670	968,999	2,667,649	4,666,319	406,652	749,805	1,156,456
1998	461,844	661,193	1,123,037	1,064,729	1,174,897	3,502,733	5,742,360	810,087	3,051,492	3,861,579
1999	613,368	1,006,577	1,619,945	1,243,942	1,285,417	5,135,770	7,665,129	795,894	3,101,531	3,897,425
2000	775,919	1,493,379	2,269,298	2,174,141	1,295,595	3,754,193	7,223,929	699,789	3,084,077	3,783,866
2001	651,209	1,444,040	2,095,249	4,194,363	1,038,206	3,544,596	8,777,165	723,649	2,906,725	3,630,374
2002	1,096,940	1,871,456	2,968,396	8,256,339	1,356,061	6,055,048	15,667,449	754,997	3,285,166	4,040,163
2003	1,168,611	2,247,438	3,416,049	4,901,790	1,057,275	3,547,976	9,507,041	803,484	3,440,305	4,243,789
2004	1,618,197	2,345,860	3,964,058	2,574,388	1,276,799	3,528,163	7,379,350	799,132	3,354,306	4,153,438
2005	916,728	1,796,605	2,713,333	2,391,493	1,129,780	2,947,359	6,468,631	848,861	3,682,079	4,530,940
2006	816,638	1,385,591	2,202,229	2,479,768	1,203,779	3,267,733	6,951,279	746,609	3,623,340	4,369,949
2007	773,789	1,512,833	2,286,622	3,220,542	1,566,454	4,000,436	8,787,431	827,113	3,588,769	4,415,882
2008	1,047,918	1,419,840	2,467,758	3,613,872	1,759,847	4,466,880	9,840,598	1,244,483	5,313,108	6,557,592
2009	1,118,174	1,789,809	2,907,984	3,270,487	1,484,217	4,198,844	8,953,549	1,084,569	4,522,550	5,607,119
2010	1,195,192	3,197,767	4,392,960	3,135,530	1,538,502	4,238,336	8,912,368	1,408,990	6,235,197	7,644,187
2011	1,570,404	3,658,323	5,228,727	3,518,367	1,697,478	4,534,900	9,750,745	1,447,965	6,560,138	8,008,103
2012	2,063,860	3,559,002	5,622,862	3,707,469	1,770,276	6,741,582	12,219,327	1,442,208	7,246,134	8,688,342
2013	1,505,566	3,066,053	4,571,619	4,209,117	1,987,801	5,955,679	12,152,597	1,687,961	8,777,136	10,465,097
2014	1,958,094	3,822,656	5,780,750	4,797,083	2,220,189	7,393,223	14,410,495	1,544,894	5,826,654	7,371,548
2015	2,171,480	3,621,701	5,793,181	5,003,327	2,119,460	8,248,427	15,371,214	2,034,183	8,477,187	10,511,370
2016	2,678,726	4,382,695	7,061,422	4,540,045	1,912,981	13,522,338	19,975,364	1,873,115	10,986,277	12,859,392
2017	2,113,916	3,573,603	5,687,519	5,203,375	2,226,298	11,665,219	19,094,892	1,512,470	6,841,790	8,354,260
2018	**2,257,507**	**3,951,903**	**6,209,410**	**5,555,216**	**2,331,383**	**6,805,156**	**14,691,755**	**1,629,997**	**7,473,002**	**9,103,000**
2019	2,147,281	3,755,565	5,902,846	5,971,345	2,494,149	7,364,065	15,829,558	1,699,139	7,825,214	9,524,353
2020	2,169,005	3,755,795	5,924,799	5,632,412	2,374,116	8,697,595	16,704,124	1,607,936	7,413,645	9,021,582
2021	2,190,695	3,793,353	5,984,048	5,688,736	2,397,857	8,784,570	16,871,163	1,624,016	7,487,782	9,111,798
2022	2,212,601	3,831,286	6,043,887	5,745,623	2,421,836	8,872,417	17,039,877	1,640,256	7,562,659	9,202,915
2023	2,234,727	3,869,599	6,104,326	5,803,079	2,446,054	8,961,140	17,210,274	1,656,659	7,638,286	9,294,945
2024	2,257,075	3,908,295	6,165,370	5,861,110	2,470,515	9,050,752	17,382,377	1,673,225	7,714,669	9,387,895
2025	2,279,646	3,947,379	6,227,025	5,919,721	2,495,220	9,141,260	17,556,202	1,689,957	7,791,816	9,481,773
2026	2,302,442	3,986,851	6,289,293	5,978,918	2,520,172	9,232,672	17,731,762	1,706,857	7,869,734	9,576,591
2027	2,325,466	4,026,721	6,352,188	6,038,707	2,545,374	9,324,998	17,909,079	1,723,926	7,948,431	9,672,356
2028	2,348,720	4,066,988	6,415,708	6,099,095	2,570,828	9,418,249	18,088,171	1,741,165	8,027,916	9,769,080
2029	2,372,208	4,107,658	6,479,866	6,160,086	2,596,536	9,512,431	18,269,053	1,758,576	8,108,195	9,866,771
2030	2,395,931	4,148,735	6,544,666	6,221,687	2,622,502	9,607,556	18,451,745	1,776,162	8,189,276	9,965,439
2031	2,419,889	4,190,222	6,610,111	6,283,903	2,648,726	9,703,631	18,636,261	1,793,924	8,271,169	10,065,093
2032	2,444,089	4,232,124	6,676,213	6,346,742	2,675,213	9,800,667	18,822,623	1,811,863	8,353,882	10,165,745
2033	2,468,529	4,274,445	6,742,975	6,410,209	2,701,966	9,898,674	19,010,849	1,829,982	8,437,420	10,267,401
2034	2,493,215	4,317,189	6,810,404	6,474,312	2,728,985	9,997,661	19,200,958	1,848,282	8,521,794	10,370,076
2035	2,518,147	4,360,362	6,878,509	6,539,055	2,756,276	10,097,638	19,392,969	1,866,764	8,607,012	10,473,776
TOTAL	**75,467,038**	**127,097,532**	**202,564,570**	**198,278,154**	**92,445,901**	**317,862,503**	**608,586,558**	**60,469,963**	**259,449,513**	**319,919,476**

TABLE B-16A Minimum OMP&R Component of Transportation Charge for Each Contractor (in dollars)

Calendar Year	SAN JOAQUIN VALLEY AREA								
				Kern					
	Dudley Ridge	Empire	Future Contractor San Joaquin Valley	Municipal and Industrial	Agricultural	Kings	Oak Flat	Tulare	Total
	[11]	[12]	[13]	[14]	[15]	[16]	[17]	[18]	[19]
1961	0	0	0	0	0	0	0	0	0
1962	0	0	0	0	0	0	0	0	0
1963	0	0	0	0	0	0	0	0	0
1964	0	0	0	0	0	0	0	0	0
1965	0	0	0	0	0	0	0	0	0
1966	0	0	0	0	0	0	0	0	0
1967	0	0	0	0	0	0	0	0	0
1968	37,806	1,963	5,639	60,701	678,086	2,008	2,073	77,591	865,867
1969	45,479	2,235	30,158	80,554	1,197,126	2,286	2,085	90,773	1,450,698
1970	46,969	2,292	35,450	96,673	1,381,493	2,344	2,158	93,408	1,660,786
1971	47,997	2,314	35,366	106,654	1,643,163	2,366	2,288	94,874	1,935,021
1972	49,866	2,414	37,844	122,313	1,729,169	2,469	2,254	98,777	2,045,106
1973	50,006	2,385	36,180	125,553	1,719,873	2,440	2,310	98,330	2,037,076
1974	52,818	2,556	36,570	135,661	1,823,065	2,614	2,529	104,609	2,160,424
1975	66,963	3,243	44,251	162,738	2,235,242	3,317	3,191	132,663	2,651,608
1976	66,504	3,328	45,364	159,303	2,215,999	3,404	2,919	133,940	2,630,761
1977	75,595	3,812	49,192	189,661	2,522,290	3,898	3,708	152,838	3,000,994
1978	70,688	3,503	49,725	174,897	2,427,163	3,583	3,644	141,672	2,874,875
1979	68,879	3,436	48,142	173,677	2,378,315	3,514	3,492	138,493	2,817,948
1980	95,898	4,722	59,551	235,741	3,146,570	4,830	4,777	191,582	3,743,671
1981	118,448	5,965	66,183	266,353	3,440,557	6,099	5,187	239,323	4,148,116
1982	134,083	6,711	67,061	311,879	3,848,922	6,862	6,382	270,061	4,651,960
1983	184,902	9,242	80,869	426,485	5,030,031	9,450	8,494	372,182	6,121,656
1984	194,228	9,656	95,555	471,854	5,636,134	9,874	8,719	389,892	6,815,912
1985	200,694	9,957	115,227	486,162	6,042,593	10,182	8,982	402,457	7,276,254
1986	207,028	10,302	110,479	530,803	6,372,710	10,536	10,341	415,776	7,667,975
1987	205,002	10,259	109,401	533,451	6,378,437	10,493	10,517	412,889	7,670,450
1988	203,711	10,223	122,903	516,432	6,388,497	10,455	10,341	410,868	7,673,430
1989	224,049	11,269	116,197	564,169	6,747,046	11,526	11,102	452,406	8,137,763
1990	271,051	13,666	148,238	664,040	8,111,616	13,976	13,206	547,974	9,783,767
1991	275,748	13,854	144,486	662,755	8,111,610	14,168	13,218	556,474	9,792,313
1992	317,889	16,027	162,466	764,224	9,115,453	16,393	18,209	642,672	11,053,333
1993	359,879	17,989	184,477	831,662	10,372,245	18,399	19,560	724,397	12,528,608
1994	309,084	15,486	224,254	738,619	9,789,833	15,839	16,434	622,879	11,732,427
1995	395,441	19,918	220,899	898,339	11,190,121	20,373	21,551	799,070	13,565,713
1996	362,623	19,968	301,835	902,162	11,872,821	20,424	21,664	796,711	14,298,209
1997	366,476	20,154	186,450	942,987	10,558,144	20,613	19,344	806,084	12,920,252
1998	453,033	24,560	288,906	1,098,213	12,207,920	25,122	21,594	995,194	15,114,543
1999	384,169	21,168	275,698	980,700	11,106,789	21,650	21,913	844,306	13,656,391
2000	384,704	21,155	206,915	1,023,474	9,953,977	21,656	22,822	844,517	12,479,220
2001	463,709	25,514	231,713	1,211,557	11,265,338	26,105	31,783	1,018,354	14,274,074
2002	426,218	21,572	223,769	1,080,828	10,227,640	22,080	25,646	813,668	12,841,421
2003	494,752	25,202	242,078	1,177,971	11,268,413	25,794	30,739	944,655	14,209,603
2004	442,084	22,638	244,298	1,124,290	10,636,869	61,698	25,464	731,713	13,289,054
2005	427,271	21,928	257,146	1,013,649	10,307,500	59,685	24,396	708,154	12,819,729
2006	463,703	23,716	195,995	1,108,027	10,310,648	71,604	26,365	764,446	12,964,504
2007	525,339	26,640	234,418	1,265,514	11,649,147	82,194	27,074	861,469	14,671,795
2008	624,426	32,189	369,529	1,523,612	15,047,970	101,240	32,491	1,034,658	18,766,116
2009	513,986	26,133	334,992	1,262,887	12,703,918	83,757	26,741	844,235	15,796,649
2010	497,866	28,918	406,853	1,310,362	13,110,520	93,911	27,631	863,987	16,340,048
2011	601,994	35,255	403,524	1,640,942	15,513,113	111,505	39,506	1,050,583	19,396,422
2012	569,718	33,274	361,069	1,608,884	15,233,336	103,893	31,051	992,405	18,933,631
2013	649,085	38,034	410,871	1,710,149	16,606,569	117,805	30,895	1,133,183	20,696,590
2014	696,585	42,073	524,934	1,852,288	19,002,410	133,504	44,496	1,236,659	23,532,949
2015	649,295	42,346	641,610	1,820,796	19,546,158	137,417	44,320	1,239,827	24,121,770
2016	663,376	43,588	374,383	1,867,979	17,816,635	130,876	45,315	1,273,310	22,215,463
2017	780,954	50,821	437,832	2,147,715	21,238,756	153,468	59,164	1,488,972	26,357,681
2018	**941,308**	**55,860**	**465,924**	**2,367,696**	**24,472,441**	**168,234**	**64,987**	**1,637,075**	**30,173,526**
2019	970,130	57,549	483,747	2,452,205	25,326,372	173,488	63,888	1,686,757	31,214,136
2020	856,608	55,291	467,127	2,275,349	24,257,459	166,715	63,307	1,620,311	29,762,165
2021	865,174	55,843	471,798	2,298,102	24,500,033	168,382	63,940	1,636,514	30,059,787
2022	873,826	56,402	476,516	2,321,083	24,745,034	170,066	64,579	1,652,879	30,360,385
2023	882,565	56,966	481,281	2,344,294	24,992,484	171,767	65,225	1,669,408	30,663,989
2024	891,390	57,536	486,094	2,367,737	25,242,408	173,484	65,877	1,686,102	30,970,628
2025	900,304	58,111	490,955	2,391,414	25,494,832	175,219	66,536	1,702,963	31,280,334
2026	909,307	58,692	495,864	2,415,328	25,749,782	176,972	67,201	1,719,993	31,593,139
2027	918,400	59,279	500,823	2,439,482	26,007,278	178,741	67,873	1,737,193	31,909,069
2028	927,584	59,872	505,831	2,463,876	26,267,352	180,529	68,552	1,754,565	32,228,160
2029	936,860	60,470	510,890	2,488,515	26,530,025	182,334	69,238	1,772,110	32,550,442
2030	946,229	61,075	515,999	2,513,400	26,795,326	184,157	69,930	1,789,831	32,875,947
2031	955,691	61,686	521,158	2,538,534	27,063,278	185,999	70,629	1,807,730	33,204,705
2032	965,248	62,303	526,370	2,563,920	27,333,912	187,859	71,336	1,825,807	33,536,753
2033	974,900	62,926	531,634	2,589,559	27,607,251	189,737	72,049	1,844,065	33,872,121
2034	984,649	63,555	536,950	2,615,454	27,883,323	191,635	72,769	1,862,506	34,210,842
2035	994,496	64,191	542,320	2,641,609	28,162,156	193,551	73,497	1,881,131	34,552,950
TOTAL	**32,512,742**	**1,933,178**	**18,648,225**	**84,253,898**	**897,288,699**	**5,068,570**	**2,121,499**	**61,382,895**	**1,103,209,706**

TABLE B-16A Minimum OMP&R Component of Transportation Charge for Each Contractor (in dollars)

Calendar Year	SOUTHERN CALIFORNIA AREA									
	AVEK	Castaic Lake	Coachella	Crestline	Desert	Littlerock	Mojave	Palmdale	San Bernardino	San Gabriel
	[20]	[21]	[22]	[23]	[24]	[25]	[26]	[27]	[28]	[29]
1961	0	0	0	0	0	0	0	0	0	0
1962	0	0	0	0	0	0	0	0	0	0
1963	0	0	0	0	0	0	0	0	0	0
1964	0	0	0	0	0	0	0	0	0	0
1965	0	0	0	0	0	0	0	0	0	0
1966	0	0	0	0	0	0	0	0	0	0
1967	0	0	0	0	0	0	0	0	0	0
1968	65,074	28,085	11,697	2,958	19,291	1,089	24,380	8,173	52,315	14,399
1969	86,339	70,342	15,522	3,925	25,598	1,445	32,348	10,844	69,419	19,106
1970	107,807	84,577	19,392	4,904	31,981	1,804	40,391	13,540	86,727	23,865
1971	178,820	105,979	32,228	8,150	53,151	2,992	66,999	22,459	144,136	39,636
1972	363,555	202,625	106,740	30,967	176,037	6,601	213,032	48,102	548,123	144,113
1973	404,661	222,765	121,341	34,674	200,116	7,346	243,320	53,975	724,535	190,156
1974	434,868	235,528	130,627	37,062	215,432	7,677	262,735	56,383	786,107	207,019
1975	504,791	289,501	151,031	43,176	249,082	9,082	303,108	65,580	905,424	238,842
1976	559,013	262,420	160,686	44,454	265,004	10,030	325,512	73,253	964,524	256,570
1977	675,504	335,749	184,813	47,743	304,792	11,890	381,161	87,355	1,069,446	289,793
1978	600,343	376,946	187,028	54,156	308,449	10,711	373,192	78,304	1,148,279	300,751
1979	661,123	349,072	196,264	52,211	323,677	12,124	401,469	87,126	1,125,452	302,508
1980	858,039	415,571	253,090	71,921	417,398	15,435	508,379	112,853	1,518,405	401,223
1981	1,001,503	511,087	284,970	73,534	469,970	18,046	588,024	131,992	1,548,350	420,523
1982	1,128,643	557,494	320,938	89,560	529,292	20,193	649,204	148,012	1,870,559	497,871
1983	1,744,932	832,687	450,049	119,275	742,218	30,643	922,072	225,793	2,373,149	639,682
1984	2,105,780	943,524	548,784	150,179	905,055	36,810	1,112,196	271,187	3,018,294	803,394
1985	2,157,936	1,055,744	584,697	157,841	964,282	38,972	1,191,309	277,250	3,230,403	860,780
1986	2,311,841	1,102,466	618,750	162,748	1,020,438	40,051	1,268,806	295,987	3,318,638	893,069
1987	2,366,343	1,032,918	628,222	167,262	1,036,061	41,773	1,283,836	307,844	3,400,838	913,933
1988	2,303,274	1,042,113	649,276	175,694	1,070,784	40,604	1,321,553	298,438	3,587,873	960,968
1989	2,280,051	1,088,176	613,266	169,993	1,011,401	39,501	1,240,888	292,775	3,499,964	932,519
1990	2,636,186	1,275,150	708,829	201,242	1,169,006	45,472	1,424,445	336,069	4,084,211	1,078,392
1991	2,737,441	1,454,172	763,989	210,644	1,259,974	48,936	1,546,583	358,165	4,348,900	1,150,633
1992	2,781,586	1,579,025	750,248	198,232	1,237,307	49,829	1,538,733	362,844	4,131,745	1,115,632
1993	3,109,819	1,689,775	850,589	234,719	1,402,796	56,125	1,722,415	411,539	5,023,595	1,338,111
1994	2,825,193	1,608,731	794,991	225,121	1,311,100	51,259	1,634,886	376,180	4,794,820	1,267,565
1995	3,121,440	1,720,649	848,101	231,718	1,398,686	58,749	1,766,297	444,998	4,828,432	1,272,345
1996	3,093,678	1,966,634	862,720	228,008	1,422,789	56,813	1,817,427	423,444	4,707,473	1,256,549
1997	3,250,394	1,810,292	918,428	281,067	1,514,687	59,547	1,853,224	446,127	5,705,741	1,477,757
1998	3,876,512	2,050,254	1,070,517	299,639	1,765,491	73,835	3,207,848	561,246	6,076,375	1,634,942
1999	3,832,428	2,108,765	1,114,208	311,154	1,837,547	75,908	3,226,793	549,879	6,454,799	1,738,148
2000	3,754,814	3,382,326	1,036,009	291,775	1,708,586	68,491	3,000,971	595,130	5,876,356	1,572,153
2001	4,461,346	3,773,156	1,111,786	298,240	1,833,547	80,861	3,287,877	700,113	5,761,358	1,556,933
2002	3,640,157	3,495,707	1,017,608	282,351	1,678,238	62,563	2,999,667	549,514	5,628,813	1,510,431
2003	4,067,155	3,392,356	1,123,306	298,428	1,852,545	68,043	3,294,891	608,571	6,599,226	1,603,982
2004	4,445,363	4,032,309	1,441,872	322,934	1,908,976	76,808	3,426,245	676,950	7,222,184	1,765,191
2005	3,834,679	3,548,174	5,894,144	289,387	2,247,118	66,837	2,910,013	581,713	6,801,965	1,600,286
2006	4,071,088	3,232,708	8,406,386	307,471	2,806,678	74,476	3,145,256	638,546	7,000,065	1,687,242
2007	4,469,076	4,383,721	8,609,465	327,510	2,894,092	78,538	3,330,899	680,702	8,076,377	1,887,207
2008	4,911,485	5,273,211	9,669,379	370,201	3,280,390	81,753	4,093,703	744,041	9,279,416	2,026,795
2009	4,557,826	4,471,284	8,662,062	354,566	2,989,001	77,818	3,710,130	690,137	9,023,368	1,982,237
2010	4,112,828	4,270,138	9,261,686	358,199	3,185,393	72,582	3,755,733	616,004	8,910,445	1,954,604
2011	4,887,368	4,712,873	10,744,160	411,268	3,645,240	85,825	4,329,105	762,911	9,479,690	2,158,473
2012	5,435,549	5,147,887	11,292,841	454,797	3,927,462	97,180	4,571,146	834,198	10,760,037	2,360,873
2013	6,323,446	5,986,501	11,844,209	490,261	4,277,363	111,414	5,178,056	967,895	11,755,800	2,628,024
2014	7,025,934	6,478,212	15,510,298	534,994	5,065,545	117,642	5,906,711	1,050,866	12,918,425	2,900,974
2015	6,449,240	6,000,148	13,227,676	523,931	4,712,979	110,270	6,004,627	937,359	12,812,424	2,955,039
2016	6,463,852	5,747,056	12,954,512	542,458	4,612,184	105,649	5,499,725	940,349	13,143,593	2,985,439
2017	6,925,743	7,438,226	11,560,881	540,323	4,468,366	113,100	5,750,657	1,007,001	13,153,322	2,941,153
2018	**7,619,757**	**7,720,125**	**17,381,837**	**604,243**	**5,605,597**	**124,387**	**6,377,663**	**1,106,199**	**14,137,557**	**3,291,262**
2019	7,954,874	7,831,416	15,875,217	639,613	5,598,904	130,563	6,712,920	1,155,560	14,815,338	3,505,046
2020	7,441,791	7,652,077	15,083,217	595,318	5,274,296	123,820	6,446,163	1,080,872	14,080,982	3,277,120
2021	7,516,209	7,728,598	15,234,049	601,271	5,327,039	125,058	6,510,624	1,091,681	14,221,792	3,309,892
2022	7,591,371	7,805,883	15,386,389	607,284	5,380,310	126,309	6,575,731	1,102,598	14,364,010	3,342,991
2023	7,667,285	7,883,942	15,540,253	613,357	5,434,113	127,572	6,641,488	1,113,624	14,507,650	3,376,421
2024	7,743,958	7,962,782	15,695,656	619,491	5,488,454	128,848	6,707,903	1,124,760	14,652,727	3,410,185
2025	7,821,397	8,042,409	15,852,612	625,686	5,543,338	130,136	6,774,982	1,136,008	14,799,253	3,444,287
2026	7,899,611	8,122,834	16,011,138	631,942	5,598,772	131,437	6,842,732	1,147,368	14,947,247	3,478,729
2027	7,978,607	8,204,062	16,171,249	638,262	5,654,759	132,752	6,911,159	1,158,842	15,096,718	3,513,517
2028	8,058,394	8,286,103	16,332,962	644,644	5,711,307	134,079	6,980,271	1,170,430	15,247,686	3,548,652
2029	8,138,977	8,368,964	16,496,292	651,091	5,768,420	135,420	7,050,073	1,182,134	15,400,162	3,584,138
2030	8,220,367	8,452,653	16,661,255	657,602	5,826,104	136,774	7,120,574	1,193,956	15,554,165	3,619,980
2031	8,302,571	8,537,180	16,827,867	664,178	5,884,365	138,142	7,191,780	1,205,895	15,709,705	3,656,180
2032	8,385,596	8,622,552	16,996,146	670,820	5,943,209	139,523	7,263,698	1,217,954	15,866,802	3,692,741
2033	8,469,453	8,708,777	17,166,107	677,528	6,002,641	140,919	7,336,335	1,230,134	16,025,471	3,729,669
2034	8,554,147	8,795,865	17,337,769	684,303	6,062,667	142,328	7,409,698	1,242,435	16,185,725	3,766,965
2035	8,639,689	8,883,824	17,511,146	691,146	6,123,294	143,751	7,483,795	1,254,859	16,347,582	3,804,635
TOTAL	**288,005,920**	**260,784,854**	**451,881,472**	**22,640,805**	**183,980,187**	**4,922,962**	**231,025,558**	**41,735,024**	**521,310,488**	**124,110,238**

TABLE B-16A Minimum OMP&R Component of Transportation Charge for Each Contractor (in dollars)

Calendar Year	SOUTHERN CALIFORNIA AREA (continued)				FEATHER RIVER AREA					
	San Gorgonio	Metropolitan	Ventura	Total	Yuba City	Butte	Plumas	Total	South Bay Area Future Contractor	Grand Total
	[30]	[31]	[32]	[33]	[34]	[35]	[36]	[37]	[38]	[39]
1961	0	0	0	0	0	0	0	0	0	0
1962	0	0	0	0	0	0	0	0	3,219	42,918
1963	0	0	0	0	0	0	0	0	12,626	168,358
1964	0	0	0	0	0	0	0	0	13,938	184,729
1965	0	0	0	0	0	0	0	0	28,937	378,874
1966	0	0	0	0	0	0	0	0	31,321	408,397
1967	0	0	0	0	0	0	0	0	47,718	634,505
1968	8,821	972,734	9,504	1,218,520	0	0	0	0	46,945	2,745,160
1969	11,704	1,295,607	12,610	1,654,810	0	0	0	0	52,963	4,074,939
1970	14,623	1,624,569	15,746	2,069,923	0	0	0	0	69,744	4,676,282
1971	24,302	2,716,584	26,118	3,421,555	0	0	54	54	55,532	6,185,714
1972	89,131	8,038,463	68,369	10,035,857	0	0	40	40	80,412	12,998,869
1973	117,779	9,890,316	78,313	12,289,296	0	0	1	1	54,219	15,194,233
1974	128,169	11,581,491	83,453	14,166,551	0	0	143	143	76,783	17,372,561
1975	147,899	13,584,548	101,893	16,593,957	0	0	1,069	1,069	84,547	20,517,423
1976	158,664	12,862,489	94,799	16,037,419	0	0	139	139	106,717	20,027,213
1977	178,774	16,203,699	121,966	19,892,683	0	0	892	892	98,618	24,213,489
1978	186,384	17,811,770	132,435	21,568,747	0	0	39	39	100,786	26,012,786
1979	186,688	16,414,289	126,756	20,238,761	0	0	3,235	3,235	119,352	24,675,598
1980	248,399	20,926,898	154,096	25,901,706	0	0	416	416	178,812	32,038,398
1981	259,244	23,731,024	186,592	29,224,860	0	0	3,847	3,847	185,347	35,516,366
1982	307,955	27,994,510	209,141	34,323,374	0	0	11,075	11,075	173,894	41,611,655
1983	394,524	38,953,367	326,258	47,754,649	0	0	1,928	1,928	220,926	56,802,781
1984	496,808	45,597,671	382,104	56,371,786	0	0	3,765	3,765	225,959	67,072,552
1985	531,765	50,064,444	416,652	61,532,075	0	0	2,888	2,888	340,322	73,228,724
1986	551,066	52,858,915	442,334	64,885,109	0	0	2,787	2,787	279,227	76,682,113
1987	564,352	50,737,631	411,276	62,892,287	0	0	2,388	2,388	345,116	75,240,981
1988	593,787	51,262,231	406,248	63,712,844	0	0	545	545	365,207	76,126,695
1989	576,852	52,638,942	431,020	64,815,349	0	0	1,800	1,800	422,329	78,708,338
1990	667,687	61,053,824	494,721	75,175,234	0	0	788	788	474,284	91,448,066
1991	711,803	60,874,529	470,139	75,935,908	0	0	3,654	3,654	214,683	91,098,893
1992	688,558	67,460,598	502,131	82,396,469	0	0	647	647	443,676	100,077,320
1993	828,208	68,749,547	538,751	85,955,990	0	0	3,630	3,630	599,571	107,321,034
1994	783,691	63,898,029	473,897	80,045,461	0	0	2,279	2,279	609,966	101,233,250
1995	785,191	68,079,888	523,512	85,080,005	0	0	2,906	2,906	534,971	107,378,966
1996	773,653	72,757,439	561,100	89,927,727	0	0	8,007	8,007	571,857	113,585,948
1997	917,372	75,655,465	564,455	94,454,555	0	0	7,449	7,449	428,638	114,939,131
1998	1,000,558	80,540,695	608,294	102,766,204	0	0	0	0	465,095	129,072,817
1999	1,066,898	86,320,578	637,626	109,274,730	0	0	0	0	584,116	136,697,736
2000	964,297	82,505,333	636,095	105,392,336	0	0	0	0	0	131,148,648
2001	950,095	92,945,584	709,090	117,469,986	0	0	0	0	0	146,246,848
2002	922,155	85,413,719	657,483	107,858,407	0	0	0	0	0	143,375,836
2003	1,514,531	82,357,577	621,295	107,401,907	0	0	3,425	3,425	0	138,781,813
2004	1,435,491	99,543,042	761,679	127,059,044	0	0	3,455	3,455	0	155,848,398
2005	1,587,021	74,184,438	652,293	104,198,067	0	0	3,452	3,452	0	130,734,153
2006	1,455,257	76,279,683	600,050	109,704,906	0	0	3,904	3,904	0	136,196,772
2007	1,832,805	105,019,512	862,669	142,452,573	0	0	3,517	3,517	0	172,617,820
2008	2,482,130	113,265,122	979,467	156,457,094	0	0	5,035	5,035	0	194,094,193
2009	2,379,922	99,862,470	829,250	139,590,070	0	0	844	844	0	172,856,214
2010	2,581,202	97,650,826	785,706	137,515,347	0	0	1,071	1,071	0	174,805,980
2011	2,655,865	105,453,545	848,936	150,175,258	0	0	2,754	2,754	0	192,562,009
2012	2,635,850	118,454,615	955,963	166,928,400	0	0	1,093	1,093	0	212,393,656
2013	2,707,720	132,625,159	1,121,850	186,017,697	0	0	289	289	0	233,903,888
2014	3,107,639	147,306,939	1,182,844	209,107,023	0	0	116	116	0	260,202,881
2015	3,098,937	131,750,858	1,046,322	189,629,811	0	0	117	117	0	245,427,463
2016	3,294,408	132,084,834	1,068,230	189,442,288	0	0	5,401	5,401	0	251,559,329
2017	3,147,998	165,972,016	1,447,623	224,466,407	0	0	295	295	0	283,961,055
2018	**3,302,187**	**178,243,949**	**1,475,810**	**246,990,573**	**0**	**0**	**284**	**284**	**0**	**307,168,548**
2019	3,426,825	177,840,984	1,490,147	246,977,408	0	0	293	293	0	309,448,593
2020	3,309,281	173,995,694	1,485,137	239,845,769	0	0	293	293	0	301,258,732
2021	3,342,375	175,735,650	1,499,988	242,244,227	0	0	296	296	0	304,271,318
2022	3,375,799	177,493,006	1,514,988	244,666,670	0	0	299	299	0	307,314,033
2023	3,409,556	179,267,937	1,530,138	247,113,336	0	0	302	302	0	310,387,171
2024	3,443,652	181,060,615	1,545,440	249,584,469	0	0	305	305	0	313,491,044
2025	3,478,088	182,871,220	1,560,894	252,080,310	0	0	308	308	0	316,625,952
2026	3,512,870	184,699,934	1,576,503	254,601,119	0	0	311	311	0	319,792,215
2027	3,547,998	186,546,932	1,592,268	257,147,124	0	0	314	314	0	322,990,131
2028	3,583,478	188,412,403	1,608,191	259,718,599	0	0	317	317	0	326,220,036
2029	3,619,312	190,296,528	1,624,273	262,315,785	0	0	320	320	0	329,482,237
2030	3,655,505	192,199,494	1,640,515	264,938,945	0	0	324	324	0	332,777,065
2031	3,692,061	194,121,486	1,656,920	267,588,330	0	0	327	327	0	336,104,826
2032	3,728,981	196,062,700	1,673,490	270,264,211	0	0	330	330	0	339,465,874
2033	3,766,271	198,023,330	1,690,225	272,966,858	0	0	333	333	0	342,860,536
2034	3,803,933	200,003,562	1,707,127	275,696,525	0	0	337	337	0	346,289,141
2035	3,841,973	202,003,598	1,724,198	278,453,490	0	0	340	340	0	349,752,035
TOTAL	**116,594,774**	**6,534,707,079**	**53,975,408**	**8,835,674,767**	**0**	**0**	**106,812**	**106,812**	**8,748,370**	**11,078,810,258**

TABLE B-16B Minimum OMP&R Component of Transportation Charge for Each Contractor for Off-Aqueduct Power Facilities[a,b] (in dollars)

Calendar Year	NORTH BAY AREA			SOUTH BAY AREA				CENTRAL COASTAL AREA		
	Napa	Solano	Total	Alameda-Zone 7	Alameda County	Santa Clara	Total	San Luis Obispo	Santa Barbara	Total
	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]
1971	0	0	0	0	0	0	0	0	0	0
1972	0	0	0	0	0	0	0	0	0	0
1973	0	0	0	0	0	0	0	0	0	0
1974	0	0	0	0	0	0	0	0	0	0
1975	0	0	0	0	0	0	0	0	0	0
1976	0	0	0	0	0	0	0	0	0	0
1977	0	0	0	0	0	0	0	0	0	0
1978	0	0	0	0	0	0	0	0	0	0
1979	0	0	0	0	0	0	0	0	0	0
1980	0	0	0	0	0	0	0	0	0	0
1981	0	0	0	0	0	0	0	0	0	0
1982	0	0	0	0	0	0	0	0	0	0
1983	10,070	0	10,070	47,473	31,446	863,937	942,856	0	0	0
1984	29,957	0	29,957	157,280	77,388	2,040,188	2,274,856	0	0	0
1985	54,709	0	54,709	458,427	582,679	2,696,450	3,737,556	0	0	0
1986	45,887	0	45,887	312,938	365,147	2,595,765	3,273,850	0	0	0
1987	90,385	0	90,385	622,029	674,111	2,306,079	3,602,219	0	0	0
1988	115,970	114,196	230,166	616,865	804,606	2,116,236	3,537,707	0	0	0
1989	64,584	138,240	202,824	407,353	396,069	1,389,347	2,192,769	0	0	0
1990	77,126	138,805	215,931	535,269	514,372	1,490,250	2,539,891	0	0	0
1991	35,178	245,181	280,359	355,578	477,883	1,065,488	1,898,949	0	165,930	165,930
1992	74,573	230,716	305,289	405,244	529,119	1,183,466	2,117,829	0	0	0
1993	89,214	247,977	337,191	841,383	256,930	1,552,562	2,650,875	0	0	0
1994	111,942	229,598	341,540	501,812	559,683	1,395,238	2,456,733	0	0	0
1995	96,842	235,605	332,447	833,227	492,578	796,524	2,122,329	0	0	0
1996	63,698	205,414	269,112	367,297	304,845	1,189,291	1,861,433	711	105	816
1997	48,518	193,255	241,773	455,751	294,951	1,220,497	1,971,199	44,788	298,986	343,774
1998	82,317	251,217	333,534	380,321	380,282	1,103,662	1,864,265	198,376	1,028,220	1,226,596
1999	58,017	195,562	253,579	559,900	446,655	1,039,572	2,046,127	147,204	791,946	939,150
2000	28,759	128,393	157,152	374,808	237,138	748,820	1,360,766	82,628	474,268	556,896
2001	81,666	157,196	238,862	396,340	233,205	673,431	1,302,976	134,574	595,294	729,868
2002	40,236	127,750	167,986	383,365	229,280	519,819	1,132,464	91,639	583,933	675,572
2003	37,618	92,735	130,353	301,657	180,804	643,729	1,126,190	78,771	477,048	555,819
2004	50,289	128,180	178,469	447,802	210,093	546,342	1,204,237	92,836	662,110	754,946
2005	53,455	149,328	202,783	452,896	265,252	772,420	1,490,568	106,901	587,036	693,937
2006	59,239	127,708	186,947	476,295	277,304	798,098	1,551,697	109,498	605,502	715,000
2007	82,724	182,954	265,678	445,250	246,862	740,211	1,432,323	103,331	759,114	862,445
2008	200,185	304,502	504,687	861,568	428,737	1,074,975	2,365,280	184,501	997,507	1,182,008
2009	167,186	237,569	404,755	708,409	418,456	1,279,442	2,406,307	209,684	853,143	1,062,827
2010	186,503	221,486	407,989	876,092	407,548	1,266,270	2,549,910	203,422	963,122	1,166,544
2011	121,673	145,499	267,172	685,604	372,699	1,174,038	2,232,341	147,645	829,034	976,679
2012	130,199	185,005	315,204	830,163	319,227	1,135,648	2,285,038	186,059	920,215	1,106,274
2013	114,869	172,310	287,179	609,808	327,688	1,046,787	1,984,283	121,826	607,752	729,578
2014	97,013	94,810	191,823	317,446	235,476	541,866	1,094,788	83,501	442,785	526,286
2015	35,066	47,874	82,940	140,365	92,557	306,876	539,798	38,476	155,225	193,701
2016	4,575	8,333	12,908	30,412	17,784	64,139	112,335	5,554	33,615	39,169
2017	3,959	7,783	11,742	25,217	16,760	56,185	98,162	4,312	24,593	28,905
2018	**3,783**	**7,099**	**10,882**	**23,083**	**15,262**	**50,531**	**88,876**	**4,715**	**22,565**	**27,280**
2019	14,571	16,765	31,336	54,721	28,450	74,408	157,578	39,916	82,098	122,014
2020	403	477	880	1,513	788	2,058	4,359	1,110	2,270	3,381
2021	402	491	893	1,511	785	2,054	4,350	1,109	2,266	3,376
2022	402	491	893	1,511	785	2,054	4,350	1,109	2,266	3,376
2023	402	491	893	1,511	785	2,054	4,350	1,109	2,266	3,376
2024	402	491	893	1,511	785	2,054	4,350	1,109	2,266	3,376
2025	402	491	893	1,511	785	2,054	4,350	1,109	2,266	3,376
2026	402	491	893	1,511	785	2,054	4,350	1,109	2,266	3,376
2027	402	491	893	1,511	785	2,054	4,350	1,109	2,266	3,376
2028	402	491	893	1,511	785	2,054	4,350	1,109	2,266	3,376
2029	402	491	893	1,511	785	2,054	4,350	1,109	2,266	3,376
2030	402	491	893	1,511	785	2,054	4,350	1,109	2,266	3,376
2031	402	491	893	1,511	785	2,054	4,350	1,109	2,266	3,376
2032	402	491	893	1,511	785	2,054	4,350	1,109	2,266	3,376
2033	402	491	893	1,511	785	2,054	4,350	1,109	2,266	3,376
2034	402	491	893	1,511	785	2,054	4,350	1,109	2,266	3,376
2035	402	491	893	1,511	785	2,054	4,350	1,109	2,266	3,376
TOTAL	**2,668,991**	**4,976,887**	**7,645,878**	**16,323,619**	**11,761,894**	**39,591,455**	**67,676,969**	**2,438,617**	**12,997,411**	**15,436,028**

[a] 1983 through 2016 changes are debt service only and do not include bond cover.

[b] 2009 through 2019 charges include Reid Gardner separation costs that are allocated to contractors based on theoretical energy use over the facility service life, 1983–2013.

TABLE B-16B Minimum OMP&R Component of Transportation Charge for Each Contractor for Off-Aqueduct Power Facilities[a,b] (in dollars)

Calendar Year	SAN JOAQUIN VALLEY AREA							
			Kern					
	Dudley Ridge	Empire	Municipal and Industrial	Agricultural	Kings	Oak Flat	Tulare	Total
	[11]	[12]	[13]	[14]	[15]	[16]	[17]	[18]
1971	0	0	0	0	0	0	0	0
1972	0	0	0	0	0	0	0	0
1973	0	0	0	0	0	0	0	0
1974	0	0	0	0	0	0	0	0
1975	0	0	0	0	0	0	0	0
1976	0	0	0	0	0	0	0	0
1977	0	0	0	0	0	0	0	0
1978	0	0	0	0	0	0	0	0
1979	0	0	0	0	0	0	0	0
1980	0	0	0	0	0	0	0	0
1981	0	0	0	0	0	0	0	0
1982	0	0	0	0	0	0	0	0
1983	159,191	0	34,366	2,964,185	13,174	9,673	3,733	3,184,322
1984	389,518	0	816,103	9,095,509	26,774	33,576	49,601	10,411,081
1985	527,952	59,322	1,053,957	11,978,046	38,810	42,297	1,253,257	14,953,641
1986	552,172	12,858	885,988	11,788,714	40,659	38,275	872,008	14,190,674
1987	450,941	24,936	1,192,388	10,448,063	39,134	37,538	911,938	13,104,938
1988	425,261	31,146	1,130,988	9,910,050	35,851	26,779	850,225	12,410,300
1989	331,852	17,226	607,908	7,400,983	22,959	24,306	754,007	9,159,241
1990	219,381	7,731	428,482	5,216,562	12,089	12,046	344,943	6,241,234
1991	13,048	3,111	570,942	146,276	0	1,354	30,685	765,416
1992	244,630	13,395	706,155	5,788,599	18,587	15,716	480,903	7,267,985
1993	471,706	25,543	1,202,455	11,405,212	37,276	36,803	1,159,908	14,338,903
1994	262,029	15,161	901,463	6,786,208	19,257	19,061	567,521	8,570,700
1995	626,214	16,830	1,486,494	12,489,555	41,275	36,377	1,051,178	15,747,923
1996	407,919	13,446	1,226,968	9,219,091	28,668	24,001	1,691,135	12,611,228
1997	423,144	(6)	794,476	7,471,645	(31)	22,025	137,304	8,848,557
1998	471,993	4,597	837,228	8,366,817	127	25,458	175,371	9,881,591
1999	360,554	19,182	874,948	7,723,883	24,159	20,065	1,749,925	10,772,716
2000	193,895	5,762	392,659	4,215,772	11,530	9,847	667,127	5,496,592
2001	200,485	6,563	113,854	2,948,087	7,528	11,821	287,409	3,575,747
2002	153,306	4,540	308,554	2,797,916	9,223	10,767	299,940	3,584,246
2003	125,188	3,901	301,142	2,626,386	10,030	7,904	287,531	3,362,082
2004	168,005	12,193	457,106	2,914,113	30,989	10,807	278,204	3,871,417
2005	315,142	14,807	358,007	5,609,958	76,490	11,047	540,681	6,926,132
2006	287,977	13,112	401,503	5,488,668	38,075	11,559	432,313	6,673,207
2007	189,684	8,758	242,253	3,662,405	24,280	10,224	365,975	4,503,579
2008	184,682	7,887	381,864	3,930,067	31,949	11,276	282,379	4,830,104
2009	181,200	8,817	63,082	4,518,839	28,827	11,595	314,621	5,126,981
2010	250,194	27,117	96,128	5,774,210	40,474	16,580	488,098	6,692,801
2011	362,592	11,506	290,168	7,797,111	39,939	11,233	338,448	8,850,997
2012	139,042	16,387	281,108	5,881,018	53,747	16,121	654,940	7,042,363
2013	174,617	9,247	247,481	4,100,710	25,730	11,818	300,486	4,870,089
2014	121,811	4,353	114,780	2,211,296	10,098	7,131	151,394	2,620,863
2015	57,355	2,365	89,264	1,214,150	5,119	3,182	93,155	1,464,590
2016	14,110	658	23,353	310,074	1,456	853	27,003	377,507
2017	14,150	598	24,966	298,309	1,366	844	26,708	366,941
2018	**12,509**	**538**	**22,665**	**265,032**	**1,237**	**764**	**23,763**	**326,508**
2019	13,198	832	44,577	311,845	2,633	1,078	24,246	398,409
2020	365	23	1,233	8,624	73	30	671	11,018
2021	364	23	1,231	8,609	73	30	669	10,998
2022	364	23	1,231	8,609	73	30	669	10,998
2023	364	23	1,231	8,609	73	30	669	10,998
2024	364	23	1,231	8,609	73	30	669	10,998
2025	364	23	1,231	8,609	73	30	669	10,998
2026	364	23	1,231	8,609	73	30	669	10,998
2027	364	23	1,231	8,609	73	30	669	10,998
2028	364	23	1,231	8,609	73	30	669	10,998
2029	364	23	1,231	8,609	73	30	669	10,998
2030	364	23	1,231	8,609	73	30	669	10,998
2031	364	23	1,231	8,609	73	30	669	10,998
2032	364	23	1,231	8,609	73	30	669	10,998
2033	364	23	1,231	8,609	73	30	669	10,998
2034	364	23	1,231	8,609	73	30	669	10,998
2035	364	23	1,231	8,609	73	30	669	10,998
TOTAL	**9,502,477**	**424,786**	**19,025,514**	**205,213,116**	**850,651**	**602,277**	**17,978,774**	**253,597,596**

[a] 1983 through 2016 charges are debt service only and do not include bond cover.

