



ABSTRACT & POWERPOINT PRESENTATION

***Keeping the Water Going:
Challenges to Recharge in the Montebello Forebay***

Monica Gasca
Civil Engineer
County Sanitation Districts of Los Angeles County
Los Angeles, California

Managed Aquifer Recharge Symposium
January 25-26, 2011
Irvine, California

Symposium Organizers:

- National Water Research Institute
- Orange County Water District
- Water Research Foundation

www.nwri-usa.org/rechargesymposium2011.htm

Keeping the Water Going – Challenges to Recharge in the Montebello Forebay

Monica Gasca
Los Angeles County Sanitation Districts

Ted Johnson
Water Replenishment District of Southern California

Ben Willardson
Los Angeles County Department of Public Works

Abstract

The Montebello Forebay Groundwater Recharge Project (MFGRP) began recharging recycled water in 1962. It is the oldest planned indirect potable reuse (IPR) groundwater recharge project in California. The MFGRP is a joint project between the Los Angeles County Department of Public Works (LACDPW) who operates the system, the Water Replenishment District of Southern California (WRD) who administers the overall management of the groundwater basin, and the Los Angeles County Sanitation Districts (LACSD) who provide the recycled water and oversee permit compliance for the system. Located in southeast Los Angeles County, the MFGRP replenishes the Central Basin via surface spreading of tertiary recycled water. The recharge of more than 1 million acre-feet of recycled water since 1962 has helped to significantly reduce overdraft in the Central Basin and has provided a new water supply roughly equivalent to the annual demands of a quarter of a million people.

Recycled water is a continuously available, locally controlled, and drought resistant water source. Because of its great dependability, using recycled water for groundwater replenishment is an important component of water supply sustainability. However, many types of challenges come with the use of recycled water for recharge in the Montebello Forebay, including regulatory, environmental, operational, and water quality. The three agencies have successfully worked together to overcome these challenges and provide a safe, reliable source of recharge water for the basin.

This work includes: many years of research into Soil Aquifer Treatment (SAT) and health effects studies (RAND) that have proven the safety of the supply; the use of river channels and direct pipelines, including an interconnection between the two spreading basins to allow greater operational flexibility; being mindful of aquatic life in the effluent dominated river channels to ensure that they are not impacted by operations; continuous monitoring of the system to enforce the concept of tertiary recycled water as a reliable and safe recharge water source; and open communication between the three distinct agencies for the optimal success of the project.

This presentation will explore the history of recycled water recharge in the Montebello Forebay, the current operation of the site - its challenges and rewards, and what the future holds for this project.



SANITATION DISTRICTS OF LOS ANGELES COUNTY

Keeping the Water Going - Challenges to Recharge in the Montebello Forebay

Monica Gasca, Los Angeles County Sanitation Districts
Ted Johnson, Water Replenishment District of Southern California
Ben Willardson, Los Angeles County Department of Public Works

