WATER PURIFICATION DEMONSTRATION PROJECT RESULTS

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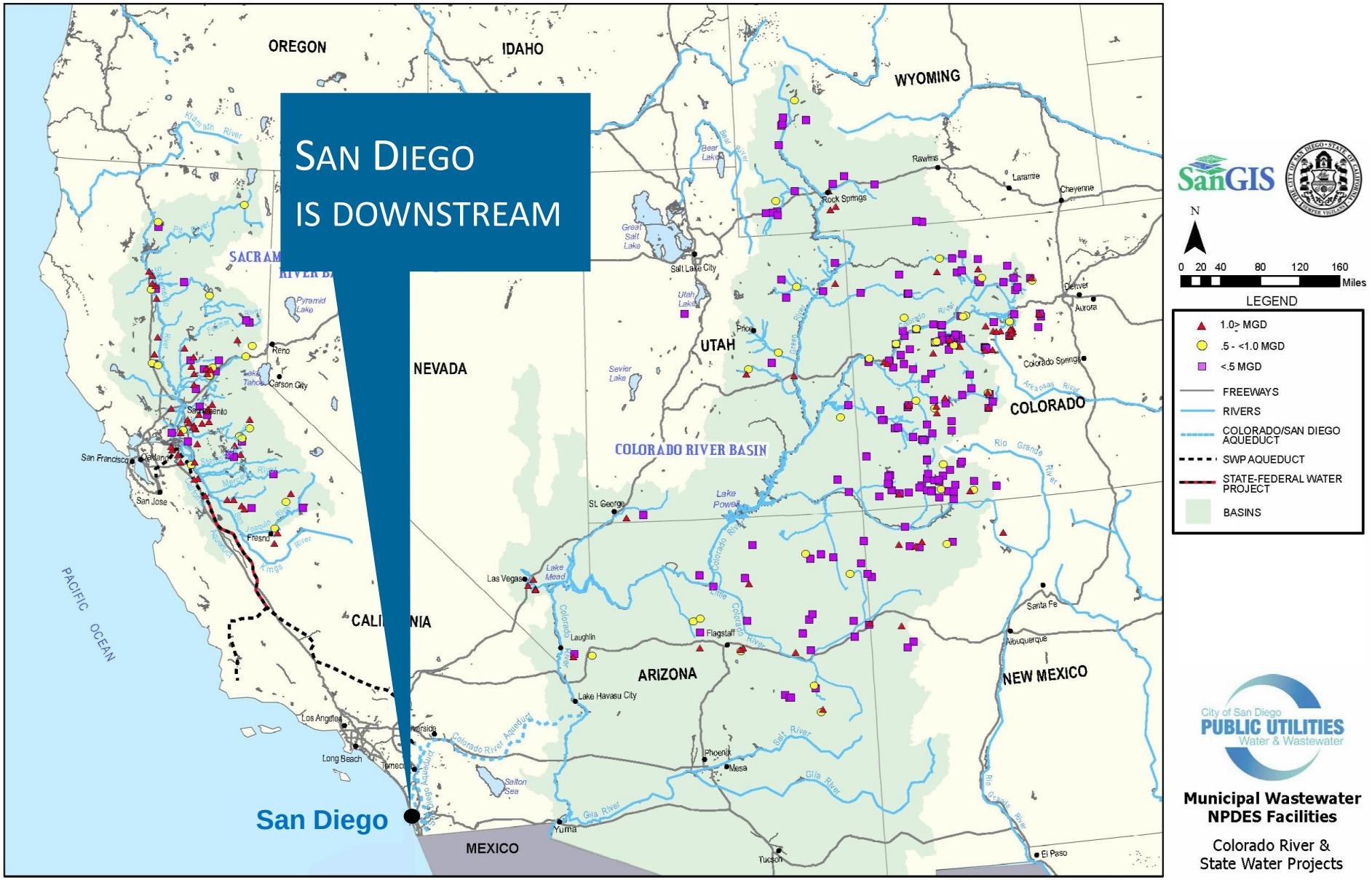
OCTOBER 22, 2013

City of San Diego
PUBLIC UTILITIES
Water & Wastewater



City of San Diego
PUBLIC UTILITIES
Water & Wastewater

Municipal Wastewater NPDES Facilities

Colorado River & State Water Projects

Water Supply Challenges

- Limited local supplies
- Increasing cost of imported water
- Pumping restrictions
- Recurring drought conditions
- Population growth
- Natural disasters

WHAT IS BEING DONE…

Regional:

