EASTERN MUNICIPAL WATER DISTRICT

Water Use Efficiency and Drought Response with Allocation-Based Tiered Rate Structures

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General Manager

June 19, 2015

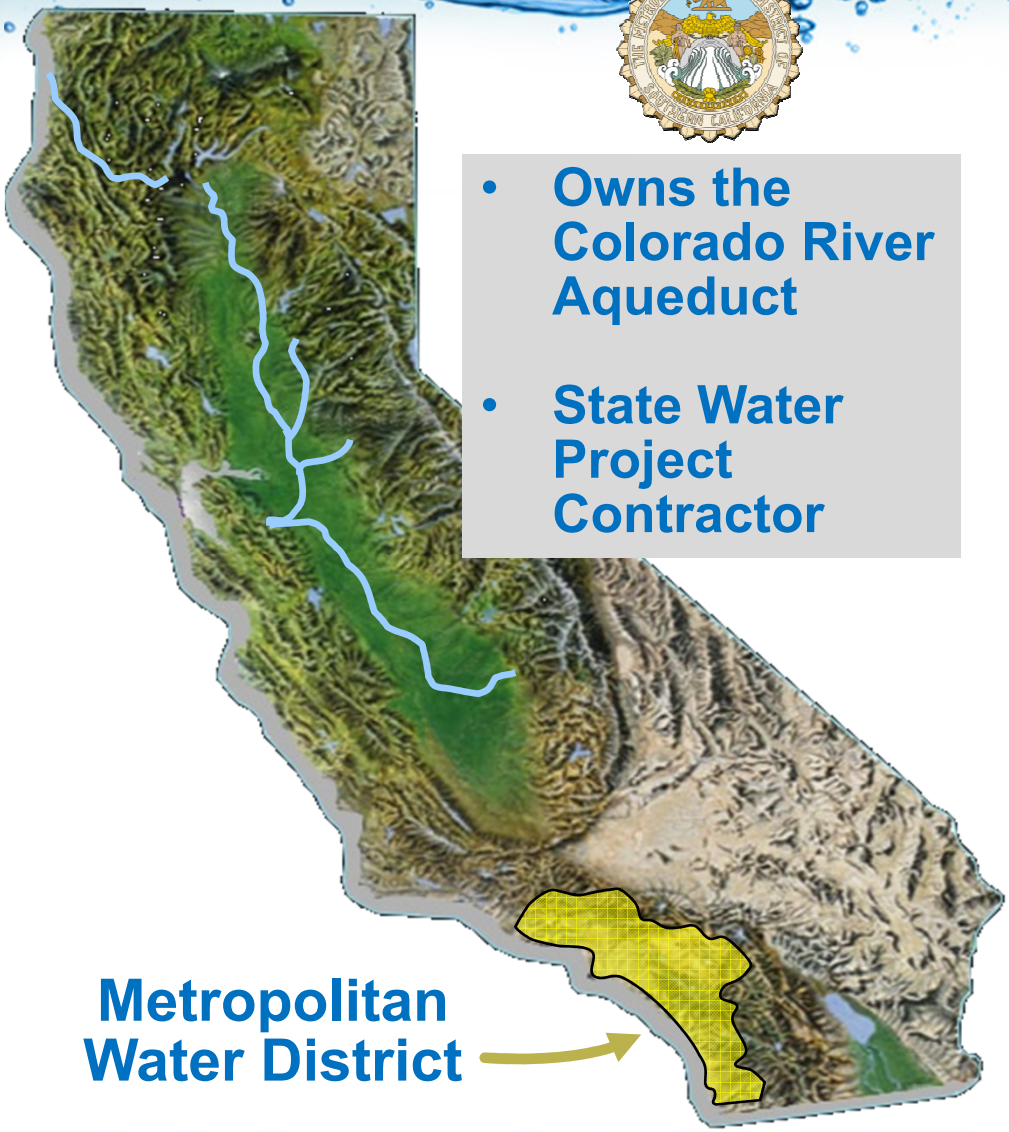
Southern California - Sources of Water

Local Supplies:

- Groundwater
- Brackish Desalination
- Recycled Water

"Best Practices" in Water Use Efficiency (Conservation)

Metropolitan Water District of Southern California

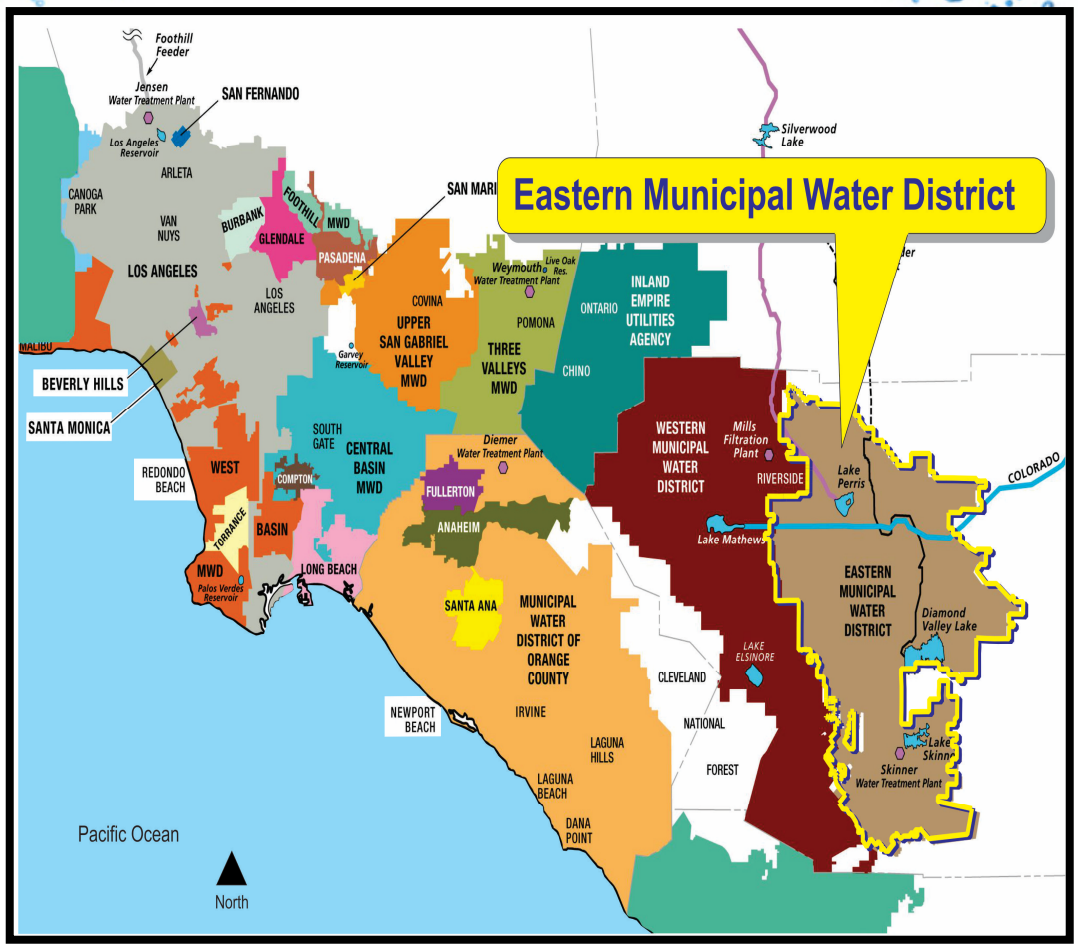


- **Owns the Colorado River Aqueduct**
- **State Water Project Contractor**

- Regional Water Wholesaler to six counties:
  - o 5,200 square miles
- Formed in 1928 by 13 cities to build Colorado River Aqueduct
- 26 Member Agencies, 37 Member Board
- 19 million residents
- Regional economy: $1 trillion
- Imported water meets ½ of retail demands
- Current Demands: 2.1 MAF

