Briefing: The Untapped Potential of California's Urban Water Supply

PACIFIC INSTITUTE

April 12 **9-10AM PT**

Heather Cooley
Director of Research

Dr. Peter Gleick
Senior Fellow
Co-Founder

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Senior Researcher

Dr. Sonali Abraham
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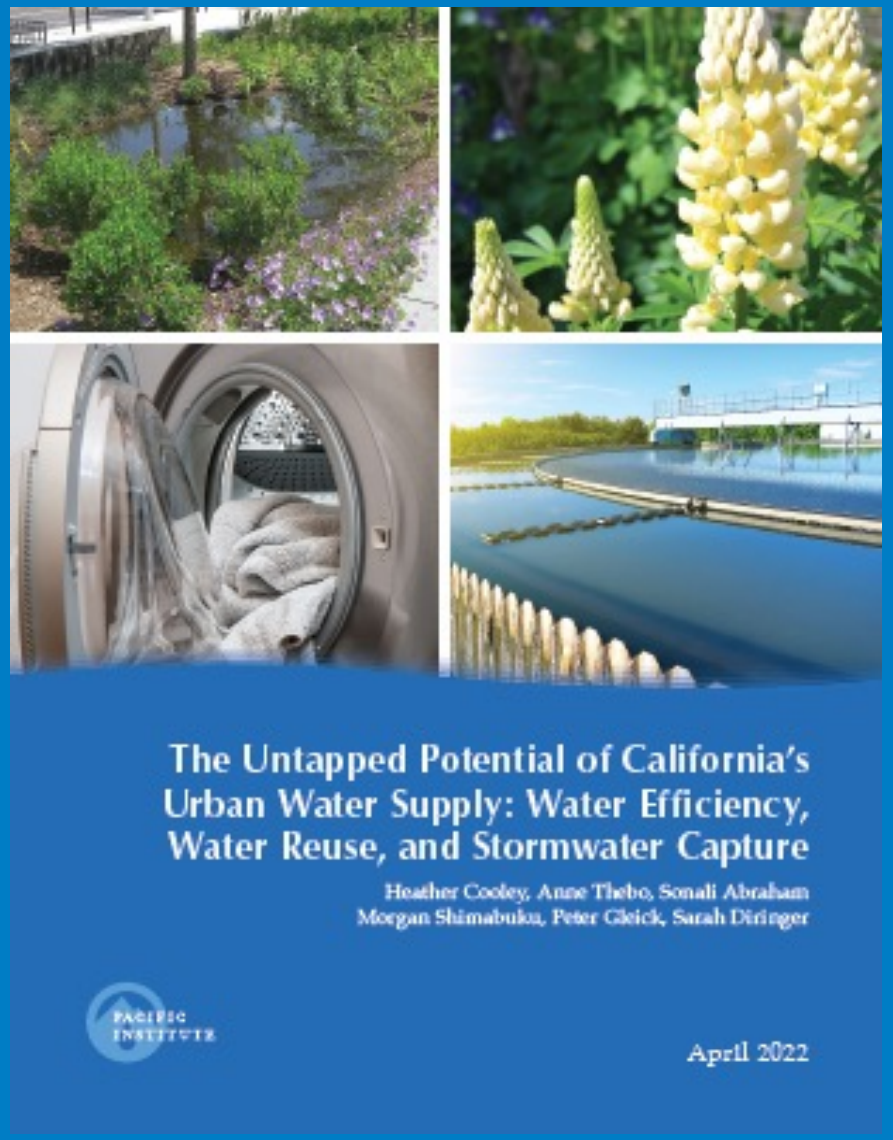
Dr. Amanda Bielawski
Director of Communications
Moderator

Registration Link | pacinst.org/webinars



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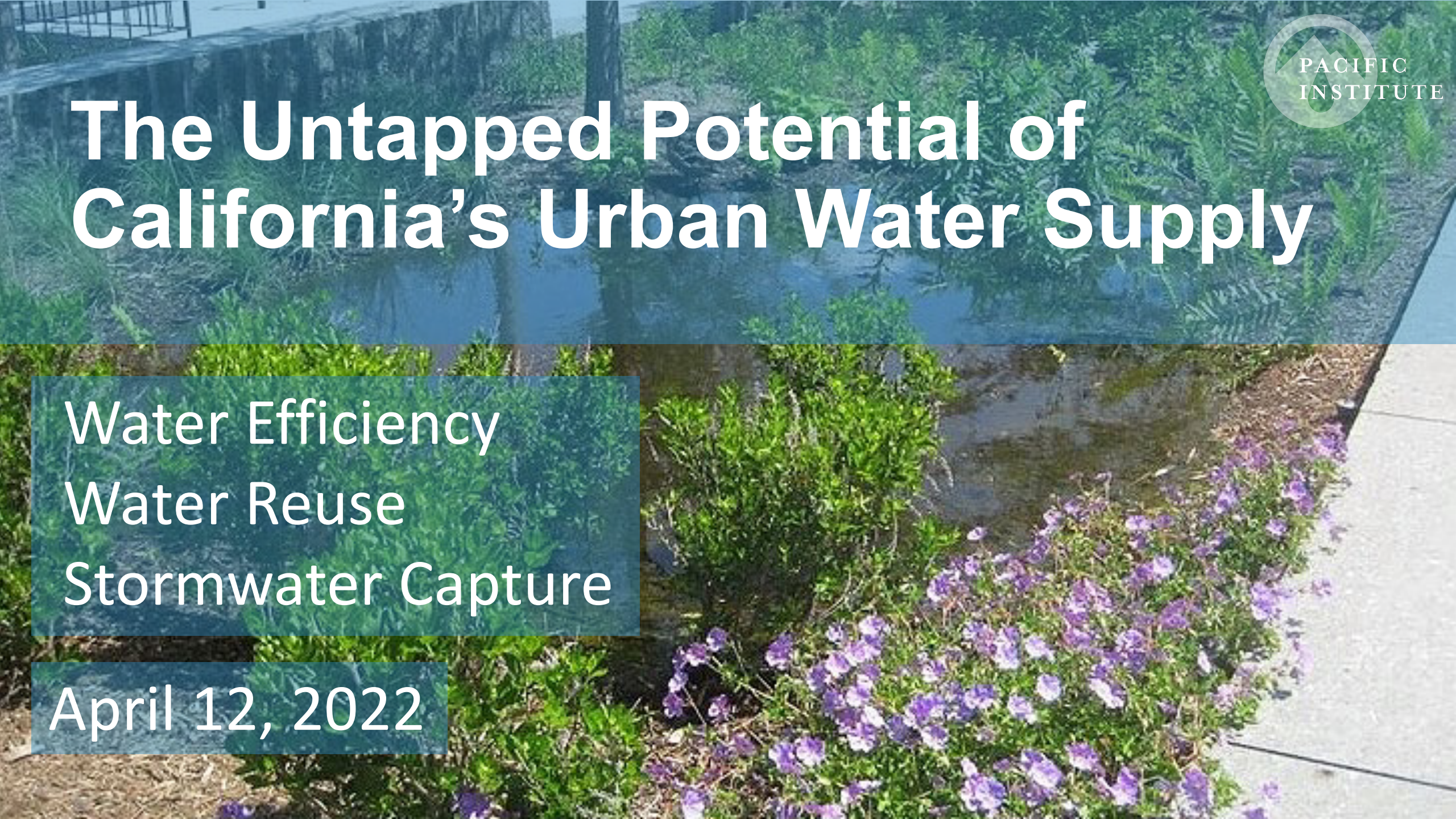


