

The Untapped Potential of California's Water Supply: Efficiency, Reuse, and Stormwater



**Kate Poole, Natural Resources Defense
Council**

**Heather Cooley, Pacific Institute
Bay-Delta Science Conference**



Acknowledgements

- Pacific Institute
 - Heather Cooley
 - Peter Gleick
 - Matthew Heberger
 - Nancy Ross
- UC Santa Barbara
 - Bob Wilkinson
- Natural Resources Defense Council
 - Kate Poole
 - Noah Garrison
 - Steve Fleischli
 - Ed Osann
 - Claire O'Connor
 - Tracy Quinn
 - Doug Obegi



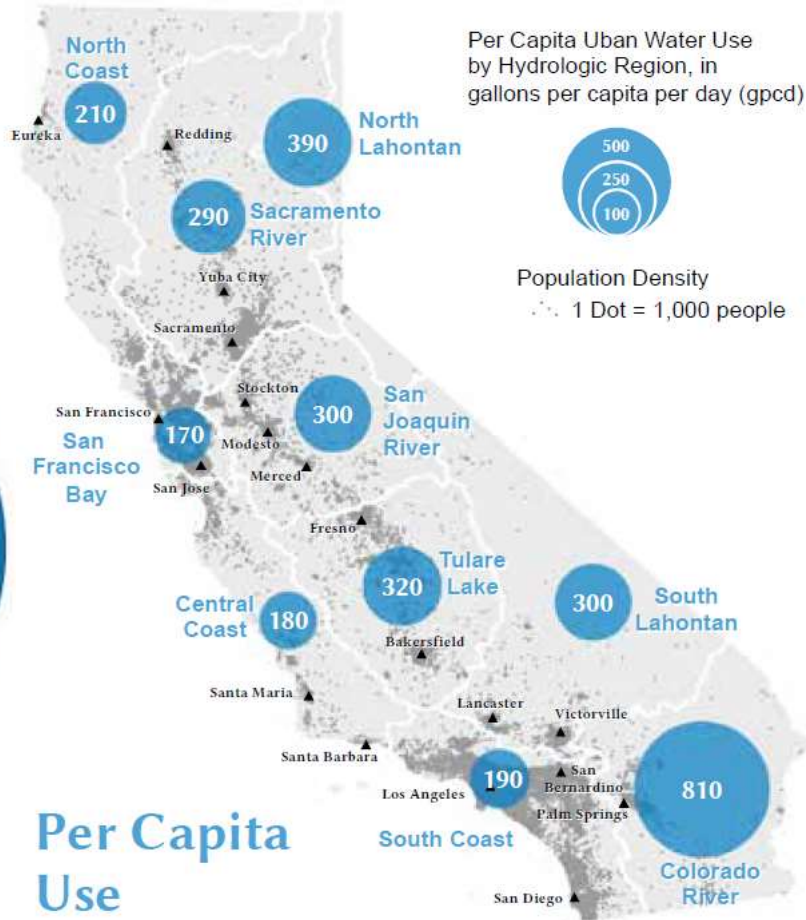
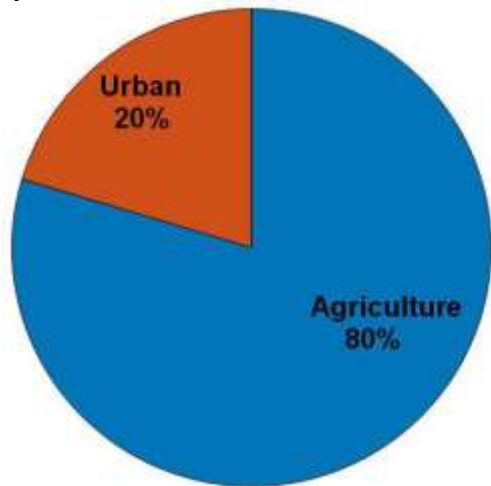
Key Findings

- There has been considerable progress in capturing efficiency improvements and developing local supplies in California.
- We are living beyond our means, taking too much water from rivers, streams, and aquifers.
- The good news:
 - large opportunities to reduce urban and agricultural water demand through efficiency improvements; and
 - opportunities to boost local supplies through stormwater capture and water reuse.

