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Increasing Confidence in Your Water Shortage Contingency Plans

WATER SMART INNOVATIONS 2021

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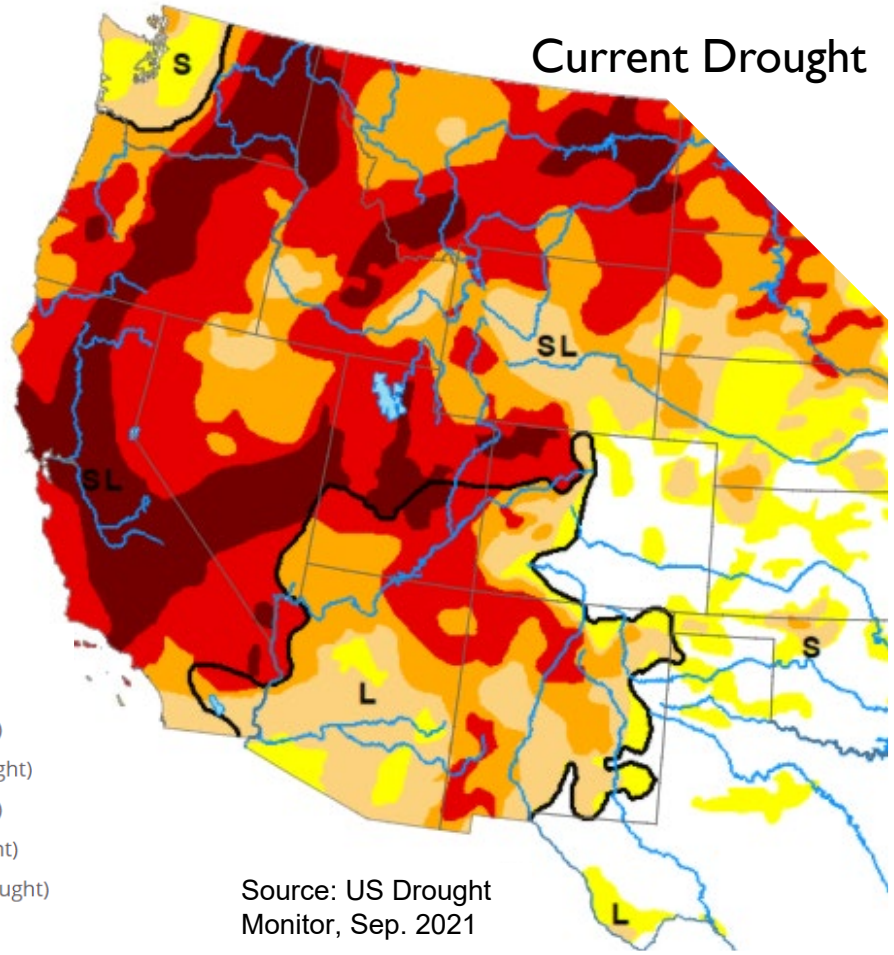
eki environment & water

OVERVIEW

- Drought Response Outlook and Planning
- Water Shortage Contingency Plan (WSCP) Introduction
- New to the 2020 WSCPs
- Modeling Using Drought Response Tool (DRT)
- Applicability to New Requirements
- Lessons Learned and Discussion

UNPRECEDENTED DROUGHT CHANGED OUR OUTLOOK

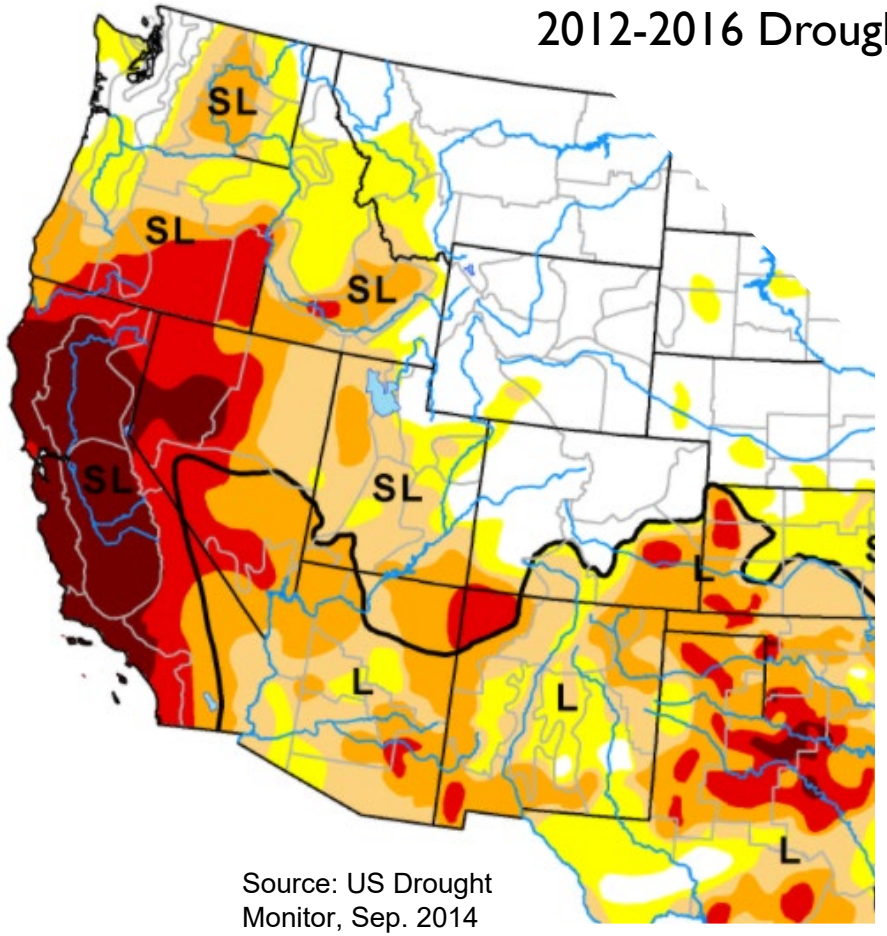
Current Drought



Intensity
- None
- D0 (Abnormally Dry)
- D1 (Moderate Drought)
- D2 (Severe Drought)
- D3 (Extreme Drought)
- D4 (Exceptional Drought)
- No Data

Source: US Drought Monitor, Sep. 2021

2012-2016 Drought



Source: US Drought Monitor, Sep. 2014

INTRODUCTION TO WATER SHORTAGE CONTINGENCY PLANS (WSCPs)

- Comprehensive drought response plan
- Component of a California state-required Supply Planning Document
  - California Water Code §10632: Urban water suppliers must develop a water shortage contingency plan which indicates the actions the supplier will take in response to supply shortages of six standard levels (10% to >50%).
- Most western states have similar regulations for drought management
  - Oregon
  - Washington
  - Arizona
  - Colorado
  - Nevada

WSCP ELEMENTS

1. Water supply reliability analysis
2. Annual assessment procedures
3. Six standard shortage stages
4. Shortage response actions
5. Communication protocols
6. Compliance and enforcement
7. Legal authorities
8. Financial consequences
9. Monitoring and reporting
10. WSCP refinement procedures

