



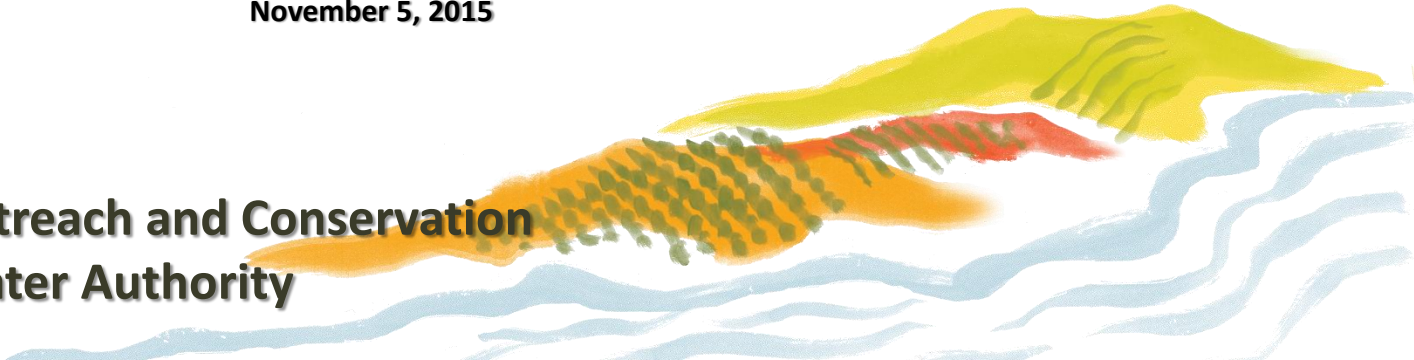
# How San Diego Prepared for this Drought... ...and the Next One, and the Next One

Index Fresh Seminar Series: California  
Water Issues  
November 5, 2015

**Jason Foster**



**Director of Public Outreach and Conservation**  
**San Diego County Water Authority**





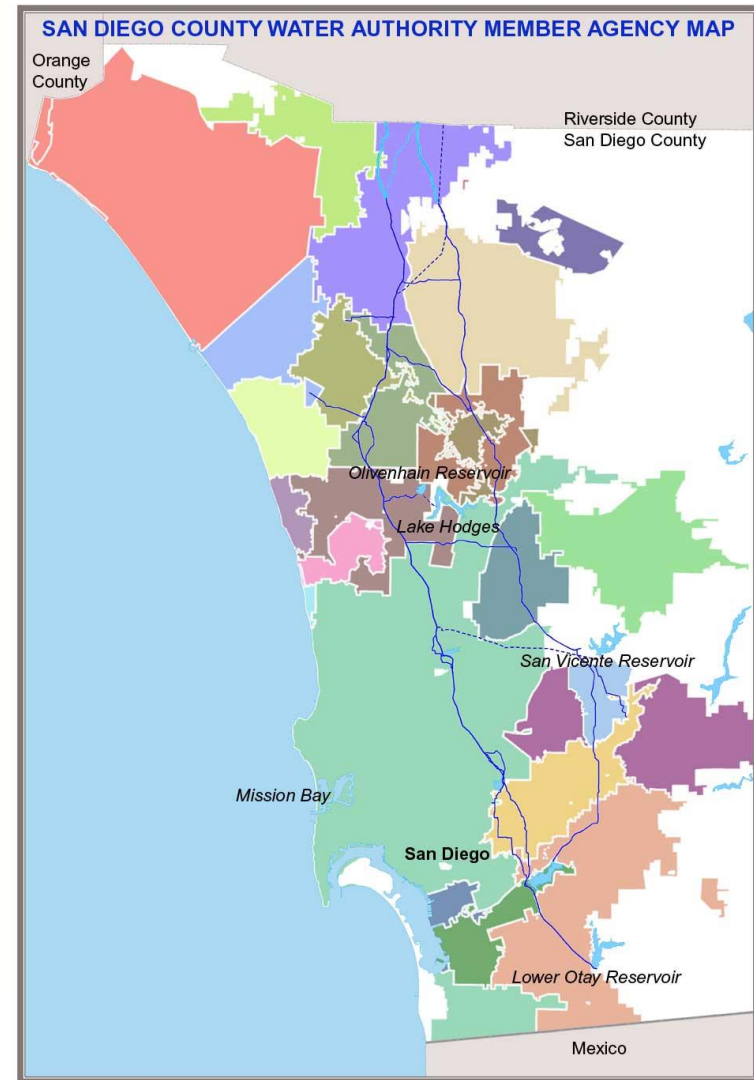
### SAN DIEGO COUNTY WATER AUTHORITY

Wholesale water agency created by  
State Legislature in 1944

- ▶ 24 member agencies
- ▶ 36-member board of directors
- ▶ Serves 3.2 million people and region's \$218 billion economy

Imports 80%-90% of water used in  
San Diego County

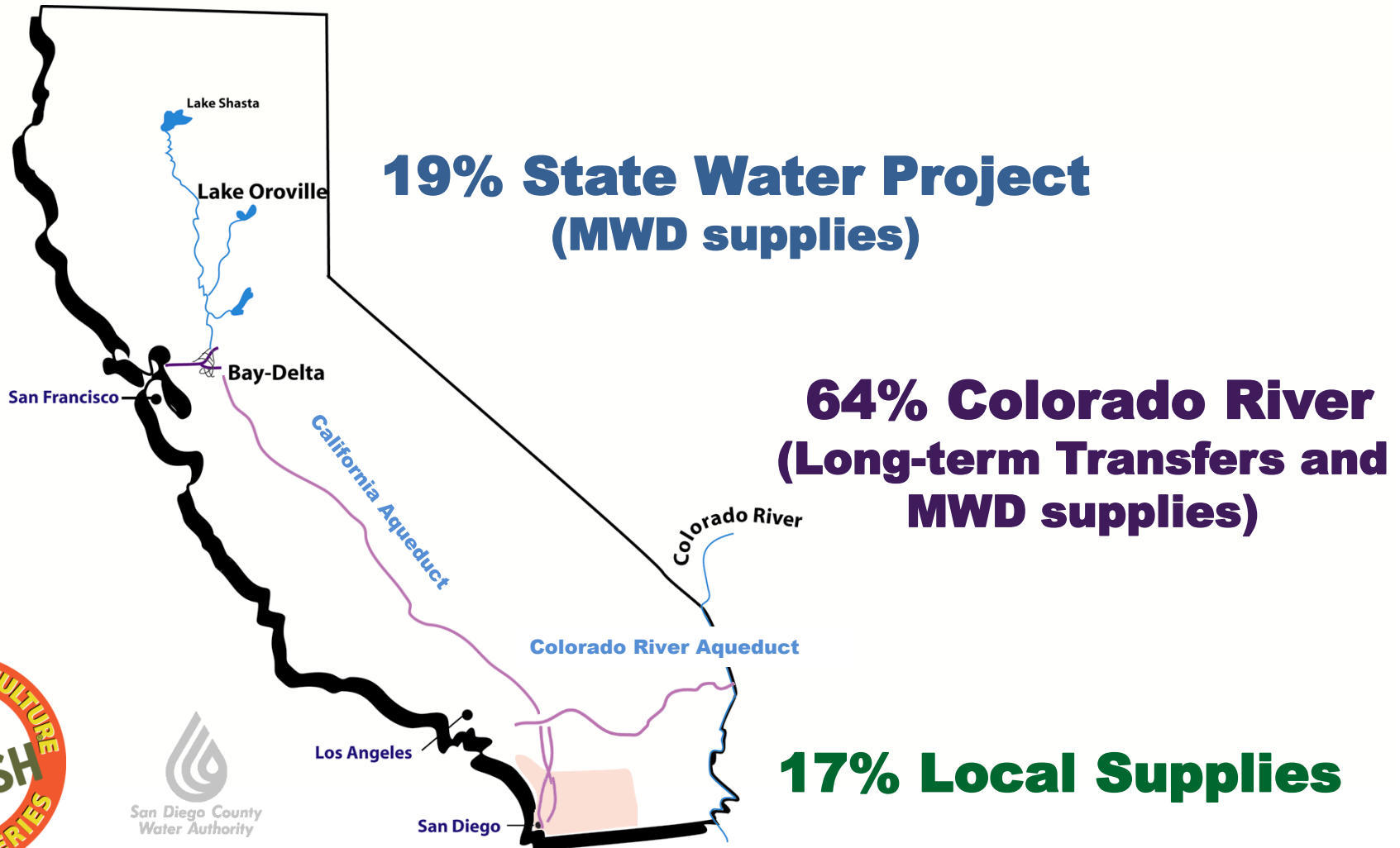
- ▶ Builds, owns, operates and maintains regional water infrastructure
- ▶ Largest member agency of Metropolitan Water District of Southern California





### We're at the End of a Very Long "Pipeline"

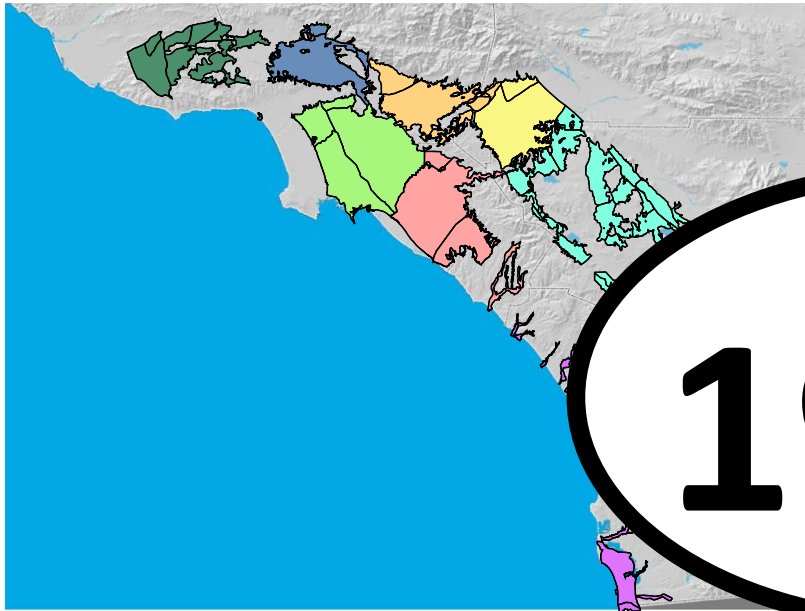
Sources of San Diego County's Water Supply (2010-2014 five-year average)



