

# Committee on Water

NARUC  Summer  
Policy Summit

# **Committee on Water**

## **Desalination as a Water Source**

# Water Supply Reliability for San Diego County



**NARUC Summer Policy Summit  
July 17, 2017**



San Diego County  
Water Authority

**Bob Yamada**  
Director of Water Resources  
San Diego County Water Authority



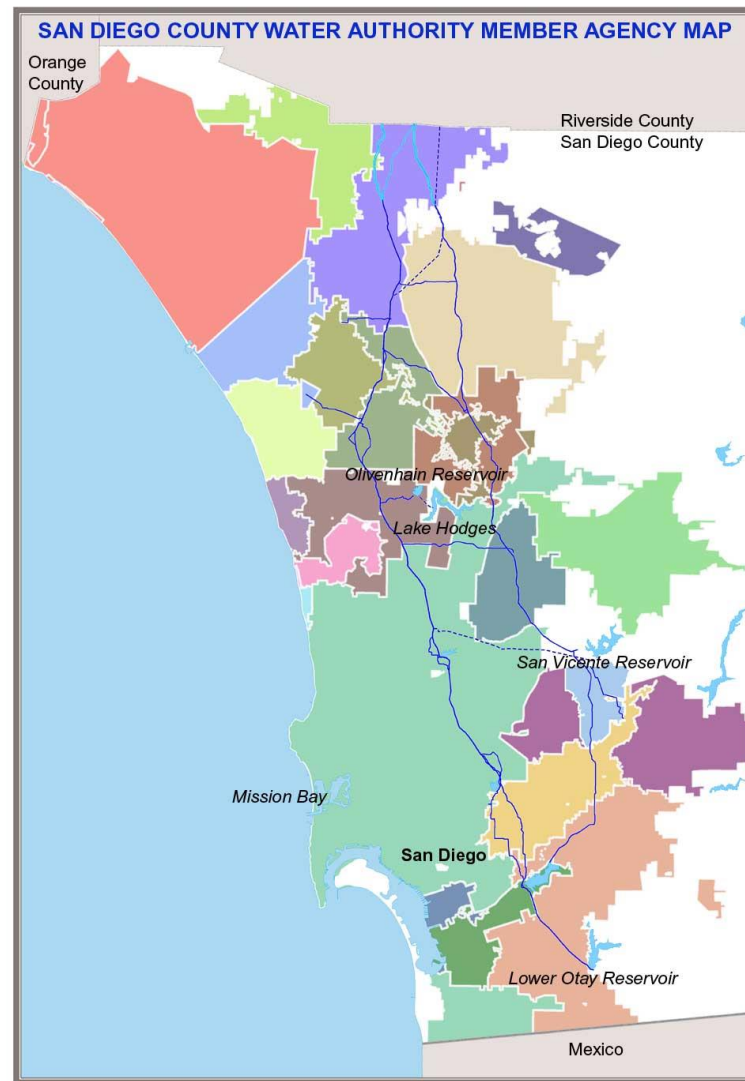
# San Diego County Water Authority

Wholesale water agency created by State Legislature in 1944

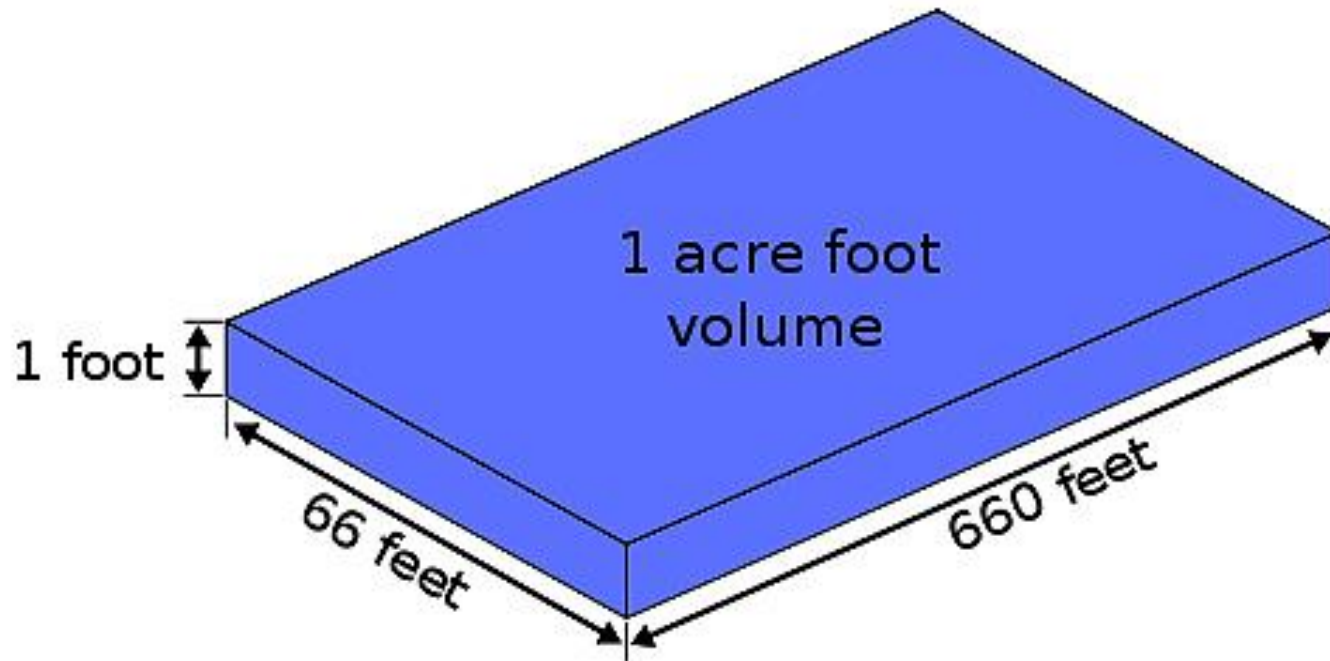
- ▶ 24 member agencies
- ▶ 36-member board of directors
- ▶ Serves 3.3 million people and region's \$222 billion economy

Provides 80%–90% of water used in San Diego County

- ▶ Added desalinated seawater to local supply in late 2015
- ▶ Builds, owns, operates and maintains large-scale regional water infrastructure



# Acre-Foot of Water (AF)



- ▶ 325,851 gallons (43,560 cubic feet)
- ▶ Enough to serve the annual needs of two single-family households of four people



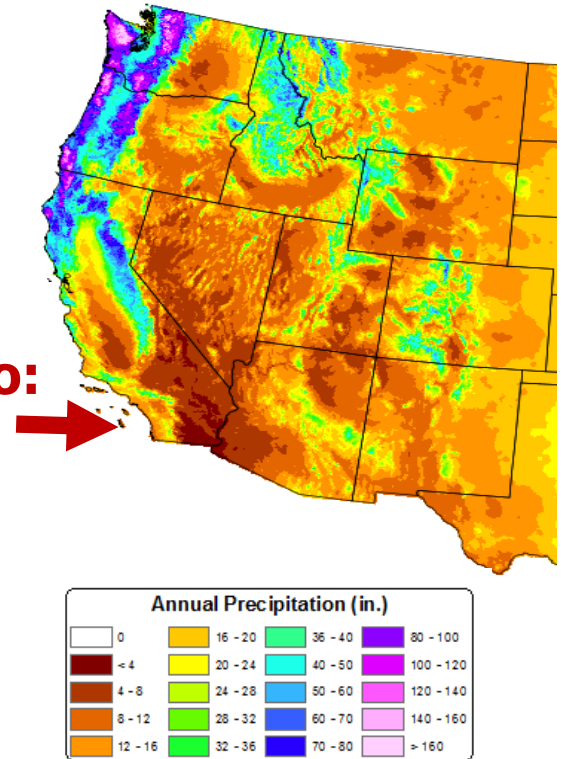
# San Diego Has Few Natural Water Assets

Very Little Groundwater



Very Little Rainfall

San Diego:  
10"



\*





# At the End of a Very Long “Pipeline”

## San Diego County's Water Supply Sources



(2012–2016 average)



# 1991-92: San Diego's Drought Crisis

## State to Shut Off Water Delivery to Southland

By VIRGINIA ELLIS  
and TED ROHRlich  
TIMES STAFF WRITERS

SACRAMENTO — Gov. Pete Wilson on Monday announced new and unprecedented cutbacks of state water deliveries so drastic that Southern California will be cut off from this traditional source mid-March.

Wilson said drought conditions state to notify ci

## Limits on tap water use urged by staff

By Steve LaRue  
Staff Writer

The staff of the San Diego County Water Authority (CWA) will continue to recommend a blanket ban of tap water on private lawns and golf course roughs and fairways despite intense opposition by landscaping contractors

## S.D. Faces 31% Cut in Imported Water Supply

By JENIFER WARREN  
TIMES STAFF WRITER

Faced with record-low rainfall and no prospects for relief, the Metropolitan Water District declared a water emergency on Tuesday and cut by 31% the amount of water it delivers to 27 agencies from Ventura to San Diego.