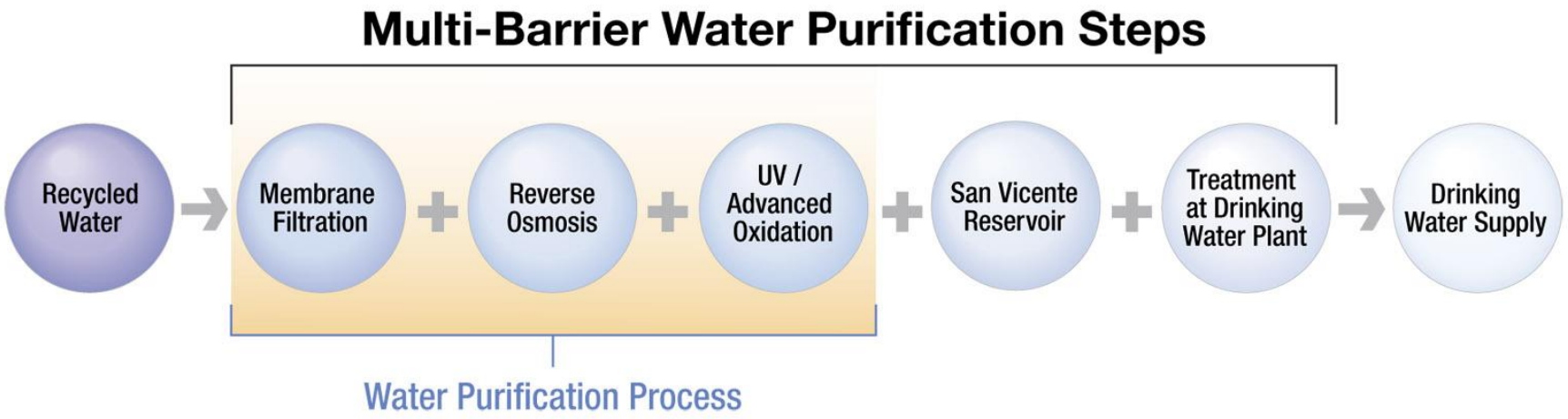
Desalination

Local:

- Water Conservation
- Groundwater Development
- Recycled Water
- Water Purification

SAN DIEGANS
WASTE
NO WATER
ALL DAY. EVERY DAY.

Water Purification Process



Microfiltration & Ultrafiltration

Reverse Osmosis

Ultraviolet Light / Hydrogen Peroxide

WATER PURIFICATION DEMONSTRATION PROJECT

COMPONENTS

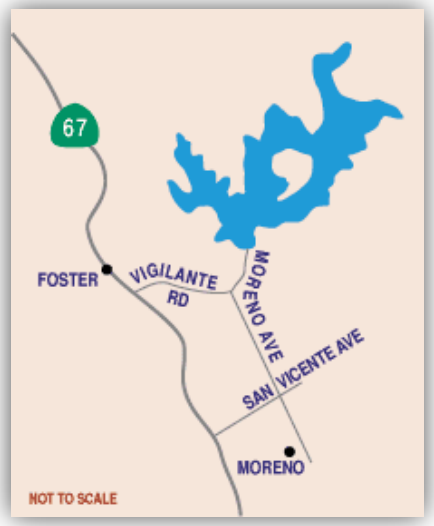
- Advanced Water Purification (AWP) Facility
- Independent Advisory Panel (IAP)
- San Vicente Reservoir Study
- Regulatory requirements
- Energy and cost analysis
- Education and outreach program

AWP Facility Testing & Monitoring Plan

- Testing period August 1, 2011 to July 31, 2012
- Measured for 342 constituents and parameters in recycled water, purified water, and imported water
- Conducted 9,000 individual water quality laboratory tests
- Implemented continuous and daily monitoring before and after each treatment step to verify integrity of each treatment process
- Visit www.purewatersd.org for more information

San Vicente Reservoir Study Results

- Reservoir provides an environmental barrier that satisfies anticipated regulatory requirements
- Purified water will be diluted at least 200:1 under all anticipated reservoir operations
- Water quality in San Vicente will not be affected by adding purified water



Regulatory Framework

- Regulatory agencies, CDPH, Regional Water Board, and County Dept of Environmental Health, attended IAP meetings
- Regulators commented on:
  - AWP Facility equipment
  - Testing & Monitoring Plan
  - San Vicente Reservoir Study

Energy & Cost Analysis

Energy:

- Energy consumption and greenhouse gas emissions of purified water delivered to San Vicente comparable to that of imported water
- Energy consumption and greenhouse gas emissions of purified water lower than ocean desalination

Cost:

- $2,000 per acre-foot to produce and convey 15 mgd of purified water to San Vicente Reservoir