Eastern Municipal Water District

- Established in 1950.
- 542 square-mile service area - population of 768,000.
- Serving seven cities and unincorporated areas.
- One of 26 MWD member agencies.
  - EMWD's Randy Record is current Chairman of MWD.
- High-growth area.
- 11.0" to 12.6" of rain per year (4" last year).



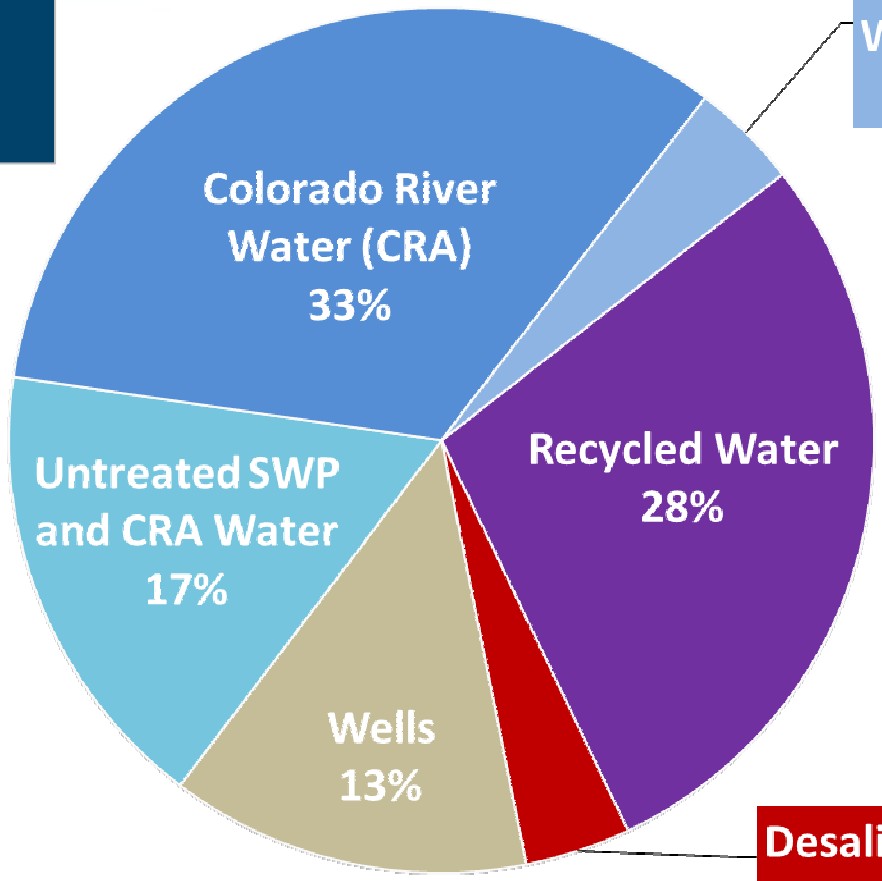
Eastern Municipal Water District Services

- **Potable (drinking water):** 140,000 water accounts
  - 88,944 AF sold in 2013/2014
  - Sources:
    - Imported Water from the Bay Delta and Colorado River
    - Groundwater wells
    - Brackish Desalters

- **Wastewater:** 229,000 accounts
  - Four regional reclamation facilities
  - Treating: 49 MGD
- **Recycled water:** 304 accounts
  - 37,467 AF sold in FY 2013/2014
  - 100% recycling – zero discharge
  - 10,850 acres of agricultural Irrigation

EMWD Water Supply Portfolio (FY 2014)

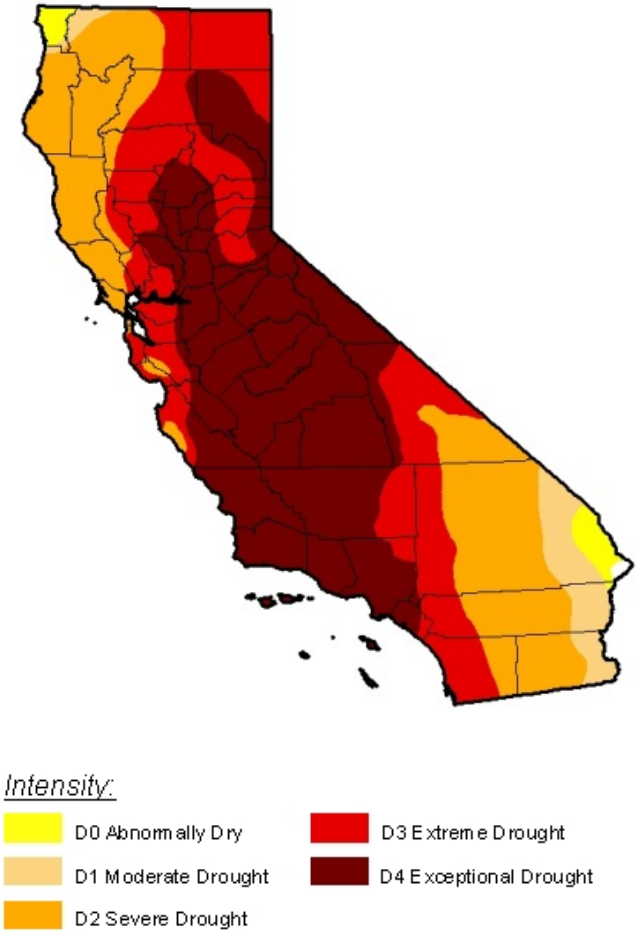
Imported Water Supply from MWD: 71,628 AF 54%



