

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

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*For the California Water Commission*

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# Untapped Savings

21<sup>ST</sup> 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

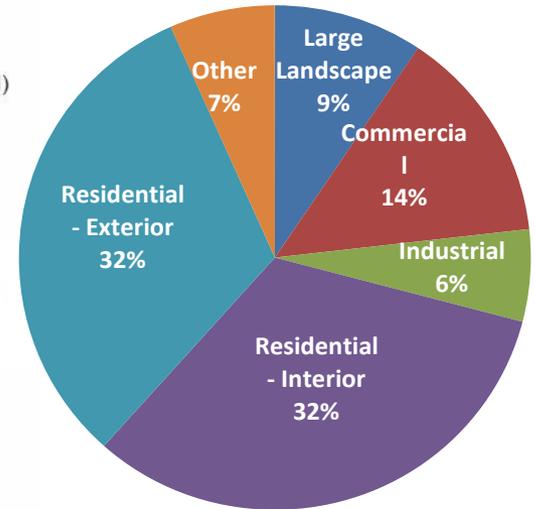
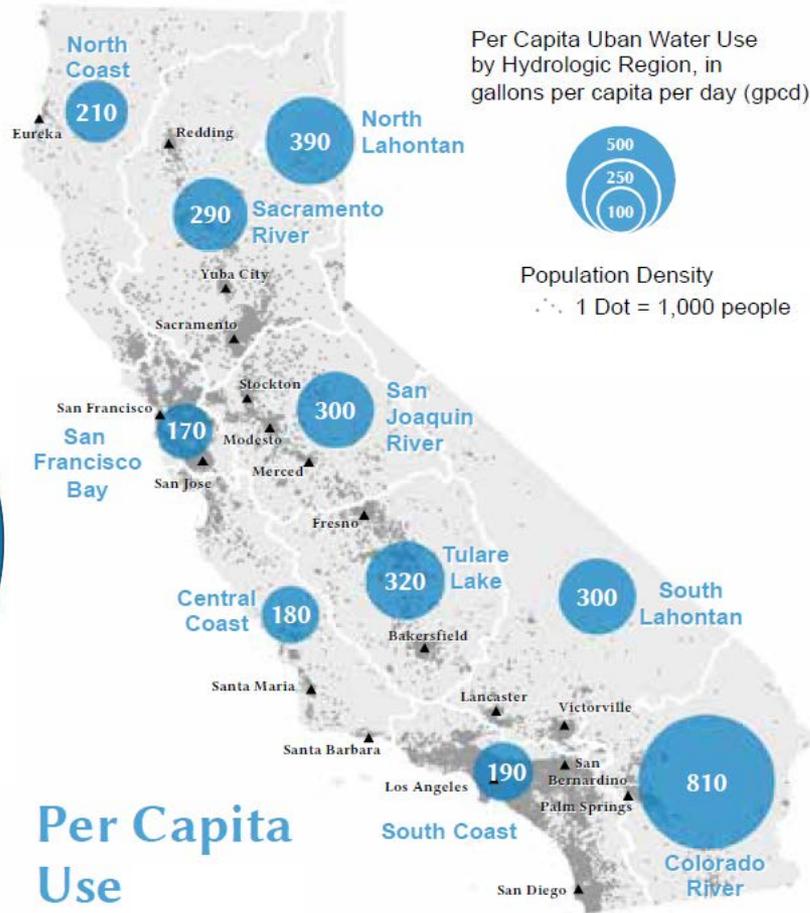
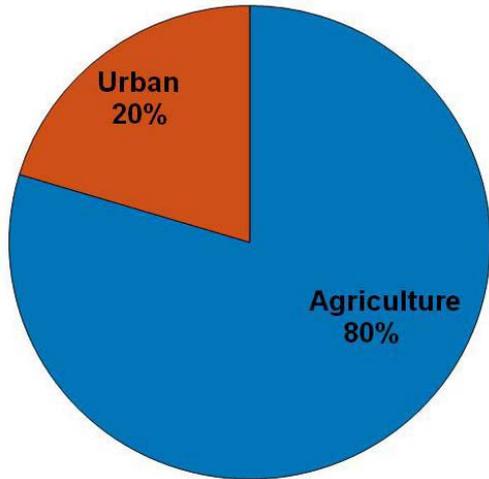


Get the Drought Series Fact Sheets at:  
[www.nrdc.org/water/ca-water-supply-solutions.asp](http://www.nrdc.org/water/ca-water-supply-solutions.asp)  
[www.pacinst.org/publication/ca-water-supply-solutions](http://www.pacinst.org/publication/ca-water-supply-solutions)

