IRP Member Agency Technical Workgroup

Final Technical Results
October 5, 2015

IRP Member Agency Technical Workgroup Process

- April 2015
  - IRP/RUWMP Kick-off 4/8
  - Water Use Efficiency Meeting 4/16
  - Uncertainty 4/22
- May 2015
  - Imported Supplies 5/18
  - Water Use Efficiency Meeting 5/20
  - Groundwater (1 of 2) 5/27
- June
  - Groundwater (2 of 2) 6/11
  - Water Use Efficiency Meeting 6/18
  - Local Resources (1 of 2) 6/24

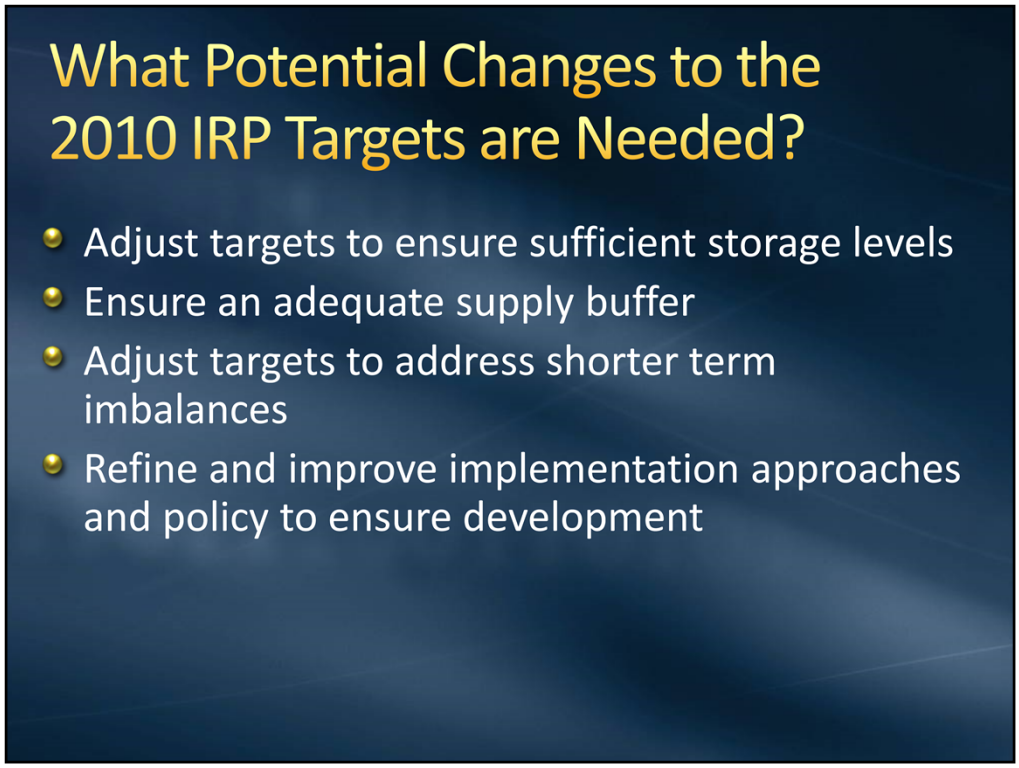
IRP Member Agency Technical Workgroup Process

- July 2015
  - Local Resources (2 of 2) 7/8
  - Water Use Efficiency Meeting 7/16
  - Retail Demands and Conservation 7/22
- August 2015
  - Draft Results (1 of 2) 8/3
- September 2015
  - Draft Results (2 of 2) 9/15
- October 2015
  - Final Results 10/5

Presentation Overview

- Technical Recommendations
- IRP Issue Paper Addendum
- Technical Policy Inventory
- Resource Costs
- Public Outreach
- Next Steps


Technical
Recommendations

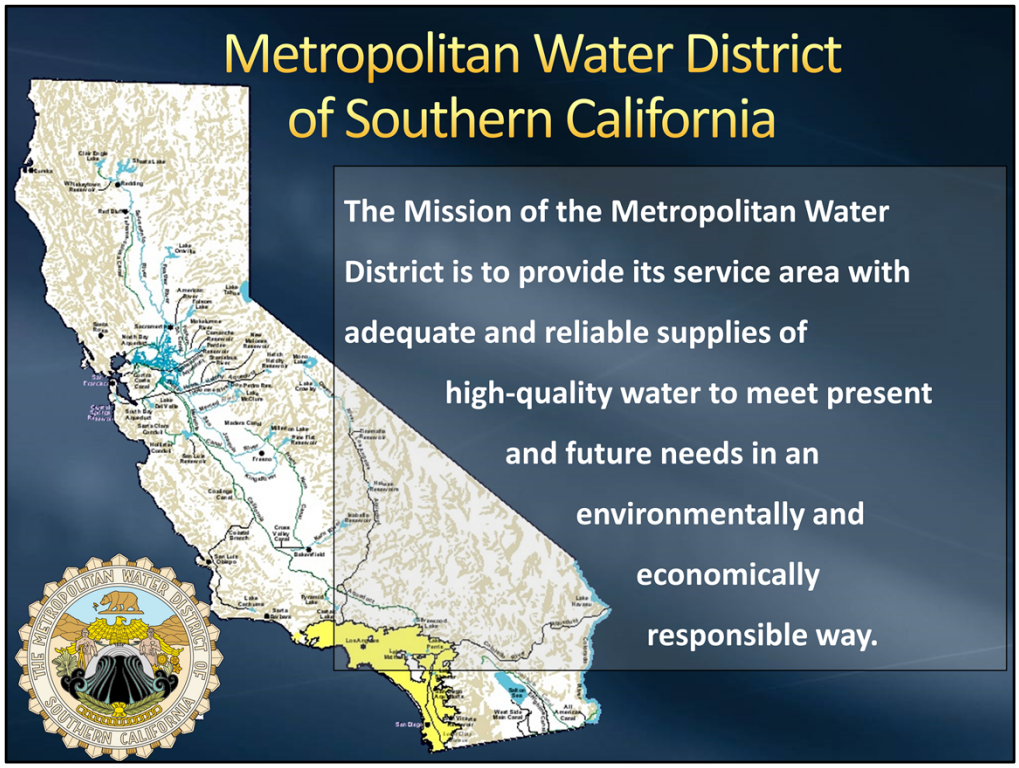


Brings us to our final question. “What potential changes are needed to the 2010 IRP targets?”

Not going to answer this question today… look at this next month. Results provide some direction.
Need to look at strategies or adjustments in the approach to deal with shorter-term

Need Help Here!

Reliability Discussion



Message Points

- Introduce the Metropolitan Water District
- Review the Mission Statement
- Emphasize that the Mission Statement drives the planning and development policies for Metropolitan

IRP Reliability Goals

- 1996
  - "…meet all retail-level water demands under all foreseeable hydrologic conditions"
  - "Through the implementation of the IRP, Metropolitan and its member agencies will have the full capability to meet full-service demands at the retail level at all times."
- 2004
  - Same as the 1996 goal plus a planning buffer
- 2010
  - Same as the 1996 goal plus the supply buffer and foundational actions

An Example of a Less Than 100% Reliability Goal

- Metropolitan will provide all of the firm wholesale demands to its member agencies 98% of the time, and have a shortage of no more than 10% in the remaining 2% of the time.

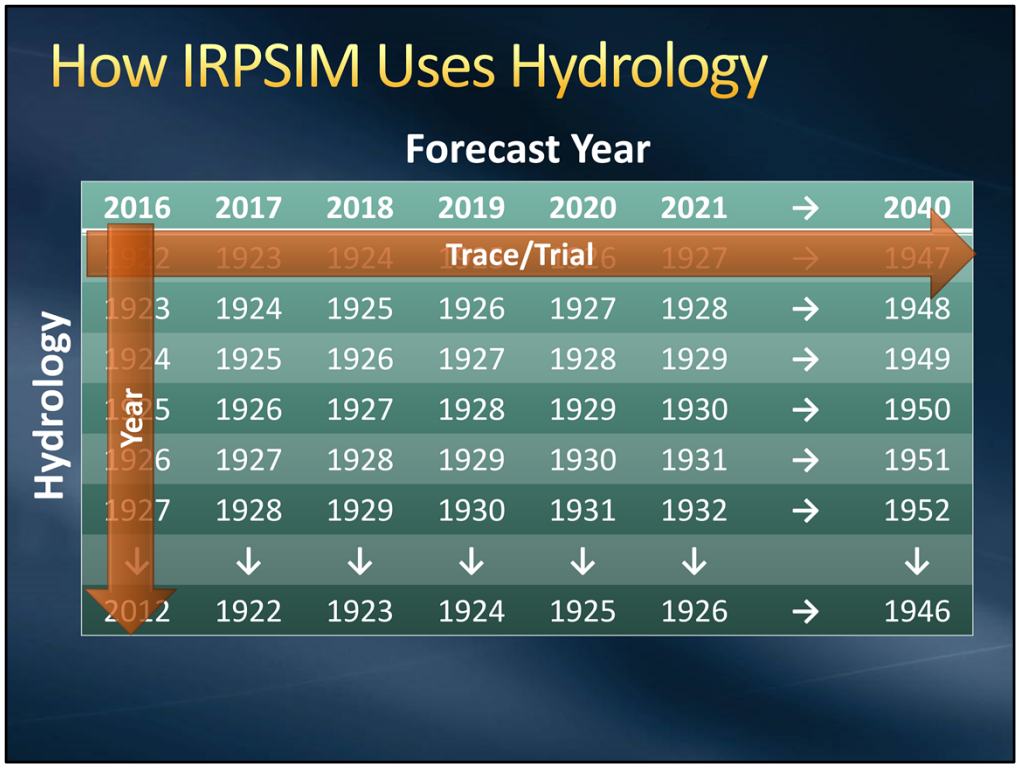
What is the Purpose of Reliability Analysis?

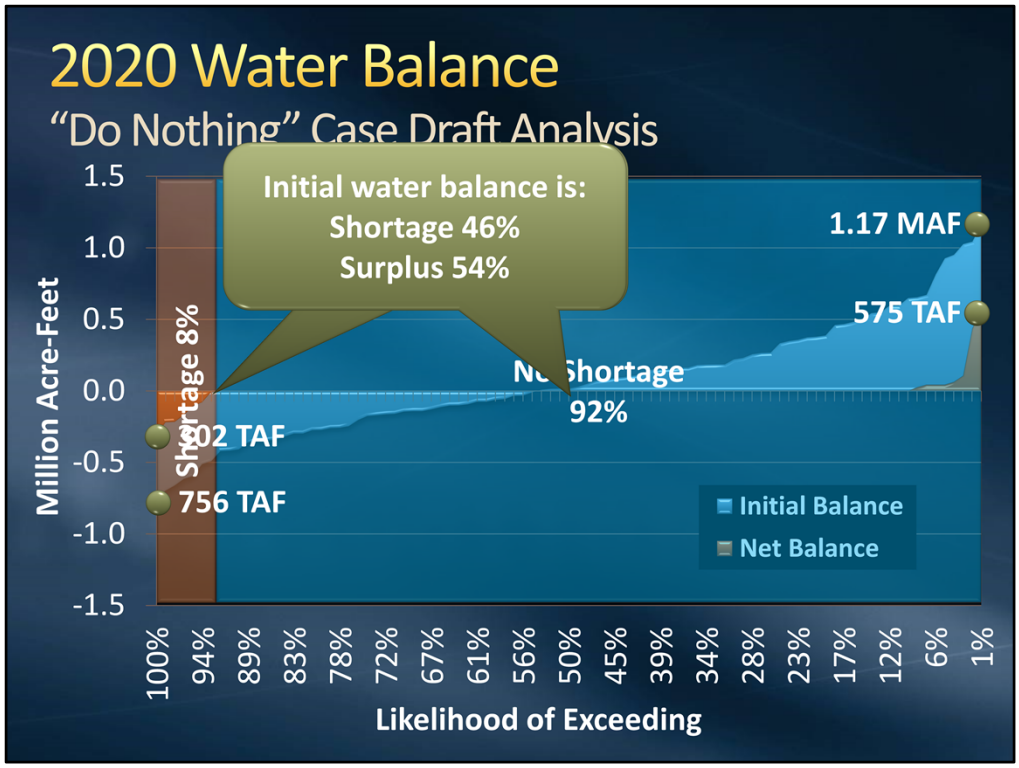
- Evaluates whether a supply mix meets demands in a manner consistent with reliability goals
- Serves as a test case
  - Tests supply and demand forecasts
  - Test ranges and variability due to climate and hydrologic factors

What is the Purpose of Reliability Analysis?

- Provides a range of outcomes for each forecast year
  - Uses 91 separate tests of supplies, demands, and storage
  - Based on climate and hydrologic conditions from 1922-2012
- Shows how many times out of 91 that there is no shortage, and what the resulting storage conditions are

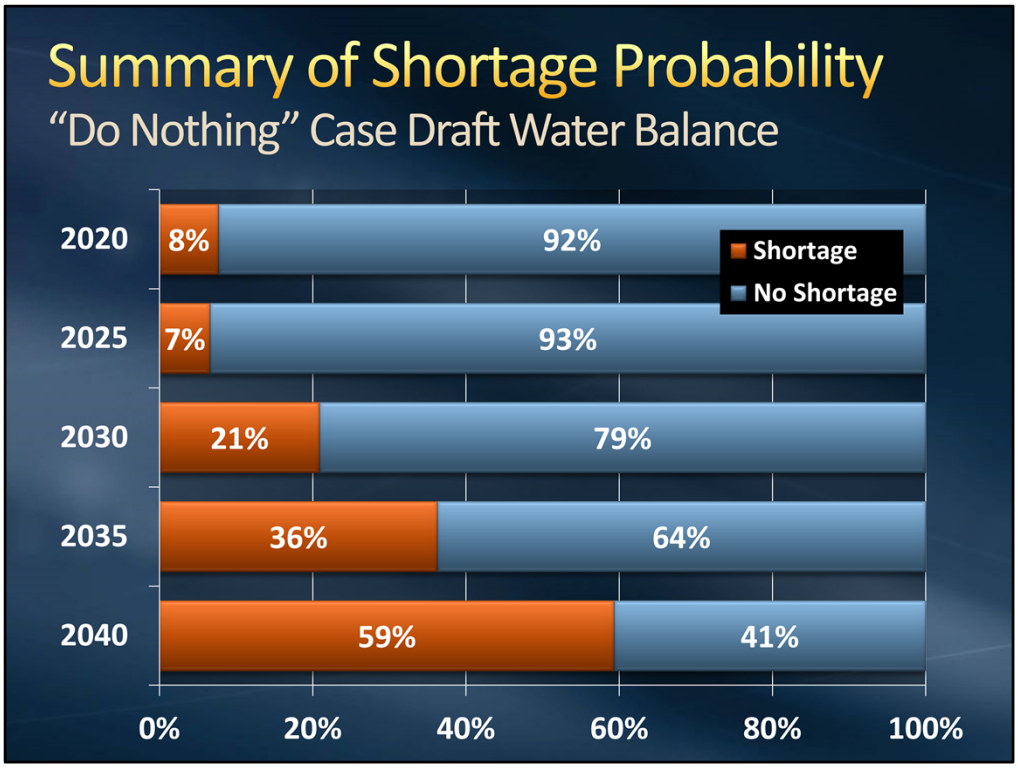
How IRPSIM Uses Hydrology

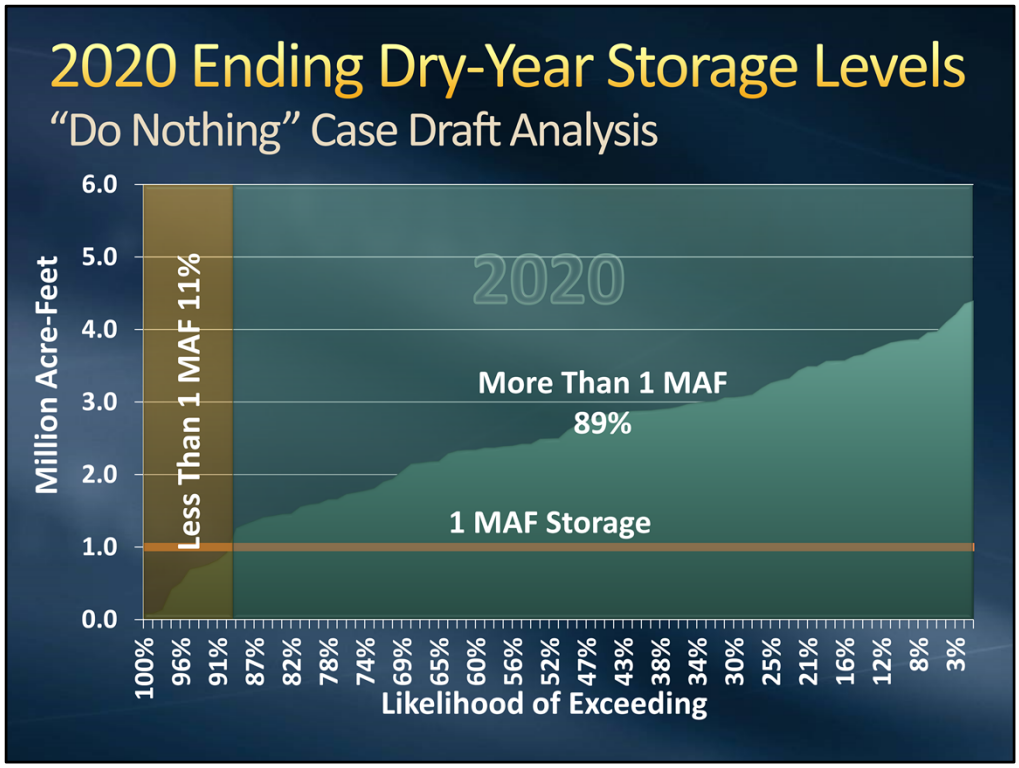



2020 Water Balance
"Do Nothing" Case Draft Analysis
Initial water balance is:
Shortage 46%
Surplus 54%
1.17 MAF
575 TAF
Net Shortage
92%
Shortage 8%
202 TAF
756 TAF
Initial Balance
Net Balance
Million Acre-Feet
1.5
1.0
0.5
0.0
-0.5
-1.0
-1.5
100%
94%
89%
83%
78%
72%
67%
61%
56%
50%
45%
39%
34%
28%
23%
17%
12%
6%
1%
Likelihood of Exceeding

