

IRP Technical Process Update

IRP Member Agency Technical Workgroup
May 18, 2015

IRP Member Agency Workgroup Process

- IRP/RUWMP Kick-off April 8th
- Water Use Efficiency Meeting April 16th
- Uncertainty April 22nd
- Imported Supplies May 18th

IRP Committee Items

April 28, 2015

- IRP Public Outreach
- Review of 2010 IRP targets and current conditions
- Monthly IRP technical process update

IRP Technical Process Homework

- Input on IRP Issue Papers
- Local supply projects inventory



IRP Technical Update Imported Supplies

Member Agency Technical Workgroup
May 18, 2015

Presentation Overview

- Colorado River Aqueduct
- State Water Project
- Central Valley Transfers and Storage
- Next steps

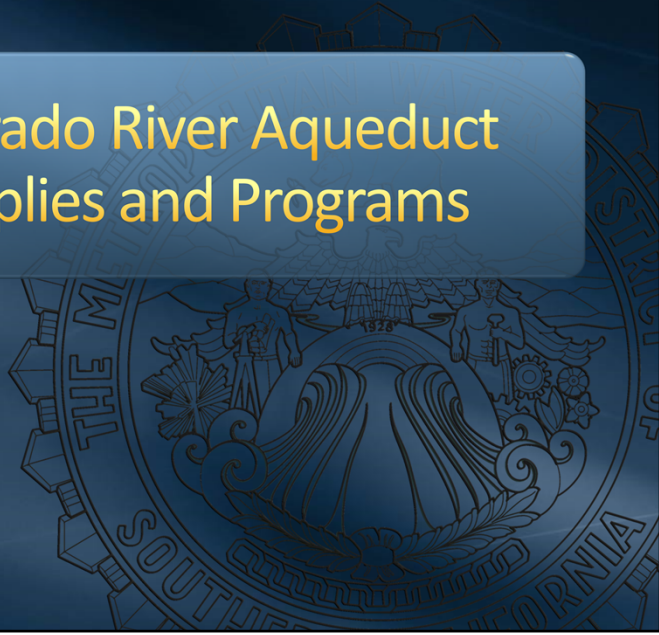
Meeting Objectives

- Review and receive input on IRP technical approach
 - Identify additional technical refinements to be completed
- Provide an overview of imported supply topics impacting the IRP
- Facilitate discussion of imported supply issues
 - Collect policy and implementation issues for consideration by the Board

CRA Topics Overview

- Colorado River supplies and programs
 - Modeling of supplies that vary by year
- Colorado River issues and discussion
 - Obligations and future paybacks
 - Storage and transfers
 - Minimizing CRA supply losses
 - Dealing with drought
 - Uncertain future of the Salton Sea

Colorado River Aqueduct Supplies and Programs



2010 IRP Update Target

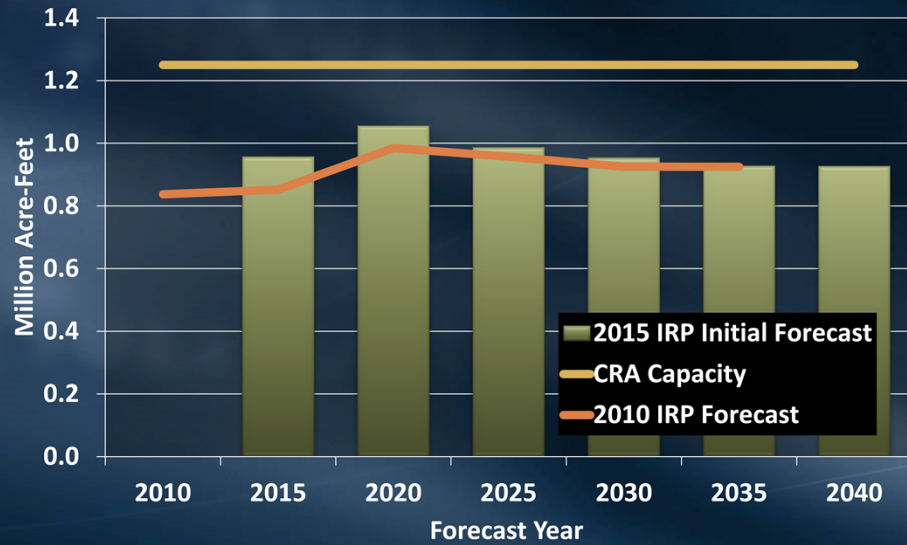
CRA

- Develop dry-year supply programs to fill the aqueduct when needed

- Colorado River Aqueduct capacity assumed to be 1.25 MAF annually
- Dry-year forecast based on average of driest 10% of hydrology set
 - Included Basic Apportionment, Surplus, current programs, and adjustments
- Remaining capacity would be filled by dry-year program development and storage

Colorado River Dry-Year Supplies

2010 IRP Target and 2015 Initial Forecast



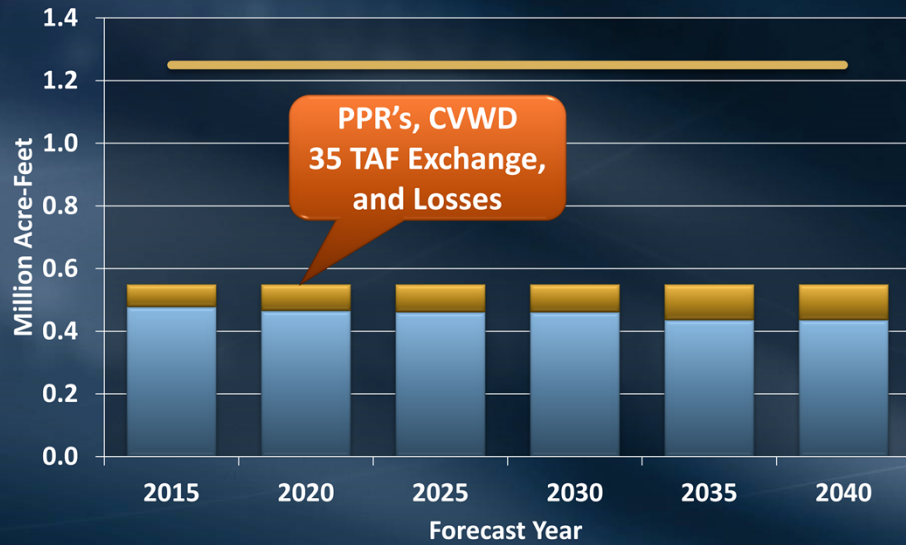
CRA Supplies and Programs

2015 IRP Technical Update



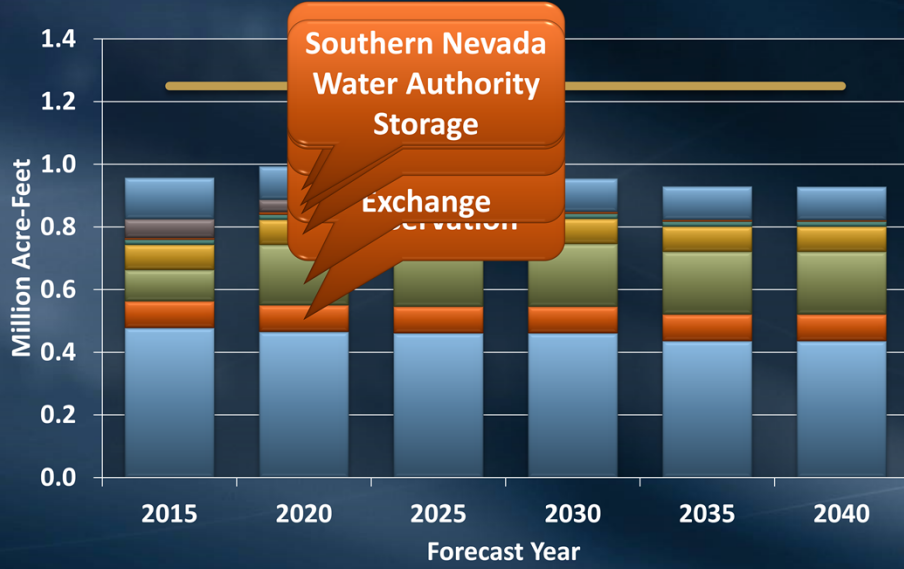
CRA Supplies and Programs

2015 IRP Technical Update



CRA Supplies and Programs

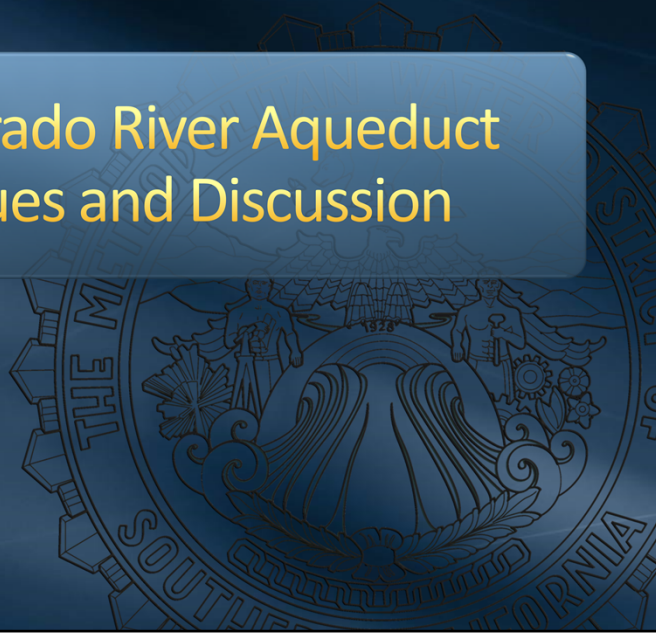
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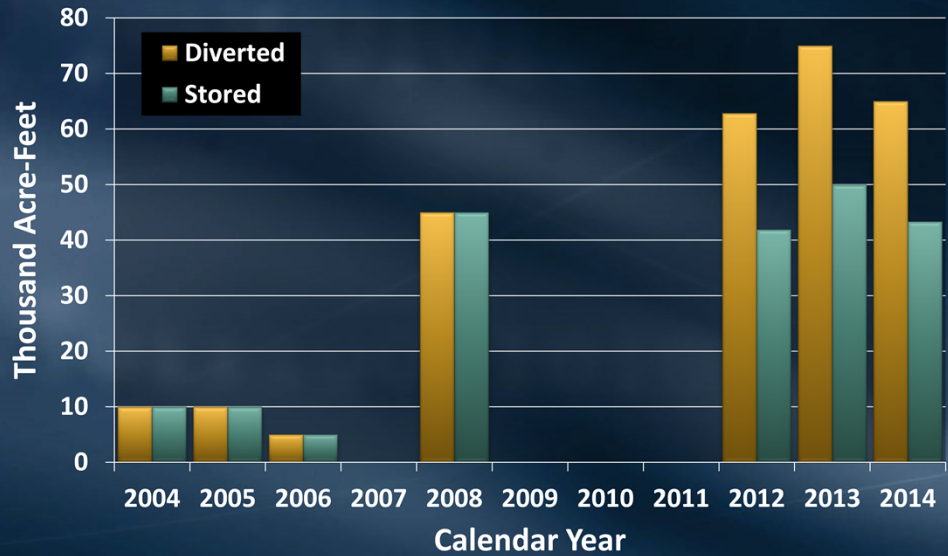
Supplies That Will Be Modeled in IRPSIM

- PVID Following, CVWD 35 TAF Exchange, etc.
- Actual values will be based on final IRP modeling results
 - If a dry-year target is retained, the 10% driest hydrology years will be reselected

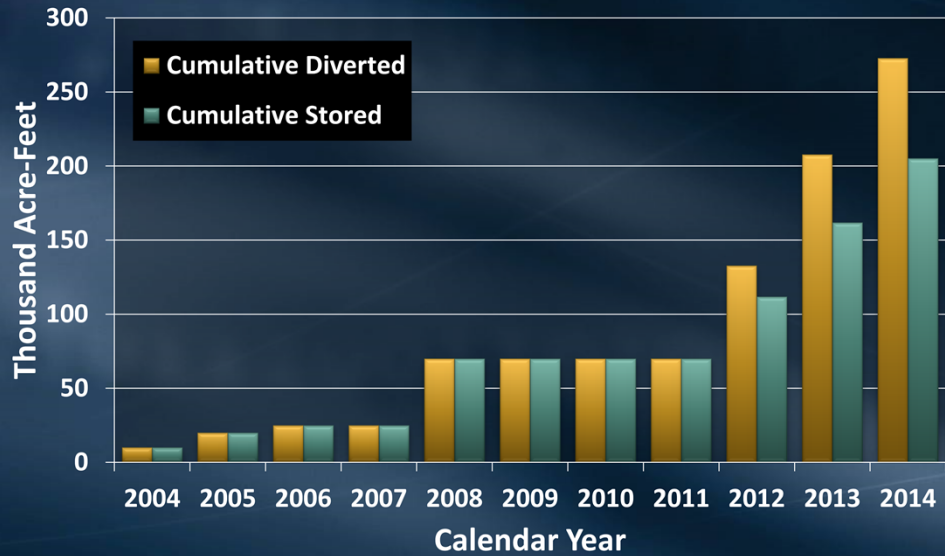
Colorado River Aqueduct Issues and Discussion

