EASTERN MUNICIPAL WATER DISTRICT

Scenario Planning for Water Supply Uncertainties Results

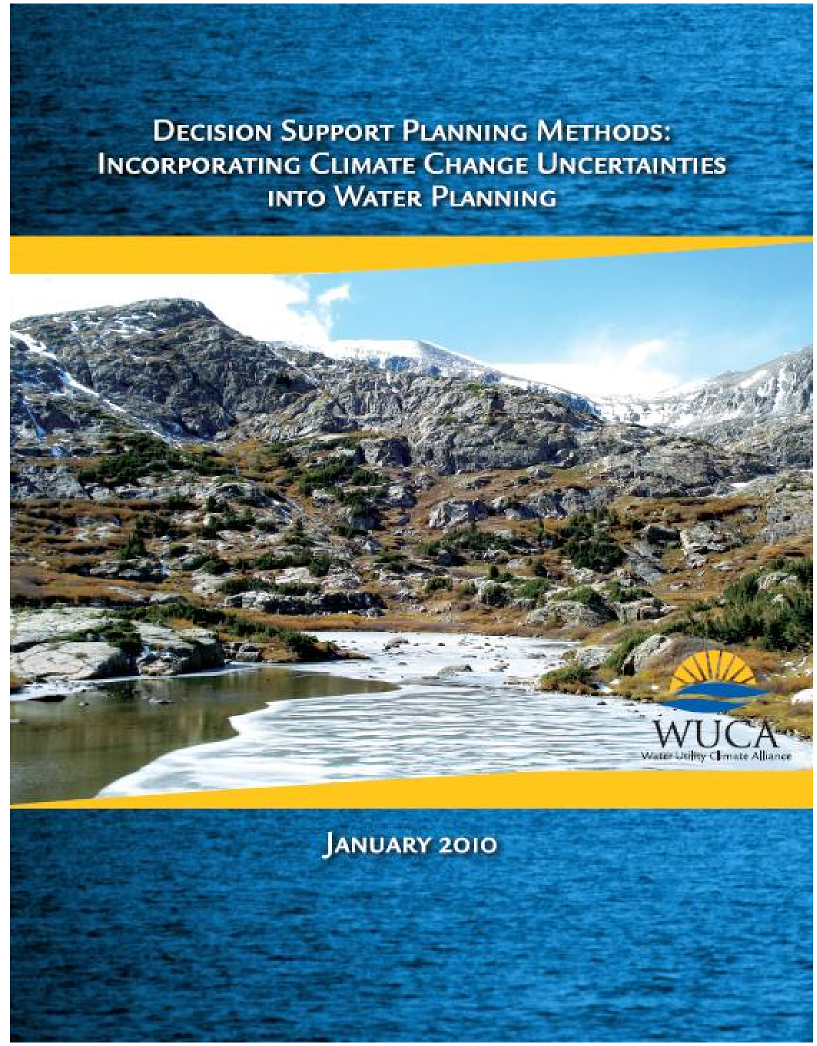
Gordon Ng

September 13, 2018

Background

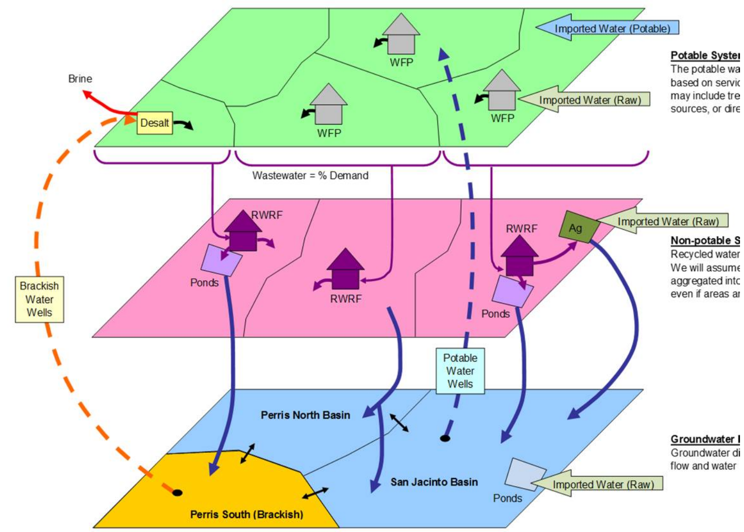
Background

- Effort addresses the strategic priority of **"Planning for Sustained 'Mega-Drought' Conditions"**
- Analysis evaluates the resiliency of the District's future water supply portfolio under changing conditions
- System model performs annual "stress test" on water supply portfolio through the simulation of critical uncertainties and their impacts on supply and demand



2015 Water Supply Master Plan – Planned Project Portfolio

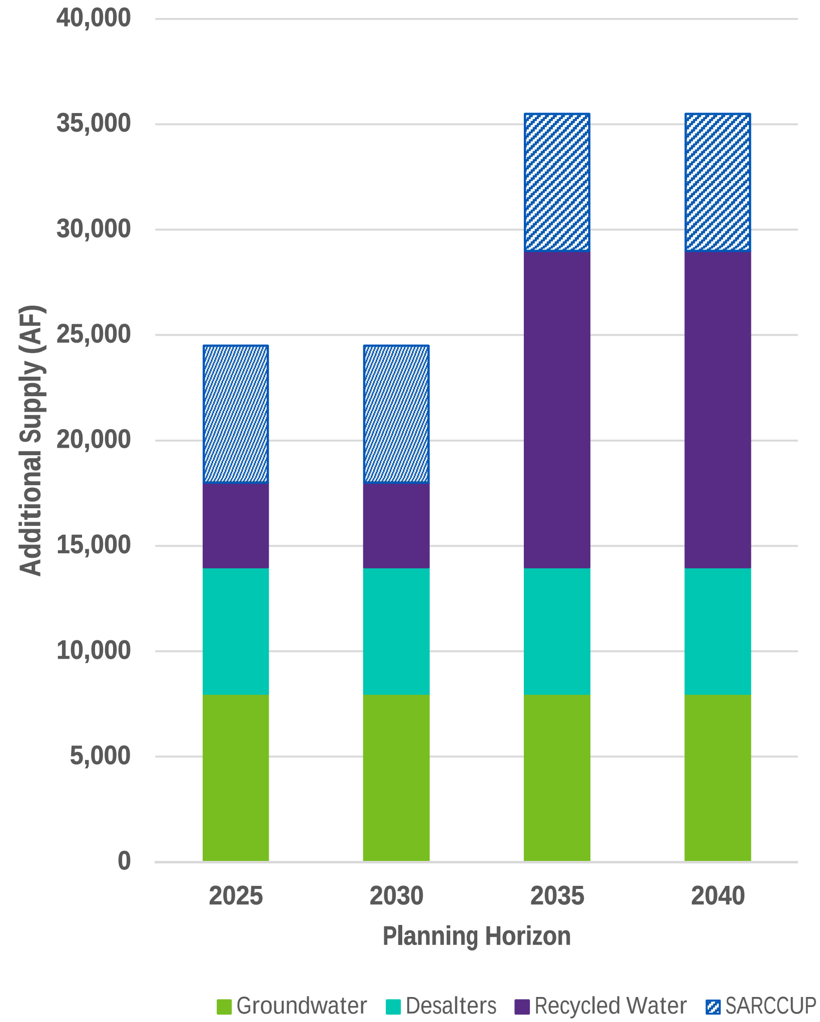
- Completed in 2015 as part of master plan updates
- Eight alternatives were ranked
- Criteria
  - Cost Effectiveness (weighted at 30%)
  - Adaptability (weighted at 25%)
  - Drought Reliability (weighted at 20%)
  - System Reliability (weighted at 15%)
  - Water Quality (weighted at 10%)
- Selected portfolio used for master plans and Urban Water Management Plan



This projects tests the planned portfolio of supplies against various extreme conditions to evaluate performance and identify potential indicators that may require future action