[b] 2009 through 2019 charges include Reid Gardner separation costs that are allocated to contractors based on theoretical energy use over the facility service life, 1983–2013.

TABLE B-16B Minimum OMP&R Component of Transportation Charge for Each Contractor for Off-Aqueduct Power Facilities[a,b] (in dollars)

Calendar Year	SOUTHERN CALIFORNIA AREA									
	AVEK	Castaic Lake	Coachella	Crestline	Desert	Littlerock	Mojave	Palmdale	San Bernardino	San Gabriel
	[19]	[20]	[21]	[22]	[23]	[24]	[25]	[26]	[27]	[28]
1971	0	0	0	0	0	0	0	0	0	0
1972	0	0	0	0	0	0	0	0	0	0
1973	0	0	0	0	0	0	0	0	0	0
1974	0	0	0	0	0	0	0	0	0	0
1975	0	0	0	0	0	0	0	0	0	0
1976	0	0	0	0	0	0	0	0	0	0
1977	0	0	0	0	0	0	0	0	0	0
1978	0	0	0	0	0	0	0	0	0	0
1979	0	0	0	0	0	0	0	0	0	0
1980	0	0	0	0	0	0	0	0	0	0
1981	0	0	0	0	0	0	0	0	0	0
1982	0	0	0	0	0	0	0	0	0	0
1983	1,083,881	411,247	565,798	35,432	894,572	1,250	0	0	233,134	28,548
1984	2,499,848	1,122,640	1,427,428	102,114	2,263,172	77	0	0	502,967	693,074
1985	3,749,257	1,572,025	2,032,672	170,137	3,230,451	0	0	157,601	884,188	601,583
1986	3,159,857	1,694,487	2,097,408	173,460	3,340,188	15,873	0	301,486	739,563	1,088,901
1987	3,167,759	1,694,698	1,991,841	190,149	3,230,424	95,994	1,786	258,719	1,951,799	1,091,691
1988	2,688,113	1,776,471	1,940,156	187,156	3,194,137	30,395	846	126,639	2,000,664	839,774
1989	2,357,669	1,348,806	1,326,863	132,076	2,218,516	50,948	13,206	493,424	1,257,332	792,087
1990	2,528,625	1,335,341	1,463,452	115,746	2,413,745	110,678	0	545,342	1,192,997	1,054,762
1991	1,048,414	531,160	1,022,405	125,256	1,686,304	65,111	473,291	488,207	540,119	796,531
1992	2,760,199	1,548,472	1,124,775	55,985	1,855,065	22,891	1,130,876	367,996	362,232	853,047
1993	3,559,487	1,332,392	2,256,338	29,498	3,721,492	60,615	1,101,799	640,919	425,969	1,406,255
1994	3,963,982	1,450,328	1,345,145	74,879	2,218,411	88,549	1,371,116	678,876	871,358	1,452,741
1995	4,324,009	1,901,361	2,498,462	44,237	4,120,837	43,892	881,146	636,541	75,278	1,397,623
1996	3,572,856	1,507,542	4,652,945	77,384	7,674,388	31,691	760,763	723,670	458,246	1,201,941
1997	3,411,379	1,468,949	4,294,703	42,135	4,319,206	24,319	891,191	648,652	625,340	1,175,556
1998	3,977,988	1,599,394	7,554,910	16,624	6,174,031	30,365	508,248	657,806	166,952	827,650
1999	3,696,973	1,694,851	3,195,685	71,662	3,678,076	18,305	501,486	710,674	815,001	1,375,575
2000	2,372,130	994,396	1,420,806	40,083	1,954,947	0	374,972	257,146	617,664	508,258
2001	2,680,895	1,418,179	460,256	53,460	759,169	0	213,385	445,872	1,339,699	119,363
2002	1,668,457	1,384,832	567,521	74,145	936,215	0	140,035	529,674	2,414,011	841,746
2003	1,445,146	1,353,956	411,258	44,506	678,236	0	405,376	277,984	780,631	624,561
2004	1,813,317	1,677,090	554,874	71,974	760,283	0	465,965	368,929	2,072,770	449,963
2005	2,047,638	1,443,555	1,721,141	32,667	1,987,091	0	542,366	400,828	1,568,493	566,063
2006	2,845,985	1,617,750	5,071,235	26,843	2,093,821	0	1,417,777	442,278	1,533,665	681,916
2007	2,990,954	1,864,667	3,225,680	77,880	1,331,802	0	2,023,088	710,515	2,639,102	177,256
2008	3,547,772	3,303,503	4,059,802	74,029	2,237,582	1,845	2,200,333	1,052,126	3,410,480	629,597
2009	3,350,539	3,010,931	4,067,070	79,671	1,633,327	3,263	2,559,670	1,152,062	3,948,007	1,025,723
2010	4,321,133	2,663,067	7,385,867	31,714	2,730,993	177	3,304,241	810,142	4,668,858	1,673,291
2011	4,952,954	1,811,301	5,605,548	13,018	2,290,872	407	309,065	551,068	2,185,513	1,468,910
2012	5,401,397	2,619,529	8,864,502	48,852	3,451,280	495	848,848	1,072,349	7,388,666	1,677,958
2013	2,563,236	2,266,914	3,520,765	77,123	1,425,559	3,270	475,946	512,798	1,986,377	591,150
2014	1,148,978	1,191,895	1,021,712	56,389	644,953	3,804	273,011	348,413	787,781	231,637
2015	530,003	545,173	828,767	25,589	460,870	2,214	205,015	131,952	568,141	185,603
2016	154,324	95,083	167,265	3,973	121,834	746	46,692	29,247	120,432	48,601
2017	149,214	85,519	137,794	3,645	118,209	874	35,206	26,070	86,142	42,319
2018	**134,488**	**79,107**	**127,404**	**3,575**	**106,445**	**874**	**36,012**	**24,456**	**80,100**	**38,350**
2019	321,370	243,605	401,963	16,851	161,977	5,650	201,643	80,194	298,095	83,676
2020	9,202	6,737	11,116	466	4,479	156	5,576	2,218	8,244	2,314
2021	9,531	6,725	11,096	465	4,471	156	5,566	2,214	8,229	2,310
2022	9,531	6,725	11,096	465	4,471	156	5,566	2,214	8,229	2,310
2023	9,531	6,725	11,096	465	4,471	156	5,566	2,214	8,229	2,310
2024	9,531	6,725	11,096	465	4,471	156	5,566	2,214	8,229	2,310
2025	9,531	6,725	11,096	465	4,471	156	5,566	2,214	8,229	2,310
2026	9,531	6,725	11,096	465	4,471	156	5,566	2,214	8,229	2,310
2027	9,531	6,725	11,096	465	4,471	156	5,566	2,214	8,229	2,310
2028	9,531	6,725	11,096	465	4,471	156	5,566	2,214	8,229	2,310
2029	9,531	6,725	11,096	465	4,471	156	5,566	2,214	8,229	2,310
2030	9,531	6,725	11,096	465	4,471	156	5,566	2,214	8,229	2,310
2031	9,531	6,725	11,096	465	4,471	156	5,566	2,214	8,229	2,310
2032	9,531	6,725	11,096	465	4,471	156	5,566	2,214	8,229	2,310
2033	9,531	6,725	11,096	465	4,471	156	5,566	2,214	8,229	2,310
2034	9,531	6,725	11,096	465	4,471	156	5,566	2,214	8,229	2,310
2035	9,531	6,725	11,096	465	4,471	156	5,566	2,214	8,229	2,310
TOTAL	**96,142,400**	**53,767,824**	**90,589,777**	**2,507,361**	**82,190,030**	**717,067**	**23,803,472**	**16,696,079**	**51,729,444**	**28,380,242**

[a] 1983 through 2016 charges are debt service only and do not include bond cover.

[b] 2009 through 2019 charges include Reid Gardner separation costs that are allocated to contractors based on theoretical energy use over the facility service life, 1983–2013.

TABLE B-16B Minimum OMP&R Component of Transportation Charge for Each Contractor for Off-Aqueduct Power Facilities[a,b] (in dollars)

Calendar Year	SOUTHERN CALIFORNIA AREA (continued)				FEATHER RIVER AREA				
	San Gorgonio	Metropolitan	Ventura	Total	Yuba City	Butte	Plumas	Total	Total State Water Project[c]
	[29]	[30]	[31]	[32]	[33]	[34]	[35]	[36]	[37]
1971	0	0	0	0	0	0	0	0	0
1972	0	0	0	0	0	0	0	0	0
1973	0	0	0	0	0	0	0	0	0
1974	0	0	0	0	0	0	0	0	0
1975	0	0	0	0	0	0	0	0	0
1976	0	0	0	0	0	0	0	0	0
1977	0	0	0	0	0	0	0	0	0
1978	0	0	0	0	0	0	0	0	0
1979	0	0	0	0	0	0	0	0	0
1980	0	0	0	0	0	0	0	0	0
1981	0	0	0	0	0	0	0	0	0
1982	0	0	0	0	0	0	0	0	0
1983	0	12,791,358	0	16,045,220	0	0	0	0	20,182,468
1984	0	39,229,567	0	47,840,887	0	0	0	0	60,556,781
1985	0	77,446,523	0	89,844,437	0	0	0	0	108,590,343
1986	0	77,581,287	0	90,192,510	0	0	0	0	107,702,921
1987	0	68,939,195	0	82,614,055	0	0	0	0	99,411,597
1988	0	79,936,309	0	92,720,660	0	0	0	0	108,898,833
1989	0	68,311,546	0	78,302,473	0	0	0	0	89,857,307
1990	0	83,964,409	277,885	95,002,982	0	0	0	0	104,000,038
1991	0	54,214,229	132,209	61,123,236	0	0	0	0	64,233,890
1992	0	72,401,054	0	82,482,592	0	0	0	0	92,173,695
1993	0	55,312,615	0	69,847,379	0	0	0	0	87,174,348
1994	0	72,838,621	0	86,354,006	0	0	0	0	97,722,979
1995	0	40,862,813	0	56,786,199	0	0	0	0	74,988,898
1996	0	36,536,259	401	57,198,086	0	0	0	0	71,940,675
1997	0	37,121,379	108,559	54,131,368	0	0	0	0	65,536,671
1998	0	30,341,609	149,170	52,004,747	0	0	0	0	65,310,733
1999	0	42,257,580	106,226	58,122,094	0	0	0	0	72,133,666
2000	0	43,977,877	123,318	52,641,597	0	0	0	0	60,213,003
2001	0	49,405,276	84,868	56,980,422	0	0	0	0	62,827,875
2002	0	45,412,974	153,549	54,123,159	0	0	0	0	59,683,427
2003	3,303	41,917,356	129,134	48,071,447	0	0	0	0	53,245,891
2004	44,648	58,676,035	170,851	67,126,699	0	0	0	0	73,135,768
2005	41,448	56,220,579	61,131	66,633,000	0	0	0	0	75,946,420
2006	265,078	60,701,335	70,268	76,767,951	0	0	0	0	85,894,802
2007	248,328	61,354,857	119,861	76,763,990	0	0	0	0	83,828,015
2008	616,986	72,144,765	300,729	93,579,549	0	0	0	0	102,461,628
2009	819,589	71,530,603	313,357	93,493,812	0	0	0	0	102,494,682
2010	1,048,807	88,263,837	322,003	117,224,130	0	0	0	0	128,041,374
2011	954,501	80,381,761	225,564	100,750,482	0	0	0	0	113,077,671
2012	1,225,982	78,031,475	299,385	110,930,718	0	0	0	0	121,679,597
2013	679,437	49,351,291	144,019	63,597,885	0	0	0	0	71,469,014
2014	284,110	24,242,063	30,070	30,264,816	0	0	0	0	34,698,576
2015	90,577	14,384,861	27,465	17,986,230	0	0	0	0	20,267,259
2016	19,135	3,292,201	7,185	4,106,718	0	0	0	0	4,648,637
2017	10,284	2,932,511	5,990	3,633,777	0	0	0	0	4,139,527
2018	**10,165**	**2,620,002**	**5,476**	**3,266,454**	**0**	**0**	**0**	**0**	**3,720,000**
2019	73,992	4,608,473	13,176	6,510,663	0	0	0	0	7,220,000
2020	2,044	127,446	364	180,362	0	0	0	0	200,000
2021	2,037	127,218	364	180,383	0	0	0	0	200,000
2022	2,037	127,218	364	180,383	0	0	0	0	200,000
2023	2,037	127,218	364	180,383	0	0	0	0	200,000
2024	2,037	127,218	364	180,383	0	0	0	0	200,000
2025	2,037	127,218	364	180,383	0	0	0	0	200,000
2026	2,037	127,218	364	180,383	0	0	0	0	200,000
2027	2,037	127,218	364	180,383	0	0	0	0	200,000
2028	2,037	127,218	364	180,383	0	0	0	0	200,000
2029	2,037	127,218	364	180,383	0	0	0	0	200,000
2030	2,037	127,218	364	180,383	0	0	0	0	200,000
2031	2,037	127,218	364	180,383	0	0	0	0	200,000
2032	2,037	127,218	364	180,383	0	0	0	0	200,000
2033	2,037	127,218	364	180,383	0	0	0	0	200,000
2034	2,037	127,218	364	180,383	0	0	0	0	200,000
2035	2,037	127,218	364	180,383	0	0	0	0	200,000
TOTAL	**6,468,973**	**1,861,572,200**	**3,387,670**	**2,317,952,539**	**0**	**0**	**0**	**0**	**2,662,309,009**

[a] 1983 through 2016 charges are debt service only and do not include bond cover.

[b] 2009 through 2019 charges include Reid Gardner separation costs that are allocated to contractors based on theoretical energy use over the facility service life, 1983–2013.

[c] Costs allocated to contractors in 1989 through 2002 are reduced by credits for Off-Aqueduct Power Facility costs allocated to the pumping of non-SWP water.

TABLE B-17 Unit Variable OMP&R Component of Transportation Charge (in dollars per acre-foot)

	NORTH BAY AQUEDUCT						SOUTH BAY AQUEDUCT		CALIFORNIA AQUEDUCT	
	Reach 1 Barker Slough Pumping Plant		Reach 3A Cordelia Pumping Plant Solano		Reach 3B Cordelia Pumping Plant Napa[a]		Reach 1 South Bay and Del Valle Pumping Plants[b]		Reach 1 Banks Pumping Plant	
Calendar Year	Unit Rate	Cumulative Unit Rate	Unit Rate	Cumulative Unit Rate	Unit Rate	Cumulative Unit Rate	Unit Rate	Cumulative Unit Rate	Unit Rate	Cumulative Unit Rate
	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]
1961	0	0	0	0	0	0	0	0	0	0
1962	0	0	0	0	0	0	4.1511341	4.1511341	0	0
1963	0	0	0	0	0	0	4.5639383	4.5639383	0	0
1964	0	0	0	0	0	0	3.5452154	3.5452154	0	0
1965	0	0	0	0	0	0	4.1911773	4.1911773	0	0
1966	0	0	0	0	0	0	3.5074573	3.5074573	0	0
1967	0	0	0	0	0	0	3.9306767	4.1752198	0.2445431	0.2445431
1968	0	0	0	0	5.7570017	5.7570017	3.3315620	4.8750942	1.5435322	1.5435322
1969	0	0	0	0	3.1823595	3.1823595	3.6949019	4.8016170	1.1067151	1.1067151
1970	0	0	0	0	3.7584301	3.7584301	4.4256141	5.3721490	0.9465349	0.9465349
1971	0	0	0	0	4.2082507	4.2082507	3.8714396	4.7522833	0.8808437	0.8808437
1972	0	0	0	0	3.9577735	3.9577735	4.3250690	5.2281686	0.9030996	0.9030996
1973	0	0	0	0	3.8103903	3.8103903	5.2455409	6.1841801	0.9386391	0.9386391
1974	0	0	0	0	3.5878850	3.5878850	6.3321503	7.2293909	0.8972406	0.8972406
1975	0	0	0	0	2.1606725	2.1606725	3.7365711	4.8327731	1.0962020	1.0962020
1976	0	0	0	0	2.9283909	2.9283909	4.5191527	5.7132795	1.1941268	1.1941268
1977	0	0	0	0	2.7516411	2.7516411	4.7630172	6.5309908	1.7679736	1.7679736
1978	0	0	0	0	3.5949619	3.5949619	5.2086183	6.8200210	1.6114026	1.6114026
1979	0	0	0	0	2.4747752	2.4747752	4.9524184	7.0944849	2.1420665	2.1420665
1980	0	0	0	0	2.9737588	2.9737588	4.5186576	5.8810391	1.3623815	1.3623815
1981	0	0	0	0	2.6488168	2.6488168	4.3834851	6.4541818	2.0706967	2.0706967
1982	0	0	0	0	10.0222589	10.0222589	5.6383622	7.4005197	1.7621575	1.7621575
1983	0	0	0	0	1.0240490	1.0240490	0.8686401	1.7143948	0.8457546	0.8457546
1984	0	0	0	0	1.6496750	1.6496750	2.7674018	3.9368186	1.1694168	1.1694168
1985	0	0	0	0	2.5224065	2.5224065	3.6942206	5.2987621	1.6045415	1.6045415
1986	0	0	0	0	4.4049446	4.4049446	7.2799222	10.5919298	3.3120077	3.3120077
1987	0	0	0	0	3.5386715	3.5386715	6.4837861	9.2276309	2.7438448	2.7438448
1988	1.1782643	1.1782643	0	1.1782643	4.4547478	5.6330121	6.1750026	8.8623074	2.6873049	2.6873049
1989	1.2715449	1.2715449	2.5423866	3.8139316	4.2807103	5.5522552	8.1617218	11.6840191	3.5222973	3.5222973
1990	2.0026083	2.0026083	4.2324041	6.2350124	5.8753602	7.8779685	11.7200790	15.8516543	4.1315753	4.1315753
1991	1.2486830	1.2486830	2.6246433	3.8733263	3.8057971	5.0544801	7.5402615	11.2354099	3.6951485	3.6951485
1992	0.7094386	0.7094386	1.4175705	2.1270091	2.3509123	3.0603509	4.0600958	6.3925272	2.3324315	2.3324315
1993	-0.3464574	-0.3464574	-0.6048649	-0.9513223	-1.0200530	-1.3665104	-1.4929934	-1.2571378	0.2358556	0.2358556
1994	1.4600287	1.4600287	2.6570107	4.1170394	4.2975560	5.7575847	7.9510779	11.2405895	3.2895116	3.2895116
1995	0.7544766	0.7544766	1.2974265	2.0519031	2.2753763	3.0298529	3.2312761	5.2610469	2.0297708	2.0297708
1996	1.6427835	1.6427835	2.7704025	4.4131859	4.7993051	6.4420886	8.0186492	11.3633990	3.3447498	3.3447498
1997	1.7801484	1.7801484	3.0246843	4.8048327	5.0575904	6.8377388	9.6521246	12.6148370	2.9627125	2.9627125
1998	-0.3253238	-0.3253238	-0.5570754	-0.8823992	-0.9104311	-1.2357549	-1.8866894	-1.7684350	0.1182544	0.1182544
1999	0.8136316	0.8136316	1.3344157	2.1480473	2.2476094	3.0612409	4.1251508	6.5396327	2.4144819	2.4144819
2000	1.3866159	1.3866159	1.9633803	3.3499962	3.0210750	4.4076910	6.3105300	8.6058809	2.2953510	2.2953510
2001	8.1191305	8.1191305	12.5398434	20.6589739	22.6630508	30.7821813	42.1952424	54.9383080	12.7430656	12.7430656
2002	4.1919307	4.1919307	5.3026984	9.4946291	8.9411156	13.1330463	18.1280636	24.2060285	6.0779649	6.0779649
2003	4.3522704	4.3522704	7.0890449	11.4413153	12.8010554	17.1533258	19.2857696	26.0112488	6.7254792	6.7254792
2004	4.9185632	4.9185632	6.4207890	11.3393522	12.6192952	17.5378585	19.8727176	27.1452671	7.2725495	7.2725495
2005	6.2706237	6.2706237	7.7072771	13.9779008	18.6144338	24.8850574	25.9514011	34.0659018	8.1145007	8.1145007
2006	5.4394183	5.4394183	6.2612439	11.7006622	18.2793045	23.7187229	22.8745423	29.6889284	6.8143861	6.8143861
2007	7.7565590	7.7565590	8.2045346	15.9610936	22.7900532	30.5466123	31.6227665	40.8504831	9.2277166	9.2277166
2008	7.7709467	7.7709467	10.0846311	17.8555778	22.0074178	29.7783644	28.6366495	41.0205231	12.3838736	12.3838736
2009	5.2294947	5.2294947	6.6742086	11.9037033	14.3323038	19.5617984	21.2143060	27.1183523	5.9040464	5.9040464
2010	6.0245942	6.0245942	8.7805865	14.8051807	16.7634973	22.7880915	24.7906703	34.2260486	9.4353782	9.4353782
2011	6.8812208	6.8812208	9.0461425	15.9273633	20.2561960	27.1374169	29.9716826	40.8044387	10.8327561	10.8327561
2012	6.9362113	6.9362113	9.6110577	16.5472691	19.2555862	26.1917976	31.5199954	42.0440151	10.5240197	10.5240197
2013	8.9525467	8.9525467	10.6529685	19.6055152	25.7415676	34.6941143	36.3541436	49.3634896	13.0093460	13.0093460
2014	10.6540821	10.6540821	14.9150865	25.5691686	31.5119967	42.1660788	44.9799007	64.5182375	19.5383369	19.5383369
2015	10.9137414	10.9137414	15.3336878	26.2474292	31.6663631	42.5801045	46.8334203	67.2115631	20.3781428	20.3781428
2016	8.4275020	8.4275020	12.2383127	20.6658147	28.3912775	36.8187795	36.4827501	51.4509061	14.9681560	14.9681560
2017	12.4398325	12.4398325	36.3096782	48.7495107	2.9763346	15.4161671	44.3686237	58.8952192	14.5265956	14.5265956
2018	**19.3038595**	**19.3038595**	**37.6105458**	**56.9144053**	**48.7757176**	**68.0795771**	**40.6668109**	**55.9388606**	**15.2720498**	**15.2720498**
2019	18.9502385	18.9502385	36.9215395	55.8717780	47.8822044	66.8324429	40.6891852	56.0504589	15.3612737	15.3612737
2020	11.6877710	11.6877710	23.0337411	34.7215121	46.5966131	58.2843841	40.7594860	57.6009242	16.8414382	16.8414382
2021	11.8589332	11.8589332	23.3710620	35.2299953	48.6149254	60.4738586	41.3561735	50.0420032	8.6858297	8.6858297
2022	11.8168690	11.8168690	23.2881598	35.1050289	48.4424799	60.2593490	41.2094916	59.8553572	18.6458657	18.6458657
2023	11.8476149	11.8476149	23.3487697	35.1963846	48.5685419	60.4161568	41.3167264	54.6231594	13.3064330	13.3064330
2024	11.8481787	11.8481787	23.3499054	35.1980840	48.5708955	60.4190742	41.3187271	53.5630306	12.2443035	12.2443035
2025	11.8466826	11.8466826	23.3469190	35.1936016	48.5647532	60.4114357	41.3134812	56.7495684	15.4360873	15.4360873
2026	11.8535776	11.8535776	23.3605047	35.2140824	48.5929392	60.4465168	41.3374897	53.3547339	12.0172443	12.0172443
2027	11.8513226	11.8513226	23.3560883	35.2074110	48.5837543	60.4350770	41.3296601	54.7729018	13.4432417	13.4432417
2028	11.8475065	11.8475065	23.3485174	35.1960239	48.5680827	60.4155892	41.3163247	54.1651475	12.8488229	12.8488229
2029	11.8479402	11.8479402	23.3494006	35.1973408	48.5699196	60.4178598	41.3178685	54.9983727	13.6805042	13.6805042
2030	11.8480052	11.8480052	23.3495268	35.1975320	48.5701493	60.4181545	41.3180576	53.8869944	12.5689368	12.5689368
2031	11.8484172	11.8484172	23.3503260	35.1987431	48.5718140	60.4202312	41.3195069	56.7575452	15.4380383	15.4380383
2032	11.8493062	11.8493062	23.3521346	35.2014408	48.5755454	60.4248515	41.3226576	52.9892664	11.6666088	11.6666088
2033	11.8427797	11.8427797	23.3392219	35.1820016	48.5487371	60.3915168	41.2998622	56.8252515	15.5253893	15.5253893
2034	11.8481353	11.8481353	23.3497792	35.1979145	48.5706659	60.4188012	41.3185144	53.7325828	12.4140684	12.4140684
2035	11.8764744	11.8764744	23.4056362	35.2821106	48.6868542	60.5633286	41.4173447	53.8918869	12.4745421	12.4745421

[a] For the period 1968 through 1987, rates are for an interim facility.

[b] The relatively minor costs of Del Valle Pumping Plant have been combined with those of South Bay Pumping Plant to simplify the allocation procedure.

TABLE B-17 Unit Variable OMP&R Component of Transportation Charge (in dollars per acre-foot)

Calendar Year	CALIFORNIA AQUEDUCT (continued)									
	Reach 4 Dos Amigos Pumping Plant		Reach 14A Buena Vista Pumping Plant		Reach 15A Teerink Pumping Plant		Reach 16A Chrisman Pumping Plant		Reach 17E Edmonston Pumping Plant	
	Unit Rate	Cumulative Unit Rate	Unit Rate	Cumulative Unit Rate	Unit Rate	Cumulative Unit Rate	Unit Rate	Cumulative Unit Rate	Unit Rate	Cumulative Unit Rate
	[11]	[12]	[13]	[14]	[15]	[16]	[17]	[18]	[19]	[20]
1961	0	0	0	0	0	0	0	0	0	0
1962	0	0	0	0	0	0	0	0	0	0
1963	0	0	0	0	0	0	0	0	0	0
1964	0	0	0	0	0	0	0	0	0	0
1965	0	0	0	0	0	0	0	0	0	0
1966	0	0	0	0	0	0	0	0	0	0
1967	0	0	0	0	0	0	0	0	0	0
1968	1.0732031	2.6167353	0	0	0	0	0	0	0	0
1969	0.7028165	1.8095316	0	0	0	0	0	0	0	0
1970	0.7813430	1.7278778	0.3333333	2.0612111	0	0	0	0	0	0
1971	0.4125312	1.2933749	1.1407617	2.4341366	0.7218469	3.1559834	0	0	0	0
1972	0.5662758	1.4693754	0.8894941	2.3588694	0.8040021	3.1628715	1.8113853	4.9742569	7.3206022	12.2948591
1973	0.5996892	1.5383283	0.8469026	2.3852309	1.0302066	3.4154375	1.8458304	5.2612679	7.4512435	12.7125113
1974	0.5736894	1.4709300	0.8122890	2.2832190	0.9665911	3.2498101	1.7739395	5.0237496	6.9004732	11.9242227
1975	0.4606980	1.5569000	0.7554447	2.3123448	0.8894108	3.2017555	1.8682537	5.0700092	6.9962702	12.0662794
1976	0.5163828	1.7105095	0.9081491	2.6186586	0.9640628	3.5827214	2.1499640	5.7326854	7.9384515	13.6711369
1977	0.6138931	2.3818668	0.9835371	3.3654038	1.2303967	4.5958005	2.7357728	7.3315733	9.9990004	17.3305737
1978	0.4545898	2.0659925	0.9044582	2.9704506	0.9762058	3.9466564	1.8872449	5.8339014	7.0810192	12.9149206
1979	0.6587934	2.8008600	1.0519199	3.8527798	1.1976258	5.0504056	2.6012890	7.6516946	9.6345625	17.2862572
1980	0.8021465	2.1645280	1.3516057	3.5161337	1.5041463	5.0202800	3.1923433	8.2126233	10.9860288	19.1986521
1981	1.0923907	3.1630874	1.2409168	4.4040042	1.3219771	5.7259813	2.9592932	8.6852745	9.9649551	18.6502296
1982	0.8326785	2.5948359	1.2041660	3.7990019	1.3723736	5.1713756	2.8986491	8.0700247	10.2096358	18.2796606
1983	0.3647859	1.2105406	0.7590265	1.9695670	0.8857383	2.8553053	1.7623405	4.6176458	5.5086367	10.1262825
1984	0.6581523	1.8275691	1.0533611	2.8809302	1.2188270	4.0997572	2.5407768	6.6405340	8.2344665	14.8750006
1985	0.8726163	2.4771579	1.4204831	3.8976409	1.6516291	5.5492701	3.4695783	9.0188484	11.8181234	20.8369718
1986	1.3996542	4.7116618	2.3713282	7.0829901	2.7567970	9.8397871	5.9534613	15.7932484	20.6010240	36.3942724
1987	1.2912643	4.0351091	2.2344385	6.2695476	2.5459999	8.8155474	5.3141190	14.1296664	17.7628277	31.8924941
1988	1.1947837	3.8820886	2.1129991	5.9950877	2.4017135	8.3968012	5.0055748	13.4023759	16.6001692	30.0025452
1989	1.4935226	5.0158199	2.6947446	7.7105645	3.0084211	10.7189856	6.5499538	17.2689394	22.1795336	39.4484730
1990	1.8962463	6.0278216	3.3080372	9.3358588	3.7483036	13.0841624	8.6832678	21.7674302	31.0405219	52.8079521
1991	1.0437991	4.7389476	2.1132495	6.8521971	2.4154810	9.2676780	5.6823745	14.9500525	20.4744695	35.4245220
1992	0.9002103	3.2326417	1.4836761	4.7163178	1.7077297	6.4240475	3.5445788	9.9686263	12.0459599	22.0145862
1993	0.1605206	0.3963762	-0.1405164	0.2558598	-0.1312944	0.1245654	-0.7754796	-0.6509143	-3.5828989	-4.2338132
1994	1.4208578	4.7103693	2.5100856	7.2204549	2.8029168	10.0233717	6.0772944	16.1006661	21.5000984	37.6007645
1995	0.7974861	2.8272569	1.3474564	4.1747133	1.4945529	5.6692662	3.1250716	8.7943378	10.7461772	19.5405149
1996	1.6726383	5.0173881	2.5952092	7.6125973	2.8425227	10.4551200	6.3087407	16.7638607	22.6420778	39.4059385
1997	1.2769880	4.2397005	2.5012144	6.7409148	2.6893394	9.4302542	6.2890095	15.7192637	23.0714697	38.7907334
1998	-0.2195574	-0.1013030	-0.4232465	-0.5245494	-0.4504610	-0.9750105	-1.0585256	-2.0335361	-3.8077856	-5.8413217
1999	0.8634492	3.2779311	1.4586807	4.7366118	1.3440477	6.0806594	3.5713752	9.6520347	14.2047038	23.8567384
2000	0.9235333	3.2188842	1.6219853	4.8408695	1.7828715	6.6237410	4.2029220	10.8266630	15.3882971	26.2149601
2001	6.0480040	18.7910696	11.1462381	29.9373077	12.2218485	42.1591562	28.2483594	70.4075156	105.7300557	176.1375712
2002	2.6241935	8.7021584	4.6014533	13.3036118	5.0195728	18.3231845	11.6145173	29.9377018	43.1577241	73.0954260
2003	3.1186984	9.8441776	5.5847107	15.4288883	6.0840848	21.5129731	14.1510704	35.6640435	52.6131846	88.2772280
2004	3.3307184	10.6032678	5.8667696	16.4700374	6.3726502	22.8426876	14.8454678	37.6881554	55.1910093	92.8791647
2005	3.8324365	11.9469372	6.8775620	18.8244992	7.4553008	26.2798000	17.3347915	43.6145915	62.0851423	105.6997338
2006	3.1141364	9.9285225	5.7852913	15.7138138	6.2261080	21.9399217	14.5523261	36.4922478	46.2503898	82.7426375
2007	4.5130560	13.7407726	8.0770771	21.8178497	8.7444274	30.5622771	20.2730047	50.8352818	68.5883222	119.4236041
2008	4.7889984	17.1728720	8.9147973	26.0876693	10.3633292	36.4509985	21.6282064	58.0792049	68.9930047	127.0722095
2009	3.0962388	9.0002851	5.6814008	14.6816859	6.2898604	20.9715463	13.8657241	34.8372704	63.6363983	98.4736687
2010	4.1050461	13.5404244	7.0464886	20.5869130	7.6449947	28.2319077	17.4954802	45.7273879	64.9312455	110.6586334
2011	4.5738107	15.4065668	8.0445944	23.4511612	8.6662772	32.1174384	19.9431610	52.0605994	70.8511904	122.9117898
2012	4.7350221	15.2590418	8.2150928	23.4741346	8.9892549	32.4633896	20.7027494	53.1661390	73.7128192	126.8789582
2013	5.6094674	18.6188134	9.6212861	28.2400995	10.4827113	38.7228108	24.2999013	63.0227121	87.0329290	150.0556411
2014	8.3477889	27.8861258	13.6556844	41.5418102	15.0843049	56.6261151	34.4794589	91.1055740	125.4819513	216.5875253
2015	7.5955489	27.9736917	13.7910831	41.7647747	15.1650061	56.9297808	34.3270461	91.2568269	127.5122462	218.7690731
2016	6.5039469	21.4721029	11.5321011	33.0042040	12.6833846	45.6875886	28.6932094	74.3807980	107.8618460	182.2426440
2017	5.6829406	20.2095362	8.6090732	28.8186094	9.5337487	38.3523580	21.8540994	60.2064574	81.2905379	141.4969953
2018	**6.8373367**	**22.1093865**	**12.1292522**	**34.2386387**	**13.1531878**	**47.3918264**	**30.5546062**	**77.9464326**	**113.6570014**	**191.6034340**
2019	6.4424794	21.8037531	11.4569375	33.2606906	12.3851928	45.6458834	28.7416319	74.3875153	106.8016317	181.1891470
2020	7.0337503	23.8751885	12.6730367	36.5482252	13.7304356	50.2786608	31.8396413	82.1183021	118.3891420	200.5074441
2021	7.1141680	15.7999978	12.8012276	28.6012253	13.8658988	42.4671241	32.1511219	74.6182459	119.5375297	194.1557757
2022	7.1347049	25.7805706	12.8717873	38.6523579	13.9494521	52.6018100	32.3503741	84.9521841	120.2987823	205.2509664
2023	7.2039806	20.5104136	13.0344733	33.5448869	14.1337852	47.6786721	32.7840824	80.4627546	121.9346291	202.3973836
2024	7.1063537	19.3506572	12.7861678	32.1368251	13.8493756	45.9862007	32.1126470	78.0988477	119.3938760	197.4927237
2025	7.1824035	22.6184908	12.9798293	35.5983201	14.0712131	49.6695331	32.6363731	82.3059062	121.3757226	203.6816288
2026	7.0678221	19.0850663	12.6867146	31.7717809	13.7353048	45.5070857	31.8432401	77.3503258	118.3740609	195.7243866
2027	7.2028120	20.6460537	13.0298081	33.6758617	14.1281824	47.8040441	32.7706659	80.5747100	121.8831693	202.4578792
2028	7.1023190	19.9511419	12.7762766	32.7274185	13.8381057	46.5655242	32.0860836	78.6516078	119.2935226	197.9451304
2029	7.1718352	20.8523394	12.9523447	33.8046842	14.0396366	47.8443207	32.5617539	80.4060746	121.0930944	201.4991690
2030	7.0756337	19.6445706	12.7087676	32.3533382	13.7608731	46.1142113	31.9038269	78.0180381	118.6041276	196.6221657
2031	7.4741780	22.9122163	13.7352747	36.6474910	14.9396754	51.5871664	34.6891742	86.2763406	129.1532269	215.4295675
2032	6.8794828	18.5460916	12.2198022	30.7658939	13.2029983	43.9688922	30.5885067	74.5573988	113.6333347	188.1907335
2033	7.4604227	22.9858120	13.7018724	36.6876844	14.9015780	51.5892624	34.5993360	86.1885984	128.8136267	215.0022251
2034	6.9263172	19.3403856	12.3359168	31.6763025	13.3353127	45.0116152	30.9003369	75.9119521	114.8112880	190.7232401
2035	8.0508200	20.5253621	15.2903658	35.8157279	16.7433162	52.5590441	38.9653222	91.5243663	145.4034293	236.9277956

TABLE B-17 Unit Variable OMP&R Component of Transportation Charge (in dollars per acre-foot) Sheet 3 of 5

	CALIFORNIA AQUEDUCT (continued)							
	Reach 18A Alamo Powerplant		Reach 22B Pearblossom Pumping Plant		Reach 23 Mojave Siphon Powerplant		Reach 26A Devil Canyon Powerplant	
Calendar Year	Unit Rate	Cumulative Unit Rate	Unit Rate	Cumulative Unit Rate	Unit Rate	Cumulative Unit Rate	Unit Rate	Cumulative Unit Rate
	[21]	[22]	[23]	[24]	[25]	[26]	[27]	[28]
1961	0	0	0	0	0	0	0	0
1962	0	0	0	0	0	0	0	0
1963	0	0	0	0	0	0	0	0
1964	0	0	0	0	0	0	0	0
1965	0	0	0	0	0	0	0	0
1966	0	0	0	0	0	0	0	0
1967	0	0	0	0	0	0	0	0
1968	0	0	0	0	0	0	0	0
1969	0	0	0	0	0	0	0	0
1970	0	0	0	0	0	0	0	0
1971	0	0	0	0	0	0	0	0
1972	0	0	1.9331104	14.2279695	0	0	-2.3717647	11.8562048
1973	0	0	3.8751940	16.5877053	0	0	-8.9027252	7.6849801
1974	0	0	3.1602116	15.0844343	0	0	-5.3440968	9.7403376
1975	0	0	3.0210558	15.0873353	0	0	-5.7803309	9.3070043
1976	0	0	3.7579009	17.4290378	0	0	-6.6439666	10.7850713
1977	0	0	3.0796474	20.4102211	0	0	-12.0911833	8.3190378
1978	0	0	4.0233030	16.9382236	0	0	-8.2569506	8.6812730
1979	0	0	5.0776468	22.3639040	0	0	-9.7140035	12.6499005
1980	0	0	4.3918283	23.5904804	0	0	-8.3797007	15.2107797
1981	0	0	3.9973528	22.6475824	0	0	-6.7528590	15.8947235
1982	0	0	3.6829998	21.9626604	0	0	-6.9238898	15.0387706
1983	0	0	1.7205305	11.8468130	0	0	-23.7923457	-11.9455328
1984	0	0	2.4763871	17.3513877	0	0	-29.2940447	-11.9426570
1985	0	0	3.4967556	24.3337274	0	0	-30.7672356	-6.4335082
1986	-2.3583180	34.0359544	5.9864597	40.0224141	0	0	-29.2499580	10.7724561
1987	-2.5482255	29.3442686	5.0535029	34.3977715	0	0	-29.7006534	4.6971181
1988	-1.3847067	28.6178385	4.7392460	33.3570844	0	0	-29.0334518	4.3236326
1989	-1.1019487	38.3465243	6.4066114	44.7531357	0	0	-28.3706997	16.3824360
1990	-1.0673268	51.7406253	8.9787944	60.7194197	0	0	-28.8797266	31.8396931
1991	-1.5206590	33.9038630	6.0785417	39.9824047	0	0	-30.3294563	9.6529484
1992	-2.6080003	19.4065859	3.6219501	23.0285360	0	0	-29.7938993	-6.7653633
1993	-0.1885524	-4.4223656	-1.0192774	-5.4416430	0	0	-30.6629489	-36.1045919
1994	-0.1279266	37.4728379	6.4513573	43.9241952	0	0	-30.4781656	13.4460296
1995	-3.4425314	16.0979836	3.3643070	19.4622905	0	0	-30.3517624	-10.8894719
1996	-5.9839345	33.4220040	6.6794995	40.1015035	-2.3423415	37.7591620	-29.5900574	8.1691046
1997	-4.7847600	34.0059734	6.8397922	40.8457656	-3.8632009	36.9825646	-30.6066647	6.3758999
1998	-5.0614104	-10.9027321	-1.3239652	-12.2266973	-3.7700558	-15.9967531	-30.4293072	-46.4260603
1999	-4.8990186	18.9577198	3.8823748	22.8400946	-5.1563836	17.6837110	-30.2385322	-12.5548211
2000	-5.3488706	20.8660895	4.5542443	25.4203338	-5.1804371	20.2398967	-30.2852311	-10.0453343
2001	-4.6452108	171.4923604	29.6368741	201.1292345	-5.7699537	195.3592808	-30.9018397	164.4574412
2002	-5.4660286	67.6293974	12.9716072	80.6010046	-6.4072101	74.1937944	-30.1661590	44.0276354
2003	-3.3142156	84.9630124	15.4234144	100.3864268	-7.1779336	93.2084932	-30.3892607	62.8192325
2004	-5.5767140	87.3024508	16.2222541	103.5247049	-7.4292488	96.0954561	-30.2389380	65.8565181
2005	-5.5017080	100.1980258	17.9086202	118.1066460	-6.6110924	111.4955536	-30.2939296	81.2016240
2006	-3.1387155	79.6039220	13.4588104	93.0627324	-5.4976224	87.5651100	-29.8005787	57.7645313
2007	-2.7809944	116.6426096	20.0909768	136.7335865	-6.1785168	130.5550697	-30.0961198	100.4589500
2008	-5.4028716	121.6693379	19.4989873	141.1683252	-6.0198040	135.1485212	-30.7631237	104.3853975
2009	-6.3446584	92.1290104	21.4368392	113.5658495	-5.4878092	108.0780404	-33.3163094	74.7617309
2010	-5.1343883	105.5242451	18.8714995	124.3957445	-6.4564845	117.9392600	-28.6783430	89.2609170
2011	-5.2103711	117.7014187	20.8533599	138.5547786	-7.1272044	131.4275743	-29.9982569	101.4293174
2012	-2.7221204	124.1568378	21.7602069	145.9170446	-11.4254128	134.4916319	-30.6216868	103.8699451
2013	-3.7638094	146.2918317	25.7561534	172.0479851	-10.3251093	161.7228758	-30.7664075	130.9564683
2014	-8.1801225	208.4074028	38.3452515	246.7526543	-7.8617556	238.8908987	-29.6636049	209.2272938
2015	-9.0636991	209.7053739	39.4008758	249.1062497	-9.3774506	239.7287992	-29.6064491	210.1223501
2016	-9.7429513	172.4996927	31.8444322	204.3441249	-11.8661775	192.4779474	-30.6919489	161.7859984
2017	-7.2346467	134.2623486	16.1366701	150.3990187	-9.7556664	140.6433523	-15.2855637	125.3577886
2018	**-11.0316924**	**180.5717416**	**36.3298796**	**216.9016212**	**-17.7063954**	**199.1952258**	**-34.8674429**	**164.3277829**
2019	-10.0530342	171.1361129	32.8329741	203.9690869	-16.0246228	187.9444642	-31.5251323	156.4193318
2020	-9.1301657	191.3772785	33.0027610	224.3800394	-15.4100903	208.9699492	-31.0041464	177.9658028
2021	-9.1438717	185.0119040	33.5627237	218.5746276	-15.4432985	203.1313292	-30.4400868	172.6912424
2022	-9.1655417	196.0854246	33.5330652	229.6184898	-15.4867877	214.1317021	-29.9247329	184.2069692
2023	-9.3218754	193.0755082	34.2189031	227.2944114	-15.7776047	211.5168066	-30.7406166	180.7761900
2024	-11.1085505	186.3841731	32.6935259	219.0776991	-15.0368375	204.0408616	-30.4007085	173.6401531
2025	-11.4839488	192.1976799	33.9364630	226.1341429	-15.6416087	210.4925342	-30.2560407	180.2364935
2026	-11.2002797	184.5241069	33.0123126	217.5364195	-15.1839235	202.3524960	-30.5679228	171.7845732
2027	-11.4209837	191.0368955	33.7397647	224.7766603	-15.5396470	209.2370133	-30.3980080	178.8390053
2028	-11.3022610	186.6428694	33.3338710	219.9767404	-15.3479714	204.6287690	-30.6252581	174.0035109
2029	-11.3589018	190.1402673	33.5234480	223.6637153	-15.4393231	208.2243922	-30.3180971	177.9062951
2030	-11.2511016	185.3710641	33.1653771	218.5364412	-15.2656071	203.2708341	-30.4145886	172.8562455
2031	-11.7183282	203.7112393	34.7254921	238.4367314	-16.0230238	222.4137076	-30.4991411	191.9145665
2032	-10.8639195	177.3268140	31.8894040	209.2162180	-14.6467387	194.5694793	-29.7448299	164.8246494
2033	-11.8047505	203.1974746	34.9989936	238.1964682	-16.1644134	222.0320548	-31.3200894	190.7119654
2034	-11.0298845	179.6933556	32.4333234	212.1266789	-14.9110513	197.2156277	-29.6451451	167.5704826
2035	-11.9469059	224.9808897	35.5781897	260.5590794	-16.3978711	244.1612083	-31.6379380	212.5232703

