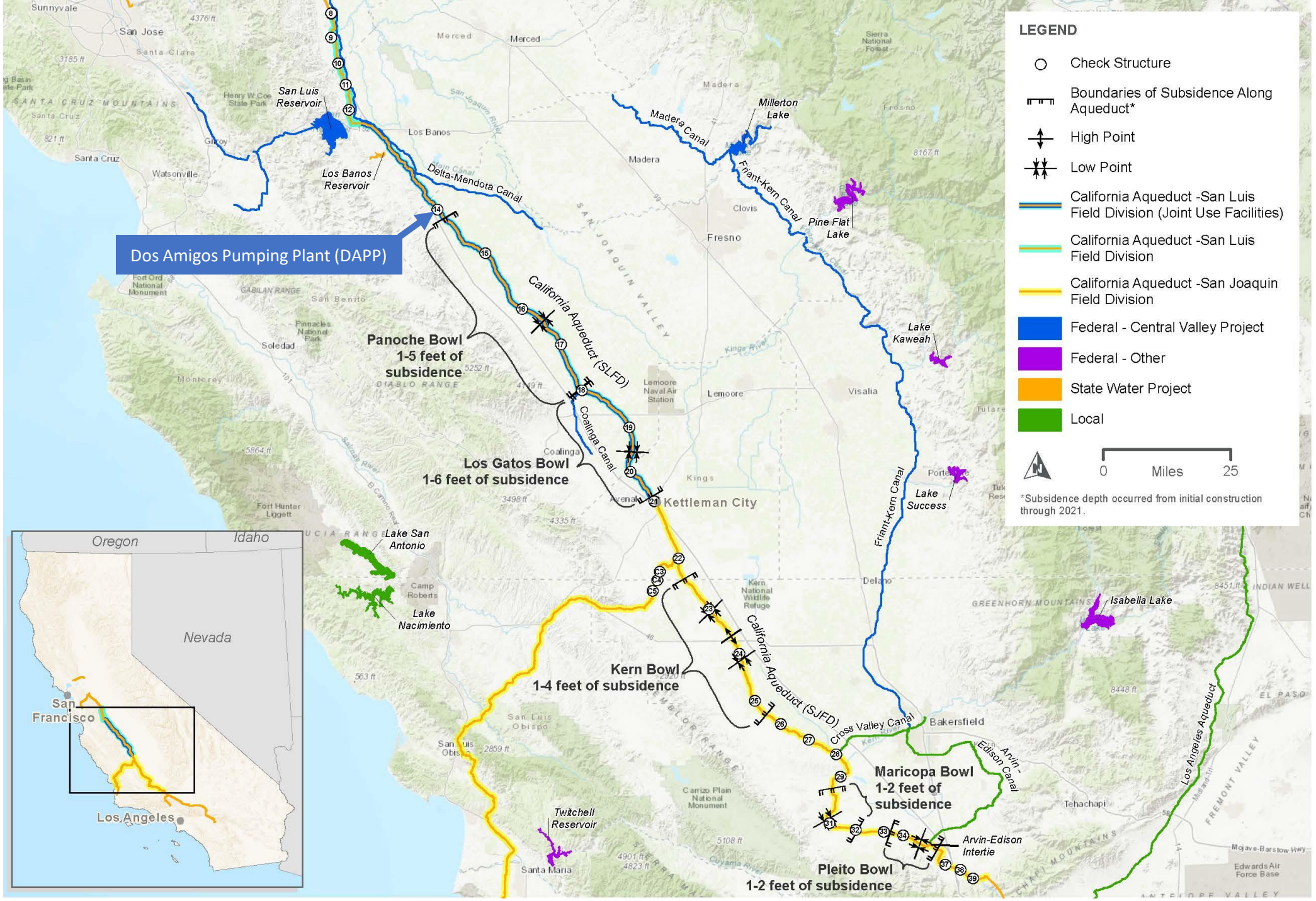
Modifying Spatial Distribution to Representation of California Aqueduct