Planned Project Portfolio (Local Supply Development)

- **Groundwater**
  - Moreno Valley: 2,000 AFY starting in 2025
  - North Perris / MARB: 6,000 AFY starting in 2025
- **Desalters**
  - Perris II Desalter (Ph. 1): 4,000 AFY and (Ph. 2): 2,000 AFY; starting in 2021 (6,000 AFY total)
- **Recycled Water**
  - PWR (Ph. 1): 4,000 AFY starting in 2022
  - PWR (Ph. 2): 11,000 AFY starting in 2035 (15,000 AFY total)
- **Imported Water Banking**
  - SARCCUP / ERRP (Ph. 1): 19,500 AF of storage capacity + 6,500 AF of withdrawal capacity available in 2020



*SARRCUP banked water only available for 3 out of 10 years (dry years)

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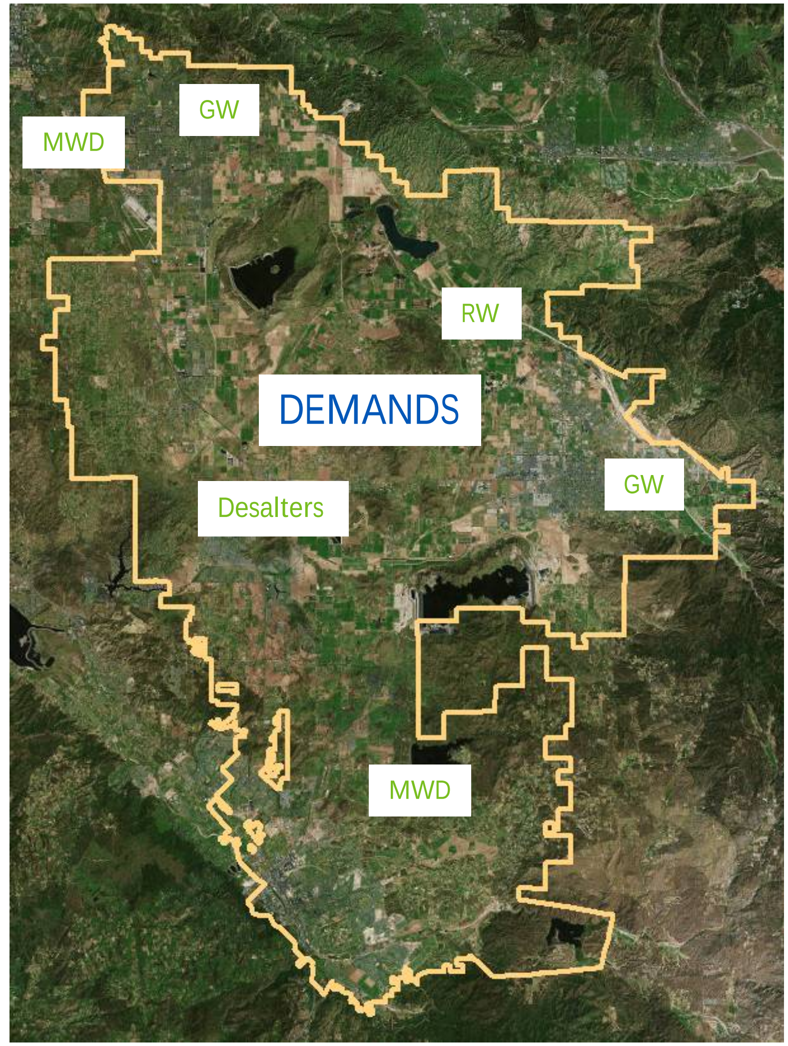
Scenario Modeling

System Model (Annual Water Supply Balance)

- System model performs an overall (District-wide) **annual balance** of supplies against demands
- Model adjusts overall supplies/demands to account for impact of simulated hydrology and **determines if a shortage occurs**
- Does <u>**not**</u> account for factors like:
  - Seasonality
  - Peak demands
  - EMWD capacity constraints (transmission/distribution)
  - MWD turnout constraints



