An aerial photograph of the Los Angeles basin, showing the city, the Pacific Ocean to the west, and the surrounding mountain ranges under a clear blue sky. The text is overlaid on the top half of the image.

Item 19: Incorporation of Stakeholder-Proposed Groundwater Quality Management Measures for Salts and Nutrients in the Central and West Coast Groundwater Basins

LOS ANGELES REGIONAL WATER QUALITY CONTROL BOARD

FEBRUARY 12, 2015

Elements of a SNMP

Salt & Nutrient Management Plan

Source ID,
Loading
Estimates,
Assimilative
Capacity (AC)

Salt and
Nutrient
Management
Measures,
Anti-
degradation
Analysis

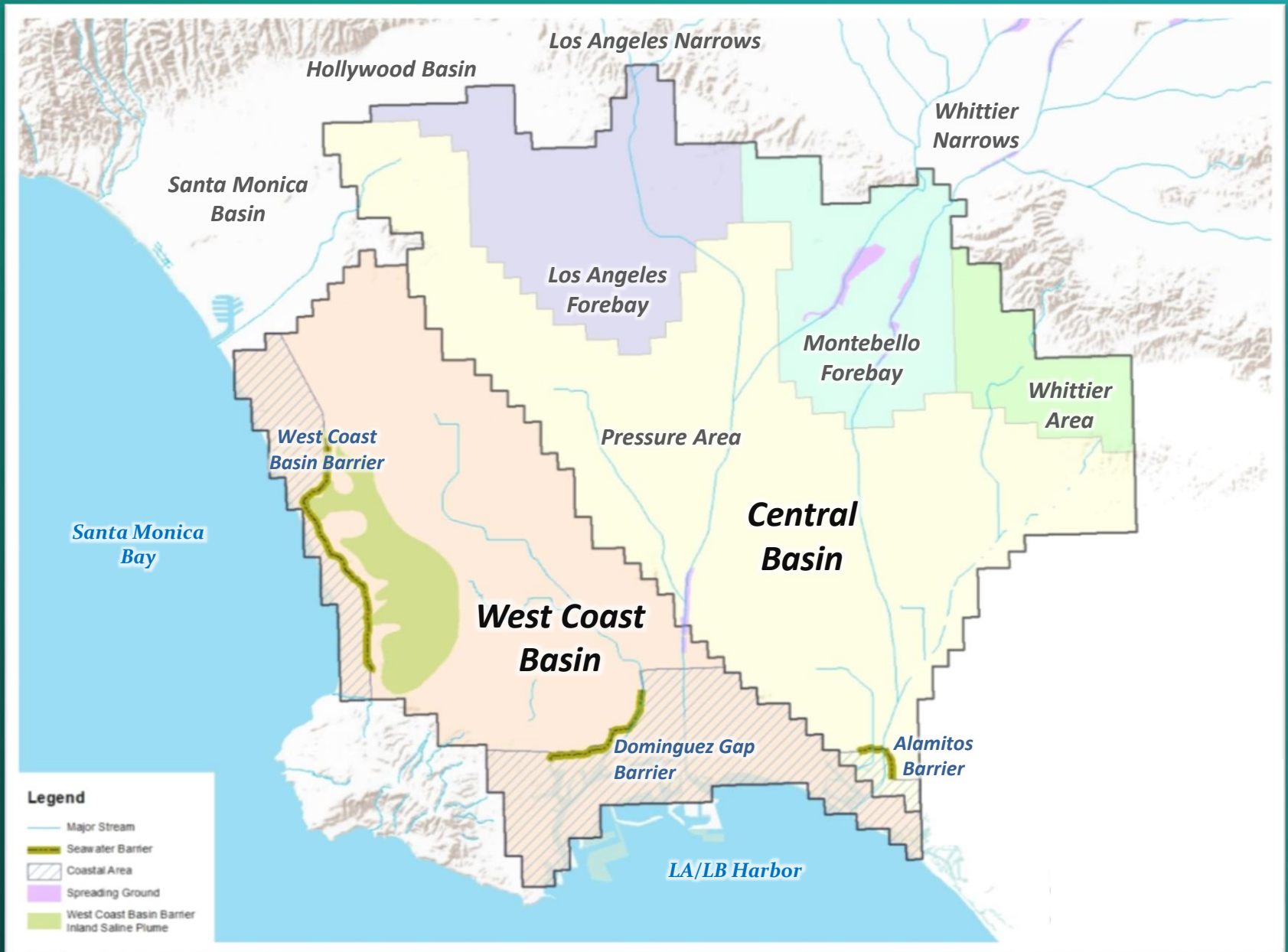
Water
Recycling
and
Stormwater
Recharge
Goals

