Sierra Valley Groundwater Sustainability Plan Development

REVIEW OF HISTORICAL GROUNDWATER LEVEL TRENDS AND WELLS

Defining Undesirable Results to inform Sustainable Management Criteria

April 12, 2021

Agenda

- Objectives of the Groundwater Sustainability Plan (GSP)
- Sustainable Management Criteria (SMC)
  - Groundwater level decline
  - Groundwater dependent ecosystems (GDEs)
  - Interconnected Surface Water (ISW)
- Review groundwater level trends and well protection analysis
- Summarize path forward
- Discuss Undesirable Results to each user/use

Objective of the Groundwater Sustainability Plan (GSP) according to initial November TAC meeting

MAINTAIN

- Viable agriculture in the valley, at or a bit above current levels
- Maintain the quiet, rural nature of the basin
- Maintain and enhance presence of wildlife
- Support wetlands for migratory and local birds

PREVENT

- Degradation of water quality
- Drying out of wetlands, streams and braided channels
- Domestic well users having to drill deeper wells
- Development including industrial farming, airport expansion and housing developments

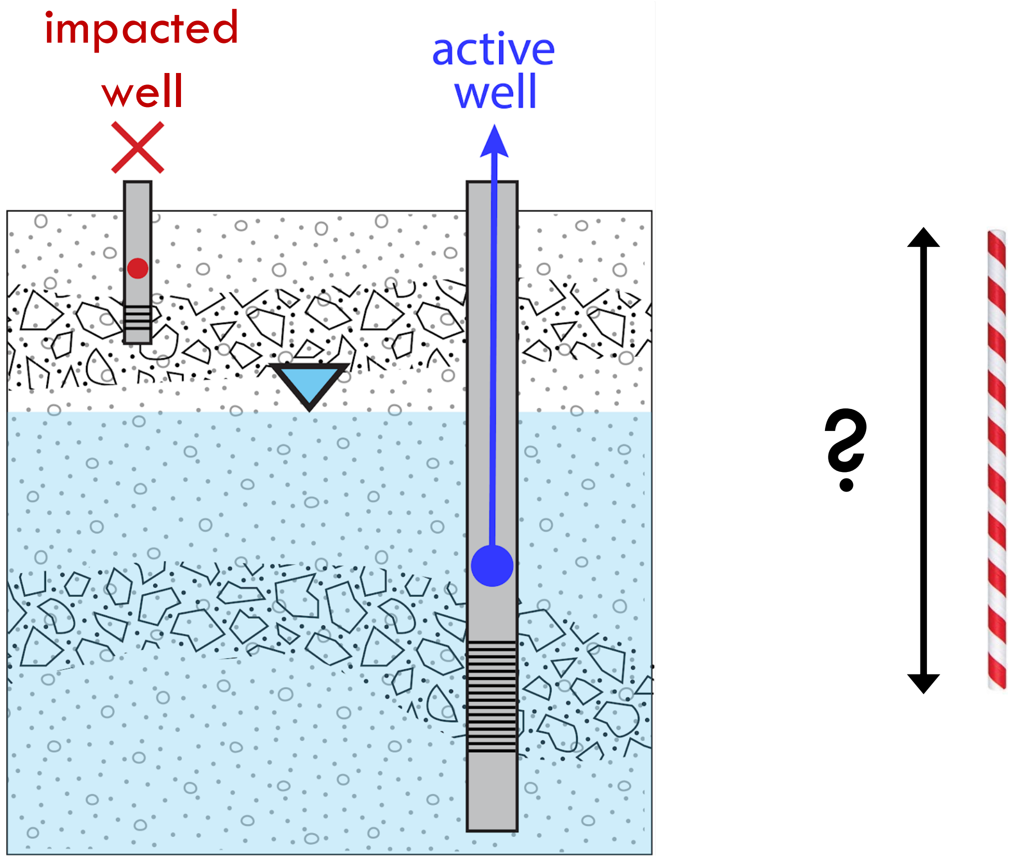
Objective of the Groundwater Sustainability Plan (GSP) according to SGMA

- Prevent Undesirable Results to beneficial uses/users through Sustainable Management Criteria (SMC) that bring demand into alignment with supply over a 20-year implementation time horizon (or less)

- Protect <u>all</u> beneficial uses/users of Sierra Valley groundwater, including (in no particular order) domestic, agricultural, municipal and environmental uses/users.

Beneficial uses: Wells

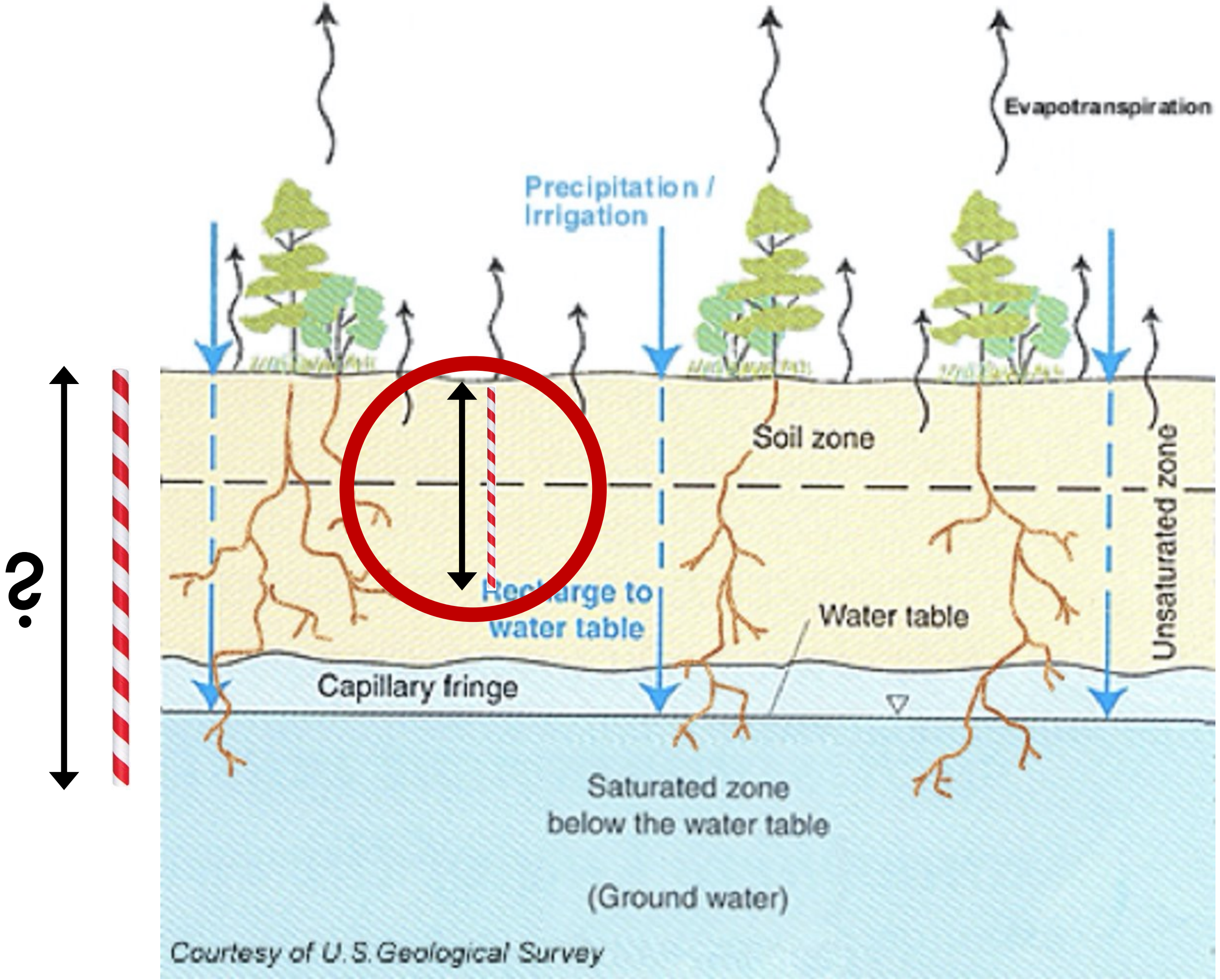
Regional-scale groundwater level declines may negatively impact wells



Beneficial user: Groundwater dependent ecosystems (GDEs)