TABLE B-17 Unit Variable OMP&R Component of Transportation Charge (in dollars per acre-foot)

Calendar Year	CALIFORNIA AQUEDUCT (continued)							
	Reach 2B (EBX) Greenspot Pump Station		Reach 3A (EBX) Crafton Hills Pump Station		Reach 4B (EBX) Cherry Valley Pump Station		Reach 29A Oso Pumping Plant	
	Unit Rate	Cumulative Unit Rate	Unit Rate	Cumulative Unit Rate	Unit Rate	Cumulative Unit Rate	Unit Rate	Cumulative Unit Rate
	[29]	[30]	[31]	[32]	[33]	[34]	[35]	[36]
1961	0	0	0	0	0	0	0	0
1962	0	0	0	0	0	0	0	0
1963	0	0	0	0	0	0	0	0
1964	0	0	0	0	0	0	0	0
1965	0	0	0	0	0	0	0	0
1966	0	0	0	0	0	0	0	0
1967	0	0	0	0	0	0	0	0
1968	0	0	0	0	0	0	0	0
1969	0	0	0	0	0	0	0	0
1970	0	0	0	0	0	0	0	0
1971	0	0	0	0	0	0	0	0
1972	0	0	0	0	0	0	1.1017349	13.3965941
1973	0	0	0	0	0	0	0.7905574	13.5030687
1974	0	0	0	0	0	0	0.7530214	12.6772442
1975	0	0	0	0	0	0	0.8405850	12.9068644
1976	0	0	0	0	0	0	0.7771828	14.4483197
1977	0	0	0	0	0	0	0.6152458	17.9458194
1978	0	0	0	0	0	0	0.5222831	13.4372037
1979	0	0	0	0	0	0	0.7045701	17.9908273
1980	0	0	0	0	0	0	1.4269064	20.6255585
1981	0	0	0	0	0	0	1.5684309	20.2186605
1982	0	0	0	0	0	0	1.4942585	19.7739190
1983	0	0	0	0	0	0	1.2818887	11.4081712
1984	0	0	0	0	0	0	1.7796296	16.6546302
1985	0	0	0	0	0	0	2.1683838	23.0053556
1986	0	0	0	0	0	0	3.2288411	39.6231134
1987	0	0	0	0	0	0	3.1272967	35.0197908
1988	0	0	0	0	0	0	2.9878581	32.9904032
1989	0	0	0	0	0	0	3.5262089	42.9746819
1990	0	0	0	0	0	0	3.6810660	56.4890182
1991	0	0	0	0	0	0	2.1853025	37.6098245
1992	0	0	0	0	0	0	1.9048343	23.9194204
1993	0	0	0	0	0	0	0.1569728	-4.0768404
1994	0	0	0	0	0	0	3.0638504	40.6646149
1995	0	0	0	0	0	0	1.5724835	21.1129984
1996	0	0	0	0	0	0	3.1318961	42.5378346
1997	0	0	0	0	0	0	2.7928728	41.5836062
1998	0	0	0	0	0	0	-0.3226129	-6.1639346
1999	0	0	0	0	0	0	1.9037719	25.7605103
2000	0	0	0	0	0	0	1.8064079	28.0213680
2001	0	0	0	0	0	0	13.3506231	189.4881943
2002	0	0	0	0	0	0	4.8843487	77.9797747
2003	0	0	0	0	0	0	6.1234197	94.4006477
2004	20.6831806	86.5396987	21.4551370	107.9948357	8.6683948	116.6632305	6.4691088	99.3482735
2005	18.8666468	100.0682708	17.9350642	118.0033350	3.6760116	121.6793465	7.3193726	113.0191064
2006	15.8383486	73.6028798	20.8963712	94.4992510	20.1039529	114.6032039	5.2225186	87.9651562
2007	20.4327334	120.8916834	28.3594988	149.2511821	63.0683616	212.3195437	8.1423808	127.5659848
2008	16.8732690	121.2586665	23.8339809	145.0926474	7.1457486	152.2383960	8.5531678	135.6253773
2009	17.5432149	92.3049458	23.7664326	116.0713784	3.9665543	120.0379327	6.8982347	105.3719035
2010	17.0453906	106.3063076	24.2475942	130.5539018	3.4314037	133.9853055	7.9660377	118.6246711
2011	18.0954829	119.5248002	25.1719928	144.6967930	3.5708095	148.2676025	8.4444168	131.3562066
2012	18.9930570	122.8630021	26.7687489	149.6317510	4.5246957	154.1564467	8.7419048	135.6208630
2013	23.5688312	154.5252996	32.3526589	186.8779585	7.2933542	194.1713126	10.3063671	160.3620082
2014	32.0601240	241.2874177	46.2710055	287.5584232	10.2867803	297.8452035	14.9345064	231.5220316
2015	34.3695813	244.4919313	47.7686747	292.2606060	4.2425137	296.5031196	15.1910120	233.9600850
2016	30.4200572	192.2060556	40.0870499	232.2931056	4.4824510	236.7755566	12.7832399	195.0258839
2017	28.4037444	153.7615330	33.3566978	187.1182308	6.8299081	193.9481389	21.7874948	163.2844901
2018	**27.6162813**	**191.9440642**	**29.6030829**	**221.5471471**	**8.4413943**	**229.9885414**	**11.6880142**	**203.2914482**
2019	26.9791908	183.3985226	28.9201349	212.3186575	8.6223235	220.9409809	11.6949126	192.8840597
2020	46.2266859	224.1924887	31.5762042	255.7686929	9.8636038	265.6322967	13.7271551	214.2345992
2021	46.9036609	219.5949033	32.0386320	251.6335352	10.5096491	262.1431844	13.6590354	207.8148111
2022	46.7372832	230.9442525	31.9250482	262.8693006	10.4724311	273.3417317	13.9716598	219.2226262
2023	46.8589595	227.6351496	32.0080925	259.6432421	10.4996241	270.1428661	14.0171496	216.4145332
2024	46.8611753	220.5013284	32.0096339	252.5109623	10.5001253	263.0110876	14.3297306	211.8224543
2025	46.8552023	227.0916958	32.0055877	259.0972835	10.4988722	269.5961556	14.0362579	217.7178866
2026	46.8824663	218.6670395	32.0241811	250.6912206	10.5048872	261.1961079	13.6709596	209.3953462
2027	46.8736031	225.7126084	32.0181118	257.7307201	10.5030075	268.2337276	14.3863819	216.8442612
2028	46.8584778	220.8619888	32.0078035	252.8697922	10.4996241	263.3694163	13.7528782	211.6980085
2029	46.8602120	224.7665071	32.0089595	256.7754666	10.5000000	267.2754666	14.2686094	215.7677785
2030	46.8604046	219.7166501	32.0091522	251.7258024	10.5000000	262.2258024	13.6350386	210.2572043
2031	46.8620424	238.7766089	32.0102120	270.7868208	10.5003759	281.2871968	16.4612592	231.8908267
2032	46.8656069	211.6902563	32.0127168	243.7029731	10.5011278	254.2041009	12.8455610	201.0362944
2033	46.8397881	237.5517535	31.9949904	269.5467438	10.4953634	280.0421072	16.0390583	231.0412833
2034	46.8609827	214.4314652	32.0094412	246.4409064	10.5001253	256.9410318	12.8507914	203.5740315
2035	46.9730251	259.4962953	32.0860308	291.5823262	10.5251880	302.1075141	24.8397569	261.7675525

TABLE B-17 Unit Variable OMP&R Component of Transportation Charge (in dollars per acre-foot) Sheet 5 of 5

Calendar Year	CALIFORNIA AQUEDUCT (continued)							
	Reach 29G Warne Powerplant		Reach 29J Castaic Powerplant		Reach 31A Las Perillas and Badger Hill Pumping Plants		Reach 33A Devil's Den, Bluestone, and Polonio Pass Pumping Plants	
	Unit Rate	Cumulative Unit Rate	Unit Rate	Cumulative Unit Rate	Unit Rate	Cumulative Unit Rate	Unit Rate	Cumulative Unit Rate
	[37]	[38]	[39]	[40]	[41]	[42]	[43]	[44]
1961	0	0	0	0	0	0	0	0
1962	0	0	0	0	0	0	0	0
1963	0	0	0	0	0	0	0	0
1964	0	0	0	0	0	0	0	0
1965	0	0	0	0	0	0	0	0
1966	0	0	0	0	0	0	0	0
1967	0	0	0	0	0	0	0	0
1968	0	0	0	0	1.5014866	4.1182219	0	0
1969	0	0	0	0	1.2624066	3.0719381	0	0
1970	0	0	0	0	1.6309699	3.3588477	0	0
1971	0	0	0	0	1.4985537	2.7919286	0	0
1972	0	0	-2.9350830	10.4615111	1.9517720	3.4211474	0	0
1973	0	0	-6.8099448	6.6931239	1.5374531	3.0757814	0	0
1974	0	0	-7.4013274	5.2759168	1.5168982	2.9878282	0	0
1975	0	0	-6.5604921	6.3463723	1.1130304	2.6699305	0	0
1976	0	0	-6.7213324	7.7269873	1.5685447	3.2790543	0	0
1977	0	0	-30.4985994	-12.5527800	1.7573375	4.1392043	0	0
1978	0	0	-9.0130187	4.4241850	1.9429506	4.0089431	0	0
1979	0	0	-19.0478097	-1.0569824	1.5600341	4.3608941	0	0
1980	0	0	-20.5438586	0.0816999	1.5124754	3.6770034	0	0
1981	0	0	-10.0059379	10.2127225	1.5414199	4.7045073	0	0
1982	-2.1714430	17.6024760	-9.5987314	8.0037446	1.7581649	4.3530008	0	0
1983	-8.9130752	2.4950960	-39.8193120	-37.3242160	0.1782765	1.3888171	0	0
1984	-15.0246012	1.6300290	-17.3126964	-15.6826674	0.8546712	2.6822403	0	0
1985	-14.7115359	8.2938197	-38.9450629	-30.6512432	1.2014351	3.6785929	0	0
1986	-14.1893653	25.4337481	-28.1596224	-2.7258742	2.2635886	6.9752505	0	0
1987	-14.8696165	20.1501743	-27.0536484	-6.9034741	1.9135072	5.9486162	0	0
1988	-14.7032843	18.2871189	-25.6857024	-7.3985835	1.7733386	5.6554272	0	0
1989	-14.4231503	28.5515316	-25.3986130	3.1529186	2.4159040	7.4317239	0	0
1990	-14.1850383	42.3039798	-26.0776142	16.2263657	3.7962150	9.8240367	0	0
1991	-14.7118704	22.8979541	-25.0234633	-2.1255092	2.4131016	7.1520492	0	0
1992	-14.6199430	9.2994774	-25.1951357	-15.8956583	1.2766372	4.5092789	0	0
1993	-10.3386607	-14.4155011	-21.1218973	-35.5373984	-1.1726172	-0.7762411	0	0
1994	-14.7696788	25.8949361	-26.7437304	-0.8487943	2.3645104	7.0748798	0	0
1995	-12.2705974	8.8424010	-25.6907993	-16.8483983	2.5750402	5.4022971	0	0
1996	-14.8515762	27.6862584	-29.5639188	-1.8776604	2.5837041	7.6010922	0	0
1997	-14.9272063	26.6563999	-27.1541858	-0.4977859	2.7029648	6.9426653	24.4572499	31.3999152
1998	-8.6695834	-14.8335180	-22.2303491	-37.0638671	-0.5072304	-0.6085333	-4.1828906	-4.7914239
1999	-14.9340263	10.8264840	-27.0443818	-16.2178978	1.3710724	4.6490034	9.8811650	14.5301684
2000	-14.1657261	13.8556418	-26.9670096	-13.1113678	1.9062744	5.1251586	14.1572786	19.2824372
2001	-16.7349304	172.7532639	-29.2914159	143.4618480	12.1791731	30.9702427	92.1279543	123.0981970
2002	-13.2004543	64.7793204	-23.7780808	41.0012396	5.4523577	14.1545162	42.2356428	56.3901590
2003	-13.9757172	80.4249305	-23.8496317	56.5752988	6.2991083	16.1432859	48.5398663	64.6831522
2004	-14.1574758	85.1907977	-25.2967499	59.8940478	6.4578566	17.0611245	52.5234071	69.5845316
2005	-14.2938796	98.7252268	-24.7472457	73.9779811	8.2000327	20.1469699	62.1217478	82.2687176
2006	-14.0865037	73.8786525	-23.8861273	49.9925252	7.3715623	17.3000848	51.9221500	69.2222347
2007	-12.5169061	115.0490788	-25.0603889	89.9886899	9.9286839	23.6694565	73.4057069	97.0751634
2008	-13.8809446	121.7444327	-29.0198140	92.7246187	10.5299618	27.7028337	79.6357472	107.3385809
2009	-10.4812488	94.8906546	-24.7607898	70.1298649	6.7821158	15.7824009	62.8994557	78.6818566
2010	-13.8211960	104.8034751	-26.2504816	78.5529935	8.4647687	22.0051931	68.9441487	90.9493418
2011	-14.1584994	117.1977072	-28.7386599	88.4590473	9.7863850	25.1929518	85.5836266	110.7765784
2012	-13.8982775	121.7225855	-25.6245942	96.0979913	9.2034933	24.4625351	86.1924105	110.6549457
2013	-14.3636831	145.9983251	-25.5768325	120.4214926	12.2377248	30.8565382	94.1771916	125.0337298
2014	-14.0124517	217.5095800	-26.4213846	191.0881954	16.5039880	44.3901137	105.3205560	149.7106698
2015	-14.2676550	219.6924301	-25.0847717	194.6076583	16.5280957	44.5017873	125.1837377	169.6855250
2016	-14.0588274	180.9670565	-24.9945598	155.9724967	12.6918776	34.1639805	95.8938919	130.0578723
2017	-24.8008233	138.4836668	-41.5406970	96.9429698	15.6911492	35.9006854	87.1430145	123.0436999
2018	**-13.5544169**	**189.7370312**	**-21.2067168**	**168.5303144**	**13.4547157**	**35.5641022**	**92.4917209**	**128.0558231**
2019	-13.6051235	179.2789361	-21.2855465	157.9933896	13.4108557	35.2146087	92.7218680	127.9364767
2020	-14.8382899	199.3963093	-23.4925881	175.9037212	6.1221806	29.9973691	125.2260086	155.2233778
2021	-14.5479806	193.2668305	-23.0243484	170.2424821	6.2089213	22.0089191	127.0598874	149.0688065
2022	-14.9362293	204.2863969	-23.6546899	180.6317070	6.1868669	31.9674375	126.6092511	158.5766886
2023	-14.9460241	201.4685091	-23.6706033	177.7979058	6.1981378	26.7085514	126.9387176	153.6472689
2024	-15.2825293	196.5399250	-24.2145332	172.3253919	6.2062358	25.5568930	126.9448605	152.5017535
2025	-14.9677056	202.7501810	-23.7058304	179.0443507	6.2042346	28.8227254	126.9287323	155.7514576
2026	-14.5673738	194.8279725	-23.0558141	171.7721584	6.2083407	25.2934070	127.0024963	152.2959034
2027	-15.3373165	201.5069447	-24.3067653	177.2001794	6.2049397	26.8509934	126.9784386	153.8294319
2028	-14.6645626	197.0334460	-23.2105609	173.8228851	6.1991850	26.1503269	126.9374694	153.0877963
2029	-15.2153588	200.5524197	-24.1083944	176.4440253	6.2041309	27.0564704	126.9422173	153.9986877
2030	-14.5357471	195.7214572	-23.0045005	172.7169567	6.2050330	25.8496036	126.9428047	152.7924083
2031	-17.5692627	214.3215640	-27.9520031	186.3695610	6.2051471	29.1173634	126.9472589	156.0646223
2032	-13.6896758	187.3466186	-21.6310780	165.7155406	6.2041309	24.7502226	126.9569506	151.7071731
2033	-17.1237530	213.9175303	-27.2221345	186.6953958	6.2004396	29.1862517	126.8868820	156.0731337
2034	-13.6949501	189.8790814	-21.6423782	168.2367032	6.1984074	25.5387930	126.9442242	152.4830172
2035	-26.5435861	235.2239664	-42.8989841	192.3249823	6.2190620	26.7444242	127.2478218	153.9922460

Tables B-18 through B-31

Note: Where applicable, the projected data values shown in this appendix are shaded and the bill year data are in **bold** type.

TABLE B-18 Variable OMP&R Component of Transportation Charge for Each Contractor[a] (in dollars)

Calendar Year	NORTH BAY AREA			SOUTH BAY AREA				CENTRAL COASTAL AREA		
	Napa	Solano	Total	Alameda-Zone 7	Alameda County	Santa Clara	Total	San Luis Obispo	Santa Barbara	Total
	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]
1961	0	0	0	0	0	0	0	0	0	0
1962	0	0	0	2,051	34,919	0	36,970	0	0	0
1963	0	0	0	7,900	49,811	0	57,711	0	0	0
1964	0	0	0	5,931	68,203	0	74,134	0	0	0
1965	0	0	0	10,918	68,765	62,926	142,609	0	0	0
1966	0	0	0	19,330	52,135	121,141	192,606	0	0	0
1967	0	0	0	19,958	53,785	163,255	236,998	0	0	0
1968	6,989	0	6,989	29,899	120,985	341,768	492,652	0	0	0
1969	8,551	0	8,551	31,859	3,904	298,968	334,731	0	0	0
1970	13,598	0	13,598	49,687	0	431,443	481,130	0	0	0
1971	10,609	0	10,609	23,842	28,328	416,329	468,499	0	0	0
1972	14,434	0	14,434	54,838	144,669	524,208	723,715	0	0	0
1973	14,449	0	14,449	18,398	15,590	547,807	581,795	0	0	0
1974	17,473	0	17,473	9,499	29	636,186	645,714	0	0	0
1975	14,779	0	14,779	22,318	4,765	425,284	452,367	0	0	0
1976	20,856	0	20,856	97,874	121,693	502,769	722,336	0	0	0
1977	22,635	0	22,635	82,578	123,044	497,792	703,414	0	0	0
1978	21,692	0	21,692	74,911	39,986	652,860	767,757	0	0	0
1979	16,237	0	16,237	137,101	77,145	652,629	866,875	0	0	0
1980	19,945	0	19,945	98,743	64,891	517,531	681,165	0	0	0
1981	23,842	0	23,842	126,437	141,456	567,968	835,861	0	0	0
1982	12,157	0	12,157	97,117	46,742	651,246	795,105	0	0	0
1983	2,342	0	2,342	8,171	5,412	148,743	162,326	0	0	0
1984	4,822	0	4,822	26,707	13,141	349,314	389,162	0	0	0
1985	10,188	0	10,188	79,863	102,790	466,291	648,944	0	0	0
1986	15,501	0	15,501	112,370	131,118	932,090	1,175,578	0	0	0
1987	27,223	0	27,223	216,211	234,290	812,631	1,263,132	0	0	0
1988	31,265	11,533	42,798	229,578	297,129	779,537	1,306,244	0	0	0
1989	37,874	66,850	104,724	306,533	304,275	1,051,562	1,662,370	0	0	0
1990	54,736	105,421	160,157	524,114	502,545	1,456,008	2,482,667	0	0	0
1991	8,159	18,824	26,983	105,736	142,105	316,839	564,680	0	(2,636)	(2,636)
1992	12,515	23,808	36,323	93,772	122,436	273,849	490,057	0	0	0
1993	(7,223)	(17,293)	(24,516)	(36,162)	(12,912)	(78,024)	(127,098)	0	0	0
1994	39,106	77,257	116,363	231,800	257,533	642,006	1,131,339	0	0	0
1995	15,701	36,724	52,425	160,663	93,610	151,287	405,560	0	0	0
1996	31,526	96,570	128,096	214,883	186,694	735,431	1,137,008	502	0	502
1997	29,683	116,555	146,238	351,185	219,799	912,861	1,483,845	34,932	233,584	268,516
1998	(6,622)	(19,825)	(26,447)	(8,777)	(18,989)	(72,459)	(100,225)	(17,211)	(89,207)	(106,418)
1999	16,237	54,380	70,617	258,207	193,717	444,579	896,503	54,386	292,594	346,980
2000	21,853	93,587	115,441	375,486	237,544	749,863	1,362,894	76,397	438,502	514,899
2001	287,659	528,307	815,967	1,675,681	989,109	2,451,313	5,116,103	527,230	2,332,218	2,859,448
2002	90,290	266,205	356,494	1,067,734	640,899	1,453,943	3,162,576	245,579	1,558,398	1,803,978
2003	131,103	266,087	397,190	1,076,990	647,811	2,301,219	4,026,020	288,034	1,744,375	2,032,409
2004	141,816	356,192	498,008	1,325,729	624,583	1,614,003	3,564,314	289,820	2,067,009	2,356,828
2005	189,098	393,118	582,216	1,483,817	849,101	2,494,389	4,827,307	349,724	1,920,481	2,270,205
2006	182,245	317,802	500,048	1,300,477	736,605	2,175,973	4,213,055	291,356	1,611,148	1,902,504
2007	332,074	604,832	936,906	1,610,876	899,784	2,704,487	5,215,147	366,556	2,692,865	3,059,421
2008	395,194	527,580	922,774	1,567,658	767,723	1,941,320	4,276,701	365,166	1,974,279	2,339,444
2009	213,095	272,109	485,204	843,028	500,952	1,551,726	2,895,706	299,058	1,215,680	1,514,738
2010	282,401	305,707	588,108	1,351,451	627,717	1,947,360	3,926,527	341,697	1,616,625	1,958,321
2011	306,596	308,367	614,963	1,751,565	950,336	2,966,408	5,668,310	423,056	2,331,847	2,754,903
2012	259,029	326,953	585,982	1,778,520	674,932	2,422,752	4,876,204	436,423	2,154,894	2,591,318
2013	434,089	527,190	961,279	2,139,773	1,092,478	3,121,315	6,353,566	460,249	2,252,858	2,713,107
2014	596,560	393,490	990,050	1,535,804	1,195,553	2,156,709	4,888,065	477,354	2,490,609	2,967,963
2015	475,777	494,055	969,832	1,443,307	917,538	3,067,605	5,428,449	582,829	1,976,928	2,559,757
2016	330,368	355,618	685,987	2,356,598	789,764	4,046,852	7,193,214	546,113	3,873,136	4,419,249
2017	175,470	1,339,216	1,514,687	2,402,587	748,863	3,757,909	6,909,358	560,956	4,783,358	5,344,314
2018	**1,185,606**	**1,325,616**	**2,511,222**	**2,476,895**	**1,206,276**	**3,496,291**	**7,179,462**	**1,597,753**	**3,494,771**	**5,092,524**
2019	1,163,887	1,339,213	2,503,100	2,479,469	1,289,183	3,363,028	7,131,680	1,697,589	3,491,514	5,189,104
2020	1,015,023	856,454	1,871,477	2,557,992	1,331,749	3,456,055	7,345,797	2,071,456	4,236,201	6,307,657
2021	1,053,152	895,453	1,948,605	2,188,866	1,137,787	3,002,520	6,329,174	1,991,112	4,068,237	6,059,349
2022	1,049,417	892,277	1,941,693	2,664,679	1,385,686	3,591,321	7,641,687	2,118,109	4,327,716	6,445,825
2023	1,052,147	894,599	1,946,746	2,411,336	1,253,698	3,277,390	6,942,423	2,052,267	4,193,188	6,245,454
2024	1,052,198	894,642	1,946,840	2,359,382	1,226,624	3,213,782	6,799,788	2,036,966	4,161,925	6,198,891
2025	1,052,065	894,528	1,946,593	2,514,068	1,307,217	3,404,974	7,226,260	2,080,372	4,250,613	6,330,985
2026	1,052,676	895,048	1,947,725	2,348,919	1,221,168	3,201,284	6,771,372	2,034,216	4,156,308	6,190,524
2027	1,052,477	894,879	1,947,356	2,418,484	1,257,420	3,286,374	6,962,278	2,054,700	4,198,159	6,252,859
2028	1,052,137	894,589	1,946,727	2,388,496	1,241,791	3,249,909	6,880,196	2,044,794	4,177,919	6,222,713
2029	1,052,177	894,623	1,946,800	2,429,260	1,263,033	3,299,902	6,992,196	2,056,960	4,202,778	6,259,739
2030	1,052,182	894,628	1,946,810	2,374,849	1,234,680	3,233,220	6,842,749	2,040,848	4,169,858	6,210,706
2031	1,052,218	894,659	1,946,877	2,516,388	1,308,447	3,405,453	7,230,288	2,084,555	4,259,160	6,343,715
2032	1,052,299	894,727	1,947,026	2,330,067	1,211,334	3,179,356	6,720,757	2,026,353	4,140,240	6,166,593
2033	1,051,718	894,233	1,945,951	2,519,703	1,310,174	3,409,515	7,239,392	2,084,669	4,259,392	6,344,061
2034	1,052,193	894,637	1,946,831	2,366,367	1,230,249	3,223,955	6,820,571	2,036,716	4,161,414	6,198,130
2035	1,054,710	896,778	1,951,488	2,381,013	1,237,956	3,233,513	6,852,482	2,056,874	4,202,602	6,259,477
TOTAL	**24,554,281**	**25,188,802**	**49,743,083**	**74,709,356**	**40,581,303**	**119,787,643**	**235,078,302**	**43,166,514**	**113,621,540**	**156,788,055**

[a] B-18 includes Extra Peaking Charges for additional power shown in Table 9.

TABLE B-18 Variable OMP&R Component of Transportation Charge for Each Contractor[a] (in dollars)

	SAN JOAQUIN VALLEY AREA								
				Kern					
Calendar Year	Dudley Ridge	Empire	Future Contractor San Joaquin Valley	Municipal and Industrial	Agricultural	Kings	Oak Flat	Tulare	Total
	[11]	[12]	[13]	[14]	[15]	[16]	[17]	[18]	[19]
1961	0	0	0	0	0	0	0	0	0
1962	0	0	0	0	0	0	0	0	0
1963	0	0	0	0	0	0	0	0	0
1964	0	0	0	0	0	0	0	0	0
1965	0	0	0	0	0	0	0	0	0
1966	0	0	0	0	0	0	0	0	0
1967	0	0	0	0	0	0	0	0	0
1968	68,977	5,176	0	0	440,922	2,355	4,760	65,680	587,870
1969	56,774	101	0	0	321,387	181	3,338	17,956	399,737
1970	69,818	6,811	0	0	470,867	0	5,595	16,550	569,641
1971	53,097	7,747	0	0	769,054	4,785	6,353	158,419	999,455
1972	62,365	8,515	0	0	1,151,788	2,057	7,375	379,686	1,611,786
1973	33,931	4,615	0	0	770,121	2,307	3,017	77,630	891,621
1974	49,114	4,413	0	46,752	677,660	2,206	3,114	106,332	889,591
1975	63,140	4,671	0	34,580	848,249	2,491	3,920	134,295	1,091,346
1976	70,851	5,132	0	94,653	966,820	2,737	4,910	100,597	1,245,701
1977	26,565	1,758	0	84,875	498,624	3,644	2,602	43,067	661,135
1978	108,944	938	0	190,675	1,616,975	4,319	6,294	24,901	1,953,046
1979	107,956	4,871	0	194,048	2,371,175	5,602	13,172	434,472	3,131,297
1980	88,746	1,935	0	121,603	1,731,588	4,762	7,766	163,301	2,119,701
1981	129,687	18,533	0	263,077	2,398,339	7,275	8,904	263,922	3,089,737
1982	108,561	937	0	145,246	2,375,404	4,541	6,763	48,137	2,689,589
1983	61,443	0	0	13,954	929,183	5,662	3,232	1,218	1,014,692
1984	82,423	0	0	216,437	1,996,259	5,946	7,475	10,496	2,319,036
1985	114,571	12,938	0	242,645	2,567,184	8,422	8,815	271,970	3,226,545
1986	236,756	5,513	0	377,798	4,876,960	17,433	16,927	376,088	5,907,475
1987	187,090	10,273	0	504,168	4,230,949	16,140	15,529	375,604	5,339,753
1988	188,170	14,894	0	524,965	4,250,194	15,528	11,928	374,528	5,380,207
1989	285,261	15,450	0	681,238	6,158,648	20,063	21,693	649,604	7,831,957
1990	218,786	7,710	0	845,877	4,778,185	12,056	12,072	344,008	6,218,694
1991	4,393	1,047	0	185,013	47,869	0	521	10,331	249,174
1992	76,840	4,426	0	227,332	1,699,824	6,059	5,222	151,055	2,170,758
1993	20,064	4,843	0	78,585	340,588	2,090	1,467	123,913	571,550
1994	135,626	7,854	0	471,316	3,417,815	9,967	10,102	293,748	4,346,428
1995	181,772	4,611	0	409,656	3,437,735	11,619	10,492	288,010	4,343,895
1996	286,064	9,577	0	715,404	6,328,965	21,039	16,403	1,196,303	8,573,755
1997	308,515	0	0	650,416	5,627,735	0	15,559	94,838	6,697,063
1998	16,993	(54)	0	(16,341)	91,651	(2)	1,171	(2,095)	91,324
1999	195,683	10,411	0	473,993	4,043,627	13,112	11,761	956,653	5,705,239
2000	194,868	5,791	0	150,870	4,259,519	11,588	10,347	638,347	5,271,330
2001	787,383	25,556	0	156,315	11,851,444	29,314	45,773	1,119,234	14,015,019
2002	425,666	12,227	0	183,569	8,013,811	24,836	29,691	839,776	9,529,575
2003	453,639	14,136	0	493,523	9,967,581	36,345	28,691	1,041,918	12,035,833
2004	520,408	37,769	0	1,406,548	8,941,409	95,991	33,665	861,595	11,897,384
2005	977,603	45,805	0	836,724	17,643,647	236,621	34,032	1,672,595	21,447,026
2006	715,648	32,585	0	990,557	13,740,855	94,619	28,907	1,074,336	16,677,506
2007	620,190	28,636	0	772,081	12,112,916	79,441	32,915	1,196,588	14,842,766
2008	380,791	16,263	0	758,437	7,719,917	65,875	24,582	582,229	9,548,095
2009	190,974	9,306	0	65,765	5,122,594	30,520	11,767	331,245	5,762,172
2010	403,800	44,128	0	144,050	9,139,391	65,692	27,419	785,452	10,609,933
2011	934,979	29,504	0	711,347	19,845,304	103,335	29,411	852,586	22,506,464
2012	279,454	34,211	0	550,517	11,938,606	112,993	33,761	1,361,982	14,311,524
2013	503,564	29,176	0	630,846	12,140,851	86,484	36,686	821,666	14,249,274
2014	521,330	14,389	0	217	7,050,429	34,986	29,698	248,978	7,900,027
2015	434,784	17,456	0	487,335	9,118,056	34,380	21,947	484,952	10,598,910
2016	448,939	39,122	0	276,892	13,304,362	78,588	27,766	910,138	15,085,807
2017	983,244	36,377	0	1,718,760	18,661,263	137,790	28,676	1,233,226	22,799,336
2018	**631,621**	**39,797**	**0**	**2,097,589**	**14,760,096**	**125,899**	**52,230**	**1,160,367**	**18,867,599**
2019	622,890	39,247	0	2,046,813	14,458,729	124,185	52,536	1,144,326	18,488,725
2020	682,066	42,975	0	2,247,093	15,407,861	134,416	57,598	1,253,042	19,825,050
2021	451,374	28,440	0	1,665,018	11,197,664	89,348	29,706	829,231	14,290,781
2022	736,499	46,405	0	2,393,777	16,452,070	145,065	63,769	1,353,042	21,190,627
2023	585,942	36,919	0	2,017,452	13,718,761	115,644	45,508	1,076,448	17,596,674
2024	552,810	34,831	0	1,922,561	13,058,910	109,170	41,876	1,015,581	16,735,738
2025	646,165	40,713	0	2,168,399	14,814,737	127,414	52,791	1,187,086	19,037,306
2026	545,222	34,353	0	1,899,012	12,899,001	107,688	41,099	1,001,642	16,528,017
2027	589,816	37,163	0	2,027,106	13,789,357	116,402	45,976	1,083,567	17,689,388
2028	569,964	35,912	0	1,965,802	13,371,811	112,522	43,943	1,047,096	17,147,049
2029	595,710	37,534	0	2,038,814	13,881,648	117,554	46,787	1,094,393	17,812,440
2030	561,206	35,360	0	1,940,642	13,197,202	110,811	42,986	1,031,006	16,919,213
2031	654,556	41,242	0	2,222,025	15,125,367	129,054	52,798	1,202,502	19,427,545
2032	529,825	33,383	0	1,840,042	12,519,530	104,678	39,900	973,355	16,040,712
2033	656,659	41,374	0	2,225,960	15,156,878	129,464	53,097	1,206,364	19,469,797
2034	552,516	34,813	0	1,902,710	12,960,234	109,112	42,456	1,015,041	16,616,882
2035	586,369	36,946	0	2,115,496	14,196,041	115,731	42,663	1,077,233	18,170,478
TOTAL	**24,227,451**	**1,335,489**	**0**	**54,848,631**	**523,770,195**	**3,697,951**	**1,621,704**	**43,359,379**	**652,860,800**

[a] B-18 includes Extra Peaking Charges for additional power shown in Table 9.

TABLE B-18 Variable OMP&R Component of Transportation Charge for Each Contractor[a] (in dollars)

Calendar Year	SOUTHERN CALIFORNIA AREA									
	AVEK	Castaic Lake	Coachella	Crestline	Desert	Littlerock	Mojave	Palmdale	San Bernardino	San Gabriel
	[20]	[21]	[22]	[23]	[24]	[25]	[26]	[27]	[28]	[29]
1961	0	0	0	0	0	0	0	0	0	0
1962	0	0	0	0	0	0	0	0	0	0
1963	0	0	0	0	0	0	0	0	0	0
1964	0	0	0	0	0	0	0	0	0	0
1965	0	0	0	0	0	0	0	0	0	0
1966	0	0	0	0	0	0	0	0	0	0
1967	0	0	0	0	0	0	0	0	0	0
1968	0	30,401	0	0	0	0	0	0	0	0
1969	0	30,627	0	0	0	0	0	0	0	0
1970	0	39,430	0	0	0	0	0	0	0	0
1971	0	34,871	0	0	0	0	0	0	0	0
1972	780	47,571	0	12,785	0	4,496	1,515	0	32,107	0
1973	286	28,968	102,812	6,896	159,536	3,855	0	0	301,444	0
1974	15,558	28,982	100,955	9,890	157,742	4,932	221	0	177,173	5,961
1975	99,186	28,568	108,253	12,758	170,111	6,391	0	0	136,066	50,723
1976	385,090	38,365	135,276	17,835	213,594	8,164	0	0	139,354	65,476
1977	199,166	21,006	0	23,598	0	1,974	1,702	0	239,663	74,838
1978	581,729	45,550	174,116	20,875	264,178	2,731	0	0	37,043	67,462
1979	1,058,904	83,940	228,437	28,603	340,510	2,328	90,803	0	236	3,668
1980	1,390,117	51,143	256,759	29,229	401,038	3,667	94,362	0	0	16,504
1981	1,480,362	118,583	274,149	33,632	430,304	23,861	90,590	0	254,649	57,523
1982	923,973	132,575	292,674	27,190	461,216	0	230,608	0	126,461	189,895
1983	333,772	(335,712)	172,336	10,792	272,477	385	0	0	(71,602)	(8,768)
1984	485,847	(142,910)	273,597	19,572	433,785	15	0	0	(66,353)	(91,433)
1985	821,069	(335,343)	413,406	34,603	657,011	0	0	32,464	(47,544)	(32,348)
1986	1,109,047	54,812	728,808	60,274	1,160,650	5,548	0	105,375	69,170	101,843
1987	1,019,605	(40,745)	668,383	63,601	1,083,530	32,651	585	157,843	88,076	49,930
1988	1,019,793	(74,006)	688,891	66,914	1,134,141	11,991	300	50,654	92,465	38,688
1989	1,736,901	178,359	978,885	97,114	1,633,489	38,269	8,951	350,953	340,460	210,334
1990	2,442,558	422,502	1,402,619	110,934	2,313,410	90,472	0	446,408	599,573	530,099
1991	286,485	(3,054)	277,078	33,945	456,999	17,978	128,405	132,700	35,339	52,116
1992	587,340	(208,900)	240,119	11,952	396,022	4,871	241,338	78,306	(22,718)	(53,500)
1993	(190,611)	(491,161)	(809,033)	(2,389)	(1,334,429)	(3,246)	(61,112)	(29,466)	(157,452)	(519,798)
1994	1,841,902	66,338	189,616	34,480	312,714	41,201	731,185	315,446	122,829	204,783
1995	761,209	(247,735)	(251,547)	7,960	(414,889)	7,727	165,622	114,342	(7,579)	(140,714)
1996	1,883,530	72,171	508,274	18,313	838,330	16,510	289,044	385,745	49,537	133,848
1997	2,121,818	22,440	365,342	24,076	330,153	15,099	414,596	438,212	61,553	115,882
1998	(577,005)	(733,387)	(3,979,131)	(2,991)	(3,279,862)	(4,405)	(46,209)	(84,367)	(87,188)	(432,227)
1999	1,309,467	(448,290)	(633,767)	20,018	(729,435)	6,484	180,423	263,297	(161,631)	(222,717)
2000	1,743,925	(360,679)	(425,149)	24,166	(584,980)	0	283,085	189,047	(184,824)	(152,086)
2001	10,748,924	4,442,763	1,496,563	206,495	2,468,506	0	850,559	1,788,151	4,356,149	388,120
2002	3,940,517	1,972,925	737,683	162,410	1,216,924	0	332,521	1,250,873	3,146,998	1,094,131
2003	5,100,245	3,152,927	907,298	145,685	1,496,291	0	1,429,259	981,068	1,640,399	1,377,877
2004	5,218,767	3,252,013	1,018,471	192,767	1,395,500	0	1,344,202	1,061,772	3,812,245	825,907
2005	5,994,948	3,011,986	3,452,612	89,977	3,986,107	0	1,580,568	1,173,519	2,654,327	1,135,524
2006	6,398,882	2,246,437	6,995,285	56,129	2,888,227	0	3,151,694	994,412	2,150,773	940,638
2007	9,366,901	4,237,414	7,356,408	230,821	3,037,276	0	6,174,449	2,222,474	6,072,123	404,247
2008	5,837,227	3,786,945	4,832,779	114,606	2,615,304	3,042	3,538,824	1,734,396	4,051,276	752,827
2009	4,115,006	2,595,637	3,413,684	96,616	1,365,374	3,869	3,228,792	1,413,078	3,432,975	861,232
2010	6,172,008	2,756,232	7,526,376	42,104	2,783,423	0	4,663,414	1,157,495	4,812,730	1,712,024
2011	11,069,348	2,825,582	9,156,937	62,297	3,689,897	0	660,947	1,270,854	3,592,835	2,392,819
2012	10,466,529	3,714,865	12,152,719	83,923	4,684,638	0	1,612,272	2,073,947	10,290,641	2,291,163
2013	7,467,802	5,716,924	8,406,502	221,237	2,722,716	0	1,254,070	1,545,866	4,697,219	1,211,609
2014	3,646,961	5,102,939	2,553,325	294,455	637,934	0	843,433	1,751,599	2,516,966	250,956
2015	2,686,999	5,288,824	7,634,010	300,360	2,356,942	0	2,159,281	1,223,779	5,622,726	1,210,284
2016	6,769,144	4,935,018	10,877,218	208,646	3,541,981	0	4,423,187	1,814,007	10,847,880	2,602,813
2017	14,632,837	5,642,545	11,047,030	274,255	3,971,460	158,698	1,536,729	2,011,653	8,164,276	2,543,635
2018	**13,722,392**	**9,360,519**	**13,640,849**	**693,199**	**5,496,764**	**249,189**	**8,801,466**	**3,537,039**	**9,718,817**	**2,839,584**
2019	13,439,661	8,779,025	12,984,369	654,047	5,232,227	236,168	8,492,228	3,352,214	9,641,784	2,702,926
2020	15,560,600	9,755,808	14,772,941	727,215	5,952,956	264,101	9,345,251	3,748,698	10,967,976	3,075,249
2021	15,610,436	9,427,783	14,335,100	706,897	5,776,522	255,316	9,102,001	3,624,013	10,630,873	2,984,105
2022	16,543,841	10,020,355	15,291,021	745,178	6,161,723	270,598	9,563,676	3,840,921	11,339,781	3,183,096
2023	16,290,401	9,853,638	15,006,232	736,078	6,046,964	266,444	9,465,820	3,781,963	11,128,582	3,123,813
2024	15,728,011	9,549,689	14,413,869	710,062	5,808,263	257,210	9,123,927	3,650,893	10,689,288	3,000,502
2025	16,218,060	9,926,570	14,961,431	732,514	6,028,911	265,233	9,417,611	3,764,768	11,095,359	3,114,487
2026	15,570,858	9,518,668	14,259,837	704,187	5,746,194	254,643	9,059,171	3,614,458	10,575,058	2,968,437
2027	16,120,446	9,820,976	14,845,426	728,145	5,982,165	263,631	9,361,070	3,742,031	11,009,329	3,090,338
2028	15,749,566	9,633,418	14,444,031	712,108	5,820,417	257,567	9,160,847	3,655,961	10,711,656	3,006,781
2029	16,044,736	9,779,708	14,768,002	724,621	5,950,966	262,394	9,314,771	3,724,468	10,951,912	3,074,221
2030	15,642,253	9,571,858	14,348,797	707,383	5,782,041	255,812	9,100,815	3,631,048	10,641,030	2,986,956
2031	17,190,368	10,330,925	15,930,828	774,000	6,419,542	281,122	9,931,057	3,990,296	11,814,261	3,316,284
2032	14,963,389	9,183,741	13,682,094	677,102	5,513,385	244,711	8,712,537	3,473,478	10,146,605	2,848,170
2033	17,146,839	10,349,023	15,831,000	772,672	6,379,315	280,413	9,920,732	3,980,232	11,740,229	3,295,503
2034	15,162,984	9,324,285	13,910,026	686,310	5,605,233	247,977	8,833,636	3,519,833	10,315,639	2,895,618
2035	18,989,325	10,654,442	17,641,557	849,681	7,108,903	310,474	10,854,913	4,406,926	13,082,933	3,672,402
TOTAL	**430,199,012**	**237,677,685**	**367,114,466**	**16,680,807**	**158,948,336**	**5,232,559**	**209,191,745**	**95,455,144**	**280,159,956**	**77,490,257**

[a] B-18 includes Extra Peaking Charges for additional power shown in Table 9.