STATE OF CALIFORNIA
DEPARTMENT OF WATER RESOURCES
STATE WATER PROJECT

California Water and Environmental Modeling Forum

4/17/2023



Groundwater overdraft subsidence in San Joaquin Valley

Impacts water delivery of the California Aqueduct

Subsidence is projected to continue

Aqueduct Profile Plot showing Subsidence Bowls

North

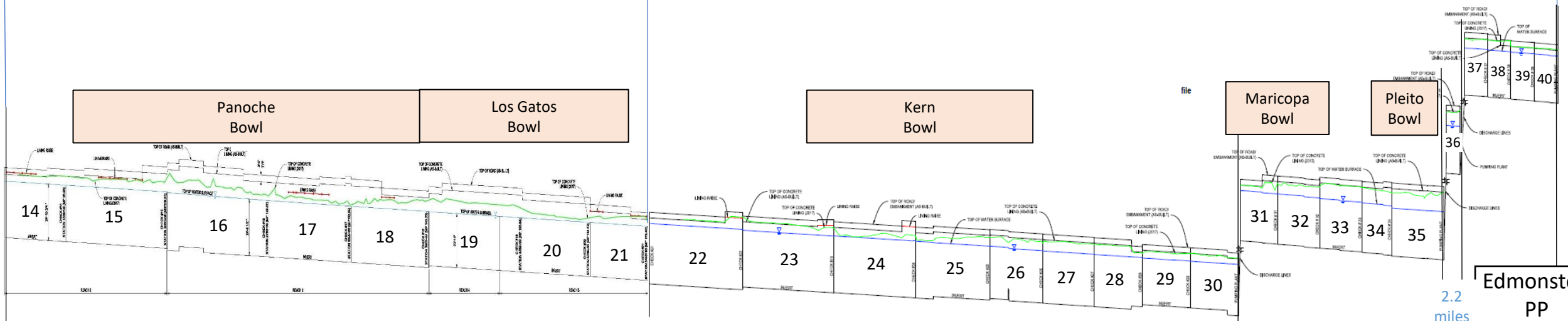
South

85.5 miles

