



PRESENTATION

# FINDINGS FROM A HEALTH IMPACT ASSESSMENT OF CALIFORNIA URBAN WATER CONSERVATION ALTERNATIVES

DATE

**SEPTEMBER 19, 2014**

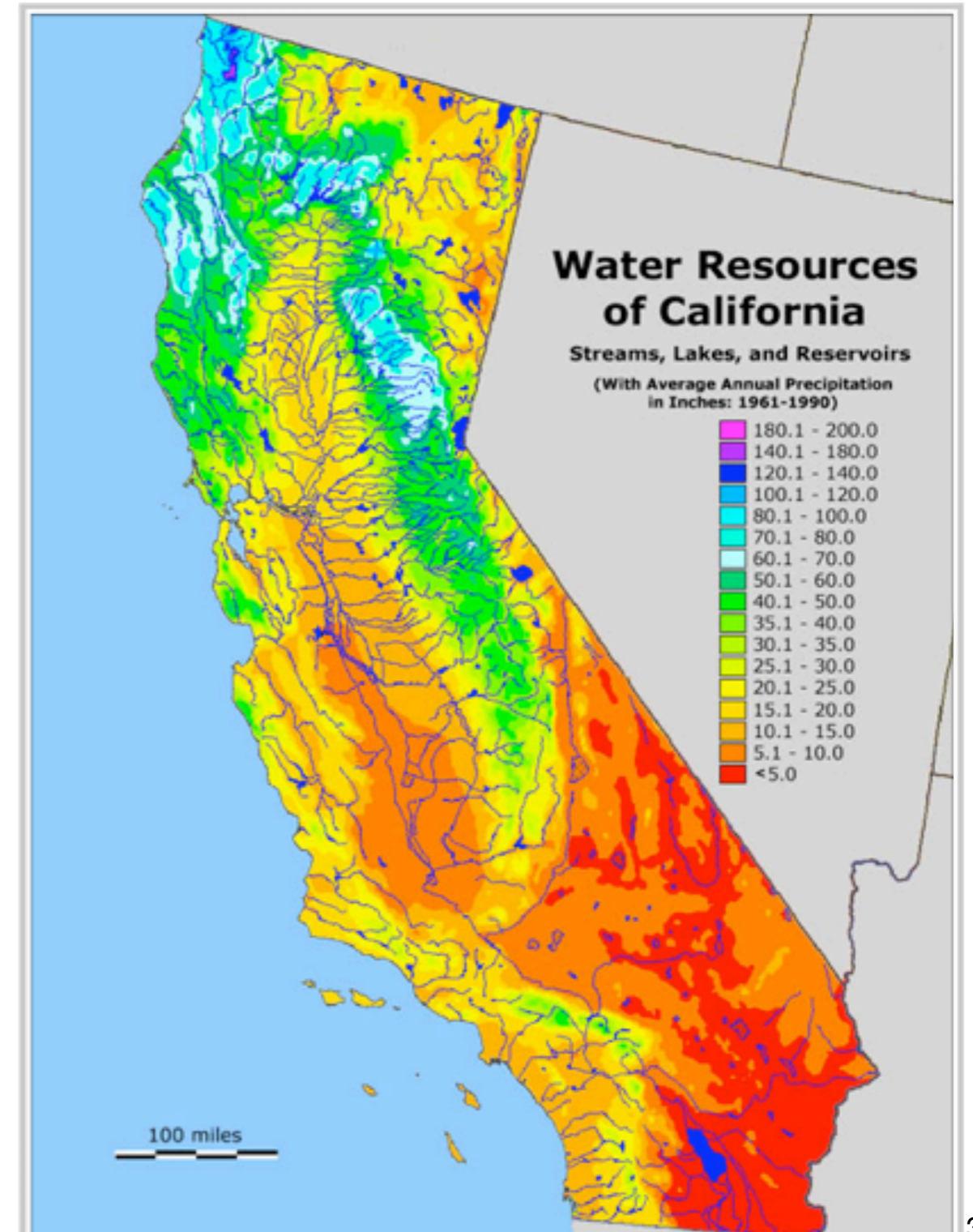
PRESENTED BY

**SHARONA SOKOLOW, MPH**

# California's Water

# Background: California's Water Resources

- Rainy season is incongruous with CA water needs
- The majority of rain falls in the North, but is needed in the South.
- Climate change issues
- Population issues