**January 25, 2011
Managed Aquifer Recharge Symposium**

Overview

- Project Background
- Challenges
- Future Needs

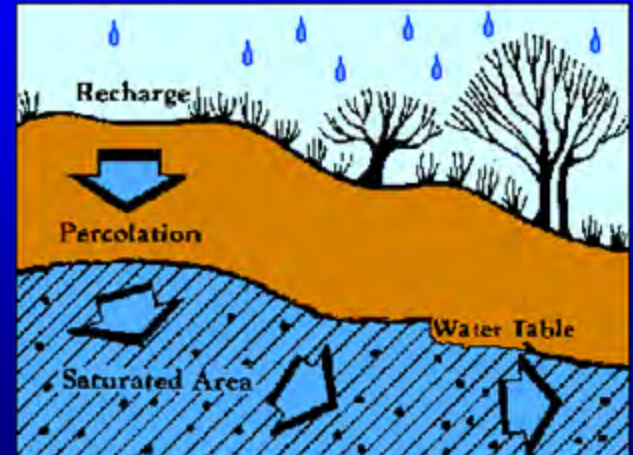


Project Location

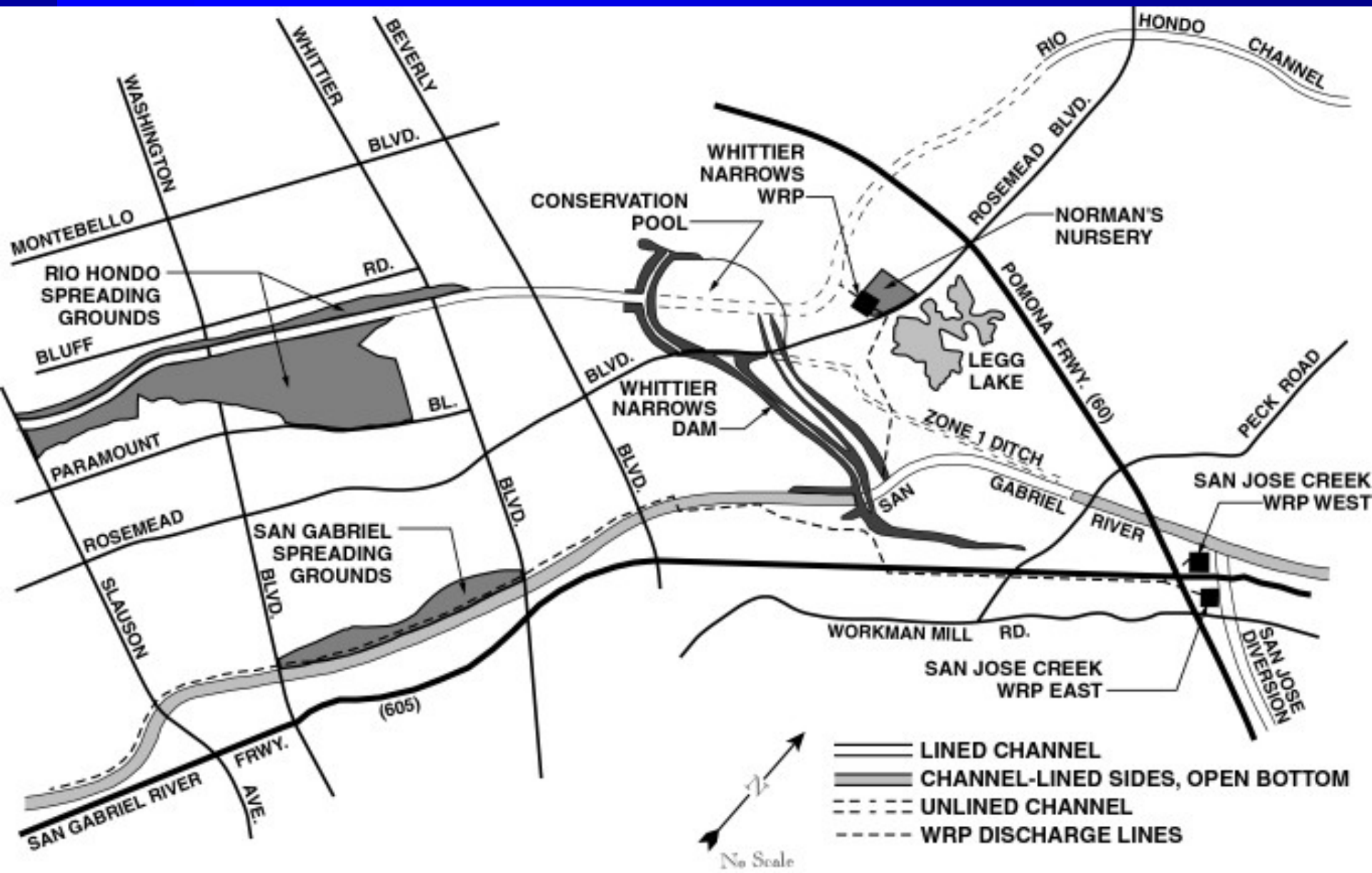


Project Background

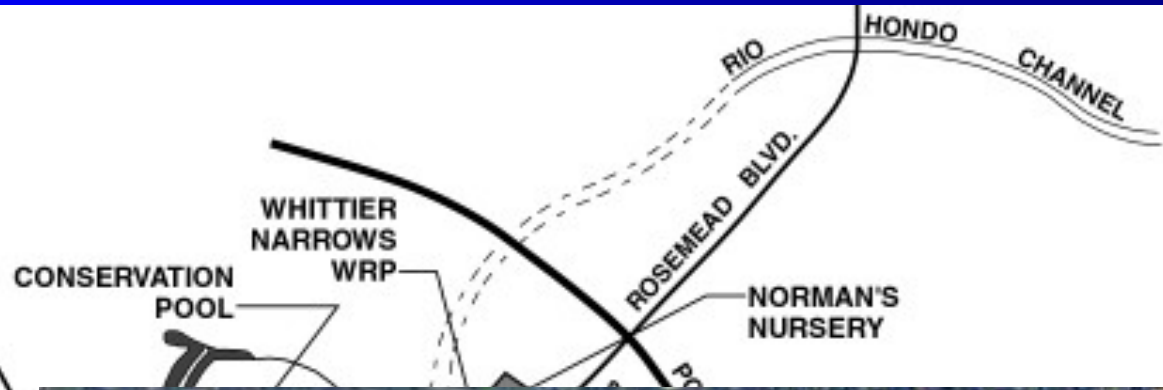
- Surface spreading operation
- Replenishes the Central Basin
 - Supplies 40% of the water demand for 3 million
 - 152,000 AF recharged WY09-10
- Recharge water:
 - Storm water (1938)
 - Imported water (1954)
 - Recycled water (1962)