121 miles

San Luis Field Division

San Joaquin Field Division



164 miles

27 miles

2.2 miles

13 miles

Dos Amigos PP

Buena Vista PP

Teerink PP

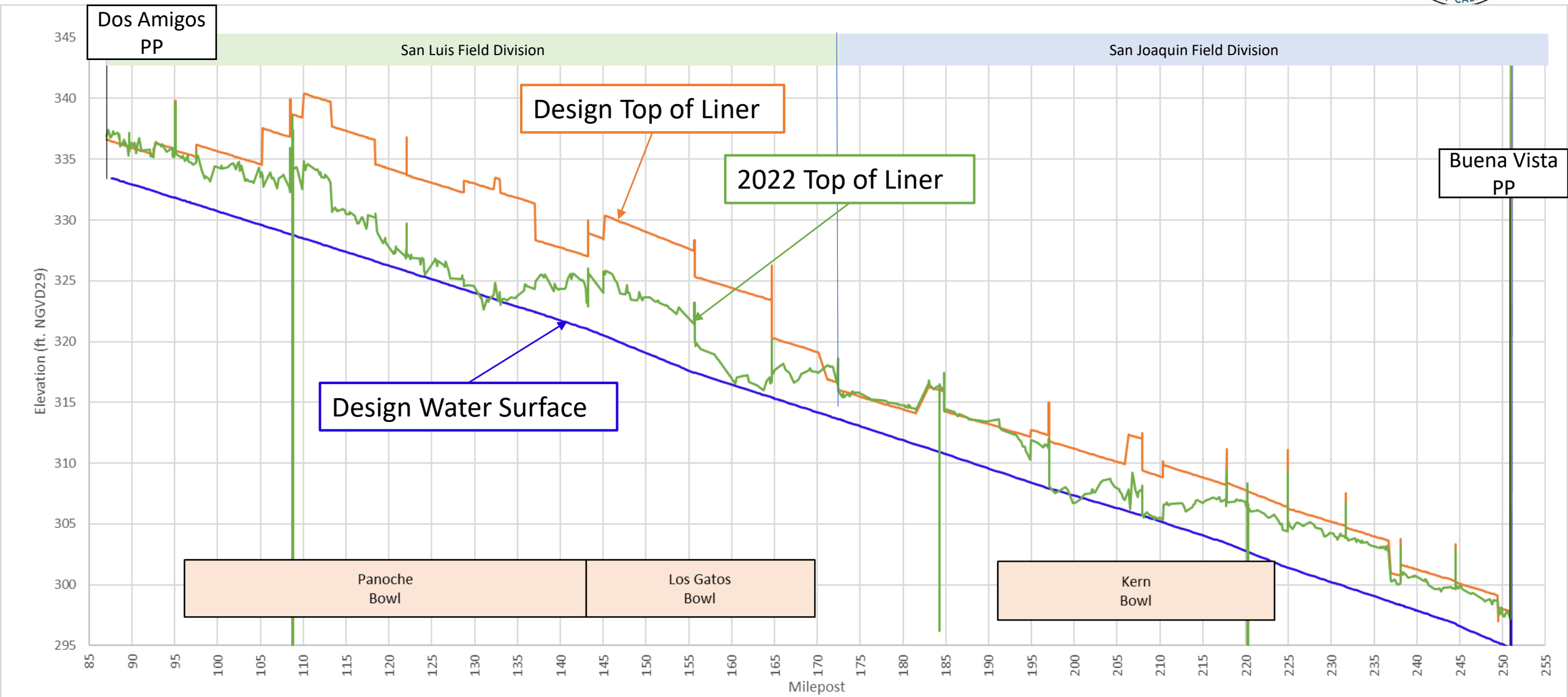
Chrisman PP

Edmonston PP

Bowl	Start MP	End MP	Length
Panoche	96.00	143.00	47.00
Los Gatos	143.00	170.00	27.00
Kern	192.00	224.00	32.00
Maricopa	250.00	263.00	13.00
Pleito	269.00	278.00	9.00
		Total	128