The Untapped Potential of California's Urban Water Supply

Water Efficiency
Water Reuse
Stormwater Capture

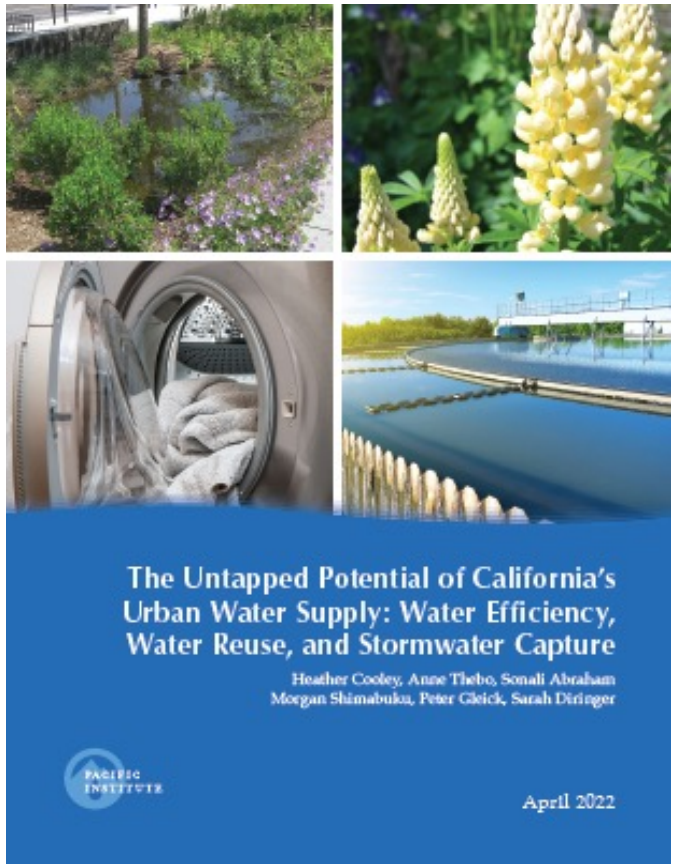
April 12, 2022

PACIFIC INSTITUTE

Moderator

Dr. Amanda Bielawski
Director of Communications
& Outreach
Moderator

Report Available



Full report available:
https://pacinst.org

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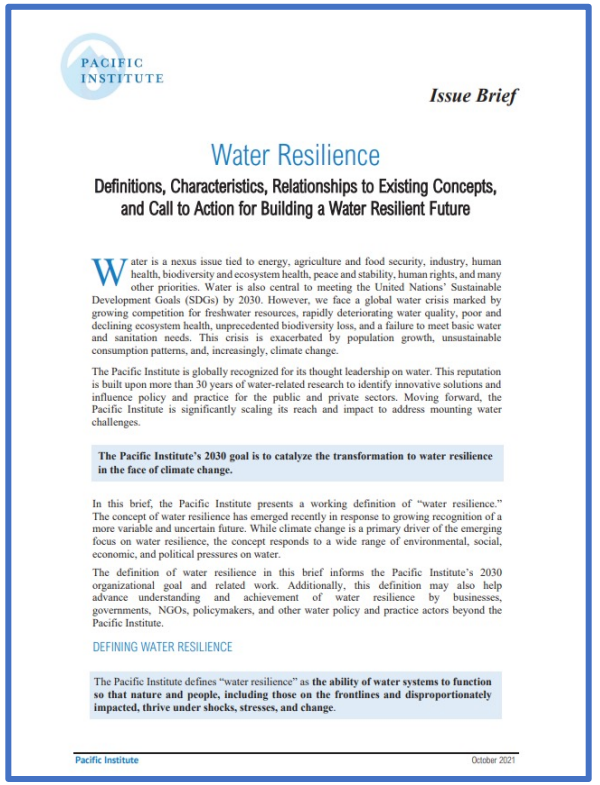
About the Pacific Institute

- **The Pacific Institute** is an independent, non-partisan global water think tank, founded in 1987 and based in Oakland, California, with staff around the world.
- **Mission:** to create and advance solutions to the world's most pressing water challenges.
- **2030 organizational goal:** to catalyze the transformation to water resilience in the face of climate change.
    - **Water Resilience:** "The ability of water systems to function so that nature and people, including those on the frontlines and disproportionately impacted, thrive under shocks, stresses, and change."



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Issue Brief

Water Resilience

Definitions, Characteristics, Relationships to Existing Concepts, and Call to Action for Building a Water Resilient Future

Water is a nexus issue tied to energy, agriculture and food security, industry, human health, biodiversity and ecosystem health, peace and stability, human rights, and many other priorities. Water is also central to meeting the United Nations' Sustainable Development Goals (SDGs) by 2030. However, we face a global water crisis marked by growing competition for freshwater resources, rapidly deteriorating water quality, poor and declining ecosystem health, unprecedented biodiversity loss, and a failure to meet basic water and sanitation needs. This crisis is exacerbated by population growth, unsustainable consumption patterns, and, increasingly, climate change.

The Pacific Institute is globally recognized for its thought leadership on water. This reputation is built upon more than 30 years of water-related research to identify innovative solutions and influence policy and practice for the public and private sectors. Moving forward, the Pacific Institute is significantly scaling its reach and impact to address mounting water challenges.

The Pacific Institute's 2030 goal is to catalyze the transformation to water resilience in the face of climate change.

In this brief, the Pacific Institute presents a working definition of "water resilience." The concept of water resilience has emerged recently in response to growing recognition of a more variable and uncertain future. While climate change is a primary driver of the emerging focus on water resilience, the concept responds to a wide range of environmental, social, economic, and political pressures on water.

The definition of water resilience in this brief informs the Pacific Institute's 2030 organizational goal and related work. Additionally, this definition may also help advance understanding and achievement of water resilience by businesses, governments, NGOs, policymakers, and other water policy and practice actors beyond the Pacific Institute.

DEFINING WATER RESILIENCE

The Pacific Institute defines "water resilience" as **the ability of water systems to function so that nature and people, including those on the frontlines and disproportionately impacted, thrive under shocks, stresses, and change**.

Pacific Institute October 2021

Water Resilience Issue Brief available: https://pacinst.org

Presenters

Heather Cooley
Director of Research

Dr. Peter Gleick
Senior Fellow
Co-Founder

Dr. Sonali Abraham
Research Associate

Dr. Anne Thebo
Senior Researcher

Dr. Amanda Bielawski
Director of Communications
& Outreach
Moderator

Agenda

- **Overview of key findings and report relevance:** Heather Cooley
- **Climate change context:** Dr. Peter Gleick
- **Potential for:**
  - **Water efficiency:** Dr. Sonali Abraham
  - **Water reuse:** Dr. Anne Thebo
  - **Stormwater capture:** Dr. Anne Thebo
- **Best practice examples:** Heather Cooley
- **Key findings and recommendations:** Heather Cooley
- **Audience Q&A:** Moderated by Dr. Amanda Bielawski

Announcements

- The session is being **recorded.**
- **All participants** (except for panelists) are **automatically muted.**
- Please use the **Q&A function** to submit questions for the speakers. The moderator will ask submitted questions in the second half of the webinar. If you have a technical issue, you may also post it in the Q&A function.
- **Slides** and **recording** will be made available following the briefing.
- **Journalists:** Please reach out to us at media@pacinst.org if you would like to arrange an interview after the briefing. Also available: data sets and details about relevant efficiency, reuse, and stormwater capture projects in specific regions.
- **Join us on Twitter:** Live tweeting underway

Report Findings & Relevance

Heather Cooley
Director of Research

Key Findings & Relevance

- California has made laudable progress in recent years to reduce water use and develop local supplies, but more is needed in the face of intensifying drought and climate change.
- Efficient technologies and practices could reduce California's urban water use by **2.0 million to 3.1 million AFY**, or by 30% to 48%.
- Reuse of municipal wastewater could boost local water supplies by **1.8 million to 2.1 million AFY**.
- Urban stormwater capture in areas overlying public supply aquifers could boost water supplies by **580,000 AF in a dry year to 3.0 million AF in a wet year**.
- These strategies are proven and cost effective – and can provide water reliability and other co-benefits for California.
- These findings can inform policy and decision making in California and beyond.

