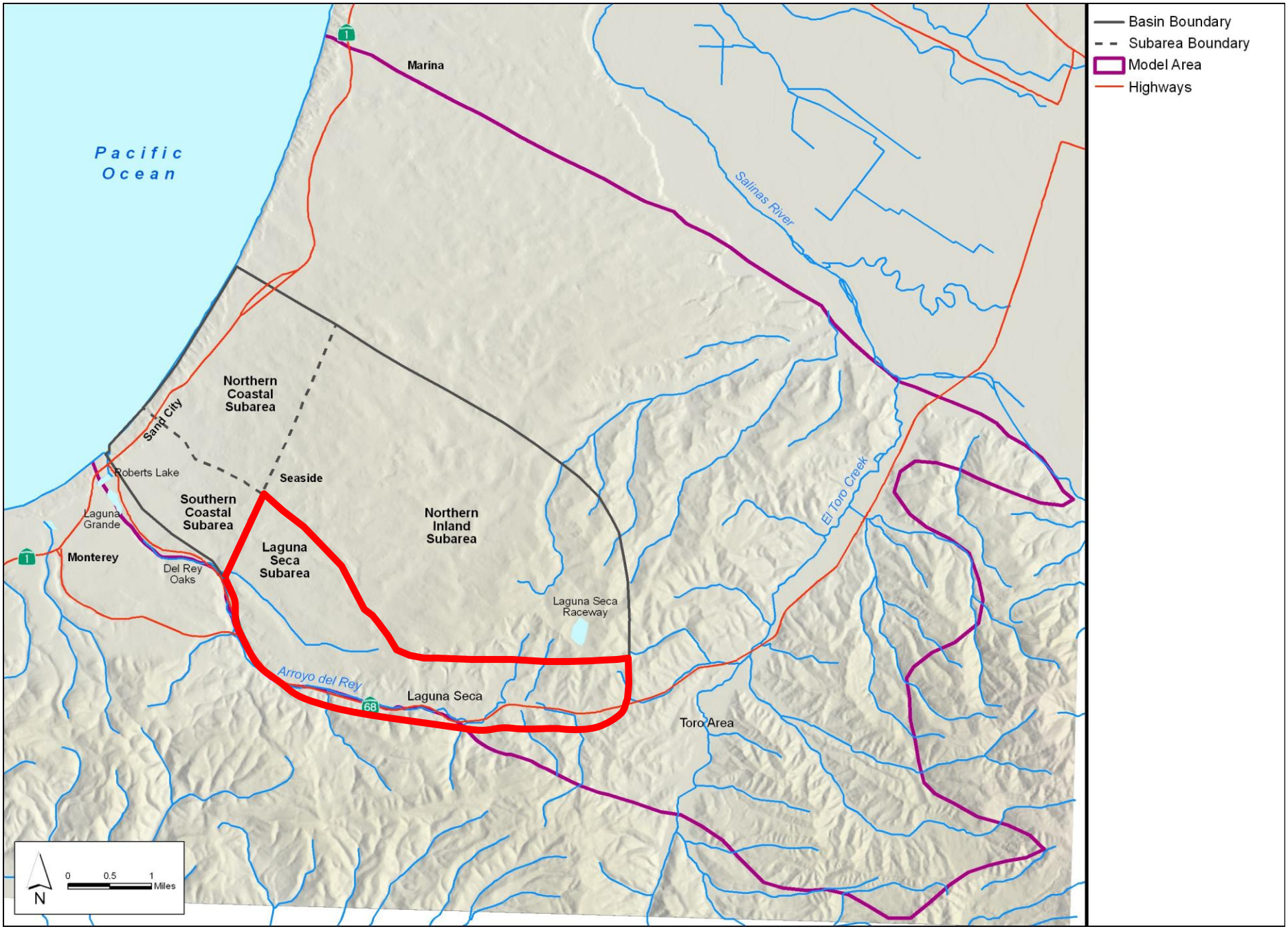
Seaside Basin Watermaster Board of Directors Meeting

April 2, 2014

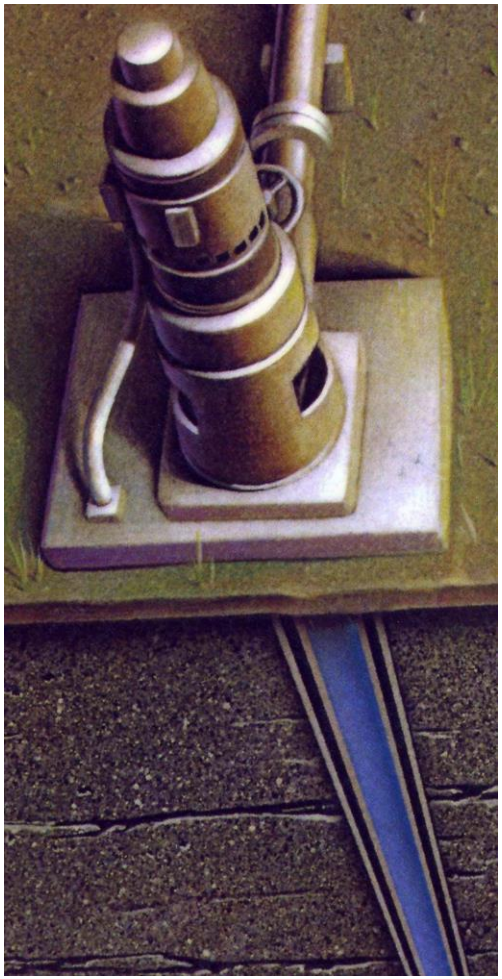
Results of Laguna Seca Safe Yield Modeling

HydroMetrics WRI


Basin Boundary
Subarea Boundary
Model Area
Highways
Pacific Ocean
Marina
Salinas River
Northern Coastal Subarea
Sand City
Roberts Lake
Seaside
Southern Coastal Subarea
Laguna Grande
Monterey
Del Rey Oaks
Laguna Seca Subarea
Northern Inland Subarea
Laguna Seca Raceway
El Toro Creek
Arroyo del Rey
Laguna Seca
Toro Area
0 0.5 1 Miles
N