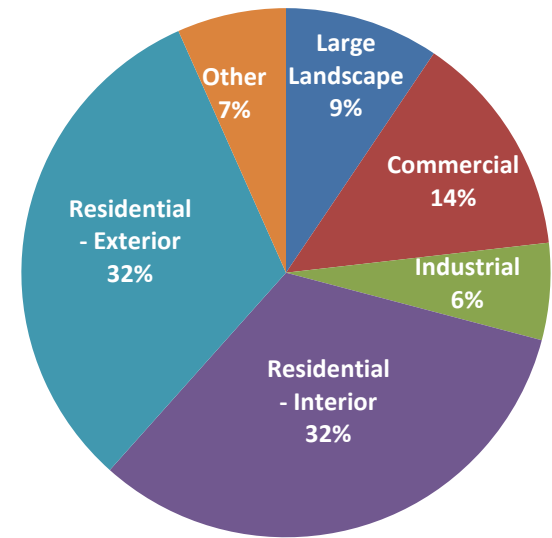


Water Use in California

Human Water Use:
44 million acre-feet per
year

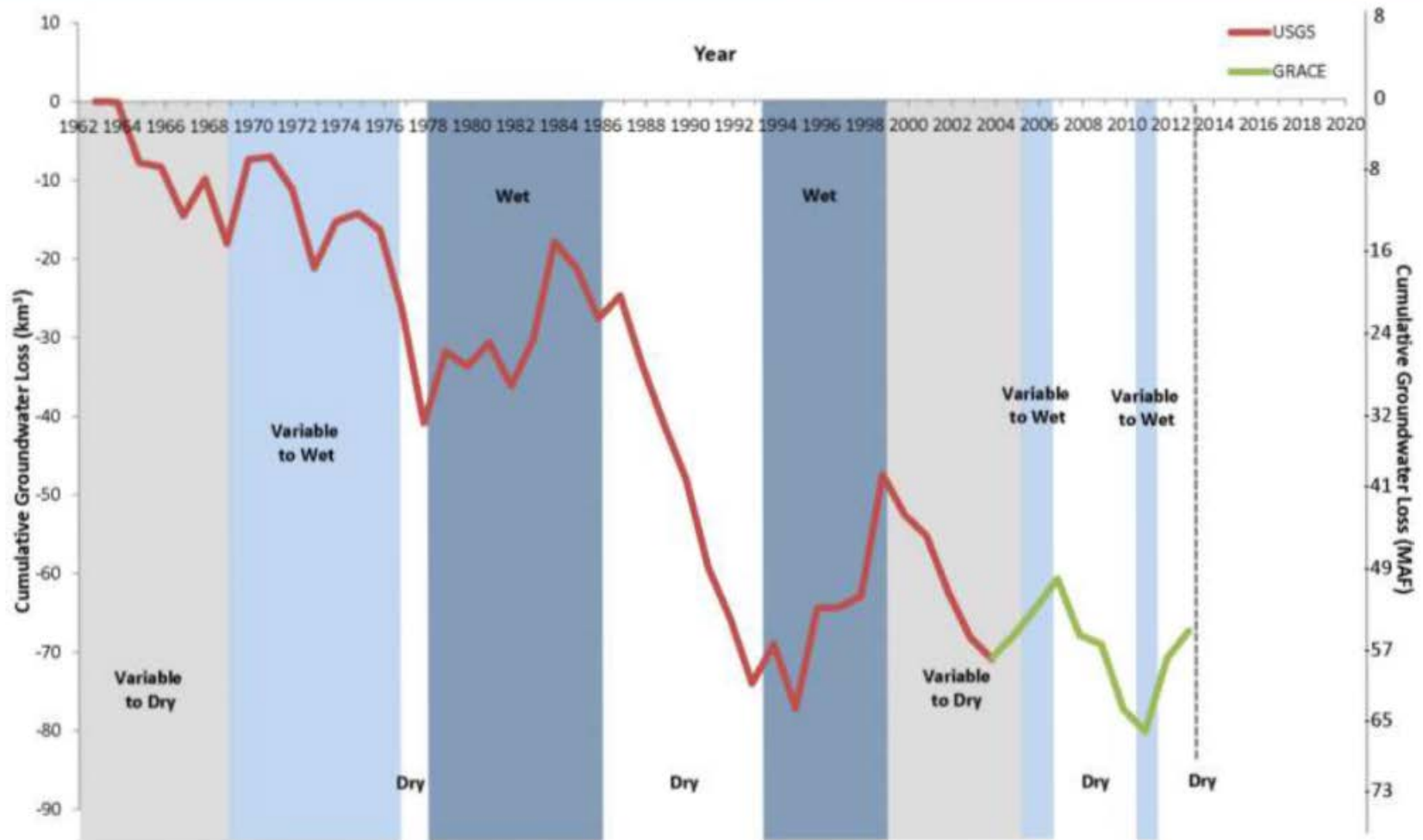


Per Capita
Use



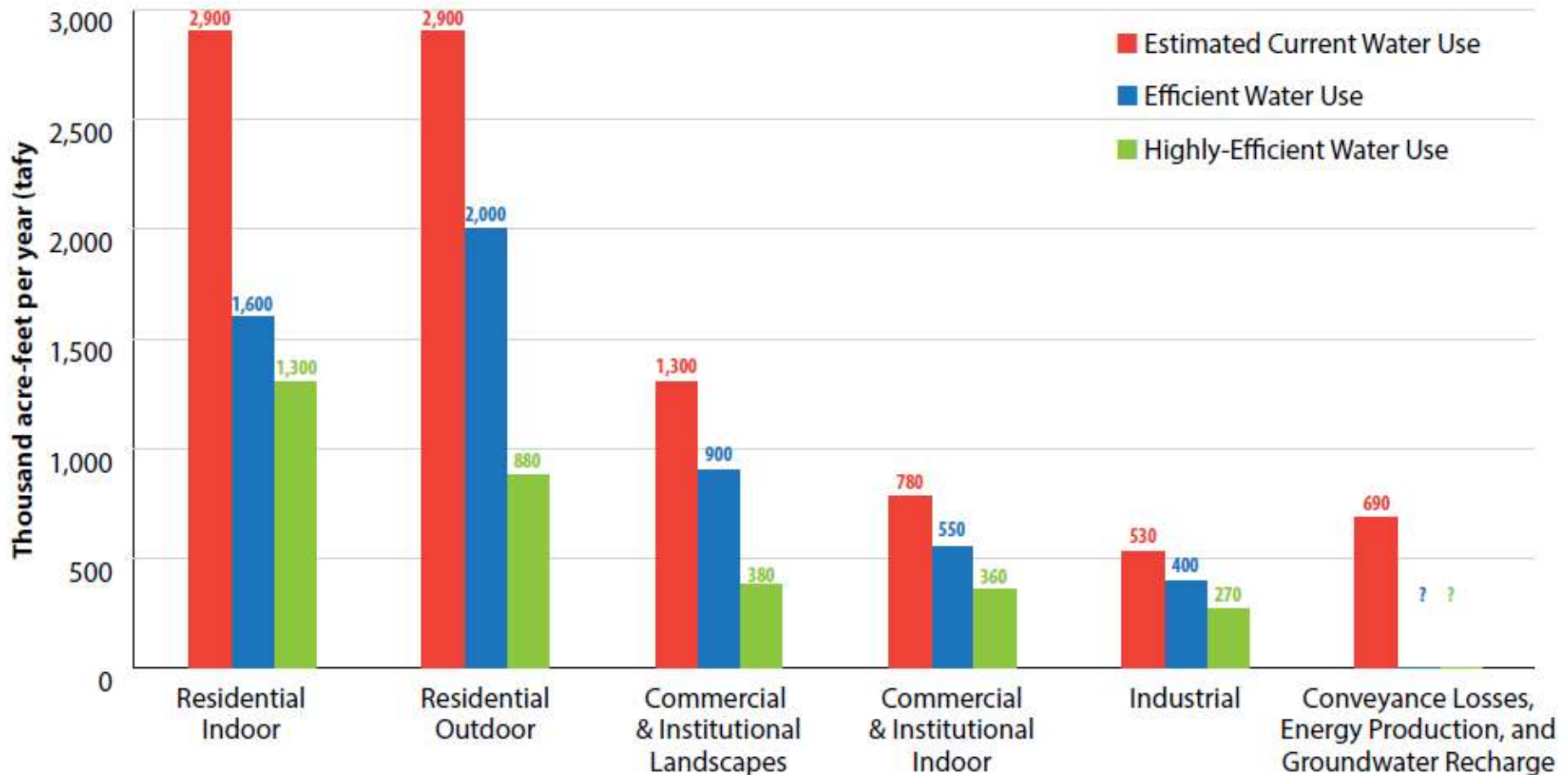
Average from 2001-2010: 230 gpcd

