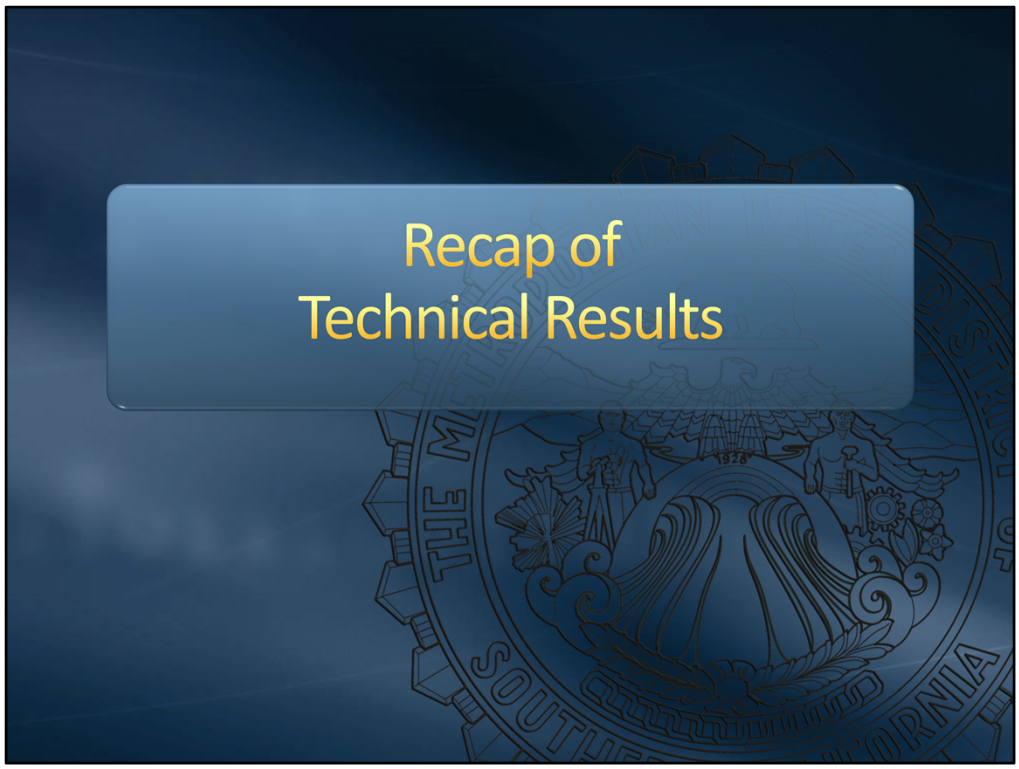
IRP Technical Update Process Results

Member Agency Managers Meeting
October 16, 2015

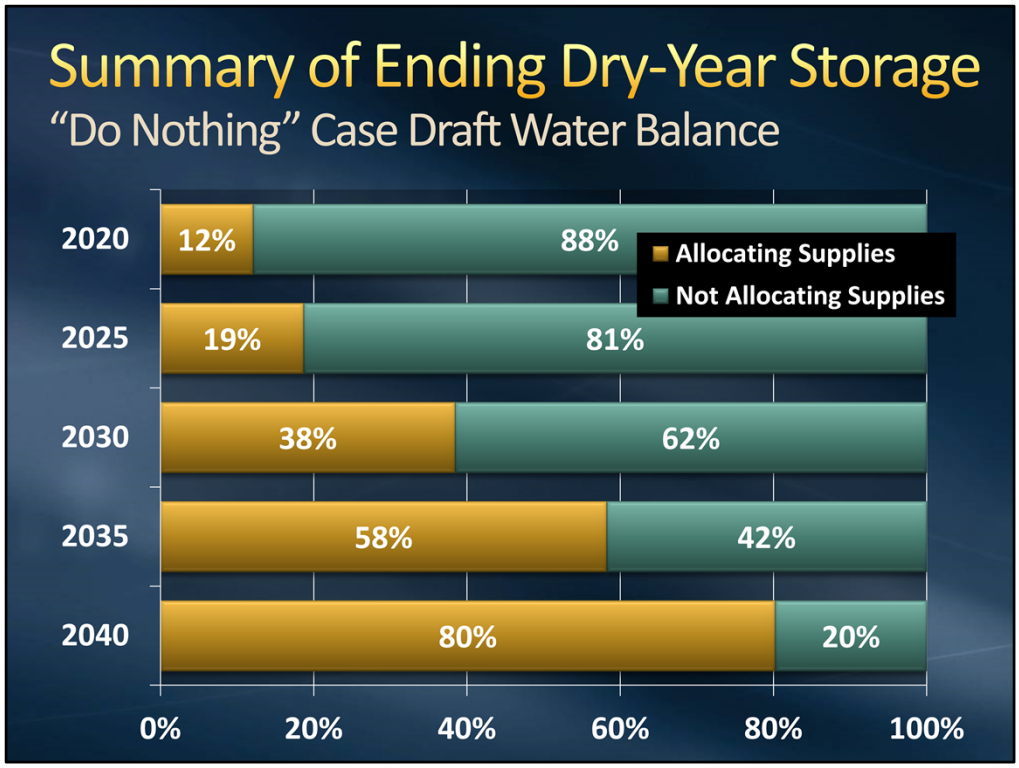
Presentation Overview

- Recap of Technical Results
- Analysis of Alternative Risk Scenarios
- Technical Process Next Steps


Recap of
Technical Results

What Happens if We do Nothing?

"Do Nothing" Case
Draft Water Balance


Summary of Ending Dry-Year Storage
"Do Nothing" Case Draft Water Balance
2020
2025
2030
2035
2040
12%
88%
19%
81%
38%
62%
58%
42%
80%
20%
Allocating Supplies
Not Allocating Supplies
0%
20%
40%
60%
80%
100%

Observations

"Do Nothing" Case Draft Water Balance

- The "do nothing" approach is not sustainable
- Shortage probability and size both increase over time
  - Total retail demands increase over time
  - Constant or decreasing local and imported supplies
- Storage quantity decreases over time
  - Less water to store
  - Higher needs for storage to balance supplies and demands
- Significant resource investments are needed

Answers our question #2 "What happens if we do nothing?"
Clearly not sustainable approach.

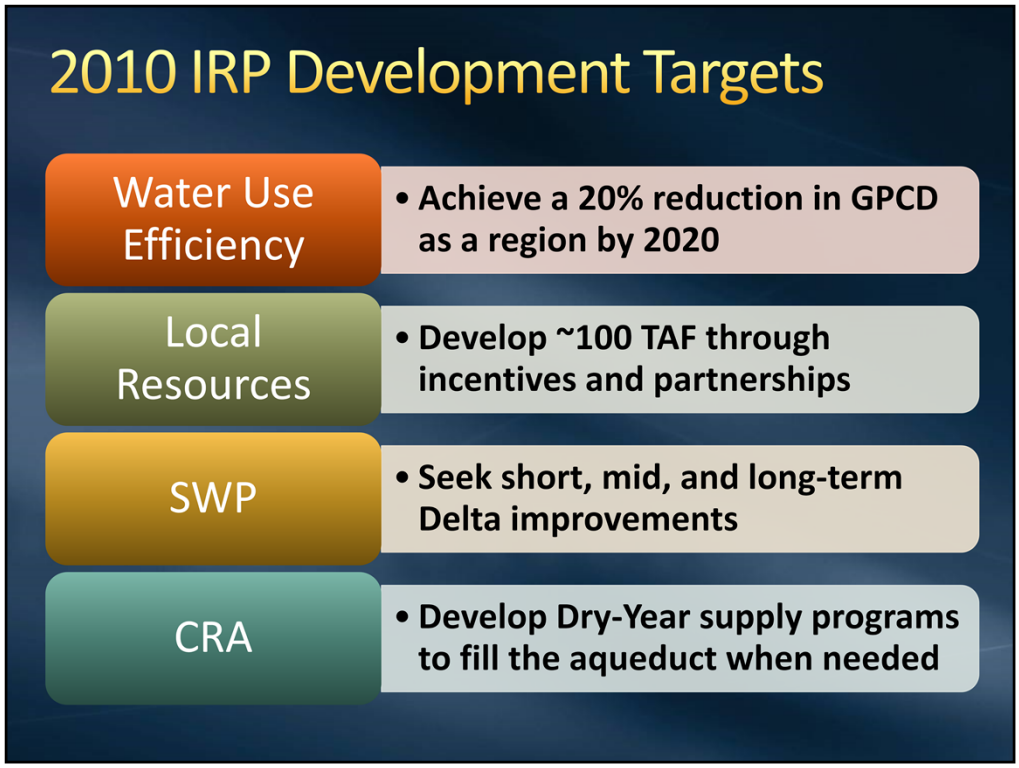
Shortage

Storage

Points to significant resource investment needs.

What Happens if We Develop the 2010 IRP Targets?

2010 IRP Approach
Draft Water Balance

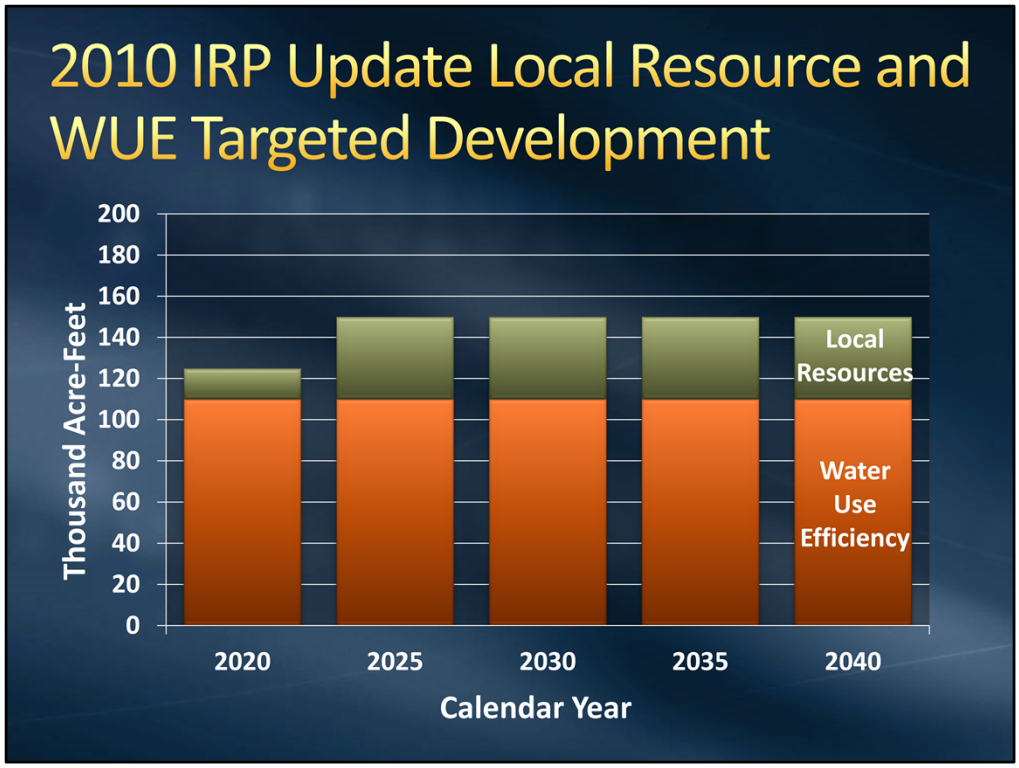


Water Use Efficiency
Conservation and recycling to achieve a 20% reduction at the regional level

Local Resources
Sought to develop just over 100 TAF of additional local supplies through groundwater recovery, seawater desalination (and recycling)