Local Water Supply: 60,367 AF 46%

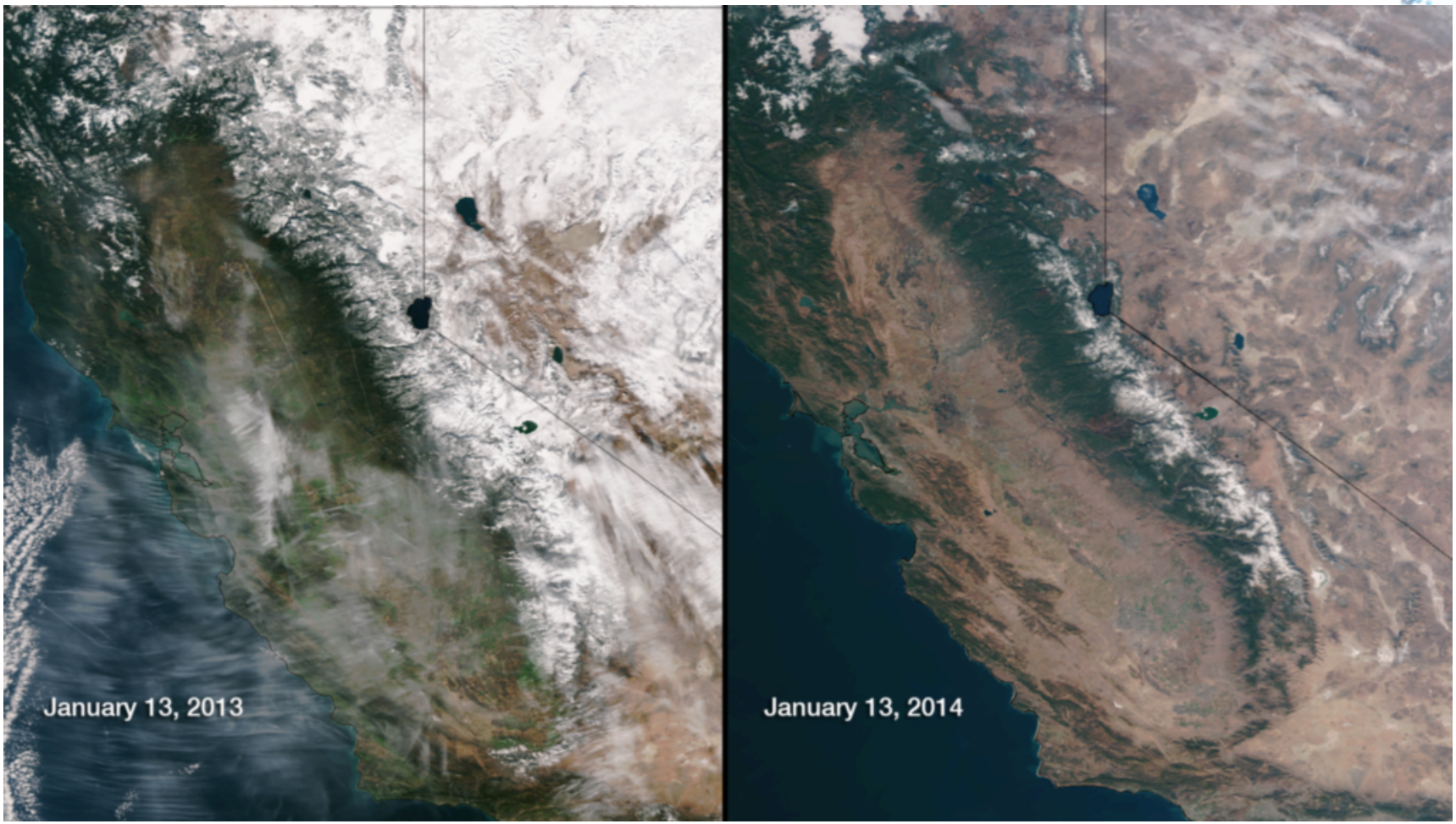
Statewide Drought 2015

- 2014 was 7th driest and the 9th hottest year on record (137 years)
- 94 percent of state in severe, extreme or exceptional drought
- Sierra snow pack only 6% of normal.
- Major reservoirs throughout California are at or below normal
- California Department of Water Resources (DWR) restricting water diversions
- Colorado River watershed snowpack average in 2014, 63% of average in 2015



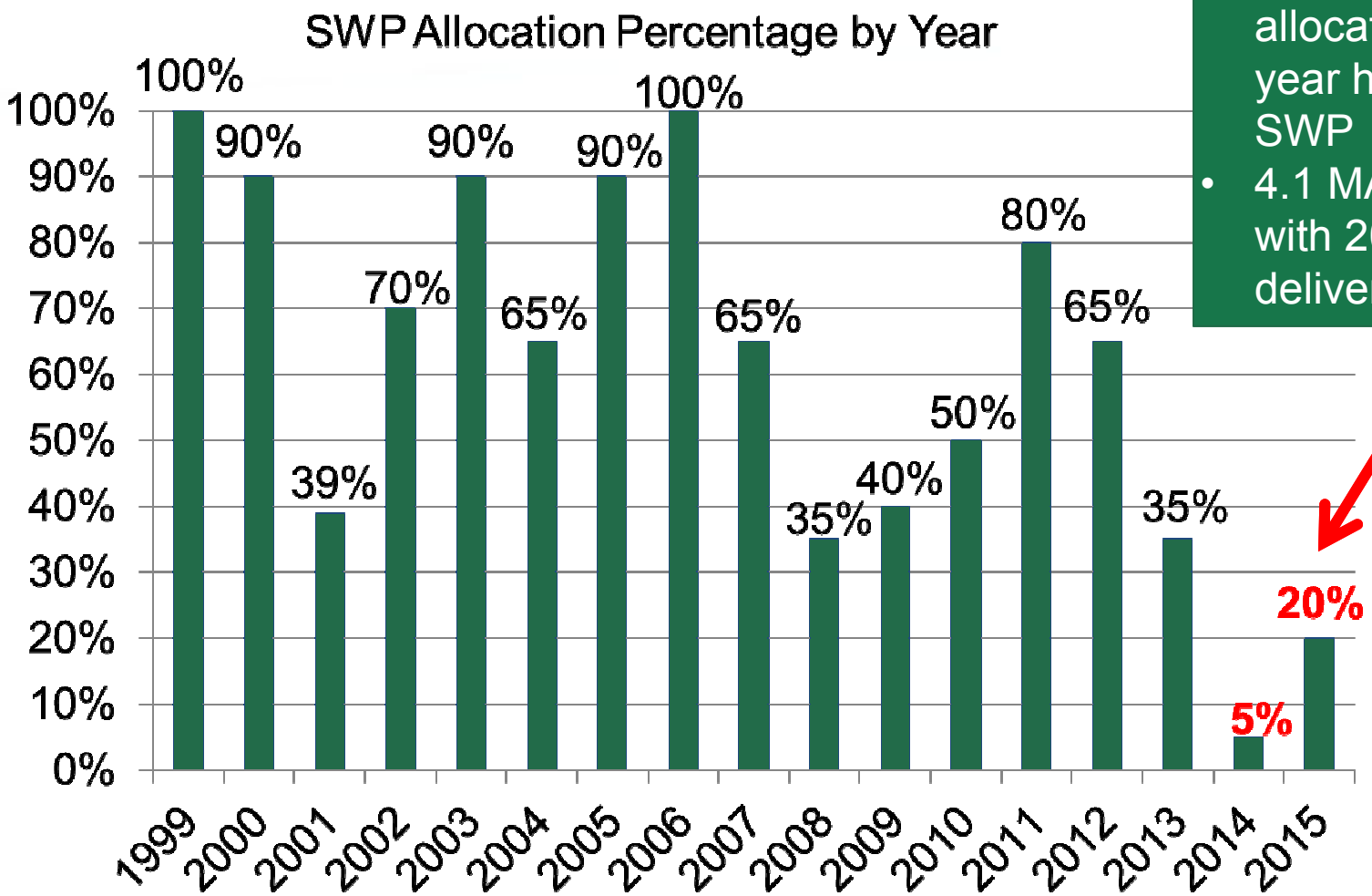
Below Average Runoff from Northern Sierra in Eight of Last 10 Years