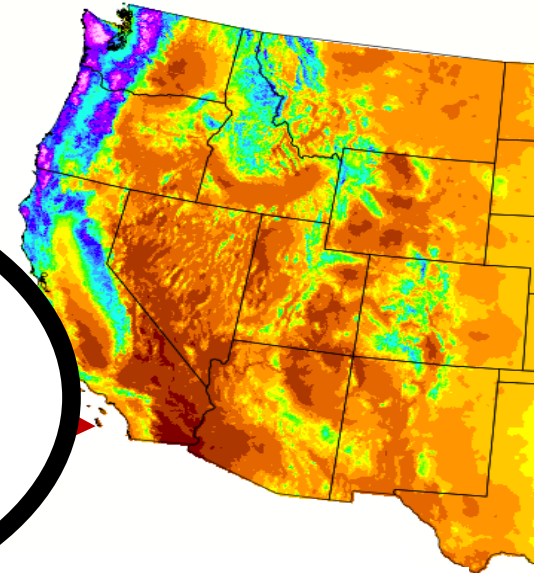


### SAN DIEGO HAS FEW NATURAL WATER ASSETS

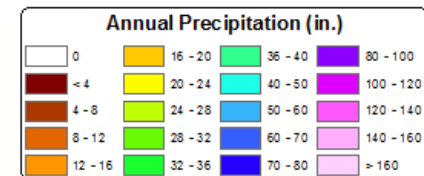
Very Little Groundwater



Very Little Rainfall



1946

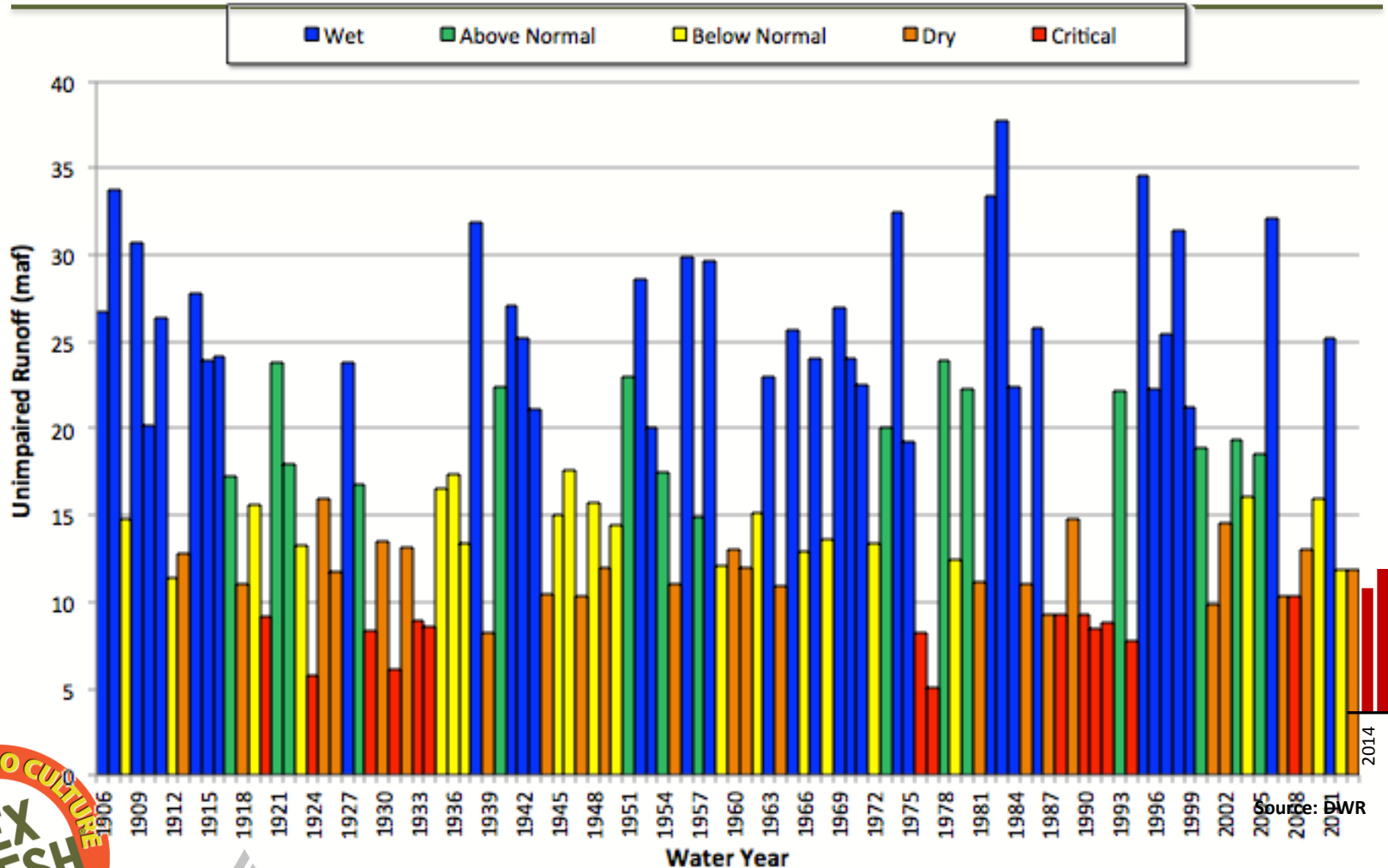


\*10-year average, 2005-2014



### DROUGHTS ARE COMMON IN CALIFORNIA

#### SACRAMENTO RIVER UNIMPAIRED RUNOFF THROUGH 2015



Source: DWR

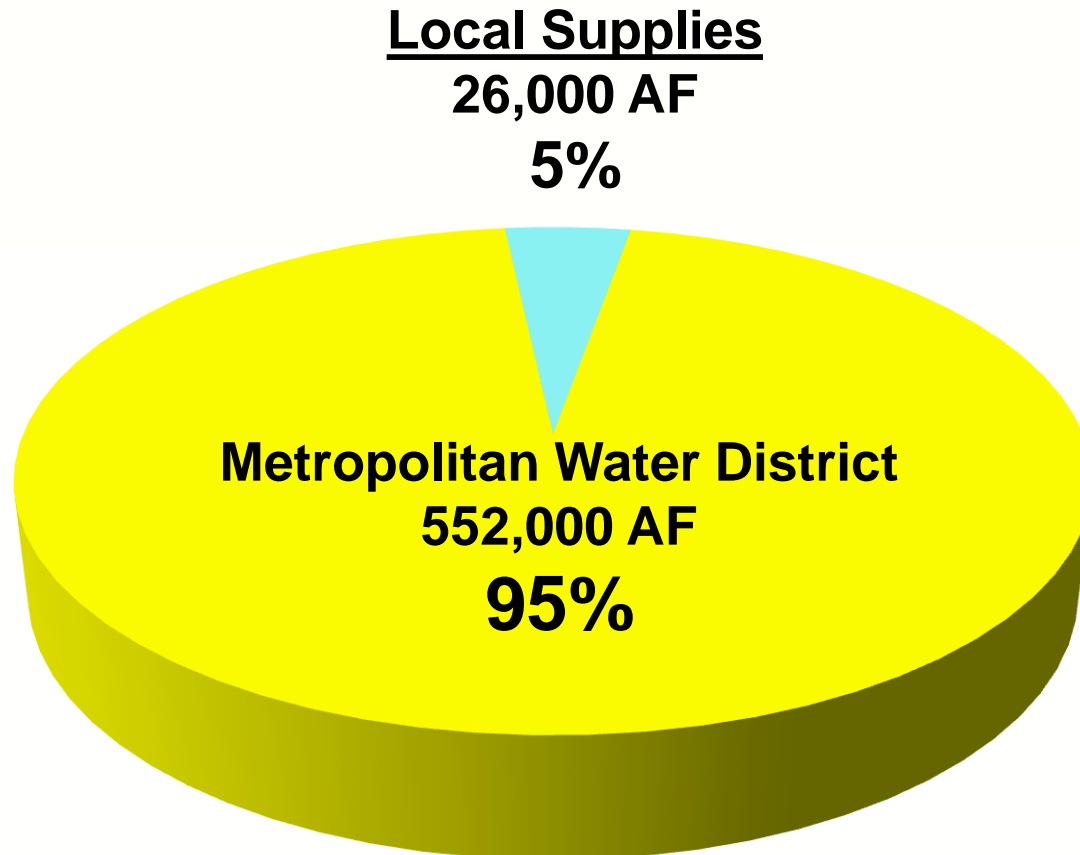


San Diego County  
Water Authority

Sacramento River Runoff is the sum of Sacramento River flow at Bend Bridge, Feather River inflow to Lake Oroville, Yuba River flow at Smartville, and American River inflow to Folsom



### SAN DIEGO COUNTY WATER SUPPLY 1991



**Total = 578,000 AF**



# 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.

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

**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.

## 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.

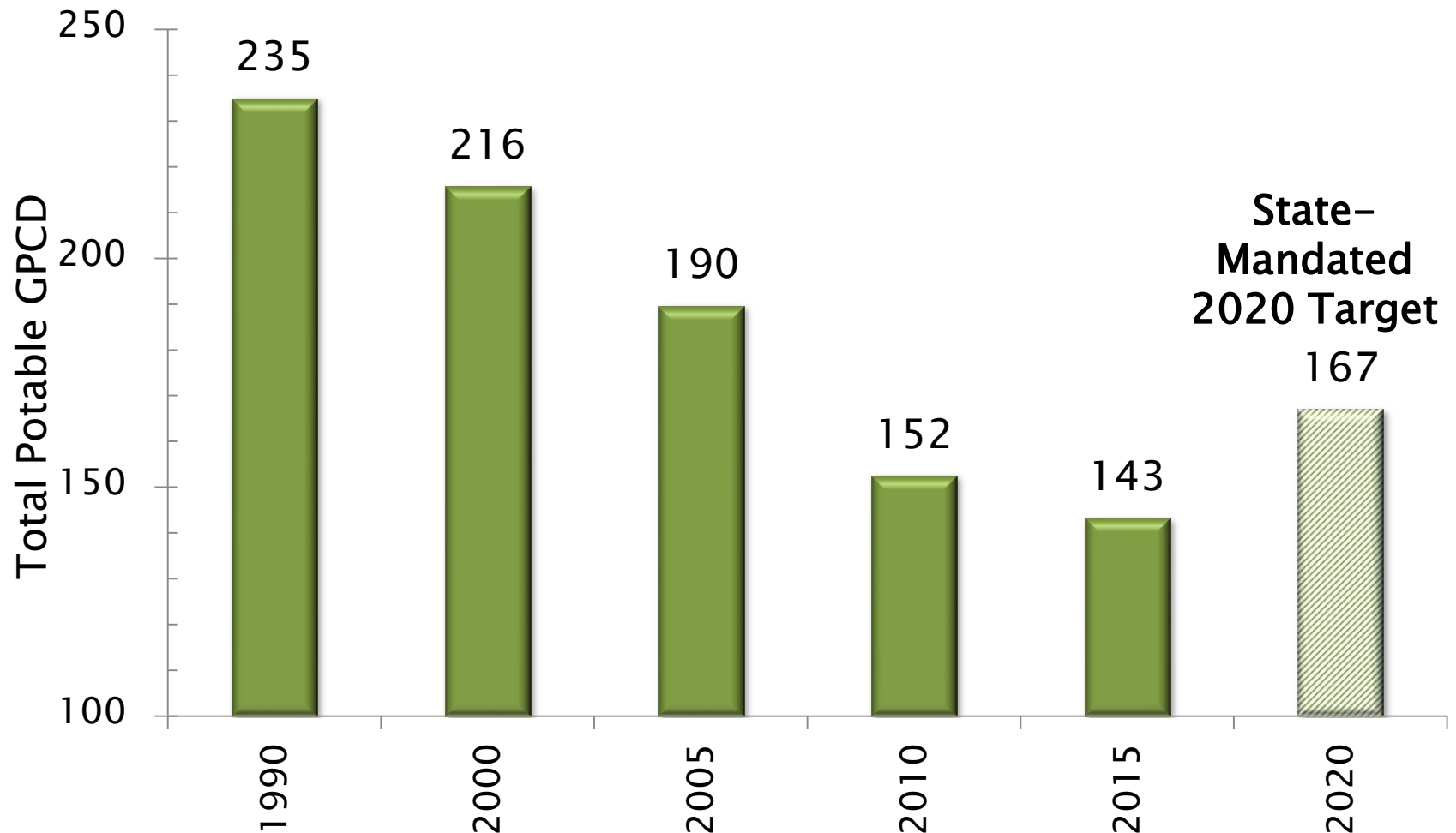
## Water: Authority to Vote Today on Mandatory Restrictions