TABLE B-18 Variable OMP&R Component of Transportation Charge for Each Contractor[a] (in dollars)

Calendar Year	SOUTHERN CALIFORNIA AREA (continued)				FEATHER RIVER AREA					
	San Gorgonio	Metropolitan	Ventura	Total	Yuba City	Butte	Plumas	Total	South Bay Area Future Contractor	Grand Total
	[30]	[31]	[32]	[33]	[34]	[35]	[36]	[37]	[38]	[39]
1961	0	0	0	0	0	0	0	0	0	0
1962	0	0	0	0	0	0	0	0	0	36,970
1963	0	0	0	0	0	0	0	0	0	57,711
1964	0	0	0	0	0	0	0	0	0	74,134
1965	0	0	0	0	0	0	0	0	0	142,609
1966	0	0	0	0	0	0	0	0	0	192,606
1967	0	0	0	0	0	0	0	0	0	236,998
1968	0	0	0	30,401	0	0	0	0	0	1,117,912
1969	0	0	0	30,627	0	0	0	0	0	773,646
1970	0	0	0	39,430	0	0	0	0	0	1,103,799
1971	0	0	0	34,871	0	0	0	0	0	1,513,434
1972	0	848,011	0	947,266	0	0	0	0	0	3,297,202
1973	0	1,083,328	0	1,687,126	0	0	0	0	0	3,174,991
1974	0	1,872,297	0	2,373,712	0	0	0	0	0	3,926,489
1975	0	3,887,152	0	4,499,209	0	0	0	0	0	6,057,701
1976	0	5,485,263	0	6,488,418	0	0	0	0	0	8,477,311
1977	0	(796,686)	0	(234,739)	0	0	0	0	0	1,152,444
1978	0	3,696,428	0	4,890,112	0	0	0	0	0	7,632,606
1979	0	4,021,960	0	5,859,389	0	0	0	0	0	9,873,798
1980	0	5,362,245	0	7,605,064	0	0	0	0	0	10,425,875
1981	0	10,862,932	0	13,626,585	0	0	0	0	0	17,576,025
1982	0	7,685,168	0	10,069,760	0	0	0	0	0	13,566,611
1983	0	(8,994,497)	0	(8,620,817)	0	0	0	0	0	(7,441,457)
1984	0	(7,633,741)	0	(6,721,621)	0	0	0	0	0	(4,008,601)
1985	0	(15,739,366)	0	(14,196,048)	0	0	0	0	0	(10,310,371)
1986	0	1,135,478	0	4,531,005	0	0	0	0	0	11,629,559
1987	0	(3,007,097)	0	116,362	0	0	0	0	0	6,746,470
1988	0	(3,407,929)	0	(378,098)	0	0	0	0	0	6,351,151
1989	0	9,488,536	0	15,062,251	0	0	0	0	0	24,661,302
1990	0	30,759,725	204,582	39,322,882	0	0	0	0	0	48,184,400
1991	0	184,870	22,623	1,625,484	0	0	0	0	0	2,463,685
1992	0	(9,471,028)	0	(8,196,198)	0	0	0	0	0	(5,499,060)
1993	0	(21,473,875)	0	(25,072,572)	0	0	0	0	0	(24,652,636)
1994	0	4,059,683	0	7,920,177	0	0	0	0	0	13,514,307
1995	0	(4,895,977)	0	(4,901,581)	0	0	0	0	0	(99,701)
1996	0	1,859,275	0	6,054,577	0	0	0	0	0	15,893,938
1997	0	2,428,729	(921)	6,336,979	0	0	0	0	0	14,932,641
1998	0	(14,593,773)	(68,568)	(23,889,113)	0	0	0	0	0	(24,030,879)
1999	0	(9,194,693)	(30,003)	(9,640,848)	0	0	0	0	0	(2,621,509)
2000	0	(14,982,560)	6,226	(14,443,828)	0	0	0	0	0	(7,179,265)
2001	0	157,946,899	265,404	184,958,532	0	0	0	0	0	207,765,068
2002	0	59,841,457	279,778	73,976,216	0	0	0	0	0	88,828,838
2003	7,287	94,319,451	358,003	110,915,789	0	0	0	0	0	129,407,240
2004	98,114	107,156,248	416,820	125,792,825	0	0	0	0	0	144,109,361
2005	84,202	113,938,011	123,173	137,224,954	0	0	0	0	0	166,351,708
2006	420,492	82,413,262	92,486	108,748,716	0	0	0	0	0	132,041,829
2007	598,467	137,718,921	317,330	177,736,829	0	0	0	0	0	201,791,069
2008	719,125	83,668,920	409,627	112,064,898	0	0	0	0	0	129,151,911
2009	750,014	60,878,165	350,866	82,505,306	0	0	0	0	0	93,163,126
2010	1,095,272	89,834,714	402,792	122,958,584	0	0	0	0	0	140,041,474
2011	1,552,923	132,160,509	426,258	168,861,206	0	0	0	0	0	200,405,845
2012	1,697,262	108,361,130	499,032	157,928,123	0	0	0	0	0	180,293,150
2013	1,833,948	108,004,831	405,361	143,488,085	0	0	0	0	0	167,765,312
2014	1,502,077	69,625,931	17,771	88,744,346	0	0	0	0	0	105,490,451
2015	1,032,066	109,096,560	210,411	138,822,243	0	0	0	0	0	158,379,191
2016	2,560,964	164,372,403	515,157	213,468,418	0	0	0	0	0	240,852,674
2017	2,321,559	155,324,566	369,341	207,998,584	0	0	0	0	0	244,566,278
2018	**2,377,151**	**152,061,027**	**545,672**	**223,043,670**	**0**	**0**	**0**	**0**	**0**	**256,694,477**
2019	2,279,572	155,707,603	514,210	224,016,033	0	0	0	0	0	257,328,642
2020	2,737,536	175,624,115	572,112	253,104,559	0	0	0	0	0	288,454,541
2021	2,695,823	168,936,238	554,243	244,639,351	0	0	0	0	0	273,267,260
2022	2,812,153	181,460,042	586,602	261,818,989	0	0	0	0	0	299,038,821
2023	2,778,884	177,417,278	578,131	256,474,227	0	0	0	0	0	289,205,524
2024	2,704,855	170,892,226	562,742	247,091,538	0	0	0	0	0	278,772,795
2025	2,773,211	177,917,042	581,937	256,797,133	0	0	0	0	0	291,338,277
2026	2,686,004	169,525,098	558,892	245,041,506	0	0	0	0	0	276,479,143
2027	2,759,059	176,046,908	577,540	254,347,062	0	0	0	0	0	287,198,943
2028	2,708,575	171,769,180	565,337	248,195,446	0	0	0	0	0	280,392,131
2029	2,749,119	175,243,676	574,897	253,163,488	0	0	0	0	0	286,174,663
2030	2,696,704	170,617,887	561,629	246,544,214	0	0	0	0	0	278,463,691
2031	2,894,560	187,694,514	611,938	271,179,694	0	0	0	0	0	306,128,119
2032	2,613,436	163,013,476	538,029	235,610,154	0	0	0	0	0	266,485,241
2033	2,881,648	187,101,504	611,536	270,290,644	0	0	0	0	0	305,289,845
2034	2,641,848	165,735,878	545,614	239,424,880	0	0	0	0	0	271,007,294
2035	3,110,616	201,864,726	658,054	293,204,951	0	0	0	0	0	326,438,876
TOTAL	**65,174,526**	**4,943,820,253**	**15,892,667**	**6,903,037,413**	**0**	**0**	**0**	**0**	**0**	**7,997,507,653**

[a] B-18 includes Extra Peaking Charges for additional power shown in Table 9.

TABLE B-19 Total Transportation Charge for Each Contractor[a] (in dollars)

Calendar Year	NORTH BAY AREA			SOUTH BAY AREA				CENTRAL COASTAL AREA		
	Napa	Solano	Total	Alameda-Zone 7	Alameda County	Santa Clara	Total	San Luis Obispo	Santa Barbara	Total
	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]
1961	0	0	0	0	0	0	0	0	0	0
1962	0	0	0	11,750	43,787	21,132	76,669	0	0	0
1963	0	0	0	199,726	190,272	447,723	837,721	0	0	0
1964	0	0	0	263,282	277,455	621,356	1,162,093	6,696	21,667	28,363
1965	0	0	0	373,816	404,324	1,158,090	1,936,230	13,756	36,029	49,785
1966	18,063	0	18,063	419,468	421,723	1,412,954	2,254,144	26,524	61,349	87,873
1967	41,574	0	41,574	539,115	498,441	1,686,098	2,723,655	56,469	118,263	174,731
1968	128,628	0	128,628	663,963	603,483	1,985,220	3,252,666	115,961	229,807	345,768
1969	254,715	0	254,715	787,629	539,340	2,083,253	3,410,223	185,156	358,861	544,017
1970	277,547	0	277,547	823,454	532,567	2,202,767	3,558,788	200,150	387,675	587,825
1971	227,474	0	227,474	788,666	552,113	2,169,897	3,510,676	202,413	392,912	595,325
1972	224,978	0	224,978	830,631	678,520	2,320,421	3,829,572	209,057	406,589	615,646
1973	221,091	31,366	252,457	796,005	549,393	2,338,620	3,684,017	206,557	402,724	609,281
1974	240,498	32,938	273,437	819,920	564,593	2,506,358	3,890,871	208,545	407,090	615,635
1975	237,459	36,291	273,750	870,024	605,731	2,409,923	3,885,678	225,895	439,873	665,768
1976	271,292	40,836	312,127	960,906	734,812	2,500,506	4,196,223	228,976	447,299	676,275
1977	293,627	45,096	338,723	925,233	713,558	2,476,399	4,115,190	238,699	468,721	707,420
1978	273,870	49,178	323,048	980,768	692,587	2,785,987	4,459,342	245,331	484,259	729,590
1979	289,479	53,340	342,819	1,046,129	736,358	2,813,578	4,596,066	243,110	483,437	726,547
1980	310,846	67,748	378,594	1,164,342	866,372	3,028,204	5,058,918	269,858	537,074	806,932
1981	347,781	87,408	435,189	1,130,235	879,357	2,917,582	4,927,174	288,997	586,257	875,254
1982	438,335	106,918	545,254	1,168,329	850,483	3,262,104	5,280,916	290,049	582,757	872,806
1983	354,787	151,259	506,046	1,180,118	900,363	3,795,446	5,875,927	319,214	633,181	952,395
1984	467,336	224,245	691,581	1,472,406	1,097,480	5,737,801	8,307,688	351,620	695,559	1,047,179
1985	736,074	364,305	1,100,379	1,923,056	1,789,369	6,551,546	10,263,971	394,593	776,994	1,171,586
1986	1,084,728	692,479	1,777,207	1,750,463	1,528,732	6,863,230	10,142,425	385,545	762,684	1,148,229
1987	1,773,801	1,559,243	3,333,044	2,240,531	2,011,876	6,675,355	10,927,762	385,289	812,310	1,197,599
1988	2,231,563	2,333,792	4,565,355	2,242,358	2,210,523	6,368,850	10,821,731	420,153	978,621	1,398,774
1989	2,397,272	3,326,436	5,723,708	2,158,807	1,872,030	5,916,714	9,947,551	414,224	1,162,723	1,576,947
1990	2,746,135	3,433,320	6,179,455	2,578,252	2,261,914	6,668,440	11,508,606	487,609	1,234,409	1,722,018
1991	2,748,636	3,682,311	6,430,947	1,757,880	1,621,188	4,527,928	7,906,996	491,419	1,476,387	1,967,806
1992	2,554,528	3,528,958	6,083,486	2,079,061	2,003,328	5,385,858	9,468,247	551,042	1,491,156	2,042,198
1993	2,592,888	3,504,240	6,097,128	2,884,303	2,011,222	6,511,865	11,407,390	610,115	1,675,438	2,285,553
1994	2,718,329	3,537,459	6,255,788	2,911,054	2,642,460	7,314,515	12,868,028	767,900	2,473,449	3,241,348
1995	2,649,273	3,509,935	6,159,208	3,039,415	2,289,027	5,893,667	11,222,109	995,341	4,977,122	5,972,462
1996	2,699,210	3,891,715	6,590,926	2,588,557	2,137,443	6,675,492	11,401,491	1,837,384	13,766,531	15,603,915
1997	2,641,891	3,631,175	6,273,066	2,661,814	2,007,332	6,551,469	11,220,615	2,294,917	21,860,553	24,155,470
1998	2,538,764	3,478,062	6,016,827	2,268,210	2,064,166	6,296,050	10,628,426	2,976,896	26,690,793	29,667,689
1999	2,689,826	3,843,209	6,533,034	2,896,215	2,455,120	8,385,576	13,736,912	3,032,745	27,479,837	30,512,582
2000	2,832,574	4,308,089	7,140,663	3,920,156	2,303,786	7,030,361	13,254,303	2,946,818	27,835,591	30,782,409
2001	3,347,635	4,912,808	8,260,443	7,396,822	2,795,685	8,451,441	18,643,949	3,501,499	29,990,590	33,492,089
2002	3,555,006	5,049,516	8,604,522	10,852,278	2,777,107	9,918,869	23,548,254	3,212,468	29,615,200	32,827,668
2003	3,666,216	5,393,174	9,059,391	7,510,447	2,507,040	8,729,606	18,747,093	3,294,613	29,872,238	33,166,850
2004	4,142,871	5,618,440	9,761,311	5,711,993	2,812,117	8,200,982	16,725,093	3,307,281	30,300,985	33,608,266
2005	3,502,397	5,128,597	8,630,994	5,729,073	2,965,732	8,975,318	17,670,122	3,431,724	30,410,329	33,842,054
2006	3,405,490	4,624,880	8,030,370	5,692,924	2,960,193	9,097,766	17,750,883	3,273,580	30,050,794	33,324,373
2007	3,598,990	5,095,768	8,694,759	6,748,223	3,476,206	10,351,154	20,575,583	3,423,644	31,255,618	34,679,262
2008	4,287,515	5,050,068	9,337,583	7,595,156	3,765,969	10,500,848	21,861,973	3,921,828	32,505,115	36,426,943
2009	4,724,048	5,101,958	9,826,007	6,525,628	3,300,877	10,257,249	20,083,754	3,722,831	30,818,032	34,540,863
2010	4,979,444	6,528,768	11,508,212	7,383,527	3,655,765	11,119,752	22,159,045	4,084,203	33,044,879	37,129,082
2011	5,344,409	6,916,235	12,260,644	8,695,011	4,339,324	12,935,612	25,969,946	4,153,867	33,960,142	38,114,008
2012	5,813,947	6,878,033	12,691,980	9,577,324	4,347,819	15,197,966	29,123,108	4,207,466	34,576,398	38,783,865
2013	5,454,488	6,605,468	12,059,956	10,359,281	5,072,808	15,131,131	30,563,220	4,418,205	35,916,645	40,334,850
2014	6,105,601	7,204,244	13,309,844	10,126,155	5,341,480	15,215,682	30,683,317	4,266,039	33,109,651	37,375,690
2015	6,186,205	7,109,808	13,296,012	9,961,867	4,717,801	16,362,663	31,042,331	4,833,644	35,061,129	39,894,772
2016	6,513,420	7,714,629	14,228,048	10,357,412	4,319,939	22,304,605	36,981,956	4,609,526	39,424,193	44,033,719
2017	5,774,391	7,902,225	13,676,616	11,017,402	4,575,026	20,070,602	35,663,030	4,253,660	36,215,012	40,468,672
2018	**6,843,575**	**8,285,194**	**15,128,769**	**11,343,425**	**5,104,111**	**14,845,037**	**31,292,573**	**5,408,805**	**35,632,241**	**41,041,046**
2019	6,679,030	8,124,788	14,803,817	11,709,508	5,337,354	15,220,857	32,267,718	5,621,283	36,089,611	41,710,894
2020	6,552,742	7,668,693	14,221,435	11,465,004	5,261,906	16,649,352	33,376,262	5,885,099	36,424,260	42,309,359
2021	6,614,050	7,753,314	14,367,363	11,185,291	5,102,261	16,313,104	32,600,656	5,866,967	36,554,939	42,421,906
2022	6,630,660	7,788,070	14,418,730	11,716,616	5,373,210	16,985,469	34,075,296	6,008,745	36,885,186	42,893,931
2023	6,654,374	7,795,172	14,449,546	11,519,319	5,264,790	16,757,021	33,541,130	5,958,323	36,823,726	42,782,049
2024	6,673,492	7,832,278	14,505,770	11,524,334	5,261,559	16,781,019	33,566,912	5,958,417	36,865,985	42,824,403
2025	6,686,315	7,867,671	14,553,985	11,735,295	5,365,614	17,058,996	34,159,906	6,017,281	37,028,693	43,045,974
2026	6,704,378	7,902,910	14,607,288	11,627,870	5,303,713	16,944,609	33,876,192	5,987,274	37,009,178	42,996,452
2027	6,723,831	7,938,176	14,662,007	11,754,236	5,363,401	17,116,443	34,234,080	6,023,112	37,123,083	43,146,195
2028	6,743,007	7,973,893	14,716,900	11,780,627	5,370,928	17,166,435	34,317,990	6,024,929	37,168,845	43,193,774
2029	6,762,496	8,010,229	14,772,725	11,876,384	5,414,517	17,301,704	34,592,605	6,053,416	37,268,696	43,322,113
2030	6,775,068	8,035,849	14,810,916	11,879,378	5,409,941	17,324,510	34,613,829	6,053,721	37,310,457	43,364,178
2031	6,783,645	8,056,300	14,839,946	12,071,651	5,503,600	17,577,304	35,152,554	6,109,931	37,458,076	43,568,007
2032	6,794,629	8,077,326	14,871,955	11,950,685	5,434,495	17,451,586	34,836,766	6,070,453	37,428,757	43,499,211
2033	6,786,429	8,071,703	14,858,132	12,202,546	5,559,664	17,778,374	35,540,583	6,146,679	37,634,446	43,781,125
2034	6,738,493	8,038,235	14,776,728	12,100,890	5,500,060	17,674,523	35,275,473	6,115,386	37,615,225	43,730,611
2035	6,617,800	7,937,245	14,555,045	12,166,434	5,527,877	17,766,135	35,460,446	6,152,222	37,736,145	43,888,367
TOTAL	**243,720,957**	**295,543,016**	**539,263,973**	**410,966,066**	**207,332,516**	**673,832,058**	**1,292,130,640**	**196,503,141**	**1,365,820,479**	**1,562,323,620**

[a] Capital charges repaid through bond debt service prior to 2016 exclude bond cover; 2017 and after includes both bond debt service and bond cover.

TABLE B-19 Total Transportation Charge for Each Contractor[a] (in dollars)

Calendar Year	SAN JOAQUIN VALLEY AREA								
				Kern					
	Dudley Ridge	Empire	Future Contractor San Joaquin Valley	Municipal and Industrial	Agricultural	Kings	Oak Flat	Tulare	Total
	[11]	[12]	[13]	[14]	[15]	[16]	[17]	[18]	[19]
1961	0	0	0	0	0	0	0	0	0
1962	0	0	0	0	0	0	0	0	0
1963	0	0	0	0	0	0	0	0	0
1964	0	0	2,725	0	0	0	0	0	2,725
1965	0	0	6,029	73,569	0	0	0	0	79,598
1966	0	0	12,039	137,330	0	0	0	0	149,368
1967	0	0	26,257	267,611	0	0	0	0	293,869
1968	187,534	9,054	54,588	445,439	1,559,495	13,770	11,793	211,368	2,493,040
1969	183,145	8,081	87,576	525,094	2,423,132	12,625	10,815	366,385	3,616,854
1970	205,443	14,848	94,675	573,998	2,952,647	12,790	13,360	300,629	4,168,389
1971	202,173	15,806	95,695	605,889	3,873,589	17,763	14,680	456,194	5,281,788
1972	225,169	16,674	98,788	631,615	5,069,232	15,220	21,202	1,104,398	7,182,298
1973	208,169	12,745	97,550	639,250	5,013,837	15,483	12,013	418,062	6,417,109
1974	290,482	12,714	98,460	698,247	5,327,057	15,590	13,129	612,790	7,068,470
1975	359,113	13,659	106,703	715,606	6,468,657	16,620	14,823	746,460	8,441,640
1976	311,963	14,205	108,084	774,291	6,832,002	16,993	16,540	577,562	8,651,640
1977	273,825	11,315	112,554	797,859	7,019,367	18,457	14,290	523,882	8,771,549
1978	363,156	4,441	115,521	890,945	8,488,757	18,921	18,349	518,453	10,418,543
1979	394,489	14,052	114,253	896,194	9,629,878	20,202	25,291	968,989	12,063,347
1980	416,167	12,402	125,950	888,893	10,203,760	20,749	24,836	753,458	12,446,215
1981	479,658	30,243	134,169	1,079,315	11,667,370	24,939	23,365	925,724	14,364,784
1982	474,167	13,393	135,057	1,004,667	12,516,933	22,955	22,850	764,024	14,954,046
1983	647,788	14,987	149,202	1,027,258	15,744,405	39,971	29,530	430,210	18,083,352
1984	920,844	15,401	164,505	2,063,179	23,887,339	54,427	60,122	798,039	27,963,857
1985	1,109,750	87,962	184,905	2,350,593	28,211,379	69,483	70,662	2,180,888	34,265,623
1986	1,274,348	34,418	180,445	2,365,159	30,785,059	80,769	76,542	2,204,200	37,000,940
1987	1,133,283	51,213	179,872	2,804,776	29,610,199	78,018	74,799	2,264,106	36,196,266
1988	1,119,251	62,008	193,735	2,750,424	29,539,148	74,168	60,694	2,222,644	36,022,071
1989	1,155,129	49,690	187,913	2,435,635	29,612,795	67,048	69,178	2,466,943	36,044,331
1990	872,131	34,852	221,392	2,541,316	27,740,495	51,058	49,617	1,895,658	33,406,517
1991	594,795	23,757	220,282	2,055,250	17,939,887	27,930	27,386	1,256,223	22,145,510
1992	965,185	39,593	241,455	2,369,788	26,238,008	55,795	51,440	1,933,363	31,894,628
1993	1,177,475	54,120	264,959	2,799,482	31,752,177	72,889	70,123	2,666,951	38,858,176
1994	1,032,565	44,246	306,359	2,808,829	29,627,988	60,460	57,890	2,142,881	36,081,217
1995	1,529,253	47,104	304,297	3,499,611	36,751,543	88,875	80,713	2,796,991	45,098,388
1996	1,357,981	48,736	389,203	3,560,139	36,724,175	86,092	74,361	4,342,882	46,583,569
1997	1,399,510	25,893	276,681	3,107,763	32,892,756	36,715	69,221	1,696,959	39,505,498
1998	1,243,394	34,848	381,847	2,654,434	29,649,306	41,835	60,517	1,827,203	35,893,383
1999	1,241,779	56,506	369,935	3,072,927	31,857,217	75,744	66,032	4,209,617	40,949,757
2000	1,074,841	38,453	302,665	2,319,641	26,765,789	61,870	55,309	2,808,723	33,427,291
2001	1,752,952	63,378	328,028	2,237,334	34,265,730	80,120	101,671	3,083,730	41,912,941
2002	1,329,431	44,084	320,541	2,330,951	29,240,228	73,376	78,397	2,572,053	35,989,060
2003	1,397,821	48,984	339,960	2,741,740	32,063,241	89,704	79,627	2,890,486	39,651,563
2004	1,454,738	78,345	342,484	3,759,643	30,680,825	234,847	82,228	2,402,767	39,035,876
2005	2,044,256	88,285	355,581	2,982,461	41,749,539	419,027	81,768	3,452,685	51,173,602
2006	1,791,569	75,158	295,034	3,281,028	37,728,605	252,456	79,123	2,800,608	46,303,581
2007	1,659,453	69,779	333,578	3,062,847	35,612,902	234,110	82,506	2,953,544	44,008,719
2008	1,514,140	62,084	468,955	3,449,499	34,886,389	247,313	80,642	2,428,779	43,137,801
2009	1,210,400	50,001	435,155	2,185,133	30,533,786	191,571	62,396	2,019,615	36,688,057
2010	1,436,573	105,908	507,229	2,347,394	36,034,430	248,598	83,923	2,627,058	43,391,113
2011	2,184,278	82,010	506,329	3,444,348	51,165,837	303,473	92,442	2,731,137	60,509,855
2012	1,272,928	89,617	467,362	3,247,999	41,063,269	319,570	93,226	3,498,848	50,052,819
2013	1,611,980	82,202	518,813	3,403,163	40,858,439	279,150	91,693	2,744,856	49,590,294
2014	1,613,184	66,560	635,247	2,813,795	36,274,444	228,520	93,619	2,118,263	43,843,630
2015	1,397,952	67,912	755,755	3,201,652	37,888,673	227,788	81,743	2,299,165	45,920,641
2016	1,382,943	89,113	487,099	2,930,991	39,441,380	262,403	86,227	2,691,682	47,371,839
2017	2,034,866	93,541	542,904	4,567,470	48,208,637	344,919	100,977	3,230,137	59,123,452
2018	**1,866,408**	**101,940**	**566,035**	**5,089,874**	**47,896,425**	**339,803**	**130,275**	**3,302,436**	**59,293,195**
2019	1,887,188	103,372	585,532	5,146,814	48,495,802	345,543	129,794	3,336,561	60,030,606
2020	1,797,422	104,034	575,420	5,183,066	48,072,799	347,938	133,227	3,355,254	59,569,161
2021	1,575,295	90,051	592,683	4,653,030	44,105,162	305,232	105,968	2,947,646	54,375,067
2022	1,869,072	108,575	596,785	5,394,703	49,604,568	362,551	140,671	3,487,821	61,564,746
2023	1,727,252	99,653	601,125	5,037,194	47,118,709	334,788	123,056	3,227,756	58,269,533
2024	1,702,946	98,135	605,418	4,963,609	46,708,783	329,998	120,075	3,183,583	57,712,547
2025	1,805,215	104,592	609,717	5,230,670	48,717,034	349,936	131,650	3,371,950	60,320,763
2026	1,713,276	98,813	614,359	4,983,151	47,056,247	331,920	120,623	3,203,535	58,121,924
2027	1,766,963	102,210	618,675	5,132,409	48,204,100	342,343	126,172	3,302,660	59,595,532
2028	1,756,295	101,552	621,250	5,093,450	48,046,627	340,144	124,818	3,283,561	59,367,696
2029	1,791,316	103,773	625,993	5,188,005	48,819,137	346,916	128,348	3,348,404	60,351,891
2030	1,766,181	102,203	630,814	5,111,638	48,399,993	341,925	125,238	3,302,738	59,780,729
2031	1,868,993	108,696	634,387	5,399,820	50,596,110	361,602	135,750	3,492,132	62,597,489
2032	1,753,819	101,454	639,588	5,045,564	48,260,906	339,099	123,558	3,281,062	59,545,049
2033	1,890,305	110,068	644,516	5,452,211	51,171,593	365,630	137,468	3,532,330	63,304,121
2034	1,795,912	104,136	649,214	5,148,523	49,251,022	347,026	127,548	3,359,447	60,782,829
2035	1,839,611	106,904	653,856	5,378,420	50,765,662	355,327	128,483	3,440,264	62,668,526
TOTAL	**83,686,889**	**4,074,537**	**24,851,744**	**202,851,613**	**2,123,362,412**	**11,610,888**	**5,106,402**	**155,697,407**	**2,611,241,893**

[a] Capital charges repaid through bond debt service prior to 2016 exclude bond cover; 2017 and after includes both bond debt service and bond cover.

TABLE B-19 Total Transportation Charge for Each Contractor[a] (in dollars)

Calendar Year	SOUTHERN CALIFORNIA AREA									
	AVEK	Castaic Lake	Coachella	Crestline	Desert	Littlerock	Mojave	Palmdale	San Bernardino	San Gabriel
	[20]	[21]	[22]	[23]	[24]	[25]	[26]	[27]	[28]	[29]
1961	0	0	0	0	0	0	0	0	0	0
1962	0	0	0	0	0	0	0	0	0	0
1963	34,411	0	0	0	726	0	0	0	51,729	0
1964	64,494	27,447	19,542	4,370	38,211	1,143	30,324	8,205	82,811	34,987
1965	121,484	53,007	34,348	7,194	42,701	2,082	53,730	15,222	135,069	35,344
1966	221,012	101,264	62,476	12,478	76,886	3,753	96,944	27,679	232,502	61,465
1967	427,622	210,814	121,269	23,472	148,839	7,284	188,141	54,023	433,350	115,574
1968	754,401	479,119	218,649	41,509	265,168	12,870	336,294	95,466	782,163	208,927
1969	1,090,136	726,302	334,105	61,226	394,024	18,693	500,828	138,063	1,205,834	321,755
1970	1,420,639	906,611	470,423	89,700	552,223	25,231	692,388	184,837	1,778,187	467,573
1971	1,760,670	1,091,194	627,331	128,360	754,065	31,837	931,873	231,280	2,538,219	659,414
1972	2,084,699	1,311,502	777,838	181,206	971,501	42,404	1,195,707	274,599	3,388,734	865,095
1973	2,177,324	1,328,212	920,218	183,713	1,184,696	43,482	1,262,464	287,315	3,971,543	946,686
1974	2,241,780	1,388,228	938,860	193,283	1,212,205	45,212	1,296,245	292,071	3,998,510	990,064
1975	2,419,858	1,457,332	983,580	206,040	1,280,804	48,490	1,365,814	304,281	4,159,094	1,088,341
1976	2,773,862	1,453,191	1,032,075	215,084	1,356,888	51,463	1,409,660	313,685	4,299,592	1,141,598
1977	2,717,286	1,522,936	929,532	226,032	1,194,916	47,348	1,482,769	329,365	4,553,831	1,197,216
1978	3,035,392	1,608,589	1,111,606	231,040	1,470,658	47,118	1,484,125	321,681	4,460,167	1,208,720
1979	3,589,381	1,644,020	1,180,841	237,955	1,569,175	48,396	1,613,105	332,472	4,422,382	1,152,375
1980	4,136,480	1,726,534	1,271,861	259,401	1,730,656	53,348	1,733,981	360,461	4,835,652	1,269,447
1981	4,469,204	1,981,128	1,355,504	271,181	1,850,802	77,806	1,860,027	391,869	5,224,182	1,357,680
1982	4,031,426	2,073,666	1,403,332	280,313	1,936,175	55,961	2,055,747	406,891	5,410,876	1,565,182
1983	5,224,176	2,336,894	1,997,502	333,081	2,880,959	69,381	2,132,388	494,688	6,020,929	1,556,652
1984	7,262,706	3,379,221	3,084,372	445,339	4,608,046	75,773	2,362,479	553,321	7,049,449	2,331,849
1985	8,979,937	3,764,491	3,882,496	540,388	5,883,196	79,232	2,474,531	759,052	7,740,359	2,378,394
1986	8,880,068	4,332,940	4,308,841	577,474	6,571,197	102,400	2,585,004	1,000,062	7,857,569	3,047,741
1987	8,897,753	4,174,459	4,164,707	604,982	6,418,841	211,809	2,618,641	1,026,398	9,224,608	3,034,142
1988	8,373,323	4,238,580	4,163,832	615,999	6,482,143	124,667	2,674,175	779,820	9,505,259	2,828,998
1989	8,750,651	4,119,069	3,808,646	586,595	5,952,262	170,570	2,622,341	1,442,627	8,944,266	2,930,395
1990	10,040,074	4,560,098	4,487,886	620,394	7,014,185	289,349	2,820,942	1,639,830	9,795,019	3,678,107
1991	6,542,001	3,529,030	2,996,131	567,450	4,550,559	175,137	3,580,884	1,294,608	8,921,839	3,035,638
1992	8,644,005	4,486,596	3,068,616	470,165	4,667,984	121,335	4,382,838	1,129,578	8,573,361	2,980,091
1993	9,028,570	4,118,011	3,267,678	472,817	4,993,632	157,747	4,262,401	1,347,511	9,505,683	3,320,012
1994	11,216,190	4,730,223	3,313,737	554,651	5,066,159	225,809	5,256,291	1,698,990	10,209,083	4,076,706
1995	10,817,875	4,988,062	4,087,603	509,163	6,340,703	155,561	4,344,518	1,527,248	9,443,228	3,715,377
1996	11,187,158	5,176,142	7,025,782	553,232	11,183,947	150,612	4,412,113	1,867,203	9,869,329	3,807,422
1997	11,437,950	4,942,863	6,588,591	579,281	7,422,990	144,833	4,716,366	1,869,307	11,268,380	4,037,862
1998	9,956,830	4,571,330	5,663,864	546,645	5,928,447	146,074	5,752,723	1,474,029	11,192,751	3,321,115
1999	11,531,679	5,021,780	4,698,256	638,518	6,060,988	147,200	5,998,812	1,864,854	12,351,722	4,198,794
2000	10,579,316	6,836,454	3,059,860	593,984	4,361,929	115,267	5,759,893	1,446,974	11,878,370	3,249,463
2001	20,607,925	12,460,450	4,100,681	797,527	6,349,945	127,791	6,459,527	3,340,991	17,850,469	3,395,382
2002	11,990,939	9,683,109	3,358,252	759,148	5,125,059	109,666	5,586,379	2,738,190	18,762,899	4,782,871
2003	13,366,291	10,737,399	3,480,415	729,620	5,324,825	115,323	7,249,334	2,277,187	17,174,460	4,950,854
2004	14,235,930	11,802,795	4,112,231	829,136	5,365,054	124,162	7,359,716	2,517,834	21,502,746	4,388,736
2005	14,640,859	10,849,027	17,785,625	653,880	10,282,020	114,279	7,159,800	2,566,959	19,551,335	4,652,123
2006	16,094,220	9,952,959	27,259,641	633,160	9,864,256	122,165	9,849,282	2,488,182	19,274,319	4,664,444
2007	19,626,995	13,367,477	26,107,567	880,501	9,362,922	126,578	13,675,716	4,029,834	25,504,781	3,830,464
2008	17,113,686	15,263,993	25,602,771	804,529	10,255,652	134,971	11,990,602	3,949,221	25,594,099	4,777,880
2009	14,851,069	12,994,009	23,275,428	780,489	8,129,472	133,461	11,662,428	3,675,343	25,475,564	5,254,942
2010	17,473,573	12,641,979	31,693,947	685,639	10,942,233	121,920	13,953,676	3,009,563	27,778,913	6,743,599
2011	23,822,880	12,338,571	33,200,942	744,441	11,912,355	136,121	7,564,215	3,017,374	25,013,394	7,443,155
2012	24,241,879	14,492,357	40,151,310	849,526	14,393,958	147,960	9,334,767	4,416,546	38,729,268	7,772,527
2013	19,278,615	16,993,271	31,796,091	1,056,777	10,803,762	165,327	9,263,022	3,465,363	29,520,847	5,890,315
2014	14,795,024	15,793,203	27,420,283	1,156,248	8,799,634	172,053	9,401,498	3,589,187	29,765,019	4,867,819
2015	12,649,725	14,864,465	30,172,442	1,122,265	10,013,761	163,343	10,781,470	2,733,054	34,790,280	5,849,321
2016	16,355,196	13,805,773	32,999,549	1,027,521	10,830,871	157,117	12,386,338	3,222,688	41,155,424	7,138,854
2017	24,574,616	16,122,755	32,668,936	1,085,044	11,206,187	321,643	9,694,910	3,470,821	39,811,442	7,004,240
2018	**24,176,513**	**19,920,965**	**41,327,158**	**1,558,456**	**13,838,727**	**420,574**	**17,494,383**	**5,069,950**	**42,856,121**	**7,607,632**
2019	24,218,845	19,405,502	39,910,671	1,556,964	13,619,627	415,084	17,558,780	4,960,492	43,640,640	7,674,196
2020	25,368,683	19,851,721	41,040,892	1,553,069	13,852,564	427,353	17,879,537	5,176,212	43,808,939	7,672,918
2021	25,409,511	19,544,367	40,753,854	1,514,550	13,630,437	417,402	17,571,418	5,045,744	43,169,163	7,505,616
2022	26,279,566	20,054,689	40,954,176	1,541,600	13,861,982	431,472	17,961,763	5,252,719	43,605,868	7,636,502
2023	26,050,025	19,958,307	40,119,490	1,533,883	13,679,758	427,607	17,884,267	5,196,750	43,401,249	7,575,101
2024	25,545,331	19,674,324	39,565,963	1,509,813	13,467,181	419,328	17,592,253	5,074,005	43,017,366	7,465,000
2025	26,088,293	20,112,968	40,155,227	1,534,685	13,706,864	428,224	17,921,245	5,195,552	43,487,589	7,591,394
2026	25,505,426	19,767,242	39,508,291	1,509,924	13,450,468	418,684	17,607,839	5,054,583	43,037,173	7,459,013
2027	26,121,155	20,132,267	40,177,639	1,538,305	13,721,441	428,770	17,961,726	5,191,817	43,571,906	7,602,668
2028	25,819,357	19,998,914	39,900,740	1,527,334	13,604,083	423,842	17,819,755	5,115,819	43,395,078	7,546,324
2029	26,179,075	20,189,751	40,355,709	1,545,162	13,781,189	429,743	18,033,095	5,193,817	43,765,962	7,643,558
2030	25,839,013	19,988,377	40,074,881	1,533,324	13,659,917	424,212	17,878,741	5,109,706	43,588,529	7,586,614
2031	27,370,317	20,688,918	41,684,913	1,600,754	14,303,291	449,237	18,718,192	5,466,730	44,813,364	7,924,227
2032	25,234,893	19,575,601	39,617,261	1,510,949	13,461,667	414,339	17,582,819	4,963,603	43,310,133	7,494,894
2033	27,419,417	20,754,557	41,854,598	1,609,209	14,352,640	450,100	18,826,239	5,471,872	44,990,032	7,959,380
2034	25,410,616	19,774,670	39,992,729	1,523,731	13,592,448	417,306	17,764,428	5,009,785	43,617,404	7,567,167
2035	29,242,054	21,171,065	43,813,711	1,689,611	15,122,309	479,837	19,826,119	5,899,405	46,467,784	8,360,056
TOTAL	**969,919,338**	**685,125,135**	**1,213,455,800**	**55,150,489**	**532,088,043**	**13,543,667**	**575,602,789**	**175,542,465**	**1,470,115,191**	**303,495,986**

[a] Capital charges repaid through bond debt service prior to 2016 exclude bond cover; 2017 and after includes both bond debt service and bond cover.

TABLE B-19 Total Transportation Charge for Each Contractor[a] (in dollars)

Calendar Year	SOUTHERN CALIFORNIA AREA (continued)				FEATHER RIVER AREA				South Bay Area Future Contractor	Grand Total
	San Gorgonio	Metropolitan	Ventura	Total	Yuba City	Butte	Plumas	Total		
	[30]	[31]	[32]	[33]	[34]	[35]	[36]	[37]	[38]	[39]
1961	0	0	0	0	0	0	0	0	0	0
1962	0	0	0	0	0	0	0	0	3,219	79,888
1963	0	690,812	0	777,678	0	0	0	0	12,626	1,628,026
1964	21,735	1,260,513	9,378	1,603,161	0	0	0	0	13,938	2,810,279
1965	21,866	2,180,589	17,766	2,720,401	0	0	405	405	28,937	4,815,355
1966	37,964	3,900,172	33,426	4,868,023	0	0	565	565	31,321	7,409,358
1967	71,283	7,693,703	68,155	9,563,529	0	0	562	562	47,718	12,845,638
1968	128,915	15,317,881	142,803	18,784,166	0	0	564	564	46,945	25,051,777
1969	198,764	23,153,064	215,209	28,358,004	0	0	3,191	3,191	52,963	36,239,966
1970	289,633	30,617,164	273,605	37,768,213	0	0	15,121	15,121	69,744	46,445,627
1971	409,327	39,958,997	342,425	49,464,993	0	0	16,001	16,001	55,532	59,151,789
1972	537,186	52,948,599	422,304	65,001,374	0	0	17,372	17,372	80,412	76,951,652
1973	587,963	57,273,225	435,655	70,602,495	0	0	17,334	17,334	54,219	81,636,913
1974	611,428	61,776,466	455,565	75,439,918	0	0	17,477	17,477	76,783	87,382,591
1975	644,621	66,756,784	478,403	81,193,443	0	0	18,406	18,406	84,547	94,563,231
1976	668,315	68,485,047	475,587	83,676,047	0	0	17,477	17,477	106,717	97,636,507
1977	696,515	66,234,179	507,063	81,638,988	0	0	18,232	18,232	98,618	95,688,719
1978	709,040	72,934,779	523,177	89,146,091	0	0	17,381	17,381	100,786	105,194,780
1979	712,866	72,666,594	526,405	89,695,966	0	0	20,579	20,579	119,352	107,564,676
1980	777,981	79,926,555	571,232	98,653,591	0	0	17,761	17,761	178,812	117,540,823
1981	806,031	91,261,394	636,404	111,543,210	0	0	21,193	21,193	185,347	132,352,151
1982	853,400	93,144,741	670,375	113,888,084	0	0	28,423	28,423	173,894	135,743,422
1983	952,131	101,787,700	803,591	126,590,072	0	0	19,276	19,276	220,926	152,247,993
1984	1,072,639	137,507,077	868,967	170,601,238	0	0	21,114	21,114	225,959	208,858,617
1985	1,120,854	172,916,230	908,769	211,427,927	0	0	20,239	20,239	340,322	258,590,046
1986	1,149,714	193,242,026	937,311	234,592,346	0	0	20,139	20,139	279,227	284,960,513
1987	1,172,015	178,764,439	908,034	221,220,827	0	0	19,742	19,742	345,116	273,240,356
1988	1,208,206	190,243,523	904,868	232,143,393	0	0	17,900	17,900	365,207	285,334,431
1989	1,194,911	193,235,261	932,599	234,690,193	0	0	19,158	19,158	422,329	288,424,216
1990	1,297,621	239,540,417	1,486,755	287,270,677	0	0	18,148	18,148	474,284	340,579,705
1991	1,354,921	179,950,983	1,141,118	217,640,299	0	0	21,018	21,018	214,683	256,327,258
1992	1,349,184	196,166,977	1,025,285	237,066,016	0	0	18,014	18,014	443,676	287,016,264
1993	1,507,550	169,493,328	1,068,135	212,543,076	0	0	20,999	20,999	599,571	271,811,894
1994	1,497,753	209,282,955	1,008,952	258,137,499	0	0	19,649	19,649	609,966	317,213,496
1995	1,520,622	173,420,265	1,061,324	221,931,546	0	0	20,277	20,277	534,971	290,938,961
1996	1,527,165	181,404,029	1,103,254	239,267,389	0	0	25,378	25,378	571,857	320,044,525
1997	1,730,348	186,736,527	1,216,560	242,691,856	0	0	24,820	24,820	428,638	324,299,963
1998	1,920,021	168,571,967	1,237,386	220,283,182	0	0	0	0	465,095	302,954,602
1999	2,167,221	192,300,888	1,266,033	248,246,744	0	0	0	0	584,116	340,563,145
2000	2,399,015	184,932,812	1,320,919	236,534,254	0	0	0	0	0	321,138,920
2001	3,321,241	374,039,724	1,616,021	454,467,675	0	0	0	0	0	556,777,096
2002	4,666,201	264,583,886	1,648,226	333,794,825	0	0	0	0	0	434,764,328
2003	5,925,777	292,850,922	1,668,182	365,850,589	0	0	20,800	20,800	0	466,496,286
2004	6,247,877	339,977,107	1,909,916	420,373,241	0	0	20,830	20,830	0	519,524,617
2005	6,521,078	312,842,936	1,398,129	409,018,049	0	0	20,827	20,827	0	520,355,648
2006	6,999,432	288,271,121	1,326,976	396,800,158	0	0	21,280	21,280	0	502,230,645
2007	7,651,044	373,699,169	1,869,669	499,732,717	0	0	20,893	20,893	0	607,711,933
2008	8,924,224	339,295,636	2,263,793	465,971,058	0	0	22,411	22,411	0	576,757,769
2009	9,237,328	303,159,441	2,071,358	420,700,332	0	0	18,220	18,220	0	521,857,233
2010	10,293,970	347,862,982	2,096,463	485,298,458	0	0	18,448	18,448	0	599,504,357
2011	11,089,087	391,153,143	2,093,965	529,529,643	0	0	20,130	20,130	0	666,404,226
2012	12,038,782	378,730,144	2,351,391	547,650,415	0	0	18,469	18,469	0	678,320,656
2013	12,565,865	364,188,780	2,271,117	507,259,153	0	0	17,665	17,665	0	639,825,139
2014	15,040,620	316,458,758	1,828,957	449,088,303	0	0	17,492	17,492	0	574,318,277
2015	16,968,882	331,003,340	1,883,235	472,995,584	0	0	17,088	17,088	0	603,166,428
2016	20,095,086	376,362,647	2,186,455	537,723,520	0	0	22,213	22,213	0	680,361,295
2017	21,407,814	401,006,537	2,400,575	570,775,520	0	0	17,109	17,109	0	719,724,398
2018	**21,959,767**	**406,215,518**	**2,557,343**	**605,003,108**	**0**	**0**	**17,096**	**17,096**	**0**	**751,775,787**
2019	22,119,375	408,165,573	2,499,191	605,744,941	0	0	14,478	14,478	0	754,572,456
2020	22,427,061	418,226,542	2,514,110	619,799,600	0	0	2,549	2,549	0	769,278,366
2021	22,356,956	411,190,546	2,497,507	610,607,070	0	0	1,725	1,725	0	754,373,788
2022	22,443,681	419,596,313	2,507,238	622,127,569	0	0	343	343	0	775,080,615
2023	22,422,039	415,861,506	2,510,510	616,620,493	0	0	345	345	0	765,663,097
2024	22,369,031	409,225,620	2,495,651	607,420,867	0	0	347	347	0	756,030,846
2025	22,458,360	417,210,140	2,525,903	618,416,445	0	0	348	348	0	770,497,421
2026	22,393,007	409,899,186	2,514,190	608,125,026	0	0	350	350	0	757,727,231
2027	22,493,099	417,655,018	2,544,293	619,140,103	0	0	350	350	0	770,778,267
2028	22,473,181	414,679,072	2,542,367	614,845,865	0	0	352	352	0	766,442,576
2029	22,546,037	419,264,181	2,559,103	621,486,382	0	0	353	353	0	774,526,069
2030	22,526,410	415,157,804	2,544,591	615,912,118	0	0	356	356	0	768,482,127
2031	22,743,617	431,244,716	2,578,628	639,586,904	0	0	357	357	0	795,745,258
2032	22,500,755	407,700,299	2,509,868	605,877,080	0	0	359	359	0	758,630,419
2033	22,794,096	432,246,844	2,584,010	641,312,993	0	0	361	361	0	798,797,315
2034	22,573,734	411,684,448	2,525,460	611,453,926	0	0	364	364	0	766,019,932
2035	23,067,283	449,058,071	2,649,717	666,847,023	0	0	366	366	0	823,419,773
TOTAL	**618,588,522**	**17,467,446,330**	**104,548,905**	**24,184,622,661**	**0**	**0**	**888,590**	**888,590**	**8,748,370**	**30,199,219,746**

[a] Capital charges repaid through bond debt service prior to 2016 exclude bond cover; 2017 and after includes both bond debt service and bond cover.

