ORANGE COUNTY WATER DISTRICT GROUNDWATER BASIN

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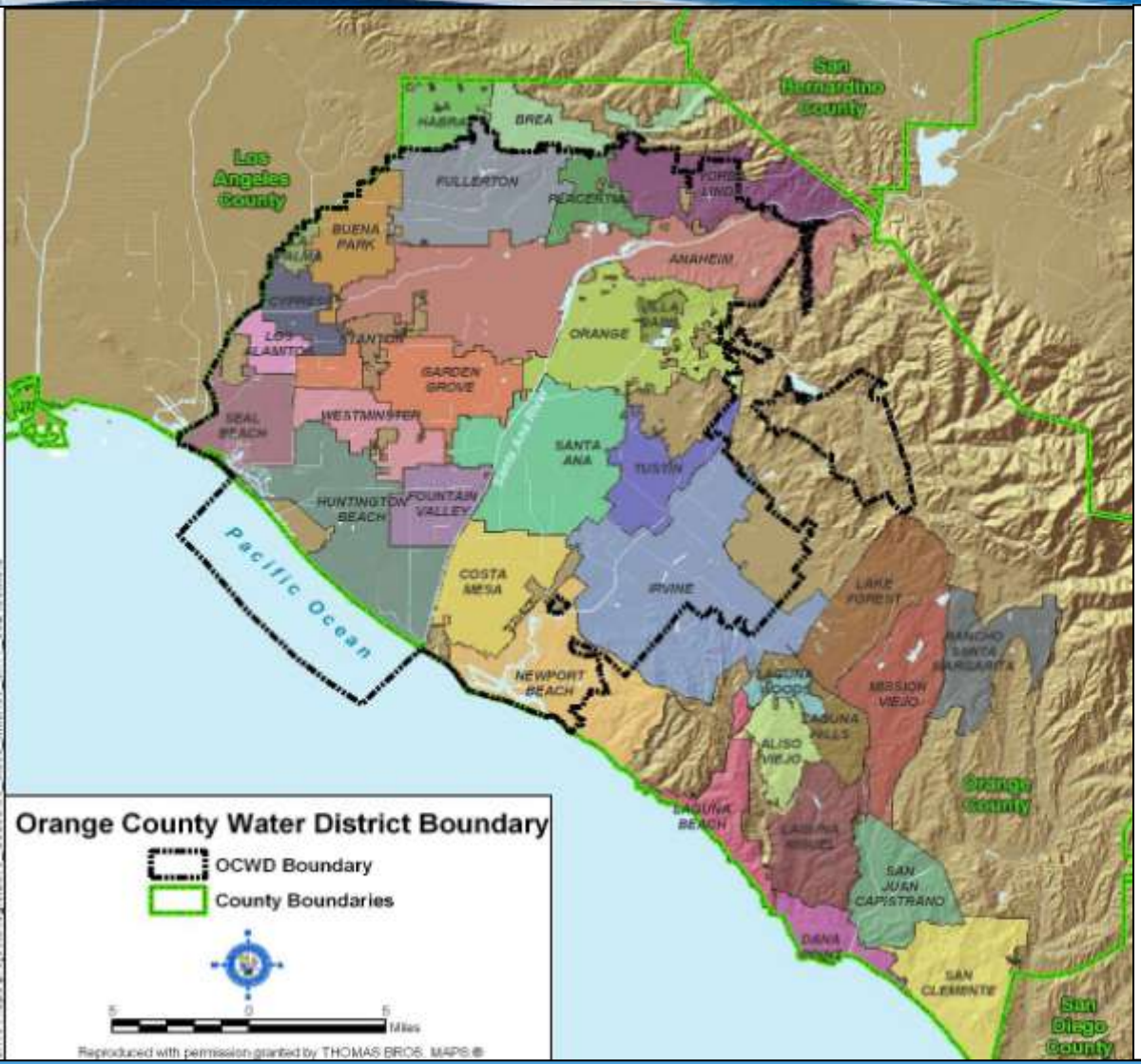
February 2011

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 mi^2) 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