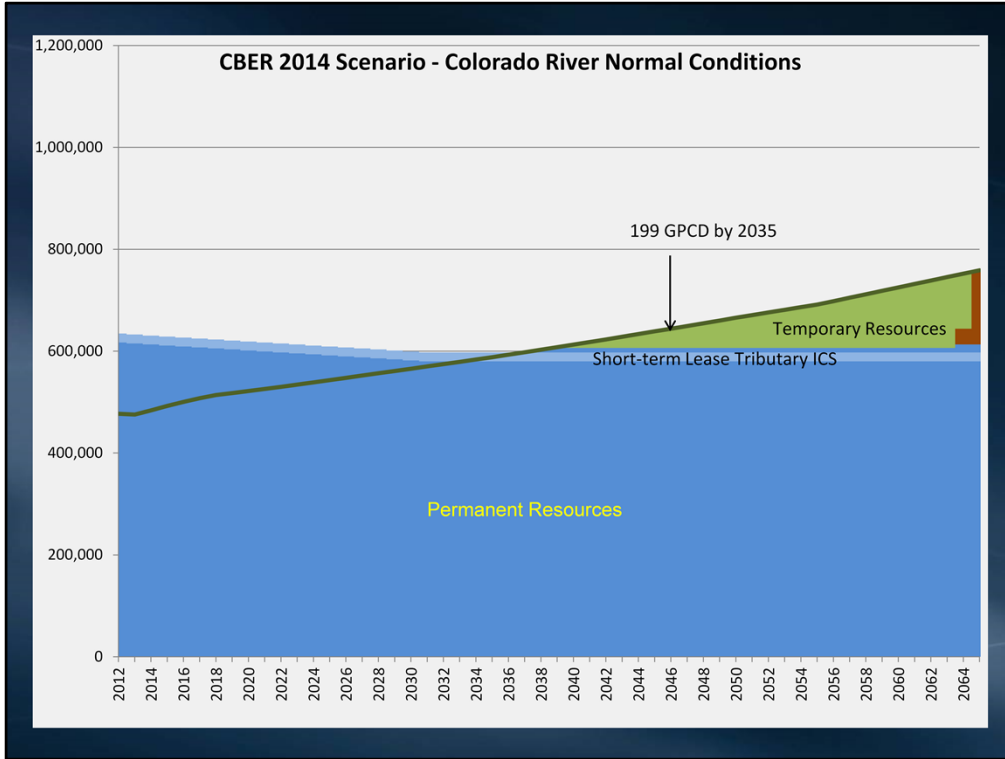


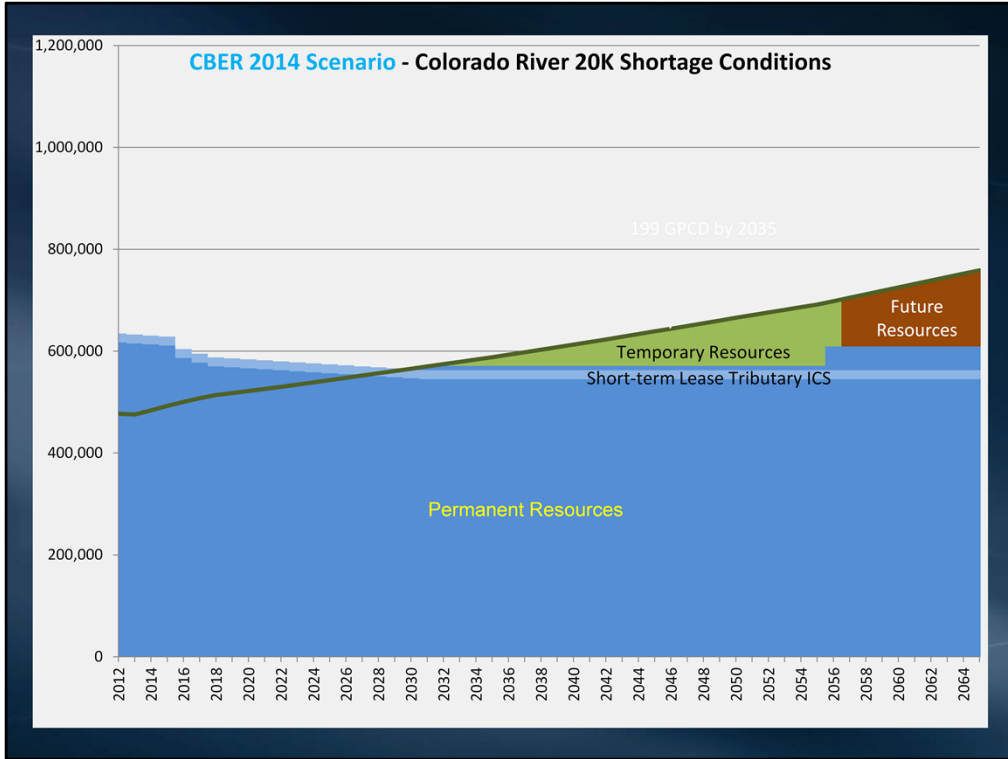
Southern Nevada Water Authority Storage Account



Southern Nevada Water Authority Storage Account







Obtaining Additional CR Supplies

- As needed, Metropolitan implements short-term transfers
 - Emergency PVID following
 - Funding Yuma Desalter
 - Conservation in Mexico
- Metropolitan will continue to explore and develop short-term transfers as needed

Issue #1: Minimizing Colorado River Supply Losses



1931 Seven Party Agreement

	<u>MAF</u>
1. Palo Verde Irrigation District	} 3.850
2. Yuma Project	
3. Imperial Irrigation District/ Coachella Valley Water District	
4. Metropolitan WD	<u>0.550</u>
Subtotal	<u>4.400</u>
5. Metropolitan WD	<u>0.700</u>
Total	<u>5.100</u>

So these agencies needed to figure out a way to divide up the 4.4

But they didn't need to start from scratch, back in 1931 an agreement was reached that outlined how CA share of CR water would be allocated, called the 7 party agreement

They came up with a priority system

Quantification Settlement Agreement Quantified Water Budgets

	<u>maf</u>
PVID	
Yuma Project	
	} 0.42 (Average)
IID	3.10
CVWD	0.33
MWD *	0.55
Total	4.40

* Amount fluctuates based on PVID/Yuma Project use, unused IID and CVWD water

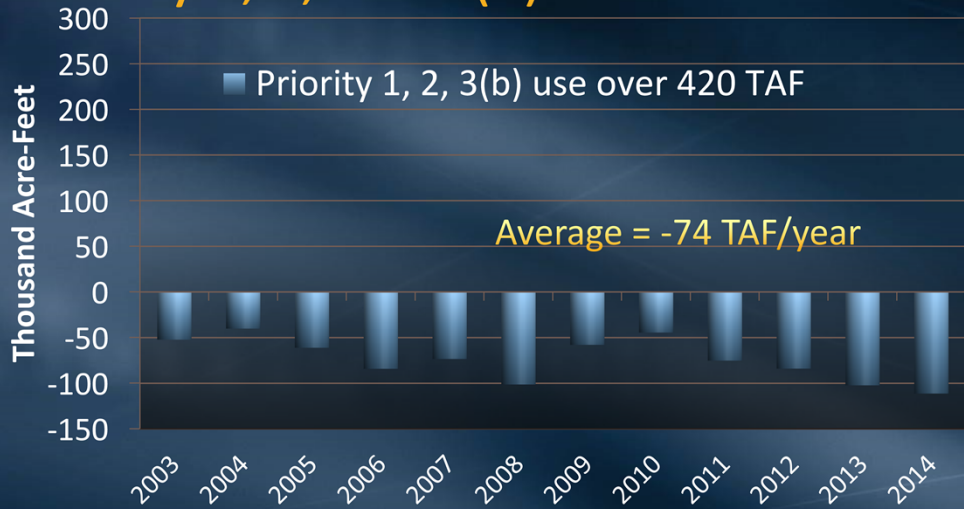
On April 24, 1930, Metropolitan and the Secretary entered into a water delivery contract pursuant to the Boulder Canyon Project Act. As a result of concerns voiced over the contract by other California agencies, and to provide more specific information on the distribution of water for incorporation into other California water delivery contracts, the Secretary requested the State of California to provide a recommendations as to the allocation of the State's apportionment.

This resulted in the Seven Party Agreement executed on August 18, 1931 by the:

- Palo Verde Irrigation District
- Imperial Irrigation District
- Coachella Valley Water District
- Metropolitan
- City of Los Angeles
- City of San Diego
- County of San Diego

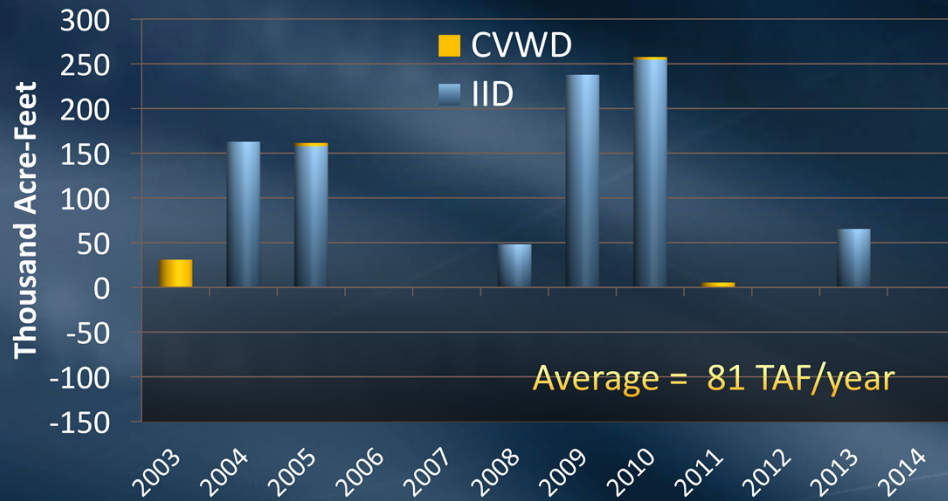
The Seven Party Agreement was incorporated into the water delivery contracts which Palo Verde, Imperial, Coachella, and the City of San Diego entered into with the Secretary. Metropolitan's 1930 contract was supplemented accordingly.

Agricultural Adjustments from Priority 1, 2, and 3(b) Use



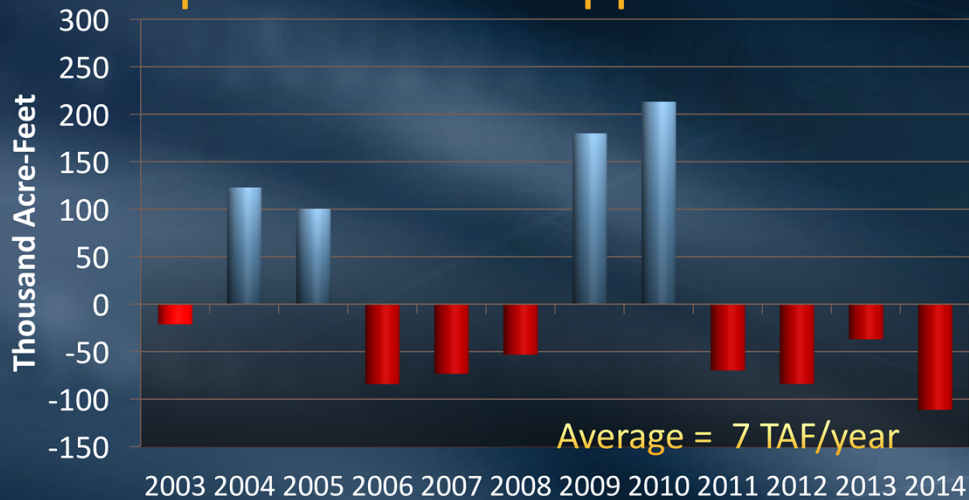
*2014 Data is Preliminary.

Annual Unused Apportionment from IID and CVWD



*2014 Data is Preliminary.

Annual Net Adjustment to Metropolitan's Basic Apportionment



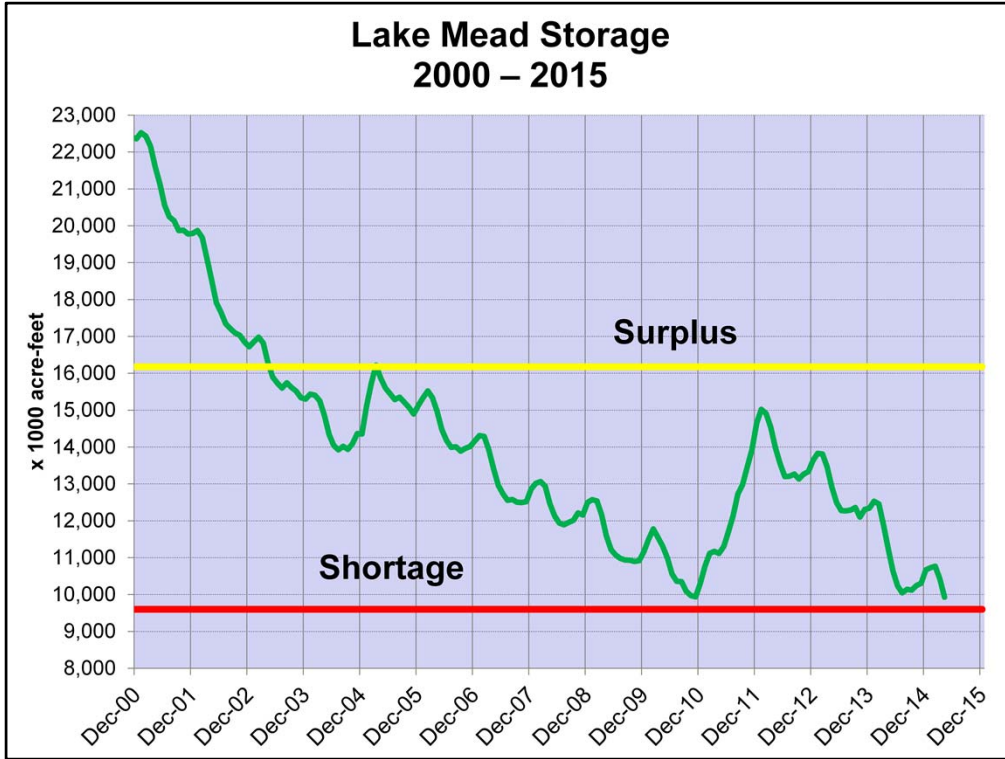
*2014 Data is Preliminary.