Montebello Forebay



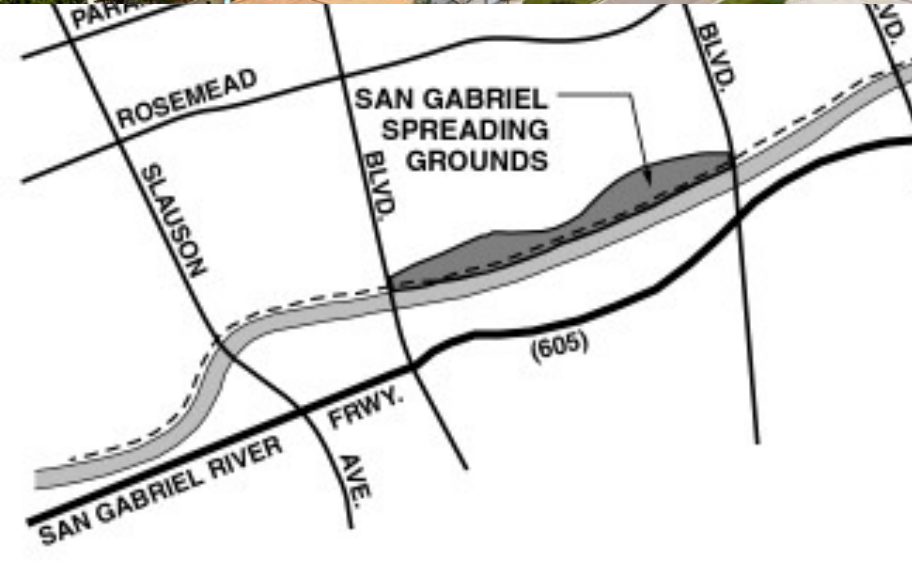
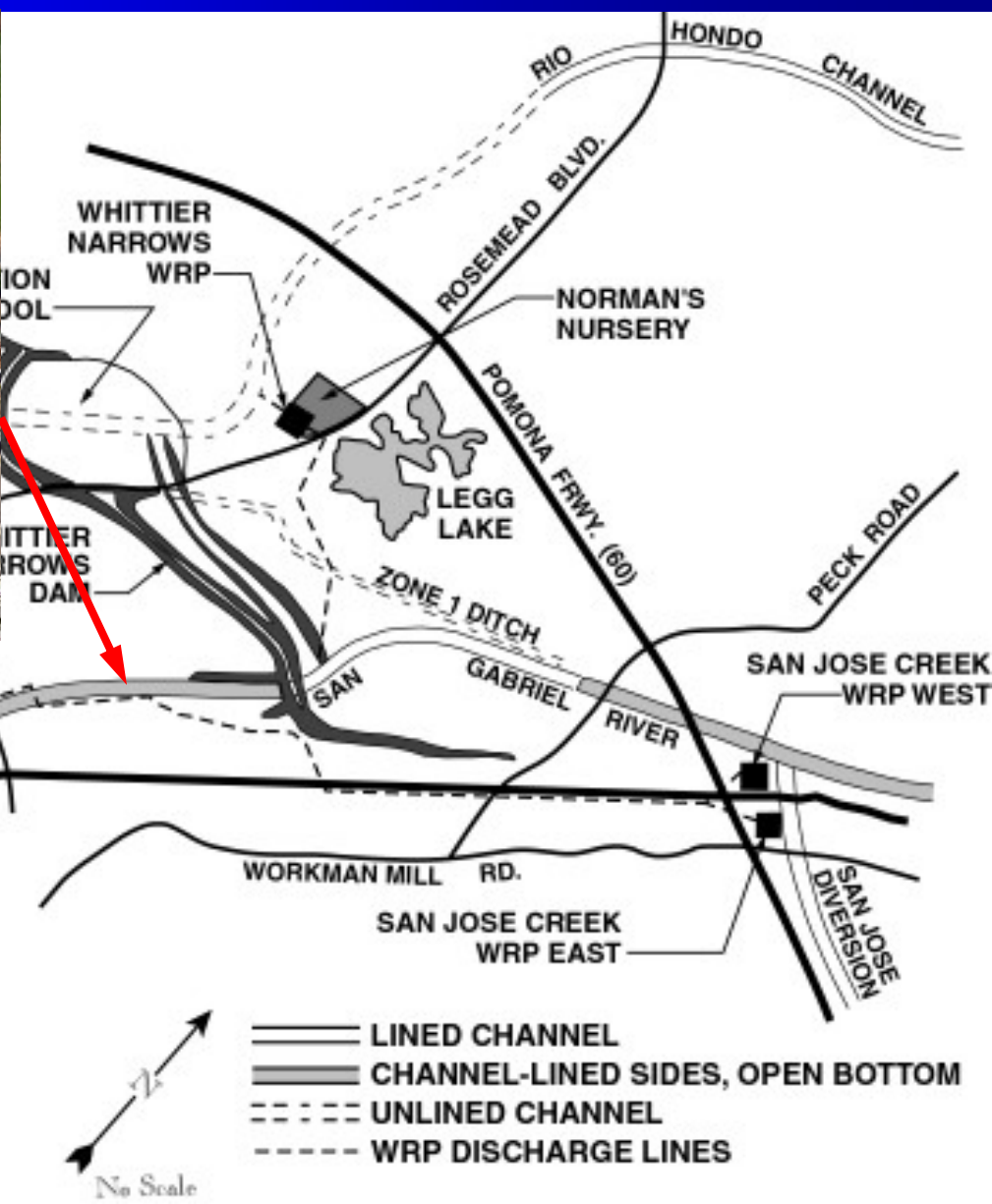