NEW TO THE 2020 WSCPs

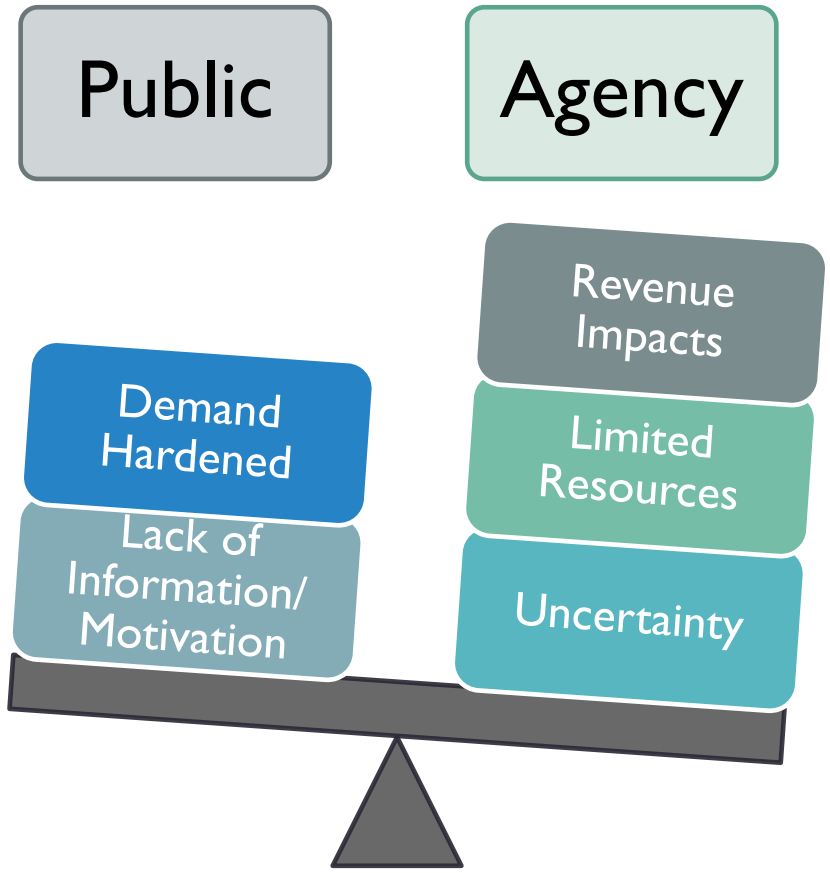
- California Water Code §10632(a)(3)(A): Six standard water shortage levels corresponding to progressive ranges of up to 10-, 20-, 30-, 40-, and 50-percent shortages and greater than 50-percent shortage.
- California Water Code §10632(a)(4)(E): Agencies are required to provide "*an estimate of the extent to which the gap between supplies and demand will be reduced by implementation*" of each demand reduction action.

2015 UWMP Stage	Supply Condition/ Shortage		2020 WSCP Level	Shortage Level
1 - Voluntary	Normal	→	1	≤10%
2 – Water Alert	Slightly Restricted (12%)	→	2	10 - 20%
3 – Water Warning	Moderately Restricted (20%)	→	3	20 - 30%
4 – Water Criteria	Severely Restricted (35%)	→	4	30 - 40%
		→	5	40 - 50%
5 – Water Emergency	Extremely Restricted (>50%)	→	6	>50%

Source: UWMP Guidebook, April 2021

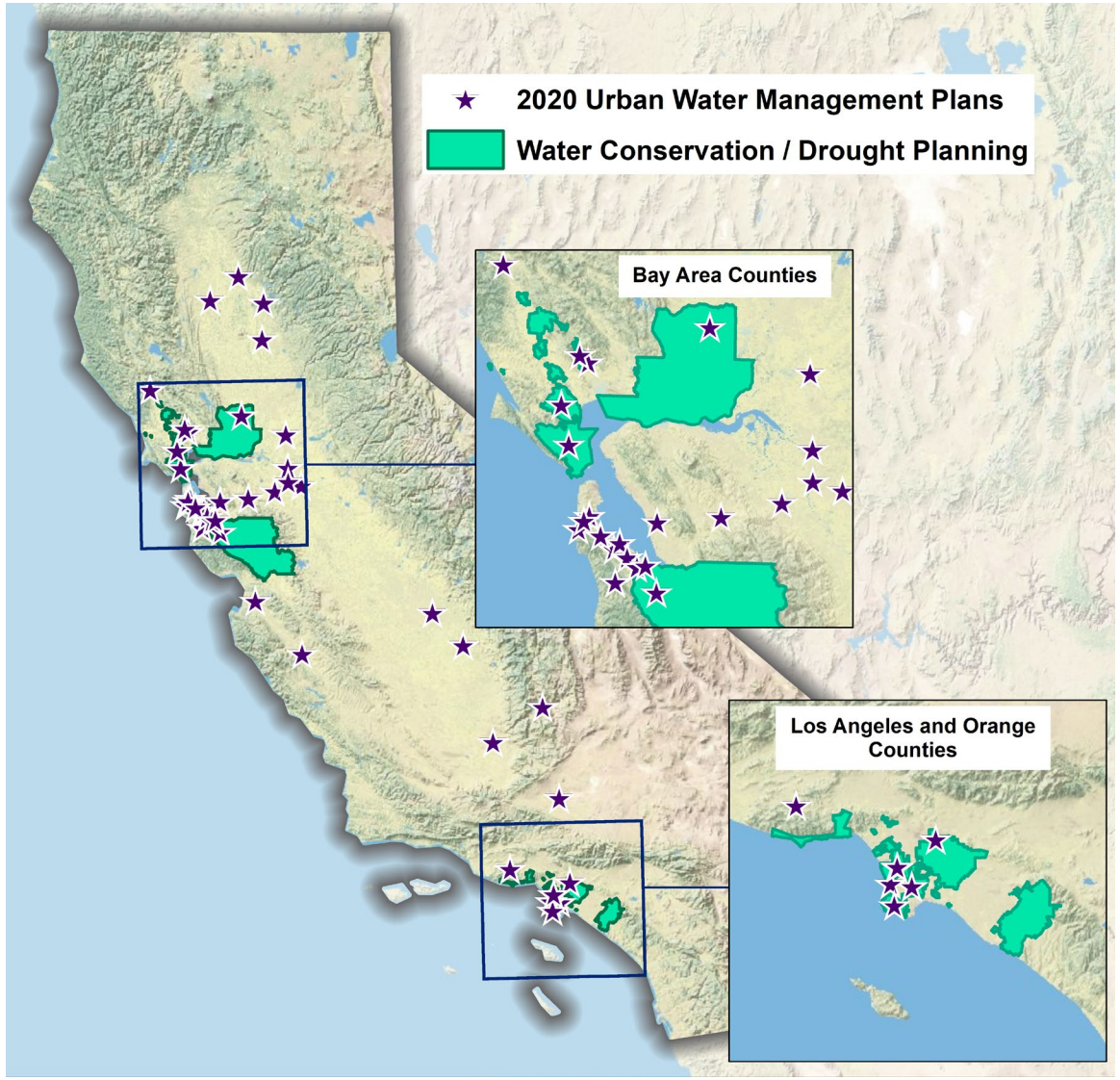
WHY IS DROUGHT RESPONSE SO DIFFICULT?