California Drought Realities & Climate Change

Dr. Peter Gleick
Senior Fellow
Co-Founder

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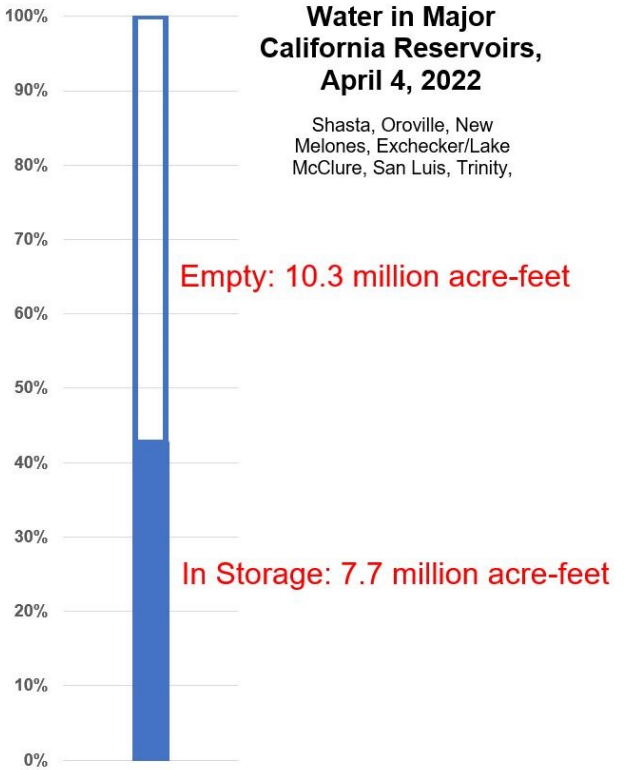
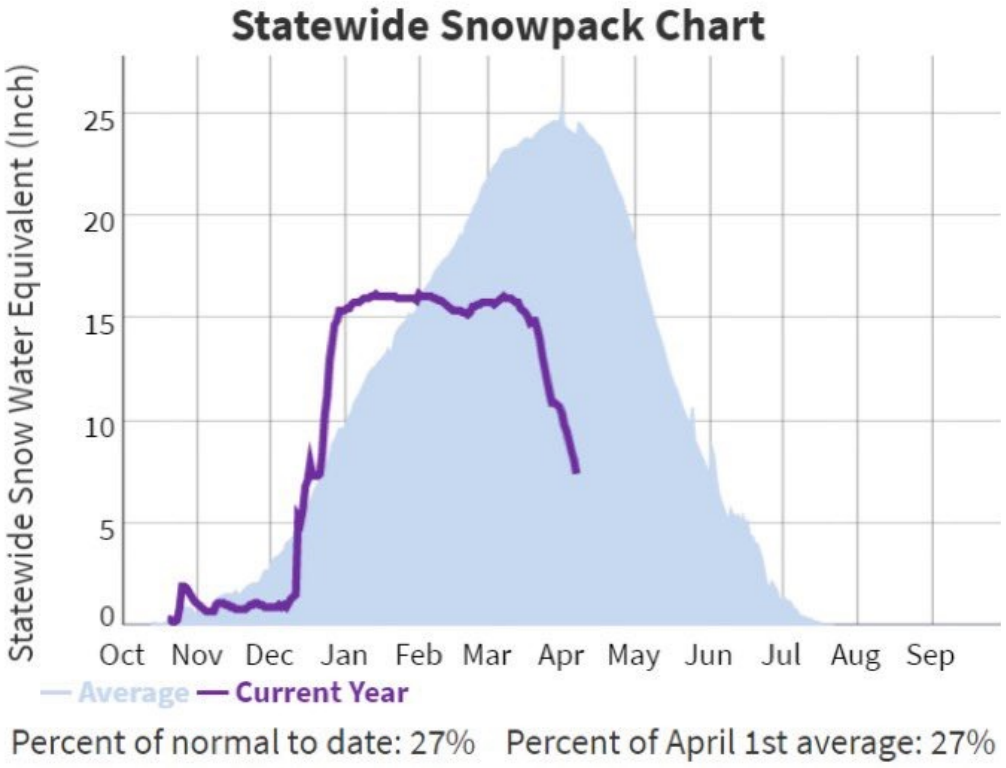
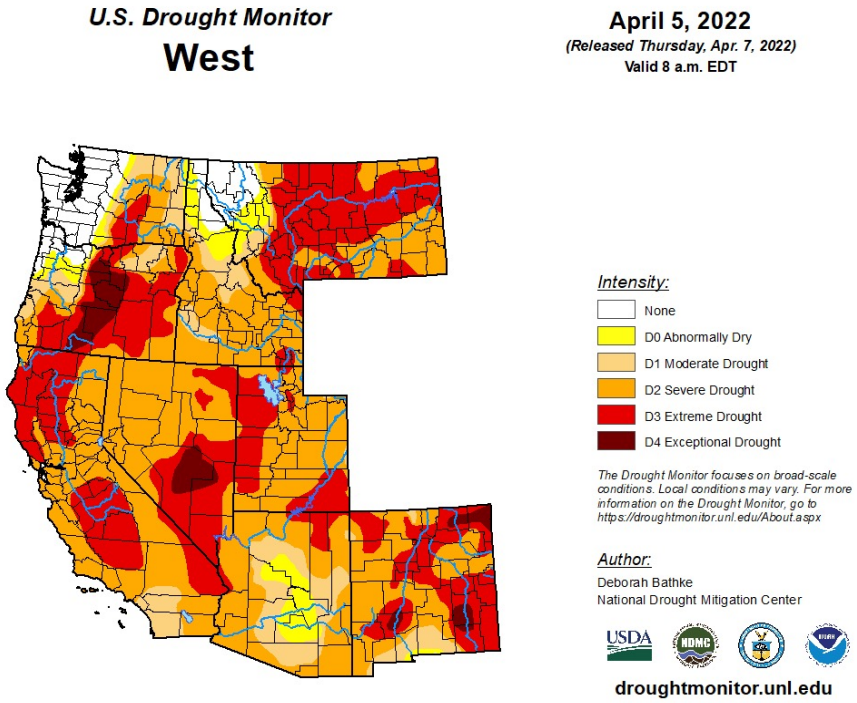
California Drought Realities

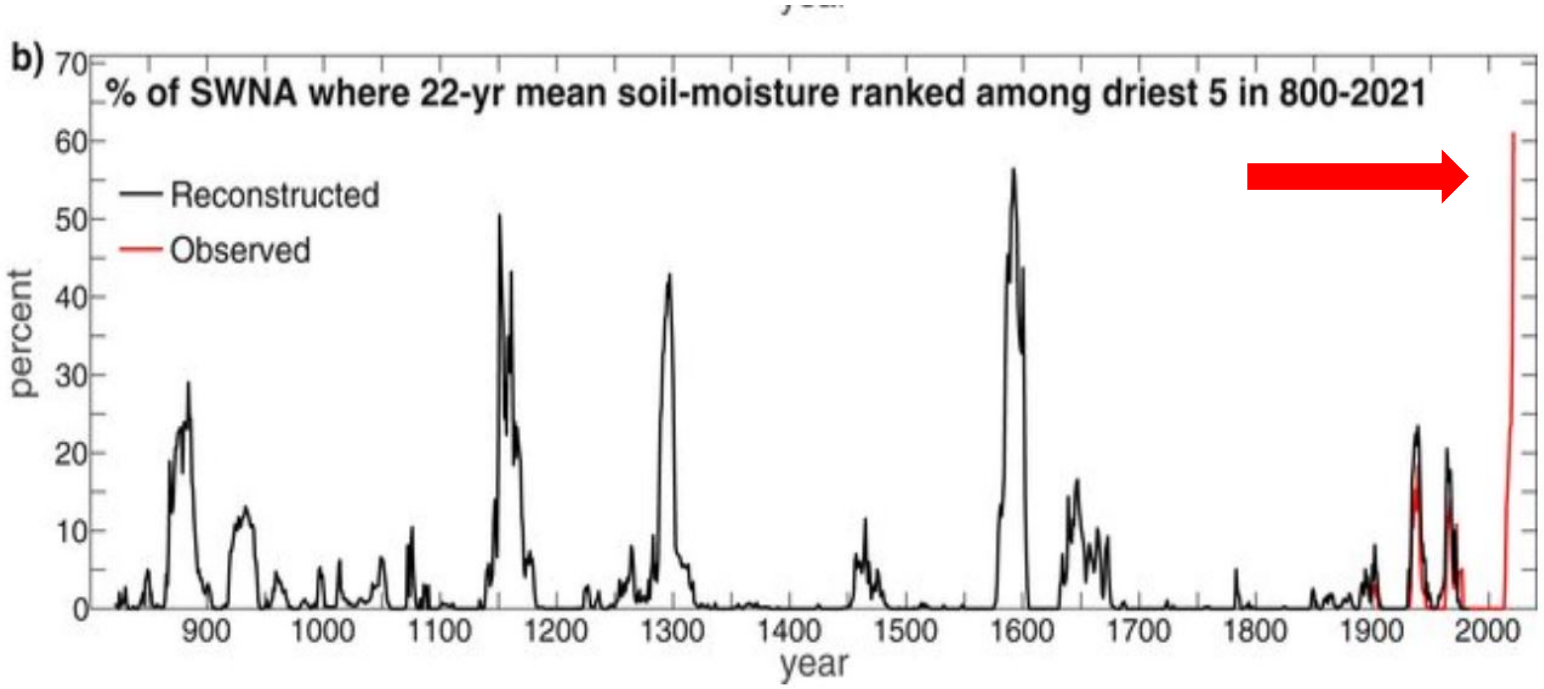






Climate Change is Already Affecting Western Water

- Climate change has ***worsened*** severe drought in California.
- Our water systems and planning do not yet account for this.
- The strategies assessed in the new report help build climate resilience.