Drought 2014 -2015

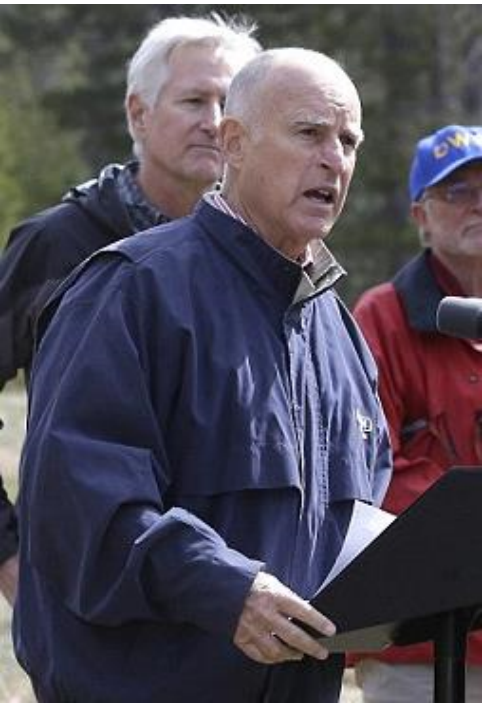


State Water Project Allocations

- 2014 Lowest allocation in 54-year history of the SWP
- 4.1 MAF requested with 205,000 AF delivered



California Responds to the Drought



- **Jan 17, 2014:** Governor Brown declares a drought emergency
- **Apr 1, 2015:** Governor's Executive Order mandating 25% statewide conservation
- **Apr 28, 2015:** State Board releases an update to the framework incorporating the following:
  - Simplistic sorting of agencies using a three-month July - September 2013 self-reported Gallons Per Capita per Day
  - Agencies assigned into groups ranging from **8% to 36% required reductions**
  - Failure to meet targets by February 2016 can result in fines of up to $10,000 per day
- **May 5, 2015:** State Board adopts the final regulation to implement the Executive Order

Water Industry's Opposition to Regulations

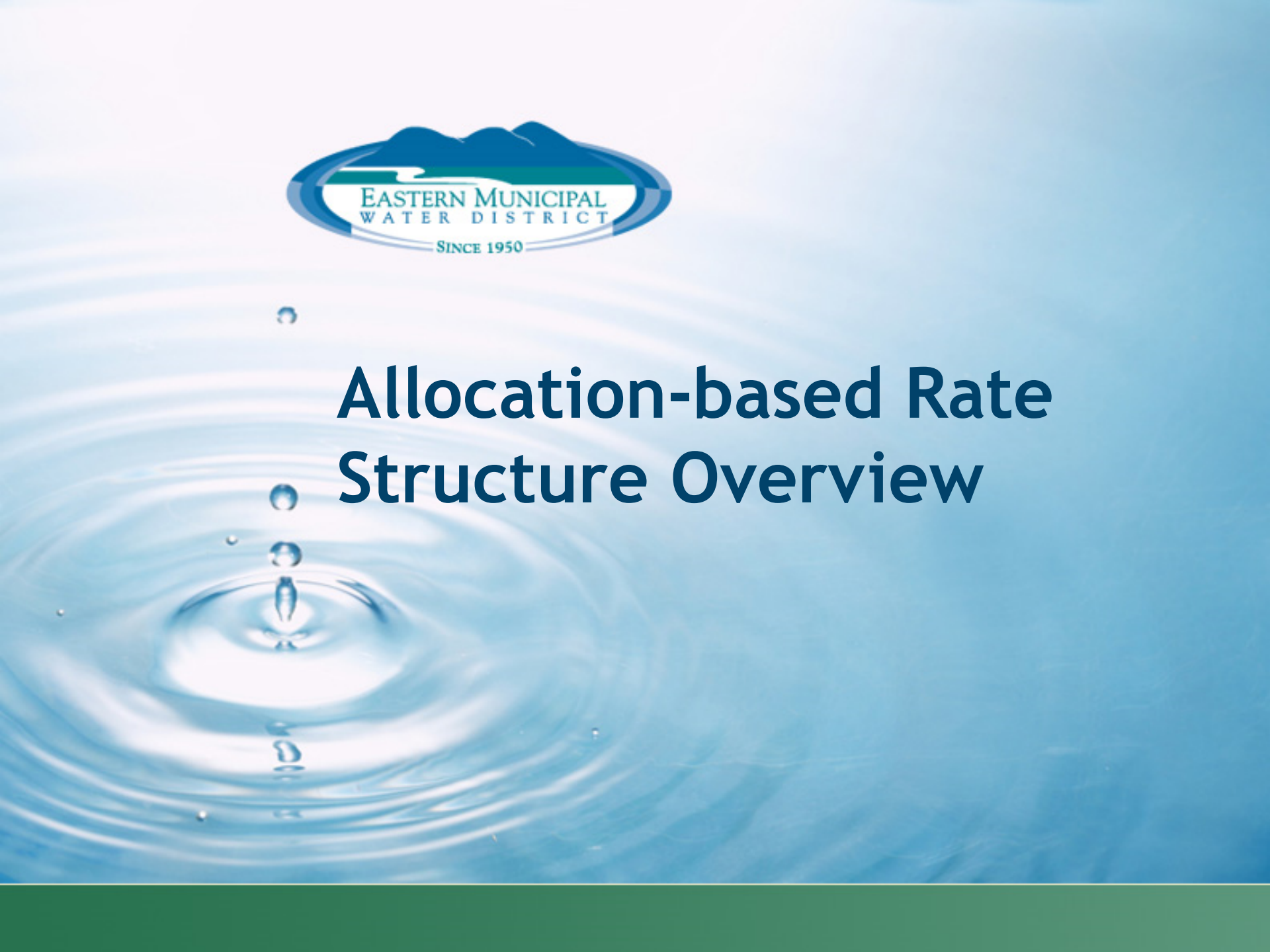
- Numerous Water Agencies Commented on deficiencies in the proposed regulatory framework
  - **No credit** provided to agencies who achieved **conservation prior to 2013**
  - The GPCD data **not adjusted for climate or housing density**
  - The base year/months are **arbitrary and penalize warmer inland areas**
  - **No credit** provided for drought-proof supply development, including recycled water

State Board rejected water industry's call for framework revisions

Southern California agencies worked together to provide a more credible quantitative model that still achieved a 25% statewide savings.