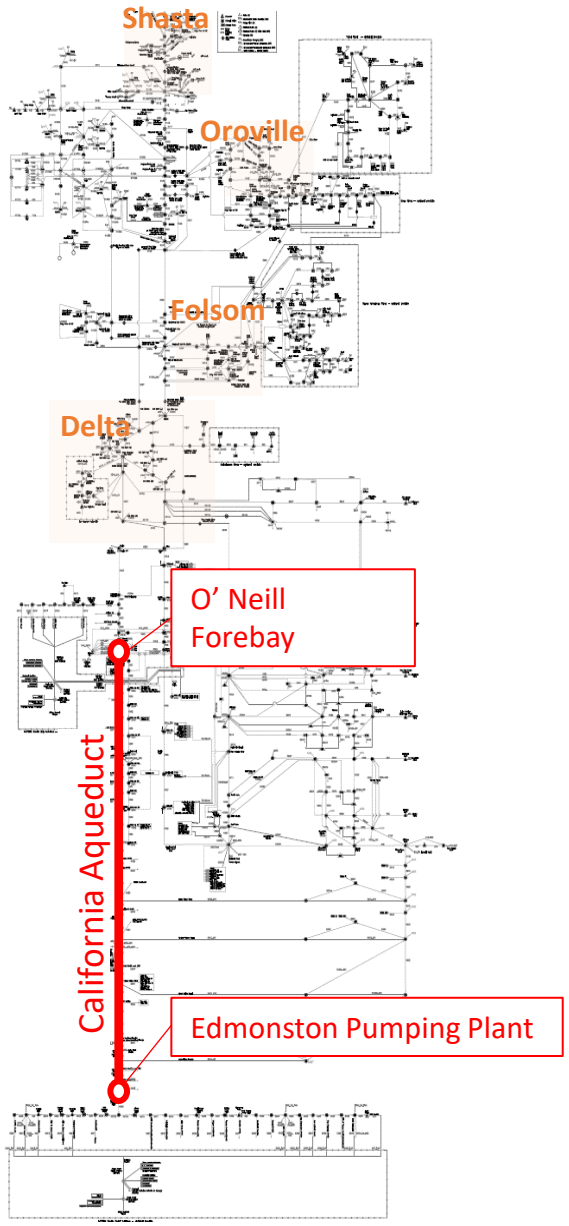
**Figure not to Scale*

Subsidence Impacts on Aqueduct Operations

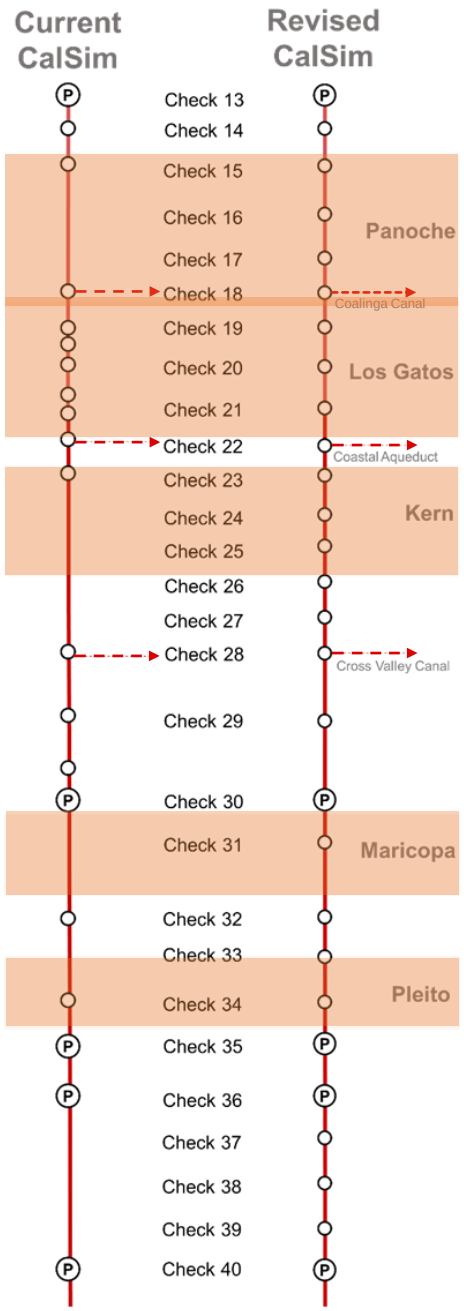


CalSim Will Simulate Delivery Capability with Subsidence

CalSim II Model Schematic



- Current versions of CalSim lack necessary resolution to evaluate subsidence effects on water delivery:
  - Representation of the Aqueduct did not correlate well with subsidence areas.
  - Demands were not based on individual pools.
- The Aqueduct portion of CalSim II has been modified to include separate accounting for each pool from the Dos Amigos Pumping Plant (DAPP) to Edmonston.
- Pilot development has been done in CalSim II and will be implemented in CalSim 3.