[http://geologycafe.com/california/maps/california\\_precipitation2.htm](http://geologycafe.com/california/maps/california_precipitation2.htm)

# California Water Sources

- 4 Major Aqueduct Systems (surface water):
  - **State Water Project, California Aqueduct**



# California Water Sources

- 4 Major Aqueduct Systems (surface water):
  - State Water Project, California Aqueduct
  - **Colorado River Aqueduct**



# California Water Sources

- 4 Major Aqueduct Systems (surface water):
  - State Water Project, California Aqueduct
  - Colorado River Aqueduct
  - **Los Angeles Aqueduct**



# California Water Sources

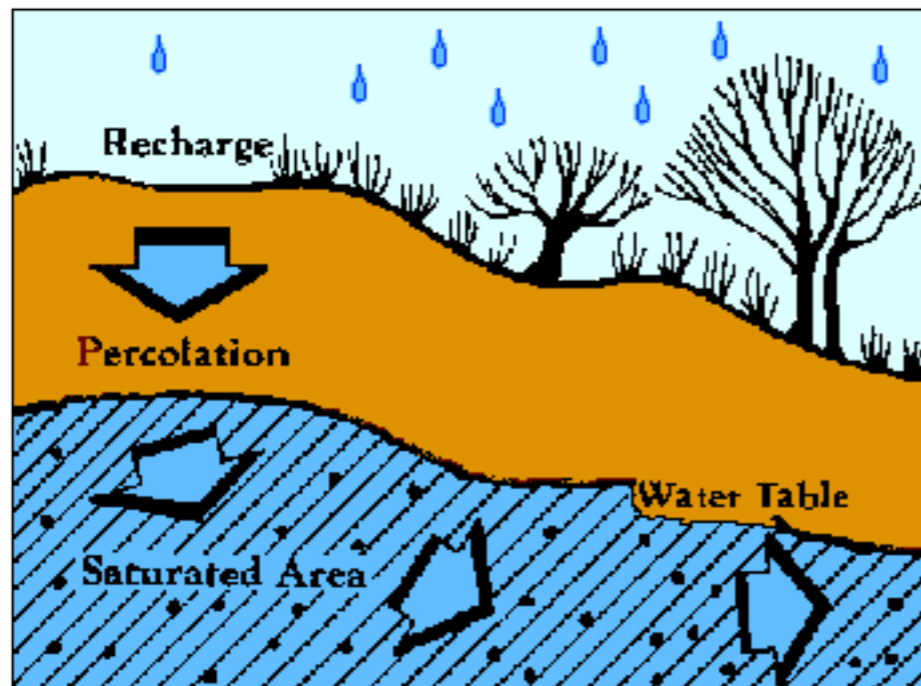
- 4 Major Aqueduct Systems (surface water):
  - State Water Project, California Aqueduct
  - Colorado River Aqueduct
  - Los Angeles Aqueduct
  - **Central Valley Project**



# California Water Sources

- 4 Major Aqueduct Systems:
  - State Water Project, California Aqueduct
  - Colorado River Aqueduct
  - Los Angeles Aqueduct
  - Central Valley Project

- **Groundwater**



<http://academic.evergreen.edu/g/grossmaz/KIEPERME/>



<http://www.centralbasin.org/waterSupplySystem.html>



# **Health Impact Assessment (HIA)**

# Project Rationale

---

- In 2009, California's legislature passed a historic water bill, which included Senate Bill x7-7, calling for all California water districts to reduce water use by 20% by the year 2020.
- Comply by submitting Urban Water Management Plans in 2010, 2015, 2020.
- Water districts are able to pick from a mix of conservation methods to best fit their individual conservation targets.
- Inspiration from Australia's drought.

# What is a Health Impact Assessment (HIA)?

---

- Starts with a policy or project -- in this case, SBx7-7 (20x2020)
- Creates actionable results to affect policy.
- This is where research meets policy!
  - **Goal:** To identify conservation options that will maximize potential benefits and minimize harm.
  - **Outcome:** To provide decision makers with tangible recommendations for how water conservation decisions can affect health.