TABLE B-20A Calculation of Delta Water Rates

Calculation in Accordance with Article 53(i) of the Monterey Amendment
(Values in millions of dollars [$] or millions of acre-feet [af] discounted to 2017 at 4.610 percent per annum)

Procedure	Capital Cost Component		Minimum Operation, Maintenance, Power and Replacement Component[a]		Total Delta Water Rate	
	[1]		[2]		[3]	
Commencing in 2018						
Total Costs of "Initial" Project Conservation Facilities to be Reimbursed and Project Water Table A Amounts During the Project Repayment Period	$9,042.13[b]	487.60 af	$8,022.39[c]	487.60 af	$17,064.52	487.60 af
Less, Project Power Revenues to be Realized During the Project Repayment Period	($4,553.19)		($4,306.45)		($8,859.64)	
Less, Delta Water Charges Paid and Project Water Table A Amounts, Prior to 2018	($3,347.16)[d]	(437.30) af	($1,363.41)	(437.30) af	($4,710.57)	(437.30) af
TOTAL	$1,141.78	50.30 af	$2,352.53	50.30 af	$3,494.31	50.30 af
Rate Applicable in 2018	$22.70 per acre-foot		$46.77 per acre-foot		$69.47 per acre-foot	

Calculation Under Original Provisions, without the Monterey Amendment
(for Plumas and Empire)

Procedure	Capital Cost Component		Minimum Operation, Maintenance, Power and Replacement Component[a]		Total Delta Water Rate	
	[4]		[5]		[6]	
Commencing in 2018						
Total Costs of "Initial" Project Conservation Facilities to be Reimbursed and Project Water Table A Amounts during the Project Repayment Period	$9,022.09[b]	487.60 af	$7,985.29[c]	487.60 af	$17,007.37	487.60 af
Less, Project Power Revenues to be Realized During the Project Repayment Period	($4,553.19)		($4,306.45)		($8,859.64)	
Less, Delta Water Charges Paid and Project Water Table A Amounts, Prior to 2018	($3,347.16)[d]	(437.30) af	($1,363.41)	(437.30) af	($4,710.57)	(437.30) af
TOTAL	$1,121.73	50.30 af	$2,315.43	50.30 af	$3,437.16	50.30 af
Rate Applicable in 2018	$22.30 per acre-foot		$46.03 per acre-foot		$68.33 per acre-foot	

[a] Considering that all operating costs of Project Conservation Facilities will not vary with annual amounts of Project water delivered, and therefore are properly classified as "Minimum" OMP&R Costs. OMP&R costs exclude amounts for Conservation Replacement Accounting System.

[b] Including net credits of $4,850,000 for settlements as to the magnitude of Project Capital costs incurred prior to December 31, 1960, and net credits of $6,678,320 for settlement as to the magnitude of Project Capital costs incurred during the 1961 through 1978 period.

[c] Includes conservation power costs and credits at San Luis Reservoir.

[d] Applying all Delta Water Charges paid prior to 1970 to reimburse Capital costs (the charge was not divided into components until 1970).

TABLE B-20B Delta Water Rates by Facility (in dollars per acre-foot)

Item	Capital Cost Component	Minimum Operation, Maintenance, Power and Replacement Component	Total Delta Water Rate
	[1]	[2]	[3]
Initial Conservation Facilities			
Oroville Division			
Water Supply and Power Costs[a]	106.57	70.56	177.13
Less, Oroville Power Revenues	-64.00	-27.11	-91.10
Subtotal	*42.57*	*43.45*	*86.02*
Delta Facilities[b]	33.77	54.25	88.02
California Aqueduct portion			
Reach1	6.45	13.15	19.60
Reach 2A	3.70	1.57	5.27
Reach 2B	1.86	1.11	2.97
Reach 3	1.31	0.58	1.89
Subtotal	*13.32*	*16.42*	*29.74*
San Luis Facilities	20.44	17.53	37.97
Planning and Preoperating Costs through 2016	5.27	0.00	5.27
45,000 af Relinquished Costs	0.40	0.74	1.14
Less, Capital Cost Credits	-2.55	0.00	-2.55
Less, Delta Water Charges paid prior to 2018	-90.52	-85.62	-176.14
Rate Applicable in 2018	22.70	46.77	69.47

[a] Includes revenue received from non-SWP contractors.

[b] Includes: 1. Delta Facility planning costs; 2. Delta Studies costs; and 3. Suisun Marsh Facilities Costs.

TABLE B-21 Total Delta Water Charge for Each Contractor (in dollars)

Calendar Year	NORTH BAY AREA			SOUTH BAY AREA				CENTRAL COASTAL AREA		
	Napa	Solano	Total	Alameda-Zone 7	Alameda County	Santa Clara	Total	San Luis Obispo	Santa Barbara	Total
	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]
1964	0	0	0	0	0	0	0	0	0	0
1965	0	0	0	0	0	0	0	0	0	0
1966	0	0	0	0	0	0	0	0	0	0
1967	0	0	0	14,000	50,050	177,100	241,150	0	0	0
1968	0	0	0	19,156	29,701	193,245	242,102	0	0	0
1969	0	0	0	30,324	44,096	215,483	289,903	0	0	0
1970	0	0	0	80,908	107,730	585,200	773,838	0	0	0
1971	0	0	0	57,320	123,080	637,120	817,520	0	0	0
1972	0	0	0	99,668	143,877	707,328	950,873	0	0	0
1973	0	0	0	120,880	167,099	782,167	1,070,146	0	0	0
1974	0	0	0	137,684	182,339	818,664	1,138,687	0	0	0
1975	0	0	0	146,204	187,324	804,123	1,137,651	0	0	0
1976	0	0	0	168,489	208,652	862,036	1,239,177	0	0	0
1977	0	0	0	172,931	208,645	827,062	1,208,638	0	0	0
1978	0	0	0	206,378	243,231	926,594	1,376,203	0	0	0
1979	0	0	0	237,771	273,208	1,005,955	1,516,934	0	0	0
1980	0	18,325	18,325	272,717	307,426	1,090,867	1,671,010	12,396	3,479	15,875
1981	0	25,440	25,440	415,564	469,768	1,589,984	2,475,316	18,068	10,414	28,482
1982	0	34,917	34,917	457,988	519,053	1,679,289	2,656,330	38,166	99,788	137,954
1983	0	12,035	12,035	316,703	359,775	1,114,795	1,791,273	38,004	68,902	106,906
1984	0	22,453	22,453	334,587	380,914	1,132,448	1,847,949	57,909	105,498	163,407
1985	0	22,001	22,001	381,970	435,728	1,244,939	2,062,637	106,103	192,937	299,040
1986	35,358	21,767	57,125	423,378	485,372	1,330,615	2,239,365	151,206	275,347	426,553
1987	0	22,984	22,984	430,024	493,786	1,304,900	2,228,710	185,355	336,664	522,019
1988	88,878	150,466	239,344	464,114	533,731	1,361,400	2,359,245	239,792	436,607	676,399
1989	102,688	305,328	408,016	513,853	591,760	1,491,833	2,597,446	331,518	602,402	933,920
1990	112,723	355,132	467,855	534,787	616,676	1,537,512	2,688,975	417,802	760,166	1,177,968
1991	129,296	395,515	524,811	603,028	681,067	1,667,194	2,951,289	443,403	806,745	1,250,148
1992	158,879	489,808	648,687	729,545	808,579	1,945,453	3,483,577	506,628	921,780	1,428,408
1993	172,457	530,778	703,235	771,894	840,958	1,990,673	3,603,525	507,825	923,957	1,431,782
1994	177,824	546,610	724,434	778,647	817,579	1,946,615	3,542,841	486,654	885,437	1,372,091
1995	203,738	713,497	917,235	874,946	874,946	2,083,205	3,833,097	520,801	947,567	1,468,368
1996	213,506	774,152	987,658	901,129	860,168	2,048,020	3,809,317	512,005	931,562	1,443,567
1997	250,558	866,141	1,116,699	1,041,633	951,056	2,264,420	4,257,109	566,105	1,029,994	1,596,099
1998	266,952	882,469	1,149,421	1,048,658	957,470	2,279,691	4,285,819	141,683	888,760	1,030,443
1999	290,688	923,459	1,214,147	1,084,480	990,178	2,357,566	4,432,224	589,391	1,072,362	1,661,753
2000	390,936	948,784	1,339,720	1,628,402	1,005,778	2,394,709	5,028,889	598,677	1,089,257	1,687,934
2001	496,412	1,097,880	1,594,292	1,868,283	1,005,998	2,395,234	5,269,515	598,809	1,089,496	1,688,305
2002	512,928	1,125,429	1,638,357	1,896,134	1,020,996	2,430,942	5,348,072	607,736	1,105,738	1,713,474
2003	511,059	1,112,692	1,623,751	1,856,232	999,510	2,379,785	5,235,527	594,946	1,082,469	1,677,415
2004	569,615	1,230,627	1,800,242	2,033,406	1,094,911	2,606,931	5,735,248	651,732	1,185,788	1,837,520
2005	573,729	1,219,893	1,793,622	2,081,144	1,084,212	2,581,456	5,746,812	645,364	1,174,201	1,819,565
2006	606,343	1,272,001	1,878,344	2,167,748	1,129,330	2,688,880	5,985,958	672,220	1,223,064	1,895,284
2007	623,728	1,291,247	1,914,975	2,198,222	1,145,206	2,726,679	6,070,107	681,671	1,240,257	1,921,928
2008	647,091	1,322,240	1,969,331	2,248,610	1,171,457	2,789,182	6,209,249	697,295	1,268,688	1,965,983
2009	717,087	1,446,549	2,163,636	2,457,420	1,280,240	3,048,190	6,785,850	762,047	1,386,499	2,148,546
2010	1,105,529	1,809,450	2,914,979	3,070,686	1,599,732	3,808,886	8,479,304	952,222	1,732,510	2,684,732
2011	1,216,921	1,993,865	3,210,786	3,380,086	1,760,920	4,192,667	9,333,673	1,048,166	1,907,076	2,955,242
2012	1,270,523	2,083,876	3,354,399	3,528,968	1,838,483	4,377,339	9,744,790	1,094,335	1,991,077	3,085,412
2013	1,344,704	2,207,862	3,552,566	3,735,010	1,945,825	4,632,915	10,313,750	1,158,229	2,107,328	3,265,557
2014	1,276,099	2,097,420	3,373,519	3,544,457	1,846,552	4,396,552	9,787,561	1,099,138	1,999,815	3,098,953
2015	1,736,721	2,857,498	4,594,219	4,823,867	2,513,086	5,983,536	13,320,489	1,495,884	2,721,671	4,217,555
2016	2,075,875	3,415,521	5,491,396	5,765,891	3,003,850	7,152,025	15,921,766	1,788,006	3,253,170	5,041,176
2017	1,999,142	3,289,270	5,288,412	5,552,760	2,892,816	6,887,657	15,333,233	1,721,914	3,132,919	4,854,833
2018	**2,016,381**	**3,317,632**	**5,334,013**	**5,600,640**	**2,917,760**	**6,947,047**	**15,465,447**	**1,736,761**	**3,159,934**	**4,896,695**
2019	2,016,381	3,317,632	5,334,013	5,600,640	2,917,760	6,947,047	15,465,447	1,736,761	3,159,934	4,896,695
2020	2,016,381	3,317,632	5,334,013	5,600,640	2,917,760	6,947,047	15,465,447	1,736,761	3,159,934	4,896,695
2021	2,016,381	3,317,632	5,334,013	5,600,640	2,917,760	6,947,047	15,465,447	1,736,761	3,159,934	4,896,695
2022	2,016,381	3,317,632	5,334,013	5,600,640	2,917,760	6,947,047	15,465,447	1,736,761	3,159,934	4,896,695
2023	2,016,381	3,317,632	5,334,013	5,600,640	2,917,760	6,947,047	15,465,447	1,736,761	3,159,934	4,896,695
2024	2,016,381	3,317,632	5,334,013	5,600,640	2,917,760	6,947,047	15,465,447	1,736,761	3,159,934	4,896,695
2025	2,016,381	3,317,632	5,334,013	5,600,640	2,917,760	6,947,047	15,465,447	1,736,761	3,159,934	4,896,695
2026	2,016,381	3,317,632	5,334,013	5,600,640	2,917,760	6,947,047	15,465,447	1,736,761	3,159,934	4,896,695
2027	2,016,381	3,317,632	5,334,013	5,600,640	2,917,760	6,947,047	15,465,447	1,736,761	3,159,934	4,896,695
2028	2,016,381	3,317,632	5,334,013	5,600,640	2,917,760	6,947,047	15,465,447	1,736,761	3,159,934	4,896,695
2029	2,016,381	3,317,632	5,334,013	5,600,640	2,917,760	6,947,047	15,465,447	1,736,761	3,159,934	4,896,695
2030	2,016,381	3,317,632	5,334,013	5,600,640	2,917,760	6,947,047	15,465,447	1,736,761	3,159,934	4,896,695
2031	2,016,381	3,317,632	5,334,013	5,600,640	2,917,760	6,947,047	15,465,447	1,736,761	3,159,934	4,896,695
2032	2,016,381	3,317,632	5,334,013	5,600,640	2,917,760	6,947,047	15,465,447	1,736,761	3,159,934	4,896,695
2033	2,016,381	3,317,632	5,334,013	5,600,640	2,917,760	6,947,047	15,465,447	1,736,761	3,159,934	4,896,695
2034	2,016,381	3,317,632	5,334,013	5,600,640	2,917,760	6,947,047	15,465,447	1,736,761	3,159,934	4,896,695
2035	2,016,381	3,317,632	5,334,013	5,600,640	2,917,760	6,947,047	15,465,447	1,736,761	3,159,934	4,896,695
TOTAL	**56,172,845**	**98,652,757**	**154,825,602**	**168,520,204**	**95,803,604**	**234,523,907**	**498,847,715**	**54,000,903**	**98,870,203**	**152,871,106**

TABLE B-21 Total Delta Water Charge for Each Contractor (in dollars)

Calendar Year	SAN JOAQUIN VALLEY AREA								
				Kern					
	Dudley Ridge	Empire	Future Contractor San Joaquin Valley	Municipal and Industrial	Agricultural	Kings	Oak Flat	Tulare	Total
	[11]	[12]	[13]	[14]	[15]	[16]	[17]	[18]	[19]
1964	0	0	0	0	0	0	0	0	0
1965	0	0	0	0	0	0	0	0	0
1966	0	0	0	0	0	0	0	0	0
1967	0	0	0	0	0	0	0	0	0
1968	40,695	10,469	0	0	165,522	3,177	8,073	98,608	326,544
1969	61,267	3,281	0	0	337,686	4,200	8,805	102,478	517,717
1970	104,405	19,950	0	0	964,915	8,645	17,290	228,095	1,343,300
1971	129,596	21,720	0	0	1,377,772	9,412	20,272	264,260	1,823,032
1972	160,756	24,113	0	0	2,175,835	11,253	43,131	905,057	3,320,145
1973	195,541	26,664	0	386,638	2,373,167	13,333	27,553	373,307	3,396,203
1974	224,202	27,909	0	446,545	2,781,595	13,954	29,770	445,138	3,969,113
1975	329,688	27,413	0	481,560	3,041,048	14,620	33,702	827,591	4,755,622
1976	414,245	29,388	0	549,549	3,931,785	15,673	35,966	877,151	5,853,757
1977	312,532	28,195	0	569,545	4,071,218	15,977	40,289	626,210	5,663,966
1978	342,208	31,588	0	674,939	4,950,959	20,006	41,065	666,516	6,727,281
1979	395,523	34,294	0	772,757	5,901,986	22,863	45,725	771,613	7,944,761
1980	555,341	37,679	0	881,371	6,984,026	27,272	70,658	933,481	9,489,828
1981	740,789	54,204	0	1,351,487	11,140,730	41,556	77,692	1,373,168	14,779,626
1982	782,396	57,248	0	1,518,993	12,703,436	47,707	85,873	1,530,443	16,726,096
1983	543,462	38,004	0	1,057,789	9,141,315	35,471	58,273	78,506	10,952,820
1984	580,379	13,572	0	1,333,200	9,741,623	39,893	61,770	756,132	12,526,569
1985	667,740	42,441	0	1,540,611	11,403,920	48,100	69,320	644,383	14,416,515
1986	745,447	45,362	0	1,714,679	12,925,113	55,946	77,115	1,469,725	17,033,387
1987	762,180	44,485	0	1,766,065	13,410,817	59,314	77,108	1,503,601	17,623,570
1988	827,669	46,411	0	1,916,790	14,707,763	61,882	83,540	1,633,680	19,277,735
1989	921,621	49,728	0	2,125,033	16,312,361	66,304	92,825	1,821,693	21,389,565
1990	964,288	50,136	0	1,998,766	17,276,959	66,848	95,259	1,980,383	22,432,639
1991	1,023,374	53,208	0	2,121,239	18,335,590	70,944	101,096	2,101,729	23,807,180
1992	1,169,299	60,795	0	2,727,688	20,646,125	81,061	115,511	2,401,419	27,201,898
1993	1,172,060	60,939	0	2,734,129	20,694,874	81,252	115,784	2,407,089	27,266,127
1994	1,123,198	58,398	0	2,156,809	20,295,455	77,865	110,957	2,306,739	26,129,421
1995	1,202,009	62,497	0	2,803,995	21,223,694	83,328	118,743	2,468,598	27,962,864
1996	534,818	69,191	0	2,756,635	19,492,814	81,921	102,219	2,426,904	25,464,502
1997	1,208,521	67,162	0	3,047,908	22,148,973	90,576	129,072	2,683,338	29,375,550
1998	1,216,671	77,807	0	2,726,511	22,070,376	91,188	129,942	2,820,148	29,132,643
1999	1,258,233	69,974	0	2,819,648	22,824,299	94,303	134,381	2,793,715	29,994,553
2000	1,278,056	70,943	0	3,223,279	21,220,235	95,788	136,498	2,837,730	28,862,529
2001	1,278,336	71,058	0	2,864,700	21,110,372	95,809	136,528	2,838,352	28,395,155
2002	1,393,975	72,121	0	3,272,056	21,060,431	97,237	138,564	2,711,156	28,745,540
2003	1,364,640	70,550	0	3,203,191	20,617,243	95,192	135,648	2,654,103	28,140,567
2004	1,494,892	77,810	0	3,508,929	22,585,122	104,277	148,595	2,897,005	30,816,630
2005	1,480,284	77,153	0	3,474,640	22,307,136	232,331	147,143	2,739,621	30,458,308
2006	1,541,884	80,380	0	3,619,232	23,235,418	242,000	153,266	2,587,428	31,459,608
2007	1,563,559	81,479	0	3,670,110	23,562,051	253,717	155,421	2,615,486	31,901,823
2008	1,599,401	83,191	0	3,754,239	24,102,160	259,533	158,984	2,675,439	32,632,947
2009	1,747,923	90,846	0	4,102,863	26,340,321	283,634	173,747	2,923,885	35,663,219
2010	1,917,507	113,466	0	5,126,760	32,304,300	354,417	217,107	3,386,937	43,420,494
2011	2,110,714	123,965	0	5,643,329	35,559,263	390,127	238,982	3,728,203	47,794,583
2012	2,203,684	129,358	0	5,891,899	37,125,531	407,312	249,508	3,892,417	49,899,709
2013	2,332,348	136,898	0	6,235,904	39,293,142	431,093	264,076	4,119,681	52,813,142
2014	2,125,733	129,639	0	5,917,760	37,288,481	409,099	250,603	3,845,708	49,967,023
2015	2,713,534	176,957	0	8,053,840	50,748,164	556,768	341,062	5,233,858	67,824,183
2016	3,243,443	211,761	0	9,626,626	60,658,473	665,496	407,666	6,255,949	81,069,414
2017	3,123,553	203,580	0	9,270,786	58,416,281	640,896	392,596	6,024,702	78,072,394
2018	**3,150,486**	**205,003**	**0**	**9,350,725**	**58,919,991**	**646,423**	**395,981**	**6,076,651**	**78,745,260**
2019	3,150,486	205,003	0	9,350,725	58,919,991	646,423	395,981	6,076,651	78,745,260
2020	2,872,604	205,003	0	9,350,725	58,919,991	646,423	395,981	6,076,651	78,467,378
2021	2,872,604	205,003	0	9,350,725	58,919,991	646,423	395,981	6,076,651	78,467,378
2022	2,872,604	205,003	0	9,350,725	58,919,991	646,423	395,981	6,076,651	78,467,378
2023	2,872,604	205,003	0	9,350,725	58,919,991	646,423	395,981	6,076,651	78,467,378
2024	2,872,604	205,003	0	9,350,725	58,919,991	646,423	395,981	6,076,651	78,467,378
2025	2,872,604	205,003	0	9,350,725	58,919,991	646,423	395,981	6,076,651	78,467,378
2026	2,872,604	205,003	0	9,350,725	58,919,991	646,423	395,981	6,076,651	78,467,378
2027	2,872,604	205,003	0	9,350,725	58,919,991	646,423	395,981	6,076,651	78,467,378
2028	2,872,604	205,003	0	9,350,725	58,919,991	646,423	395,981	6,076,651	78,467,378
2029	2,872,604	205,003	0	9,350,725	58,919,991	646,423	395,981	6,076,651	78,467,378
2030	2,872,604	205,003	0	9,350,725	58,919,991	646,423	395,981	6,076,651	78,467,378
2031	2,872,604	205,003	0	9,350,725	58,919,991	646,423	395,981	6,076,651	78,467,378
2032	2,872,604	205,003	0	9,350,725	58,919,991	646,423	395,981	6,076,651	78,467,378
2033	2,872,604	205,003	0	9,350,725	58,919,991	646,423	395,981	6,076,651	78,467,378
2034	2,872,604	205,003	0	9,350,725	58,919,991	646,423	395,981	6,076,651	78,467,378
2035	2,872,604	205,003	0	9,350,725	58,919,991	646,423	395,981	6,076,651	78,467,378
TOTAL	**107,486,255**	**7,035,434**	**0**	**303,754,072**	**1,993,647,713**	**18,706,184**	**13,232,431**	**215,668,276**	**2,659,530,365**

TABLE B-21 Total Delta Water Charge for Each Contractor (in dollars)

Calendar Year	SOUTHERN CALIFORNIA AREA									
	AVEK	Castaic	Coachella	Crestline	Desert	Littlerock	Mojave	Palmdale	San Bernardino	San Gabriel
	[20]	[21]	[22]	[23]	[24]	[25]	[26]	[27]	[28]	[29]
1964	0	0	0	0	0	0	0	0	0	0
1965	0	0	0	0	0	0	0	0	0	0
1966	0	0	0	0	0	0	0	0	0	0
1967	0	0	0	0	0	0	0	0	0	0
1968	0	13,060	0	0	0	0	0	0	0	0
1969	0	17,804	0	0	0	0	0	0	0	0
1970	0	37,905	0	0	0	0	0	0	0	0
1971	0	48,508	0	0	0	0	0	0	0	0
1972	160,756	74,751	41,797	4,662	64,303	1,367	67,518	13,021	369,739	85,202
1973	222,207	107,163	51,552	7,279	79,994	2,577	95,104	26,131	54,908	14,338
1974	279,090	143,266	59,539	10,791	93,030	3,721	121,869	39,631	465,150	114,427
1975	319,822	166,307	63,964	13,250	100,515	4,752	140,722	50,989	479,733	119,705
1976	431,018	207,673	74,449	17,045	117,550	6,269	174,366	67,591	538,772	137,142
1977	469,922	226,502	79,144	19,079	122,180	6,861	189,848	77,255	540,410	139,097
1978	600,180	274,819	97,313	24,428	147,413	9,687	236,913	98,345	631,768	165,313
1979	720,173	320,077	115,033	29,836	171,470	11,889	284,640	117,285	714,457	189,760
1980	857,818	376,845	134,920	35,949	210,736	14,256	337,177	138,590	811,952	215,694
1981	1,355,100	592,631	218,713	57,637	343,292	22,946	534,813	211,396	1,237,658	330,644
1982	1,551,434	664,082	254,298	66,408	400,739	26,335	313,057	235,100	1,341,923	364,482
1983	1,110,994	472,521	184,283	47,759	291,367	19,002	434,517	163,925	943,775	252,096
1984	450,405	509,602	202,914	52,247	321,718	20,719	472,282	174,500	1,003,760	266,383
1985	565,881	591,346	240,344	61,540	381,970	24,474	551,734	200,605	1,152,983	308,405
1986	635,066	659,259	275,347	70,160	438,498	27,822	625,994	223,785	1,285,253	350,799
1987	652,450	676,176	288,131	73,104	467,095	29,064	648,002	228,654	1,319,729	364,779
1988	711,641	742,582	319,496	80,756	525,996	32,024	711,641	248,146	1,438,752	402,232
1989	2,083,593	830,453	362,565	91,333	605,021	36,301	803,932	276,155	1,607,864	454,180
1990	2,207,667	869,029	386,049	96,930	636,731	38,438	848,974	289,119	1,696,277	481,308
1991	2,454,678	961,298	409,704	102,869	675,746	40,793	900,994	306,835	1,819,725	510,800
1992	2,804,695	1,098,371	468,125	117,538	772,102	46,610	1,029,469	350,587	2,079,203	583,636
1993	2,811,318	1,100,964	469,230	117,815	773,925	46,720	1,031,900	351,415	2,084,113	585,014
1994	2,694,116	1,055,065	449,668	112,905	741,661	44,772	988,880	336,766	1,997,227	560,625
1995	2,883,156	1,129,097	481,220	120,826	793,702	47,914	1,058,269	360,394	2,137,369	599,963
1996	2,834,460	1,110,027	473,093	118,785	780,296	47,104	1,040,394	354,307	2,101,269	589,830
1997	3,133,957	1,227,316	523,081	131,336	862,744	52,082	1,150,325	391,745	2,323,295	652,153
1998	3,155,093	1,235,593	526,609	132,222	868,562	52,433	1,728,006	394,387	2,338,963	656,551
1999	3,262,870	1,277,800	544,598	136,739	898,233	54,224	1,787,034	407,859	2,418,863	678,979
2000	3,314,278	2,279,763	553,178	138,893	912,384	55,078	1,815,190	510,073	2,456,972	689,676
2001	3,315,004	2,280,263	553,299	138,924	912,584	55,090	1,815,587	510,185	2,457,510	689,827
2002	3,437,351	2,314,256	561,548	140,995	926,188	55,912	1,842,654	517,791	2,494,146	700,112
2003	3,365,016	2,265,555	549,731	138,028	906,698	54,735	1,803,877	506,894	2,441,659	685,379
2004	3,686,201	2,481,798	602,201	151,202	993,241	59,960	1,976,053	555,277	2,674,711	750,797
2005	3,650,179	2,457,547	596,316	149,725	983,535	59,374	1,956,744	549,850	2,648,574	743,459
2006	3,802,076	2,559,814	3,256,234	155,955	1,344,440	61,844	2,038,171	572,732	2,758,791	774,397
2007	3,855,524	2,595,798	3,302,008	158,148	1,363,339	62,714	2,066,822	580,783	2,797,573	785,284
2008	3,943,904	2,655,301	3,377,700	161,772	1,394,591	64,151	2,114,200	594,096	2,861,701	803,284
2009	4,310,140	2,901,877	3,691,358	176,795	1,524,095	70,109	2,310,528	649,264	3,127,443	877,878
2010	5,385,764	3,626,059	5,269,593	220,916	2,123,453	87,605	3,153,757	811,293	3,907,916	1,096,959
2011	5,928,431	3,991,418	5,800,554	243,174	2,337,412	96,432	3,471,528	893,038	4,301,676	1,207,488
2012	6,189,558	4,167,227	6,056,050	253,886	2,440,367	100,679	3,624,437	932,373	4,491,150	1,260,674
2013	6,550,942	4,410,535	6,409,638	268,709	2,582,850	106,557	3,836,054	986,811	4,753,371	1,334,279
2014	6,368,143	4,185,518	6,082,630	255,000	2,451,078	101,120	3,640,346	936,466	4,510,863	1,266,208
2015	8,666,793	5,696,327	8,278,222	347,045	3,335,822	137,621	5,133,874	1,274,493	6,139,108	1,723,258
2016	10,359,280	6,808,728	9,894,827	414,817	3,987,255	164,497	6,136,437	1,523,381	7,337,978	2,059,784
2017	9,976,357	6,557,049	9,529,073	399,484	3,839,869	158,416	5,909,610	1,467,071	7,066,735	1,983,645
2018	**10,062,381**	**6,613,589**	**9,611,239**	**402,928**	**3,872,979**	**159,782**	**5,960,566**	**1,479,721**	**7,127,671**	**2,000,749**
2019	10,062,381	6,613,589	9,611,239	402,928	3,872,979	159,782	5,960,566	1,479,721	7,127,671	2,000,749
2020	10,062,381	6,613,589	9,611,239	402,928	3,872,979	159,782	6,238,448	1,479,721	7,127,671	2,000,749
2021	10,062,381	6,613,589	9,611,239	402,928	3,872,979	159,782	6,238,448	1,479,721	7,127,671	2,000,749
2022	10,062,381	6,613,589	9,611,239	402,928	3,872,979	159,782	6,238,448	1,479,721	7,127,671	2,000,749
2023	10,062,381	6,613,589	9,611,239	402,928	3,872,979	159,782	6,238,448	1,479,721	7,127,671	2,000,749
2024	10,062,381	6,613,589	9,611,239	402,928	3,872,979	159,782	6,238,448	1,479,721	7,127,671	2,000,749
2025	10,062,381	6,613,589	9,611,239	402,928	3,872,979	159,782	6,238,448	1,479,721	7,127,671	2,000,749
2026	10,062,381	6,613,589	9,611,239	402,928	3,872,979	159,782	6,238,448	1,479,721	7,127,671	2,000,749
2027	10,062,381	6,613,589	9,611,239	402,928	3,872,979	159,782	6,238,448	1,479,721	7,127,671	2,000,749
2028	10,062,381	6,613,589	9,611,239	402,928	3,872,979	159,782	6,238,448	1,479,721	7,127,671	2,000,749
2029	10,062,381	6,613,589	9,611,239	402,928	3,872,979	159,782	6,238,448	1,479,721	7,127,671	2,000,749
2030	10,062,381	6,613,589	9,611,239	402,928	3,872,979	159,782	6,238,448	1,479,721	7,127,671	2,000,749
2031	10,062,381	6,613,589	9,611,239	402,928	3,872,979	159,782	6,238,448	1,479,721	7,127,671	2,000,749
2032	10,062,381	6,613,589	9,611,239	402,928	3,872,979	159,782	6,238,448	1,479,721	7,127,671	2,000,749
2033	10,062,381	6,613,589	9,611,239	402,928	3,872,979	159,782	6,238,448	1,479,721	7,127,671	2,000,749
2034	10,062,381	6,613,589	9,611,239	402,928	3,872,979	159,782	6,238,448	1,479,721	7,127,671	2,000,749
2035	10,062,381	6,613,589	9,611,239	402,928	3,872,979	159,782	6,238,448	1,479,721	7,127,671	2,000,749
TOTAL	**318,647,359**	**202,097,327**	**255,161,641**	**13,117,400**	**116,759,412**	**5,199,126**	**184,690,543**	**47,141,367**	**234,460,845**	**65,619,407**

TABLE B-21 Total Delta Water Charge for Each Contractor (in dollars)

Calendar Year	SOUTHERN CALIFORNIA AREA (continued)				FEATHER RIVER AREA				South Bay Area Future Contractor	Grand Total
	San Gorgonio	Metropolitan	Ventura	Total	Yuba City	Butte	Plumas	Total		
	[30]	[31]	[32]	[33]	[34]	[35]	[36]	[37]	[38]	[39]
1964	0	0	0	0	0	0	0	0	0	0
1965	0	0	0	0	0	0	0	0	0	0
1966	0	0	0	0	0	0	0	0	0	0
1967	0	0	0	0	0	0	0	0	0	241,150
1968	0	0	0	13,060	0	1,050	875	1,925	0	583,631
1969	0	0	0	17,804	0	1,225	929	2,154	0	827,578
1970	0	0	0	37,905	0	3,848	1,995	5,843	0	2,160,886
1971	0	0	0	48,508	0	4,546	3,186	7,732	0	2,696,792
1972	0	2,043,211	0	2,926,327	0	4,929	3,778	8,707	0	7,206,052
1973	0	2,317,893	0	2,979,146	0	7,059	4,444	11,503	0	7,456,998
1974	0	4,231,933	0	5,562,447	0	8,336	4,931	13,267	0	10,683,514
1975	0	5,073,286	0	6,533,045	0	9,416	5,117	14,533	0	12,440,851
1976	0	6,422,167	0	8,194,042	0	7,004	5,780	12,784	0	15,299,760
1977	0	7,104,278	0	8,974,576	0	16,917	5,827	22,744	0	15,869,924
1978	0	9,016,389	0	11,302,568	0	12,635	6,844	19,479	0	19,425,531
1979	0	10,935,192	0	13,609,812	0	16,575	7,773	24,348	0	23,095,855
1980	84,294	13,102,796	12,396	16,333,423	0	19,834	8,801	28,635	0	27,557,096
1981	140,930	20,910,099	36,136	25,991,995	0	21,682	13,370	35,052	0	43,335,911
1982	167,929	23,998,560	57,248	29,441,595	0	16,117	14,694	30,811	0	49,027,703
1983	124,148	17,203,307	50,672	21,298,366	0	15,202	10,134	25,336	0	34,186,736
1984	138,982	18,766,458	64,344	22,444,314	20,590	15,442	10,681	46,713	0	37,051,405
1985	166,935	22,050,974	84,882	26,382,073	24,050	16,976	12,166	53,192	0	43,235,458
1986	195,056	25,089,658	120,965	29,997,662	31,753	18,145	13,457	63,355	0	49,817,447
1987	207,598	26,095,043	148,284	31,198,109	37,071	17,794	13,642	68,507	0	51,663,899
1988	233,604	28,781,238	201,116	34,429,224	46,722	18,565	14,852	80,139	0	57,062,086
1989	268,530	32,505,376	265,215	40,190,518	61,184	19,891	16,576	97,651	0	65,617,116
1990	289,119	33,616,369	334,242	41,790,252	63,506	20,055	17,381	100,942	0	68,658,631
1991	306,835	35,676,185	354,722	44,521,184	170,267	21,283	19,155	210,705	0	73,265,317
1992	350,587	40,763,329	405,303	50,869,555	194,545	24,318	22,697	241,560	0	83,873,685
1993	351,415	40,859,579	406,260	50,989,668	195,005	24,376	23,563	242,944	0	84,237,281
1994	336,766	39,156,173	389,323	48,863,947	186,875	23,360	23,360	233,595	0	80,866,329
1995	360,394	41,903,674	416,641	52,292,619	199,987	24,999	26,040	251,026	0	86,725,209
1996	0	41,195,923	409,604	51,055,092	196,610	24,576	26,624	247,810	0	83,007,946
1997	0	45,548,810	447,746	56,444,590	214,918	27,173	30,223	272,314	0	93,062,361
1998	0	45,855,992	450,529	57,394,940	107,459	27,356	31,537	166,352	0	93,159,618
1999	47,152	47,422,430	466,491	59,403,272	226,327	28,291	33,820	288,438	0	96,994,387
2000	71,841	48,169,576	478,942	61,445,844	229,892	69,207	35,708	334,807	0	98,699,723
2001	95,809	48,180,135	479,047	61,483,264	229,942	83,833	37,187	350,962	0	98,781,493
2002	97,237	48,898,394	486,188	62,472,772	233,371	85,083	39,185	357,639	0	100,275,854
2003	118,989	47,869,376	475,957	61,181,894	228,460	83,293	39,743	351,496	0	98,210,650
2004	156,416	52,438,419	521,386	67,047,662	250,266	92,048	0	342,314	0	107,579,616
2005	167,795	51,925,988	516,291	66,405,377	247,820	717,290	0	965,110	0	107,188,794
2006	188,222	51,397,939	537,776	69,448,391	258,133	32,606	8,699	299,438	0	110,967,023
2007	204,501	52,120,469	545,336	70,438,299	268,738	33,950	19,600	322,288	0	112,569,420
2008	482,528	53,315,217	557,837	72,326,282	274,736	794,785	56,138	1,125,659	0	116,229,451
2009	527,337	58,266,144	609,638	79,042,606	292,626	844,842	63,417	1,200,885	0	127,004,742
2010	658,937	72,806,845	761,778	99,910,875	365,653	1,054,033	81,825	1,501,511	0	158,911,895
2011	725,331	80,142,822	838,533	109,977,837	414,001	1,185,940	92,561	1,692,502	0	174,964,623
2012	757,280	83,672,846	875,468	114,821,995	424,826	1,216,951	100,037	1,741,814	0	182,648,119
2013	801,494	88,558,170	926,583	121,525,993	444,760	1,274,052	109,975	1,828,787	0	193,299,795
2014	760,603	84,040,101	879,310	115,477,386	431,273	1,235,416	108,033	1,774,722	0	183,479,164
2015	1,035,151	114,375,290	1,196,707	157,339,711	574,420	1,645,472	153,363	2,373,255	0	249,669,412
2016	1,237,301	136,710,965	1,430,405	188,065,655	686,595	1,966,807	190,584	2,843,986	0	298,433,393
2017	1,191,565	131,657,554	1,377,531	181,113,959	703,970	2,016,581	183,222	2,903,773	0	287,566,604
2018	**1,201,839**	**132,792,806**	**1,389,410**	**182,675,660**	**671,729**	**1,924,226**	**184,502**	**2,780,457**	**0**	**289,897,532**
2019	1,201,839	132,792,806	1,389,410	182,675,660	671,729	1,924,226	184,502	2,780,457	0	289,897,532
2020	1,201,839	132,792,806	1,389,410	182,953,542	671,729	1,924,226	184,502	2,780,457	0	289,897,532
2021	1,201,839	132,792,806	1,389,410	182,953,542	671,729	1,924,226	184,502	2,780,457	0	289,897,532
2022	1,201,839	132,792,806	1,389,410	182,953,542	671,729	1,924,226	184,502	2,780,457	0	289,897,532
2023	1,201,839	132,792,806	1,389,410	182,953,542	671,729	1,924,226	184,502	2,780,457	0	289,897,532
2024	1,201,839	132,792,806	1,389,410	182,953,542	671,729	1,924,226	184,502	2,780,457	0	289,897,532
2025	1,201,839	132,792,806	1,389,410	182,953,542	671,729	1,924,226	184,502	2,780,457	0	289,897,532
2026	1,201,839	132,792,806	1,389,410	182,953,542	671,729	1,924,226	184,502	2,780,457	0	289,897,532
2027	1,201,839	132,792,806	1,389,410	182,953,542	671,729	1,924,226	184,502	2,780,457	0	289,897,532
2028	1,201,839	132,792,806	1,389,410	182,953,542	671,729	1,924,226	184,502	2,780,457	0	289,897,532
2029	1,201,839	132,792,806	1,389,410	182,953,542	671,729	1,924,226	184,502	2,780,457	0	289,897,532
2030	1,201,839	132,792,806	1,389,410	182,953,542	671,729	1,924,226	184,502	2,780,457	0	289,897,532
2031	1,201,839	132,792,806	1,389,410	182,953,542	671,729	1,924,226	184,502	2,780,457	0	289,897,532
2032	1,201,839	132,792,806	1,389,410	182,953,542	671,729	1,924,226	184,502	2,780,457	0	289,897,532
2033	1,201,839	132,792,806	1,389,410	182,953,542	671,729	1,924,226	184,502	2,780,457	0	289,897,532
2034	1,201,839	132,792,806	1,389,410	182,953,542	671,729	1,924,226	184,502	2,780,457	0	289,897,532
2035	1,201,839	132,792,806	1,389,410	182,953,542	671,729	1,924,226	184,502	2,780,457	0	289,897,532
TOTAL	**34,681,713**	**4,382,463,080**	**43,626,212**	**5,903,665,432**	**20,627,473**	**49,587,232**	**5,074,565**	**75,289,270**	**0**	**9,445,029,490**

TABLE B-22 Water System Revenue Bond Surcharge for Each Contractor[a] (in dollars)

Calendar Year	NORTH BAY AREA			SOUTH BAY AREA				CENTRAL COASTAL AREA		
	Napa	Solano	Total	Alameda-Zone 7	Alameda County	Santa Clara	Total	San Luis Obispo	Santa Barbara	Total
	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]
1971	0	0	0	0	0	0	0	0	0	0
1972	0	0	0	0	0	0	0	0	0	0
1973	0	0	0	0	0	0	0	0	0	0
1974	0	0	0	0	0	0	0	0	0	0
1975	0	0	0	0	0	0	0	0	0	0
1976	0	0	0	0	0	0	0	0	0	0
1977	0	0	0	0	0	0	0	0	0	0
1978	0	0	0	0	0	0	0	0	0	0
1979	0	0	0	0	0	0	0	0	0	0
1980	0	0	0	0	0	0	0	0	0	0
1981	0	0	0	0	0	0	0	0	0	0
1982	0	0	0	0	0	0	0	0	0	0
1983	0	0	0	0	0	0	0	0	0	0
1984	0	0	0	0	0	0	0	0	0	0
1985	0	0	0	0	0	0	0	0	0	0
1986	0	0	0	0	0	0	0	0	0	0
1987	0	0	0	0	0	0	0	0	0	0
1988	29,131	40,505	69,636	25,436	30,176	100,035	155,647	13,126	24,392	37,518
1989	48,804	69,621	118,425	43,343	51,681	170,303	265,327	26,828	49,634	76,462
1990	41,166	60,482	101,648	38,407	51,185	149,440	239,032	27,956	51,795	79,751
1991	63,389	92,401	155,790	62,470	81,991	235,712	380,173	44,887	83,709	128,596
1992	84,320	126,227	210,547	89,247	115,208	325,629	530,084	61,137	113,925	175,062
1993	90,152	137,473	227,625	98,432	125,174	347,457	571,063	67,725	126,662	194,387
1994	91,785	141,222	233,007	102,021	126,216	352,415	580,652	81,420	159,156	240,576
1995	108,311	181,787	290,098	126,001	149,377	416,956	692,334	131,675	270,726	402,401
1996	132,305	232,343	364,648	158,514	180,787	505,042	844,343	242,654	534,449	777,103
1997	135,556	237,492	373,048	171,263	187,162	522,127	880,552	141,810	846,617	988,427
1998	130,346	228,366	358,712	164,682	179,971	502,065	846,718	136,361	814,087	950,448
1999	182,507	316,416	498,923	227,072	248,031	691,830	1,166,933	188,835	1,124,110	1,312,945
2000	238,571	364,418	602,989	260,766	284,875	794,730	1,340,371	218,359	1,364,019	1,582,378
2001	234,773	358,616	593,389	561,965	280,341	782,078	1,624,384	214,883	1,342,304	1,557,187
2002	257,520	391,851	649,371	610,230	288,977	806,174	1,705,381	221,503	1,383,661	1,605,164
2003	268,151	408,027	676,178	635,422	300,907	839,455	1,775,784	230,647	1,440,782	1,671,429
2004	268,425	408,444	676,869	636,070	301,214	840,312	1,777,596	230,883	1,442,252	1,673,135
2005	253,413	385,602	639,015	610,756	284,369	793,318	1,688,443	217,970	1,361,594	1,579,564
2006	274,219	417,261	691,480	660,900	307,716	858,451	1,827,067	235,866	1,473,385	1,709,251
2007	177,891	270,066	447,957	441,730	197,505	550,975	1,190,210	152,478	975,872	1,128,350
2008	254,590	386,862	641,452	773,686	288,283	803,089	1,865,058	223,659	1,369,892	1,593,551
2009	285,324	434,158	719,482	687,665	320,178	893,215	1,901,058	245,418	1,533,052	1,778,470
2010	273,015	415,428	688,443	657,998	306,365	854,681	1,819,044	234,831	1,466,914	1,701,745
2011	294,866	448,677	743,543	710,662	330,884	923,085	1,964,631	253,625	1,584,318	1,837,943
2012	383,092	455,983	839,075	753,264	330,355	933,048	2,016,667	229,311	1,456,050	1,685,361
2013	416,223	495,679	911,902	820,192	360,039	1,013,496	2,193,727	249,613	1,583,700	1,833,313
2014	454,438	541,511	995,949	894,353	392,064	1,103,675	2,390,092	271,760	1,722,805	1,994,565
2015	436,482	520,709	957,191	854,027	375,378	1,053,325	2,282,730	260,767	1,649,215	1,909,982
2016	435,356	520,887	956,243	851,748	374,332	1,047,728	2,273,808	260,376	1,644,453	1,904,829
2017	825,082	988,823	1,813,905	1,735,420	711,139	1,988,098	4,434,657	494,547	3,122,046	3,616,593
2018	**776,986**	**934,577**	**1,711,563**	**1,522,713**	**669,079**	**1,869,953**	**4,061,745**	**465,832**	**2,954,217**	**3,420,049**
2019	888,462	1,068,663	1,957,125	1,741,181	765,074	2,138,241	4,644,496	532,666	3,378,067	3,910,733
2020	870,981	1,047,637	1,918,618	1,706,922	750,020	2,096,169	4,553,111	522,186	3,311,600	3,833,786
2021	892,387	1,073,384	1,965,771	1,748,872	768,453	2,147,686	4,665,011	535,019	3,392,989	3,928,008
2022	867,576	1,043,541	1,911,117	1,700,248	747,088	2,087,974	4,535,310	520,144	3,298,654	3,818,798
2023	876,191	1,053,903	1,930,094	1,717,132	754,507	2,108,708	4,580,347	525,309	3,331,410	3,856,719
2024	856,548	1,030,277	1,886,825	1,678,637	737,592	2,061,434	4,477,663	513,533	3,256,725	3,770,258
2025	814,512	979,714	1,794,226	1,596,255	701,393	1,960,266	4,257,914	488,330	3,096,897	3,585,227
2026	773,943	930,917	1,704,860	1,516,749	666,459	1,862,629	4,045,837	464,008	2,942,647	3,406,655
2027	818,097	984,026	1,802,123	1,603,281	704,481	1,968,894	4,276,656	490,480	3,110,527	3,601,007
2028	704,475	847,359	1,551,834	1,380,609	606,638	1,695,443	3,682,690	422,359	2,678,520	3,100,879
2029	733,798	882,630	1,616,428	1,438,075	631,889	1,766,014	3,835,978	439,939	2,790,010	3,229,949
2030	549,623	661,099	1,210,722	1,077,133	473,292	1,322,763	2,873,188	329,519	2,089,748	2,419,267
2031	549,561	661,025	1,210,586	1,077,012	473,238	1,322,615	2,872,865	329,482	2,089,513	2,418,995
2032	549,916	661,451	1,211,367	1,077,708	473,544	1,323,468	2,874,720	329,695	2,090,861	2,420,556
2033	549,878	661,406	1,211,284	1,077,634	473,512	1,323,378	2,874,524	329,672	2,090,719	2,420,391
2034	549,894	661,426	1,211,320	1,077,666	473,526	1,323,417	2,874,609	329,682	2,090,780	2,420,462
2035	549,784	661,293	1,211,077	1,077,450	473,431	1,323,152	2,874,033	329,616	2,090,361	2,419,977
TOTAL	**20,341,815**	**25,921,665**	**46,263,480**	**40,279,019**	**18,905,096**	**52,900,148**	**112,084,263**	**13,508,381**	**82,199,821**	**95,708,202**

[a] 1988 through 2016 charges are debt service only and do not include bond cover; 2017 charges and after include bond cover.