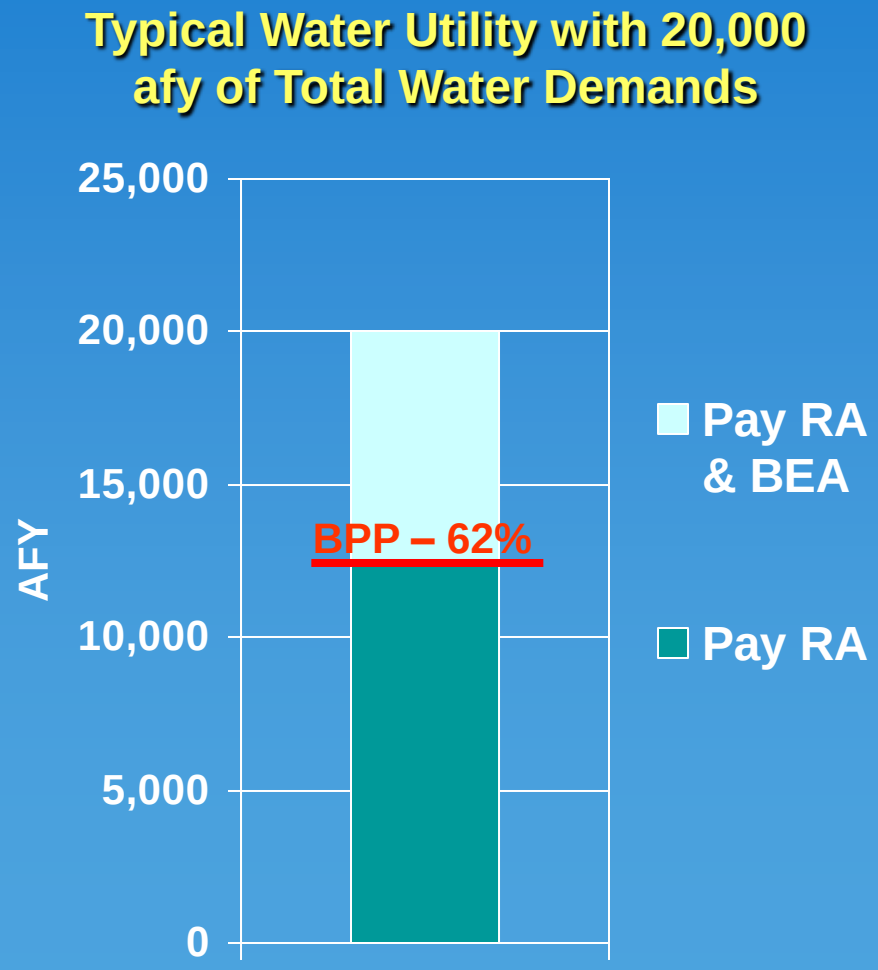
Uniformity of Cost & Access to Basin Supplies

- 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

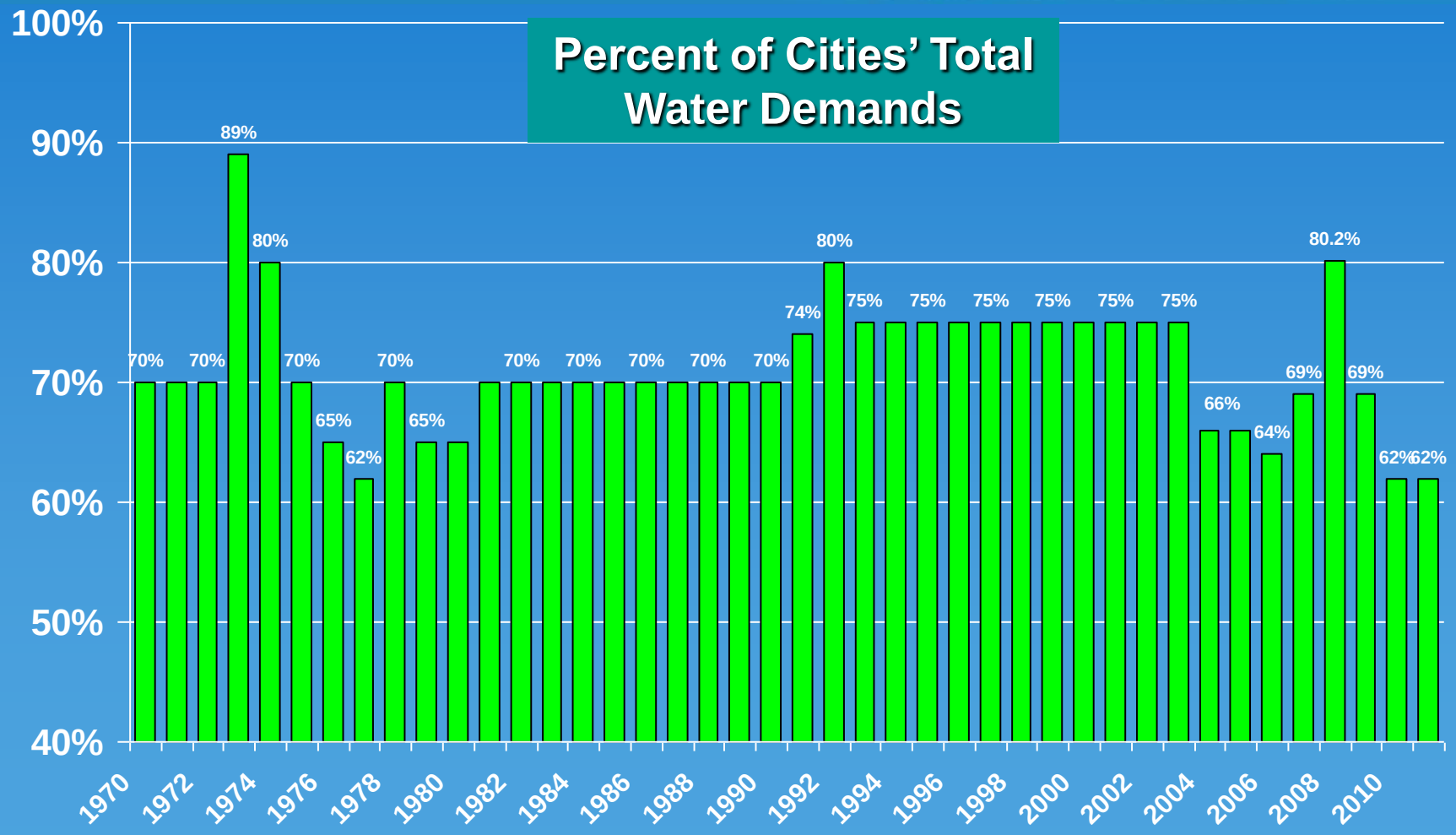
- Demand side management
  - Annual setting of the BPP
- Supply Side Management
  - River Water (base flow & storm flow)
  - Recycled Water (GWRS)
  - Imported Water (MWD)
- Incidental recharge

