



Inland Empire
UTILITIES AGENCY*
*A Municipal Water District

Clean, inexpensive, plentiful water

Chino Basin

Groundwater Recharge Program

Integrated Use of Stormwater, Recycled Water, and Imported Water

Santa Ana Watershed Project Authority
Watershed Tour for Pete Silva, Asst. Administrator of US EPA

Friday, April 30, 2010

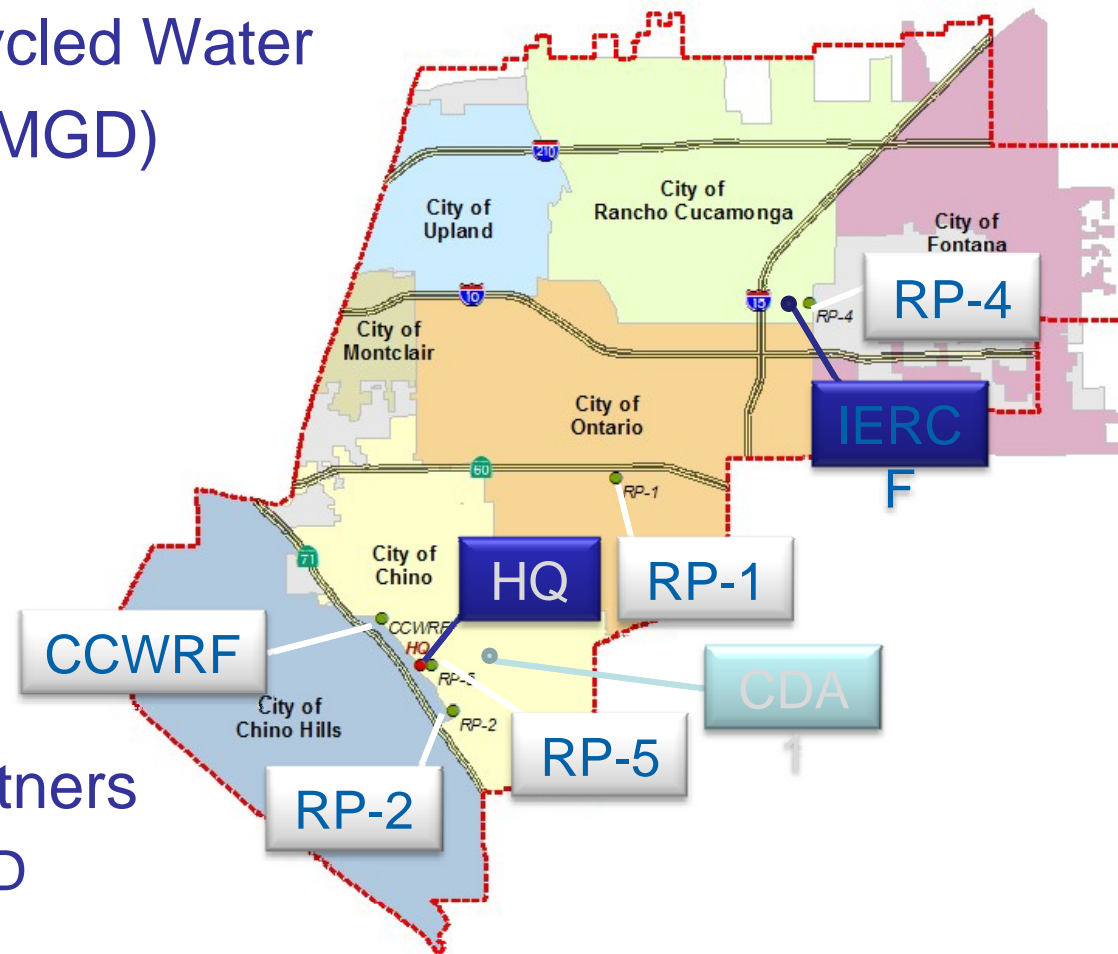


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Inland Empire Utilities Agency