Regional-scale groundwater declines may negatively impact local-scale GDEs

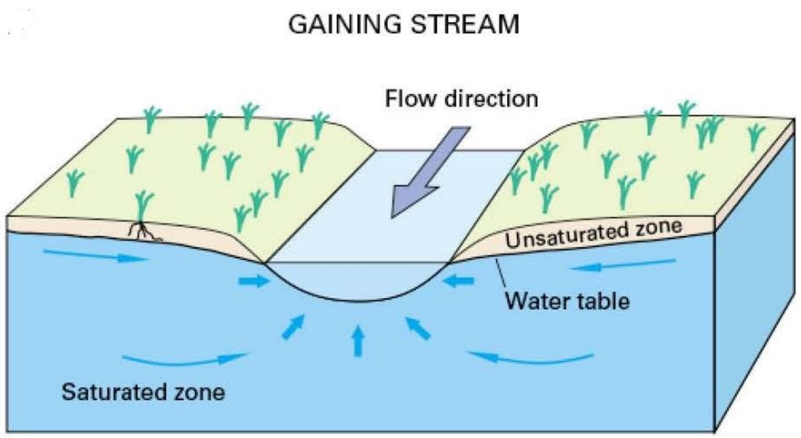
Photos taken near Marble Hot Springs



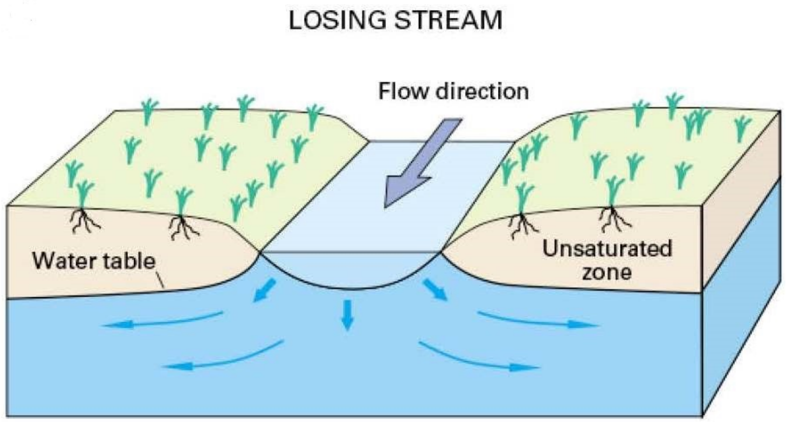
Interconnected surface water (ISW)

23 CCR § 351(o) "Interconnected surface water" refers to surface water that is hydraulically connected at any point by a continuous saturated zone to the underlying aquifer and the overlying surface water is not completely depleted.