Water Supply Risks to Metropolitan

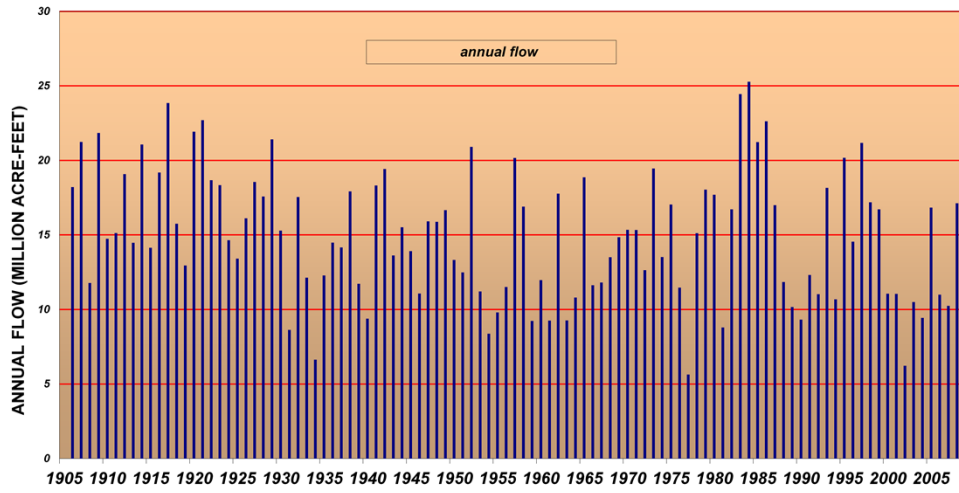
- Agriculture demand could grow along the Colorado River
 - PVID: 16,000 additional mesa acres
 - CRIT: 56,000 AF of unused water rights
 - Other areas could grow
- Water use increases would affect MWD's supply
- Options to address increases include expanded fallowing, purchasing land

Issue #2: Dealing with Drought

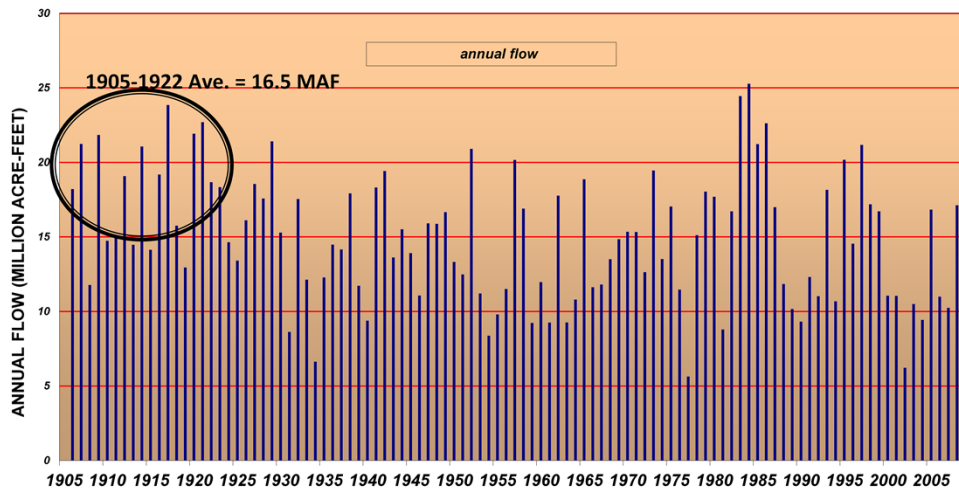




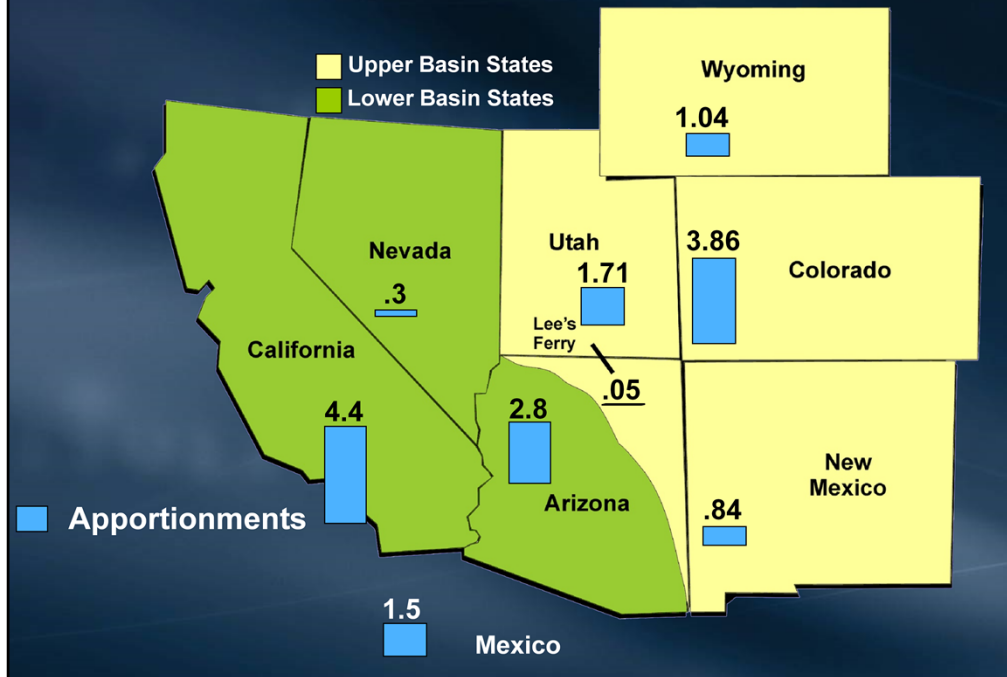
COLORADO RIVER NATURAL FLOW (AT LEE'S FERRY)
1906-2008
103 Year Average = 15.0 MAF

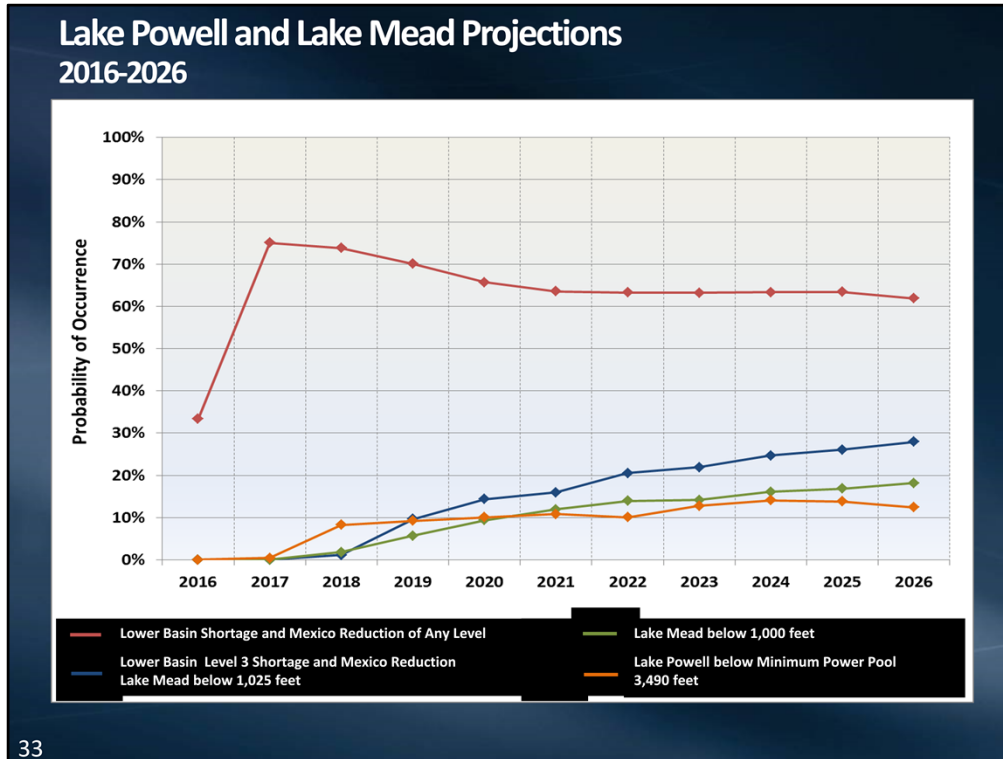


COLORADO RIVER NATURAL FLOW (AT LEE'S FERRY)
1906-2008
103 Year Average = 15.0 MAF



Colorado River Apportionments (Million acre-feet)





Key points:

- This figure illustrates the probabilities of reaching critical reservoir elevations in Lakes Powell and Mead through 2026 assuming observed historical hydrology.
- Based on the January CRSS Run:
 - Projections show approximately a 21% chance of a U.S. Lower Basin shortage and Mexico reduction in 2016, with a more significant chance (approximately 50%) in 2017.
 - Under the 2007 Interim Guidelines, the probability of a U.S. Lower Basin shortage is around 60% for most of the remainder of the interim period (through 2026).
 - These projections will be updated in April.
- Climate models indicate we should expect increased variability in the future which may include longer, more extreme dry and wet periods than previously observed.
- At elevation 1,000 feet (304.8 meters), Lake Mead's storage is approximately 4.5 maf (5,550 mcm), or 17% of capacity.
- At elevation 3,490 feet (3,063.8 meters), Lake Powell's storage is approximately 4.0 MAF (4,930 mcm), or 16% of capacity.
- Projections are done using the Colorado River Simulation System (CRSS) with initial conditions projected by the October 24-Month Study.
- Observed Historical Hydrology resamples the observed historical record of 1906-2010 for 105 future sequences.

Shortage Impacts to Metropolitan

- Many water management and supply programs disappear
 - ICS Storage in Lake Mead
 - SNWA Exchange Program
 - Fund conservation outside of CA
 - Overrun flexibility
- If shortage is severe enough, CA's high reliability could be in jeopardy
- Working cooperatively with other states to address issues

Issue #3: Uncertain Future of the Salton Sea



QSA Provided Time to Restore Salton Sea

- Formed in 1905
 - Sustained by Ag drainage
- 50% Saltier than Ocean
 - Salinity increase 1%/yr
 - Soon too Salty for Fish
- Sea protected from QSA Transfer Impacts for 15 years
 - IID to deliver 800 TAF of “mitigation water” to Salton Sea through 2017
 - Provided time for state to develop long-term solution

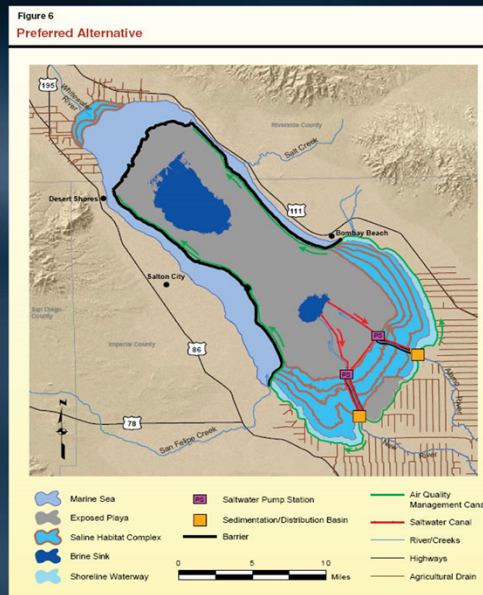


Frequent Fish Kills on Salton Sea



15 Year Period Nearing End; No Action Taken to Save Salton Sea

- State has done little to advance Sea's restoration
- Issued Draft EIR
 - Preferred Alternative \$9 billion, \$100 million O&M
- IID petitioned SWRCB to condition QSA transfers on Salton Sea restoration
- Resources agencies hosting meetings with stakeholders



Using Trust Fund monies, Needles would be responsible for:

- constructing Stage 2 of the Project to increase Project capacity to 10,000 acre-feet per year,
- conducting studies to forecast the future salinity of Project water and assessing potential solutions should the salinity be projected to exceed the threshold,
- implementing a solution to reduce the salinity of Project water, or acquiring a less expensive alternative supply to replace Project water, and
- defraying any incremental increase in operation, maintenance, replacement, and administration costs necessary to operate and maintain the solution to reduce salinity.