Local Impacts of SWRCB Regulation

Water Supplier	Tier	Standard	Jul – Sept 2014 R-GPCD
Eastern MWD	**7**	**28%**	**130.7**
City of Riverside	7	28%	135.3
Rubidoux CSD	7	28%	158.0
Western – Retail	8	32%	189.2
City of Corona	8	32%	194.3
Jurupa CSD	8	32%	198.6
EVMWD	8	32%	205.8
Lee Lake WD	8	32%	208.1
City of Norco	9	36%	224.3
Rancho California	9	36%	349.1
Coachella Valley WD	9	36%	475.1
Desert Water Agency	9	36%	416.0



Allocation-based Rate Structure Overview

Foundation of EMWD Water Use Efficiency – the Allocation-based Rate Structure

- Commonly Used Names:
  - "Allocation-based Rate Structure"
  - "Water Budget Rate Structure"
  - "Conservation-based Rate Structure"
  - "Tiered Rate Structure"

Same Basic Rate Structure

- Creates an "Allocation" or "Water Budget" for each customer account based upon reasonable indoor and outdoor needs and efficient use.

- Uses Economic Incentives: Water is priced to customer *lower for use within allocation* – much *higher for use over allocation*

Unique Features of an Allocation-based Rate Structure

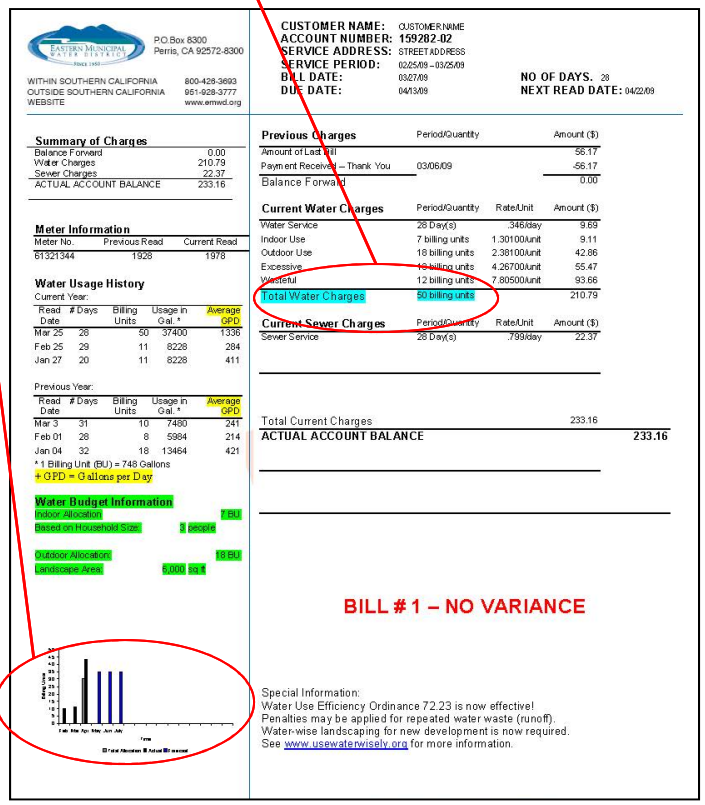
- **Individualized:** based on land-use specific uses (indoor needs) and landscape needs (weather adjusted).
- **Encouraged efficient use pattern:** within allocation through a sharply tiered pricing system
  - Rewards efficiency
  - Communicates cost of water over-use
- **Uses fair premise:** those who over-use pay more, those who use only what they need, pay much less

Unique Features of an Allocation-based Rate Structure

- **Identifies over-use customers:** water bill functions as a "report card" – focus staff resources
- **Provides appropriate nexus:** revenue from over-use tiers reinvested in water use efficiency programs
- **Proven concept:** citied by State Water Resources Control Board as a model structure, University of California Riverside conducting long-term study on impact to efficiency

Identifies excessive and wasteful water use

Provides target for efficiency



EASTERN MUNICIPAL WATER DISTRICT
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Perris, CA 92572-8300
WITHIN SOUTHERN CALIFORNIA 800-426-3693
OUTSIDE SOUTHERN CALIFORNIA 951-928-3777
WEBSITE www.emwd.org

CUSTOMER NAME: CUSTOMER NAME
ACCOUNT NUMBER: 159282-02
SERVICE ADDRESS: STREET ADDRESS
SERVICE PERIOD: 02/25/09 - 03/25/09
BILL DATE: 03/27/09
DUE DATE: 04/13/09
NO OF DAYS. 28
NEXT READ DATE: 04/22/09

Summary of Charges
Balance Forward 0.00
Water Charges 210.79
Sewer Charges 22.37
ACTUAL ACCOUNT BALANCE 233.16

Meter Information
Meter No. 61321344 | Previous Read 1928 | Current Read 1978

Water Usage History
Current Year:

Read Date	# Days	Billing Units	Usage in Gal. *	Average GPD
Mar 25	28	50	37400	1336
Feb 25	29	11	8228	284
Jan 27	20	11	8228	411

Previous Year:

Read Date	# Days	Billing Units	Usage in Gal. *	Average GPD
Mar 3	31	10	7480	241
Feb 01	28	8	5984	214
Jan 04	32	18	13464	421

* 1 Billing Unit (BU) = 748 Gallons
+ GPD = Gallons per Day

Water Budget Information
Indoor Allocation 7 BU
Based on Household Size: 3 people
Outdoor Allocation: 19 BU
Landscape Area: 5,000 sq ft

Previous Charges

	Period/Quantity	Amount ($)
Amount of Last Bill		56.17
Payment Received – Thank You	03/06/09	-56.17
Balance Forward		0.00

Current Water Charges

	Period/Quantity	Rate/Unit	Amount ($)
Water Service	28 Day(s)	.346/day	9.69
Indoor Use	7 billing units	1.30100/unit	9.11
Outdoor Use	18 billing units	2.38100/unit	42.86
Excessive	13 billing units	4.26700/unit	55.47
Wasteful	12 billing units	7.80500/unit	93.66
Total Water Charges	50 billing units		210.79

Current Sewer Charges

	Period/Quantity	Rate/Unit	Amount ($)
Sewer Service	28 Day(s)	.799/day	22.37

Total Current Charges 233.16
ACTUAL ACCOUNT BALANCE 233.16

BILL # 1 – NO VARIANCE

Special Information:
Water Use Efficiency Ordinance 72.23 is now effective!
Penalties may be applied for repeated water waste (runoff).
Water-wise landscaping for new development is now required.
See www.usewaterwisely.org for more information.