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

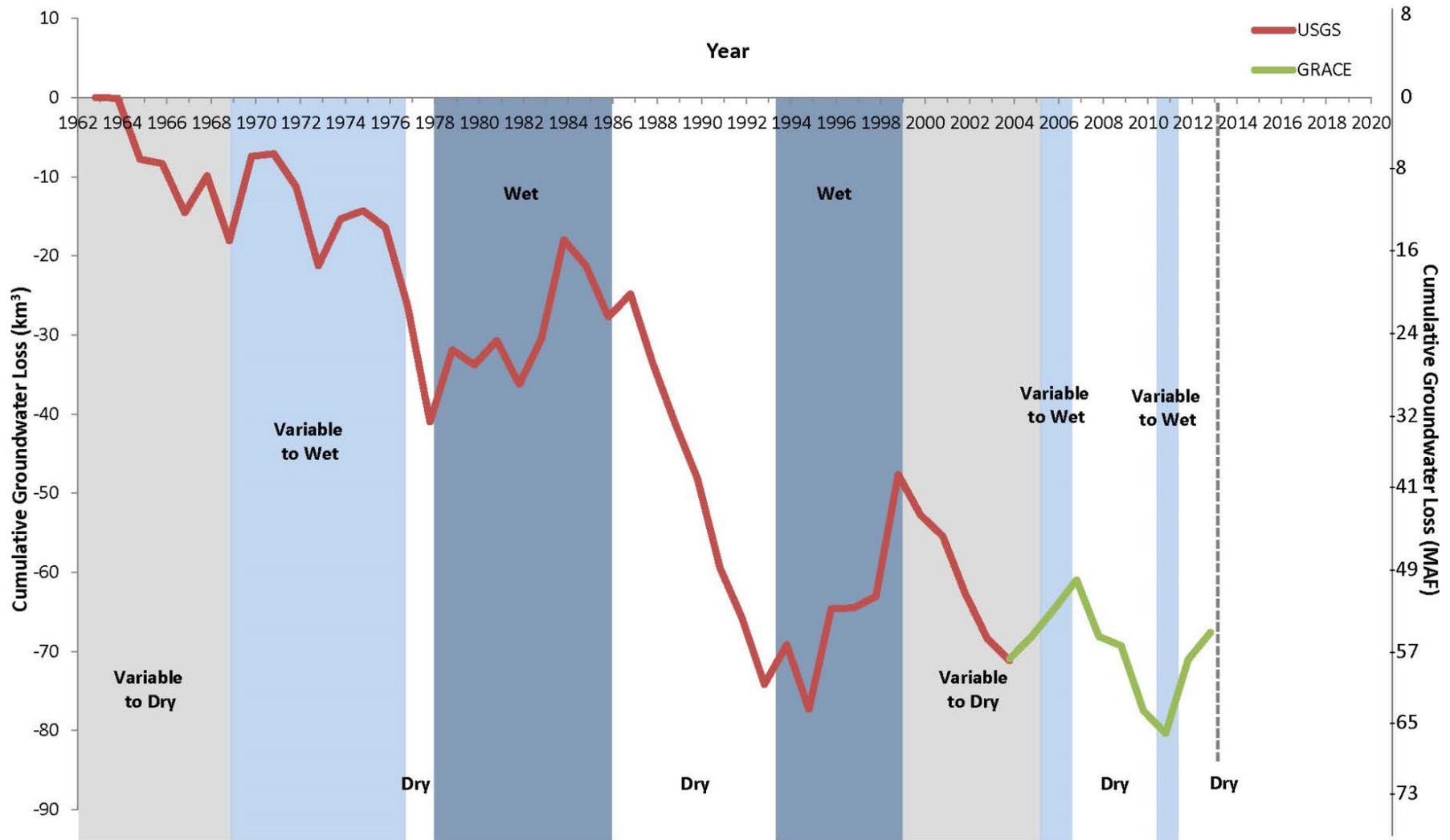
# Water Use in California

Human Water Use:  
44 million acre-feet per  
year

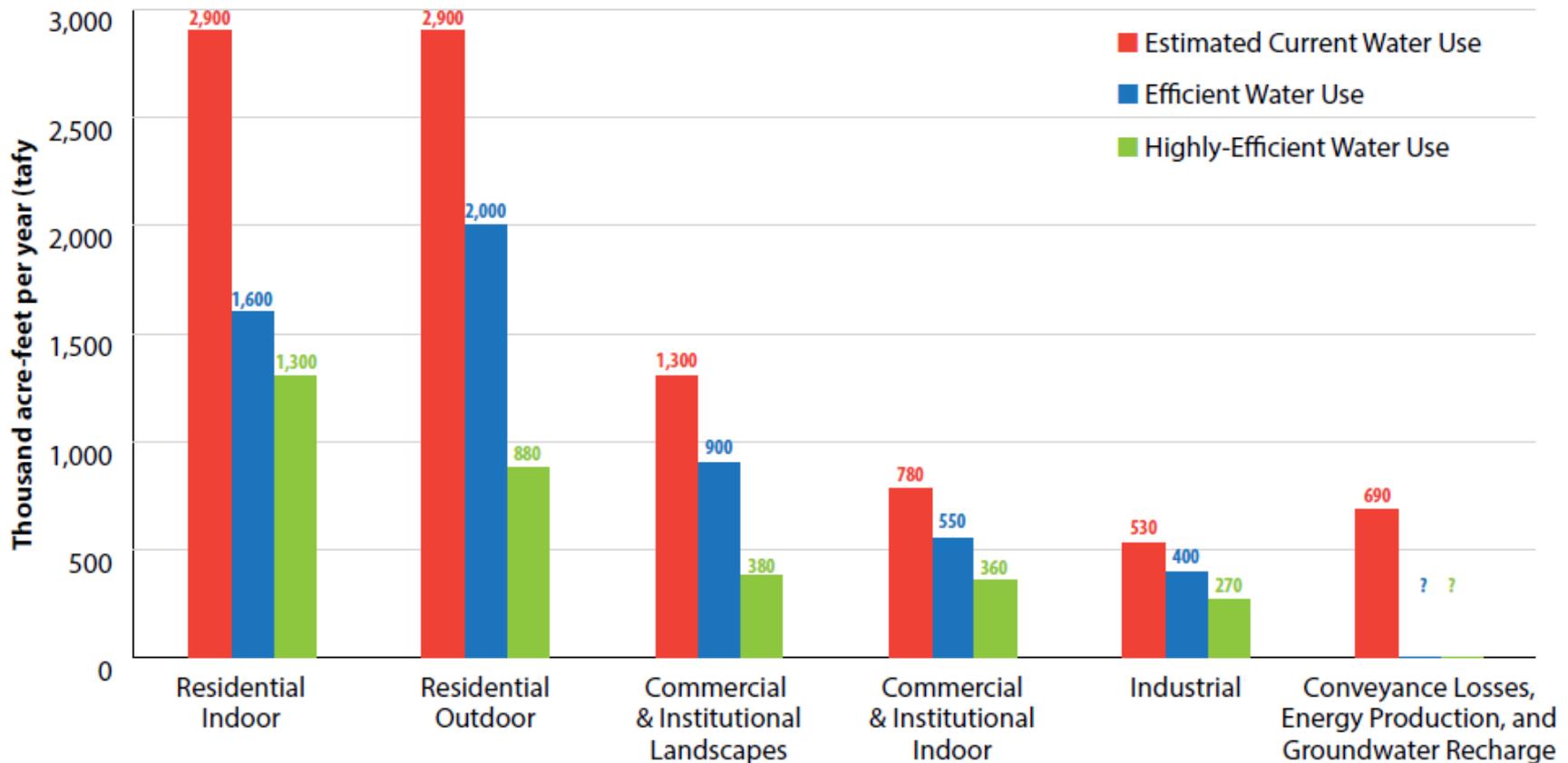