Living Beyond Our Means



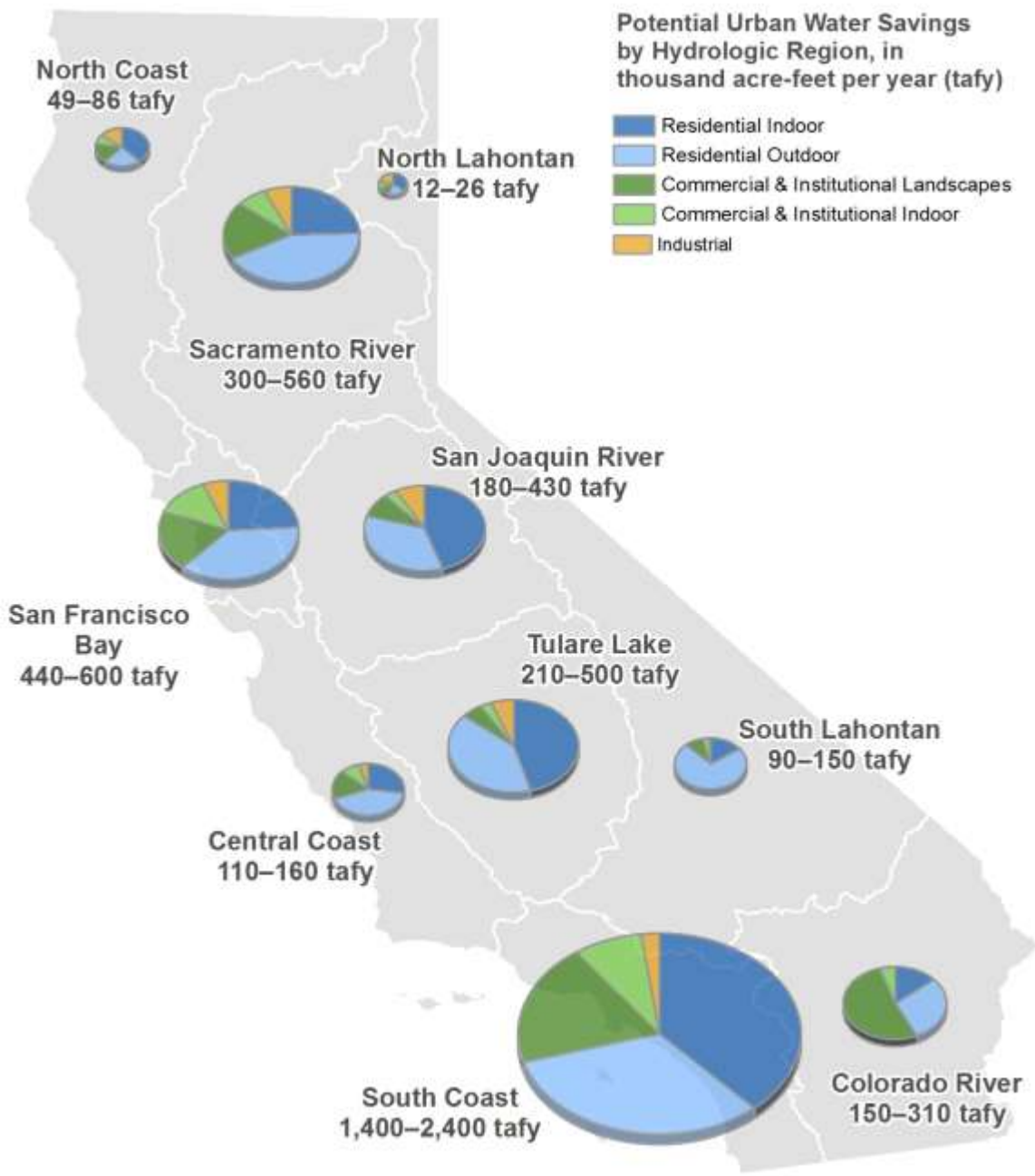
Urban Efficiency Potential

Water Savings – 2.9 million to 5.2 million acre-feet per year



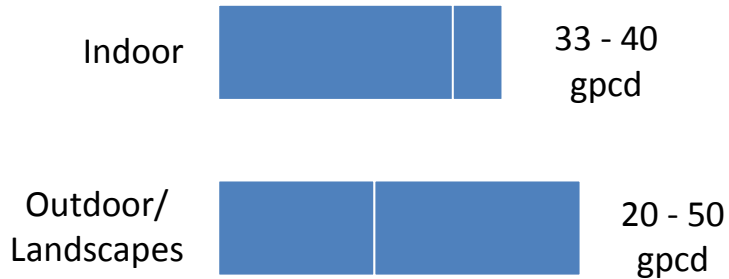