# SBx7-7: The Specifics

---

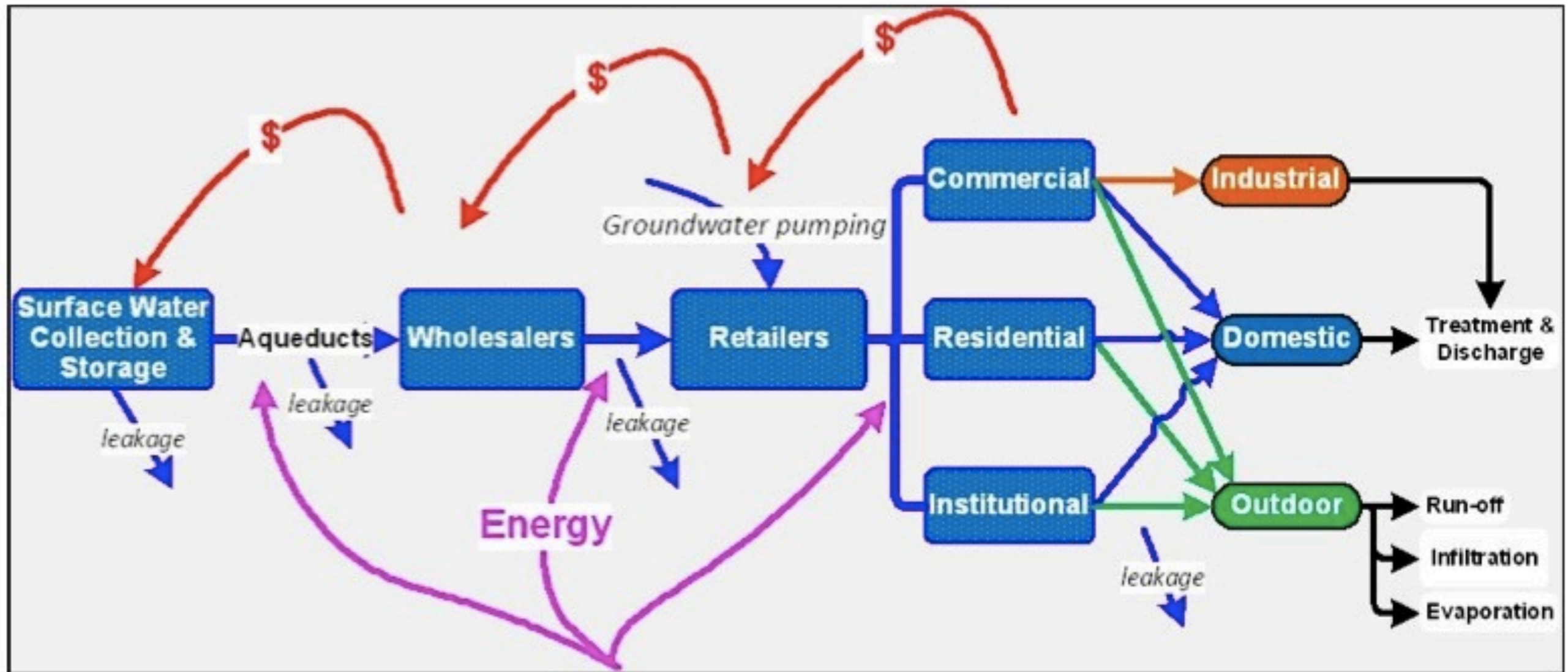
## **Demand Management Measures SB X7-7** (CA Water Code Section 10631)

- A. Water survey programs for single-family residential and multifamily residential customers
- B. Residential plumbing retrofit
- C. System water audits, leak detection, and repair
- D. Metering with commodity rates for all new connections and retrofit of existing connections
- E. Large landscape conservation programs and incentives (*not addressed*)
- F. High-efficiency washing machine rebate programs
- G. Public information programs (*not addressed*)
- H. School education programs (*not addressed*)
- I. Conservation programs for commercial, industrial, and institutional accounts
- J. Wholesale agency programs (*not addressed*)
- K. Conservation pricing
- L. Water conservation coordinator (*not addressed*)
- M. Water waste prohibition
- N. Residential ultra-low-flush toilet replacement programs

**Table ES1-1:** Demand Management Measures (DMMs) for Urban Water Conservation

# **Health Impacts from Conservation Within California's Water System**

# Health Impacts Framework: Water Availability, Energy & Money



**Figure ES1-2:** The flow of water, energy and money in the urban water delivery system

# Examples

**Health Impact Area:** Water Availability

# Water Availability

---

- **Two Examples**
  - System Leak Detection and Repair
  - Landscape Irrigation (Residential and Public)





# System Leak Detection & Repair: **Scope**

---

- In an average home, leaks account for 10,000 gallons of water wasted every year.
- Outside the home, many leaks occur under the surface, infiltrating into the ground or dripping into storm drains or sewers.
- Leaks in conveyance piping can cause damage to pipes.
- CA Dept. of Water Resources estimates that 700,000 acre-feet of leakage occurs in California each year via conveyance piping.