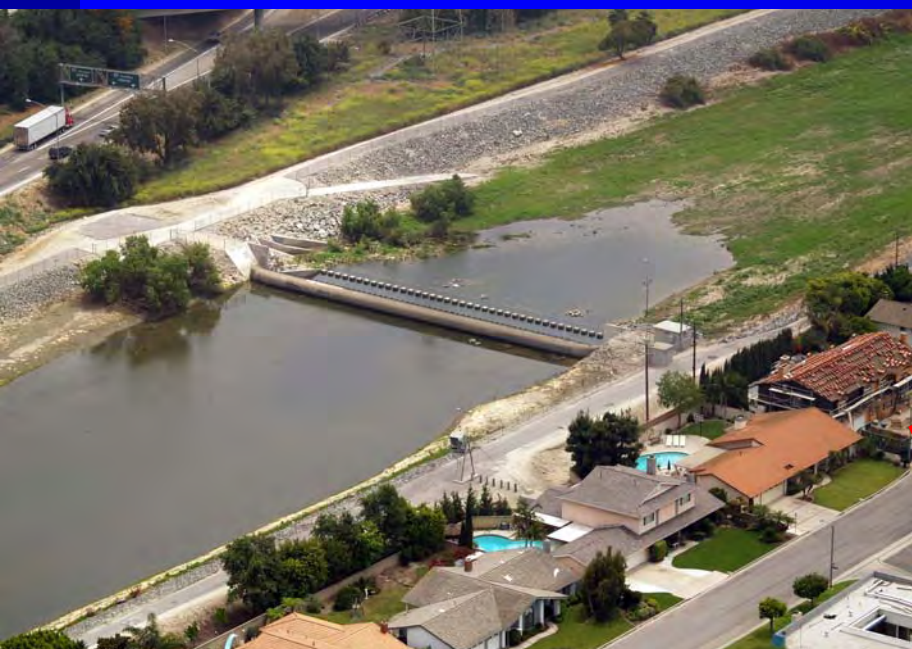
Rio Hondo Spreading Grounds



