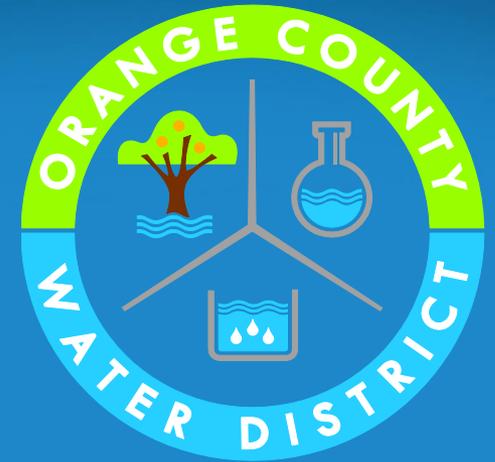


MANAGEMENT OF CALIFORNIA'S GROUNDWATER RESOURCES

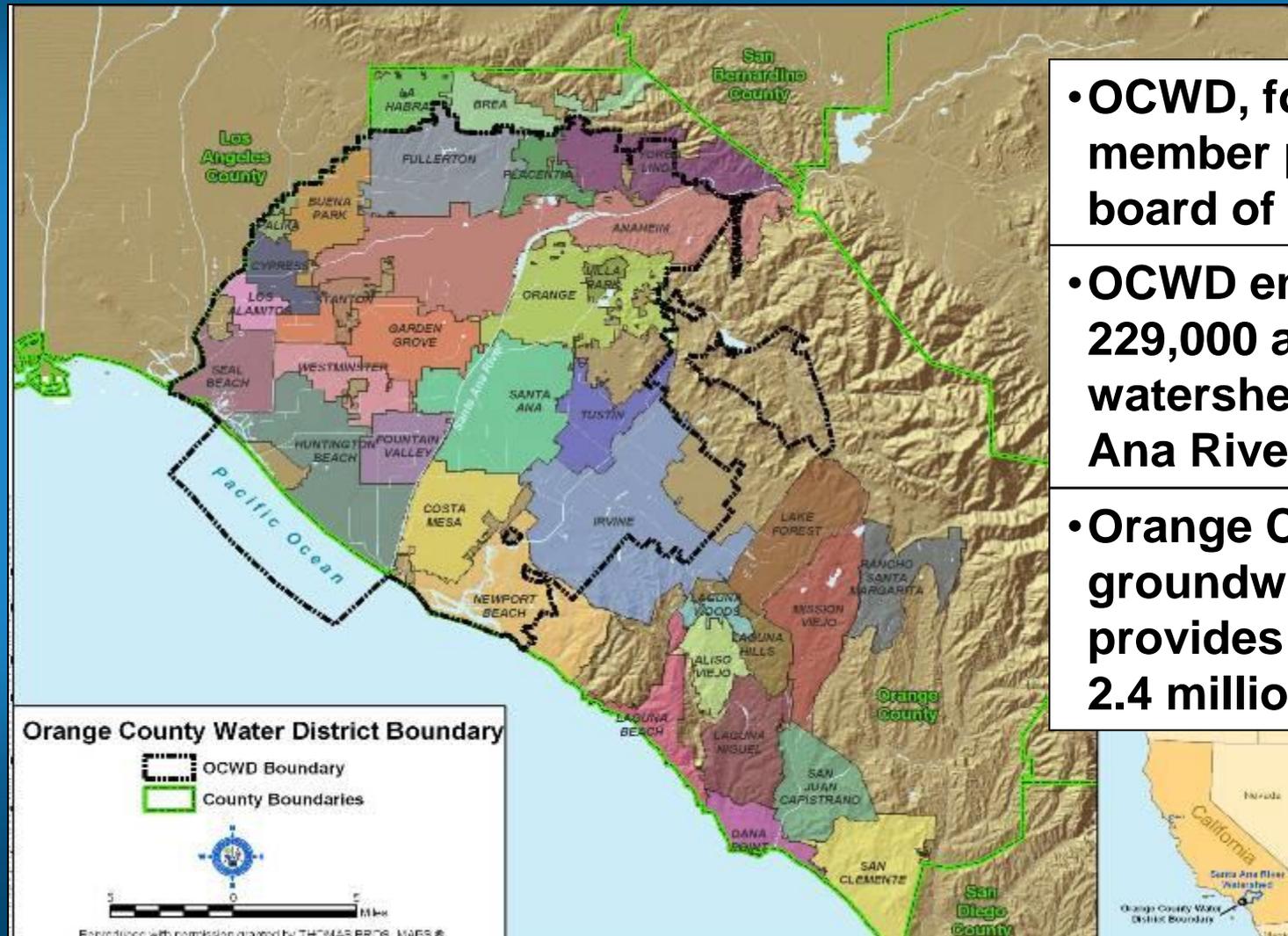
Michael R. Markus, P.E.
General Manager
Orange County Water District