OCWD Basin Management Tools

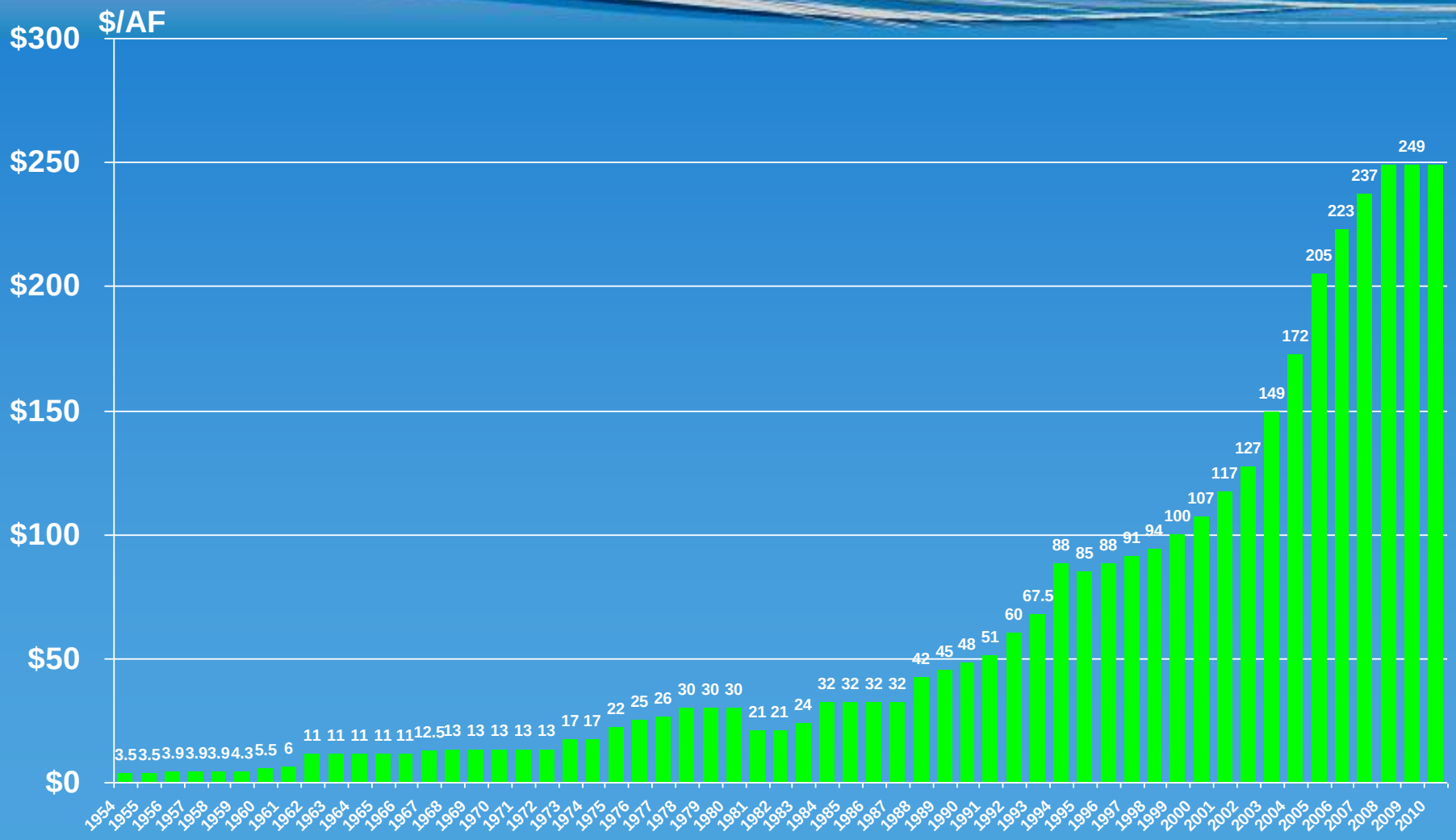


- **Basin Production Percentage** (BPP) Set Annually - Assume 62%
- **Replenishment Assessment** (RA) Paid for groundwater pumping below BPP - $249/af