## 50% Water-Delivery Cut Will Be Blow to San Diego

■ **Drought:** Metropolitan Water District directors also vote a 90% cut in allocation for agricultural users.

## Water Dependence Bodes a Dry San Diego Future

■ **Drought:** A twisted history of water politics has left the county at the vulnerable end of the supply pipeline.

## Grim water outlook is getting even worse

By Steve LaRue  
Staff Writer

SACRAMENTO — Southern Californians are likely to be ordered to cut back their water consumption by an unprecedented 30 percent this spring unless more snow falls on the Sierra Nevada, the area's chief water official said yesterday.

# San Diego Civic Leaders “Never Again!” “No More Water Shortages!”

## State Water Project cuts off water to farms; urban slash expected

## L.A. Ready to Battle San Diego Over Water

■ **Conservation:** DWP officials weigh legal action as southern neighbor refuses to impose rationing.

## Water: Authority to Vote Today on Mandatory Restrictions

## Companies cringe at 50 percent cut in water

Firms offer conservation plans to mayor; some say cutbacks could cripple growth





# Water Supply Reliability

- Employ resource strategies unique to local conditions
- No single resource strategy can manage all uncertainties
- Multi-faceted approach required
  - Diversification
  - Water use efficiency
  - New supplies
    - Recycled water
    - Desalination
  - Infrastructure improvements
  - Regional storage
- Close coordination with member agencies



# Increasing San Diego County's Water Supply Reliability through Supply Diversification

**1991**

28 TAF

5%

550 TAF

95%

**Total = 578 TAF**

**2020\***

80 TAF

14%

43 TAF

7%

56 TAF

10%

33 TAF

6%

52 TAF

9%

8 TAF

1%

126 TAF

21%

190 TAF

32%

**Total = 588 TAF**

**2016**

79 TAF

17%

23 TAF

5%

27 TAF

6%

21 TAF

5%

18 TAF

4%

187 TAF

41%

100 TAF

22%

**Total = 455 TAF**

**2035\***

80 TAF

12%

57 TAF

8%

72 TAF

10%

36 TAF

5%

51 TAF

7%

110 TAF

16%

200 TAF

29%

88 TAF

13%

**Total = 694 TAF**

**(Region under State Mandated Water Use Restrictions)**



Metropolitan Water District



All American & Coachella Canal Lining



Seawater Desalination



Local Surface Water



Imperial Irrigation District Transfer



Recycled Water



Groundwater



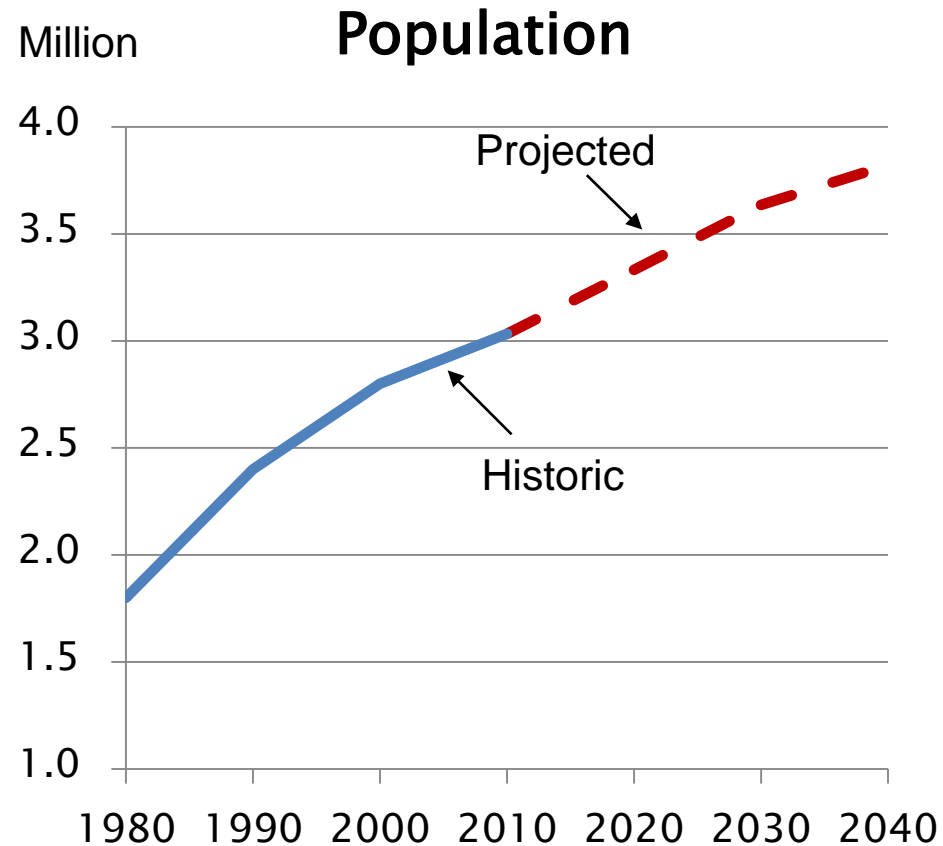
Potable Reuse

\* Includes verifiable and additional planned local supply projects from 2015 UWMP

(TAF=Thousand Acre-Feet)

# Water Authority Service Area Population Growth

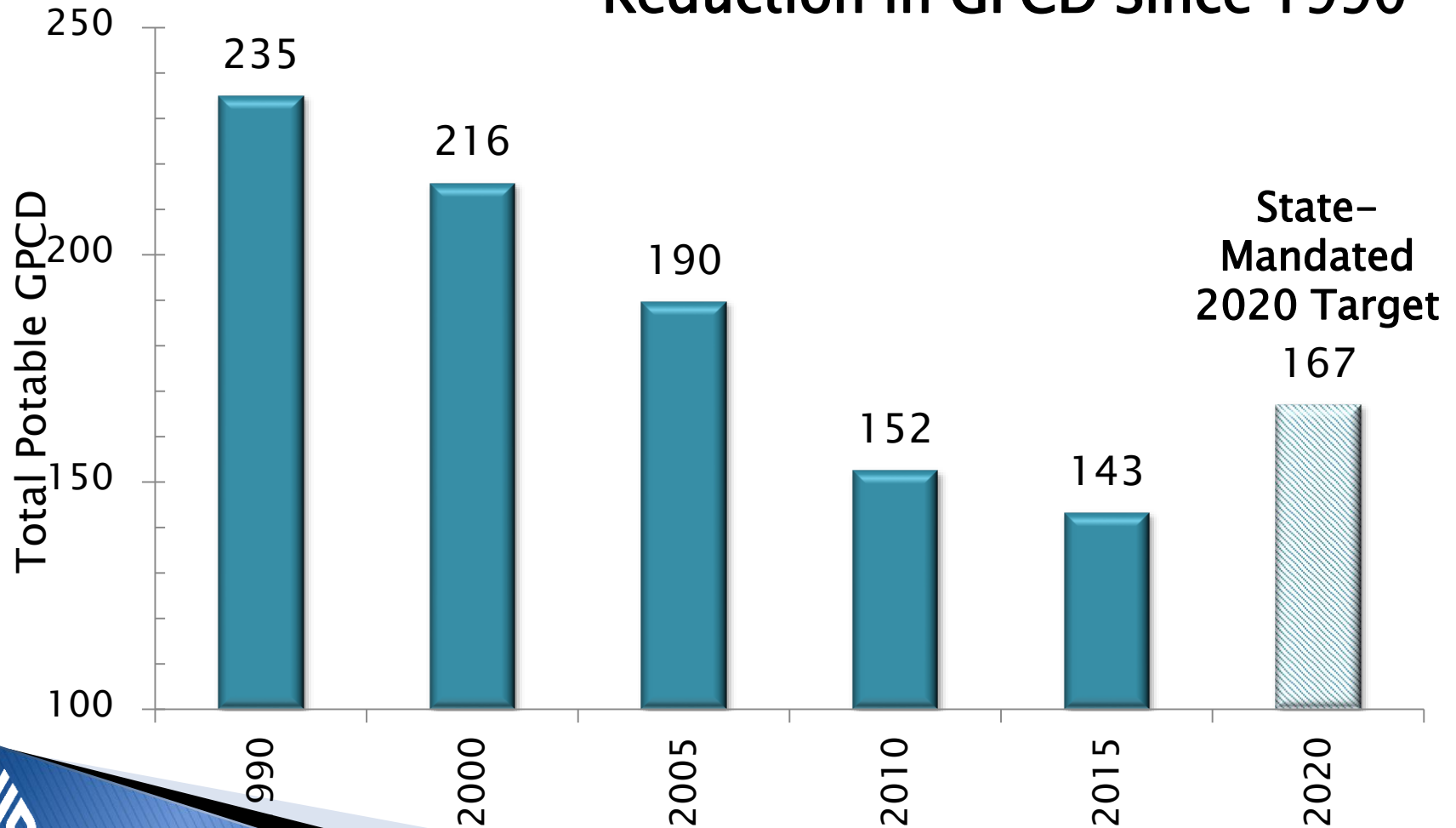
- Based on SANDAG Forecast
  - Series 13 projections
  - Includes 2010 Census results
- Additional 700,000 people from 2015 to 2040
- Population totals roughly 3.8 million by 2040
- 2/3 growth from in-region births over deaths