Assembly Water, Parks & Wildlife Committee

March 11, 2014



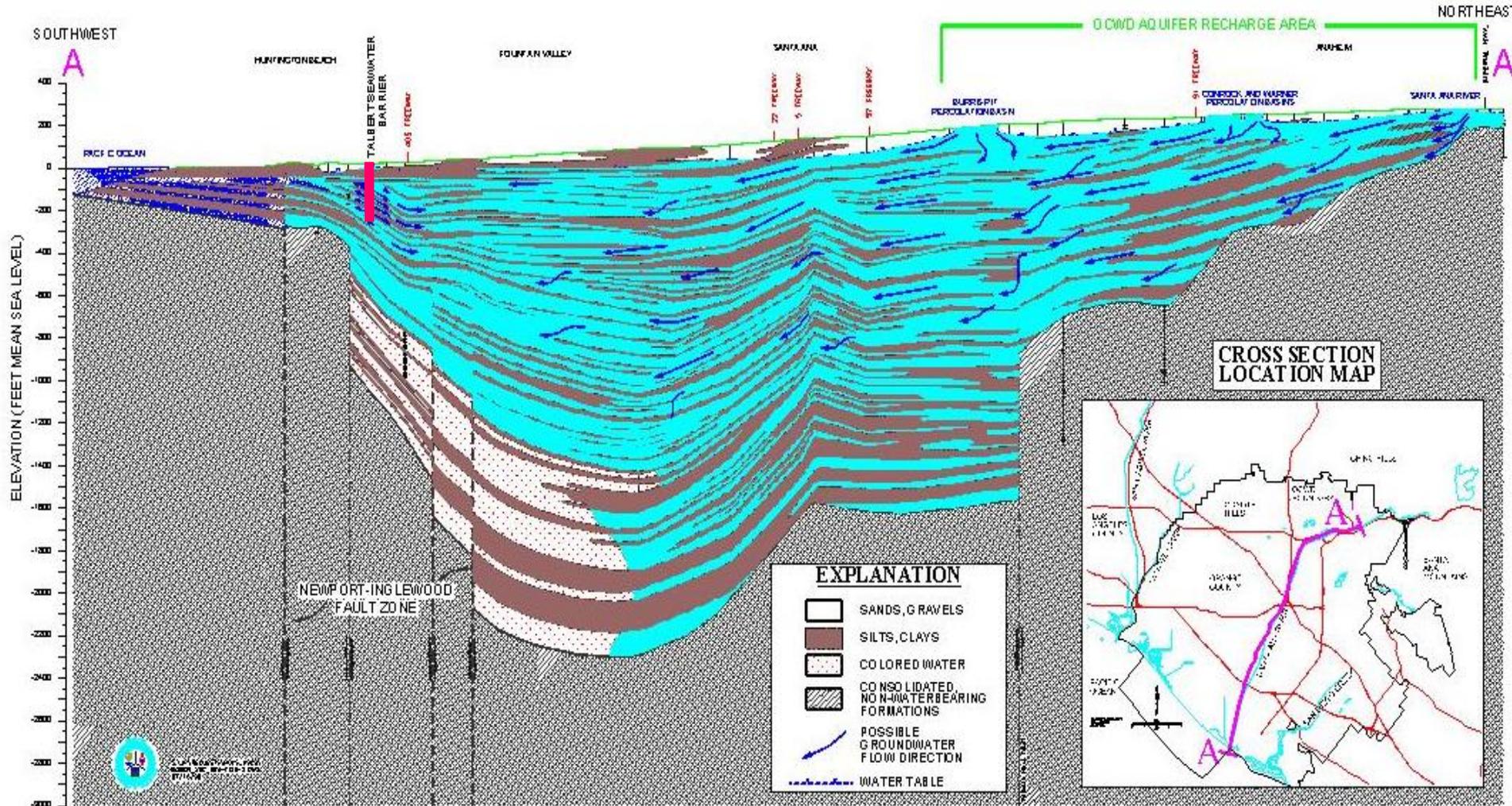
ORANGE COUNTY WATER DISTRICT



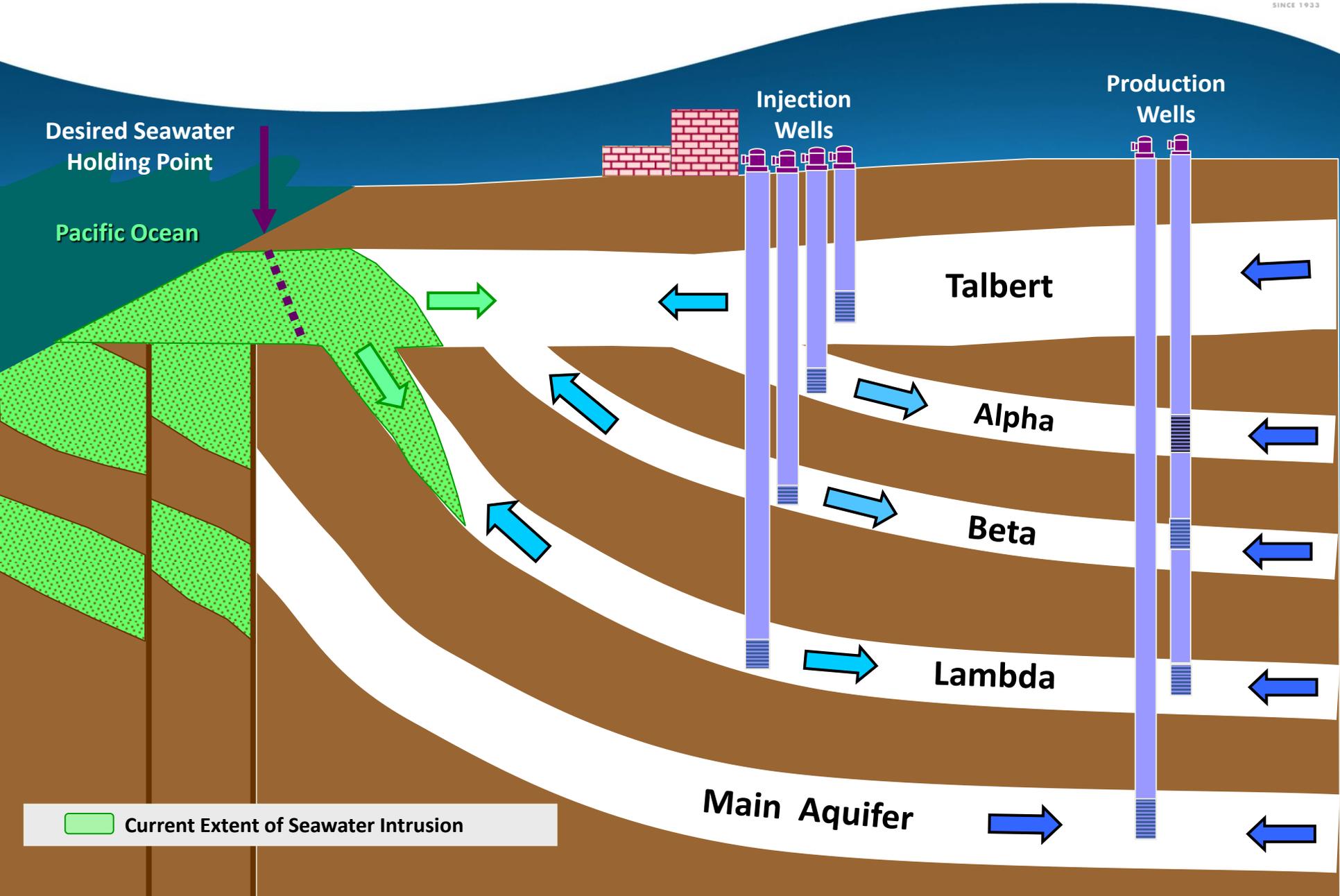
- OCWD, formed in 1933, 10 member publicly elected board of directors
- OCWD encompasses 229,000 acres in the lower watershed of the Santa Ana River (SAR)
- Orange County groundwater basin provides water for over 2.4 million people