**Companies cringe at 50 percent cut in water**  
Firms offer conservation plans to mayor; some say cutbacks could cripple growth





# 39% DECLINE IN PER CAPITA WATER USE IN WATER AUTHORITY SERVICE AREA SINCE 1990

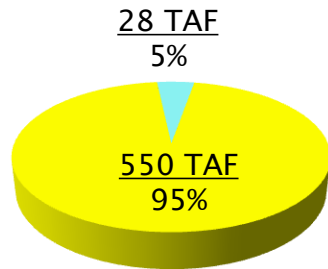


The reduction in potable per capita water use since 1990 offsets the need for over 300,000 acre-feet per year within the region.



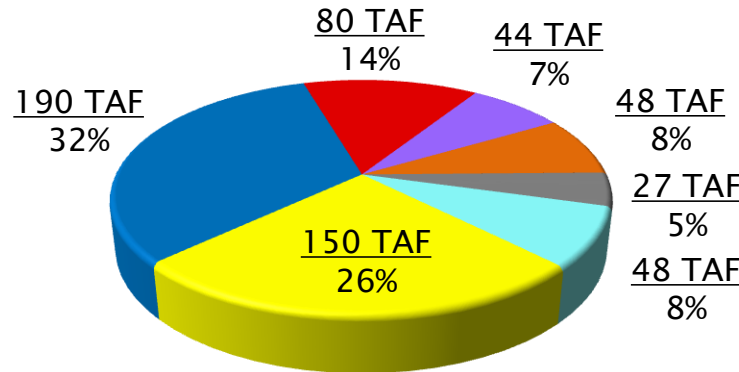
# INCREASING SAN DIEGO COUNTY'S WATER SUPPLY RELIABILITY THROUGH SUPPLY DIVERSIFICATION

**1991**



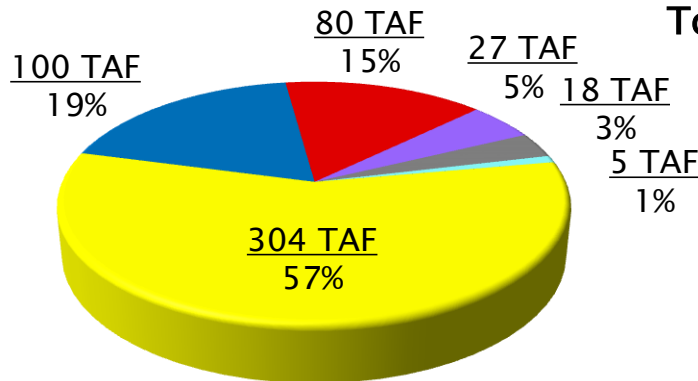
Total = 578 TAF

**Estimated 2020**



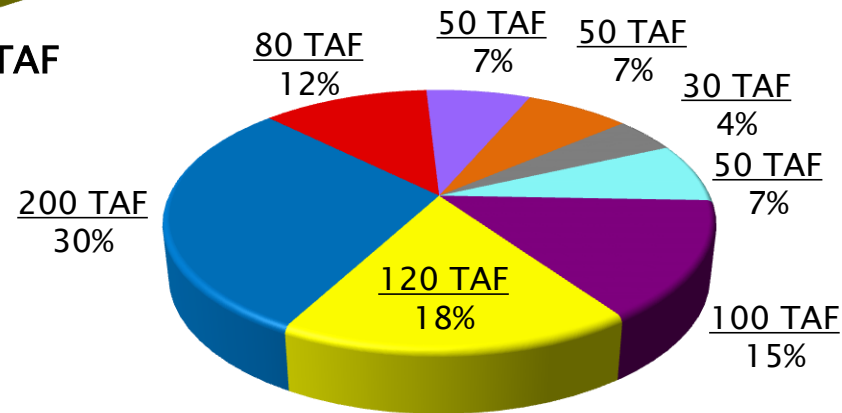
Total = 587 TAF

**2015**

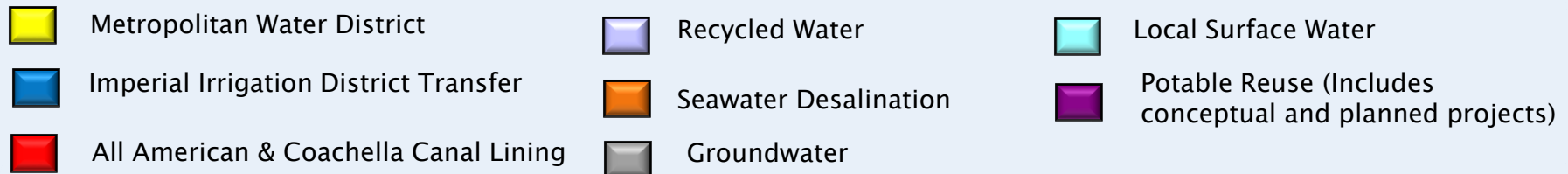


Total = 534 TAF

**Projected 2035**



Total = 680 TAF

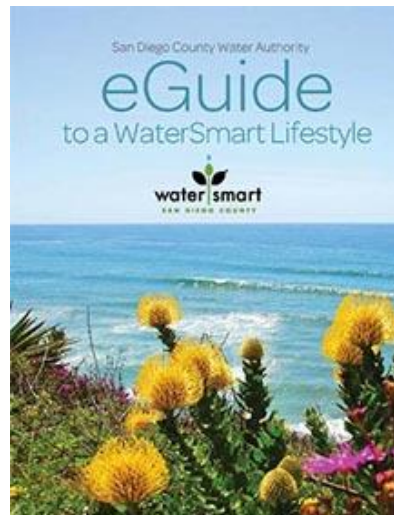
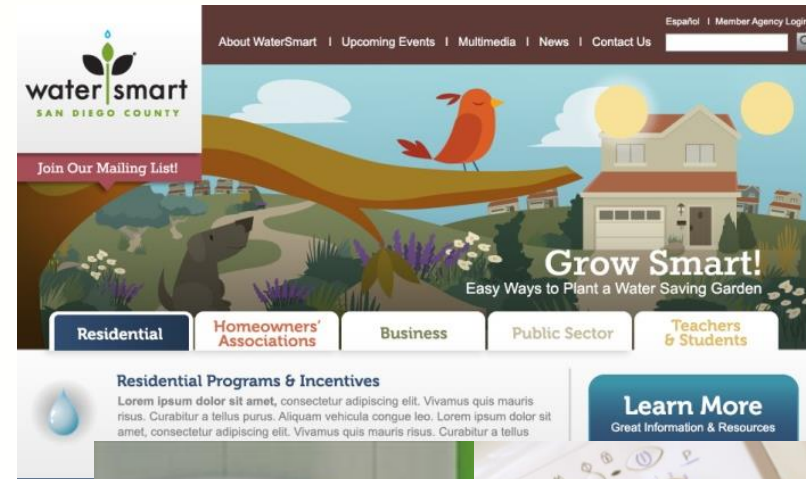




### RELIABILITY THROUGH DIVERSIFICATION: CONSERVATION

- Rebates, tools & services
- Plant fairs and landscape classes
- Offset 103,000 AF of demand by 2020
- 13% of supply by 2020

Programs Available at  
[WaterSmartSD.org](http://WaterSmartSD.org)

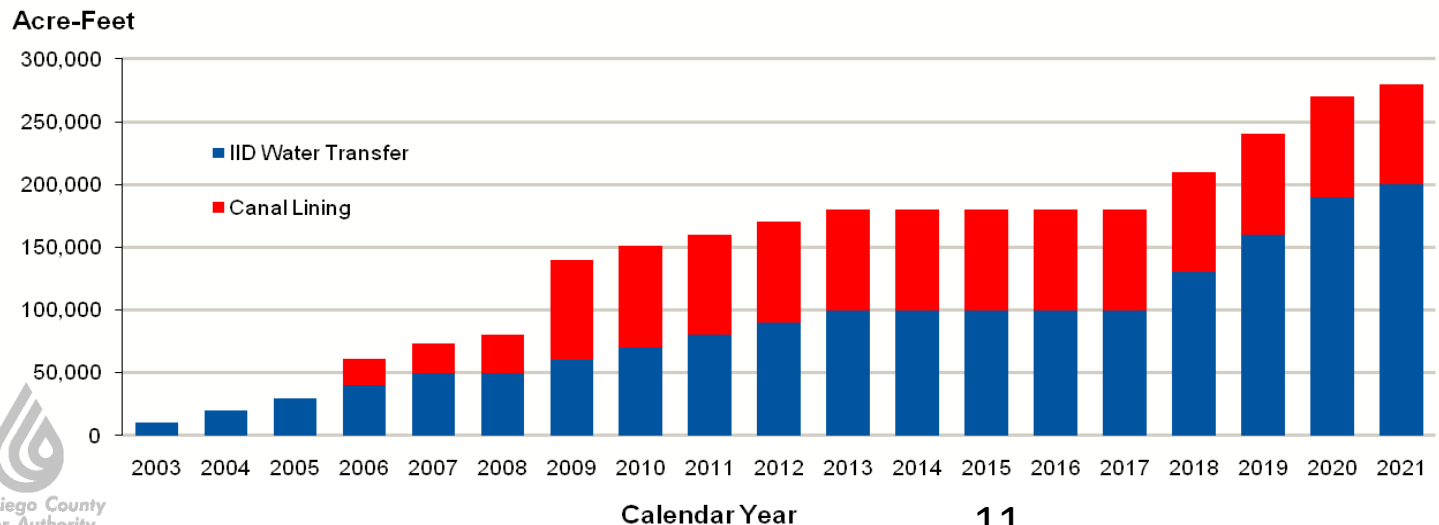




### Reliability Through Diversification: Imperial Irrigation District Transfer

- Nation's largest ag-to-urban water conservation and transfer agreement
- Ramps up to 200,000 AF/year by 2021
- 45-to 75-year term
- 32% of supply by 2020

