

ORANGE COUNTY WATER DISTRICT



Association of Metropolitan Water Agencies (AMWA)



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WHERE DOES CALIFORNIA GET ITS WATER?



- Imported Supplies
- Groundwater
- Storm Water
- Water Transfers
- Desalination
- Water Recycling

OCWD GENERAL INFORMATION



- ▶ **OCWD governed by a 10 person Board of Directors**
 - ▶ 7 members directly elected by the public
 - ▶ 3 members appointed (Santa Ana, Anaheim & Fullerton)
- ▶ **Non-adjudicated groundwater basin**
- ▶ **Each year the Board sets the percentage of groundwater that can be pumped (BPP)**
- ▶ **Each year the Board Replenishment Assessment (RA) and Basin Equity Assessment (BEA) for the cost of pumping groundwater**

OCWD OPERATIONAL FACILITIES



- ▶ **Groundwater Replenishment System**
- ▶ **Operates 400 acre constructed wetlands to remove nitrogen from a portion of the river flows feeding Prado Dam and stores water behind the dam to increase storage.**
- ▶ **Santa Ana River (SAR) Facilities in Anaheim and Orange capture water for groundwater recharge. OCWD maintains water rights to the SAR downstream of Prado Dam.**

Groundwater Replenishment System

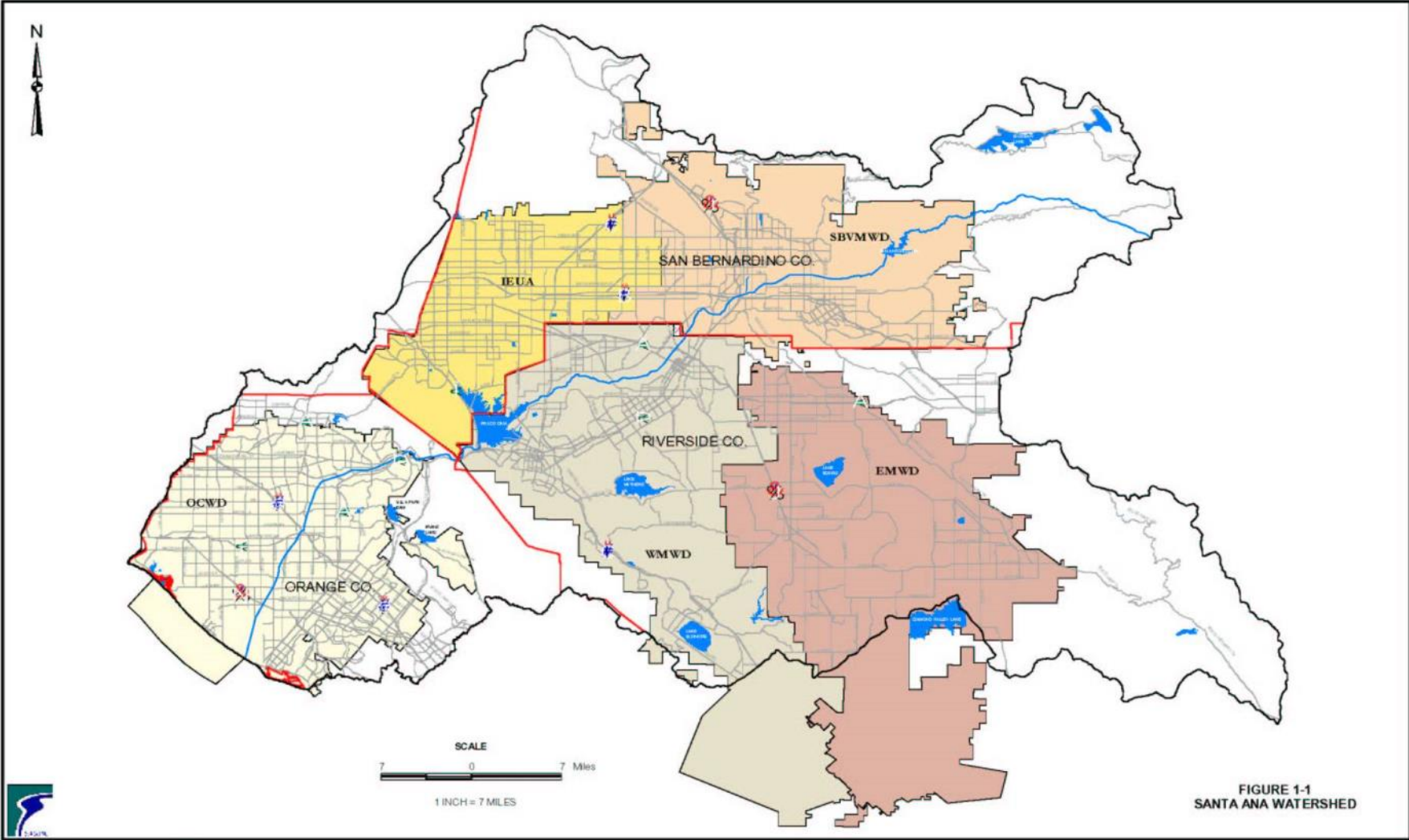


Prado Dam

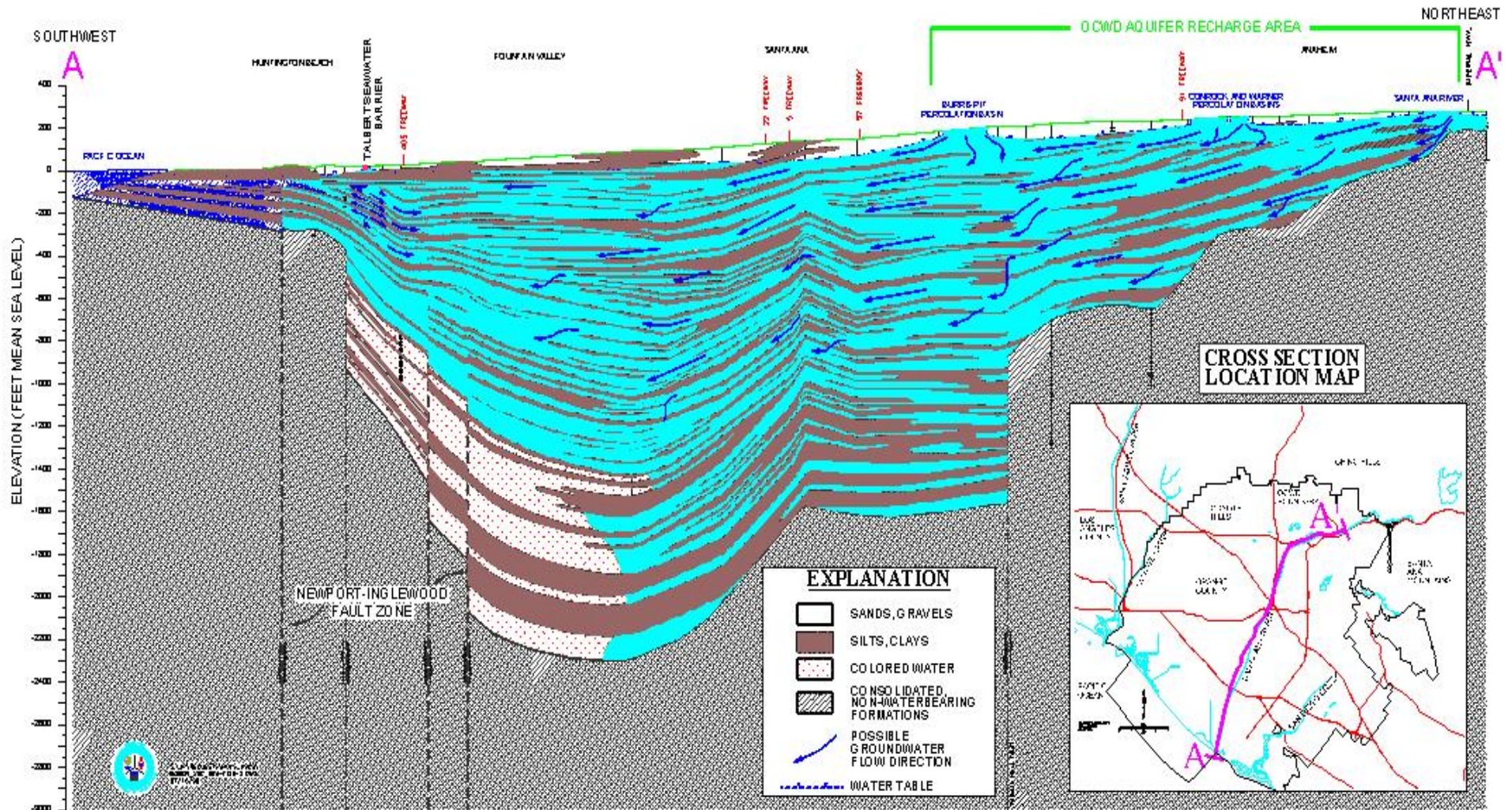


Santa Ana River Facilities

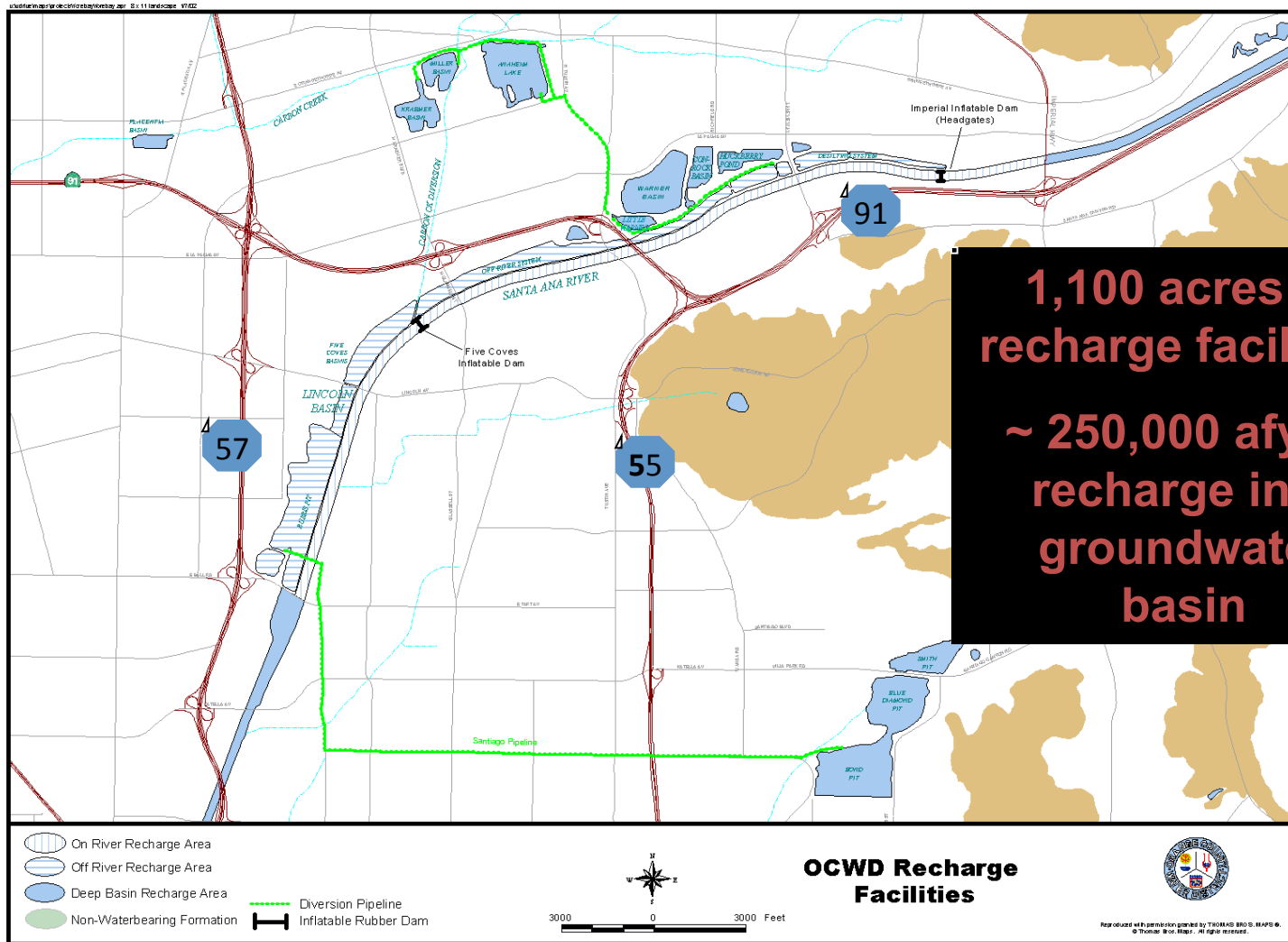
SANTA ANA RIVER WATERSHED



GROUNDWATER BASIN CROSS SECTION



OCWD RECHARGE FACILITIES



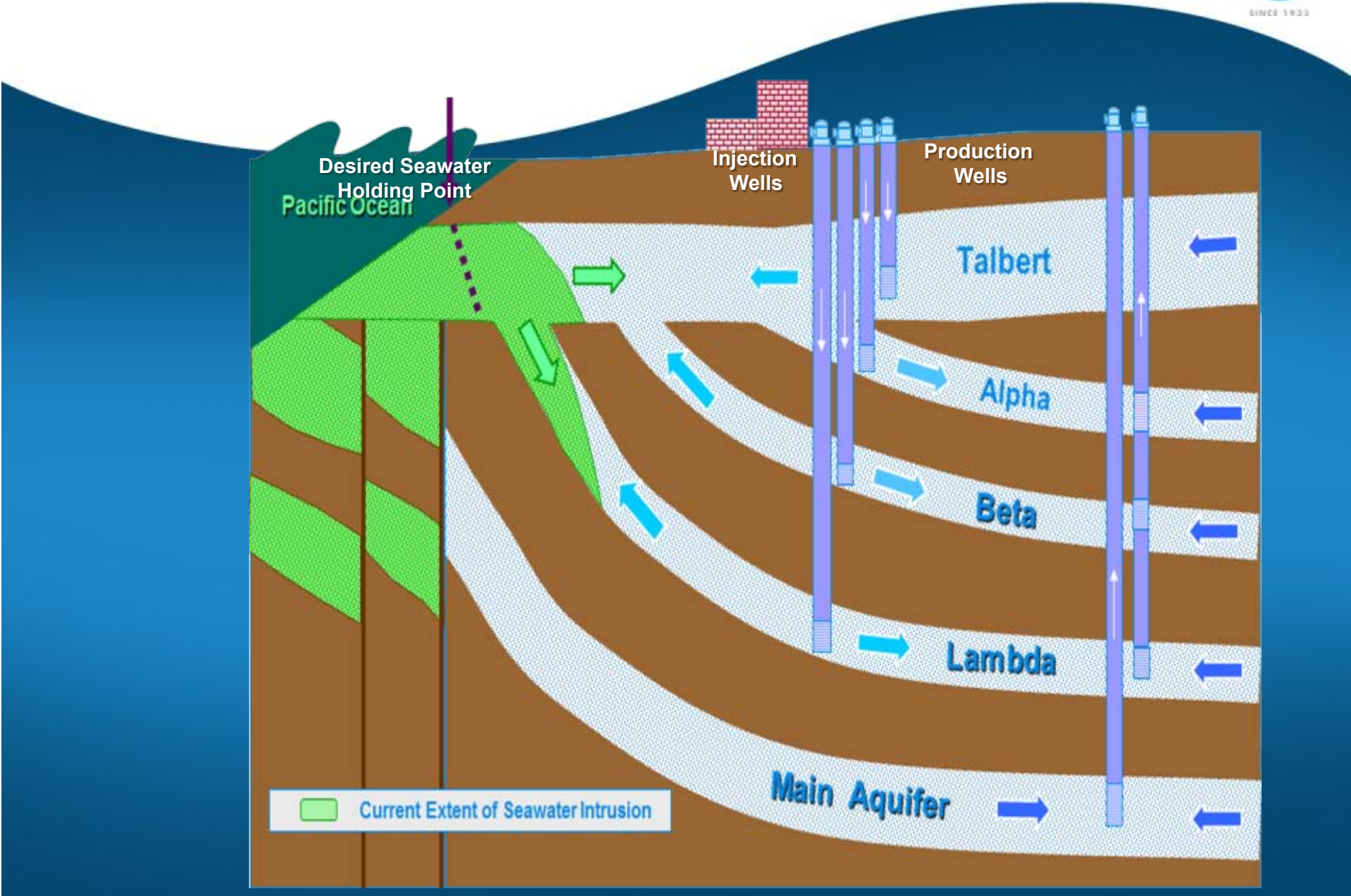
**1,100 acres of recharge facilities
~ 250,000 afy of recharge into groundwater basin**

