City of San Diego
PUBLIC UTILITIES
Water & Wastewater

Water Purification | Demonstration Project

THE CITY OF SAN DIEGO
PUBLIC UTILITIES DEPARTMENT

December 2, 2010

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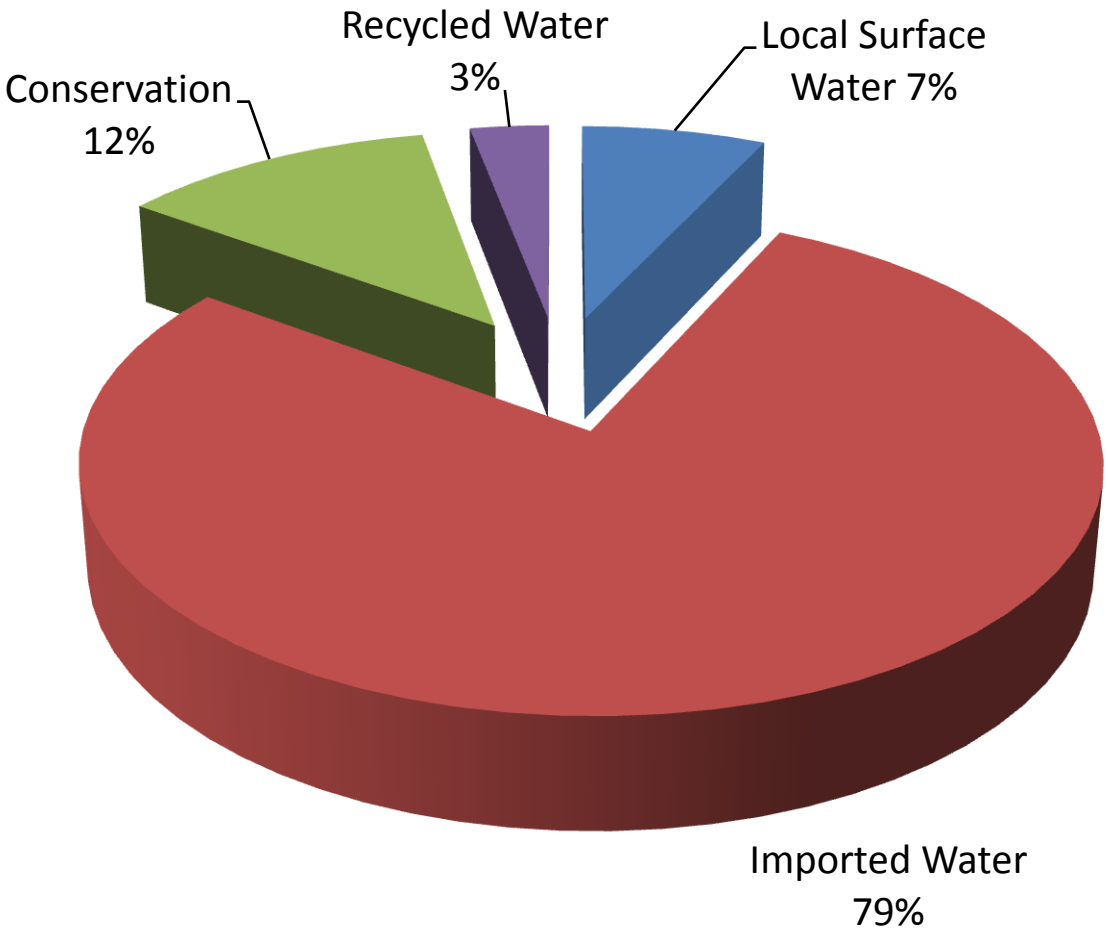
Long-Range Planning & Water Resources Deputy Director

Today we will discuss…

- San Diego's need for a local, reliable water source
- The role of the Water Purification Demonstration Project
- The process of advanced water purification
- The potential benefits of using advanced purified water


Redding
Sacramento
San Francisco
Fresno
Los Angeles
San Diego
Colorado River
California Water Projects
Federal Water Projects
Central Valley Project
Coachella Canal
All American Canal
State Water Projects
Local Water Projects
Mokelumne Aqueduct
Hetch Hetchy Aqueduct
Los Angeles Aqueduct
Colorado River Aqueduct
Bay-Delta

Water Supply

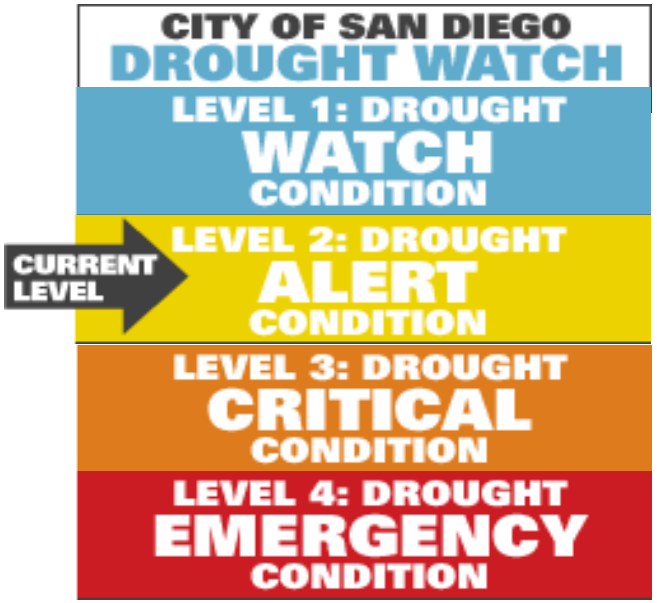


Average (2005-2010)

Source: City of SD Public Utilities Department 8/16/10

Water Supply Challenges

- Sustained drought conditions
- Pumping restrictions
- Cost of water increases
- Population growth
- Earthquakes



NO TIME TO WASTE
NO WATER TO WASTE

What is being done…

- Water Conservation
- Groundwater Development
- Recycled Water
- The Water Reuse Program

San Diego's Water Reuse Program

Water Reuse Study - (complete)

Study Objective

To conduct an impartial, balanced, comprehensive and science-based study of all recycled water opportunities so the City of San Diego can meet current and future water supply needs.