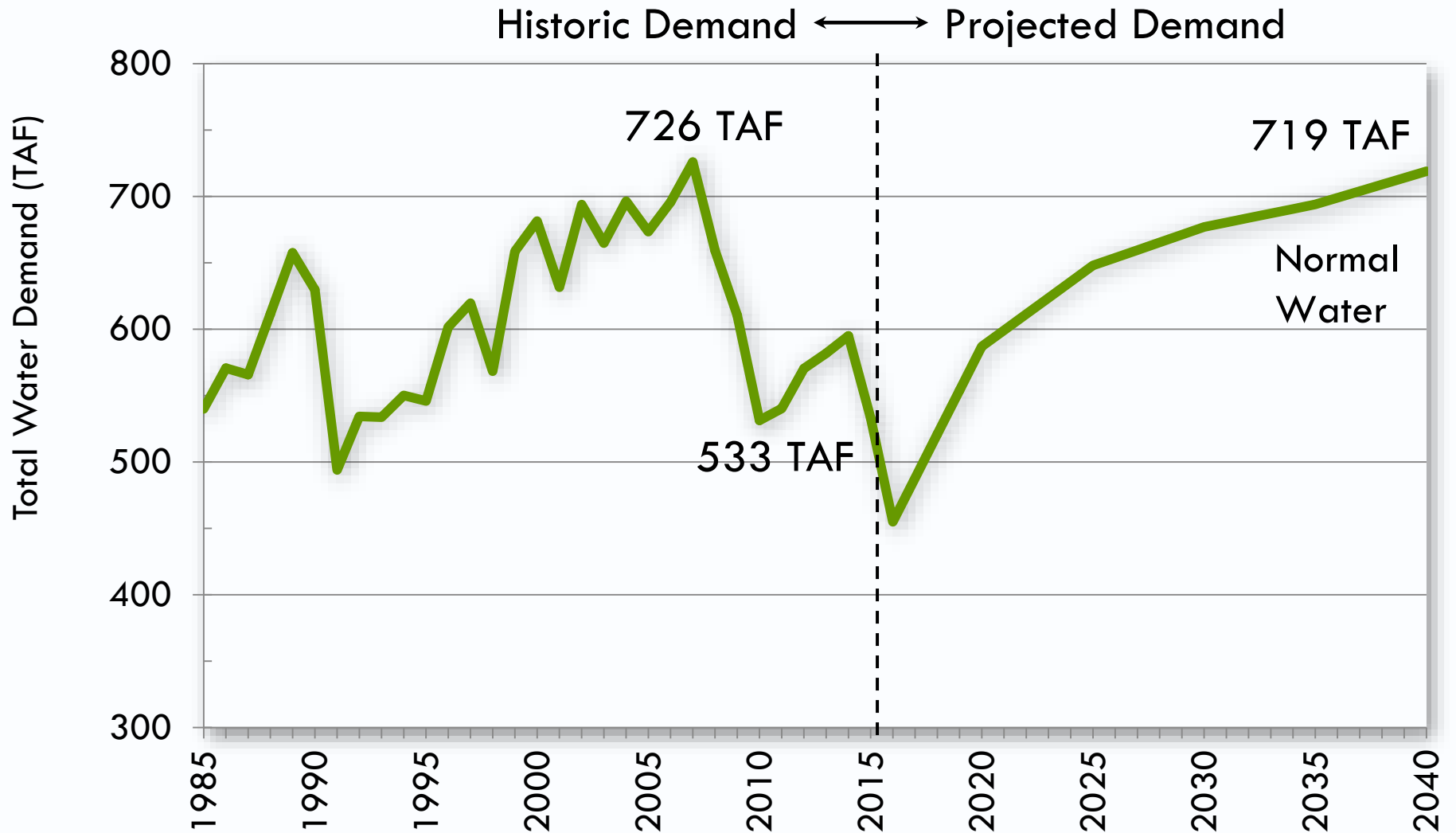


# “Making Conservation a Way of Life”

San Diego Region has seen 40%  
Reduction in GPCD Since 1990



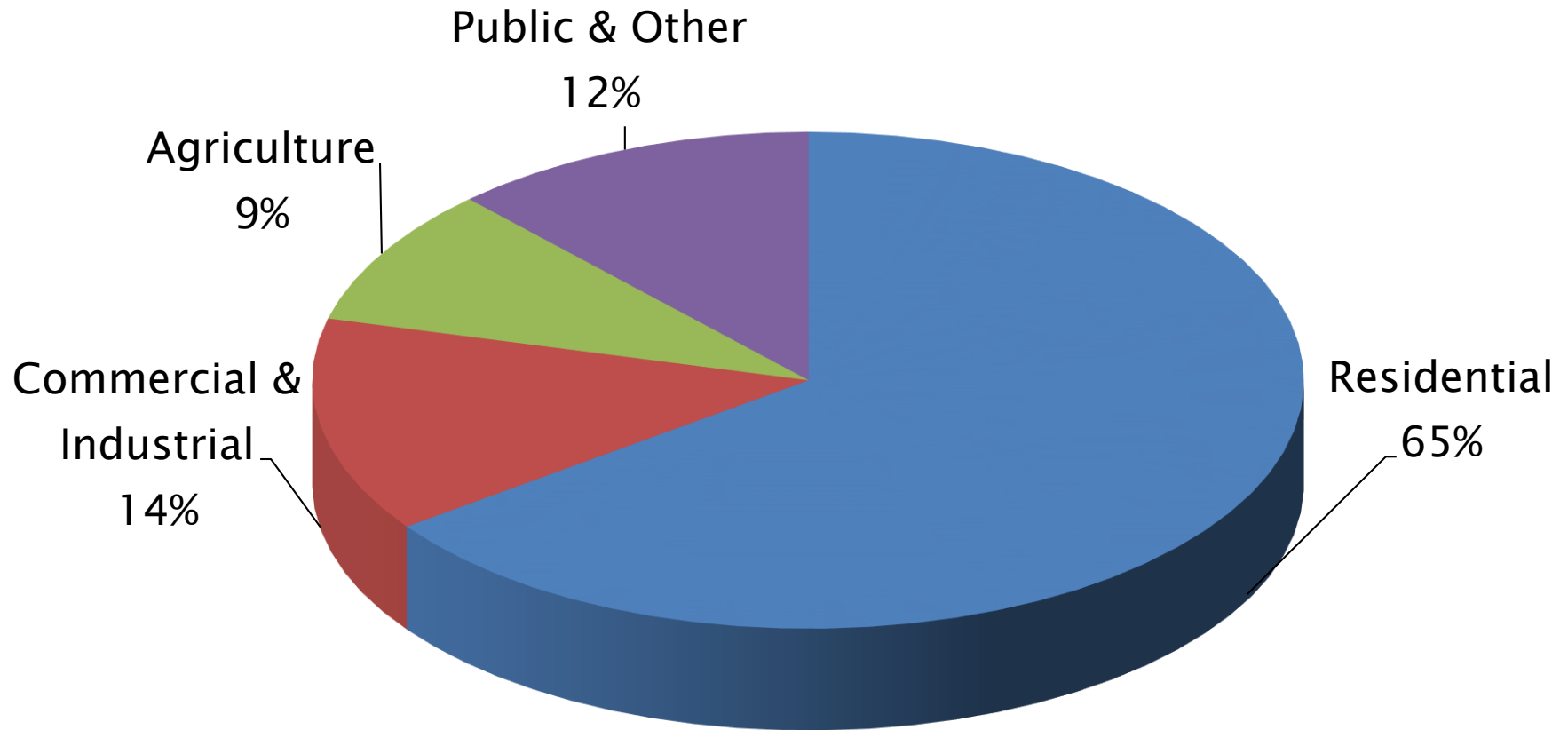
# Total Water Demands Within Water Authority Service Area



Includes Long-Term Water Use Efficiency

TAF= Thousand Acre-Feet

# San Diego County 2015 Water Use by Sector





# Historic Investments in Infrastructure

**San Vicente Dam Raise & Related Projects**  
\$816 million



**Carlsbad Seawater Desalination Projects**  
\$1 billion



Plant Site

**Olivenhain Dam & Reservoir**  
\$198 million



**Twin Oaks Valley Water Treatment Plant**  
\$179 million



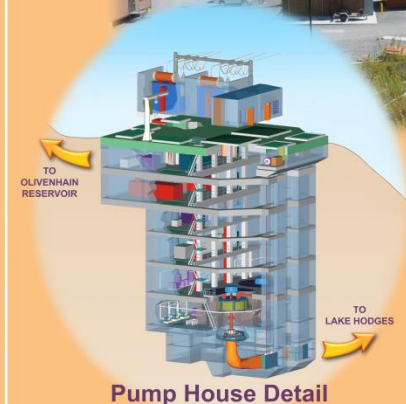
**All-American & Coachella Canal Lining Projects**  
\$447 million  
(\$190 million from Water Authority)