- **Basin Equity Assessment** (BEA) Paid for groundwater pumping above the BPP in addition to the RA - $490/af

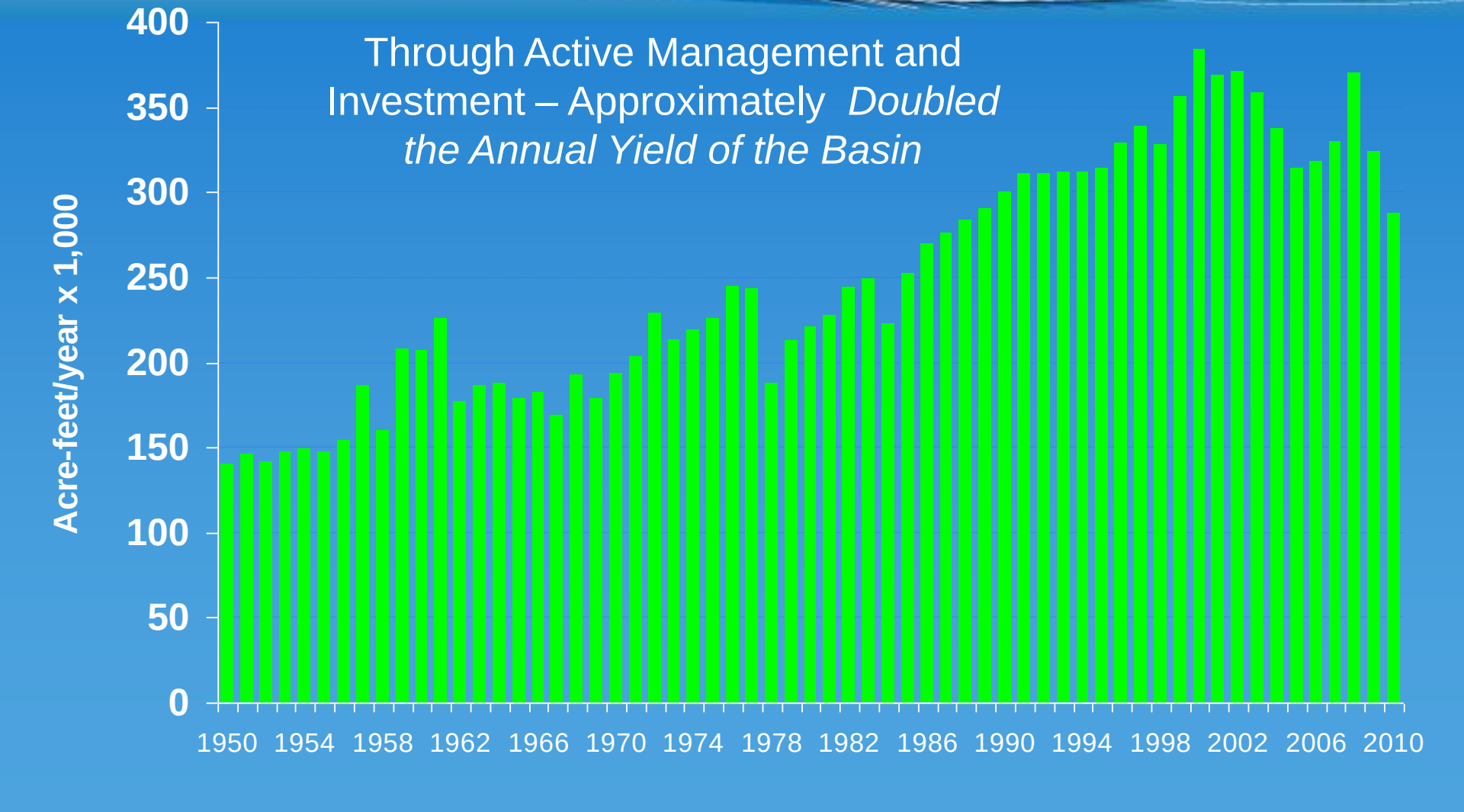
Historical Basin Production Percentage (BPP)



