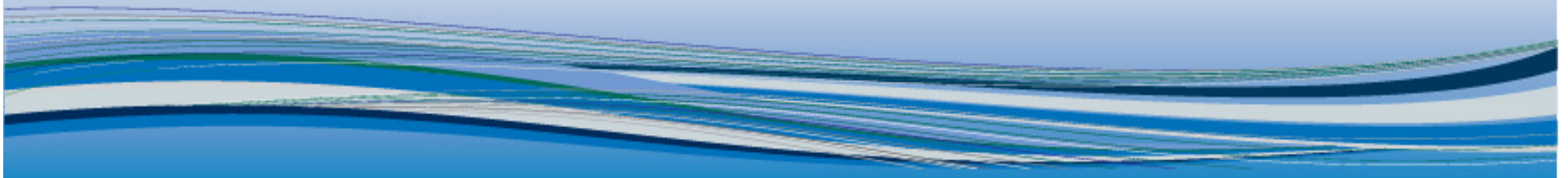




A joint effort of the
Orange County Water District and Orange County Sanitation District

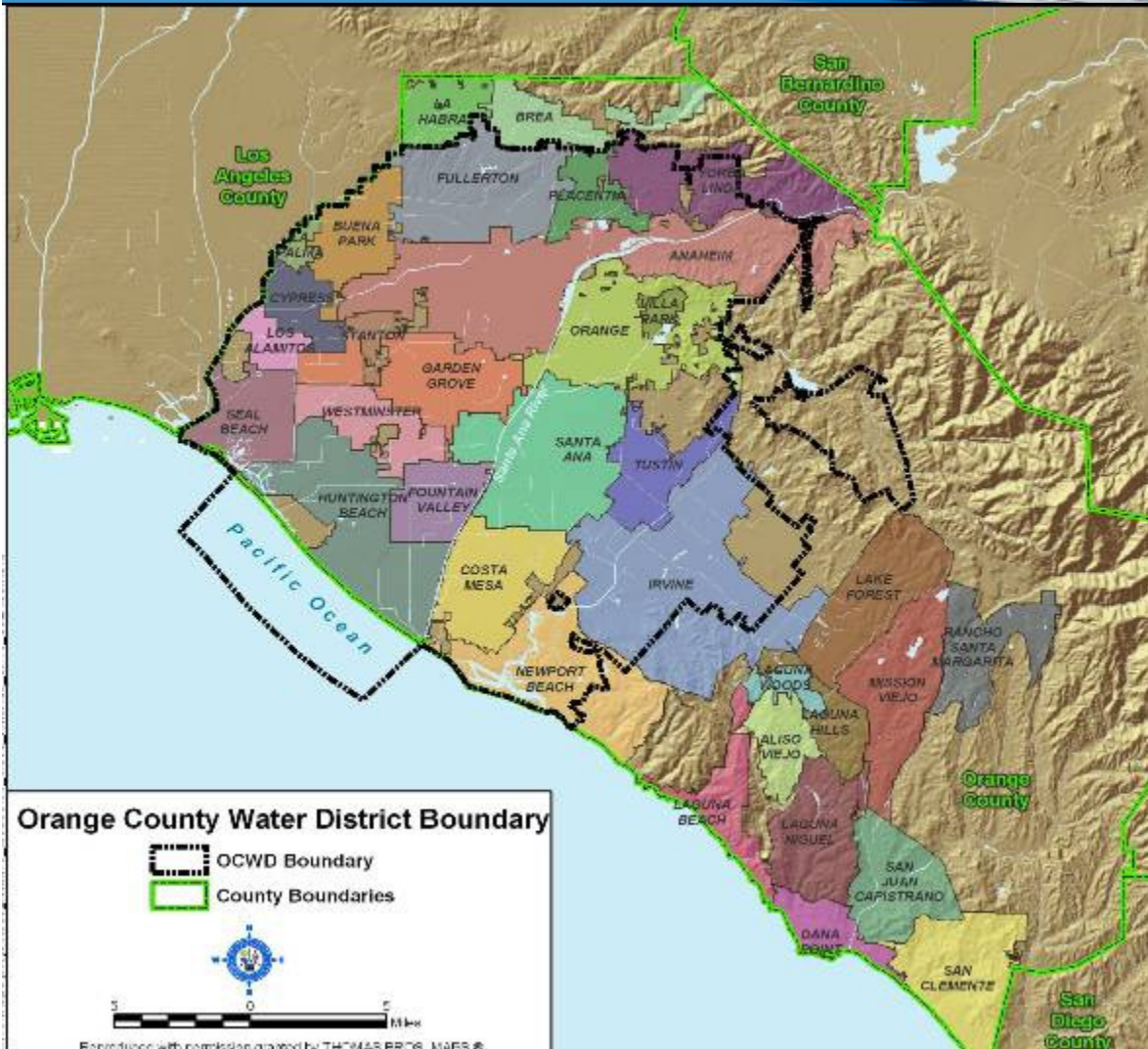


California Water



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

Orange County Water District



- OCWD, formed in 1933, is responsible for managing and protecting the Orange County groundwater basin
- OCWD encompasses 92,700 hectares in the lower watershed of the Santa Ana River (SAR)
- Orange County groundwater basin provides water for over 2.4 million people



Orange County's Water