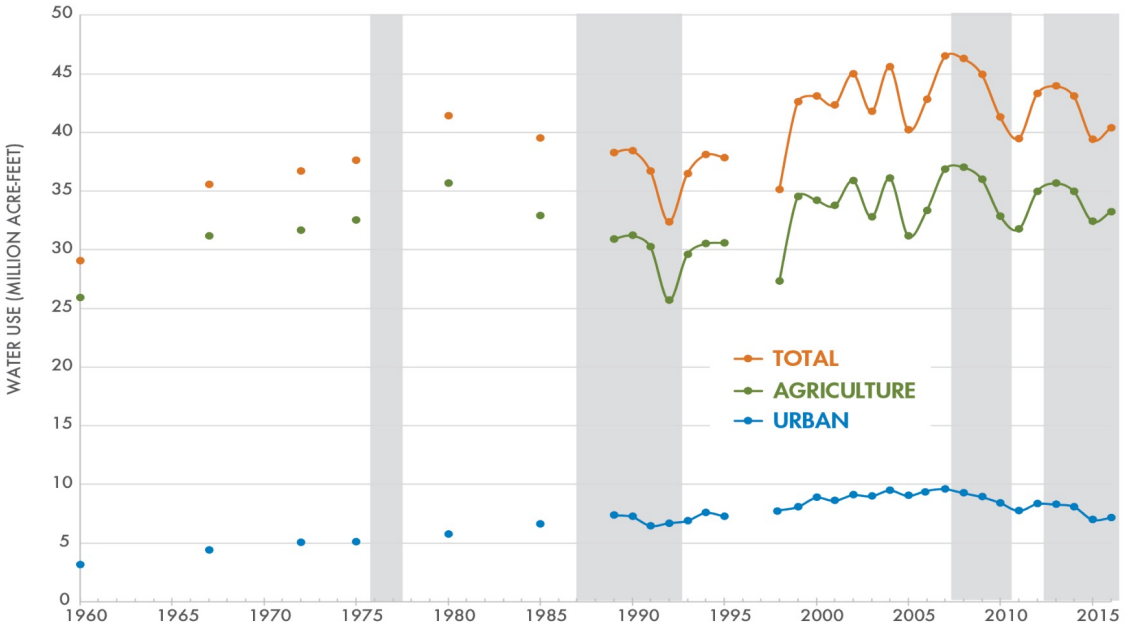
The past 22 years in the Southwestern US have been the driest in 1200 years.

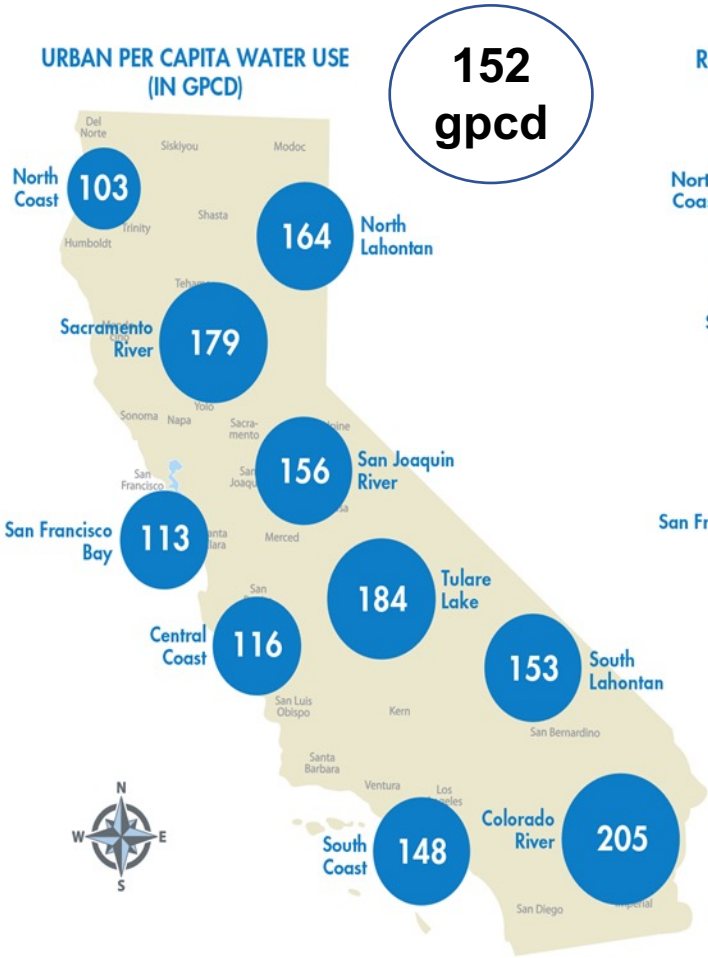
Williams, Cook, Smerdon 2022 Nature Climate Change

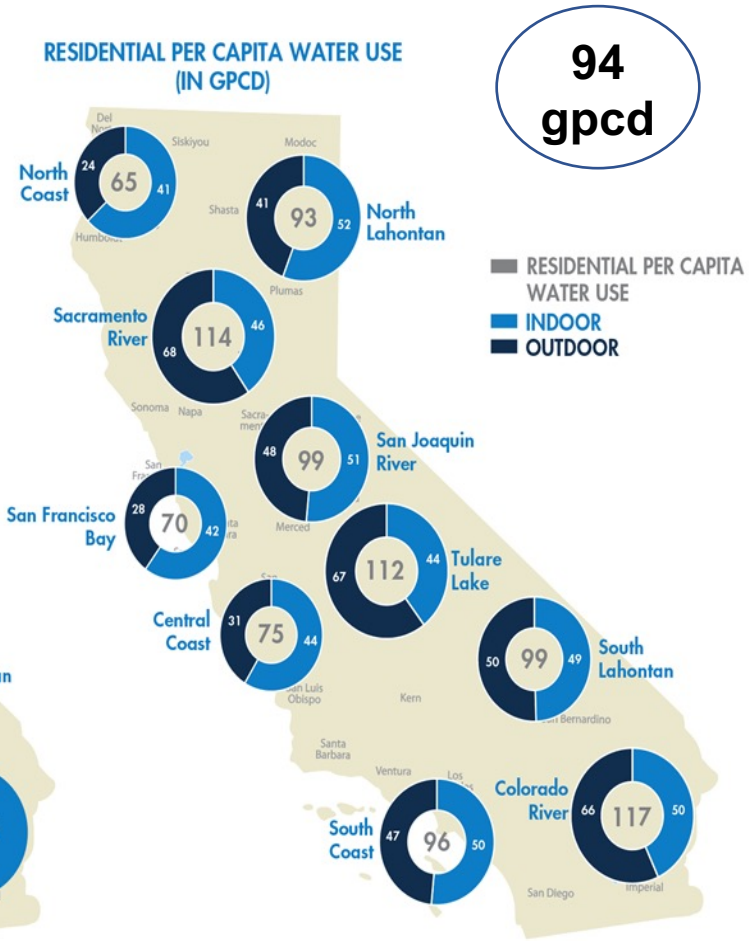
Urban Water Efficiency Potential

Dr. Sonali Abraham
Research Associate

Urban water use has declined dramatically since peaking in 2007. Between 2017 and 2019, urban water use averaged 6.6 million AFY.







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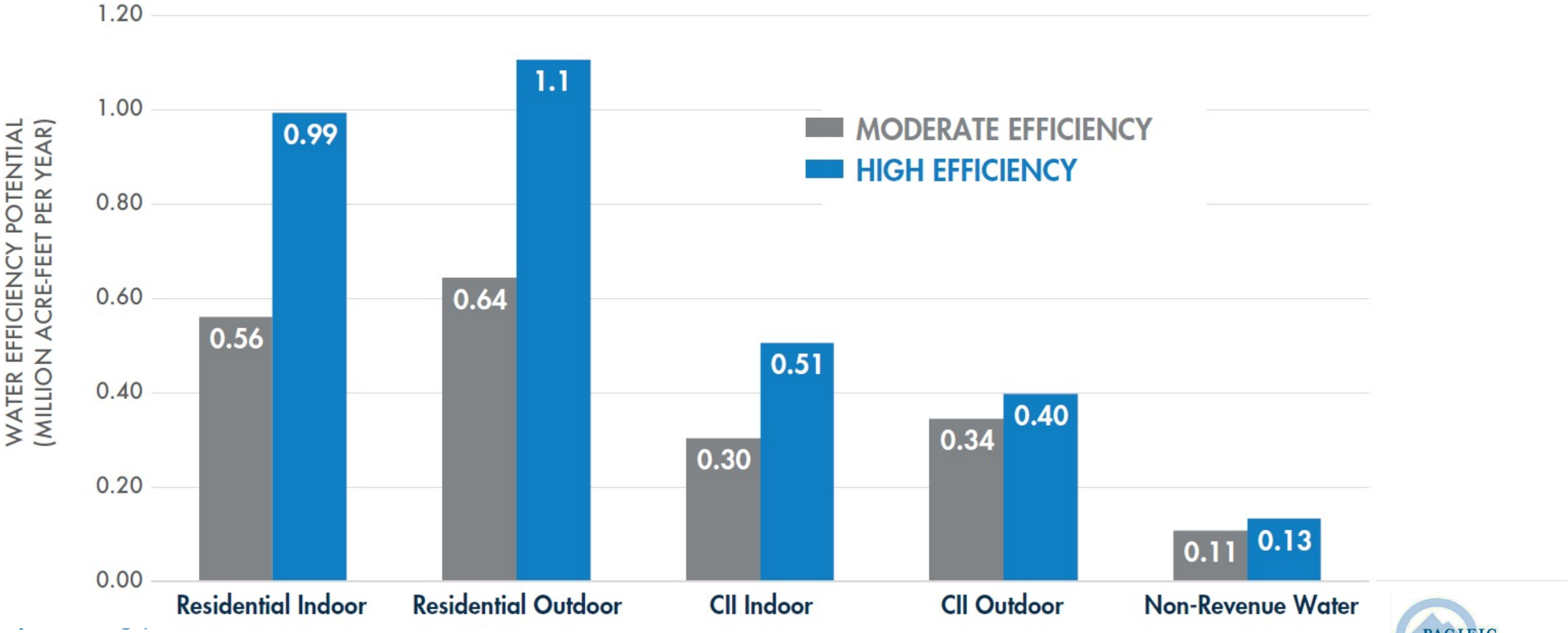
Estimating Water Efficiency Potential