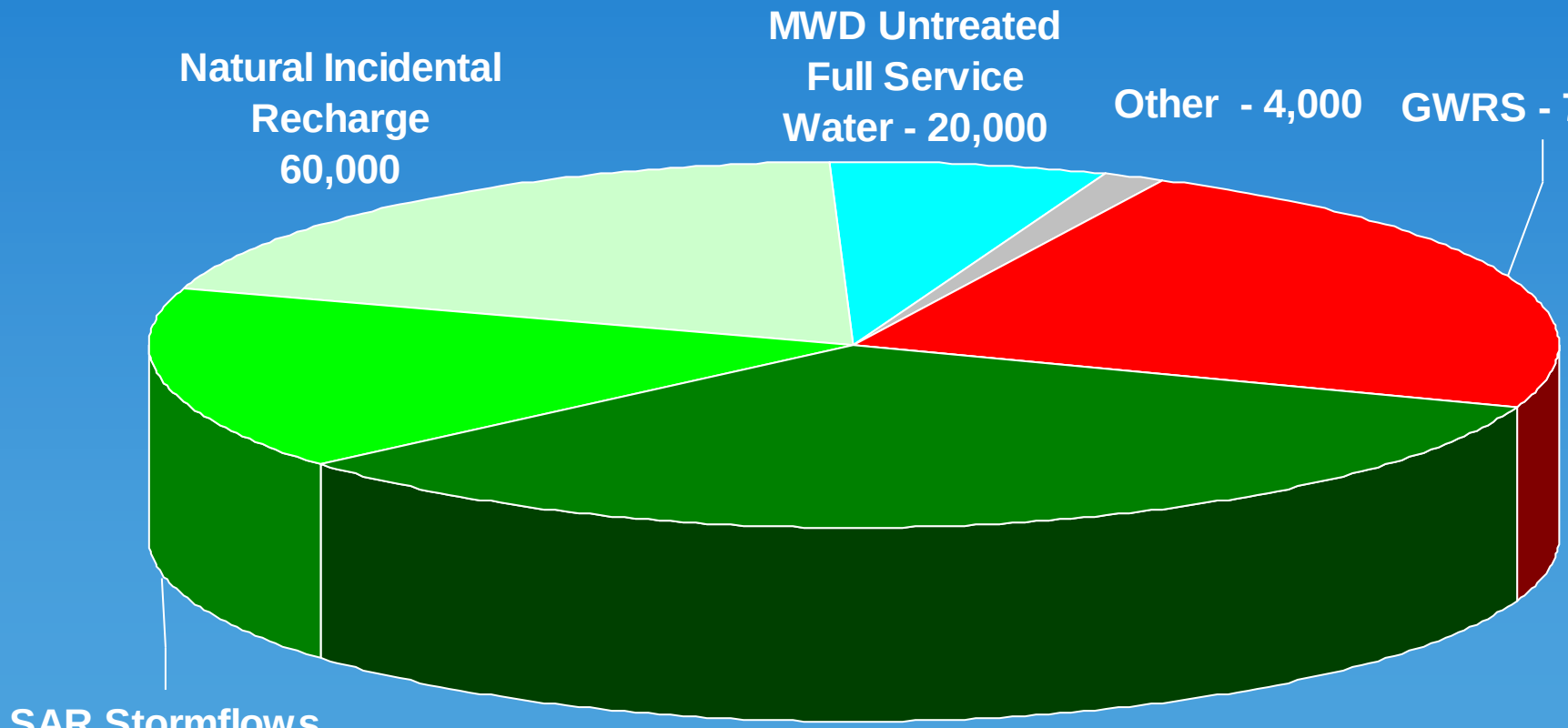
Replenishment Assessment History



Groundwater Pumping History



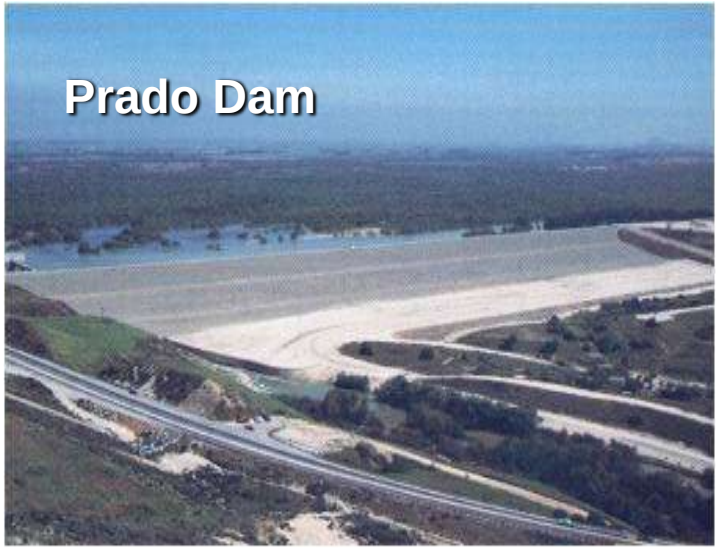
Sources for Groundwater Recharge



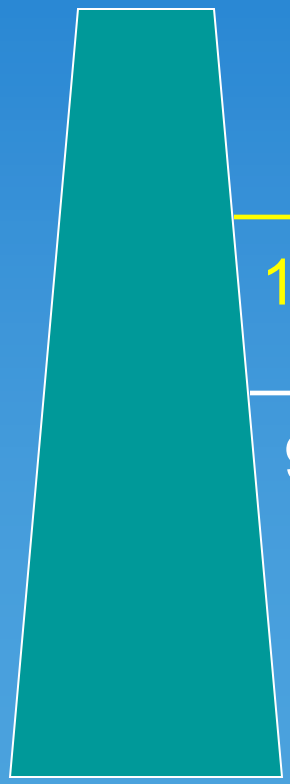
(308,000 Acre-feet/Year)