Basin-wide
Monitoring
Plan & CEC
Monitoring
for Recycled
Water
Projects

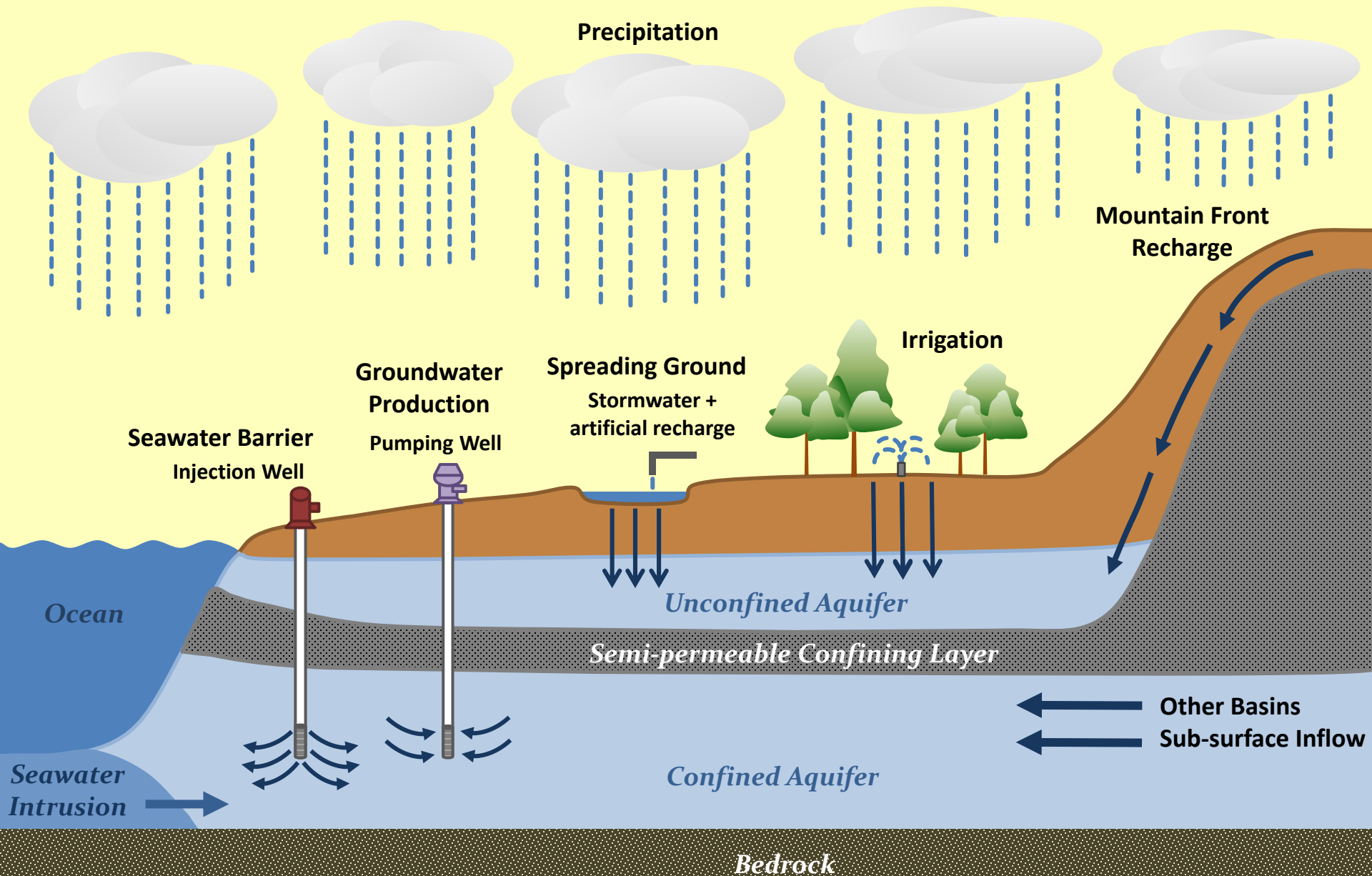
CEQA
Analysis



Description of Basins



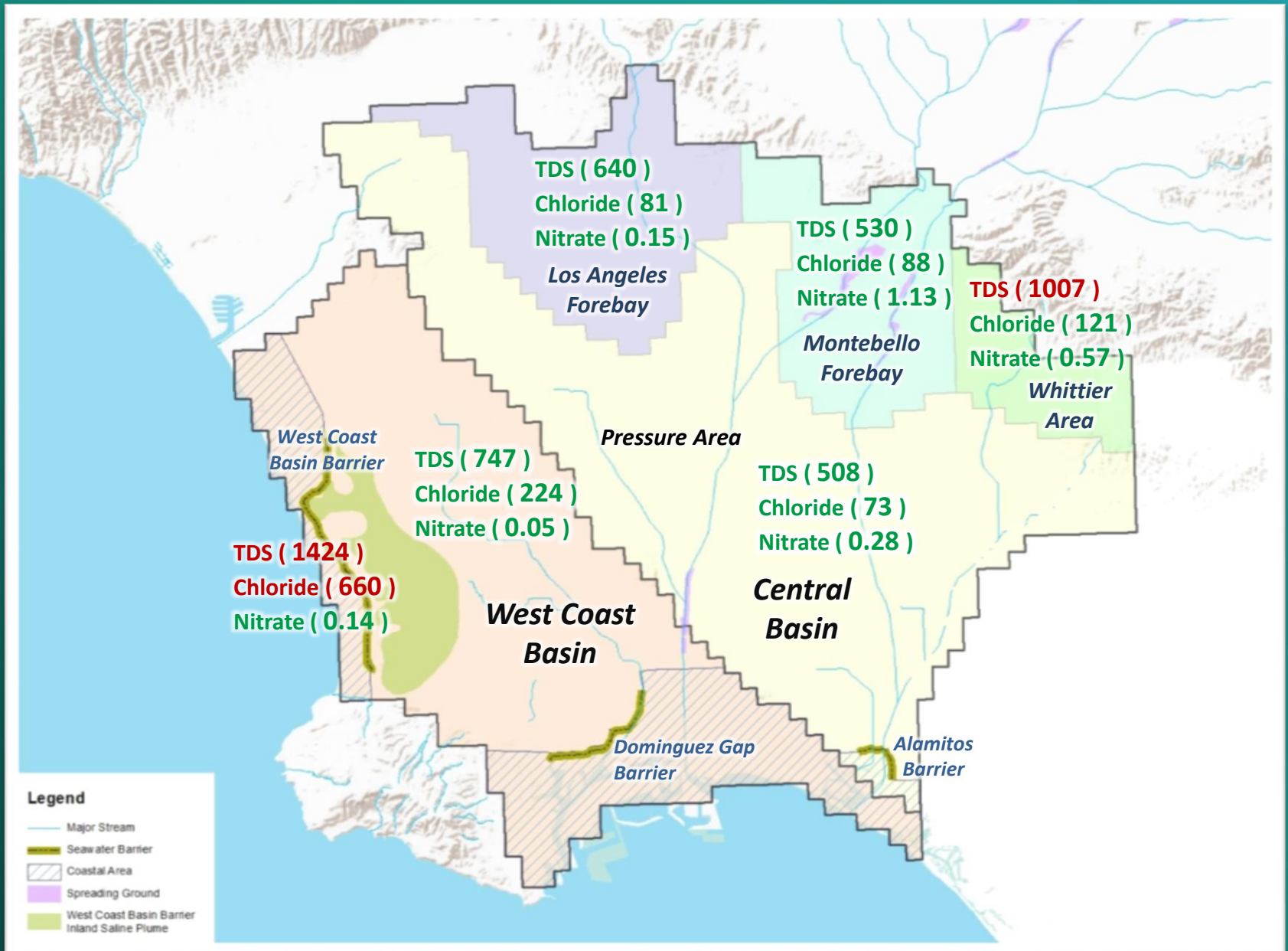
Salt and Nutrient Loads to Basins



Salt and Nutrient Loads to Basins

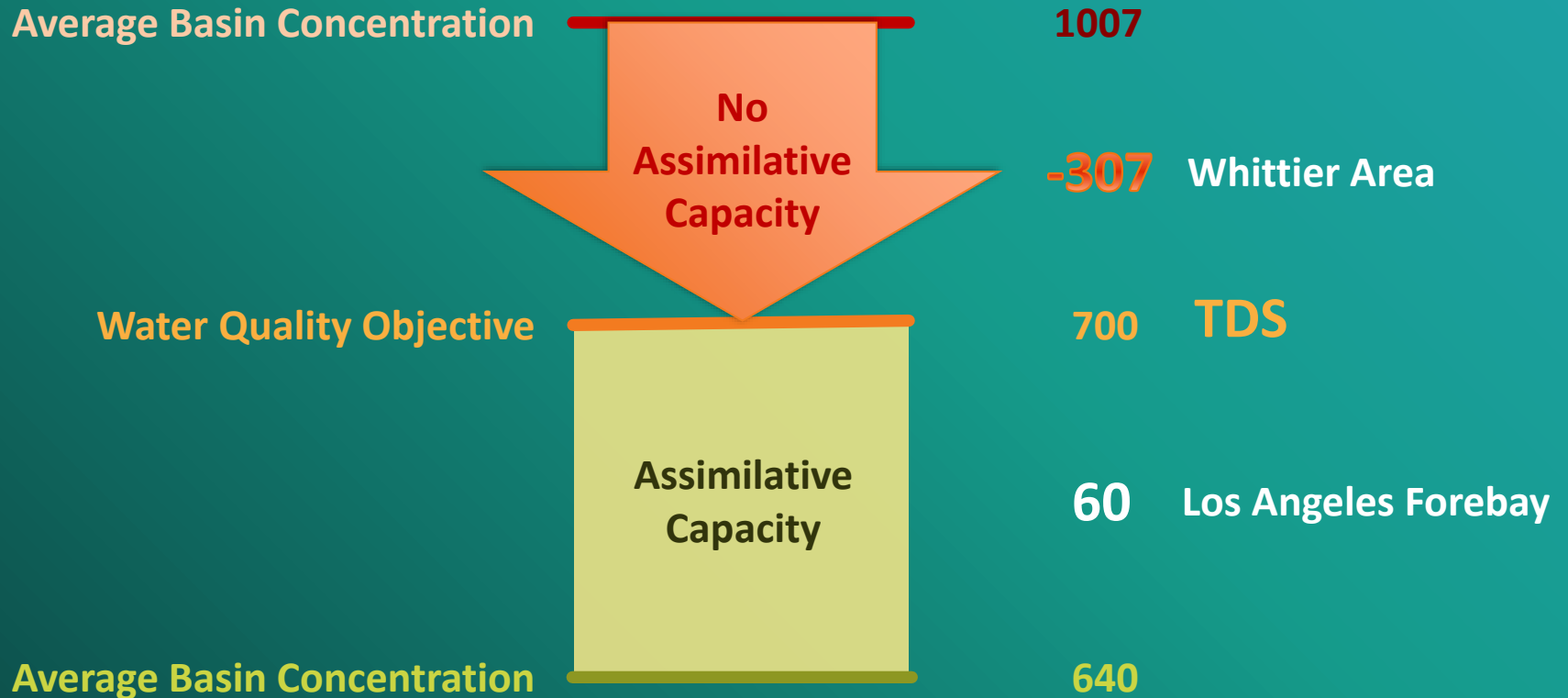
Source Water	Central Basin			West Coast Basin		
	TDS	Chloride	Nitrate	TDS	Chloride	Nitrate
TOTAL INFLOW (TONS)	134,849	22,956	419.0	50,090	19,099	35.9
Spreading Grounds	48.9%	57.2%	73.4%	0.3%	0.1%	2.2%
Seawater Barriers	1.7%	1.9%	1.2%	17.6%	10.4%	42.6%
Precipitation Infiltration	2.5%	2.0%	0.9%	3.4%	1.2%	5.3%
Mountain Front Recharge	1.6%	1.4%	3.2%	1.6%	0.6%	13.9%
Irrigation Return Flows	23.5%	20.0%	1.2%	25.4%	16.1%	6.1%
Subsurface Inflow	21.9%	17.5%	20.1%	51.8%	71.1%	29.8%
TOTAL OUTFLOW (TONS)	-133,663	-17,323	-111.3	-57,937	-28,999	-4.0
Groundwater Production	100%	100%	100%	100%	100%	100%
ANNUAL CHANGE IN MASS (TONS)	1,186	5,633	307.7	-7,847	-9,900	31.9

Basin Groundwater Quality



Assimilative Capacity

$$AC = \text{Water Quality Objective} - \text{Average Basin Concentration}$$



Groundwater Basins' Assimilative Capacity for Salts and Nutrients

Location	Assimilative Capacity (mg/l)		
	TDS	Chloride	Nitrate
CENTRAL BASIN WATER QUALITY OBJECTIVES	700	150	10
Los Angeles Forebay	60	69	9.85
Montebello Forebay	166	62	8.87
Whittier Area	-307	29	9.43
Central Basin Pressure Area	215	85	9.90
WEST COAST BASIN WATER QUALITY OBJECTIVES	800	250	10
West Coast Basin (excluding seawater impacted areas)	53	26	9.95
West Coast Basin (including seawater-impacted areas)	-624	-410	9.95