City of San Diego
PUBLIC UTILITIES
Water & Wastewater

WRC
WATER RELIABILITY COALITION

- BIOCOM
- Building Industry Association of San Diego
- Building Owners and Managers Association, San Diego Chapter
- Citizens Coordinate for Century 3
- Coastal Environmental Rights Foundation
- Empower San Diego
- Endangered Habitats League
- Environmental Health Coalition
- Equinox Center
- 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 Regional Economic Development Corporation
- San Diego Coastkeeper
- San Diego County Apartment Association
- San Diego County Taxpayers Association
- San Diego Business Leadership Alliance
- San Diego Regional Chamber of Commerce
- San Diego River Park Foundation
- Surfrider Foundation, San Diego Chapter
- Sustainability Alliance of Southern California
- Utility Consumers' Action Network

SUMMARY

ADVANCED WATER PURIFICATION FACILITY

Operated 12 months; produced water that met all state and federal standards

SAN VICENTE RESERVOIR STUDY

Satisfied all anticipated regulatory requirements

REGULATORY FRAMEWORK

Received conceptual approval for a full-scale project from CDPH & Regional Water Board

ENERGY & COST ANALYSIS

Determined energy use is comparable to imported water and costs $2,000 per AF

EDUCATION & OUTREACH

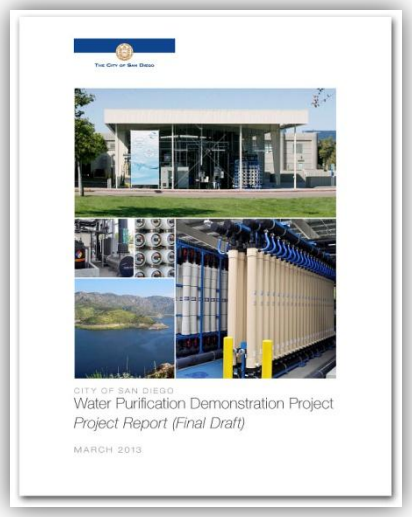
Increased understanding and approval of water purification

PROJECT REPORT

Adopted by City Council in April 2013

AND NOW WE'RE…

- Responding to directives set forth by City Council
- Continuing tours, presentations and events