- Wholesale Imported & Recycled Water
- Wastewater Treatment (60 MGD)
- Regional Compositing
- Renewable Energy

- 235 Square Miles
- 800,000 People
- 8 Facilities Operated
- Groundwater Recharge Partners
 - CBWM, SBCFCD, & CBWCD
 - 19 Recharge Sites

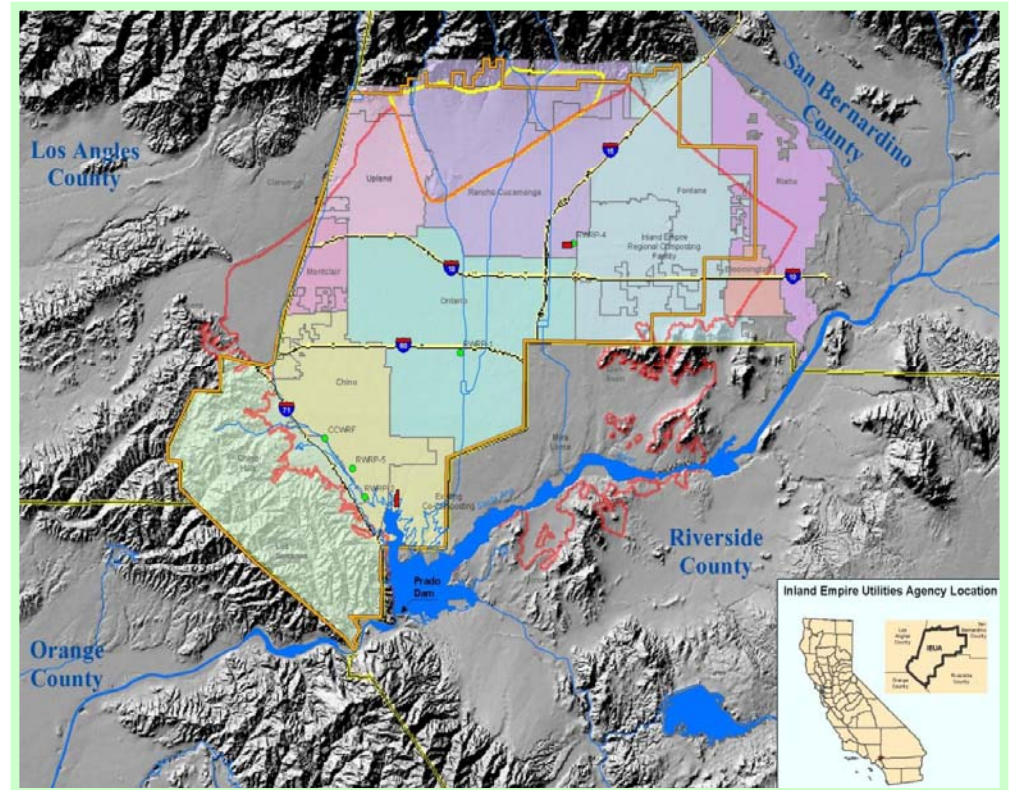




IEUA Water Supply Planning

- **Challenges**
 - Population growth
 - Increasing water demand
 - Significant imported water supply reductions and lack of reliability
- **Solution**
 - Increased development of local water supplies

Chino Basin is one of the largest groundwater basins in Southern California



For the first time in its history, Metropolitan Water District is facing consecutive years of mandatory water supply reductions.



