Forecast Informed Reservoir Operations at Prado Dam

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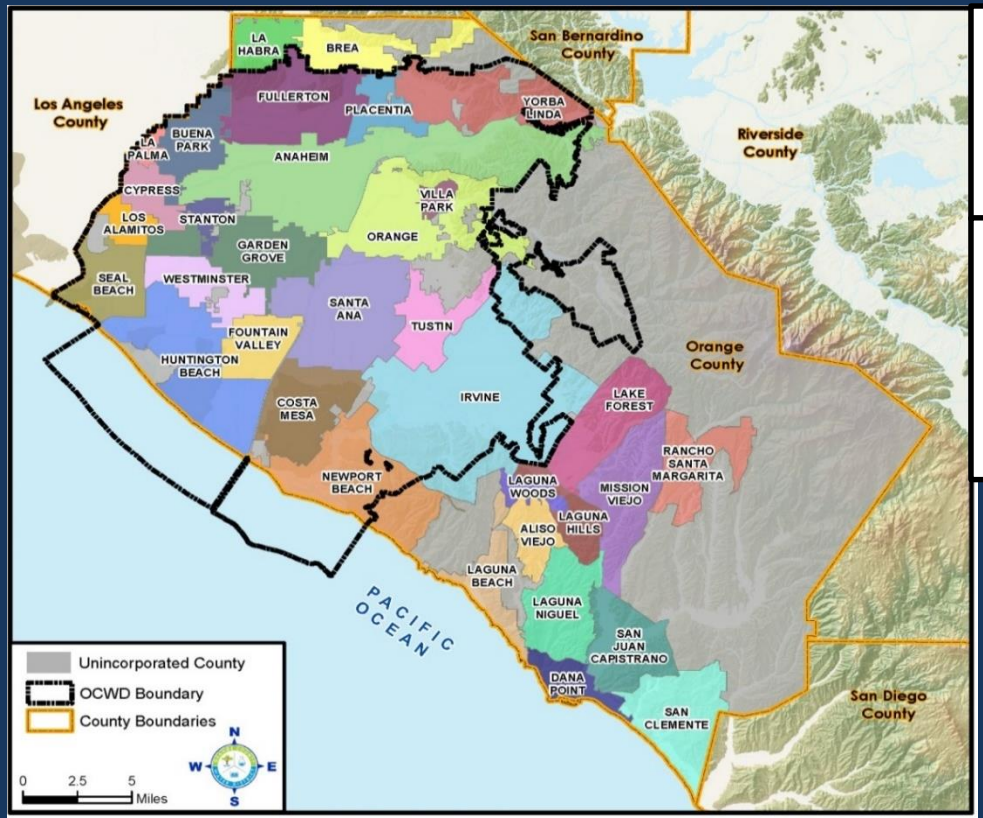
Orange County Water District