State Water Project
Show you what this looks like based on what Steve went over

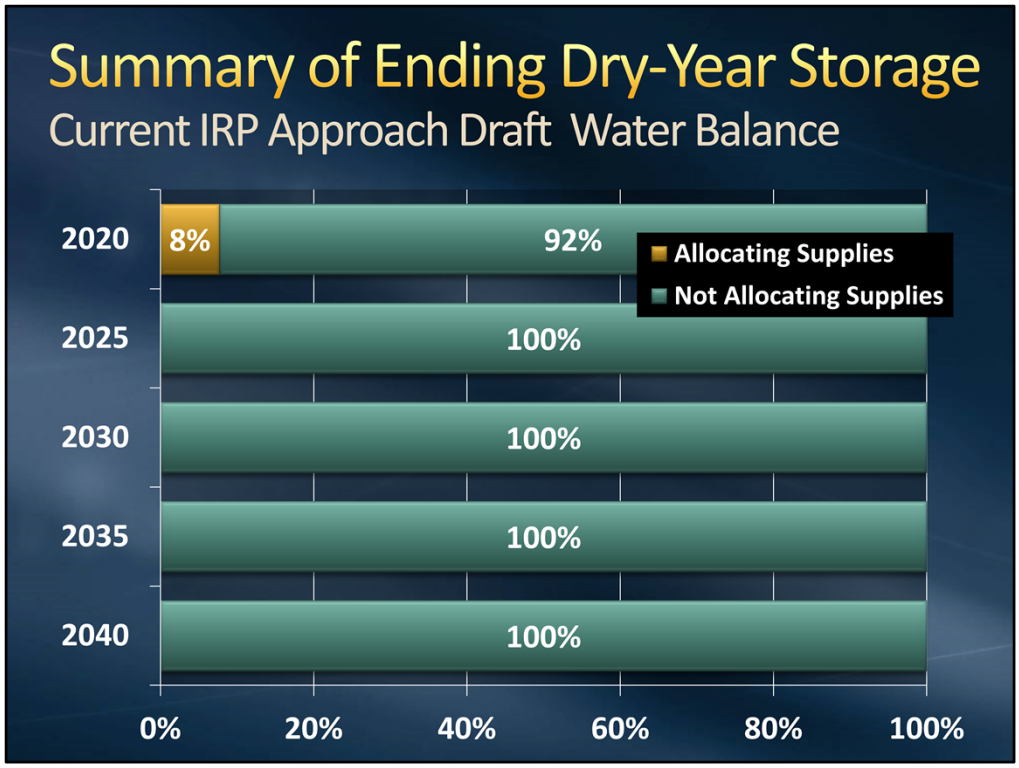
Colorado River
Essentially there, assuming no additional development beyond existing supplies and programs… implications that we will touch on later.

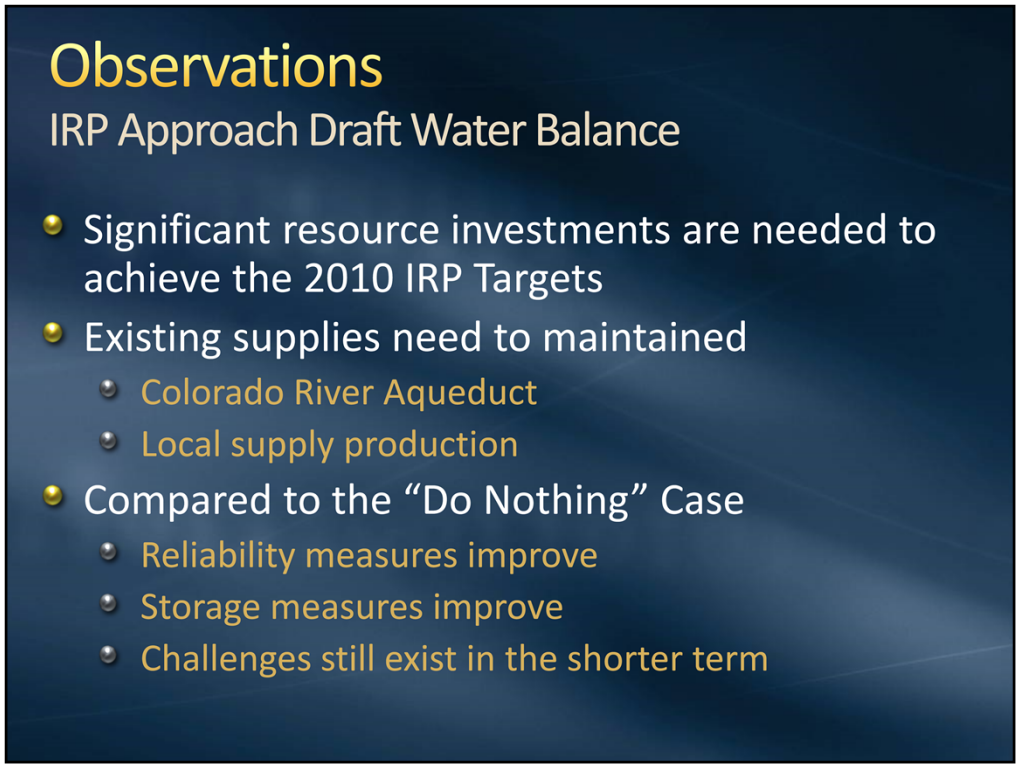


Stack up additional investments that would be made under the 2010 IRP approach.
20% reduction: Demographics, demands, conservation, recycling, 130 TAF of additional water use efficiency
100 Local Augmentation: a bit over half-way there, 40 TAF remaining, Carlsbad making up most of difference
Delta – California water fix (average year supplies)
Feel for additional development. Made great strides since the 2010 IRP, still have a ways to go, no small task to do.

Summary of Ending Dry-Year Storage

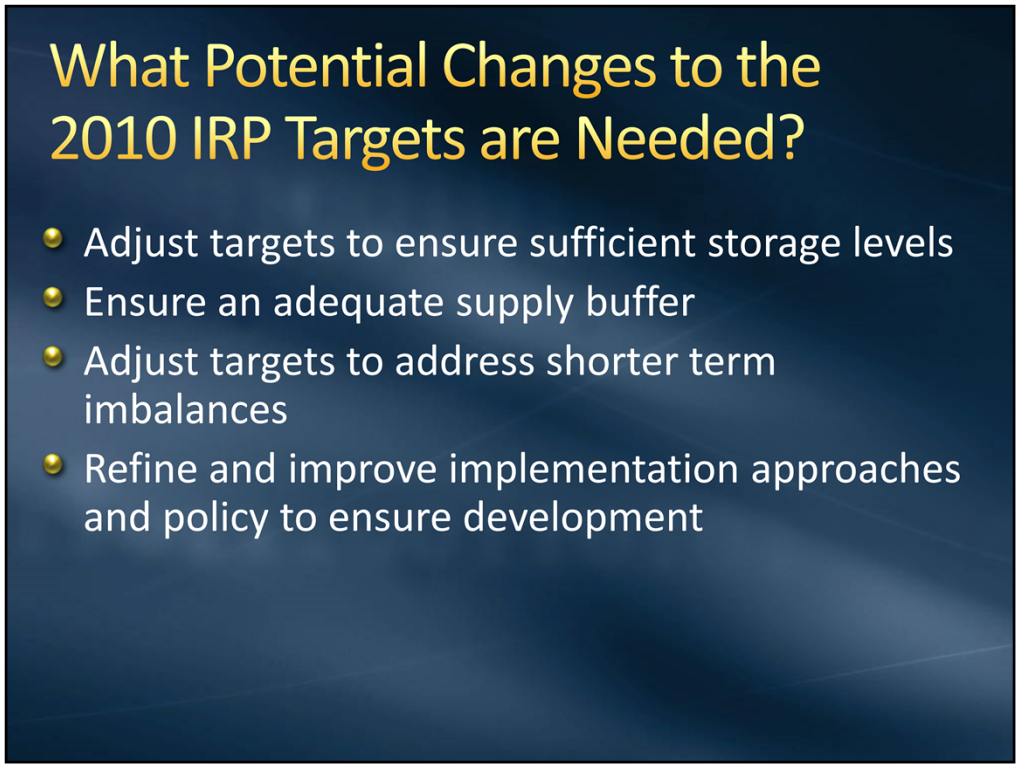
Current IRP Approach Draft Water Balance





Still need to make these investments to achieve the reliability shown. 2010 targets represent continued significant investments.
Existing supply forecasts need to be maintained… uncertainty behind the Colorado river supplies, and local supplies particularly groundwater (will talk about next month)

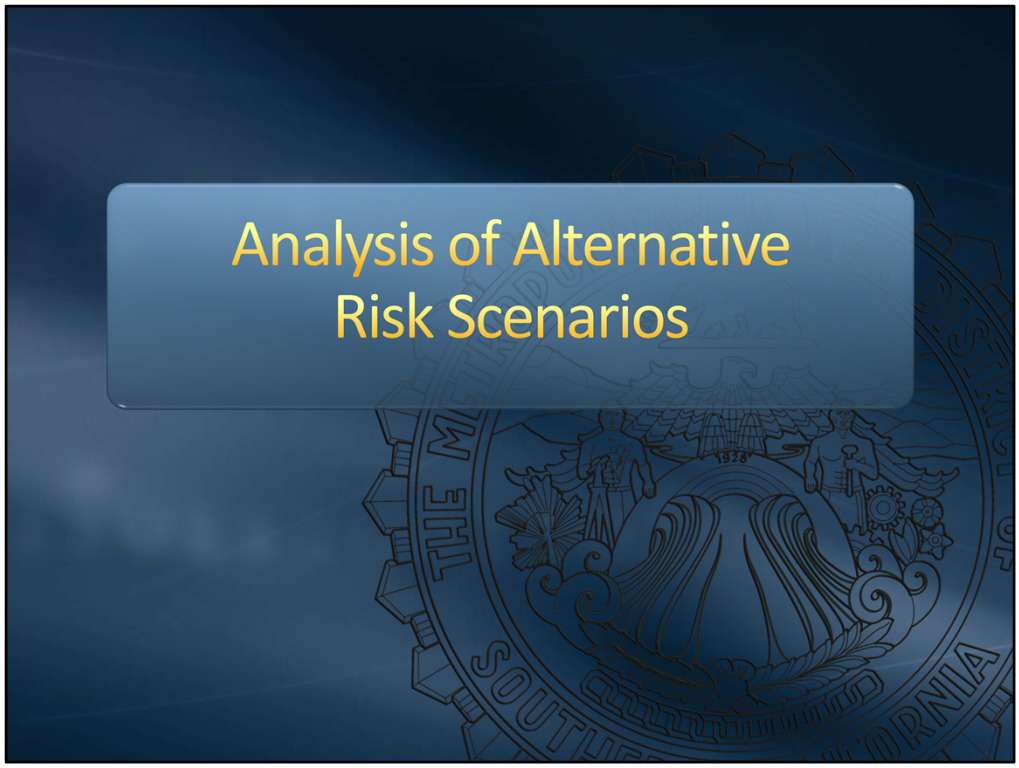
Short-term challenges based on current conditions, and development schedules of supplies.



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!