INFORMATION

Visit: www.purewatersd.org

Email: purewatersd@sandiego.gov

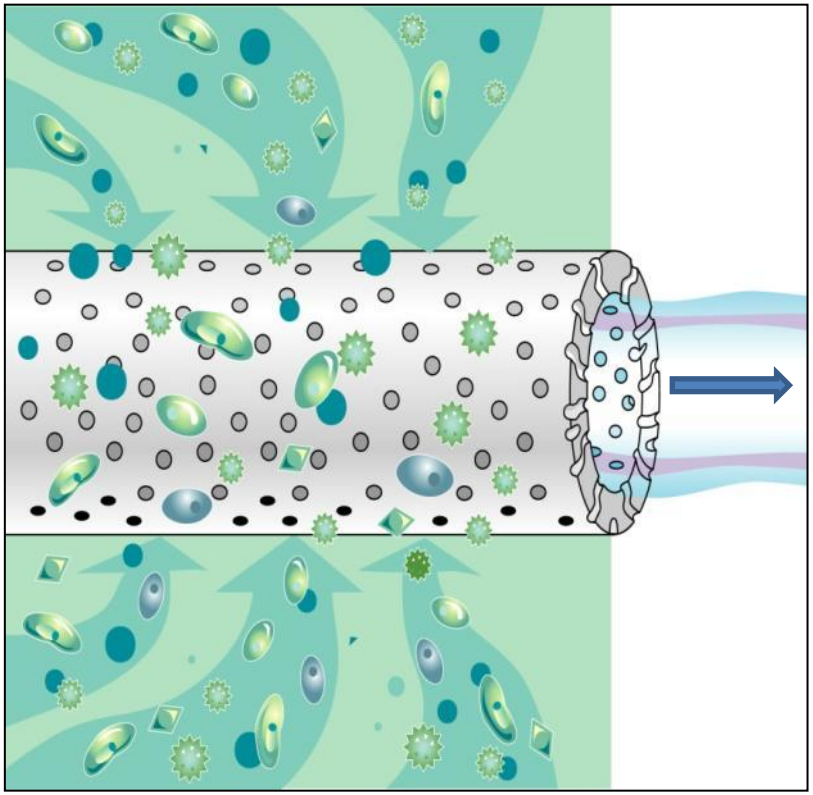
Call: (619) 533-7572

Reports: purewatersd.org/projectreports

BACK-UP SLIDES

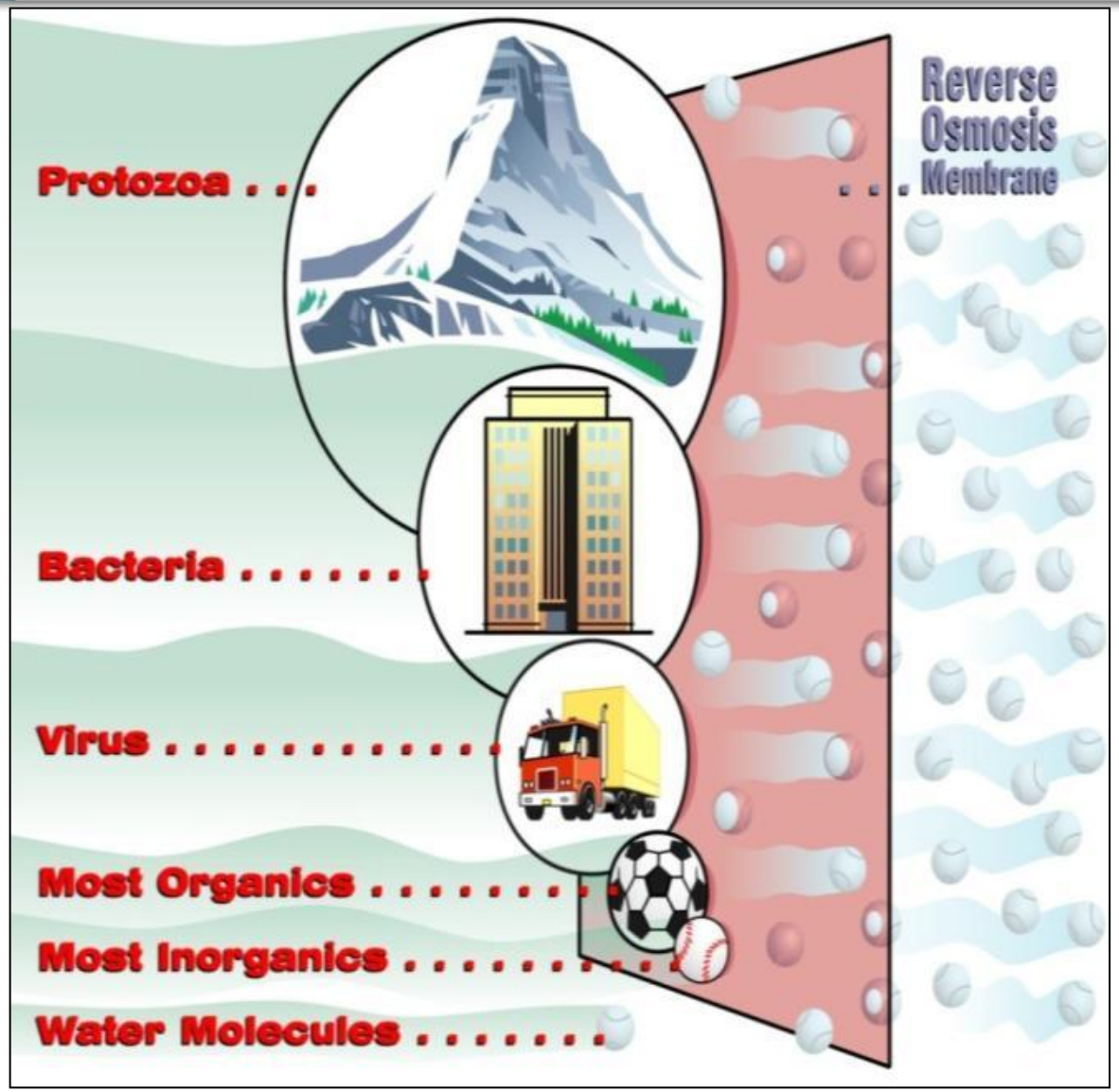
City of San Diego
PUBLIC UTILITIES
Water & Wastewater