**Pipeline Relining**  
\$493 million



**Lake Hodges Projects**  
\$208 million



Pump House Detail

# Next Increment of Supply - Potable Reuse Sampling of Proposed Projects

Member Agency	2035 Estimated Yield (AF/YR)
City of San Diego	93,000
Padre Dam MWD	11,500
City of Oceanside	3,000
Santa Fe Irrigation District	1,000

**Padre Dam MWD's  
Advanced Water Purification Facility  
Demonstration Project**



**City of San Diego's  
Pure Water Facility  
Demonstration Project**





# Why Ocean Desalination?

- ▶ New, local water supply
- ▶ Reduces need for imported water
- ▶ Drought-proof supply
- ▶ Recognized by the State as a drought-resilient supply
- ▶ Improved water quality
- ▶ While more expensive than existing imported supplies, cost on par with other new, local water supplies
- ▶ Enhances regional supply reliability and local control
- ▶ Strong public support
- ▶ Complements water recycling



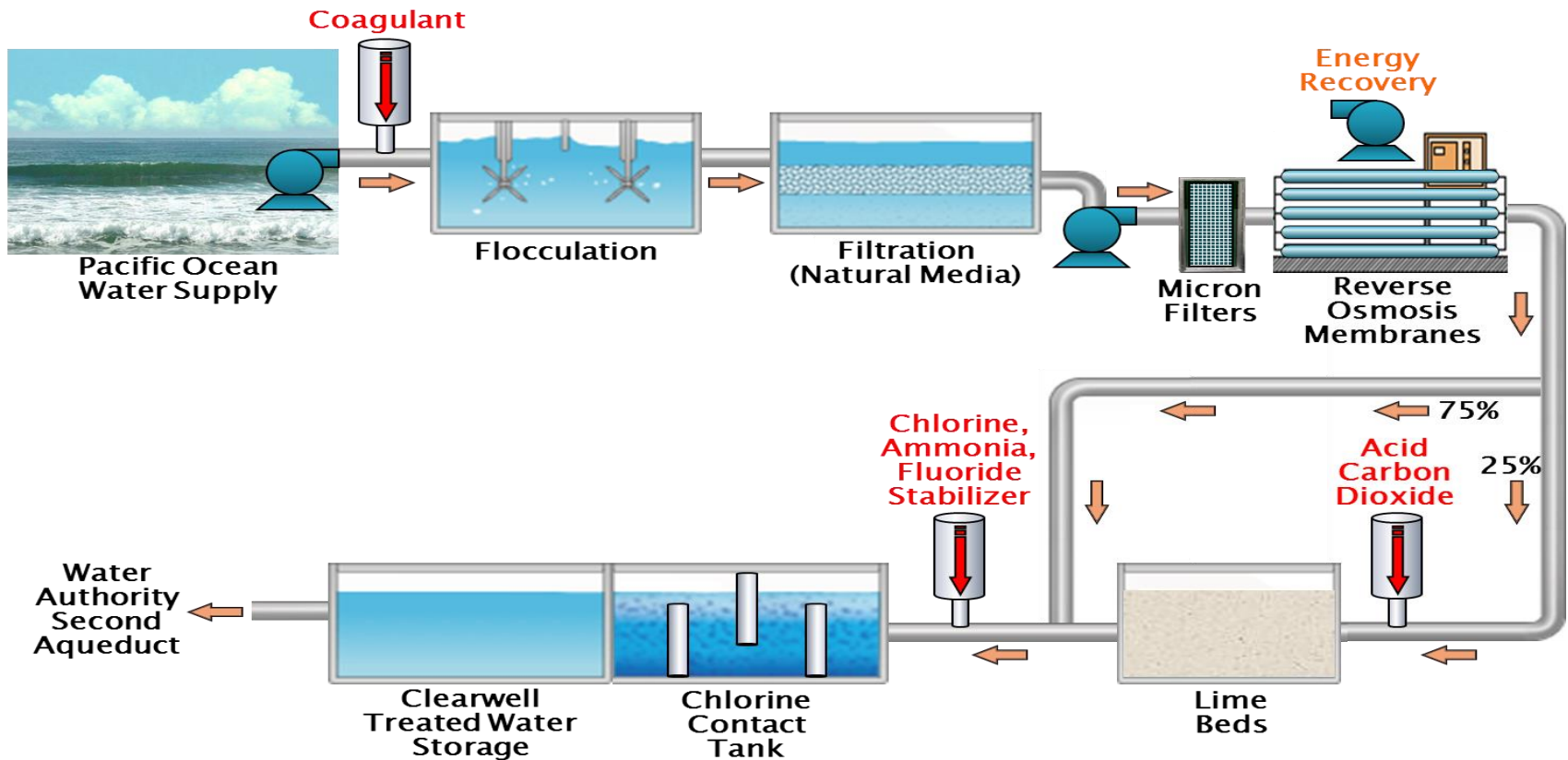


# Lewis Carlsbad Desalination Plant

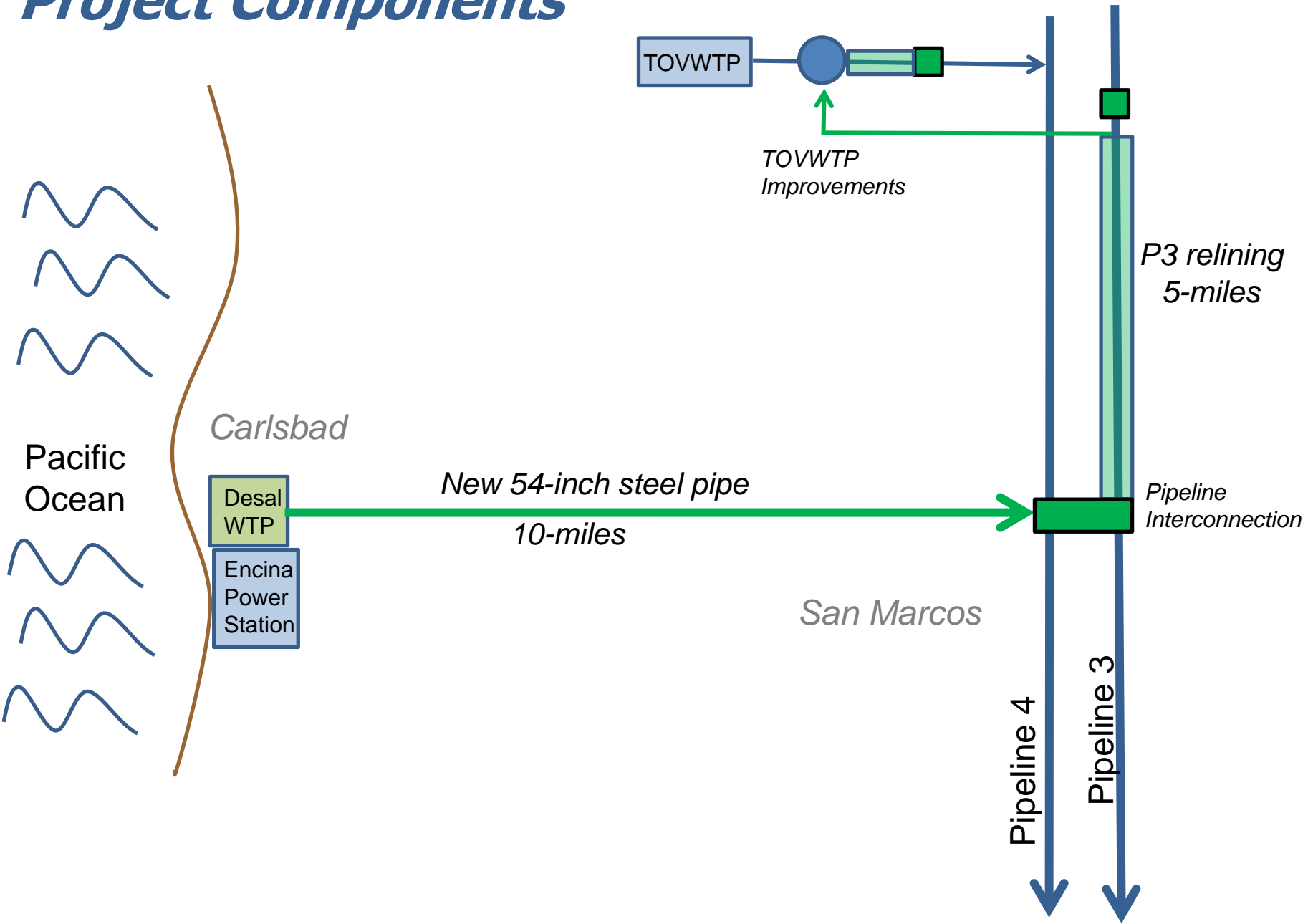
- Owned and operated by Poseidon Water
- 30 year contract
- \$1 billion investment
- 48,000-56,000 acre-feet/year of drought-proof supplies
- Largest, most advanced seawater desalination facility in North America
- On-line in December 2015



# Lewis Carlsbad Desalination Plant – “How it Works”



# Project Components





# Reverse Osmosis System





# ***Total Project Costs***

## **Total Capital Cost**

Total desalination plant	\$537 million
Total conveyance pipeline	\$159 million
Financing costs	\$227 million
Water Authority improvements and oversight	\$80 million
<b>Total Capital Costs</b>	<b>\$1.003 billion</b>