FIRO Workshop, La Jolla, CA

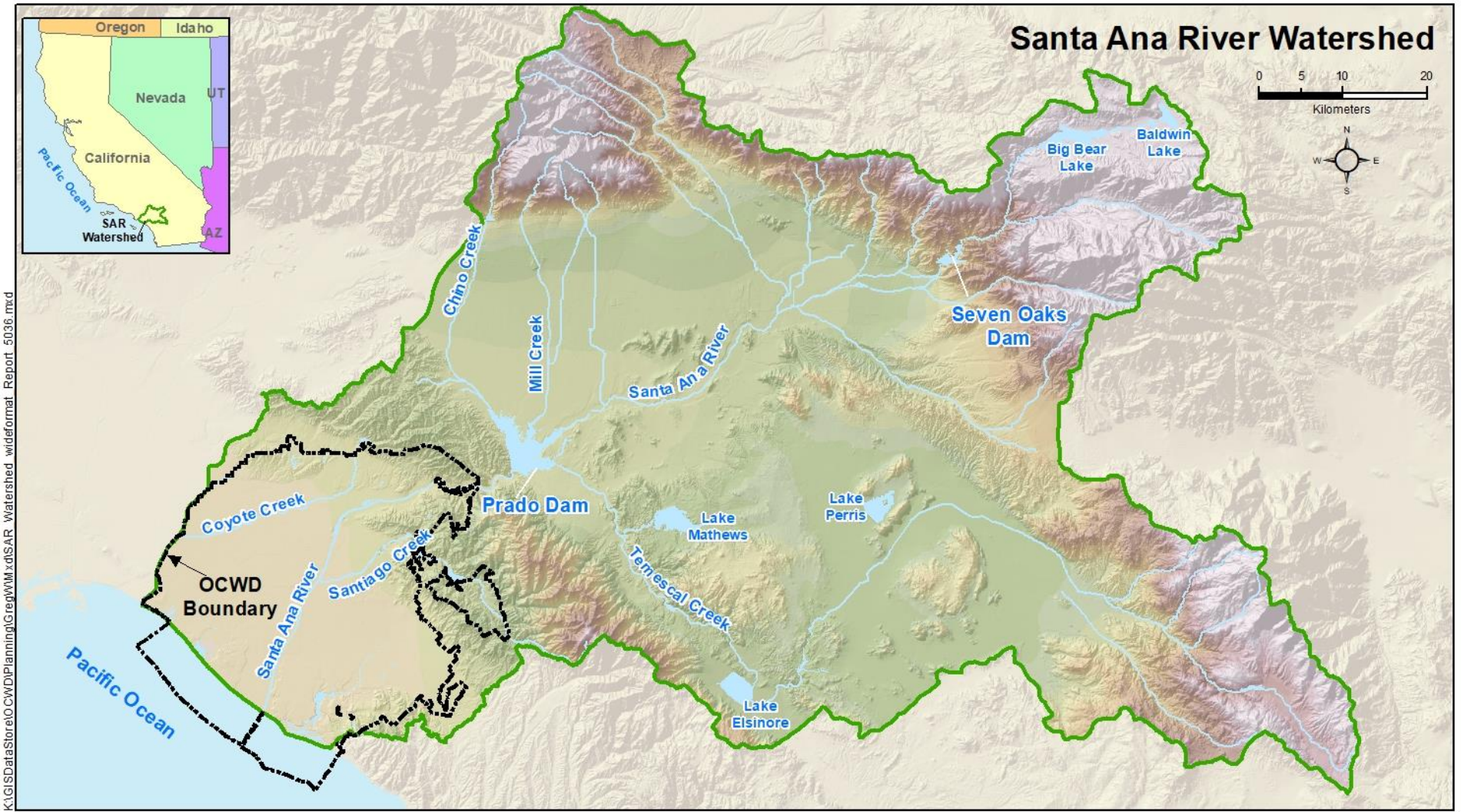
August 6, 2019

OCWD encompasses 370 square miles in North Orange County



Orange County groundwater basin provides water for 2.5 million people

Orange County Water District was formed by the State of CA in 1933 to manage the groundwater basin