CROSS SECTION OF THE GROUNDWATER BASIN



SEAWATER INTRUSION BARRIER

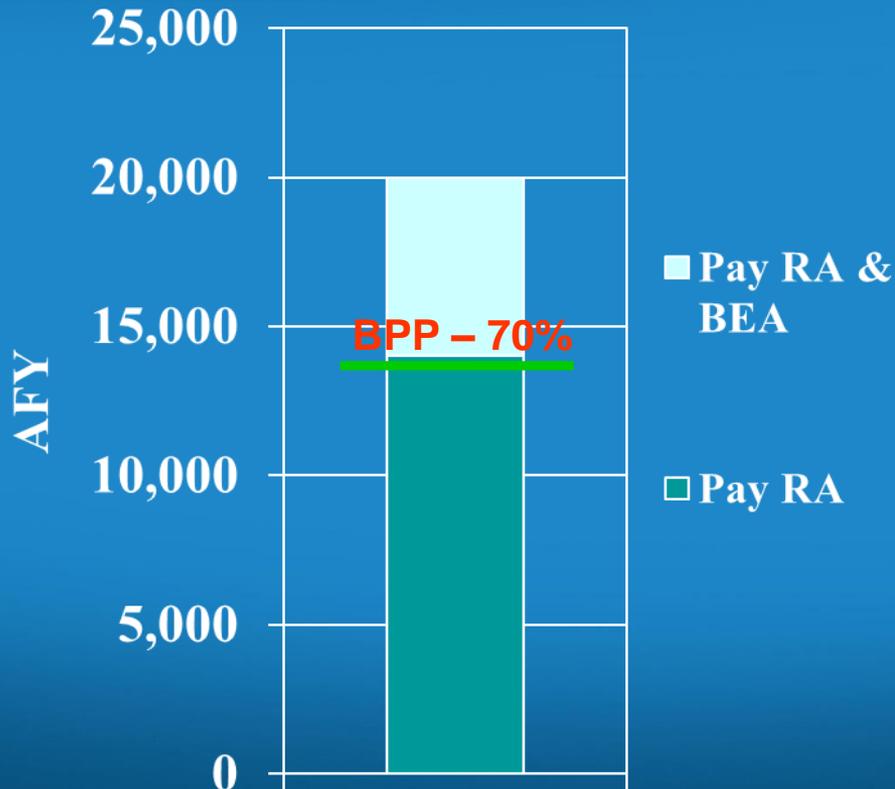


OCWD MANAGEMENT POLICIES

- ▶ Invest in local projects
- ▶ Avoid basin adjudication
 - ▶ Maintain uniformity of cost and access to the groundwater basin
 - ▶ Treat all parties equally
- ▶ No power to restrict pumping – only set the rates paid to pump
- ▶ Conjunctively operate with the MWD imported water system