- Northern and central Orange County receives 65% of its water supply from a large groundwater basin managed by the Orange County Water District
- South of the city of Irvine, Orange County is 95% dependent on imported water from Northern California and the Colorado River



Why Do We Need The GWRS?



San Luis Reservoir before and now. Gov. Schwarzenegger declares emergency

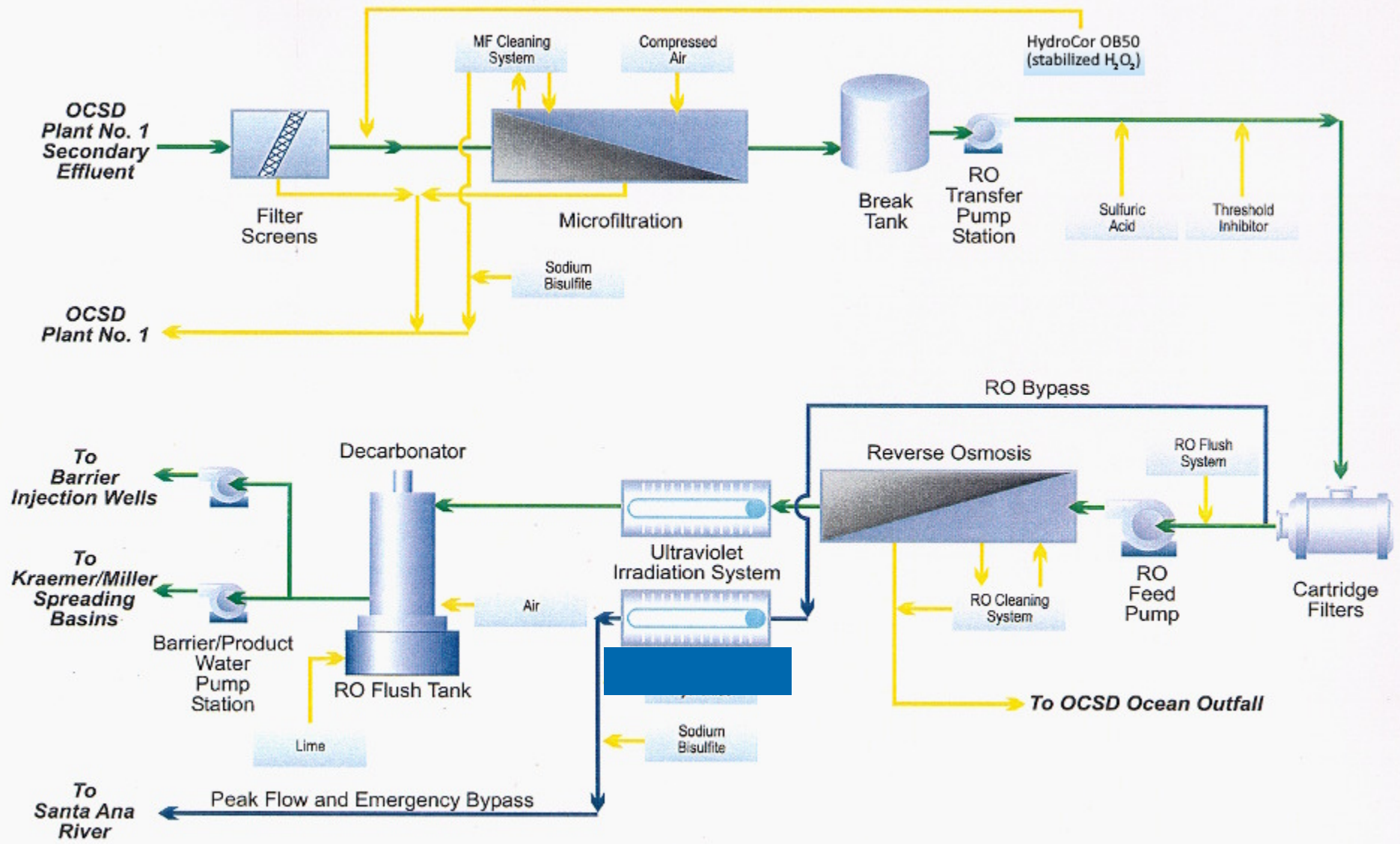
- Extended drought
- Imported water shortages
 - Colorado River losses
 - State Water Project losses
 - Environmental restrictions
 - Potential levee failures
- Local Projects lessen dependency on outside sources