Santa Ana River Watershed
Oregon
Idaho
Nevada
UT
California
AZ
Pacific Ocean
SAR Watershed
0 5 10 20
Kilometers
N
W
E
S
Big Bear Lake
Baldwin Lake
Seven Oaks Dam
Chino Creek
Mill Creek
Santa Ana River
Prado Dam
Coyote Creek
Santiago Creek
Santa Ana River
OCWD Boundary
Pacific Ocean
Lake Mathews
Lake Perris
Temescal Creek
Lake Elsinore
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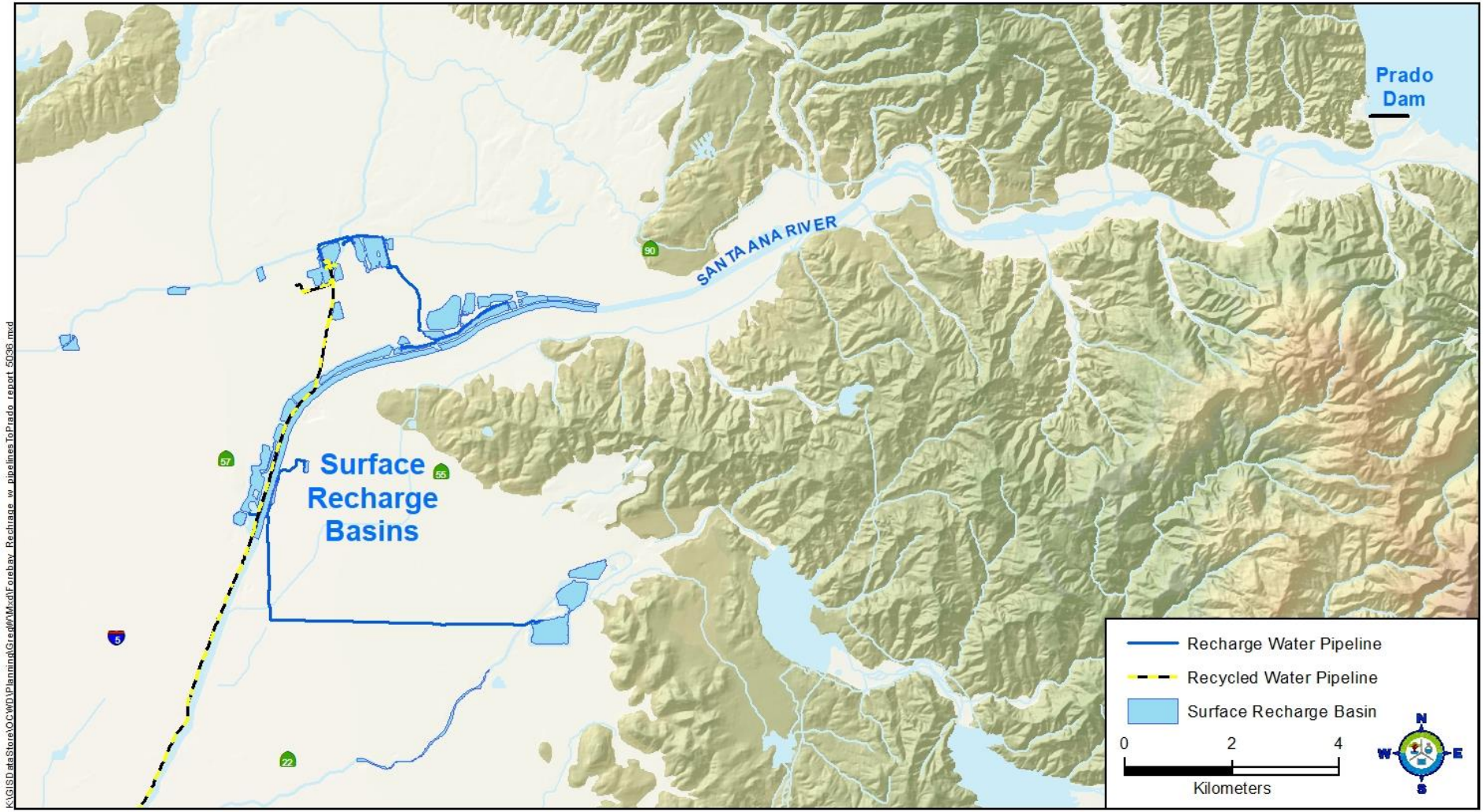
Prado Dam
SANTA ANA RIVER
Surface Recharge Basins
Recharge Water Pipeline
Recycled Water Pipeline
Surface Recharge Basin
0
2
4
Kilometers
N
W
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2019-20 Groundwater Basin Water Balance

Water Source	Volume (acre-feet per year)
SAR Baseflow	65,000
SAR Stormflows	41,000
Incidental Recharge	52,000
GWR System	103,000
MWD Supplies	65,000
Other	3,000
Total Water Into Basin	329,000
Expected Pumping	320,250
Subtotal Basin Gain/Loss	Gain 8,750