OCWD Recharge Facilities

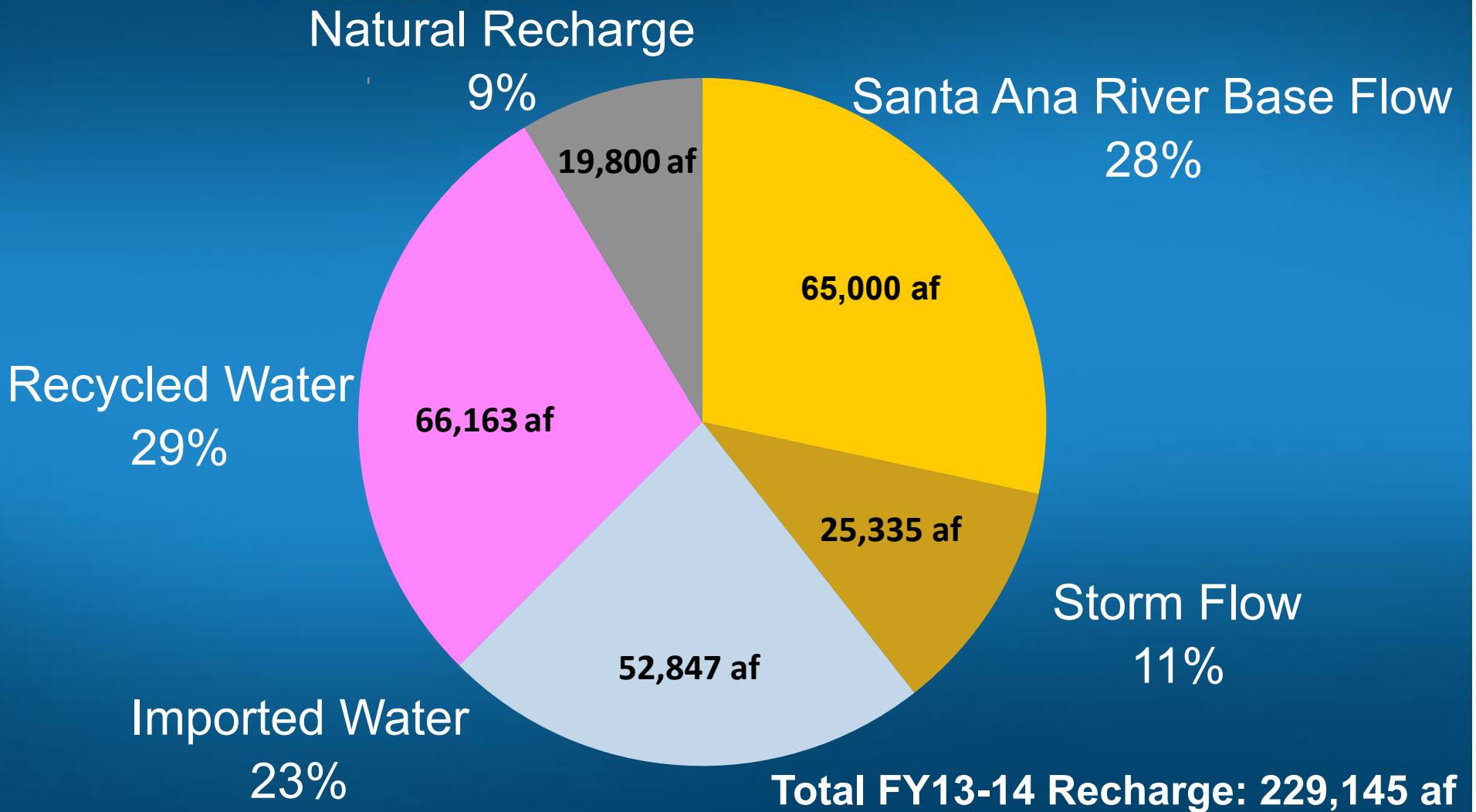


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SEAWATER INTRUSION

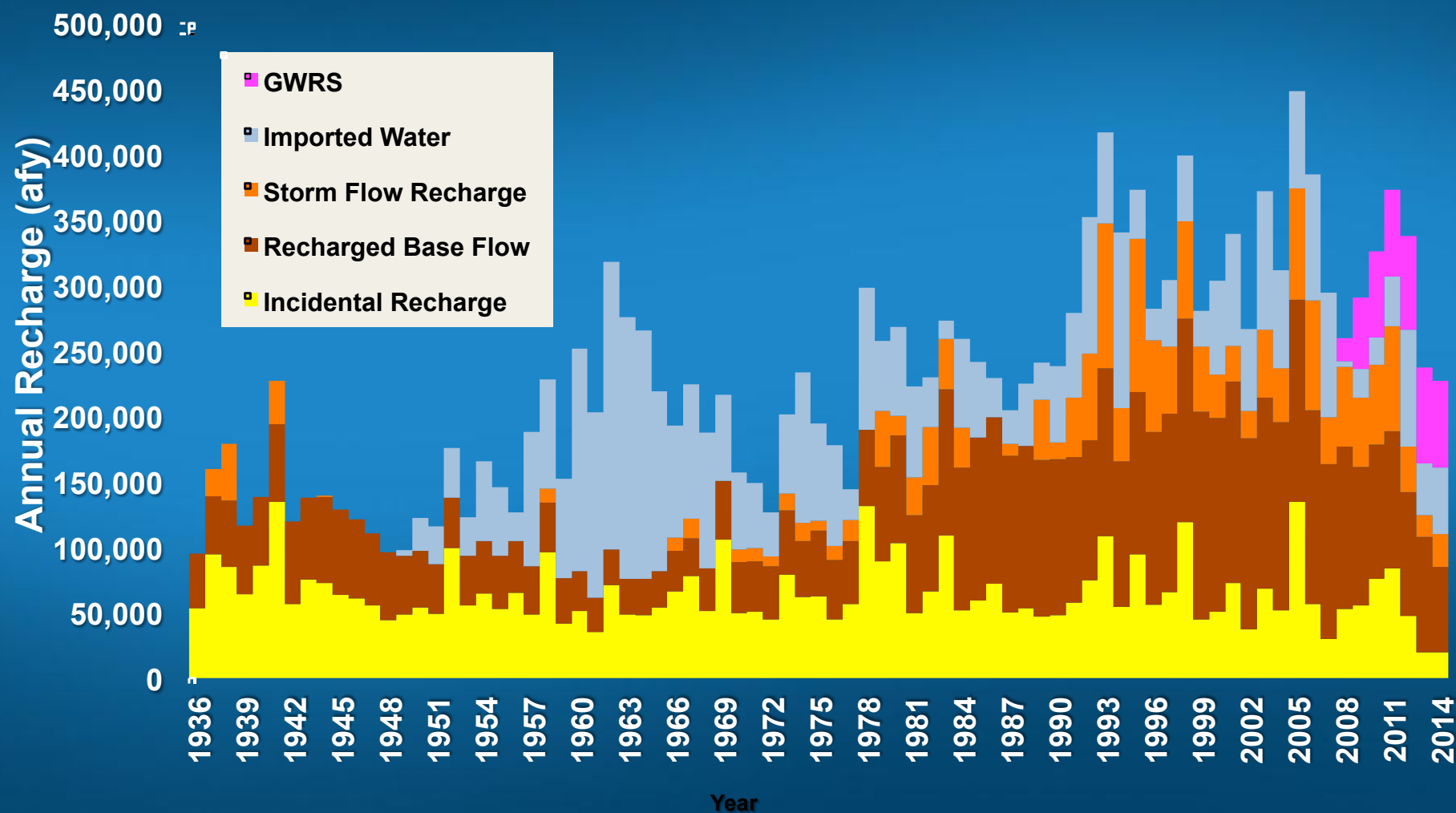


OCWD WATER SUPPLY SOURCES (Acre-feet per year)





HISTORICAL OCWD WATER SUPPLY SOURCES



THE GROUNDWATER REPLENISHMENT SYSTEM (GWRS)



- ▶ New 70-million-gallons per day advanced water purification facility