What Is The GWRS?

- **New 70 MGD (265,000 m³/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 (88,000,000 m³) per year source of water, which is enough water for nearly 600,000 people**
- **Operational since January 2008**



GWRS Advanced Purification Process



Microfiltration System



- 86 MGD (325,500 m³/day)
Siemens CMF-S
Microfiltration System
- Tiny, straw like hollow fiber polypropylene membrane
- Removes bacteria, protozoa, and suspended solids
- 0.2 micron pore size
- In basin submersible system

Reverse Osmosis System



- 70 MGD (265,000 m³/day) Reverse Osmosis System
- 3 stage: 78-48-24 array
- Hydranautics ESPA-2 Membranes
- Recovery Rate: 85%
- Removes dissolved minerals, viruses, and organic compounds (incl. pharmaceuticals)
- Pressure range: 150 – 200 psi

Direct Photolysis/Advanced Oxidation



- 70 MGD (265,000 m³/day) Trojan UVPhox System
- Low Pressure – High Output lamp system
- Destroys trace organics
- Uses Hydrogen Peroxide to create an Advanced Oxidation Process
- After treatment, water is so pure we need to add minerals back - lime

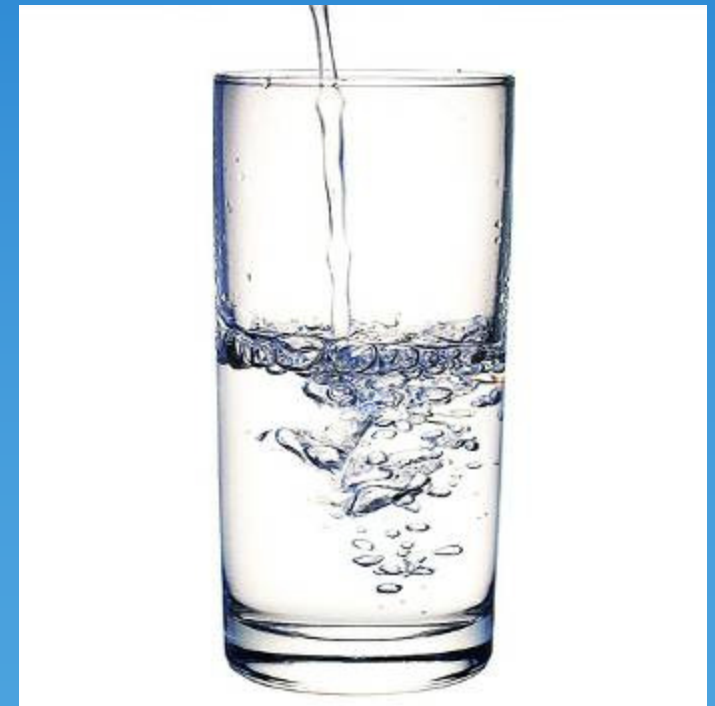
Independent Advisory Panel

- 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



Regulatory Oversight

- **Regional Water Quality Control Board issues permits for recycling**
- **CA Department of Public Health regulates drinking water and establishes reclamation criteria**
 - Treatment
 - TOC limit
 - Travel time
 - Blending
- **No federal role regulating reuse**
- **CDPH hearing findings and recommendations incorporated into permit by Regional Board**



GWRS Proven Reliability

- **California Department of Public Health 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**

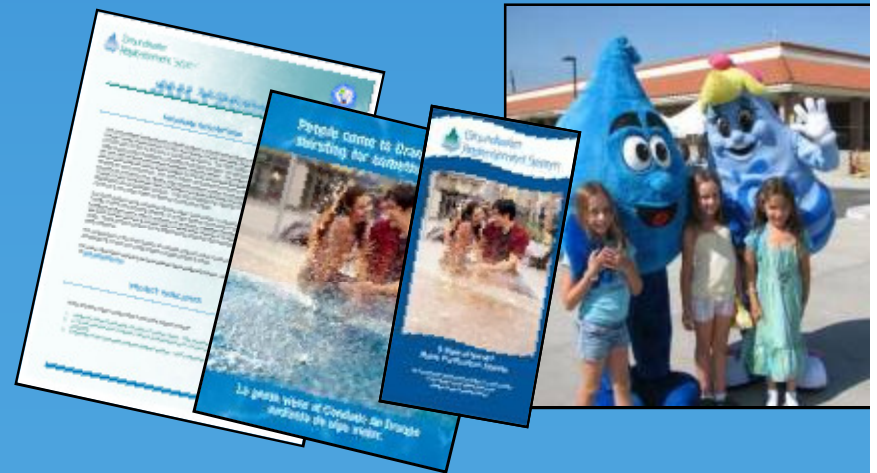
Project Funding and Timing

- **Project cost: approximately \$481 million**
 - Split equally between OCWD and OCSD
