

Sierra Valley Technical Advisory Committee

February 8, 2021



Agenda

- GroundWater Quality SMC
- Subsidence SMC



SUSTAINABLE MANAGEMENT CRITERIA

**DEGRADED GROUNDWATER
QUALITY**

“Significant and Unreasonable” Undesirable Results

Discussed in previous TAC:

- WQ impacts to safe drinking water
- WQ impacts to irrigation water use
- WQ impacts to stream baseflow (from groundwater)
 - Deferred to development of GW-SW Sustainability Indicator

Review - Basin Conditions

- Generally good groundwater quality with a few localized areas with exceedances of regulatory thresholds or Basin Plan Water Quality Objectives
- Data gaps
 - Spatial and temporal
 - Representative of land use and activities in the Basin
- Work with other regulatory programs to resolve some gaps (irrig land)

Water Quality Standards/Objectives

- Established to provide reasonable protection of designated beneficial uses
 - MCLs – Maximum Contaminant Levels. Drinking water standards – *Title 22 of the California Code of Regulations*
 - Basin Plan Objectives – Standards established to protect aquatic life, human health, agriculture, industrial uses - *Water Quality Control Plan for the Central Valley*
 - Priority Pollutants – Clean Water Act objectives to protect aquatic life and human health
- MCLs and Basin Plan objectives most applicable to groundwater quality



Before Considering the “Thermometer” we need to understand “Medical Treatment” Options:

GSP Projects & Management Actions for GW Water Quality

- Existing regulatory agencies (and programs), such as the Regional Board, State Water Board, Department of Pesticides, etc
- GSAs are the main steward of groundwater basin sustainability (closer to the “pulse” than state)
- GSAs have monitoring duties
- In case of man-made pollution: May act as a proactive “facilitator” to move forward on processes that protect GW quality
- For projects&actions designed in GSP and considered for implementation :
 - Evaluate effects on existing man-made pollution
 - Evaluate effects on existing naturally occurring contaminants

The shortlist of constituents for which we will establish Sustainable Management Criteria

- Considerations used to narrow the “Shortlist”
 - A Maximum Contaminant Level (MCL), Basin Plan water quality objective, or human health-related level exists for the constituent
 - Only consider data from the last 30 years
 - Focus on water quality parameters confirmed by multiple measurements
 - Include constituents that:
 - (a) show exceedances of a threshold,
 - (b) show a strong likelihood of exceeding a threshold, **OR**
 - (c) are commonly addressed in other GSPs.
- This list can evolve over the time horizon of the GSP