- Meeting regulatory requirements
- Supporting economic development and quality of life in the communities you serve
- Demand hardening
- Financial solvency
- Uncertainty



APPLICATION TO UWMPS & WSCPS

- 40+ 2020 UWMPs and WSCPs across the state:
  - City of Menlo Park
  - Redwood City
  - City of Burlingame
  - Westborough Water District
  - City of Lathrop
  - Valley of the Moon Water District
  - City of Tracy
  - City of East Palo Alto
  - Etc.



ELEMENTS OF A STRONG DROUGHT RESPONSE PLAN

- Reflects the interests of the Agency, its Governing Body, the Customers
- Process that engages and is transparent to the public
- Determines the triggers for the declaration of a water shortage emergency
- Define the Stages of Action and response measures
  - Provides a roadmap for who does what when

IDENTIFY DROUGHT RESPONSE OPTIONS AND ACTIONS

- Identify and think about:

What is the Max Savings Potential?	• By Sector • By End Use
How to Achieve Savings	• Regional Actions • Agency Actions • Customer Actions
How does the tool meet the new 2020 WSCP requirements	• Quantitative Analytical Tool • By different stages

DWR REQUIRED TABLE

- Locally appropriate "shortage response actions" for each shortage level, with a corresponding estimate of the extent the action will address the gap between supplies and demands.
- DRT can be applied to meet the new requirement.

Table 8-2 Demand Reduction Actions

Shortage Level	Demand Reduction Actions	How much is this going to reduce the shortage gap?	Additional Explanation or Reference *(optional)*	Penalty, Charge, or Other Enforcement?
NOTES:				

DROUGHT RESPONSE TOOL (DRT)

- High-level planning tool developed mid-drought in 2015
- Excel Spreadsheet Model
- Graphical and tabular inputs/outputs
- Supports new WSCP requirements

AGENCY INPUT

Agency Information

- Production data
- Water use by sector
- Accounts by sector
- Population
- Savings goal

AGENCY INPUT

Select Drought Response Actions

- Agency actions
- Customer actions
- Compliance rate

OUTPUT

Estimated Water Savings Potential

- Water savings by end-use
- Water savings by sector
- Total water savings

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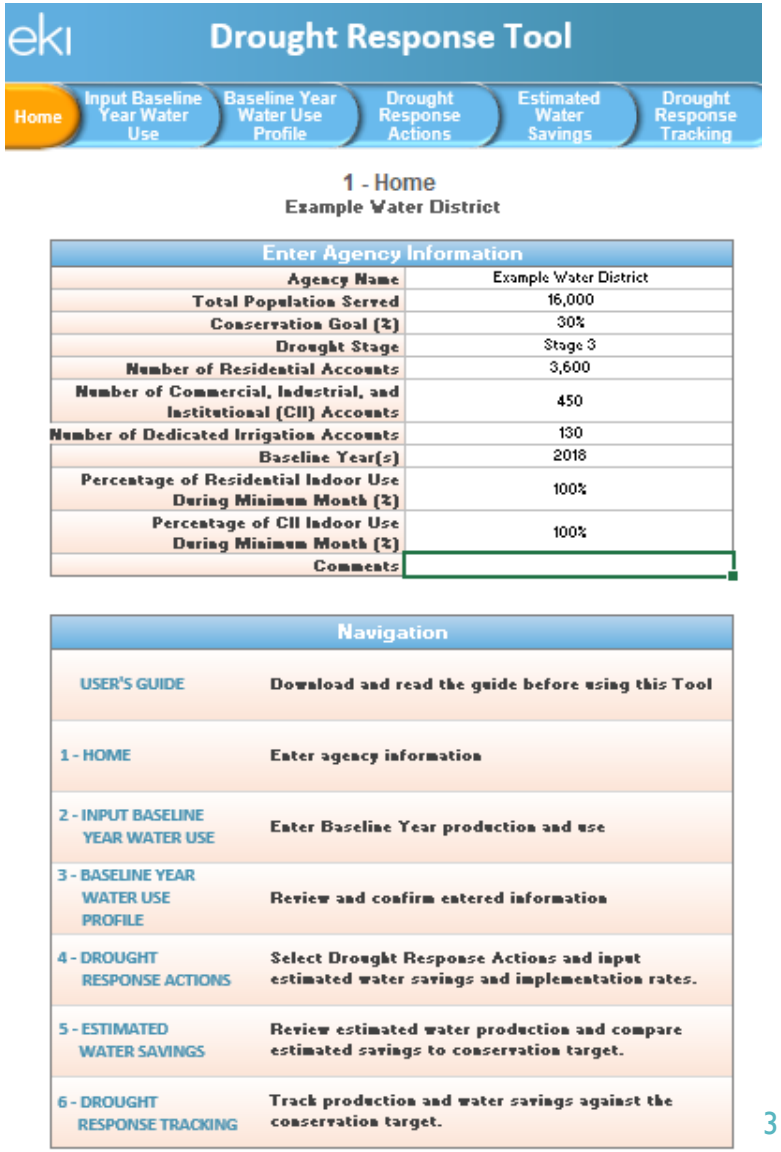
QUANTITATIVE APPROACH TO DROUGHT RESPONSE PLANNING

- Developed a quantitative analytical tool to develop water allocation method & stages of action:
  - Based on system-specific data
  - Allows testing of different water savings strategies
  - Compare/contrast different consumption reduction methods
  - Ability to analyze economic impacts
- Allow agencies to meet the requirements easier:
  - Have confidence in water savings potential
  - Supports communication with management, elected officials and the public



Drought Response Tool

Home | Input Baseline Year Water Use | **Baseline Year Water Use Profile** | Drought Response Actions | Estimated Water Savings | Drought Response Tracking