- ▶ Takes sewer water that otherwise would be wasted to the ocean, purifies it to near distilled quality and then recharges it into the groundwater basin
- ▶ Provides a new 72,000 acre-feet per year source of water, which is enough water for nearly 600,000 people
- ▶ Largest planned indirect potable reuse project in the world



THE GWRS PURIFICATION PROCESS



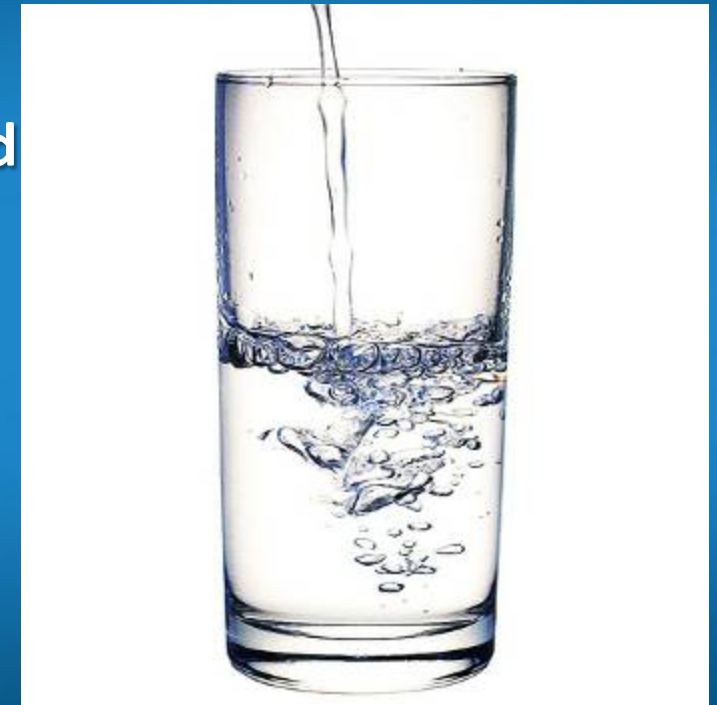
- ▶ **Microfiltration:** Tiny, straw-like plastic membranes filter out bacteria, particles and protozoa
- ▶ **Reverse Osmosis:** Water is forced through the molecular structure of the RO membranes where dissolved chemicals, pharmaceuticals and viruses are removed
- ▶ **Ultraviolet Light with Hydrogen Peroxide:** Water is exposed to UV with H_2O_2 that disinfects and destroys potential harmful trace organics