AC = Water Quality Objective - Average Basin Concentration

Assimilative Capacity & Anti-degradation Analysis

Assimilative Capacity Use (AC)

Anti-degradation Requirements

**Single Project using $< 10\%$
or
Multiple Projects using $< 20\%$**

Demonstrate/Verify Use of AC

**Single Project using $> 10\%$
or
Multiple Projects using $> 20\%$**

Conduct a full-scale analysis

Projects Improve TDS and Chloride Conditions in West Coast Basin and limit use of Nitrate Assimilative capacity to $< 10\%$ over the planning period

Major Planned (Future) Salt and Nutrient Projects and Management Strategies

Replace Imported Water with Advanced Treated Recycled Water at Seawater Intrusion Barriers

- 2014/15
- Water Replenishment District of Southern California & City of Los Angeles

Replace Imported Water with Tertiary Recycled Water and/or Advanced Treated Recycled Water for Basin Recharge

- 2015-2018
- Water Replenishment District of Southern California

Expand Existing Goldsworthy De-salter and Increase Groundwater Pumping for Treatment by the Goldsworthy De-salter and Brewer De-salter

- 2015
- Water Replenishment District of Southern California

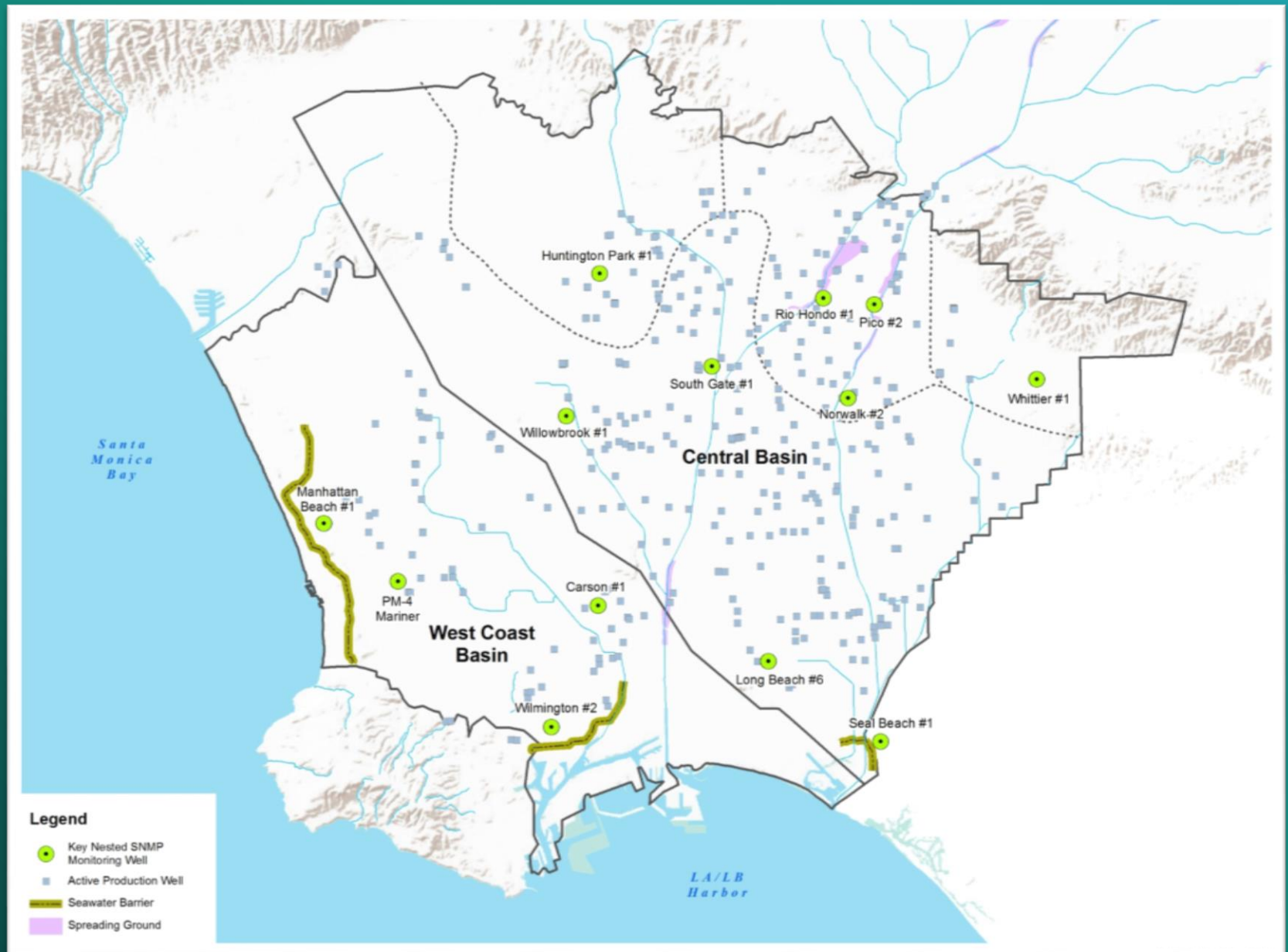
Increase Recycled Water Use for Irrigation

- On-going
- County Sanitation Districts of Los Angeles County

Projected Impact of Projects on Basin Water Quality

Basin/Sub-Basin	Projected Impact of Future Projects and Baseline Conditions		
Change (2010 to 2025) (mg/L)	TDS	Chloride	Nitrate
Los Angeles Forebay	-0.6	1.6	0.15
Montebello Forebay	-66.1	-0.7	0.16
Whittier Area	-41.5	-3.1	0.05
Pressure Area	18.8	8.2	0.13
Central Basin			
Change (2010 to 2025)	1.1	5.6	0.14
Assimilative Capacity Used (2010 to 2025)(%)	0.7%	6.7%	1.4%
West Coast Basin			
Change (2010 to 2025)	-58.6	-34.1	0.06
Assimilative Capacity Used (2010 to 2025)(%)	NA	NA	0.6%

Monitoring Program



WRD Presentation

- Stakeholder Process
- SNMP Model
- Planned Projects and Monitoring
- CEQA



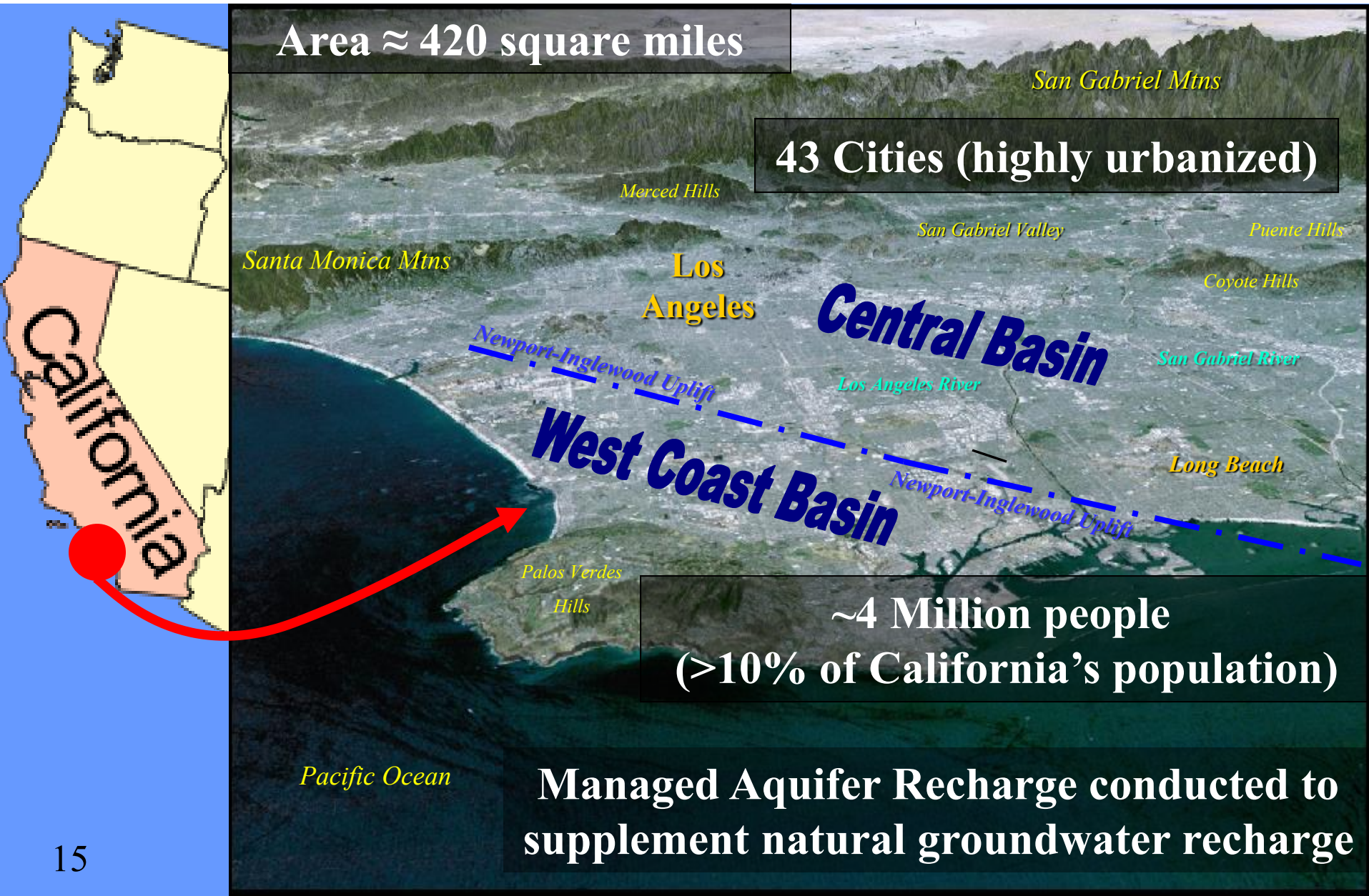
Salt/Nutrient Management Plan (SNMP) for the Central Basin & West Coast Basin (CBWCB)