Summary of Shortage Probability

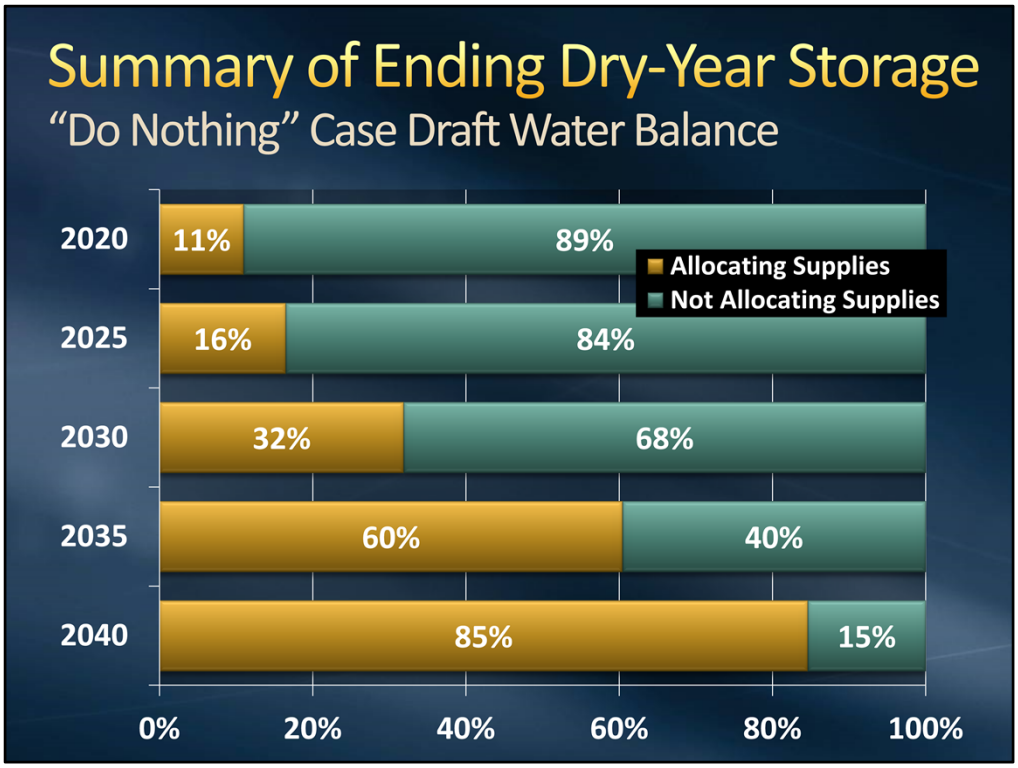
"Do Nothing" Case Draft Water Balance




2020 Ending Dry-Year Storage Levels
"Do Nothing" Case Draft Analysis
Million Acre-Feet
6.0
5.0
4.0
3.0
2.0
1.0
0.0
2020
Less Than 1 MAF 11%
More Than 1 MAF
89%
1 MAF Storage
100%
96%
91%
87%
82%
78%
74%
69%
65%
60%
56%
52%
47%
43%
38%
34%
30%
25%
21%
16%
12%
8%
3%
Likelihood of Exceeding

Summary of Ending Dry-Year Storage

"Do Nothing" Case Draft Water Balance



Analysis of Alternative Scenarios

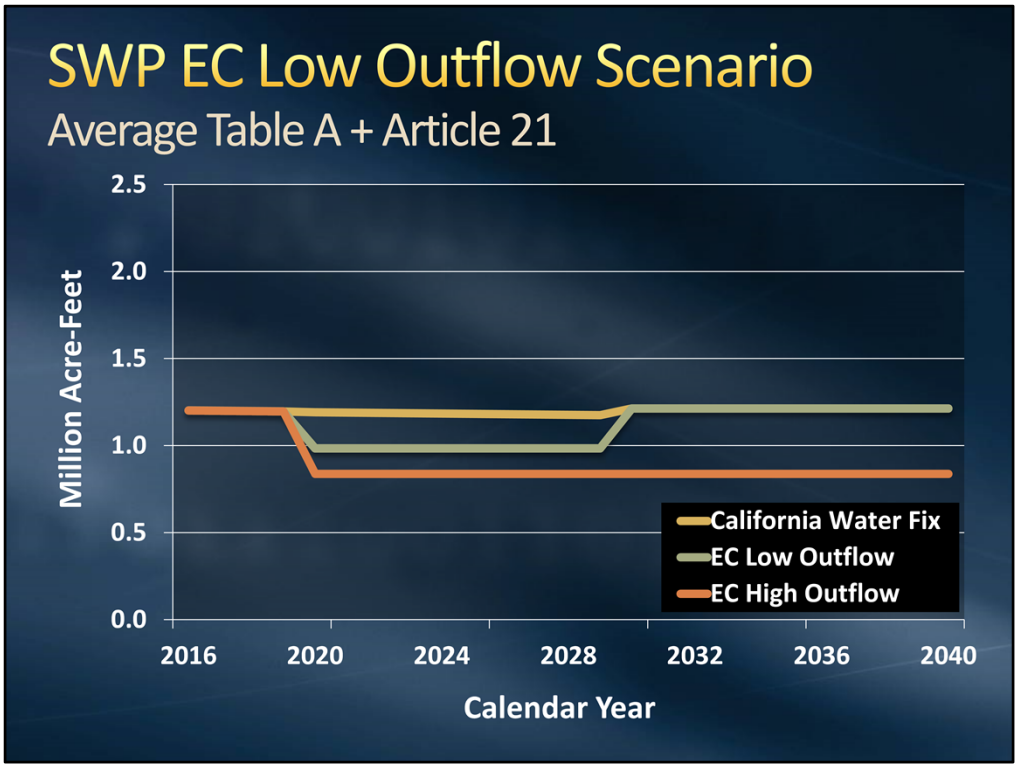
- Looked at reliability impacts of three risk scenarios
  - Scenario 1: More restrictive Delta regulatory framework in the near-term
  - Scenario 2: Local Resources production is lower than forecasted
  - Scenario 3: Scenario 1 and 2 combined
- Determined core supply development needed to mitigate risks
  - Added core supply in 50 TAF increments
  - Assumed additional supply available starting in 2020

Scenario 1

SWP Supplies Assuming Existing Conveyance and Low Outflow Requirements

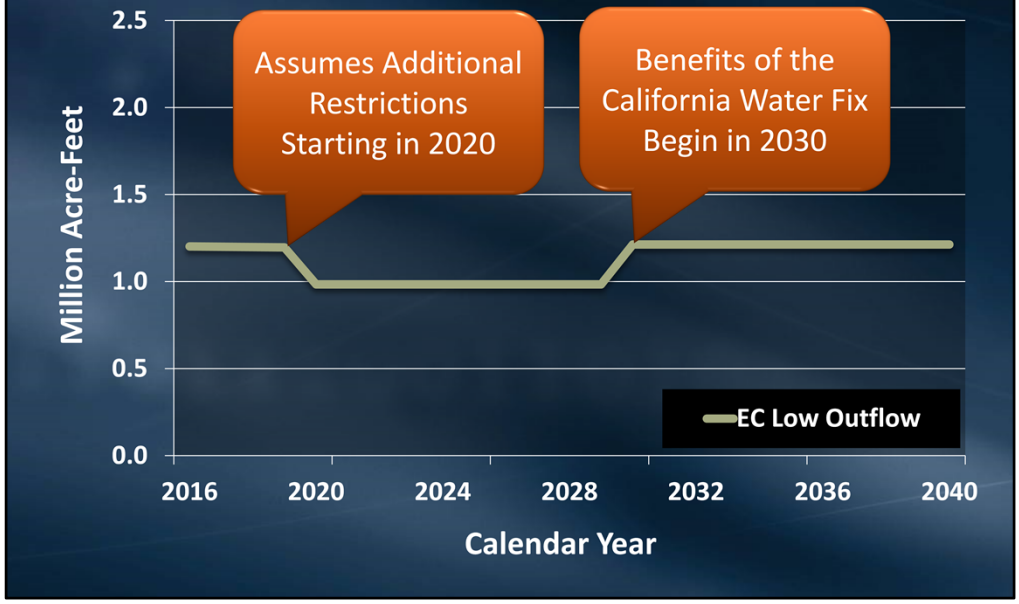
SWP EC Low Outflow Scenario

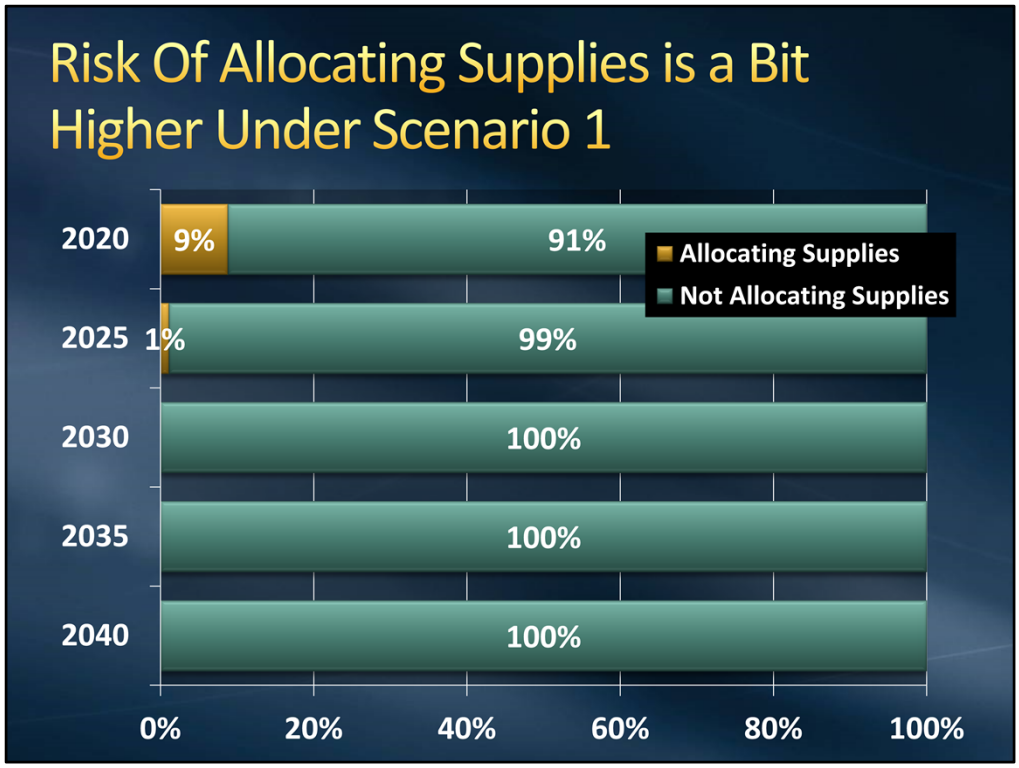
Average Table A + Article 21



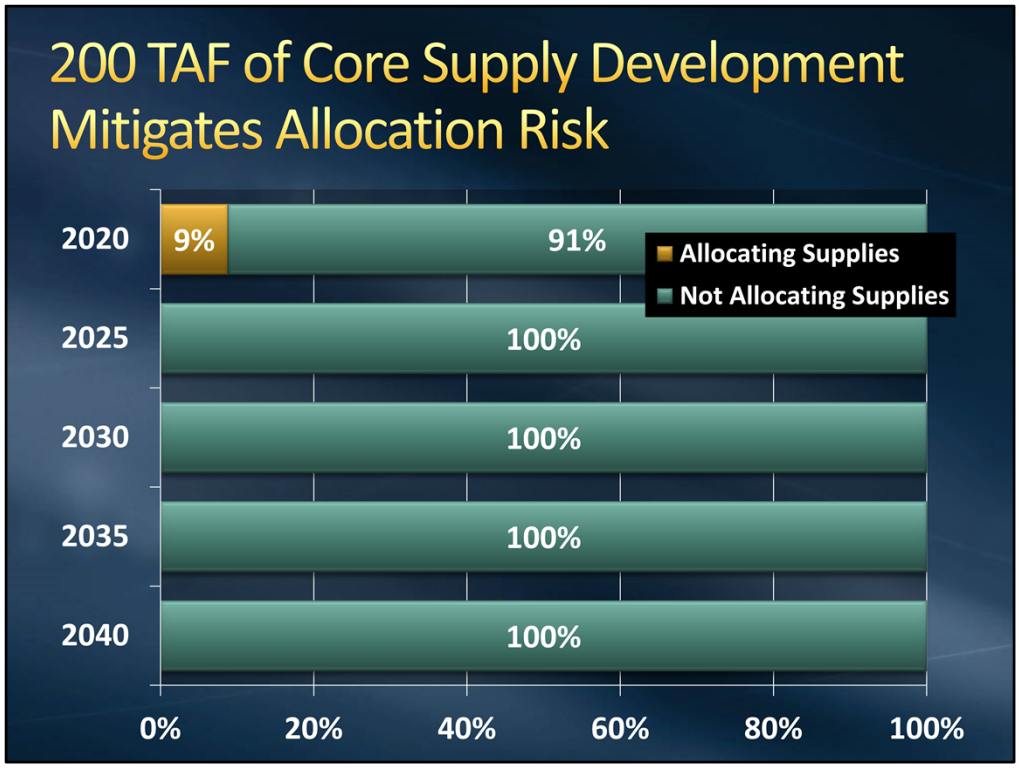
SWP EC Low Outflow Scenario

Average Table A + Article 21



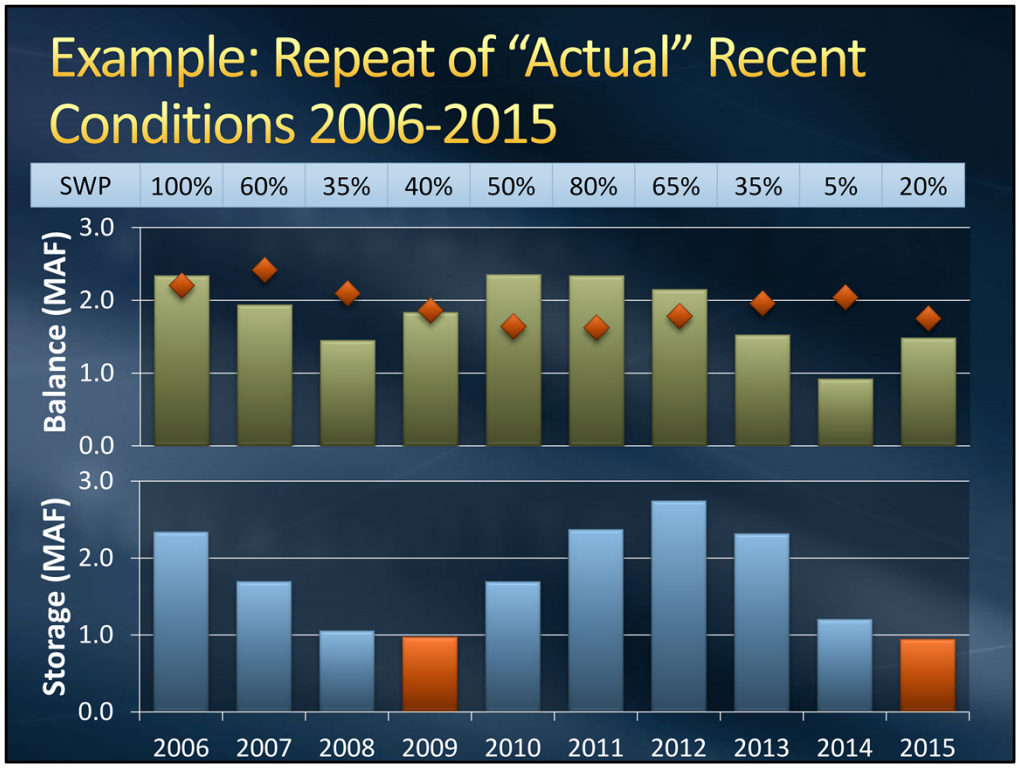


Huge reduction in storage below 1 MAF.



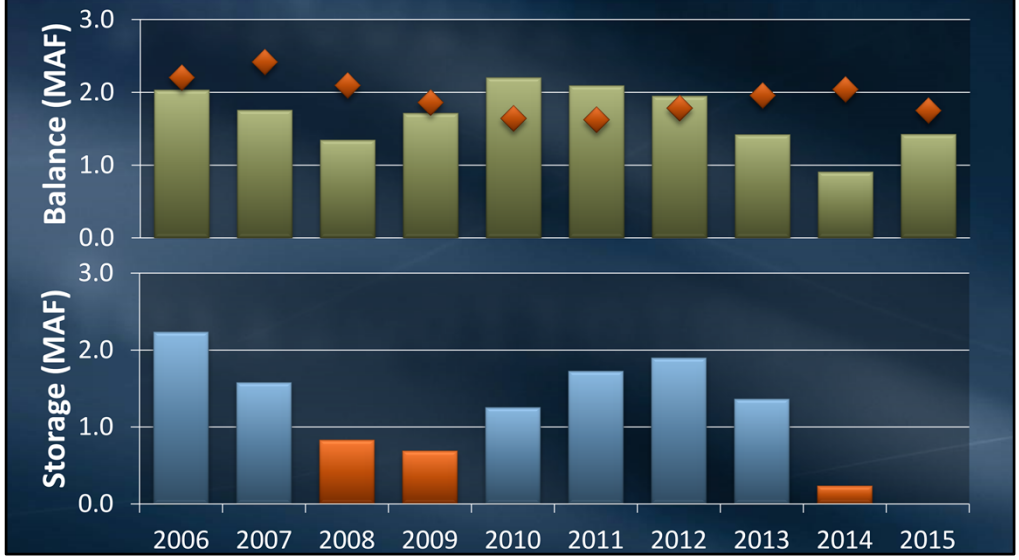
Huge reduction in storage below 1 MAF.