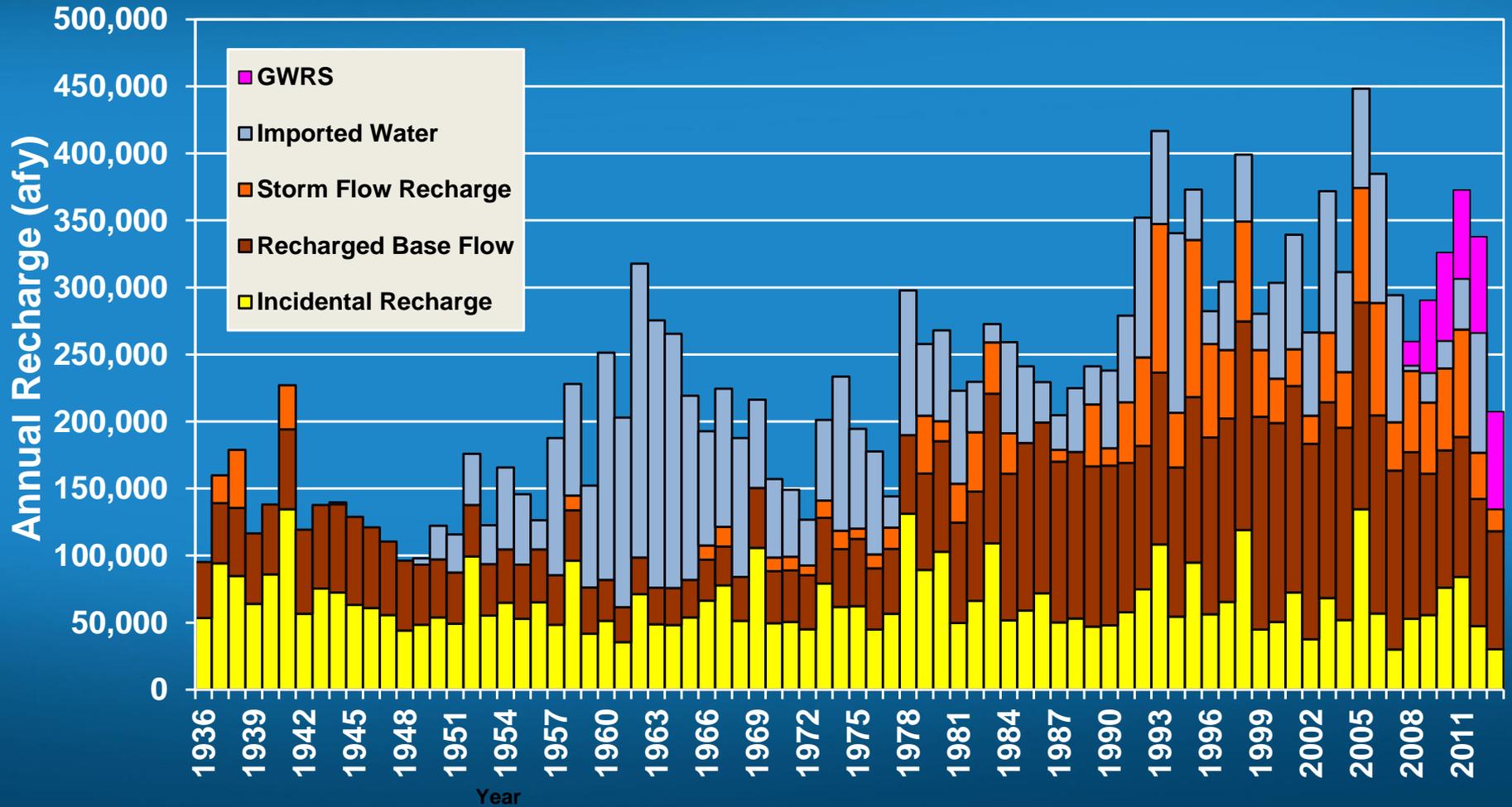
OCWD BASIN MANAGEMENT TOOLS

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

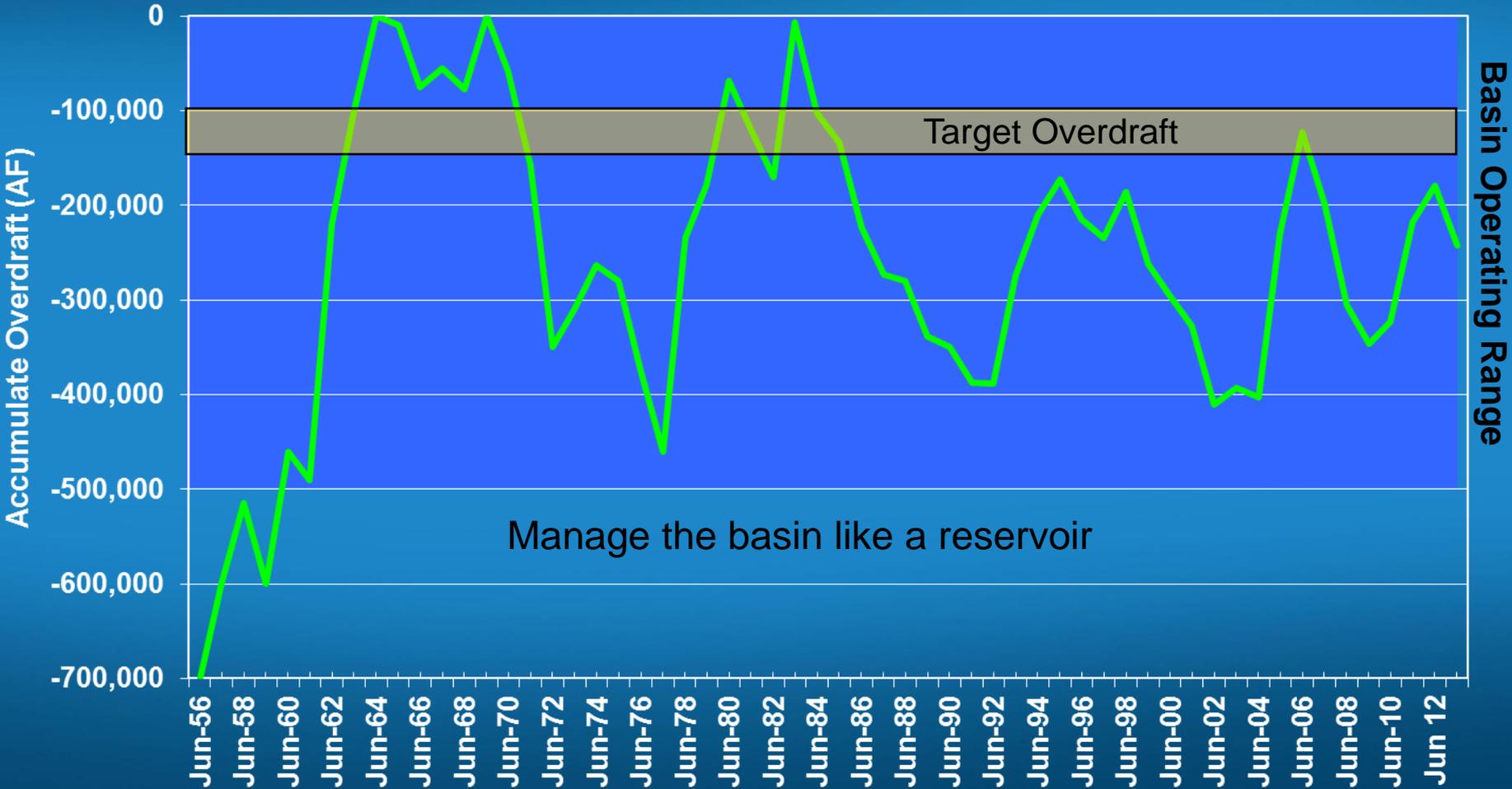


- ▶ Basin Production Percentage (BPP) Set Annually - Currently 70%