Analysis of Alternative
Risk Scenarios

Analysis of Alternative Scenarios

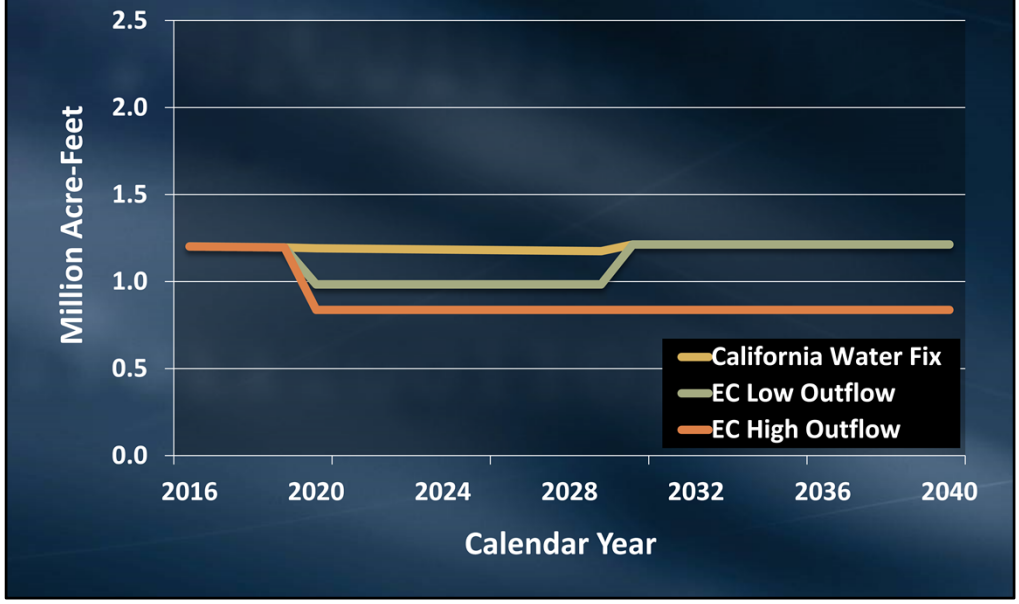
- Looked at reliability impacts of three risk scenarios
  - Scenario 1: More restrictive Delta regulatory framework in the near-term
  - Scenario 2: Local Resources production is lower than forecasted
  - Scenario 3: Scenario 1 and 2 combined
- Determined core supply development needed to mitigate risks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

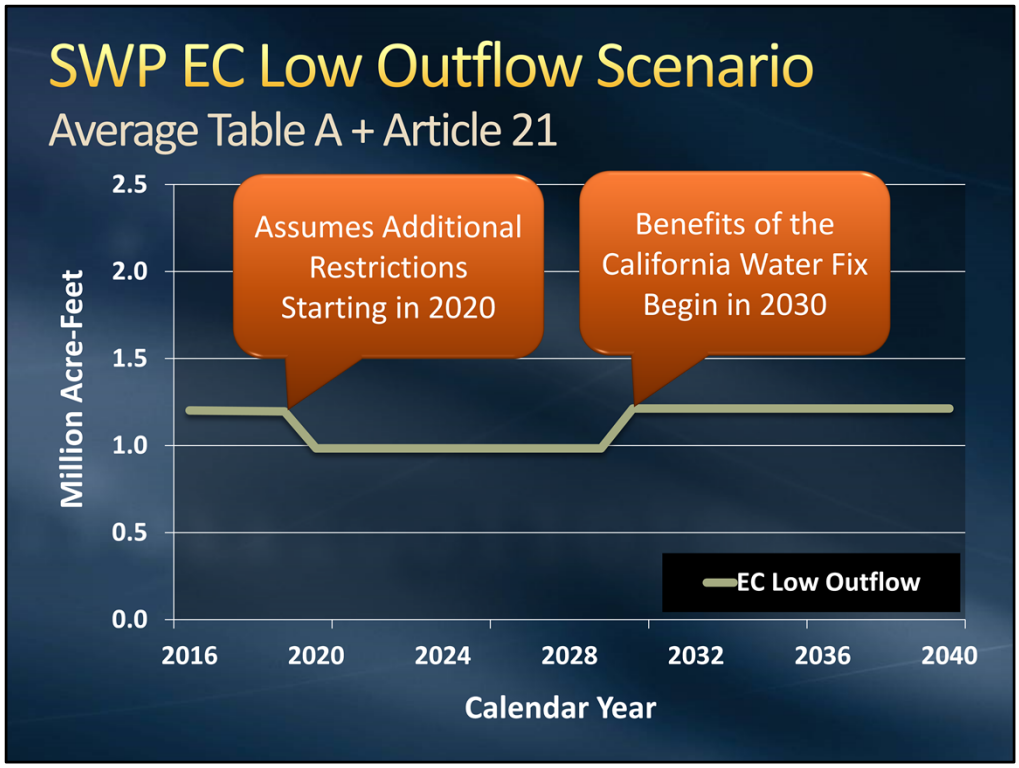
Scenario 1

SWP Supplies Assuming Existing Conveyance and Low Outflow Requirements

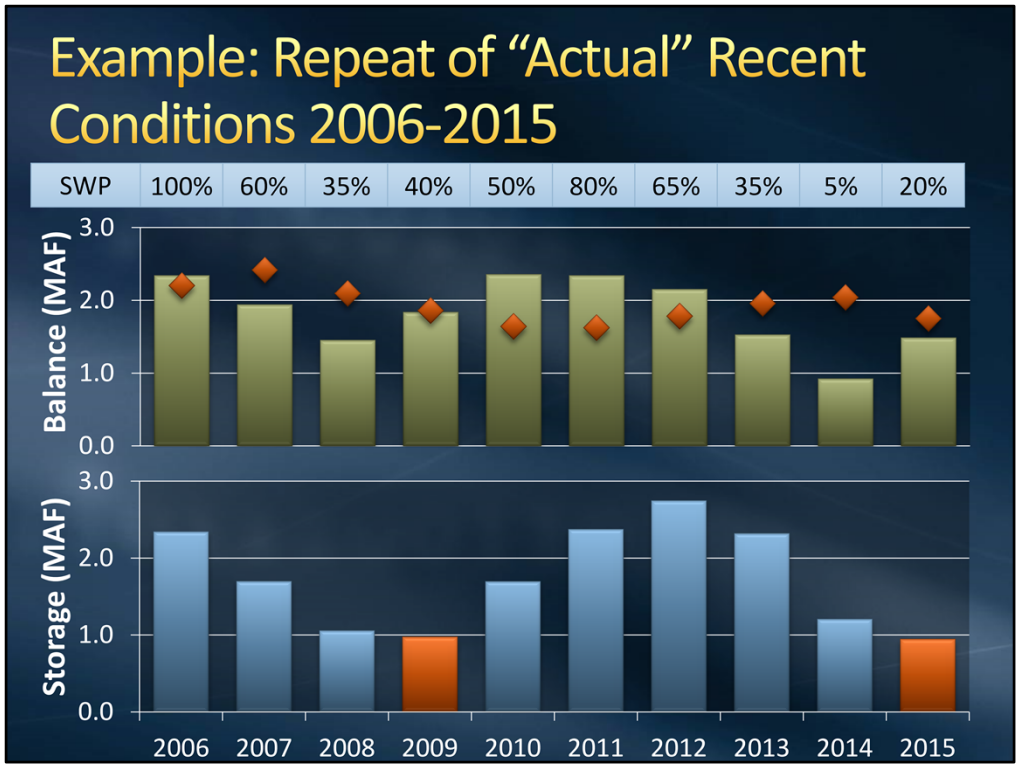
SWP EC Low Outflow Scenario

Average Table A + Article 21

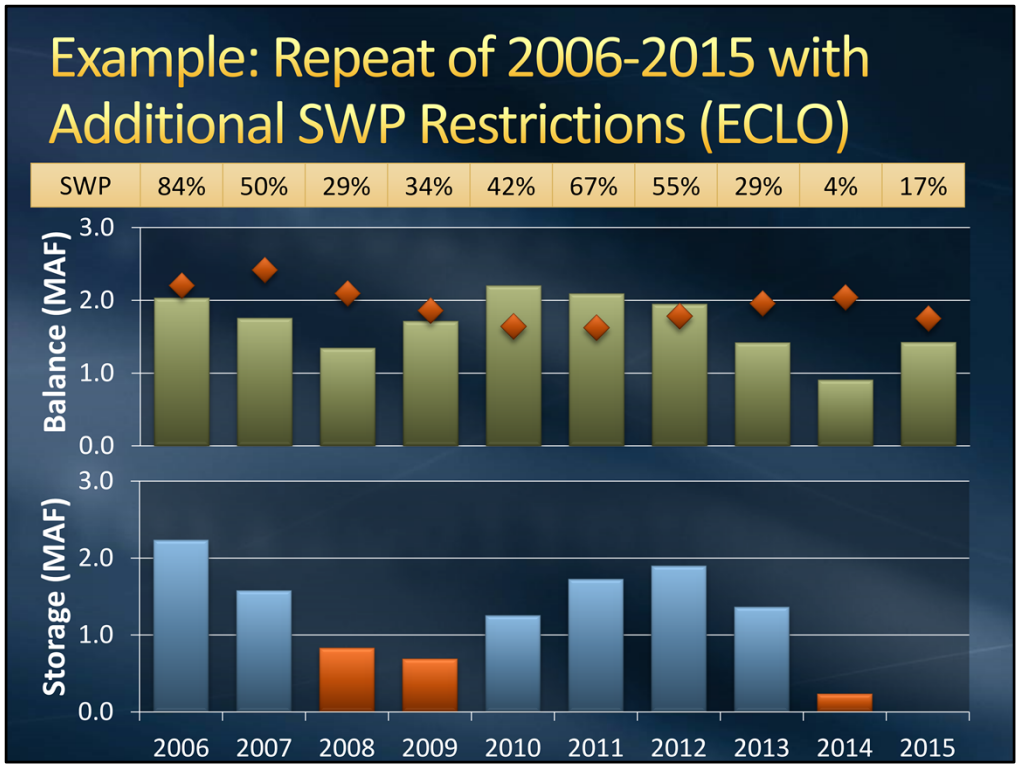



SWP EC Low Outflow Scenario
Average Table A + Article 21
Assumes Additional Restrictions Starting in 2020
Benefits of the California Water Fix Begin in 2030
Million Acre-Feet
2.5
2.0
1.5
1.0
0.5
0.0
EC Low Outflow
2016
2020
2024
2028
2032
2036
2040
Calendar Year

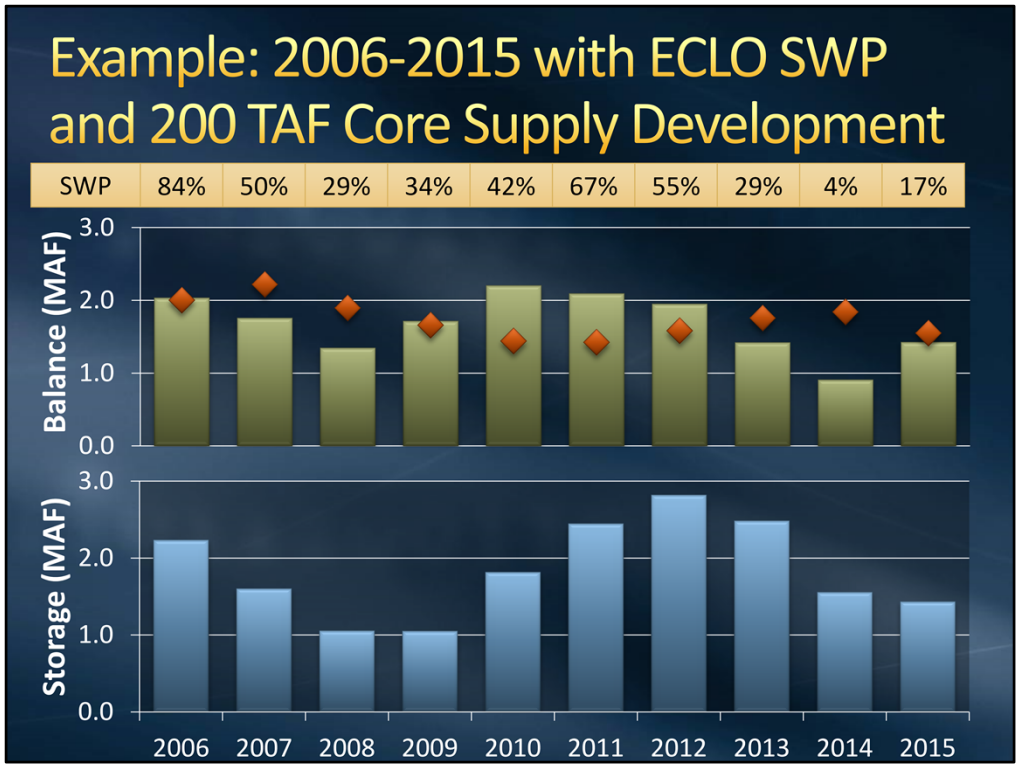
Example: Repeat of "Actual" Recent Conditions 2006-2015