Example: Repeat of "Actual" Recent Conditions 2006-2015

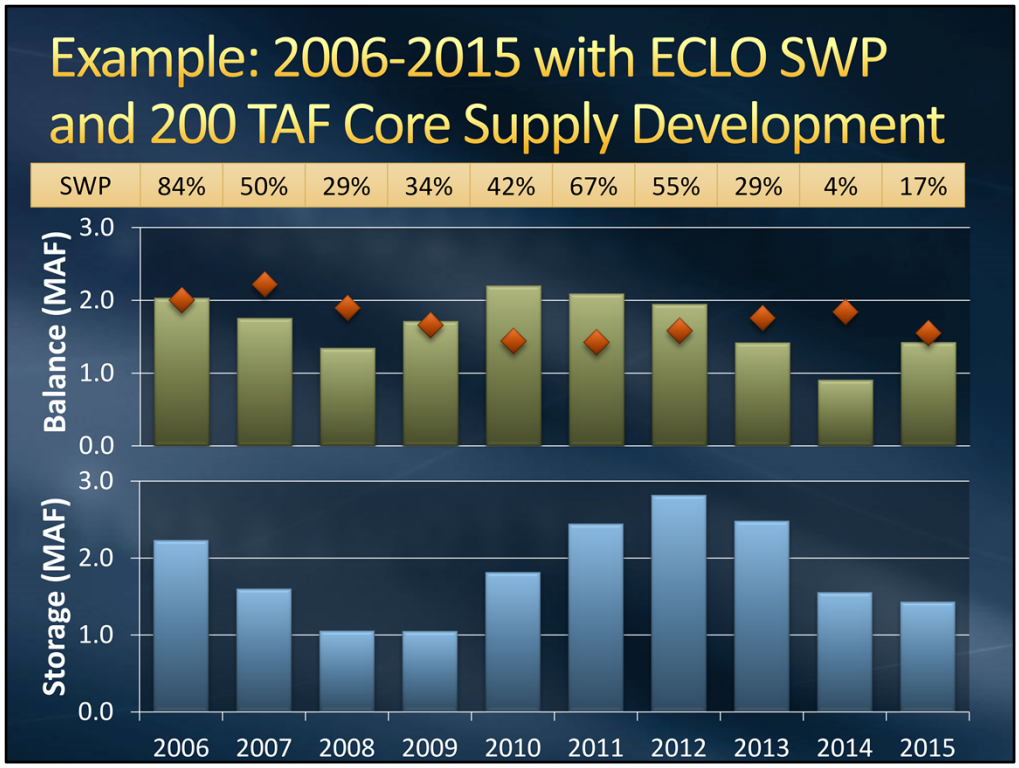


Example: Repeat of 2006-2015 with Additional SWP Restrictions (ECLO)

SWP	84%	50%	29%	34%	42%	67%	55%	29%	4%	17%



Example: 2006-2015 with ECLO SWP and 200 TAF Core Supply Development



Scenario 2

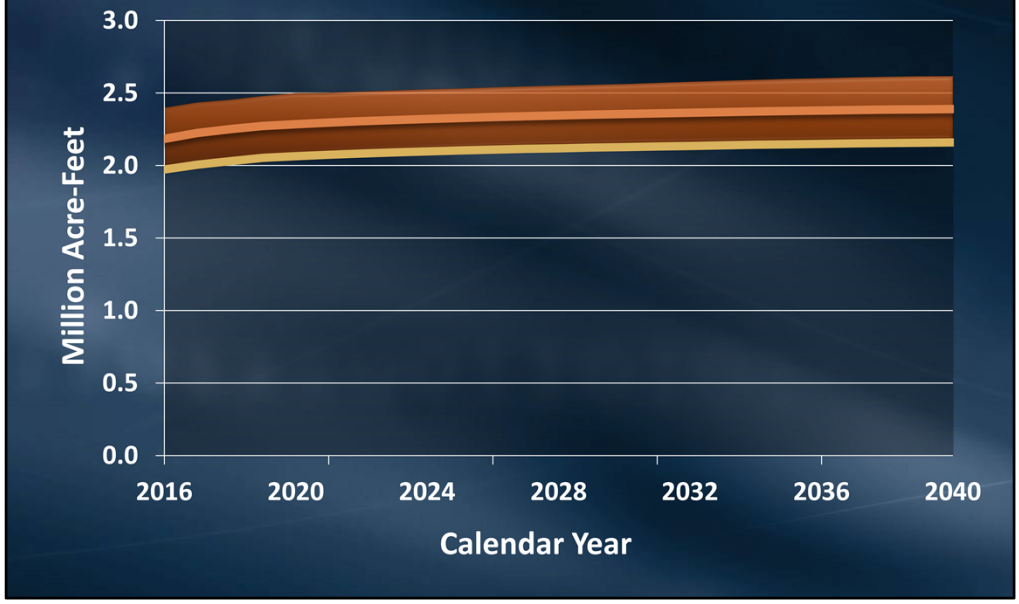
Reduced Local Supply Production

Potential Risks to Local Supplies

- Modeled as a 10% reduction in all local supply categories
- Represents potential reductions in supplies due to a number of factors:
  - Climate change impacts on groundwater recharge or surface supplies
  - Water quality impacts to groundwater or other supplies
  - Implementation risk to facility expansions
  - Infrastructure maintenance risks

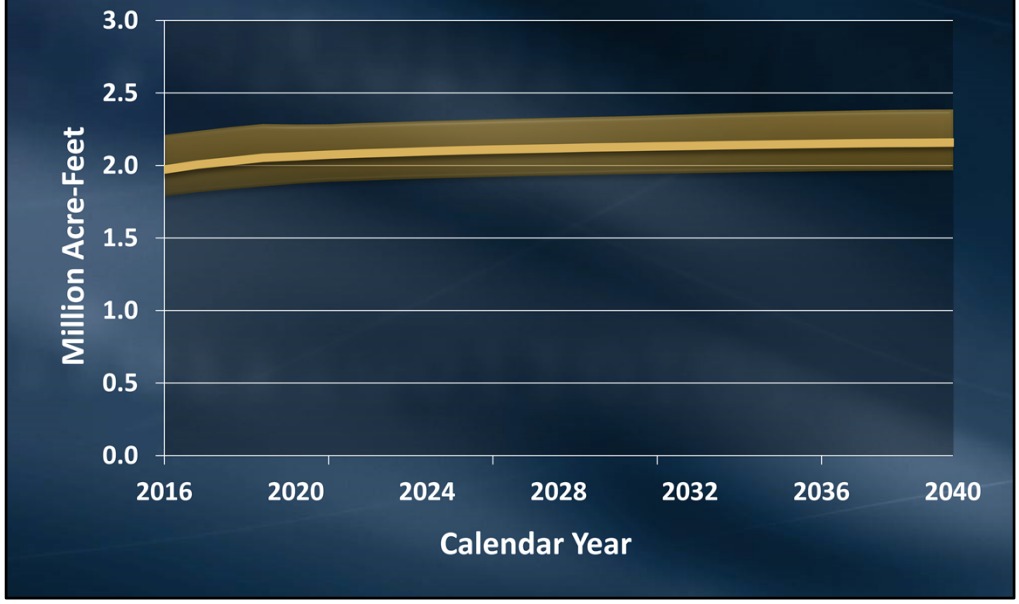
Total Range of Local Supplies

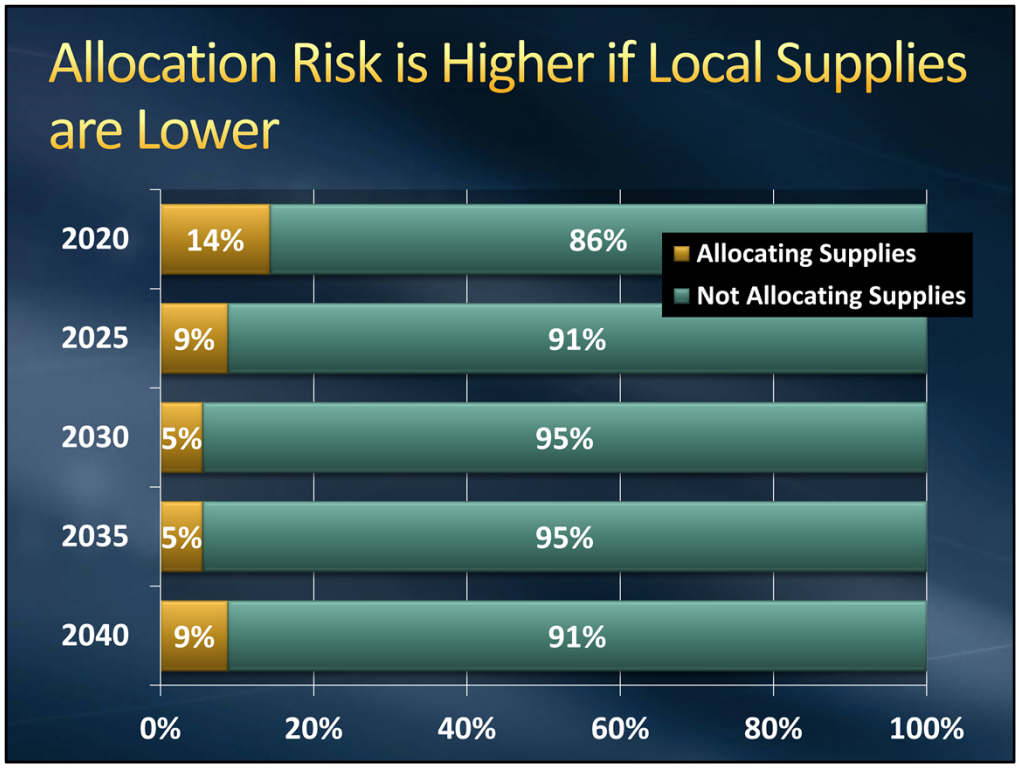
With a 10% Overall Reduction



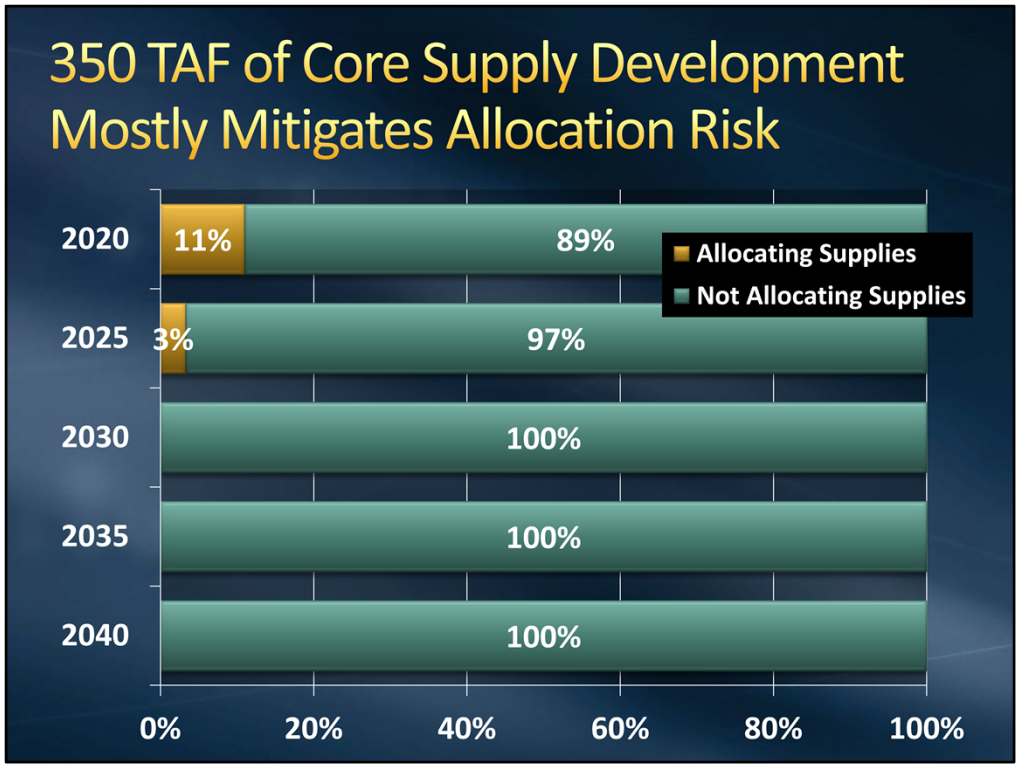
Total Range of Local Supplies

With a 10% Overall Reduction





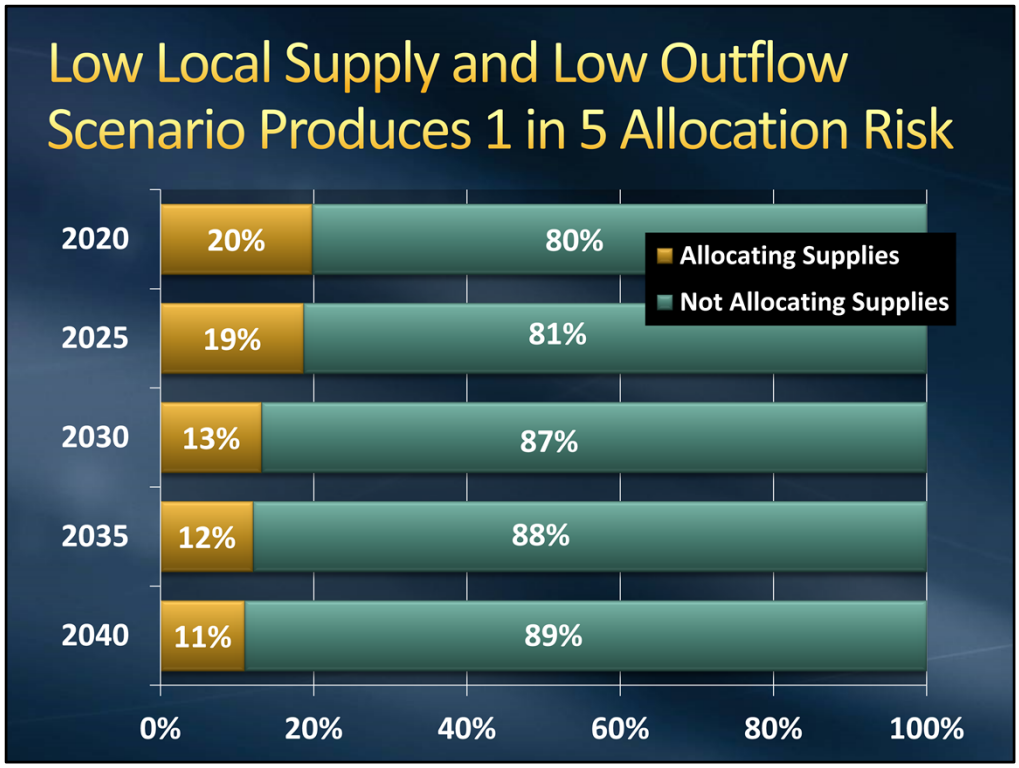
Huge reduction in storage below 1 MAF.



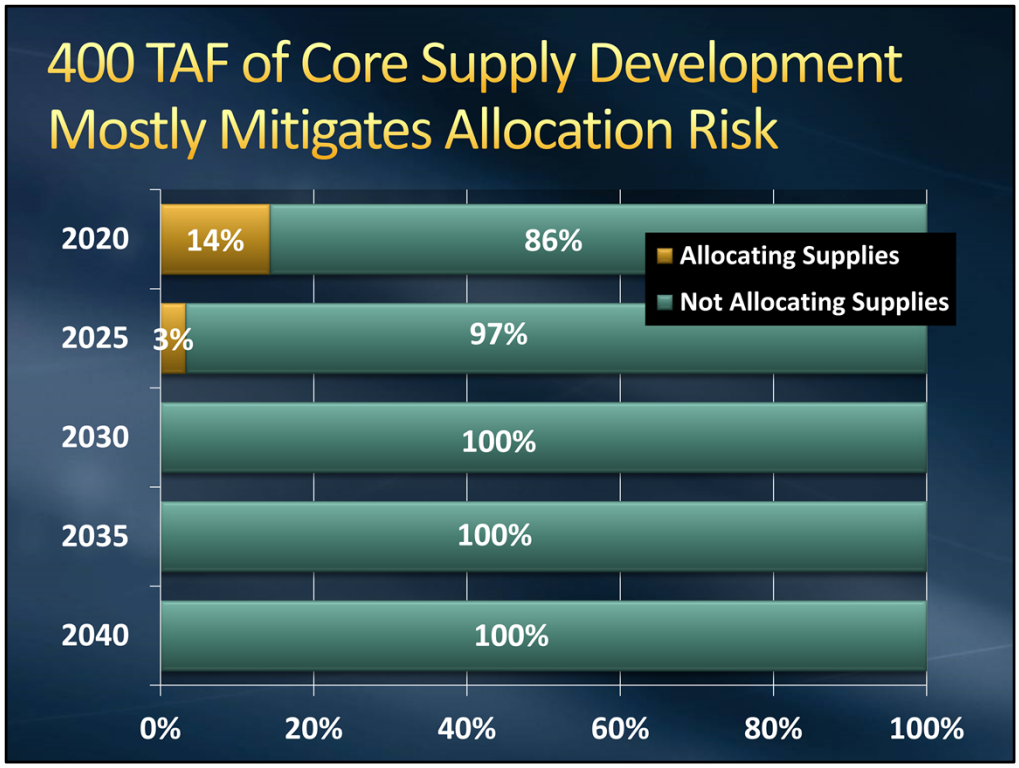
Huge reduction in storage below 1 MAF.