February 12, 2015
LARWQCB Board Meeting

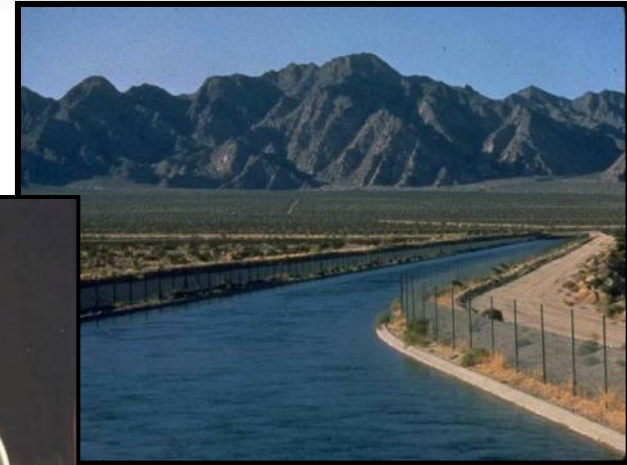
Presented by WRD on behalf of the CBWCB Stakeholders

SNMP Study Area (CBWCB)



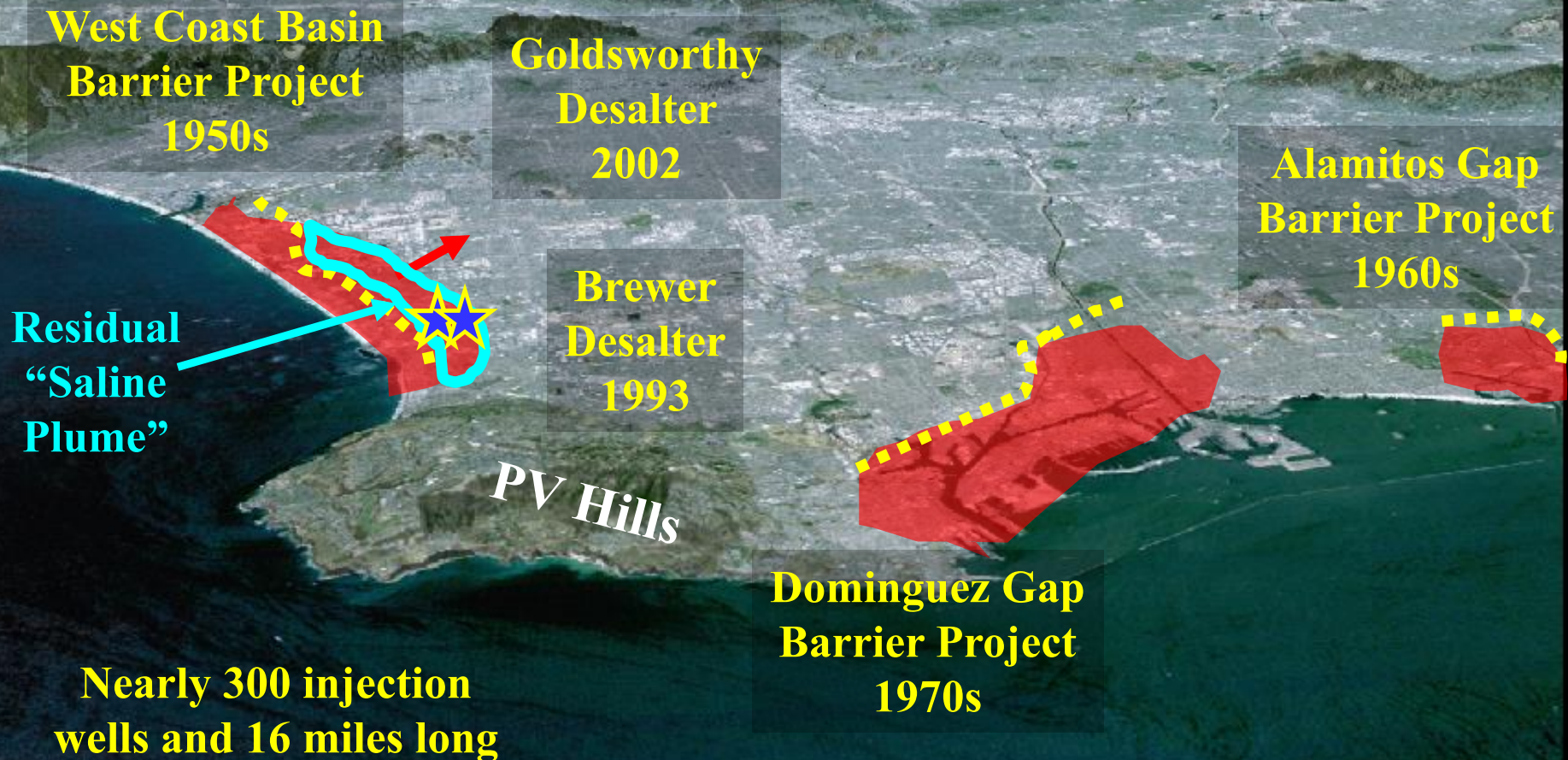
Sources of Water in CBWCB

- **IMPORTED WATER:** 60%
from State Water Project,
Colorado River, or
LA Aqueduct
- **GROUNDWATER:** 40%
>400 Active Production Wells
Pump ~245,000 acre-feet/yr
- **RECYCLED WATER:** Growing uses
(irrigation, industrial applications,
groundwater recharge)



Major Salinity Control Measures

Excessive pumping between 1900 and 1950s caused groundwater levels to drop below sea level, which resulted in seawater intrusion



SNMP Stakeholders



Other SNMP Stakeholders

Regulatory Agencies

- Los Angeles Regional Water Quality Control Board
- California Department of Public Health (SWRCB Division of Drinking Water)
- California Department of Water Resources

Water Purveyors & Water Associations

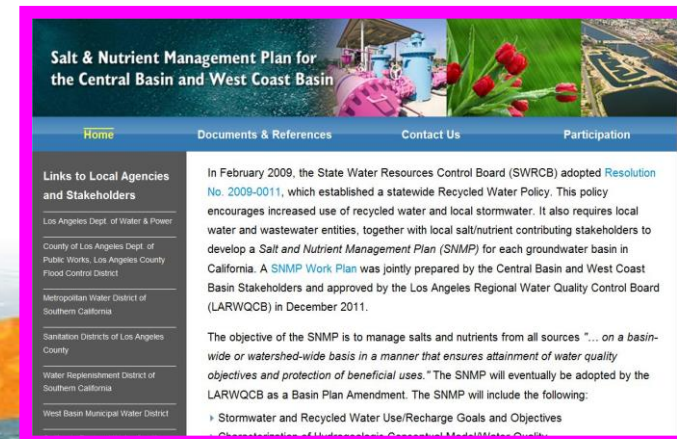
- Metropolitan Water District of Southern California
- City of Los Angeles, Bureau of Sanitation
- Central Basin Municipal Water District
- Central Basin Water Association
- City of Compton, Municipal Water Department
- City of Inglewood
- City of Long Beach Water Department
- City of Manhattan Beach
- City of Torrance
- Golden State Water Company
- West Basin Water Association

Environmental Groups

- Council for Watershed Health
- Heal the Bay
- University of California, Los Angeles, Institute for Environment and Stability
- Santa Monica Bay Restoration Commission
- Natural Resources Defense Council
- Friends of Los Angeles River