How it Works - EMWD's Individualized Allocations

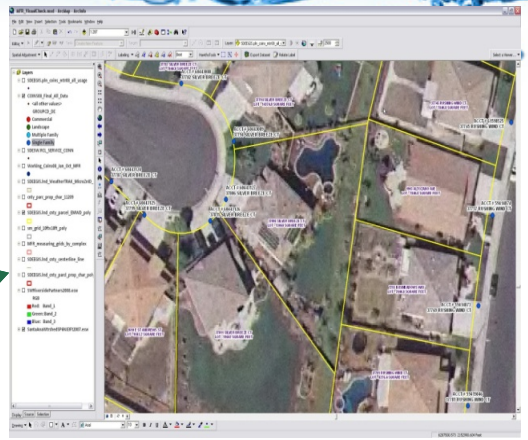
Customer Allocation =
Indoor Needs + Outdoor Needs (seasonal) + Variances

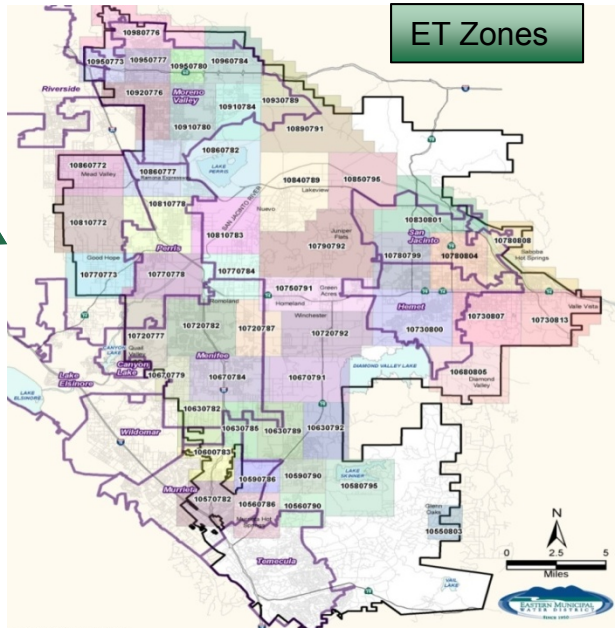
- **Indoor Water Allocation:**
  - 55 gallons per capita per day (GPCD)
  - Single family residential default = 3 person per household
  - Multi-family residential default = 2 person per household
  - Additional allocation for **Variances**
    - Persons per household
    - Medical needs
    - Licensed Care facility
    - Other

Individualized Allocations (cont'd.)

Outdoor Water Allocation (seasonal):

- Irrigated area and Evapotranspiration (ET)
- Irrigated area is:
  - Area from GIS parcel information
  - Measured using infrared aerial photography
  - Verified in the field where necessary
- Evapotranspiration for 50 separate zones
- Account Adjustment (Conservation) Factor:
  - 1.00 - before September 2008
  - 0.80 - September 2008 and January 2010
  - 0.70 - after January 2010
  - **0.50 - July 6, 2015 (new landscape standards)**





EMWD Sends a Clear Pricing Signal

Tier 1: Indoor Use — **$1.73/unit***

- Budget = Number of Persons x 55 Gallons Per Day

Tier 2: Outdoor Use — **$3.16/unit**

- Budget = Landscaped Area and Evapotranspiration

Within Allocation

Tier 3: Excessive — **$5.66/unit**

- Up to 50% use in excess of Indoor and Outdoor budgets

Tier 4: Wasteful — **$10.36/unit**

- Over 50% in excess of Indoor and Outdoor budgets

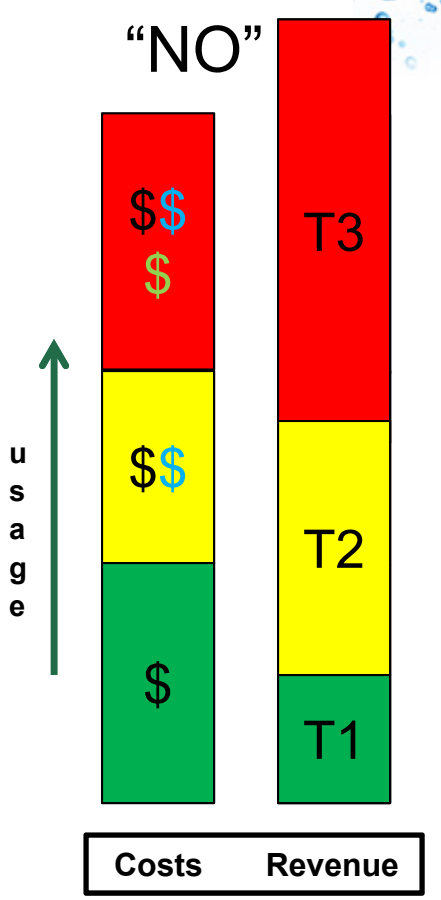
Over-allocation

* One billing unit equals 100 cubic feet

Allocation Rates - Key Structural Issues

Revenue Stability and Defensibility

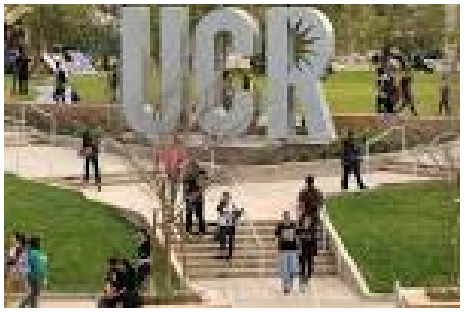
- Critical revenue stability provision - fixed expenses collected from:
  - Fixed (meter) charges; and
  - Bottom volumetric tier(s) which *all* customers pay
- A clear nexus between costs associated with levels of usage (*and over-usage*) and the rates charged for those usage categories.
  - "Cost of service" attribution for each Tier.
- Pricing differential between Tiers not arbitrarily set to simply send a "pricing signal"
- California Constitutional requirement (Proposition 218)



Rate Structure Effectiveness - 2013
University of California Riverside Study

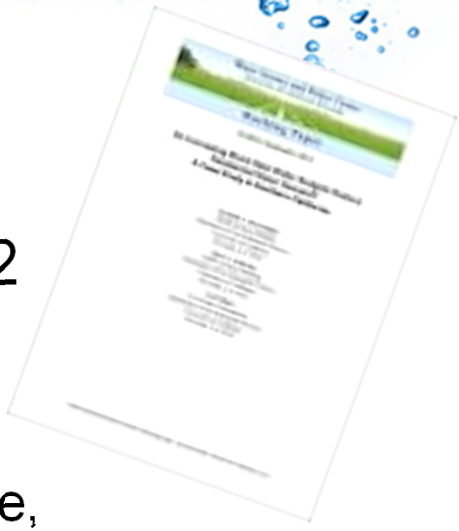
Goal was to answer three questions:

- To what extent have water budgets affected water demand?
- How responsive is water demand to changes in water price?
- How might pricing be used in the future to manage demands in the context of:
  - Population and economic growth
  - Climate related supply challenges



Dr. Ken Baerenklau
Dr. Kurt Schwabe
Dr. Ariel Dinar

Data for UC Riverside Study



Analysis Parameters:

- 13,565 residential accounts
- Continuous records from Jan. 2003 – Sept. 2012
- Data from EMWD:
  - Pricing, usage, household size, irrigated area, voluntary demand curtailment dates, microclimate zone, other EMWD conservation programs.
- Data from other sources:
  - Evapotranspiration from EMWD weather stations, Hydropoint and CIMIS
  - Income, education: U.S. Bureaus of Census and Labor Statistics
- Calibrated analytical modeling