Water Purification Demonstration Project

Project Objective

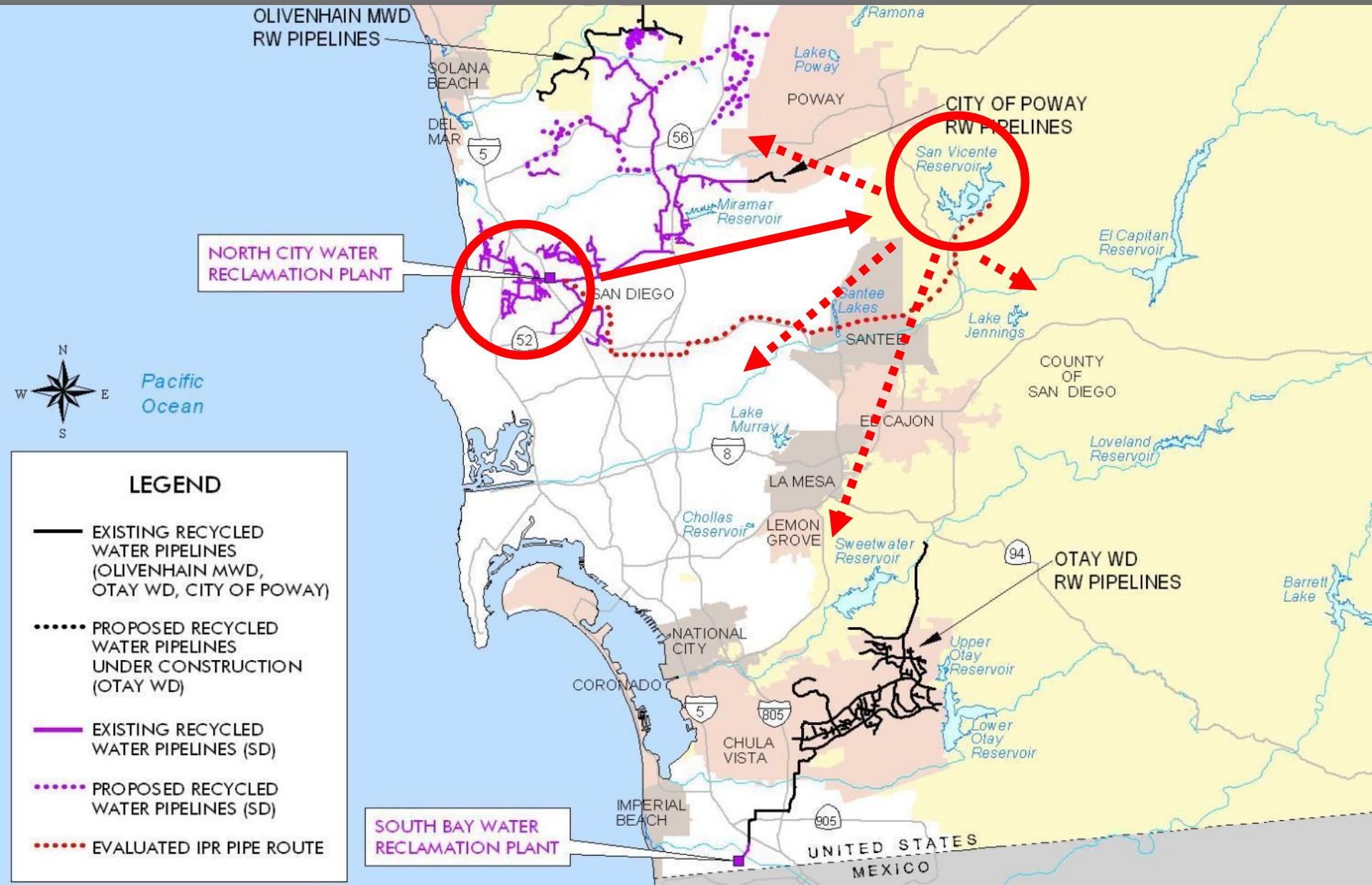
Evaluate the feasibility of using advanced treatment technology to produce water that can be sent to San Vicente Reservoir and later distributed as potable water.

Determine if the Demonstration Project provides evidence of viability for a full-scale IPR/RA project.

Water Purification Demonstration Project Goals

- Design, install and operate an Advanced Water Purification Facility
- Conduct a limnology and reservoir detention study of San Vicente Reservoir
- Define the regulatory requirements for a full-scale project
- Conduct an independent energy and economic analysis
- Perform pipeline alignment study
- Conduct a public education and outreach program