**IID and Canal Lining Deliveries 2003-2021**





### Reliability Through Diversification: All-American & Coachella Canal Linings

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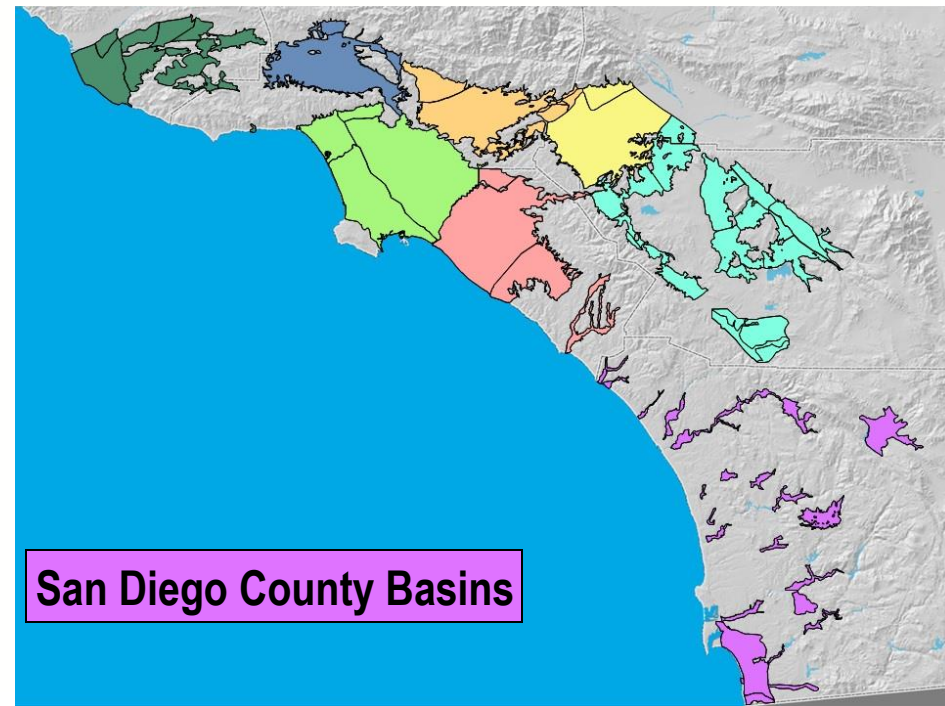
- 80,000 AF/year for 110 years
- All-American: 23 miles
- Coachella: 35 miles
- 14% of supply by 2020





### Reliability Through Diversification: Groundwater

- 20,000 AF/year today, growing to 27,000 AF/year by 2020
- Brackish groundwater must be desalinated
- Seven local agencies have groundwater projects
- 5% of supply by 2020





### Reliability Through Diversification: Local Surface Water

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- 25 reservoirs
- Combined water storage capacity: approximately 745,000 AF
- 8% of supply by 2020



Olivenhain and Lake Hodges 14





### Reliability Through Diversification: Recycled Water

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- 27,000 AF/year today, growing to approximately 44,000 AF/year by 2020
- Drought-proof
- 17 agencies in San Diego purvey recycled water
- Primarily used for landscape irrigation
- 7% of supply by 2020





### Reliability Through Diversification: Seawater Desalination

#### Carlsbad Seawater Desalination Project

- ▶ Expected on-line in late 2015
- ▶ \$1 billion investment
- ▶ 56,000 AF/year of drought-proof supplies
- ▶ 8% of supply by 2020





# Water Authority Strategy Consistent with California Water Action Plan

- Make conservation a way of life
- Increase regional self-reliance and integrated water management
- Manage and prepare for dry periods
- Expand water storage capacity



*“All Californians have a stake in our water future. These actions set us on a path toward reliability, restoration, and resilience in California water.”*





### Future Sources: Potable Reuse

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- ▶ Several agencies considering projects
- ▶ San Diego: up to 83 MGD by 2035
- ▶ Padre Dam: up to 3,000 AF per year



City of San Diego's Pure Water Facility



Padre Dam's Advanced Water Purification  
Demonstration Facility



# Future Sources:

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## Additional Seawater Desalination

### Camp Pendleton

- ▶ Potential project
- ▶ Feasibility studies under way
- ▶ Participation from U.S. Marine Corps
- ▶ Size: 100-150 million gallons per day





# INVESTMENTS IN INFRASTRUCTURE





**Project: San Vicente Dam Raise**  
**Complete: 2014**  
**Cost: \$401 million**



**Benefit: Increase reservoir capacity by 152,000 acre-feet**



**Project: Olivenhain Dam & Reservoir**  
**Complete: 2003**  
**Cost: \$198 million**  
**Benefit: 22,000 AF of storage**





# Project: Twin Oaks Water Treatment Plant

**Complete: 2008**

**Cost: \$179 million**

**Benefit: 100 MGD treated supply for region**



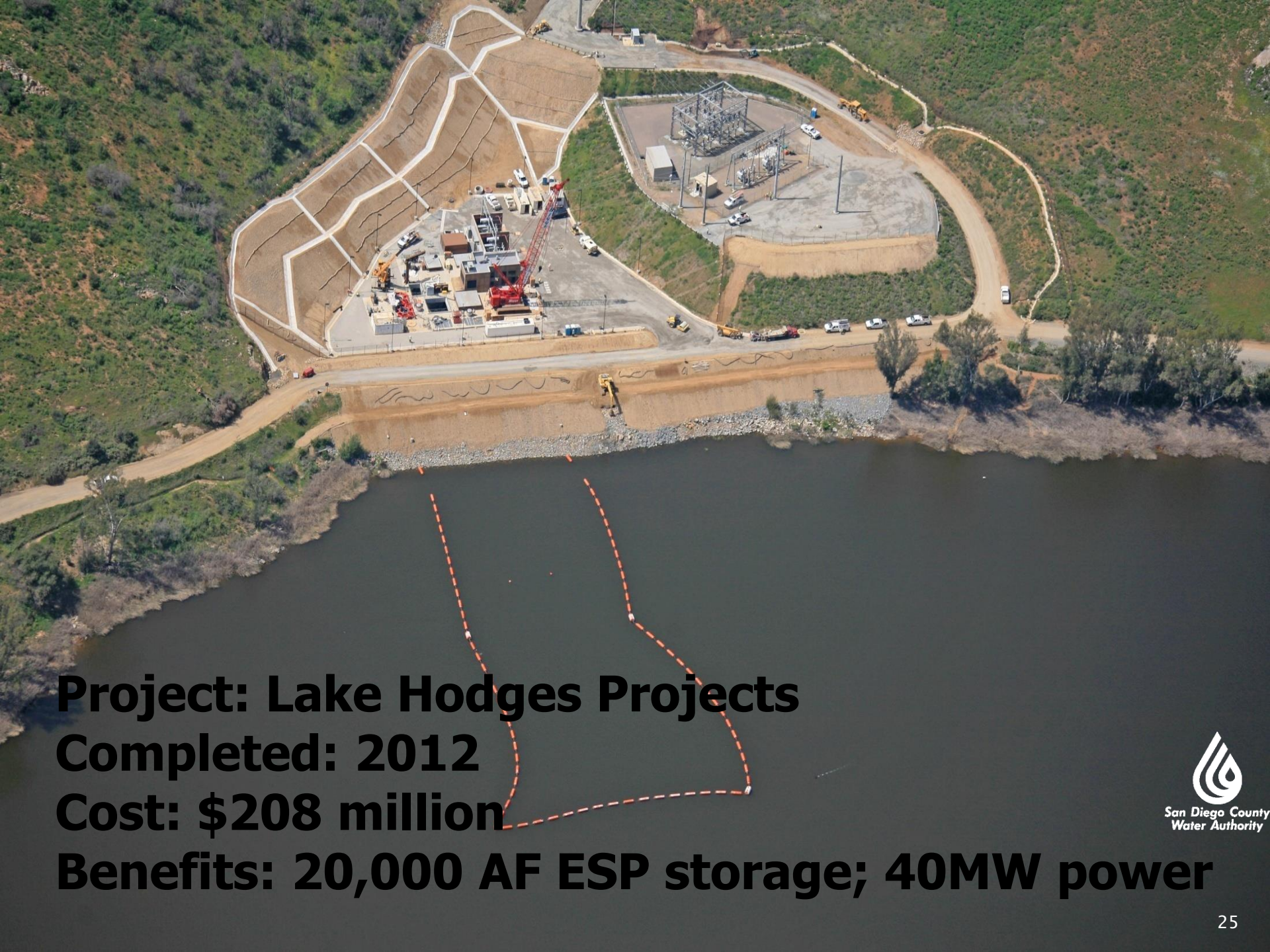
San Diego County  
Water Authority



**Project: Pipeline Relining Program**  
**Complete: Ongoing**  
**Cost: \$493 million**  
**Benefit: Extended life of major pipelines**







**Project: Lake Hodges Projects**

**Completed: 2012**

**Cost: \$208 million**

**Benefits: 20,000 AF ESP storage; 40MW power**



# Capital Improvement Program

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- \$2.8 billion CIP (1989 – 2030)
  - \$1.5 billion Emergency Storage Program (ESP)
- Dozens of major projects – completed or under construction

*San Vicente Dam Raise:  
Completion 2014*





# Transitional Special Agricultural Water Rate (TSAWR)





# TSAWR Estimated Cost Benefit

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- ▶ Supply
  - TSAWR customers pay lower supply rate
  - Benefit is differential between Water Authority melded supply rate and MWD's full service volumetric rate (Tier 1)
- ▶ Storage
  - TSAWR customers exempt from fixed storage charge
    - Storage charge only applies to agency's M&I deliveries
  - TSAWR deliveries not included in 3-year rolling average deliveries used to calculate agencies' proportional share of fixed storage charge