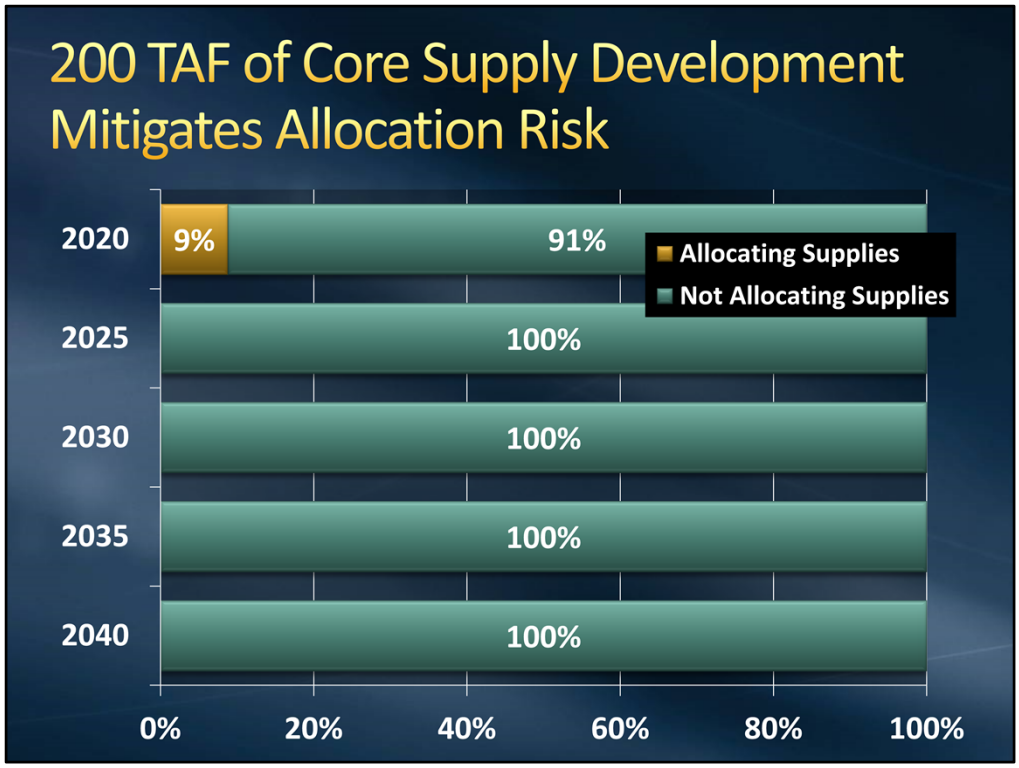


Example: Repeat of 2006-2015 with Additional SWP Restrictions (ECLO)



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





Huge reduction in storage below 1 MAF.

Scenario 2

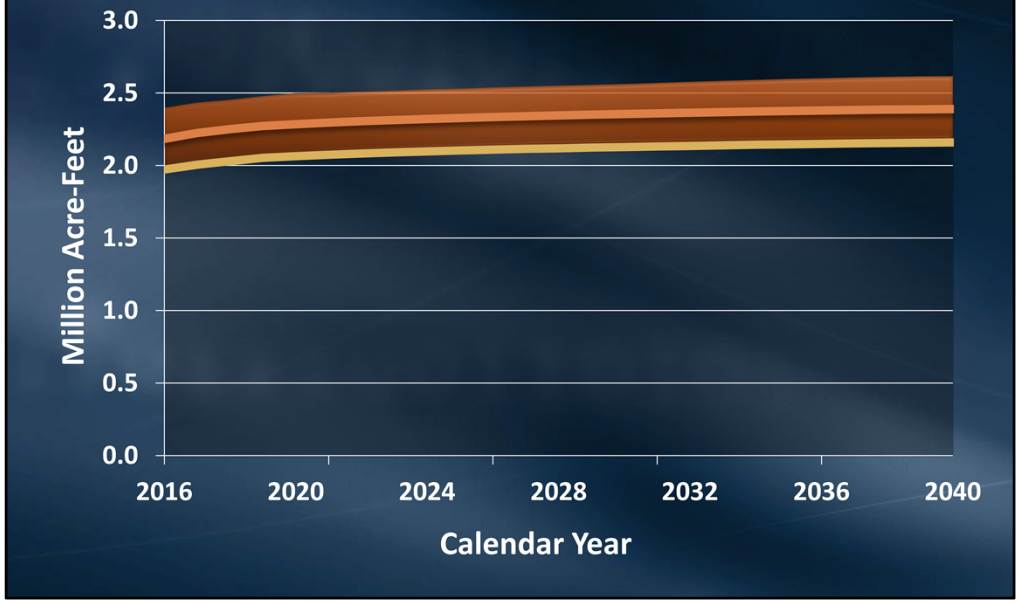
Reduced Local Supply Production

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

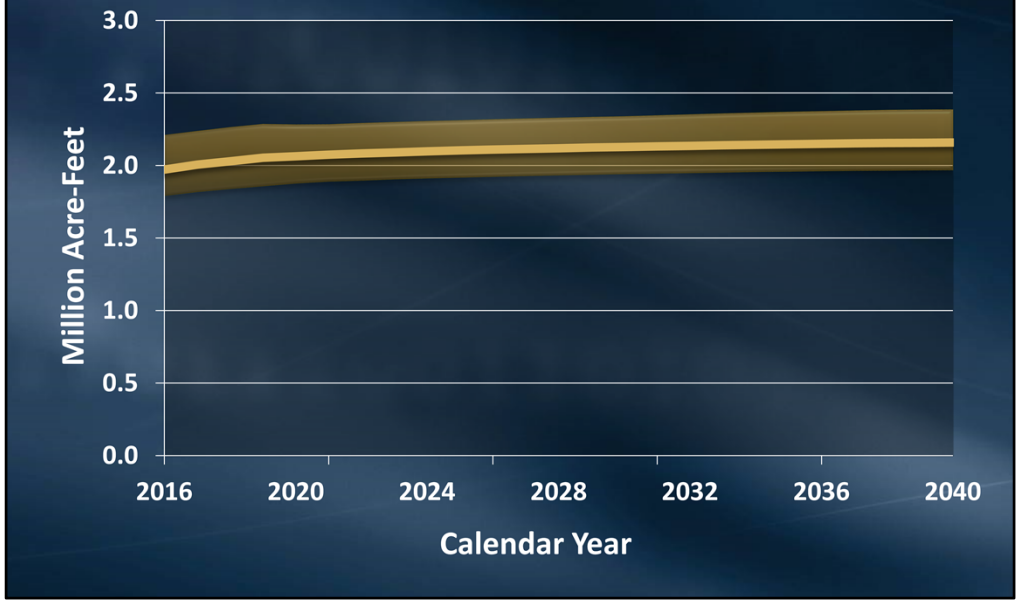
Total Range of Local Supplies

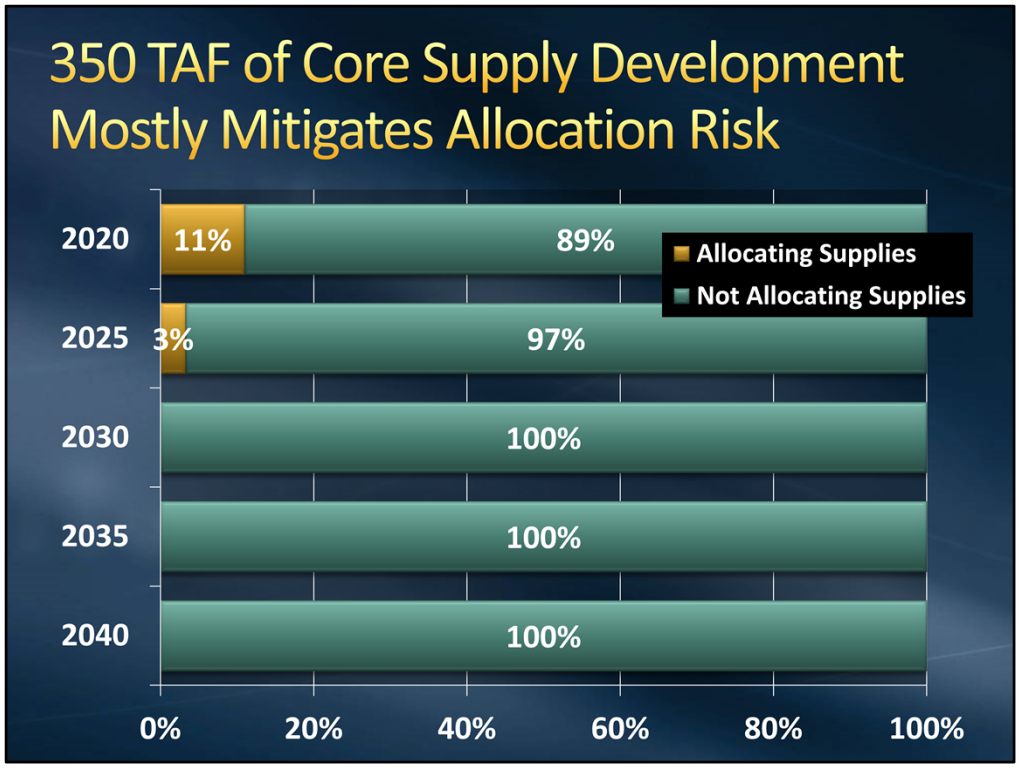
With a 10% Overall Reduction



Total Range of Local Supplies

With a 10% Overall Reduction



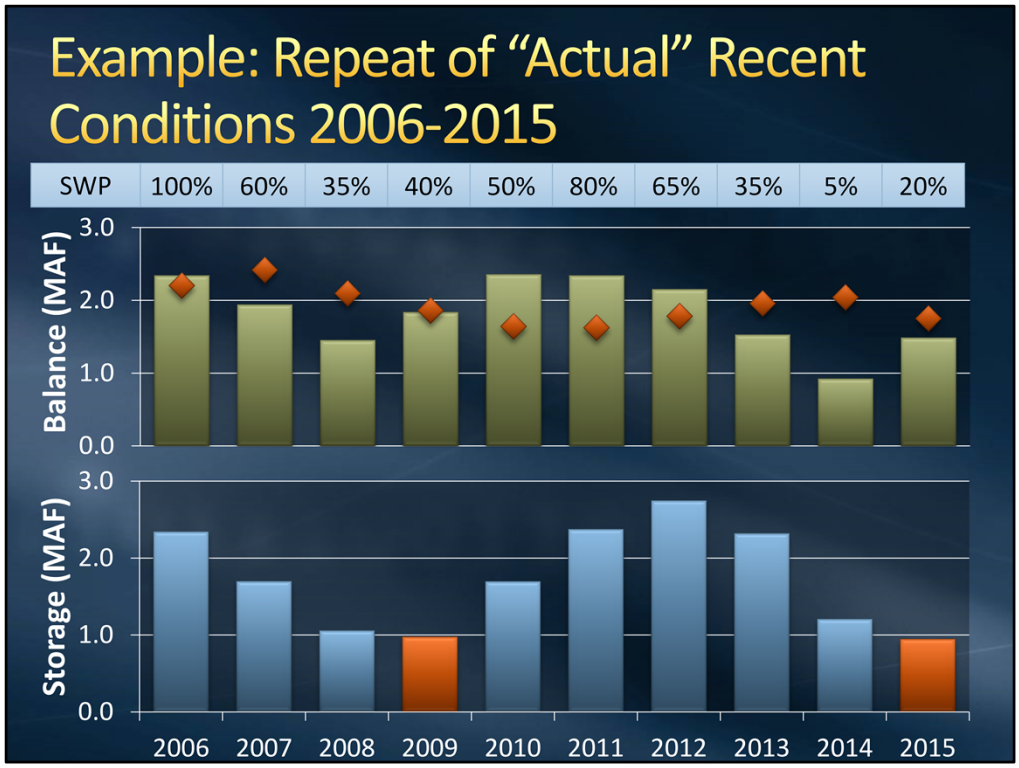


Huge reduction in storage below 1 MAF.