Average from 2001-2010: 230 gpcd

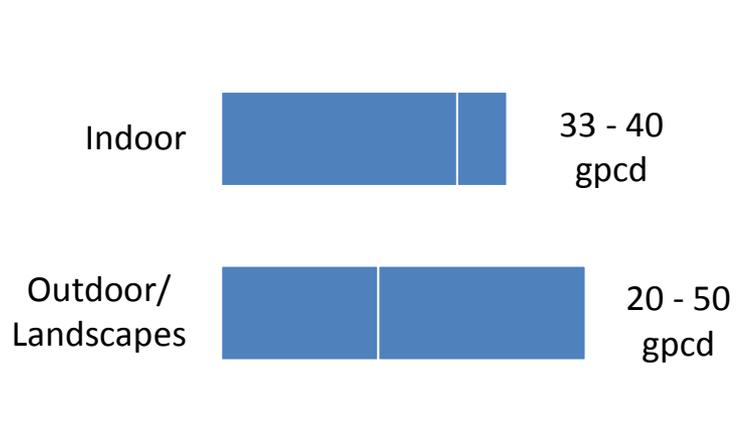
# We Are Living Beyond Our Means



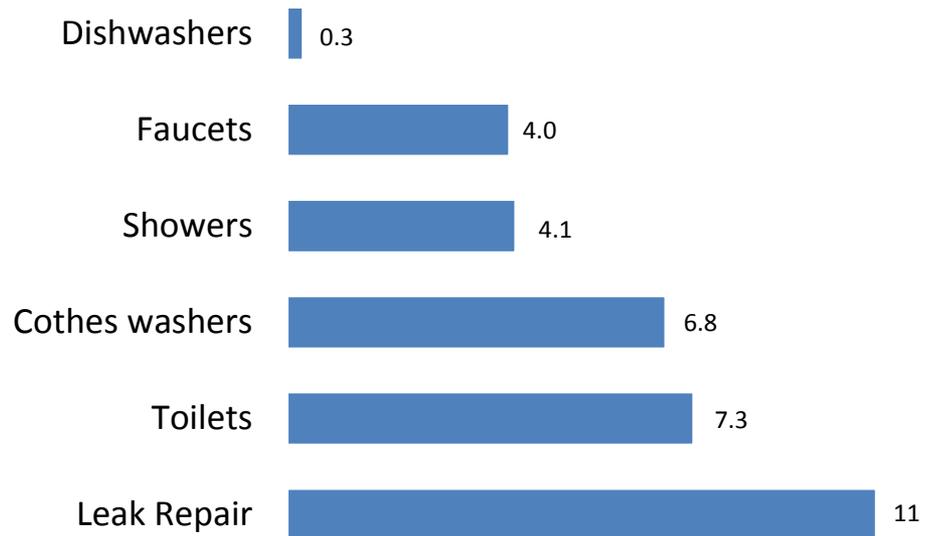
# Urban Efficiency Potential