Background

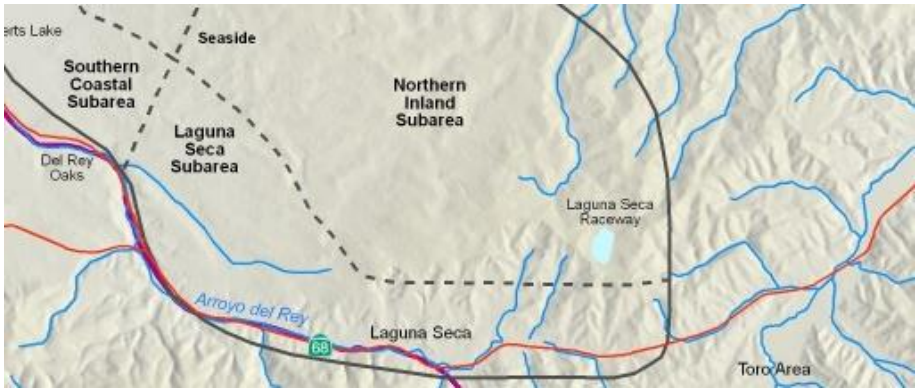
- Safe yield is generally defined as the amount of water that can be pumped from a basin without causing undesirable impacts



HydroMetrics WRI

Background

- The Decision sets a safe yield for the Laguna Seca sub-area at 644 acre-feet/year.
- The source of this number is unclear.



Background

- Operational safe yield is how much can be pumped from **existing wells** without undesirable impacts.
- The operational safe yield is always **equal to or less than** the safe yield.
- The Decision states that the operational safe yield can be modified if pumping will cause "Material Injury".

HydroMetrics WRI

Modeling Purpose

- What is the effect of Cal-Am no longer pumping from Laguna Seca?
- Is the safe yield of the Laguna Seca sub-area 644 acre-feet per year?
- What is the operational safe yield of the Laguna Seca sub-area?

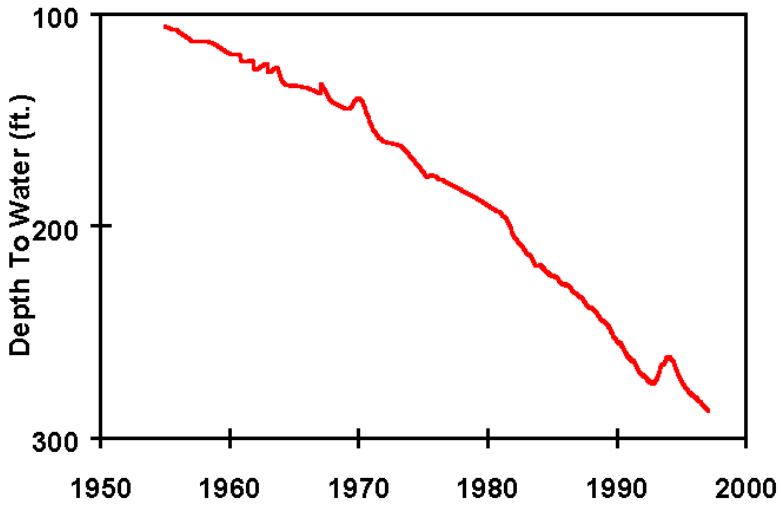
Questions rely on a definition of Material Injury! What defines "too much pumping"?

HydroMetrics WRI

Safe Yield Definition for Model

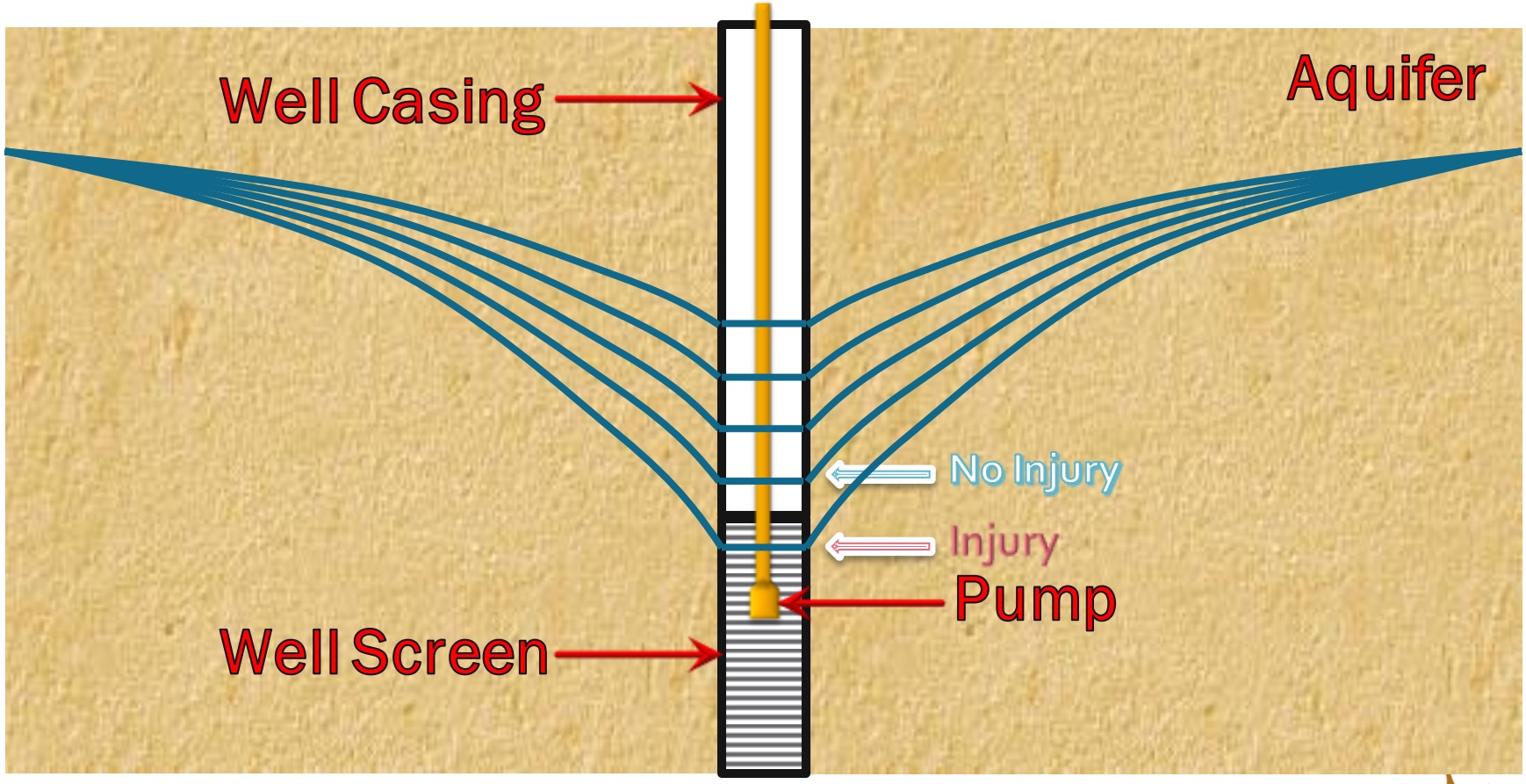
Groundwater levels must equilibrate by the end of the simulation.