TABLE B-22 Water System Revenue Bond Surcharge for Each Contractor[a] (in dollars)

Calendar Year	SAN JOAQUIN VALLEY AREA								
				Kern					
	Dudley Ridge	Empire	Future Contractor San Joaquin Valley	Municipal and Industrial	Agricultural	Kings	Oak Flat	Tulare	Total
	[11]	[12]	[13]	[14]	[15]	[16]	[17]	[18]	[19]
1971	0	0	0	0	0	0	0	0	0
1972	0	0	0	0	0	0	0	0	0
1973	0	0	0	0	0	0	0	0	0
1974	0	0	0	0	0	0	0	0	0
1975	0	0	0	0	0	0	0	0	0
1976	0	0	0	0	0	0	0	0	0
1977	0	0	0	0	0	0	0	0	0
1978	0	0	0	0	0	0	0	0	0
1979	0	0	0	0	0	0	0	0	0
1980	0	0	0	0	0	0	0	0	0
1981	0	0	0	0	0	0	0	0	0
1982	0	0	0	0	0	0	0	0	0
1983	0	0	0	0	0	0	0	0	0
1984	0	0	0	0	0	0	0	0	0
1985	0	0	0	0	0	0	0	0	0
1986	0	0	0	0	0	0	0	0	0
1987	0	0	0	0	0	0	0	0	0
1988	33,986	1,657	0	67,288	726,501	2,228	2,851	66,748	901,259
1989	59,273	2,785	0	116,689	1,251,452	3,733	4,927	116,736	1,555,595
1990	53,349	2,419	0	287,811	947,351	3,248	4,367	109,118	1,407,663
1991	82,252	3,731	0	359,380	1,564,983	5,035	6,771	168,217	2,190,369
1992	112,566	5,127	0	452,691	2,153,423	6,927	9,285	230,217	2,970,236
1993	119,670	5,459	0	272,449	2,491,672	7,381	9,894	244,813	3,151,338
1994	118,265	5,379	0	244,671	2,485,820	7,300	9,766	241,933	3,113,134
1995	139,226	6,340	0	317,885	2,894,181	8,599	11,490	284,798	3,662,519
1996	169,333	7,703	0	354,341	2,722,240	10,461	13,978	346,367	3,624,423
1997	165,364	7,980	0	366,285	2,673,847	10,826	14,465	357,986	3,596,753
1998	159,011	7,672	0	352,211	2,571,110	10,410	13,909	344,232	3,458,555
1999	218,784	10,373	0	485,897	3,371,115	14,376	19,166	476,017	4,595,728
2000	251,339	11,735	0	557,296	3,620,348	16,500	21,990	546,406	5,025,614
2001	247,338	11,547	0	548,424	3,461,158	16,238	21,640	537,707	4,844,052
2002	273,542	11,904	0	565,321	3,496,023	16,737	22,306	521,659	4,907,492
2003	284,834	12,395	0	588,659	3,640,346	17,428	23,227	543,193	5,110,082
2004	285,125	12,408	0	589,259	3,644,059	17,446	23,251	543,748	5,115,296
2005	269,179	11,714	0	556,305	3,431,851	39,485	21,951	488,483	4,818,968
2006	291,279	12,676	0	601,979	3,713,614	42,726	23,753	528,589	5,214,616
2007	187,144	8,113	0	383,463	2,314,841	34,088	15,230	285,915	3,228,794
2008	271,383	11,832	0	563,171	3,478,837	41,080	22,094	445,805	4,834,202
2009	303,076	13,189	0	626,357	3,864,004	46,037	24,715	497,108	5,374,486
2010	257,209	12,620	0	599,335	3,631,924	44,051	23,648	440,950	5,009,737
2011	277,794	13,630	0	647,304	3,922,606	47,577	25,542	476,242	5,410,695
2012	271,192	12,709	0	666,489	5,450,478	40,125	23,964	510,822	6,975,779
2013	286,050	13,814	0	724,170	5,680,875	43,592	26,041	521,112	7,295,654
2014	302,692	15,056	0	790,204	6,189,586	47,573	28,404	561,312	7,934,827
2015	278,438	14,506	0	758,484	5,949,402	45,814	27,366	540,099	7,614,109
2016	278,950	14,593	0	759,888	5,962,338	46,008	27,523	541,874	7,631,174
2017	531,373	27,824	0	1,443,220	11,382,800	88,473	52,401	1,042,586	14,568,677
2018	**500,847**	**26,202**	**0**	**1,357,207**	**10,705,138**	**82,310**	**49,399**	**973,302**	**13,694,405**
2019	572,705	29,961	0	1,551,929	12,241,035	94,119	56,486	1,112,944	15,659,179
2020	561,436	29,372	0	1,521,394	12,000,181	92,267	55,375	1,091,046	15,351,071
2021	575,235	30,094	0	1,558,785	12,295,108	94,535	56,736	1,117,861	15,728,354
2022	559,242	29,257	0	1,515,446	11,953,267	91,907	55,159	1,086,781	15,291,059
2023	564,795	29,547	0	1,530,494	12,071,964	92,819	55,706	1,097,573	15,442,898
2024	552,133	28,885	0	1,496,183	11,801,332	90,738	54,457	1,072,967	15,096,695
2025	525,036	27,467	0	1,422,756	11,222,164	86,285	51,785	1,020,310	14,355,803
2026	498,885	26,099	0	1,351,892	10,663,212	81,988	49,206	969,490	13,640,772
2027	527,347	27,588	0	1,429,018	11,271,557	86,665	52,013	1,024,800	14,418,988
2028	454,106	23,757	0	1,230,548	9,706,101	74,629	44,789	882,470	12,416,400
2029	473,008	24,746	0	1,281,768	10,110,104	77,735	46,653	919,202	12,933,216
2030	354,288	18,535	0	960,058	7,572,578	58,224	34,944	688,492	9,687,119
2031	354,248	18,533	0	959,950	7,571,726	58,218	34,940	688,415	9,686,030
2032	354,477	18,545	0	960,570	7,576,613	58,255	34,962	688,859	9,692,281
2033	354,453	18,543	0	960,504	7,576,096	58,251	34,960	688,812	9,691,619
2034	354,463	18,544	0	960,533	7,576,320	58,253	34,961	688,833	9,691,907
2035	354,392	18,540	0	960,340	7,574,801	58,241	34,954	688,694	9,689,962
TOTAL	**15,070,112**	**753,105**	**0**	**38,656,301**	**290,178,082**	**2,176,941**	**1,413,400**	**29,061,643**	**377,309,584**

[a] 1988 through 2016 charges are debt service only and do not include bond cover; 2017 charges and after include bond cover.

TABLE B-22 Water System Revenue Bond Surcharge for Each Contractor[a] (in dollars)

	SOUTHERN CALIFORNIA AREA									
Calendar Year	AVEK	Castaic Lake	Coachella	Crestline	Desert	Littlerock	Mojave	Palmdale	San Bernardino	San Gabriel
	[20]	[21]	[22]	[23]	[24]	[25]	[26]	[27]	[28]	[29]
1971	0	0	0	0	0	0	0	0	0	0
1972	0	0	0	0	0	0	0	0	0	0
1973	0	0	0	0	0	0	0	0	0	0
1974	0	0	0	0	0	0	0	0	0	0
1975	0	0	0	0	0	0	0	0	0	0
1976	0	0	0	0	0	0	0	0	0	0
1977	0	0	0	0	0	0	0	0	0	0
1978	0	0	0	0	0	0	0	0	0	0
1979	0	0	0	0	0	0	0	0	0	0
1980	0	0	0	0	0	0	0	0	0	0
1981	0	0	0	0	0	0	0	0	0	0
1982	0	0	0	0	0	0	0	0	0	0
1983	0	0	0	0	0	0	0	0	0	0
1984	0	0	0	0	0	0	0	0	0	0
1985	0	0	0	0	0	0	0	0	0	0
1986	0	0	0	0	0	0	0	0	0	0
1987	0	0	0	0	0	0	0	0	0	0
1988	64,266	57,111	27,032	7,656	44,492	2,154	55,996	16,240	151,182	39,907
1989	205,668	98,720	46,993	13,263	78,104	3,763	97,138	27,981	259,860	69,104
1990	185,010	87,808	42,449	11,905	69,970	3,385	87,327	24,956	231,650	61,851
1991	296,854	140,371	65,947	18,548	108,704	5,236	135,623	38,641	363,310	96,172
1992	402,015	234,421	89,358	25,192	147,297	7,053	183,813	52,160	491,537	130,372
1993	424,871	247,076	93,981	26,566	154,919	7,437	193,361	55,045	517,379	137,298
1994	424,023	247,222	94,502	26,865	155,776	7,431	194,191	54,968	525,394	139,422
1995	500,084	290,998	111,730	31,822	184,170	8,769	229,530	64,852	623,848	165,593
1996	606,388	353,132	135,428	38,634	223,237	10,640	278,178	78,696	760,333	201,821
1997	626,151	362,776	139,565	39,802	230,058	10,972	286,779	81,146	808,482	207,472
1998	602,091	348,838	134,202	38,273	221,218	10,550	275,761	78,028	777,418	199,501
1999	826,108	479,470	184,524	52,650	304,166	14,475	642,815	107,060	1,041,566	277,200
2000	940,325	1,150,965	210,453	60,212	346,906	16,486	736,157	121,898	1,191,538	316,860
2001	925,355	1,132,642	207,102	59,254	341,384	16,224	724,438	135,581	1,172,568	311,816
2002	974,814	1,167,539	213,483	61,079	351,902	16,724	746,758	139,071	1,208,696	321,423
2003	1,015,056	1,215,738	222,296	63,601	366,429	17,415	777,586	144,812	1,258,593	334,692
2004	1,016,092	1,216,978	222,523	63,666	366,803	17,432	778,379	144,960	1,259,877	335,033
2005	959,268	1,148,920	210,078	60,105	346,290	16,457	734,849	136,853	1,189,420	316,297
2006	1,038,026	1,243,248	1,213,645	65,040	501,286	17,809	795,182	148,089	1,287,074	342,266
2007	666,215	820,799	1,036,396	41,723	354,543	11,413	520,847	95,550	825,932	219,727
2008	999,433	1,167,531	1,157,440	61,924	478,719	17,175	757,686	144,009	1,367,672	325,069
2009	1,080,062	1,293,596	1,262,793	67,674	521,586	18,529	827,383	154,087	1,339,196	356,126
2010	1,033,467	1,237,788	1,283,384	64,754	524,108	17,731	824,481	147,438	1,281,421	340,762
2011	1,116,181	1,336,855	1,386,101	69,937	566,054	19,149	890,469	159,239	1,383,979	368,035
2012	1,090,934	915,850	1,073,158	67,263	523,945	18,453	731,452	154,732	1,323,822	351,925
2013	1,186,869	996,745	1,172,413	73,154	570,092	20,052	795,549	168,130	1,438,513	382,372
2014	1,345,233	1,085,473	1,276,763	79,660	621,395	21,838	866,523	183,142	1,568,301	416,868
2015	1,288,246	1,039,717	1,228,651	76,255	595,985	20,924	868,542	175,577	1,500,551	398,955
2016	1,287,598	1,037,955	1,232,122	76,009	595,354	20,895	867,266	175,457	1,495,424	397,690
2017	2,441,561	1,968,931	2,487,883	144,061	1,130,096	39,617	1,645,505	332,754	2,834,899	753,972
2018	**2,295,675**	**1,849,307**	**2,219,292**	**135,462**	**1,064,379**	**37,239**	**1,548,497**	**312,825**	**2,664,966**	**708,792**
2019	2,625,042	2,114,632	2,537,700	154,897	1,217,089	42,582	1,770,664	357,707	3,047,316	810,484
2020	2,573,392	2,073,025	2,487,769	151,849	1,193,141	41,744	1,735,825	350,669	2,987,358	794,537
2021	2,636,638	2,123,973	2,548,910	155,581	1,222,465	42,770	1,778,486	359,287	3,060,777	814,065
2022	2,563,331	2,064,921	2,478,043	151,256	1,188,477	41,581	1,729,039	349,298	2,975,679	791,431
2023	2,588,786	2,085,426	2,502,650	152,758	1,200,278	41,994	1,746,208	352,766	3,005,227	799,290
2024	2,530,749	2,038,674	2,446,545	149,333	1,173,370	41,052	1,707,061	344,858	2,937,855	781,371
2025	2,406,549	1,938,623	2,326,477	142,004	1,115,785	39,038	1,623,285	327,933	2,793,676	743,025
2026	2,286,684	1,842,064	2,210,600	134,931	1,060,210	37,093	1,542,432	311,600	2,654,529	706,016
2027	2,417,141	1,947,156	2,336,717	142,629	1,120,696	39,209	1,630,429	329,377	2,805,972	746,295
2028	2,081,435	1,676,724	2,012,181	122,820	965,048	33,764	1,403,986	283,631	2,416,263	642,645
2029	2,168,072	1,746,515	2,095,935	127,932	1,005,217	35,169	1,462,425	295,437	2,516,837	669,395
2030	1,623,910	1,308,159	1,569,878	95,823	752,918	26,342	1,095,373	221,285	1,885,138	501,384
2031	1,623,727	1,308,012	1,569,701	95,812	752,833	26,339	1,095,249	221,261	1,884,926	501,327
2032	1,624,775	1,308,856	1,570,715	95,874	753,319	26,356	1,095,956	221,403	1,886,143	501,651
2033	1,624,664	1,308,767	1,570,607	95,867	753,268	26,354	1,095,881	221,388	1,886,014	501,617
2034	1,624,712	1,308,805	1,570,654	95,870	753,290	26,355	1,095,914	221,395	1,886,070	501,632
2035	1,624,386	1,308,543	1,570,339	95,851	753,139	26,350	1,095,694	221,350	1,885,691	501,531
TOTAL	**64,487,932**	**55,477,395**	**55,887,108**	**3,883,096**	**29,069,910**	**1,067,519**	**43,801,968**	**8,844,622**	**76,659,872**	**20,332,089**

[a] 1988 through 2016 charges are debt service only and do not include bond cover; 2017 charges and after include bond cover.

TABLE B-22 Water System Revenue Bond Surcharge for Each Contractor[a] (in dollars)

Calendar Year	SOUTHERN CALIFORNIA AREA (continued)				FEATHER RIVER AREA				South Bay Area Future Contractor	Grand Total
	San Gorgonio	Metropolitan	Ventura	Total	Yuba City	Butte	Plumas	Total		
	[30]	[31]	[32]	[33]	[34]	[35]	[36]	[37]	[38]	[39]
1971	0	0	0	0	0	0	0	0	0	0
1972	0	0	0	0	0	0	0	0	0	0
1973	0	0	0	0	0	0	0	0	0	0
1974	0	0	0	0	0	0	0	0	0	0
1975	0	0	0	0	0	0	0	0	0	0
1976	0	0	0	0	0	0	0	0	0	0
1977	0	0	0	0	0	0	0	0	0	0
1978	0	0	0	0	0	0	0	0	0	0
1979	0	0	0	0	0	0	0	0	0	0
1980	0	0	0	0	0	0	0	0	0	0
1981	0	0	0	0	0	0	0	0	0	0
1982	0	0	0	0	0	0	0	0	0	0
1983	0	0	0	0	0	0	0	0	0	0
1984	0	0	0	0	0	0	0	0	0	0
1985	0	0	0	0	0	0	0	0	0	0
1986	0	0	0	0	0	0	0	0	0	0
1987	0	0	0	0	0	0	0	0	0	0
1988	24,019	2,642,354	18,118	3,150,527	1,336	552	853	2,741	0	4,317,328
1989	42,040	4,587,641	34,565	5,564,840	0	918	1,454	2,372	0	7,583,021
1990	38,023	4,037,980	34,994	4,917,308	2,535	800	1,283	4,618	0	6,750,020
1991	59,122	6,259,893	54,115	7,642,536	9,945	1,243	2,027	13,215	0	10,510,679
1992	80,131	8,435,312	72,892	10,351,553	13,671	1,710	2,806	18,187	0	14,255,669
1993	84,371	8,885,273	76,858	10,904,435	14,608	1,827	3,026	19,461	0	15,068,309
1994	85,698	8,926,755	76,794	10,959,041	14,409	1,801	3,070	19,280	0	15,145,690
1995	101,792	10,539,430	90,436	12,943,054	16,958	2,119	3,705	22,782	0	18,013,188
1996	124,074	12,810,359	109,783	15,730,703	20,640	2,579	4,620	27,839	0	21,369,059
1997	28,259	13,168,230	112,960	16,102,652	21,382	2,674	4,872	28,928	0	21,970,360
1998	27,174	12,662,268	108,619	15,483,941	20,562	2,571	4,685	27,818	0	21,126,192
1999	53,545	17,454,651	149,123	21,587,353	28,348	3,543	6,765	38,656	0	29,200,538
2000	70,117	19,805,800	168,259	25,135,976	32,271	9,794	7,996	50,061	0	33,737,389
2001	69,001	19,490,499	165,580	24,751,444	31,757	9,638	7,869	49,264	0	33,419,720
2002	71,126	20,091,004	170,682	25,534,301	32,736	9,935	8,112	50,783	0	34,452,492
2003	74,063	20,920,403	177,728	26,588,412	34,087	10,345	8,446	52,878	0	35,874,763
2004	74,138	20,941,743	177,910	26,615,534	34,121	10,356	8,456	52,933	0	35,911,363
2005	69,992	19,770,593	167,960	25,127,082	32,213	9,776	7,983	49,972	0	33,903,044
2006	75,738	20,330,228	181,750	27,239,381	34,858	10,579	8,638	54,075	0	36,735,870
2007	45,192	12,752,863	116,415	17,507,615	22,362	7,007	5,579	34,948	0	23,537,874
2008	250,631	19,303,204	173,561	26,204,054	32,180	9,751	7,973	49,904	0	35,188,221
2009	78,805	21,153,536	189,110	28,342,483	36,270	11,008	8,988	56,266	0	38,172,245
2010	75,405	20,240,944	180,952	27,252,635	34,705	10,532	8,600	53,837	0	36,525,441
2011	81,440	21,860,932	195,434	29,433,805	37,482	11,375	9,289	58,146	0	39,448,763
2012	215,055	22,686,017	191,051	29,343,657	35,313	101,156	12,344	148,813	0	41,009,352
2013	233,662	23,602,562	207,636	30,847,749	38,359	109,882	13,628	161,869	0	43,244,214
2014	254,740	25,718,327	226,122	33,664,385	41,861	119,916	15,370	177,147	0	47,156,965
2015	243,775	24,614,514	216,476	32,268,168	40,374	115,656	15,317	171,347	0	45,203,527
2016	242,979	24,546,439	215,981	32,191,169	40,634	116,401	15,914	172,949	0	45,130,172
2017	460,639	46,536,525	409,305	61,185,748	77,392	221,697	30,266	329,355	0	85,948,935
2018	**433,001**	**43,719,334**	**384,082**	**57,372,851**	**72,958**	**208,994**	**28,526**	**310,478**	**0**	**80,571,091**
2019	495,125	49,991,879	439,187	65,604,304	83,425	238,979	32,619	355,023	0	92,130,860
2020	485,383	49,008,237	430,546	64,313,475	81,784	234,277	31,977	348,038	0	90,318,099
2021	497,312	50,212,703	441,127	65,894,094	83,794	240,035	32,763	356,592	0	92,537,830
2022	483,485	48,816,634	428,863	64,062,038	81,464	233,361	31,852	346,677	0	89,964,999
2023	488,286	49,301,399	433,121	64,698,189	82,273	235,678	32,168	350,119	0	90,858,366
2024	477,340	48,196,144	423,412	63,247,764	80,429	230,395	31,447	342,271	0	88,821,476
2025	453,914	45,830,845	402,632	60,143,786	76,482	219,088	29,904	325,474	0	84,462,430
2026	431,305	43,548,112	382,578	57,148,154	72,672	208,175	28,414	309,261	0	80,255,539
2027	455,911	46,032,568	404,404	60,408,504	76,818	220,052	30,035	326,905	0	84,834,183
2028	392,592	39,639,311	348,238	52,018,638	66,149	189,490	25,864	281,503	0	73,051,944
2029	408,933	41,289,239	362,733	54,183,839	68,903	197,377	26,940	293,220	0	76,092,630
2030	306,295	30,926,089	271,691	40,584,285	51,609	147,838	20,179	219,626	0	56,994,207
2031	306,261	30,922,609	271,661	40,579,718	51,603	147,821	20,176	219,600	0	56,987,794
2032	306,459	30,942,572	271,836	40,605,915	51,636	147,917	20,189	219,742	0	57,024,581
2033	306,438	30,940,458	271,817	40,603,140	51,633	147,906	20,188	219,727	0	57,020,685
2034	306,447	30,941,371	271,825	40,604,340	51,634	147,911	20,189	219,734	0	57,022,372
2035	306,385	30,935,169	271,771	40,596,199	51,624	147,881	20,185	219,690	0	57,010,938
TOTAL	**10,775,618**	**1,255,970,952**	**10,982,693**	**1,637,240,774**	**2,070,259**	**4,470,316**	**723,549**	**7,264,124**	**0**	**2,275,870,427**

[a] 1988 through 2016 charges are debt service only and do not include bond cover; 2017 charges and after include bond cover.

TABLE B-23 Total Transportation and Delta Water Charge for Each Contractor[a] (in dollars)

Calendar Year	NORTH BAY AREA			SOUTH BAY AREA				CENTRAL COASTAL AREA		
	Napa	Solano	Total	Alameda-Zone 7	Alameda County	Santa Clara	Total	San Luis Obispo	Santa Barbara	Total
	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]
1961	0	0	0	0	0	0	0	0	0	0
1962	0	0	0	11,750	43,787	21,132	76,669	0	0	0
1963	0	0	0	199,726	190,272	447,723	837,721	0	0	0
1964	0	0	0	263,282	277,455	621,356	1,162,093	6,696	21,667	28,363
1965	0	0	0	373,816	404,324	1,158,090	1,936,230	13,756	36,029	49,785
1966	18,063	0	18,063	419,468	421,723	1,412,954	2,254,144	26,524	61,349	87,873
1967	41,574	0	41,574	553,115	548,491	1,863,198	2,964,805	56,469	118,263	174,731
1968	128,628	0	128,628	683,119	633,184	2,178,465	3,494,768	115,961	229,807	345,768
1969	254,715	0	254,715	817,953	583,436	2,298,736	3,700,126	185,156	358,861	544,017
1970	277,547	0	277,547	904,362	640,297	2,787,967	4,332,626	200,150	387,675	587,825
1971	227,474	0	227,474	845,986	675,193	2,807,017	4,328,196	202,413	392,912	595,325
1972	224,978	0	224,978	930,299	822,397	3,027,749	4,780,445	209,057	406,589	615,646
1973	221,091	31,366	252,457	916,885	716,492	3,120,787	4,754,163	206,557	402,724	609,281
1974	240,498	32,938	273,437	957,604	746,932	3,325,022	5,029,558	208,545	407,090	615,635
1975	237,459	36,291	273,750	1,016,228	793,055	3,214,046	5,023,329	225,895	439,873	665,768
1976	271,292	40,836	312,127	1,129,395	943,464	3,362,542	5,435,400	228,976	447,299	676,275
1977	293,627	45,096	338,723	1,098,164	922,203	3,303,461	5,323,828	238,699	468,721	707,420
1978	273,870	49,178	323,048	1,187,146	935,818	3,712,581	5,835,545	245,331	484,259	729,590
1979	289,479	53,340	342,819	1,283,900	1,009,566	3,819,533	6,113,000	243,110	483,437	726,547
1980	310,846	86,073	396,919	1,437,059	1,173,798	4,119,071	6,729,928	282,254	540,553	822,807
1981	347,781	112,848	460,629	1,545,799	1,349,125	4,507,566	7,402,490	307,065	596,671	903,736
1982	438,335	141,835	580,171	1,626,317	1,369,536	4,941,393	7,937,246	328,215	682,545	1,010,760
1983	354,787	163,294	518,081	1,496,821	1,260,138	4,910,241	7,667,200	357,218	702,083	1,059,301
1984	467,336	246,698	714,034	1,806,993	1,478,394	6,870,249	10,155,637	409,529	801,057	1,210,586
1985	736,074	386,306	1,122,380	2,305,026	2,225,097	7,796,485	12,326,608	500,696	969,931	1,470,626
1986	1,120,086	714,246	1,834,332	2,173,841	2,014,104	8,193,845	12,381,790	536,751	1,038,031	1,574,782
1987	1,773,801	1,582,227	3,356,028	2,670,555	2,505,662	7,980,255	13,156,472	570,644	1,148,974	1,719,618
1988	2,349,572	2,524,763	4,874,335	2,731,908	2,774,430	7,830,285	13,336,623	673,071	1,439,620	2,112,691
1989	2,548,764	3,701,385	6,250,149	2,716,003	2,515,471	7,578,850	12,810,324	772,570	1,814,759	2,587,329
1990	2,900,024	3,848,934	6,748,958	3,151,446	2,929,775	8,355,392	14,436,613	933,367	2,046,370	2,979,737
1991	2,941,321	4,170,227	7,111,548	2,423,378	2,384,246	6,430,834	11,238,458	979,709	2,366,841	3,346,550
1992	2,797,727	4,144,993	6,942,720	2,897,853	2,927,115	7,656,940	13,481,908	1,118,807	2,526,861	3,645,668
1993	2,855,497	4,172,491	7,027,988	3,754,629	2,977,354	8,849,995	15,581,978	1,185,665	2,726,057	3,911,722
1994	2,987,938	4,225,291	7,213,229	3,791,722	3,586,255	9,613,545	16,991,521	1,335,974	3,518,042	4,854,015
1995	2,961,322	4,405,219	7,366,541	4,040,362	3,313,350	8,393,828	15,747,540	1,647,817	6,195,415	7,843,231
1996	3,045,021	4,898,210	7,943,232	3,648,200	3,178,398	9,228,554	16,055,151	2,592,043	15,232,542	17,824,585
1997	3,028,005	4,734,808	7,762,813	3,874,710	3,145,550	9,338,016	16,358,276	3,002,832	23,737,164	26,739,996
1998	2,936,062	4,588,897	7,524,960	3,481,550	3,201,607	9,077,806	15,760,963	3,254,940	28,393,640	31,648,580
1999	3,163,021	5,083,084	8,246,104	4,207,767	3,693,329	11,434,972	19,336,069	3,810,971	29,676,309	33,487,280
2000	3,462,081	5,621,291	9,083,372	5,809,324	3,594,439	10,219,800	19,623,563	3,763,854	30,288,867	34,052,721
2001	4,078,820	6,369,304	10,448,124	9,827,070	4,082,024	11,628,753	25,537,848	4,315,191	32,422,390	36,737,581
2002	4,325,454	6,566,796	10,892,250	13,358,642	4,087,080	13,155,985	30,601,707	4,041,707	32,104,599	36,146,306
2003	4,445,426	6,913,893	11,359,320	10,002,101	3,807,457	11,948,846	25,758,404	4,120,206	32,395,489	36,515,694
2004	4,980,911	7,257,511	12,238,422	8,381,469	4,208,242	11,648,225	24,237,937	4,189,896	32,929,025	37,118,921
2005	4,329,539	6,734,092	11,063,631	8,420,973	4,334,313	12,350,092	25,105,377	4,295,058	32,946,124	37,241,183
2006	4,286,052	6,314,142	10,600,194	8,521,572	4,397,239	12,645,097	25,563,908	4,181,666	32,747,243	36,928,908
2007	4,400,609	6,657,081	11,057,691	9,388,175	4,818,917	13,628,808	27,835,900	4,257,793	33,471,747	37,729,540
2008	5,189,196	6,759,170	11,948,366	10,617,452	5,225,709	14,093,119	29,936,280	4,842,782	35,143,695	39,986,477
2009	5,726,459	6,982,665	12,709,125	9,670,713	4,901,295	14,198,654	28,770,662	4,730,296	33,737,583	38,467,879
2010	6,357,988	8,753,646	15,111,634	11,112,211	5,561,862	15,783,319	32,457,393	5,271,256	36,244,303	41,515,559
2011	6,856,196	9,358,777	16,214,973	12,785,759	6,431,128	18,051,364	37,268,250	5,455,658	37,451,536	42,907,193
2012	7,467,562	9,417,892	16,885,454	13,859,556	6,516,657	20,508,353	40,884,565	5,531,112	38,023,525	43,554,638
2013	7,215,415	9,309,009	16,524,424	14,914,483	7,378,672	20,777,542	43,070,697	5,826,047	39,607,673	45,433,720
2014	7,836,138	9,843,175	17,679,312	14,564,965	7,580,096	20,715,909	42,860,970	5,636,937	36,832,271	42,469,208
2015	8,359,408	10,488,015	18,847,422	15,639,761	7,606,265	23,399,524	46,645,550	6,590,295	39,432,015	46,022,309
2016	9,024,651	11,651,037	20,675,687	16,975,051	7,698,121	30,504,358	55,177,530	6,657,908	44,321,816	50,979,724
2017	8,598,615	12,180,318	20,778,933	18,305,582	8,178,981	28,946,357	55,430,920	6,470,121	42,469,977	48,940,098
2018	**9,636,942**	**12,537,403**	**22,174,345**	**18,466,778**	**8,690,950**	**23,662,037**	**50,819,765**	**7,611,398**	**41,746,392**	**49,357,790**
2019	9,583,873	12,511,083	22,094,955	19,051,329	9,020,188	24,306,145	52,377,661	7,890,710	42,627,612	50,518,322
2020	9,440,104	12,033,962	21,474,066	18,772,566	8,929,686	25,692,568	53,394,820	8,144,046	42,895,794	51,039,840
2021	9,522,818	12,144,330	21,667,147	18,534,803	8,788,474	25,407,837	52,731,114	8,138,747	43,107,862	51,246,609
2022	9,514,617	12,149,243	21,663,860	19,017,504	9,038,058	26,020,490	54,076,053	8,265,650	43,343,774	51,609,424
2023	9,546,946	12,166,707	21,713,653	18,837,091	8,937,057	25,812,776	53,586,924	8,220,393	43,315,070	51,535,463
2024	9,546,421	12,180,187	21,726,608	18,803,611	8,916,911	25,789,500	53,510,022	8,208,711	43,282,644	51,491,356
2025	9,517,208	12,165,017	21,682,224	18,932,190	8,984,767	25,966,309	53,883,267	8,242,372	43,285,524	51,527,896
2026	9,494,702	12,151,459	21,646,161	18,745,259	8,887,932	25,754,285	53,387,476	8,188,043	43,111,759	51,299,802
2027	9,558,309	12,239,834	21,798,143	18,958,157	8,985,642	26,032,384	53,976,183	8,250,353	43,393,544	51,643,897
2028	9,463,863	12,138,884	21,602,747	18,761,876	8,895,326	25,808,925	53,466,127	8,184,049	43,007,299	51,191,348
2029	9,512,675	12,210,491	21,723,166	18,915,099	8,964,166	26,014,765	53,894,030	8,230,116	43,218,640	51,448,757
2030	9,341,072	12,014,580	21,355,651	18,557,151	8,800,993	25,594,320	52,952,464	8,120,001	42,560,139	50,680,140
2031	9,349,587	12,034,957	21,384,545	18,749,303	8,894,598	25,846,966	53,490,866	8,176,174	42,707,523	50,883,697
2032	9,360,926	12,056,409	21,417,335	18,629,033	8,825,799	25,722,101	53,176,933	8,136,909	42,679,552	50,816,462
2033	9,352,688	12,050,741	21,403,429	18,880,820	8,950,936	26,048,799	53,880,554	8,213,112	42,885,099	51,098,211
2034	9,304,768	12,017,293	21,322,061	18,779,196	8,891,346	25,944,987	53,615,529	8,181,829	42,865,939	51,047,768
2035	9,183,965	11,916,170	21,100,135	18,844,524	8,919,068	26,036,334	53,799,926	8,218,599	42,986,440	51,205,039
TOTAL	**320,235,617**	**420,117,438**	**740,353,055**	**619,765,289**	**322,041,216**	**961,256,113**	**1,903,062,618**	**264,012,425**	**1,546,890,503**	**1,810,902,928**

[a] Capital charges repaid through bond debt service prior to 2016 exclude bond cover; capital charges for 2017 and after include both bond debt service and bond cover.

TABLE B-23 Total Transportation and Delta Water Charge for Each Contractor[a] (in dollars)

Calendar Year	SAN JOAQUIN VALLEY AREA								
				Kern					
	Dudley Ridge	Empire	Future Contractor San Joaquin Valley	Municipal and Industrial	Agricultural	Kings	Oak Flat	Tulare	Total
	[11]	[12]	[13]	[14]	[15]	[16]	[17]	[18]	[19]
1961	0	0	0	0	0	0	0	0	0
1962	0	0	0	0	0	0	0	0	0
1963	0	0	0	0	0	0	0	0	0
1964	0	0	2,725	0	0	0	0	0	2,725
1965	0	0	6,029	73,569	0	0	0	0	79,598
1966	0	0	12,039	137,330	0	0	0	0	149,368
1967	0	0	26,257	267,611	0	0	0	0	293,869
1968	228,229	19,523	54,588	445,439	1,725,017	16,947	19,866	309,976	2,819,584
1969	244,412	11,362	87,576	525,094	2,760,818	16,825	19,620	468,863	4,134,571
1970	309,848	34,798	94,675	573,998	3,917,562	21,435	30,650	528,724	5,511,689
1971	331,769	37,526	95,695	605,889	5,251,361	27,175	34,952	720,454	7,104,820
1972	385,925	40,787	98,788	631,615	7,245,067	26,473	64,333	2,009,455	10,502,443
1973	403,710	39,409	97,550	1,025,888	7,387,004	28,816	39,566	791,369	9,813,312
1974	514,684	40,623	98,460	1,144,792	8,108,652	29,544	42,899	1,057,928	11,037,583
1975	688,801	41,072	106,703	1,197,166	9,509,705	31,240	48,525	1,574,051	13,197,262
1976	726,208	43,593	108,084	1,323,840	10,763,787	32,666	52,506	1,454,713	14,505,397
1977	586,357	39,510	112,554	1,367,404	11,090,585	34,434	54,579	1,150,092	14,435,515
1978	705,364	36,029	115,521	1,565,884	13,439,716	38,927	59,414	1,184,969	17,145,824
1979	790,012	48,346	114,253	1,668,951	15,531,864	43,065	71,016	1,740,602	20,008,108
1980	971,508	50,081	125,950	1,770,264	17,187,786	48,021	95,494	1,686,939	21,936,043
1981	1,220,447	84,447	134,169	2,430,802	22,808,100	66,495	101,057	2,298,892	29,144,410
1982	1,256,563	70,641	135,057	2,523,660	25,220,369	70,662	108,723	2,294,467	31,680,142
1983	1,191,250	52,991	149,202	2,085,047	24,885,720	75,442	87,803	508,716	29,036,172
1984	1,501,223	28,973	164,505	3,396,379	33,628,962	94,320	121,892	1,554,171	40,490,426
1985	1,777,490	130,403	184,905	3,891,204	39,615,299	117,583	139,982	2,825,271	48,682,138
1986	2,019,795	79,780	180,445	4,079,838	43,710,172	136,715	153,657	3,673,925	54,034,327
1987	1,895,463	95,698	179,872	4,570,841	43,021,016	137,332	151,907	3,767,707	53,819,836
1988	1,980,906	110,076	193,735	4,734,502	44,973,412	138,278	147,085	3,923,072	56,201,065
1989	2,136,023	102,203	187,913	4,677,357	47,176,608	137,085	166,930	4,405,372	58,989,491
1990	1,889,768	87,407	221,392	4,827,893	45,964,805	121,154	149,243	3,985,159	57,246,819
1991	1,700,421	80,696	220,282	4,535,869	37,840,460	103,909	135,253	3,526,169	48,143,059
1992	2,247,050	105,515	241,455	5,550,167	49,037,556	143,783	176,236	4,564,999	62,066,762
1993	2,469,205	120,518	264,959	5,806,060	54,938,723	161,522	195,801	5,318,853	69,275,641
1994	2,274,028	108,023	306,359	5,210,309	52,409,263	145,625	178,613	4,691,553	65,323,772
1995	2,870,488	115,941	304,297	6,621,491	60,869,418	180,802	210,946	5,550,387	76,723,771
1996	2,062,132	125,630	389,203	6,671,115	58,939,229	178,474	190,558	7,116,153	75,672,494
1997	2,773,395	101,035	276,681	6,521,956	57,715,576	138,117	212,758	4,738,283	72,477,801
1998	2,619,076	120,327	381,847	5,733,156	54,290,792	143,433	204,368	4,991,583	68,484,581
1999	2,718,796	136,853	369,935	6,378,472	58,052,631	184,423	219,579	7,479,349	75,540,038
2000	2,604,236	121,131	302,665	6,100,216	51,606,372	174,158	213,797	6,192,859	67,315,434
2001	3,278,626	145,983	328,028	5,650,458	58,837,260	192,167	259,839	6,459,789	75,152,148
2002	2,996,948	128,109	320,541	6,168,328	53,796,682	187,350	239,267	5,804,868	69,642,092
2003	3,047,295	131,929	339,960	6,533,590	56,320,830	202,324	238,502	6,087,782	72,902,212
2004	3,234,755	168,563	342,484	7,857,831	56,910,006	356,570	254,074	5,843,520	74,967,802
2005	3,793,719	177,152	355,581	7,013,406	67,488,526	690,843	250,862	6,680,789	86,450,878
2006	3,624,732	168,214	295,034	7,502,239	64,677,637	537,182	256,142	5,916,625	82,977,805
2007	3,410,156	159,371	333,578	7,116,420	61,489,794	521,915	253,157	5,854,945	79,139,336
2008	3,384,924	157,107	468,955	7,766,909	62,467,386	547,926	261,720	5,550,023	80,604,950
2009	3,261,399	154,036	435,155	6,914,353	60,738,111	521,242	260,858	5,440,608	77,725,762
2010	3,611,289	231,994	507,229	8,073,489	71,970,654	647,066	324,678	6,454,945	91,821,344
2011	4,572,786	219,605	506,329	9,734,981	90,647,706	741,177	356,966	6,935,582	113,715,133
2012	3,747,804	231,684	467,362	9,806,387	83,639,278	767,007	366,698	7,902,087	106,928,307
2013	4,230,378	232,914	518,813	10,363,237	85,832,456	753,835	381,810	7,385,649	109,699,090
2014	4,041,609	211,255	635,247	9,521,759	79,752,511	685,192	372,626	6,525,283	101,745,480
2015	4,389,924	259,375	755,755	12,013,976	94,586,239	830,370	450,171	8,073,122	121,358,933
2016	4,905,336	315,467	487,099	13,317,505	106,062,191	973,907	521,416	9,489,505	136,072,427
2017	5,689,792	324,945	542,904	15,281,476	118,007,718	1,074,288	545,974	10,297,425	151,764,523
2018	**5,517,741**	**333,145**	**566,035**	**15,797,806**	**117,521,554**	**1,068,536**	**575,655**	**10,352,389**	**151,732,860**
2019	5,610,379	338,336	585,532	16,049,468	119,656,828	1,086,085	582,261	10,526,156	154,435,045
2020	5,231,462	338,409	575,420	16,055,185	118,992,971	1,086,628	584,583	10,522,951	153,387,610
2021	5,023,134	325,148	592,683	15,562,540	115,320,261	1,046,190	558,685	10,142,158	148,570,799
2022	5,300,918	342,835	596,785	16,260,874	120,477,826	1,100,881	591,811	10,651,253	155,323,183
2023	5,164,651	334,203	601,125	15,918,413	118,110,664	1,074,030	574,743	10,401,980	152,179,809
2024	5,127,683	332,023	605,418	15,810,517	117,430,106	1,067,159	570,513	10,333,201	151,276,620
2025	5,202,855	337,062	609,717	16,004,151	118,859,189	1,082,644	579,416	10,468,911	153,143,944
2026	5,084,765	329,915	614,359	15,685,768	116,639,450	1,060,331	565,810	10,249,676	150,230,074
2027	5,166,914	334,801	618,675	15,912,152	118,395,648	1,075,431	574,166	10,404,111	152,481,898
2028	5,083,005	330,312	621,250	15,674,723	116,672,719	1,061,196	565,588	10,242,682	150,251,474
2029	5,136,928	333,522	625,993	15,820,498	117,849,232	1,071,074	570,982	10,344,257	151,752,485
2030	4,993,073	325,741	630,814	15,422,421	114,892,562	1,046,572	556,163	10,067,881	147,935,226
2031	5,095,845	332,232	634,387	15,710,495	117,087,827	1,066,243	566,671	10,257,198	150,750,897
2032	4,980,900	325,002	639,588	15,356,859	114,757,510	1,043,777	554,501	10,046,572	147,704,708
2033	5,117,362	333,614	644,516	15,763,440	117,667,680	1,070,304	568,409	10,297,793	151,463,118
2034	5,022,979	327,683	649,214	15,459,781	115,747,333	1,051,702	558,490	10,124,931	148,942,114
2035	5,066,607	330,447	653,856	15,689,485	117,260,454	1,059,991	559,418	10,205,609	150,825,866
TOTAL	**206,243,256**	**11,863,076**	**24,851,744**	**545,261,986**	**4,407,188,207**	**32,494,013**	**19,752,233**	**400,427,326**	**5,648,081,842**

[a] Capital charges repaid through bond debt service prior to 2016 exclude bond cover; capital charges for 2017 and after include both bond debt service and bond cover.