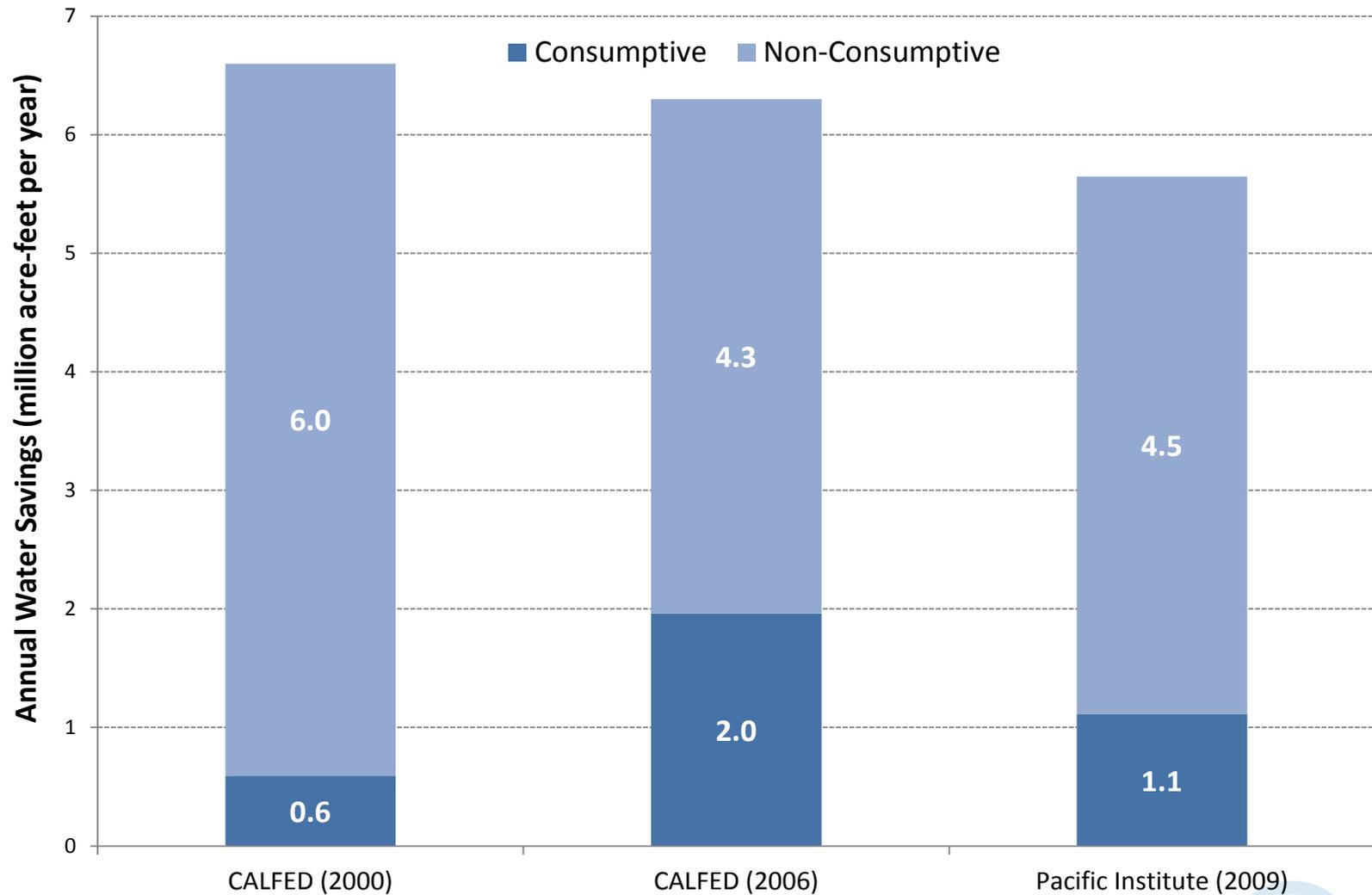
# Residential Per Capita Savings



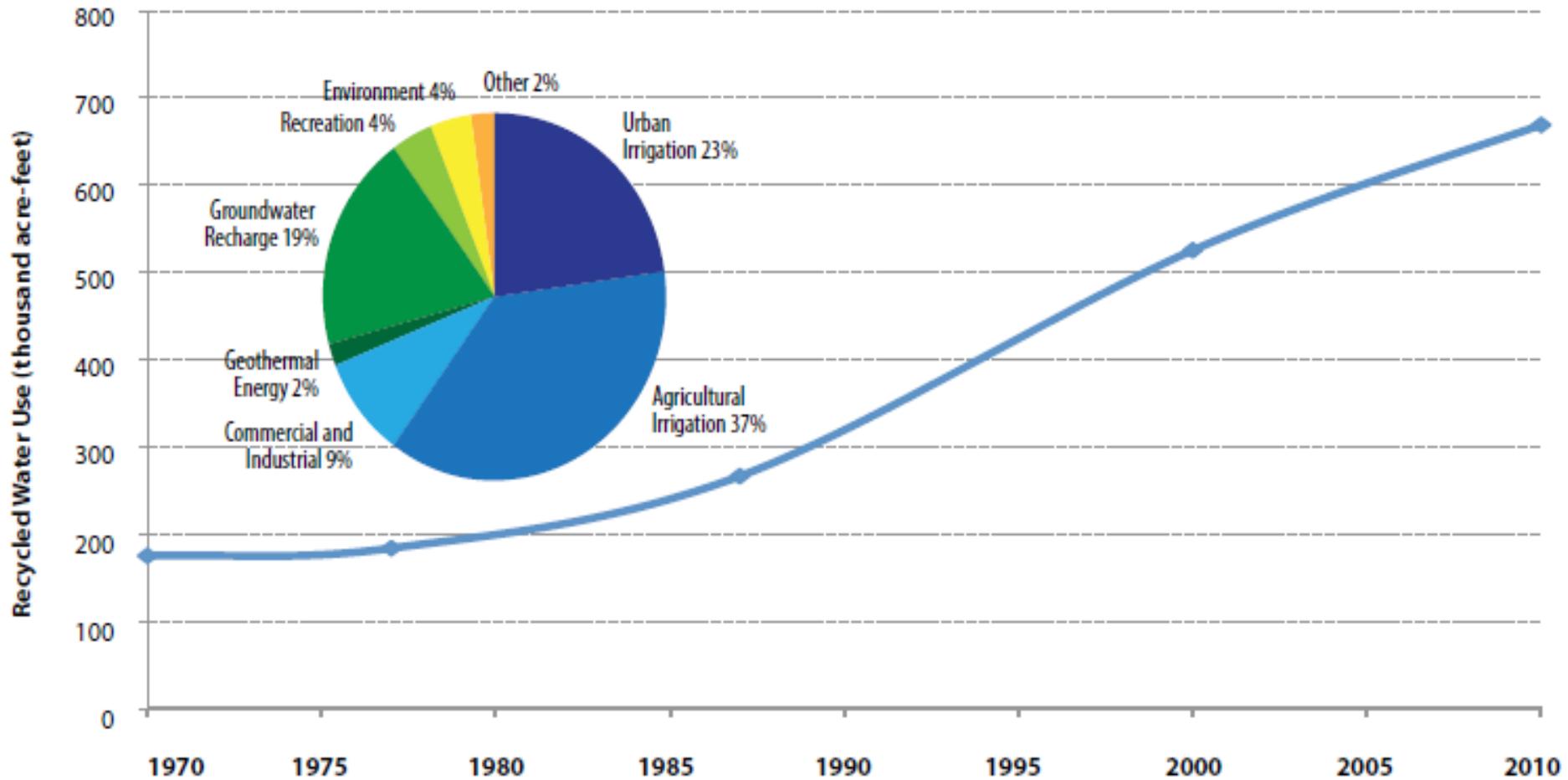
Total residential savings is 53 – 90 gpcd  
(from current levels of 140 gpcd)