Salton Sea Risks to QSA

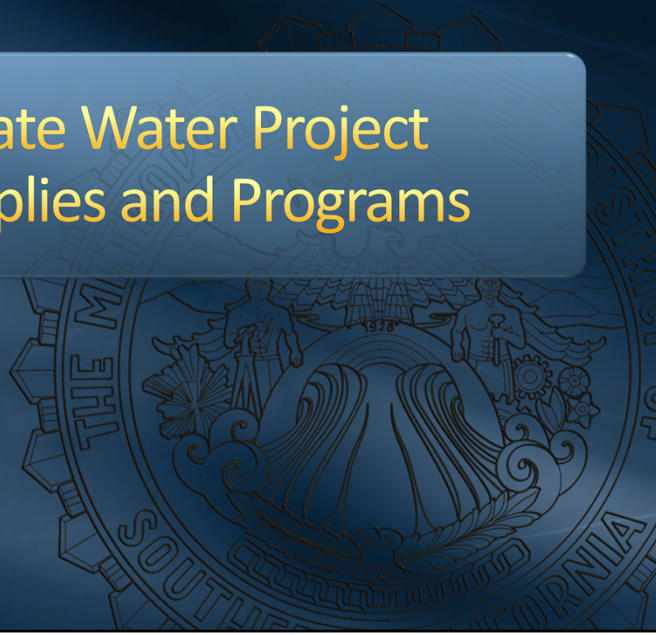
- IID threatens to end transfers to SDCWA and CVWD without restoration plan
- If dust not sufficiently mitigated, lawsuits could block QSA transfers
- Working with QSA parties to encourage state to develop consensus Salton Sea solution

Summary

- Metropolitan, along with SDCWA, have implemented significant ag to urban transfers to help CA live within 4.4 MAF Apportionment
- New tools have been developed to help manage those supplies
 - Lake Mead ICS, etc.
- The Colorado River faces continued challenges to its water supply reliability that will require new and innovative agreements and actions

Other Issues and Discussion

State Water Project Supplies and Programs



SWP Topics Overview

- State Water Project supplies and programs
 - Draft 2015 SWP Delivery Capability Report
- State Water Project issues and discussion
 - History of Delta environmental regulations
 - Effects of drought on long-term hydrology
 - Metropolitan's IRP Delta resource strategy
 - California Water Fix / Eco Restore elements
- Metropolitan's Central Valley transfer and storage programs

2010 IRP Update Target

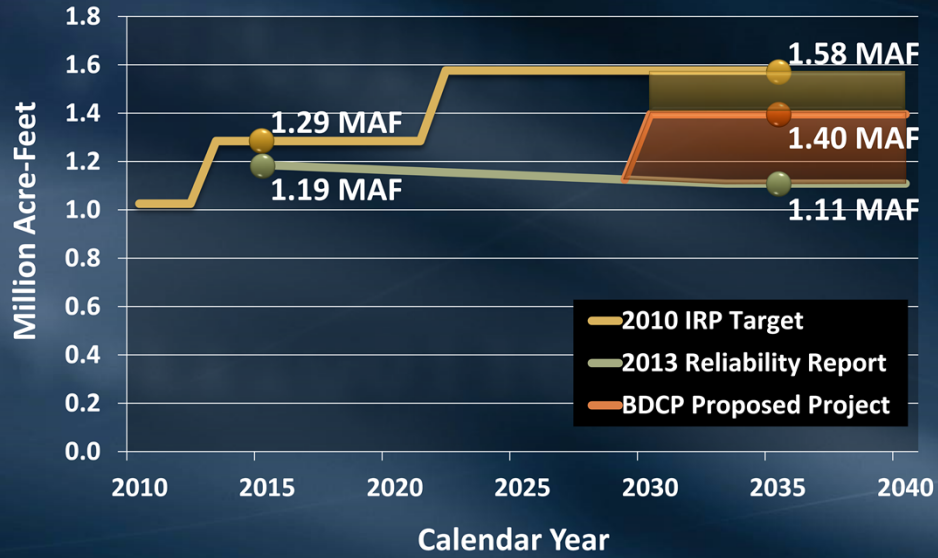
SWP

- Seek short, mid, and long-term Delta improvements

- Near-term 2010 – 2012
 - Draft 2009 DWR SWP Reliability Report
- Mid-term 2013 – 2021
 - Ten percent reduction in impacts over the near-term assumption
- Long-term 2022 – 2035
 - 2005 DWR SWP Reliability Report

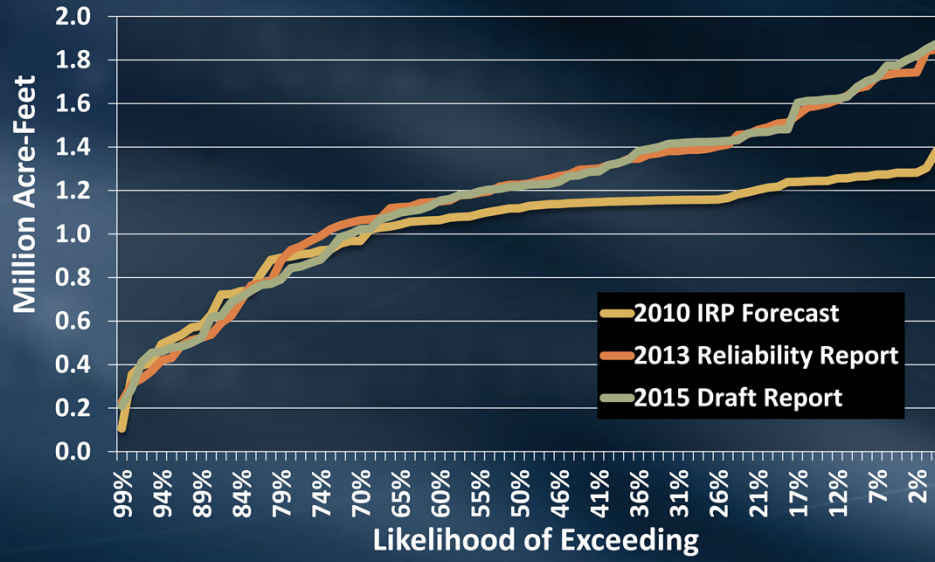
Average State Water Project Supplies

2010 IRP Target and 2015 Initial Forecast



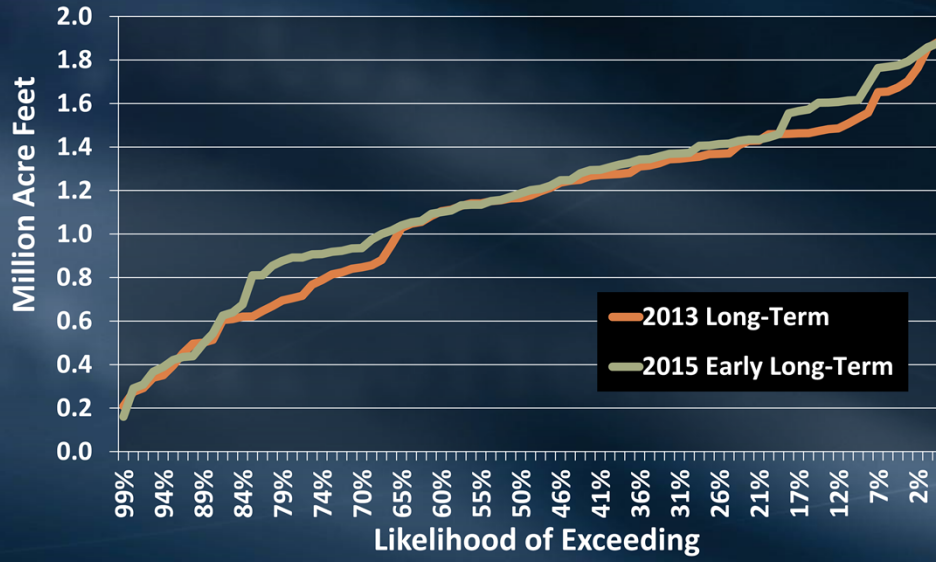
State Water Project Supplies

Near-Term Table A Allocation Forecast



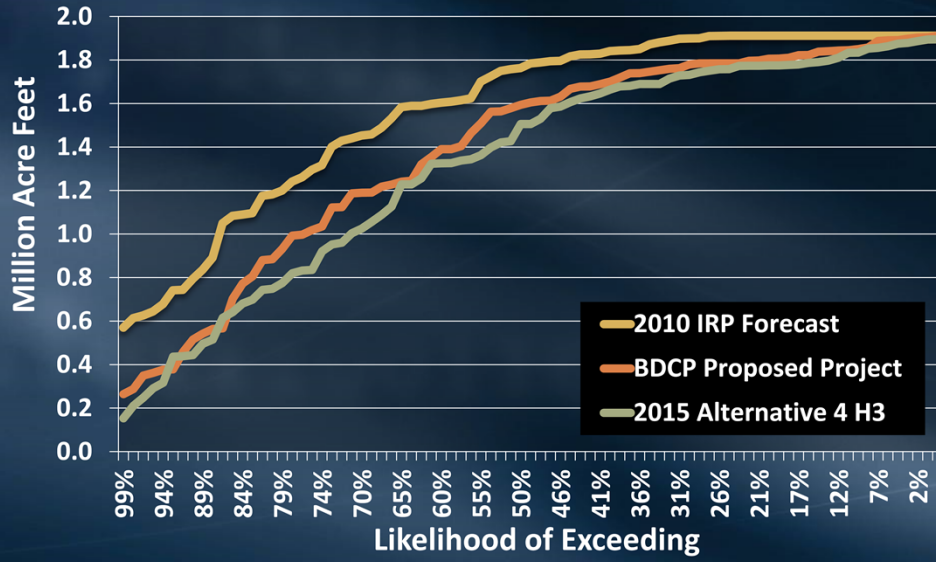
State Water Project Supplies

Early Long-Term Table A Allocation Forecast



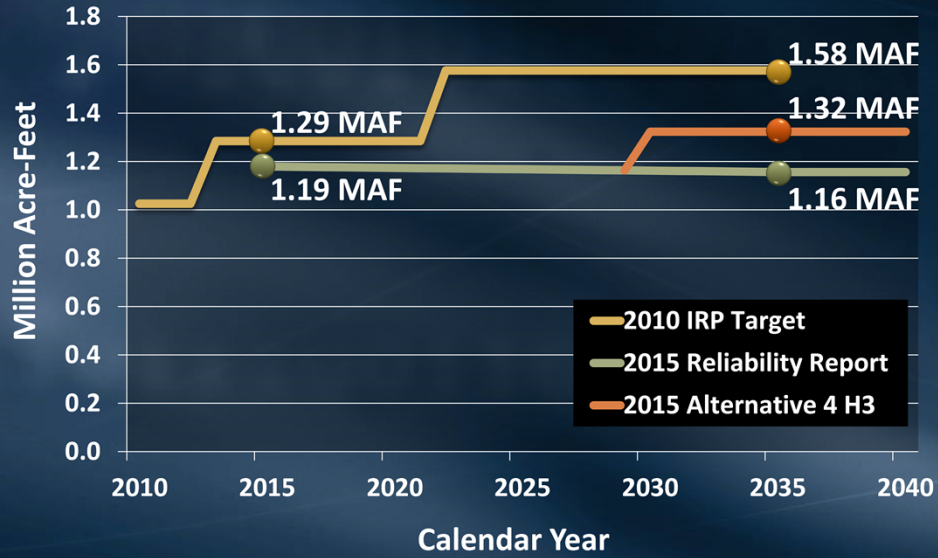
State Water Project Supplies

Delta Fix Table A Allocation Forecast



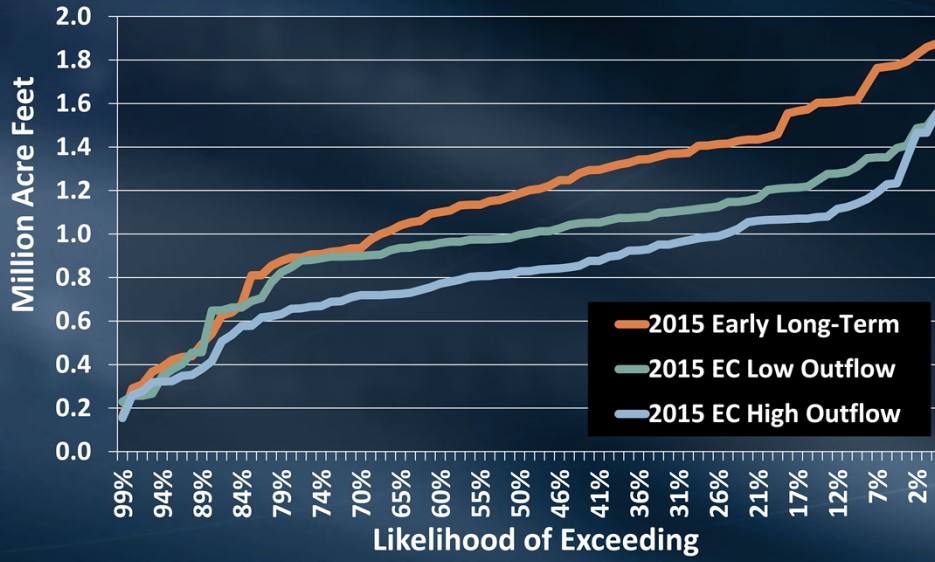
Average State Water Project Supplies

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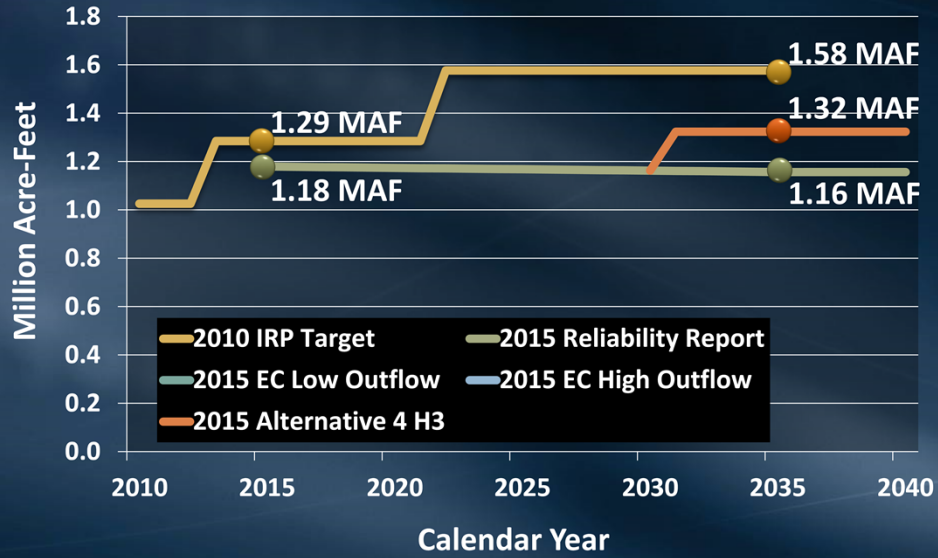
State Water Project Supplies