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Chronology of Recharge Program

- 1978 – Chino Basin Judgment
- 1999 - Optimum Basin Management Plan
- 2002 - CBWM adopted Recharge Master Plan
- 2002 - IEUA Certified PEIR for RW Master Plan
- 2002 – CBWM approved application for 30,000 AF RW recharge
- 2004 - Maximum Benefit Basin Plan Amendment for TDS
- 2004 – MOU with OCWD
- 2005 & 2007 Recharge Permit and update
- 2009 - Permit Amendment for Underflow and Averaging Period

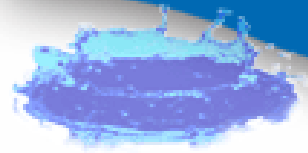


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Recharge Program Goals

- Conduct groundwater replenishment for water supply reliability
- With Water Sources
 - Maximizing the capture of stormwater
 - Maximizing recycled water within program and permit limits
 - Utilizing imported water as available





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Recharge Water Sources Cost

- Storm Water
 - \$0/AF Runoff + \$30 to \$50 Maintenance
- Recycled Water IEUA
 - \$95/AF (2011)
- MWD Replenishment – Not Available
 - \$366 (2010), \$409 (2011), \$442 (2012)
- MWD Tier 1 Full Service Untreated
 - \$424 (2010), \$527 (2011), \$560 (2012)

IEUA's recycled water program is the least expensive supply of recycled water in Southern California!