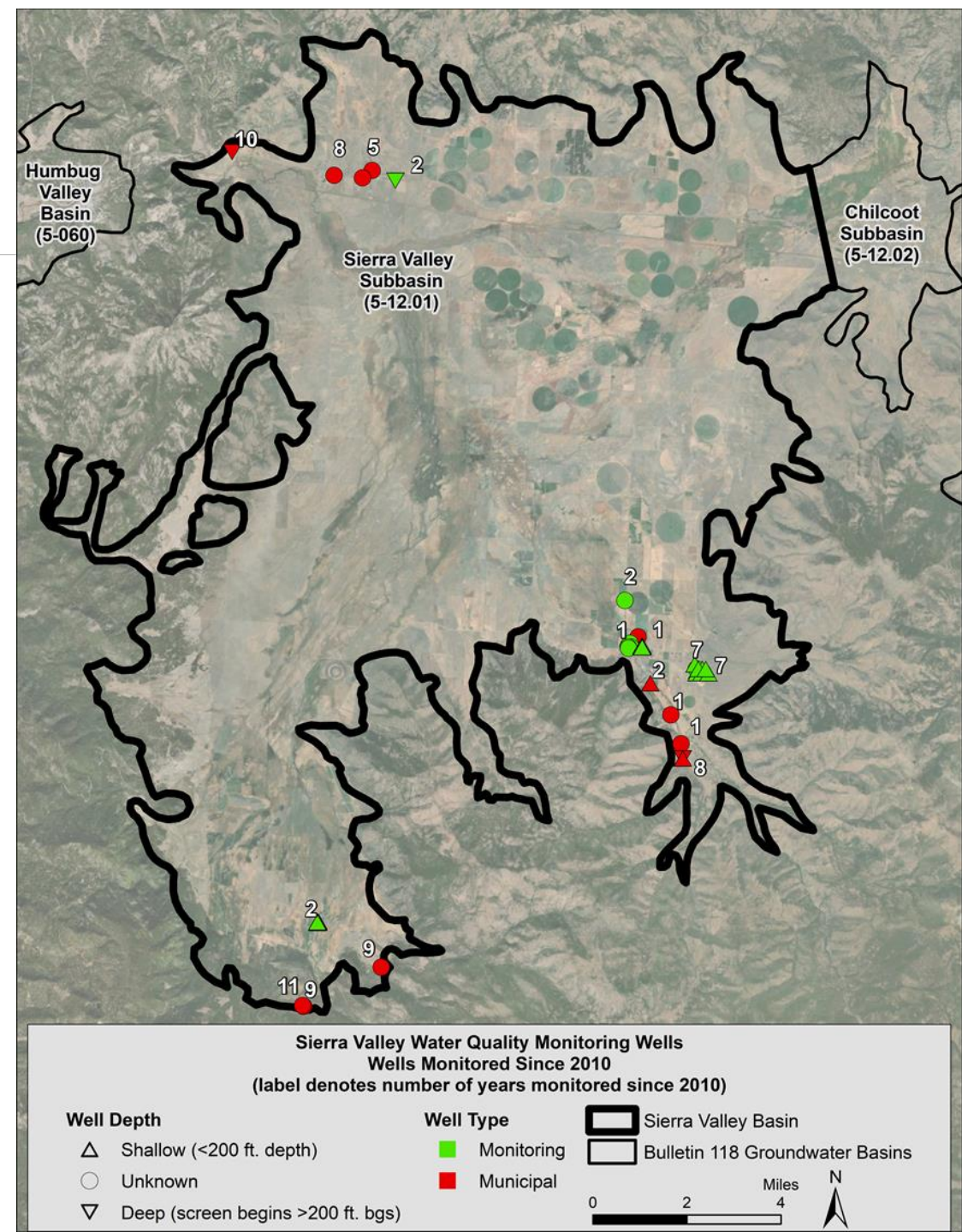
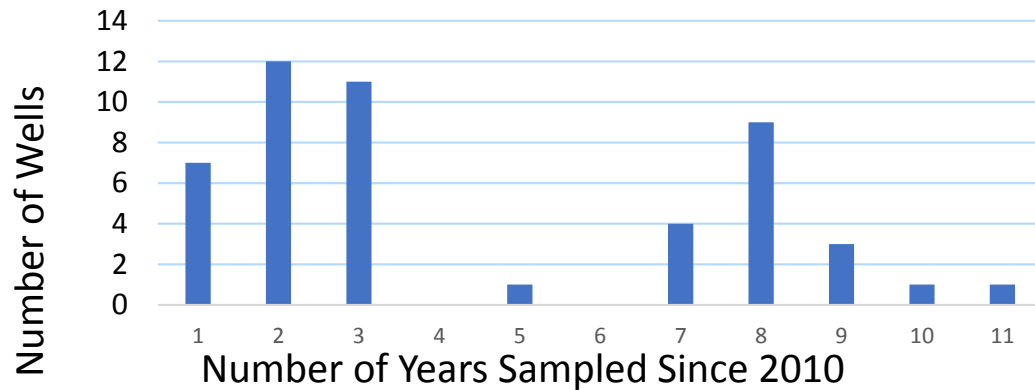
What did we do in the past few weeks with the feedback received on Water Quality?

Review – Process to address WQ

- WQ is presented in GSP chapter 2 (GW conditions) and chapter 3 (Sustainable Management Criteria and Monitoring Network)
- Review all available data and selection of constituents
- Identify data gaps
- Highlight constituents to:
 - Include in GW conditions in Ch. 2
 - Define SMCs
 - Include in future monitoring

Monitoring Well Network

Green wells in the map are public supply wells that have taken water quality samples in the past 2 years.



Review- Process to Identify COCs

- Data set filtered to identify list of potential constituents of concern
 - Data limited to those collected in the past 30 years (1990-2020)
 - Limited to wells with three or more water quality measurements
 - Timeseries and maps generated to compare data with regulatory thresholds (Title 22 and/or Basin Plan)

Constituent	Maximum Threshold	Regulatory Threshold	Values to Date in SV (2011-2020)
Arsenic	5 µg/L, trigger only 9 µg/L, trigger only 10 µg/L, MT	10 µg/L (Title 22)	ND-8.5 µg/L 13 wells sampled
Benzene	1 µg/L	1 µg/L (Title 22)	ND-32 µg/L 31 wells samples, 2 wells had exceedances
Boron	00.18 mg/L, trigger only 0.2 mg/L, MT	0.1 mg/L (Basin Plan Upper Limit for the EC value not exceed by 50% of wells) 0.2 mg/L (Basin Plan Upper Limit for the EC value not exceeded by 90% of wells)	ND-1.7 mg/L 1 of 10 wells sampled had exceedance
Iron	150 µg/L, trigger only 270 µg/L, trigger only 300 µg/L, MT	300 µg/L (SMCL - Title 22)	100 – 2400 mg/L 2 of 13 wells had exceedances
Manganese	25 µg/L, trigger only 45 µg/L, trigger only 50 µg/L, MT	50 µg/L (SMCL - Title 22)	ND-1200 mg/L 3 of 13 wells had exceedances
Nitrate as Nitrogen	5 µg/L, trigger only 9 µg/L, trigger only 10 µg/L, MT	10 g/L (Title 22)	1-4.8 mg/L 0 of 28 wells had exceedances
pH	7.0-8.5, MT	7.0-8.5 (Basin Plan)	Not readily available, Will be used as a trigger to do more investigation
Total Dissolved Solids	500 mg/L trigger only	500 mg/L (recommended, SMCL-Title 22) 1000 mg/L (Upper limit, SMCL Title 22)	100 – 630 mg/L 1 of 15 wells had a value above 500 mg/L