- The **current water use baseline** was developed from the **Electronic Annual Reports (EARs)** submitted by water agencies for 2017 to 2019.
- Two water-savings scenarios were developed:
  - **Moderate efficiency** based on full compliance with current standards for appliances and fixtures (SB 407), landscapes (MWELO), and distribution leaks (SB 555).
  - **High efficiency** based on ***available*** leading-edge technologies and practices that use less water than current standards.

Water Efficiency Potential by Sector

Statewide potential: 2.0 million to 3.1 million acre-feet per year



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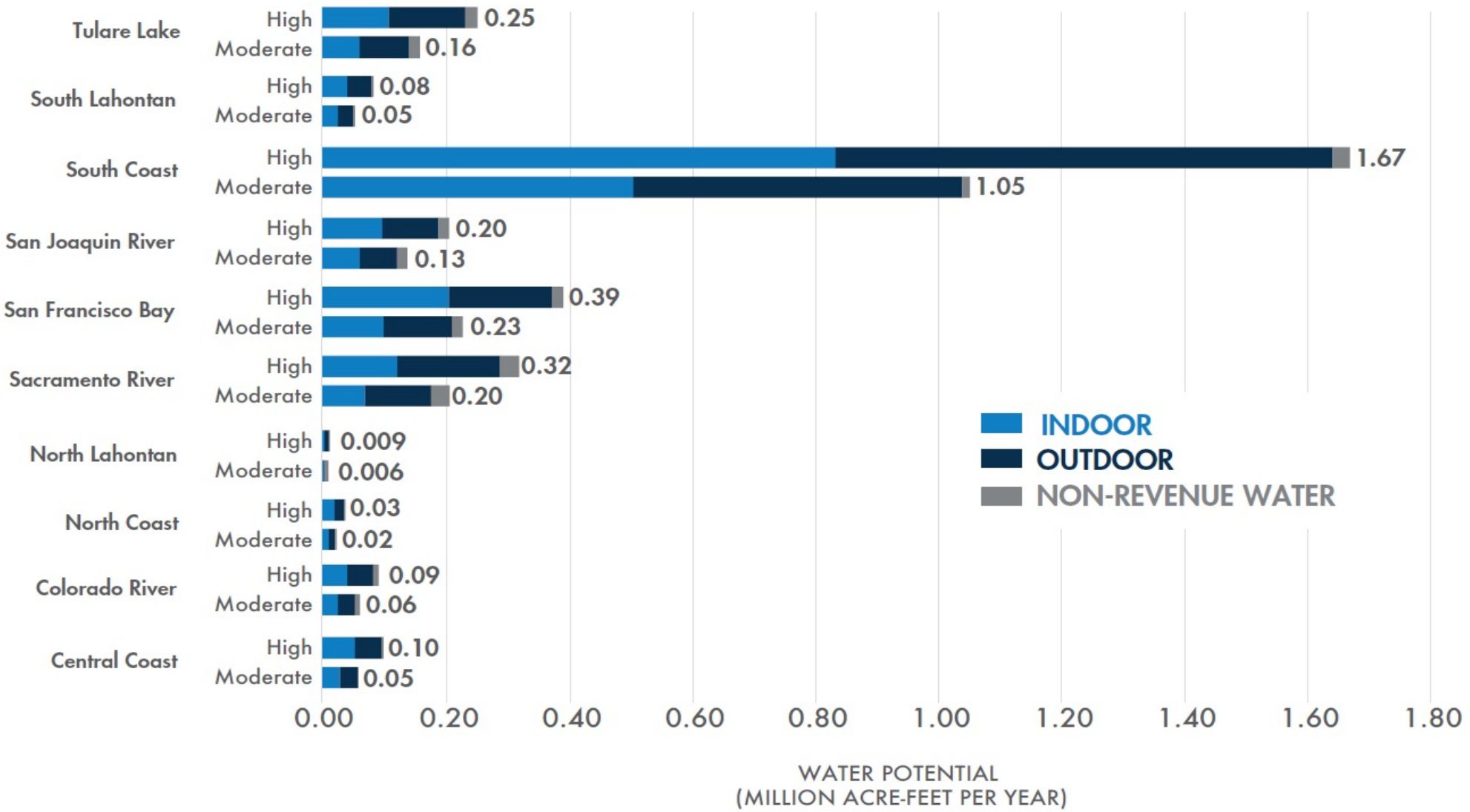
Water Efficiency Potential by Region



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Water Reuse Potential

Dr. Anne Thebo
Senior Researcher

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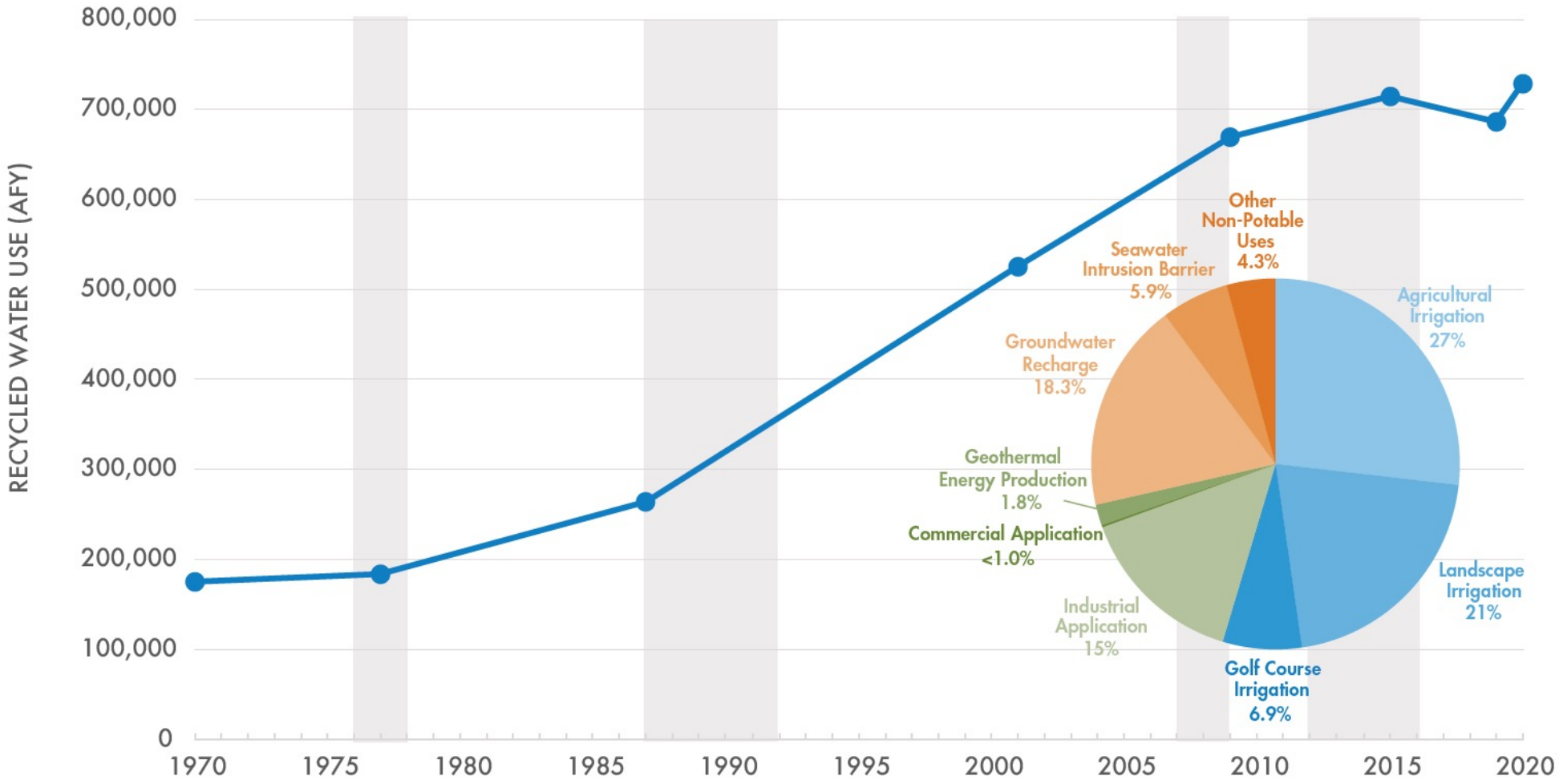
Recycled Water Trends, 1970 to 2020