Membrane-filtration: Step One



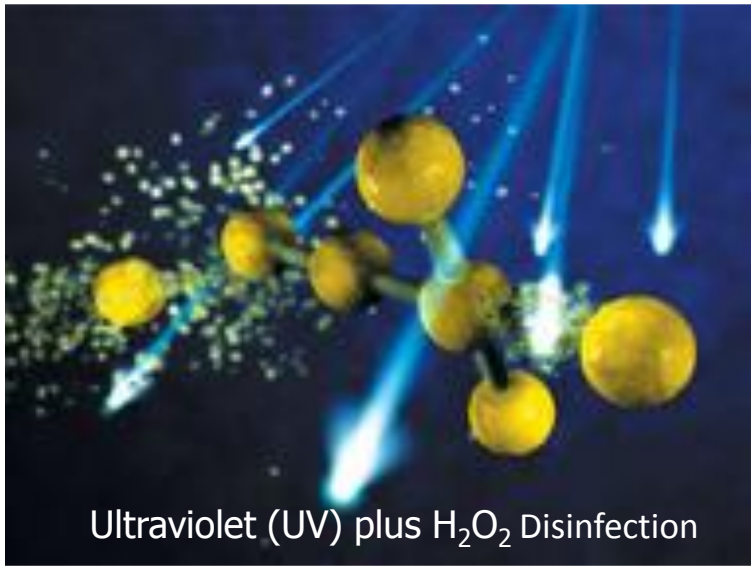
- Hollow fiber with holes in the sides
- Used to make baby food, purify medicines, fruit juices and more
- Excellent pre-filter before reverse osmosis

Reverse Osmosis: Step Two

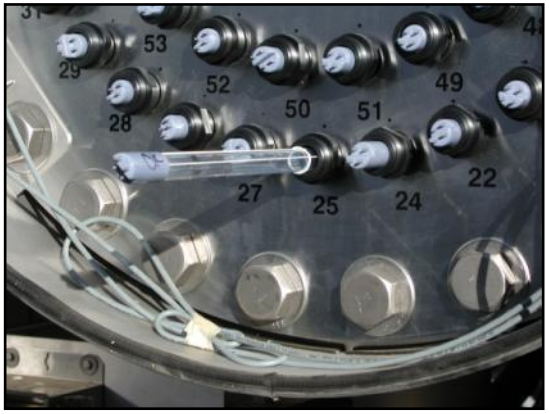


- Same technology used by bottled water companies
- Forces water under high pressure through sheets of plastic membrane
- Demineralizes and purifies water

Ultraviolet Light plus H_2O_2: Step Three


Ultraviolet (UV) plus H_2O_2 Disinfection

- High-intensity light and hydrogen peroxide
- Creates advanced oxidation reaction, essentially destroys anything in the water



San Vicente Reservoir Study

Reservoir Enlargement

- San Vicente Dam and Reservoir constructed in 1944
- Reservoir enlarged from 90,000 acre feet to 247,000 acre feet
- Water Authority is constructing facilities
- City will operate reservoir, dam, and outlet works
- Refilling will take three to five years