Groundwater levels that continue to drop throughout the simulation are not sustainable.



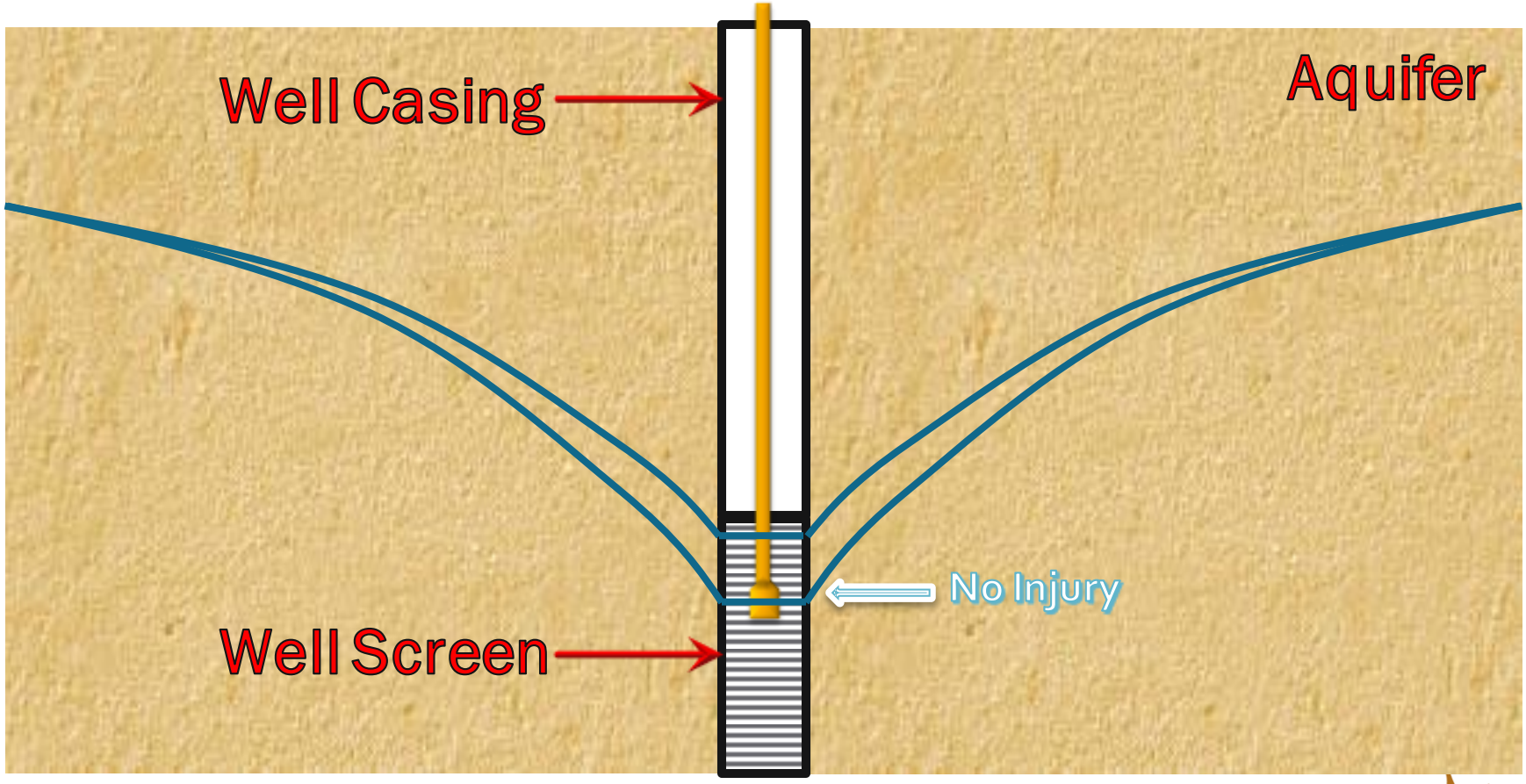
HydroMetrics WRI

Material Injury Definition for Model



HydroMetrics WRI

Material Injury Definition for Model



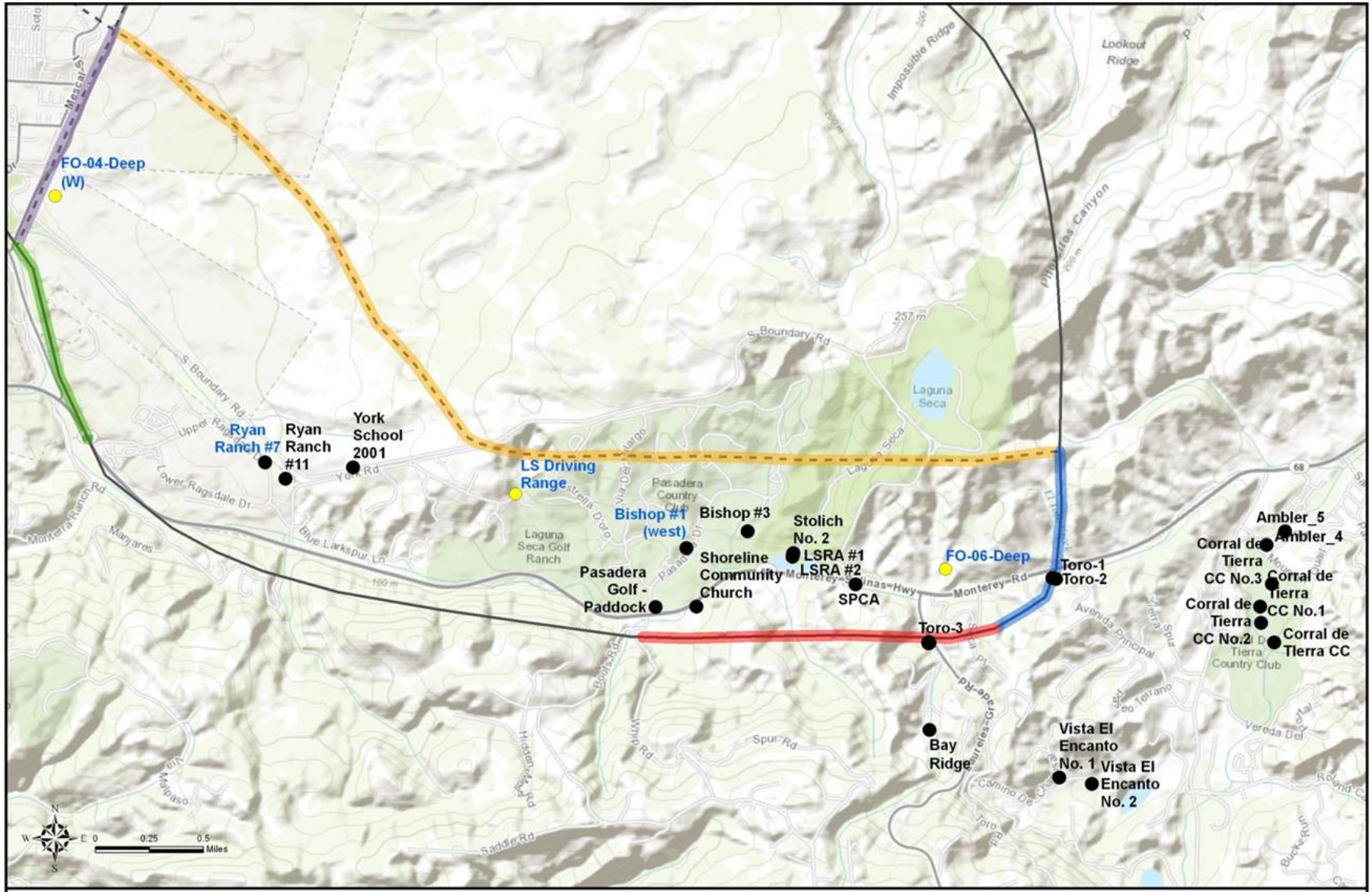
HydroMetrics WRI

Baseline Scenario Establishes Safe Yield

- Cal-Am's 25 Year Replenishment Plan
- Alternative Producers pump at 2011 rates
- Laguna Seca pumping ≈ 520 acre-feet/year