SNMP Stakeholder Process

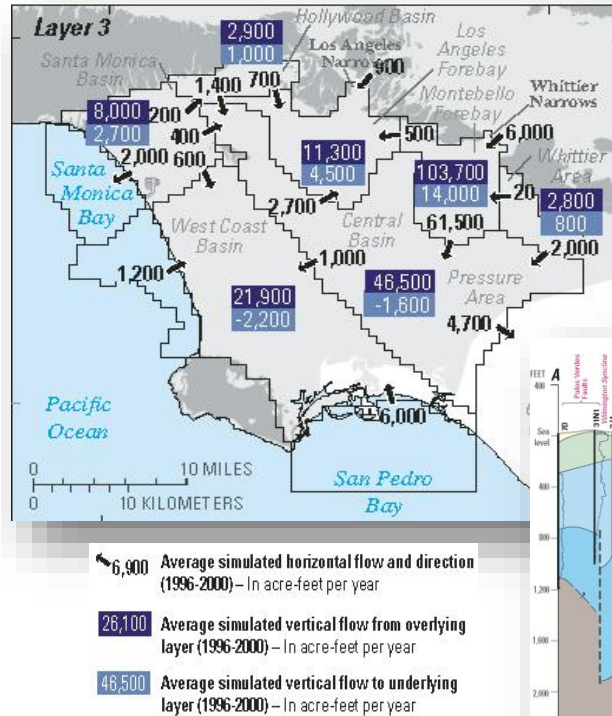
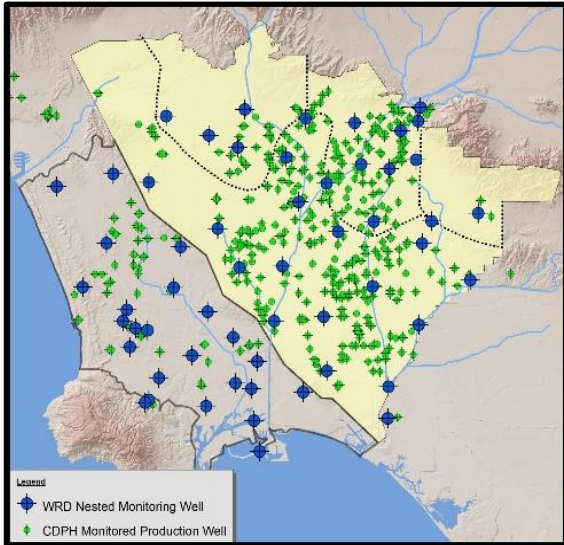
- **Multiple opportunities for stakeholder participation and collaboration:**
 - Seven SNMP Stakeholder Workshops hosted by WRD & also attended by LARWQCB staff
 - Presentations at LARWQCB Workshops, to regional planning meetings/groups, conferences, etc.
 - CEQA Scoping Meeting held on Oct 21, 2013
 - Six Technical Memoranda issued for 30-day public & LARWQCB review
- **Data Sharing & Communication:**
 - CBWCB SNMP website: <http://www.wrd.saltnutrient.com/>
 - E-mail address: wrд@saltnutrient.com
 - FTP site: fileshare.rmcwater.com



SNMP Water Quality Assessment

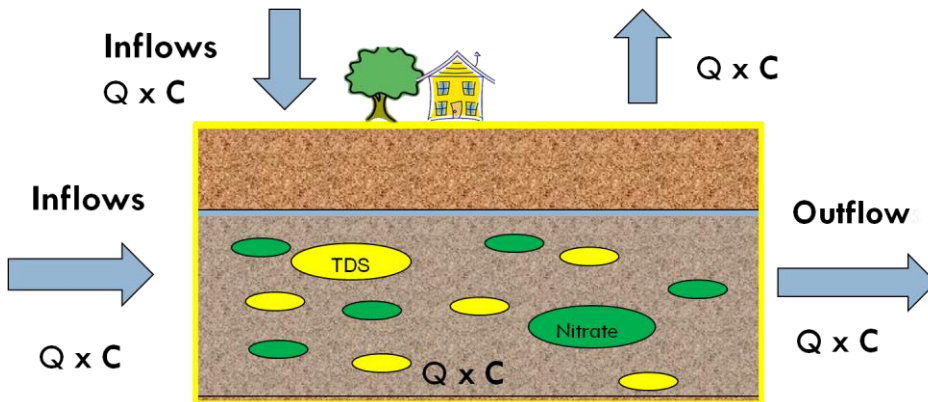
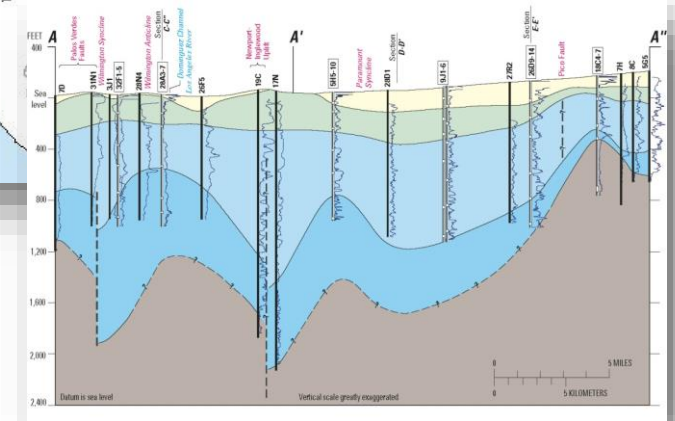
STEP 1

Compiled all water quality data



STEP 2

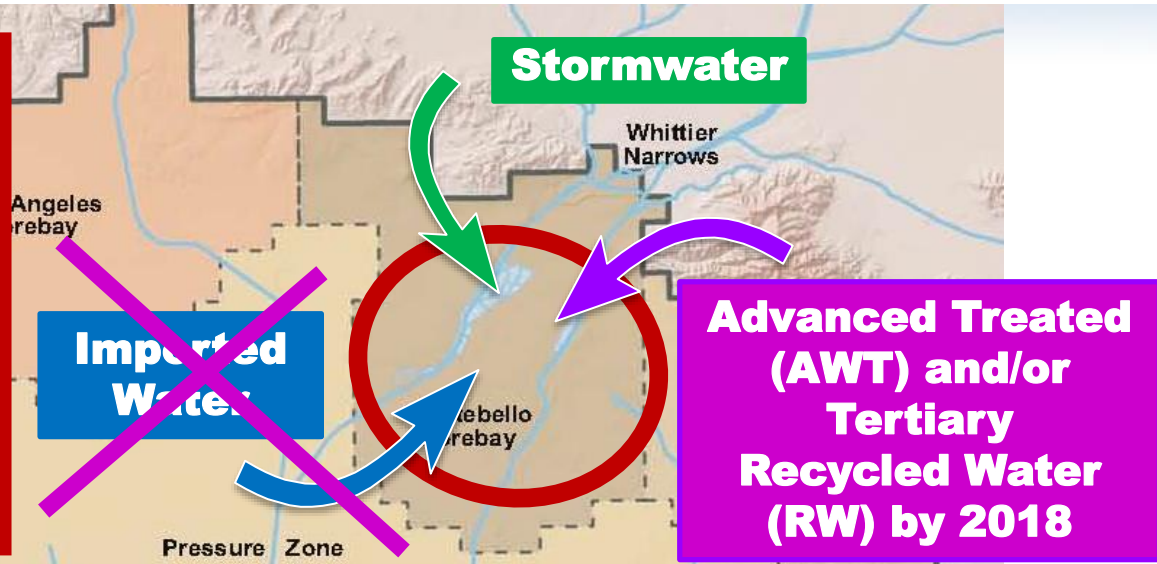
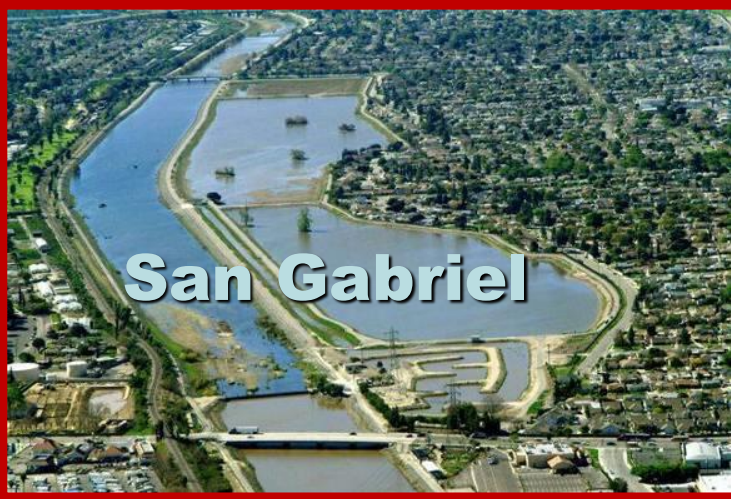
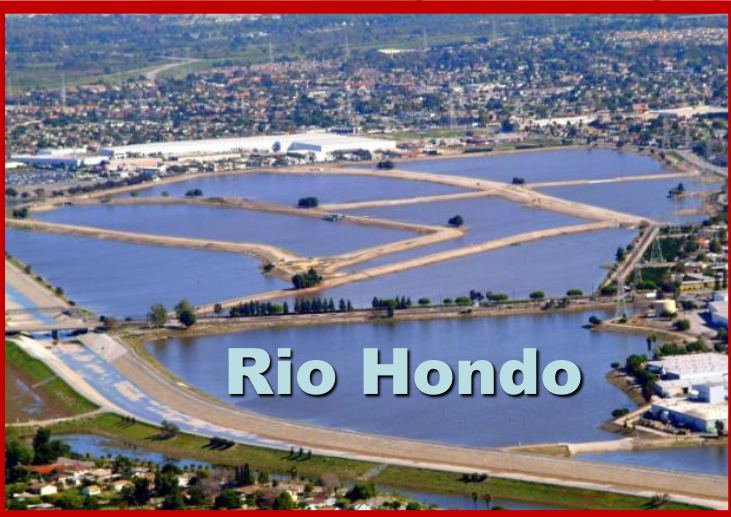
Utilized existing groundwater model to obtain volumes and flows