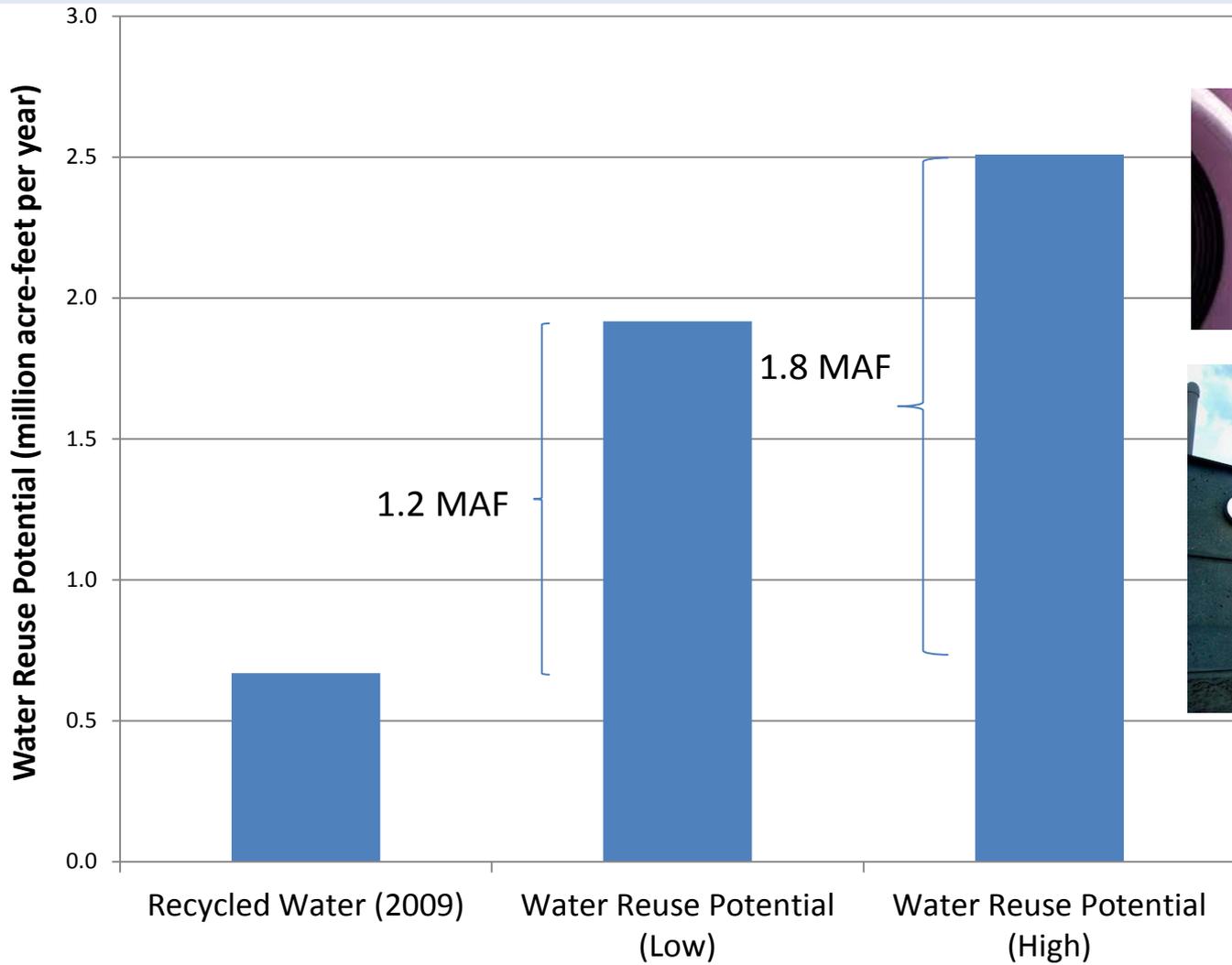
# Agricultural Efficiency Potential



# Water Recycling Trends, 1970 - 2009

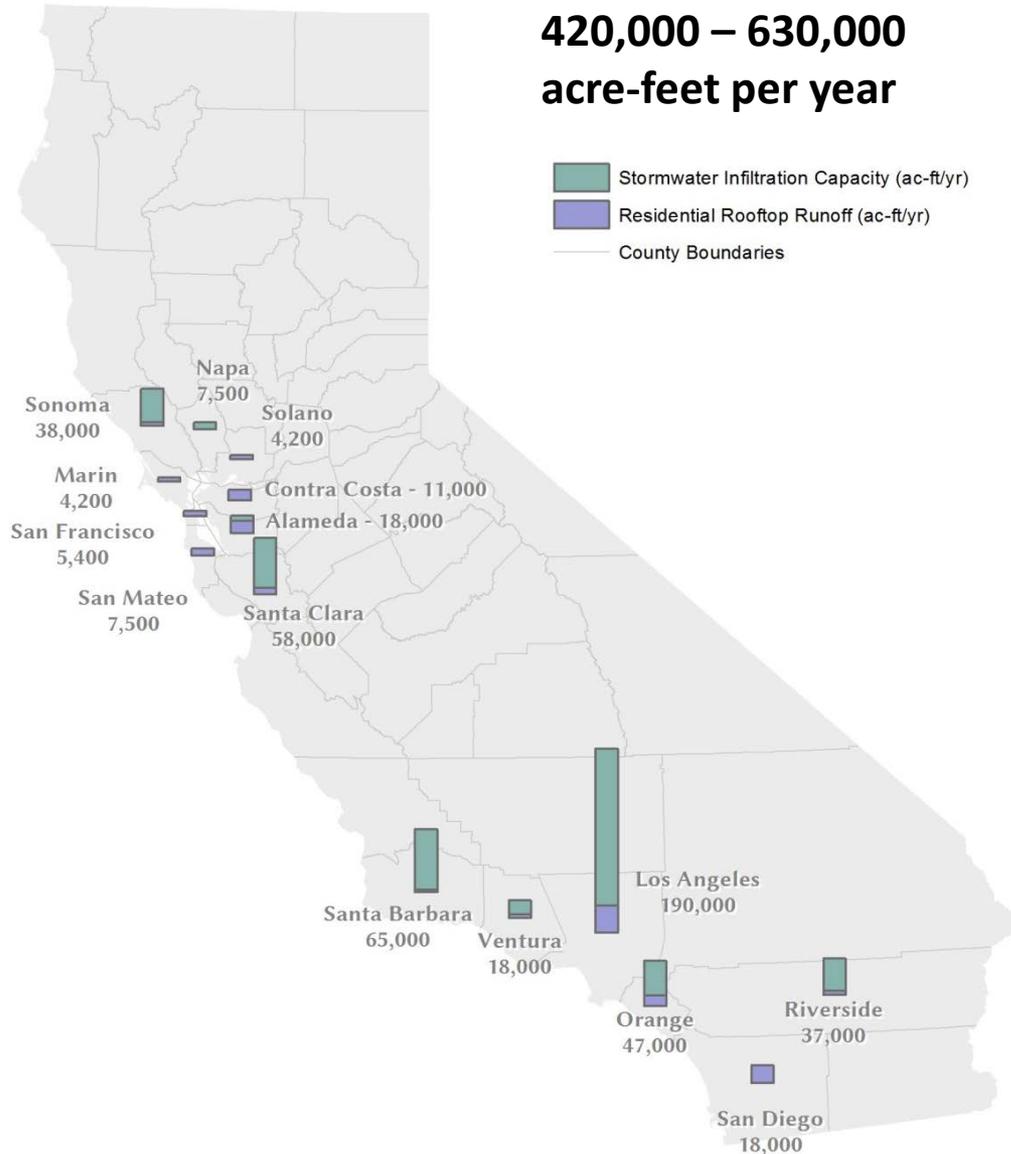


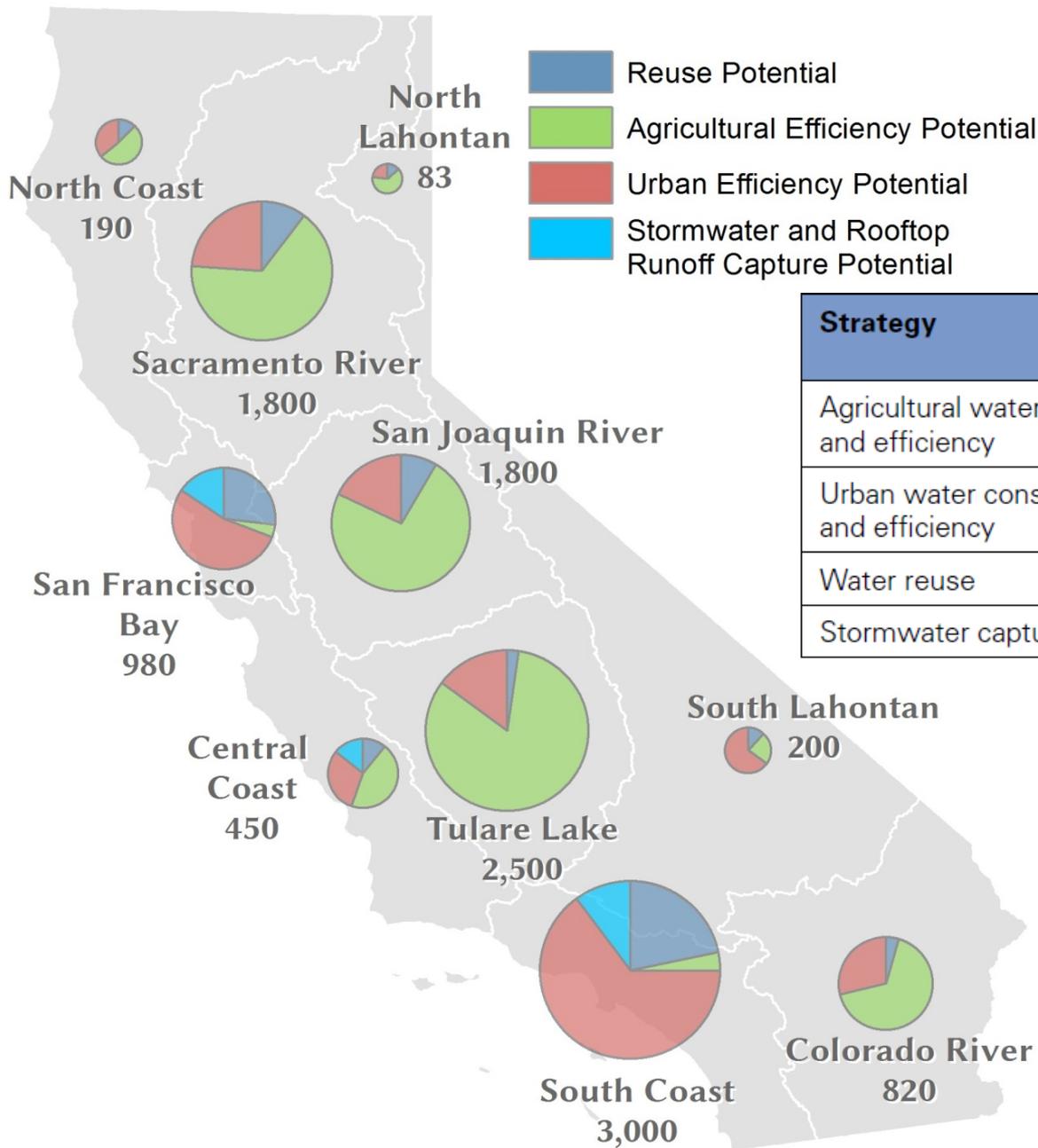
# Water Reuse Potential



# 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

# Water-Use Efficiency Definitions

- How much water is required to satisfy a particular demand?
  - Many definitions
  - Long academic history
  - Long field experience
  - Poorly measured, in practice

# Efficiency: Good News

- Remarkable progress; growing number of “success stories.”
- New appreciation for the potential for improvements.
- Better understanding of the definitions, complexities, and possibilities.
- Growing efforts to understand and address barriers to implementation of improvements.