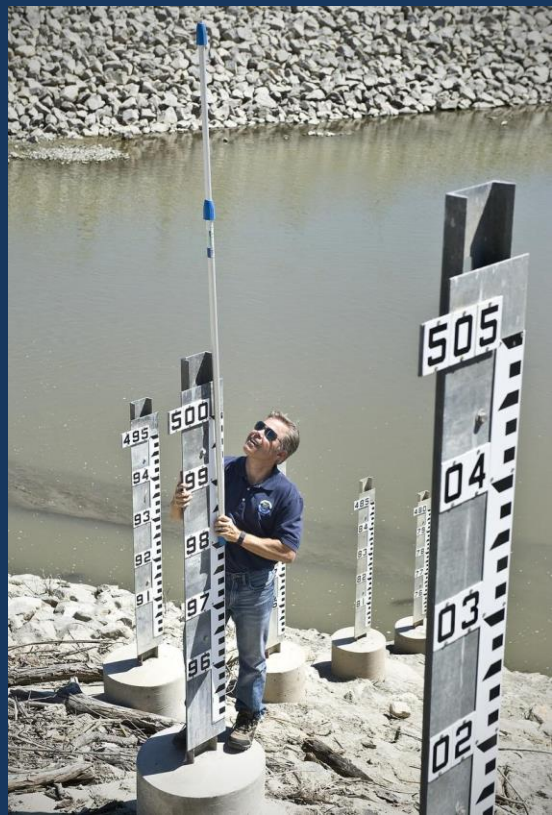
Army Corps of Engineers
& OCWD have long-standing Partnership in Prado Basin

Key Features of Stormwater Capture at Prado Dam

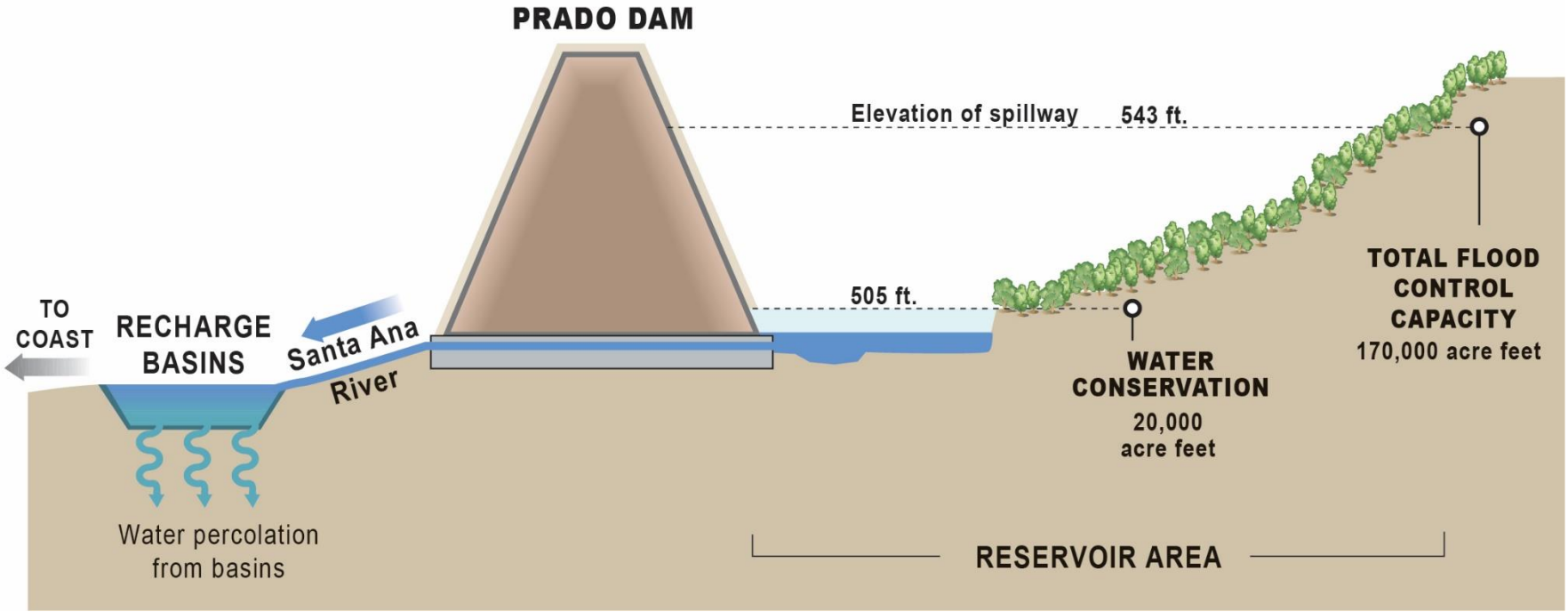
- Dam is owned and operated by Army Corps
- Primary purpose: flood risk management
- Stormwater capture, aka ‘water conservation’ is secondary purpose
- No dedicated water supply pool
- OCWD has no storage rights
- Stormwater held temporarily in ‘buffer pool’ can be released by Corps at any time at their sole discretion