STEP 3

Developed SNMP Mixing Model to calculate future groundwater quality & salt/nutrient mass loading to 2025

Proposed Major Projects Modeled in the SNMP



**Montebello Forebay
Spreading Grounds**

**Groundwater
Reliability
Improvement
Program (GRIP)**



Assessment

Two Recycled Water Project Options Considered:

21,000 AF Imported Water

GRIP A

11,000 AF Tertiary RW

10,000 AF AWT RW

GRIP B

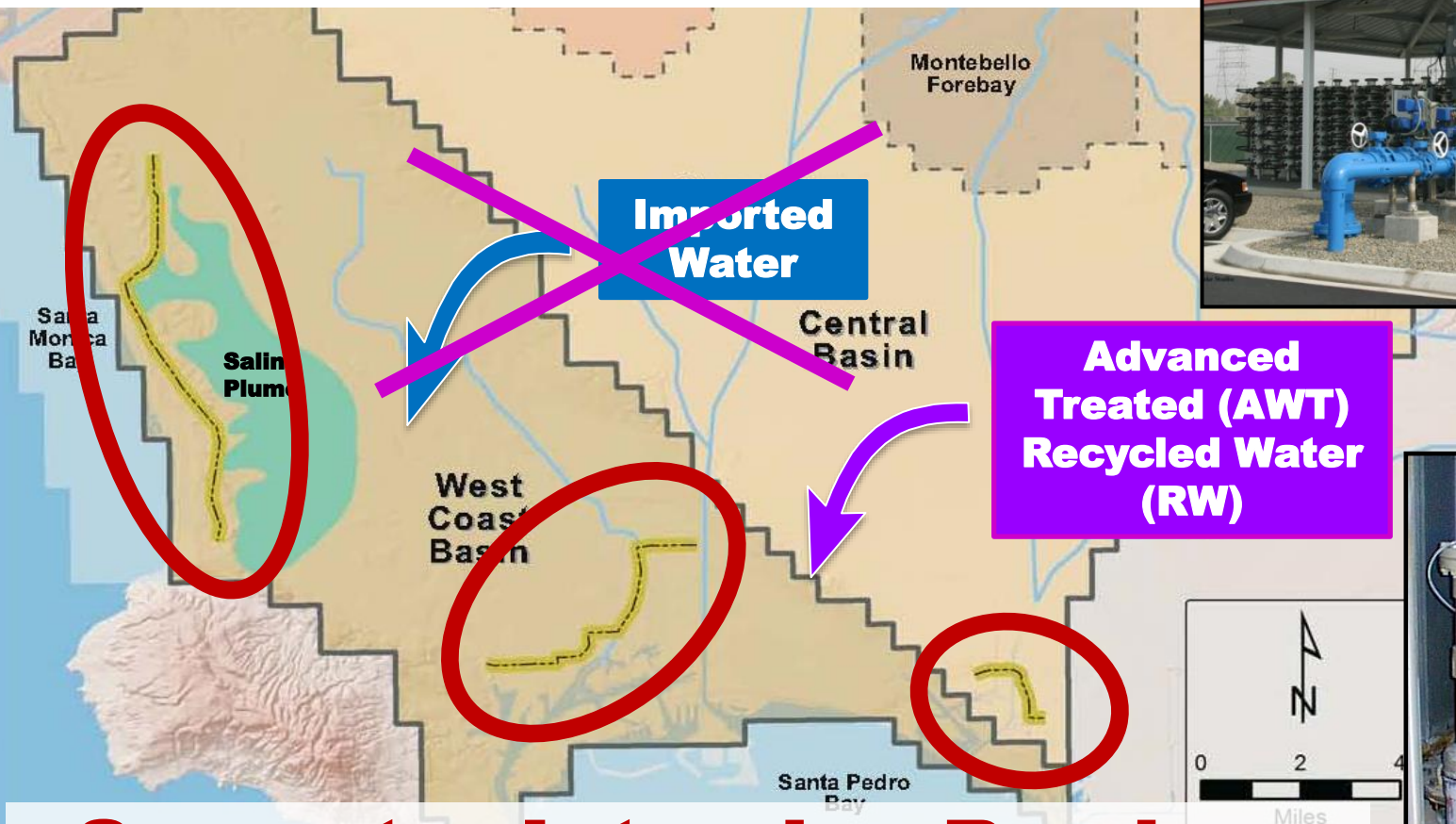
21,000 AF Tertiary RW



- Potential WQ impacts from both GRIP A and GRIP were evaluated separately using the SNMP mixing model
- GRIP A had negligible impacts on groundwater quality
- GRIP B slightly increases TDS, chloride, & nitrate concentrations, but levels remain well below Water Quality Objectives and would utilize less than 10% of the available Assimilative Capacity in the Central Basin

Proposed Major Projects Modeled in the SNMP

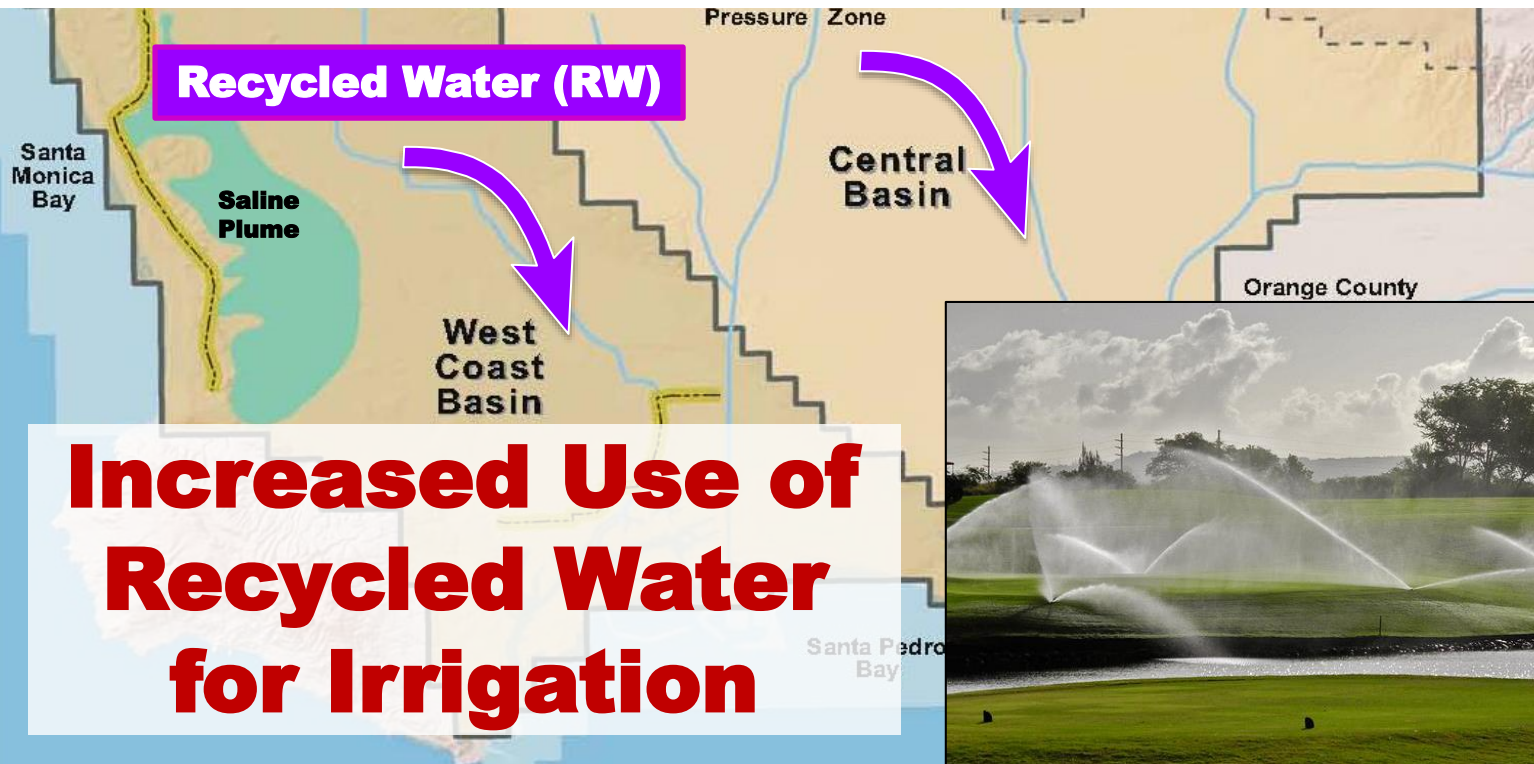
- Total AWT recycled water will increase from 9,500 to 31,700 AFY by 2019
- TDS and chloride concentrations significantly decrease in both basins
- In West Coast Basin, achieve Water Quality Objectives by ~2035 (all implementation measures)
- Nitrate remains significantly below WQO in both basins