3 - Baseline Year (2018) Water Use Profile

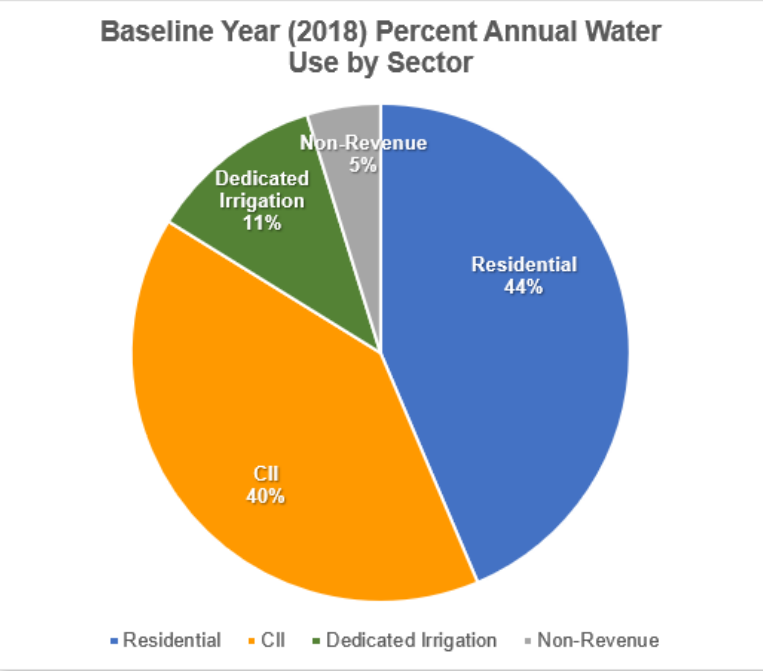
Example Water District

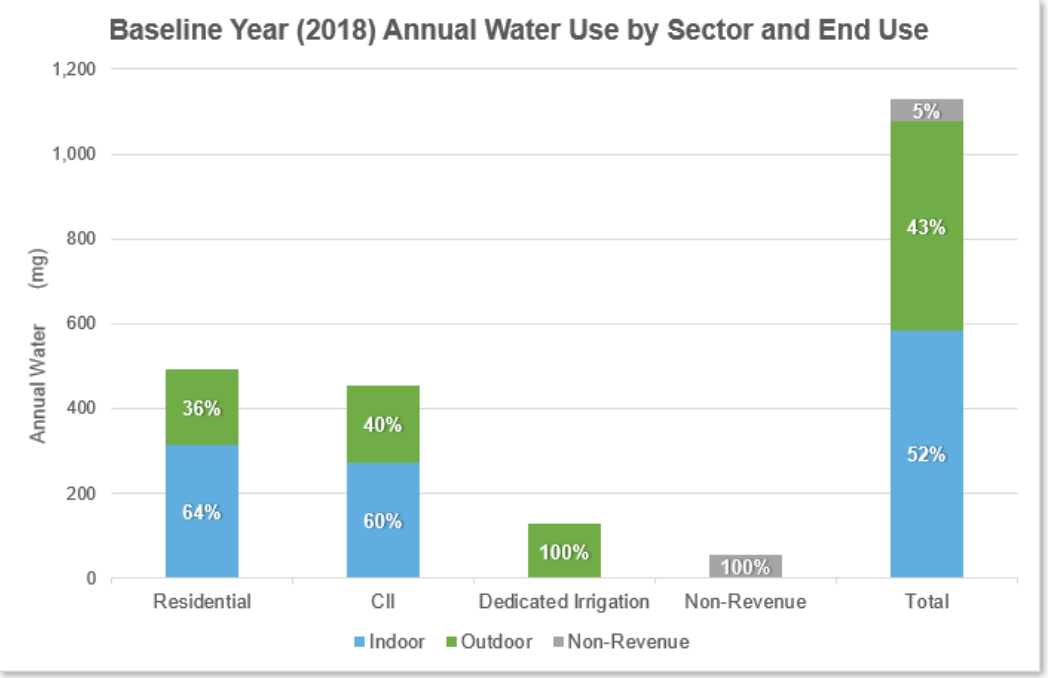
Baseline Year (2018) Annual Water Use Summary

Units: (mg)

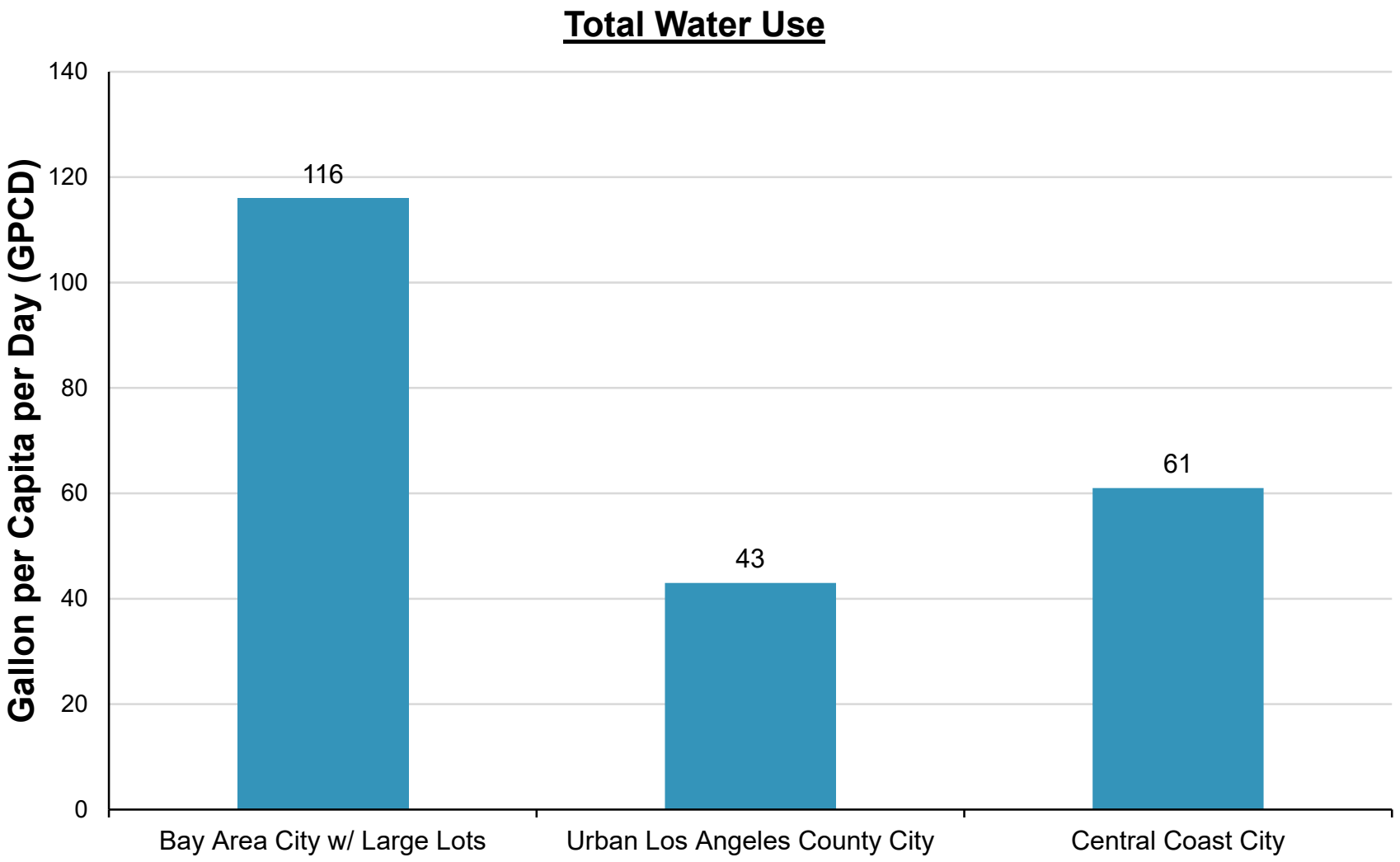
A summary of your Baseline Year water use by sector and major end use category is shown below. Select the units in which your production and use data are displayed.