★**Potential Water Savings:** Very High

\* 1 acre foot = 325,853 gallons

# System Leak Detection & Repair: **Health**

---

- **Benefits:**

- Lower costs to homeowners
- Decreased mold exposure

- **Harms:**

- Dampness and mold resulting from leaky pipes can cause indoor air pollution.
- Exposure to mold and indoor air pollution is strongly correlated to asthma and allergic rhinitis, especially in children (Koskinen, Husman et al. 1999).
- Potentially high cost of repairs

# Landscape Irrigation: **Scope**

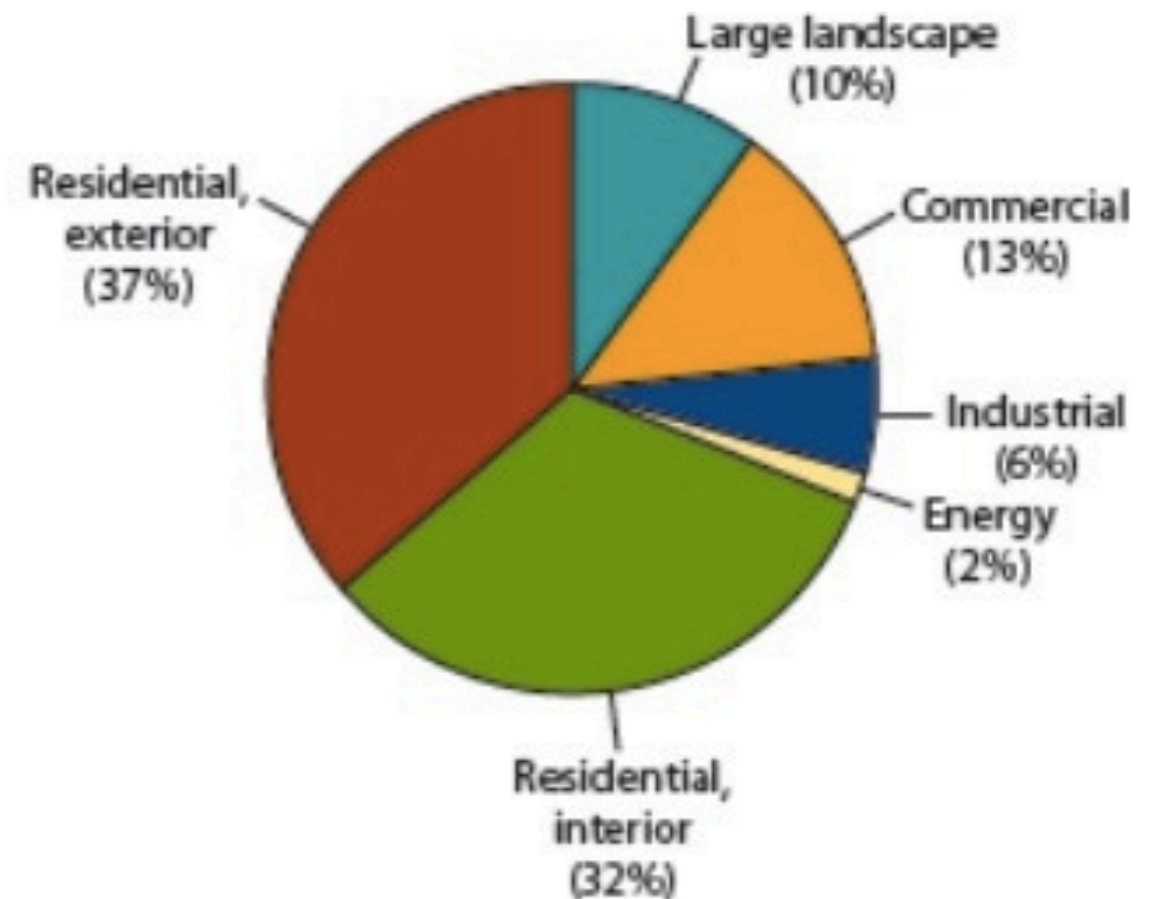
- Landscape irrigation is estimated to be one-third of total residential water use, equaling more than **7 billion gallons per day**.
- Xeriscaping rebate programs
  - Ex: Long Beach
- Strict landscape watering schedules
  - Ex: LA Dept. of Water & Power
- Weather Based Irrigation Controllers
  - Ex: Irvine Ranch Water District
- Expanded Recycled Water Use
  - Ex: Burbank Water District

## ★Potential Water Savings:

Very high to moderate.