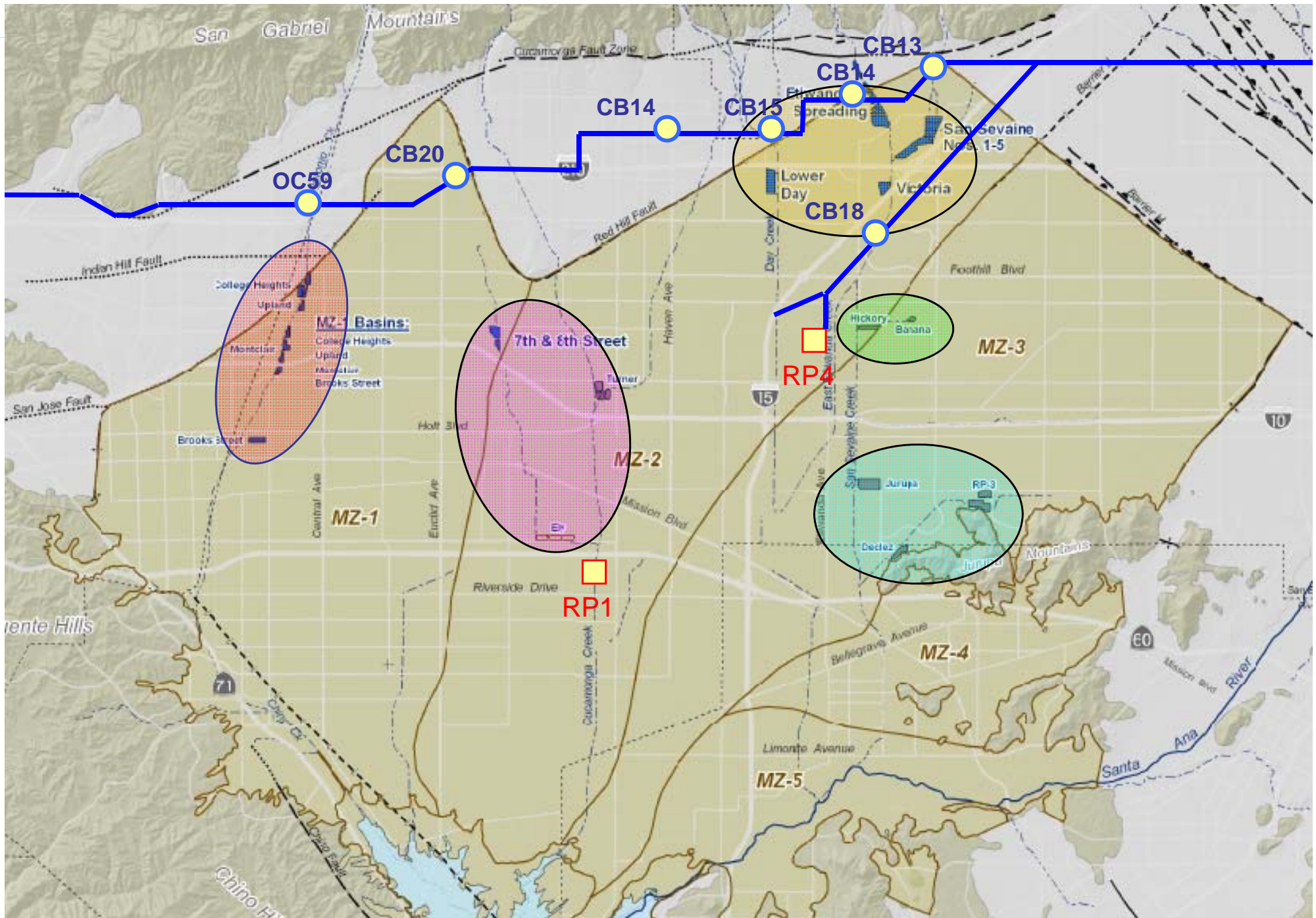


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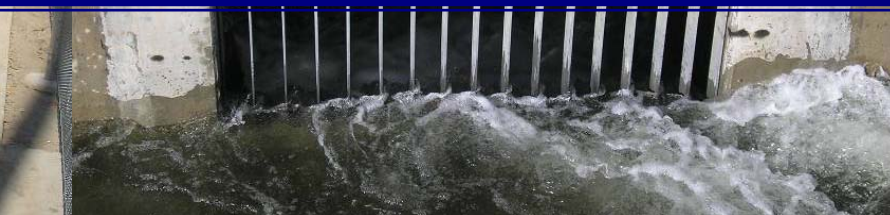