Water Use	Total Production (mg)	Water Use (mg)				Comments
		Residential	CII	Dedicated Irrigation	Non-Revenue	
Total	1,130	493	454	129	54	
Total Indoor	585	314	272	--	--	
Total Outdoor	491	179	183	129	--	
Total Non-Revenue	54	--	--	--	54	
Total Indoor %	52%	64%	60%	0%	--	
Total Outdoor %	43%	36%	40%	100%	--	
Total Non-Revenue %	5%	--	--	--	100%	



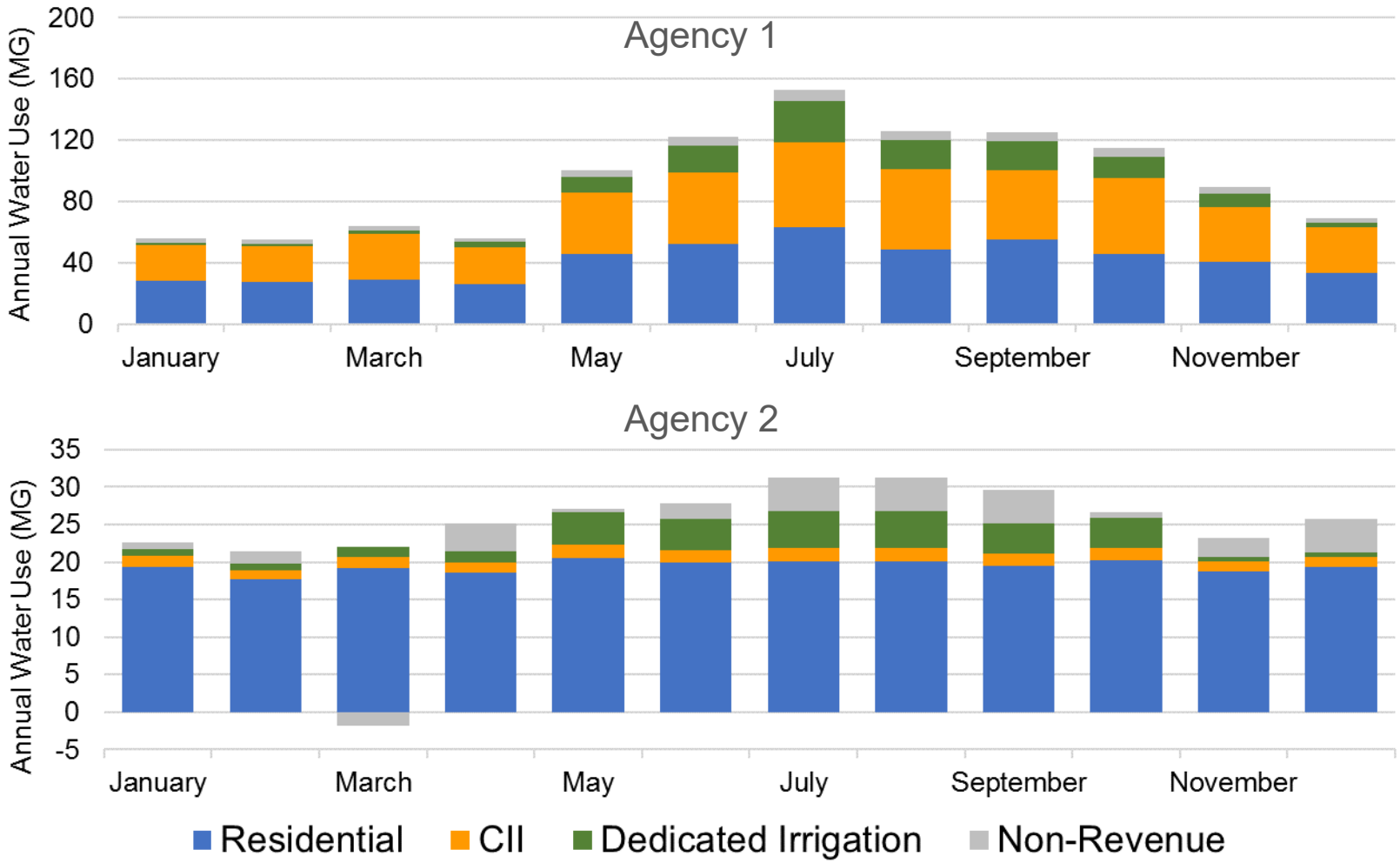


AGENCIES ARE STARTING FROM DIFFERENT BASELINES



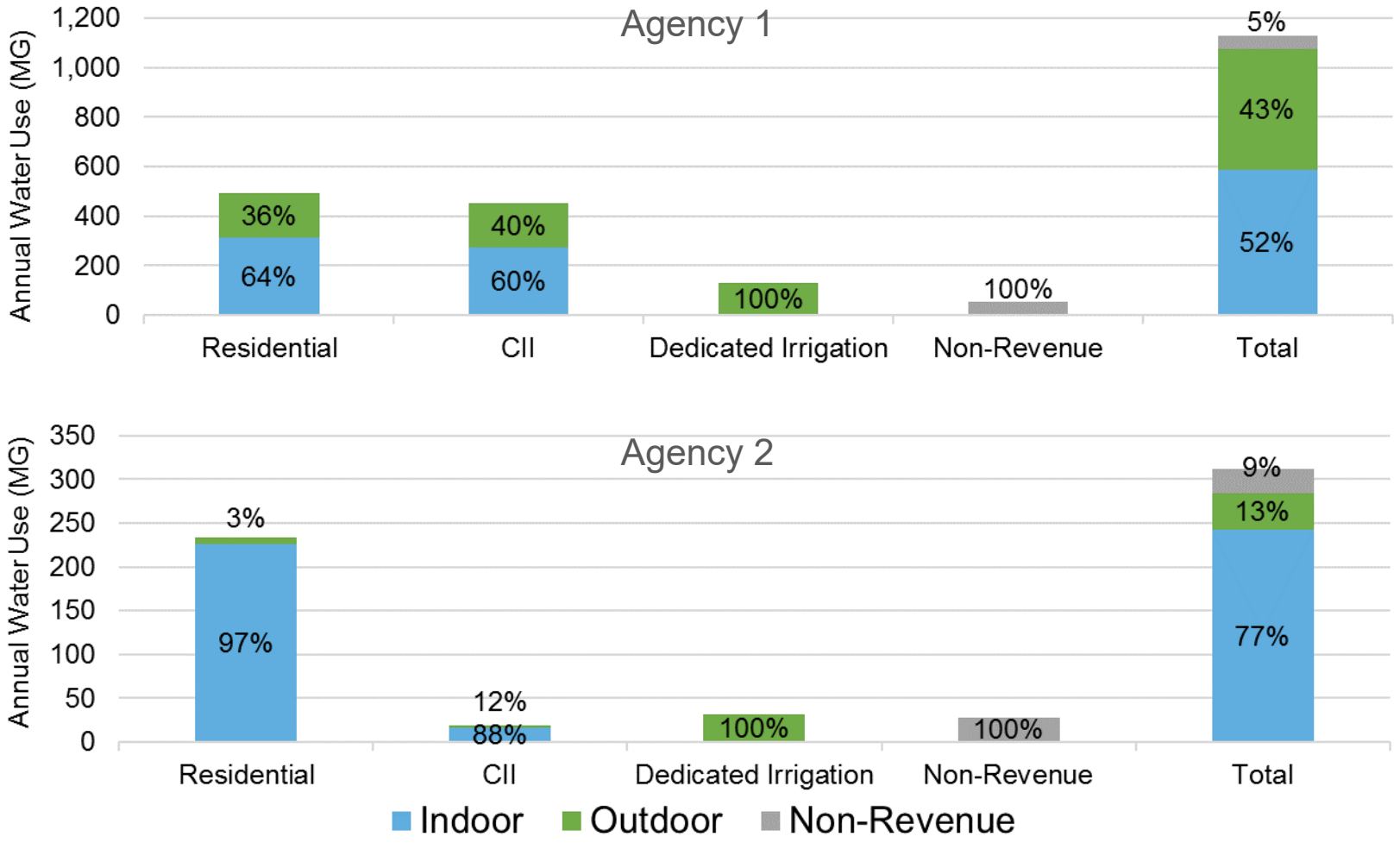
USE BASELINE ANALYSIS TO IDENTIFY SECTORS