Scenario 3

Impact of Scenarios 1 and 2 Combined

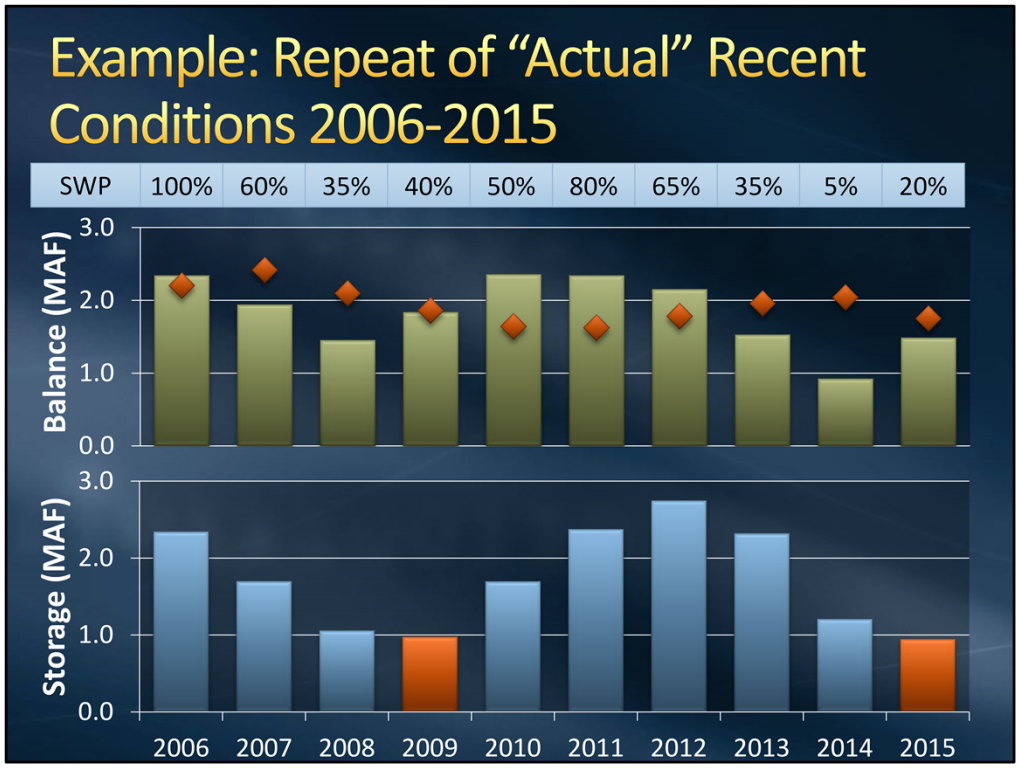


Huge reduction in storage below 1 MAF.

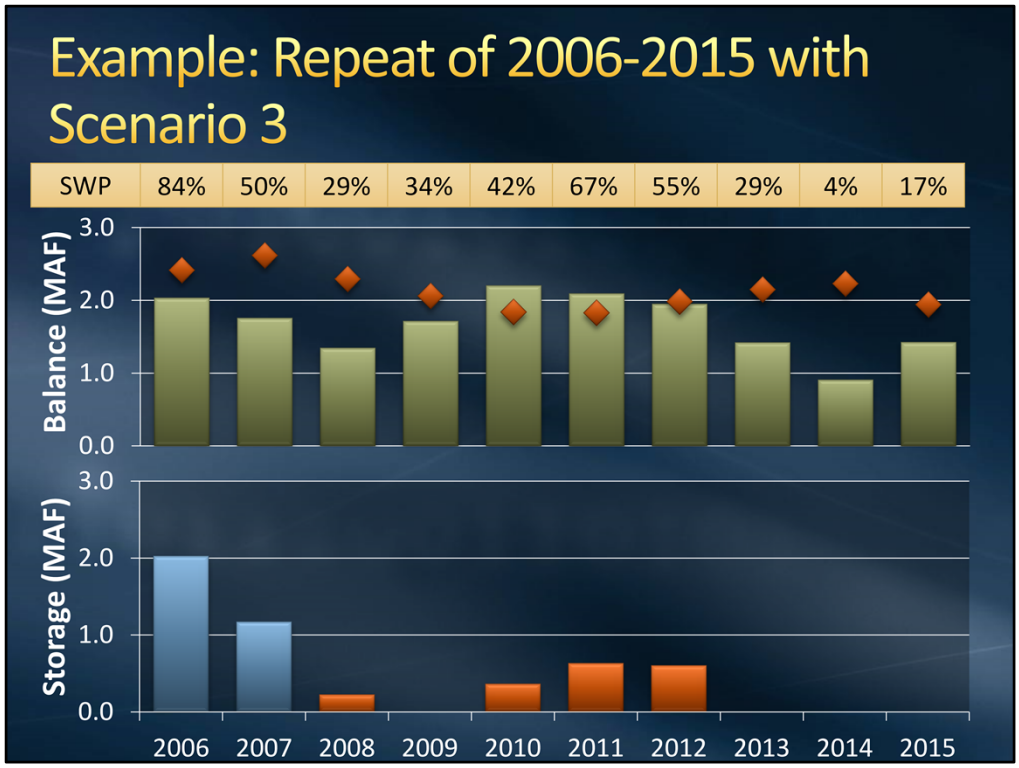


Huge reduction in storage below 1 MAF.

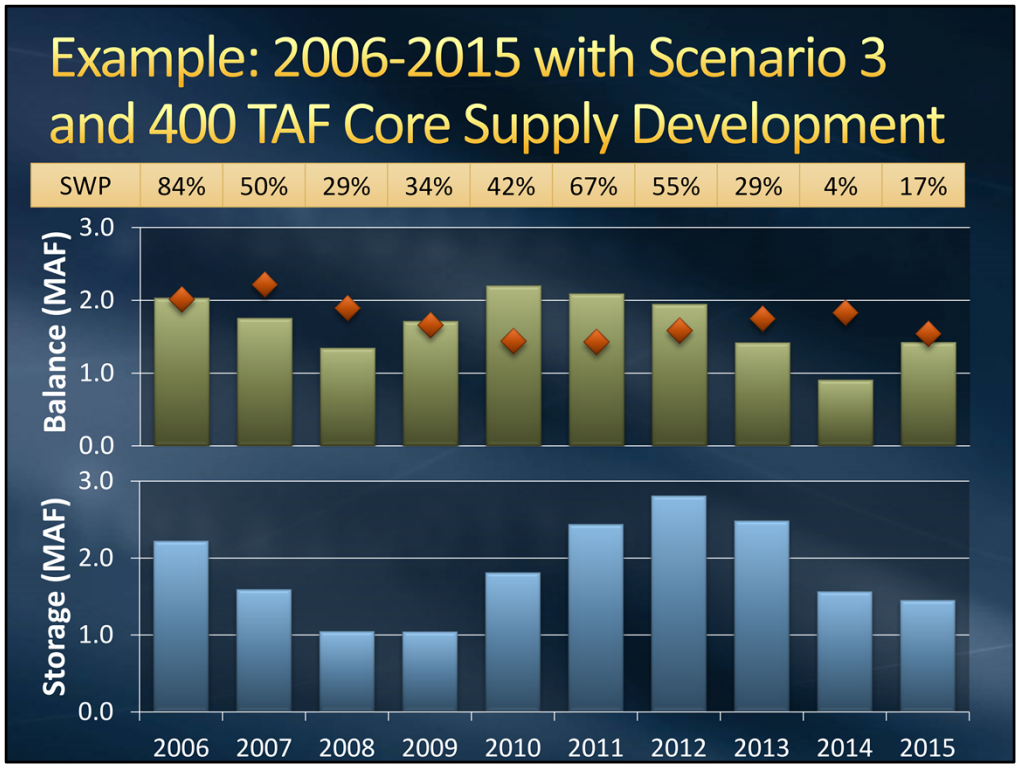
Example: Repeat of "Actual" Recent Conditions 2006-2015



Example: Repeat of 2006-2015 with Scenario 3



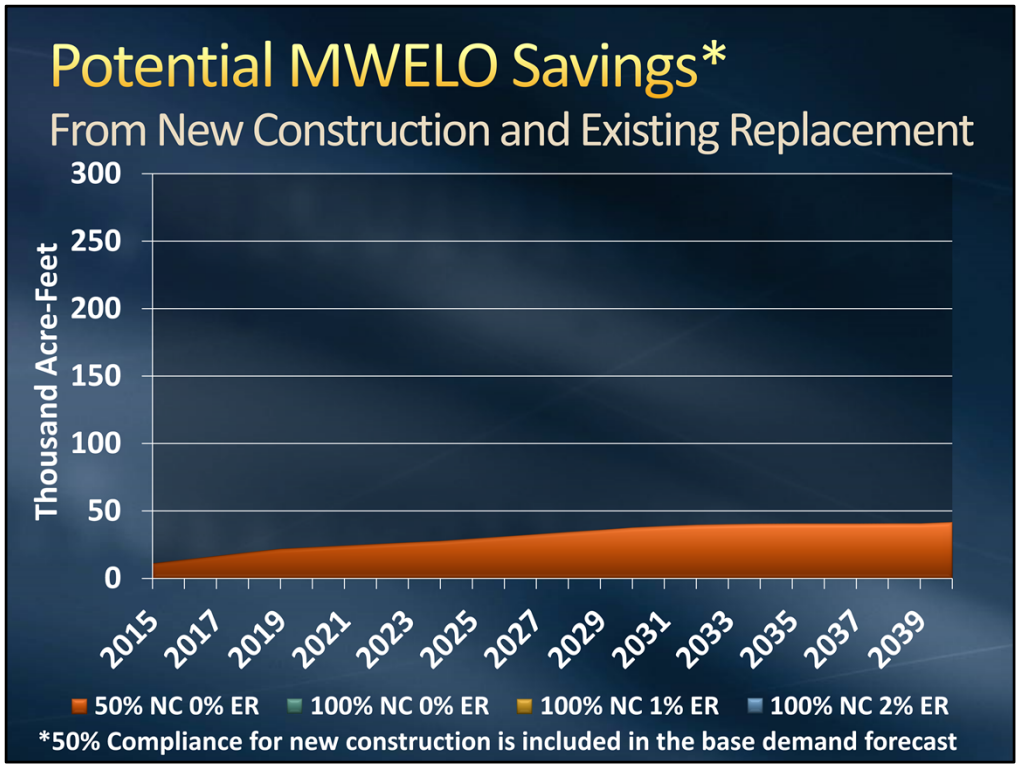
Example: 2006-2015 with Scenario 3 and 400 TAF Core Supply Development



Summary of Risk/Storage Analysis

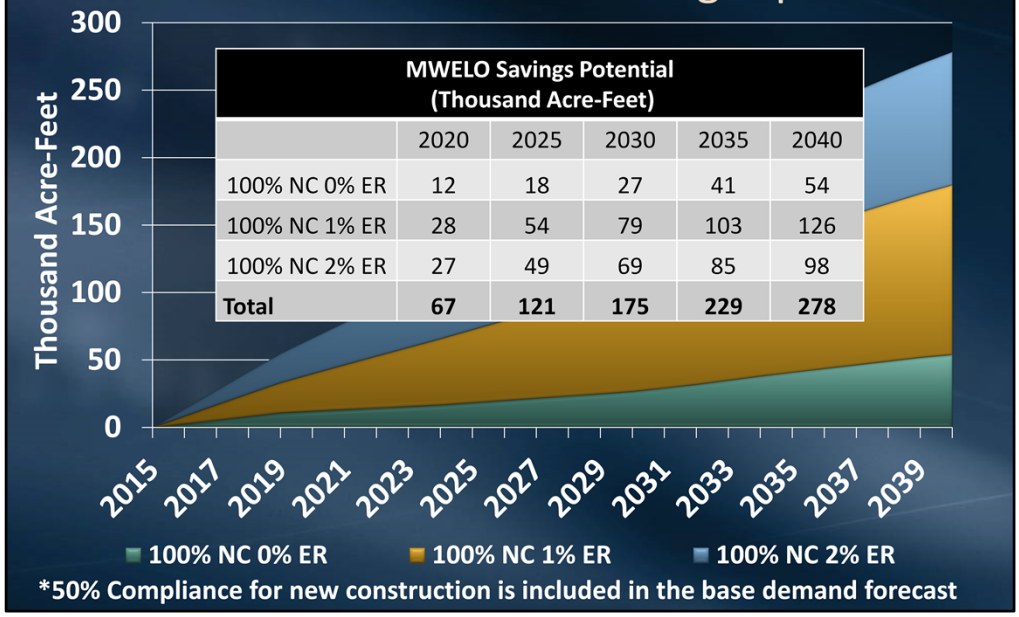
- The 2010 IRP Targets do not provide a sufficient buffer against the risks shown
  - Particularly if more than one of these risks occur at the same time
- Additional core supply needed to avoid allocating supplies:
  - 50 TAF to 250 TAF per year
- Total need including 150 TAF remaining 2010 IRP Target is:
  - 200 TAF to 400 TAF per year

Can These Additional Levels of Development Be Achieved?


Potential MWELO Savings*
From New Construction and Existing Replacement
Thousand Acre-Feet
300
250
200
150
100
50
0
2015
2017
2019
2021
2023
2025
2027
2029
2031
2033
2035
2037
2039
50% NC 0% ER
100% NC 0% ER
100% NC 1% ER
100% NC 2% ER
*50% Compliance for new construction is included in the base demand forecast

Potential MWELO Savings*

From New Construction and Existing Replacement

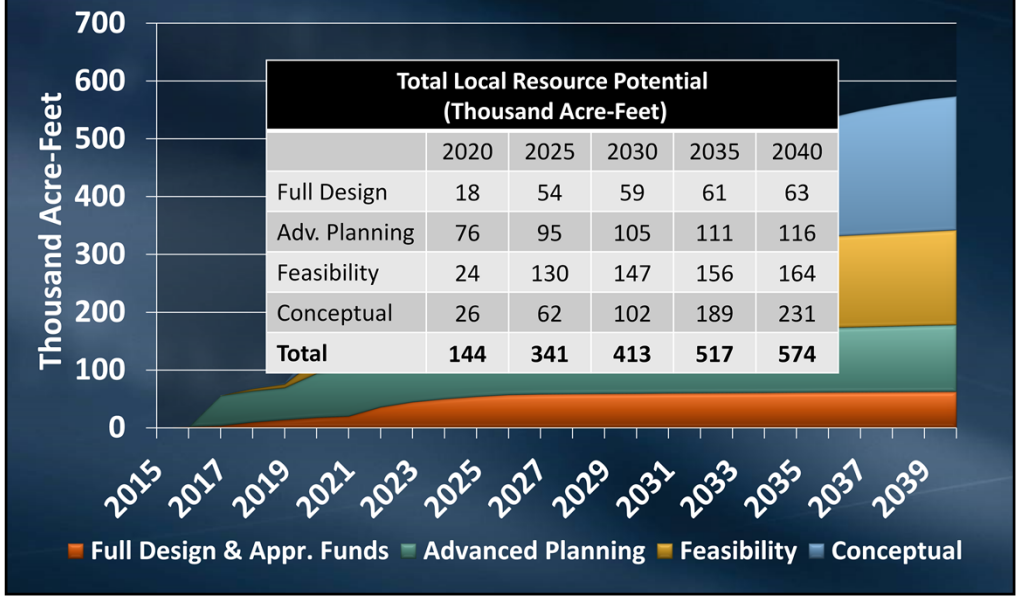


MWELO Savings Potential (Thousand Acre-Feet)					
	2020	2025	2030	2035	2040
100% NC 0% ER	12	18	27	41	54
100% NC 1% ER	28	54	79	103	126
100% NC 2% ER	27	49	69	85	98
Total	**67**	**121**	**175**	**229**	**278**

*50% Compliance for new construction is included in the base demand forecast

Total Local Resources Potential

All Future Local Projects



Total Local Resource Potential (Thousand Acre-Feet)					
	2020	2025	2030	2035	2040
Full Design	18	54	59	61	63
Adv. Planning	76	95	105	111	116
Feasibility	24	130	147	156	164
Conceptual	26	62	102	189	231
Total	**144**	**341**	**413**	**517**	**574**

Addressing Shorter-Term Imbalances

A Transfers and Exchanges Strategy Can Help Address Near-Term Needs

- Dry Years
  - Continue to pursue purchases but recognize limitations
- Normal Years
  - Pursue North of Delta purchases when availability and export capacities are higher and price is lower
- Wet Years
  - Develop partnerships with South of Delta users for unbalanced exchanges
  - Leverage extensive storage resources

Key Technical Findings

Summary of Key Technical Findings

- Additional local supply and conservation development is needed to mitigate risk
- Maintaining imported supplies continues to be critical
  - Limited opportunities for additional development of imported supplies beyond targets
- A comprehensive water transfer approach can address shorter-term reliability challenges
- Implementation policy and approach to developing local supplies and conservation is key

IRP Key Technical Findings
Colorado River Aqueduct

- Stabilize CRA base supplies against risks from growing demands, drought, etc.
  - Develop 1.0 MAF of base supply programs
- Maintain flexibility in CRA dry-year programs and storage
  - Ensure access to 1.2 MAF of supplies in dry-years

IRP Key Technical Findings
State Water Project

- Manage flow and export regulations in the near-term
  - Continue to engage in collaborative science-based approaches
- Pursue a long-term Delta solution
  - Continue active participation in the California Water Fix and the California EcoRestore efforts