Constituents of Concern in Chapter 2

- 1) Arsenic (*Naturally-occurring, wood preservatives, pesticides*)
- 2) MTBE (*Clean-up sites*)
- 3) Boron (*Naturally-occurring, industrial wastes, sewage, fertilizers*)
- 4) Manganese (*Naturally-occurring, industrial effluent, mine waste*)
- 5) Nitrate as Nitrogen (*Septic tanks, fertilizers, animal waste*)
- 6) pH (*Naturally-occurring*)
- 7) Total Dissolved Solid (*Naturally-occurring, septic tanks, fertilizers, wastewater*)

Constituents to Set SMCs For:

- ~~1) Arsenic (Naturally-occurring, wood preservatives, pesticides)~~
- ~~2) MTBE (Clean-up sites)~~
- ~~3) Boron (Naturally-occurring, industrial wastes, sewage, fertilizers)~~
- ~~4) Manganese (Naturally-occurring, industrial effluent, mine waste)~~
- 5) Nitrate as Nitrogen (Septic tanks, fertilizers, animal waste)
- 6) pH (Naturally-occurring)
- 7) Total Dissolved Solid (Naturally-occurring, septic tanks, fertilizers, wastewater)

Constituents to be included in the future monitoring

- 1) Arsenic (*Naturally-occurring, wood preservatives, pesticides*)
- ~~2) MTBE (*Clean-up sites*)~~
- 3) Boron (*Naturally-occurring, industrial wastes, sewage, fertilizers*)
- ~~4) Manganese (*Naturally-occurring, industrial effluent, mine waste*)~~
- 5) Nitrate as Nitrogen (*Septic tanks, fertilizers, animal waste*)
- 6) pH (*Naturally-occurring*)
- 7) Total Dissolved Solid (*Naturally-occurring, septic tanks, fertilizers, wastewater*)