- *Still some serious misunderstandings, misrepresentations, constraints on implementation.*

# Water-Use Efficiency Potential

- Some believe that WUE potential is small and that the only real options for cities and farms are fallowing, crop shifting, or “new” supplies.
- The good news is that this is wrong: Strong evidence that the potential for improving water-use efficiency is substantial.
- This allows us to maintain sustainable and strong (and more productive) agricultural and urban sectors.

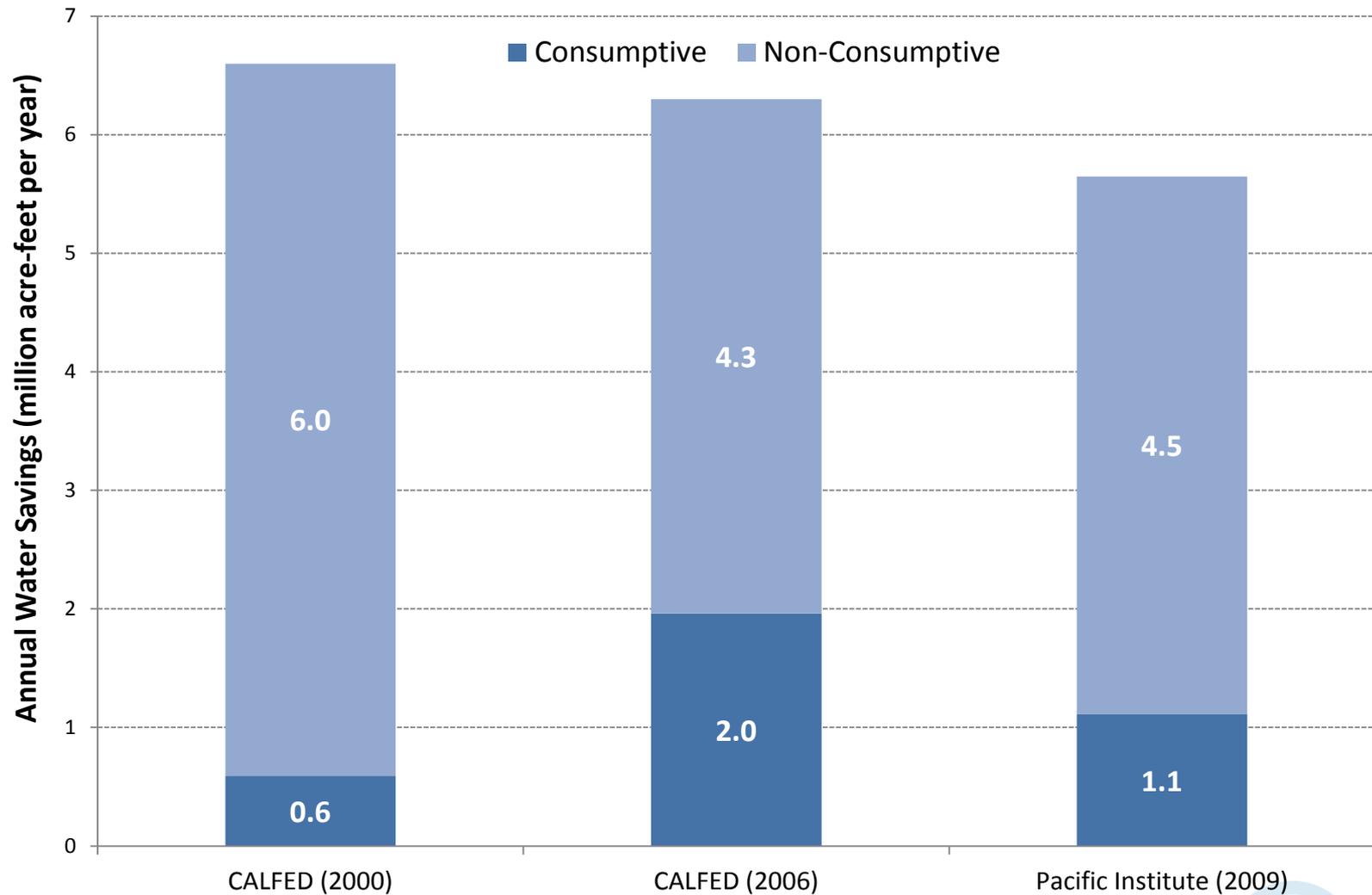
# Additional Factors to Consider

- “New” water versus overall savings
- Co-benefits (traditionally ignored or discounted)
- Water-Use “Productivity” (versus “Efficiency” or “Conservation”)
  - Yield per unit water
  - Dollars per unit water
  - Employment per unit water
  - Other measures