### TSAWR Cutback – Supply Component

- ▶ Occurs when MWD is allocating supplies to Water Authority
- ▶ Reduction equal to MWD cutback to Water Authority
- ▶ Reduction period corresponds to MWD cutback duration
- ▶ Penalty rate for non-compliance
  - If Water Authority exceeds allocation from MWD
  - Rate equal to MWD penalty rate





# TSAWR Cutback – Storage Component

- ▶ Emergency Storage Program
  - TSAWR customers cutback at twice level of regional M&I cutback, up to 90%
  - Water reallocated to commercial and industrial customers
- ▶ Carryover Storage Program (CSP)
  - TSAWR customers receive no deliveries from CSP during shortages





### Water Authority's Agricultural Water Management Program

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1. Irrigation System Evaluations
2. Agricultural Recycled Water Retrofit
3. Agricultural Research Project





### Irrigation System Evaluations

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- Provided at no cost for agricultural sites of at least one acre
- Customer receives a comprehensive report with recommendations on how to improve system efficiencies
- Customer provided an estimate of potential water savings from increased efficiencies





### Agricultural Recycled Water Retrofit

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- Financial incentives to convert from potable to recycled water
- Funded in part by a Department of Water Resources grant

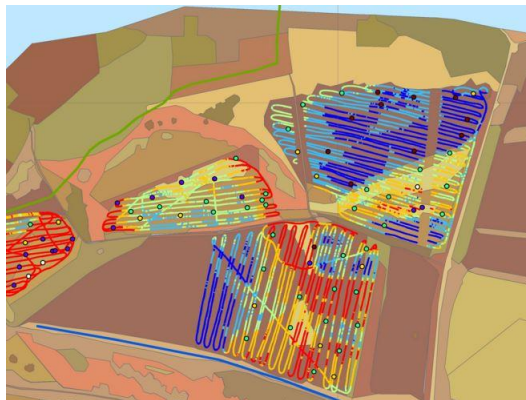




### Agricultural Research Project

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- Electrical conductivity mapping
- Installation of soil moisture sensors
- Allows growers to increase water-use efficiency
- Potential to increase crop production





# RESPONDING TO DROUGHT CONDITIONS AND STATE BOARD WATER USE REDUCTION MANDATE





### Despite Adequate Supplies in San Diego County, State Orders Water Cutbacks

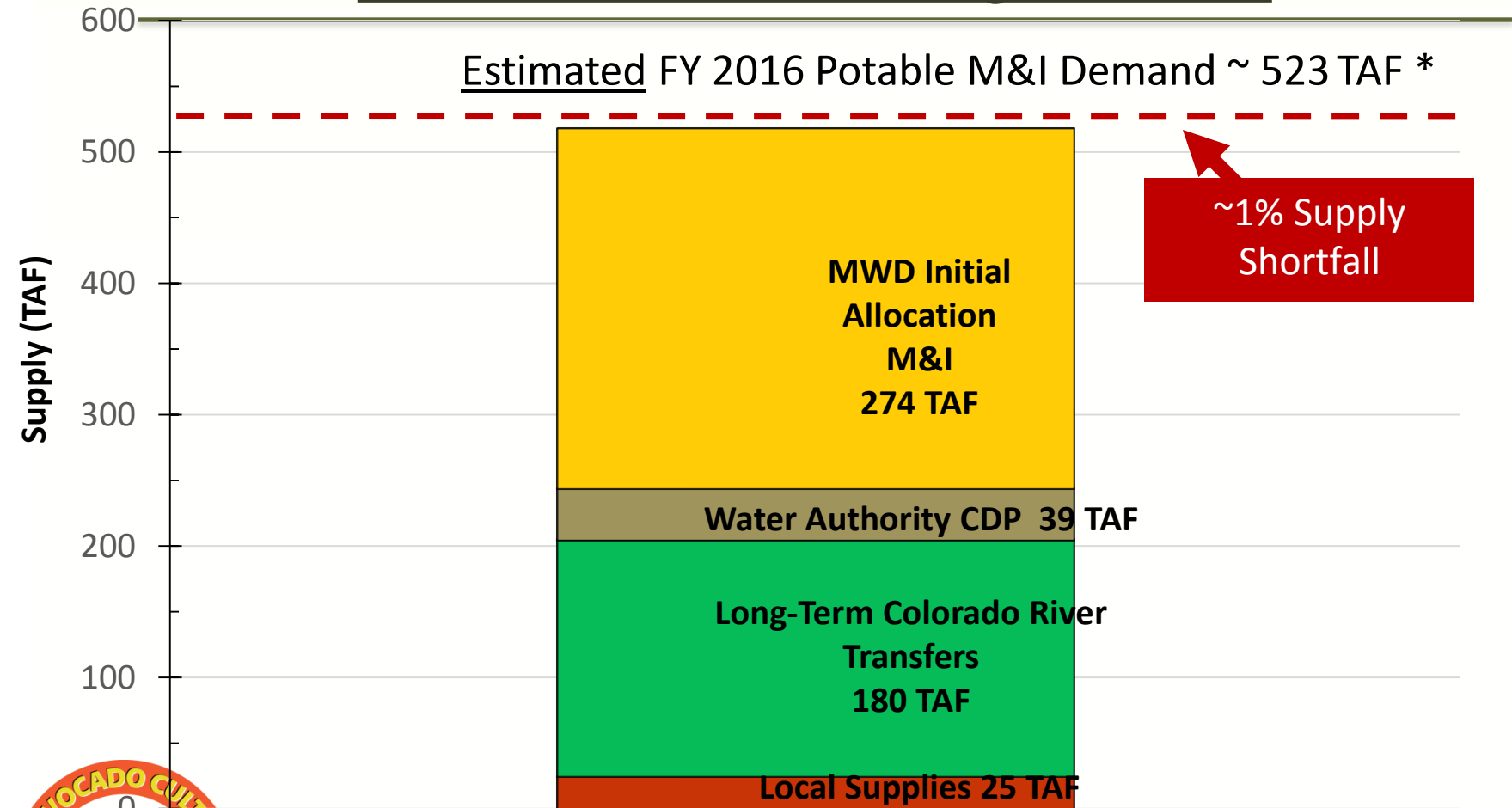
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- Governor Jerry Brown's April 1 Executive Order:
  - 25% water savings statewide
- State Water Resources Control Board's May 5 Emergency Conservation Regulation
  - Set water use reduction target for every urban water agency in California, regardless of their supply condition
  - Effective June 1, 2015-Feb. 29, 2016





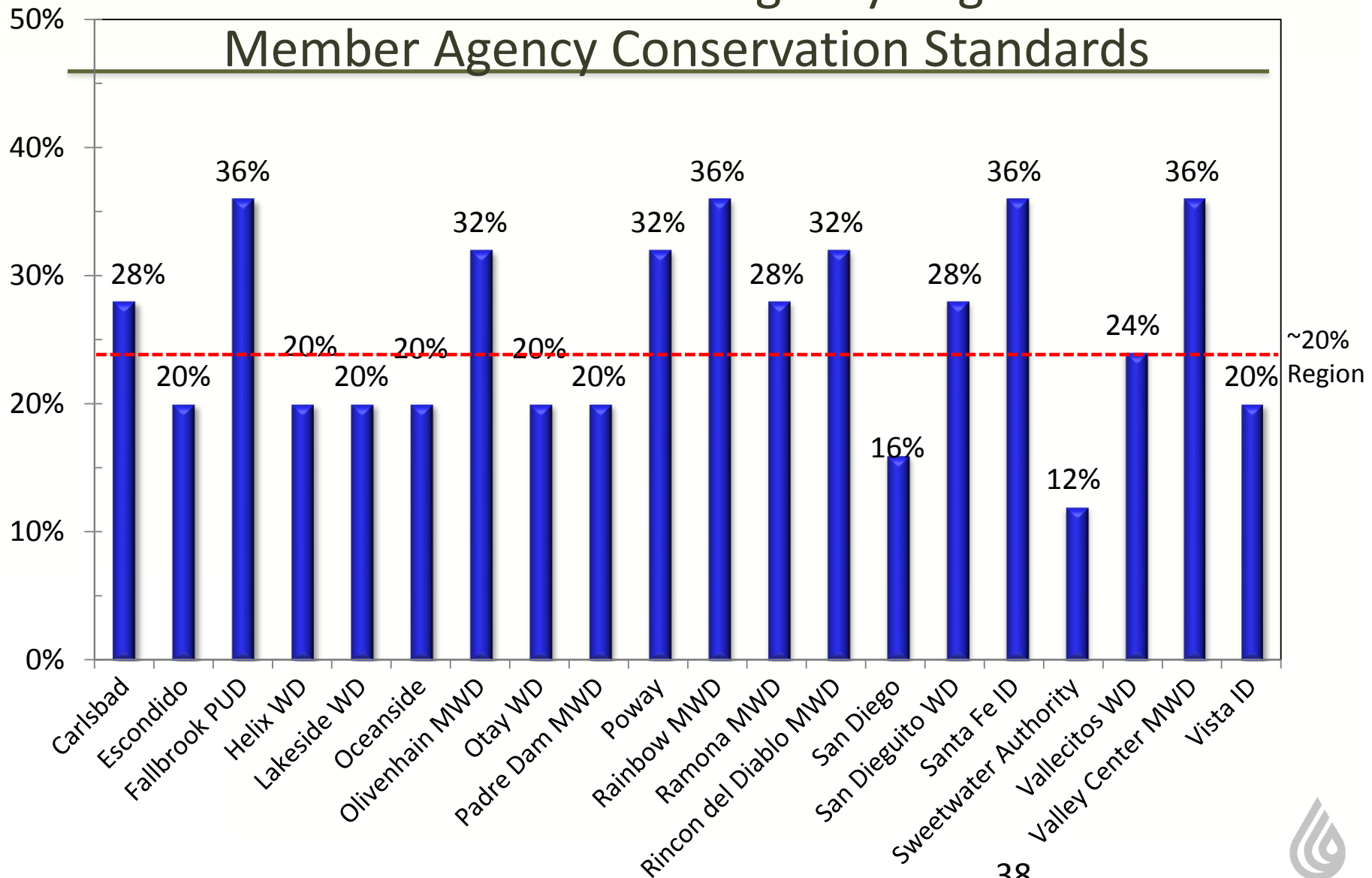
### Water Authority Can Meet 99% of Projected Demands in FY 2016, Even with 15% MWD Shortage Allocation



- Based on actual FY 2014, escalated at 1/2% per year.
- MWD supply allocation in effect 7/1/15 through June 30, 2016.