## **2016/17 water purchase price\* (includes pipeline)**

\*Current estimate based on highest electricity rate applicable

<b>56,000 acre-feet per year</b>	<b>48,000 acre-feet per year</b>
<b>\$2,125/AF</b>	<b>\$2,368/AF</b>

# Landmark Water Purchase Agreement between the Water Authority and Poseidon

- ▶ Water Authority Board approved WPA on Nov 29, 2012
- ▶ Outlines commercial and financial terms for production and delivery of water from the Carlsbad Desalination Project
- ▶ Transfers risk to private developer
  - Permitting
  - Design liability
  - Cost overruns
  - Operations
  - Must meet water quality requirements



# The Carlsbad Project: A Successful Public Private Partnership (P3)

- ▶ ***Risk Transfer*** to Poseidon/Contractor team
- ▶ ***Price certainty*** throughout Water Purchase Agreement term
- ▶ ***Buy-out provisions*** after 10 years of operation
- ▶ ***Transfer to public ownership*** at the end of the 30 year agreement



# Project Financing Structure

- ▶ 82% funded through Bonds issued via the California Pollution Control Financing Authority
  - Plant Bonds issued as Tax-Exempt Private Activity Bonds with Poseidon as sponsor
  - Pipeline Bonds issued as Tax-Exempt Governmental Purpose Bonds with the Water Authority as sponsor
  - Bonds sold on December 24, 2012
  - Interest rate 4.78%
- ▶ 18% Cash Equity from Stonepeak Infrastructure





# Project Delivery by P3

## ▶ Pros:

- Risk transfer to the private sector
- Speed (design and construction can proceed concurrently)
- A commodity purchase with defined terms and conditions
- Performance guarantees
- Approval rights over acceptance/performance testing
- Debt is kept off the public agency balance sheet

## ▶ Cons:

- Take or Pay contract
- Higher cost of capital
- Greater overall transactional complexity
- Limited public agency input regarding design, construction and operations
- Public agency does not have a direct relationship with contractors



# Status of Plant Operations

- ▶ Began commercial operations on December 23, 2015
- ▶ Over 21 billion gallons of desalinated ocean water produced to date
- ▶ Permitting and procurement under way for planned intake and discharge modifications



# A Balanced Approach is Required to Manage Supply Shortages

www.psdgraphics.com



- Provides more resiliency in times of shortages
- Protects economy and quality of life in San Diego County





# Thank You!



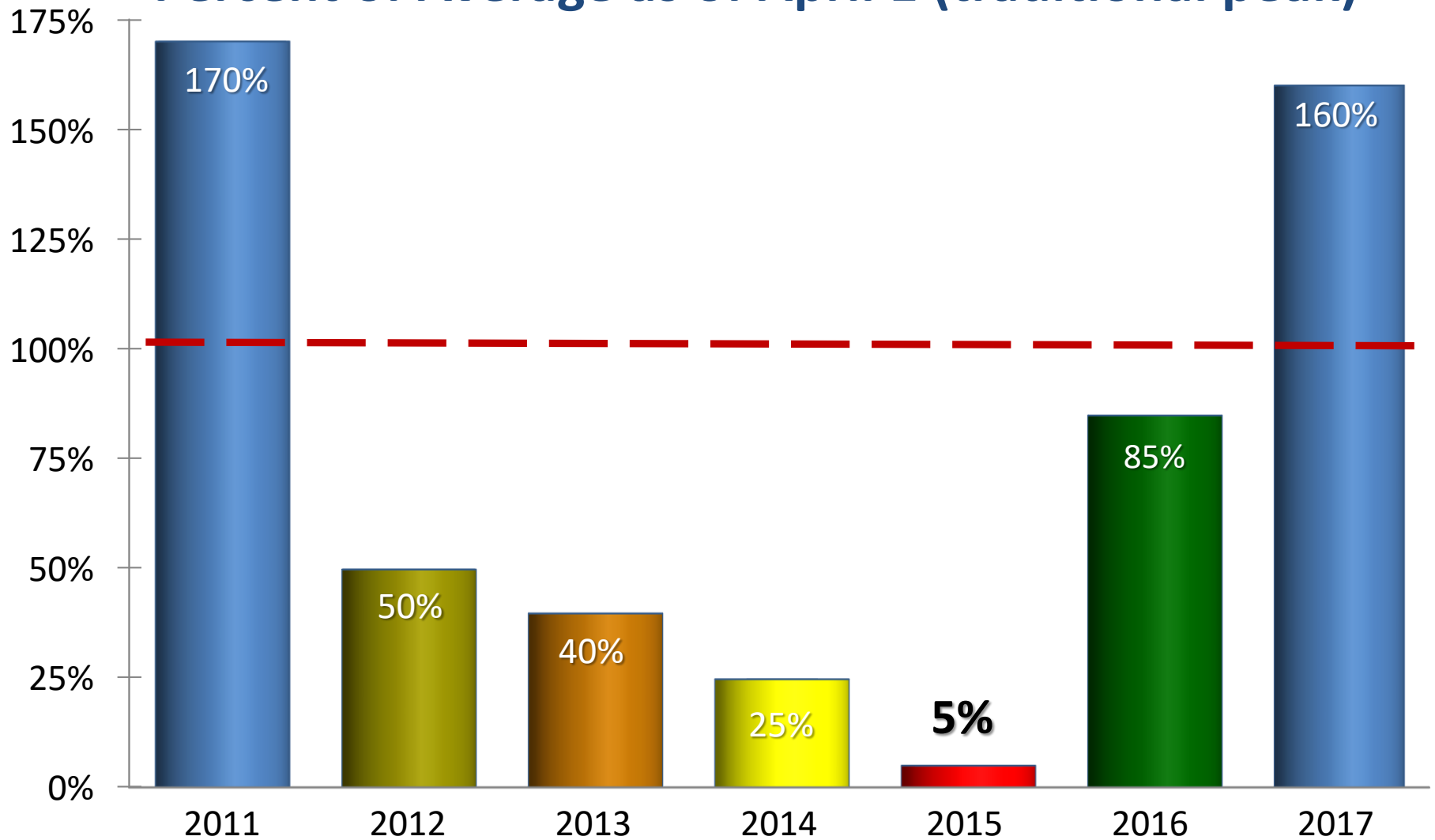
San Diego County  
Water Authority



# California's Five-Year Drought (2012-2016)

## Snow Water Content – Northern Sierra

Percent of Average as of April 1 (traditional peak)