San Gabriel Spreading Grounds



River & Rubber Dams



Recycled Water Use

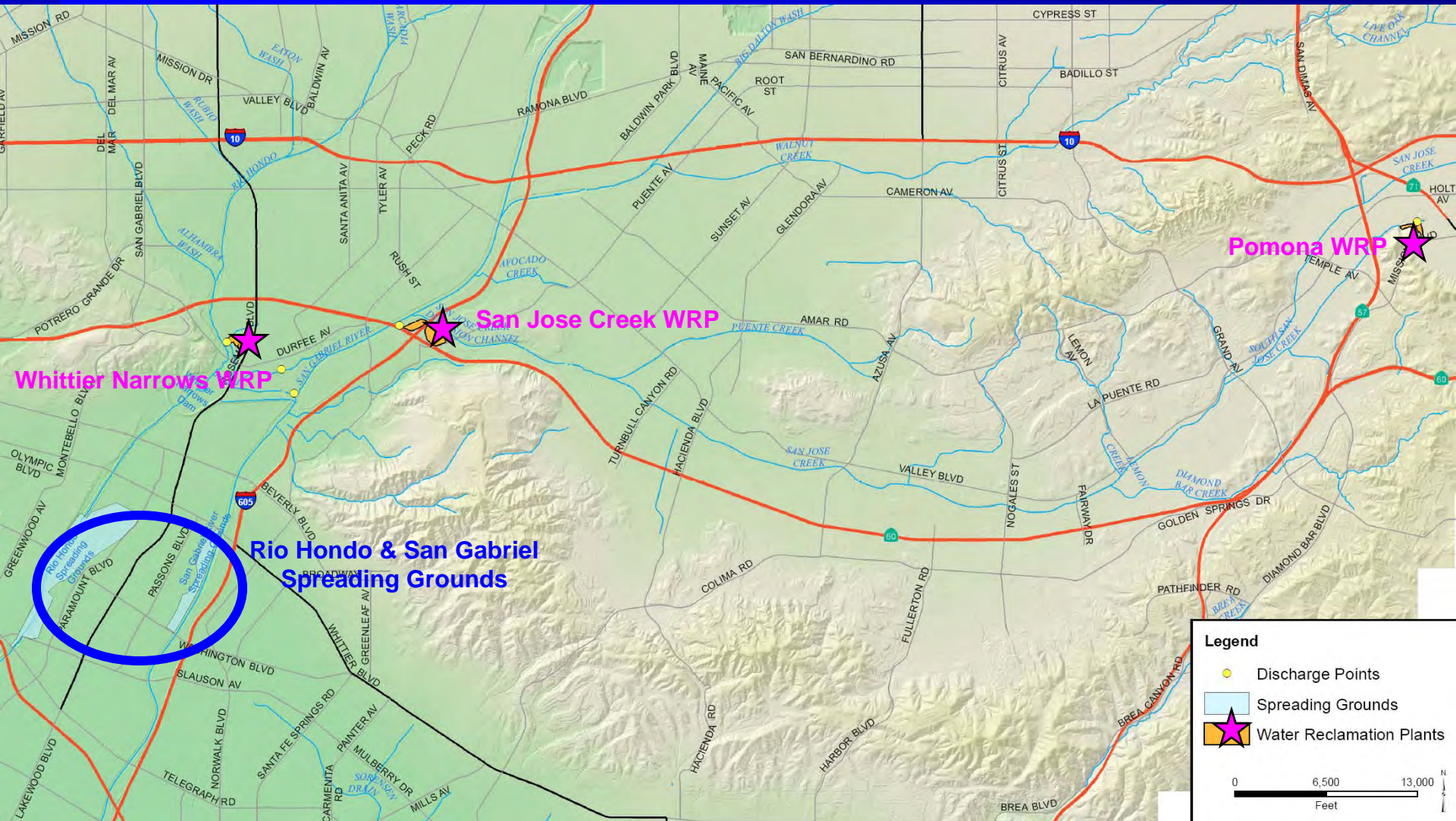
- Began in 1962
 - >1.5 Million AF recharged since inception
 - 56,000 AF recharged in WY09-10
- Three co-permittees
 - Los Angeles County Sanitation Districts
 - Water Replenishment District of So Cal
 - Los Angeles County Public Works
- Permit amended April 2009
 - Not to exceed 35% as a 5-year average
 - 5-year Average = 32%

Recycled Water Use Cont.