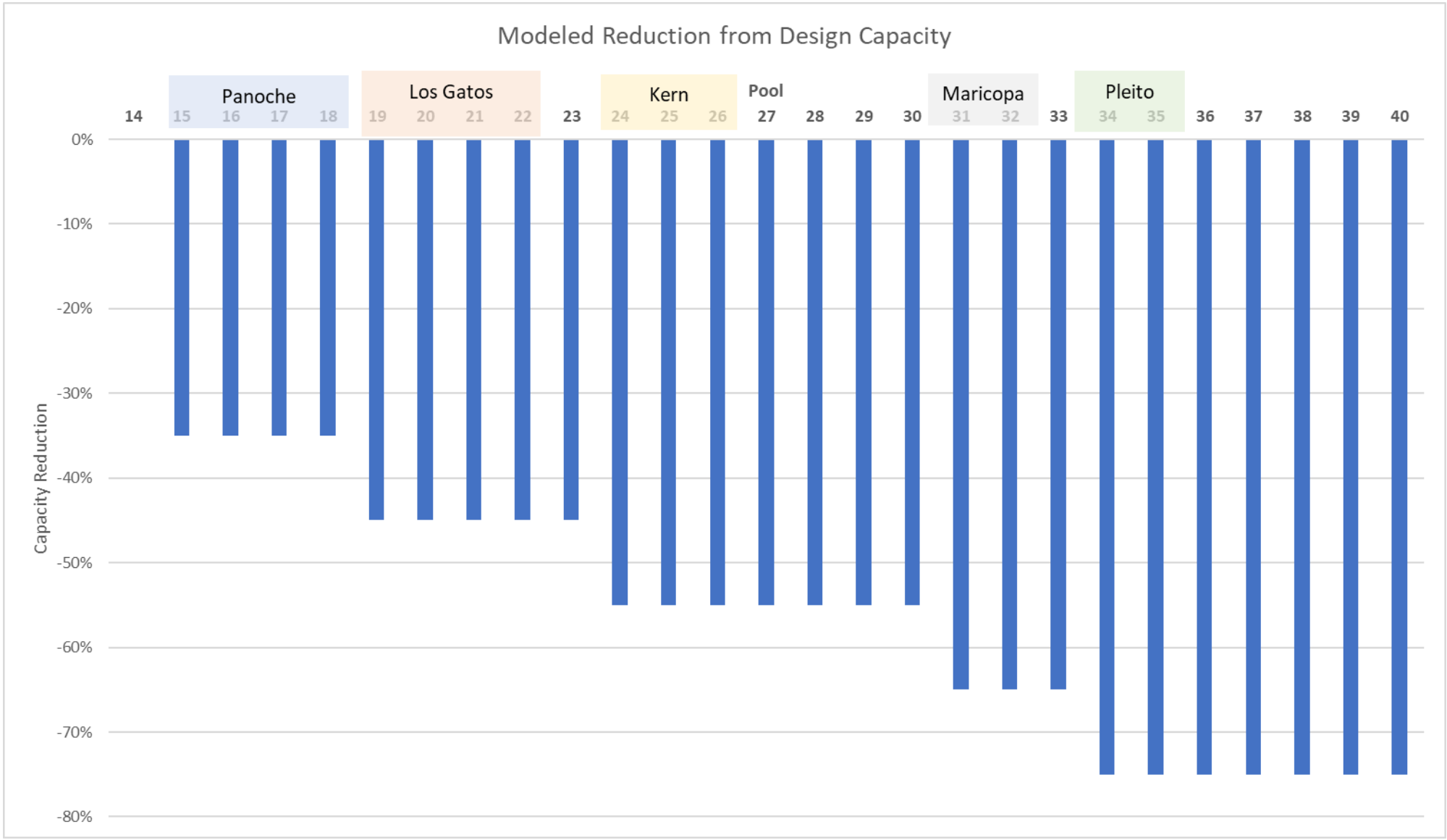
Summary of CA Aqueduct Refinements

- Revised spatial resolution of California Aqueduct to pool-by-pool
  - Reflect Aqueduct design capacity changes
  - Represent Aqueduct sections where subsidence may reduce capacity
- Set capacity values of revised Aqueduct configuration to match original design and Joint Use Facilities Agreement provisions
- Disaggregated demands by pool based on historical deliveries
- Reviewed and revised conveyance priorities for SWP and CVP water supplies