**Figure 2.12**

Landscaping accounts for at least half of gross urban water use



SOURCE: California Department of Water Resources (2009).

NOTES: The total (8.3 million acre-feet) excludes conveyance losses and active groundwater. Water for landscaping uses include residential exterior, large landscapes (e.g., parks, golf courses, cemeteries), and a portion of commercial and industrial water use.

# Landscape Irrigation: **Health**

---

- **Benefits:**

- Reduces urban heat island effect
- Keeps air cleaner
- Space to exercise and play
- Positive impact for mental health
- Positive impact for elderly health
- Decreased lawn runoff, improved surface water quality
- Decreased water use = decreased costs

- **Harms:**

- Out of pocket costs may be fiscally regressive.



<http://www.theguardian.com/lifeandstyle/the-running-blog/2013/sep/02/running-blog-how-was-your-weekend>

# Examples

**Health Impact Area: Money**

# Money

---

- **Example:**

- Tiered Water Pricing



[http://www.china.org.cn/environment/2014-01/03/content\\_31081663.htm](http://www.china.org.cn/environment/2014-01/03/content_31081663.htm)

# Tiered Water Pricing: **Scope**

---

- If you use more water, you pay more.
- Price increases serve as a warning to customers to conserve.

**Table 2:** Tiered pricing – Residential water rates, Lee Lake Water District, Riverside County

<b>Tier</b>	<b>Monthly Usage</b>	<b>Price</b>
Tier 1	0 to 5 units	\$1.85/unit
Tier 2	6 to 15 units	\$2.02/unit
Tier 3	16 to 30 units	\$2.37/unit
Tier 4	31 to 45 units	\$3.15/unit
Tier 5	46 and above	\$4.28/unit
<b>Other charges</b>		
1. Water Service Charge \$20.87 per month		
2. Sewer Service Charge \$35.30 per month		
3. Zone Pumping Charge: This monthly charge is based on water usage in units and zone		

★**Potential Water Savings:** Very high

# Tiered Water Pricing: **Health**

---

- **Benefits:**

- Costs savings for low income households.
- Better leak detection with corresponding decrease in mold.
- Better financial sustainability for water conservation programs.

- **Harms:**

- Costs impact households that have higher water use that cannot be quickly reduced.



# Examples

**Health Impact Area:** Energy

# Energy

---

- Examples:
  - Rebates for water efficient fixtures (showerheads, faucets, etc.)
  - Expansion of Alternative Water Sources (recycled water)



# Rebates for Water Efficient Fixtures: **Scope**

---

- Installing low-flow toilets, shower fixtures, high-efficiency washing machines and faucet aerators can reduce household water use by up to 30%,
  - A typical household could save \$170 each year in water costs.
- Current regulations do not eliminate fixtures grandfathered into the system.
- To combat existing inefficient fixtures, water districts introduced fixture rebate programs for their customers.

★**Potential Water Savings:** High-Moderate

# Rebates for Water Efficient Fixtures: **Health**

---

- **Benefits:**

- Cost saving measure
- Reduced energy footprint, especially for hot water fixtures