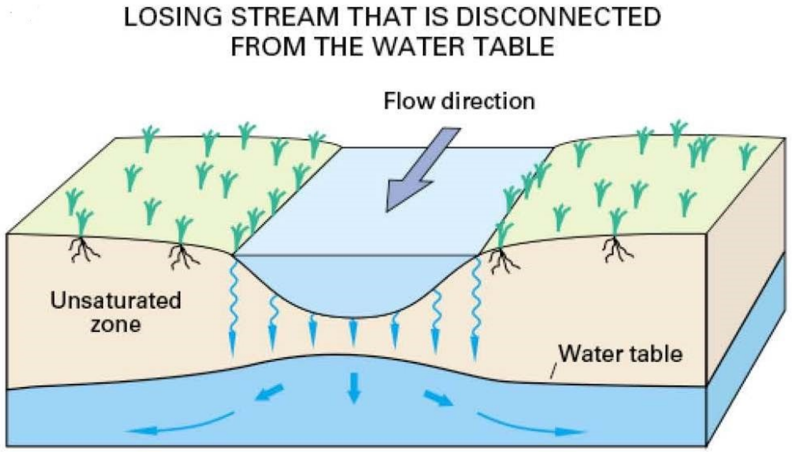
Gaining



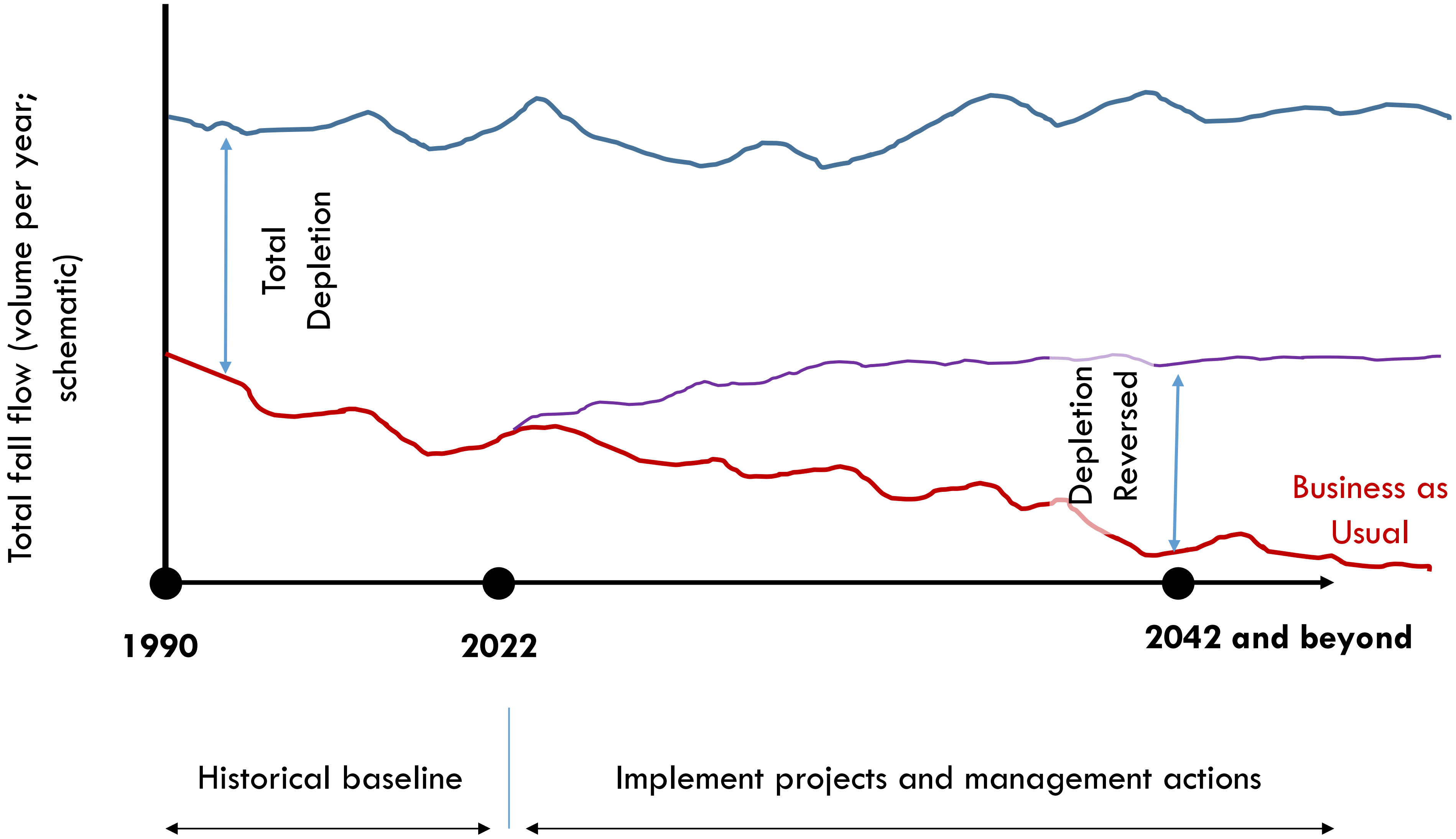
Losing connected



Losing disconnected

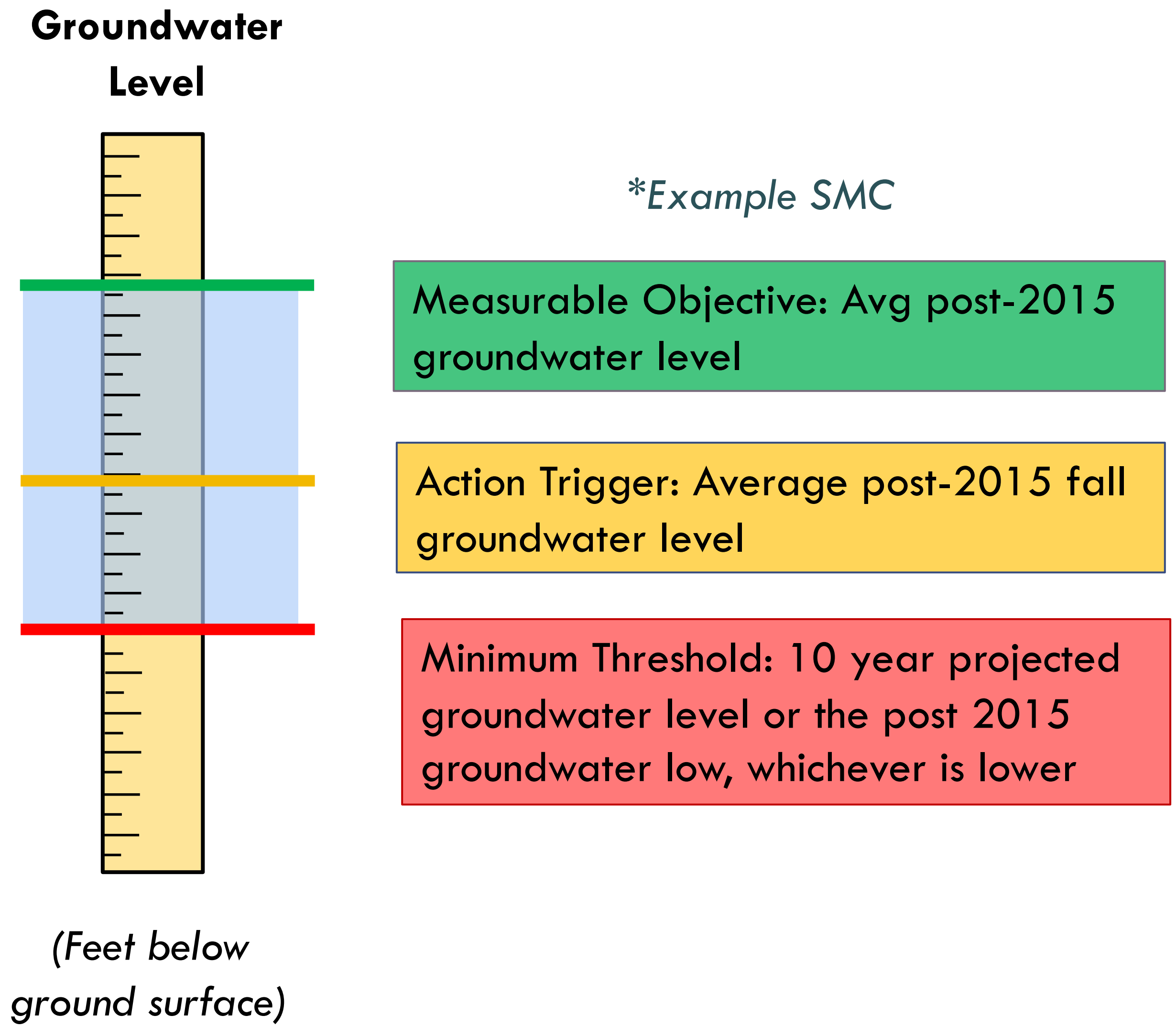


SMC for Interconnected Surface Water (ISW)

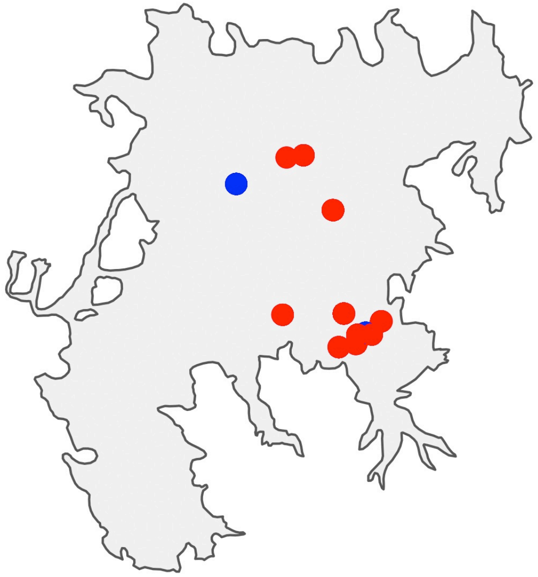


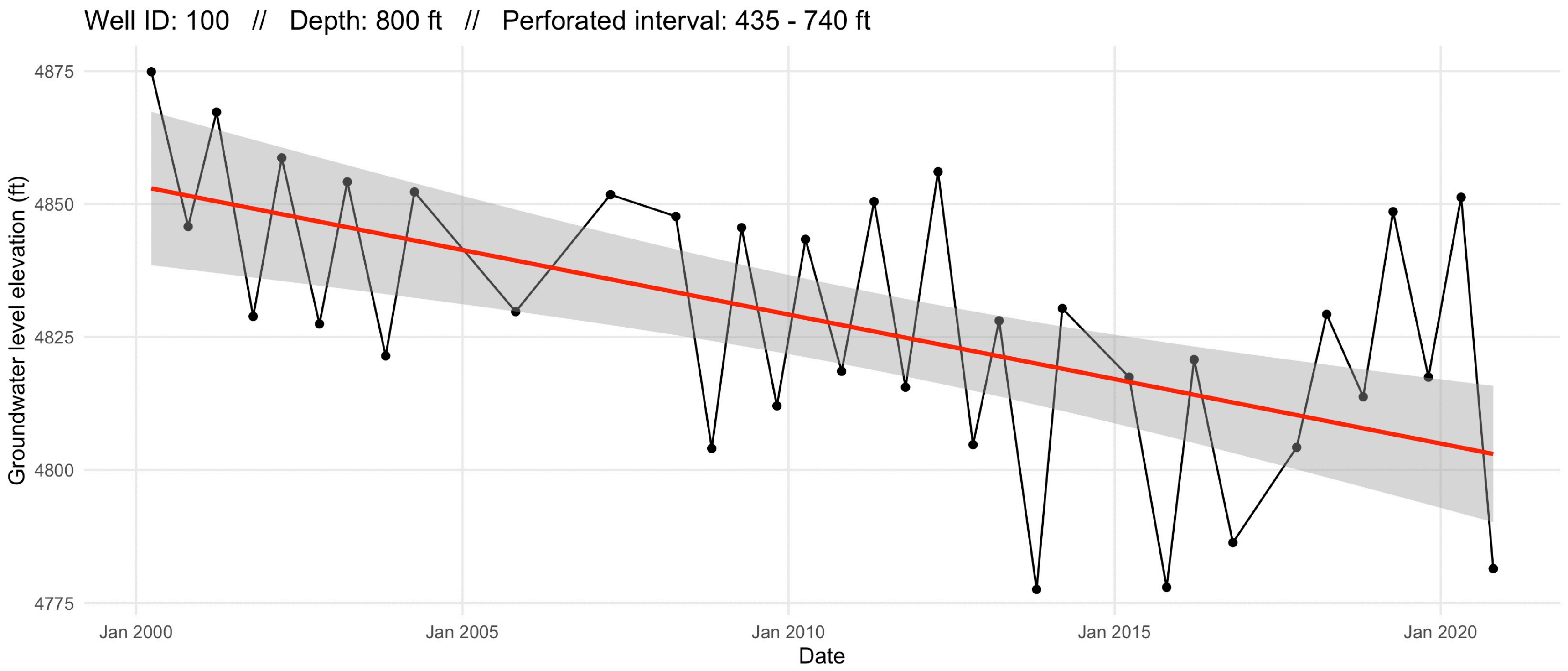
Sustainable Management Criteria (SMC) for groundwater level

- A ruler to measure significant and unreasonable impacts to beneficial users/uses.
- Groundwater level SMC is perhaps the most important Sustainability Indicator because it is directly measurable and can be used as a proxy for groundwater storage and interconnected surface water.



Most groundwater elevations are decreasing (2000-2020)





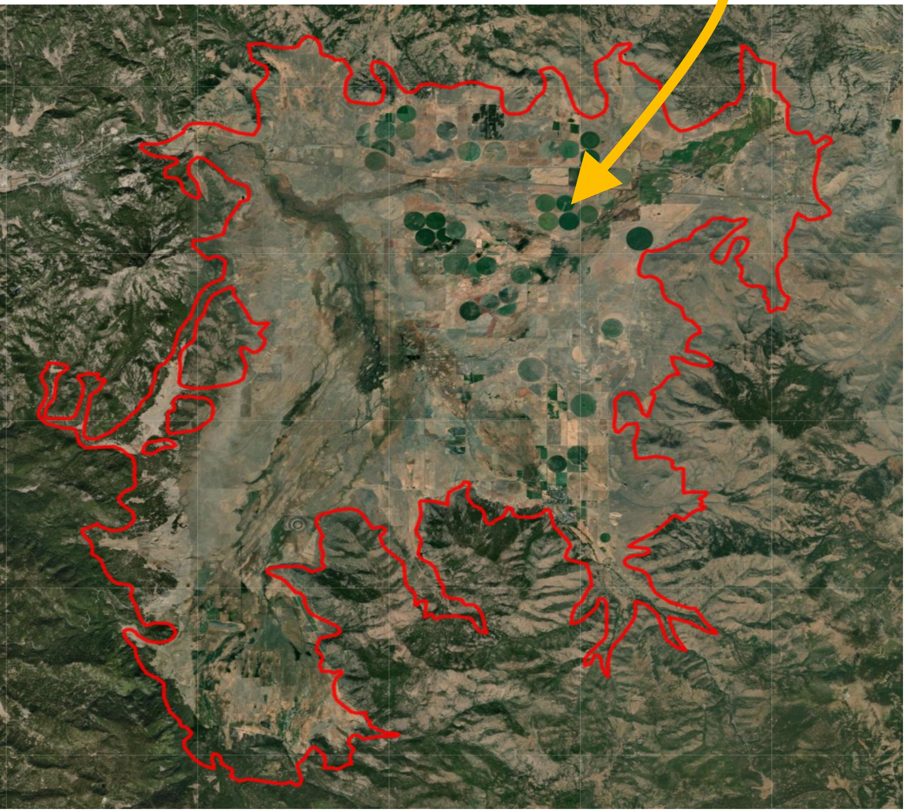
(39.7527403, -120.2566675)