Demonstration Project Concept

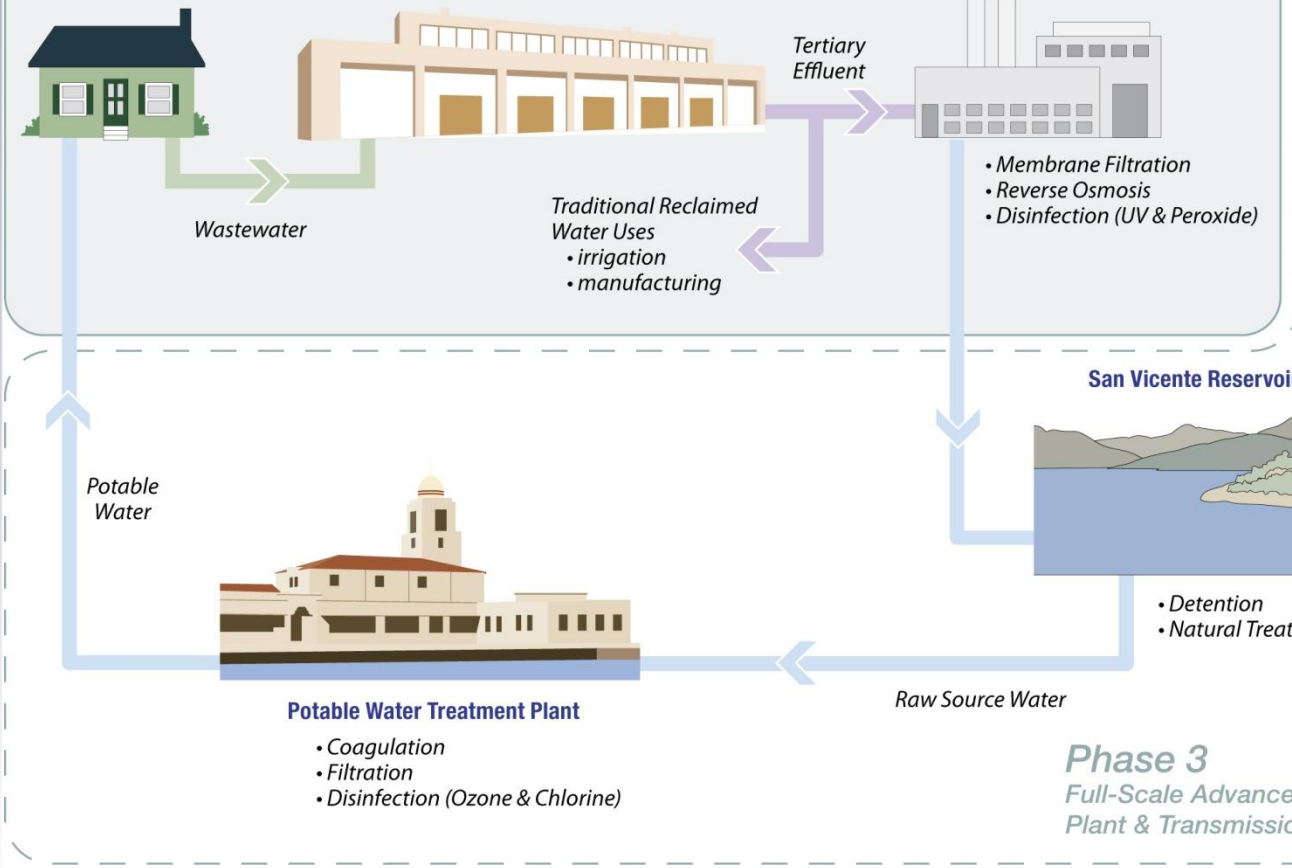


City of San Diego's

Demonstration Project

Water Purification Demonstration Process

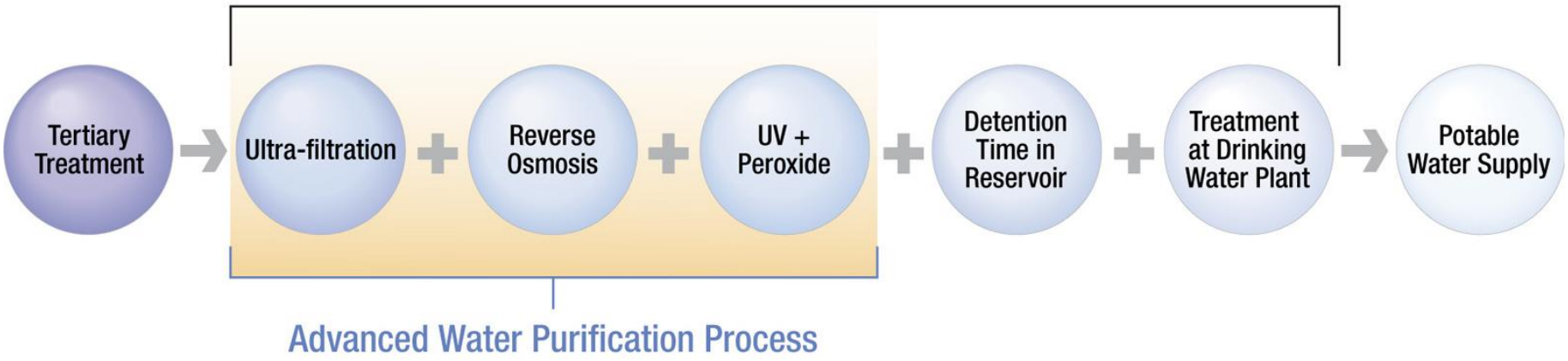
Phase 2 *Demonstration-Scale Project*



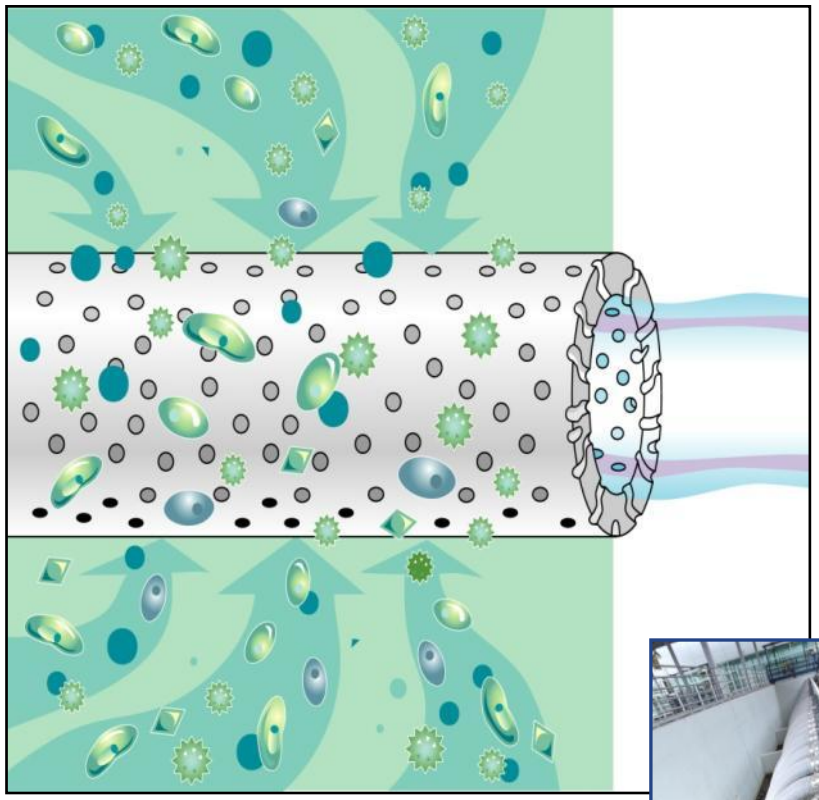
Phase 3

Full-Scale Advanced Water Purification Plant & Transmission Pipeline

Multiple Barrier Water Treatment Steps

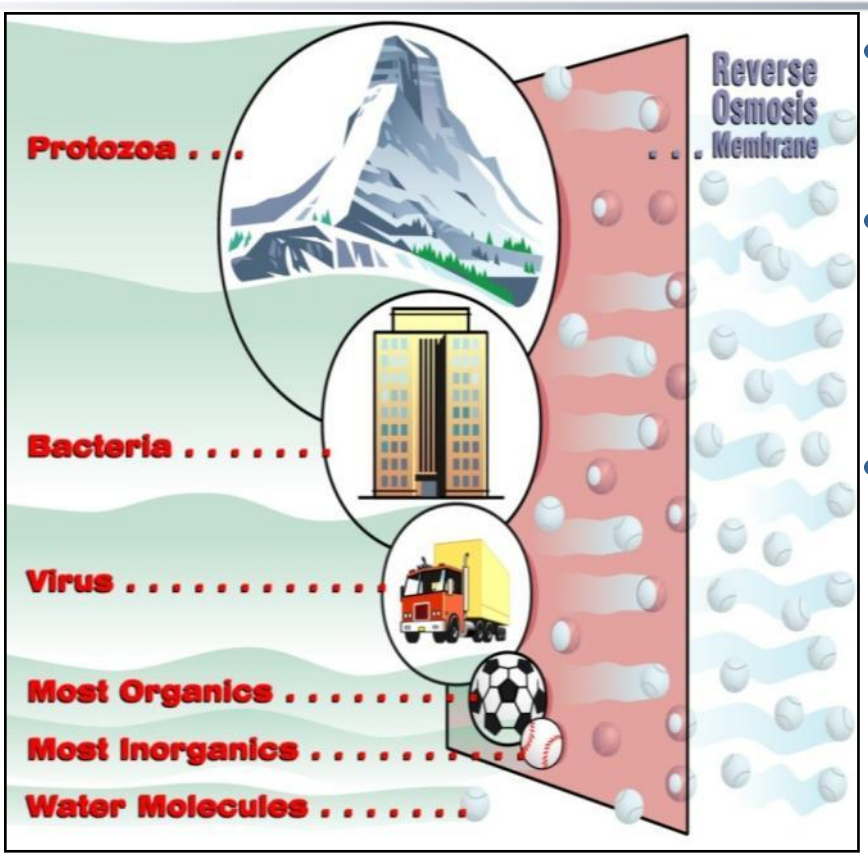


Micro-filtration: Step One



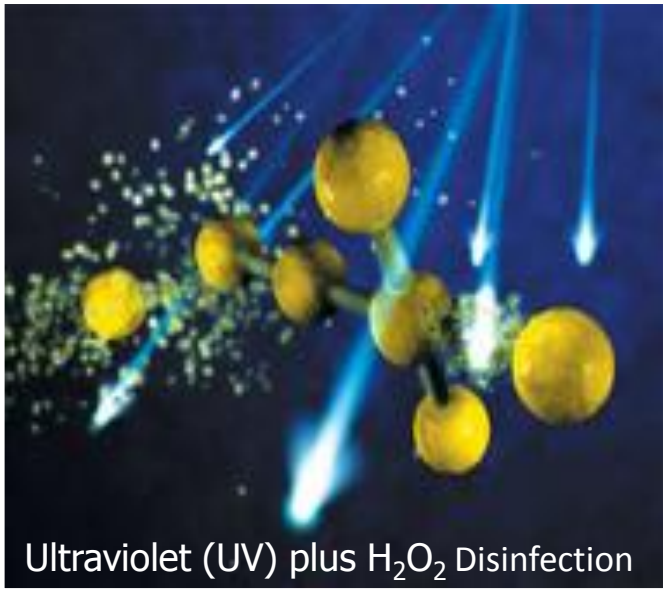
- Like a hollow straw with holes in the sides
- Used to make baby food, purify medicines, fruit juices and more
- Excellent pre-filter before reverse osmosis