- **Harms:**

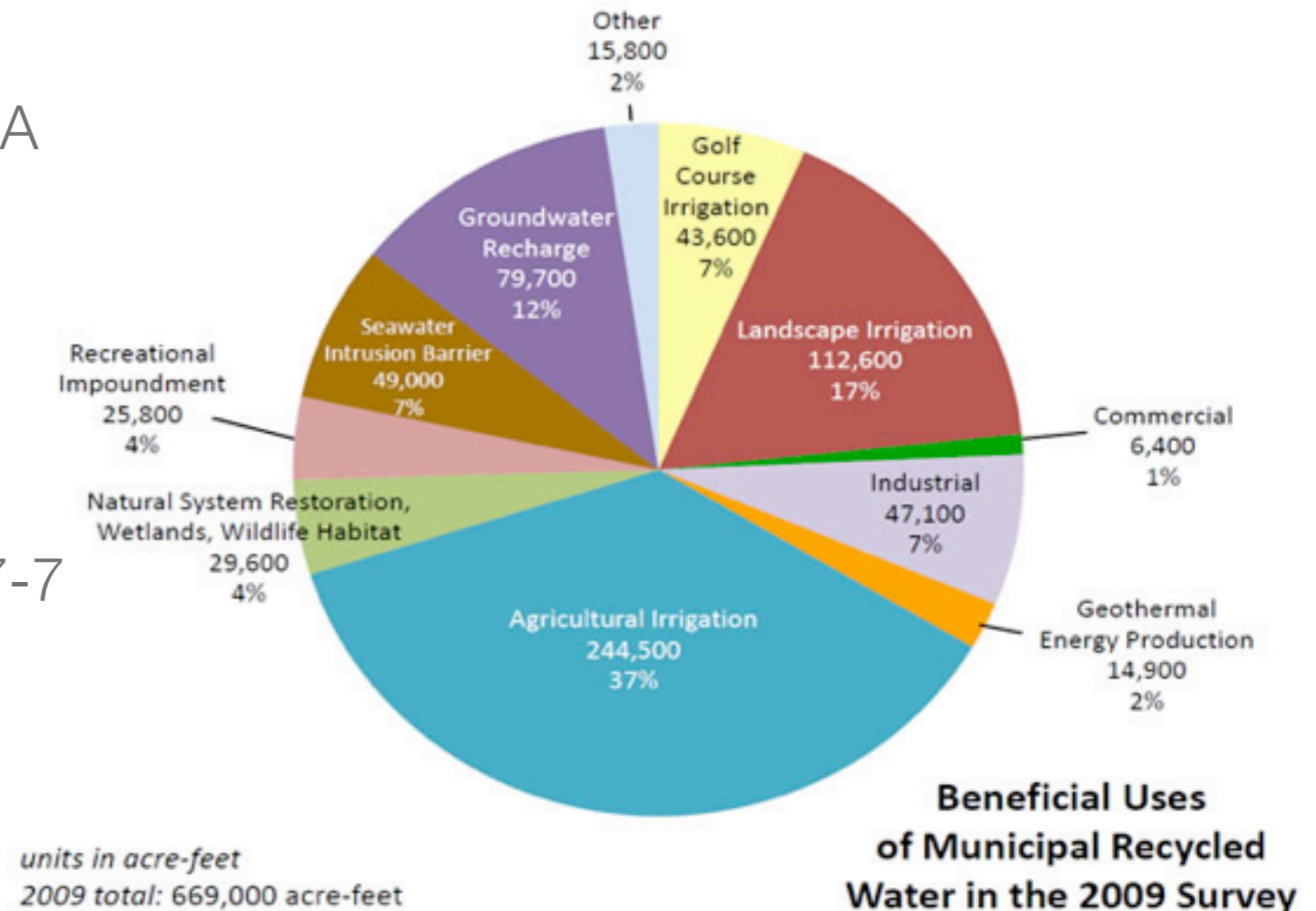
- Some rebates (washing machines) may be fiscally regressive, especially for low income individuals
- Diminishing returns over time.
- Applicability to rental housing.



<http://www.houselogic.com/home-advice/appliances/states-offer-cash-rebates-clunker-appliances/#>