increasing

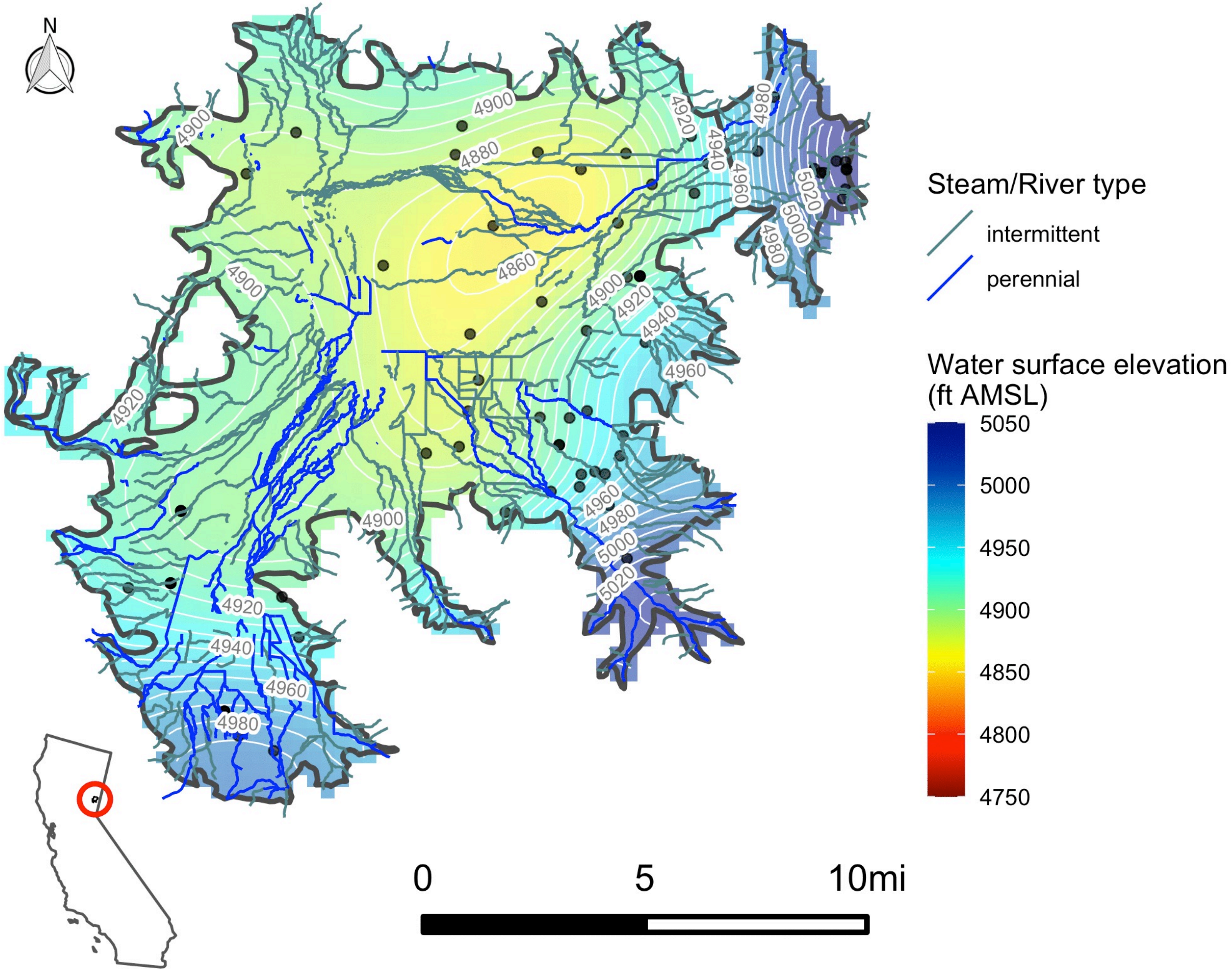
decreasing

All groundwater level data is available in the Data Management System.

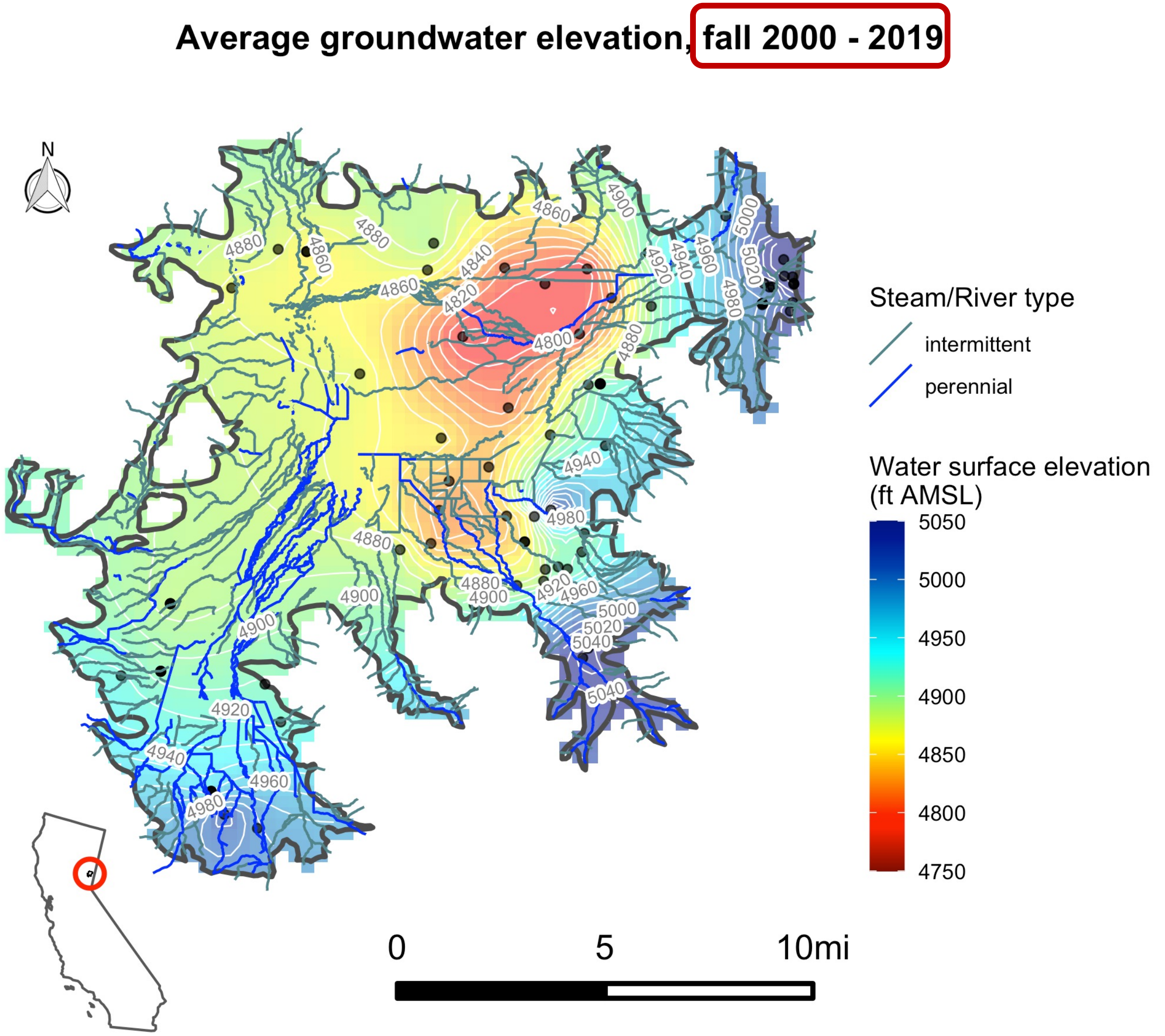
Groundwater level declines are more pronounced in areas east of the Grizzly fault where agricultural pumping occurs.