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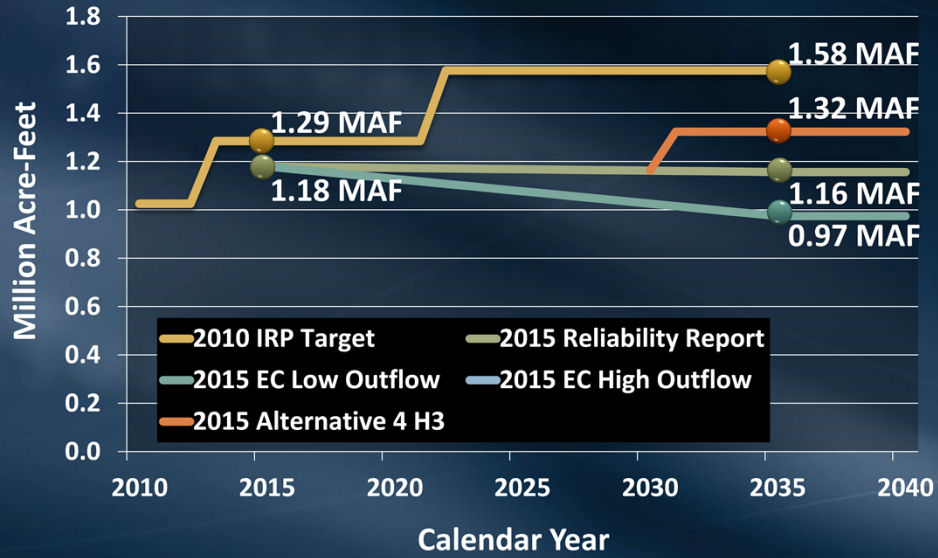
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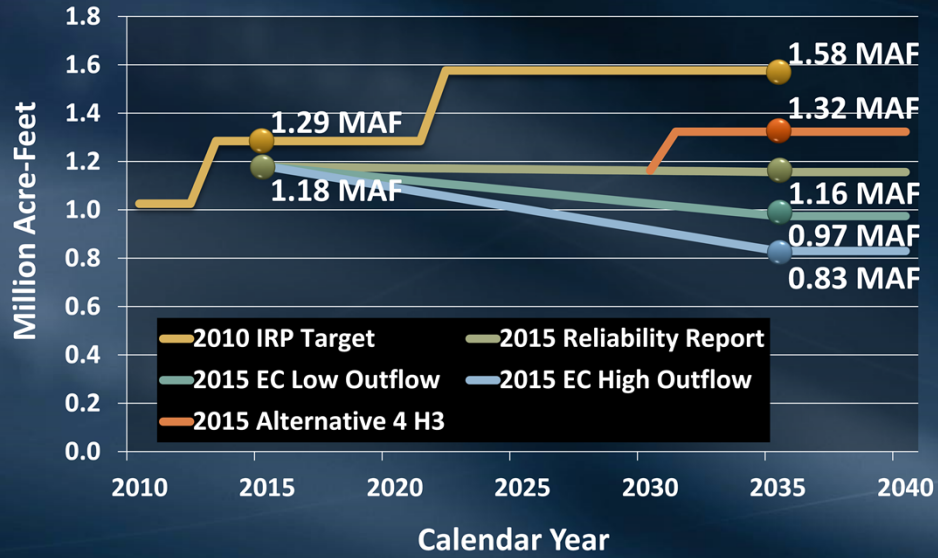
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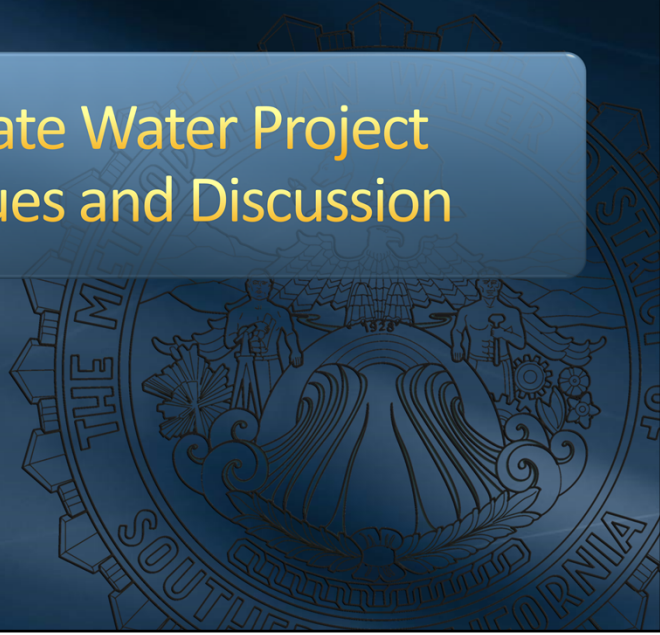
SWP New Information Takeaways

- New near and early long-term studies show same or slightly improved outlook and range of supply
- Long term studies with regulatory/outflow requirements show greater decline in future supply
- New Alternative 4 H3 study shows slightly less improvement compared to the BDCP Proposed Project study

IRP Technical Update

- Extended hydrology forecast
- Review of BDCP scenarios and refinements
- Future scenario with no BDCP

State Water Project Issues and Discussion





**Integrated Resource Plan
Update on State Water Project Supplies**

May 18, 2015



Presentation Agenda

- History of Delta Environmental Regulations
- Effects of Drought on Long-Term Hydrology
- Metropolitan's IRP Delta Resource Strategy
- California Water Fix / Eco Restore Elements
- Summary



Key Summary Points

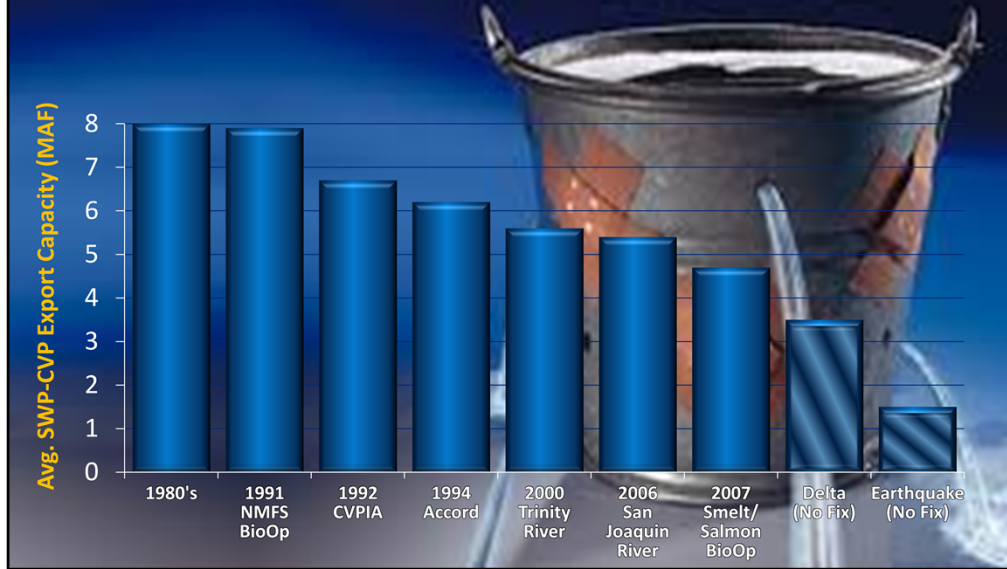
- Looking to achieve regulatory stability on the State Water Project
- Pursuing in combination with other water management actions
- Evaluating the Governor's announcement

History of Delta Environmental Regulations

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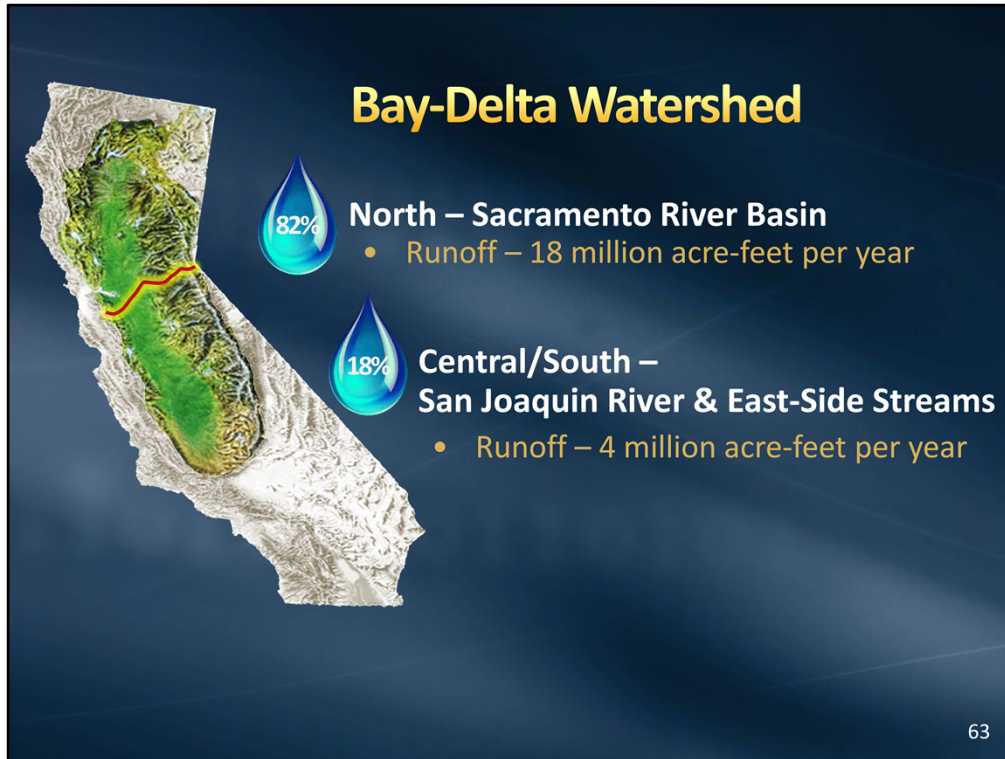
History of Delta Environmental Regulations

SWP/CVP Export Capacity



Effects of Drought on Long-Term Hydrology

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Dec 2014 Storage Estimates (by USBR)

- Shasta/Oroville/Folsom – 1.4 to 1.9 million af (with 1.1 million af deadpool)
- Colorado River – 30 million af

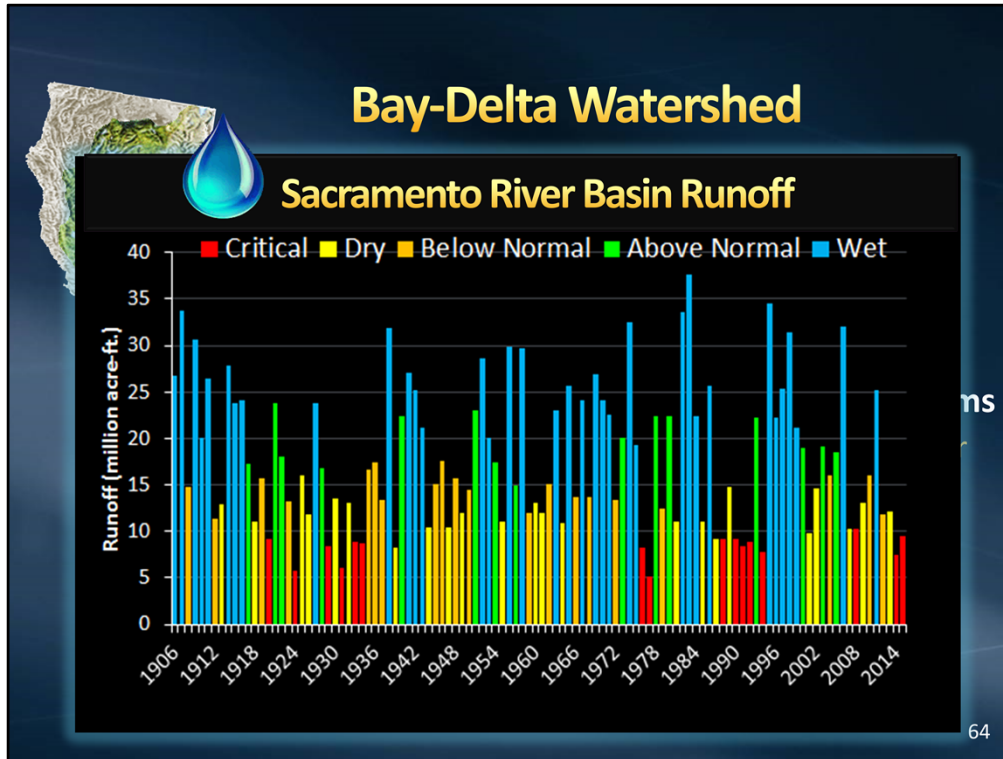
Watershed Runoff (Average)

- Total Delta Watershed 22 million af/yr
- Northern Delta Watershed 18 million af/yr (82% of total falls in this region)

<u>Basin</u>	<u>Runoff (Avg.)</u>	<u>Runoff (Max)</u>	<u>Storage</u>
• Sacramento River	18 million af	38 million af	16 million af (43 reservoirs)
• San Joaquin River	3.3 million af	15 million af	11.5 million af (34 reservoirs)
• Colorado River	15 million af	25 million af	60 million af (XX reservoirs)

Other Notes

- Pre-Bio Opinion – 70% of time Shasta, Oroville, Folsom would spill (i.e. flood flows)
- The natural annual discharge of the San Joaquin before agricultural development is estimated at 6 to 7.9 million af



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Bay-Delta Watershed

Sacramento River Basin Runoff

	Period	Runoff (Avg.)
Full Data Record	1906 - 2015	18.0 million acre-ft.
Last 10 years	2006 - 2015	15.0 million acre-ft.
CalSim II Model	1922 - 2003	17.6 million acre-ft.
CalSim III Model	1922 - 2013	17.4 million acre-ft.