Potential Water Savings by Hydrologic Region



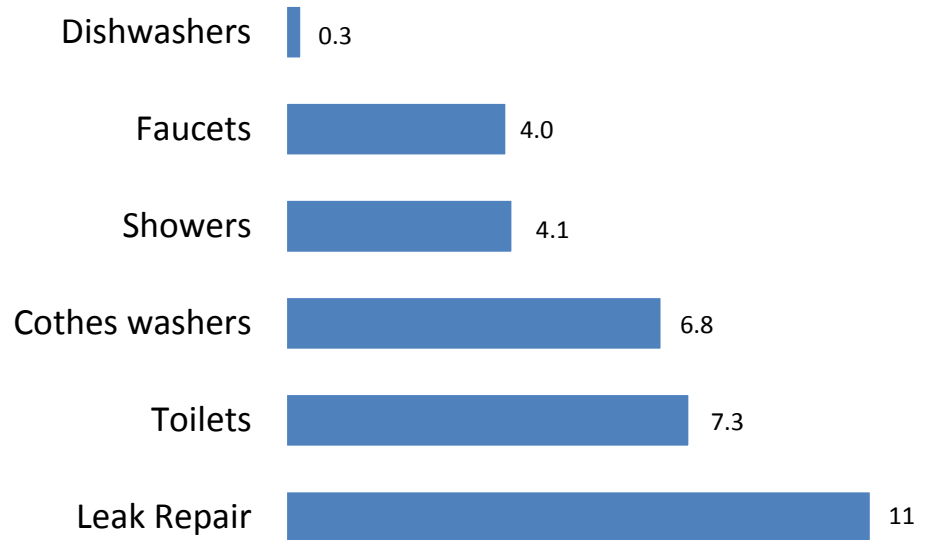
Residential Per Capita Savings

Residential Savings

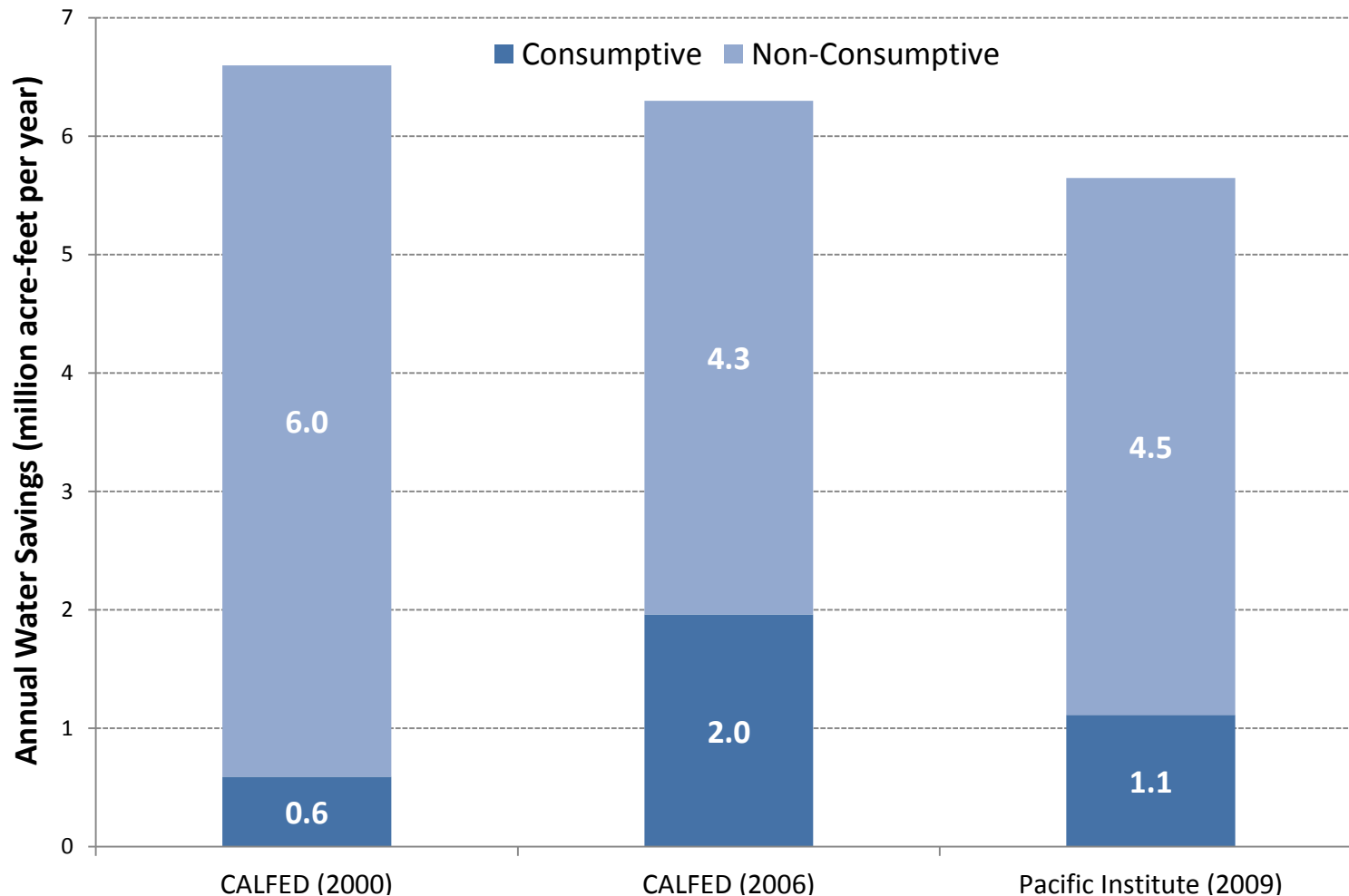


Total residential savings is 53 – 90 gpcd
(from current levels of 140 gpcd)