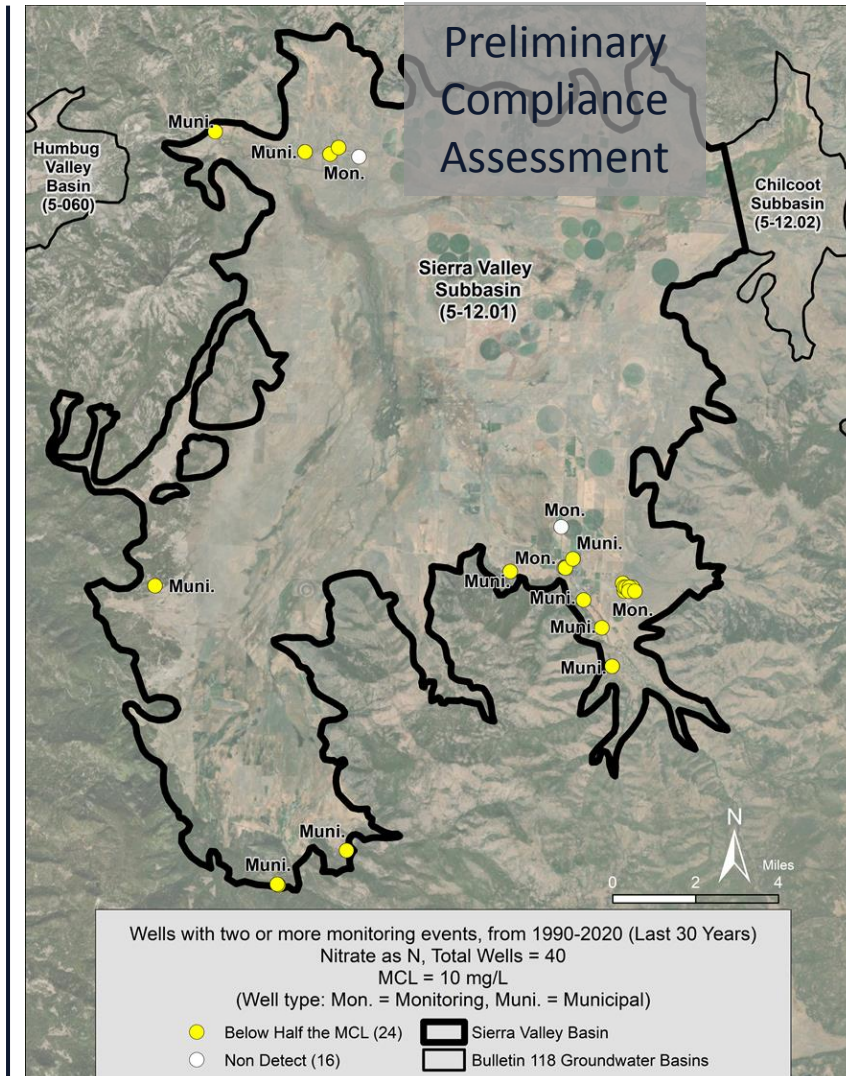
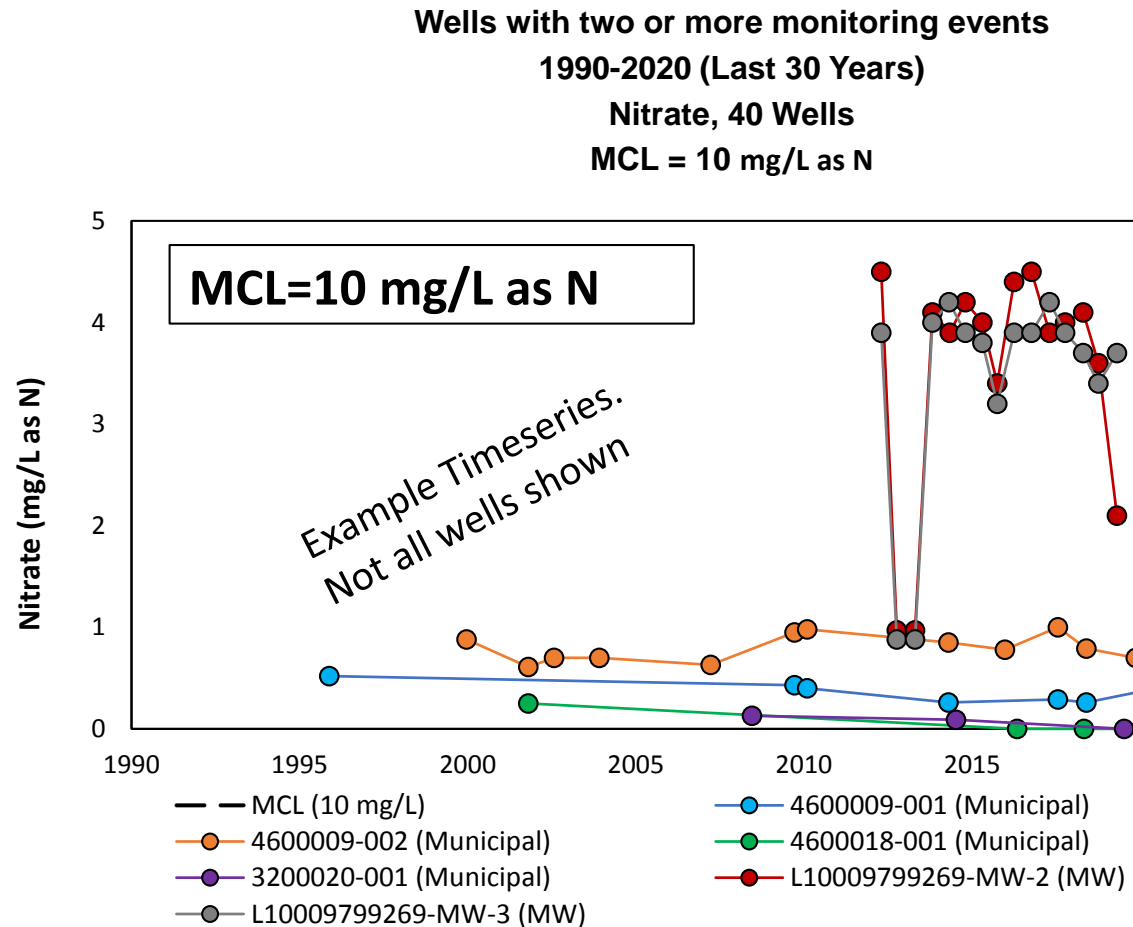
Undesirable Results

“The criteria used to define when and where the effects of the groundwater conditions cause undesirable results for each applicable sustainability indicator. The criteria shall be based **on a quantitative description of the combination of minimum threshold exceedances that cause significant and unreasonable effects in the basin.**”