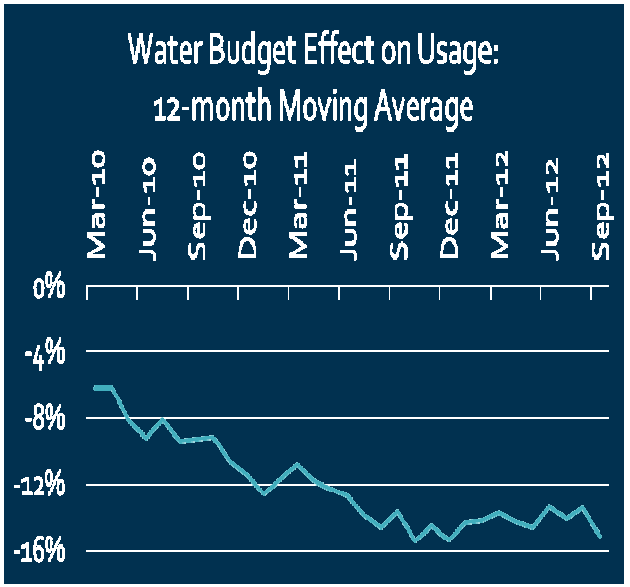
Studying the Efficacy of EMWD's Budget-based Rate Structure

UC RIVERSIDE UNIVERSITY OF CALIFORNIA Water Science and Policy Center

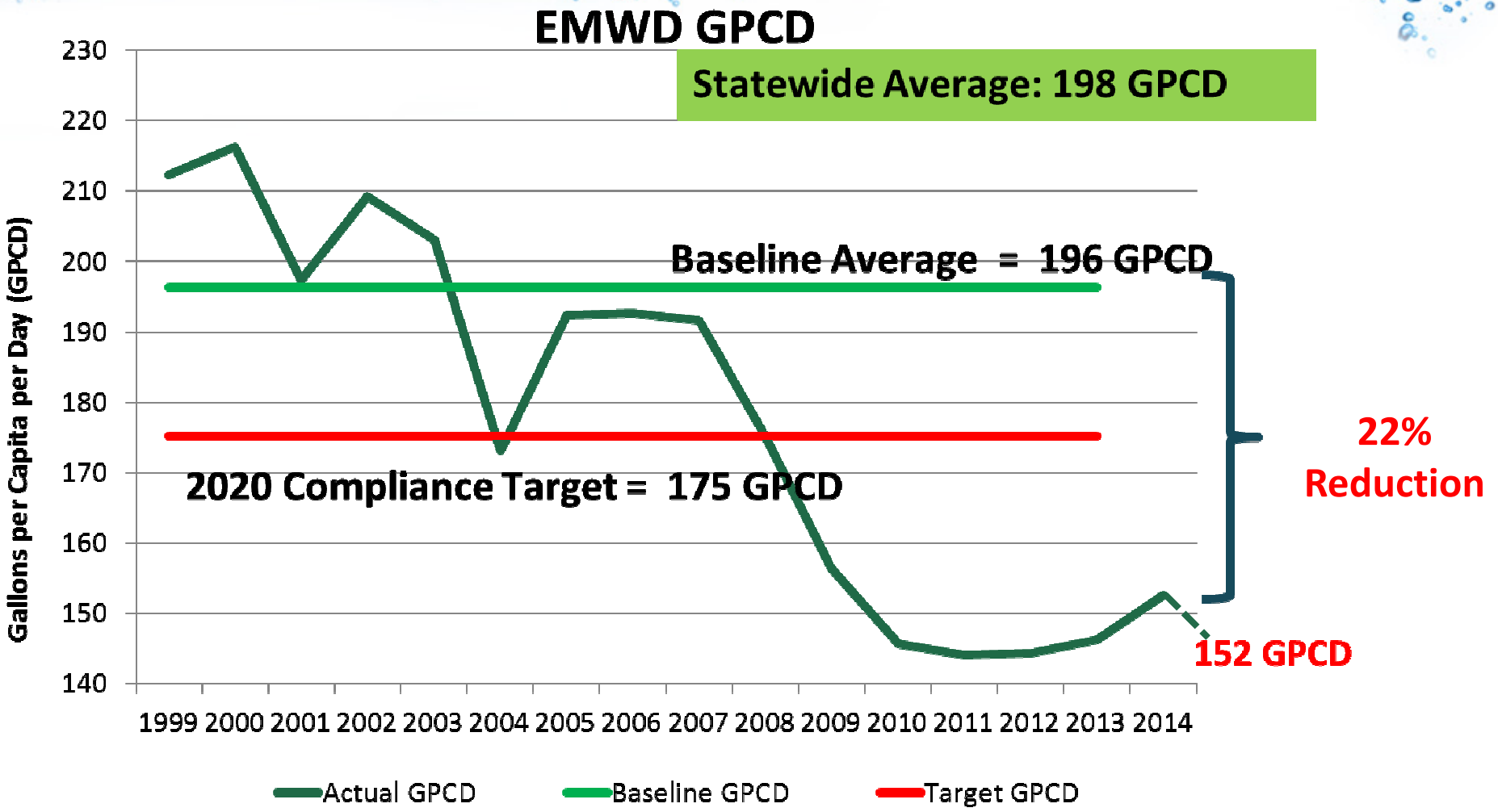
- University of California Riverside key findings:

  "Average prices rose less than 4% under water budgeting, but would have had to rise 34% under flat rate pricing to achieve the same demand effect."

  "Controlling for the effects of inflation and the recent economic downturn, EMWD's Budget-based rate structure resulted in at least a 15% reduction in water use."



Performance and Demand Reduction



EMWD's Drought Response Using the Allocation-based Rate Structure

EMWD's Water Shortage Contingency Plan

- Water Shortage Contingency Plan Prioritizes:
  - Public safety, health and welfare
  - Sustaining economic vitality
  - Quality of life
- Five "Stages" of plan tied to supply or regulatory shortages
  - Progressive actions initially focusing on curtailing outdoor use
    - Mandatory Reductions begin in Stage 3
  - Elimination of all outdoor use in Stage 5
- Addresses all customer groups with indoor residential and commercial/industrial given highest priority.