- ▶ Replenishment Assessment (RA) Paid for groundwater pumping below BPP - \$276/af
- ▶ Basin Equity Assessment (BEA) Paid for groundwater pumping above the BPP in addition to the RA - \$600/af

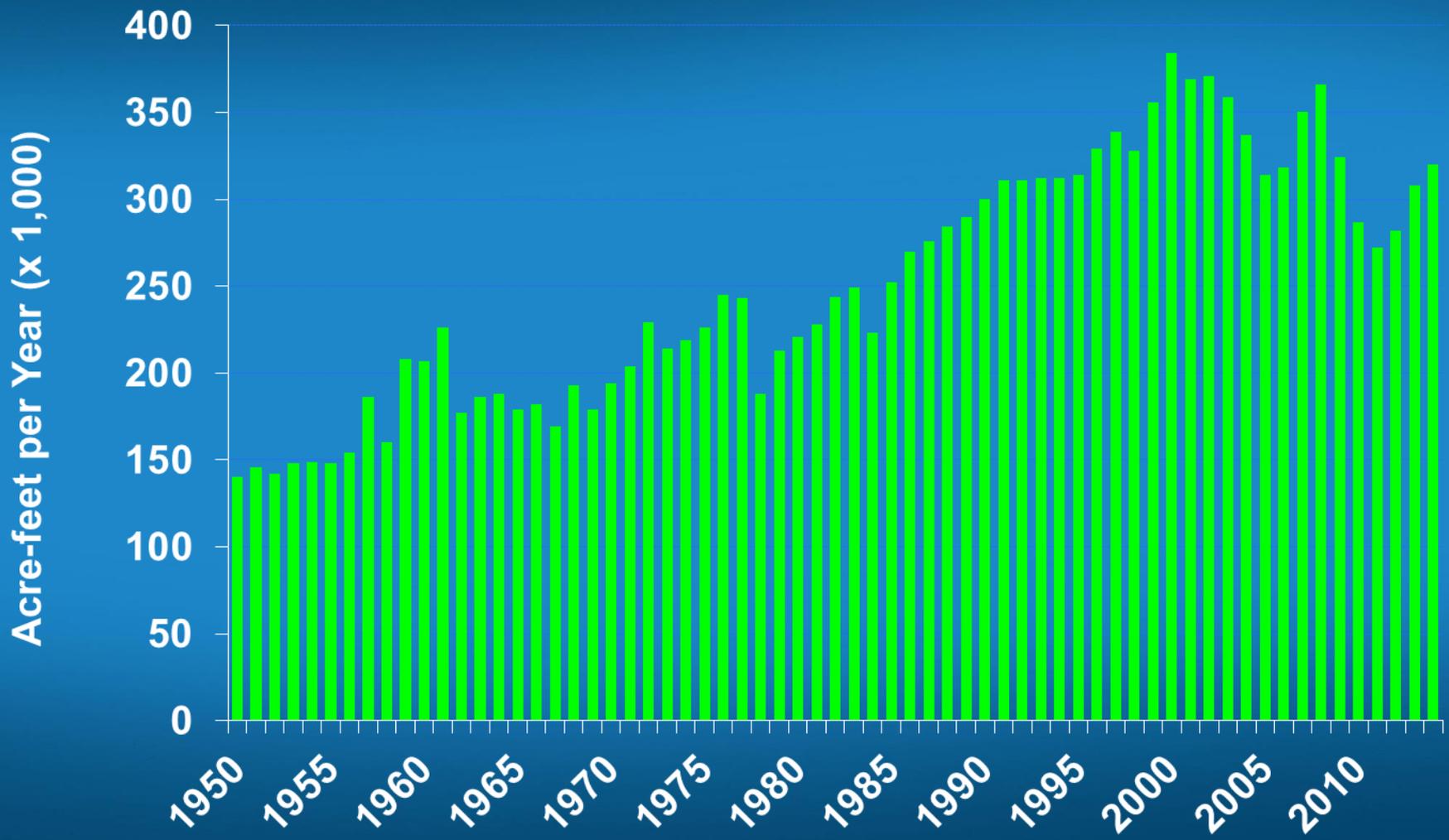
SOURCES OF WATER TO THE GROUNDWATER BASIN