Seawater Intrusion Barriers

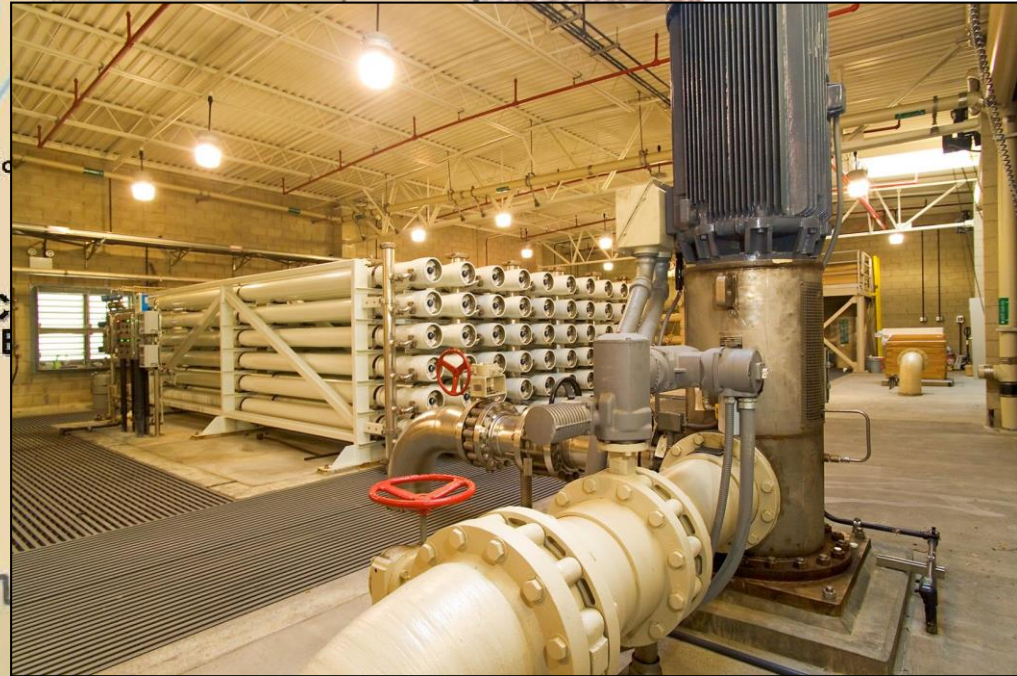
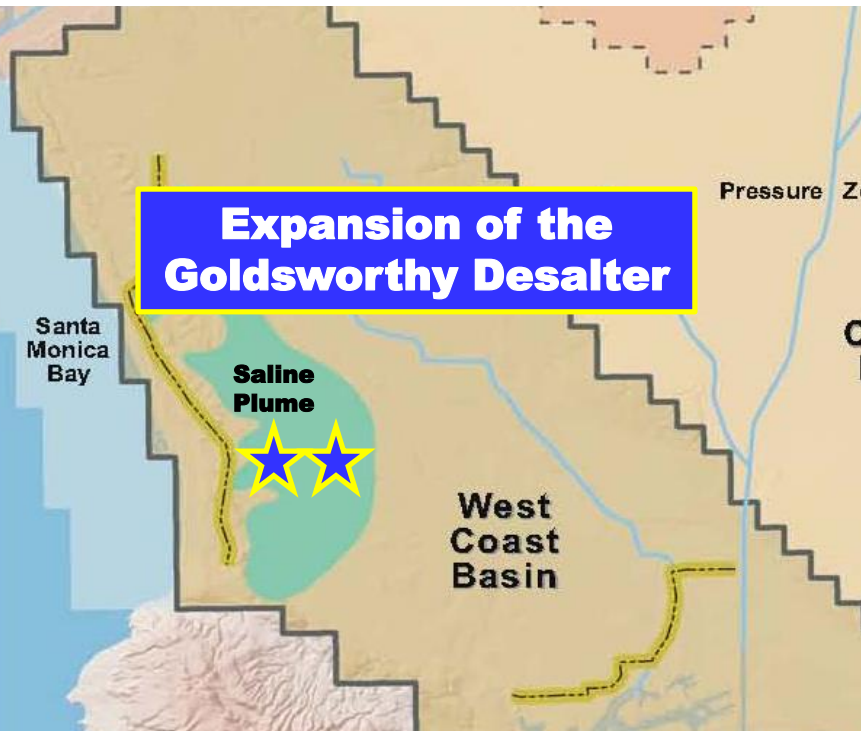
Proposed Major Projects Modeled in the SNMP

- Anticipated to increase from 10,600 to 23,100 AFY by 2025 (replacing imported water & groundwater usage)
- Minimal impact on TDS and chloride loading in both basins, even at SMCLs; these minor impacts are more than offset by implementation measures that reduce salt/nutrient loading
- In Central Basin, use significantly less than 10% of the available Assimilative Capacity
- Nitrate remains significantly below WQO in both basins