Baseline Year (Non-Drought) Monthly Total Water Use by Sector



…AND MORE DISCRETIONARY WATER USE / SAVINGS POTENTIAL

Baseline Year (Non-Drought) Indoor Vs. Outdoor Water Use by Customer Type



THE DRT MODELS WATER SAVINGS FROM A VARIETY OF MEASURES

Types of drought response measures

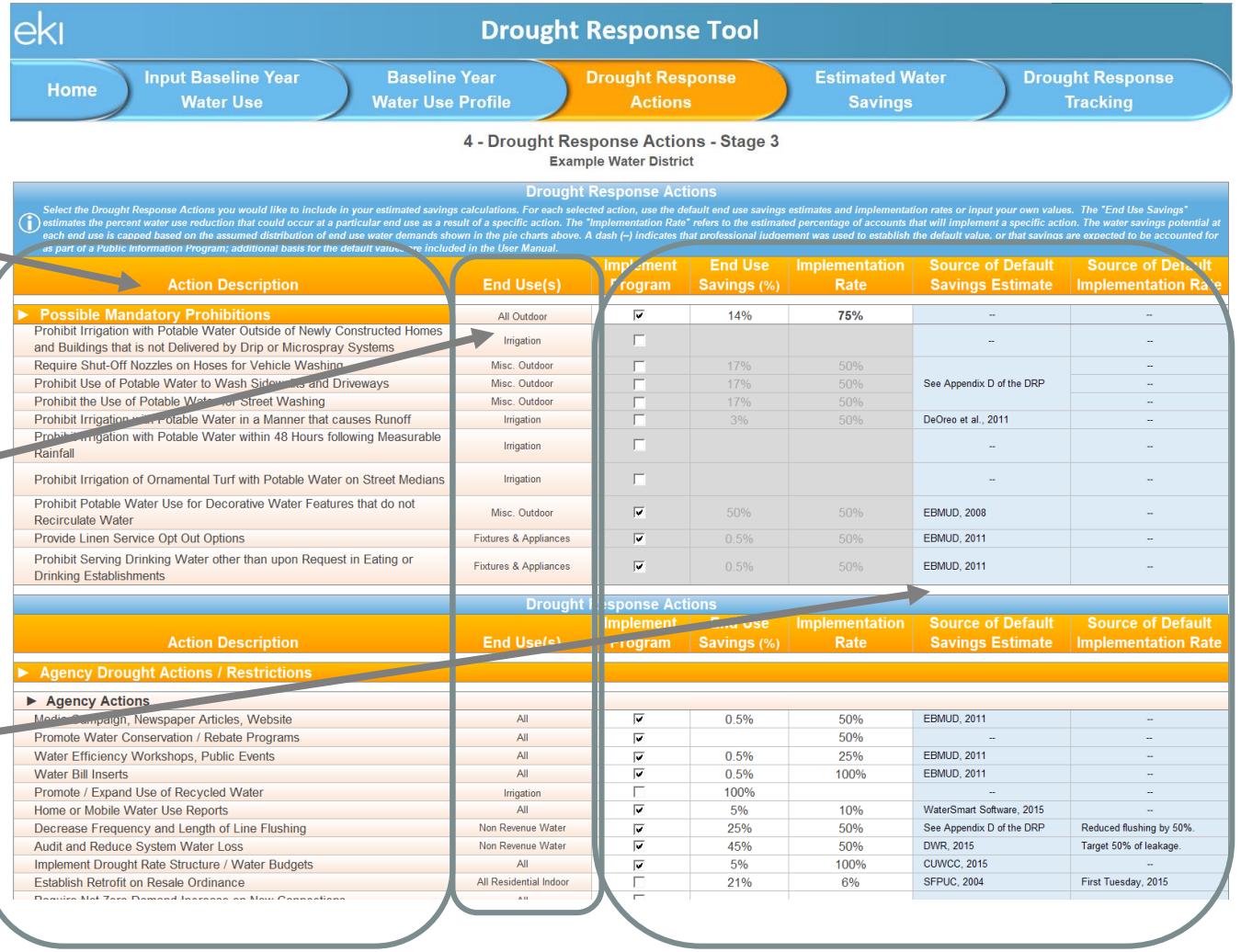
- State mandatory prohibitions
- Accelerated implementation of rebate programs
- Agency actions
- Customer / end use prohibitions

Grouped by sector and by end use

- Residential, CII, irrigation
- Indoor, outdoor, non-revenue

Fully customizable

- Each measure has default water savings and implementation rate based on literature