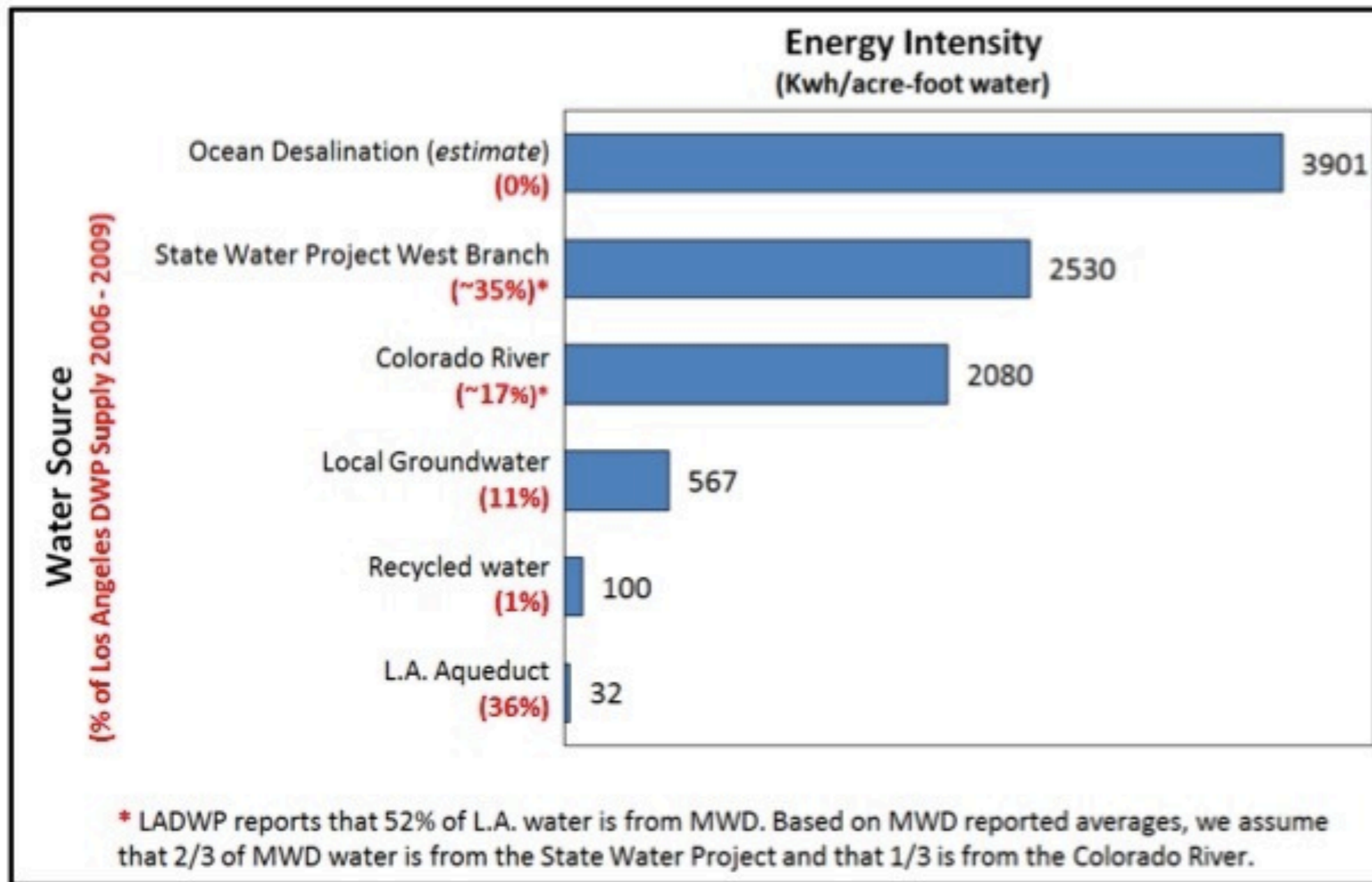
# Alternative Water Sources: **Scope**

- Recycled water is under-utilized in CA on the urban scale.
- Cheaper than imported water
- Incentives for expansion under SBx7-7
- Low energy footprint



★**Potential Water Savings:** High

# Differences in Energy Intensity By Water Source



**Figure ES1-3:** Energy intensity (i.e. embedded energy) of different water sources drawn on by the Los Angeles Department of Water and Power.<sup>1</sup>

# Alternative Water Sources: **Health**

---

- **Benefits:**

- Cost savings
- Reduction in energy footprint of water
- Positive impact for groundwater basins, and groundwater basin water quality
- Potential for greater availability of park space
- Reduction in urban heat island effect

- **Harms**

- Requires proper treatment and application to prevent transmission of communicable disease.

# Additional Health Impacts from Conservation Alternatives

---

- Air Quality and Greenhouse Gas Emissions
- Ambient temperature/Urban Heat Island Effects
- Water Quality and Waterborne Disease Risks
- Arthropod-borne Disease
- Household finances and fiscal equity
- Access to park and green space
- Exposure to mold and indoor air pollution



# Recommendations from our HIA

---

1. Make early, well planned efforts that lead to significant, maintained reductions in usage.
2. Prioritize conservation measures that have environmental and health co-benefits.
3. Encourage property owners to install and properly maintain more water efficient landscapes while taking steps to minimize unintended harm.
4. Invest in infrastructure that reduces waste, thereby reducing consumer costs and increasing the use efficiency of water.