Indoor Savings



Agricultural Efficiency Potential

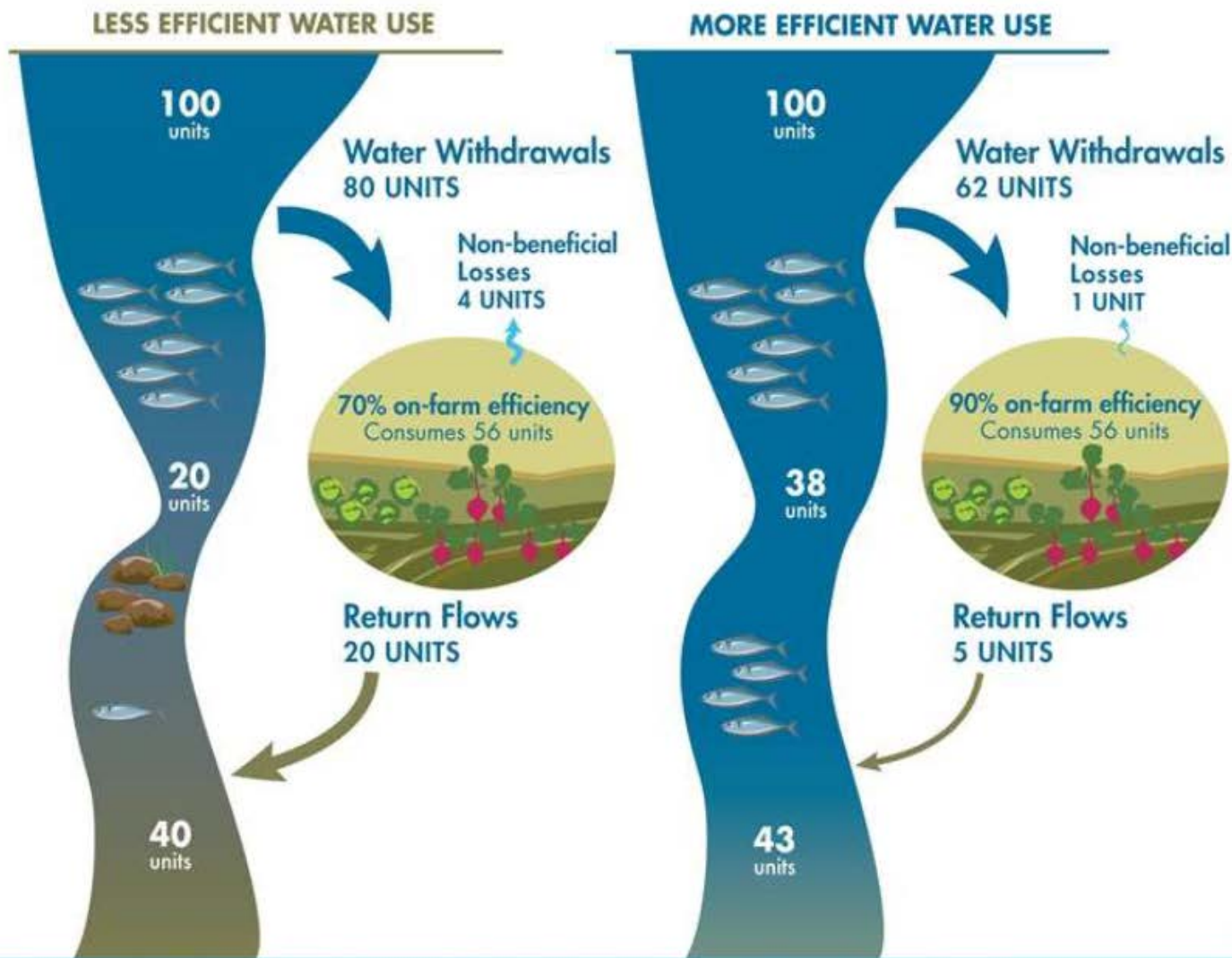


Important Points

- Efficiency savings represent demand reductions.
- Some of these savings represent additional supply that can be allocated to other uses.
- The rest mean less water taken from surface and ground water, with a number of benefits:
 - Less polluted runoff
 - Instream flow augmentation
 - Energy savings and reductions in GHG emissions
 - Delay or eliminate need for capital-intensive infrastructure
 - Reduce vulnerability to drought and other water-supply constraints



The Multiple Benefits of Water Efficiency



BENEFITS OF EFFICIENCY INCLUDE:

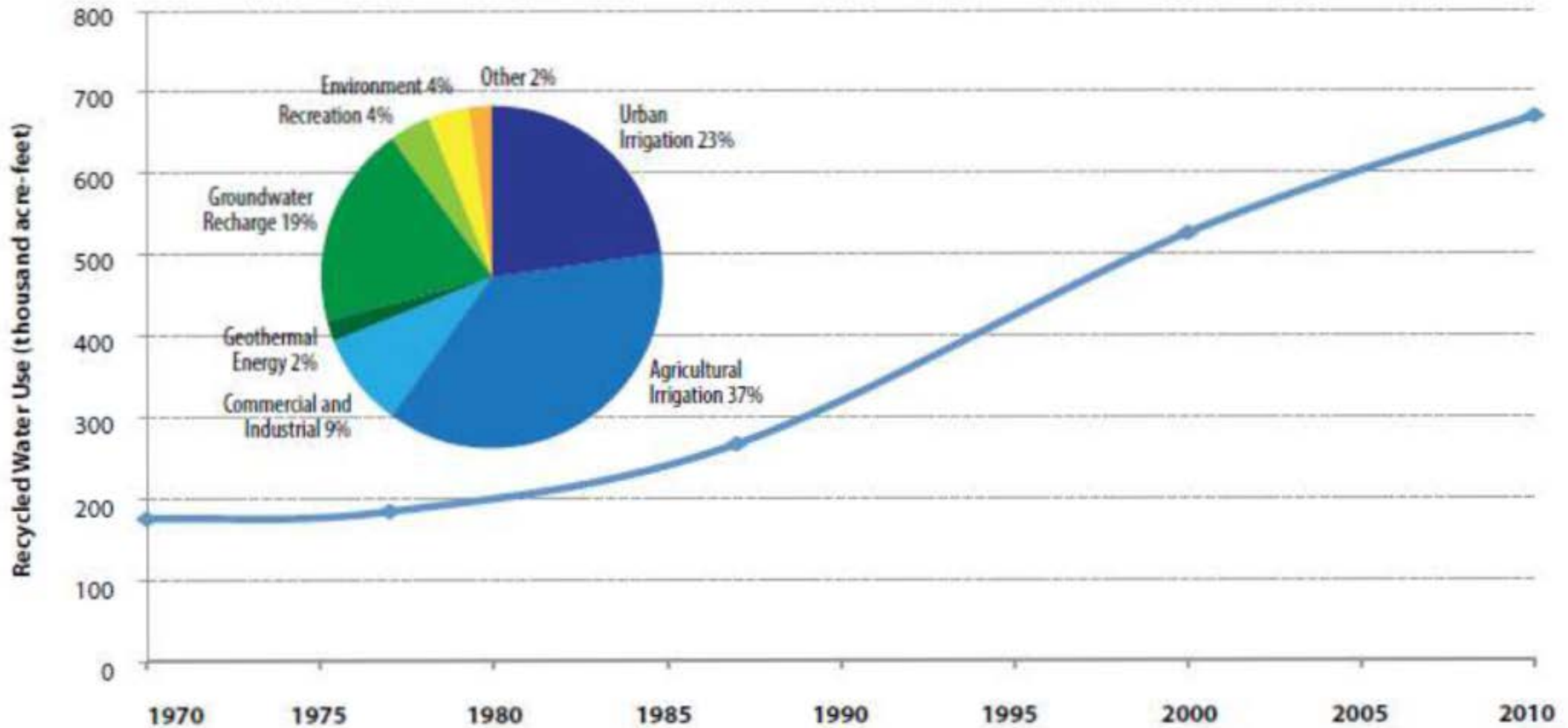
- Maintain agricultural production
- Reduced non-beneficial consumptive losses, creating new supply
- Less polluted runoff into rivers, streams, and groundwater aquifers
- More water to support in-stream flows
- Less energy for pumping
- Reduce or eliminate need for expensive infrastructure
- Less vulnerability to drought