**Lake Oroville (State Water Project)  
Final Year of Drought  
January 21, 2016 (Bidwell Canyon Marina)**





**Lake Oroville (State Water Project)  
Beginning of Wet Year  
January 21, 2017 (Bidwell Canyon Marina)**



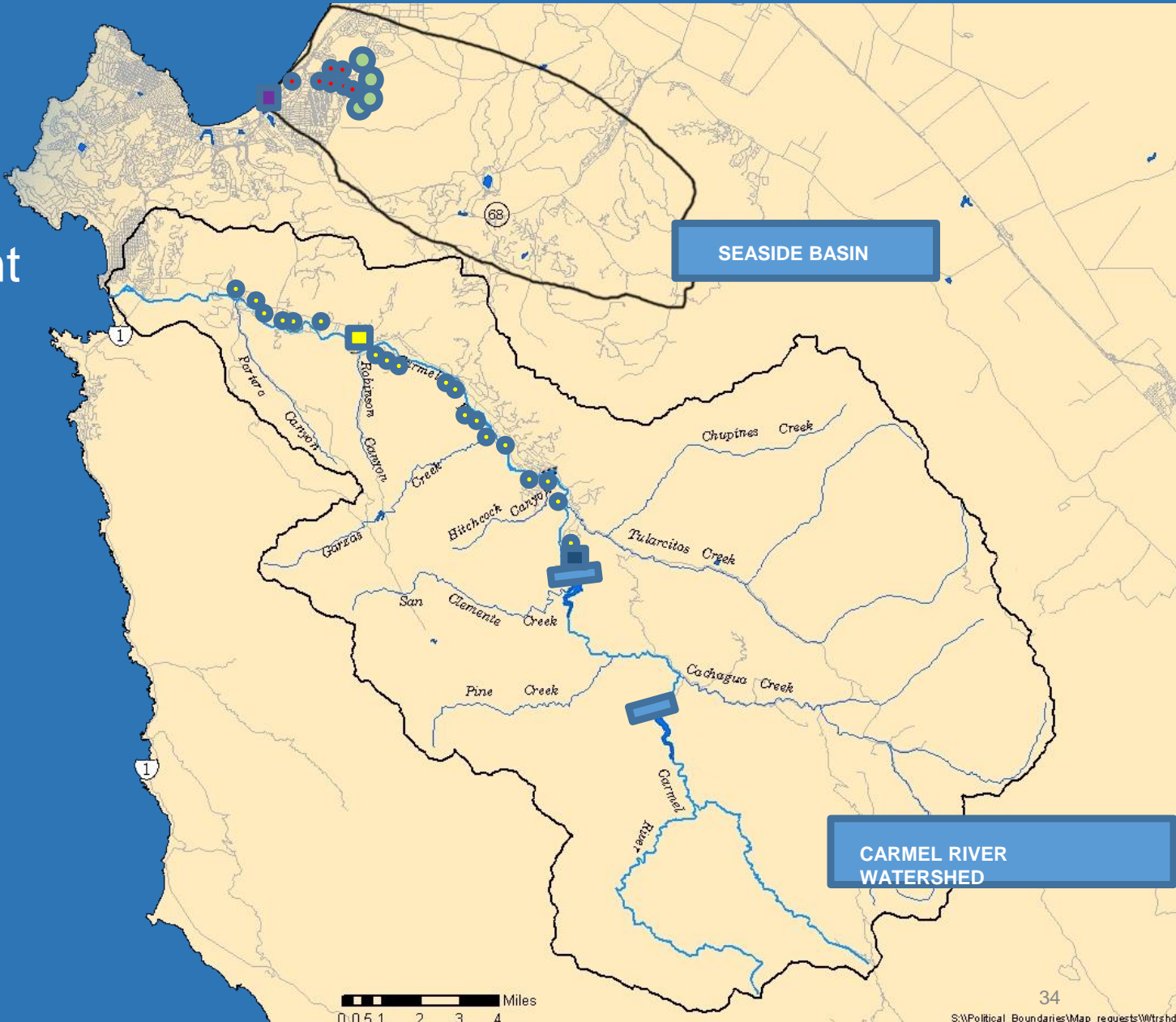
# MONTEREY PENINSULA WATER SUPPLY PROJECT & HISTORICAL CONTEXT

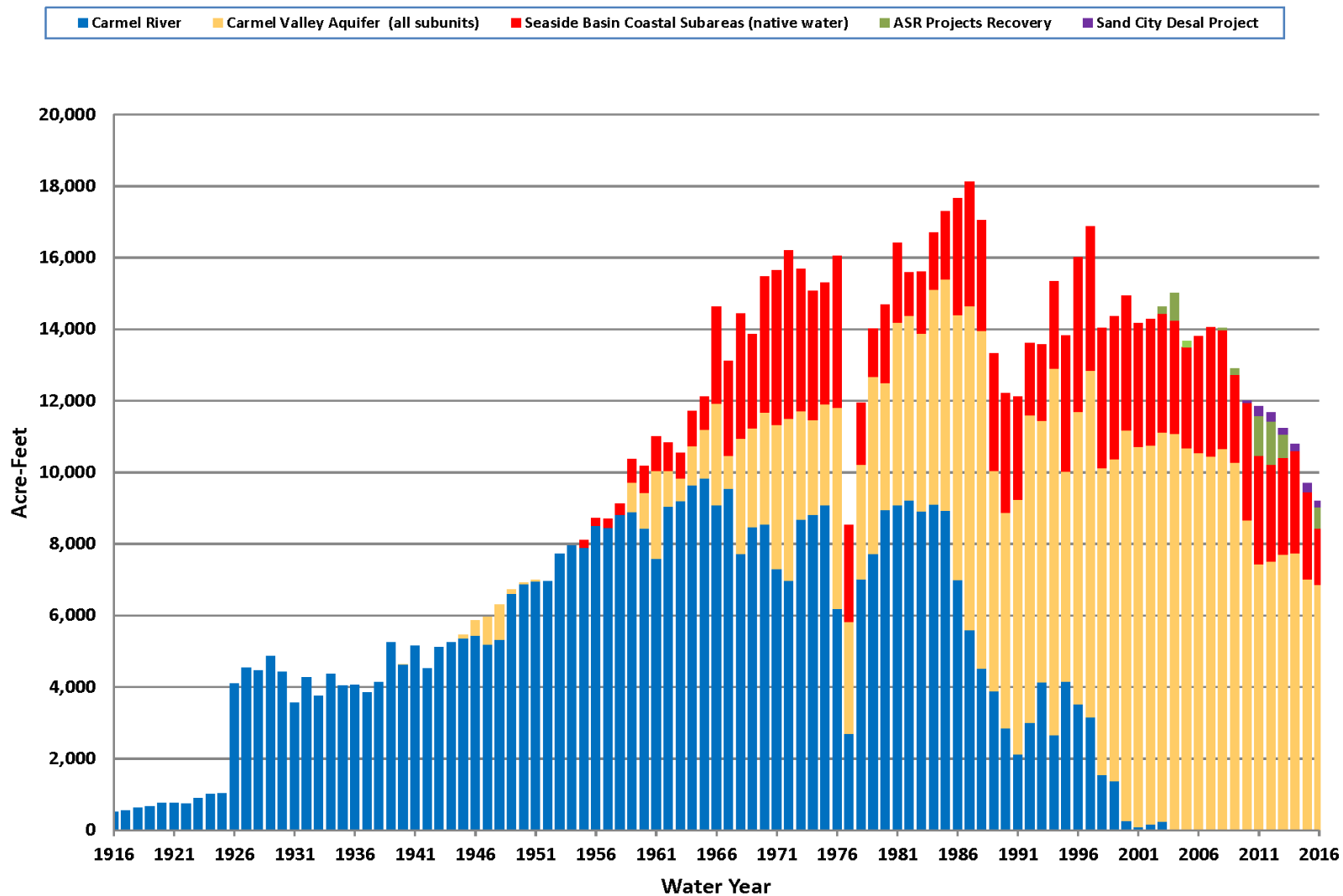




# MONTERE WATER SUPPLY

1880 – present





1916-2016

CAL AM WATER  
PRODUCTION

MAIN SYSTEM BY  
SOURCE

AUGUST  
1977

Severe  
drought

- Inflow was approximately 4% of the long-term average

SEPTEMBER  
1992

Drought

JUNE  
1995

SWRCB  
issues order  
95-10

AUGUST  
1997

Steelhead  
listed as  
“threatened”

OCTOBER  
2009

Cease and  
Desist Order

DECEMBER  
2010

CPUC approves  
Regional Desal  
project

APRIL  
2012

MPWSP  
application filed  
with CPUC

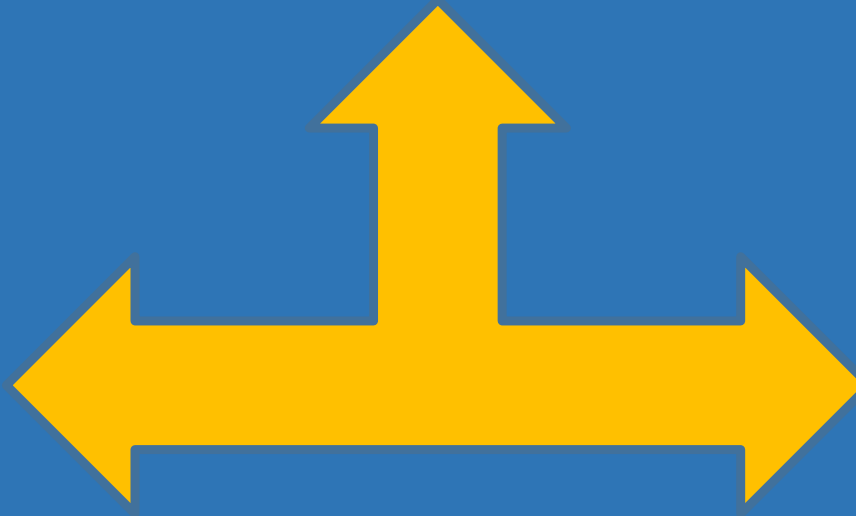
## Monterey Peninsula Water Supply Project (MPWSP)