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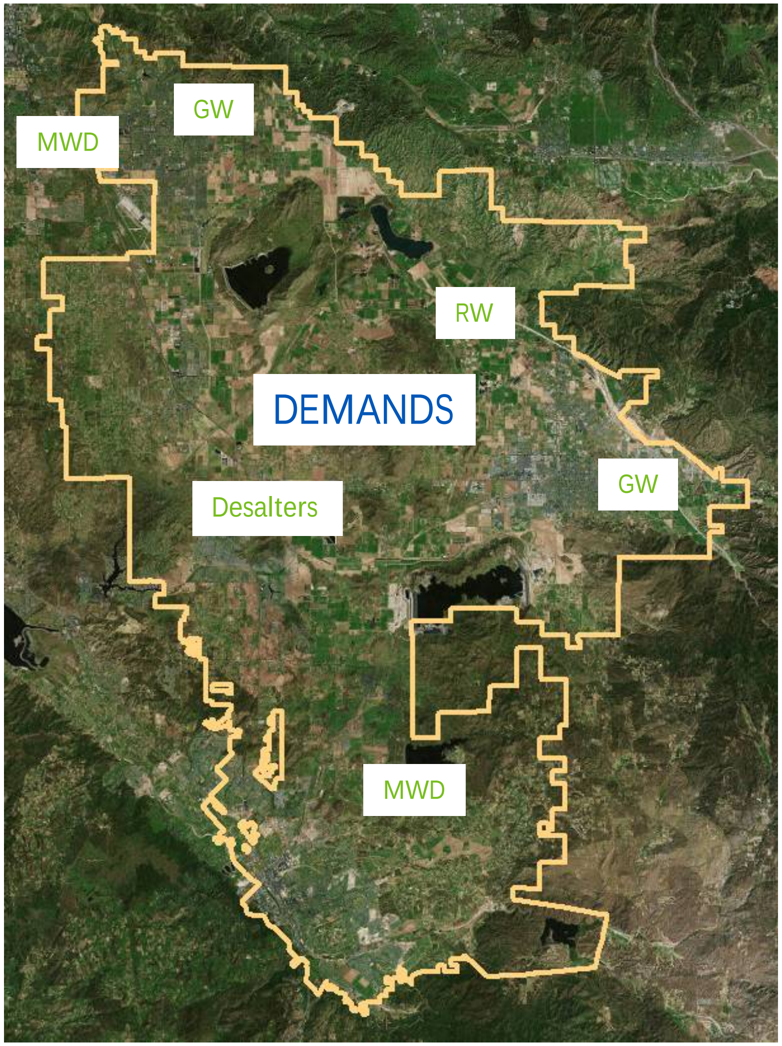
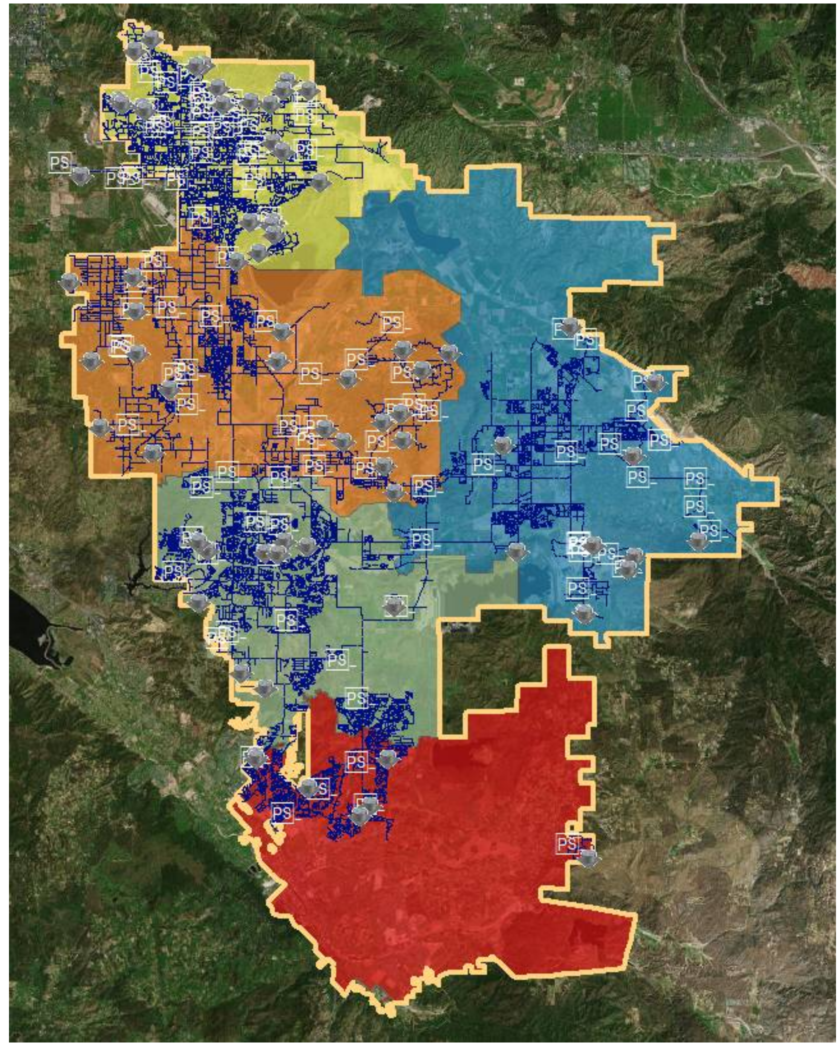
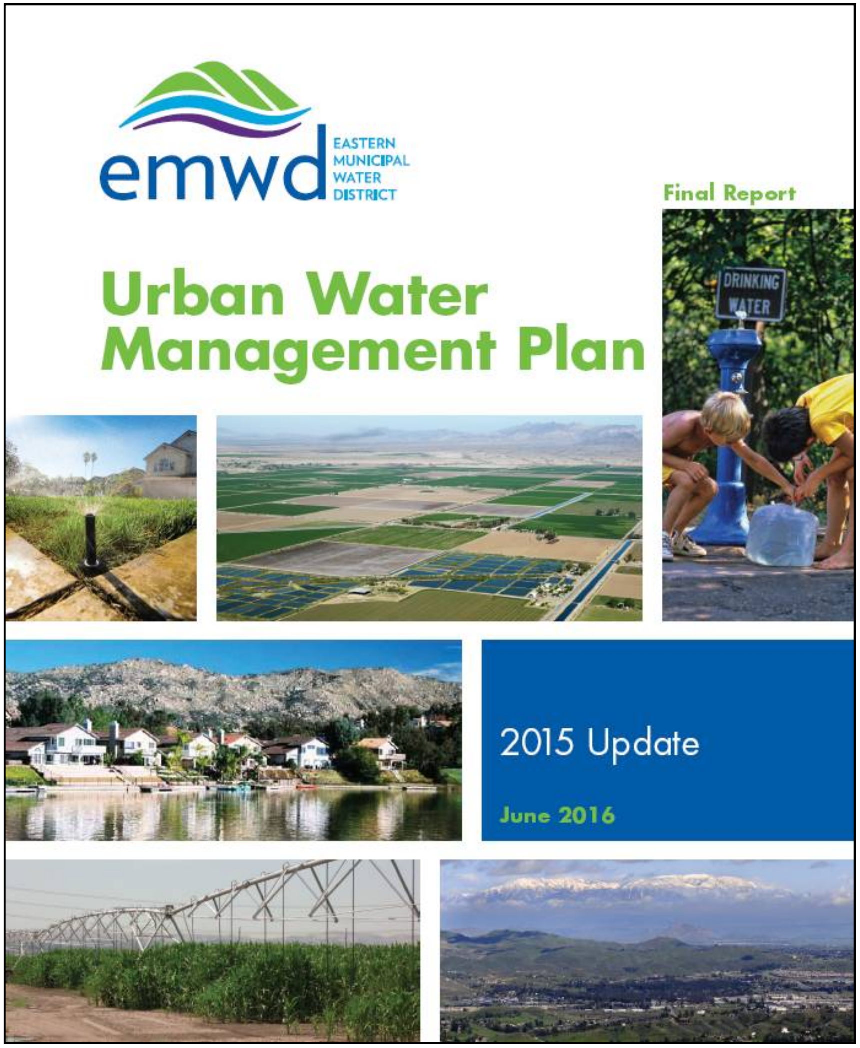


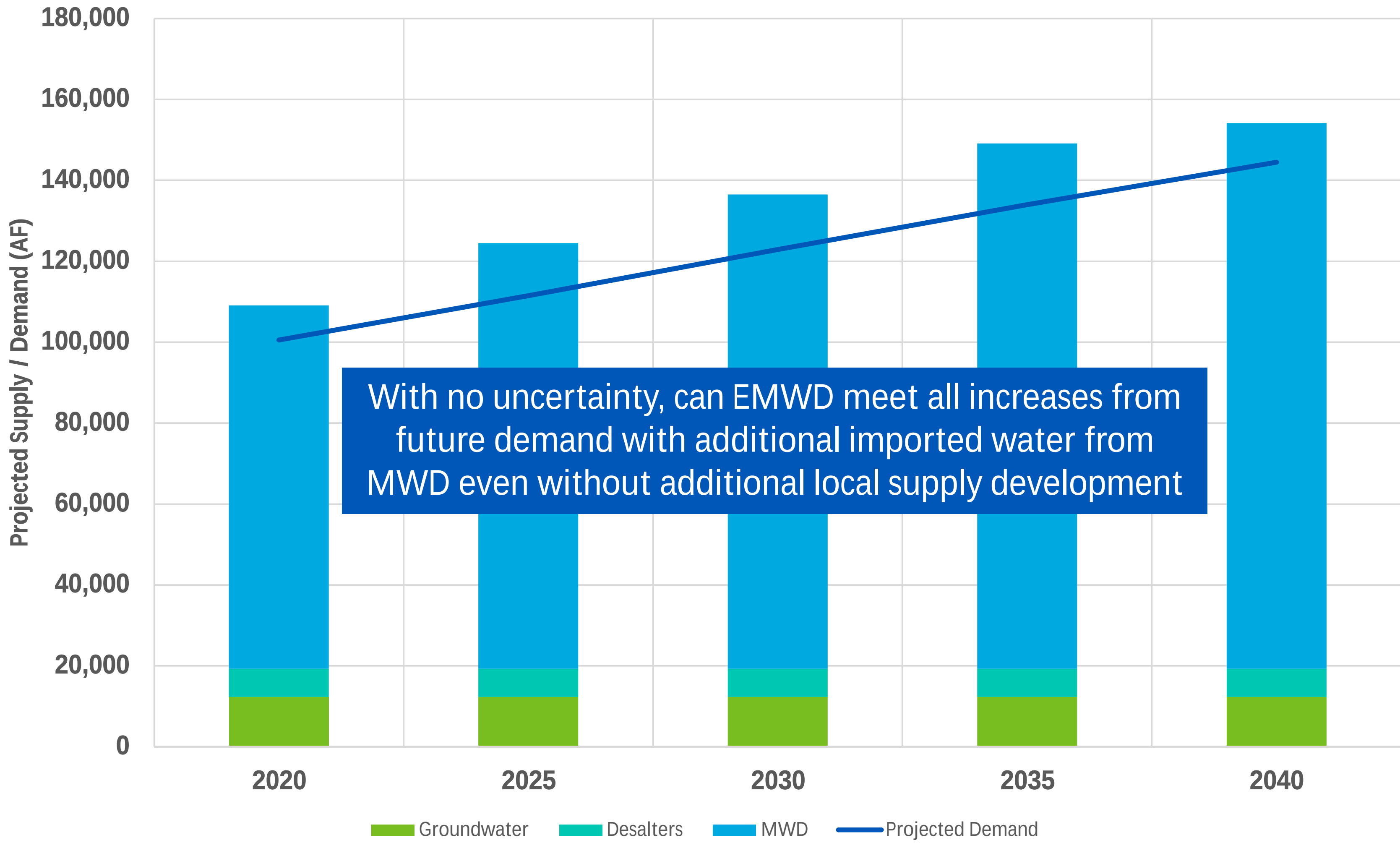


Model Data Sources

- Local Supplies based on 2015 UWMP, updated to current timeline and scale
- MWD Supplies: UWMP coordination (2015/16)
- Simulated hydrology is an adaptation of a “do-nothing” scenario from MWD’s 2015 Integrated Resource Plan update