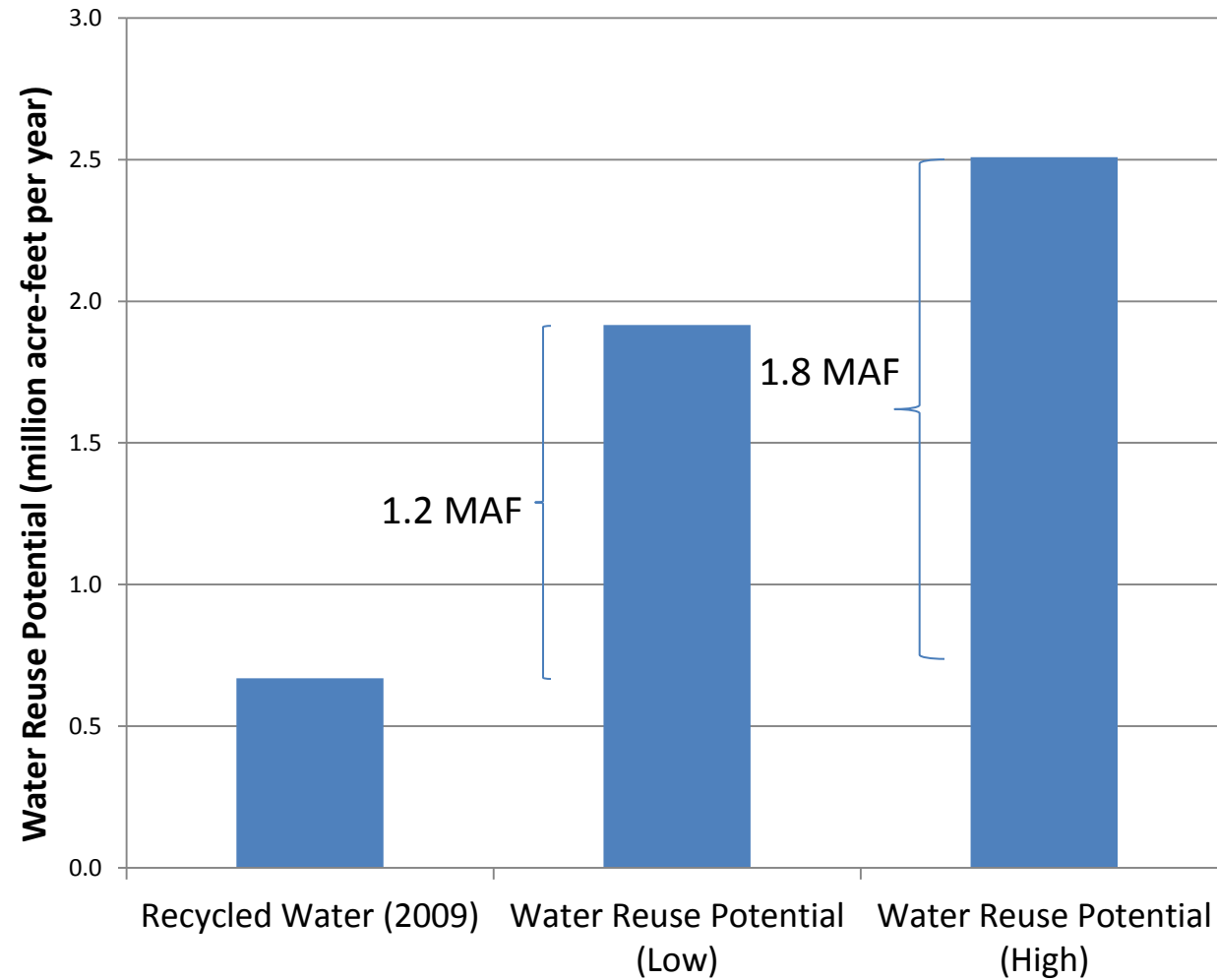
www.pacinst.org

*Numbers in this figure are for illustrative purposes. Actual quantities would depend on site-specific conditions.