Reverse Osmosis: Step Two



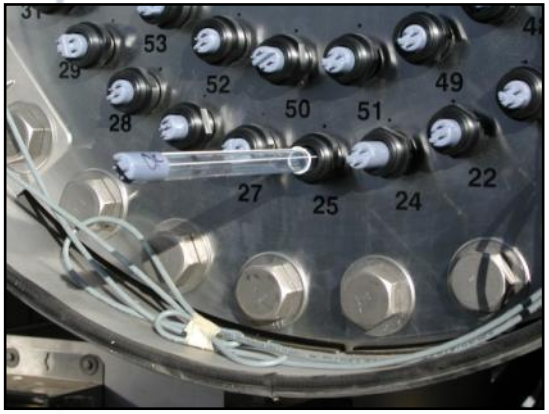
- Same technology used by bottled water companies
- Forces water under high pressure through sheets of plastic membrane
- Demineralizes and purifies water

Ultraviolet Light plus H_2O_2: Step Three



Ultraviolet (UV) plus H_2O_2 Disinfection

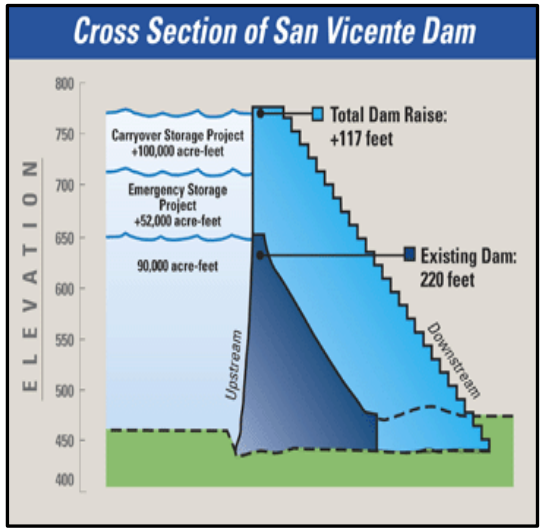
- High-intensity light and hydrogen peroxide (H_2O_2)
- Creates advanced oxidation reaction, essentially destroys anything in the water
- Multiple barrier, redundant approach



San Vicente Limnology and Reservoir Detention Study

San Vicente Reservoir - 2004

San Vicente Reservoir - 2010



Reservoir Enlargement

- Dam will be raised 117 feet
- Currently 90,000 acre-feet
- After dam raise 242,000 acre-feet
- Construction duration 2009 – 2012
- Refilling reservoir will take 2 to 5 years
- Construction drawdown means no access to reservoir for field tests (tracer studies)

Independent Advisory Panel

- George Tchobanoglous, Ph.D., P.E., Civil & Environmental Engineering *(Panel Chair),* University of California, Davis
- David R. Schubert, Ph.D.
  Salk Institute for Biological Studies
- Richard J. Bull, Ph.D., Consulting Toxicologist
  Mobull Consulting
- Joseph A. Cotruvo, Ph.D., Joseph Cotruvo Associates
- James Crook, Ph.D., P.E., Water Reuse Consultant
- Richard Gersberg, Ph.D., Occupational & Environmental Health,
  Graduate School of Public Health, San Diego State University
- Sunny Jiang, Ph.D., Associate Professor, Civil and Environmental Engineering
  University of California, Irvine
- Michael A. Anderson, Ph.D. , Applied Limnology & Environmental Chemistry
  University of California, Riverside
- Audrey D. Levine, Ph.D., P.E., DEE, National Program Director, Drinking Water Research
  U.S. Environmental Protection Agency
- Michael P. Wehner, Assistant General Manager, Orange County Water District