# Recommendations continued...

---

5. Minimize regressive combinations of rebates and rate increases that benefit higher income households while increasing water costs for low-income households.
6. Institutionalize integrated inter-agency conservation planning at the local level to develop joint sustainability plans to improve water and energy efficiency while also supporting economic and health goals.
7. Monitor health impacts of water conservation policies with metrics such as those outlined in this report.

# Future Work

---

- Promotion of recycled water as an alternative water source:
  - Water, Energy, Greenhouse Gas Emissions & Health.
  - Recycled water as a benefit to Public Health.
  - Expansion of recycled water applications on the urban scale.

# Acknowledgements

---

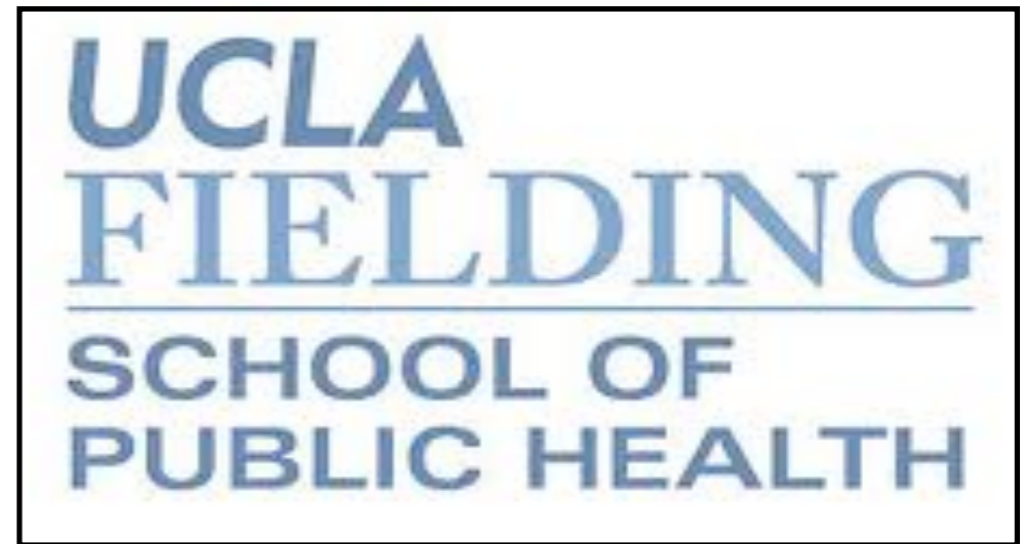
UCLA HIA Project Team:

**Dr. Brian Cole**, Project Manager &  
Co-Author

**Sharona Sokolow**, MPH, Co-  
Author

**Dr. Jonathan Fielding**, PI

**Dr. Richard Jackson**, Co-PI



This research was supported in part by a grant from the Health Impact Project, a collaboration of the Robert Wood Johnson Foundation and The Pew Charitable Trusts.

# Technical Advisory Board

---

- Mike Antos, *Council for Watershed Health*
- Peter Brostrom, *Department of Water Resources (DWR)*
- Chris Brown, *CA Urban Water Conservation Council (CUWCC)*
- Colleen Callahan, *UCLA Luskin Center*
- JR DeShazo, *UCLA Luskin Center*
- Edith DeGuzman, *Tree People*
- Conner Everts, *Southern California Watershed Alliance*
- Mike Hollis, *Metropolitan Water District (MWD)*
- Caryn Mandelbaum, *Environment Now*
- Pankaj Parekh, *LA DWP*
- Milad Taghavi, *LA DWP*
- Tim Worley, *American Water Works Assn (AWWA)*



# For more information:

---

- Full report, including case study of Burbank, California and executive summaries:
- <http://www.ph.ucla.edu/hs/health-impact/reports.htm>
- **Sharona Sokolow:** [sharonas@ucla.edu](mailto:sharonas@ucla.edu)
- **Brian Cole,** Lead Author: [blcole@ucla.edu](mailto:blcole@ucla.edu)



**QUESTIONS?**  
Thanks for your Attention!