# “New” Water is Not the Only Goal

- Some analysts focus on “new water.” If a policy doesn’t produce water that can be “reallocated” or “marketed,” they discount it.
- This results from a confusion between “consumptive and non-consumptive” and “beneficial and non-beneficial” uses.
- And this focus ignores critical and valuable co-benefits.

# Agricultural Efficiency Potential



# Importance of Reducing Non-Beneficial Uses

- Improve Water Quality
- Increase Instream Flows
- Improve Timing of Instream Flows
- Ecosystem Benefits
- Delay or Eliminate Spending on New Water Supply Infrastructure
- Improve Crop Quality and Yield
- Reduce Energy Use
- Decrease Soil Salinity



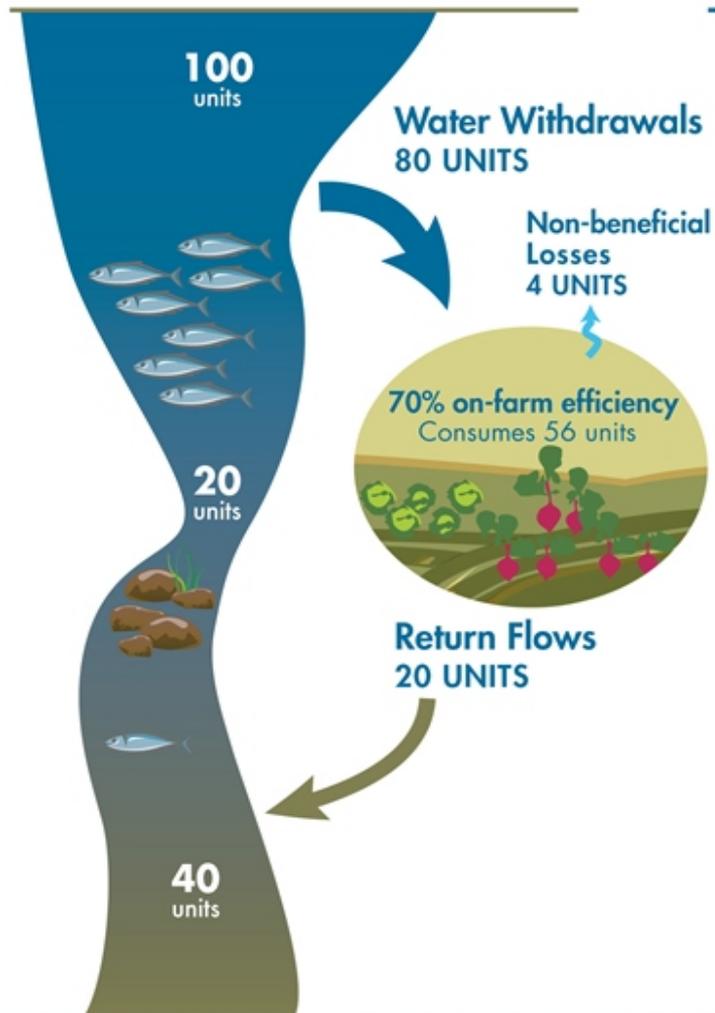


# The Multiple Benefits of Water Efficiency

## 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

### LESS EFFICIENT WATER USE



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

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

# Productivity versus Efficiency

What is our “goal”?

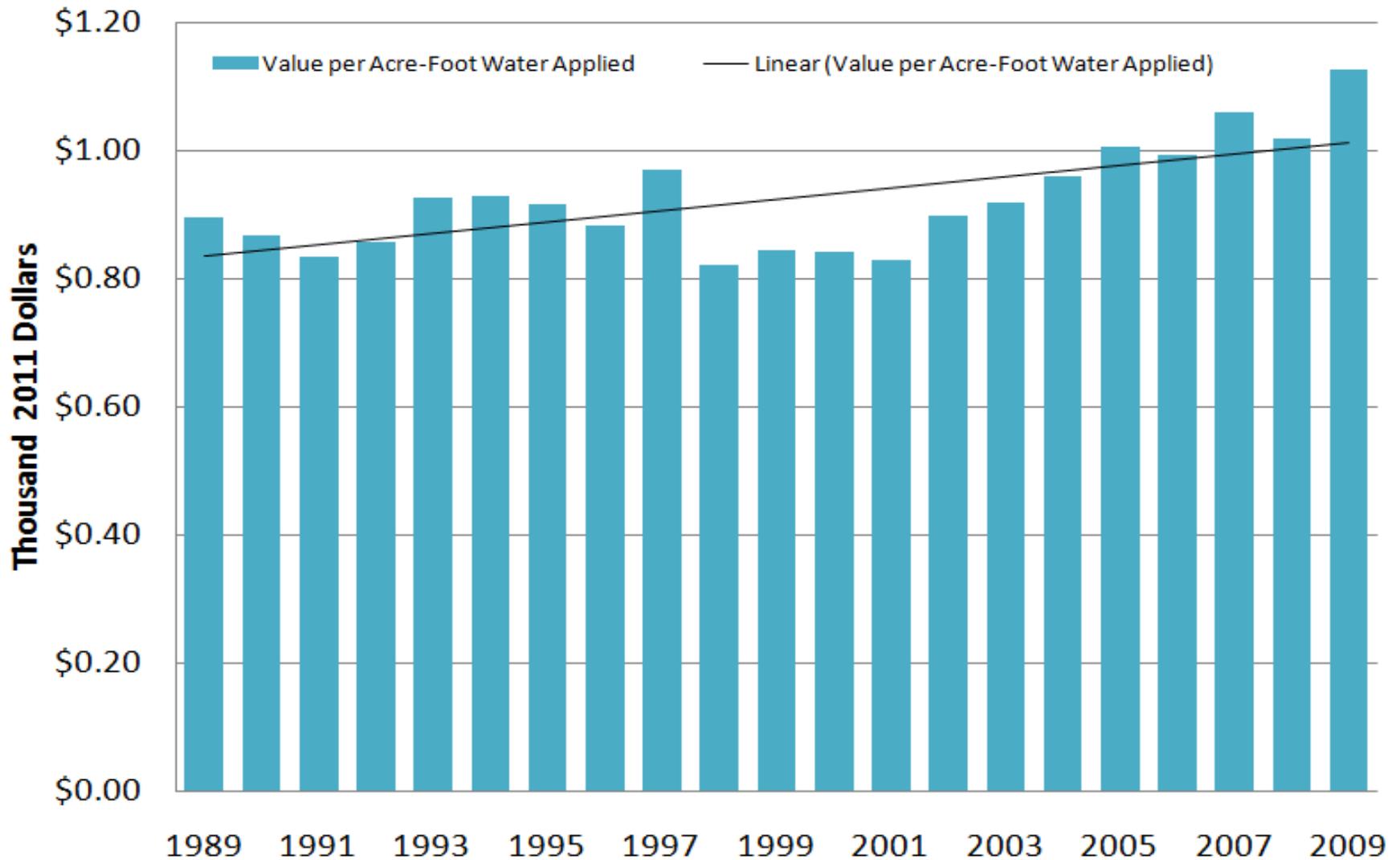
Maximize economic return?

