California is water challenged

75% of precipitation falls north of Sacramento

75% of water is used south of Sacramento
Where does Orange County’s water come from?

NORTH AND CENTRAL ORANGE COUNTY
- About 30% Imported Water
- About 70% Local Groundwater

SOUTH ORANGE COUNTY
- About 95% Imported Water
- About 5% Local Groundwater and Other
MWD storage reserves

- 2006: 2.2 Million Acre-Feet
- 2007: 1.8 Million Acre-Feet
- 2008: 1.1 Million Acre-Feet
- 2009: 1 Million Acre-Feet
- 2010: 1.7 Million Acre-Feet
- 2011: 2.4 Million Acre-Feet
- 2012: 2.7 Million Acre-Feet
- 2013: 2.3 Million Acre-Feet
- 2014: 1.2 Million Acre-Feet
- 2015: 0.9 Million Acre-Feet
- 2016: 1.5 Million Acre-Feet
Orange County Water District
Since 1933

- Serves 2.4 million people
- Manages & replenishes OC Groundwater Basin
- Ensures water reliability & quality
- Protects OC water rights to Santa Ana River
- Internationally recognized
Santa Ana River (SAR) Watershed

- More than 10 major wastewater dischargers into the SAR
- Approximately 140 MGD of tertiary discharges
1969 Santa Ana River Judgment

- Adjudication of the SAR
- Resolved years of litigation
- Generally guarantees OCWD 42,000 afy of SAR base flows
- OCWD guaranteed all water reaching Prado Dam
- Established five member water master
- Established SAWPA
Recharge facilities
Replenishment Assessment and Additional Replenishment Assessment

$402/af

FY2016-17

Additional Replenishment Assessment - Paid by non-Ag production (8 votes)

Replenishment Assessment - Paid by all production (6 votes)
Cost of water

Groundwater
$402 AF

Imported
$1,022 AF
Basin Production Percentage (BPP); Basin Equity Assessment (BEA)

- Established in 1969
- Set every April – requires 8 votes
- Production under BPP pays RA
- Production above BPP pays RA and BEA
- BEA calculated so that production above BPP is equivalent to the cost of purchasing MWD water
- BPP and BEA do not control pumping but determine the price of it
OCWD basin management tools

Typical Water Utility with 20,000 afy of Total Water Demands

- Basin Production Percentage (BPP) Set Annually - Assume 70%
- Replenishment Assessment (RA)
  Paid for groundwater pumping below BPP - $402/af
- Basin Equity Assessment (BEA)
  Paid for groundwater pumping above the BPP in addition to the RA - $515/af
Historical Basin Production Percentage (BPP)
Replenishment assessment history

$/AF

Groundwater Replenishment System
Annual groundwater basin pumping
Historical total water demands (afy)
OCWD Groundwater Basin accumulated overdraft

Accumulate Overdraft (AF)

Target Overdraft

Basin Operating Range


OCWD service territory water supply sources to meet total water demands of approximately 447,000 afy

- GWRS: 103,000
- Other: 20,000
- SAR Baseflows: 64,000
- SAR Stormflows: 51,000
- MWD Treated: 83,000
- MWD Untreated: 65,000
- Natural Incidental Recharge: 61,000
Historical SAR baseflow (afy)
Reasons for declining SAR flows

• Less wastewater being generated
  – Economic recession
  – Greater conservation
• Increased recycling in upper SAR watershed
• Increased groundwater pumping near SAR
• Dry hydrology
• Lower groundwater levels in upper watershed groundwater basins
OCWD has a cooperative program with the ACOE to conserve water behind Prado Dam

- ACOE Flood risk management facility
- Temporary storage of storm water
- Average capture and recharge of 50,000 afy
- Sedimentation will fill conservation pool in 50 yrs
Environmental stewards while sustaining water supplies
OCWD ensures water is safe
OCWD Management Policies

- Avoid Basin adjudication
  - Judge decides basin pumping rights
  - Very costly and time consuming
  - Lose basin management options
  - OCWD is the only major non-adjudicated basin in Southern California
OCWD management policies

• Supply Side Management
  – Producers have no restriction on amount of water they produce
  – Seek and develop programs/projects to meet increased production
    ■ Surplus MWD water
    ■ GWR System
    ■ Recharge Projects
    ■ Increase the capture of Santa Ana River water
OCWD management policies

- Uniformity of cost and access to basin supplies regardless of time
  - All producers can pump up to the BPP
  - All OCWD cost spread among all user, i.e.:
    - MWD replenishment water
    - Coastal seawater intrusion cost
    - Local groundwater cleanup cost
    - Health effects study next to spreading facilities
  - No distinction between producers
MWD storage program

- Long Term Conjunctive Use Program (CUP)
- Store up to 66,000 af
- MWD can withdrawal up to 22,000 afy
- Will have ~ 48,000 af in account by June 30
- $50 million of benefits to OCWD
- Program can be cycled
- 25 year program
Huntington Beach desalination facility
Poseidon Resources Huntington Beach ocean desalination plant

- Proposed 50 mgd – 56,000 afy
- $670 million
- ~$1,850/af unit price (2014)
- Would reduce need for MWD imported water
- Poseidon working to obtain
  - Coastal Commission permit
  - Purchasers of water
Water quality lawsuits

- MTBE
- North Basin
- South Basin
MTBE case

Sites with Known MTBE Contamination in the Shallow Aquifer Zone

Source: San Diego Regional Water Quality Control Board
Water quality lawsuits

Capital Cost = $40 million (est.)
O&M Cost = $6 million/year (est.)
OCWD & OCSD:
Turning wastewater to drinking water
Microfiltration system

► 86 MGD (325,500 m³/day or 326 MLD) 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 or 265 MLD) 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 (10-14 bar)
Direct photolysis/advanced oxidation

- 70 MGD (265,000 m³/day or 265 MLD) 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
## GWRS summary

<table>
<thead>
<tr>
<th>Project</th>
<th>GWRS Max Daily Production (MGD)</th>
<th>GWRS Yearly Production (AFY)</th>
<th>Capital Cost (millions)</th>
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<tbody>
<tr>
<td>GWRS</td>
<td>70</td>
<td>72,000</td>
<td>$481</td>
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<tr>
<td>GWRS Initial Expansion</td>
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<td>$142</td>
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<tr>
<td>GWRS Final Expansion</td>
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<tr>
<td>130 mgd</td>
<td>134,000 afy</td>
<td>$876 million</td>
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World-wide support for water reuse

- Proactive outreach
- No active opposition
- 200+ tours of GWRS each year
OCWD efforts to secure new water supplies

- Expand GWRS
- Increase utilization of Prado Dam
- Increase stormwater recharge
- Water efficiency and conservation measures
- Exploring ocean water desalination
Thank you!

To **sign up for tours** or for more information, visit us at www.ocwd.com.

To **receive our newsletter**, please leave your card with our staff member.

**Questions?** Please call 714-378-3206.