1944 to 2012

2013

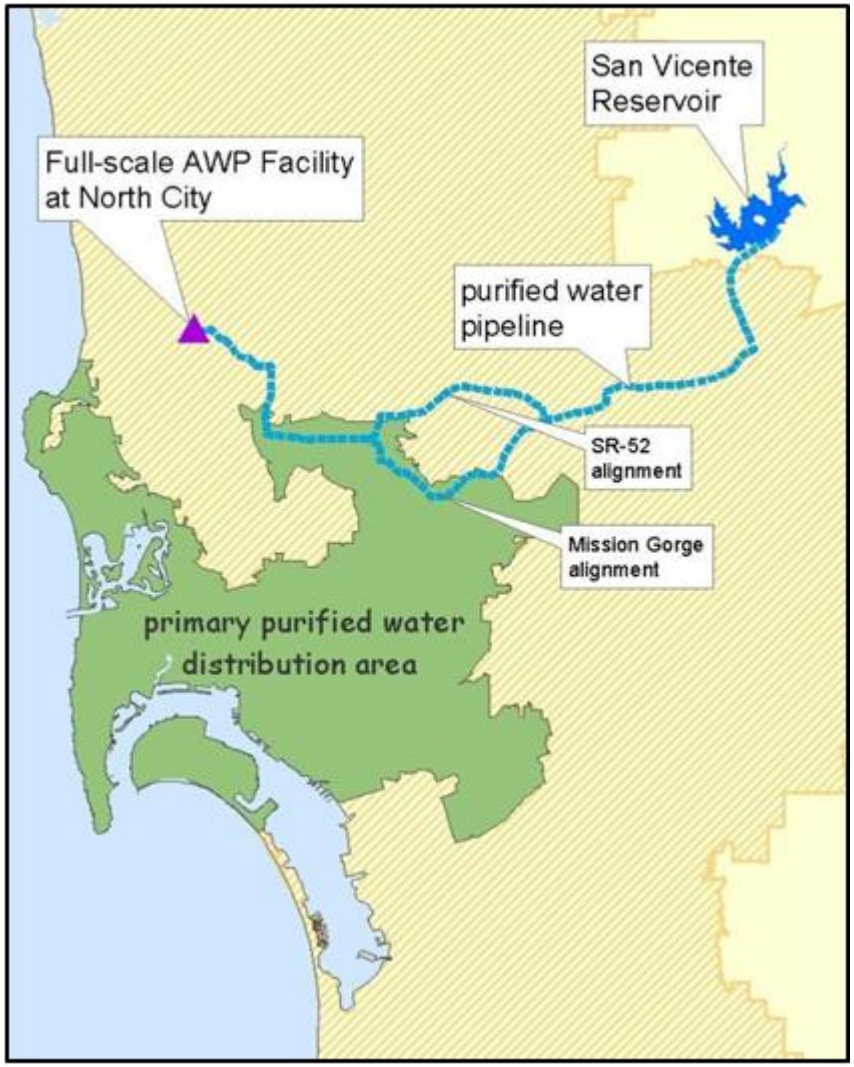
Purified Water Distribution Areas

Under normal operations, purified water is delivered to the Alvarado WTP and to the area in green.

In an extraordinary event, such as extended drought, purified water could go to six WTPs and to the crosshatched area.

Pipeline Alignment Study

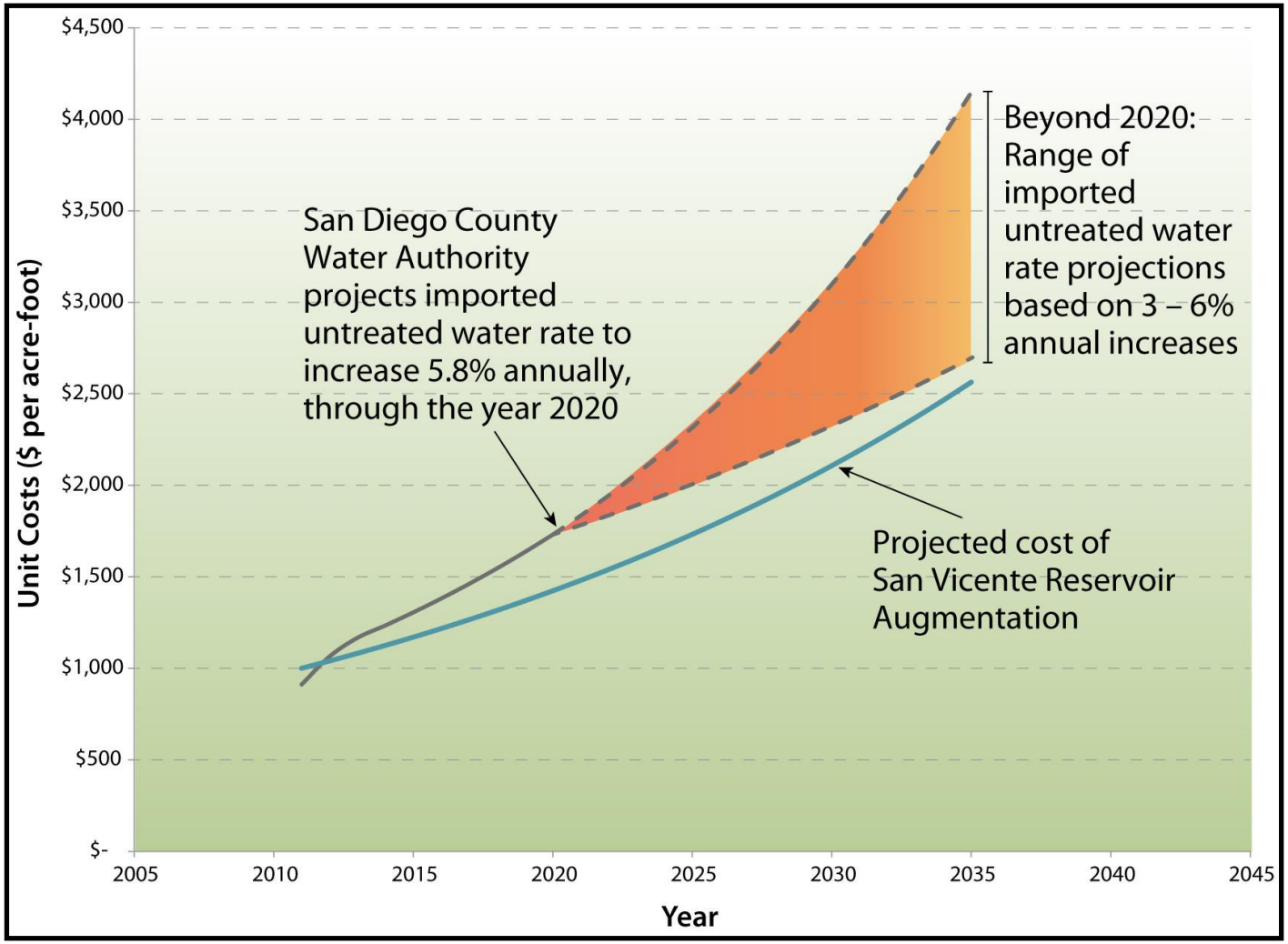
- 22 mile, 36-inch pipeline to convey water from the AWP Facility to San Vicente Reservoir
- Two potential alignments identified:
  - State Route 52 alignment
  - Mission Gorge alignment
- Additional analysis is needed to refine alignment