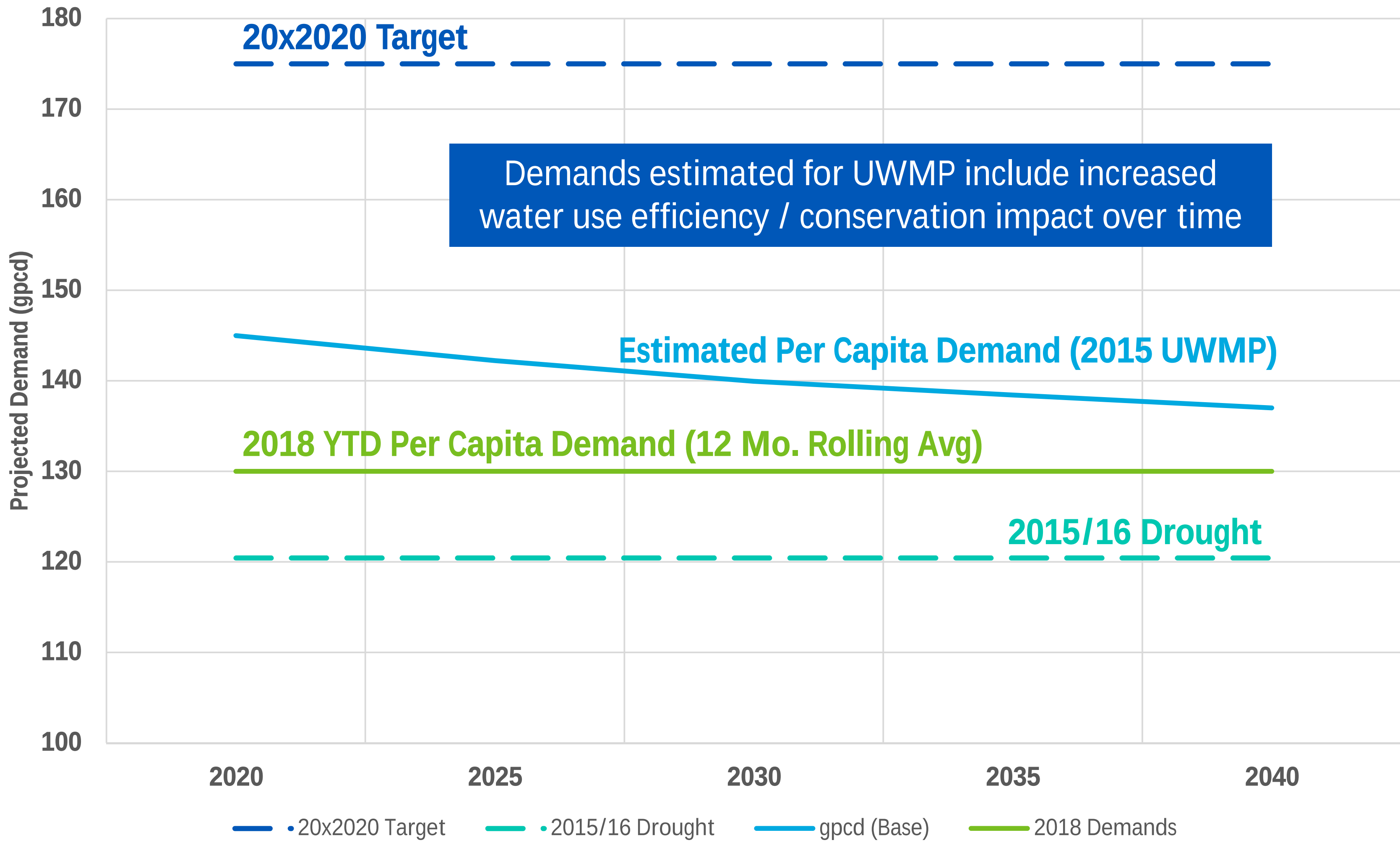


Baseline Supply Conditions (Potable Retail System)



Includes 7,500 AF annually for Soboba Settlement Recharge
Does not include GW pumping which may be available above ABPR

Baseline Demand Assumption (Potable Retail System)



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Simulation Results:
A Hypothetical “Worst-Case” Scenario

Criteria for Hypothetical “Worst-Case” Scenario

- Probability of a dry year (supply disruption) increases quickly over time
  - Simulation Starts (2020): **1 year out of 10** is dry
  - Simulation Ends (2040): **8 years out of 10** are dry
- Supply Disruption (during simulated dry years, % change relative to normal years)
  - Loss of 10 – 20% of native groundwater supplies
  - Loss of 10 – 20% of imported water supplies from MWD
  - MWD fully reliable after 2036 (estimated completion of CA Water Fix)
- Dry Year Demand Impacts
  - Initial drought periods: demands spike in response to dry/hot conditions
  - Extended drought periods: demands roll back down (if multiple, consecutive dry years are simulated)
  - Changes to wholesale demands not considered

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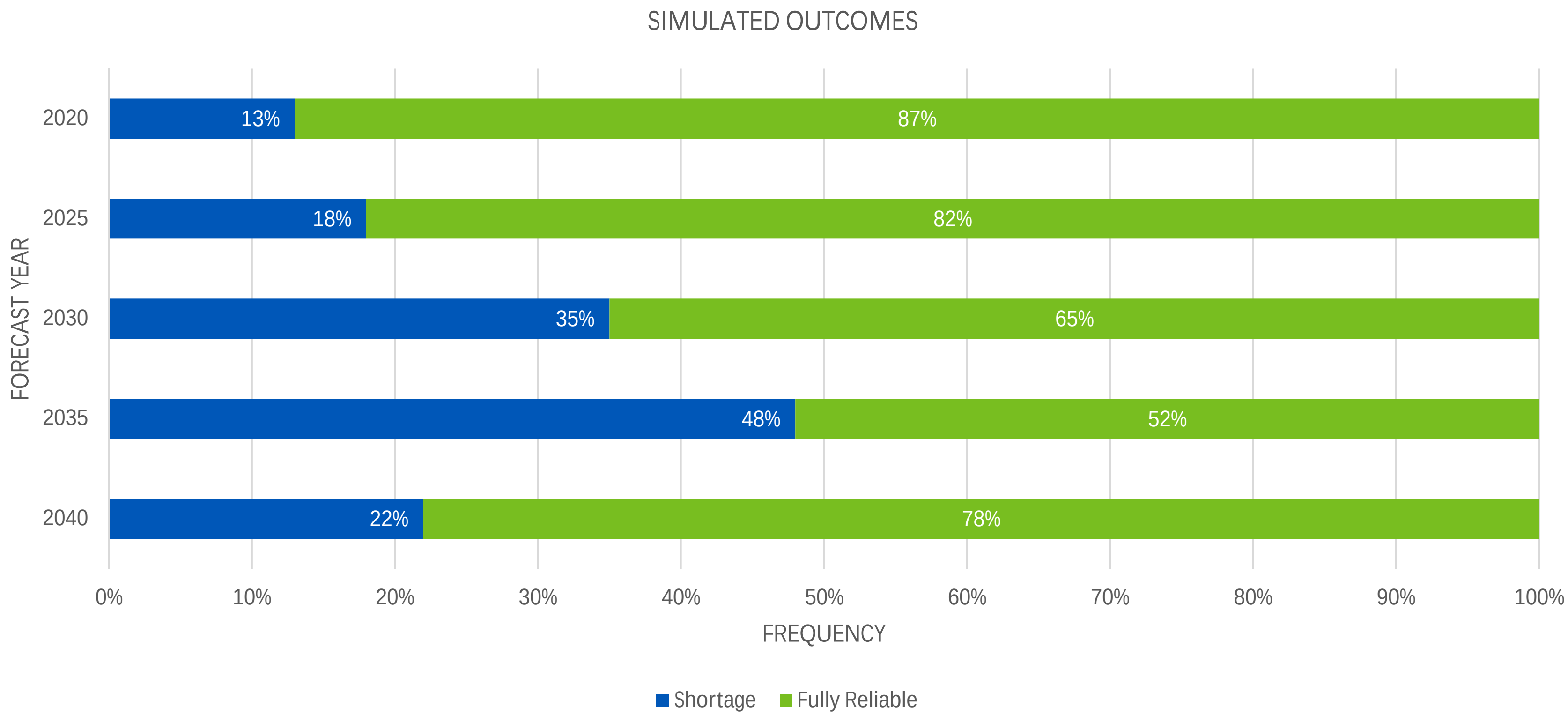
Hypothetical Shortage Occurrences