Yield = Recharge + Inflow – Subsurface Outflow

- Annual average natural safe yield = 240 acre-feet/year


FO-04-Deep (W)
Ryan Ranch #7
Ryan Ranch #11
York School 2001
LS Driving Range
Bishop #1 (west)
Bishop #3
Stolich No. 2
LSRA #1
LSRA #2
SPCA
Shoreline Community Church
Pasadera Golf - Paddock
FO-06-Deep
Toro-1
Toro-2
Toro-3
Ambler_5
Ambler_4
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Monterra Ranch Rd
Mesa Dr
Hidden Valley Rd
Buckeye Rd
Vereda Del Tesoro
Camino De Chaparral
Vereda Del Valle
Rolando Ca
Buckeye Run
Mescal St
Soto
Manzanares
Malpaso
Via Del Largo
Estrella Drive
Pasadera Dr
Laguna Seca
Tierra Spur
Vereda Del Tesoro
257 m
200 m
100 m
68
N
S
E
W
0
0.25
0.5
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Adjudicated Seaside Groundwater Basin Boundary
Basin Boundary
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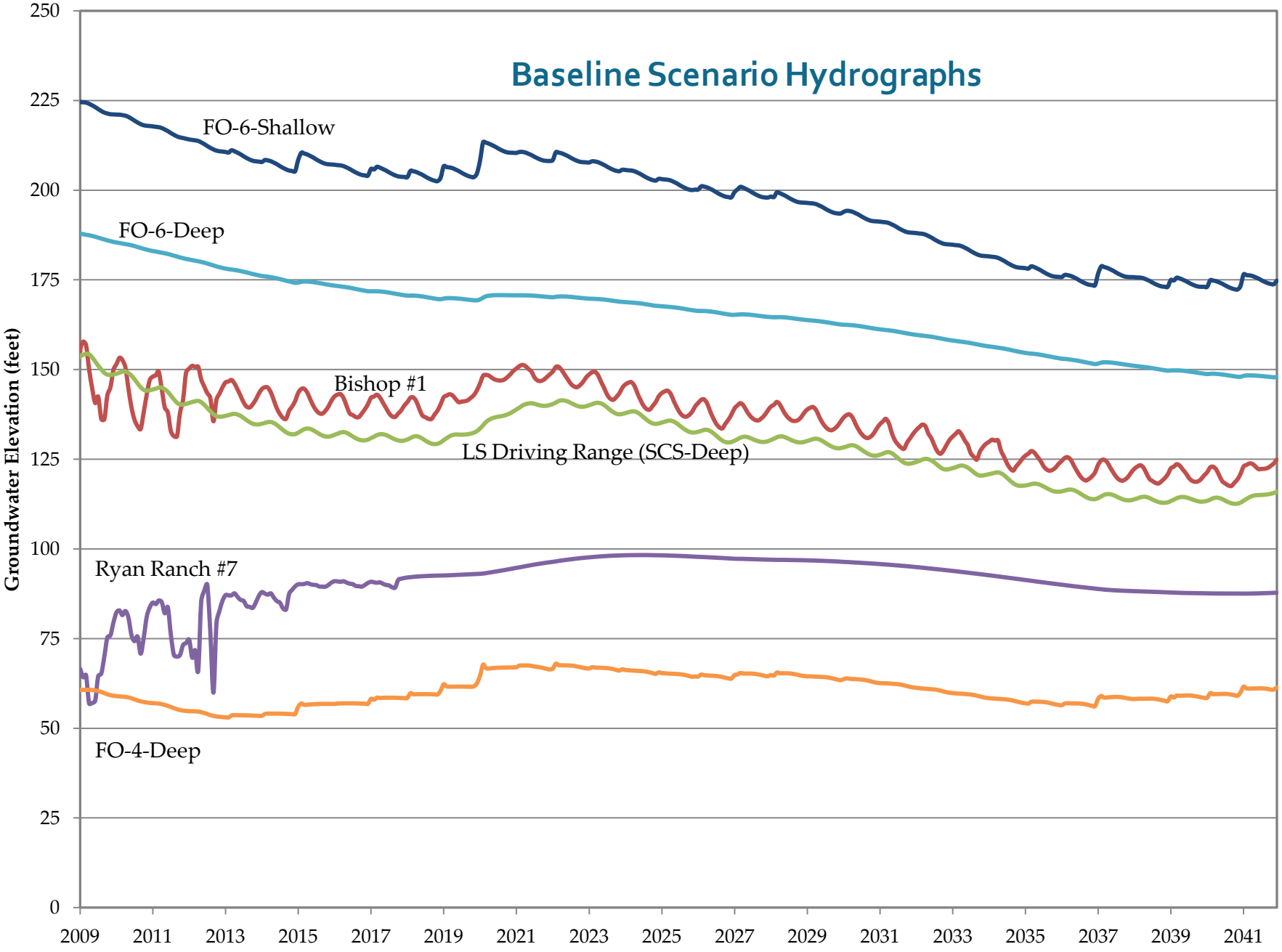
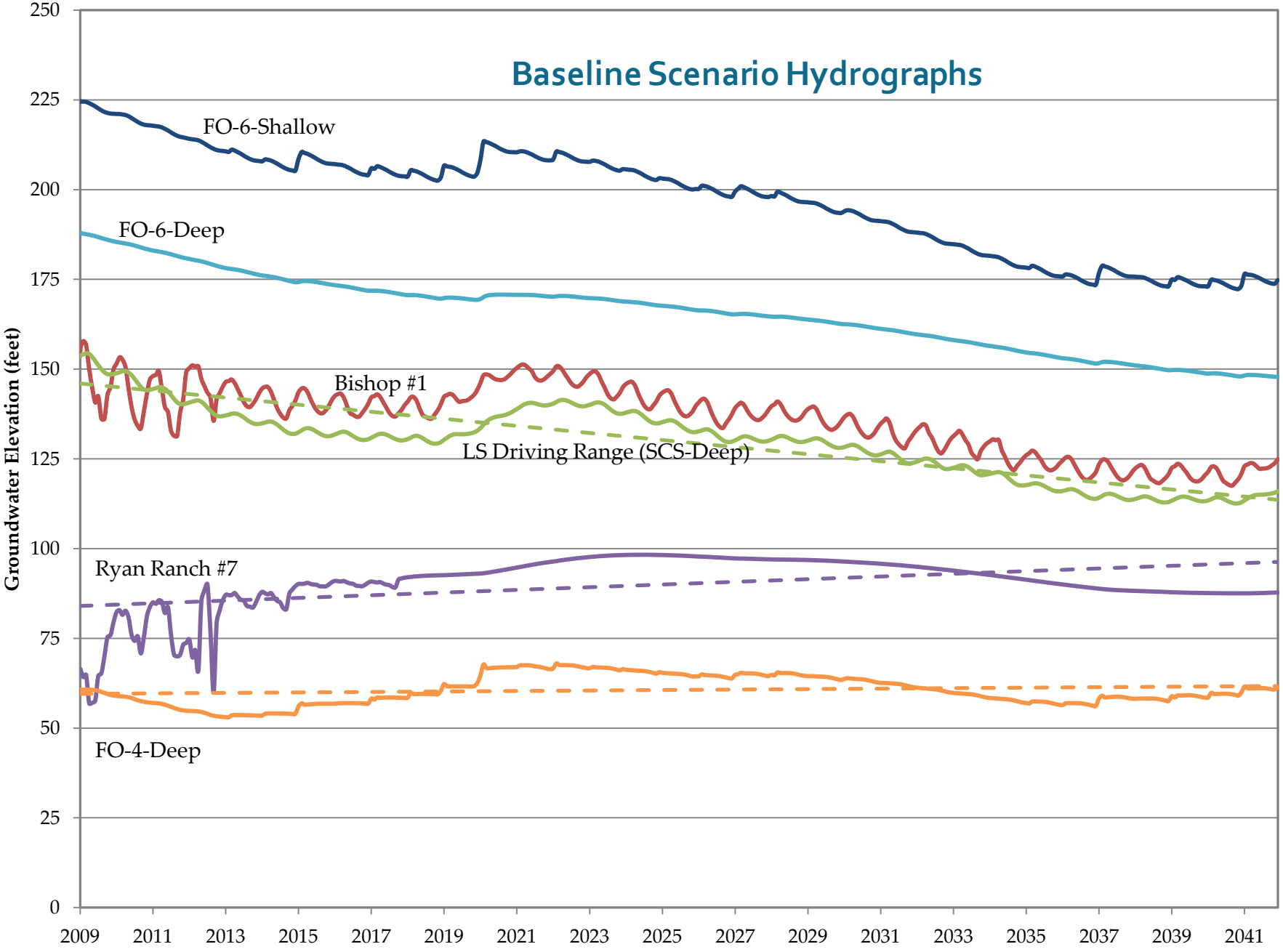
West Boundary
Blue well labels indicate well used in a hydrograph
HydroMetrics WRI