**DESALINATION**

6,252 AF

**GW**  
ground water  
replenishment

3,500  
AF



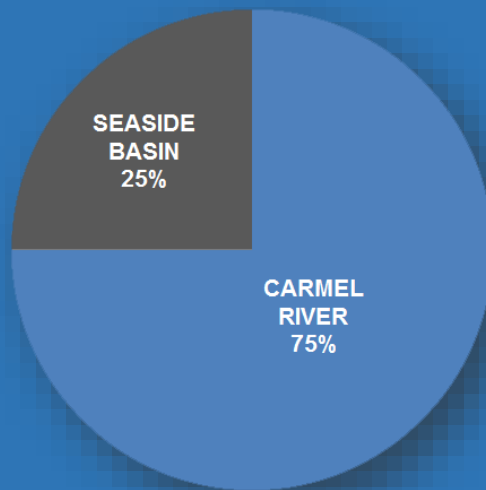
1,300 AF

**ASR**  
aquifer storage  
and recovery

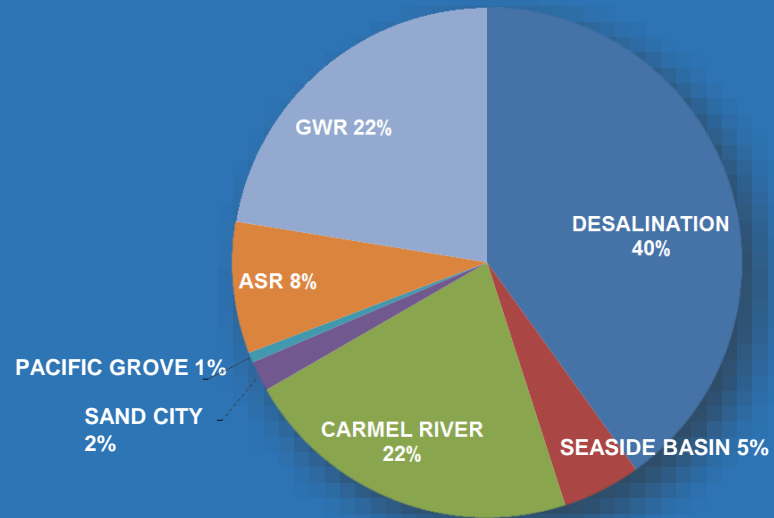


# WATER SOURCES

TODAY/TOMORROW

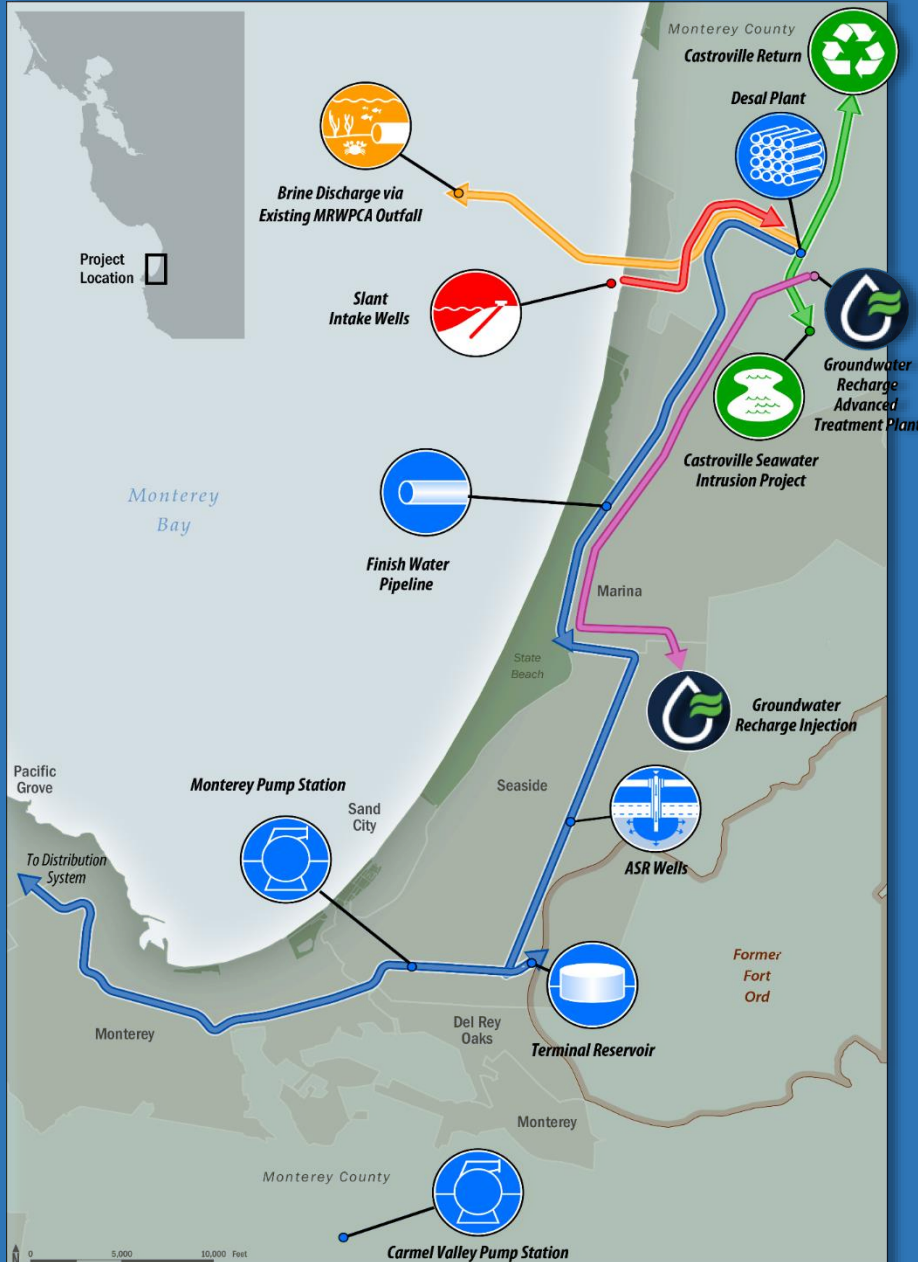


**HISTORIC WATER  
SOURCES**



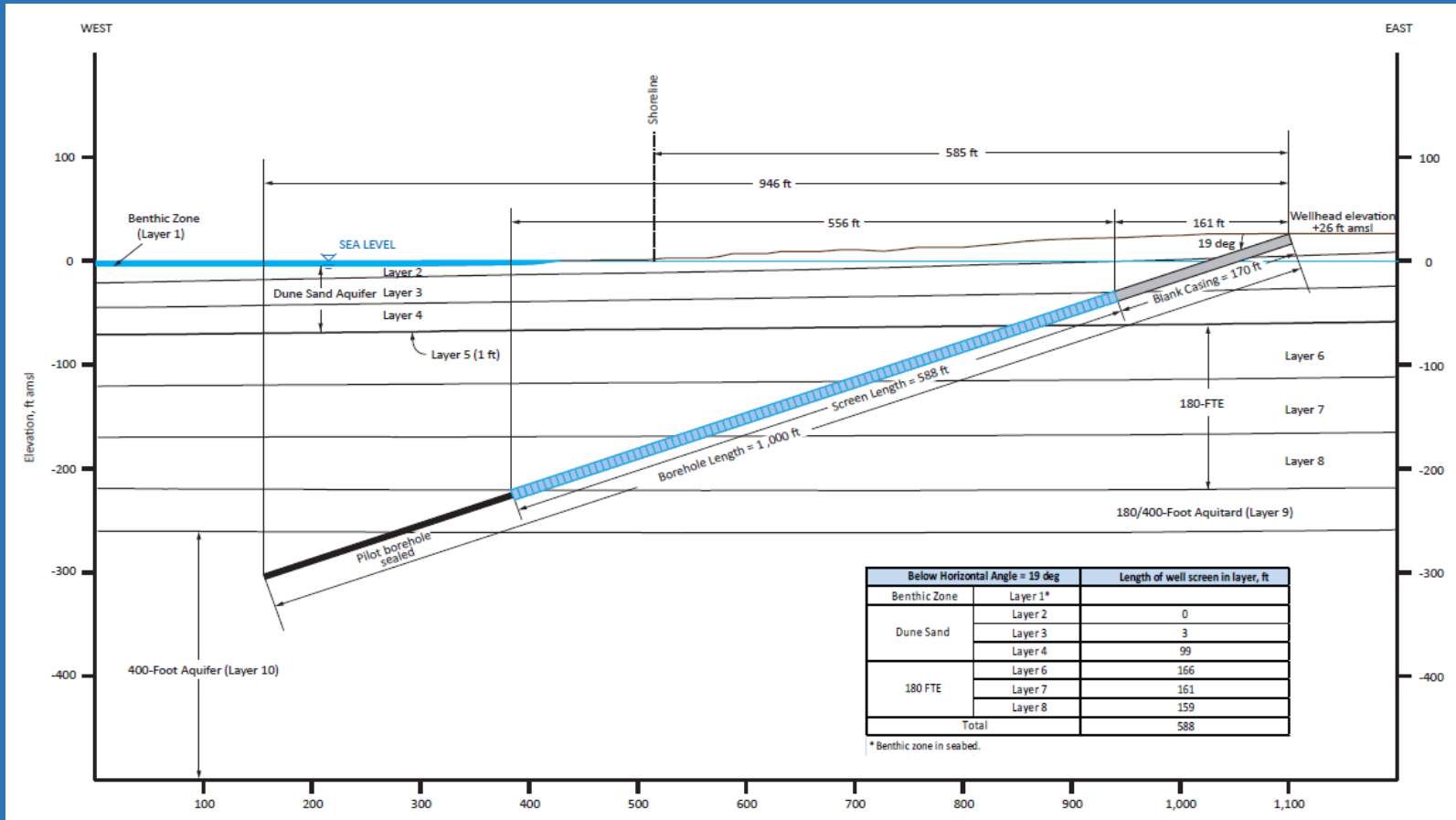
**FUTURE WATER  
SOURCES**

# PROJECT OVERVIEW



Project Component	Cost (M) 9.6 MGD	Cost (M) 6.4 MGD
Desal Plant	\$124	\$115
Pipelines, Terminal Reservoir & BPS	\$128	\$128
Intake Wells & Return Systems	\$86	\$79
<b>Total Cost</b>	<b>\$338</b>	<b>\$322</b>