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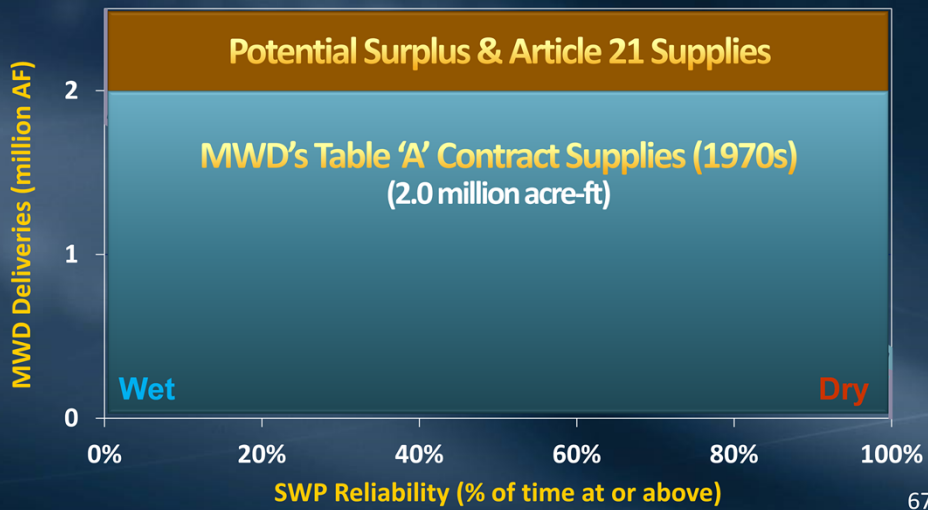
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Metropolitan's Integrated Resource Plan

Delta Resource Strategy

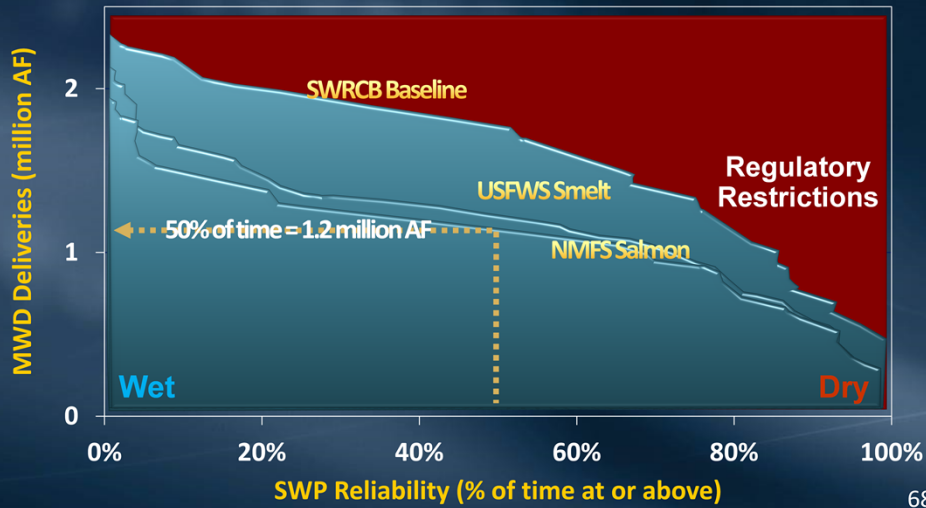
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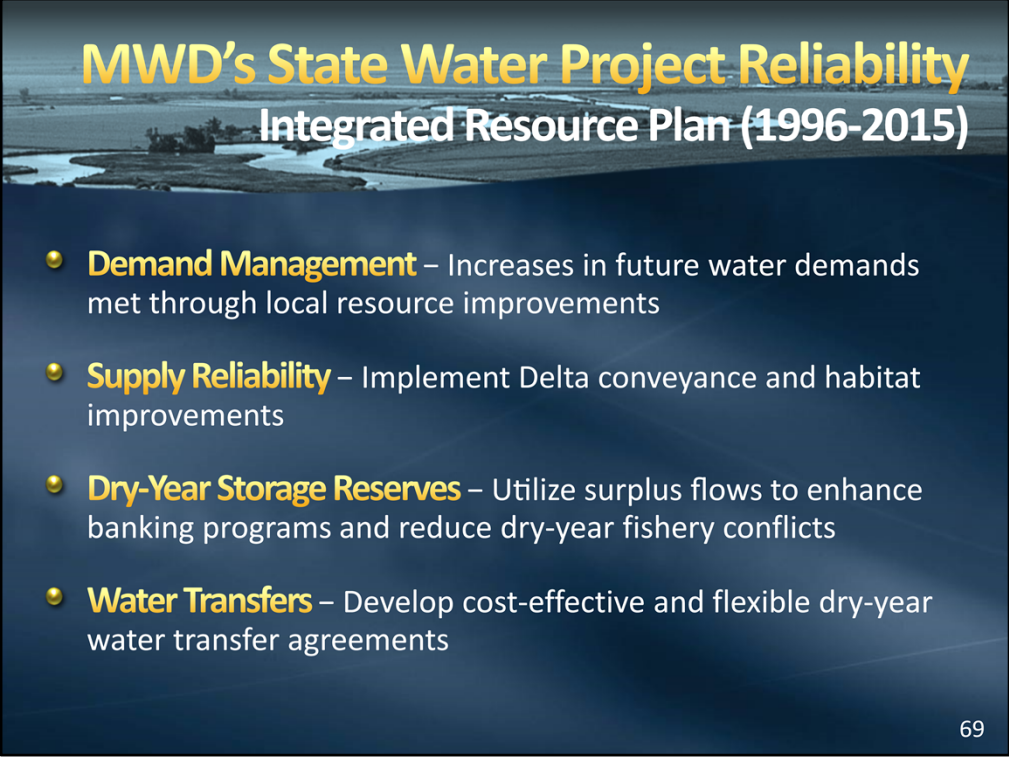
MWD's State Water Project Reliability Original Plan (Circa 1970s)



MWD's State Water Project Reliability

Regulatory Restrictions (began 1980s)





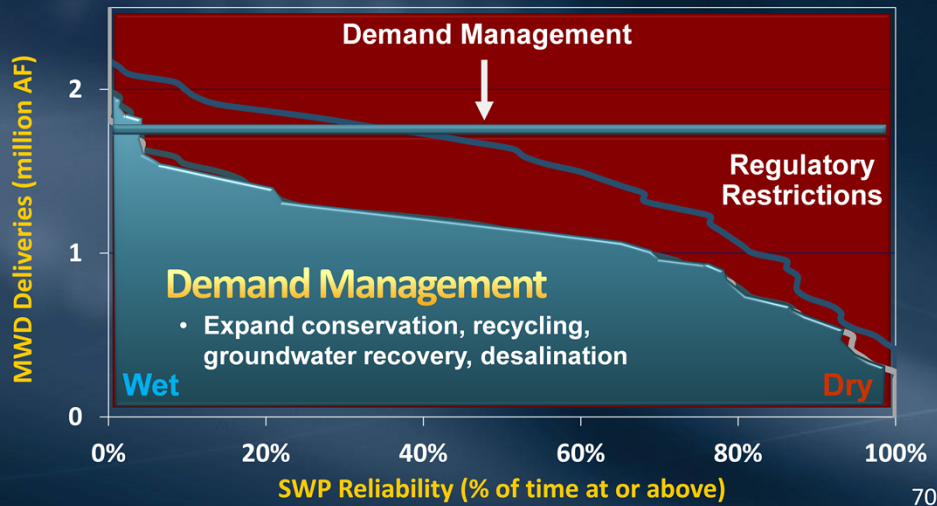
MWD's State Water Project Reliability Integrated Resource Plan (1996-2015)

- **Demand Management** – Increases in future water demands met through local resource improvements
- **Supply Reliability** – Implement Delta conveyance and habitat improvements
- **Dry-Year Storage Reserves** – Utilize surplus flows to enhance banking programs and reduce dry-year fishery conflicts
- **Water Transfers** – Develop cost-effective and flexible dry-year water transfer agreements

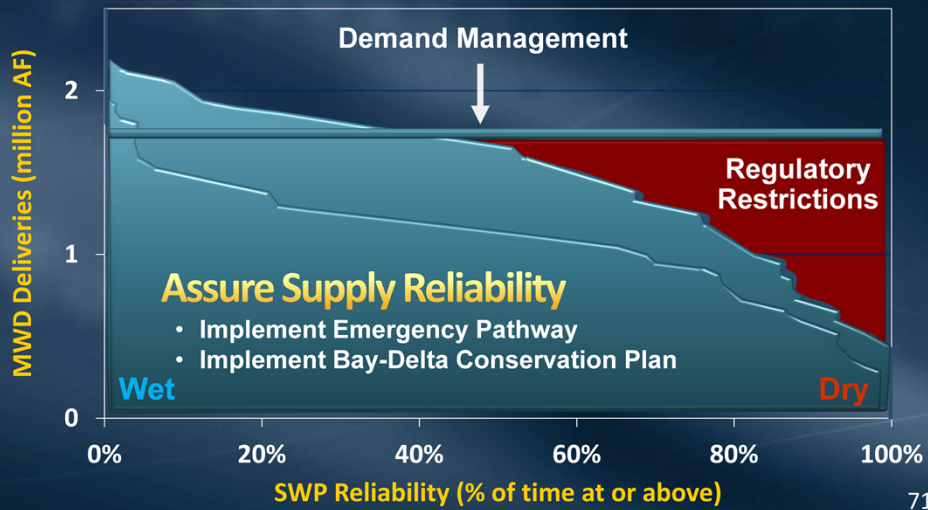
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- Demand Management – Increases in future water demands met through local resource improvements (conservation, recycling, groundwater recovery, desalination)
- Supply Reliability – Implement Delta conveyance and habitat improvements
- Dry-Year Storage Reserves – Utilize surplus flows to enhance banking programs and reduce dry-year conflicts with fisheries
- Water Transfers – Develop cost-effective, flexible dry-year water transfer option agreements

MWD's State Water Project Reliability Integrated Resource Plan (1996-2015)

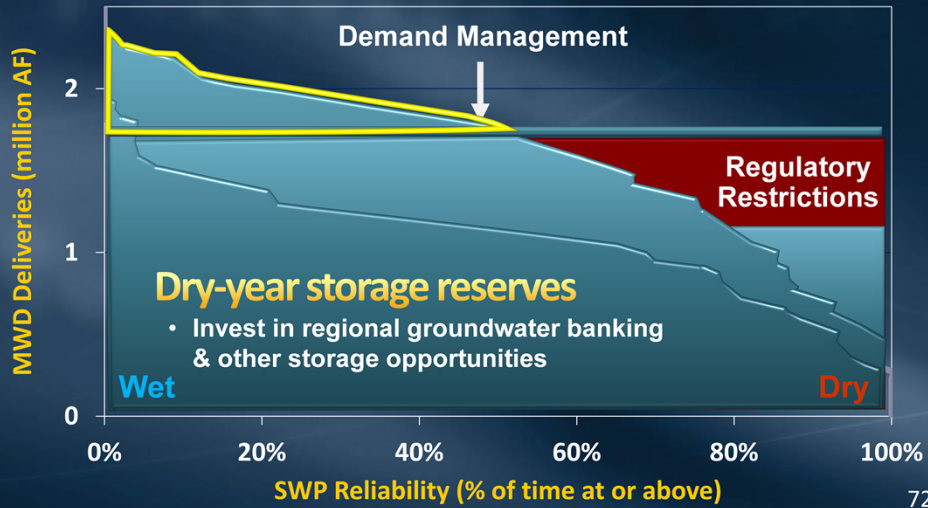


MWD's State Water Project Reliability Integrated Resource Plan (1996-2015)



MWD's State Water Project Reliability

Integrated Resource Plan (1996-2015)



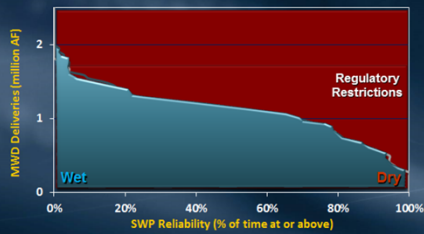
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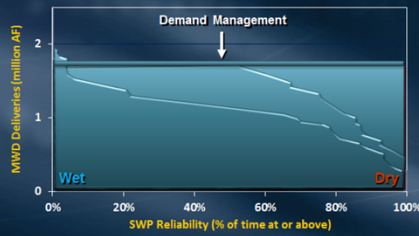
MWD's State Water Project Reliability