Advanced Water Purification: a proven technology

Orange County, California

Upper Occoquan Service Authority

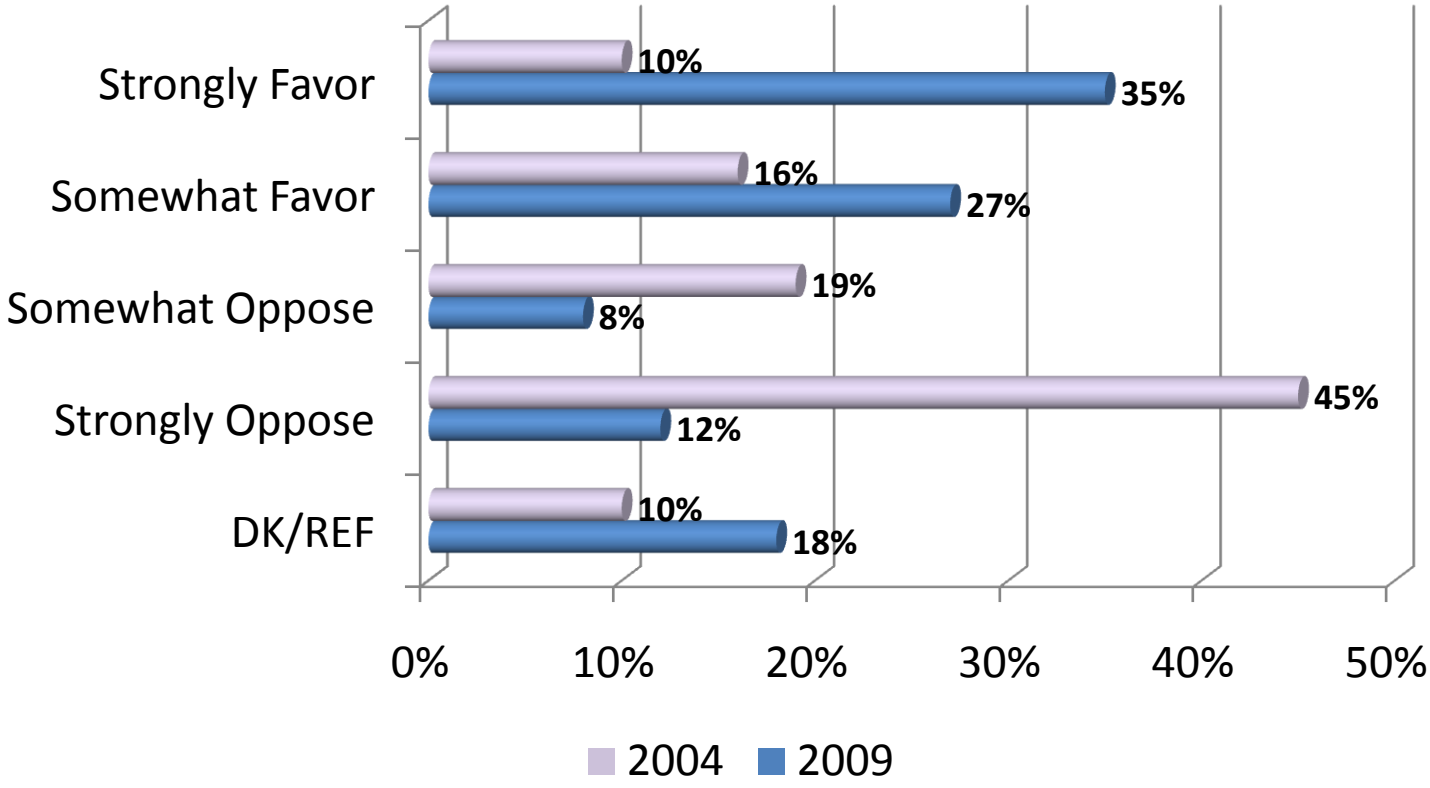
Leader in Water Reclamation and Reuse


Fairfax County, Virginia

Public Opinion Survey Results

San Diego County Water Authority Survey Comparisons

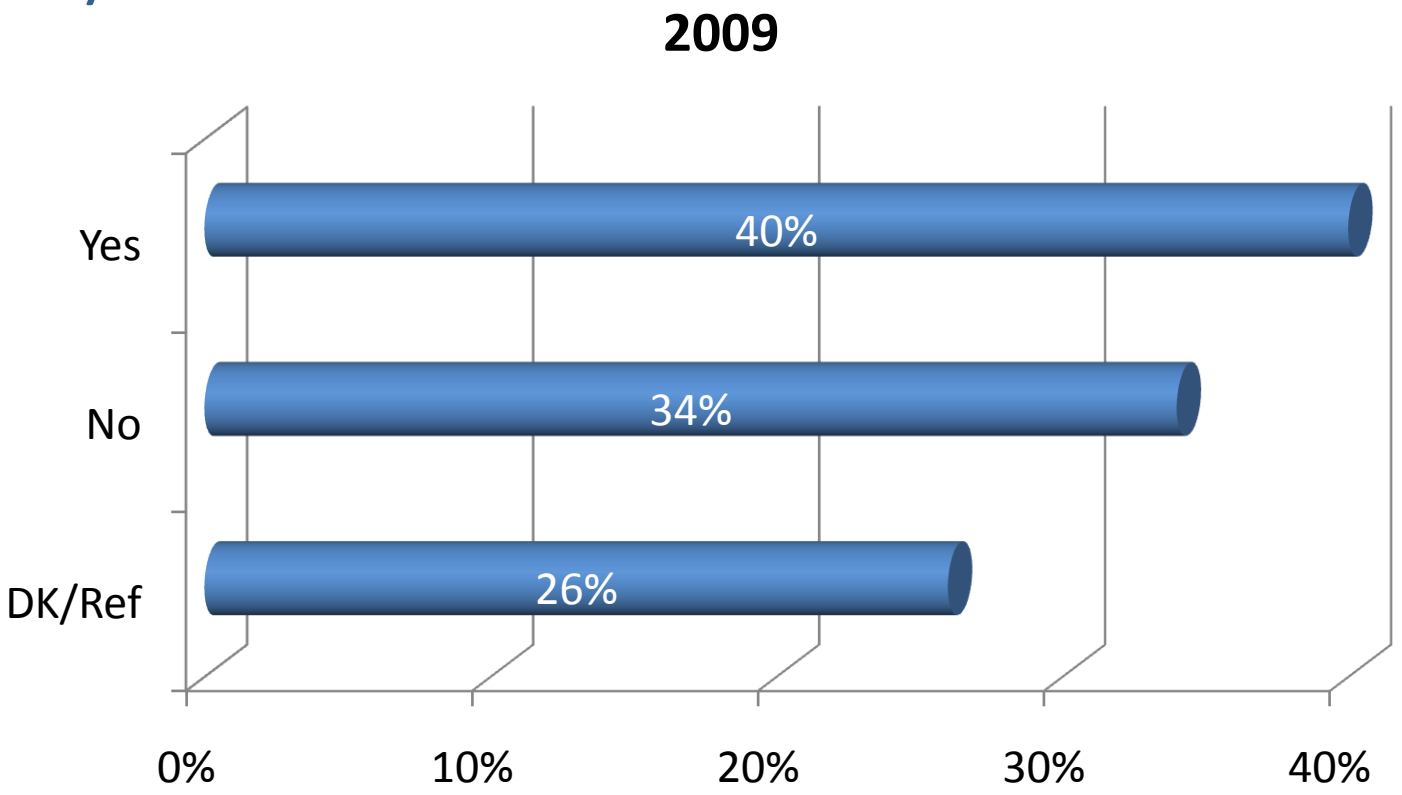
Using Advanced Treated Recycled Water as an Addition to Drinking Water Supplies



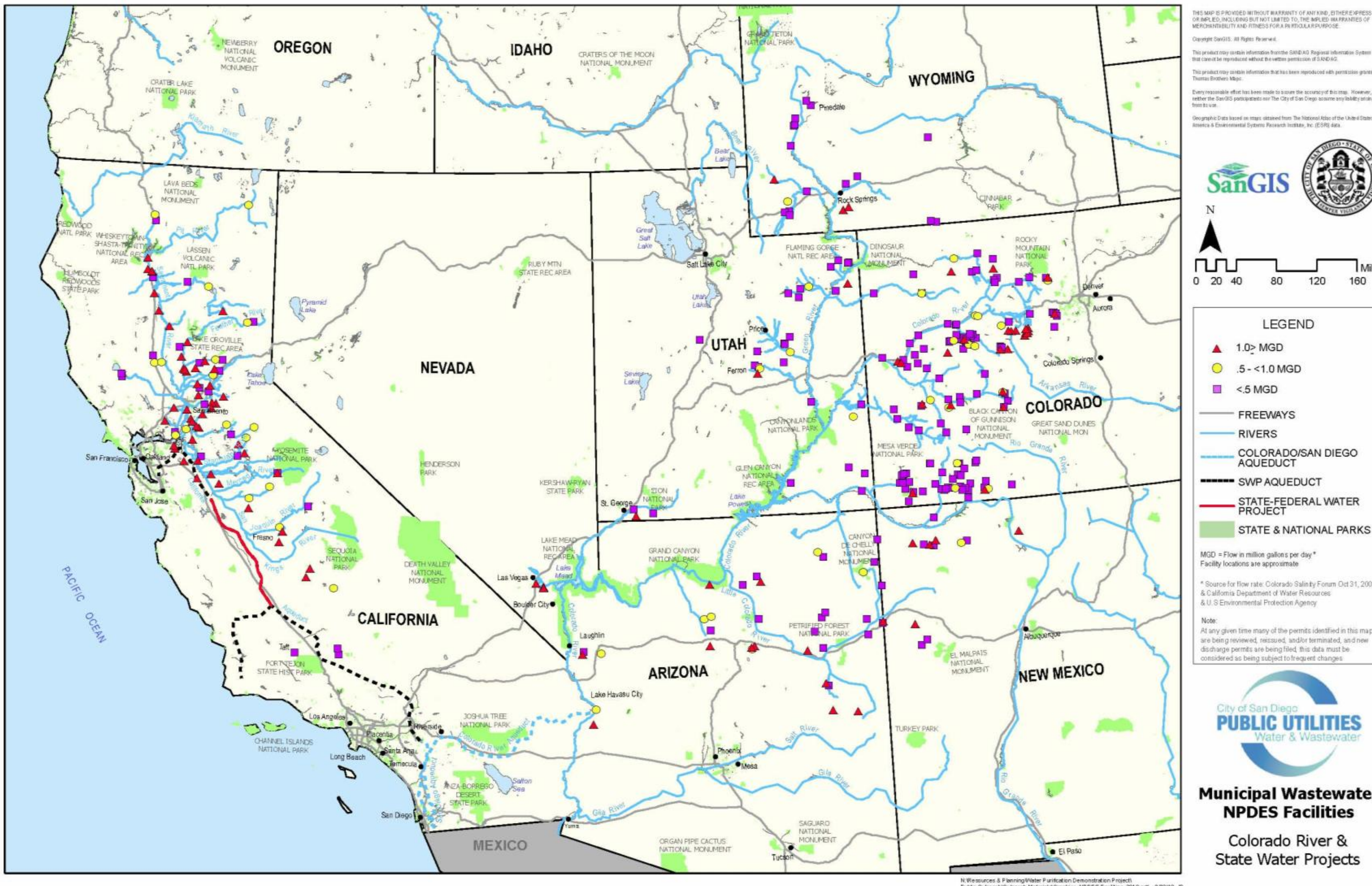
Public Opinion Survey Results

San Diego County Water Authority Survey

Do You Think Our Drinking Water Already Contains Recycled Water?