Prado Dam

- **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

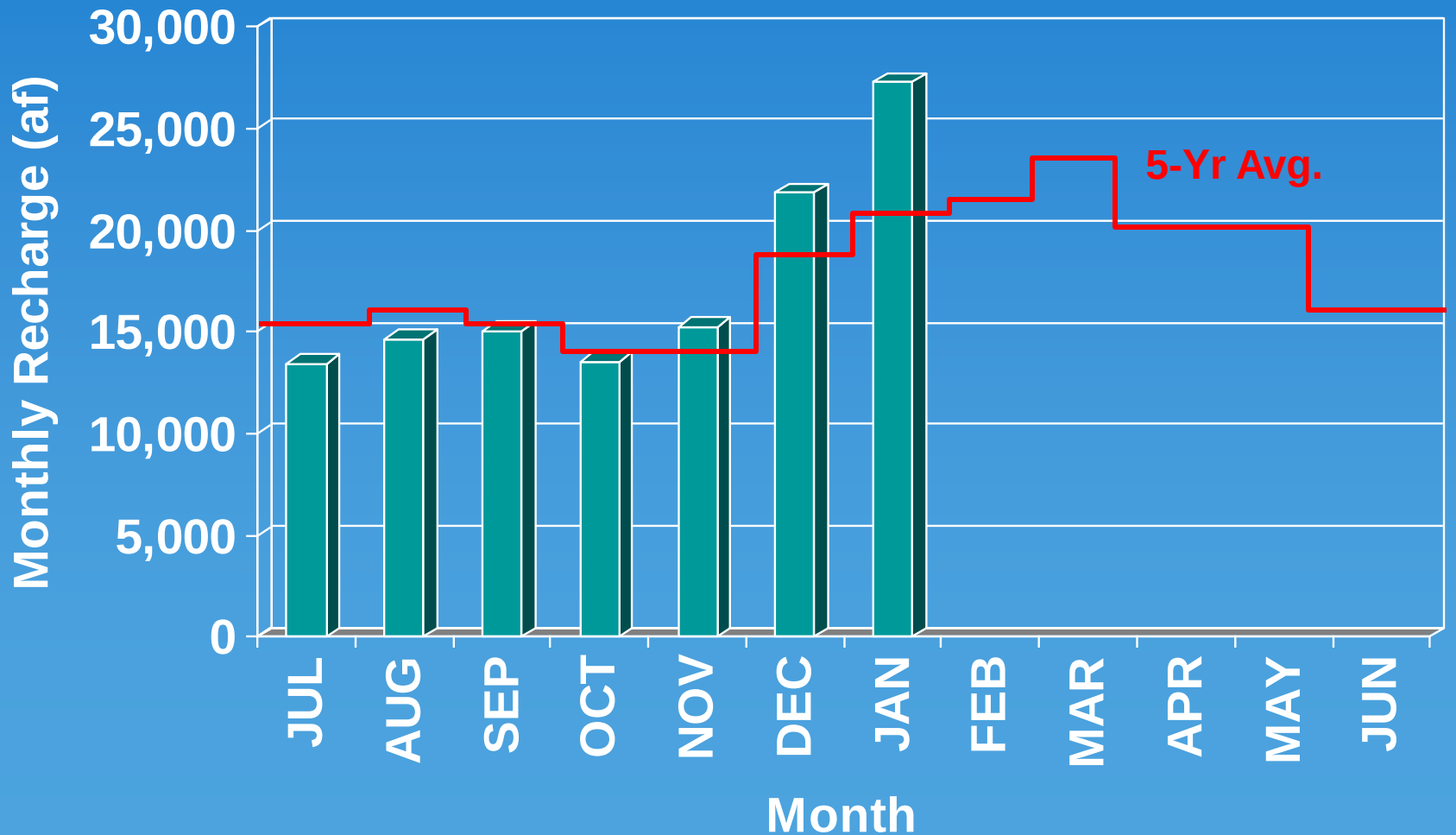


Recharge Operations