Efforts to Increase Stormwater Capture at Prado

- Temporary ‘deviation’ to 505 feet in flood season approved by Army Corps
- Permanent change to 505 feet in flood season being evaluated in Prado Basin Feasibility Study being conducted by Corps with OCWD as local sponsor
- Increased stormwater capture requires no modification to dam structures



Stormwater Capture at Prado Dam



Water held below elevation 505 ft is released at rate OCWD can recharge it downstream

Forecast Informed Reservoir Operations at Prado Dam

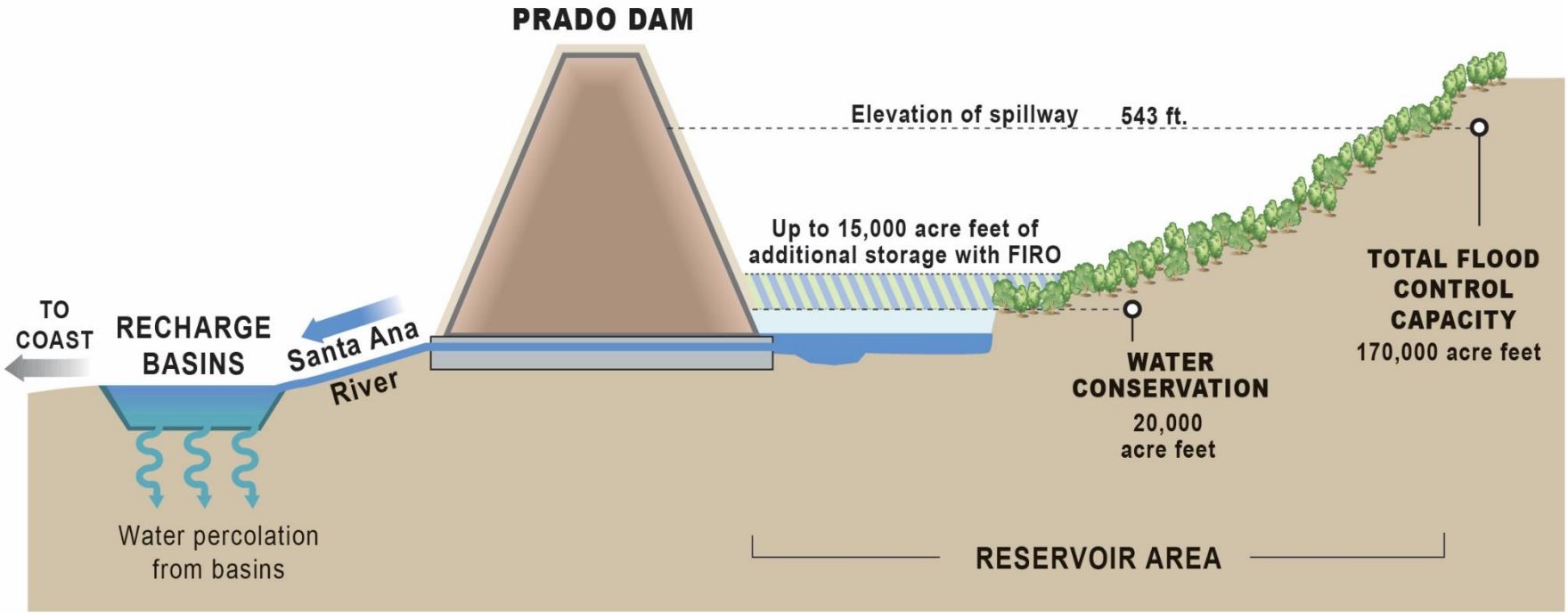
- We are exploring application of FIRO at Prado Dam
- Potential to expand storage volume available for stormwater capture without impacting flood risk management