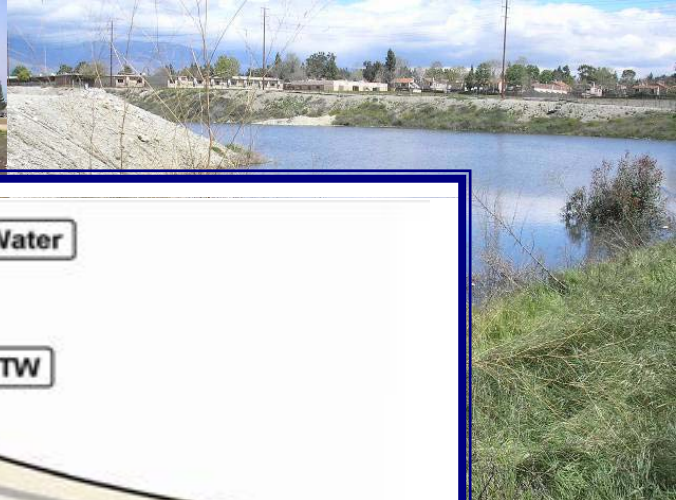
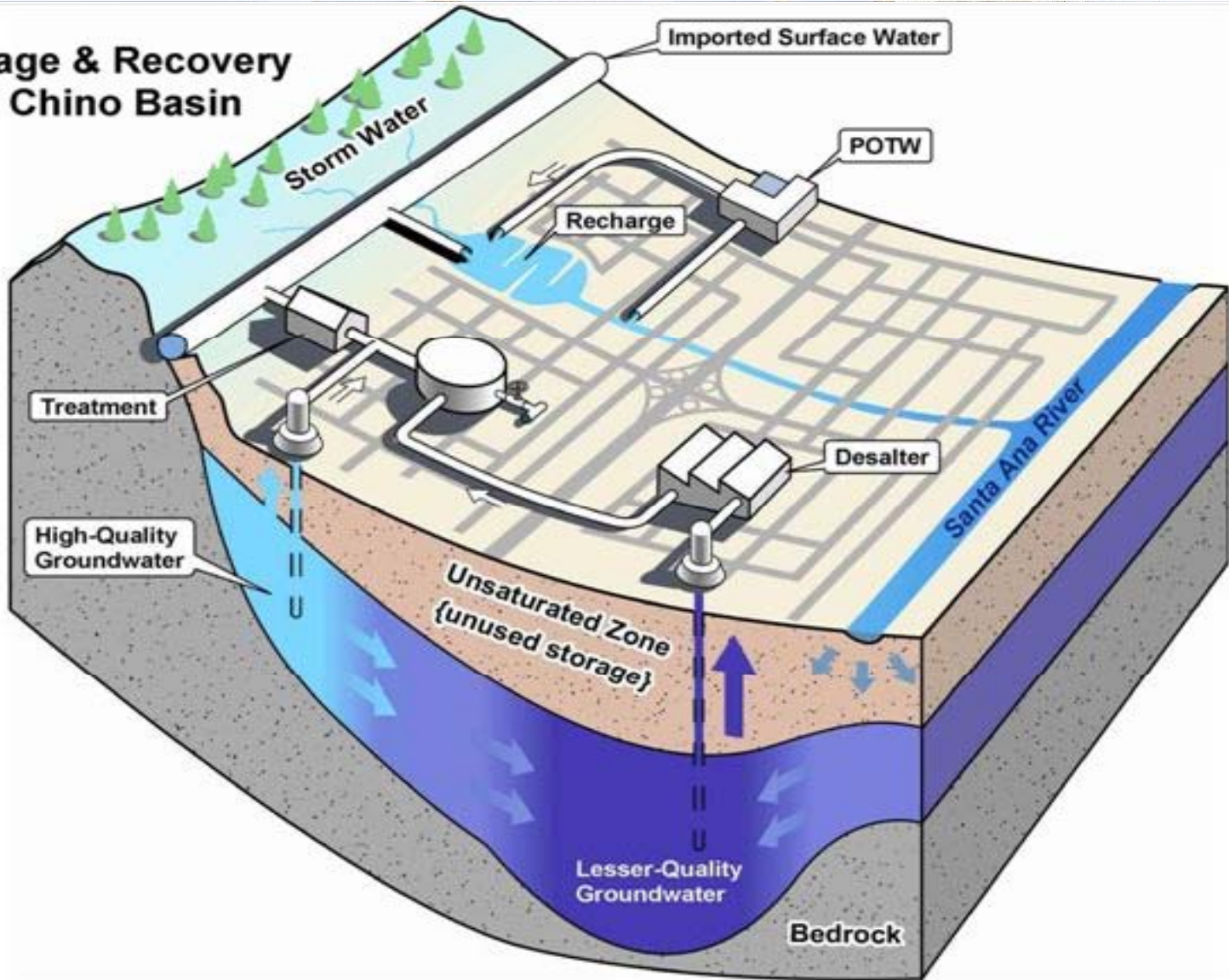
Chino Basin Recharge Facilities Development