Our suggestion: Criteria for Thresholds and Measurable Objectives

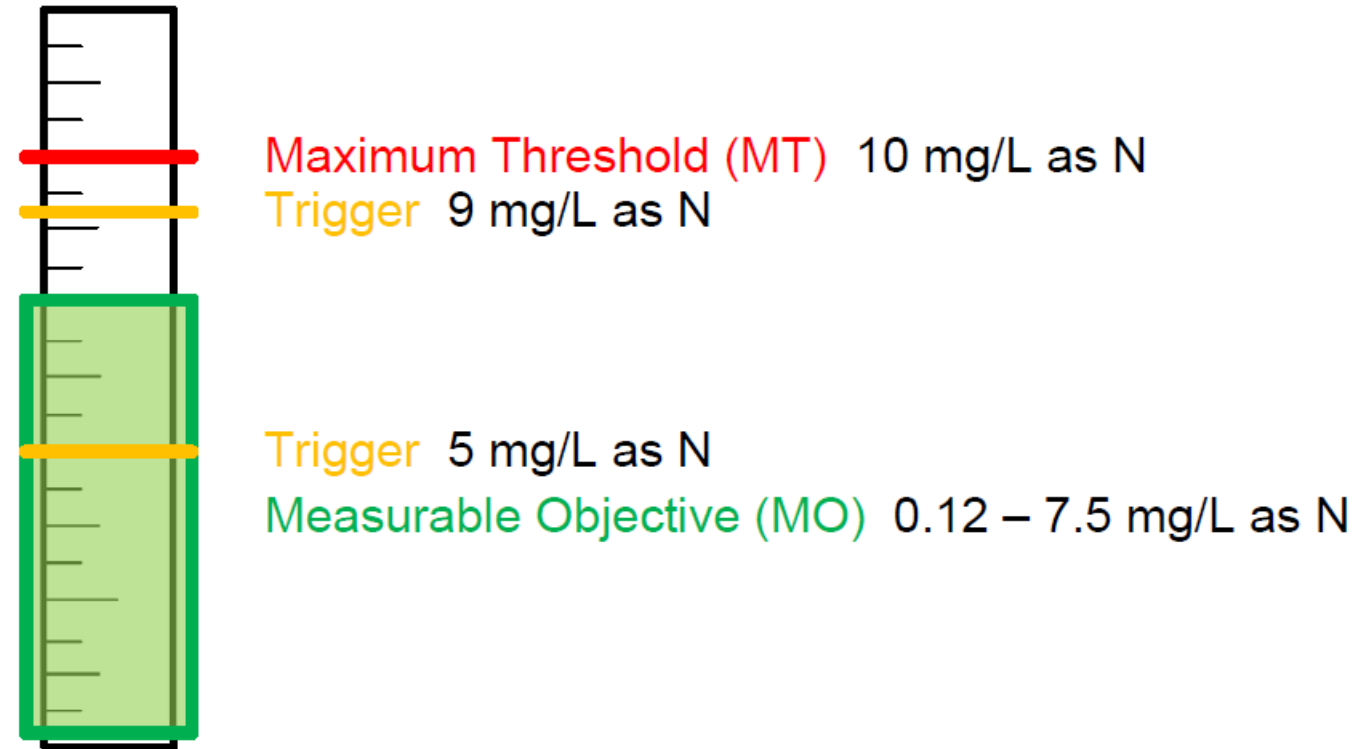
- Maximum Threshold – MT -(Concentrations)
 - Regulatory Thresholds (Title 22 Drinking Water Standards)
 - Triggers (if applicable)
- Measurable Objectives
 - Well-specific
 - Within range of values measured in the past 30 years (1990-2020) at a particular well
 - If historical values have exceeded the maximum threshold, the measurable objective will be 75% of the Maximum Thresholds