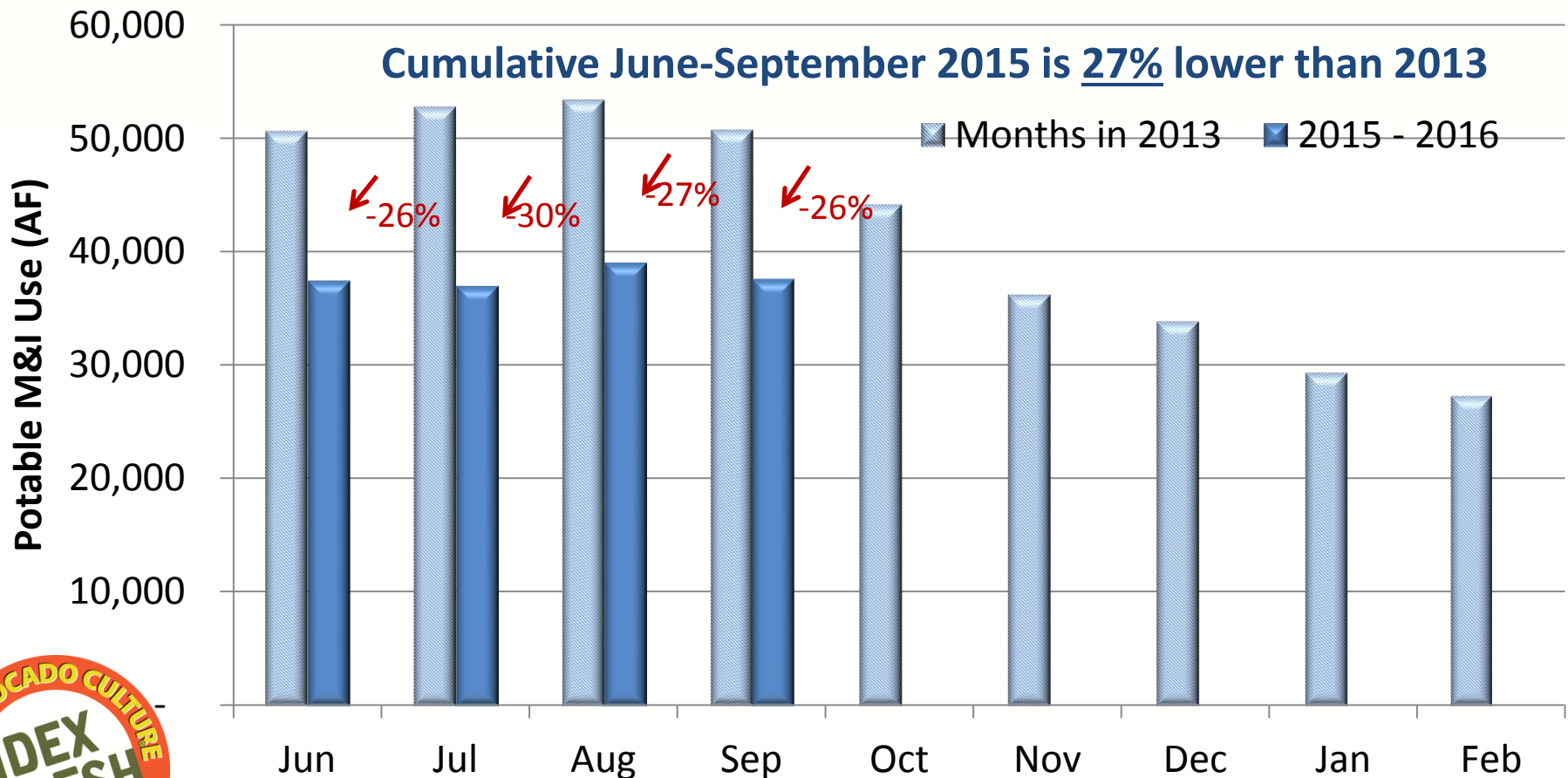


### State Water Board Emergency Regulations Member Agency Conservation Standards





### Total Potable M&I Water Use: SWRCB Emergency Regulation Reporting Months





# Water Authority's Comprehensive Conservation Outreach Campaign: "When in Drought"



Online & Outdoor



TV



Landscaper Training



Civic Events



Web Site



Radio/  
Pandora



Social Media YouTube



Partnerships



Large Events:  
SD County Fair



#droughtbucketlist



# WATER AUTHORITY STORING CONSERVED WATER

- ▶ Water conserved by residents and businesses is being stored in the newly expanded San Vicente Reservoir
  - 42,000 AF of 100,000 AF carryover supplies stored since early May
    - Potential to store 100,000 AF by June 30, 2016
- ▶ Reservoir already holds 36,000 AF of 52,000 AF emergency storage target