Upstream Wastewater Discharges



Public Outreach & Education

Benefits of Reservoir Augmentation

- Provide a local and sustainable supply of drinking water
- Increase utilization of recycled water
- Decrease dependence on imported water
- Use less energy than imported water
- Improve quality of reservoir water
- Have a positive impact on the environment

Water Reliability Coalition

- BIOCOM
- Building Industry Association
- Building Owners and Managers Association
- Citizens Coordinate for Century 3
- Coastal Environmental Rights Foundation
- Endangered Habitats League
- Environmental Health Coalition
- Empower San Diego
- Friends of Infrastructure
- Industrial Environmental Association
- National Association of Industrial and Office Properties
- San Diego and Imperial Counties Labor Council
- San Diego Audubon Society
- San Diego Coastkeeper
- San Diego County Taxpayers Association
- San Diego Regional Chamber of Commerce
- San Diego Regional Economic Development Corporation
- San Diego River Parks Foundation
- Surfrider Foundation, San Diego Chapter
- Sustainability Alliance of Southern California
- Utility Consumers' Action Network

What you should know…

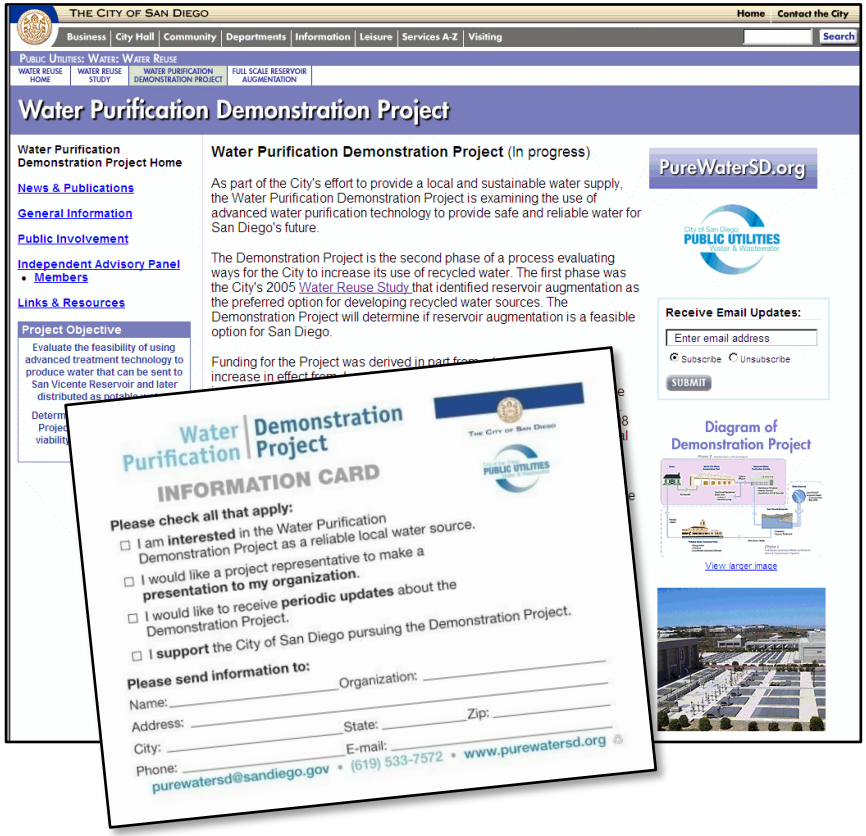
- San Diego needs to develop local, reliable sources of water.
- The Water Purification Demonstration Project is examining the use of advanced purified water.
- The purified water goes through multiple advanced treatment steps.
- No purified water will be added to the drinking water system during the Demonstration Project.