REGULATED CONSTITUENTS

Regulations/Guidelines	Number of Constituents
California Department of Public Health Goals	
Primary Drinking Water Maximum Contaminant Levels (MCLs)	90
Secondary Drinking Water MCLs	18
Microbial	4
Notification Levels	30
Groundwater Replenishment Criteria	142
San Diego Water Board (projected)	
San Vicente Reservoir Limits	143
Total	231

COMPARING THE COST OF THE WATER



Projected cost of purified water (solid line) of a full-scale reservoir augmentation project at San Vicente Reservoir compared to actual and projected costs of untreated imported water (dashed lines).

Demonstration Project
San Vicente IPR/RA Cost Estimate

	Capital	Annual Operating and Maintenance
AWP Facility	$144,700,000	$8,145,000
Pipeline & Pump station	$224,500,000	$3,385,000
Increased North City Tertiary Treatment	$0	$3,965,000
Total	**$369,200,000**	**$15,495,000**

- Result - $2,000 per acre-foot to produce and convey 15 mgd of purified water to San Vicente Reservoir

Demonstration Project, San Vicente IPR/RA
Avoided Wastewater Costs

	Capital	Annual Operating and Maintenance
Point Loma Wet Weather Storage Facility	$123,000,000	$6,150,000
Reduced Treatment at Point Loma	$0	$2,210,000
Reduced Pumping at Pump Station No. 2	$0	$450,000
Total	**$123,000,000**	**$8,810,000**
Total (per-acre-foot basis)	**$1,000**	

- Net cost: $1,000 per acre-foot to produce and convey 15 mgd of purified water to San Vicente Reservoir

PUBLIC OUTREACH & EDUCATION

SCOOP SAN DIEGO

San Diego City Council Approves Water Purification

- Water Reliability Coalition says new safe, reliable drinking water could supply up to 40 percent of City of San Diego's demand

KFMB-TV 8 HD CBS8.com SAN DIEGO, CA

Council committee asks for staff report on implementing recycled drinking water

Recommend 7 people recommend this. Sign Up to see what your friends recommend.

Posted: Mar 20, 2013 6:33 PM PDT
Updated: Mar 20, 2013 6:33 PM PDT

SAN DIEGO (CNS) - The San Diego City Council's Natural Resources and Cu
planning for a syst
report back in thre

KPBS Listen Schedules Programs Blogs Give
News Arts & Culture Family Living Events

Final Report Says Recycling Water Is Not So Expensive

Wednesday, March 20, 2013
By Tom Fudge

SAN DIEGO — The San Diego Public Utilities Department today presents its final report on water recycling and estimates it would cost no more to recycle water than to import it.

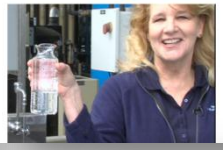
KPBS Radio News

00:00 / 00:00

Final Report Says Recycling Water Is Not So Expensive

Aired 3/20/13

The San Diego water department today presents its final report on water recycling and estimates it would cost no more to recycle water than to import it.



The report will be presented the San Diego City Council's Natural Resources and Culture Committee.

Turning wastewater into drinking water could provide a large, reliable source of water for San Diego. But water recycling has been politically controversial because some people think reusing wastewater is distasteful.

It's also been seen as expensive: about twice the cost of importing water from outside the region.

But the final report on San Diego's Water Purification Demonstration Project now claims the future cost of recycled and imported water would be about the same, around $1,000 per acre foot.

The report indicates recycling water does
money by reducing the need for imported
by cutting the volume of water the city mu

Tide turns for water purification plan

UT San Diego

By Deborah Sullivan Brennan 6 A.M. APRIL 22, 2013

The New York Times
SundayReview | The Opinion Pages

'Taking the Waste Out of Wastewater'

The New York Times

As 'Yuck Factor' Subsides, Treated Wastewater Flows From Taps

By FELICITY BARRINGER

SAN DIEGO — Almost hidden in the northern hills, the pilot wastewater treatment plant here does not seem a harbinger of revolution. It cost $13 million, uses only well-established technologies and produces a million gallons a day.