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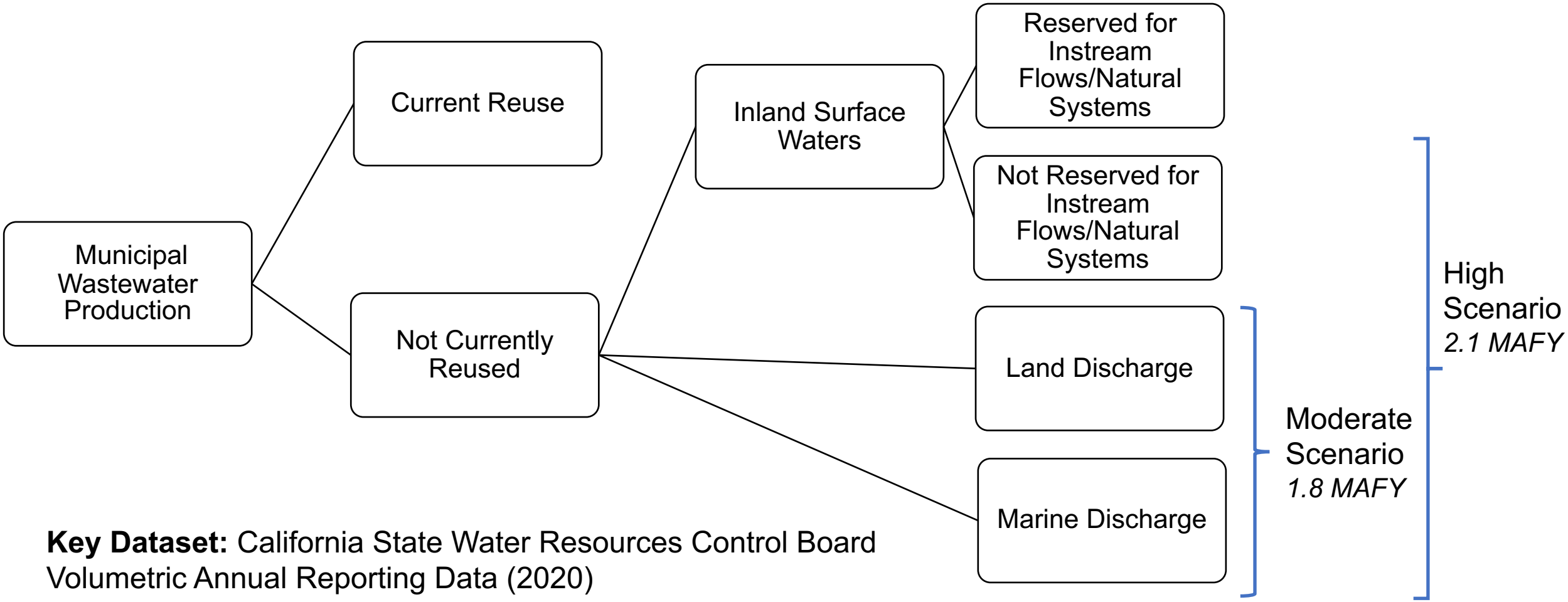
Estimating Water Reuse Potential



Key Dataset: California State Water Resources Control Board Volumetric Annual Reporting Data (2020)

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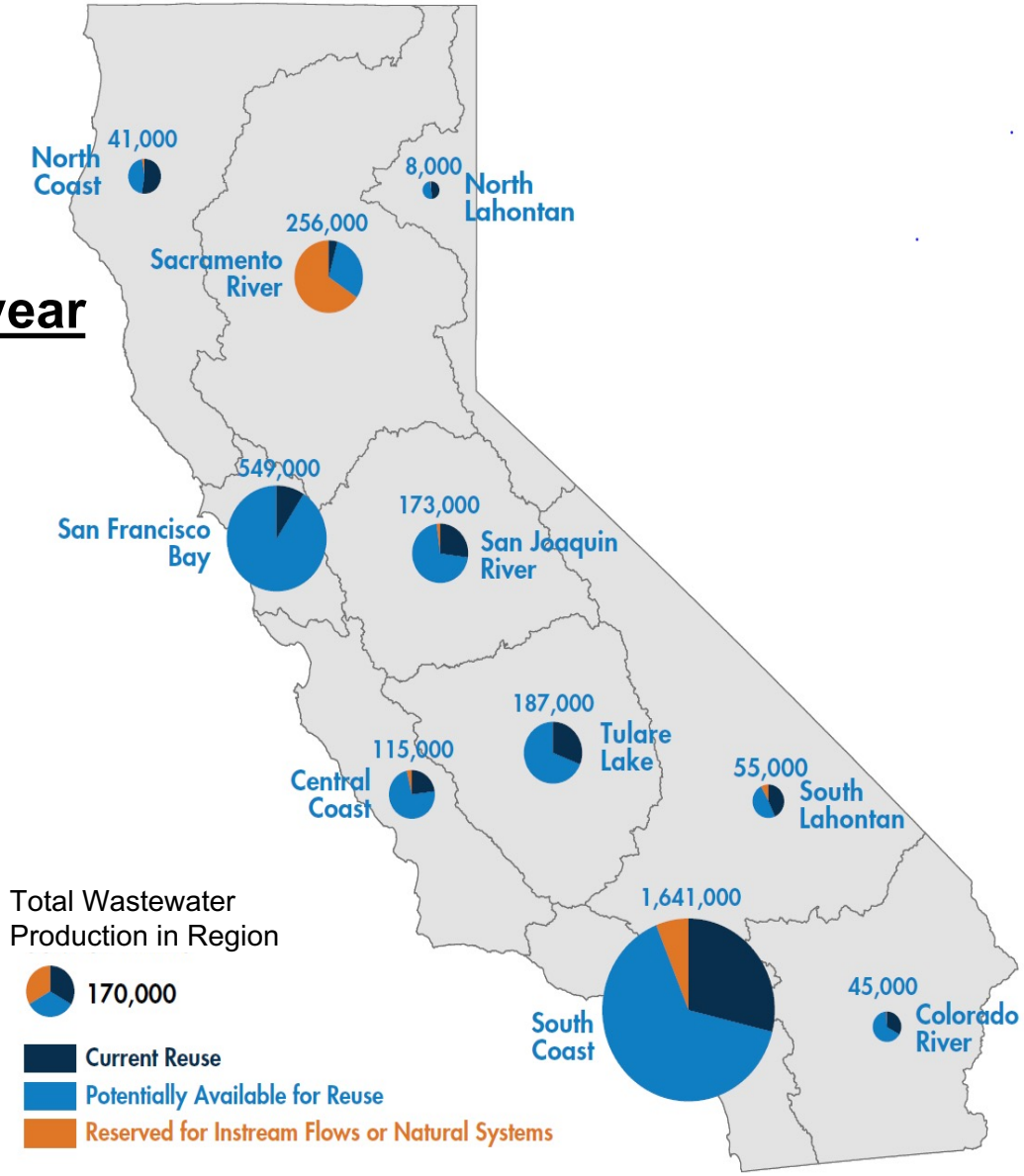
Water Reuse Potential by Region

Statewide potential: 1.8 million to 2.1 million acre-feet per year

Hydrologic Region	Currently Reused (AFY)	Effluent Reserved for Instream Flows or Natural Systems (AFY)	Potentially Available for Reuse (AFY)	TOTAL Effluent (AFY)	Currently Reused (%)	Potentially Available for Reuse (%)
Central Coast	26,000	4,000	84,000	**115,000**	23	73
Colorado River	15,000	0	30,000	**45,000**	33	66
North Coast	21,000	1,000	18,000	**41,000**	52	45
North Lahontan	4,000	0	4,000	**8,000**	48	51
Sacramento River	11,000	168,000	78,000	**256,000**	4	30
San Francisco Bay	49,000	3,000	497,000	**549,000**	9	90
San Joaquin River	47,000	4,000	123,000	**173,000**	27	71
South Coast	473,000	101,000	1,067,000	**1,641,000**	29	65
South Lahontan	24,000	4,000	27,000	**55,000**	43	49
Tulare Lake	58,000	0	129,000	**187,000**	31	69
TOTAL	**729,000**	**285,000**	**2,057,000**	**3,071,000**	**24**	**67**

Notes: Not available for reuse is defined as water allocated to instream flows or natural systems. Value of total effluent in this table differs from Figure 12 because of reporting discrepancies between water supplied to recycled water producers and the quantity of water recycled water producers reported reusing.