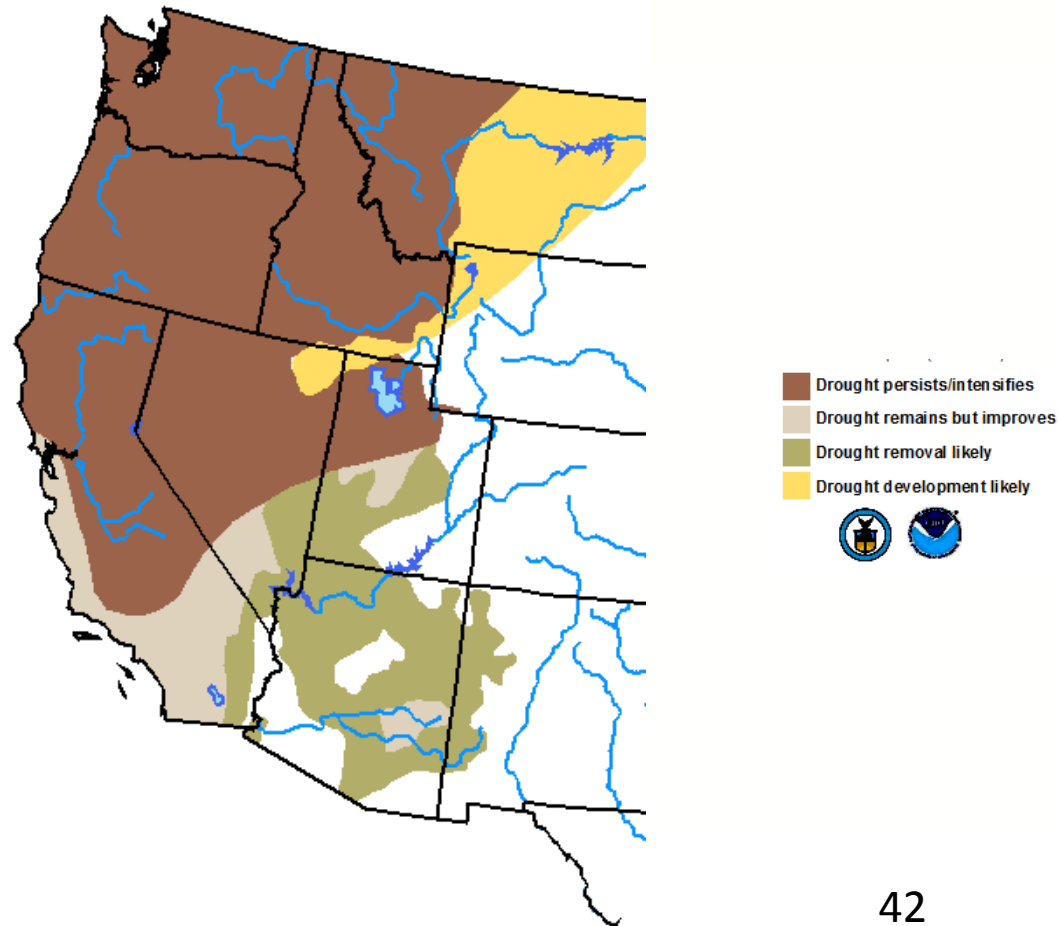
San Vicente Dam & Reservoir





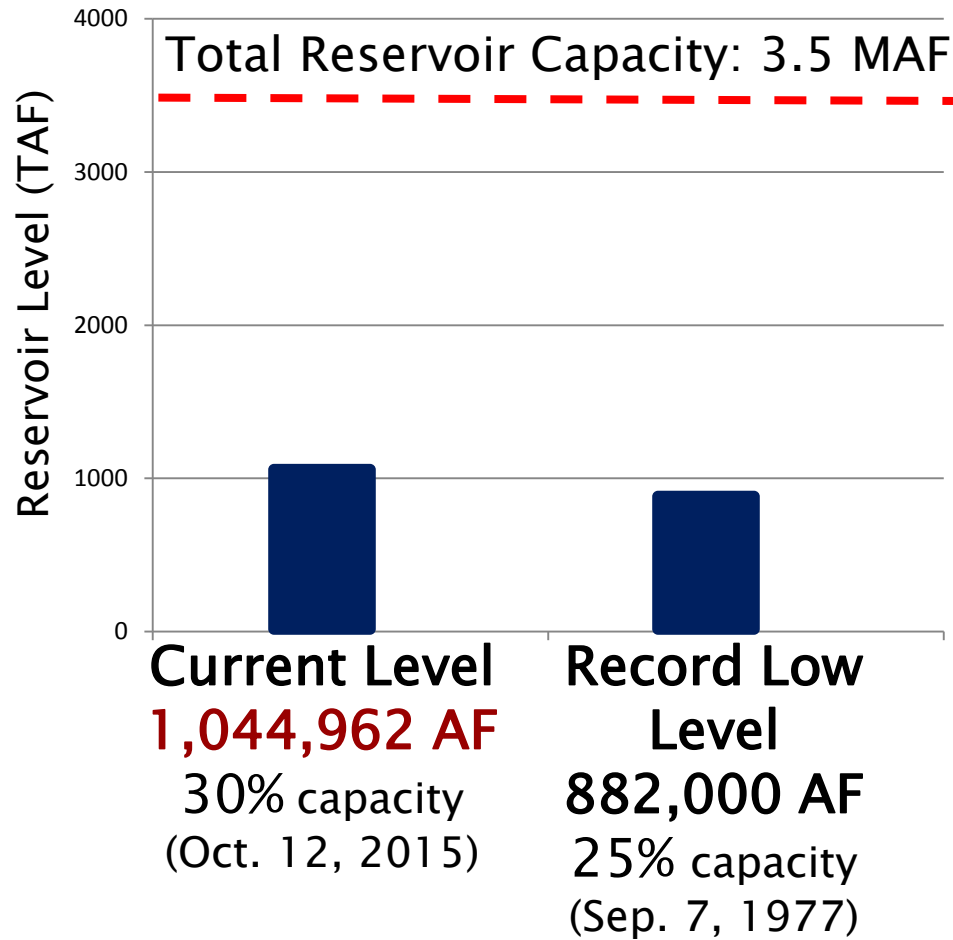
### Initial Outlook for Water Year 2016

Seasonal Drought Outlook  
Oct-Dec 2015





# LAKE OROVILLE NEAR RECORD LOW LEVELS



100% capacity – July 2011



30% capacity – Sept. 2015

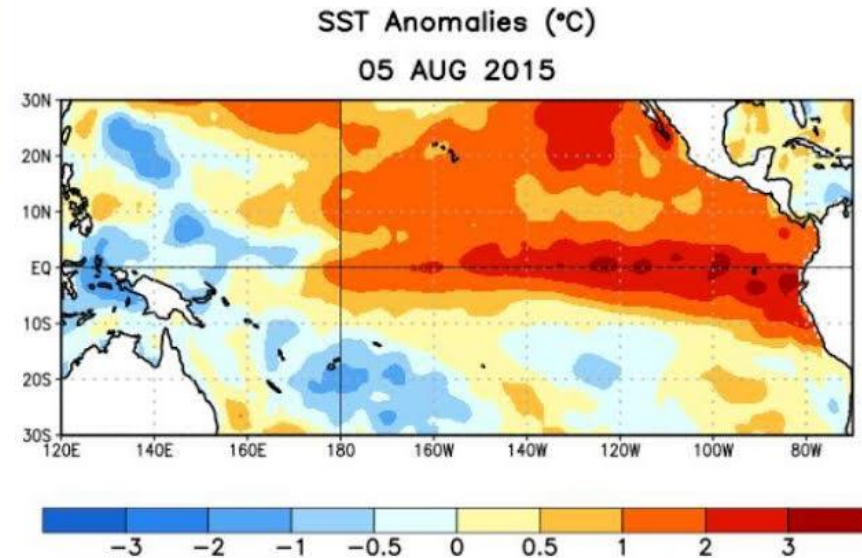


### NOAA Climate Prediction Center

### El Niño Update

- **September 2015:**  
**El Niño Advisory**

- Issued when El Niño conditions are observed and expected to continue
- >95% chance El Niño will continue through winter and gradually weaken through spring 2016



- ▶ **September 2014: El Niño Watch**

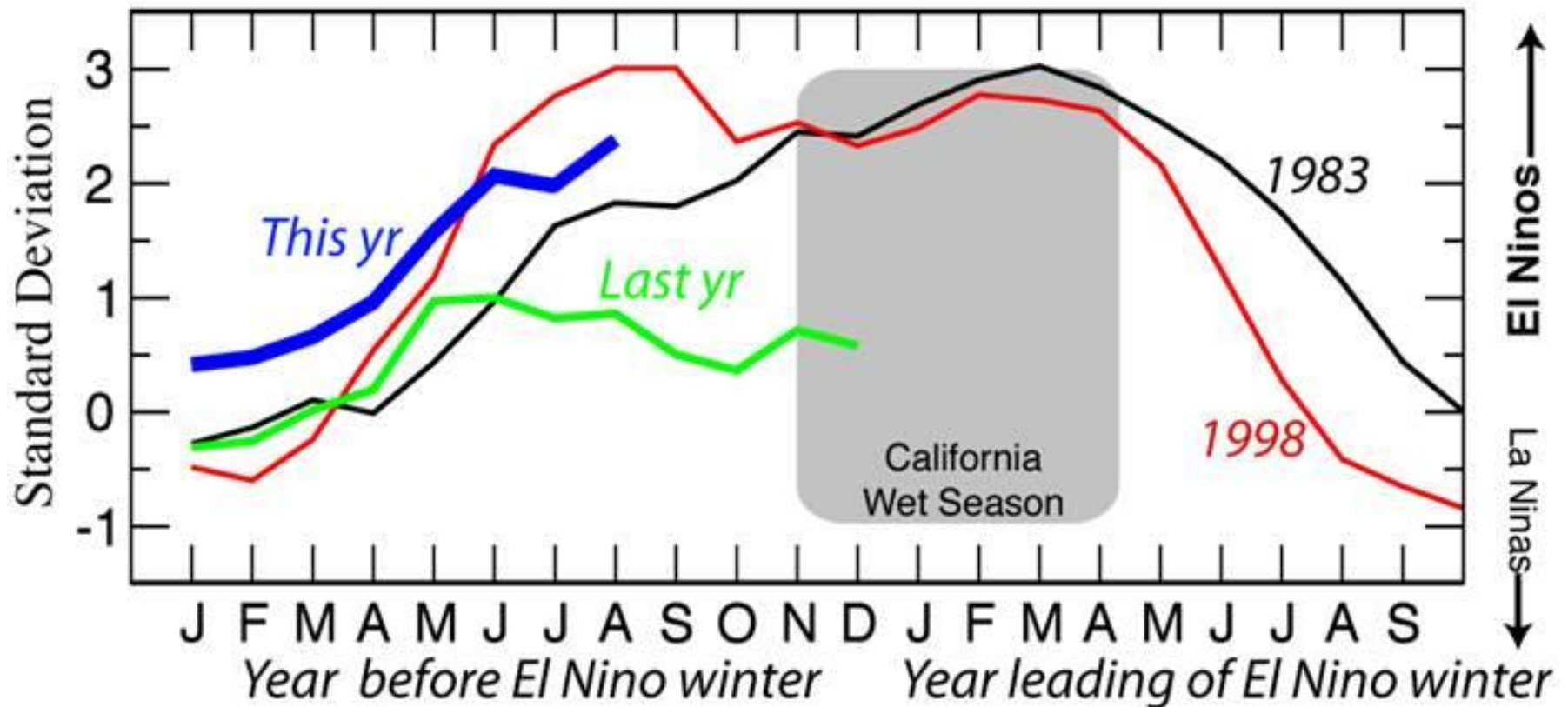
- Issued when conditions favorable for development of El Niño
- Chance of El Niño had decreased to 60-65% for fall and winter





# Current El Niño is Tracking Consistent with Strong Events in 1983 and 1998

NOAA Multi-Variate El Niño Index

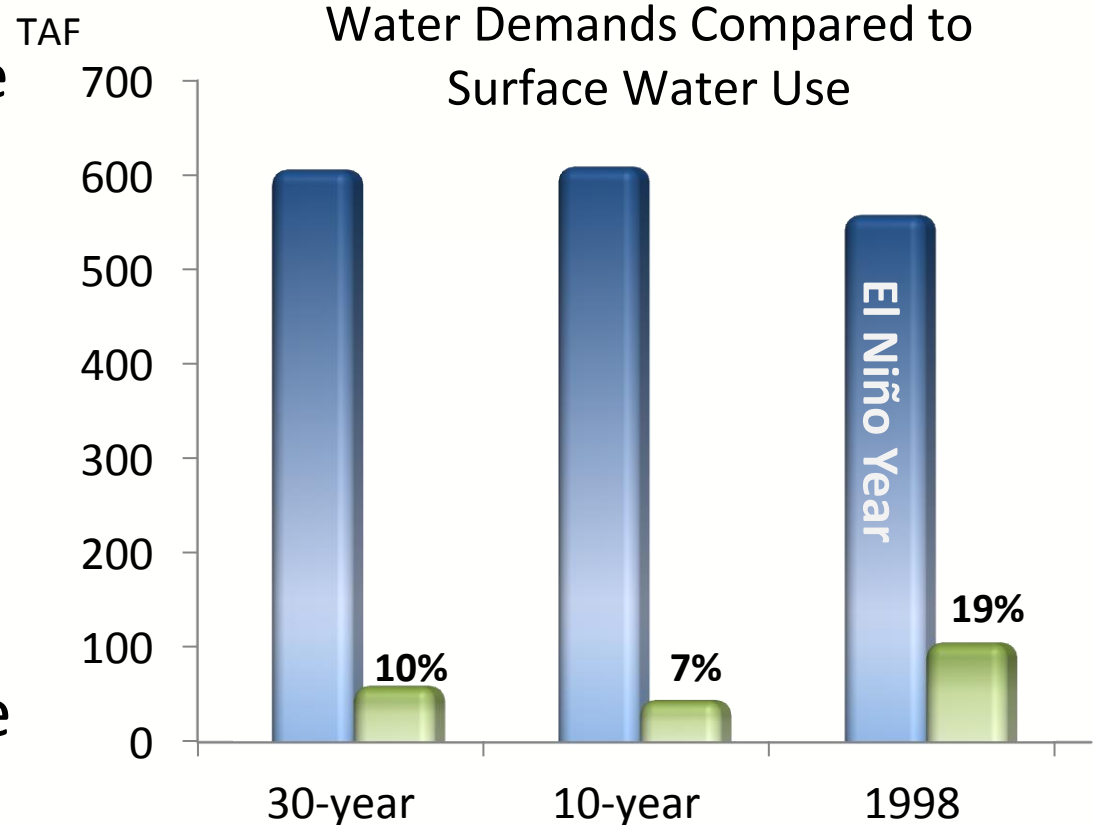


Source: Mike Dettinger, USGS/SIO



### EL NIÑO REALITY CHECK

- 30-year average: surface water use meets 10% of demand
- Most recent 10 (drought) years: 7%
- During strong 1998 El Niño, 19%
  - Demands lower due to higher rainfall