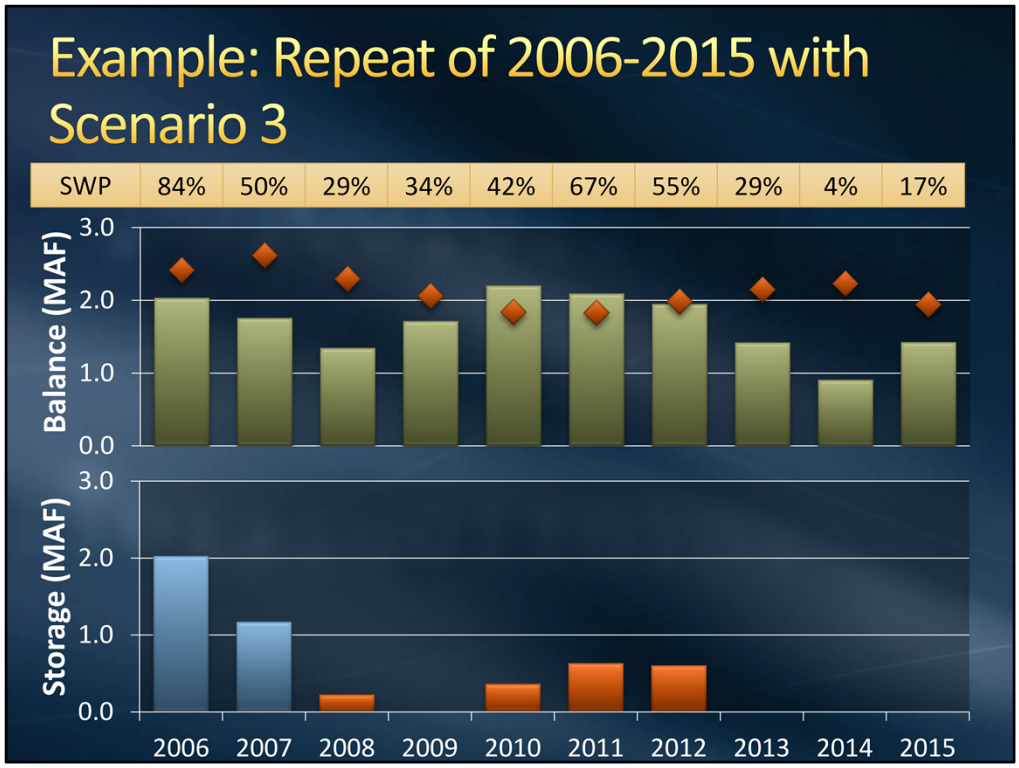
Scenario 3

Impact of Scenarios 1 and 2 Combined

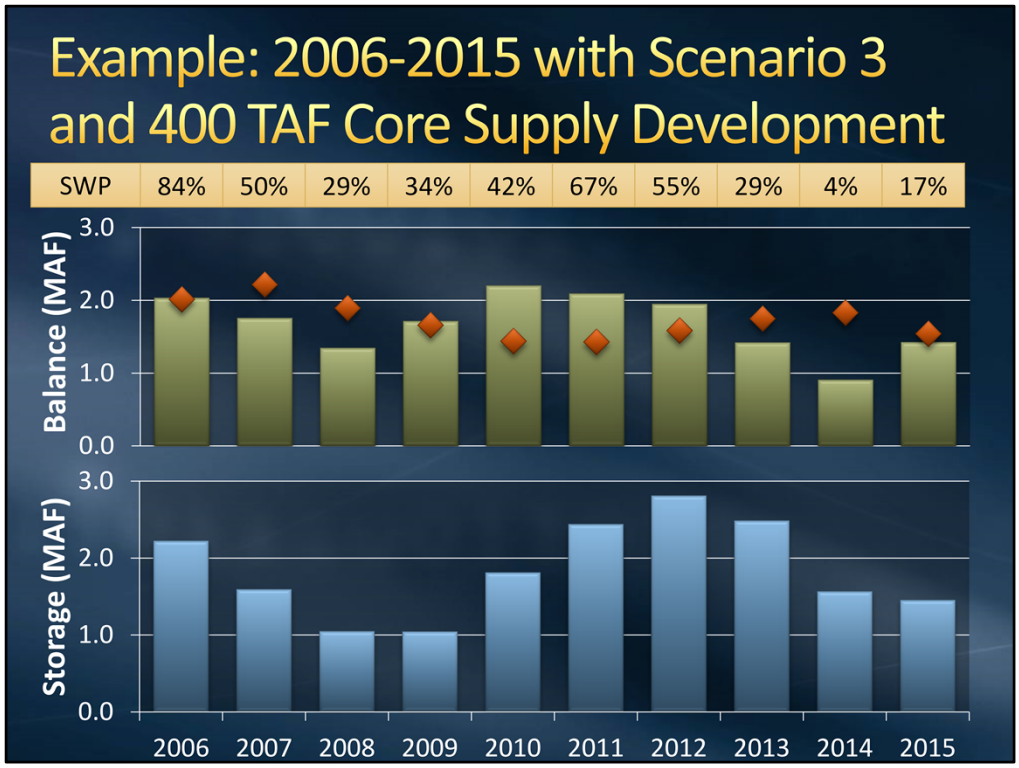
Example: Repeat of "Actual" Recent Conditions 2006-2015

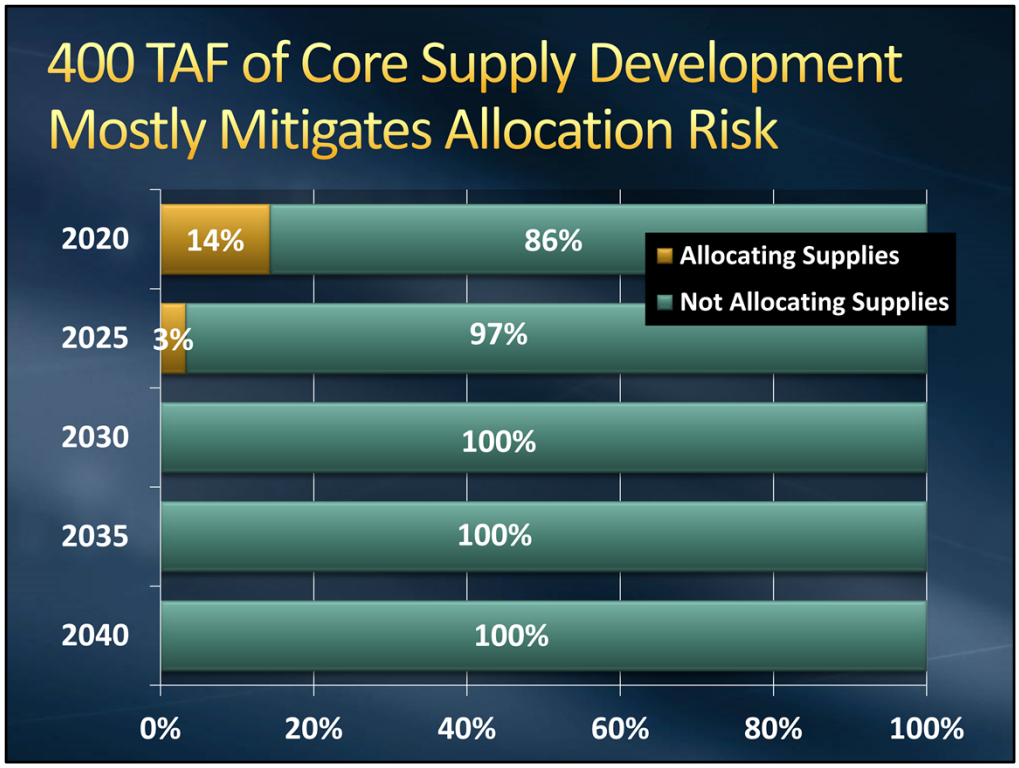


Example: Repeat of 2006-2015 with Scenario 3



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



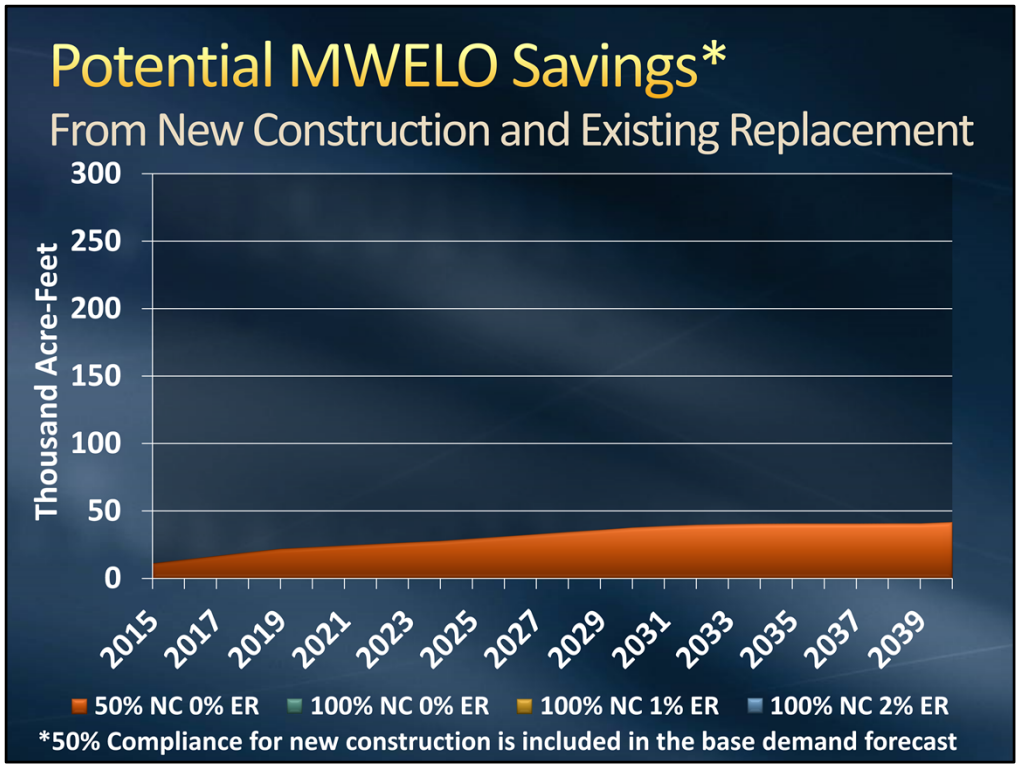


Huge reduction in storage below 1 MAF.