TABLE B-23 Total Transportation and Delta Water Charge for Each Contractor[a] (in dollars)

	SOUTHERN CALIFORNIA AREA									
Calendar Year	AVEK	Castaic Lake	Coachella	Crestline	Desert	Littlerock	Mojave	Palmdale	San Bernardino	San Gabriel
	[20]	[21]	[22]	[23]	[24]	[25]	[26]	[27]	[28]	[29]
1961	0	0	0	0	0	0	0	0	0	0
1962	0	0	0	0	0	0	0	0	0	0
1963	34,411	0	0	0	726	0	0	0	51,729	0
1964	64,494	27,447	19,542	4,370	38,211	1,143	30,324	8,205	82,811	34,987
1965	121,484	53,007	34,348	7,194	42,701	2,082	53,730	15,222	135,069	35,344
1966	221,012	101,264	62,476	12,478	76,886	3,753	96,944	27,679	232,502	61,465
1967	427,622	210,814	121,269	23,472	148,839	7,284	188,141	54,023	433,350	115,574
1968	754,401	492,179	218,649	41,509	265,168	12,870	336,294	95,466	782,163	208,927
1969	1,090,136	744,106	334,105	61,226	394,024	18,693	500,828	138,063	1,205,834	321,755
1970	1,420,639	944,516	470,423	89,700	552,223	25,231	692,388	184,837	1,778,187	467,573
1971	1,760,670	1,139,702	627,331	128,360	754,065	31,837	931,873	231,280	2,538,219	659,414
1972	2,245,455	1,386,253	819,635	185,868	1,035,804	43,771	1,263,225	287,620	3,758,473	950,297
1973	2,399,531	1,435,375	971,770	190,992	1,264,690	46,059	1,357,568	313,446	4,026,451	961,024
1974	2,520,870	1,531,494	998,399	204,074	1,305,235	48,933	1,418,114	331,702	4,463,660	1,104,491
1975	2,739,680	1,623,639	1,047,544	219,290	1,381,319	53,242	1,506,536	355,270	4,638,827	1,208,046
1976	3,204,880	1,660,864	1,106,524	232,129	1,474,438	57,732	1,584,026	381,276	4,838,364	1,278,740
1977	3,187,208	1,749,438	1,008,676	245,111	1,317,096	54,209	1,672,617	406,620	5,094,241	1,336,313
1978	3,635,572	1,883,408	1,208,919	255,468	1,618,071	56,805	1,721,038	420,026	5,091,935	1,374,033
1979	4,309,554	1,964,097	1,295,874	267,791	1,740,645	60,285	1,897,745	449,757	5,136,839	1,342,135
1980	4,994,298	2,103,379	1,406,781	295,350	1,941,392	67,604	2,071,158	499,051	5,647,604	1,485,141
1981	5,824,304	2,573,759	1,574,217	328,818	2,194,094	100,752	2,394,840	603,265	6,461,840	1,688,324
1982	5,582,860	2,737,748	1,657,630	346,721	2,336,914	82,296	2,368,804	641,991	6,752,799	1,929,664
1983	6,335,170	2,809,415	2,181,785	380,840	3,172,326	88,383	2,566,905	658,613	6,964,704	1,808,748
1984	7,713,111	3,888,823	3,287,286	497,586	4,929,764	96,492	2,834,761	727,821	8,053,209	2,598,232
1985	9,545,818	4,355,837	4,122,840	601,928	6,265,166	103,706	3,026,265	959,657	8,893,342	2,686,799
1986	9,515,134	4,992,199	4,584,188	647,634	7,009,695	130,222	3,210,998	1,223,847	9,142,822	3,398,540
1987	9,550,203	4,850,635	4,452,838	678,086	6,885,936	240,873	3,266,643	1,255,052	10,544,337	3,398,921
1988	9,149,230	5,038,273	4,510,360	704,411	7,052,631	158,845	3,441,812	1,044,206	11,095,193	3,271,137
1989	11,039,912	5,048,242	4,218,204	691,191	6,635,387	210,634	3,523,411	1,746,763	10,811,990	3,453,679
1990	12,432,751	5,516,935	4,916,384	729,229	7,720,886	331,172	3,757,243	1,953,905	11,722,946	4,221,266
1991	9,293,533	4,630,699	3,471,782	688,867	5,335,009	221,166	4,617,501	1,640,084	11,104,874	3,642,610
1992	11,850,715	5,819,388	3,626,099	612,895	5,587,383	174,998	5,596,120	1,532,325	11,144,101	3,694,099
1993	12,264,759	5,466,051	3,830,889	617,198	5,922,476	211,904	5,487,662	1,753,971	12,107,175	4,042,324
1994	14,334,329	6,032,510	3,857,907	694,421	5,963,596	278,012	6,439,362	2,090,724	12,731,704	4,776,753
1995	14,201,115	6,408,157	4,680,553	661,811	7,318,575	212,244	5,632,317	1,952,494	12,204,445	4,480,933
1996	14,628,006	6,639,301	7,634,303	710,651	12,187,480	208,356	5,730,685	2,300,206	12,730,931	4,599,073
1997	15,198,058	6,532,955	7,251,237	750,419	8,515,792	207,887	6,153,470	2,342,198	14,400,157	4,897,487
1998	13,714,014	6,155,761	6,324,675	717,140	7,018,227	209,057	7,756,490	1,946,444	14,309,132	4,177,167
1999	15,620,657	6,779,050	5,427,378	827,907	7,263,387	215,899	8,428,661	2,379,773	15,812,151	5,154,973
2000	14,833,919	10,267,182	3,823,491	793,089	5,621,219	186,831	8,311,240	2,078,945	15,526,880	4,255,999
2001	24,848,284	15,873,355	4,861,082	995,705	7,603,913	199,105	8,999,552	3,986,757	21,480,547	4,397,025
2002	16,403,104	13,164,904	4,133,283	961,222	6,403,149	182,302	8,175,791	3,395,052	22,465,741	5,804,406
2003	17,746,363	14,218,692	4,252,442	931,249	6,597,952	187,473	9,830,797	2,928,893	20,874,712	5,970,925
2004	18,938,223	15,501,571	4,936,955	1,044,004	6,725,098	201,554	10,114,148	3,218,071	25,437,334	5,474,566
2005	19,250,306	14,455,494	18,592,019	863,710	11,611,845	190,110	9,851,393	3,253,662	23,389,329	5,711,879
2006	20,934,322	13,756,021	31,729,520	854,155	11,709,982	201,818	12,682,635	3,209,003	23,320,184	5,781,107
2007	24,148,734	16,784,074	30,445,971	1,080,372	11,080,804	200,705	16,263,385	4,706,167	29,128,286	4,835,475
2008	22,057,023	19,086,825	30,137,911	1,028,225	12,128,962	216,297	14,862,488	4,687,326	29,823,472	5,906,233
2009	20,241,271	17,189,482	28,229,579	1,024,958	10,175,153	222,099	14,800,339	4,478,694	29,942,203	6,488,946
2010	23,892,804	17,505,826	38,246,924	971,309	13,589,794	227,256	17,931,914	3,968,294	32,968,250	8,181,320
2011	30,867,492	17,666,844	40,387,597	1,057,552	14,815,821	251,702	11,926,212	4,069,651	30,699,049	9,018,678
2012	31,522,371	19,575,434	47,280,518	1,170,675	17,358,270	267,092	13,690,656	5,503,651	44,544,240	9,385,126
2013	27,016,426	22,400,551	39,378,142	1,398,640	13,956,704	291,936	13,894,625	4,620,304	35,712,731	7,606,966
2014	22,508,400	21,064,194	34,779,676	1,490,908	11,872,107	295,011	13,908,367	4,708,795	35,844,183	6,550,895
2015	22,604,764	21,600,509	39,679,315	1,545,565	13,945,568	321,888	16,783,886	4,183,124	42,429,939	7,971,534
2016	28,002,074	21,652,456	44,126,498	1,518,347	15,413,480	342,509	19,390,041	4,921,526	49,988,826	9,596,328
2017	36,992,534	24,648,735	44,685,892	1,628,589	16,176,152	519,676	17,250,025	5,270,646	49,713,076	9,741,857
2018	**36,534,569**	**28,383,861**	**53,157,689**	**2,096,846**	**18,776,085**	**617,595**	**25,003,446**	**6,862,496**	**52,648,758**	**10,317,173**
2019	36,906,268	28,133,723	52,059,610	2,114,789	18,709,695	617,448	25,290,010	6,797,920	53,815,627	10,485,429
2020	38,004,456	28,538,335	53,139,900	2,107,846	18,918,684	628,879	25,853,810	7,006,602	53,923,968	10,468,204
2021	38,108,530	28,281,929	52,914,003	2,073,059	18,725,881	619,954	25,588,352	6,884,752	53,357,611	10,320,430
2022	38,905,278	28,733,199	53,043,458	2,095,784	18,923,438	632,835	25,929,250	7,081,738	53,709,218	10,428,682
2023	38,701,192	28,657,322	52,233,379	2,089,569	18,753,015	629,383	25,868,923	7,029,237	53,534,147	10,375,140
2024	38,138,461	28,326,587	51,623,747	2,062,074	18,513,530	620,162	25,537,762	6,898,584	53,082,892	10,247,120
2025	38,557,223	28,665,180	52,092,943	2,079,617	18,695,628	627,044	25,782,978	7,003,206	53,408,936	10,335,168
2026	37,854,491	28,222,895	51,330,130	2,047,783	18,383,657	615,559	25,388,719	6,845,904	52,819,373	10,165,778
2027	38,600,677	28,693,012	52,125,595	2,083,862	18,715,116	627,761	25,830,603	7,000,915	53,505,549	10,349,712
2028	37,963,173	28,289,227	51,524,160	2,053,082	18,442,110	617,388	25,462,189	6,879,171	52,939,012	10,189,718
2029	38,409,528	28,549,855	52,062,883	2,076,022	18,659,385	624,694	25,733,968	6,968,975	53,410,470	10,313,702
2030	37,525,304	27,910,125	51,255,998	2,032,075	18,285,814	610,336	25,212,562	6,810,712	52,601,338	10,088,747
2031	39,056,425	28,610,519	52,865,853	2,099,494	18,929,103	635,358	26,051,889	7,167,712	53,825,961	10,426,303
2032	36,922,049	27,498,046	50,799,215	2,009,751	18,087,965	600,477	24,917,223	6,664,727	52,323,947	9,997,294
2033	39,106,462	28,676,913	53,036,444	2,108,004	18,978,887	636,236	26,160,568	7,172,981	54,003,717	10,461,746
2034	37,097,709	27,697,064	51,174,622	2,022,529	18,218,717	603,443	25,098,790	6,710,901	52,631,145	10,069,548
2035	40,928,821	29,093,197	54,995,289	2,188,390	19,748,427	665,969	27,160,261	7,600,476	55,481,146	10,862,336
TOTAL	**1,353,054,629**	**942,699,857**	**1,524,504,549**	**72,150,985**	**677,917,365**	**19,810,312**	**804,095,300**	**231,528,454**	**1,781,235,908**	**389,447,482**

[a] Capital charges repaid through bond debt service prior to 2016 exclude bond cover; capital charges for 2017 and after include both bond debt service and bond cover.

TABLE B-23 Total Transportation and Delta Water Charge for Each Contractor[a] (in dollars)

Calendar Year	SOUTHERN CALIFORNIA AREA (continued)				FEATHER RIVER AREA					
	San Gorgonio	Metropolitan	Ventura	Total	Yuba City	Butte	Plumas	Total	South Bay Area Future Contractor	Grand Total
	[30]	[31]	[32]	[33]	[34]	[35]	[36]	[37]	[38]	[39]
1961	0	0	0	0	0	0	0	0	0	0
1962	0	0	0	0	0	0	0	0	3,219	79,888
1963	0	690,812	0	777,678	0	0	0	0	12,626	1,628,026
1964	21,735	1,260,513	9,378	1,603,161	0	0	0	0	13,938	2,810,279
1965	21,866	2,180,589	17,766	2,720,401	0	0	405	405	28,937	4,815,355
1966	37,964	3,900,172	33,426	4,868,023	0	0	565	565	31,321	7,409,358
1967	71,283	7,693,703	68,155	9,563,529	0	0	562	562	47,718	13,086,788
1968	128,915	15,317,881	142,803	18,797,226	0	1,050	1,439	2,489	46,945	25,635,408
1969	198,764	23,153,064	215,209	28,375,808	0	1,225	4,120	5,345	52,963	37,067,544
1970	289,633	30,617,164	273,605	37,806,118	0	3,848	17,116	20,964	69,744	48,606,513
1971	409,327	39,958,997	342,425	49,513,501	0	4,546	19,187	23,733	55,532	61,848,581
1972	537,186	54,991,810	422,304	67,927,701	0	4,929	21,150	26,079	80,412	84,157,704
1973	587,963	59,591,118	435,655	73,581,641	0	7,059	21,778	28,837	54,219	89,093,911
1974	611,428	66,008,399	455,565	81,002,365	0	8,336	22,408	30,744	76,783	98,066,105
1975	644,621	71,830,070	478,403	87,726,488	0	9,416	23,523	32,939	84,547	107,004,082
1976	668,315	74,907,214	475,587	91,870,089	0	7,004	23,257	30,261	106,717	112,936,267
1977	696,515	73,338,457	507,063	90,613,564	0	16,917	24,059	40,976	98,618	111,558,643
1978	709,040	81,951,168	523,177	100,448,659	0	12,635	24,225	36,860	100,786	124,620,311
1979	712,866	83,601,786	526,405	103,305,778	0	16,575	28,352	44,927	119,352	130,660,531
1980	862,275	93,029,351	583,628	114,987,014	0	19,834	26,562	46,396	178,812	145,097,919
1981	946,961	112,171,493	672,540	137,535,205	0	21,682	34,563	56,245	185,347	175,688,062
1982	1,021,329	117,143,301	727,623	143,329,679	0	16,117	43,117	59,234	173,894	184,771,125
1983	1,076,279	118,991,007	854,263	147,888,438	0	15,202	29,410	44,612	220,926	186,434,729
1984	1,211,621	156,273,535	933,311	193,045,552	20,590	15,442	31,795	67,827	225,959	245,910,022
1985	1,287,789	194,967,204	993,651	237,810,000	24,050	16,976	32,405	73,431	340,322	301,825,504
1986	1,344,770	218,331,684	1,058,276	264,590,008	31,753	18,145	33,596	83,494	279,227	334,777,960
1987	1,379,613	204,859,482	1,056,318	252,418,936	37,071	17,794	33,384	88,249	345,116	324,904,255
1988	1,465,829	221,667,115	1,124,102	269,723,144	48,058	19,117	33,605	100,780	365,207	346,713,845
1989	1,505,481	230,328,278	1,232,379	280,445,551	61,184	20,809	37,188	119,181	422,329	361,624,353
1990	1,624,763	277,194,766	1,855,991	333,978,237	66,041	20,855	36,812	123,708	474,284	415,988,356
1991	1,720,878	221,887,061	1,549,955	269,804,019	180,212	22,526	42,200	244,938	214,683	340,103,254
1992	1,779,902	245,365,618	1,503,480	298,287,124	208,216	26,028	43,517	277,761	443,676	385,145,618
1993	1,943,336	219,238,180	1,551,253	274,437,179	209,613	26,203	47,588	283,404	599,571	371,117,484
1994	1,920,217	257,365,883	1,475,069	317,960,487	201,284	25,161	46,079	272,524	609,966	413,225,515
1995	1,982,808	225,863,369	1,568,401	287,167,219	216,945	27,118	50,022	294,085	534,971	395,677,358
1996	1,651,239	235,410,311	1,622,641	306,053,184	217,250	27,155	56,622	301,027	571,857	424,421,530
1997	1,758,607	245,453,567	1,777,266	315,239,098	236,300	29,847	59,915	326,062	428,638	439,332,684
1998	1,947,195	227,090,227	1,796,534	293,162,063	128,021	29,927	36,222	194,170	465,095	417,240,412
1999	2,267,918	257,177,969	1,881,647	329,237,369	254,675	31,834	40,585	327,094	584,116	466,758,070
2000	2,540,973	252,908,188	1,968,120	323,116,074	262,163	79,001	43,704	384,868	0	453,576,032
2001	3,486,051	441,710,358	2,260,648	540,702,383	261,699	93,471	45,056	400,226	0	688,978,309
2002	4,834,564	333,573,284	2,305,096	421,801,898	266,107	95,018	47,297	408,422	0	569,492,674
2003	6,118,829	361,640,701	2,321,867	453,620,895	262,547	93,638	68,989	425,174	0	600,581,699
2004	6,478,431	413,357,269	2,609,212	514,036,437	284,387	102,404	29,286	416,077	0	663,015,596
2005	6,758,865	384,539,517	2,082,380	500,550,508	280,033	727,066	28,810	1,035,909	0	661,447,486
2006	7,263,392	359,999,288	2,046,502	493,487,930	292,991	43,185	38,617	374,793	0	649,933,538
2007	7,900,737	438,572,501	2,531,420	587,678,631	291,100	40,957	46,072	378,129	0	743,819,227
2008	9,657,383	411,914,057	2,995,191	564,501,394	306,916	804,536	86,522	1,197,974	0	728,175,441
2009	9,843,470	382,579,121	2,870,106	528,085,421	328,896	855,850	90,625	1,275,371	0	687,034,220
2010	11,028,312	440,910,771	3,039,193	612,461,968	400,358	1,064,565	108,873	1,573,796	0	794,941,693
2011	11,895,858	493,156,897	3,127,932	668,941,285	451,483	1,197,315	121,980	1,770,778	0	880,817,612
2012	13,011,117	485,089,007	3,417,910	691,816,067	460,139	1,318,107	130,850	1,909,096	0	901,978,127
2013	13,601,021	476,349,512	3,405,336	659,632,895	483,119	1,383,934	141,268	2,008,321	0	876,369,148
2014	16,055,963	426,217,186	2,934,389	598,230,074	473,134	1,355,332	140,895	1,969,361	0	804,954,406
2015	18,247,808	469,993,144	3,296,418	662,603,463	614,794	1,761,128	185,768	2,561,690	0	898,039,367
2016	21,575,366	537,620,051	3,832,841	757,980,344	727,229	2,083,208	228,711	3,039,148	0	1,023,924,860
2017	23,060,018	579,200,616	4,187,411	813,075,227	781,362	2,238,278	230,597	3,250,237	0	1,093,239,937
2018	**23,594,607**	**582,727,658**	**4,330,835**	**845,051,619**	**744,687**	**2,133,220**	**230,124**	**3,108,031**	**0**	**1,122,244,410**
2019	23,816,339	590,950,258	4,327,788	854,024,905	755,154	2,163,205	231,599	3,149,958	0	1,136,600,848
2020	24,114,283	600,027,585	4,334,066	867,066,617	753,513	2,158,503	219,028	3,131,044	0	1,149,493,997
2021	24,056,107	594,196,055	4,328,044	859,454,706	755,523	2,164,261	218,990	3,138,774	0	1,136,809,150
2022	24,129,005	601,205,753	4,325,511	869,143,149	753,193	2,157,587	216,697	3,127,477	0	1,154,943,146
2023	24,112,164	597,955,711	4,333,041	864,272,224	754,002	2,159,904	217,015	3,130,921	0	1,146,418,995
2024	24,048,210	590,214,570	4,308,473	853,622,173	752,158	2,154,621	216,296	3,123,075	0	1,134,749,854
2025	24,114,113	595,833,791	4,317,945	861,513,773	748,211	2,143,314	214,754	3,106,279	0	1,144,857,383
2026	24,026,151	586,240,104	4,286,178	848,226,722	744,401	2,132,401	213,266	3,090,068	0	1,127,880,302
2027	24,150,849	596,480,392	4,338,107	862,502,149	748,547	2,144,278	214,887	3,107,712	0	1,145,509,982
2028	24,067,612	587,111,189	4,280,015	849,818,045	737,878	2,113,716	210,718	3,062,312	0	1,129,392,052
2029	24,156,809	593,346,226	4,311,246	858,623,763	740,632	2,121,603	211,795	3,074,030	0	1,140,516,231
2030	24,034,544	578,876,699	4,205,692	839,449,945	723,338	2,072,064	205,037	3,000,439	0	1,115,373,866
2031	24,251,717	594,960,131	4,239,699	863,120,164	723,332	2,072,047	205,035	3,000,414	0	1,142,630,584
2032	24,009,053	571,435,677	4,171,114	829,436,537	723,365	2,072,143	205,050	3,000,558	0	1,105,552,532
2033	24,302,373	595,980,108	4,245,237	864,869,675	723,362	2,072,132	205,051	3,000,545	0	1,145,715,532
2034	24,082,020	575,418,625	4,186,695	835,011,808	723,363	2,072,137	205,055	3,000,555	0	1,112,939,836
2035	24,575,507	612,786,046	4,310,898	890,396,764	723,353	2,072,107	205,053	3,000,513	0	1,170,328,243
TOTAL	**664,045,853**	**23,105,880,362**	**159,157,810**	**31,725,528,867**	**22,697,732**	**54,057,548**	**6,686,704**	**83,441,984**	**8,748,370**	**41,920,119,663**

[a] Capital charges repaid through bond debt service prior to 2016 exclude bond cover; capital charges for 2017 and after include both bond debt service and bond cover.

TABLE B-24 Equivalent Unit Charge for Water Supply for Each Contractor[a] (in dollars per acre-foot)

Project Service Area and Water Supply Contractor	Transportation Charge					Delta Water Charge	Water System Revenue Bond Surcharge	Total Equivalent Unit Charge
	Capital Cost Component	Minimum OMP&R Component	Off-Aqueduct Component	Variable OMP&R Component	Total			
	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]
FEATHER RIVER AREA								
Yuba City	0.00	0.00	0.00	0.00	0.00	144.80	14.38	159.18
Butte	0.00	0.00	0.00	0.00	0.00	614.37	51.13	665.50
Plumas	44.73	5.05	0.00	0.00	49.78	89.07	11.67	150.52
Feather River Area	9.53	1.08	0.00	0.00	10.61	246.85	22.72	280.18
NORTH BAY AREA								
Napa	178.72	76.13	4.88	18.41	278.14	44.89	17.18	340.22
Solano	105.05	66.45	5.30	11.73	188.54	50.50	13.57	252.61
North Bay Area	132.32	70.03	5.15	14.20	221.70	48.42	14.91	285.04
SOUTH BAY AREA								
Alameda-Zone 7	51.77	60.02	9.13	20.27	141.19	46.39	9.70	197.28
Alameda County	30.63	33.99	7.43	13.22	85.28	31.89	5.07	122.24
Santa Clara	24.98	26.19	6.59	11.05	68.81	20.73	3.45	92.98
South Bay Area	30.31	33.03	7.14	12.92	83.41	26.77	4.74	114.93
SAN JOAQUIN VALLEY AREA								
Kings	6.46	9.89	3.82	7.92	28.10	38.08	4.02	70.21
Dudley Ridge	5.54	6.09	3.33	4.82	19.78	20.98	2.24	43.01
Empire	2.35	5.77	2.54	4.47	15.14	23.86	1.86	40.86
Kern	10.19	11.97	5.09	6.75	34.00	26.42	2.96	63.38
Oak Flat	2.29	3.30	2.04	2.98	10.61	22.64	1.88	35.14
Tulare	5.76	6.27	3.26	4.67	19.97	22.16	2.32	44.45
San Joaquin Valley Area	9.41	11.00	4.78	6.41	31.61	25.71	2.86	60.18
CENTRAL COASTAL AREA								
San Luis Obispo	433.05	273.11	13.92	117.97	838.04	214.72	52.17	1,104.93
Santa Barbara	1,122.34	270.33	20.40	97.78	1,510.85	105.78	79.72	1,696.35
Central Coastal Area	976.91	270.92	19.03	102.04	1,368.90	128.76	73.91	1,571.57
SOUTHERN CALIFORNIA AREA								
AVEK	58.98	60.28	33.50	65.47	218.22	56.98	10.16	285.36
Castaic Lake	62.48	66.98	25.74	42.96	198.17	49.43	12.89	260.49
Coachella	86.64	100.61	44.48	75.10	306.84	54.52	11.96	373.32
Crestline	164.84	159.19	35.35	79.58	438.96	84.04	21.31	544.31
Desert	54.59	58.40	53.18	43.02	209.19	34.00	7.61	250.80
Littlerock	100.30	101.87	30.96	64.27	297.40	93.98	16.58	407.96
Mojave	199.57	232.69	34.80	135.74	602.79	163.69	36.41	802.90
Palmdale	61.25	66.04	39.97	100.63	267.90	66.52	10.81	345.23
San Bernardino	298.93	218.49	31.36	77.80	626.58	96.61	26.15	749.34
San Gabriel	125.10	122.67	48.31	48.59	344.68	60.71	15.69	421.08
San Gorgonio	1,814.04	603.82	36.02	217.10	2,670.97	164.32	44.79	2,880.08
Metropolitan	92.47	81.32	39.67	41.29	254.76	50.06	12.09	316.90
Ventura	530.34	478.99	39.07	96.15	1,144.55	319.62	76.70	1,540.87
Southern California Area	97.89	86.01	39.28	46.12	269.30	52.91	12.60	334.80
ALL AREAS	56.39	48.29	20.59	25.33	150.61	38.94	7.85	197.40

[a] Hypothetical charges, which, if assessed on all Table A water delivered to date, all surplus water delivered prior to May 1, 1973, and all Table A water estimated to be delivered during the remainder of the project repayment period (Table B-5B), would provide a sum at the end of the period financially equivalent to all Transportation Charge and Delta Water Charge payments required under a water supply contract, considering interest at the Project Interest Rate, 4.610 percent per annum.

TABLE B-25 Equivalent Unit Transportation Costs of Water Delivered from or through Each Aqueduct Reach[a] (in dollars per acre-foot)

Aqueduct Reach	Unit Cost of Reach[b]						Cumulative Unit Costs from the Delta					
	Capital Costs	Water System Revenue Bond Surcharge[c]	Minimum OMP&R	Off-Aqueduct Costs	Variable OMP&R	Total	Capital Costs	Water System Revenue Bond Surcharge[c]	Minimum OMP&R	Off-Aqueduct Costs	Variable OMP&R	Total
	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]	[12]
NBA												
1	45.71	15.21	17.63	2.50	1.37	82.42	45.71	15.21	17.63	2.50	1.37	82.42
2	48.65	16.18	7.71	0.00	0.00	72.54	94.36	31.39	25.34	2.50	1.37	154.96
3A	8.67	2.88	15.33	4.53	2.22	33.63	103.03	34.27	40.67	7.03	3.59	188.59
3B	55.78	18.56	34.65	3.81	4.93	117.73	150.14	49.95	59.99	6.31	6.30	272.69
SBA												
1	7.99	2.66	20.67	5.62	5.14	42.08	10.22	3.40	24.74	8.35	7.54	54.25
2	0.75	0.25	2.33	0.00	0.00	3.33	10.97	3.65	27.07	8.35	7.54	57.58
4	2.51	0.83	3.98	0.00	0.00	7.32	13.48	4.48	31.05	8.35	7.54	64.90
5	5.28	1.76	3.12	0.00	0.00	10.16	18.76	6.24	34.17	8.35	7.54	75.06
6	0.31	0.10	0.33	0.00	0.00	0.74	19.07	6.34	34.50	8.35	7.54	75.80
7	2.34	0.78	0.60	0.00	0.00	3.72	21.41	7.12	35.10	8.35	7.54	79.52
8	3.17	1.05	1.00	0.00	0.00	5.22	24.58	8.17	36.10	8.35	7.54	84.74
9	6.56	2.18	3.75	0.00	0.00	12.49	31.14	10.35	39.85	8.35	7.54	97.23
CA												
1	2.23	0.74	4.07	2.73	2.40	12.17	2.23	0.74	4.07	2.73	2.40	12.17
2A	1.42	0.47	0.80	0.00	0.00	2.69	3.65	1.21	4.87	2.73	2.40	14.86
2B	0.73	0.24	0.40	0.00	0.00	1.37	4.38	1.45	5.27	2.73	2.40	16.23
3	0.63	0.21	0.30	0.00	0.00	1.14	5.01	1.66	5.57	2.73	2.40	17.37
4	1.01	0.34	2.02	1.31	1.09	5.77	6.02	2.00	7.59	4.04	3.49	23.14
5	0.78	0.26	0.40	0.00	0.00	1.44	6.80	2.26	7.99	4.04	3.49	24.58
6	0.20	0.07	0.20	0.00	0.00	0.47	7.00	2.33	8.19	4.04	3.49	25.05
7	1.16	0.39	0.49	0.00	0.00	2.04	8.16	2.72	8.68	4.04	3.49	27.09
8C	0.02	0.01	0.09	0.00	0.00	0.12	8.18	2.73	8.77	4.04	3.49	27.21
8D	0.45	0.15	0.39	0.00	0.00	0.99	8.63	2.88	9.16	4.04	3.49	28.20
9	0.38	0.13	0.36	0.00	0.00	0.87	9.01	3.01	9.52	4.04	3.49	29.07
10A	0.40	0.13	0.47	0.00	0.00	1.00	9.41	3.14	9.99	4.04	3.49	30.07
11B	0.59	0.20	0.30	0.00	0.00	1.09	10.00	3.34	10.29	4.04	3.49	31.16
12D	0.55	0.18	0.27	0.00	0.00	1.00	10.55	3.52	10.56	4.04	3.49	32.16
12E	0.39	0.13	0.46	0.00	0.00	0.98	10.94	3.65	11.02	4.04	3.49	33.14
13B	0.83	0.28	0.53	0.00	0.00	1.64	11.77	3.93	11.55	4.04	3.49	34.78
14A	3.22	1.07	4.08	2.31	2.05	12.73	14.99	5.00	15.63	6.35	5.54	47.51
14B	0.51	0.17	0.50	0.00	0.00	1.18	15.50	5.17	16.13	6.35	5.54	48.69
14C	0.42	0.14	0.37	0.00	0.00	0.93	15.92	5.31	16.50	6.35	5.54	49.62
15A	2.38	0.79	4.25	2.83	2.22	12.47	18.30	6.10	20.75	9.18	7.76	62.09
16A	3.95	1.31	6.59	6.14	5.19	23.18	22.25	7.41	27.34	15.32	12.95	85.27
17E	13.32	4.43	18.51	21.49	19.15	76.90	35.57	11.84	45.85	36.81	32.10	162.17
17F	3.45	1.15	0.23	0.00	0.00	4.83	39.02	12.99	46.08	36.81	32.10	167.00
18A	3.10	1.03	2.22	0.00	-2.01	4.34	42.12	14.02	48.30	36.81	30.09	171.34
19	2.29	0.76	1.35	0.00	0.00	4.40	44.41	14.78	49.65	36.81	30.09	175.74
19C	2.49	0.83	0.00	0.00	0.00	3.32	46.90	15.61	49.65	36.81	30.09	179.06
20A	1.82	0.61	2.22	0.00	0.00	4.65	48.72	16.22	51.87	36.81	30.09	183.71
20B	2.21	0.74	1.46	0.00	0.00	4.41	50.93	16.96	53.33	0.00	30.09	151.31
21	1.12	0.37	1.02	0.00	0.00	2.51	52.05	17.33	54.35	0.00	30.09	153.82
22A	1.16	0.39	0.53	0.00	0.00	2.08	53.21	17.72	54.88	0.00	30.09	155.90
22B	11.42	3.80	14.32	6.39	6.31	42.24	64.63	21.52	69.20	6.39	36.40	198.14
23	3.14	1.04	0.99	0.00	-2.57	2.60	67.77	22.56	70.19	6.39	33.83	200.74
24	6.09	2.03	2.78	0.00	0.00	10.90	73.86	24.59	72.97	6.39	33.83	211.64
25	4.44	1.48	0.16	0.00	0.00	6.08	78.30	26.07	73.13	6.39	33.83	217.72
26A	4.85	1.61	9.28	0.00	-17.51	(1.77)	83.15	27.68	82.41	6.39	16.32	215.95
28G	9.03	3.00	3.51	0.00	0.00	15.54	92.18	30.68	85.92	6.39	16.32	231.49
28H	8.69	2.89	3.68	0.00	0.00	15.26	100.87	33.57	89.60	6.39	16.32	246.75
28J	97.52	32.44	51.18	0.00	0.00	181.14	198.39	66.01	140.78	6.39	16.32	427.89
EBX												
1	N/A	0.00	0.17	0.00	0.00	0.17	N/A	27.68	82.58	6.39	16.32	132.97
2A	N/A	0.00	1.45	0.00	0.00	1.45	N/A	27.68	84.04	6.39	16.32	134.43
2B	N/A	0.00	57.94	7.51	27.98	93.43	N/A	27.68	141.97	13.90	44.30	227.86
2C	N/A	0.00	4.14	0.00	0.00	4.14	N/A	27.68	146.12	13.90	44.30	232.00
2D	N/A	0.00	0.00	0.00	0.00	0.00	N/A	27.68	146.12	13.90	44.30	232.00
2E	N/A	0.00	0.00	0.00	0.00	0.00	N/A	27.68	146.12	13.90	44.30	232.00
3A	N/A	0.00	122.46	9.06	29.57	161.09	N/A	27.68	268.58	22.96	73.87	393.09
3B	N/A	0.00	4.57	0.00	0.00	4.57	N/A	27.68	273.15	22.96	73.87	397.66
4A	N/A	0.00	4.88	0.00	0.00	4.88	N/A	27.68	278.03	22.96	73.87	402.54
4B	N/A	0.00	51.44	1.16	8.11	60.71	N/A	27.68	329.47	24.12	81.99	463.25
WB												
29A	4.52	1.50	10.63	2.89	2.25	21.79	43.54	14.49	56.71	39.70	34.35	188.79
29F	3.30	1.10	1.27	0.00	0.00	5.67	46.84	15.59	57.98	39.70	34.35	194.46
29G	10.96	3.65	6.04	0.00	-8.10	12.55	57.80	19.24	64.02	39.70	26.25	207.01
29H	6.83	2.27	5.73	0.00	0.00	14.83	64.63	21.51	69.75	39.70	26.25	221.84
29J	11.44	3.81	1.65	0.00	-15.14	1.76	76.07	25.32	71.40	39.70	11.11	223.60
30	18.36	6.11	5.14	0.00	0.00	29.61	94.43	31.43	76.54	39.70	11.11	253.21
CB												
31A	8.31	2.76	24.27	2.11	1.93	39.38	16.94	5.64	33.43	6.15	5.42	67.58
33A	310.37	103.25	45.77	14.62	25.29	499.30	327.31	108.89	79.20	20.77	30.71	566.88
34	221.75	73.77	1.27	0.00	0.00	296.79	549.06	182.66	80.47	20.77	30.71	863.67
35	0.00	0.00	0.00	0.00	0.00	0.00	549.06	182.66	80.47	20.77	30.71	863.67

[a] Representative of transportation unit costs only; does not include a unit cost of conservation. The Delta Water Rate should be added to these values in order to approximate unit costs at canalside. Includes surplus water prior to May 1, 1973.

[b] Hypothetical charges which, if assessed on all Table A water delivered to date, all surplus water delivered prior to May 1, 1973, and all Table A water estimated to be delivered during the remainder of the project repayment period (Table B-5B), would provide a sum at the end of the period financially equivalent to all Transportation Charges required under the water supply contract considering interest rate at the Project Interest Rate of 4.610 percent per annum.

[c] The Water System Revenue Bond (WSRB) Surcharge equivalent unit rate is calculated by multiplying Column 1 by the ratio of the 2018 WSRB surcharge to the sum of the Transportation Capital and the Capital component of the Delta Water Charge.