For More Information

Visit: www.purewatersd.org

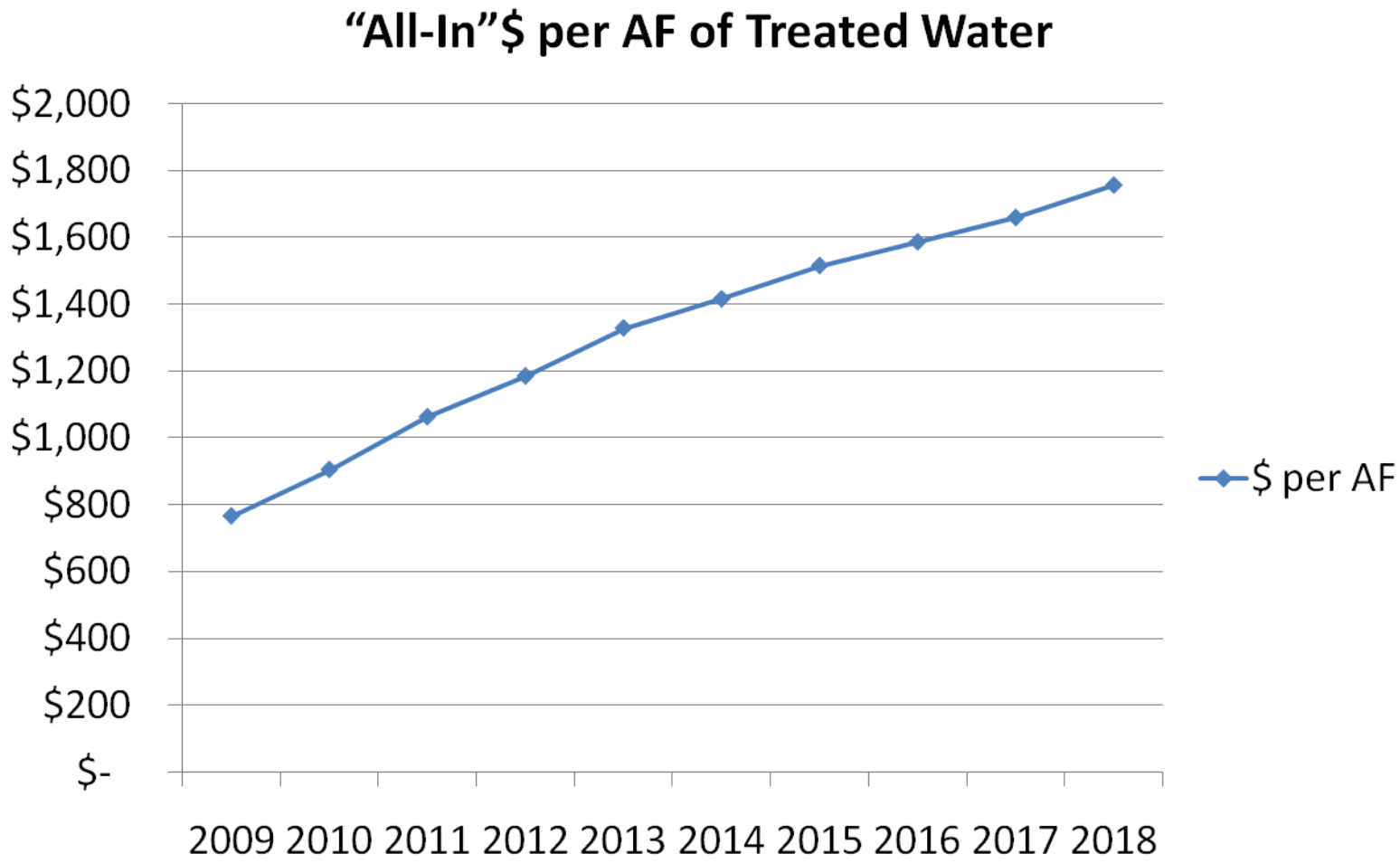
Email: purewatersd@sandiego.gov

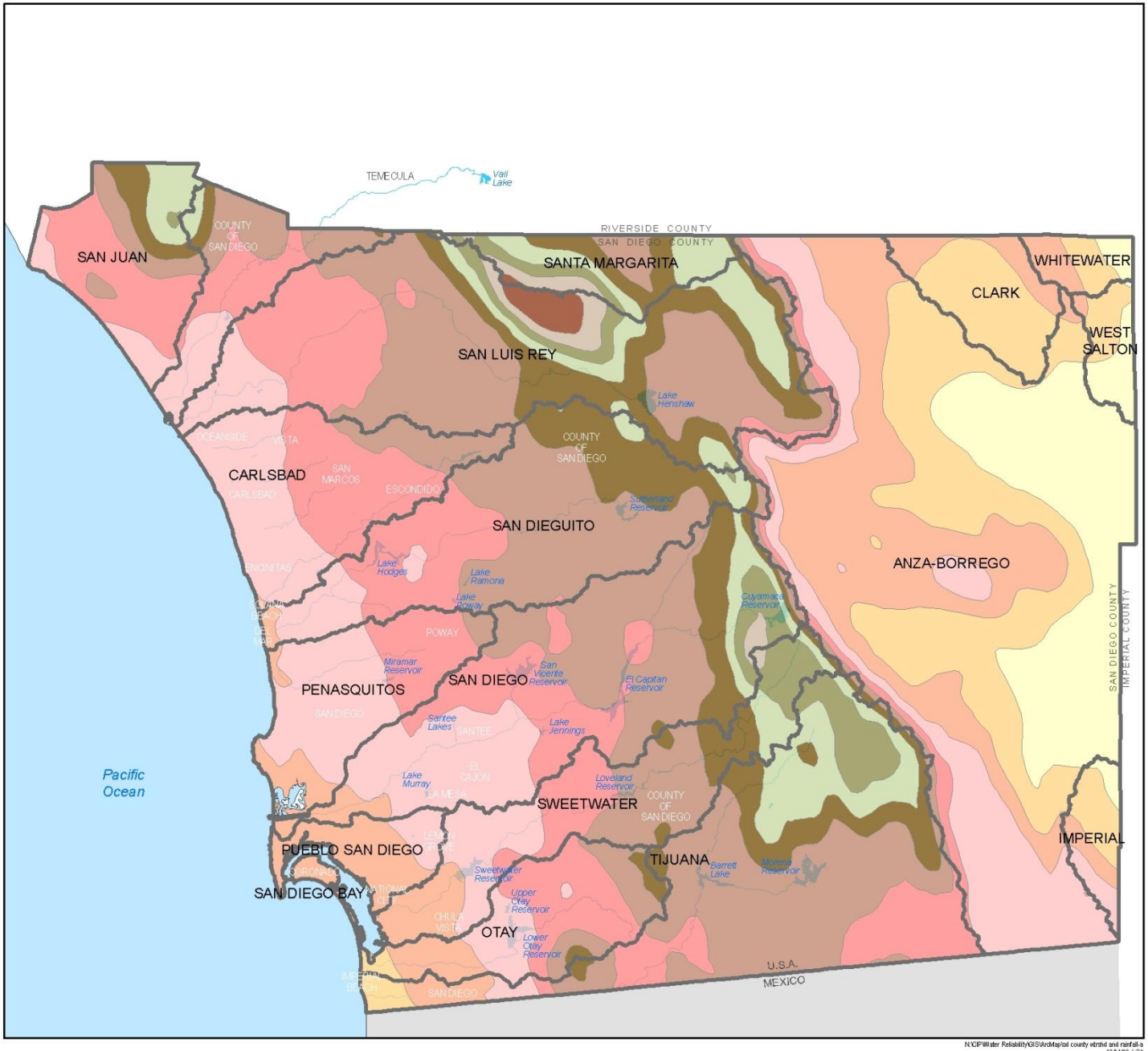
Call: (619) 533-7572





SDCWA's Projected Rate Increases





SanGIS

0 2.5 5 10 Miles

LEGEND
Rivers
Watershed

LEGEND

RAINFALL RANGE

- 3 to 6
- 6 to 9
- 9 to 12
- 12 to 15
- 15 to 18
- 18 to 21
- 21 to 24
- 24 to 27
- 27 to 30
- 30 to 33
- 33 to 35

PUBLIC UTILITIES

Long Range Planning & Water Resources Division

San Diego County
Watershed and Rainfall

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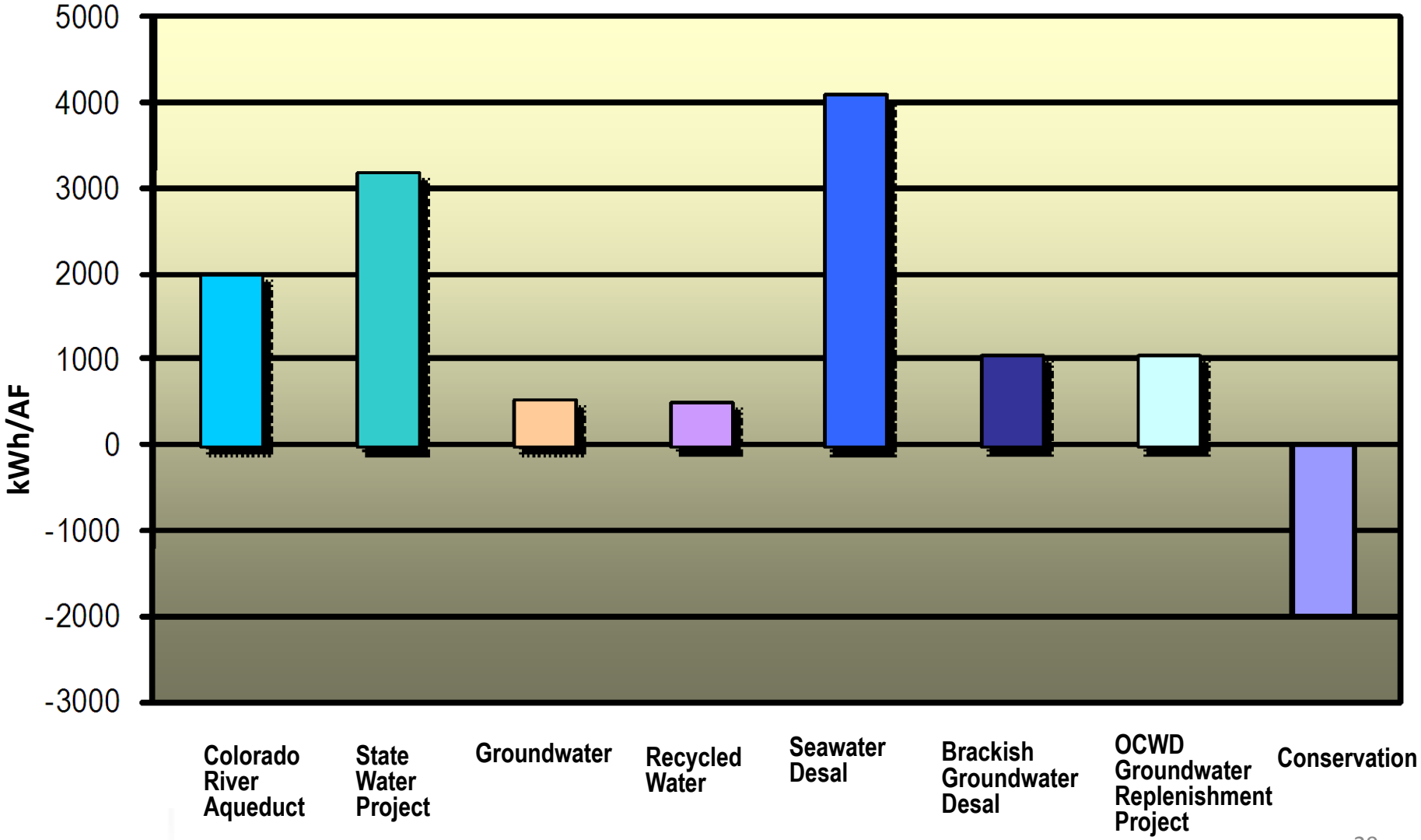
10/14/10 LCA