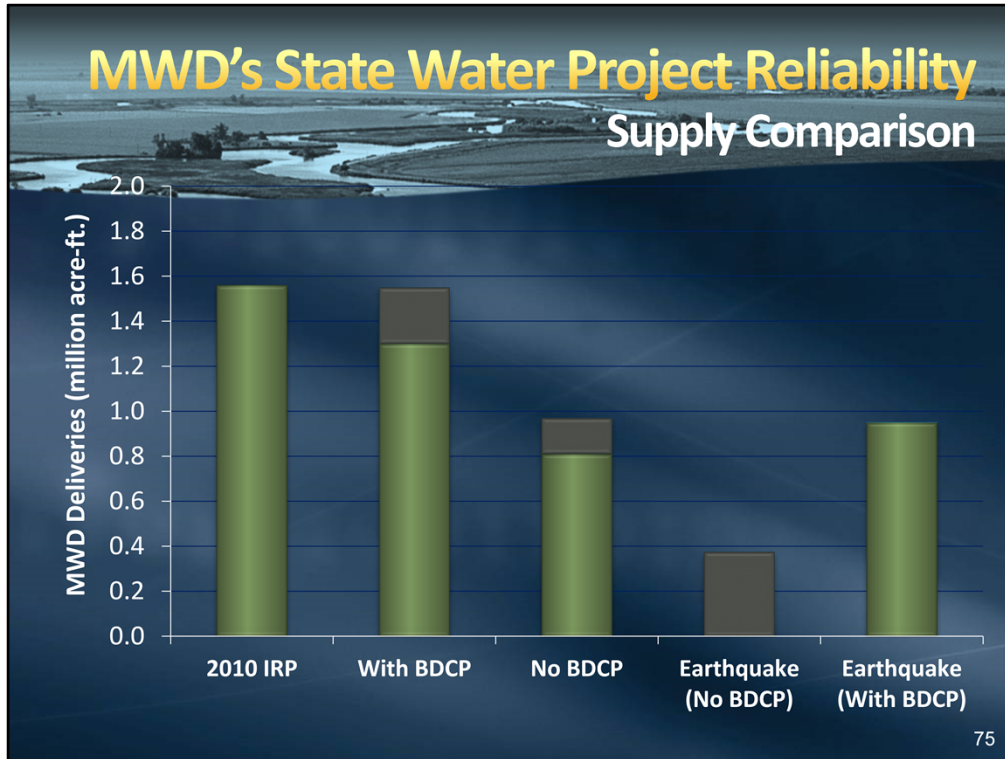
Integrated Resource Plan Strategy

Regulation Effects . . .



. . . MWD IRP Strategy





Assumptions

- With BDCP – average delivery splits of 55% SWP / 45% CVP with decision tree additional outflows = 1.55 MAF
- Under water acquisition program a portion of the decision tree flows would come from state/feds = 1.3 MAF
- No BDCP – range is based on 50/50 split of decision tree modeled flows
- Earthquake – no conveyance improvements in place, middle river emergency pathway in place or approx. 1/3 of previous exports

State's Delta Proposals

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State's New Alternative 4A

Summary



- Protects State's water supplies through Delta system upgrades
- Improves river flow direction
- Reduces fish impacts
- Water contractor funded



- Supports long-term health of native fish & wildlife
- Implements habitat restoration
 - ~ 30,000 acres in 5 years
- Broader public funding

Alternative 4 vs New Alternative 4A

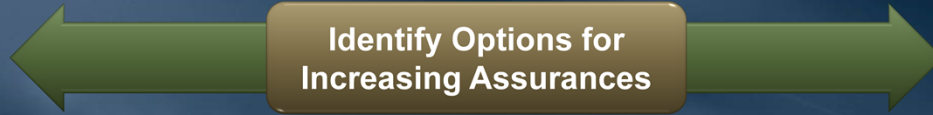
Assurances – Section 7 vs. Section 10

Section 7

Bio Opinion/ 2081 Permit

Section 10

Habitat Conservation Plan/NCCP



Lower Level Assurances

Higher Level Assurances



Summary

- State to release recirculated EIR/S in Summer 2015
- Further evaluation by MWD focused on
 - Consistency with Board policy goals
 - Impacts on supply reliability, quality, costs, assurances, governance, implementation schedule, etc.
 - Alternative regulatory approaches
- Develop agreements for contractual protections

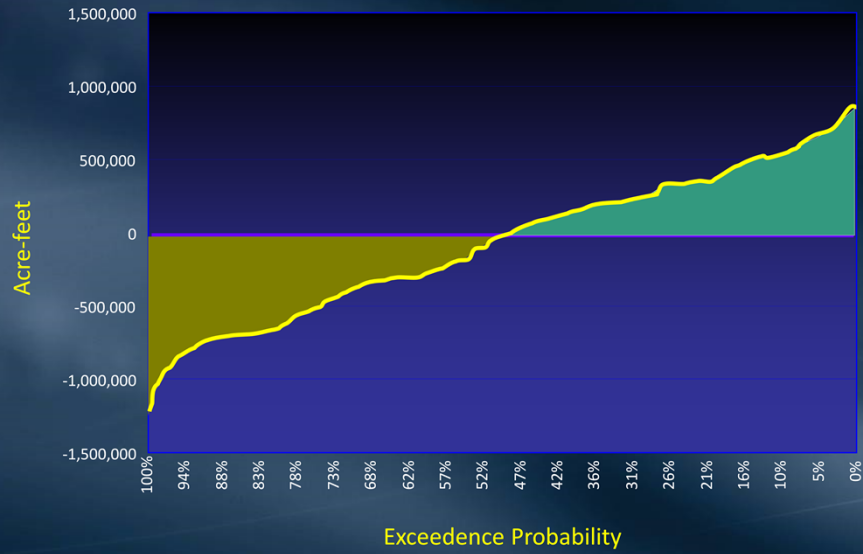


Metropolitan's Central Valley Water Transfer and Storage Programs

Steve Hirsch
Water Transfers & Exchanges Program Manager
Metropolitan Water District of Southern California

May 18, 2015

Example Surplus/Shortage Outcomes



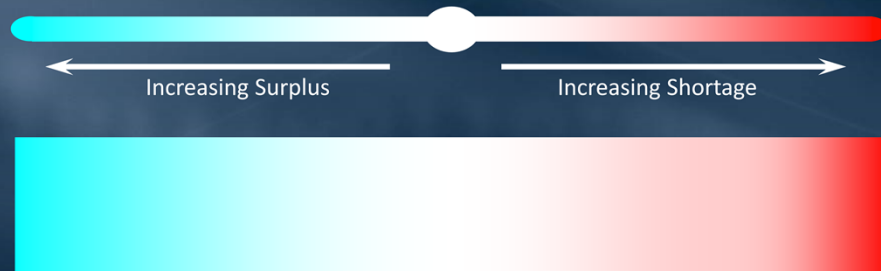
WATER SURPLUS & DROUGHT MANAGEMENT PLAN

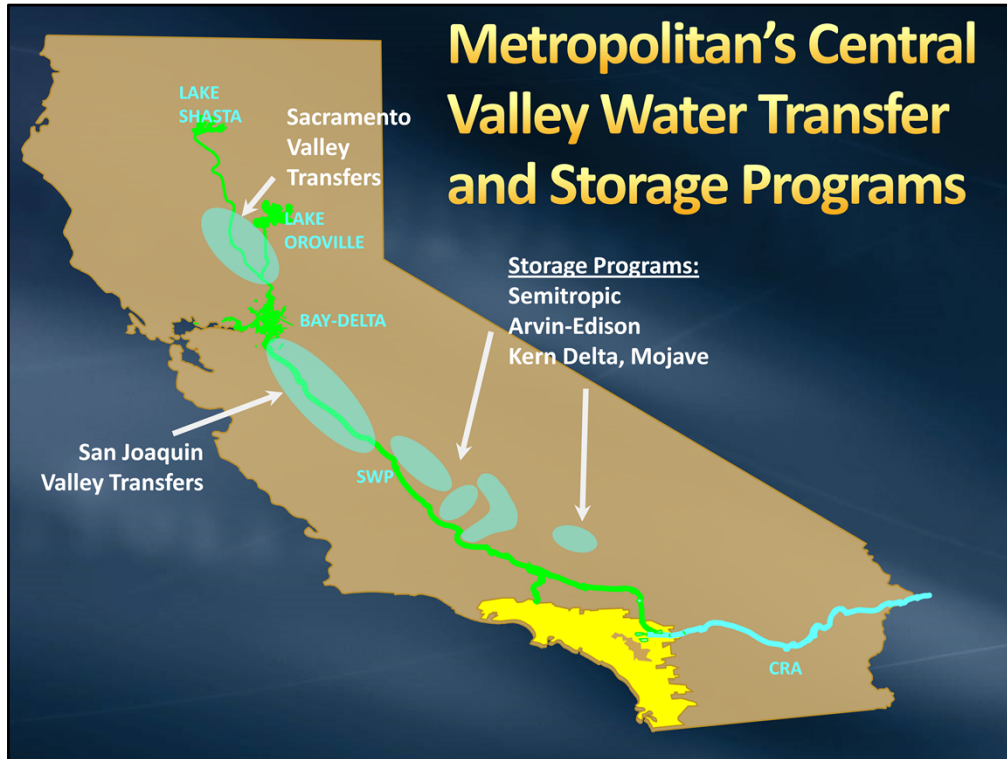
Surplus Storage:

- Local Surface Reservoirs
- Groundwater Basins
- Programs Outside Region

Take From:

- Local Storage
- Outside Region Storage
- Transfers





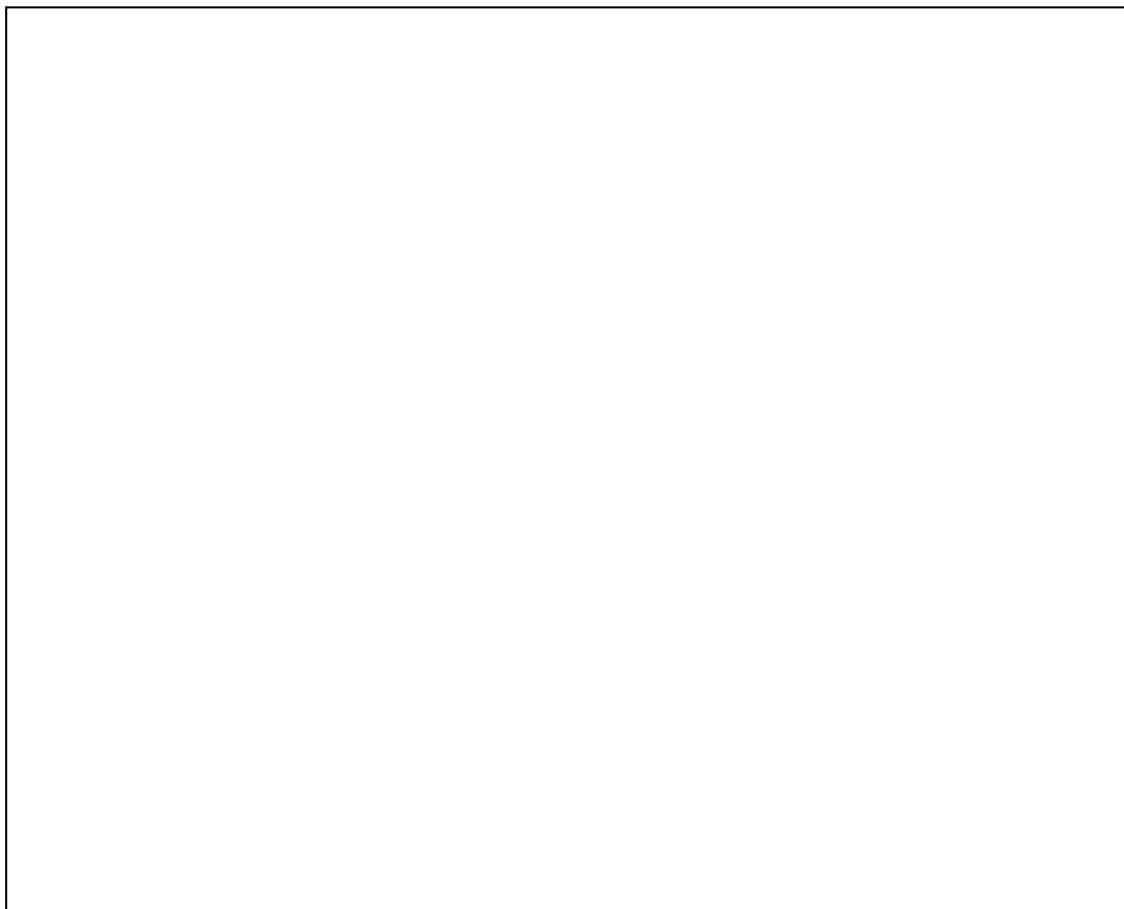
Metropolitan has a number of storage programs inside & outside of the region. Partnerships have been developed with Central Valley agencies to store water. Several have been developed in recent years, and we have added additional programs this past year.