Nitrate – Two Views of Example Data

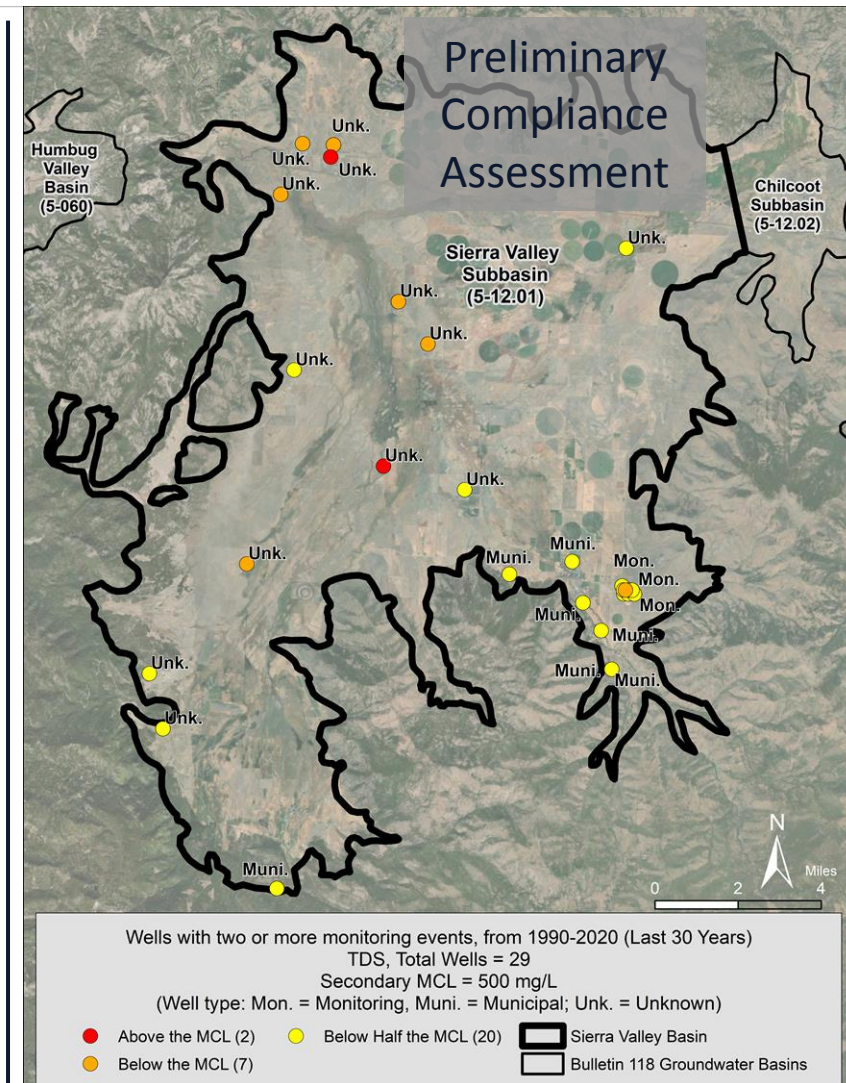
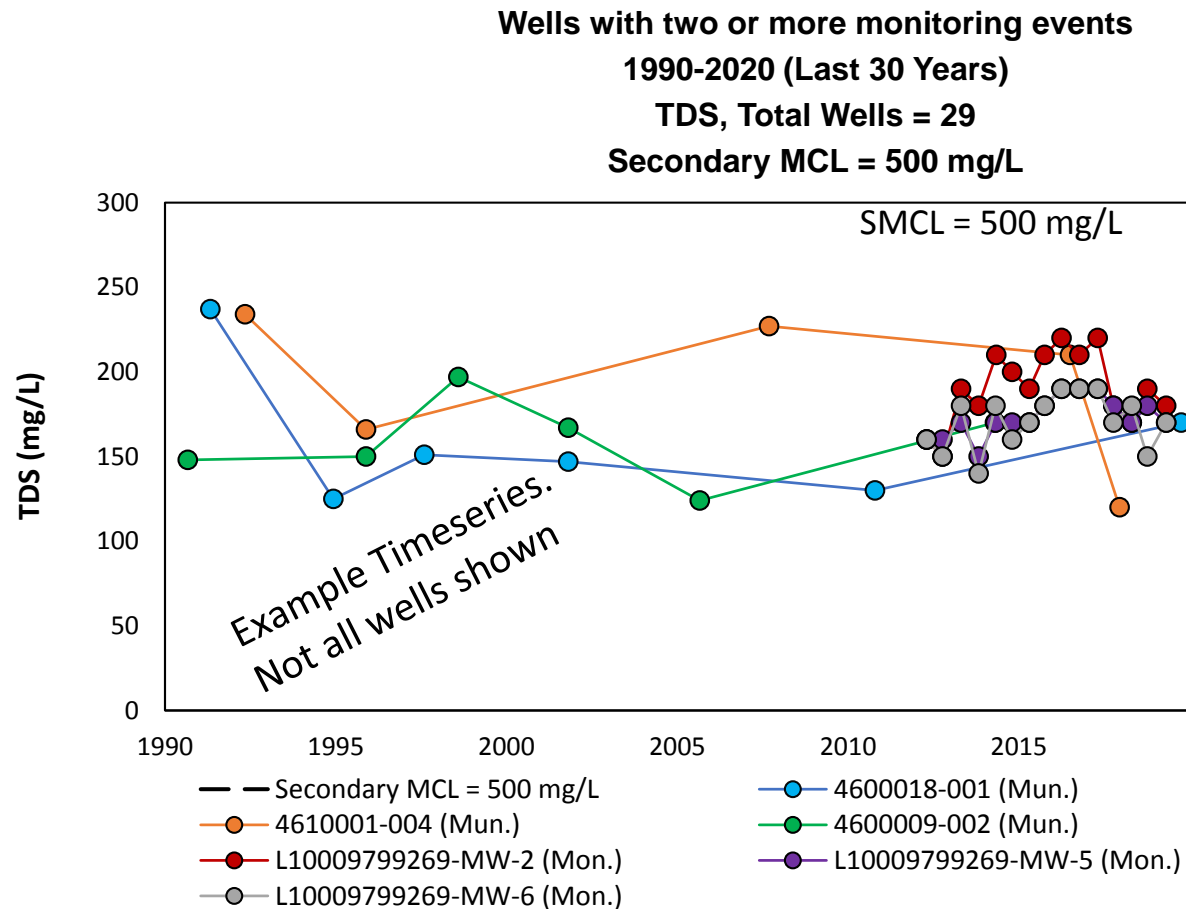