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Estimating stormwater capture potential

- No comprehensive estimate of existing stormwater capture volume.

- For our study, we developed statewide estimates:
  - **Impervious surface cover** in urban areas across the state and in areas overlying **public supply aquifers**
  - High, medium, and low historical **precipitation**

Stormwater Capture Potential by Region

Hydrologic Region	Urban Stormwater Capture Potential (AFY)		
	Low Precipitation	Medium Precipitation	High Precipitation
Central Coast	20,000	89,000	140,000
Colorado River	11,000	11,000	36,000
North Coast	31,000	82,000	130,000
North Lahontan	3,000	7,000	10,000
Sacramento River	84,000	250,000	350,000
San Francisco Bay	85,000	300,000	460,000
San Joaquin River	40,000	110,000	170,000
South Coast	260,000	620,000	1,400,000
South Lahontan	12,000	23,000	63,000
Tulare Lake	34,000	90,000	180,000
Total	**580,000**	**1,600,000**	**3,000,000**

Notes: Numbers are rounded to two significant figures. Totals may not equal column sums due to rounding.

Examples, Conclusions, Recommendations

Heather Cooley
Director of Research

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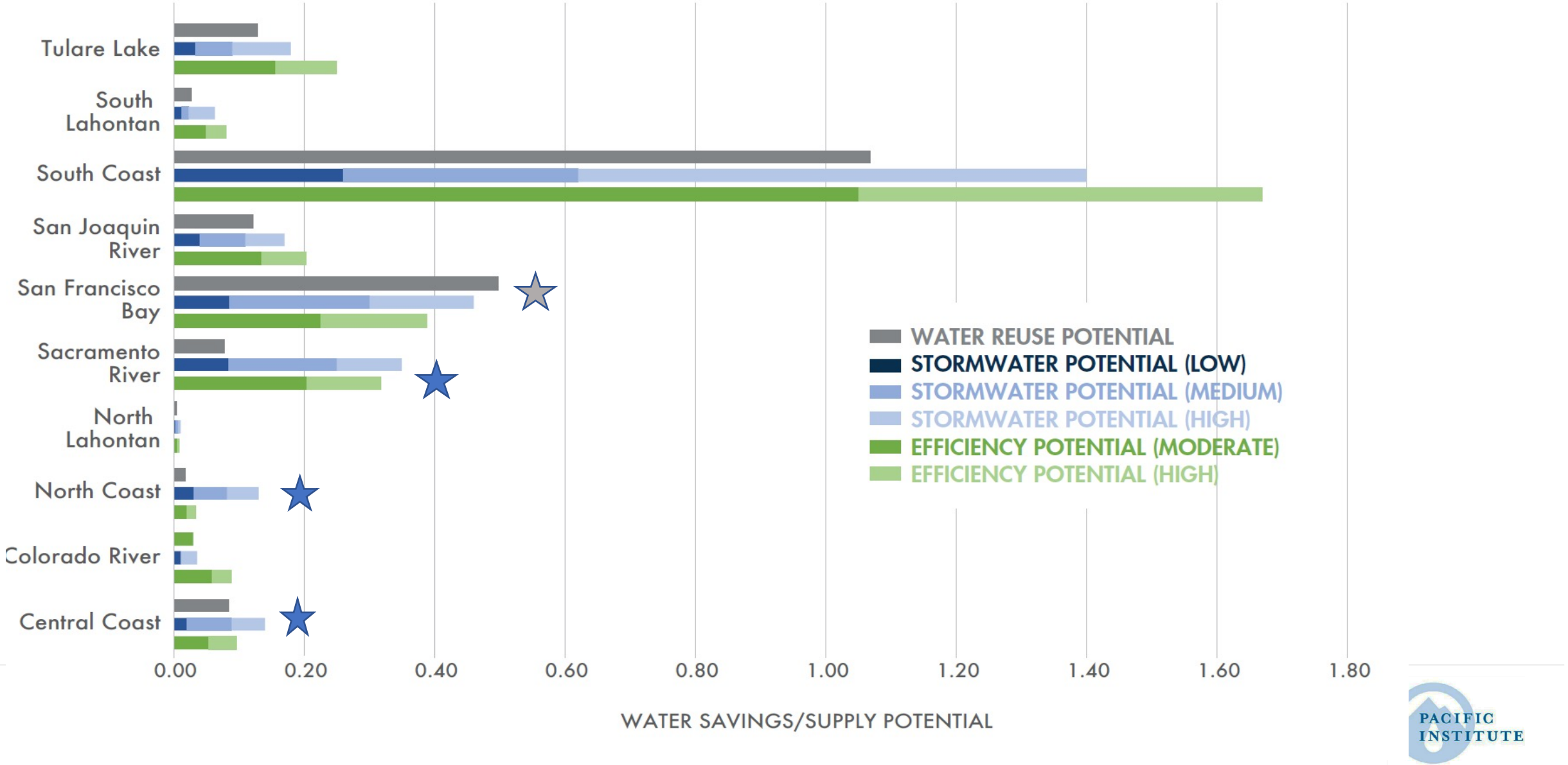
Water Efficiency, Water Reuse, and Stormwater Capture Potential by Region



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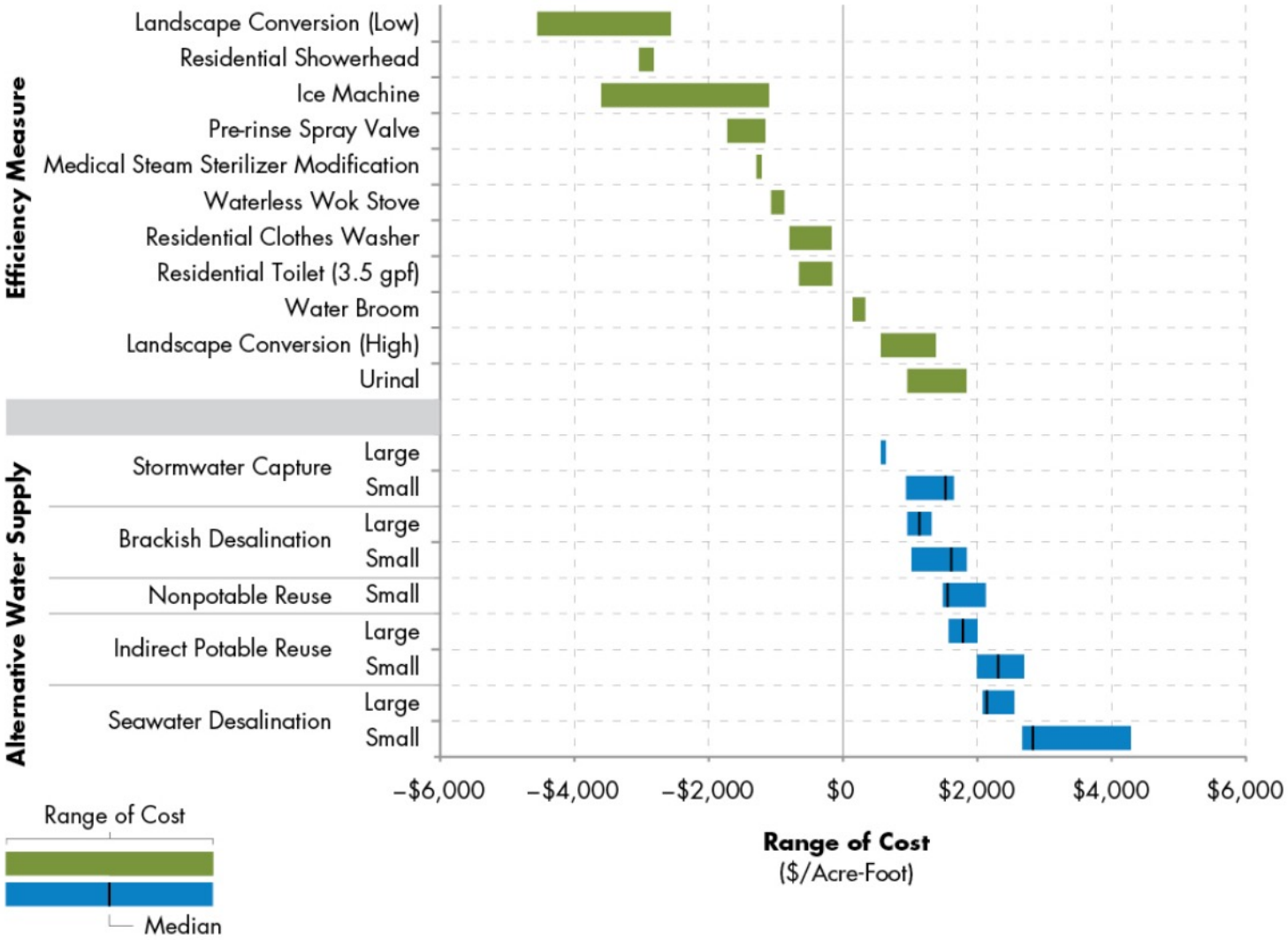
Key Points

- The potentials quantified are **NOT** additive across the three strategies but they are complementary.
- This is a **snapshot of current opportunities** – we did not evaluate new technologies, changes in population or economic activities, or any new development.
- We did **NOT** quantify opportunities for agriculture – but recognize they are significant.