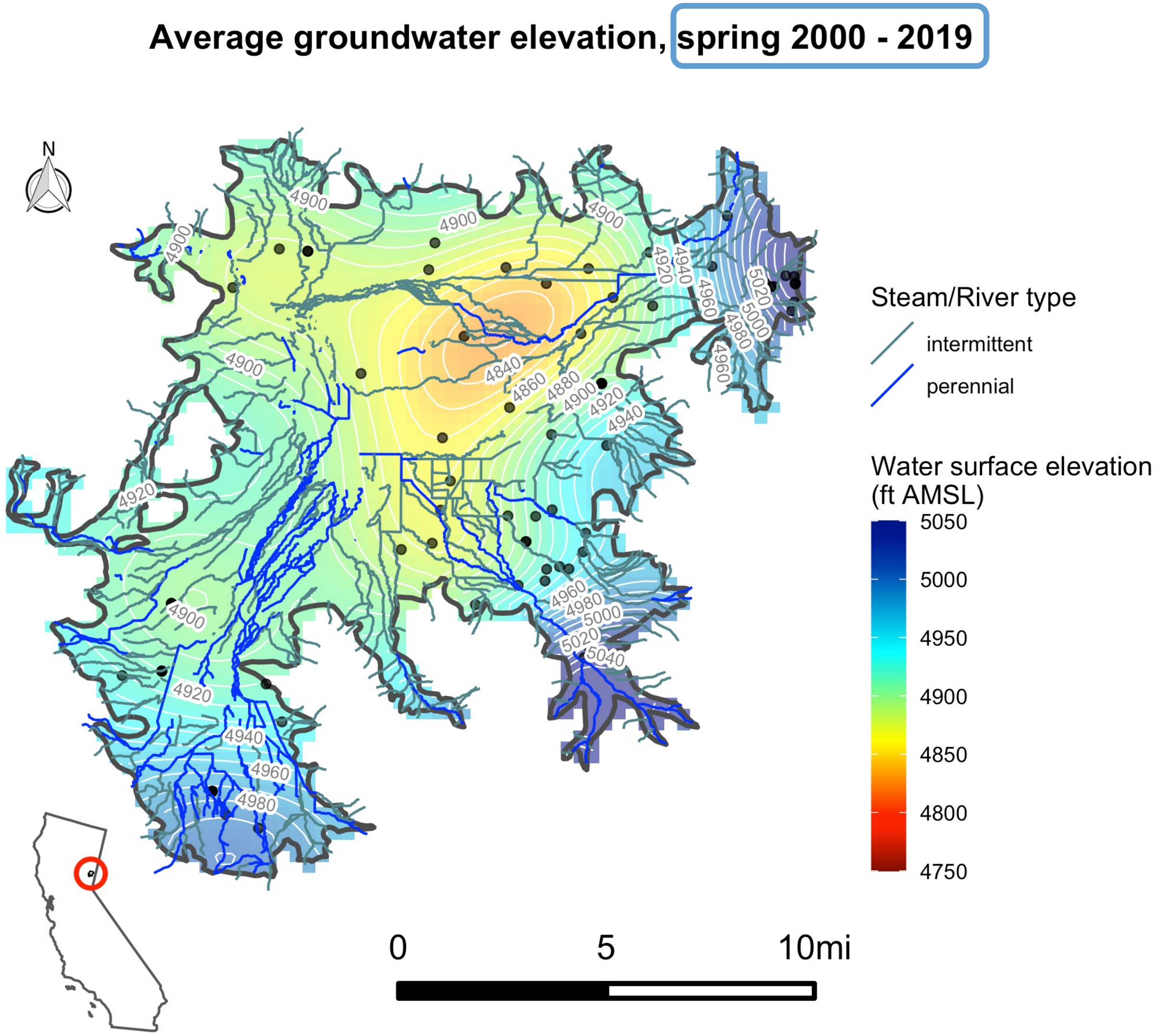


Average groundwater elevation, spring 2000 - 2003



Long term data (2000 – 2019) show seasonal groundwater level oscillation…

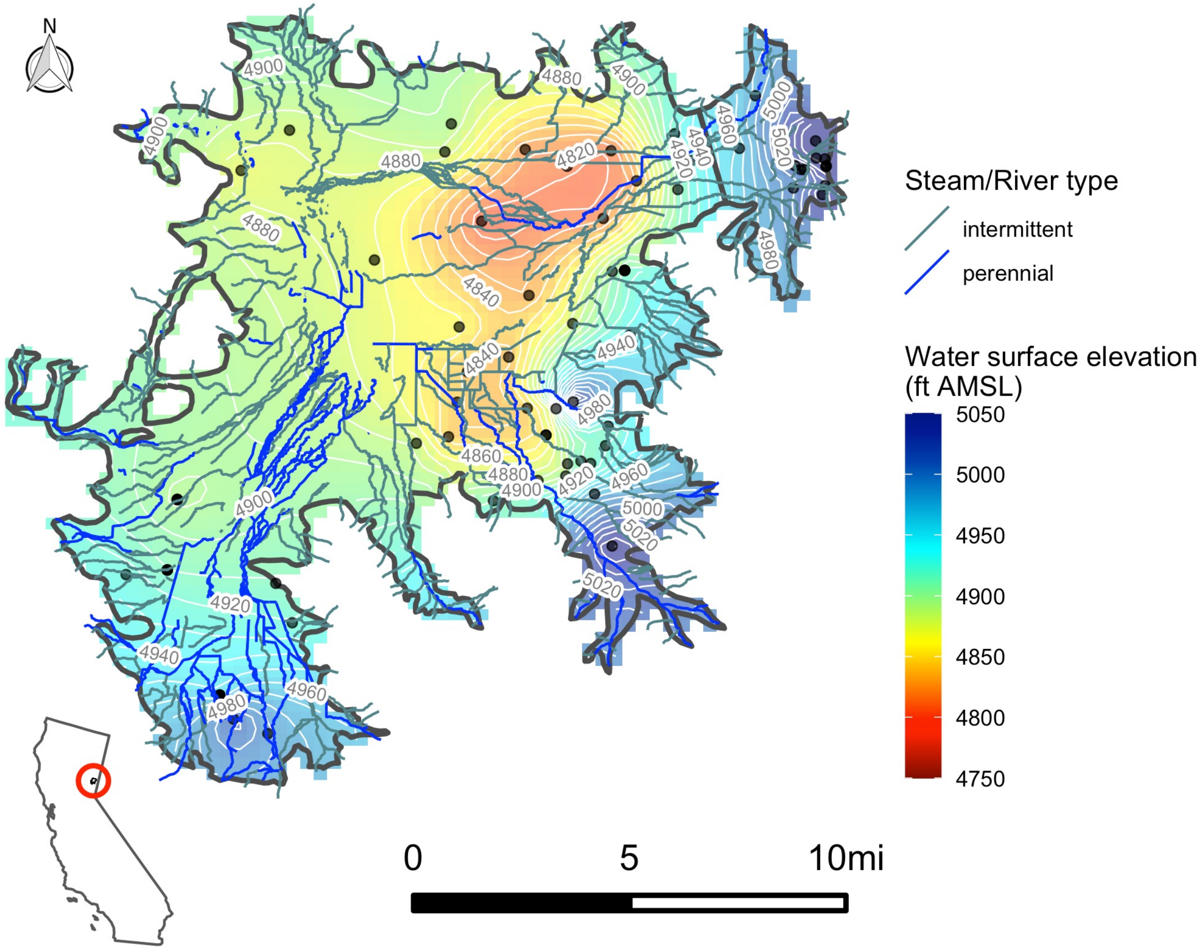




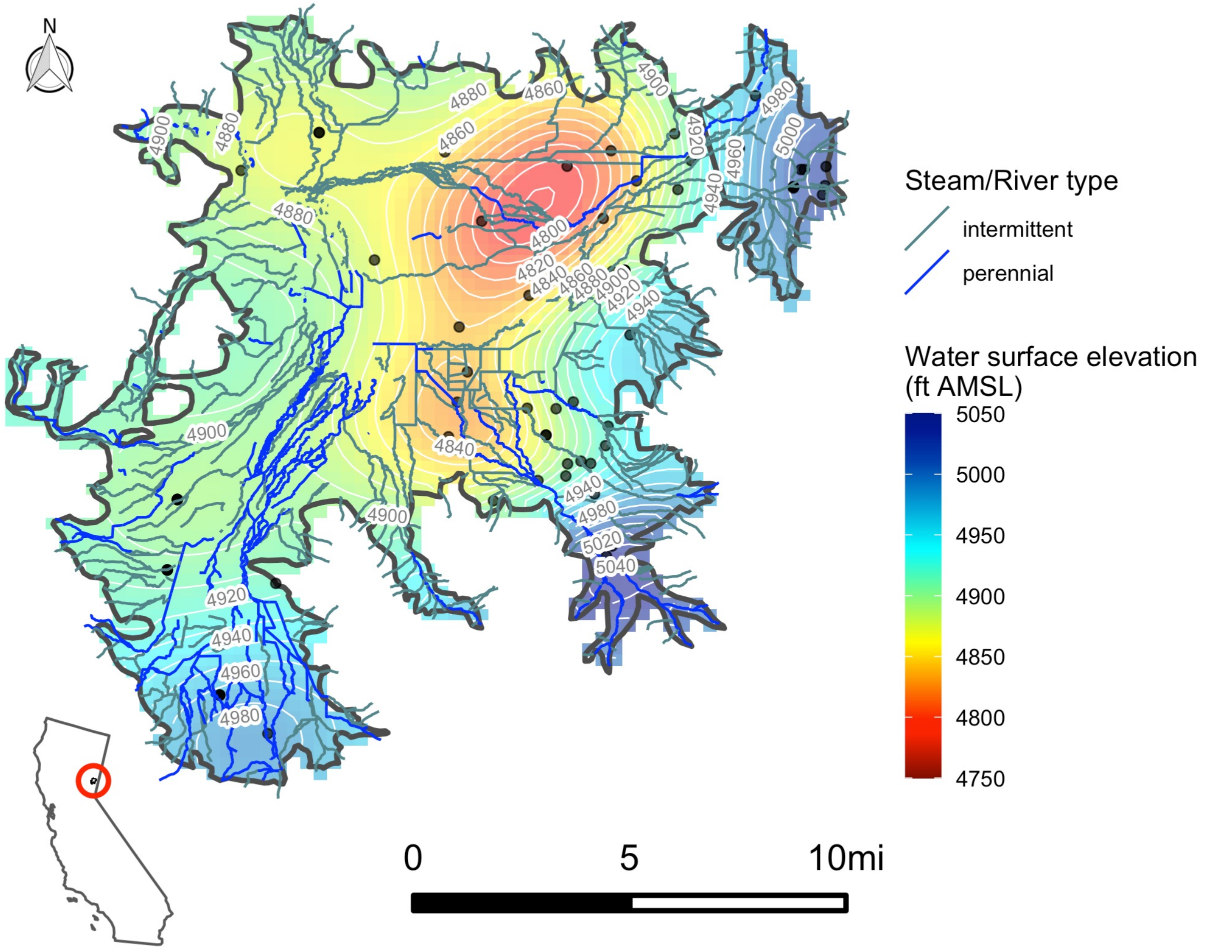
…and groundwater level decline, notably in the north east