Thresholds and Measurable Objectives: Nitrate

Nitrate as Nitrogen

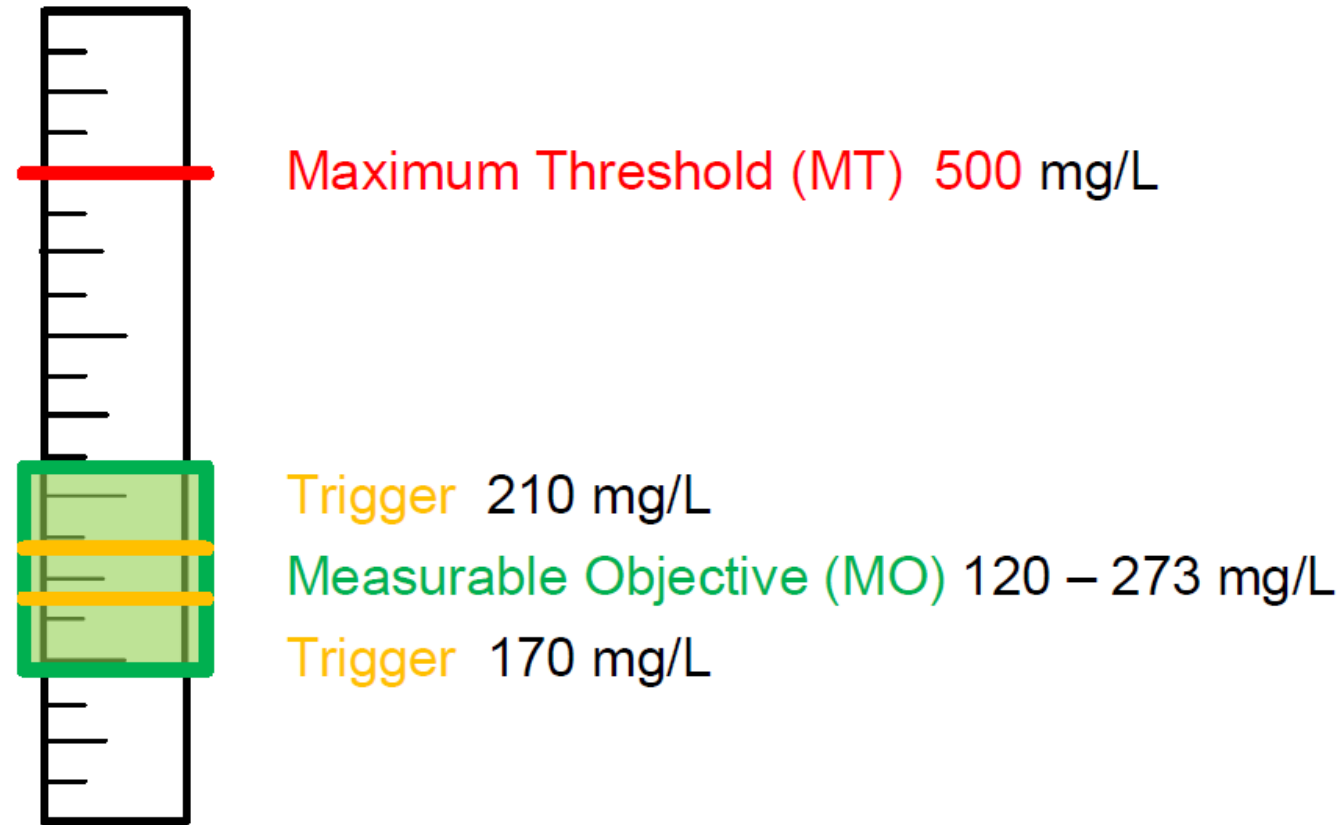


TDS– Two Views of Example Data



Thresholds and Measurable Objectives: TDS

Total Dissolved Solids (based on 6 example wells)