UNDER HYPOTHETICAL "MEGA-DROUGHT" CONDITIONS WITH NO ADDITIONAL LOCAL SUPPLY PROJECTS



Adaptation Strategies:
“No-Regrets” Solutions to Uncertainty

Adaptation Strategies

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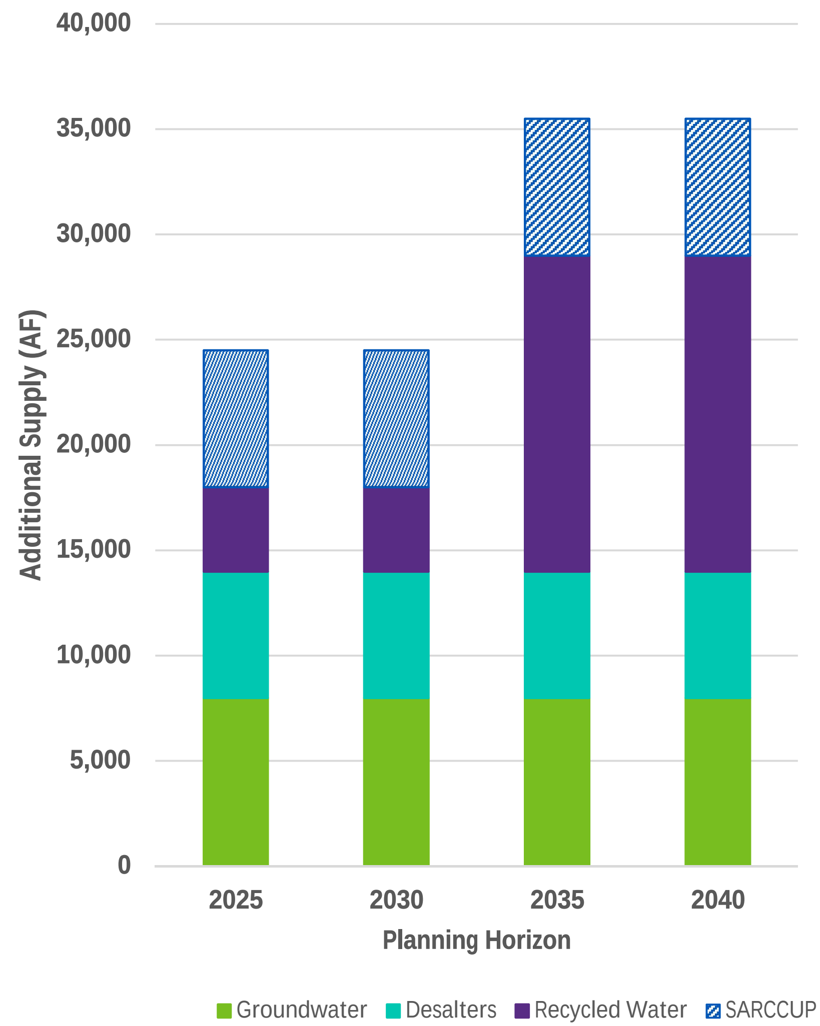

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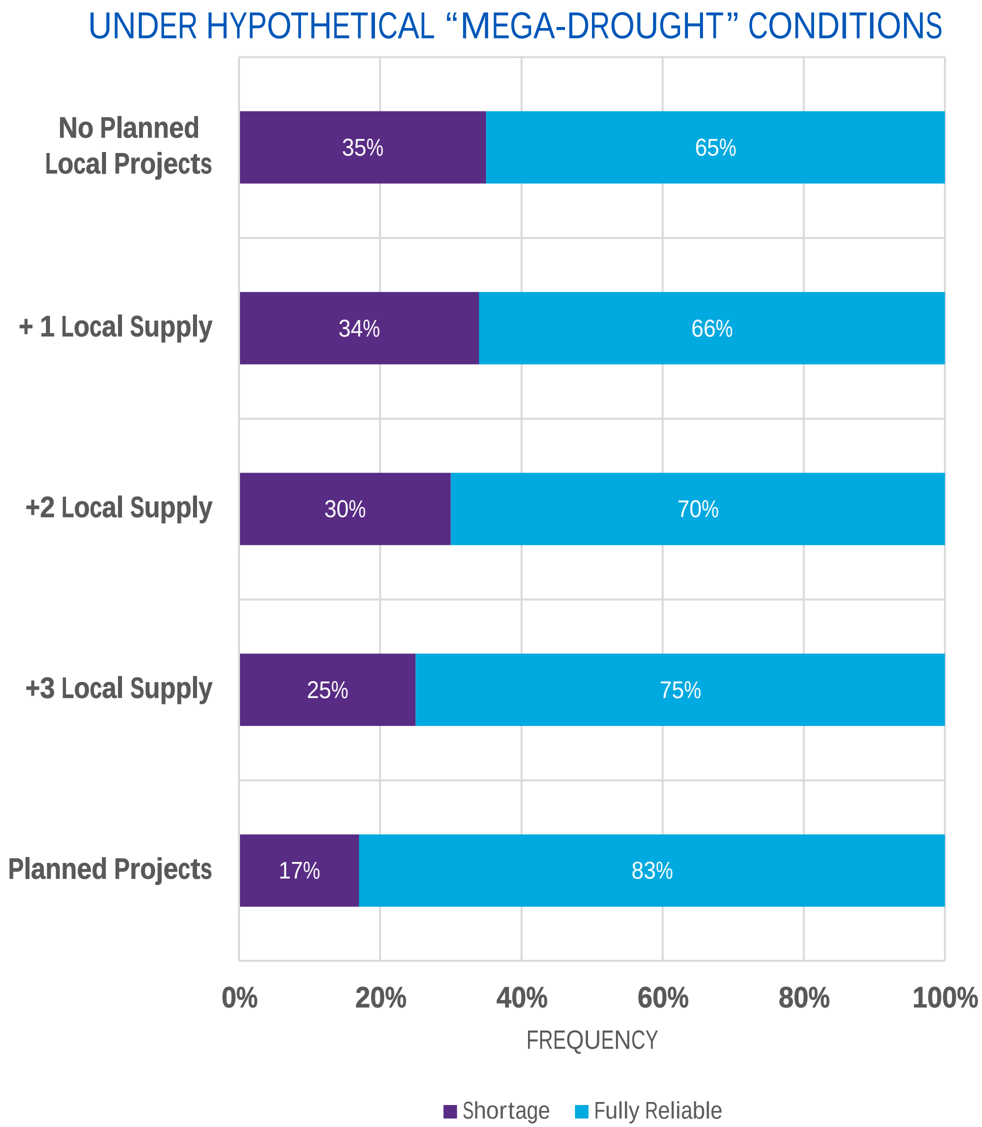
Planned Project Phasing – Individual Impacts (2030)