Baseline Scenario Hydrographs
Groundwater Elevation (feet)
250
225
200
175
150
125
100
75
50
25
0
2009
2011
2013
2015
2017
2019
2021
2023
2025
2027
2029
2031
2033
2035
2037
2039
2041
FO-6-Shallow
FO-6-Deep
Bishop #1
LS Driving Range (SCS-Deep)
Ryan Ranch #7
FO-4-Deep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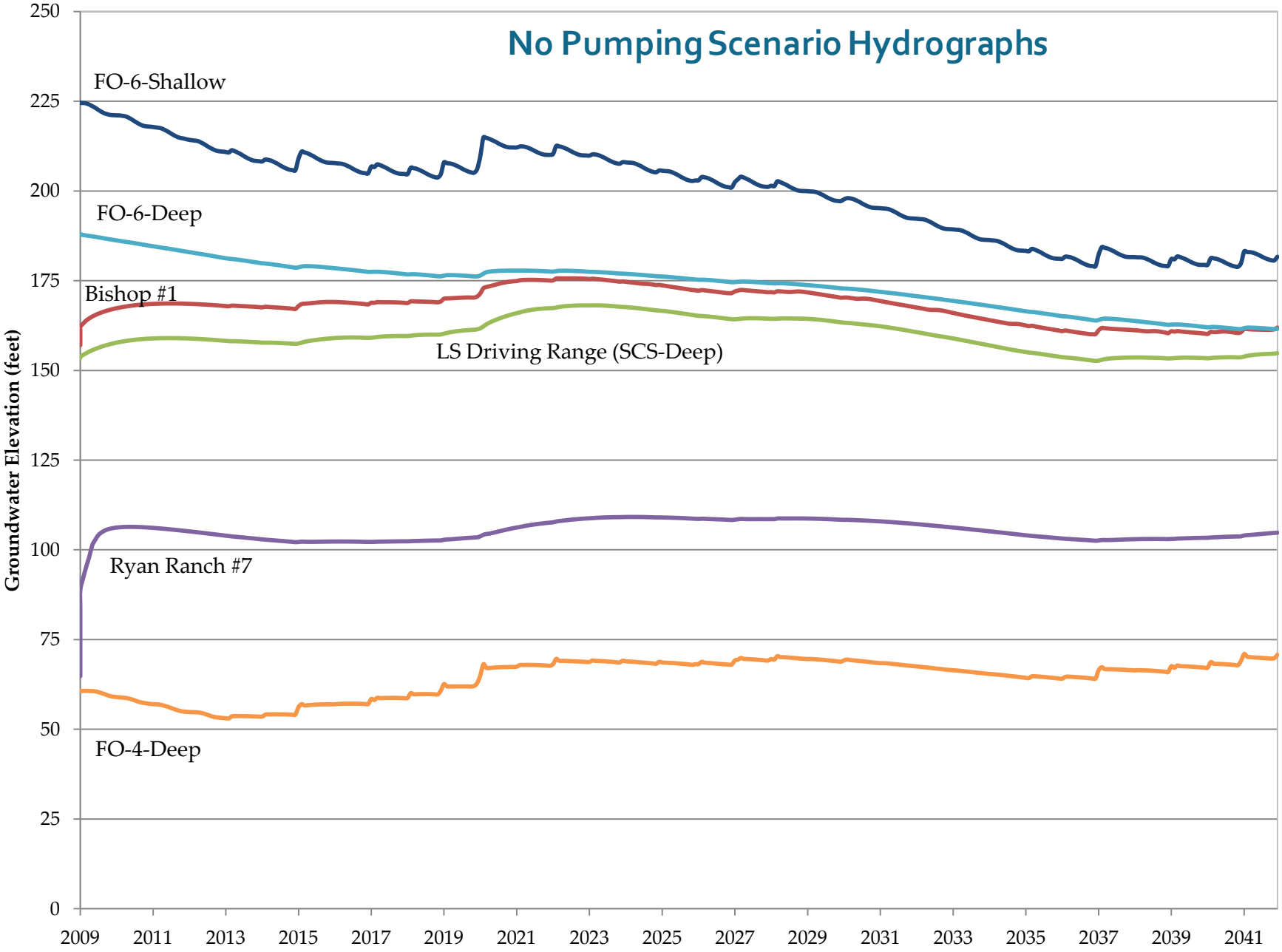
Operational Safe Yield Simulation

1) Operational Safe Yield Criteria
   - Groundwater elevations stabalize
   - Maintain minimum subsurface outflows at present levels
   - Prevent Material Injury

Can We Get to an Operational Safe Yield?

- What happens if pumping of both standard producers and alternate producers is reduced to zero.