~20 year change

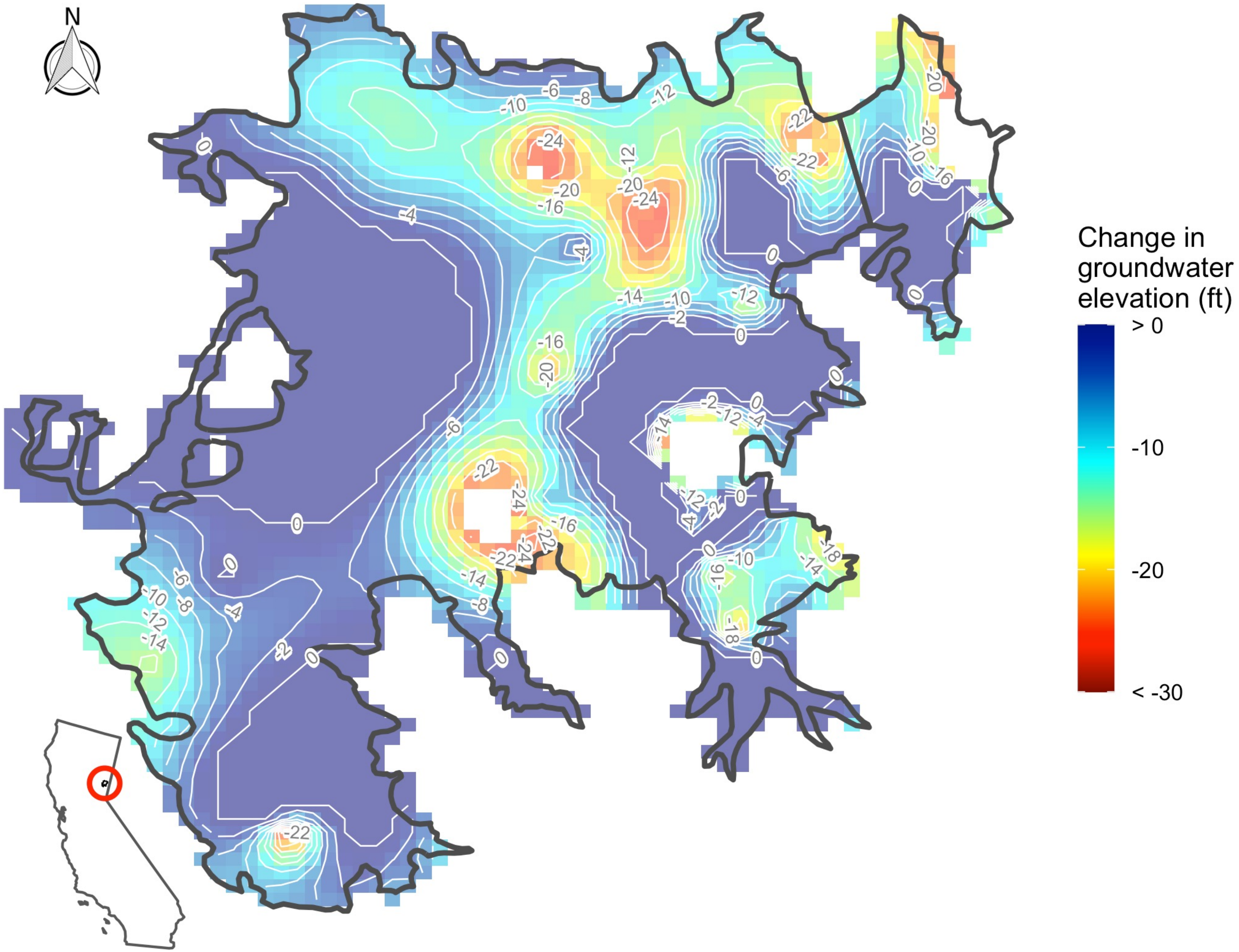
Average groundwater elevation, fall 2000 - 2003



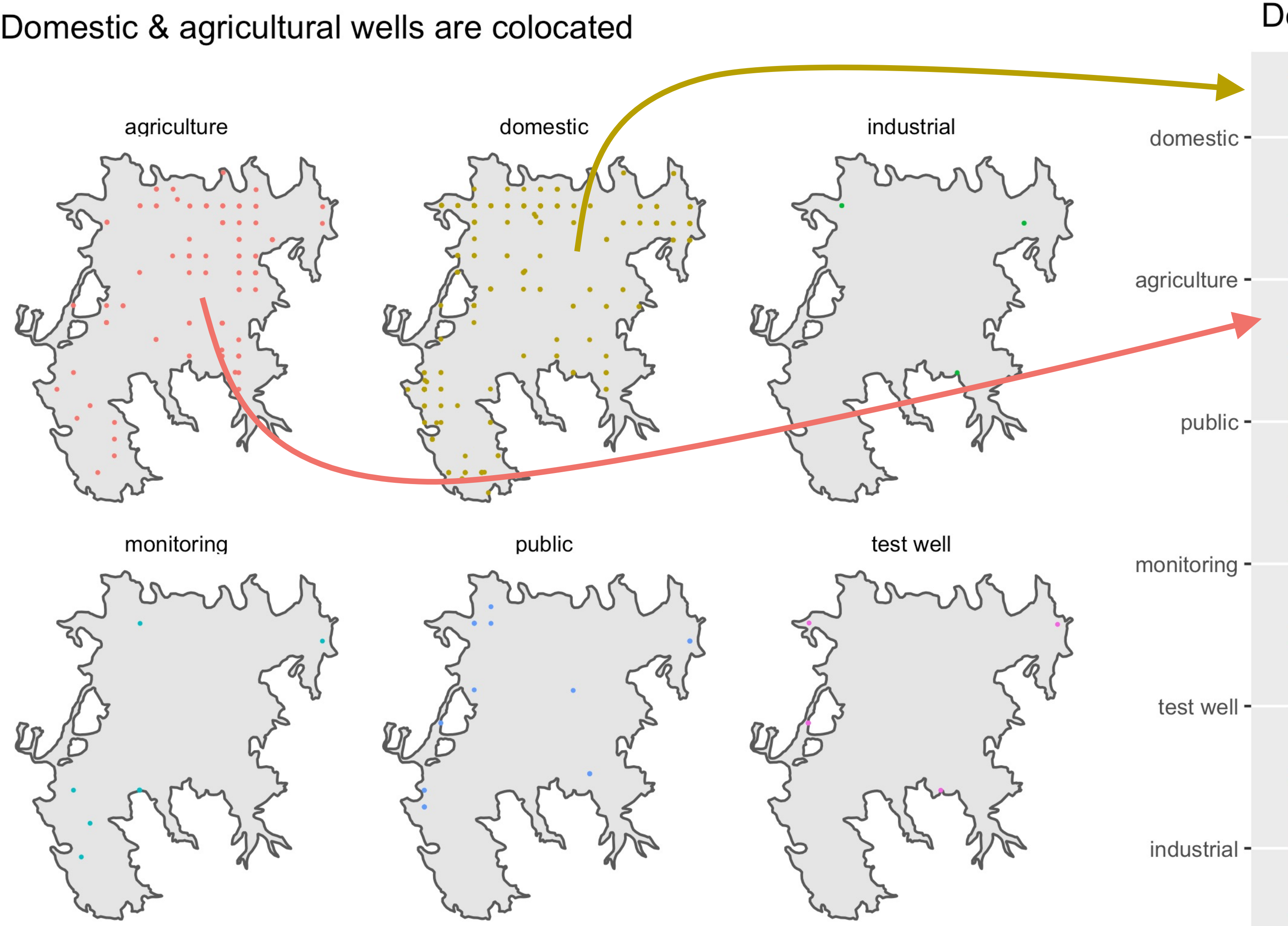
Average groundwater elevation, fall 2016 - 2019