Case 1: Demand from future growth met solely with increased imported water

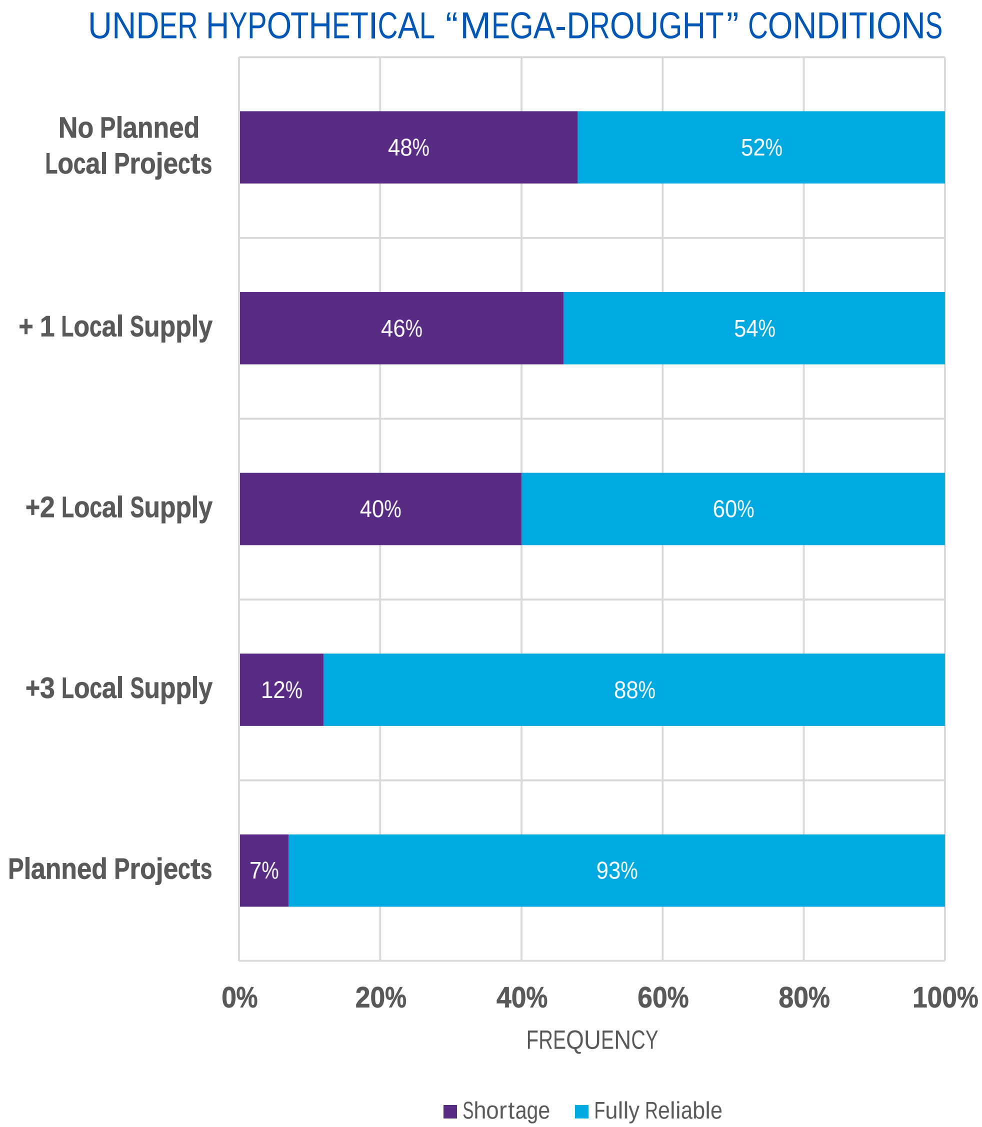
Case 2: Adds supplies from Perris II Desalter

Case 3: Adds Moreno Valley and North Perris Groundwater

Case 4: Adds PWR (Phase 1)

Case 5: Adds SARCCUP (ERRP Phase 1)

Planned Project Phasing – Individual Impacts (2035)



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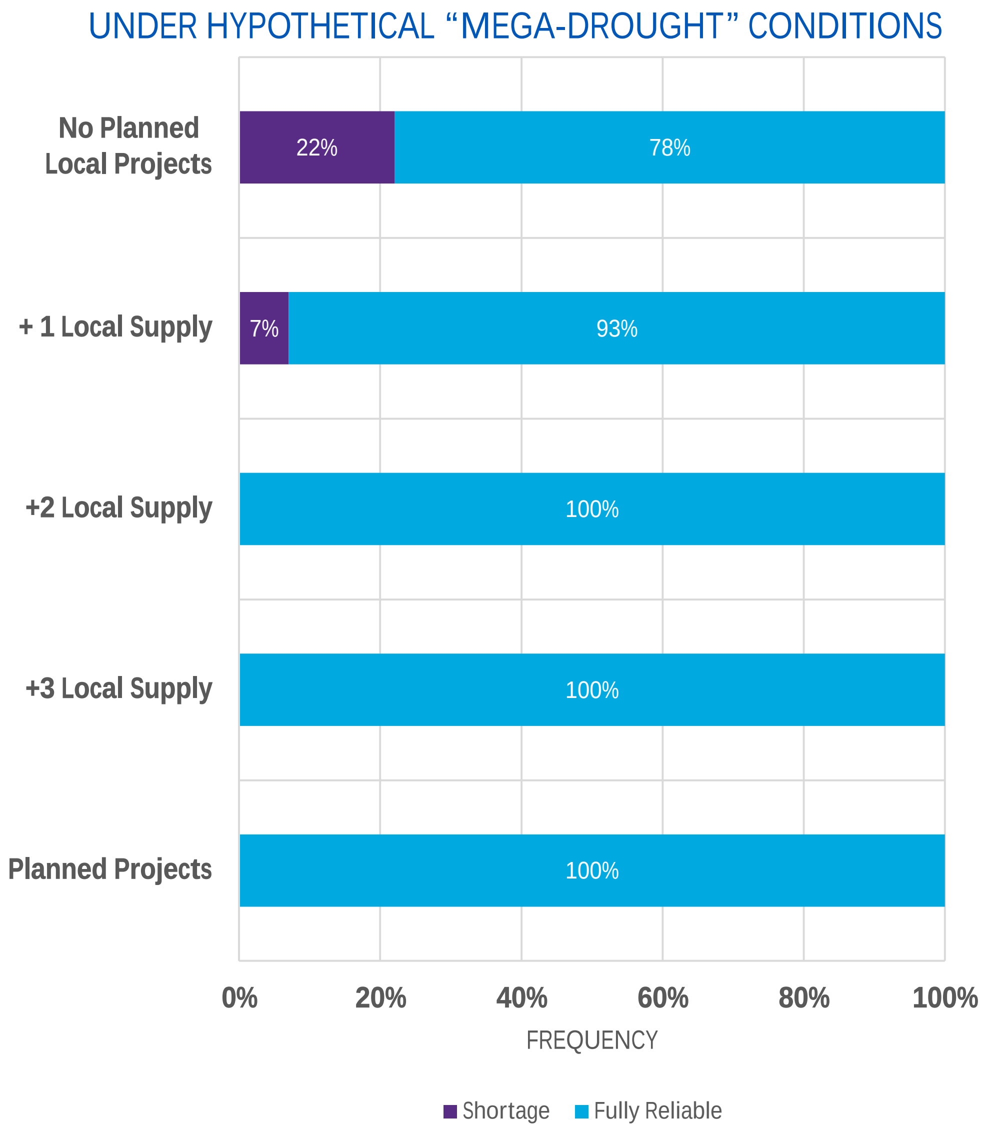