IRP Key Technical Findings
Conservation

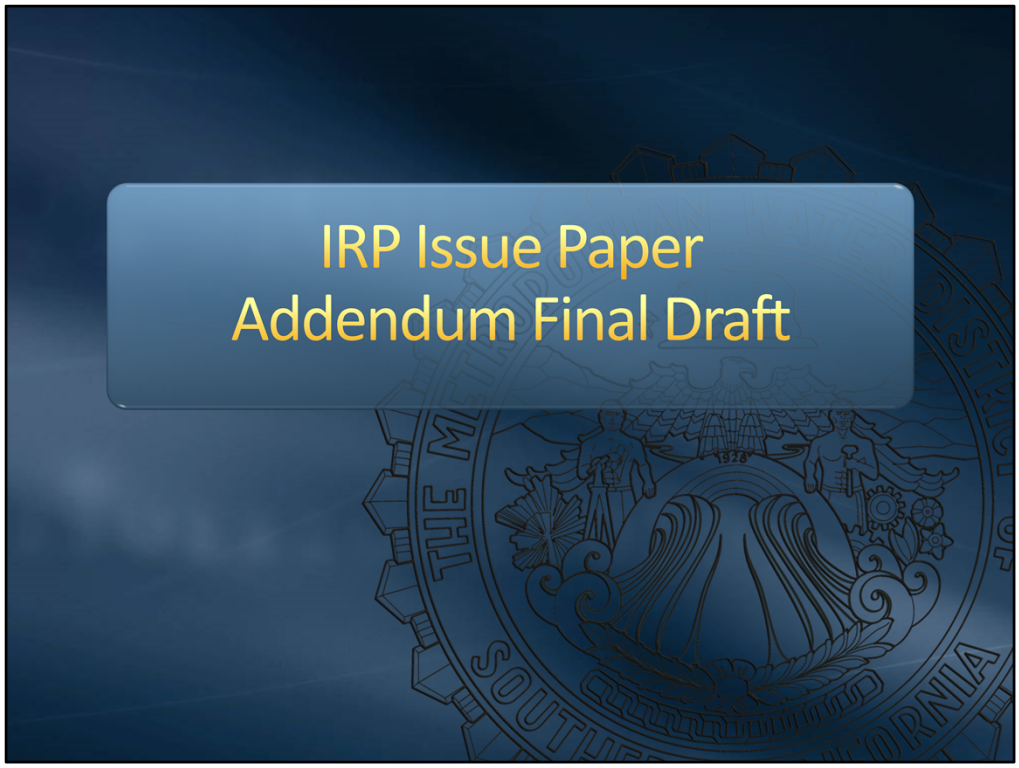
- Meet regional 20x2020 GPCD reduction
- Pursue additional conservation in support of the State's Model Water Efficient Landscape Ordinance
  - Attain 100% compliance for new construction
  - Increase annual replacement rate for existing homes and businesses
- Continue device-based programs for residential, commercial and industrial

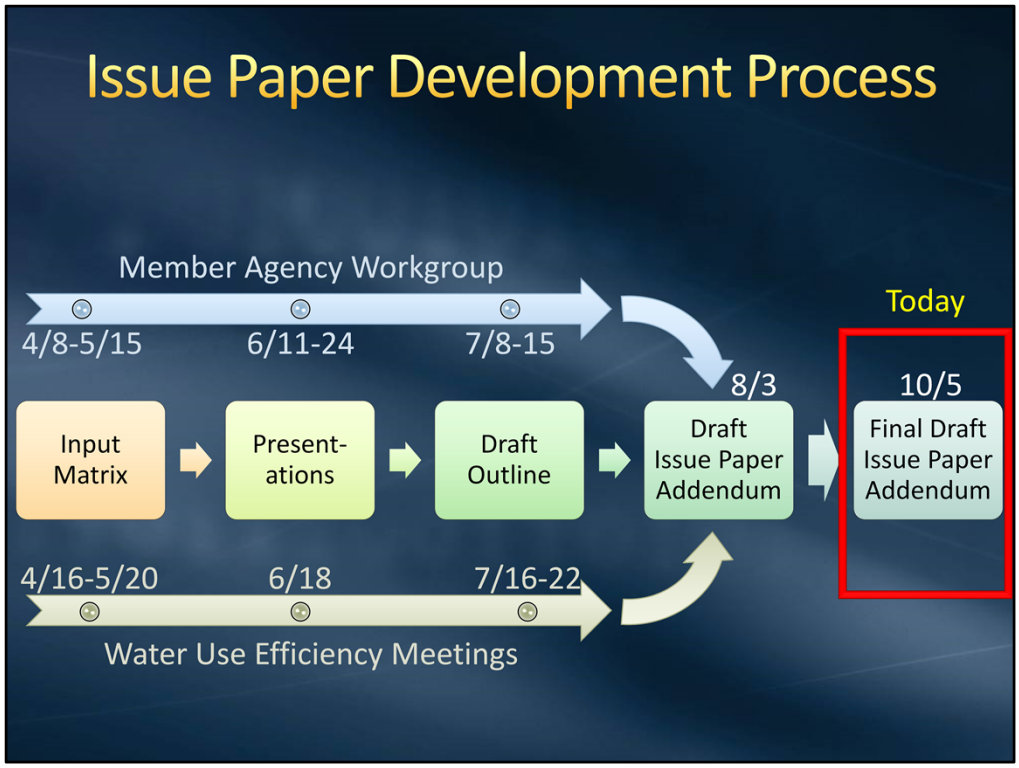
IRP Key Technical Findings
Local Resources

- Develop additional local supplies to meet growth and ensure adequate storage reserves
  - Pursue additional recycling, groundwater recovery, and seawater desalination
- Develop additional local supplies to reduce needs for imported replenishment
  - Expand opportunities for groundwater recharge from stormwater and recycling

IRP Key Technical Findings
Transfers and Exchanges

- Develop a comprehensive transfers and exchanges strategy
  - Focus on obtaining additional supplies in normal and wet years
- Ensure strategy works in conjunction with Metropolitan and local storage


IRP Issue Paper
Addendum Final Draft



Thank you for all your participation and input. Hopefully we captured your input and represented the key points in this paper.

Input matrix: introduced at the kickoff meeting, comments due 5/15
Presentations on the compiled input and issue paper content from 6/11 (groundwater part 2 workshop) to 6/24 meeting on local resources (all other resources)
Draft outline: presented and sent out for review on 7/8 (comments due 7/15)

Parallel process

Utilizing an already established venue: monthly WUE meetings, comprised of member agency and Metropolitan conservation staff (generally on the 3rd Thursday of every month)

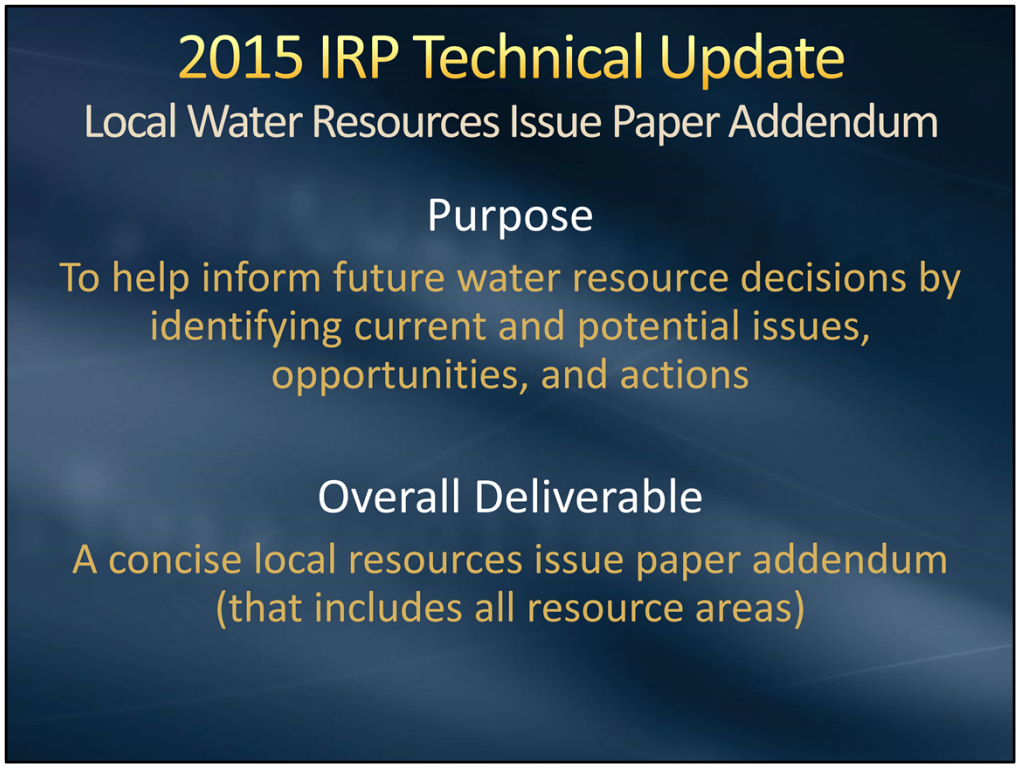
The processes (and resource topics) come together for the draft addendum to be presented on August 3rd at the MA Workgroup meeting.

A reminder about what info is included in this issue paper

Information for the IRP can be placed into three categories (information that…):

1) Informs the forecast
2) Feeds the issue paper (discuss conservation issues)
3) Will be flagged to add to a subsequent Board discussion on policies and implementation

All three feed the policy implementation discussion



It's good to remind ourselves of the **goals** of this issue paper addendum.
Not dictating policy, rather providing information to **help** with the policy development.
This is also **not** a dissertation on each resource.

The team stayed true to this purpose and put tremendous effort to try and keep this paper focused on just the essentials for maximum effectiveness. We were brutal with each other's work…chopping away with a meat cleaver when needed. The info that we chopped were all good info, but we didn't want the reader to have to sift through info to get the main points. We are aiming for an effective (meaning concise and readable) comprehensive document.

So we are aiming for these things, but please keep in mind that this is a **1st draft** that we developed within a very challenging timeframe and it is by no means perfect…yet. That's where this review period comes in handy. And when reviewing, we ask you to also remember to stay true to the purpose of this paper: any essential pieces missing? Are things screaming at you the wrong way.

Sections

- Opening Material (TOC, Summary, Intro)
- Conservation
- Groundwater (including Stormwater and Other Recharge)
- Recycled Water
- Seawater Desalination
- Stormwater Direct Use
- Graywater
- Resource Interrelations
- Conclusions

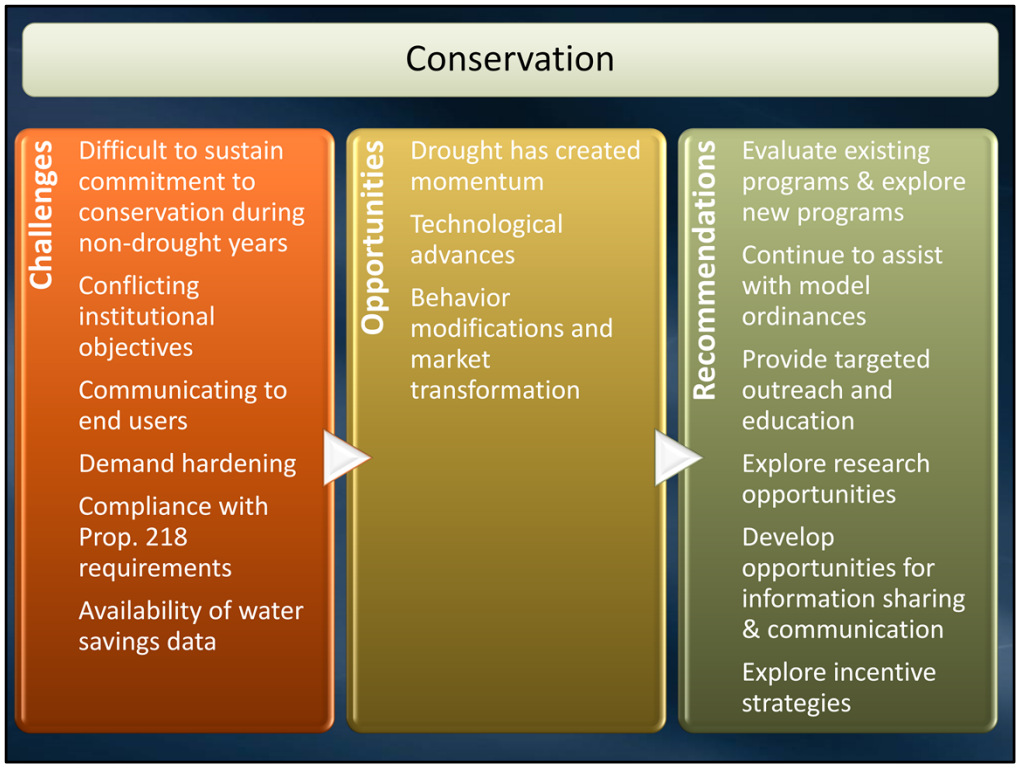
For this presentation, we will go over the highlights of the challenges/barriers, opportunities, and recommendations subsections per resource
You will see that the recommendations are more broad categories of recommendations versus detailed steps, as we are very careful to allow flexibility and not to presume to dictate policy, which is in phase 2

Opening Material (TOC, Summary, Introduction)

- The summary includes a table highlighting the main points per resource

Challenges	Opportunities	Recommendations

- Introduction
  - States the purpose: to help advance the regional discussion
  - Provides an overview: builds on the 2010 Issue Papers
  - Describes the collaborative process



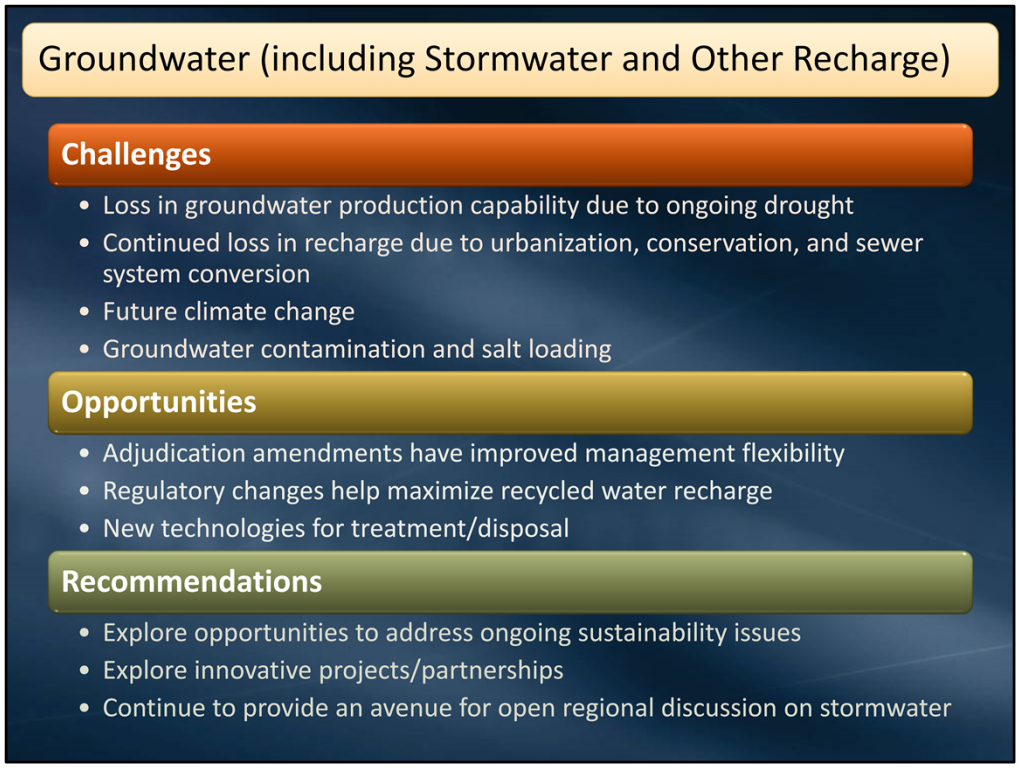
Recommendations are providing broad direction to feed the future policy discussion…and allow for flexibility in moving forward

The Conservation chapter was developed in large part with input from member and local agencies at the Monthly WUE Meetings (we met with them 3 times since April).

- Conservation is a hot topic at the moment; the drought has caught attention of the government, media and public, and saving water has become a massive effort coming from both top-down and bottom-up
- Governor Brown's Executive Order in April 2015 was a game changer. It led to major policy changes in the last 6 months:
    - SWRCB imposed first-ever mandatory retail water use restrictions
    - Revised Model Water Efficient Landscape Ordinance was adopted by CA Water Commission in July
    - MWD received an immediate 20-fold increase in rebate requests; in May 2015, Metropolitan's Board further increased the two-year conservation budget to an unprecedented amount of $450 million, with $340 million committed to turf removal incentives.
- With water conservation activity at an all-time high, the challenge will be to encourage and sustain water-saving behavior and to optimize the resources available to achieve water savings into the future.