Primary Enforcement of WSCP is through Allocation-based Rate Structure

EMWD Water Shortage Contingency Plan

Stage	Date Approved	Description	Actions
Stage 1	April 2011	Supply Watch	Voluntary reduction up to 10%
Stage 2	April 2014	Supply Alert	Voluntary reduction up to 25%
Stage 3	August 2014 (3a)	Mandatory Waste Reduction	**3a: No variance adjustments; observation based penalties** 3b: Tier 3 budgets decreased by 50% 3c: Tier 3 budgets decreased by 100%
Stage 4		Mandatory Outdoor Reduction	Watering schedules limited (1-2 days/week) 4a: Tier 2 budgets decreased by 10% 4b: Tier 2 budgets decreased by 50% 4c: Tier 2 budgets decreased by 100%
Stage 5		Mandatory Indoor Reductions	Catastrophic stage (50% reduction in demand) 5a: Tier 1 budgets decreased by 10% 5b: Tier 1 budgets decreased by 30% 5c: Tier 1 budgets decreased by 50%

EMWD Response to SWRCB Regulations

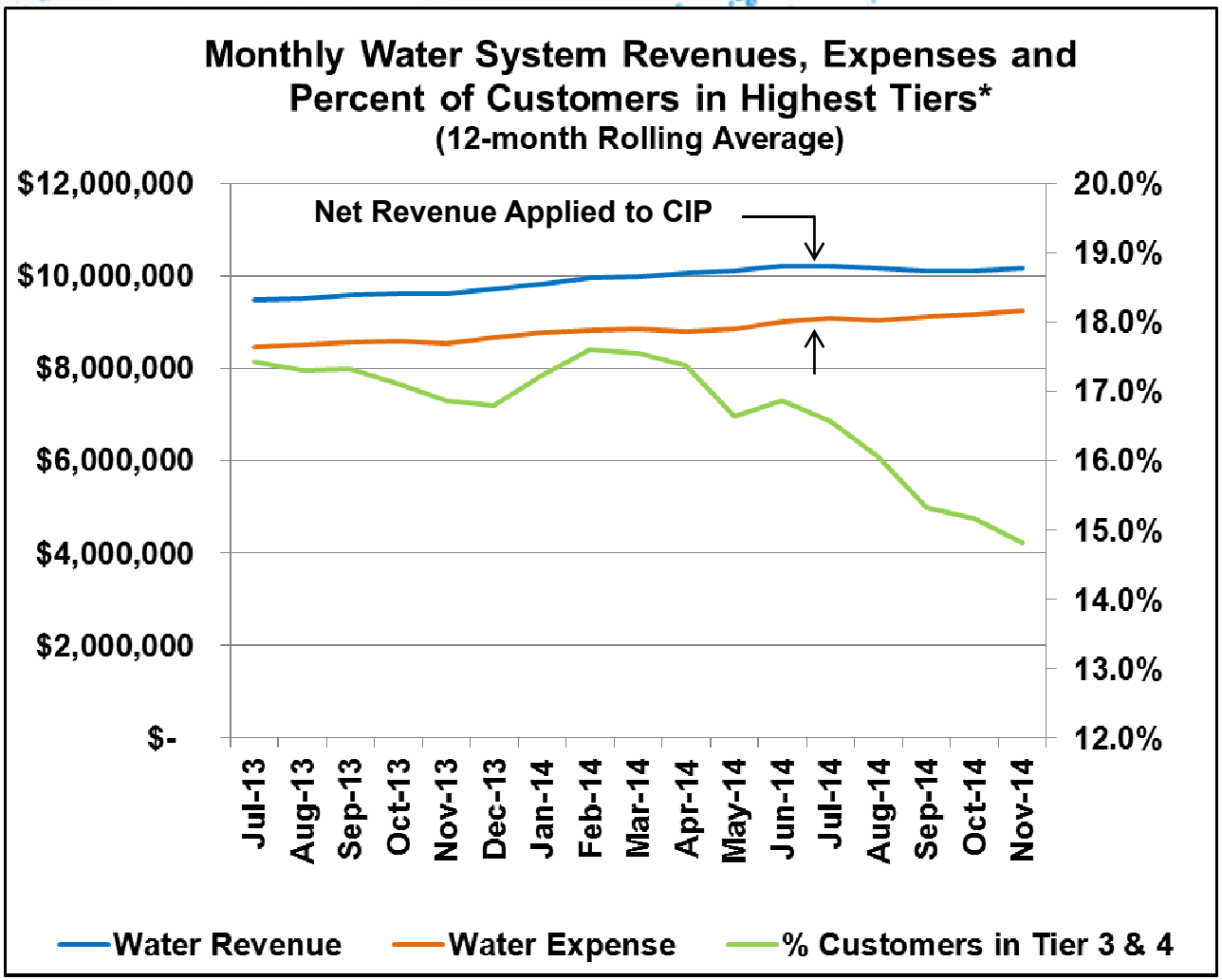
Stage 4a – "Mandatory Outdoor Reduction" supports achieving the State mandated 28% savings level.

- Enforcement provisions through rate structure:
  - Tier 3 rate is eliminated
  - Tier 2 (outdoor) allocation reduced by 10 percent
  - Effective immediately
  - Changes will appear on bills dated after July 1, 2015
- New Landscape Standards (0.5 Et) and elimination of "Non-Functional" turf

Example of Customer Impact - Stage 4 "Mandatory Outdoor Use Reduction"

	Customer 1 (Wasteful)				Customer 2 (Efficient)			
	Tier	Usage (BU)	Water Rate	Water Cost	Tier	Usage (BU)	Water Rate	Water Cost
Without Stage 4	Indoor	8	$1.79	$14.34	Indoor	8	$1.79	$14.34
	Outdoor	13	$3.28	$43.28	Outdoor	11	$3.28	$36.08
	Excessive	9	$5.88	$52.91	Excessive		$5.88	$0.00
	Wasteful		$10.76	$0	Wasteful		$10.76	$0.00
	Total			**$109.91**	**Total**			**$50.42**
With Stage 4	Indoor	8	$1.79	$14	Indoor	8	$1.79	$14.34
	Outdoor	12	$3.28	$39	Outdoor	11	$3.28	$36.08
	~~Excessive~~	⇩	$5.88	~~$0~~	~~Excessive~~		$5.88	~~$0~~
	Wasteful	10	$10.76	$108	Wasteful		$10.76	$0
	Total			**$161**	**Total**			**$50.42**

Revenue Stability



*includes fixed and variable revenues and expenses

- Tiered commodity sales declined 7.7% in 2014 from calls for additional conservation.
- Mitigated by allocation of fixed costs to meter charge and bottom tiers.
- Net Operating Revenue applied to capital projects remained steady.

Rating Agency Comments

Fitch Ratings

"The impact on credit quality will depend heavily on utilities' rate-setting decisions … **[EMWD] in Riverside County, California has significant fixed meter charges and water budget-based rate structures in which tier sizes can be adjusted to reflect drought stresses and supply availability."**

"...self-stabilizing rate structure..."

April 8, 2015: California Water Restrictions May Sink Utility Revenue

Summary

EMWD's Allocation-based Rate Structure:

- Encourages efficient use and has resulted in demonstrated minimum savings of 15%.
  - Higher savings achievable when paired with other water use efficiency programs.
- Attributes higher cost supplies, charges and program expenses to those customers triggering such expenses.
- Is key tool in EMWD's Water Shortage Contingency Plan to compel conservation.
- Results in greater revenue stability during periods of demand curtailment.
  - Consistent fixed cost recovery on all customers
  - Rating Agencies: "Self-stabilizing" rate structure

EASTERN MUNICIPAL WATER DISTRICT

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