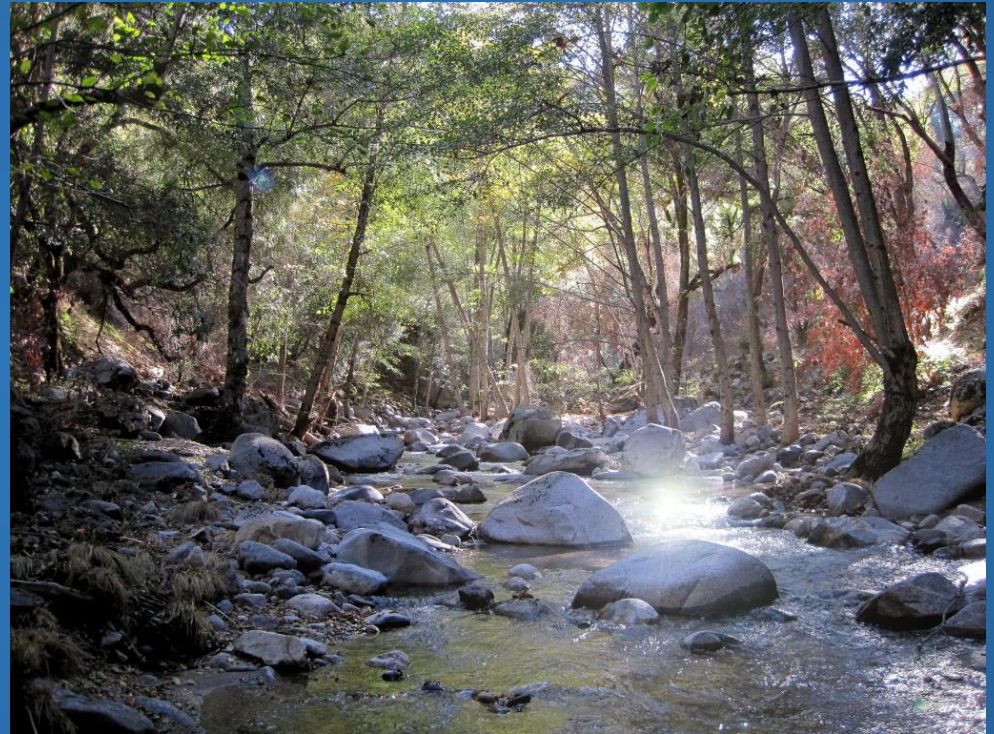
# SLANT WELL PROFILE



# WATER PROJECT

## KEY BENEFITS

- ▶ **RESTORES** CARMEL RIVER
- ▶ **REPLENISHES** SEASIDE BASIN
- ▶ **MINIMIZES** OCEAN LIFE IMPACT
- ▶ **SEEKS** GREEN ENERGY SOURCES

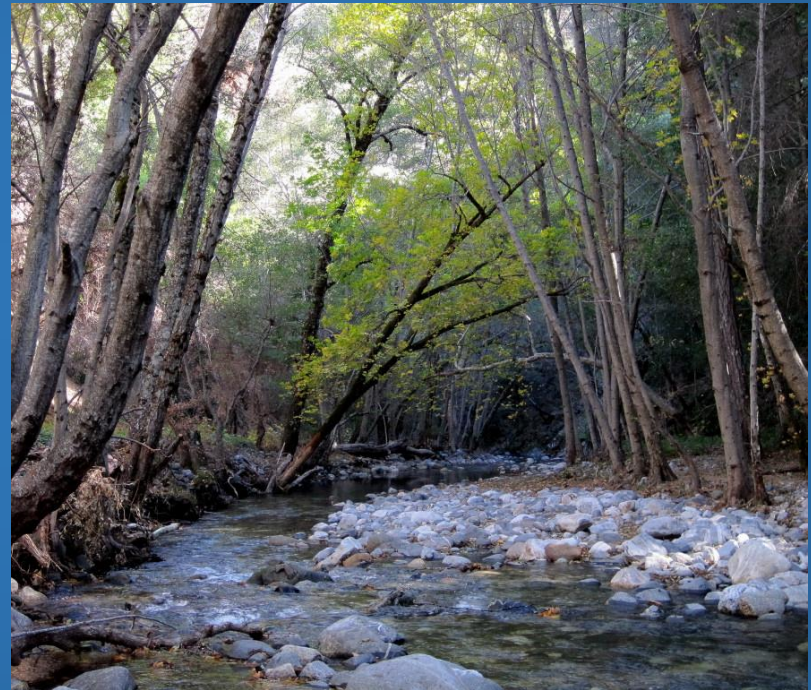




# PUBLIC PARTICIPATION

- ▶ Governance
- ▶ Public investment – reduce cost
- ▶ Environmental – slant wells,
- ▶ Salinas Basin – aquifer modeling, Hydro
- ▶ Working Group – 16-party  
Consensus settlement

- CALIFORNIA AMERICAN WATER
- CITIZENS FOR PUBLIC WATER
- CITY OF PACIFIC GROVE
- COALITION OF PENINSULA BUSINESSES
- COUNTY OF MONTEREY
- DIVISION OF RATEPAYERS ADVOCATES
- LANDWATCH MONTEREY COUNTY
- MONTEREY COUNTY FARM BEREAU
- MONTEREY COUNTY WATER RESOURCES AGENCY
- MONTEREY PENINSULA REGIONAL WATER AUTHORITY
- MONTEREY PENINSULA WATER MANAGEMEN DISTRICT
- MONTEREY REGIONAL WATER POLLUTION CONTROL AGENCY
- PLANNING AND CONSERVATION LEAGUE
- SALINAS VALLEY WATER COALITION
- SIERRA CLUB
- SURFRIDER FOUNDATION

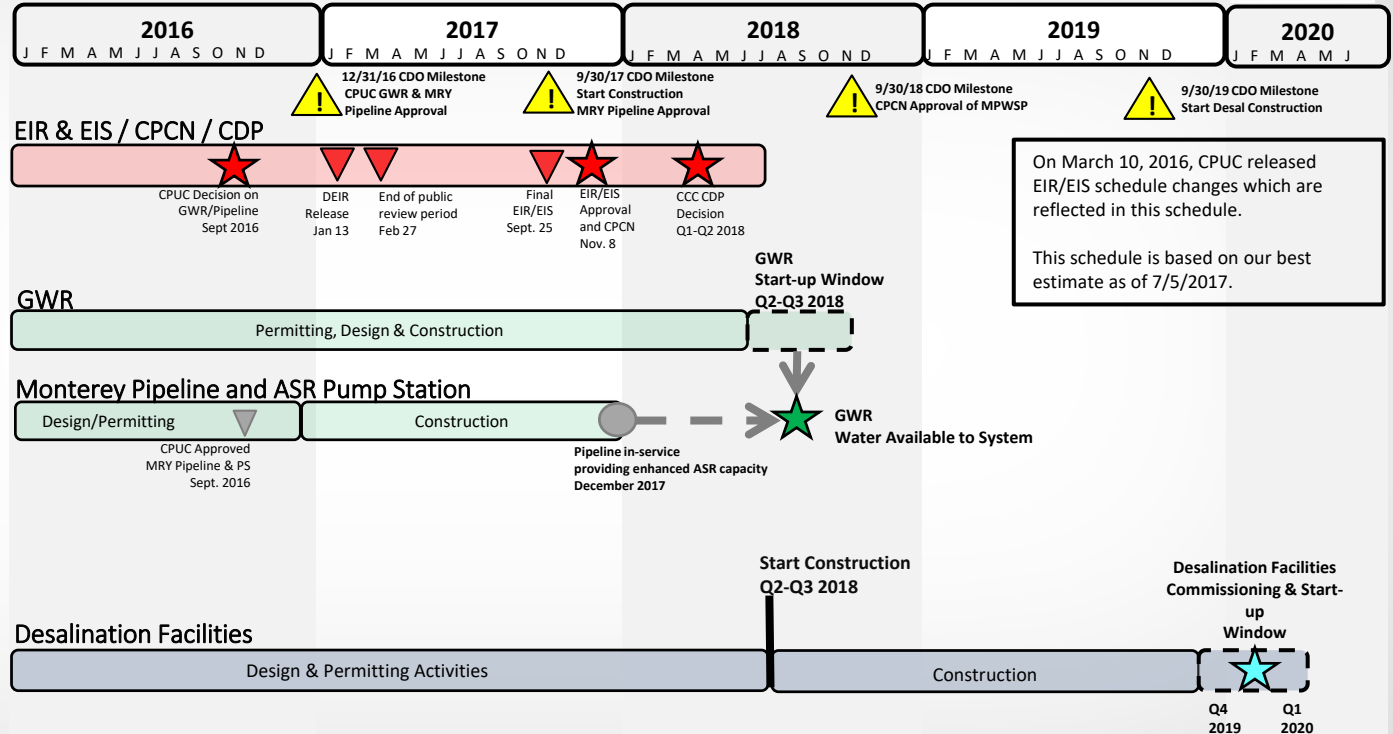


# QUESTIONS



# MPWSP SCHEDULE

## MPWSP Anticipated Schedule



Note: The schedule is based on the information and assumptions available at time of update and is accurate to +/-6 months.



# QUESTIONS





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