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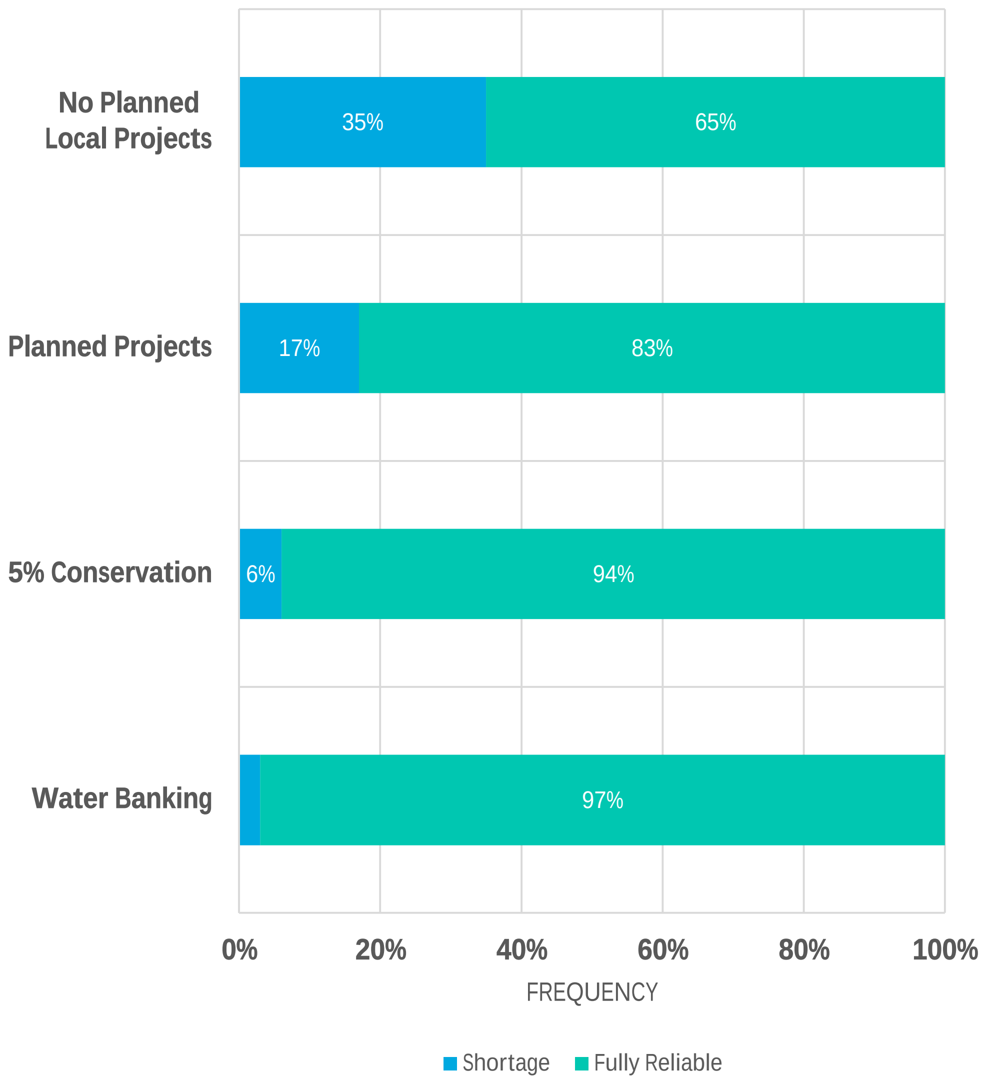
ALL CASES: CA WATER FIX COMPLETE

Simulation of Adaptation Measures – 2030 Results

UNDER HYPOTHETICAL "MEGA-DROUGHT" CONDITIONS



Case 1: Demand from future growth met solely with increased imported water

Case 2: Adds supplies from planned projects (groundwater development, Perris II, PWR, SARCCUP/ERRP)

Case 3: Adds conservation effort of 5%

Case 4: Adds an additional water banking project (beyond planned projects)

ASSUMES WATER IS AVAILABLE TO BANK DURING WET/AVERAGE YEARS

Simulation of Adaptation Measures – 2035 Results

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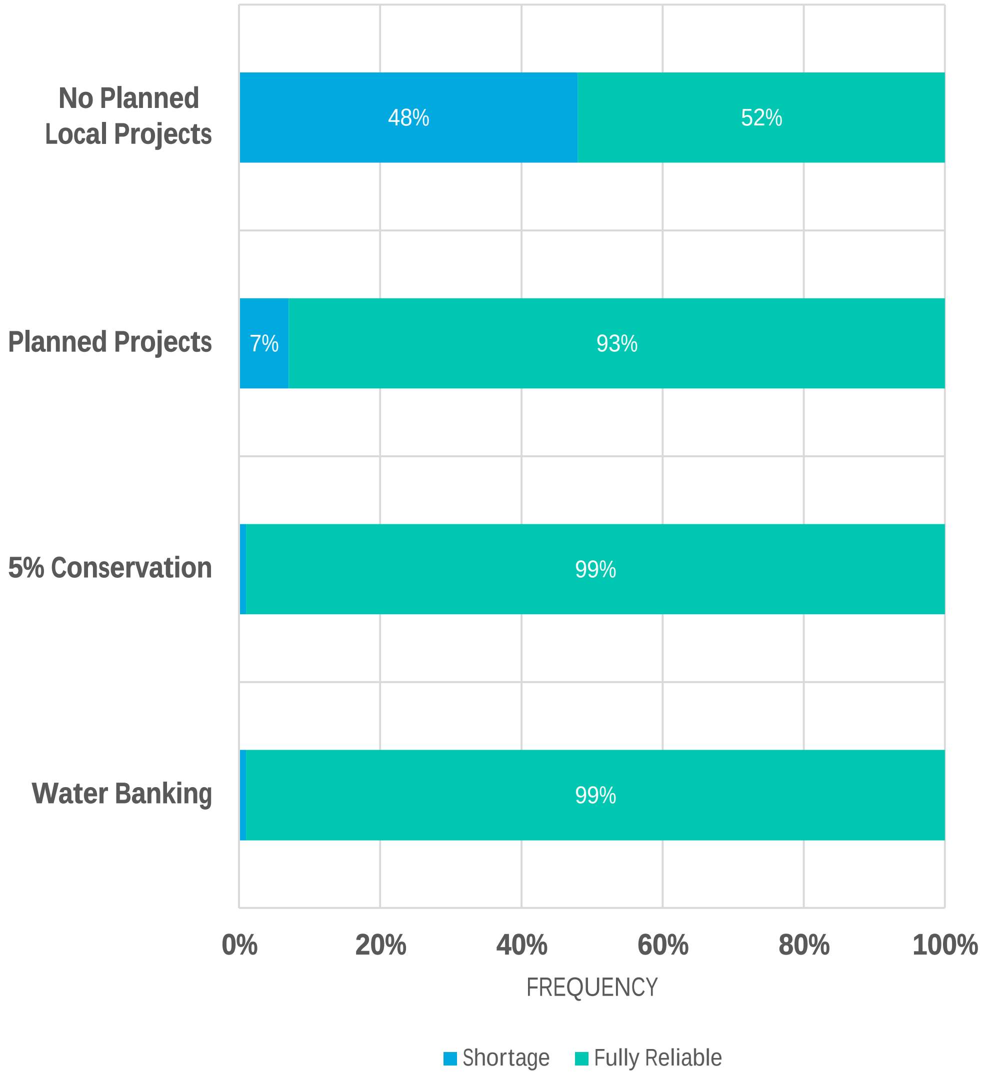