SELECT AND COMPARE DROUGHT RESPONSE ACTIONS

Drought Response Actions						
Action Description	End Use(s)	Implement Program	End Use Savings (%)	Implementation Rate	Source of Default Savings Estimate	Source of Default Implementation
▶ **Agency Drought Actions / Restrictions**						
▶ **Agency Actions**						
Media Campaign, Newspaper Articles, Website	All	☑	0.5%	50%	EBMUD, 2011	--
Promote Water Conservation / Rebate Programs	All	☑		50%	--	--
Water Efficiency Workshops, Public Events	All	☑	0.5%	25%	EBMUD, 2011	--
Water Bill Inserts	All	☑	0.5%	100%	EBMUD, 2011	--
Promote / Expand Use of Recycled Water	Irrigation	☐	100%		--	--
Home or Mobile Water Use Reports	All	☐	5%	10%	WaterSmart Software, 2015	--
Decrease Frequency and Length of Line Flushing	Non Revenue Water	☐	25%	50%	See Appendix D of the DRP	Reduced flushing by 50%.
Audit and Reduce System Water Loss	Non Revenue Water	☐	45%	50%	DWR, 2015	Target 50% of leakage.
Implement Drought Rate Structure / Water Budgets	All	☑	5%	100%	CUWCC, 2015	--
Establish Retrofit on Resale Ordinance	All Residential Indoor	☐	21%	6%	SFPUC, 2004	First Tuesday, 2015
Require Net Zero Demand Increase on New Connections	All	☐			--	--
Moratorium on New Connections	All	☐			--	--
Move to Monthly Metering / Billing	All	☐	5%	10%	See Appendix D of the DRP	--
Increase Water Waste Patrols / Enforcement	All	☑			--	--
Establish Drought Hotline	All	☑			--	--
Reduce Distribution System Pressures	Non Revenue Water	☐	4.5%	100%	CUWCC, 2010; DWR, 2015	--
▶ **Dedicated Irrigation**						
Conduct Irrigation Account Surveys	Irrigation	☑	30%	10%	EBMUD, 2011	--
Limit Irrigation Days, Time and Duration (Select One)						
Limit Irrigation to 2 Days/Week, 15 Minutes/Day, Between 9PM and 6AM	Irrigation	☑	38%	50%	UC IPM, 2014	--
Limit Irrigation to 1 Day/Week, 10 Minutes/Day, Between 9PM and 6AM	Irrigation	☐	79%	50%		
Prohibit use of Potable Water for Irrigation	Irrigation	☐	100%	50%		
Require Repair of all Leaks within 24 hours	External Leaks	☑	100%	5%	--	--
- OR -						
Establish Water Budget - 25% Reduction	Irrigation	☐	25%	50%	--	--
Establish Water Budget - 50% Reduction	Irrigation	☐	50%	50%	--	--
Establish Water Budget - 75% Reduction	Irrigation	☐	75%	50%	--	--

SELECT AND COMPARE DROUGHT RESPONSE ACTIONS

Drought Response Actions						
Action Description	End Use(s)	Implement Program	End Use Savings (%)	Implementation Rate	Source of Default Savings Estimate	Source of Default Implementation
▶ Agency Drought Actions / Restrictions						
▶ Agency Actions						
Media Campaign, Newspaper Articles, Website	All	☑	0.5%	50%	EBMUD, 2011	--
Promote Water Conservation / Rebate Programs	All	☑		50%	--	--
Water Efficiency Workshops, Public Events	All	☑	0.5%	25%	EBMUD, 2011	--
Water Bill Inserts	All	☑	0.5%	100%	EBMUD, 2011	--
Promote / Expand Use of Recycled Water	Irrigation	☐	100%		--	--
Home or Mobile Water Use Reports	All	☐	5%	10%	WaterSmart Software, 2015	--
Decrease Frequency and Length of Line Flushing	Non Revenue Water	☐	25%	50%	See Appendix D of the DRP	Reduced flushing by 50%.
Audit and Reduce System Water Loss	Non Revenue Water	☐	45%	50%	DWR, 2015	Target 50% of leakage.
Implement Drought Rate Structure / Water Budgets	All	☑	5%	100%	CUWCC, 2015	--
Establish Retrofit on Resale Ordinance	All Residential Indoor	☐	21%	6%	SFPUC, 2004	First Tuesday, 2015
Require Net Zero Demand Increase on New Connections	All	☐			--	--
Moratorium on New Connections	All	☐			--	--
Move to Monthly Metering / Billing	All	☐	5%	10%	See Appendix D of the DRP	--
Increase Water Waste Patrols / Enforcement	All	☑			--	--
Establish Drought Hotline	All	☑			--	--
Conduct Irrigation Account Surveys	Irrigation	☑	30%	10%	EBMUD, 2011	--
Limit Irrigation Days, Time and Duration (Select One)						
Limit Irrigation to 2 Days/Week, 15 Minutes/Day, Between 9PM and 6AM	Irrigation	☑	38%	50%	UC IPM, 2014	--
Limit Irrigation to 1 Day/Week, 10 Minutes/Day, Between 9PM and 6AM	Irrigation	☐	79%	50%		
Prohibit use of Potable Water for Irrigation	Irrigation	☐	100%	50%		
Require Repair of all Leaks within 24 hours	External Leaks	☑	100%	5%	--	--
- OR -						
Establish Water Budget - 25% Reduction	Irrigation	☐	25%	50%	--	--
Establish Water Budget - 50% Reduction	Irrigation	☐	50%	50%	--	--
Establish Water Budget - 75% Reduction	Irrigation	☐	75%	50%	--	--

MODEL FOR EFFECTIVE, MORE PREDICTABLE SAVINGS

eki **Drought Response Tool**

Home | Input Baseline Year Water Use | Baseline Year Water Use Profile | Drought Response Actions | **Estimated Water Savings** | Drought Response Tracking

5 - Estimated Water Savings - Stage 3

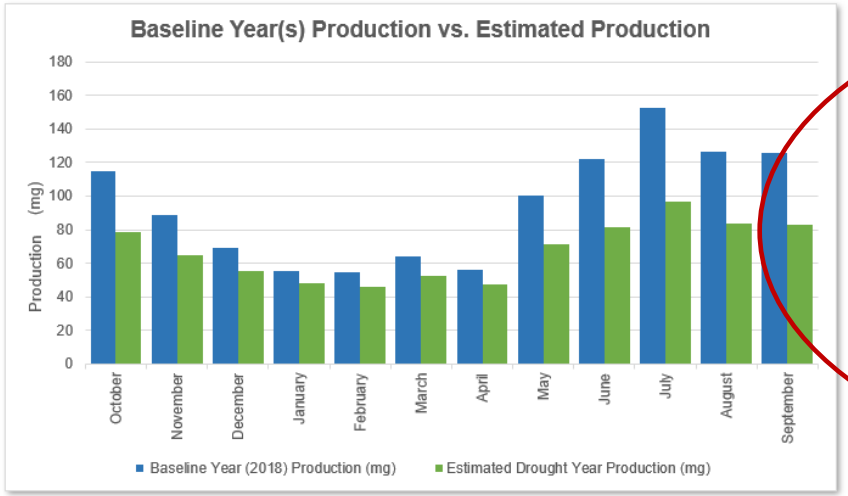
Example Water District

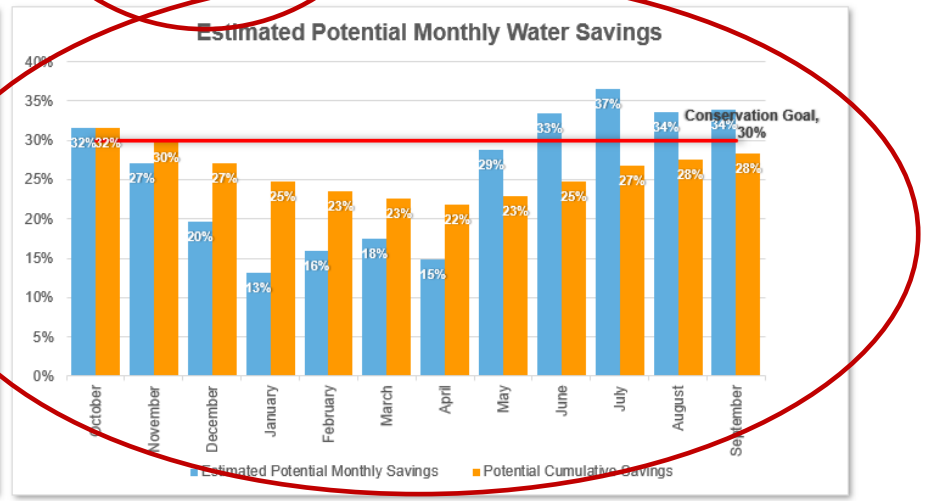
Estimated Monthly Water Use and Savings Summary

Units: (mg)

This provides a summary of the estimated production relative to Baseline Year production and potential water savings, assuming implementation of selected actions at the water savings and implementation rates indicated in the Drought Response Actions worksheet. Select the units that your production data are displayed in.