- Groundwater levels in eastern monitoring wells continues to drop.
- Can't meet at least one of the criteria.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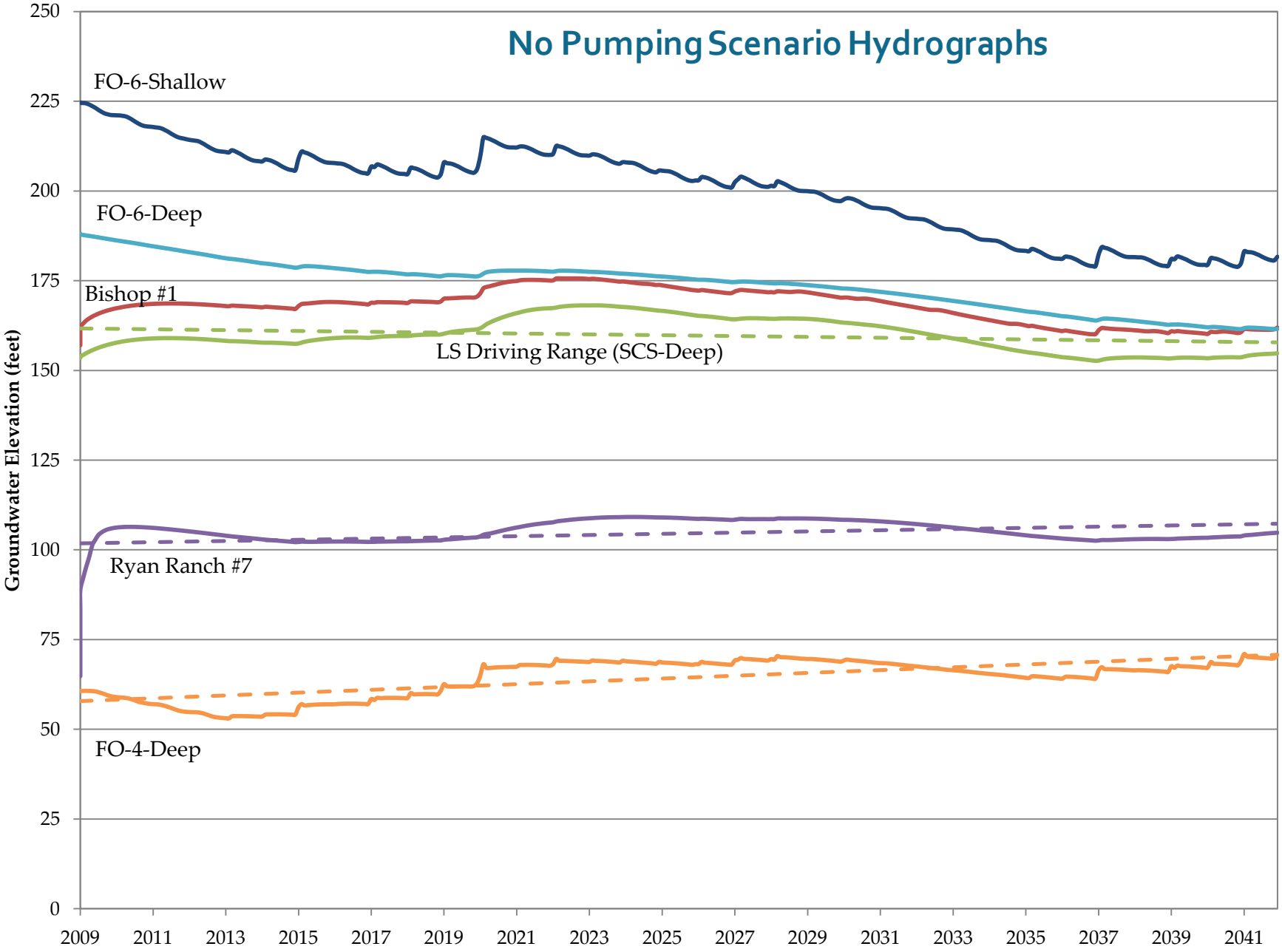
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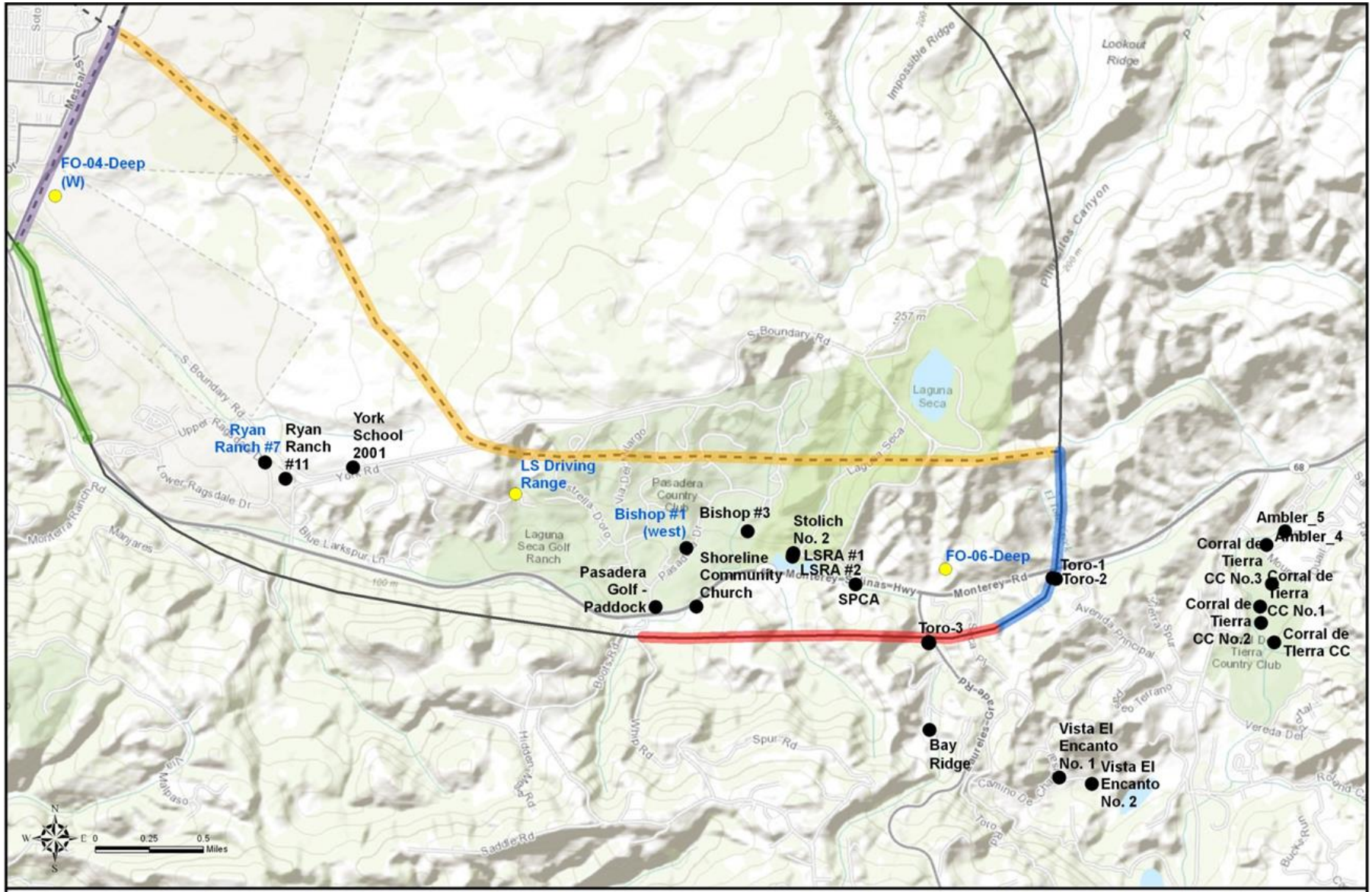
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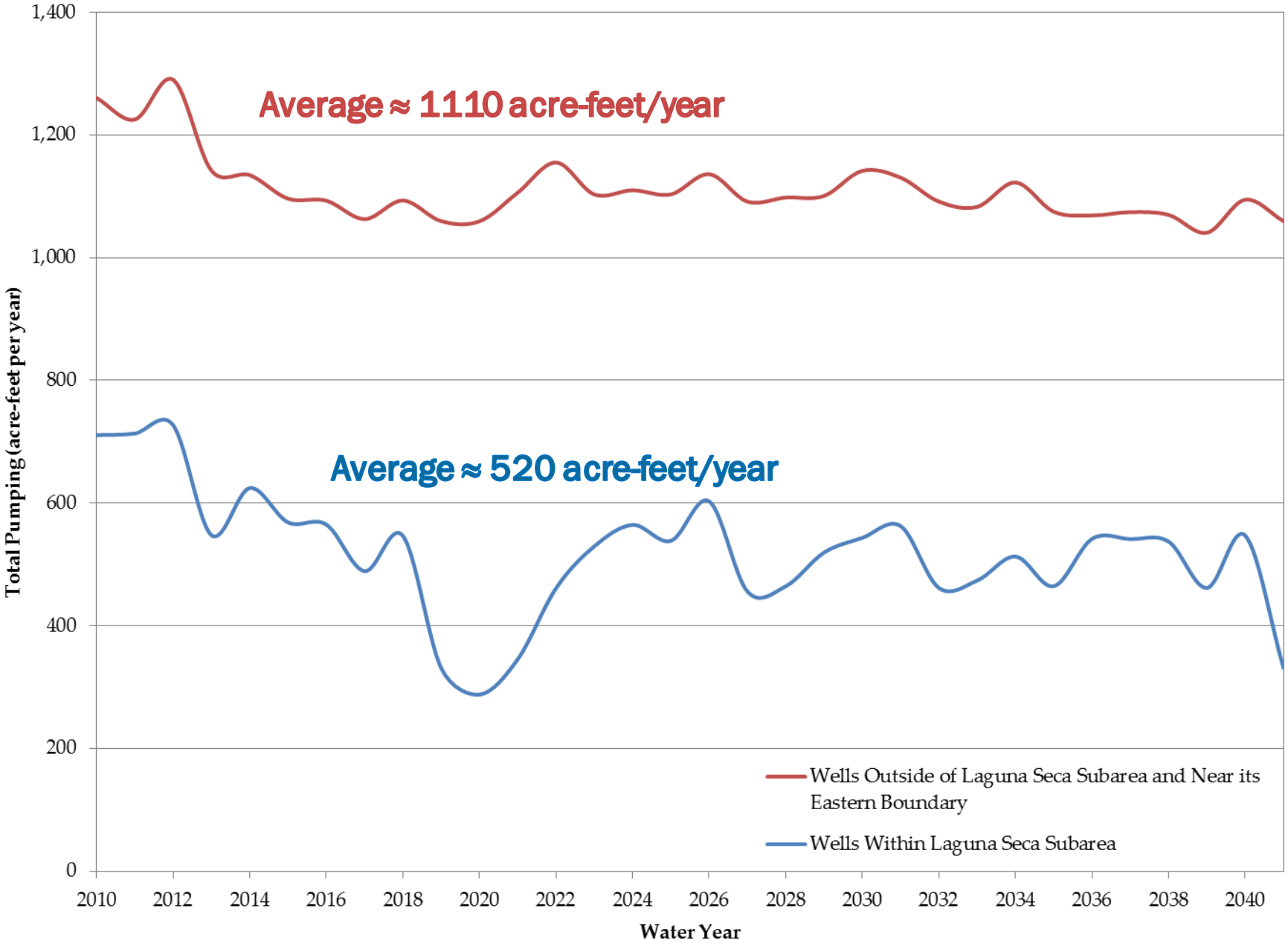