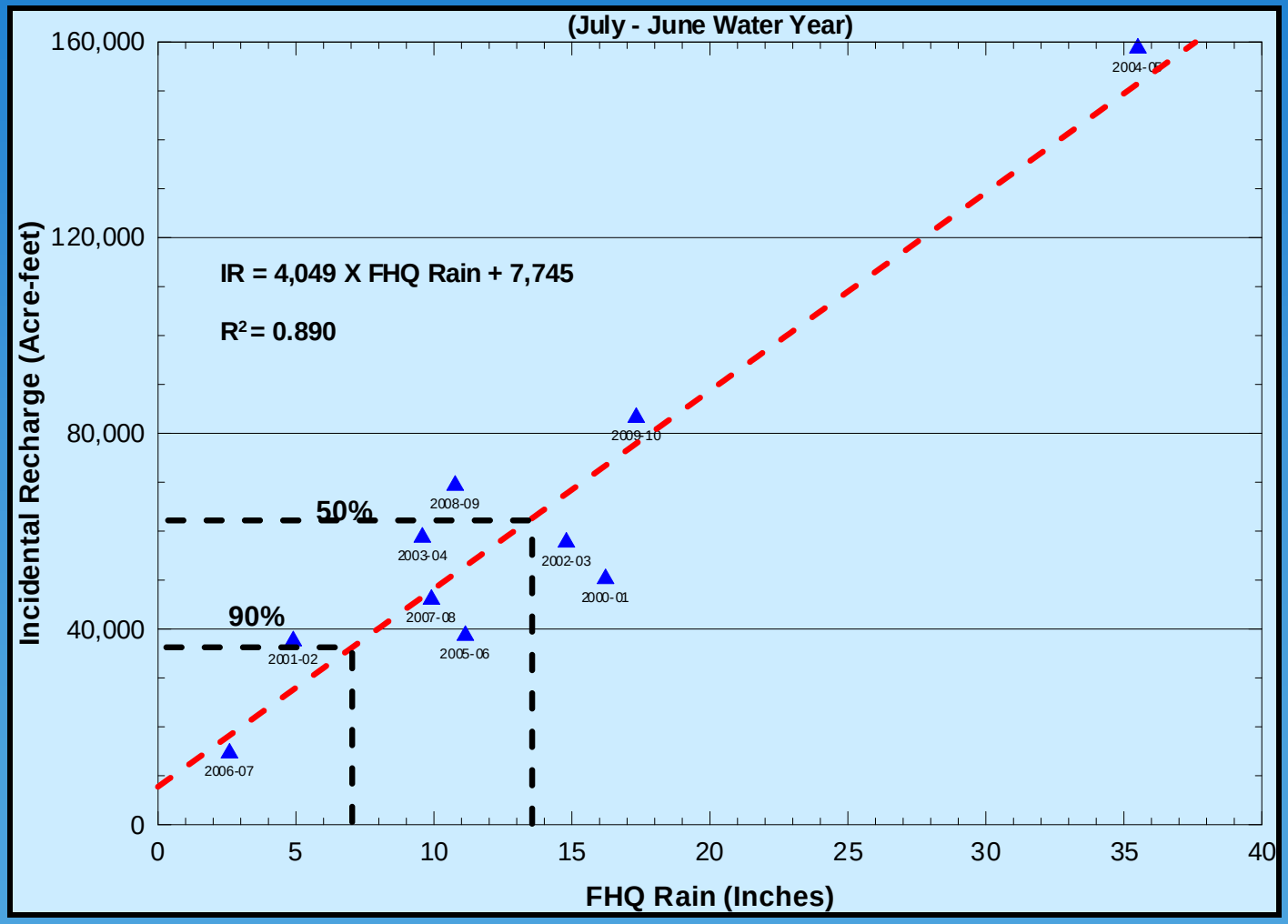
- OCWD began SAR acquisitions in 1936
- Currently own & operate
  25 facilities covering
  1,500 acres