Background

- Entered into Agreement in 1997
- Contract terminates in 2035
- Storage Capacity: 350,000 AF
- Current Storage Level: 157,158 AF

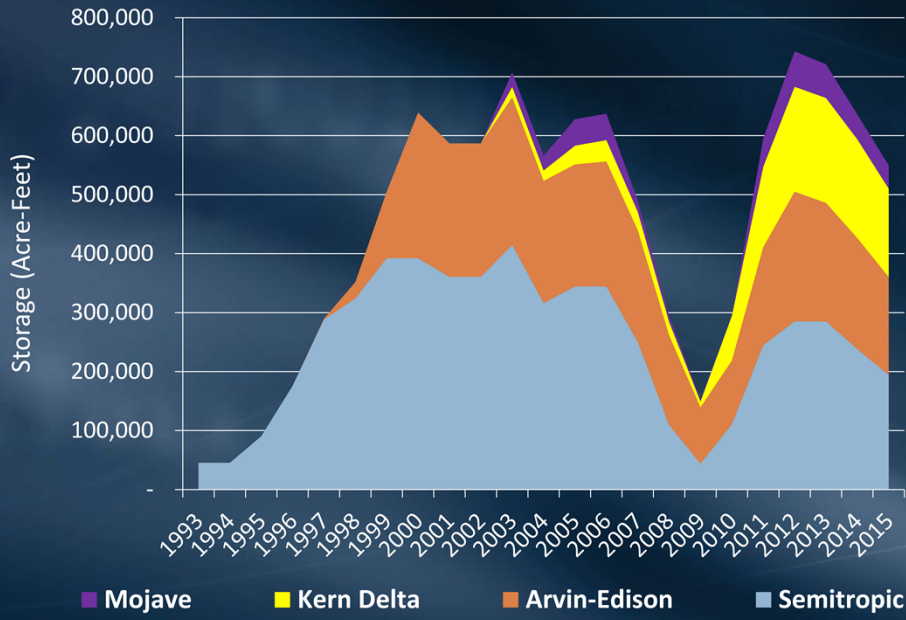








CV Groundwater Storage Programs



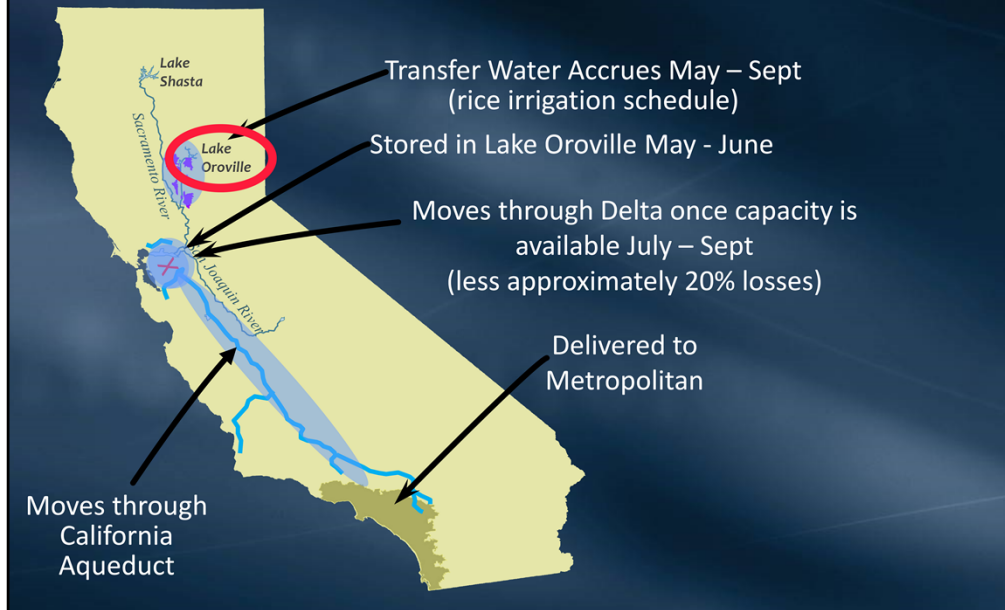
Emerging Issues for Central Valley Storage Programs

- Competition from other banking partners during extended drought
- Lower groundwater levels/aging infrastructure affecting returns
- Ability to replenish storage

Central Valley Water Transfers

- Types
 - Crop Idling/Shifting
 - Groundwater Substitution
 - Reservoir Reoperation
- Paper vs Real Water

Movement of Transfer Supplies



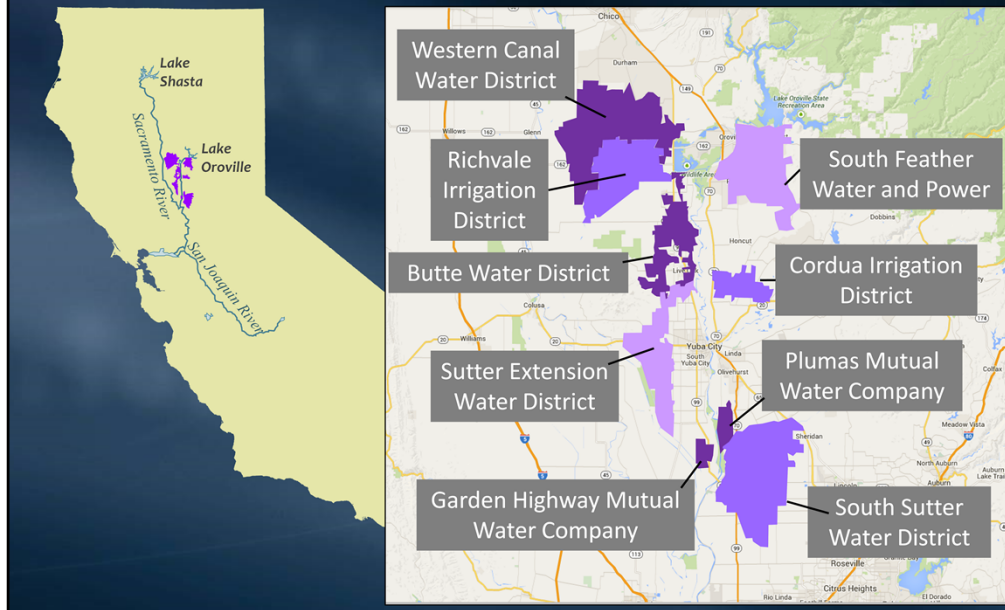
- This map shows how the transfer supplies are delivered to Metropolitan

MWD Central Valley Water Transfers

- Governor's Drought Water Bank
 - 1991, 1992, 1994, 2009
- 2001 DWR Dry Year Purchase Program
- 2003 MWD Water Purchase Program
- SWC Buyers Group
 - 2005, 2008, 2010, 2015
- Yuba Accord
 - 2008-2025

2015 SWC Buyers Group

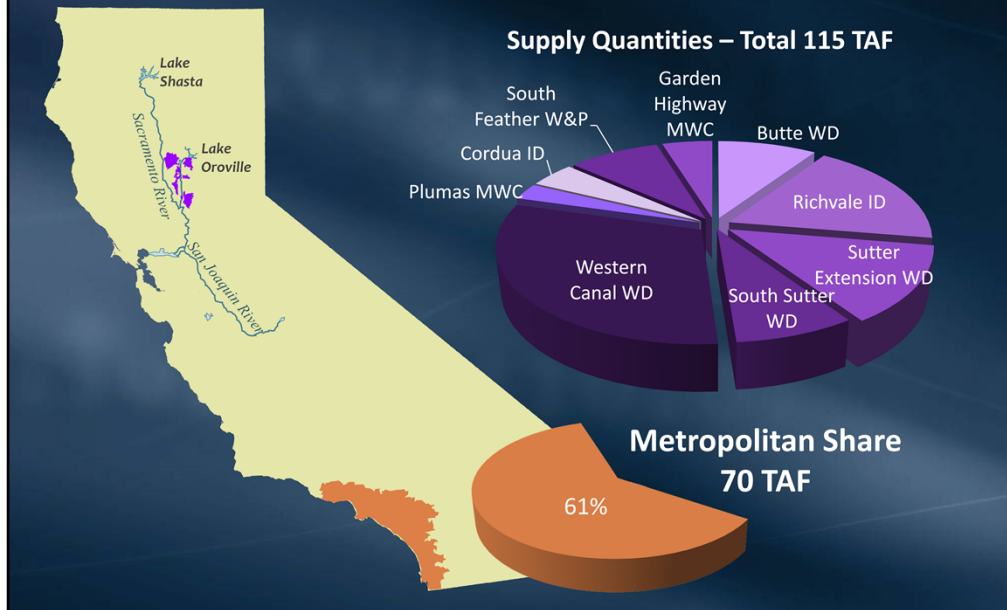
Location of Sellers



- This map shows the location of the potential sellers we have identified to date.
- We are focused on the Feather River watershed because of the need to store the transfer supplies made available in May and June in Lake Oroville
- Most of these sellers have taken formal Board actions to sell transfer supplies to the SWC Buyer Group.

2015 SWC Buyers Group

Identified Supplies Before Curtailments – up to 115 TAF



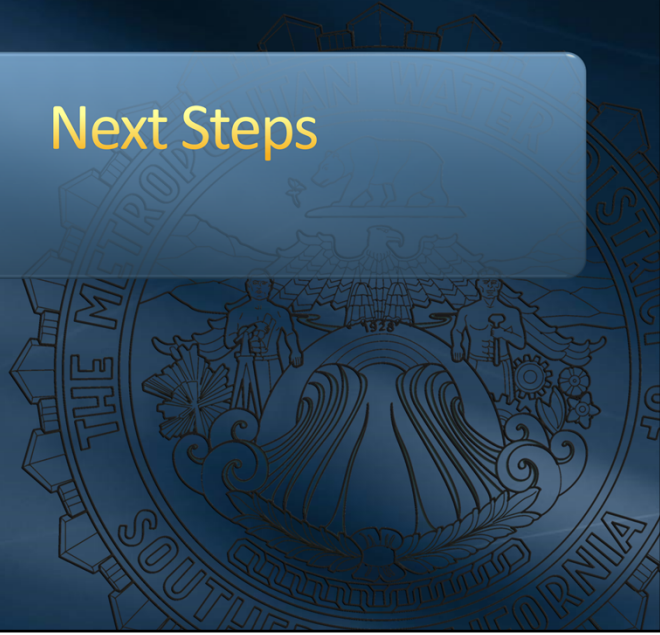
- We have identified over 115 TAF to date, of which Metropolitan’s share would be 70 TAF.
- We are actively seeking additional water transfer supplies to increase Metropolitan’s share
- About 75% of these supplies would be made available by fallowing rice acreage. The sellers have made it clear that they will not fallow lands to make transfer supplies available if their supplies are curtailed. DWR makes a final determination in early April.

Emerging Issues for Central Valley Water Transfers

- Higher prices
- More competition from agriculture
- Expanding the water transfer window
- Determining best buying approach
- Frequency of pursuing water transfers

Other Issues and Discussion

Next Steps



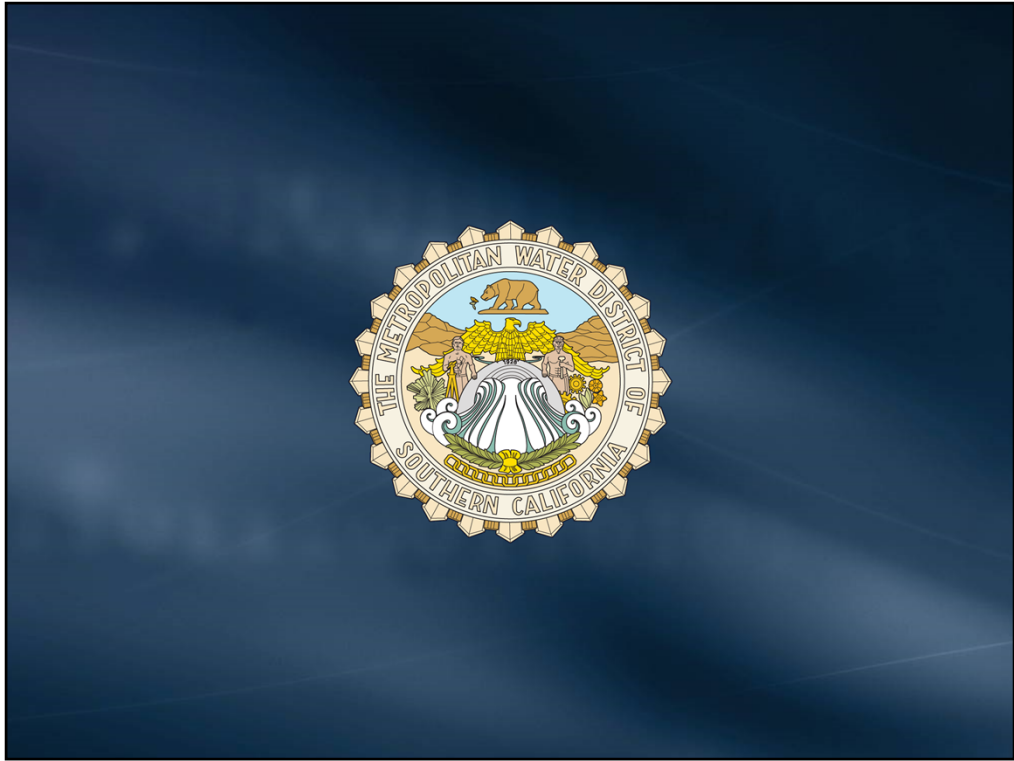
IRP Technical Update Next Steps

- Incorporate feedback from this workgroup
- Make additional technical refinements
- Return with preliminary results in early August
- Compile policy and implementation issues for Board policy process

Upcoming Technical Process Activities

May 2015

- Water Use Efficiency Meeting May 20th
- IRP Committee Meeting May 26th
 - Mary Ann Dickinson, AWE – conservation potential
 - Dr. Kenneth Baerenklau, UCR – conservation rates
 - Monthly IRP technical process update
- Member Agency Workgroup May 27th
 - Groundwater and Stormwater (part 1 of 2)



Storage and Transfer Targets

IRP 1996-2004

- In-Region Surface Water Storage
 - 620 TAF of dry-year storage capacity
- In-Region Groundwater Storage
 - 300 TAF of dry-year yield
- Central Valley/State Water Project Storage and Transfers
 - 300 TAF of dry-year yield