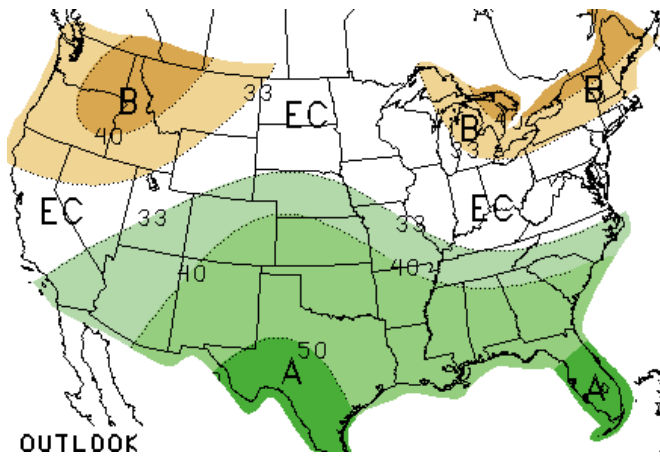
■ Total Water Demands

■ Surface Water Use

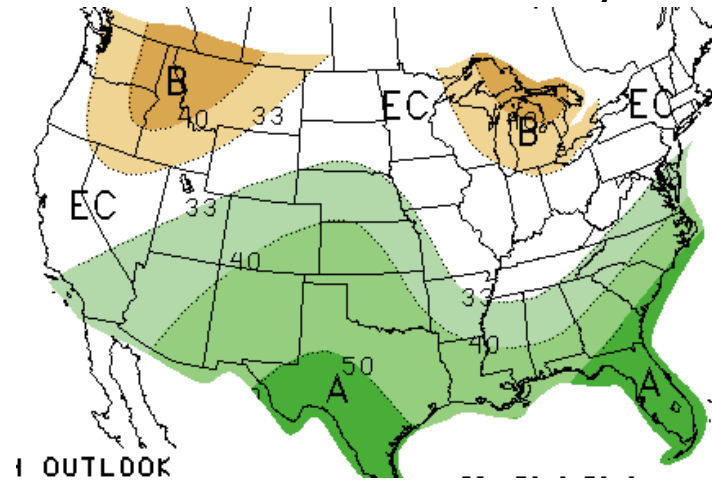


# NATIONAL WEATHER SERVICE PRECIPITATION OUTLOOK

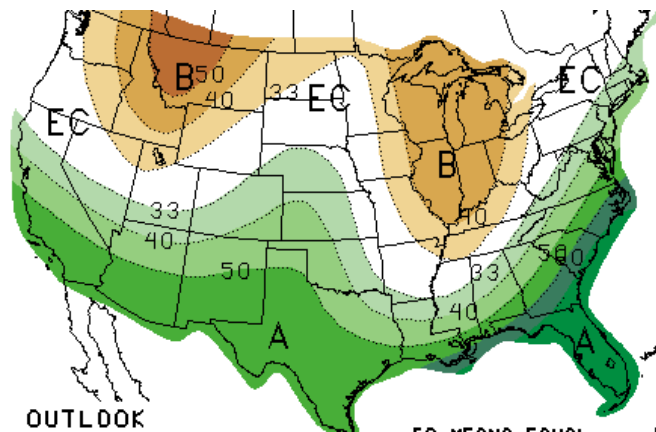
October – December



November – January



December – February



**A = Above Average**

**B = Below Average**

**EC = Equal Chances**

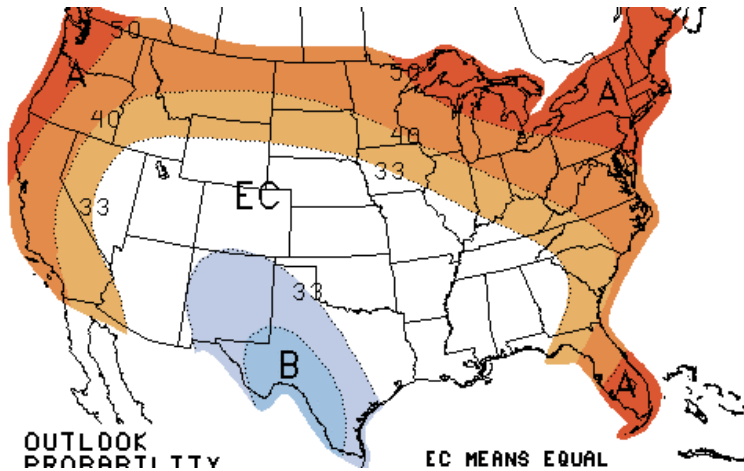
Made September 17, 2015



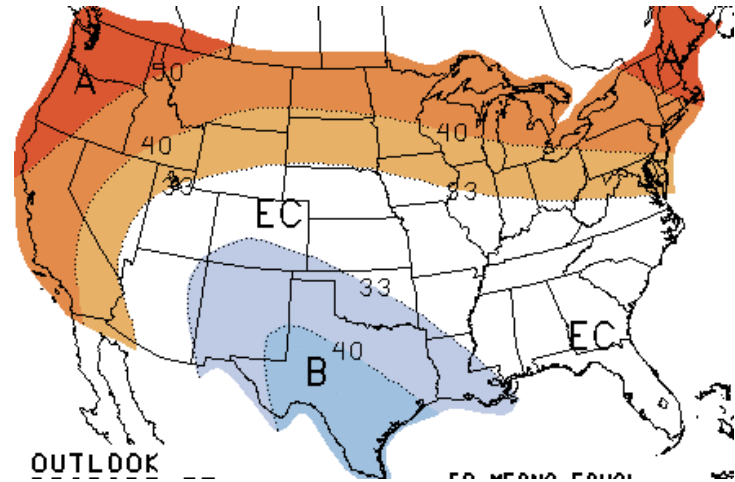


# NATIONAL WEATHER SERVICE TEMPERATURE OUTLOOK

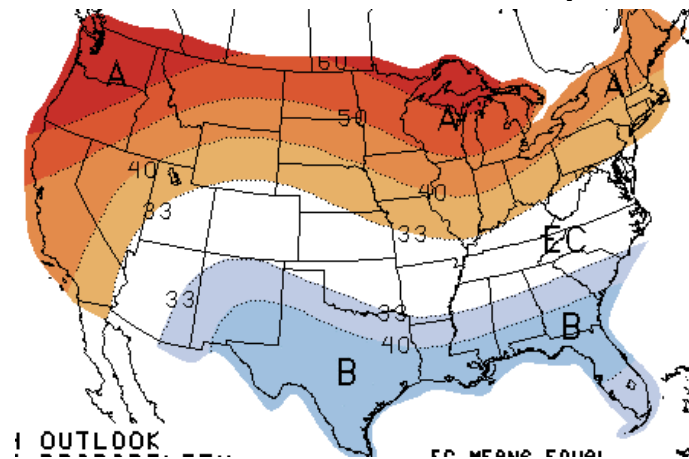
October – December



November – January



December – February



**A = Above Average**

**B = Below Average**

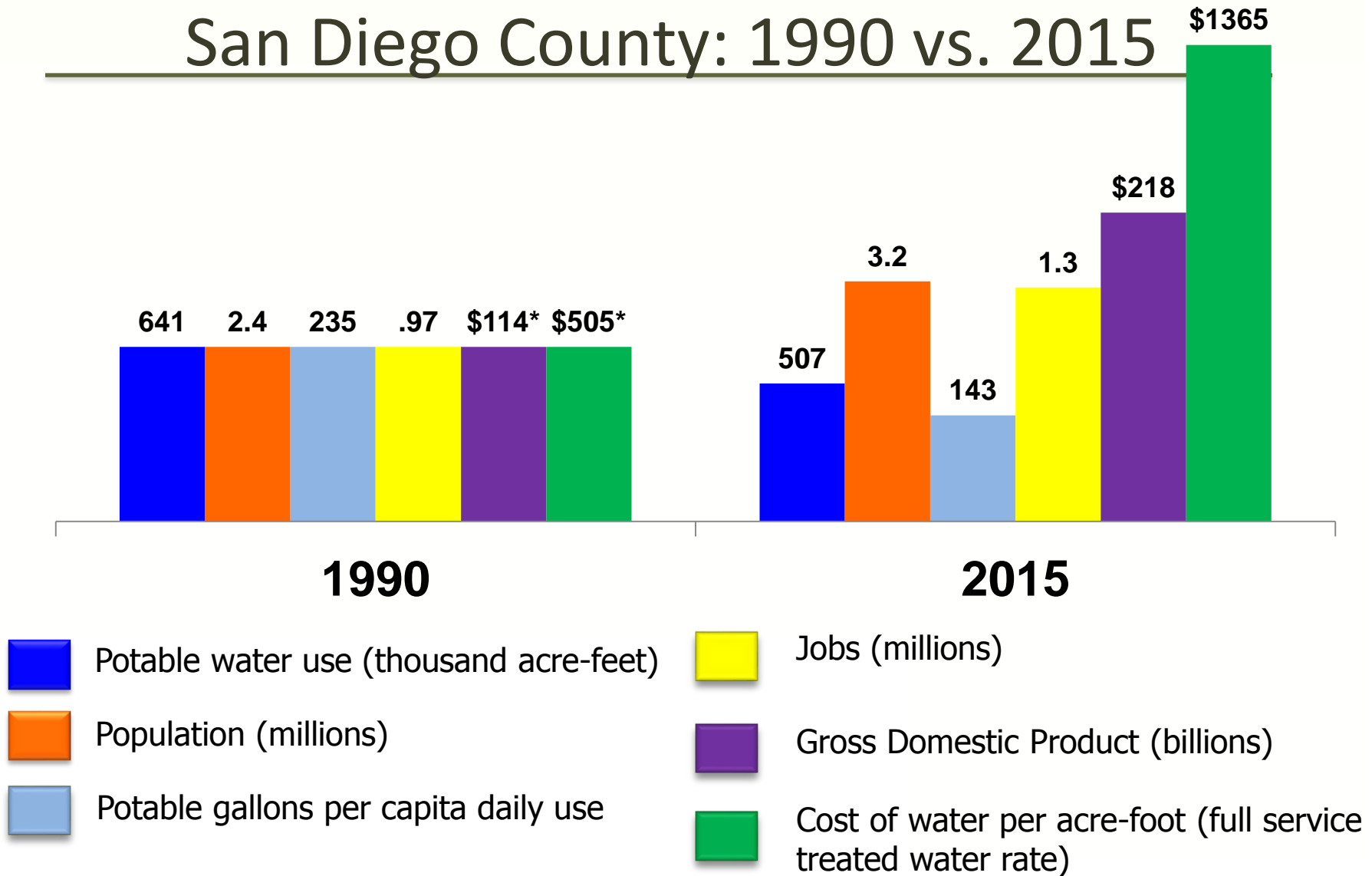
**EC = Equal Chances**

Made September 17, 2015





### San Diego County: 1990 vs. 2015





### Water is an Excellent Value

- Fully treated tap water in San Diego County costs less than 1¢ per gallon



- 67% of San Diego ratepayers believe water is good or excellent value compared to other utilities\*



\*2015 Water Issues Public  
Opinion Poll, April 2015, Probe  
Research. Sample size=1,000



# STAY IN TOUCH WITH THE WATER AUTHORITY

[whenindrought.org](http://whenindrought.org)

## Video & Slide Sharing



[youtube.com/SDCWAvideo](http://youtube.com/SDCWAvideo)



[slideshare.net/waterauthority](http://slideshare.net/waterauthority)

## Mobile App



[whenindrought.org](http://whenindrought.org)



[sdcwa.org/mobile-news-app](http://sdcwa.org/mobile-news-app)

## Social Media



[facebook.com/  
SanDiegoCountyWaterAuthority](https://facebook.com/SanDiegoCountyWaterAuthority)



[@sdcwa](https://twitter.com/sdcwa)  
[@mwdfacts](https://twitter.com/mwdfacts)



[sdcwa.org/rss](http://sdcwa.org/rss)

[www.sdcwa.org](http://www.sdcwa.org)