Quantification of Undesirable Results

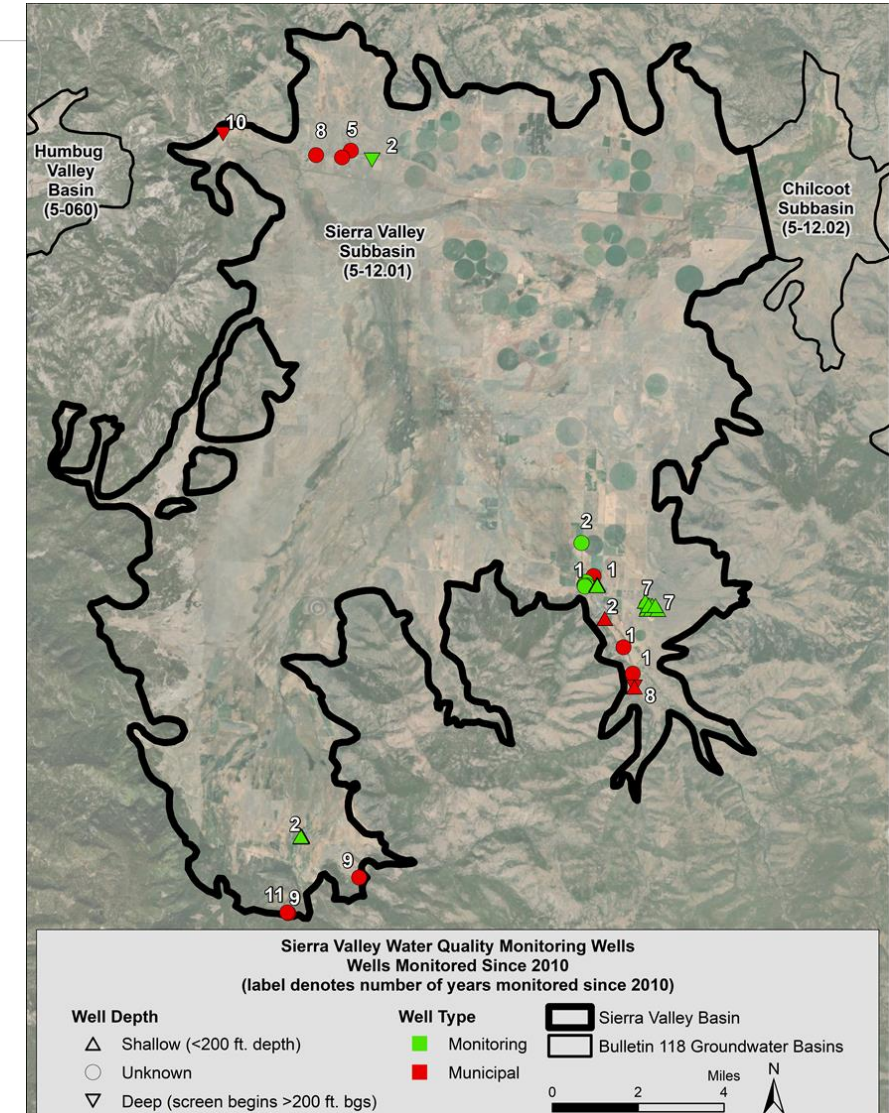
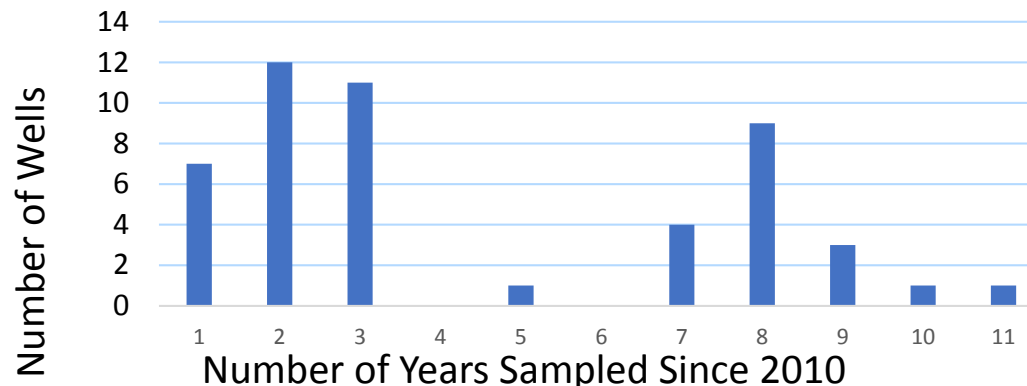
Exceedance of maximum thresholds for concentration in over 10% (or 5%) of wells in the monitoring network

AND/ OR

Significant increasing trend in degradation of water quality=
An increase by more than 1% per year, on average over ten years, in more than 10% (or 5%) of wells in the monitoring network.

Monitoring Well Network

- Requires good spatial and temporal coverage of the Basin
- Existing monitoring wells have large data gaps
- Suggested expansion (at least 5 more wells, plus the new well drilled by DWR)
- Monitoring frequency: once per year or every other year



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How to Proceed?

Do you agree with keeping the current list of constituents limited to Chapter 2 and only assigning an SMC to a select few?

Do you agree with the suggestion of only assigning SMCs to nitrate and Total Dissolved Solids?

Do you agree with the assessment of the well network (use existing municipal data and expand with at least 5 more wells)?