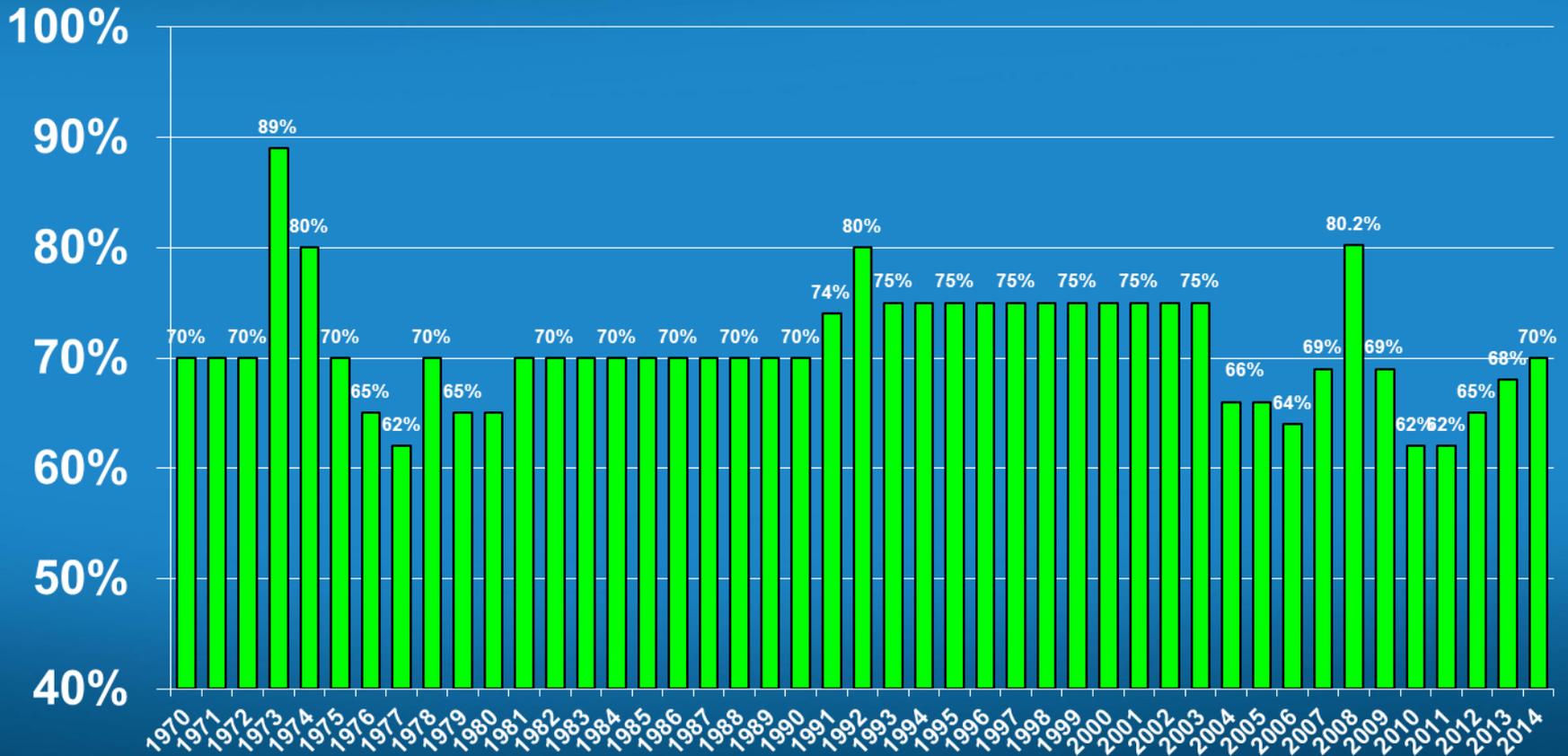
GROUNDWATER BASIN LEVELS



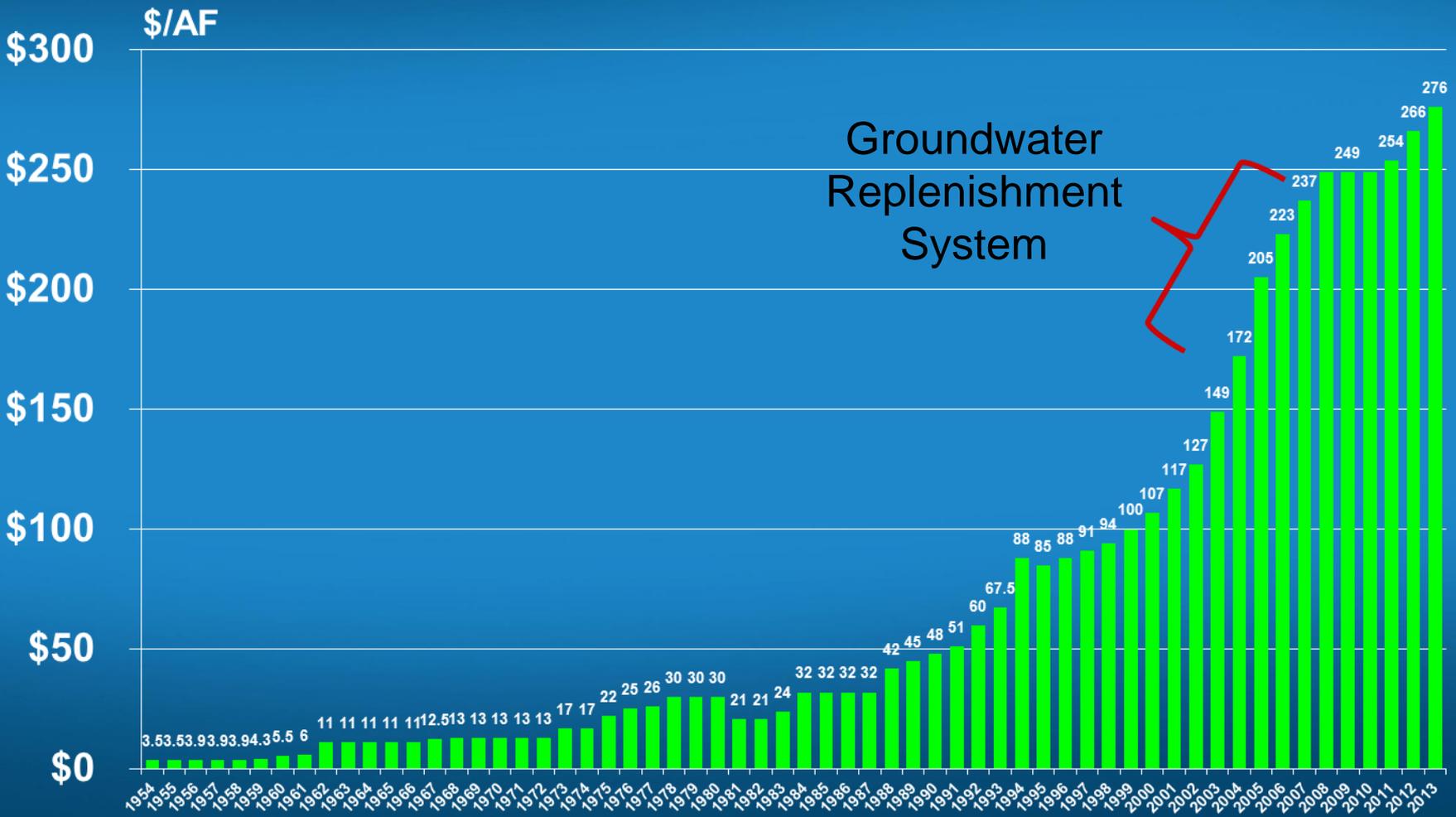
GROUNDWATER PRODUCTION HISTORY



HISTORICAL BASIN PRODUCTION PERCENTAGE (BPP)



REPLENISHMENT ASSESSMENT HISTORY



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-foot per year source of water, which is enough water for nearly 600,000 people
- ▶ Operational since January 2008
- ▶ Largest planned indirect potable reuse project in the world



GWRS INITIAL EXPANSION

- ▶ Science and practice supports proven safety and reliability
- ▶ Success led to GWRS Initial Expansion
- ▶ \$142 Million (US Dollars)
- ▶ Creates additional 31,000 acre-foot per year new local water, enough to serve 250,000 people
- ▶ Broke ground in January 2012
- ▶ Complete in 2015
- ▶ Inspired other global projects
- ▶ Potential is great – 1.3 billion gallons of treated wastewater lost to Pacific Ocean every day





For more information,
Visit www.gwrsystem.com
Or www.ocwd.com

Or contact:
Michael R. Markus, P.E.
General Manager
mmarkus@ocwd.com



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