Month	Baseline Year (2018) Production (mg)	Estimated Drought Year Production (mg)	Estimated Potential Monthly Savings	Potential Cumulative Savings	Conservation Goal	Comments
October	115	78	32%	32%	30%	
November	89	65	27%	30%	30%	
December	69	56	20%	27%	30%	
January	56	48	13%	25%	30%	
February	55	46	16%	23%	30%	
March	64	53	18%	23%	30%	
April	56	48	15%	22%	30%	
May	100	71	29%	23%	30%	
June	122	81	33%	25%	30%	
July	153	97	37%	27%	30%	
August	126	84	34%	28%	30%	
September	125	83	34%	28%	30%	





MODEL FOR EFFECTIVE, MORE PREDICTABLE SAVINGS

eki **Drought Response Tool**

Home | Input Baseline Year Water Use | Baseline Year Water Use Profile | Drought Response Actions | **Estimated Water Savings** | Drought Response Tracking

5 - Estimated Water Savings - Stage 3

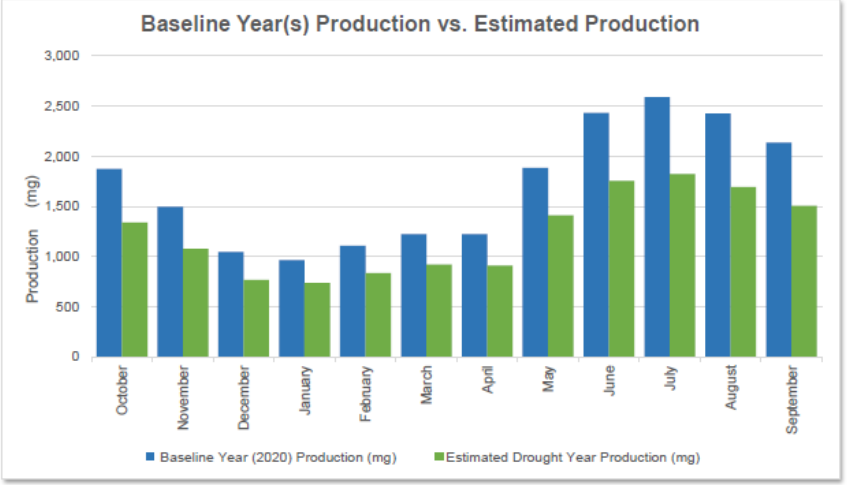
Bakersfield

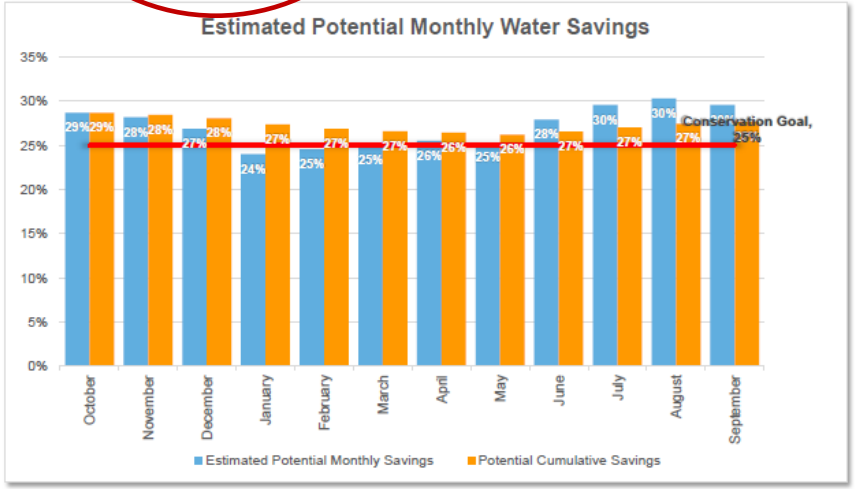
Estimated Monthly Water Use and Savings Summary

Units: (mg)

This provides a summary of the estimated production relative to Baseline Year production and potential water savings assuming implementation of selected actions at the water savings and implementation rates indicated in the Drought Response Actions worksheet. Select the units that your production data are displayed in.

Month	Baseline Year (2020) Production (mg)	Estimated Drought Year Production (mg)	Estimated Potential Monthly Savings	Potential Cumulative Savings	Conservation Goal	Comments
October	1,874	1,336	29%	29%	25%	
November	1,497	1,075	28%	28%	25%	
December	1,047	765	27%	28%	25%	
January	964	733	24%	27%	25%	
February	1,105	833	25%	27%	25%	
March	1,222	917	25%	27%	25%	
April	1,220	909	26%	26%	25%	
May	1,885	1,408	25%	26%	25%	
June	2,432	1,753	28%	27%	25%	
July	2,589	1,823	30%	27%	25%	
August	2,426	1,691	30%	27%	25%	
September	2,135	1,503	30%	28%	25%	





EXAMPLE WSCP STAGE – 10% SUPPLY SHORTAGE

Table 8-2. Demand Reduction Actions (DWR Table 8-2)

Shortage Level	Demand Reduction Actions	How much is this going to reduce the shortage gap?	Additional Explanation or Reference *(optional)*	Penalty, Charge, or Other Enforcement?
1	Other	8%	1. Limit landscape irrigation to specific times 2. Customers must repair leaks, breaks, and malfunctions in a timely manner 3. Restrict or prohibit runoff from landscape irrigation 4. Prohibit application of potable water to outdoor landscapes within 48 hours of measurable rainfall 5. Prohibit use of potable water for washing hard surfaces 6. Lodging establishments must offer opt out of linen service 7. Require shut-off nozzles on hoses for vehicle washing with potable water 8. Restaurants may only serve water upon request 9. No watering of landscape of newly constructed homes and buildings in a manner inconsistent with regulations or other requirements established by the California Building Standards Commission, and the Department of Housing and Community	Yes

LESSONS FROM THE 2012-2016 DROUGHT

- Need effective drought management tools in place given the drought emergencies issued in most counties in California
  - Many agencies have proactively developed conservation messaging and closely coordinating their drought response with other agencies and regulatory bodies
- Real data from the recent drought will be valuable in calibrating future analyses
- Quantitative modeling provides more predictable results and transparency in measures
- The more detail regarding specific actions and by whom, the easier to implement
- Last drought has resulted in demand hardening, but the DRT also provides a solution

QUESTIONS

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