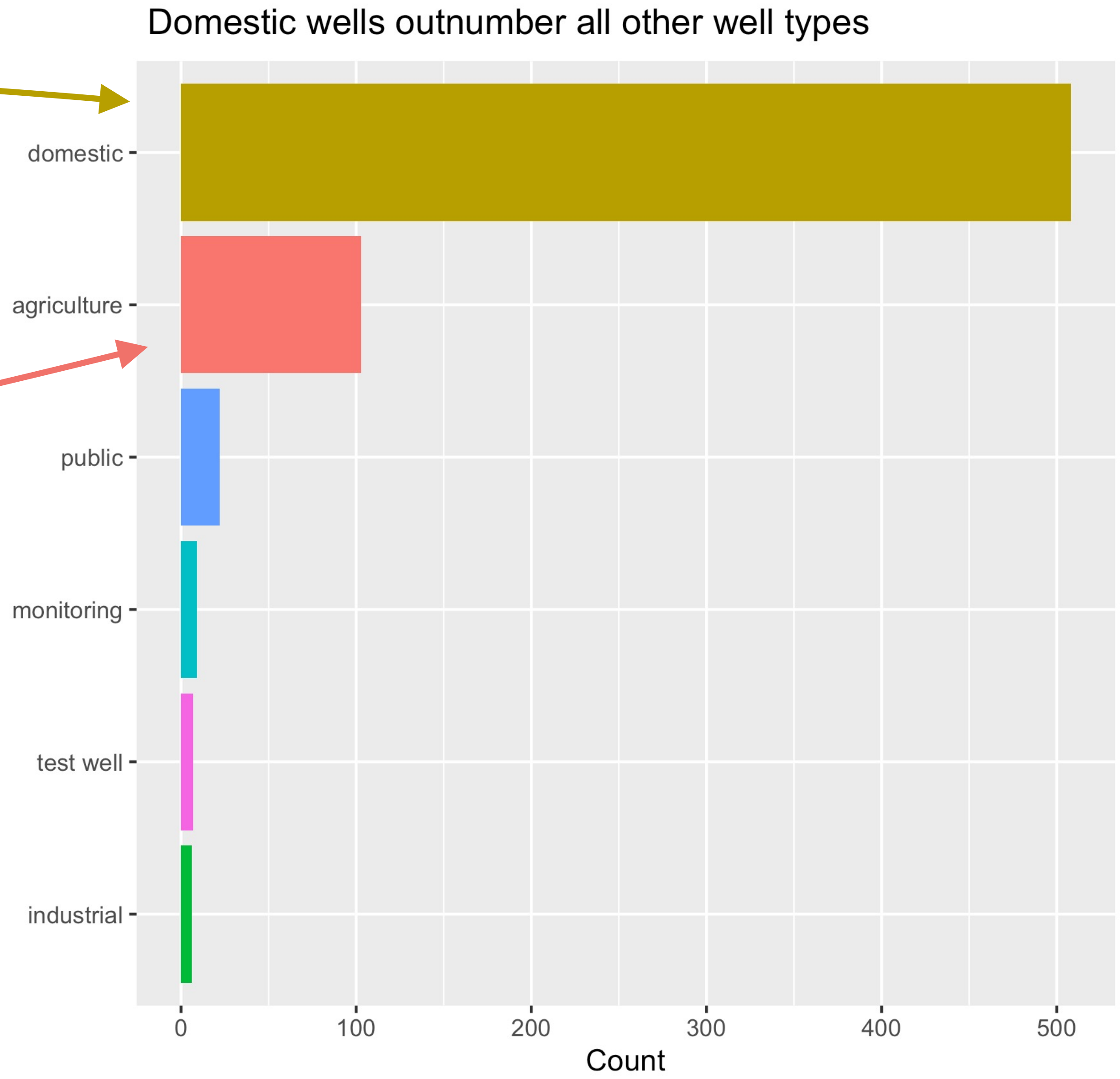


Difference in groundwater elevation between present day and 2000



Well types: domestic and agricultural wells are most common





DWR Well Completion Report Database, https://data.cnra.ca.gov/dataset/well-completion-reports

Forecasted impacted wells under a return to 2012-2016 fall lows

31-year retirement age

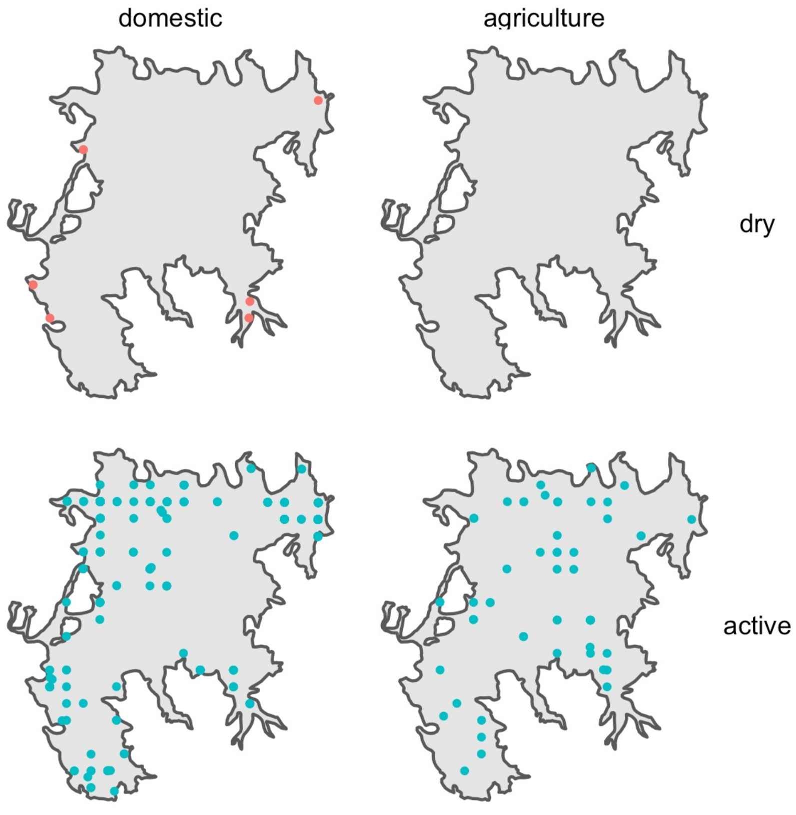
well type	number active	number dry
domestic	309	8
agricultural	57	0