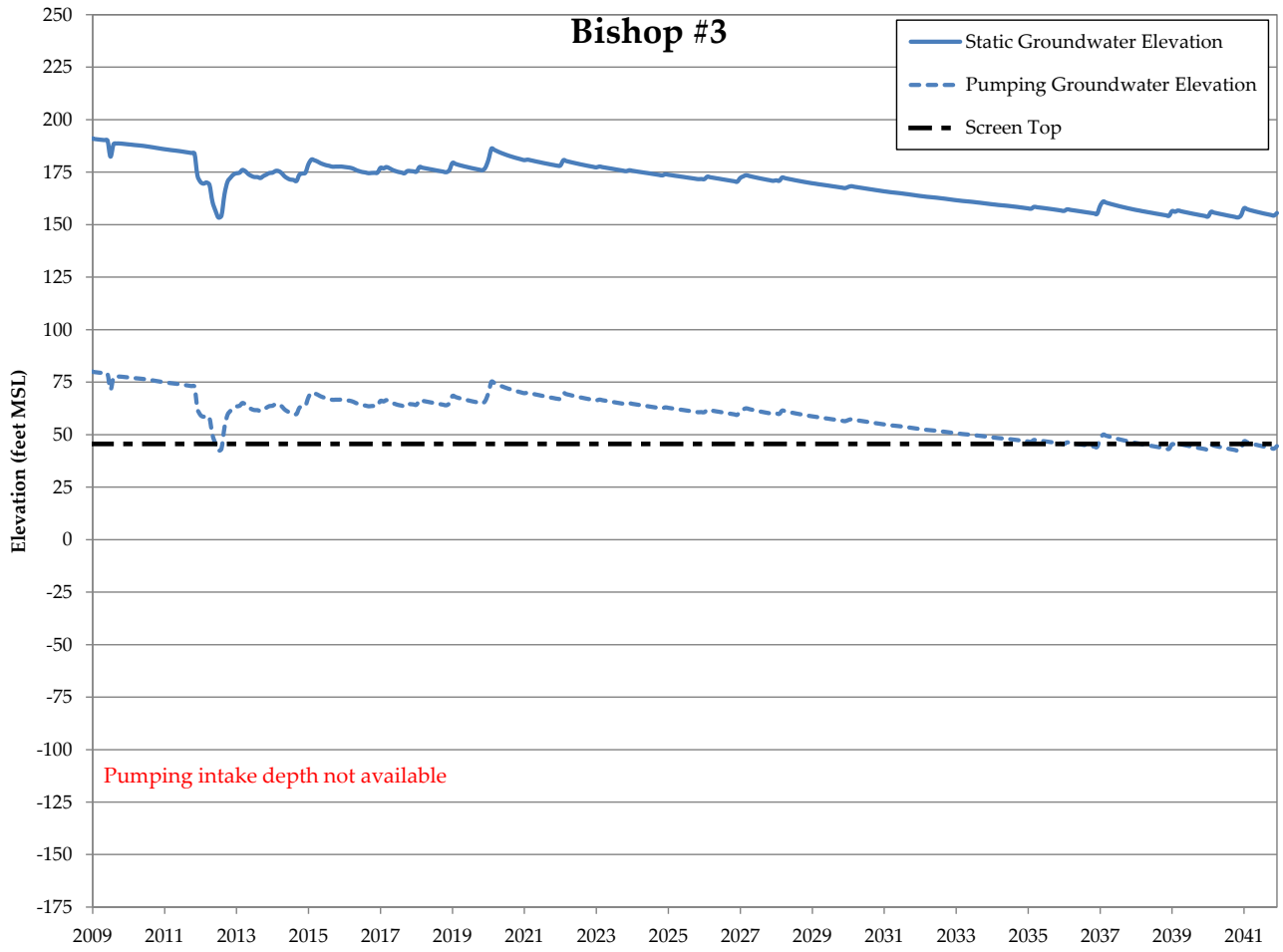

Average ≈ 1110 acre-feet/year
Average ≈ 520 acre-feet/year
Total Pumping (acre-feet per year)
1,400
1,200
1,000
800
600
400
200
0
2010
2012
2014
2016
2018
2020
2022
2024
2026
2028
2030
2032
2034
2036
2038
2040
Water Year
Wells Outside of Laguna Seca Subarea and Near its Eastern Boundary
Wells Within Laguna Seca Subarea

Not Many Wells Violate the Material Injury Standard

However, screen depth and pump location information is missing for many wells



Questions

- Can we define a safe yield if groundwater levels continue to drop, but not in actively pumping wells?
- Is water levels below the screen top in standby wells material injury?
- How do we address water that flows from LSSA into the Main Basin?