 - Expandable to 130 MGD (492,000 m³/d)
- **Costs are less than imported water**
 - Project received \$92 million in state and federal grants
 - Water being produced for \$480/af (\$0.46/m³)
 - Without outside funding cost of water would be approximately \$850/af (\$0.73/m³)



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



Strong Community Support

Proactive face-to-face outreach with more than 1,200 presentations, 700 tours and many news stories that resulted in:

- No active opposition
- 100% support from cities in OCWD service area
- 100% support from OC State and Federal elected officials
- 100% support from Chambers of Commerce, OC Tax & OCBC
- Many major businesses, Edison, Semper Energy, etc.
- All major environmental groups (Surfriders, Coastkeepers)
- Several health experts, medical doctors and hospitals
- Several key minority leaders
- More than 200 community groups like Kiwanis, Rotary, etc.



Benefits of GWRS



- Creates a new water supply
- Reuses a wasted resource
- Increases water supply reliability
- Offsets imported water cutbacks
- Costs comparable to imported water
- Saves half the energy over imported water or desalinated seawater
- Improves quality of water in the basin

What Have We Learned From GWRS?

- **Public can accept indirect potable reuse projects if:**
 - need is clear
 - outreach is effective and ongoing
 - politicians 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**



What's Next?

- **Expand the capacity of the plant to 100 MGD (378,500 m³/d)**
 - **Bids were received July 18, 2011**
 - **Low bidder McCarthy - \$115.1 million**
 - **Contract was awarded on September 7, 2011**
 - **Project completion scheduled for October 2014**
- **Project will produce additional 31,000 acre-feet (38.2 million m³) of water per year, which is enough water for nearly 250,000 people.**

GWRS Aerial View