Summary of Risk/Storage Analysis

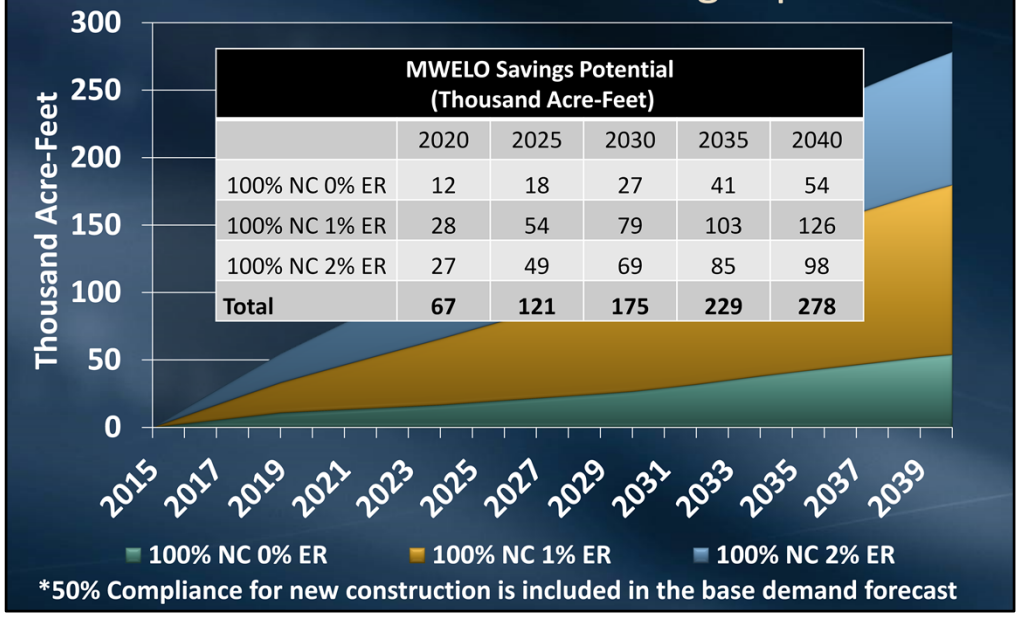
- The 2010 IRP Targets do not provide a sufficient buffer against the risks shown
  - Particularly if more than one of these risks occur at the same time
- Additional core supply needed to avoid allocating supplies:
  - 50 TAF to 250 TAF per year
- Total need including 150 TAF remaining 2010 IRP Target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

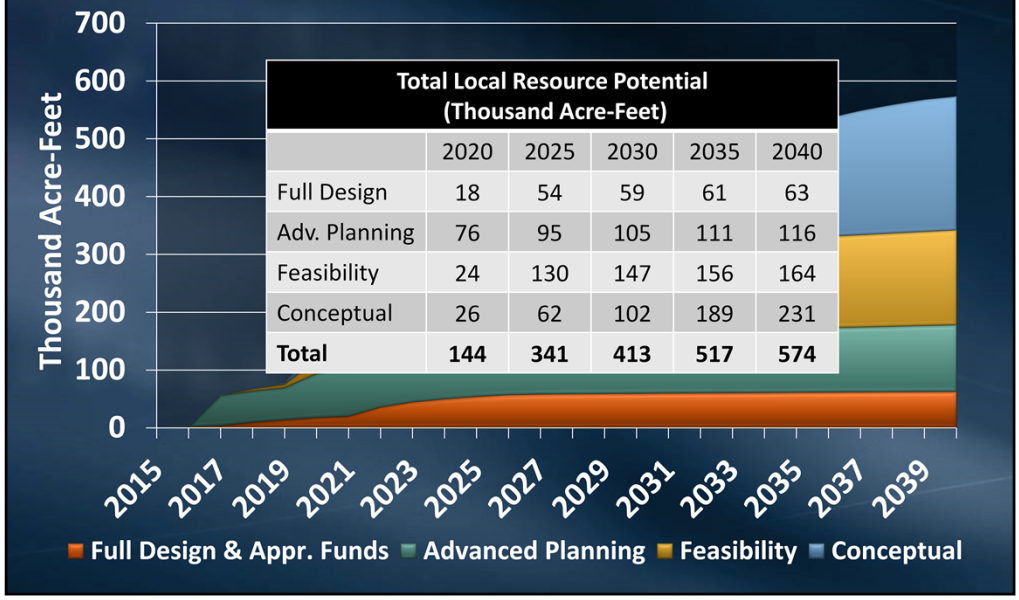


MWELO Savings Potential (Thousand Acre-Feet)					
	2020	2025	2030	2035	2040
100% NC 0% ER	12	18	27	41	54
100% NC 1% ER	28	54	79	103	126
100% NC 2% ER	27	49	69	85	98
Total	**67**	**121**	**175**	**229**	**278**

*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**

Key Technical Findings

Summary of Key Technical Findings

- Additional local supply and conservation development is needed to mitigate risk
  - 200 TAF to 400 TAF per year
- Stabilizing imported supplies continues to be critical
  - Provide every-year core supplies
  - Maximize use of regional storage resources
- A comprehensive water transfer approach can address shorter-term reliability challenges
- Implementation policy and approach to developing local supplies and conservation is key

IRP Technical Recommendations
Colorado River Aqueduct

- Stabilize CRA base supplies against risks from growing demands, drought, etc.
  - Develop sufficient base supply programs to ensure 900 TAF of diversions
- Maintain flexibility in CRA dry-year programs and storage
  - Ensure access to 1.2 MAF of supplies in dry-years

IRP Technical Recommendations
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 Technical Recommendations
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 Technical Recommendations
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 Technical Recommendations
Transfers and Exchanges

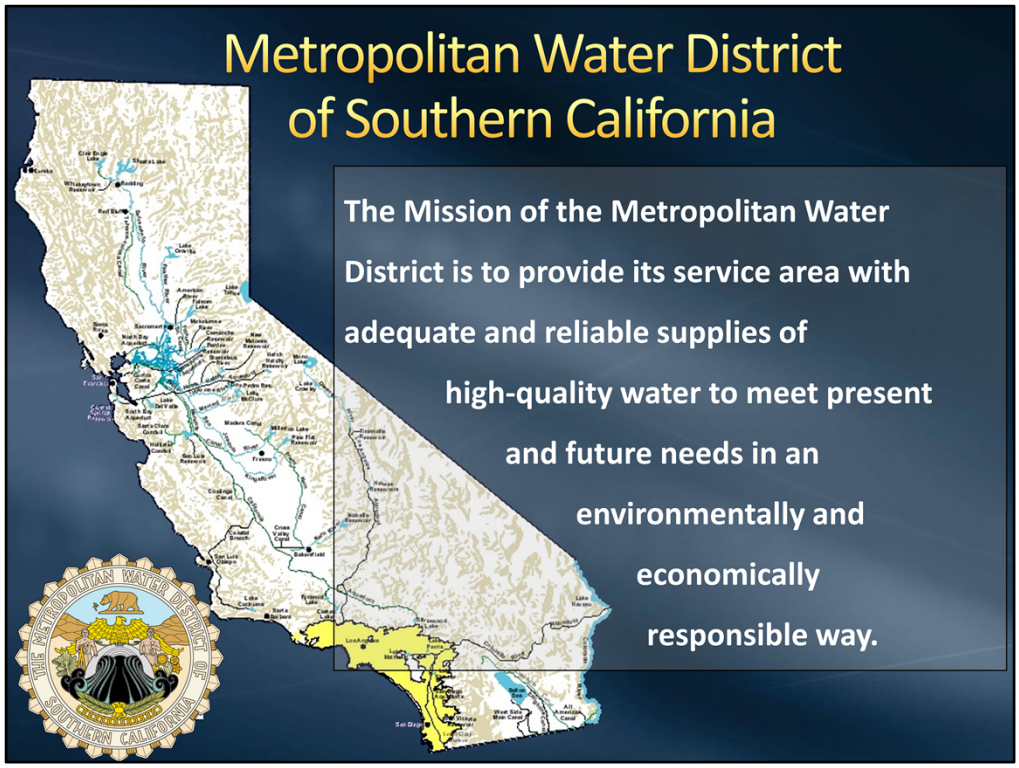
- Develop a comprehensive transfers and exchanges strategy
  - Focus on obtaining additional supplies in normal and wet years
- Ensure strategy works in conjunction with Metropolitan and local storage


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

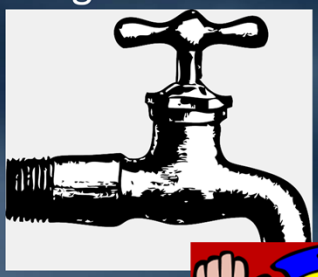


Message Points

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

What Does Reliability Mean?

Nothing comes out the tap?



Limited outdoor watering?

Limits enforced by fines and penalties?

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

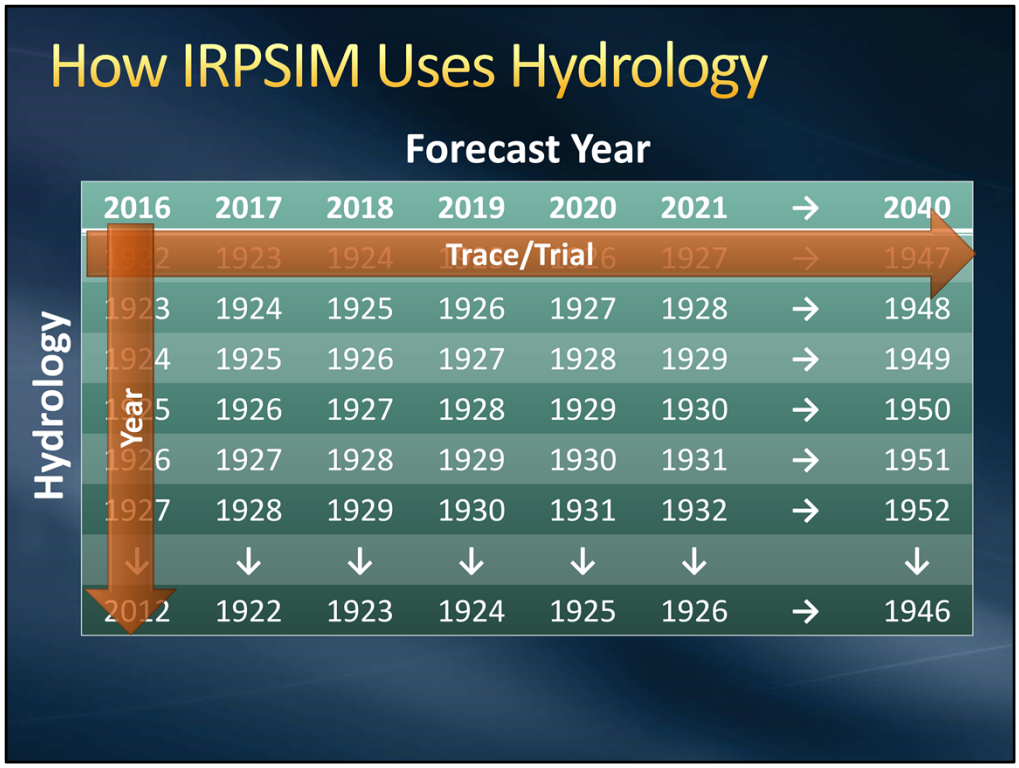
What is the Purpose of Reliability Analysis?