Modified Model Verified Favorably with DCR 2019

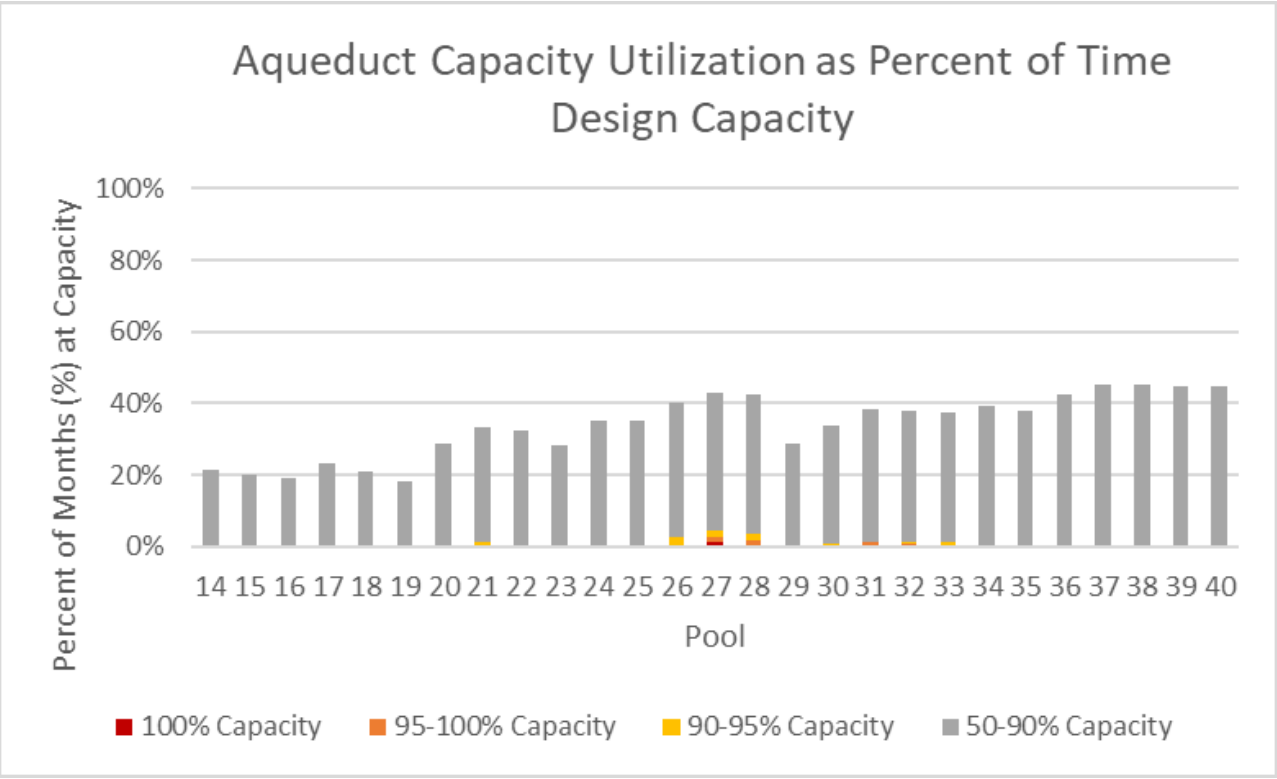
- Began with DCR 2019 CalSim II model
- Compared results:
  - Reservoir Storages
  - Delta Exports
  - Delta Outflow
  - Deliveries
- Simulations compared favorably, with minor changes resulting from application of design capacity and Joint Use capacity allocations in the Aqueduct