Water Recycling Trends, 1970 - 2009

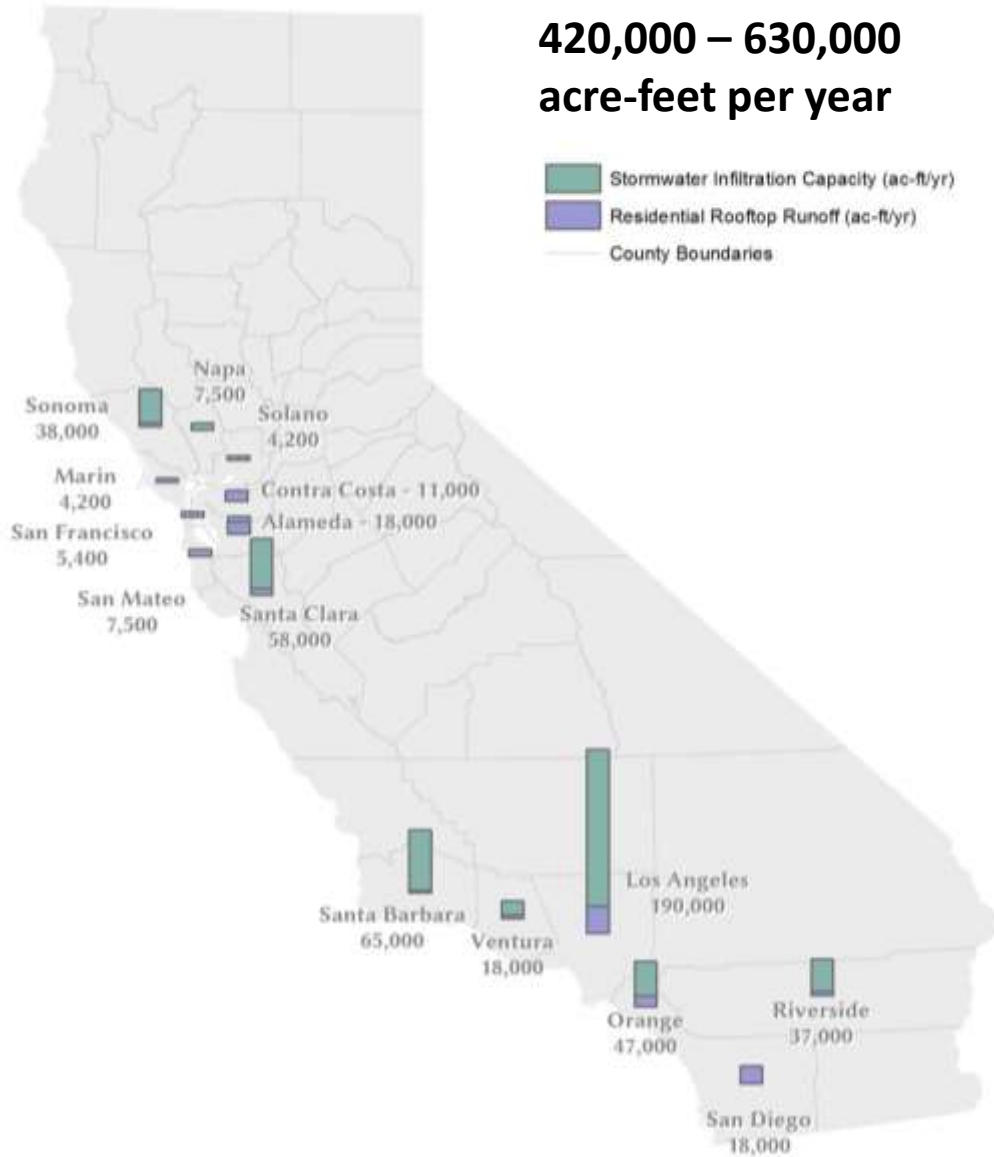


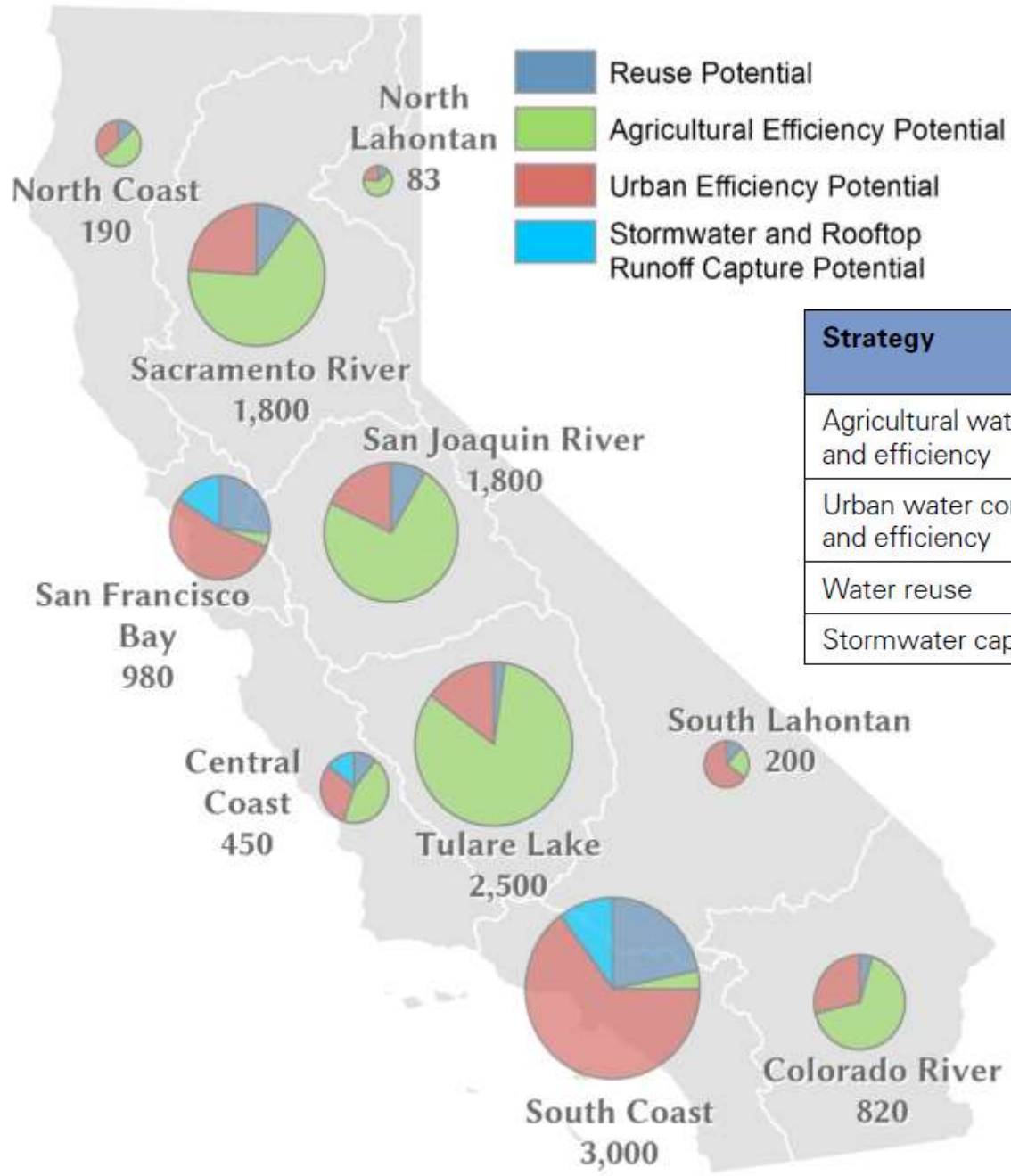
Water Reuse Potential



Stormwater Capture Potential

**420,000 – 630,000
acre-feet per year**





Strategy	Water Savings (million acre-feet per year)
Agricultural water conservation and efficiency	5.6 – 6.6
Urban water conservation and efficiency	2.9 – 5.2
Water reuse	1.2 – 1.8
Stormwater capture	0.4 – 0.6

**10.8 million -
13.7 million
acre-feet per
year**





Untapped Savings

Stormwater Capture

21ST CENTURY SOLUTIONS FOR A SUSTAINABLE WATER SUPPLY FOR CALIFORNIA

Every year, California uses

6 MILLION ACRE-FEET

more water than our rivers and aquifers can sustainably provide

Every year, California could save up to

14 MILLION ACRE-FEET

of water to close this gap



That's enough water to irrigate all of the orchards, nuts, berries, vineyards, tomatoes, lettuces, rice, and vegetables grown in California, with water left over.

Agricultural Efficiency: 5.6-6.6 MILLION ACRE-FEET

- Use smart irrigation scheduling to ensure crops are watered when they most need it
- Use deficit irrigation to limit water use at drought-tolerant growth stages
- Expand efficient drip and sprinkler irrigation technology

Stormwater Capture: 0.4-0.6 MILLION ACRE-FEET

- Install rainwater barrels and cisterns at homes and businesses
- Recharge groundwater with stormwater runoff

Water Reuse: 1.2-1.8 MILLION ACRE-FEET

- Use recycled water to irrigate landscapes and crops
- Install graywater systems to water lawns and flush toilets in homes and businesses
- Recharge groundwater with recycled water

Urban Efficiency: 2.9-5.2 MILLION ACRE-FEET

- Replace unneeded turf grass with native and drought-tolerant plants
- Accelerate replacement of inefficient plumbing fixtures and appliances
- Find and fix water leakage in buildings and under streets
- Operate cooling towers more efficiently in factories and office buildings



Get the Drought Series Fact Sheets at:
www.nrdc.org/water/ca-water-supply-solutions.asp
www.pacinst.org/publication/ca-water-supply-solutions

* 1 Million Acre-Feet is generally enough to supply 2 million families for 1 year (until we all become more efficient!)

For copies of the reports, infographic, and fact sheet:

www.pacinst.org/publication/ca-water-supply-solutions/

www.nrdc.org/water/ca-water-supply-solutions.asp

www.californiadrought.org