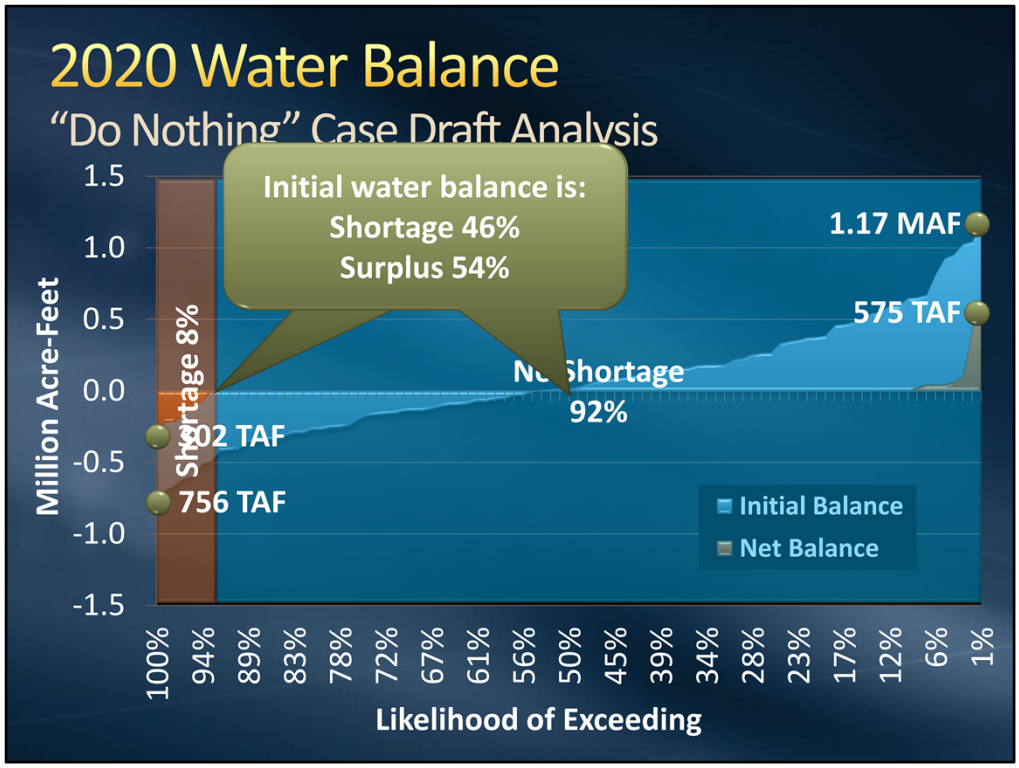
- Evaluates whether a supply mix meets demands in a manner consistent with reliability goals
- Serves as a test case
  - Tests supply and demand forecasts
  - Test ranges and variability due to climate and hydrologic factors

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

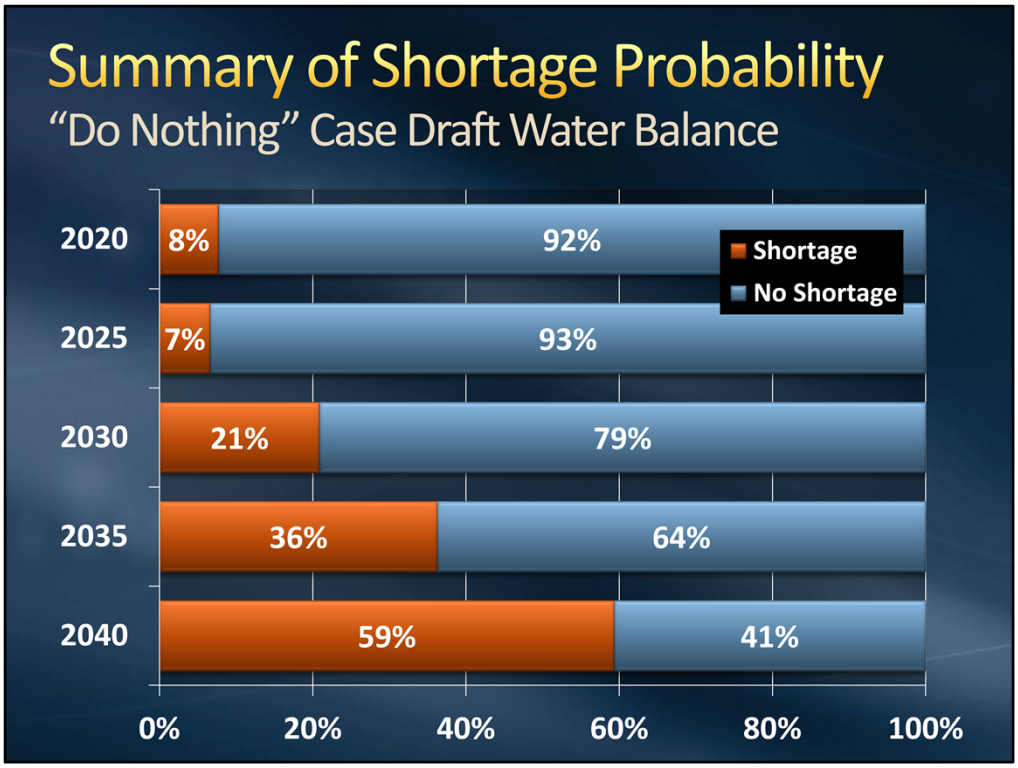
How IRPSIM Uses Hydrology

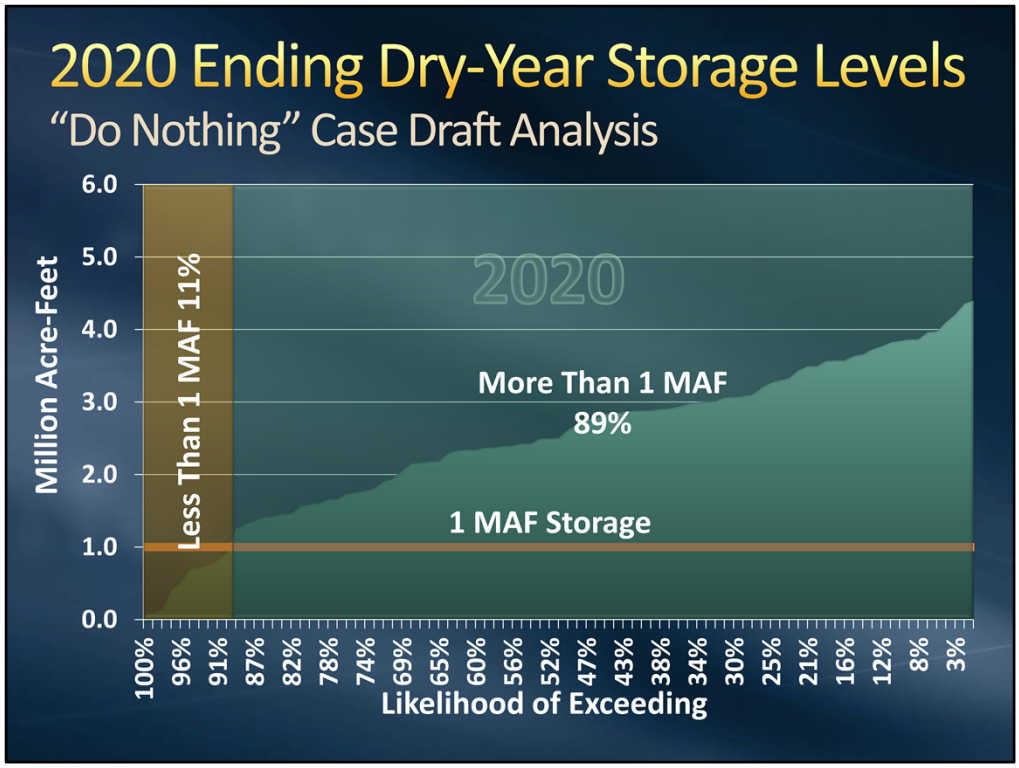



2020 Water Balance
"Do Nothing" Case Draft Analysis
Initial water balance is:
Shortage 46%
Surplus 54%
1.17 MAF
575 TAF
Net Shortage
92%
Shortage 8%
202 TAF
756 TAF
Initial Balance
Net Balance
Million Acre-Feet
1.5
1.0
0.5
0.0
-0.5
-1.0
-1.5
100%
94%
89%
83%
78%
72%
67%
61%
56%
50%
45%
39%
34%
28%
23%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

Summary of Shortage Probability

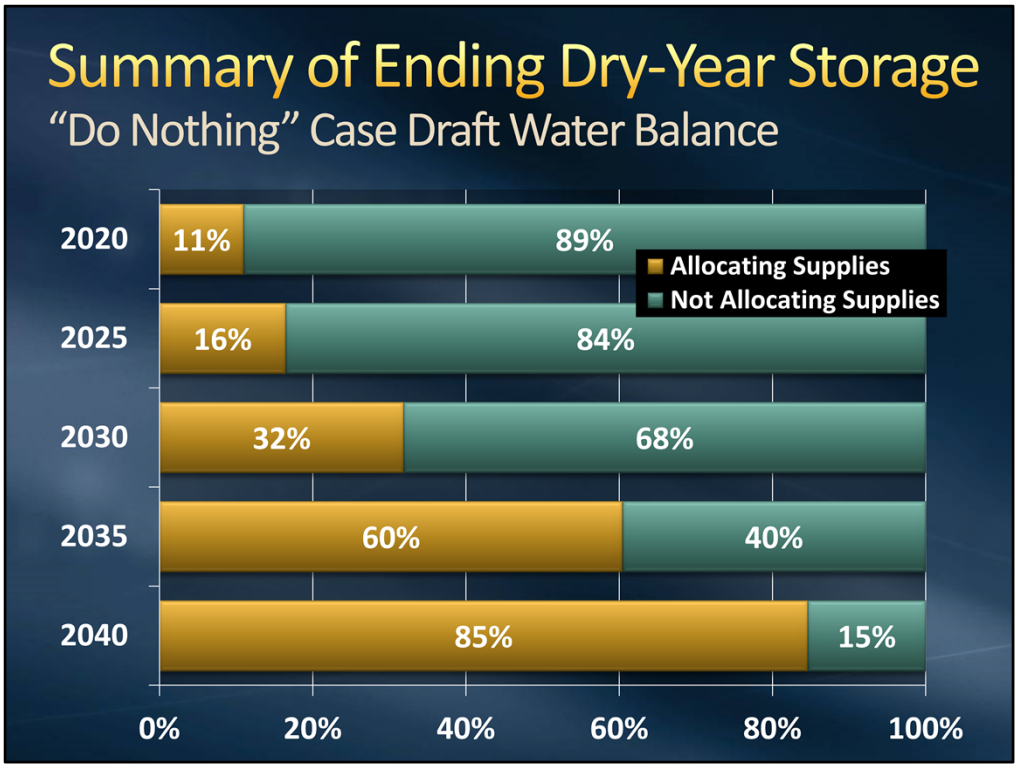
"Do Nothing" Case Draft Water Balance




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

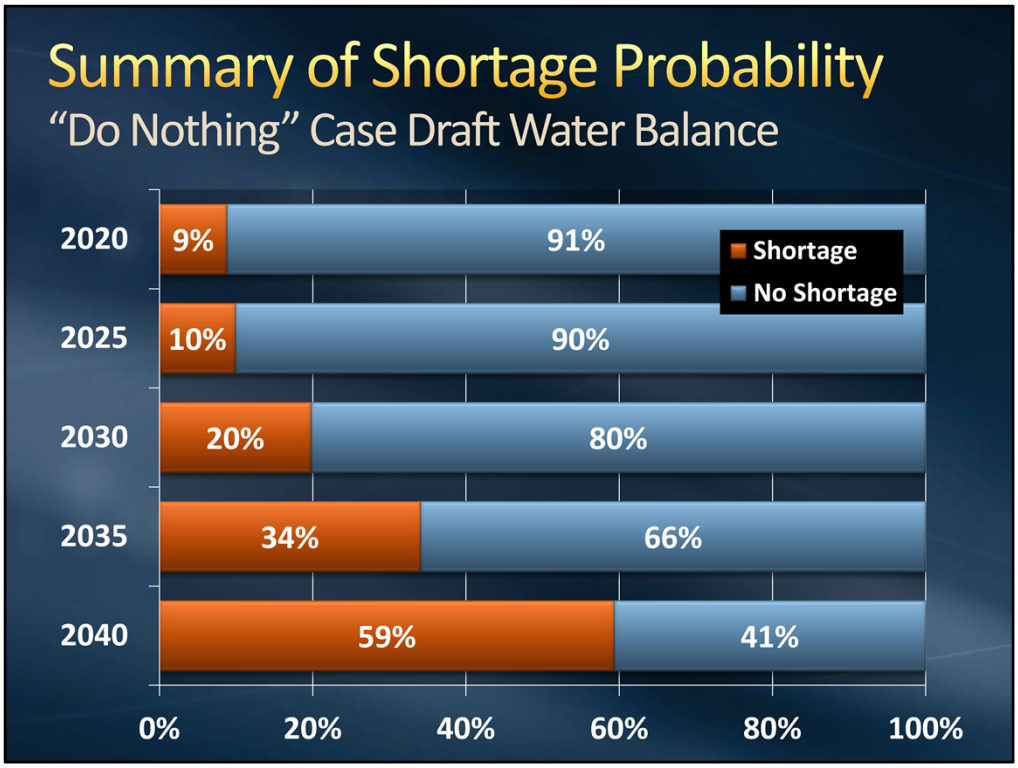


What Does the Analysis Mean?