Carbon Footprint by Water Source

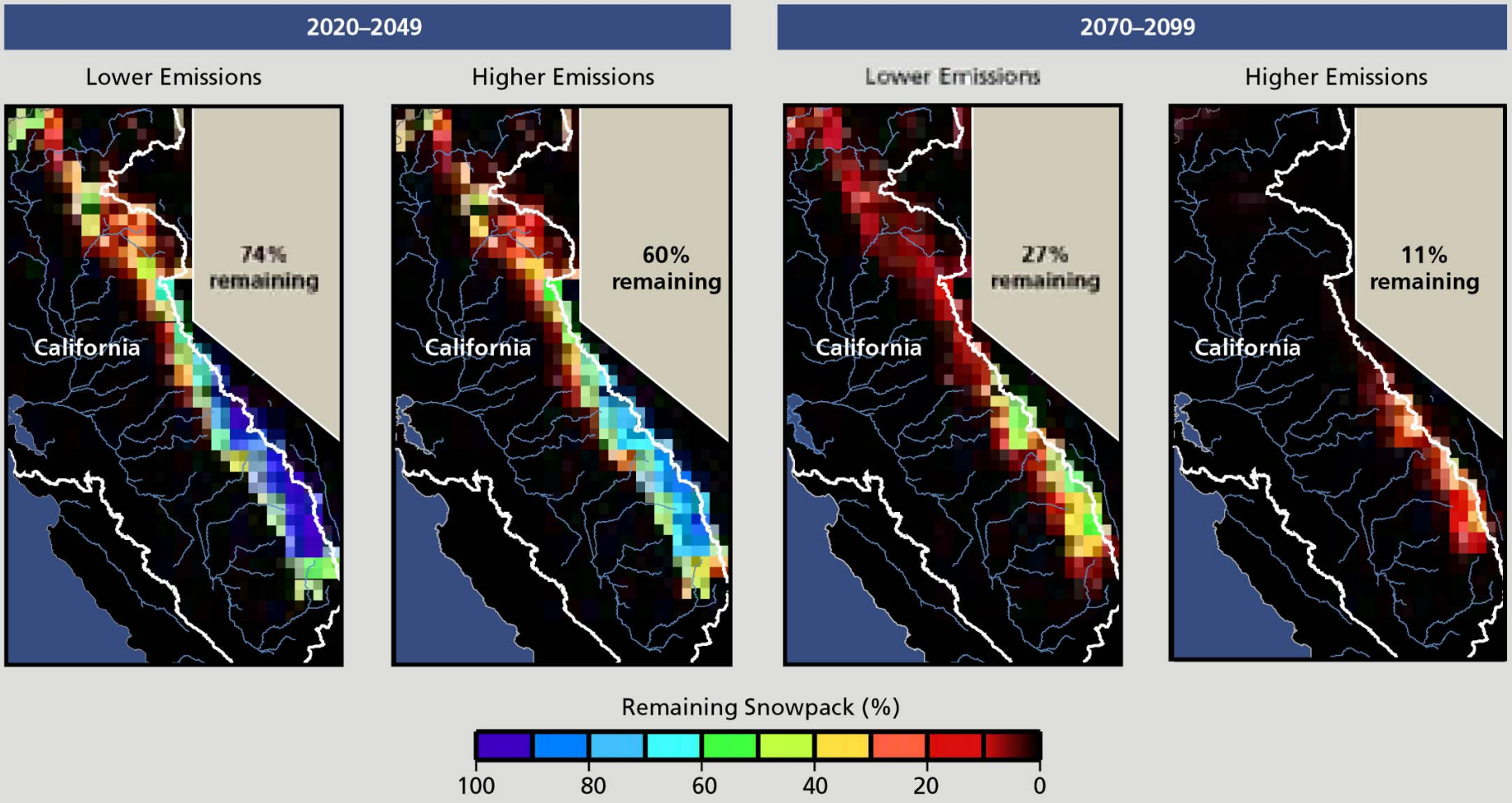


Source: Pacific Institute analysis regarding SDCWA data

Source of OCWD GW Replenishment: City of San Diego

Diminishing Sierra Snowpack

% Remaining, Relative to 1961-1990



(Hanemann *et al.*, 2004)

Change in water use by agency Fiscal year 2009 to 2010

No.	Agency	2009	2010	Percentage change
1.	Ramona	7,810	6,120	-21.6%
2.	Poway	13,680	11,440	-16.4%
3.	Rincon Del Diablo	7,470	6,280	-15.9%
4.	Lakeside	4,810	4,050	-15.8%
5.	Rainbow	26,420	22,360	-15.4%
6.	Santa Fe	13,430	11,390	-15.2%
7.	Valley Center	34,780	29,520	-15.1%
8.	Camp Pendleton	9,730	8,280	-14.9%
9.	Olivenhain	23,460	19,990	-14.8%
10.	Padre Dam	14,660	12,510	-14.7%
11.	Vallecitos	19,050	16,470	-13.5%
12.	Vista	21,960	19,230	-12.4%
13.	Fallbrook	15,210	13,320	-12.4%
14.	Carlsbad	19,620	17,230	-12.2%
15.	Helix	37,660	33,210	-11.8%
16.	San Diego	218,940	193,470	-11.6%
17.	Otay	34,970	31,190	-10.8%
18.	Oceanside	32,050	28,610	-10.7%
19.	Escondido	27,370	24,440	-10.7%
20.	San Dieguito	7,240	6,550	-9.5%
21.	Sweetwater	22,690	20,790	-8.4%
22.	Del Mar	1,200	1,130	-5.8%
23.	Yuima	3,380	3,300	-2.4%
	Total	617,590	540,880	-12.4%

Acre-feet

Excludes recycled water

Sources: San Diego County Water Authority; SanGIS

MATT PERRY • U-T

Conservation's Impact on San Diego's Water Use 1980 – 2009