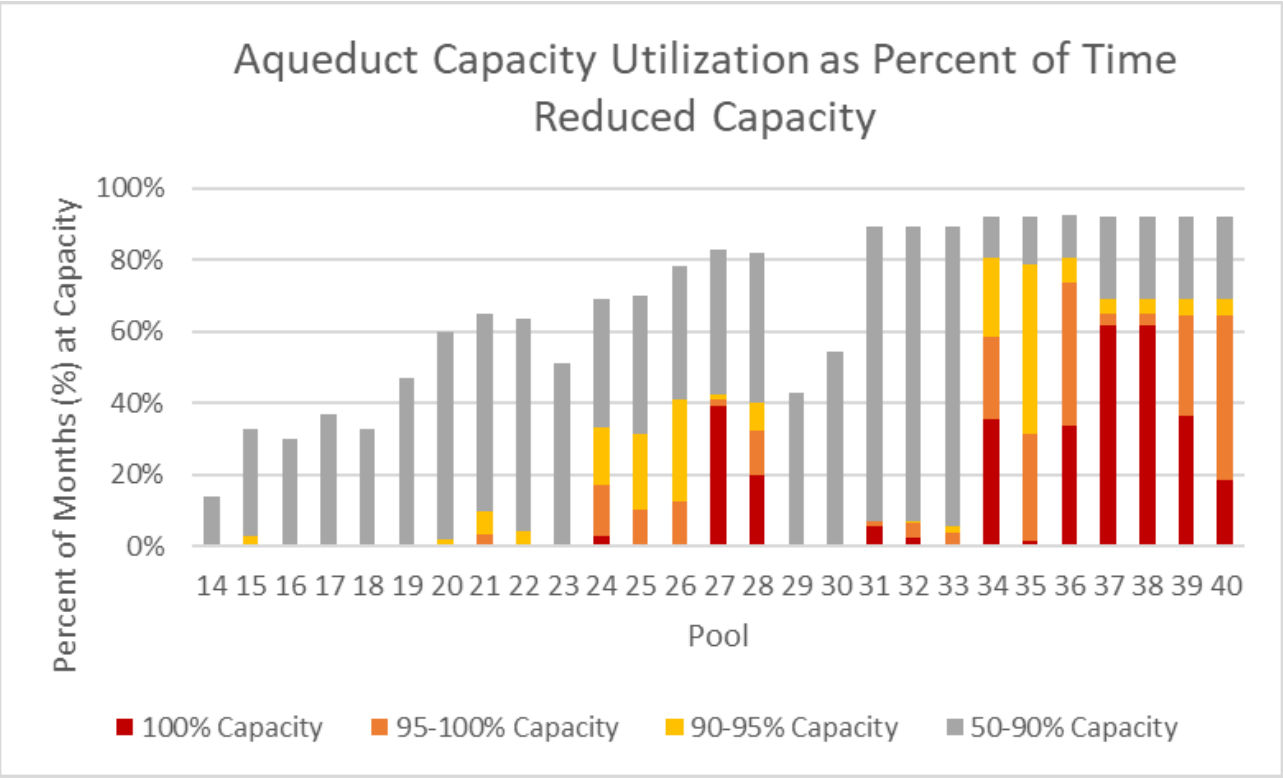
Proof of Concept Simulation: Reduced Capacities Pool 14 to 40



NOTE: Hypothetical capacity reductions used in proof of concept simulation

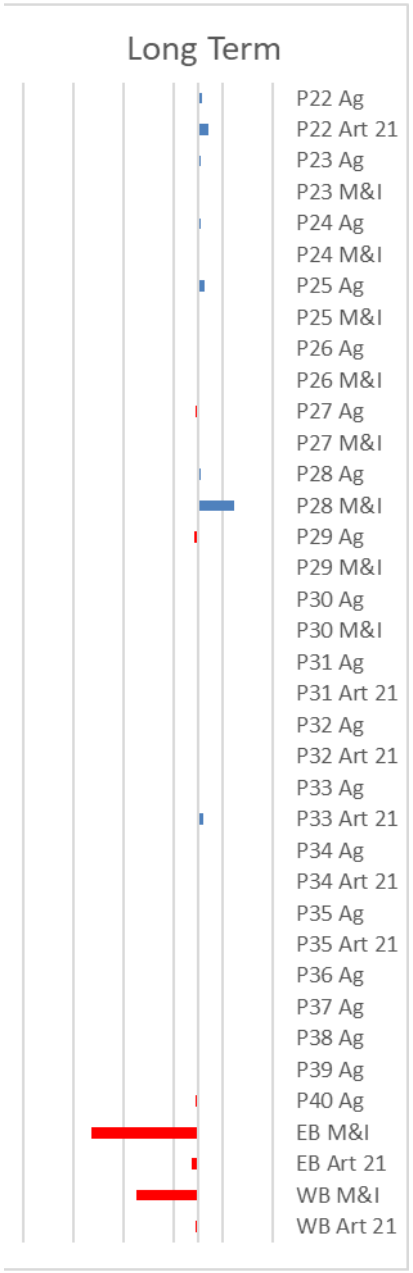
Water Delivery Reductions Occur When Full Available Capacity Is Used





NOTE: Utilization of hypothetical capacity in proof of concept simulation

Proof of Concept Simulation: SWP Delivery Changes



System response to reduced downstream deliveries increases upstream deliveries

Progressively greater capacity reductions affect downstream deliveries

NOTE: Hypothetical delivery changes from proof of concept simulation

Next Steps

- Port modifications to CalSim 3 architecture
  - Increase spatial resolution
  - Increase delivery resolution at pool level along CA Aqueduct
  - Clarify and refine prioritization of delivery types