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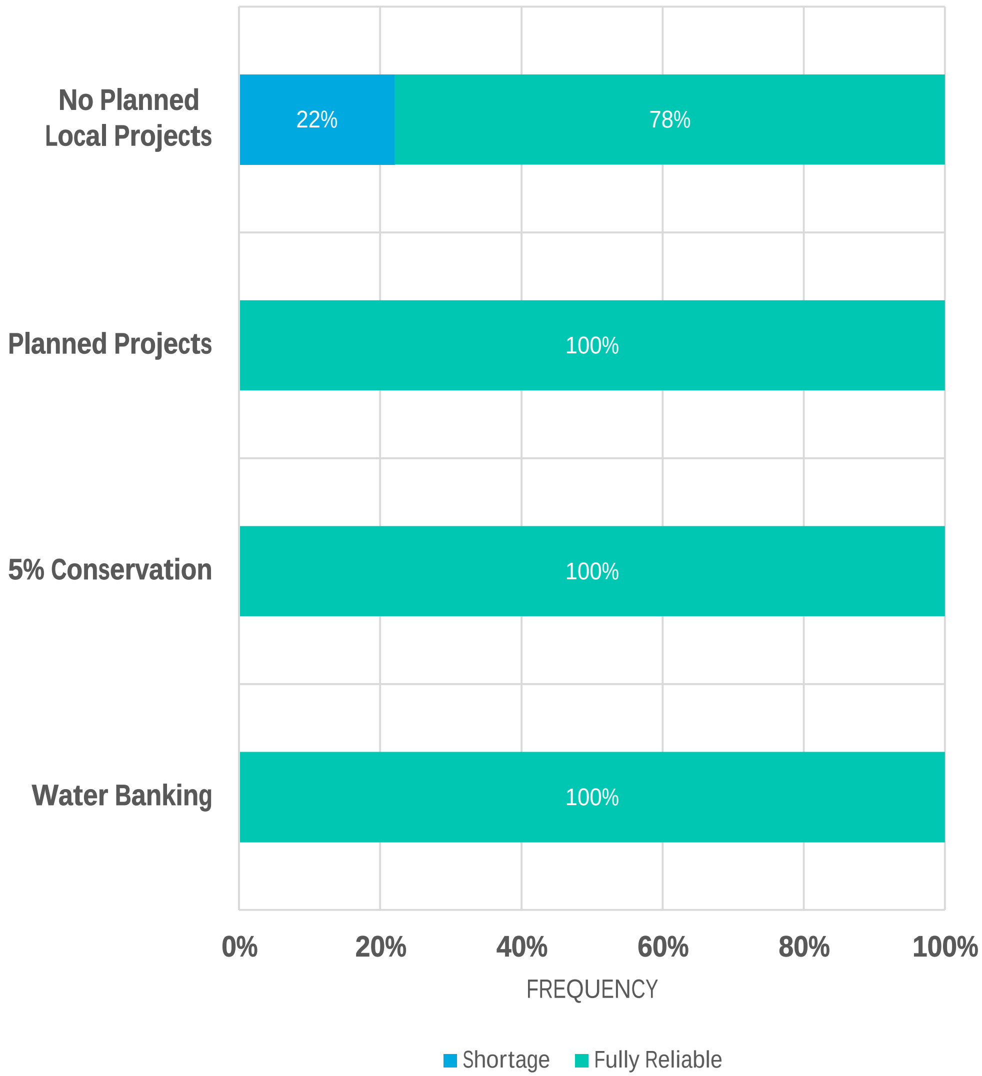

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ALL CASES: CA WATER FIX COMPLETE

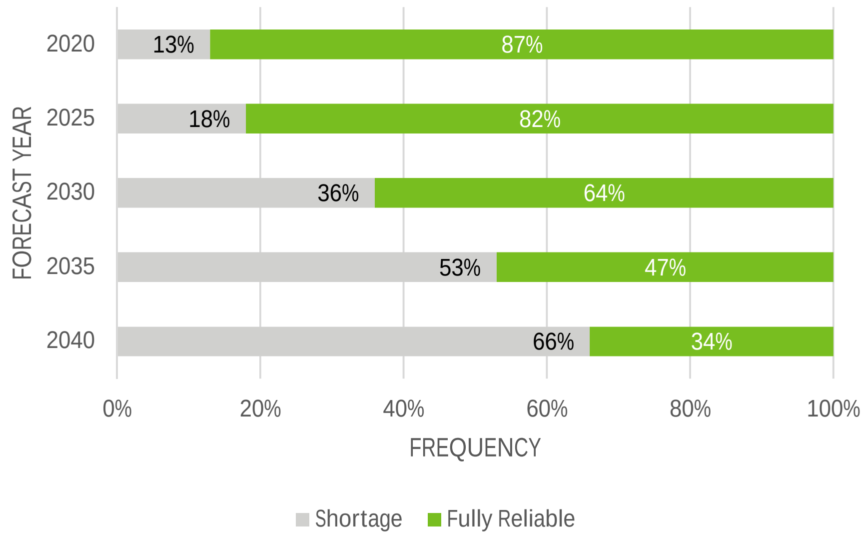
Regulatory Impact on Adaptation Strategies

Impact of Regulatory Supply Limitations

UNDER "MEGA-DROUGHT" CONDITIONS

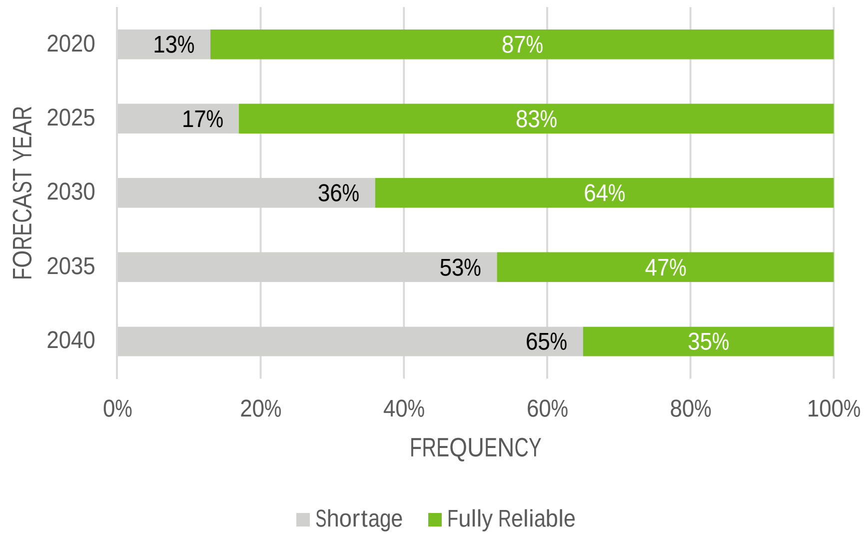
NO PLANNED PROJECTS

SIMULATED OUTCOMES



WITH PLANNED PROJECTS

SIMULATED OUTCOMES



Portfolio shows NO improvement despite additional local supply projects if a State emergency mandatory water consumption limit is imposed

Shortage is not an "actual" shortage – supply is limited by regulation not availability

Future Reliability

Potential Indicators of Future Reliability

- MWD reliability
  - Timing of California Water Fix
  - State Water Project / Colorado River allocations
  - Imported supply availability
- Severe or Prolonged Drought Conditions
  - More frequent, longer duration dry / hot conditions
  - “Wetter” wet years
- Groundwater bank balances (starting/ending balances during dry periods)
- Demand patterns
  - Changing water use efficiency
  - Rate of growth / development
  - Land use changes

Conclusions

- Portfolio defined in 2015 Water Supply Master Plan performs well on an average basis, even under the adverse conditions simulated in a hypothetical “worst case” scenario
- Continue to monitor indicators of water supply reliability
- Continue to monitor regulatory environment
- Project timing, scale, and scope to be adjusted accordingly based on observations

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