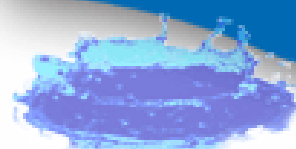
- Landmark Project
- Multi-agency Cooperation
- Recycled Water Recharge Maximized
- Water Supply Dependability Enhanced
- Capital Project Investments
 - Basin Improvements \$65 Million
 - RW Distribution System \$106 Million

Facilities Improvement Project



Storage & Recovery in Chino Basin





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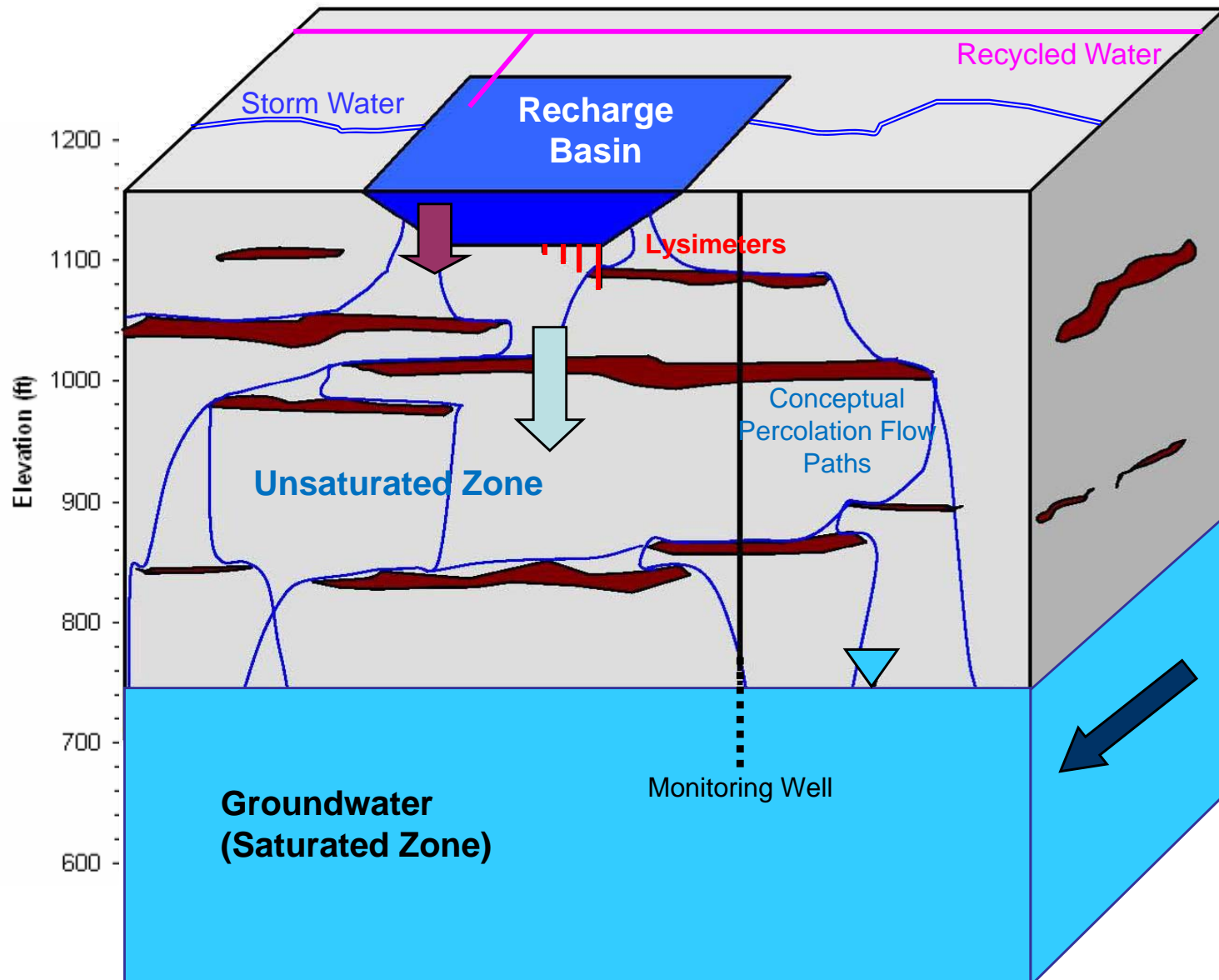
2009/10 is a Record Recharge Year!

Chino Basin Groundwater Recharge FY2005/06 through FY2009/10

Period	Storm Water (AF)	MWD (AF)	Recycled (AF)	Total (AF)	Unit Value (\$/AF)	
					MWD Tier 2 Treated	Value
FY 2005/06	12,999	33,756	1,304	48,059	\$ 524	\$ 25,182,877
FY 2006/07	4,734	32,991	2,754	40,750	\$ 549	\$ 22,371,681
FY 2007/08	10,243	-	2,340	12,583	\$ 574	\$ 7,222,629
FY 2008/09	7,590	-	2,750	10,340	\$ 606	\$ 6,266,040
FY 2009/10 (thru April)	13,800	430	5,000	19,230	\$ 811	\$ 15,595,530
Subtotals	35,566	66,747	9,147	111,732		\$ 76,638,757