FIRO Steering Committee chaired by Dr. Marty Ralph and Greg Woodside

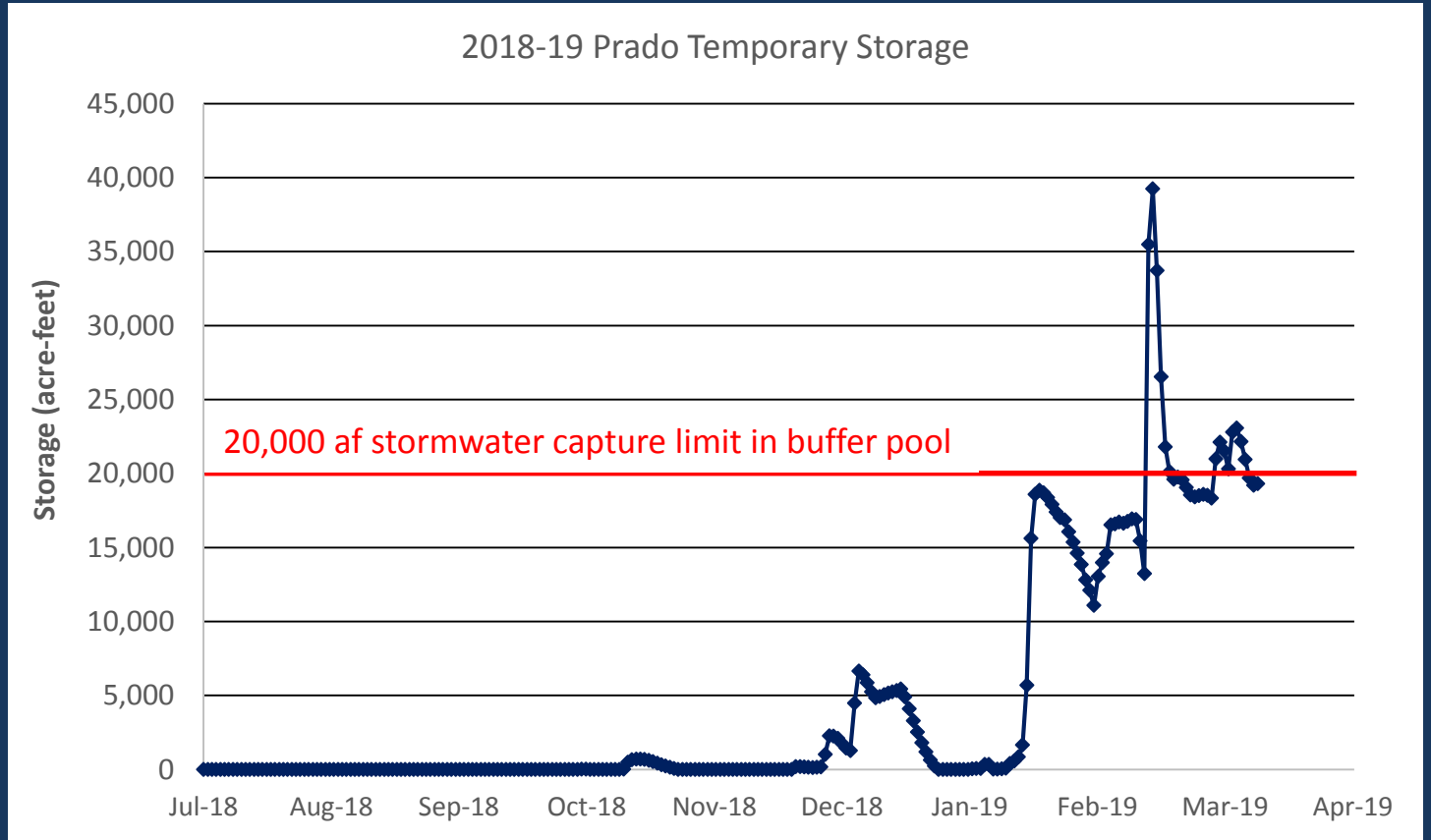
Includes staff from:

- USACE
- DWR
- National Weather Service
- Sonoma Water
- Orange County DPW
- USFWS

Potential Increased Storage Space With Forecast Informed Reservoir Operations



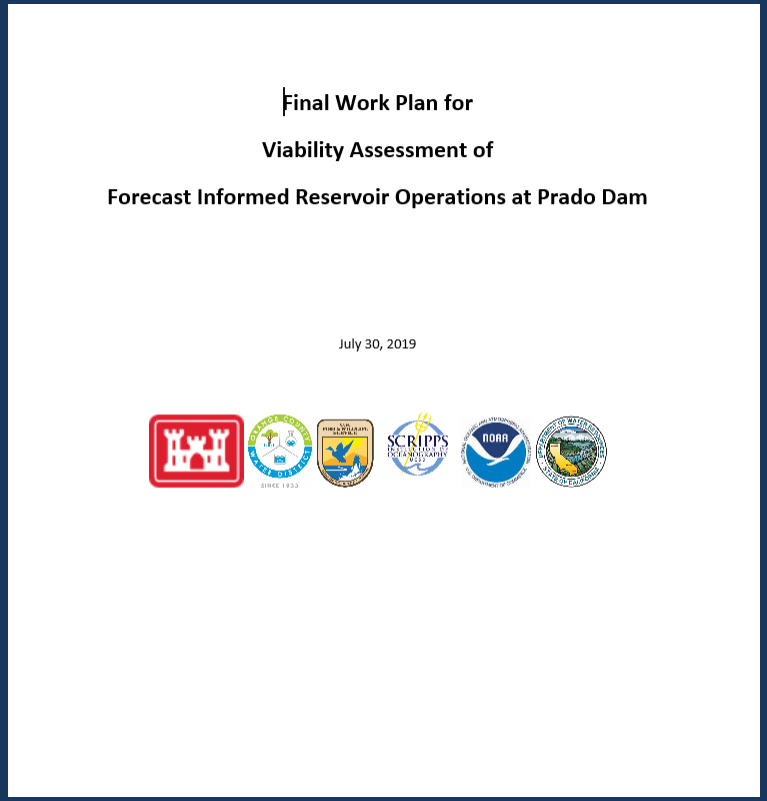
February 14, 2019 AR increased storage behind Prado Dam to nearly 40,000 af



Prado Dam FIRO Scoping Study

- FIRO Viability Assessment Work Plan (completed Aug. 2019)
- Preliminary technical studies, including
  - Explore precipitation forecast skill
  - Evaluate forecast lead time needed for FIRO at Prado Dam