Recent Storms

December & January recharge among the highest ever



Incidental Recharge vs. Rainfall



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

OCSD Secondary Effluent

Normally Goes to Ocean

Microfiltration (MF)

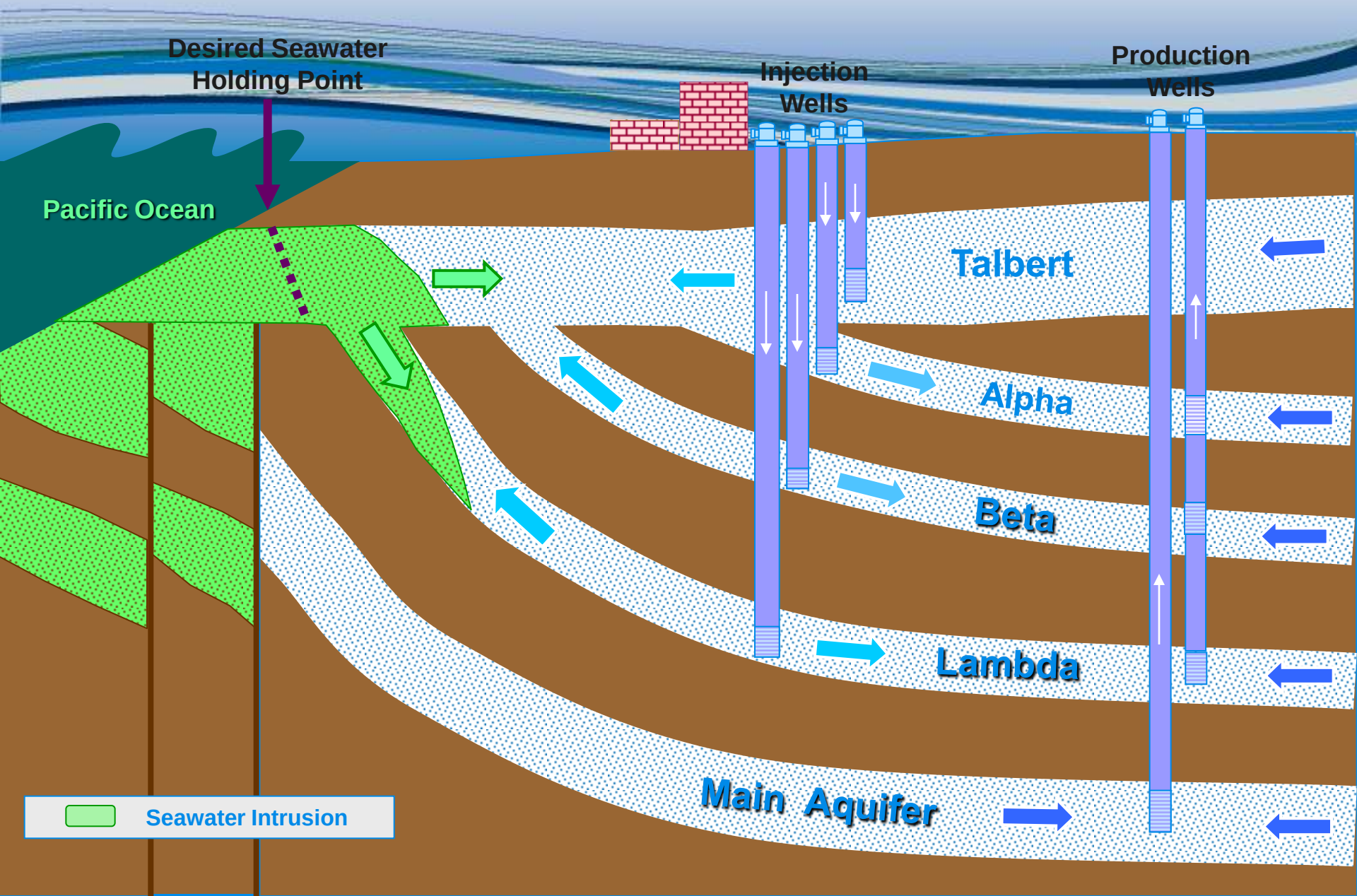
Reverse Osmosis (RO)

Ultraviolet Light (UV) with Hydrogen Peroxide

Seawater Barrier

Recharge Basins in Anaheim

Water Quality Protection Near the Coast



Challenges

- **Local**
  - SAR baseflow decline
  - SAR armoring
  - Degradation of basin percolation rates
- **State**
  - Competition for import water
  - Environmental impacts in Delta

Questions?