- Average Rainfall
- Highest stormwater volume (+13,800 AF)
- Highest recycled water volume (+5,000 AF)

Water Quality Monitoring





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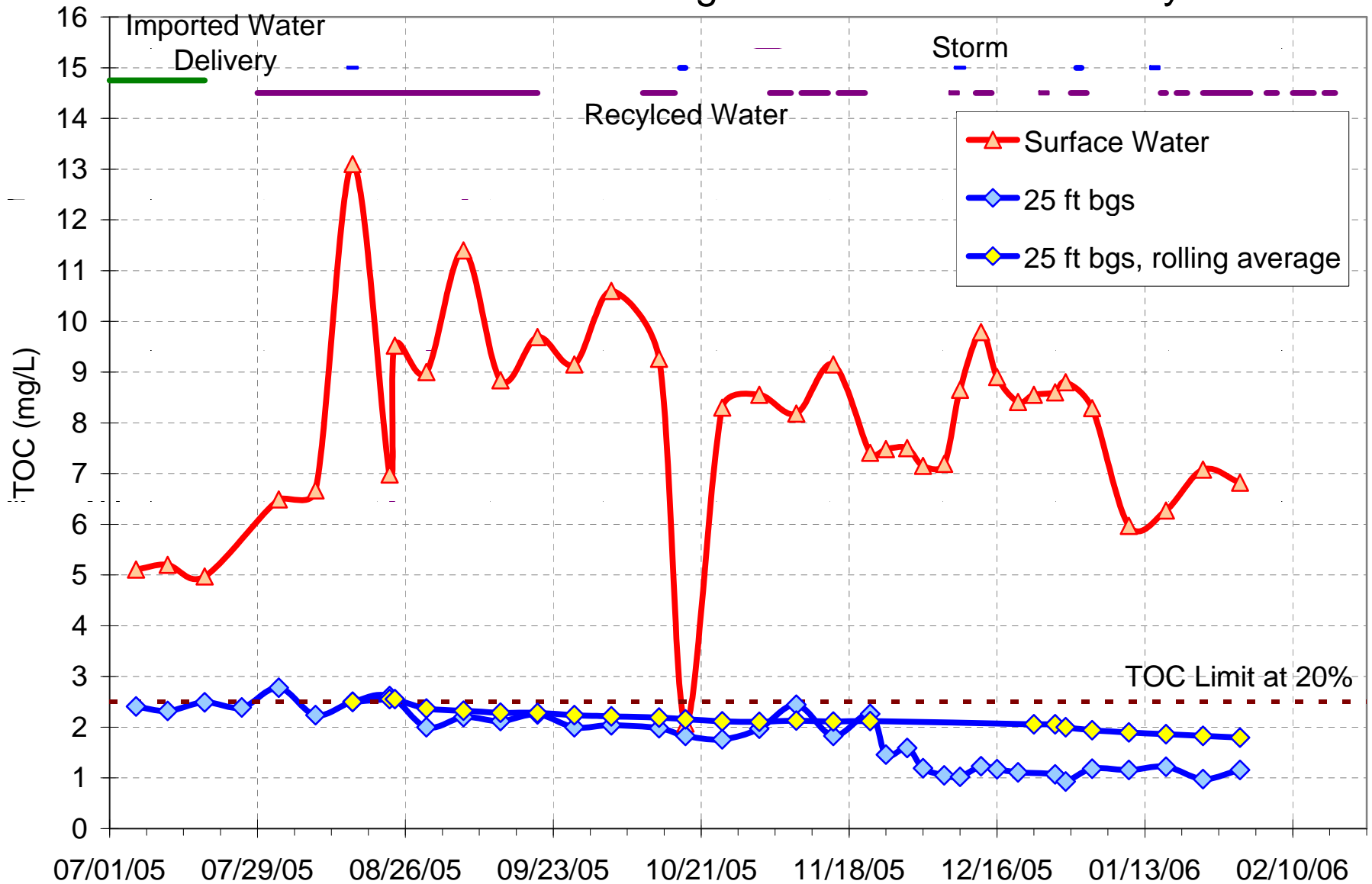
Soil-Aquifer Treatment (SAT)