REGULATORY OVERSIGHT



- ▶ **The State Water Resource Control Board has the overall regulatory oversight**
 - ▶ **Regional Water Quality Control Board issues permits for recycling**
 - ▶ **Division of Drinking Water (DDW) regulates drinking water and establishes reclamation criteria**
 - ▶ **Treatment**
 - ▶ **TOC limit**
 - ▶ **Travel time**
 - ▶ **Blending**
- ▶ **No federal role regulating reuse**



INDEPENDENT ADVISORY PANEL



- ▶ Appointed by National Water Research Institute
- ▶ Leading experts in hydrogeology, chemistry, toxicology, microbiology, engineering, public health, public communications and environmental protection
- ▶ Review operations, monitoring and water quality
- ▶ Panel makes recommendations to OCWD and regulatory agencies to assure quality and reliability



GWRS PROVEN RELIABILITY



- ▶ **Division of Drinking Water (DDW) developed permit requirements**
- ▶ **Test for over 400 compounds with all results well below permit levels or at non-detection (ND) levels**
 - ▶ **28 Volatile Organic Compounds – All ND**
 - ▶ **39 Non-Volatile Synthetic Organic Compounds – All ND**
 - ▶ **8 Disinfection By-Products – All ND**
 - ▶ **10 Unregulated Chemicals – All but one ND, all below permit levels**
 - ▶ **51 Priority Pollutants – All ND**
 - ▶ **16 Endocrine Disrupting Chemicals and Pharmaceuticals – All ND**

PROJECT FUNDING AND TIMING



- ▶ **Capital Cost: approximately \$481 million**
 - ▶ Split equally between OCWD and OCSD
- ▶ **Expandable to 130,000 afy**
- ▶ **Costs comparable to imported water**
 - ▶ Project received \$92 million in state and federal grants, and \$4 million per year (21 year) operation and maintenance subsidy from Metropolitan Water District
- ▶ **Costs \$480 per acre-ft (\$850 per acre-ft without subsidies)**
- ▶ **Operational since January 2008**



BENEFITS OF GWRS



- ▶ Creates a new local water supply
- ▶ Reuses a wasted resource
- ▶ Increases water supply reliability
- ▶ Offsets imported water cutbacks
- ▶ Costs less than imported water
- ▶ Takes half the energy than importing water and one-third the energy to desalinate seawater
- ▶ Improves quality of water in the basin



PUBLIC OUTREACH



- ▶ Many projects stopped by public and political opposition
- ▶ Outreach began early, over 10 years prior to start-up
- ▶ Researched public concerns
- ▶ Face to face presentations
- ▶ Community leaders
- ▶ Measured effects of outreach
- ▶ Community support
- ▶ Outreach continues today, assisted by media interest
- ▶ No active opposition



KEYS TO SUCCESS



- ▶ **Project meets Orange County's water needs**
- ▶ **Board of Directors insistence on highest quality water**
- ▶ **History of successful water reuse in Orange County with Water Factory 21 recycling facility**
- ▶ **Groundwater basin provides environmental buffer and psychological barrier**
- ▶ **Successful outreach from conception of facility, to construction and finally commissioning**

WHAT HAVE WE LEARNED?



- ▶ Public can accept indirect potable reuse projects if:
- ▶ Need is clear
- ▶ Outreach is effective and ongoing
- ▶ Elected officials and community leaders make commitment
- ▶ Quality is higher than alternatives
- ▶ Regulators have ongoing oversight
- ▶ Independent scientific review
- ▶ The more people know about GWRS the more they accept it



GWRS INITIAL EXPANSION PROJECT



- ▶ \$142 million
- ▶ Site mobilization began late 2011, broke ground in January 2012
- ▶ Expansion Project creates additional 31,000 AFY of new local water, enough to serve 250,000 people
- ▶ Total capacity of plant will be 103,000 afy, which is enough water for 850,000 people
- ▶ Complete in first quarter of 2015



QUESTIONS?