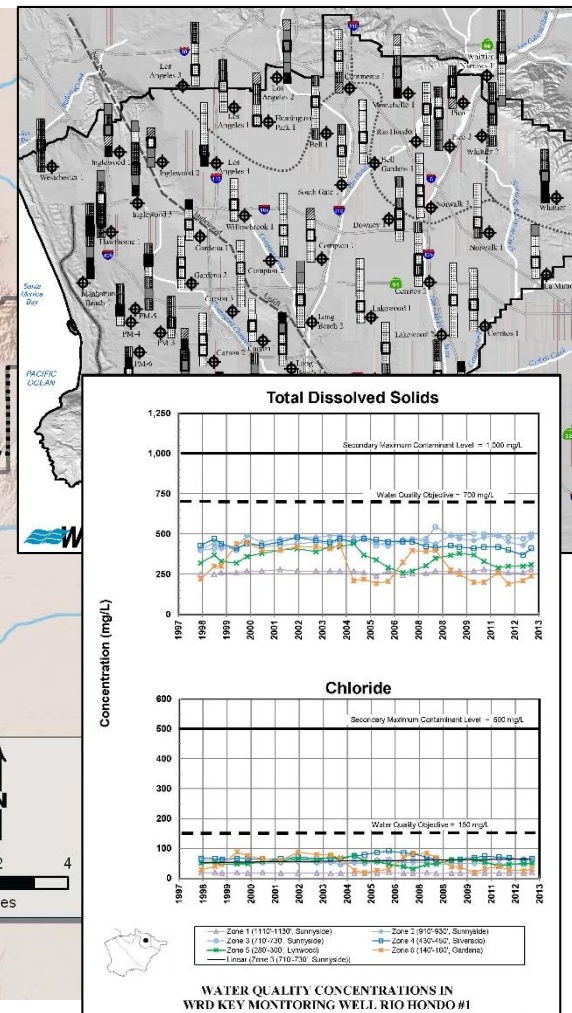
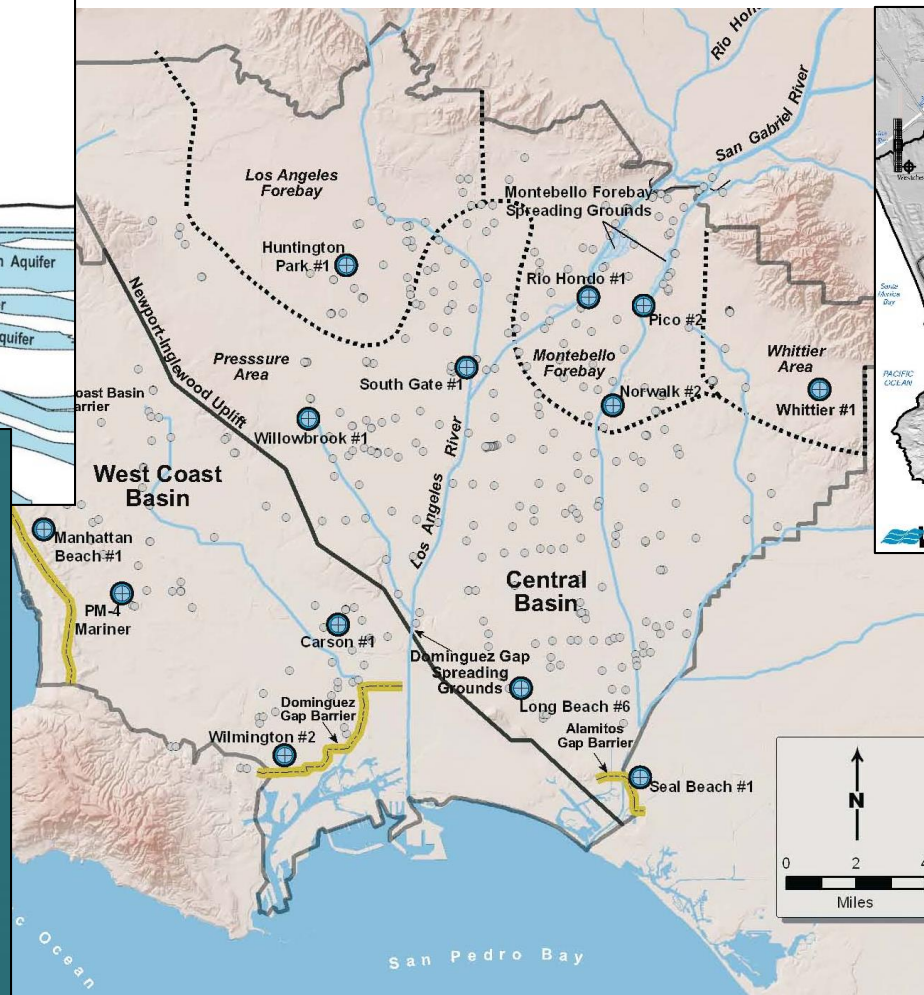
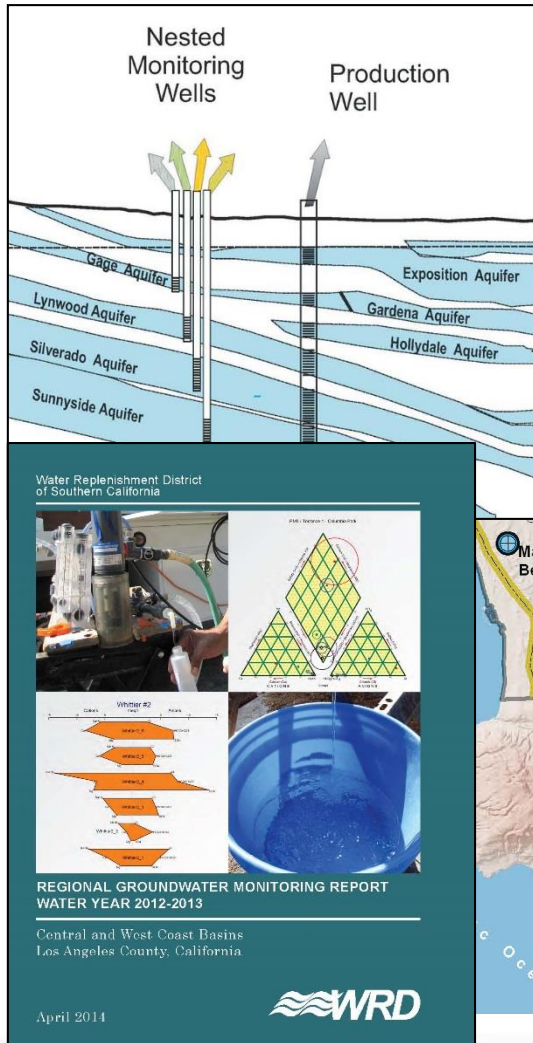
Proposed Major Projects Modeled in the SNMP

- Goldsworthy Desalter will be expanded by end of 2015
- Total groundwater pump & treat by desalters will increase from 2,400 to 6,400 AFY
- Significant decrease of TDS and chloride concentrations; anticipated to achieve Water Quality Objectives by ~2035 (includes all implementation measures)
- No impact on nitrate loading in West Coast Basin



**Increased Groundwater Pump & Treat
by the Two Desalters**

SNMP Monitoring Plan



70 Nested groundwater monitoring wells at 13 locations throughout the most critical areas of the basins

SNMP – Major Implementation Measures

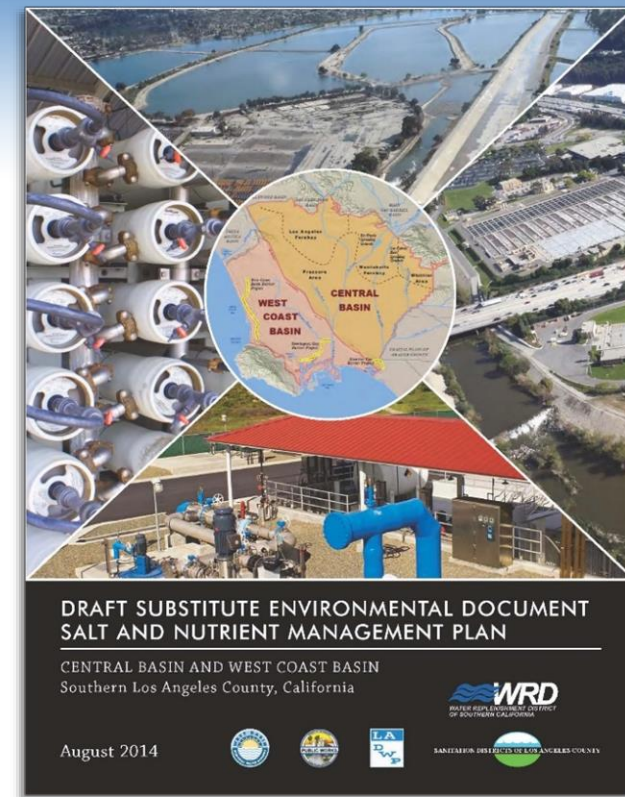
- 💧 **Seawater Intrusion Barriers** – Continued operation & planned upgrade to 100% advanced treated recycled water at all 3 barriers
- 💧 **Desalters** – Continued operation of 2 desalters & expansion of the Goldsworthy Desalter
- 💧 **Spreading Grounds** – Continued operation, improved stormwater capture, potential use of some advanced treated recycled water (i.e. GRIP)
- 💧 **SNMP Monitoring Program** – 70 Nested groundwater monitoring wells @ 13 locations throughout the basins; continue existing robust monitoring programs for all other source waters
- 💧 **MS4 Program** – Rigorous monitoring requirements that will improve surface water quality
- 💧 **LID and Stormwater Capture Projects** – Will increase stormwater recharge
- 💧 **Wastewater Source Control Programs** – Reduces salts & nutrients in recycled water
- 💧 **Salinity Control Programs** – MWD (i.e. Southern California Salinity Coalition)
- 💧 **Public Outreach** – WRD, Council for Watershed Health, & Southern California Salinity Coalition

CEQA Analysis

➤ 3 Program Alternatives were evaluated:

- **Program 1:** No planned implementation measures or proposed major projects
- **Program 2:** All implementation measures, recycled water – volume & quality, & GRIP A
- **Program 3:** All implementation measures, recycled water – volume & quality, & GRIP B

- Conducted program-level environmental analysis and selected Program 2 as the Recommended Program Alternative, which results in less than significant adverse environmental impacts
- Subsequent project-level environmental analyses will be conducted by the responsible parties as specific projects are implemented



A serene sunset scene over a calm body of water. The sun is low on the horizon, casting a warm, golden glow across the sky and reflecting on the water's surface. Silhouettes of trees and houses are visible along the distant shore. The overall mood is peaceful and contemplative.

Questions?

Thank You

Phuong Ly

562-275-4246 | ply@wrd.org

Wrap Up & Staff Recommendation



Updates to the Salt and Nutrient Management Measures

Salt and nutrient management measures will be updated:

- At the end of the planning horizon (i.e. 2025)
- To reflect changing conditions in the CBWCB
- Where results from SNMP Monitoring Program indicate modifications are warranted



Regulatory Implications

- The salt and nutrient management strategies are stakeholder-proposed measures to protect beneficial uses.
- Further Regional Water Board action will only be taken where data and/or other information indicate that the projected water quality conditions are not being met.
- Routine permitting of existing and proposed facilities/projects will continue.



Creation of New Basin Plan Chapter

- Chapter 8:
Groundwater Quality
Management
 - Salt and nutrient
management measures
for each basin
 - Future implementation
provisions for
groundwater quality
management

Chapter 8: Groundwater Quality Management Sustainability and Basin-specific Protection of Groundwater	
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2



Comments

- These management measures were proposed and developed by stakeholders through an open process.
- Stakeholder input was solicited and considered throughout plan development.
- No comments were received on the proposed incorporation of these measures into the Basin Plan item.



Staff Recommendation

- Adopt the Stakeholder-Proposed Salt and Nutrient Management Measures for the Central and West Coast Basins