- Three WRPs
 - Whittier Narrows
 - San Jose Creek
 - Pomona
- Gravity feed
- Treatment
 - Prior to recharge: Tertiary
 - During transport: Attenuation
 - During recharge: Soil Aquifer Treatment (SAT)
- Operational Costs = \$267/AF



WRP Locations



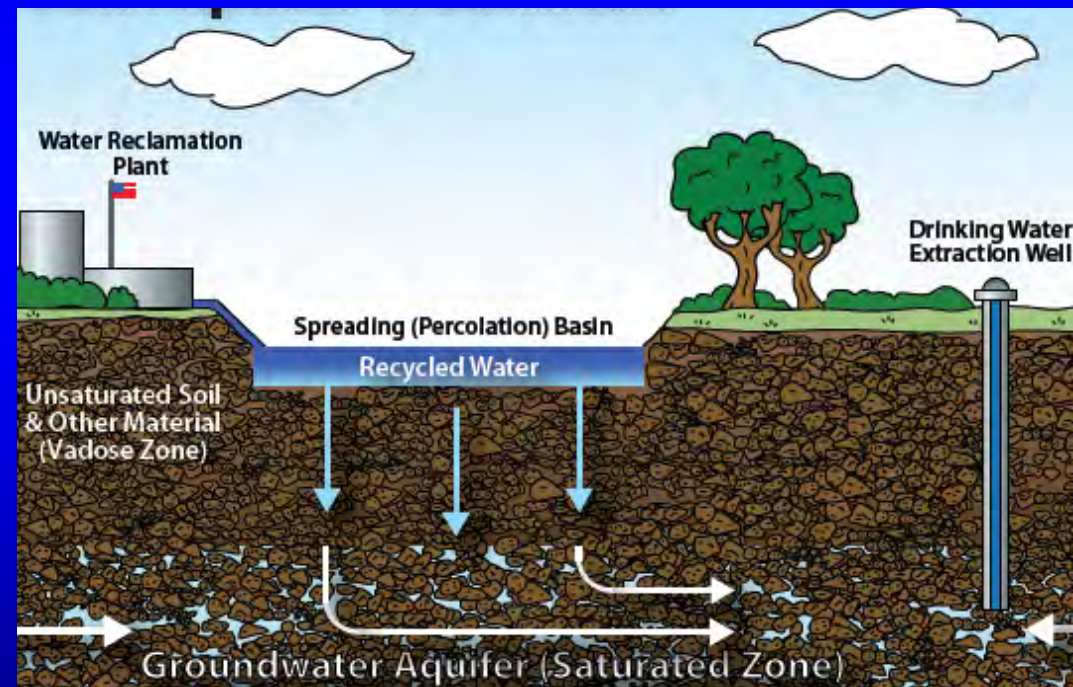
Project Goals

- Minimize costs & maximize reliability
 - Maximize use of local supplies
 - Reduce dependence of imported water
- Protect groundwater quality
- Maintain groundwater levels