In addition to the Challenges, Opportunities, and Recommendations listed on this slide, there were some Lessons Learned

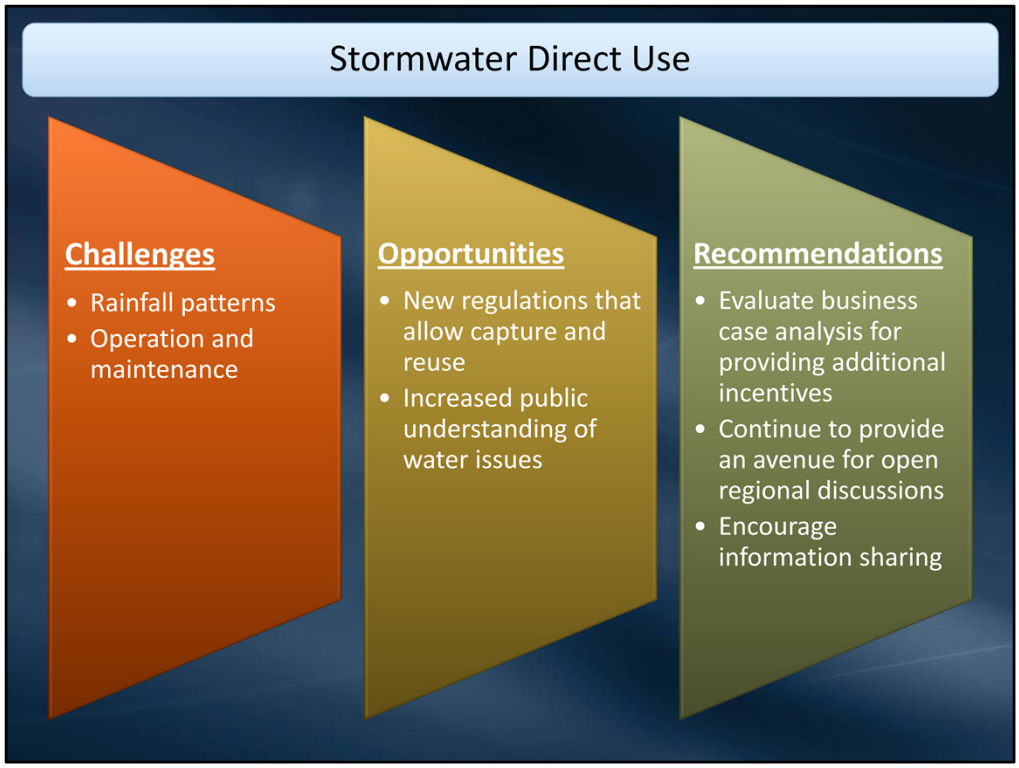
- **Mandatory Reporting Has a Powerful Effect on Conservation**
- **Water Pricing Can Reduce Demand**
- **Non-Price Measures are Also Effective** (social norms messaging; showing consumers that their water use not consistent with their perceptions)
- **Legislation Can Help Change Marketplace and Prioritize Conservation** (legislation can increase passive conservation, and it can protect citizens from cities and HOAs when trying to do the right thing, like letting a lawn go brown)



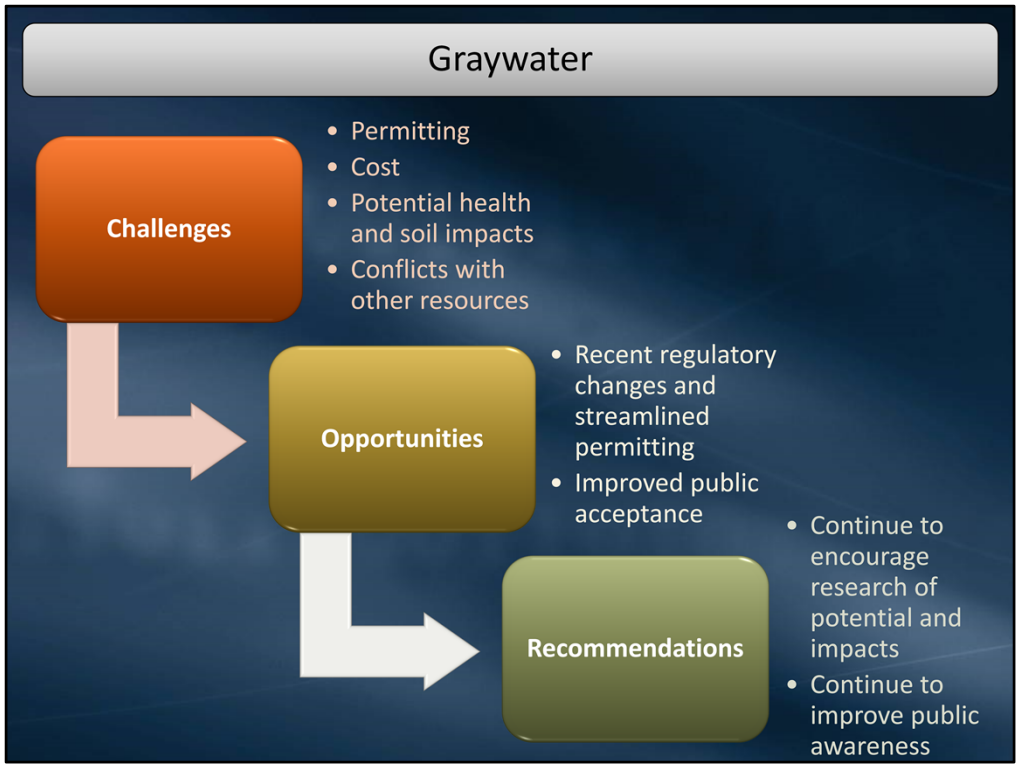
Challenges to sustainability
The amount of water available now and in the future
Water quality


Recycled Water
Challenges
• Permitting
• Public acceptance
• Cost
• Water quality
• Operational & institutional barriers
Opportunities
• Progress toward new regulatory process
• Improving public perception
• New funding opportunities
• New technologies & research
Recommendations
• Explore opportunities to improve permitting
• Improve public education and awareness
• Explore various funding mechanisms (i.e., incentives, ownerships, and partnerships)
• Consider joint technical studies


Seawater Desalination
Challenges
• Costs
• Permitting and new regulations
• Demand risk
• NGO opposition
Opportunities
• Improve permitting process
• New technologies & research
• Improving public communications
• Partnerships to share risks
Recommendations
• Explore legislative, regulatory, and communications opportunities
• Investment in research and innovation
• Investigate partnership opportunities



Consistent and effective capture



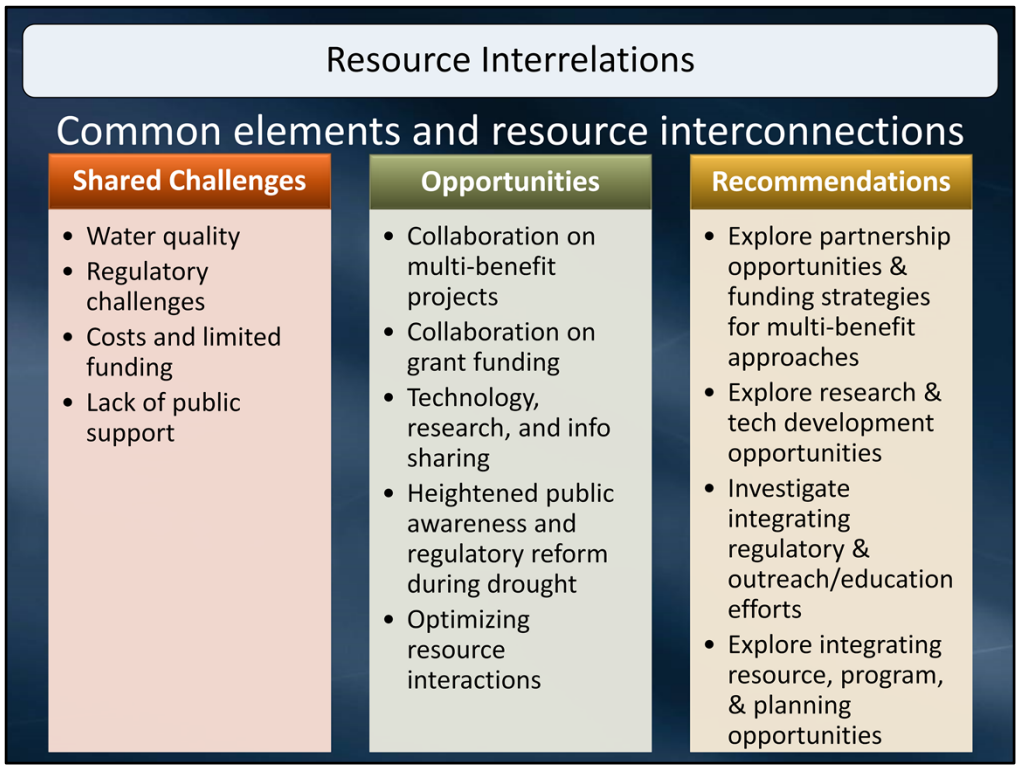
Graywater made its first appearance in the 2010 IRP.

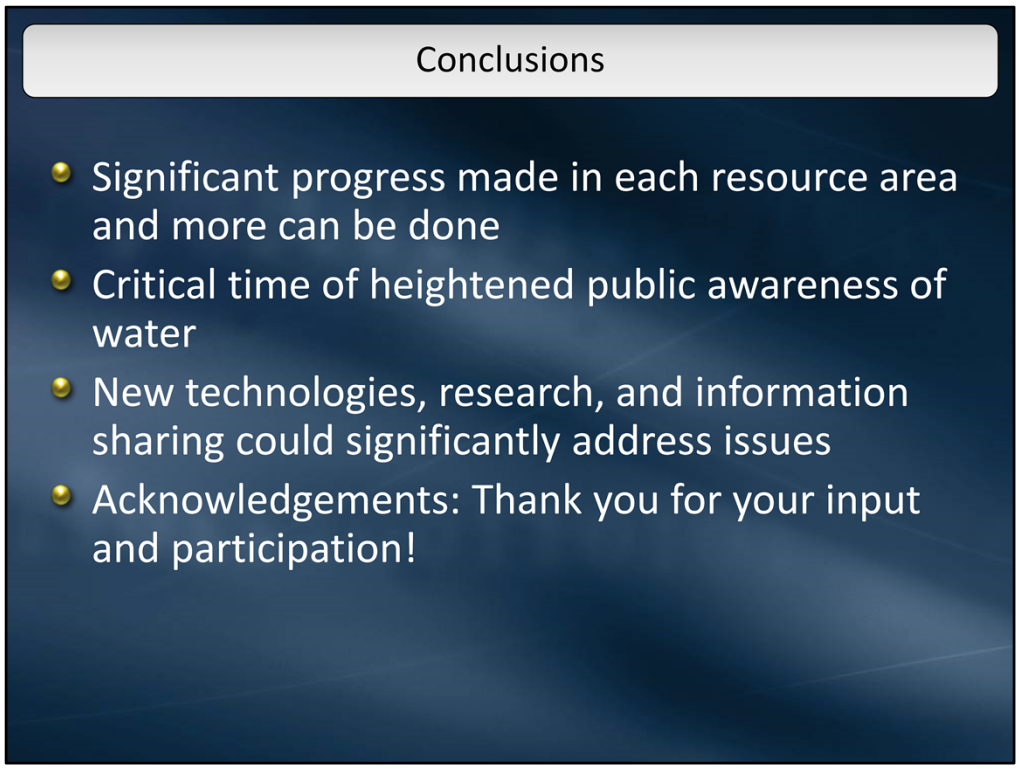
Graywater still most the barriers and challenges it had in the past; it is costly; it can be bothersome to obtain permits, there are potential health and environmental risks, and not least there are potential conflicts with other resources, included recycled water, groundwater, conservation, and sewer systems.

However, graywater has seen significant opportunities since the writing of the 2010 IRP Issue Paper.

- In 2009, the California Plumbing Code was revised to simplify the permitting requirements for graywater systems, and small laundry-to-landscape systems no longer require a permit.
- Legislation now prohibits local governments from banning graywater use.
- The Governor's Executive Order directs state agencies to work together to implement a Water Energy Technology (WET) program to deploy innovative water management technologies, which may include graywater.
- The revised MWELO encourages graywater use by allowing small landscapes that are irrigated only with graywater or captured rainwater to meet a simple irrigation checklist and not be subject to the entire ordinance.
- There is growing public acceptance and enthusiasm for graywater as a Do-It-Yourself grassroots solution to drought-related water use restrictions and increasing water bills.

The recommendations are the same as before: to continue to encourage research and to continue to improve public awareness of the benefits as well as the rules and risks of using graywater.


Resource Interrelations
Common elements and resource interconnections
Shared Challenges
• Water quality
• Regulatory challenges
• Costs and limited funding
• Lack of public support
Opportunities
• Collaboration on multi-benefit projects
• Collaboration on grant funding
• Technology, research, and info sharing
• Heightened public awareness and regulatory reform during drought
• Optimizing resource interactions
Recommendations
• Explore partnership opportunities & funding strategies for multi-benefit approaches
• Explore research & tech development opportunities
• Investigate integrating regulatory & outreach/education efforts
• Explore integrating resource, program, & planning opportunities



Great opportunity for shifting public behavior/perception, institutional reform, regulatory enhancements, partnerships

Issue Paper Addendum Next Steps

- Board Information Item
  - October 27, 2015
- 2015 IRP Technical Report Board Adoption
  - Included as an Appendix
  - December 8, 2015
- 2015 IRP Phase 2
  - Beginning January 2016


Policy Inventory

IRP Technical Policy Issues to Date

Issues to Be Addressed in Phase 2

- Compiled through MA technical process, IRP Issue Paper review, and public outreach
- Four broad categories:
  - Metropolitan's role in local resource development
  - Governance and financial considerations
  - Groundwater as supply and storage
  - Conservation programming

IRP Technical Policy Issues

MWD's Role in Local Resource Development

- Does the "treatment" of new local supply development in the WSAP affect IRP local supply targets or development policies?
- Should MWD develop, own and operate locally-based supplies?
- Should MWD invest in R&D, and what are the priorities?
  - What is the future of the Foundational Actions Funding Program?
  - What about partnerships and coastal land acquisition?

IRP Technical Policy Issues

MWD's Role in Local Resource Development

- Should new local supplies be given additional consideration in MWD's Water Supply Allocation Plan or any future allocation plans?
- What criteria should be considered with MWD's local resource investments?
  - Regional Benefits

IRP Technical Policy Issues

Governance and Financial Considerations

- How do we recognize investment risks?
  - Stranded asset risk?
  - Offset sales risk?
- What are implications of GPCD targets on WSAP and local supply development?
  - Preferential rights?
  - Reallocating resources from low GPCD to high GPCD agencies?
- Should member agencies be allowed to opt-out of regional programs?

IRP Technical Policy Issues

Governance and Financial Considerations

- How can financial policies hinder or accelerate resource development?
  - MWD rate increases
  - Local rate increases
  - Incentives for local development
  - Partnerships

IRP Technical Policy Issues

Groundwater as Both Storage and Supply

- How should the region consider (non-CUP) water in local groundwater basins and surface reservoirs when planning and managing for regional storage and regional reliability?
- How does the region promote long-term sustainable groundwater management?
  - How does this relate to existing definitions of safe yield?

IRP Technical Policy Issues

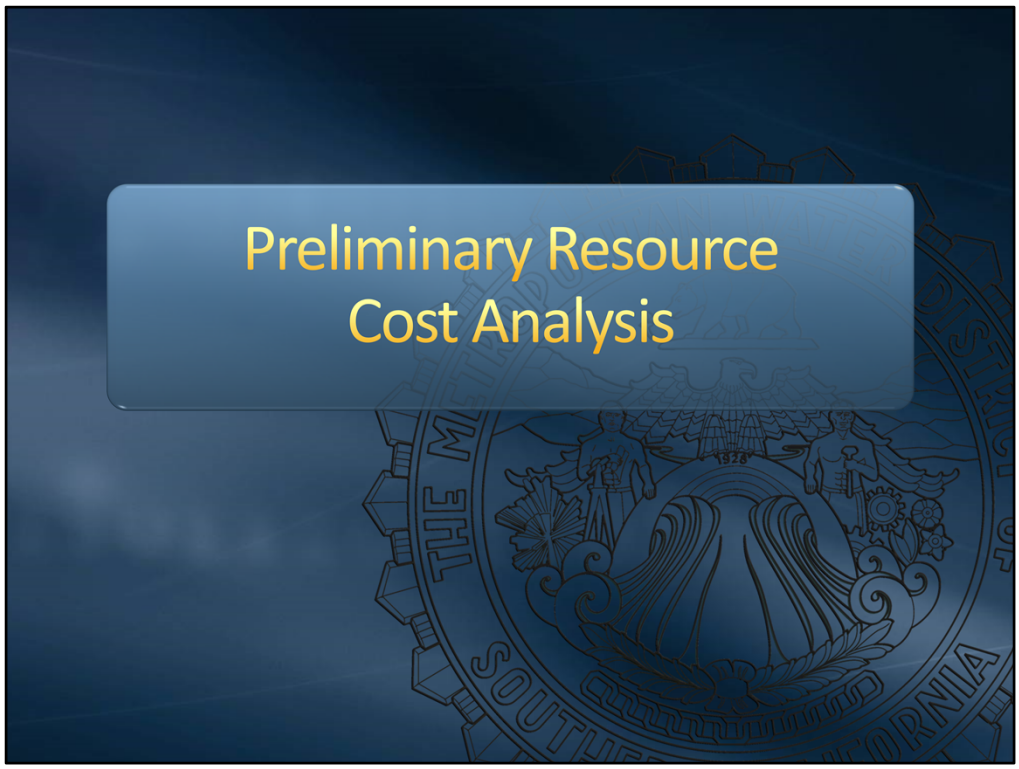
Groundwater as Both Storage and Supply

- What is the regional role or responsibility in meeting supplemental replenishment needs of groundwater basins and surface water reservoirs? What are potential policies?
  - Rates, capacity charge, level of service policy, etc.
  - How to distinguish between regional and local benefits? What is the implication?

IRP Technical Policy Issues

Conservation Programming

- What should be considered when designing conservation programs in the future? Examples:
  - Efficiency targets and monitoring of "wasteful" users
  - Program consistency (avoiding mid-year changes)
  - Fiscal sustainability
  - New devices for rebates (e.g. cisterns)
- How do we measure the effectiveness of water conservation programs?
- What should future conservation goals be?
- What happens after 2020?