These strategies are technically feasible *and* cost effective.



Source: Cooley and Phurisamban 2016

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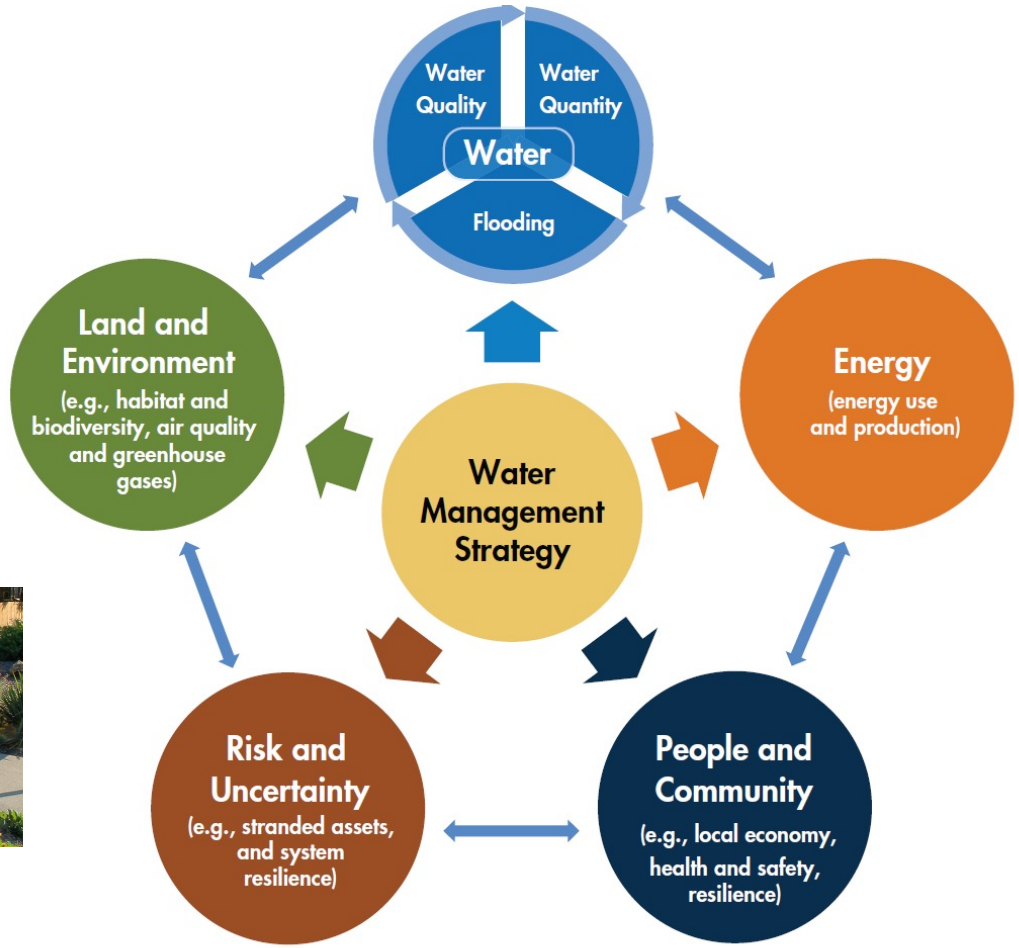
These strategies also provide co-benefits, making them more economically viable.



Source: Diringer et al. 2019

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Best Practice Examples

Retrofit-on-Resale Ordinance, San Francisco

Lead: San Francisco Public Utilities Commission

- Adopted in 2009, requires **high-efficiency plumbing fixtures** in single- and multi-family homes **upon sale.**
- Projected to **save over 2.5 billion gallons** by 2045.

Direct Install Gardens (DIG), Long Beach

Lead: Long Beach Water

- Pilot program provides **single-family homeowners in low-income neighborhoods** with a **free sustainable landscape.**
- Replaced over 17,000 ft^2 of turf and **saved over 250,000 gallons of water.**

Source: Long Beach Water

Best Practice Examples

Pure Water Monterey, Monterey

Lead: Monterey One Water

- Treats **municipal wastewater, industrial process water, irrigation drainage, and urban stormwater** for groundwater recharge.
- Produces **1.2 billion gallons per year** of purified water to support the area's potable supply.

Source: Monterey One Water

Regional Recycled Water Program, Southern CA

Lead: Metropolitan Water District of Southern California

- Proposed facility would **produce up to 150 million gallons per day of purified water.**
- Could lead to a long-term agreement with partner agencies, including in Nevada and Arizona, to **co-fund construction and operation in exchange for Colorado River water**.

Source: Metropolitan Water District of Southern California

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Best Practice Examples

Stormwater Retention Basins, Fresno

Lead: Fresno Metropolitan Flood Control District

- More than **150 stormwater retention basins** in the Fresno-Clovis area that reduce flooding, improve water quality, and replenish groundwater.
- Recharge groundwater **by 16 billion gallons per year**.

Source: Fresno Metropolitan Flood Control District

Moscone Center Expansion Project, San Francisco

Lead: San Francisco Public Utilities Commission

- **District-scale onsite water system** treats and reuses rainwater, condensate from the building's cooling system, and foundation drainage.
- **Offsets about 15 million gallons per year of potable water** for use in toilets and urinals, landscape irrigation, and to refill street-cleaning trucks.

Source: Image courtesy of Skidmore, Ownings & Merrill LLP with Mark Cavagnero Associates, 2016. All rights reserved.

Key Findings

- California has made laudable progress in recent years to reduce water use and develop local supplies, but more is needed in the face of intensifying drought and climate change.
- Efficient technologies and practices could reduce California's urban water use by **2.0 million to 3.1 million AFY**, or by 30% to 48%.
- Reuse of municipal wastewater could boost local water supplies by **1.8 million to 2.1 million AFY**.
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- These strategies are proven and cost effective – and can provide water reliability and other co-benefits for California.

Recommendations

Expand Efforts to Improve Water Use Efficiency and Water Loss Control.

- Increase funding for water-efficiency and water-loss control programs to levels consistent with other water-supply investments.
- Ban non-functional grass at businesses and institutions and in large housing developments.
- Adopt retrofit-on-resale ordinances for residential and non-residential properties.
- Make efficiency programs accessible to low-income and multi-family households.

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Recommendations

Expand the Supply and Use of Recycled Water.

- Leverage state and federal funding for recycled water, prioritizing multi-benefit projects.
- Continue progress on regulations for direct potable reuse and onsite non-potable water systems, and revise regulatory frameworks, as appropriate.
- Incorporate efficiency and changes in population, economic activity, and land use in local and regional assessments of supply and demand for recycled water.

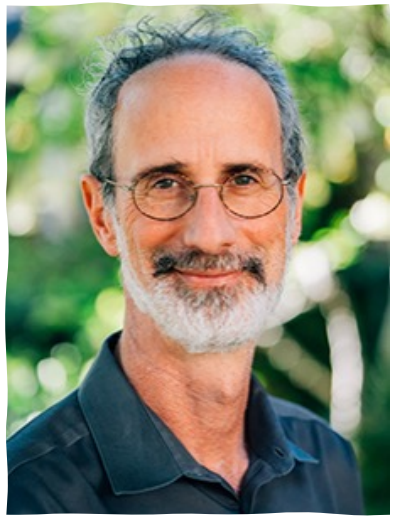
Recommendations

Increase Efforts to Capture and Use Stormwater.

- Reduce barriers to funding for ongoing operation and maintenance costs.
- Create partnerships to provide stacked incentives for multi-benefit stormwater projects on residential and other properties.
- Develop stormwater capture goals based on a quantitative assessment of its potential and track progress toward those goals.

Q & A Session

Heather Cooley
Director of Research



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  - arrange an interview
  - data sets and details about relevant regional projects
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