Maximize total yield of food and fiber?

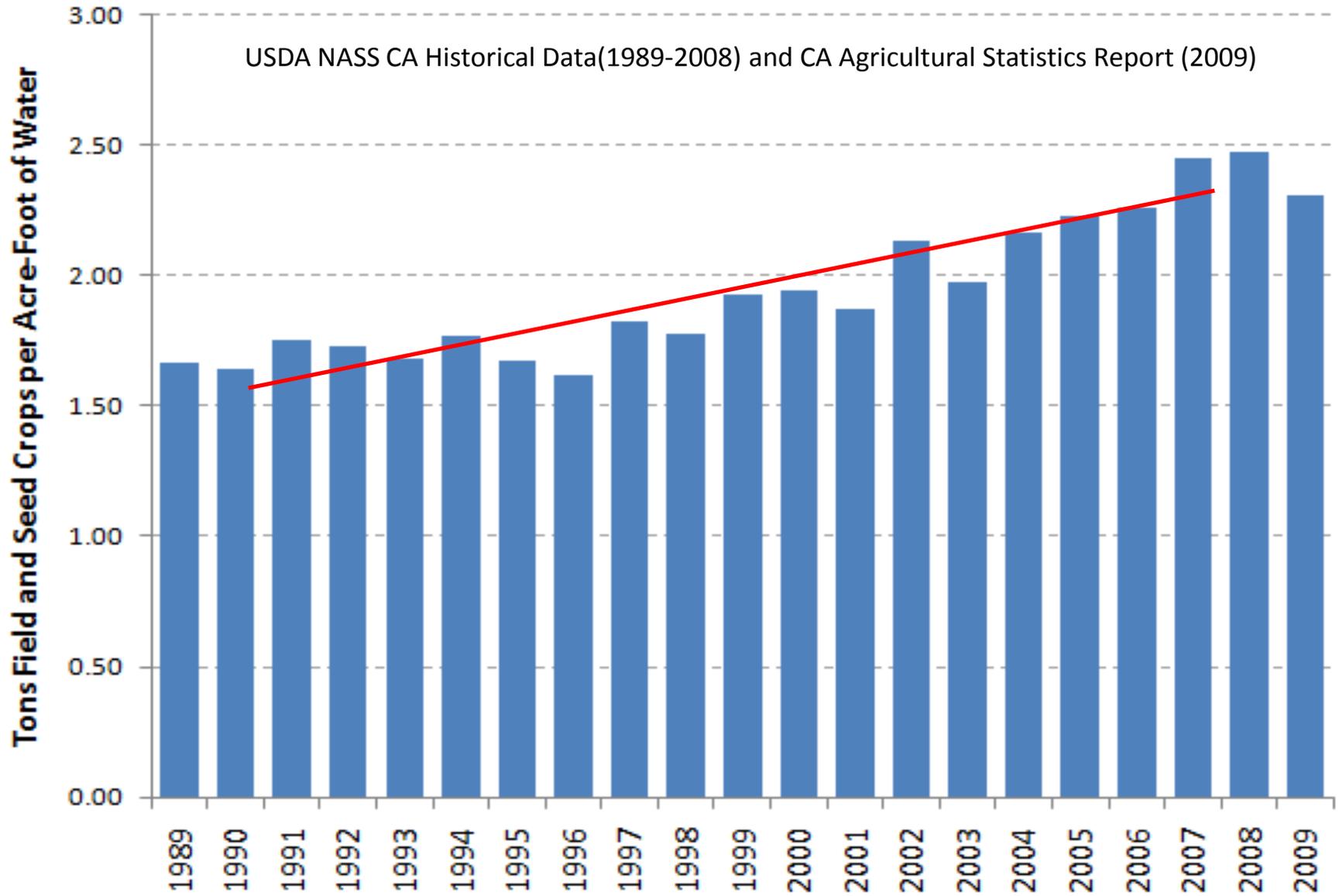
Save and reallocate water?

Boost employment?

# Economic Productivity: \$ Value per AF



# Crop Productivity: Tons/AF of Water



# Productivity versus Efficiency

- The purpose of improving “efficiency” is NOT just to free up “new” water for reallocation.
- Efficiency improvements can lead to “productivity,” “quality,” and financial improvements. These are *real* benefits.
- What happens with “saved water” is a *policy* decision (Transfer it? Market it? Reallocate it? Expand on-field production?)
- New discussion is needed on capturing co-benefits.

# Summary: Efficiency Benefits

- Efficiency savings represent real demand reductions.
- Some of these savings represent additional (“**new**”) supply that can be allocated to other uses.
- The rest mean less water taken from surface and groundwater, with vital “co-benefits.”
- There are additional advantages to improving productivity.

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

[www.pacinst.org/publication/ca-water-supply-solutions/](http://www.pacinst.org/publication/ca-water-supply-solutions/)

[www.nrdc.org/water/ca-water-supply-solutions.asp](http://www.nrdc.org/water/ca-water-supply-solutions.asp)

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