- Does not serve as a guarantee of reliability
- Provides a reasonable test of the effectiveness of a resource-mix
  - Based on the best information available
  - Considers additional reasonable risks
- Serves as a basis for developing resource goals and targets

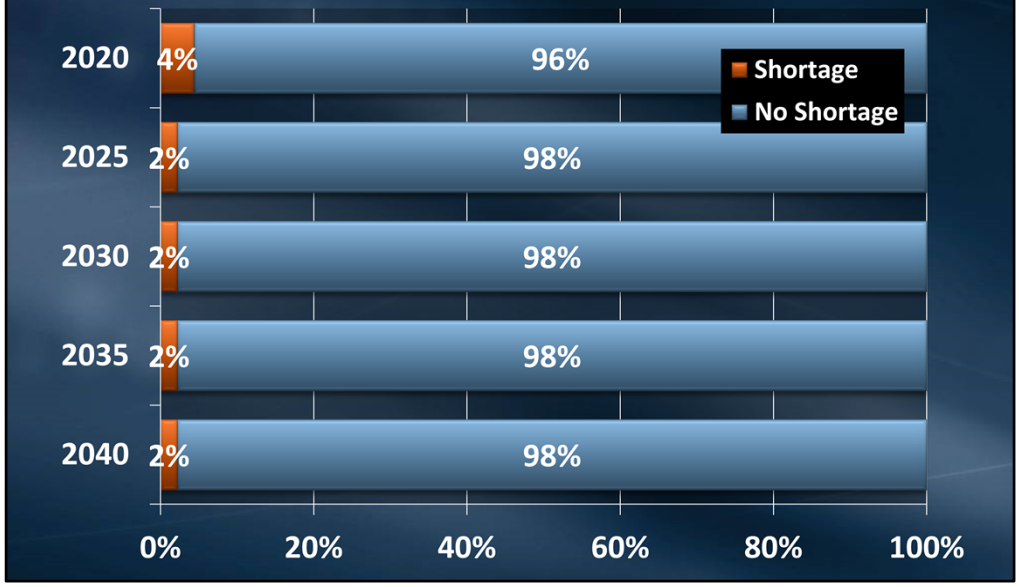
Summary of Shortage Probability

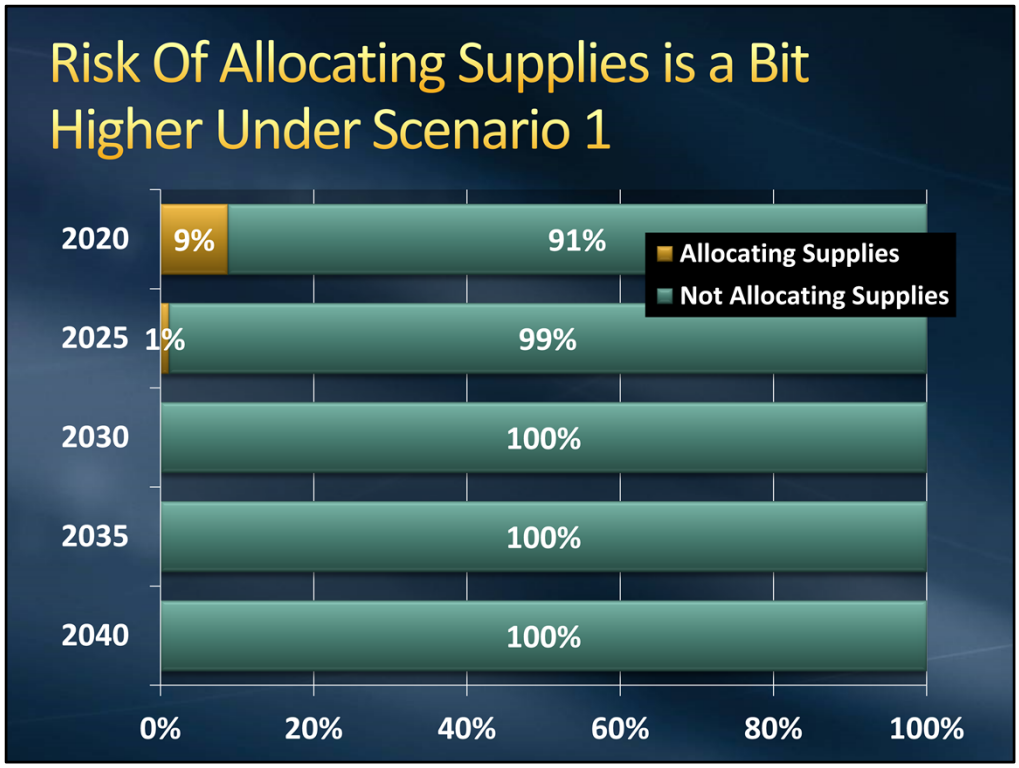
"Do Nothing" Case Draft Water Balance



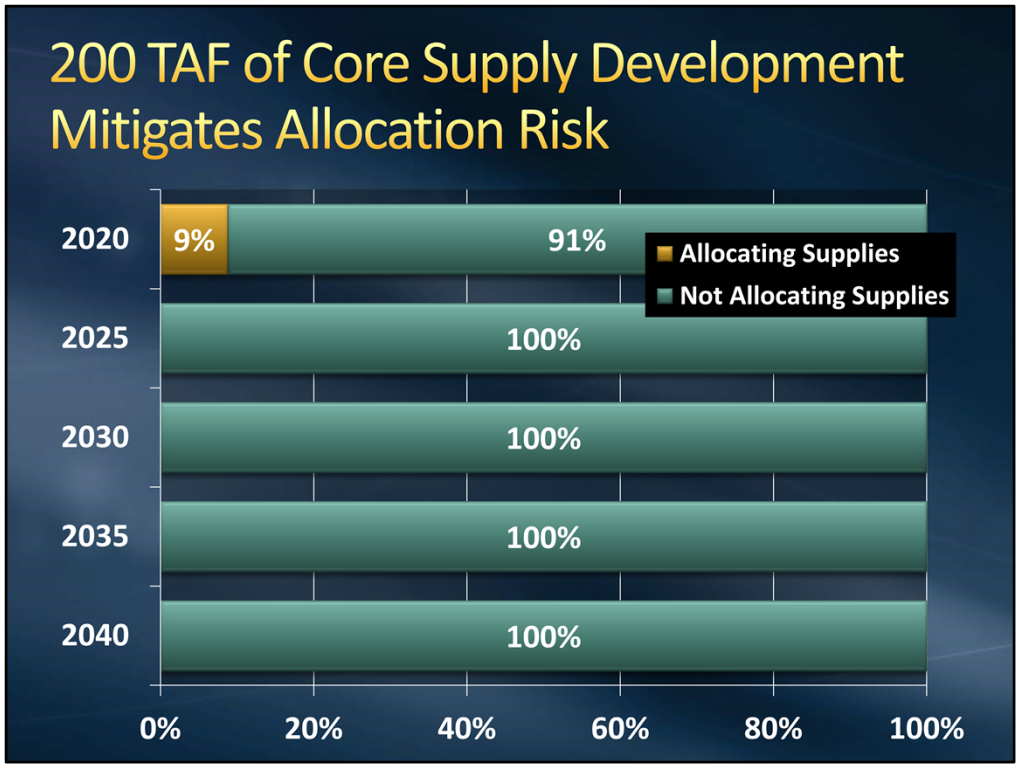
Summary of Shortage Probability

IRP Approach Draft Water Balance





Huge reduction in storage below 1 MAF.



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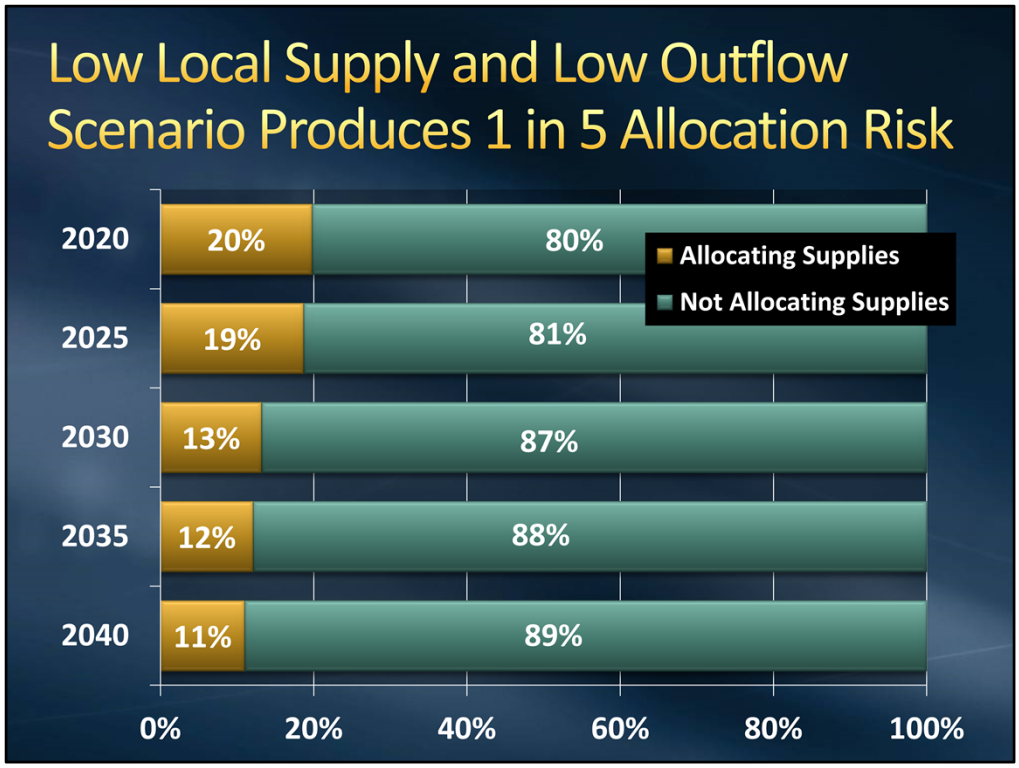

Huge reduction in storage below 1 MAF.

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