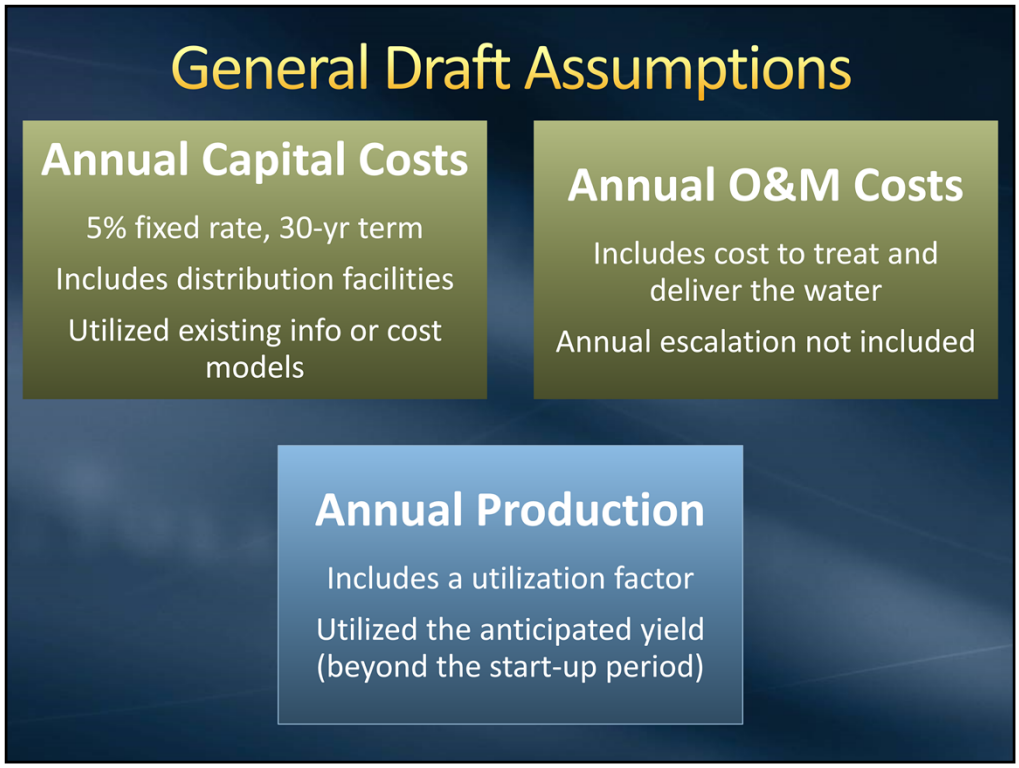

Preliminary Resource
Cost Analysis

Overview

- Purpose: To provide a general picture of costs of potential future water resources
- In-region resources
  - Stormwater centralized and distributed
  - Groundwater recovery
  - Recycled water
  - Seawater desalination
- Results: a range of estimated unit costs for each resource type ($/AF)
- Needs: additional information on future projects and overall feedback to refine cost estimates

- This topic is not always an easy one. Fortunately, at this stage, we are NOT directing policy.
- A general sense of scale

- When it comes to calculating costs, there is a large spectrum of ways to go about doing this
- In the end, we were advised by our finance folks to keep it simple…least sensitive to small variations/assumptions such as escalation rates, discount rates, assumed ramp-up schedules, etc.
- Help to get things on a level playing field



- Some things are across the board with the understanding that resources are different and that adjustments are needed

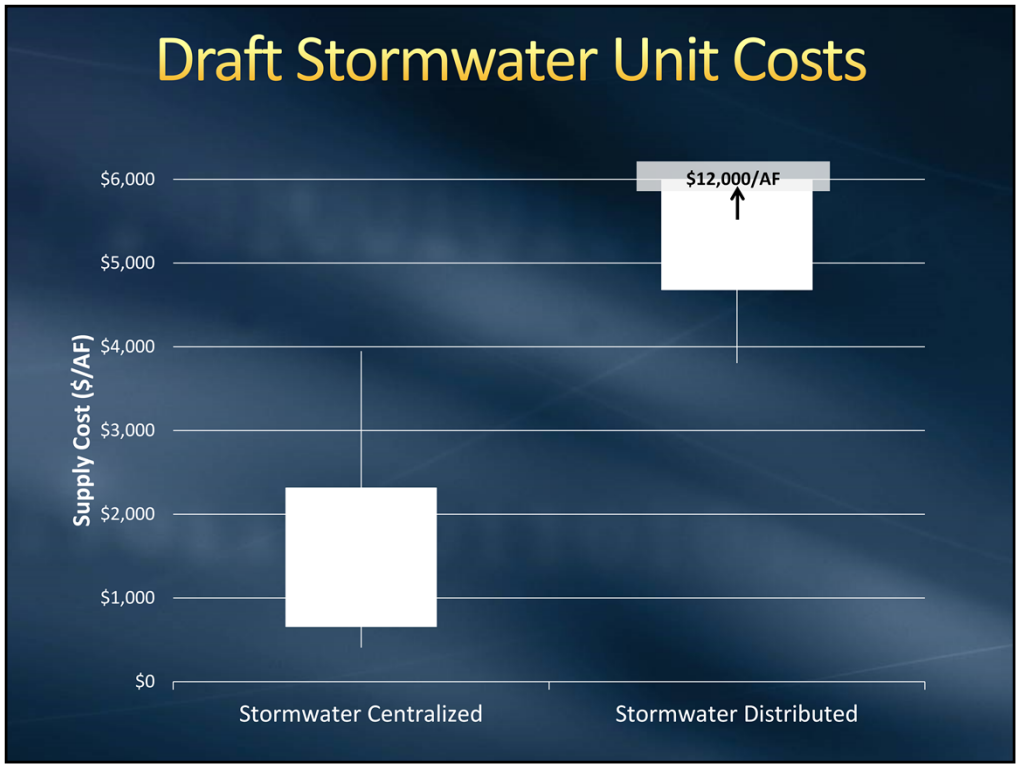
Stormwater

- Source: The Southern California Water Committee Stormwater Database
  - Converted to 2015 dollars
  - Utilized future projects with status of feasibility, advanced planning, or full design and online before 2025
  - Utilized projects with an annual yield > 50 AF
- Other assumptions
  - Included $200/AF for groundwater pumping
  - Applied a 90% utilization rate to account for infiltrated stormwater that is actually pumped

Stormwater Projects

Project Name	Capital Cost (Million $)	O&M Cost (Million $/yr)	Estimated Yield (AF/yr)
Big Tujunga Dam Sediment Removal	35.4	0.5	2730
Borrego Canyon Wash Bypass Channel Improvement	16.6	0.4	654
Burbank Boulevard BMP	8.9	0.0	53
Canterbury Power Line Easement	17.7	0.3	1470
Drainage A Detention Basin	5.3	0.3	930
Fletcher Basin Rehabilitation	5.9	0.4	1,800
Old Pacoima Wash	25.8	0.1	500
Pacoima Dam Sediment Removal	91.3	0.6	3224
San Fernando Road Swales	6.4	0.0	130
Sun Valley Parking Lot Infiltration	5.9	0.0	80
Van Norman Stormwater Capture	10.7	0.8	4200

Prior to utilization factor



Box and whiskers.
Whiskers: high/low
Box: 25% and 75%

Similar range of existing projects
5% interest rate, 30 year term. No escalation rate or discount rate used.
Project total AF used in cost analysis

Placeholder: California Water Fix ~985 to $1,013/AF (Tier 1 Treated)

Stormwater: 15,000 AF Total, cost w/ 90% utilization factor, only projects >50AF capture and recharge
Groundwater Recovery: 60,000 AF Total, cost w/ 90% utilization factor
Recycled Water: 104,134 AF Total, cost using full estimated production (not capacity)
Seawater Desalination, 223,000 to 446,000 AF Total, cost w/ 90% utilization factor

IPR
61,166
DPR
17,354
NPR
25,614
Total
104,134

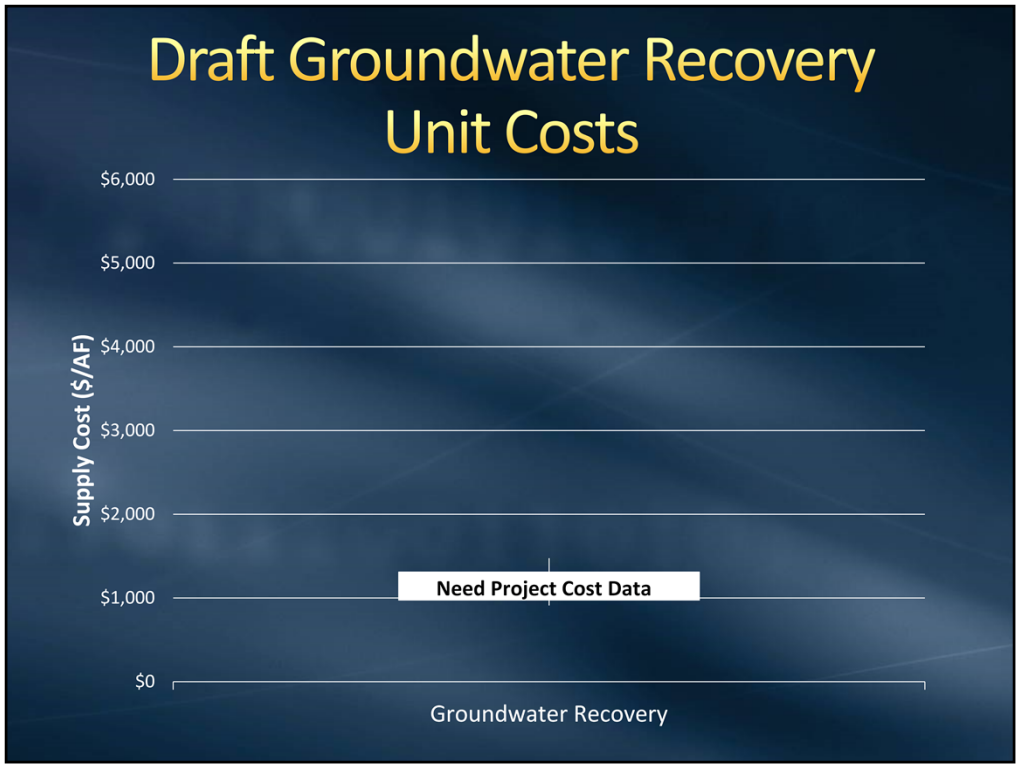
Groundwater Recovery

- Assumptions
  - Capital costs modeled using formula based upon recent historical data/trend
  - Includes future projects with status of feasibility, advanced planning, or full design and online before 2025
  - Groundwater pumping costs included in rate
  - 90% utilization rate to account for plant operations
- Data needs
  - Additional data needed to adjust for different constituents of concern

Groundwater Recovery Projects

Project Name	Capital Cost* (Million $)	O&M Cost * (Million $/yr)	Estimated Yield (AF/yr)
IRWD Wells 51, 52 & 53 Potable (Non-exempt)	9.4	1.8	2400
Lower Sweetwater Desalter, Phase II	32.1	4.6	5200
Middle Sweetwater River Basin Groundwater Well System (Capacity)	1.8	0.8	1000
Mission Valley Brackish Groundwater Recovery Project	4.2	1.3	1760
Moorpark/South Las Posas Desalter Phase 1	30.4	3.8	5000
North Pleasant Valley Desalter	49.0	5.3	7300
Oceanside Mission Basin Desalter Expansion/Seawater Recovery and Treatment	35.3	4.3	5600
Otay Mesa Lot 7 Well Desalination	0.7	0.3	400
Rancho del Rey Well Desalination	0.9	0.4	500
Round Mountain Desalter	1.8	0.7	1000
San Diego Formation / Balboa Park Pilot Production Well	2.3	1.1	1300
San Diego Formation / Diamond BID Pilot Production Well	2.9	1.2	1600
San Dieguito Reservoir Seepage Recovery Feasibility Study	0.3	0.1	150
San Marino GWR Project	10.2	2.1	2500
San Paqual Brackish Groundwater Recovery Project	17.2	2.6	3360
San Vicente & El Capitan Seepage Recovery	2.5	1.0	1400
SJC San Juan Desalter Project Expansion	6.2	1.4	2000
Sweetwater Authority/Otay WD San Diego Formation Recovery	21.5	3.5	3900
Tujunga Well Treatment	184.1	16.9	24000
Tustin Legacy Well # 1	7.8	1.5	2200

*Need data from project proponents



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Recycled Water

- Near term future projects considered
- Assumptions
  - Capital costs modeled using formula based upon recent historical data/trend
  - O&M costs calculated at 3% of capital
  - 85% utilization based on past experience for non-potable reuse projects
  - 90% utilization for indirect potable reuse and direct potable reuse projects
  - Unit costs for projects greater than 500 AFY
    - Cost breakpoint due to large unit costs for smaller projects

- Projects used in calculation

Questions for Member Agencies

Are these unit costs reasonable?

Should costs be normalized?

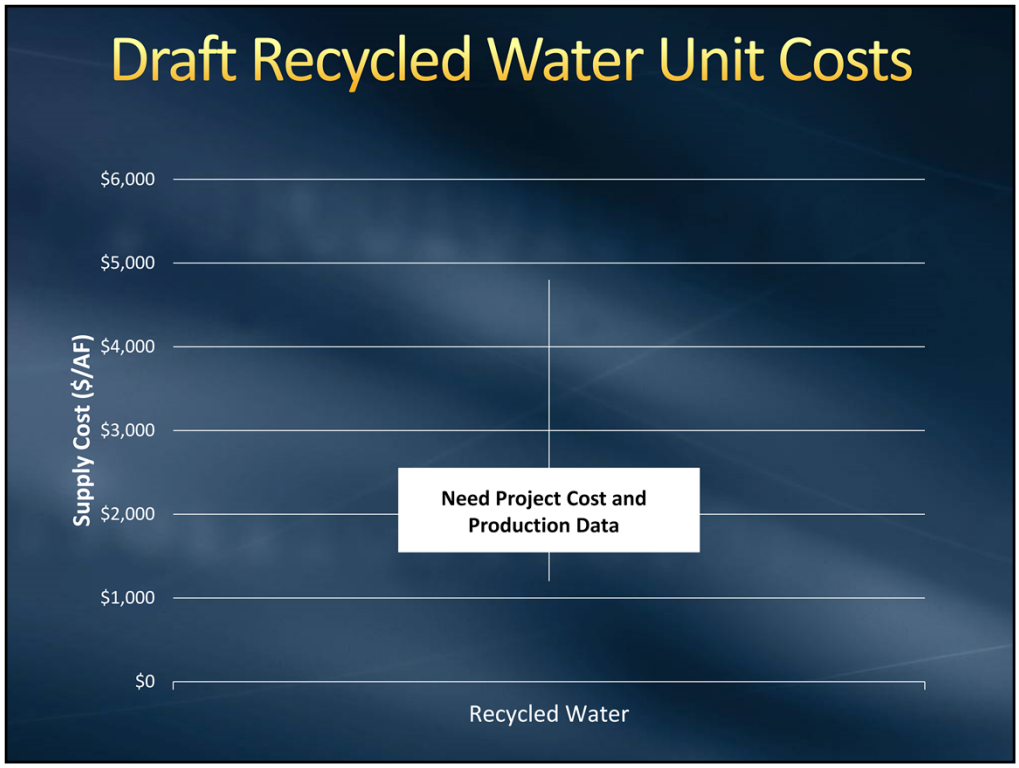
Should assumptions be modified?

Which assumptions?

Recycled Water Projects

Project Name	Capital (Million $)	O&M (Million $/yr)	Yield (AF/yr)
Groundwater Reliability Improvement Project	102	0.3	10,000
Regional Recycled Water Supply Program	1,088	61.6	56,000
Direct Reuse/Rose Hills Expansion	13	0.2	600
City of San Diego Pure	369.2	15.5	33,630
San Clemente Water Reclamation Project	16	0.2	1,000
Elsinore Valley/Tuscany (Phase 1A)	19.5	0.4	1,225
Escondido Regional Reclaimed Water Project (Easterly Ag Distribution & MFRO with Mains and Brine)	56.9	1.7	1,258
Escondido Regional Reclaimed Water Project (HARRF Upgrades)	126.3	3.8	2,492
North Hollywood Water Recycling Project	34	0.08	2,772
Carlsbad MWD Encina Basin Water Reclamation Program - Phases I and II	39	0.9	3,292
Harbor Water Recycling Project	109.9	7.9	9,300

*Need data from project proponents



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Seawater Desalination

- Sources: publically available reports
  - Under construction and future projects
  - Converted to 2015 dollars
- Other assumptions
  - $/kWh adjusted ↑ for some projects
  - 90% utilization factor
  - Pipeline costs included
  - Poseidon projects: include capitalized interest
  - Carlsbad: cost as reported w/no adjustments
- Impact of new regulations not included

Seawater Desalination: Project List

Project	Capital ($Mil)	O&M ($Mil/yr)	Yield (AF/yr)	Source
Long Beach – high	N/A	8.9	5,600	2010 pilot study report
Long Beach – Base	N/A	8.1	5,600	2010 pilot study report
WB - Redondo (10 MGD)	153.6	11.6	11,200	2013 program master plan
Doheny Desal (Fe/Mn treatment)	202.6	12.9	16,000	2013 final summary report
WB - El Segundo (20 MGD)	291.2	21.0	22,400	2013 program master plan
WB - Redondo (40 MGD)	439.3	41.2	44,800	2013 program master plan
Carlsbad	N/A	N/A	48,000	2015 (June) presentation
Huntington Beach	892.8	56.0	56,000	2014 OCWD financial rep.
WB - El Segundo (60 MGD)	706.5	60.5	67,200	2013 program master plan

Need: updated cost estimates for other member agency projects

Only unit costs available

O&M and Unit costs are not adjusted to current year dollars, but the Unit costs were adjusted using CPI

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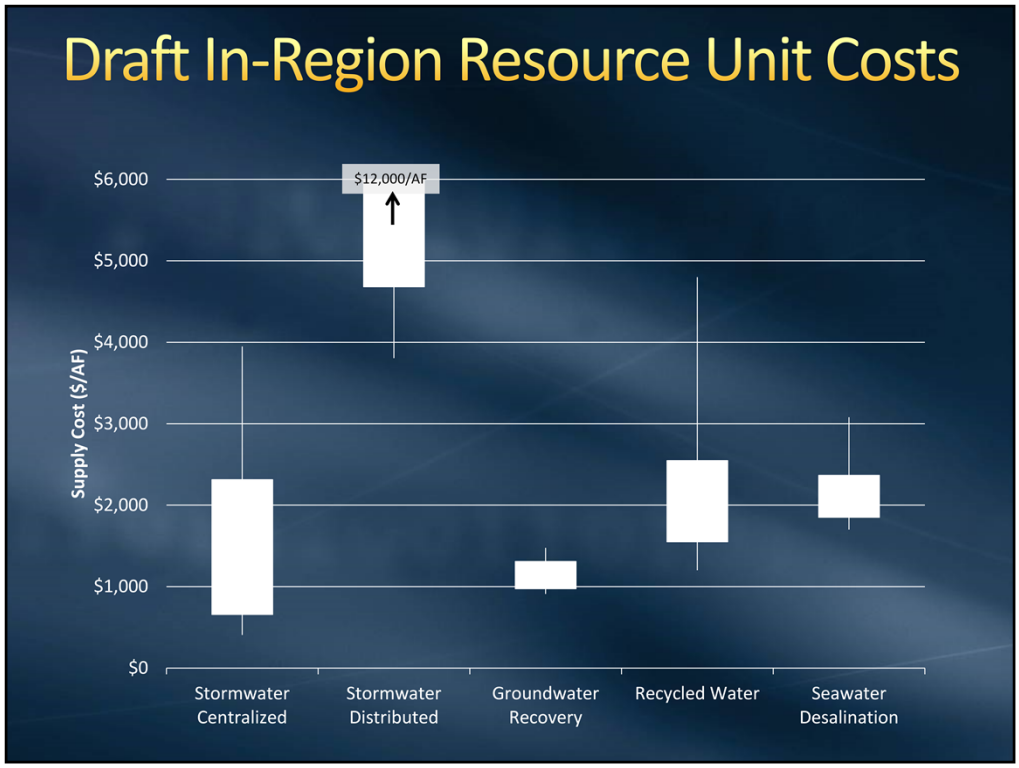