- IEUA has demonstrated successful and reliable SAT treatment
- Removal of up to 80% total organic carbon
- Removal of up to 50% total nitrogen by 25 feet depth
- SAT Reliably monitored using lysimeters

- Soil-Aquifer Treatment is
 - The natural biodegradation process occurs during percolation of water through shallow soil.
 - Native soil bacteria develop and metabolize the low concentration of dissolved organics.
 - Sustainable process does not build up organic carbon in the soil to diminish removal rate.
 - SAT has worked best with a continuous supply of recharge water regardless of the source.



Banana Basin: Total Organic Carbon Time History





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State Water Resources Control Board

Blue Ribbon Panel Draft Report on Compounds of Emerging Concern in Recycled Water

- April 15, 2010, the panel released its draft report on CECs in recycled water
- Panel recommended baseline monitoring for consistency of treatment and occurrence
- IEUA currently monitors for all recommended parameters in effluent
- IEUA results are non detect of regulated CECs



IEUA Expert Panel and Collaboration with Regulatory Agencies

- **NWRI Convened Expert Panel**
 - James Crook, PhD
 - Richard Bull, PhD
 - Jean-François Debroux, Ph D.
 - Jörg Drewes, PhD
 - Peter Fox, PhD
 - Dennis Williams, PhD
- **2-Day Workshop** (February 2010)
- **Final Report** (April 2010)
- **Panel Findings**
 - IEUA has an efficient pretreatment program
 - IEUA's monitoring program is very extensive
 - SAT monitoring provides a conservative measure of recycled water contribution
 - Use of groundwater underflow as diluent water is logical for the IEUA project and a site-specific Darcian method of determination is appropriate.
 - Use of a 120-month recycled water contribution averaging period does not decrease the level of public health protection given the unique properties of the Chino Basin and IEUA treatment processes



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Chino Basin Recharge Master Plan 2010 Update

- Additional stormwater capture and needs
- Benefits from low impact development
- Future Development from Compliance with the 2010 MS4 Permits (manage 80th percentile 24hour storm)

CBWM Modeling of Rainfall-Runoff Recharge due to MS4 permits

- 50% recharge yields 6,290 AF (5,268 AF new)
- 100% recharge yields 12,581 AF (10,470 AF new)



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San Bernardino County Storm Water Retention Task Force

- Members Supervisors (2nd and 4th Districts) and IEUA
- Guasti Regional Park / Turner Demonstration Project
- Developing conjunctive-multibenefit use of County Land
 - Enhance stormwater capture volume
 - Improve dry weather and stormwater quality
 - Expand Guasti Region Park facilities
 - Beautify major transportation corridor
 - Develop water conservation education



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Guasti/Turner Draft Concepts





Chino Creek Wetlands & Educational Park

- The park is a community demonstration site for how to improve water supply, storm water treatment, and water efficiency.
- Low Impact Development demonstration for water quality and infiltration
- The park has education elements on the value of conservation & wetlands importance.
- Santa Ana Watershed Association is IEUA's partner for programs and tours.
- Construction was partially funded by State Water Resources Control Board.



- 22 acres of habitat
- Wildlife monitoring stations
- Field checklist of the birds
- 6 connecting ponds
- 1 MGD of recycled water flow
- Picnic area, visitors center & amphitheater
- 22,000 drought tolerant, CA-friendly plants
- 5+ miles of state-of-the-art irrigation
- 1.7 miles of wetlands and riparian trails





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Recharge Program Benefits to Watershed



- Increased recharge to Chino Basin and enhanced water supply reliability
- Education of the community on water conservation and environmental topics
- Highest quality recycled water maintains groundwater quality.
- Public health protection by multiple barriers