Challenges

- Regulatory
- Operational
- Water Quality



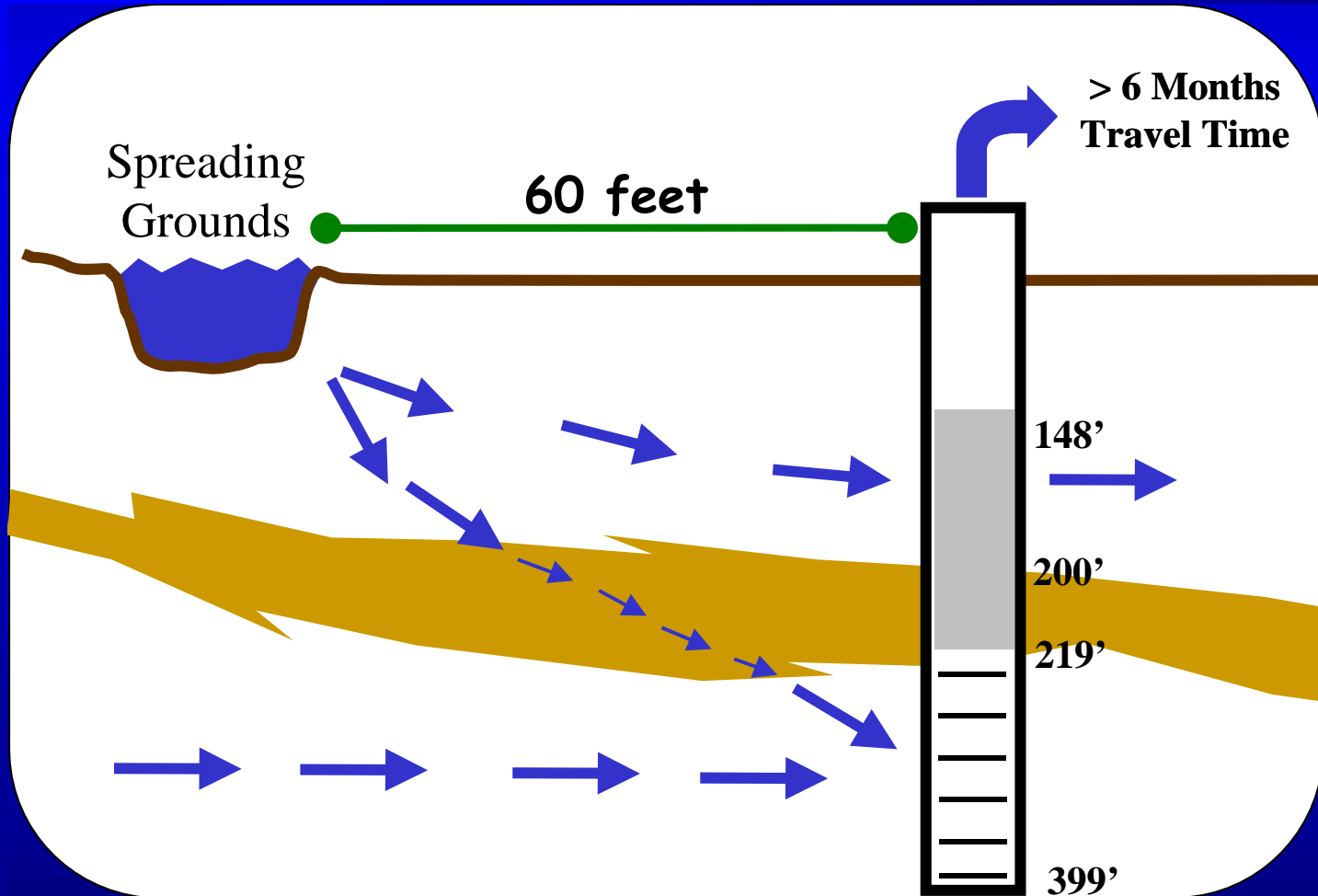
Regulatory

- Regional Board & CDPH
- Recharge & NPDES requirements
- Draft Groundwater Recharge Regulations
- Recycled water quantity limits
- Point of Compliance
 - Effluent vs. groundwater
- Averaging Periods
 - Monthly vs. Running averages

Retention Time

- Draft GWR Regulations
 - Retention time = 6 mths
- Sulfur Hexafluoride tracer study
 - 2-yr test
 - 4 production wells <6 mth
- Seal upper perforations
 - Depth: 148 ft → 219 ft
 - Retention time: 8 wks → 26 wks

Well Modification



Quantity Restrictions

- Issued in 1991
 - Volume and dilution requirements
 - Annual: 60,000 AF and 50%
 - 3-year: 50,000 AF and 35%
- Amended in 2009
 - Dilution requirement only
 - 5-year Average: 35%
- Draft GWR Regulations
 - TOC max = 0.5 / RWC
 - RWC = 35% → TOC max = 1.43 mg/L
 - MF TOC = 1.13 mg/L

Operational

- Flood control facilities
 - Infiltration rates
 - Conveyance
- Aquatic life
- Permit requirements
 - Dilution
- Proximity to public



Infiltration Rates

- Spreading cycles
 - Continual movement of water
- Bypass “first flush”
 - Trash controlled at headworks
 - Desilting basin
- Maintenance
 - Weeds cleared
 - Sediment disked and removed from basin



Conveyance

- River channel
 - Pro: Natural attenuation
 - Con: Incidental recharge in MSGB
- Direct pipeline
 - Pro: Directly to spreading grounds
 - Con: No attenuation
- Interconnection pipeline
 - Connects spreading grounds



Aquatic Life

- Effluent dominated river
- Aquatic life impacts
 - Work with CDFG
 - Diversion gate modifications
 - Monitor diversion



Water Quality

- Comprehensive monitoring
- Source control/pretreatment
- Research
- NDMA
 - Notification level
 - Fate and transport
- CECs
 - Method development
 - Special studies