~2%

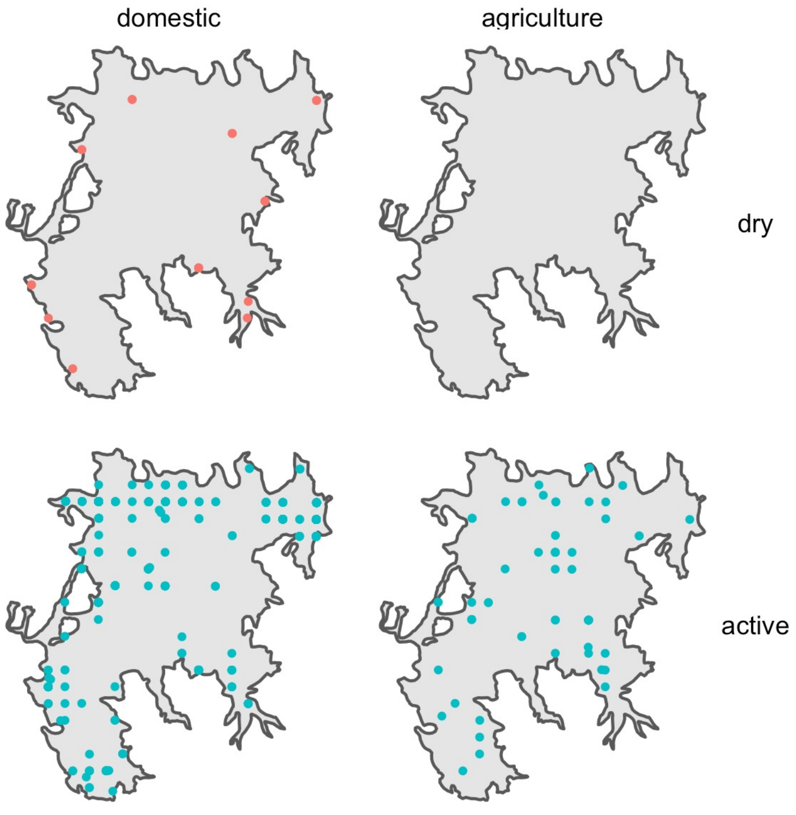
40-year retirement age

well type	number active	number dry
domestic	418	20
agricultural	61	0

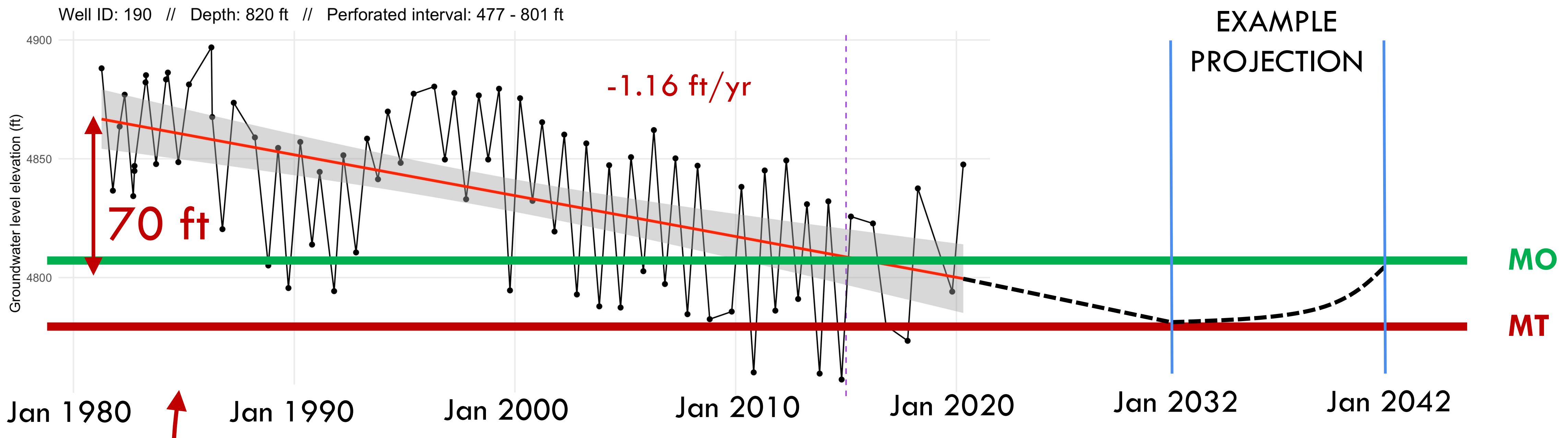
~4%



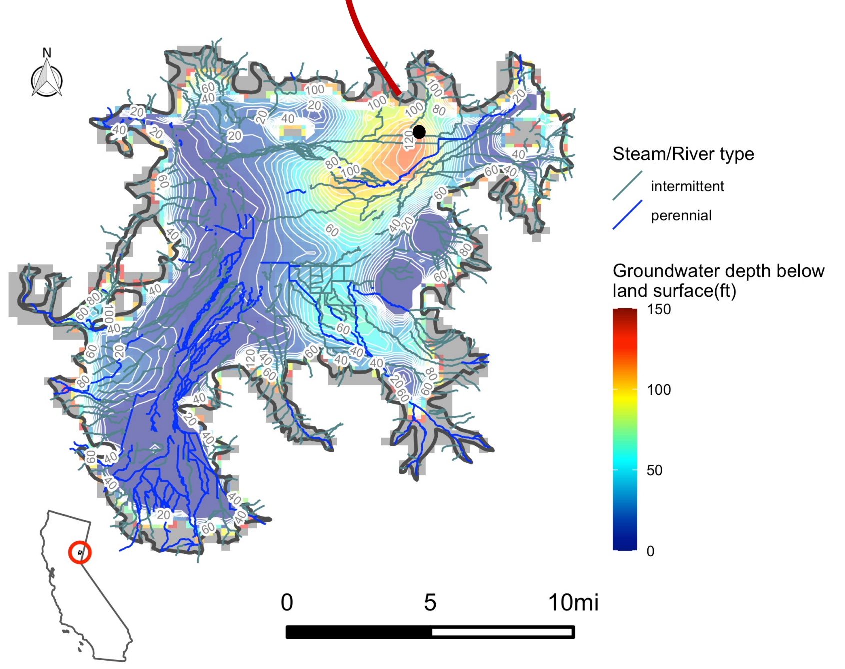
assuming a 31 year retirement age



assuming a 40 year retirement age



Average fall groundwater depth below land surface, 2000-2019



Approach to set reasonable sustainable management criteria (SMC): minimum thresholds (MTs) & measurable objectives (MOs).

MTs are to be avoided, MOs are to be achieved.

EXAMPLE: MTs = projected 10 year* decline. MOs = 2015 low.

Provides a "soft landing" for a basin in steady decline, allowing time to pivot through demand reduction and supply augmentation

**the number of years can be adjusted based on modeling and stakeholder input*

Summary

The Groundwater Sustainability Plan (GSP) must consider significant and unreasonable impact to **<u>ALL</u>** beneficial uses/users of groundwater (domestic, agricultural, public, and environmental).

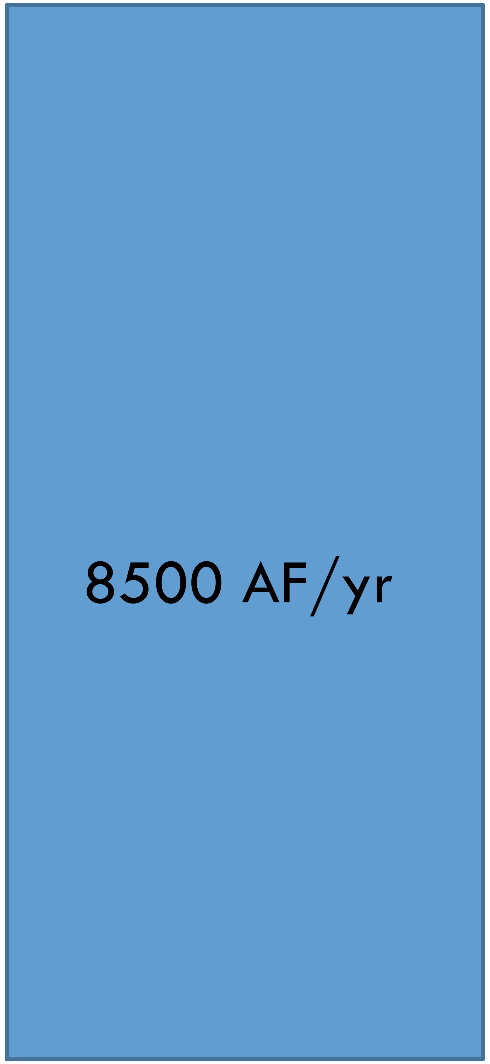
Groundwater level decline during the 20-year implementation period is unlikely to stabilize without reduction in groundwater pumping, *unless management actions that increase supply (e.g., conjunctive use) and manage demand (e.g., water conservation, irrigation efficiency) are implemented*. Dry years will continue to result in further groundwater level decline. The groundwater model allow us to test the impact of specific management actions.

The GSP has the most likelihood of success if all parties participate in the planning process, understand and quantify tradeoffs, and agree on the Plan. State intervention and a loss of local control over groundwater management occurs when a Plan is not submitted; when a submitted Plan fails review by DWR; or when a submitted Plan passes review but fails to accomplish the stated Sustainability Goal during the implementation time horizon.

Water budget back of the envelope

(Bachand and Carlton, 2020)

- 8500 AF/yr pumping in the Basin



Water budget back of the envelope

(Bachand and Carlton, 2020)

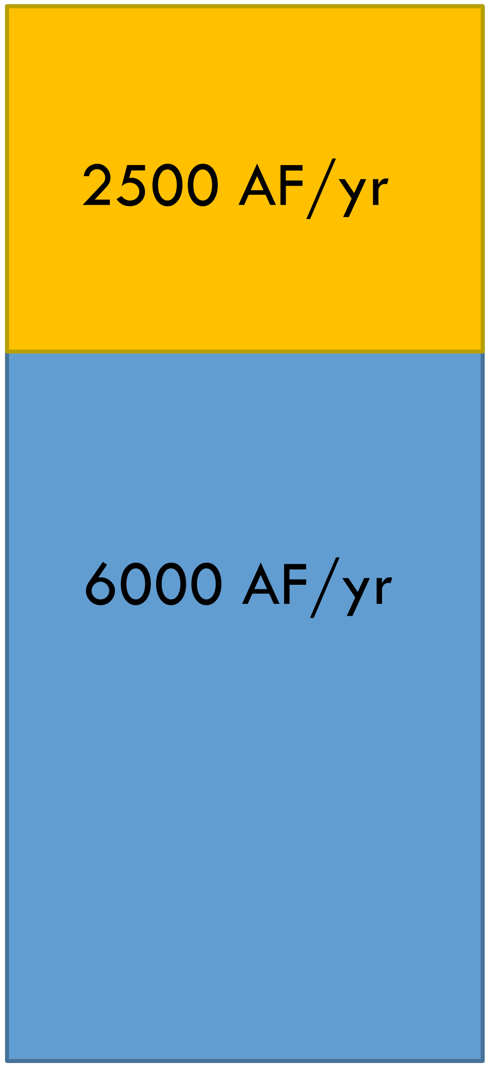
- 8500 AF/yr pumping in the Basin
- 6000 AF/yr sustainable yield (varies year to year, this is a long-term average)

Implied average 2500 AF/yr reduction to operate within basin sustainable yield, a 31% reduction in pumping, which suggests the need for one or more of:

- Supply augmentation (e.g., conjunctive use)
- Water conservation and irrigation efficiency

Keep in mind, these numbers are annual averages. Groundwater budget from forthcoming model will add nuance to these numbers and allow for planning and management.

- Pumping is not equal everywhere
- Pumping depends strongly on water year type



3 beneficial users/uses: discussions in progress

March ✓ Consultant team and TAC has received input from concerned **domestic well users** and can quantify impacts to these users resulting from different groundwater management scenarios.

April ✗ As a group we need to better understand the needs of **agricultural users** and a reasonable path forward that avoids undesirable results for them.

May ✗ We also need to better understand **environmental users** of groundwater and interconnected surface water depletions.

Discussion: sharing values

We ask that representatives from each user/use (domestic well users, agricultural users, environmental users) communicate an Undesirable Result for their user/use category. *We encourage succinct answers (1 minute maximum) to allow for multiple voices.*