TABLE B-26 Capital Costs of Each Aqueduct Reach to be Reimbursed through the Capital Cost Component of the East Branch Enlargement Transportation Charge Phase 1 and Phase 2 (in dollars)

Calendar Year	CALIFORNIA AQUEDUCT MOJAVE DIVISION Reach 18A	Reach 19	Reach 20A	Reach 20B	Reach 21	Reach 22A	Reach 22B	Reach 23B
	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]
1952	0	0	0	0	0	0	0	0
1953	0	0	0	0	0	0	0	0
1954	0	0	0	0	0	0	0	0
1955	0	0	0	0	0	0	0	0
1956	0	0	0	0	0	0	0	0
1957	0	0	0	0	0	0	0	0
1958	0	0	0	0	0	0	0	0
1959	0	0	0	0	0	0	0	0
1960	0	0	0	0	0	0	0	0
1961	0	0	0	0	0	0	0	0
1962	0	0	0	0	0	0	0	0
1963	0	0	0	0	0	0	0	0
1964	0	0	0	0	0	0	0	0
1965	0	0	0	0	0	0	0	0
1966	0	0	0	0	0	0	0	0
1967	0	0	0	0	0	0	0	0
1968	0	0	0	0	0	0	0	0
1969	0	0	0	0	0	0	0	0
1970	0	0	0	0	0	0	0	0
1971	0	0	0	0	0	0	0	0
1972	0	0	0	0	0	0	0	0
1973	0	0	0	0	0	0	0	0
1974	0	0	0	0	0	0	0	0
1975	0	0	0	0	0	0	0	0
1976	0	0	0	0	0	0	0	0
1977	0	0	0	0	0	0	0	0
1978	0	0	0	0	0	0	0	0
1979	117,000	0	0	0	0	0	0	0
1980	200,000	0	0	0	0	0	0	74,000
1981	135,000	0	0	0	0	0	0	385,000
1982	1,503,000	0	0	0	0	0	0	1,586,000
1983	2,260,000	0	0	0	0	0	0	2,965,000
1984	735,000	0	0	0	0	0	796,000	1,380,000
1985	93,000	435,000	75,000	544,000	859,000	703,000	970,000	146,000
1986	784,000	4,477,000	3,144,000	2,234,000	1,569,000	1,203,000	1,808,000	34,000
1987	11,000	951,000	1,076,000	666,000	399,000	47,000	16,421,000	43,000
1988	1,000	125,000	1,681,000	1,730,000	2,024,000	40,000	13,326,000	70,000
1989	0	206,000	2,089,000	2,174,000	2,510,000	61,000	11,242,000	229,000
1990	1,000	577,000	903,000	735,000	928,000	194,000	20,131,000	887,000
1991	1,000	280,000	413,000	333,000	422,000	93,000	20,702,000	1,215,000
1992	0	40,000	41,000	39,000	35,000	13,000	9,599,000	3,719,000
1993	0	19,000	16,000	19,000	12,000	6,000	2,319,000	19,654,000
1994	0	2,000	3,000	2,000	4,000	3,000	803,000	3,173,000
1995	0	0	0	0	0	0	223,000	1,465,000
1996	0	0	0	0	0	0	6,014,000	478,000
1997	0	0	0	0	0	0	404,000	1,327,000
1998	0	0	0	0	0	0	0	0
1999	0	0	0	0	0	0	0	0
2000	0	0	0	0	0	0	0	0
2001	0	0	0	0	0	0	0	0
2002	0	0	0	0	0	0	0	0
2003	0	0	0	0	0	0	0	0
2004	0	0	0	0	0	0	0	0
2005	0	0	0	0	0	0	0	0
2006	0	4,366	0	22,095	37,971	0	67,871	0
2007	0	34,564	0	174,915	300,601	0	537,312	0
2008	0	67,077	0	339,450	583,367	0	1,042,743	0
2009	0	90,089	0	455,906	783,502	0	1,400,476	0
2010	0	21,120	0	106,881	183,682	0	328,324	0
2011	0	16,403	0	83,011	142,660	0	254,998	0
2012	0	26,143	0	132,299	227,364	0	406,404	0
2013	0	690	0	3,492	6,002	0	10,728	0
2014	0	4,290	0	21,708	37,307	0	66,685	0
2015	0	3,519	0	17,808	30,604	0	54,704	0
2016	0	0	0	0	0	0	0	0
2017	0	0	0	0	0	0	0	0
2018	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
2019	0	0	0	0	0	0	0	0
2020	0	0	0	0	0	0	0	0
2021	0	0	0	0	0	0	0	0
2022	0	0	0	0	0	0	0	0
2023	0	0	0	0	0	0	0	0
2024	0	0	0	0	0	0	0	0
2025	0	0	0	0	0	0	0	0
2026	0	0	0	0	0	0	0	0
2027	0	0	0	0	0	0	0	0
2028	0	0	0	0	0	0	0	0
2029	0	0	0	0	0	0	0	0
2030	0	0	0	0	0	0	0	0
2031	0	0	0	0	0	0	0	0
2032	0	0	0	0	0	0	0	0
2033	0	0	0	0	0	0	0	0
2034	0	0	0	0	0	0	0	0
2035	0	0	0	0	0	0	0	0
TOTAL	**5,841,000**	**7,380,261**	**9,441,000**	**9,833,565**	**11,095,061**	**2,363,000**	**108,928,245**	**38,830,000**

TABLE B-26 Capital Costs of Each Aqueduct Reach to be Reimbursed through the Capital Cost Component of the East Branch Enlargement Transportation Charge Phase 1 and Phase 2 (in dollars)

Calendar Year	CALIFORNIA AQUEDUCT (continued)							GRAND TOTAL
	MOJAVE DIVISION (continued)			SANTA ANA DIVISION				
	Reach 23C	Reach 24	Total	Reach 25	Reach 26A	Reach 26B	Total	
	[9]	[10]	[11]	[12]	[13]	[14]	[15]	[16]
1952	0	0	0	0	0	0	0	0
1953	0	0	0	0	0	0	0	0
1954	0	0	0	0	0	0	0	0
1955	0	0	0	0	0	0	0	0
1956	0	0	0	0	0	0	0	0
1957	0	0	0	0	0	0	0	0
1958	0	0	0	0	0	0	0	0
1959	0	0	0	0	0	0	0	0
1960	0	0	0	0	0	0	0	0
1961	0	0	0	0	0	0	0	0
1962	0	0	0	0	0	0	0	0
1963	0	0	0	0	0	0	0	0
1964	0	0	0	0	0	0	0	0
1965	0	0	0	0	0	0	0	0
1966	0	0	0	0	0	0	0	0
1967	0	0	0	0	0	0	0	0
1968	0	0	0	0	0	0	0	0
1969	0	0	0	0	0	0	0	0
1970	0	0	0	0	0	0	0	0
1971	0	0	0	0	0	0	0	0
1972	0	0	0	0	0	0	0	0
1973	0	0	0	0	0	0	0	0
1974	0	0	0	0	0	0	0	0
1975	0	0	0	0	0	0	0	0
1976	0	0	0	0	0	0	0	0
1977	0	0	0	0	0	0	0	0
1978	0	0	0	0	0	0	0	0
1979	0	0	117,000	0	0	0	0	117,000
1980	0	0	274,000	0	0	0	0	274,000
1981	0	0	520,000	0	0	0	0	520,000
1982	0	0	3,089,000	0	0	0	0	3,089,000
1983	0	0	5,225,000	0	0	0	0	5,225,000
1984	0	0	2,911,000	0	0	0	0	2,911,000
1985	0	0	3,825,000	0	528,000	89,000	617,000	4,442,000
1986	25,000	0	15,278,000	0	1,926,000	154,000	2,080,000	17,358,000
1987	178,000	0	19,792,000	0	3,699,000	437,000	4,136,000	23,928,000
1988	632,000	0	19,629,000	0	5,667,000	3,329,000	8,996,000	28,625,000
1989	1,130,000	0	19,641,000	0	40,879,000	1,650,000	42,529,000	62,170,000
1990	2,066,000	0	26,422,000	0	29,853,000	1,650,000	31,503,000	57,925,000
1991	4,980,000	0	28,439,000	0	26,027,000	999,000	27,026,000	55,465,000
1992	11,920,000	0	25,406,000	0	15,317,000	299,000	15,616,000	41,022,000
1993	16,303,000	0	38,348,000	0	4,878,000	0	4,878,000	43,226,000
1994	7,081,000	0	11,071,000	0	3,151,000	0	3,151,000	14,222,000
1995	5,350,000	0	7,038,000	0	2,137,000	0	2,137,000	9,175,000
1996	1,706,000	0	8,198,000	0	9,181,000	0	9,181,000	17,379,000
1997	1,905,000	0	3,636,000	0	175,000	0	175,000	3,811,000
1998	28,000	0	28,000	0	0	0	0	28,000
1999	0	0	0	0	0	0	0	0
2000	0	0	0	0	0	0	0	0
2001	0	0	0	0	0	0	0	0
2002	0	0	0	0	0	0	0	0
2003	0	0	0	0	0	0	0	0
2004	0	0	0	0	0	0	0	0
2005	0	0	0	0	0	0	0	0
2006	0	0	132,302	0	0	0	0	132,302
2007	0	0	1,047,392	0	0	0	0	1,047,392
2008	0	0	2,032,638	0	0	0	0	2,032,638
2009	0	0	2,729,973	0	0	0	0	2,729,973
2010	0	0	640,008	0	0	0	0	640,008
2011	0	0	497,072	0	0	0	0	497,072
2012	0	0	792,210	0	0	0	0	792,210
2013	0	0	20,913	0	0	0	0	20,913
2014	0	0	129,990	0	0	0	0	129,990
2015	0	0	106,635	0	0	0	0	106,635
2016	0	0	0	0	0	0	0	0
2017	0	0	0	0	0	0	0	0
2018	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
2019	0	0	0	0	0	0	0	0
2020	0	0	0	0	0	0	0	0
2021	0	0	0	0	0	0	0	0
2022	0	0	0	0	0	0	0	0
2023	0	0	0	0	0	0	0	0
2024	0	0	0	0	0	0	0	0
2025	0	0	0	0	0	0	0	0
2026	0	0	0	0	0	0	0	0
2027	0	0	0	0	0	0	0	0
2028	0	0	0	0	0	0	0	0
2029	0	0	0	0	0	0	0	0
2030	0	0	0	0	0	0	0	0
2031	0	0	0	0	0	0	0	0
2032	0	0	0	0	0	0	0	0
2033	0	0	0	0	0	0	0	0
2034	0	0	0	0	0	0	0	0
2035	0	0	0	0	0	0	0	0
TOTAL	**53,304,000**	**0**	**247,016,132**	**0**	**143,418,000**	**8,607,000**	**152,025,000**	**399,041,132**

TABLE B-27 Minimum OMP&R Costs of Each Aqueduct Reach to be Reimbursed through Minimum OMP&R Component of the East Branch Enlargement Transportation Charge Phase 1 and Phase 2 (in dollars)

Sheet 1 of 2

Calendar Year	CALIFORNIA AQUEDUCT MOJAVE DIVISION							
	Reach 18A	Reach 19	Reach 20A	Reach 20B	Reach 21	Reach 22A	Reach 22B	Reach 23B
	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]
1971	0	0	0	0	0	0	0	0
1972	0	0	0	0	0	0	0	0
1973	0	0	0	0	0	0	0	0
1974	0	0	0	0	0	0	0	0
1975	0	0	0	0	0	0	0	0
1976	0	0	0	0	0	0	0	0
1977	0	0	0	0	0	0	0	0
1978	0	0	0	0	0	0	0	0
1979	0	0	0	0	0	0	0	0
1980	0	0	0	0	0	0	0	0
1981	0	0	0	0	0	0	0	0
1982	0	0	0	0	0	0	0	0
1983	0	0	0	0	0	0	0	0
1984	0	0	0	0	0	0	0	0
1985	0	0	0	0	0	0	0	0
1986	0	0	0	0	0	0	0	0
1987	0	0	0	0	0	0	0	0
1988	0	0	0	0	0	0	0	0
1989	0	0	0	0	0	0	0	0
1990	0	0	0	0	0	0	0	0
1991	0	0	0	0	0	0	0	0
1992	0	0	0	0	0	0	0	0
1993	0	0	0	0	0	0	0	0
1994	0	0	0	0	0	0	1,048,625	0
1995	0	0	0	0	0	0	953,814	0
1996	0	0	0	0	0	0	1,171,411	0
1997	0	0	0	0	0	0	1,110,038	0
1998	0	0	0	0	0	0	1,213,002	0
1999	1,229	517	646	409	383	169	668,466	0
2000	4,452	1,875	2,340	1,484	1,386	614	1,310,774	0
2001	347	146	183	116	108	48	1,034,428	0
2002	1,639	690	861	546	510	226	1,533,205	0
2003	0	0	0	0	0	0	1,818,330	0
2004	2,132	27,868	18,579	18,731	10,355	8,528	1,473,712	0
2005	1,243	16,250	10,833	10,922	6,038	4,973	1,028,465	0
2006	3,279	42,860	28,573	28,807	15,926	13,116	1,464,704	0
2007	0	0	0	0	0	0	1,407,641	0
2008	0	0	0	0	0	0	2,054,203	0
2009	(4)	(46)	(31)	(31)	(17)	(14)	1,718,626	0
2010	(1)	(8)	(5)	(5)	(3)	(2)	1,808,494	0
2011	0	0	0	0	0	0	1,898,122	0
2012	4	54	36	36	20	17	1,908,193	0
2013	0	0	0	0	0	0	1,989,690	0
2014	231	3,023	2,015	2,032	1,123	925	2,501,292	0
2015	(697)	(9,108)	(6,072)	(6,122)	(3,385)	(2,787)	2,627,155	0
2016	0	0	0	0	0	0	2,888,120	0
2017	0	0	0	0	0	0	2,494,079	0
2018	**0**	**0**	**0**	**0**	**0**	**0**	**2,961,060**	**0**
2019	0	0	0	0	0	0	3,237,223	0
2020	0	0	0	0	0	0	3,237,223	0
2021	0	0	0	0	0	0	3,237,223	0
2022	0	0	0	0	0	0	3,237,223	0
2023	0	0	0	0	0	0	3,237,223	0
2024	0	0	0	0	0	0	3,237,223	0
2025	0	0	0	0	0	0	3,237,223	0
2026	0	0	0	0	0	0	3,237,223	0
2027	0	0	0	0	0	0	3,237,223	0
2028	0	0	0	0	0	0	3,237,223	0
2029	0	0	0	0	0	0	3,237,223	0
2030	0	0	0	0	0	0	3,237,223	0
2031	0	0	0	0	0	0	3,237,223	0
2032	0	0	0	0	0	0	3,237,223	0
2033	0	0	0	0	0	0	3,237,223	0
2034	0	0	0	0	0	0	3,237,223	0
2035	0	0	0	0	0	0	3,237,223	0
TOTAL	**13,855**	**84,122**	**57,959**	**56,926**	**32,445**	**25,812**	**97,118,439**	**0**

TABLE B-27 Minimum OMP&R Costs of Each Aqueduct Reach to be Reimbursed through Minimum OMP&R Component of the East Branch Enlargement Transportation Charge Phase 1 and Phase 2 (in dollars)

Calendar Year	CALIFORNIA AQUEDUCT (continued)							GRAND TOTAL
	MOJAVE DIVISION (continued)			SANTA ANA DIVISION				
	Reach 23C	Reach 24	Subtotal	Reach 25	Reach 26A[a]	Reach 26B	Subtotal	
	[9]	[10]	[11]	[12]	[13]	[14]	[15]	[16]
1971	0	0	0	0	0	0	0	0
1972	0	0	0	0	0	0	0	0
1973	0	0	0	0	0	0	0	0
1974	0	0	0	0	0	0	0	0
1975	0	0	0	0	0	0	0	0
1976	0	0	0	0	0	0	0	0
1977	0	0	0	0	0	0	0	0
1978	0	0	0	0	0	0	0	0
1979	0	0	0	0	0	0	0	0
1980	0	0	0	0	0	0	0	0
1981	0	0	0	0	0	0	0	0
1982	0	0	0	0	0	0	0	0
1983	0	0	0	0	0	0	0	0
1984	0	0	0	0	0	0	0	0
1985	0	0	0	0	0	0	0	0
1986	0	0	0	0	0	0	0	0
1987	0	0	0	0	0	0	0	0
1988	0	0	0	0	0	0	0	0
1989	0	0	0	0	0	0	0	0
1990	0	0	0	0	0	0	0	0
1991	0	0	0	0	0	0	0	0
1992	0	0	0	0	0	0	0	0
1993	0	0	0	0	0	0	0	0
1994	0	0	1,048,625	0	1,713,260	0	1,713,260	2,761,885
1995	0	0	953,814	0	1,452,549	0	1,452,549	2,406,363
1996	0	0	1,171,411	0	1,350,581	0	1,350,581	2,521,992
1997	679,826	0	1,789,864	0	1,528,509	0	1,528,509	3,318,373
1998	825,038	0	2,038,040	0	1,619,068	0	1,619,068	3,657,108
1999	382,178	0	1,053,997	0	956,229	0	956,229	2,010,227
2000	735,392	0	2,058,318	0	1,406,680	0	1,406,680	3,464,998
2001	812,064	0	1,847,440	0	798,363	0	798,363	2,645,802
2002	727,222	0	2,264,899	0	1,130,735	0	1,130,735	3,395,634
2003	899,530	0	2,717,859	0	1,234,283	0	1,234,283	3,952,142
2004	913,367	0	2,473,273	0	1,806,947	0	1,806,947	4,280,220
2005	1,036,431	0	2,115,156	0	1,850,269	0	1,850,269	3,965,425
2006	837,967	0	2,435,233	0	1,760,147	0	1,760,147	4,195,380
2007	1,304,590	0	2,712,231	0	2,794,232	0	2,794,232	5,506,463
2008	1,056,077	0	3,110,280	0	2,703,400	0	2,703,400	5,813,680
2009	1,529,591	0	3,248,074	0	2,832,688	0	2,832,688	6,080,763
2010	1,434,301	0	3,242,771	0	2,411,279	0	2,411,279	5,654,050
2011	1,813,653	0	3,711,776	0	2,101,292	0	2,101,292	5,813,068
2012	1,255,363	0	3,163,724	0	2,309,162	0	2,309,162	5,472,886
2013	1,503,045	0	3,492,735	0	2,755,300	0	2,755,300	6,248,034
2014	1,889,846	0	4,400,487	0	3,275,793	0	3,275,793	7,676,281
2015	1,953,191	0	4,552,174	0	4,425,825	0	4,425,825	8,977,999
2016	2,199,962	0	5,088,082	0	3,922,276	0	3,922,276	9,010,358
2017	1,957,199	0	4,451,278	0	4,095,035	0	4,095,035	8,546,313
2018	**2,175,004**	**0**	**5,136,064**	**0**	**3,764,632**	**0**	**3,764,632**	**8,900,696**
2019	2,446,488	0	5,683,711	0	3,859,528	0	3,859,528	9,543,239
2020	2,446,488	0	5,683,711	0	3,859,528	0	3,859,528	9,543,239
2021	2,446,488	0	5,683,711	0	3,859,528	0	3,859,528	9,543,239
2022	2,446,488	0	5,683,711	0	3,859,528	0	3,859,528	9,543,239
2023	2,446,488	0	5,683,711	0	3,859,528	0	3,859,528	9,543,239
2024	2,446,488	0	5,683,711	0	3,859,528	0	3,859,528	9,543,239
2025	2,446,488	0	5,683,711	0	3,859,528	0	3,859,528	9,543,239
2026	2,446,488	0	5,683,711	0	3,859,528	0	3,859,528	9,543,239
2027	2,446,488	0	5,683,711	0	3,859,528	0	3,859,528	9,543,239
2028	2,446,488	0	5,683,711	0	3,859,528	0	3,859,528	9,543,239
2029	2,446,488	0	5,683,711	0	3,859,528	0	3,859,528	9,543,239
2030	2,446,488	0	5,683,711	0	3,859,528	0	3,859,528	9,543,239
2031	2,446,488	0	5,683,711	0	3,859,528	0	3,859,528	9,543,239
2032	2,446,488	0	5,683,711	0	3,859,528	0	3,859,528	9,543,239
2033	2,446,488	0	5,683,711	0	3,859,528	0	3,859,528	9,543,239
2034	2,446,488	0	5,683,711	0	3,859,528	0	3,859,528	9,543,239
2035	2,446,488	0	5,683,711	0	3,859,528	0	3,859,528	9,543,239
TOTAL	**69,511,135**	**0**	**166,900,693**	**0**	**121,610,509**	**0**	**121,610,509**	**288,511,202**

[a] Units 3 and 4 at Devil Canyon Powerplant were operational in 1993.

TABLE B-28 Capital Costs of East Branch Enlargement Transportation Facilities Allocated to Each Contractor Phase 1 and Phase 2 (in dollars)

Calendar Year	SOUTHERN CALIFORNIA AREA							Total
	AVEK	Coachella	Desert	Mojave	Palmdale	San Bernardino	Metropolitan	
	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]
1971	0	0	0	0	0	0	0	0
1972	0	0	0	0	0	0	0	0
1973	0	0	0	0	0	0	0	0
1974	0	0	0	0	0	0	0	0
1975	0	0	0	0	0	0	0	0
1976	0	0	0	0	0	0	0	0
1977	0	0	0	0	0	0	0	0
1978	0	0	0	0	0	0	0	0
1979	0	11,731	1,010	10,566	466	0	93,227	117,000
1980	0	28,241	4,708	27,495	797	0	212,759	274,000
1981	0	56,134	16,676	61,271	538	0	385,381	520,000
1982	0	326,180	76,872	337,913	5,988	0	2,342,047	3,089,000
1983	0	554,658	138,964	582,070	9,004	0	3,940,304	5,225,000
1984	0	306,514	68,842	314,468	2,928	0	2,218,248	2,911,000
1985	49,675	447,266	65,773	347,262	4,514	21,614	3,505,896	4,442,000
1986	185,353	1,757,633	236,324	1,363,586	41,900	78,842	13,694,362	17,358,000
1987	49,735	2,455,279	378,535	1,774,447	10,615	151,421	19,107,968	23,928,000
1988	124,534	2,689,959	500,466	1,712,431	13,783	231,982	23,351,845	28,625,000
1989	155,446	7,118,094	2,423,000	1,671,088	17,419	1,673,409	49,111,544	62,170,000
1990	62,786	6,459,229	1,943,918	2,234,452	8,680	1,222,053	45,993,882	57,925,000
1991	28,686	6,265,822	1,875,066	2,168,712	4,024	1,065,433	44,057,257	55,465,000
1992	2,911	4,826,764	1,610,921	1,359,335	471	627,012	32,594,586	41,022,000
1993	1,205	5,094,237	1,828,410	2,722,156	212	199,684	33,380,096	43,226,000
1994	273	1,726,376	631,816	478,543	27	128,988	11,255,977	14,222,000
1995	0	1,130,963	423,243	206,978	0	87,480	7,326,336	9,175,000
1996	0	2,025,987	645,296	606,205	0	375,830	13,725,682	17,379,000
1997	0	451,011	154,366	205,796	0	7,164	2,992,663	3,811,000
1998	0	3,551	1,293	0	0	0	23,156	28,000
1999	0	0	0	0	0	0	0	0
2000	0	0	0	0	0	0	0	0
2001	0	0	0	0	0	0	0	0
2002	0	0	0	0	0	0	0	0
2003	0	0	0	0	0	0	0	0
2004	0	0	0	0	0	0	0	0
2005	0	0	0	0	0	0	0	0
2006	1,368	13,170	1,134	11,862	103	0	104,665	132,302
2007	10,827	104,265	8,976	93,908	819	0	828,597	1,047,392
2008	21,011	202,344	17,420	182,243	1,589	0	1,608,031	2,032,638
2009	28,220	271,762	23,397	244,765	2,134	0	2,159,695	2,729,973
2010	6,616	63,711	5,485	57,382	500	0	506,314	640,008
2011	5,138	49,482	4,260	44,567	389	0	393,236	497,072
2012	8,189	78,862	6,789	71,028	619	0	626,723	792,210
2013	216	2,082	179	1,875	16	0	16,545	20,913
2014	1,344	12,940	1,114	11,655	102	0	102,835	129,990
2015	1,102	10,615	914	9,561	83	0	84,360	106,635
2016	0	0	0	0	0	0	0	0
2017	0	0	0	0	0	0	0	0
2018	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
2019	0	0	0	0	0	0	0	0
2020	0	0	0	0	0	0	0	0
2021	0	0	0	0	0	0	0	0
2022	0	0	0	0	0	0	0	0
2023	0	0	0	0	0	0	0	0
2024	0	0	0	0	0	0	0	0
2025	0	0	0	0	0	0	0	0
2026	0	0	0	0	0	0	0	0
2027	0	0	0	0	0	0	0	0
2028	0	0	0	0	0	0	0	0
2029	0	0	0	0	0	0	0	0
2030	0	0	0	0	0	0	0	0
2031	0	0	0	0	0	0	0	0
2032	0	0	0	0	0	0	0	0
2033	0	0	0	0	0	0	0	0
2034	0	0	0	0	0	0	0	0
2035	0	0	0	0	0	0	0	0
TOTAL	**744,635**	**44,544,862**	**13,095,167**	**18,913,620**	**127,720**	**5,870,912**	**315,744,217**	**399,041,133**

TABLE B-29 Capital Cost Component of East Branch Enlargement Facilities Transportation Charge for Each Contractor[a b] (in dollars)

Calendar Year	SOUTHERN CALIFORNIA AREA							Total
	AVEK	Coachella	Desert	Mojave	Palmdale	San Bernardino[c]	Metropolitan	
	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]
1971	0	0	0	0	0	0	0	0
1972	0	0	0	0	0	0	0	0
1973	0	0	0	0	0	0	0	0
1974	0	0	0	0	0	0	0	0
1975	0	0	0	0	0	0	0	0
1976	0	0	0	0	0	0	0	0
1977	0	0	0	0	0	0	0	0
1978	0	0	0	0	0	0	0	0
1979	0	0	0	0	0	0	0	0
1980	0	0	0	0	0	0	0	0
1981	0	0	0	0	0	0	0	0
1982	0	0	0	0	0	0	0	0
1983	0	0	0	0	0	0	0	0
1984	0	0	0	0	0	0	0	0
1985	0	0	0	0	0	0	0	0
1986	0	0	0	0	0	0	0	0
1987	0	0	0	0	0	0	0	0
1988	18,266	1,209,293	360,156	502,810	3,356	0	8,552,529	10,646,410
1989	19,176	1,269,524	378,094	527,854	3,523	0	8,978,504	11,176,675
1990	19,186	1,270,244	378,308	528,153	3,525	0	8,983,597	11,183,013
1991	19,187	1,270,261	378,314	528,160	3,525	0	8,983,717	11,183,164
1992	38,420	2,543,616	757,549	1,057,606	7,059	0	17,989,315	22,393,565
1993	40,029	2,650,139	789,274	1,101,897	7,354	0	18,742,682	23,331,375
1994	39,705	2,628,706	782,890	1,092,986	7,295	0	18,591,099	23,142,681
1995	39,632	2,623,828	781,438	1,090,958	7,281	0	18,556,603	23,099,740
1996	39,825	2,636,667	785,261	1,096,296	7,317	0	18,647,406	23,212,772
1997	41,743	2,763,629	823,074	1,149,085	7,669	0	19,545,322	24,330,522
1998	42,642	2,823,126	840,793	1,173,823	7,834	0	19,966,108	24,854,326
1999	44,738	2,961,887	882,120	1,231,519	8,219	0	20,947,475	26,075,958
2000	49,031	3,246,109	966,768	1,349,695	9,008	0	22,957,586	28,578,197
2001	49,048	3,247,263	967,111	1,350,175	9,011	0	22,965,748	28,588,356
2002	47,894	3,170,848	944,353	1,318,402	8,799	0	22,425,318	27,915,614
2003	40,765	2,698,871	803,787	1,122,160	7,489	0	19,087,337	23,760,409
2004	44,199	2,926,222	871,498	1,216,690	8,120	0	20,695,237	25,761,966
2005	33,144	2,194,299	653,514	912,364	6,089	0	15,518,826	19,318,236
2006	46,979	3,110,276	926,313	1,293,217	8,631	0	21,996,926	27,382,342
2007	45,289	2,998,370	892,985	1,246,688	8,321	0	21,205,488	26,397,141
2008	42,491	2,813,118	837,813	1,169,662	7,806	0	19,895,328	24,766,218
2009	43,670	2,891,182	861,062	1,202,121	8,023	0	20,447,424	25,453,482
2010	44,839	2,968,619	884,125	1,234,318	8,238	0	20,995,084	26,135,223
2011	43,190	2,859,419	851,602	1,188,914	7,935	0	20,222,785	25,173,845
2012	43,704	2,893,449	861,737	1,203,063	8,029	0	20,463,459	25,473,441
2013	37,663	2,493,469	742,614	1,036,756	6,919	0	17,634,660	21,952,081
2014	39,985	2,647,224	788,406	1,100,685	7,346	0	18,722,067	23,305,713
2015	44,642	2,955,568	880,238	1,228,892	8,202	0	20,902,785	26,020,327
2016	45,025	2,952,620	878,340	1,230,001	8,218	0	20,886,144	26,000,348
2017	68,023	4,389,688	1,310,045	1,811,034	12,144	0	31,012,447	38,603,381
2018	**66,209**	**4,284,695**	**1,279,366**	**1,765,979**	**11,840**	**0**	**30,267,339**	**37,675,428**
2019	66,541	4,295,054	1,282,367	1,770,076	11,872	0	30,339,849	37,765,759
2020	65,273	4,187,628	1,248,748	1,730,048	11,609	0	29,589,307	36,832,613
2021	66,330	4,281,512	1,278,384	1,764,290	11,832	0	30,243,747	37,646,095
2022	64,001	4,123,966	1,231,029	1,700,146	11,405	0	29,132,341	36,262,888
2023	52,926	3,379,820	1,007,972	1,395,246	9,370	0	23,878,747	29,724,081
2024	55,272	3,550,845	1,059,537	1,464,840	9,829	0	25,085,485	31,225,808
2025	63,096	4,039,506	1,204,082	1,670,205	11,209	0	28,545,334	35,533,432
2026	26,058	1,586,112	471,781	655,672	4,433	0	11,205,843	13,949,899
2027	26,512	1,618,235	481,615	668,192	4,517	0	11,431,309	14,230,380
2028	18,235	1,051,241	310,264	440,265	2,997	0	7,437,405	9,260,407
2029	18,680	1,099,258	325,537	457,638	3,108	0	7,771,989	9,676,210
2030	20,307	195,564	16,836	176,137	1,536	0	1,554,155	1,964,535
2031	20,236	194,875	16,778	175,516	1,530	0	1,548,678	1,957,613
2032	20,276	195,266	16,811	175,869	1,534	0	1,551,790	1,961,546
2033	20,251	195,026	16,790	175,652	1,531	0	1,549,876	1,959,126
2034	20,283	195,325	16,816	175,921	1,534	0	1,552,251	1,962,130
2035	20,293	195,420	16,825	176,008	1,535	0	1,553,008	1,963,089
TOTAL	**1,922,909**	**118,776,882**	**35,141,120**	**49,833,684**	**335,506**	**0**	**840,757,459**	**1,046,767,560**

[a] 1988 through 2016 charges are debt service only and do not include bond cover; 2017 charges and after include both debt service and bond cover.

[b] East Branch Enlargement Phase 2 debt service schedule starts in 2016, and this table is the sum of East Branch Enlargement Phase 1 and Phase 2 capital charges for each contractor.

[c] Under Article 49(d)(4)(A) of its contract, San Bernardino Valley Municipal Water District elected to pay a portion of its allocated costs of East Branch Enlargement in advance rather than to participate in payment of Water System Revenue Bonds. This election was made via a letter of agreement signed June 1, 1987. As of June 1999, $6,347,938 has been received from the San Bernardino Valley Municipal Water District.

TABLE B-30 Minimum OMP&R Component of East Branch Enlargement Facilities Transportation Charge for Each Contractor (in dollars)

Calendar Year	SOUTHERN CALIFORNIA AREA							Total
	AVEK	Coachella	Desert	Mojave	Palmdale	San Bernardino	Metropolitan	
	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]
1971	0	0	0	0	0	0	0	0
1972	0	0	0	0	0	0	0	0
1973	0	0	0	0	0	0	0	0
1974	0	0	0	0	0	0	0	0
1975	0	0	0	0	0	0	0	0
1976	0	0	0	0	0	0	0	0
1977	0	0	0	0	0	0	0	0
1978	0	0	0	0	0	0	0	0
1979	0	0	0	0	0	0	0	0
1980	0	0	0	0	0	0	0	0
1981	0	0	0	0	0	0	0	0
1982	0	0	0	0	0	0	0	0
1983	0	0	0	0	0	0	0	0
1984	0	0	0	0	0	0	0	0
1985	0	0	0	0	0	0	0	0
1986	0	0	0	0	0	0	0	0
1987	0	0	0	0	0	0	0	0
1988	0	0	0	0	0	0	0	0
1989	0	0	0	0	0	0	0	0
1990	0	0	0	0	0	0	0	0
1991	0	0	0	0	0	0	0	0
1992	0	0	0	0	0	0	0	0
1993	0	0	0	0	0	0	0	0
1994	0	320,415	101,486	95,075	0	70,133	2,174,776	2,761,885
1995	0	278,176	86,604	86,479	0	59,461	1,895,643	2,406,363
1996	0	287,293	82,991	106,208	0	55,287	1,990,213	2,521,992
1997	0	389,636	123,446	100,643	0	62,571	2,642,077	3,318,373
1998	0	429,772	135,927	109,979	0	66,278	2,915,152	3,657,108
1999	37	236,006	75,040	60,907	11	39,144	1,599,082	2,010,227
2000	132	402,818	121,284	119,930	40	57,583	2,763,211	3,464,998
2001	10	307,323	89,527	93,873	3	32,682	2,122,384	2,645,802
2002	49	388,806	107,887	139,410	15	46,287	2,713,180	3,395,634
2003	0	451,900	123,861	164,862	0	50,526	3,160,993	3,952,142
2004	1,278	499,301	153,131	141,292	265	73,969	3,410,984	4,280,220
2005	745	471,965	156,985	97,723	154	75,742	3,162,111	3,965,425
2006	1,965	487,548	147,442	144,604	407	72,053	3,341,361	4,195,380
2007	0	657,550	223,135	127,626	0	114,384	4,383,768	5,506,463
2008	0	679,733	212,365	186,248	0	110,665	4,624,669	5,813,680
2009	(2)	722,197	238,293	155,809	0	115,958	4,848,508	6,080,763
2010	0	666,324	211,945	163,968	0	98,707	4,513,106	5,654,050
2011	0	684,580	213,521	172,096	0	86,018	4,656,853	5,813,068
2012	2	640,882	199,041	173,024	1	94,527	4,365,409	5,472,886
2013	0	736,427	235,244	180,399	0	112,790	4,983,174	6,248,034
2014	139	903,175	285,688	227,616	29	134,097	6,125,537	7,676,281
2015	(418)	1,064,390	351,407	235,687	(87)	181,174	7,145,846	8,977,999
2016	0	1,061,590	338,147	261,856	0	160,561	7,188,204	9,010,358
2017	0	1,012,804	332,839	226,130	0	167,633	6,806,907	8,546,313
2018	**0**	**1,045,998**	**329,124**	**268,469**	**0**	**154,108**	**7,102,997**	**8,900,696**
2019	0	1,120,126	349,171	293,508	0	157,992	7,622,442	9,543,239
2020	0	1,120,126	349,171	293,508	0	157,992	7,622,442	9,543,239
2021	0	1,120,126	349,171	293,508	0	157,992	7,622,442	9,543,239
2022	0	1,120,126	349,171	293,508	0	157,992	7,622,442	9,543,239
2023	0	1,120,126	349,171	293,508	0	157,992	7,622,442	9,543,239
2024	0	1,120,126	349,171	293,508	0	157,992	7,622,442	9,543,239
2025	0	1,120,126	349,171	293,508	0	157,992	7,622,442	9,543,239
2026	0	1,120,126	349,171	293,508	0	157,992	7,622,442	9,543,239
2027	0	1,120,126	349,171	293,508	0	157,992	7,622,442	9,543,239
2028	0	1,120,126	349,171	293,508	0	157,992	7,622,442	9,543,239
2029	0	1,120,126	349,171	293,508	0	157,992	7,622,442	9,543,239
2030	0	1,120,126	349,171	293,508	0	157,992	7,622,442	9,543,239
2031	0	1,120,126	349,171	293,508	0	157,992	7,622,442	9,543,239
2032	0	1,120,126	349,171	293,508	0	157,992	7,622,442	9,543,239
2033	0	1,120,126	349,171	293,508	0	157,992	7,622,442	9,543,239
2034	0	1,120,126	349,171	293,508	0	157,992	7,622,442	9,543,239
2035	0	1,120,126	349,171	293,508	0	157,992	7,622,442	9,543,239
TOTAL	**3,937**	**33,868,751**	**10,612,267**	**8,829,549**	**838**	**4,978,202**	**230,217,658**	**288,511,202**

TABLE B-31 Total East Branch Enlargement Facilities Transportation Charge for Each Contractor (in dollars)

Calendar Year	SOUTHERN CALIFORNIA AREA							Total
	AVEK	Coachella	Desert	Mojave	Palmdale	San Bernardino	Metropolitan	
	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]
1971	0	0	0	0	0	0	0	0
1972	0	0	0	0	0	0	0	0
1973	0	0	0	0	0	0	0	0
1974	0	0	0	0	0	0	0	0
1975	0	0	0	0	0	0	0	0
1976	0	0	0	0	0	0	0	0
1977	0	0	0	0	0	0	0	0
1978	0	0	0	0	0	0	0	0
1979	0	0	0	0	0	0	0	0
1980	0	0	0	0	0	0	0	0
1981	0	0	0	0	0	0	0	0
1982	0	0	0	0	0	0	0	0
1983	0	0	0	0	0	0	0	0
1984	0	0	0	0	0	0	0	0
1985	0	0	0	0	0	0	0	0
1986	0	0	0	0	0	0	0	0
1987	0	0	0	0	0	0	0	0
1988	18,266	1,209,293	360,156	502,810	3,356	0	8,552,529	10,646,410
1989	19,176	1,269,524	378,094	527,854	3,523	0	8,978,504	11,176,675
1990	19,186	1,270,244	378,308	528,153	3,525	0	8,983,597	11,183,013
1991	19,187	1,270,261	378,314	528,160	3,525	0	8,983,717	11,183,164
1992	38,420	2,543,616	757,549	1,057,606	7,059	0	17,989,315	22,393,565
1993	40,029	2,650,139	789,274	1,101,897	7,354	0	18,742,682	23,331,375
1994	39,705	2,949,121	884,376	1,188,061	7,295	70,133	20,765,875	25,904,566
1995	39,632	2,902,004	868,042	1,177,437	7,281	59,461	20,452,246	25,506,103
1996	39,825	2,923,960	868,252	1,202,504	7,317	55,287	20,637,619	25,734,764
1997	41,743	3,153,265	946,520	1,249,728	7,669	62,571	22,187,399	27,648,895
1998	42,642	3,252,898	976,720	1,283,802	7,834	66,278	22,881,260	28,511,434
1999	44,775	3,197,893	957,160	1,292,426	8,230	39,144	22,546,557	28,086,185
2000	49,163	3,648,927	1,088,052	1,469,625	9,048	57,583	25,720,797	32,043,195
2001	49,058	3,554,586	1,056,638	1,444,048	9,014	32,682	25,088,132	31,234,158
2002	47,943	3,559,654	1,052,240	1,457,812	8,814	46,287	25,138,498	31,311,248
2003	40,765	3,150,771	927,648	1,287,022	7,489	50,526	22,248,330	27,712,551
2004	45,477	3,425,523	1,024,629	1,357,982	8,385	73,969	24,106,221	30,042,186
2005	33,889	2,666,264	810,499	1,010,087	6,243	75,742	18,680,937	23,283,661
2006	48,944	3,597,824	1,073,755	1,437,821	9,038	72,053	25,338,287	31,577,722
2007	45,289	3,655,920	1,116,120	1,374,314	8,321	114,384	25,589,256	31,903,604
2008	42,491	3,492,851	1,050,178	1,355,910	7,806	110,665	24,519,997	30,579,898
2009	43,668	3,613,379	1,099,355	1,357,930	8,023	115,958	25,295,932	31,534,245
2010	44,839	3,634,943	1,096,070	1,398,286	8,238	98,707	25,508,190	31,789,273
2011	43,190	3,543,999	1,065,123	1,361,010	7,935	86,018	24,879,638	30,986,913
2012	43,706	3,534,331	1,060,778	1,376,087	8,030	94,527	24,828,868	30,946,327
2013	37,663	3,229,896	977,858	1,217,155	6,919	112,790	22,617,834	28,200,115
2014	40,124	3,550,399	1,074,094	1,328,301	7,375	134,097	24,847,604	30,981,994
2015	44,224	4,019,958	1,231,645	1,464,579	8,115	181,174	28,048,631	34,998,326
2016	45,025	4,014,210	1,216,487	1,491,857	8,218	160,561	28,074,348	35,010,706
2017	68,023	5,402,492	1,642,884	2,037,164	12,144	167,633	37,819,354	47,149,694
2018	**66,209**	**5,330,693**	**1,608,490**	**2,034,448**	**11,840**	**154,108**	**37,370,336**	**46,576,124**
2019	66,541	5,415,180	1,631,538	2,063,584	11,872	157,992	37,962,291	47,308,998
2020	65,273	5,307,754	1,597,919	2,023,556	11,609	157,992	37,211,749	46,375,852
2021	66,330	5,401,638	1,627,555	2,057,798	11,832	157,992	37,866,189	47,189,334
2022	64,001	5,244,092	1,580,200	1,993,654	11,405	157,992	36,754,783	45,806,127
2023	52,926	4,499,946	1,357,143	1,688,754	9,370	157,992	31,501,189	39,267,320
2024	55,272	4,670,971	1,408,708	1,758,348	9,829	157,992	32,707,927	40,769,047
2025	63,096	5,159,632	1,553,253	1,963,713	11,209	157,992	36,167,776	45,076,671
2026	26,058	2,706,238	820,952	949,180	4,433	157,992	18,828,285	23,493,138
2027	26,512	2,738,361	830,786	961,700	4,517	157,992	19,053,751	23,773,619
2028	18,235	2,171,367	659,435	733,773	2,997	157,992	15,059,847	18,803,646
2029	18,680	2,219,384	674,708	751,146	3,108	157,992	15,394,431	19,219,449
2030	20,307	1,315,690	366,007	469,645	1,536	157,992	9,176,597	11,507,774
2031	20,236	1,315,001	365,949	469,024	1,530	157,992	9,171,120	11,500,852
2032	20,276	1,315,392	365,982	469,377	1,534	157,992	9,174,232	11,504,785
2033	20,251	1,315,152	365,961	469,160	1,531	157,992	9,172,318	11,502,365
2034	20,283	1,315,451	365,987	469,429	1,534	157,992	9,174,693	11,505,369
2035	20,293	1,315,546	365,996	469,516	1,535	157,992	9,175,450	11,506,328
TOTAL	**1,926,846**	**152,645,633**	**45,753,387**	**58,663,233**	**336,344**	**4,978,202**	**1,070,975,117**	**1,335,278,762**

CONVERSION FACTORS

Quantity	To convert from customary unit	To metric units	Multiply customary unit by	To convert to customary unit, multiply metric unit by
Length	inches (in)	millimeters (mm)●	25.4	0.03937
	inches (in)	centimeters (cm)	2.54	0.3937
	feet (ft)	meters (m)	0.3048	3.2808
	miles (mi)	kilometers (km)	1.6093	0.62139
Area	square inches (in^2)	square millimeters (mm^2)	645.16	0.00155
	square feet (ft^2)	square meters (m^2)	0.092903	10.764
	acres (ac)	hectares (ha)	0.40469	2.4710
	square miles (mi^2)	square kilometers (km^2)	2.590	0.3861
Volume	gallons (gal)	liters (L)	3.7854	0.26417
	million gallons (10^6 gal)	megaliters (ML)	3.7854	0.26417
	cubic feet (ft^3)	cubic meters (m^3)	0.028317	35.315
	cubic yards (yd^3)	cubic meters (m^3)	0.76455	1.308
	acre-feet (af)	thousand cubic meters ($m^3 \times 10^3$)	1.2335	0.8107
	acre-feet (af)	hectare-meters (ha - m)■	0.1234	8.107
	thousand acre-feet (taf)	million cubic meters ($m^3 \times 10^6$)	1.2335	0.8107
	thousand acre-feet (taf)	hectare-meters (ha - m)■	123.35	0.008107
	million acre-feet (maf)	billion cubic meters ($m^3 \times 10^9$)◆	1.2335	0.8107
	million acre-feet (maf)	cubic kilometers (km^3)	1.2335	0.8107
Flow	cubic feet per second (ft^3/s)	cubic meters per second (m^3/s)	0.028317	35.315
	gallons per minute (gal/min)	liters per minute (L/min)	3.7854	0.26417
	gallons per day (gal/day)	liters per day (L/day)	3.7854	0.26417
	million gallons per day (mgd)	megaliters per day (ML/day)	3.7854	0.26417
	acre-feet per day (af/day)	thousand cubic meters per day ($m^3 \times 10^3$/day)	1.2335	0.8107
Mass	pounds (lb)	kilograms (kg)	0.45359	2.2046
	tons (short, 2,000 lb)	megagrams (Mg)	0.90718	1.1023
Velocity	feet per second (ft/s)	meters per second (m/s)	0.3048	3.2808
Power	horsepower (hp)	kilowatts (kW)	0.746	1.3405
Pressure	pounds per square inch (psi)	kilopascals (kPa)	6.8948	0.14505
	feet head of water	kilopascals (kPa)	2.989	0.32456
Specific capacity	gallons per minute per foot of drawdown	liters per minute per meter of drawdown	12.419	0.08052
Concentration	parts per million (ppm)	milligrams per liter (mg/L)	1.0	1.0
Electrical conductivity	micromhos per centimeter (µmhos/cm)	microsiemens per centimeter (µS/cm)	1.0	1.0
Temperature	degrees Fahrenheit (°F)	degrees Celsius (°C)	(°F - 32)/1.8	(1.8 x °C) + 32

● When using "dual units," inches are normally converted to millimeters (rather than centimeters).

■ Not used often in metric countries, but is offered as a conceptual equivalent of customary western U.S. practice (a standard depth of water over a given area of land).

◆ ASTM Manual E380 discourages the use of billion cubic meters since that magnitude is represented by giga (a thousand million) in other countries. It is shown here for potential use for quantifying large reservoir volumes (similar to million acre-feet).

OTHER COMMON CONVERSION FACTORS

1 cubic foot=7.48 gallons=62.4 pounds of water

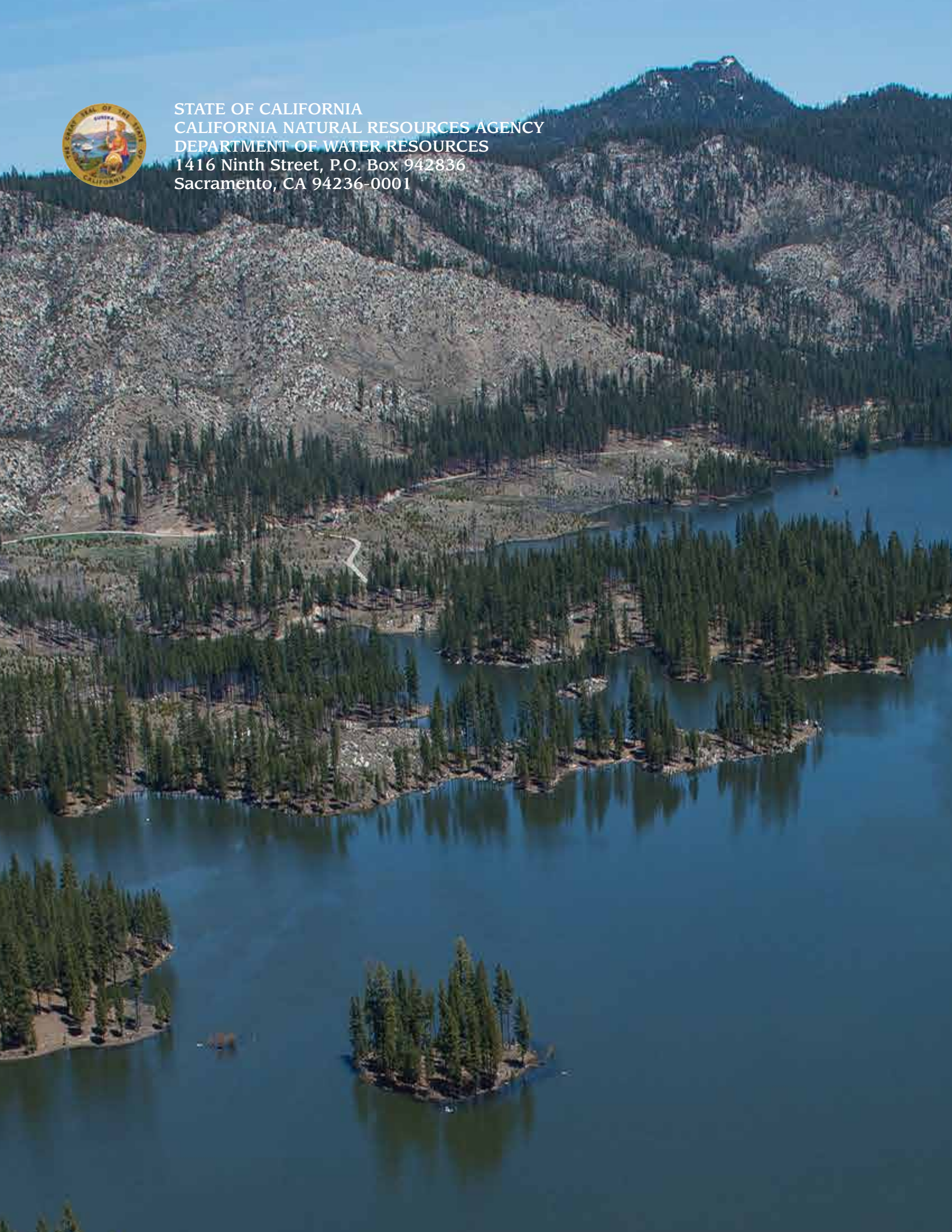
1 cubic foot per second (cfs)=450 gallons per minute (gpm)

1 cfs=646,320 gallons per day=1.98 af a day

1 acre-foot=approximately 325,851 gallons=43,560 cubic feet

1 million gallons=3.07 acre-feet

1 million gallons per day (mgd)=1,120 af a year



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