Research Findings

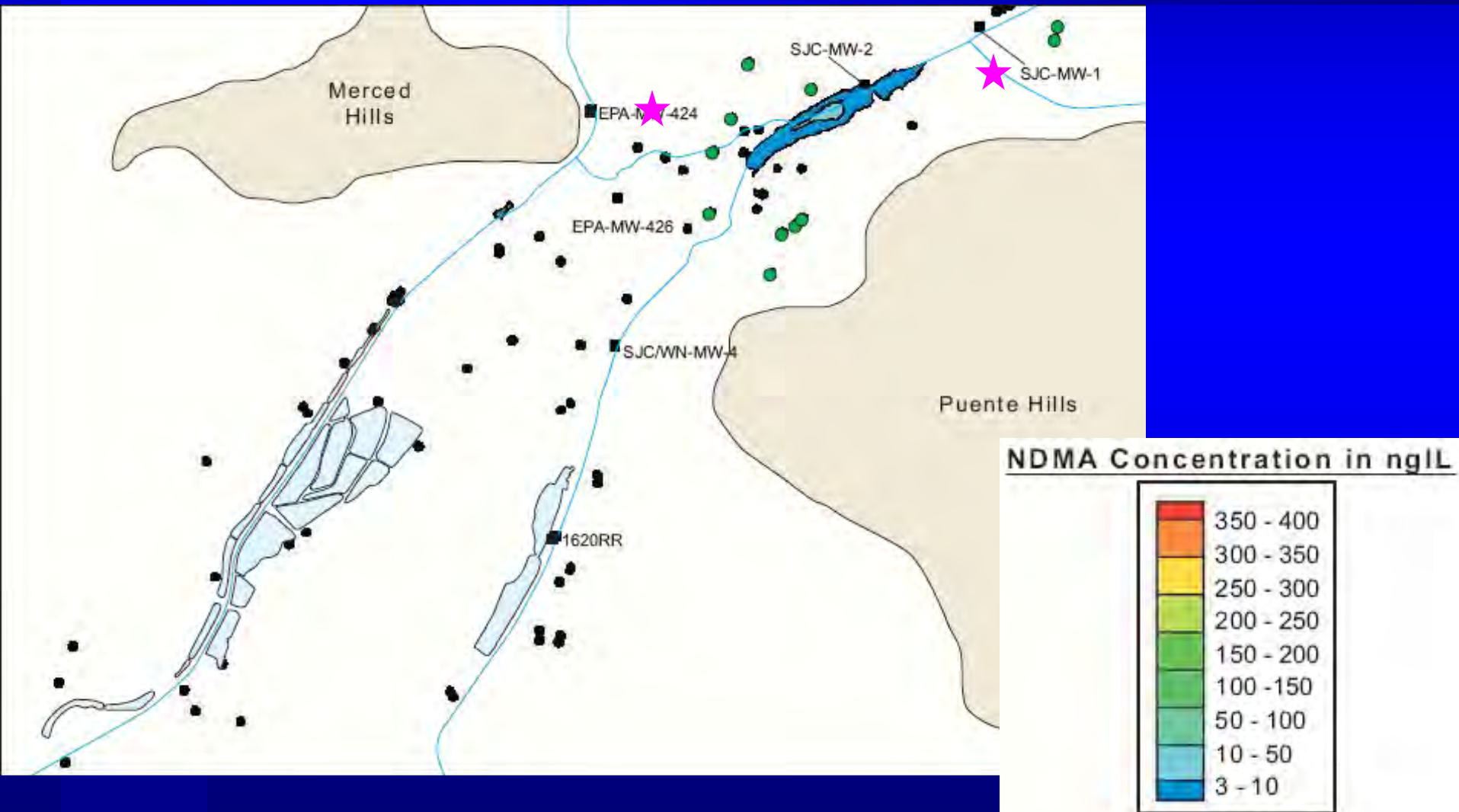
- Health Effects Study (1984)
 - No measurable adverse effects
- Rand Epidemiologic Assessment (1996)
 - No difference in cancer, mortality, infectious disease rates
- Rand Birth Outcomes (1999)
 - No difference in birth defects rates
- SAT for Sustainable Water Reuse (2001, 2006)
 - Organics, nitrogen removal sustainable
 - No infectious enteric virus found
- Pathogen Work
 - Present in low numbers but not viable
- Risk Assessment (2010)
 - Unlikely contribute to human health risk

NDMA

- Increased concentrations
 - Prior to NDN: 390 ng/L
 - Following NDN: 1,130 ng/L
- Hinder operational flexibility
- Research
 - Sequential CI
 - Decreased concentrations: 280 ng/L
 - Attenuation/dilution
 - No impacts to production wells



NDMA Concentrations



Future Needs

- Emerging contaminants
 - Monitoring
 - Fate and transport
- Increase recharge
 - Dilution
 - Advanced treatment
 - Additional recycled water flows
 - Public perception
- More research



Questions?

Monica Gasca
Los Angeles County Sanitation Districts

mgasca@lacsd.org
562-908-4288 x2838