USA TODAY

NO. 1 IN THE USA • USATODAY.COM

COVER STORY

From toilets to tap

As water becomes more precious, more drinking water will come from treated sewage. Here's how it works.

FOX5 SAN DIEGO

LOCAL NEWS

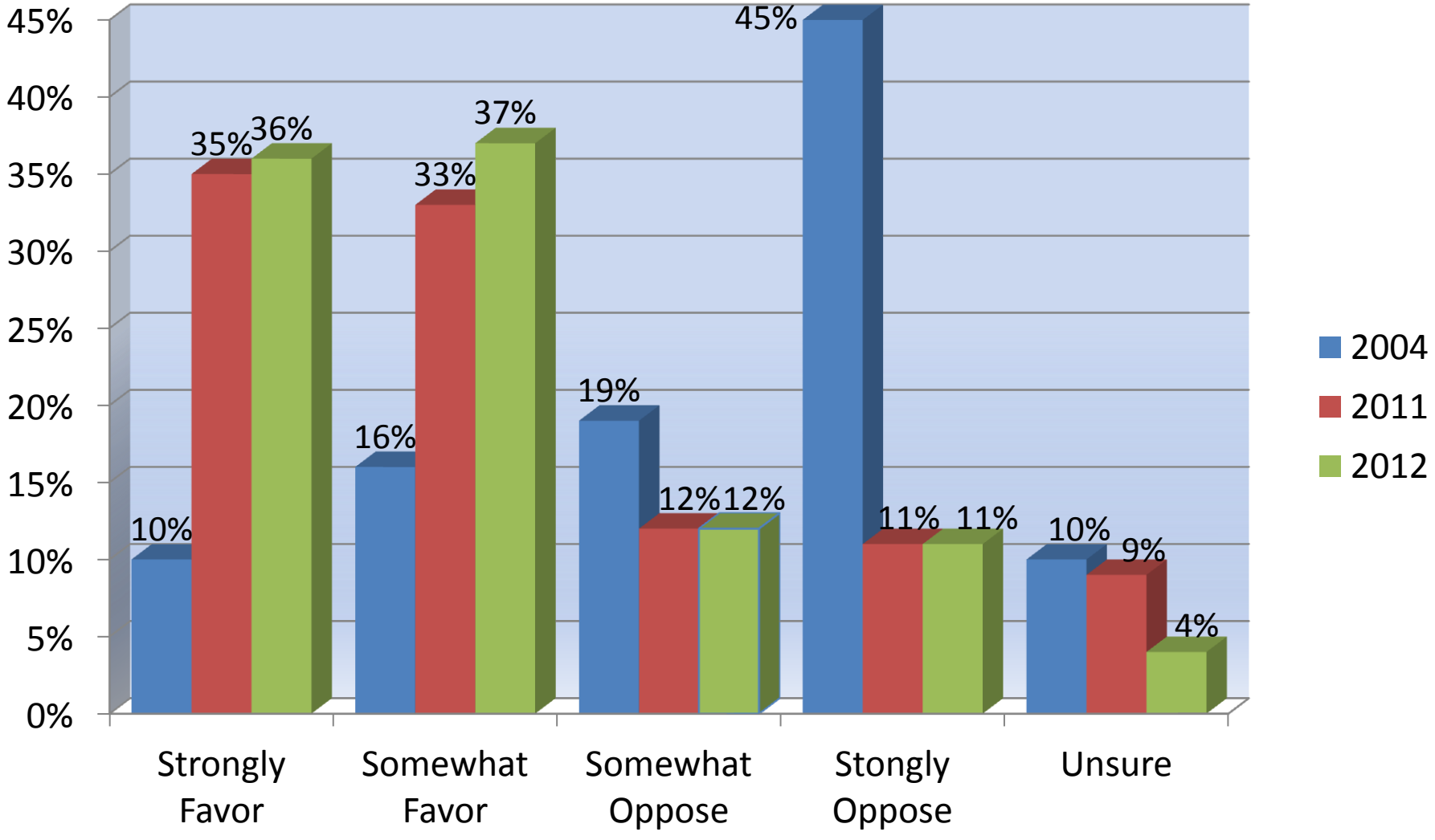
San Diego studies making drinking water from waste water

abc 10 NEWS

Purification system that makes toilet water clean enough to drink is closer to coming to San Diego

Public Outreach & Education Program
Research Results

Use Advanced Treated Recycled Water as an Addition to Drinking Water Supply



Public Outreach & Education Program

Research Results

Accepting of Recycled Water to Supplement Drinking Water if Respondent Learned certain facts