Prado Dam FIRO Work Plan



Final Work Plan for

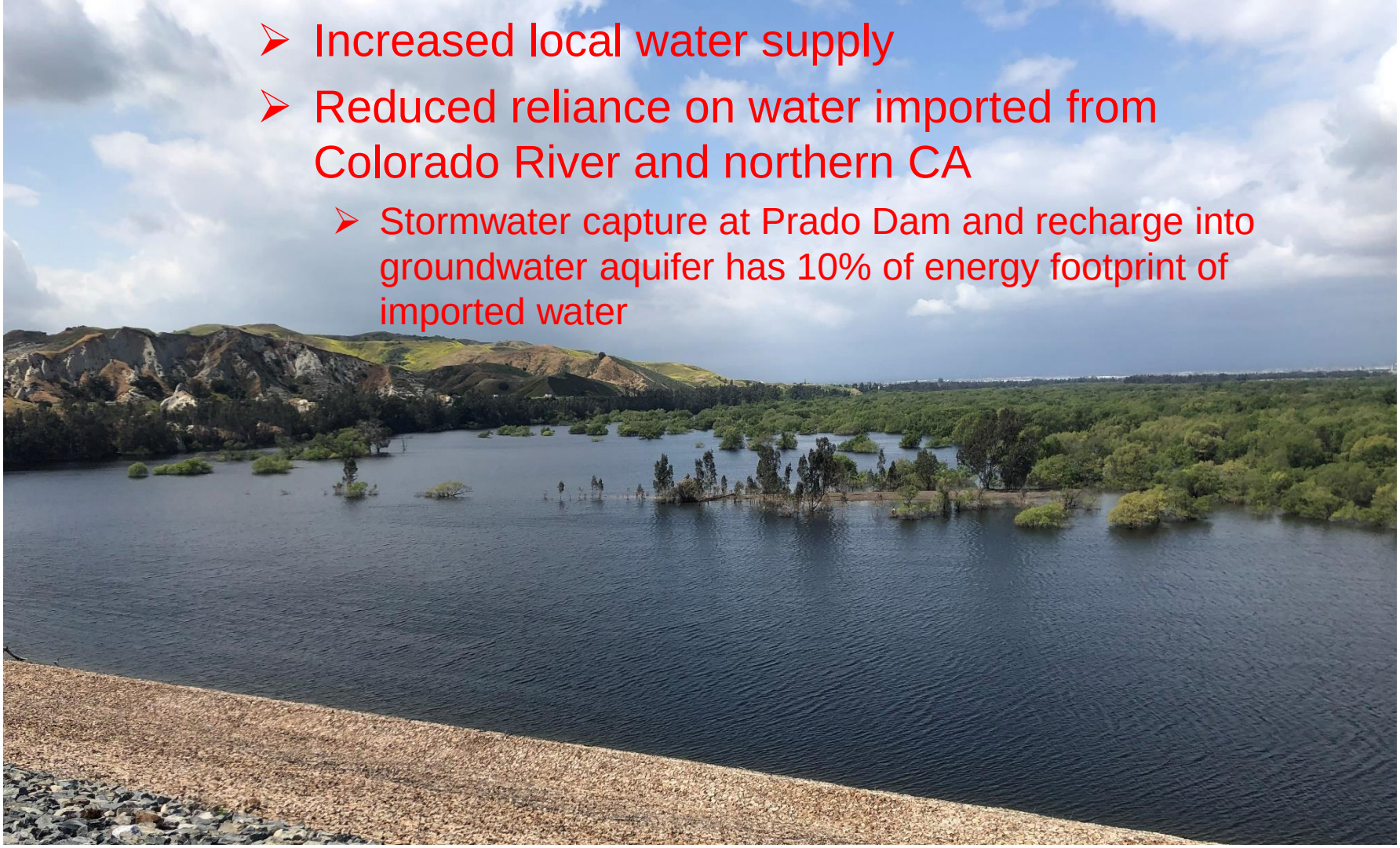
Viability Assessment of

Forecast Informed Reservoir Operations at Prado Dam

July 30, 2019

Key issues include:

- Forecast skill of large rain events
- Modeling river flow rate into Prado Reservoir
- Time to drain volume of increased stormwater captured
- Endangered species
- Land use within the reservoir area



- Increased local water supply
- Reduced reliance on water imported from Colorado River and northern CA
  - Stormwater capture at Prado Dam and recharge into groundwater aquifer has 10% of energy footprint of imported water

Prado Dam FIRO Timeline

Phase I: Scoping Study, Develop FIRO Viability Assessment Work Plan Outline

Phase II: Conduct Technical Studies; Complete FIRO Viability Assessment Work Plan

Phase III: Execute FIRO Viability Assessment

Phase IV: Conduct FIRO at Prado Dam as part of Major Deviation

Phase V: FIRO incorporated into Prado Dam Water Control Manual as permanent feature.

*Phase IV/V timeline dependent on hydrology and completion of the Santa Ana River Mainstem Project.