Orange County Water District (OCWD)

- OCWD formed in 1933 by an Act of the State Legislature
- Farmers/landowners were over pumping the O.C. groundwater basin
- OCWD was created to manage and protect the groundwater basin
- 229,000 acres (358 mi²) in the lower watershed of the Santa Ana River
- Basin provides water for more than 2.4 million people
OCWD Governance

- Governed by a 10 member Board of Directors
- Only Major Non-Adjudicated Groundwater Basin in Southern California
- Conjunctive Use Basin
- Board sets the amount of pumping on an annual basis, depending on basin water levels
- Philosophy of increasing local water supplies to support growth and reduce need for imported water
Conjunctive Use

- Conjunctive use coordinates management of surface water & groundwater supplies

  - When the Metropolitan Water District (MWD) has excess water they sometimes sell it at a discounted rate for direct or in-lieu recharge

  - OCWD & MWD have a program whereby MWD can store up to 66,000 af in the OC Basin and remove it when they need it
OCWD Policies

- Avoid basin adjudication
- Uniformity of cost and access to basin supplies
- Management of both the demand & supply sides
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
- Non-adjudicated status incentivizes the development of groundwater recharge projects
Uniformity of Cost & Access to Basin Supplies

- All producers can pump up to the BPP

- RA spreads OCWD costs among all users
  - MWD replenishment water
  - Seawater barrier maintenance
  - Local groundwater remediation
  - Laboratory services (CCR, etc.)

- No distinction between producers
Demand & Supply Side Management

- Demand side management
  - Annual setting of the BPP

- Supply Side Management
  - River Water (base flow & storm flow)
  - Recycled Water (GWRS)
  - Imported Water (MWD)

- Incidental recharge
OCWD Basin Management Tools

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

- **Basin Production Percentage (BPP) Set Annually - Assume 62%**
- **Replenishment Assessment (RA) Paid for groundwater pumping below BPP - $249/af**
- **Basin Equity Assessment (BEA) Paid for groundwater pumping above the BPP in addition to the RA - $490/af**
Historical Basin Production Percentage (BPP)

Percent of Cities’ Total Water Demands


Values: 40%, 50%, 60%, 70%, 80%, 90%, 100%
Groundwater Pumping History

Through Active Management and Investment – Approximately *Doubled* the Annual Yield of the Basin
Sources for Groundwater Recharge

SAR Stormflows: 50,000
MWD Untreated Full Service Water: 20,000
Natural Incidental Recharge: 60,000
SAR Baseflows: 102,000
GWRS: 72,000
Other: 4,000

Total: 308,000 Acre-feet/Year
OCWD has an agreement with the ACOE to conserve water behind Prado Dam

Dam is critical asset for the capture of storm flows

SAR base flows consist of wastewater discharged in the Upper Watershed
## Upper SAR Storage

<table>
<thead>
<tr>
<th>Prado Dam</th>
<th>Non-Flood Season Conservation Pool</th>
<th>Conservation Pool</th>
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<tbody>
<tr>
<td>19,826 af</td>
<td>505</td>
<td>Oct.-Feb.</td>
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<tr>
<td>9,278 af</td>
<td>498</td>
<td></td>
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</table>
Recharge Operations

- OCWD began SAR acquisitions in 1936
- Currently own & operate 25 facilities covering 1,500 acres
Recent Storms

Month

December & January recharge among the highest ever

5-Yr Avg.

Monthly Recharge (af)
Incidental Recharge vs. Rainfall

\[ IR = 4,049 \times FHQ \text{ Rain} + 7,745 \]

\[ R^2 = 0.890 \]
Recycled Water

• OCWD’s history of innovation in water reuse
  - Water Factory 21
  - Groundwater Replenishment System

• Indirect Potable Use

• Extraordinary Quality
GWRS Advanced Water Purification Process

- Microfiltration (MF)
- Reverse Osmosis (RO)
- Ultraviolet Light (UV) with Hydrogen Peroxide

OCSD Secondary Effluent

Normally Goes to Ocean

Seawater Barrier

Recharge Basins in Anaheim
Water Quality Protection Near the Coast

- Desired Seawater Holding Point
- Pacific Ocean
- Injection Wells
- Production Wells
- Talbert, Alpha, Beta, Lambda
- Main Aquifer
- Seawater Intrusion
Challenges

• Local
  - SAR baseflow decline
  - SAR armoring
  - Degradation of basin percolation rates

• State
  - Competition for import water
  - Environmental impacts in Delta
Questions?