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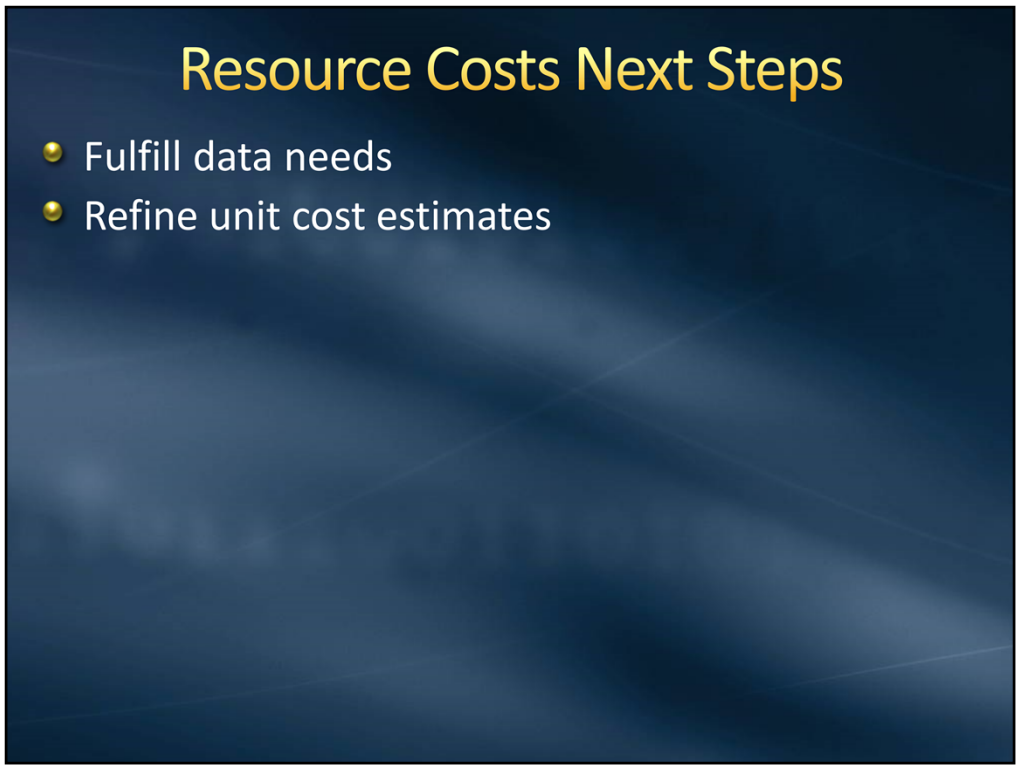
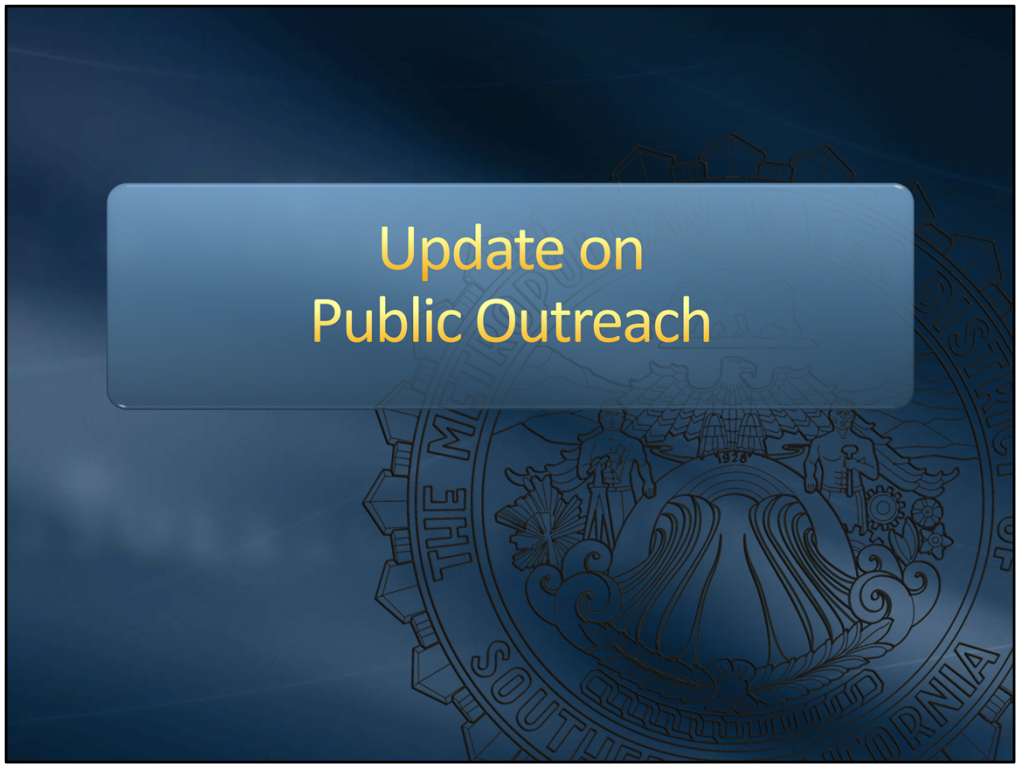
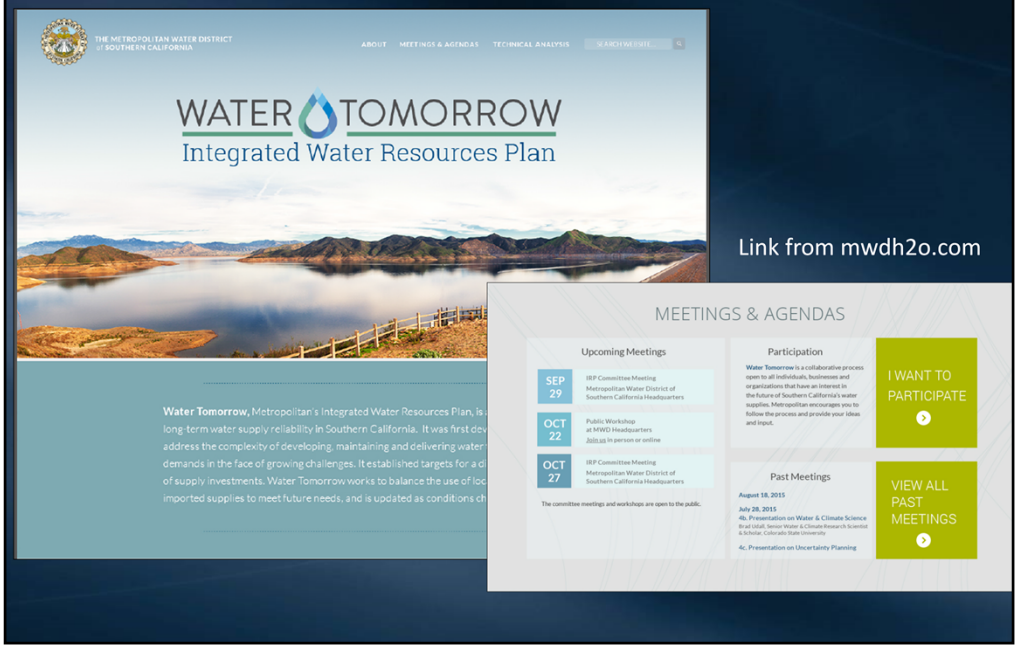


- A general sense of scale


Update on
Public Outreach

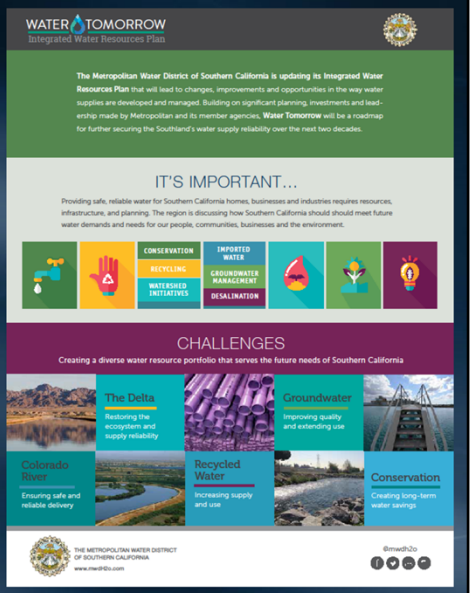
New Webpage



Link from mwdh2o.com

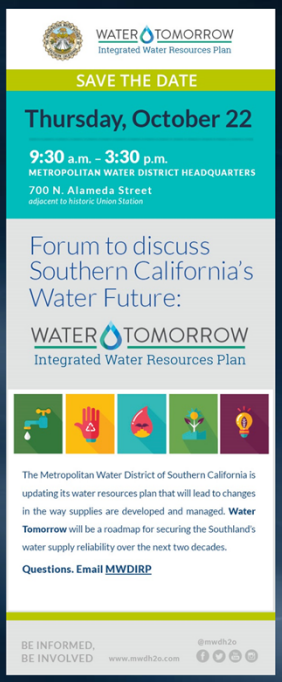
In the Community

- New information sheet
- Presentation slides
- Talking points

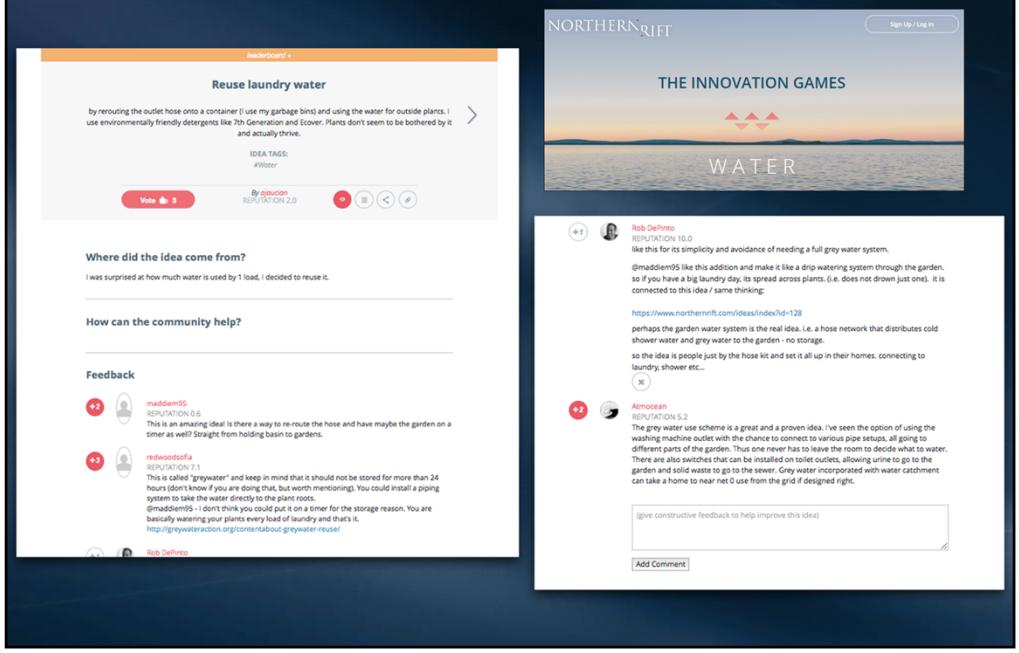


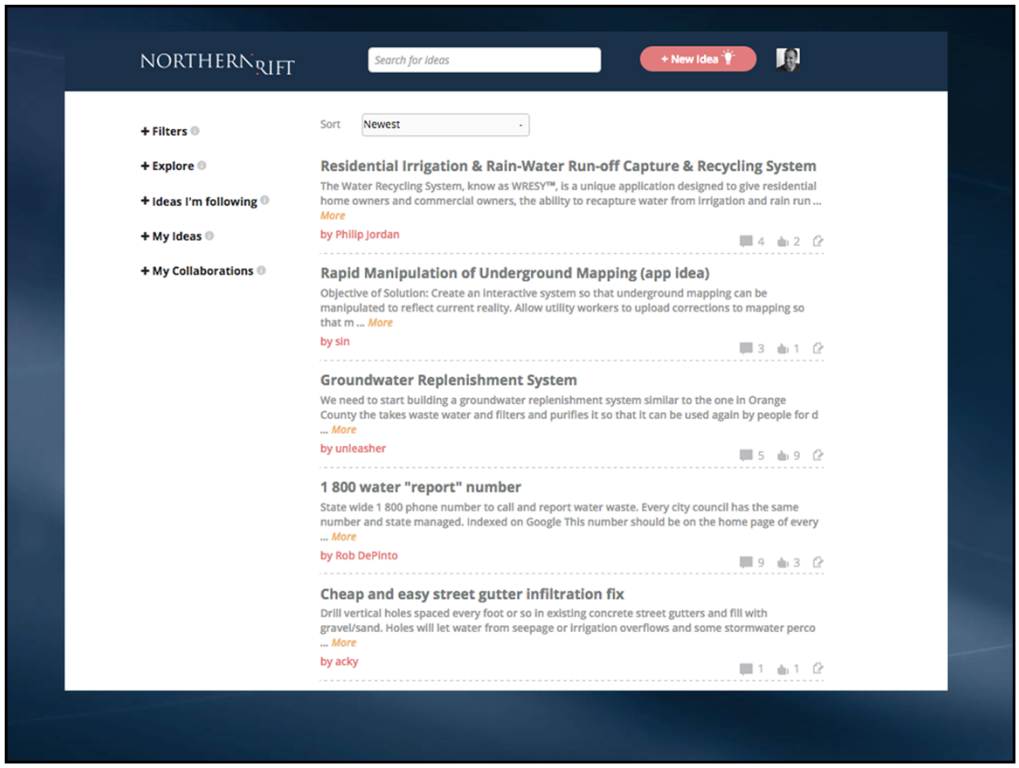
Public Workshop

- October 22 at Metropolitan
  - Save the Date notices
- In person, webcast and recorded
- Facilitated discussion



Pathway for New Ideas



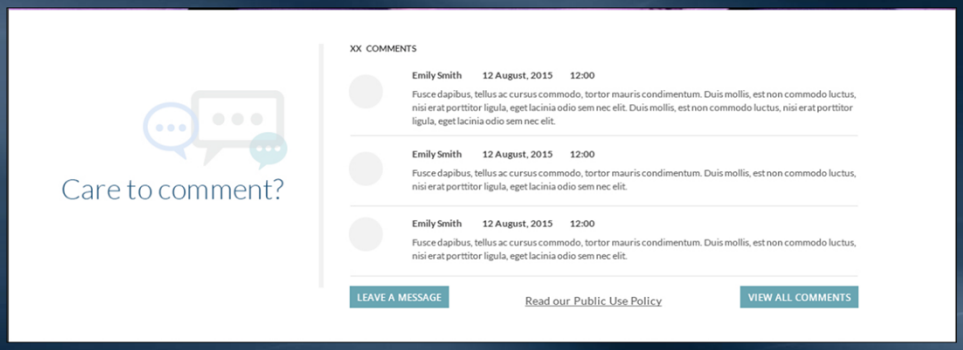

NORTHERN RIFT
Search for ideas
+ New Idea
+ Filters
+ Explore
+ Ideas I'm following
+ My Ideas
+ My Collaborations
Sort
Newest
Residential Irrigation & Rain-Water Run-off Capture & Recycling System
The Water Recycling System, know as WRESY™, is a unique application designed to give residential home owners and commercial owners, the ability to recapture water from irrigation and rain run ...
More
by Philip Jordan
4 2
Rapid Manipulation of Underground Mapping (app idea)
Objective of Solution: Create an interactive system so that underground mapping can be manipulated to reflect current reality. Allow utility workers to upload corrections to mapping so that m ... More
by sin
3 1
Groundwater Replenishment System
We need to start building a groundwater replenishment system similar to the one in Orange County the takes waste water and filters and purifies it so that it can be used again by people for d ... More
by unleasher
5 9
1 800 water "report" number
State wide 1 800 phone number to call and report water waste. Every city council has the same number and state managed. Indexed on Google This number should be on the home page of every ... More
by Rob DePinto
9 3
Cheap and easy street gutter infiltration fix
Drill vertical holes spaced every foot or so in existing concrete street gutters and fill with gravel/sand. Holes will let water from seepage or irrigation overflows and some stormwater perco ... More
by acky
1 1

Engaging Stakeholders

- Member agency PIOs
- DWR Water News
- Southern California Water Committee
- Southern California Water Dialogue

Preparing for Policy Discussions

- Comment feature on website
- MWD IRP email
- Online Q & A




Technical Process
Next Steps

Upcoming Technical Process Activities
October-December 2015

- IRP Public Outreach Workshop - October 22nd
- IRP Committee Meeting - October 27th
  - Report on Public Outreach Workshop
  - Technical Process Results
  - IRP Issue Paper Addendum
  - Inventory of Policy Issues
- IRP Technical Workgroup Process - November
  - Report Drafting
- IRP Committee Meeting - December 8th
  - Consider 2015 IRP Technical Update Adoption


THE METROPOLITAN WATER DISTRICT OF
SOUTHERN CALIFORNIA