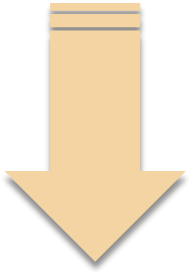
SANTA CRUZ MID-COUNTY GROUNDWATER AGENCY

DIFFERENCE BETWEEN THE AROMAS AND PURISIMA AREAS OF THE MID-COUNTY BASIN

GSP Advisory Committee - December 12

Aromas and Purisima Differences

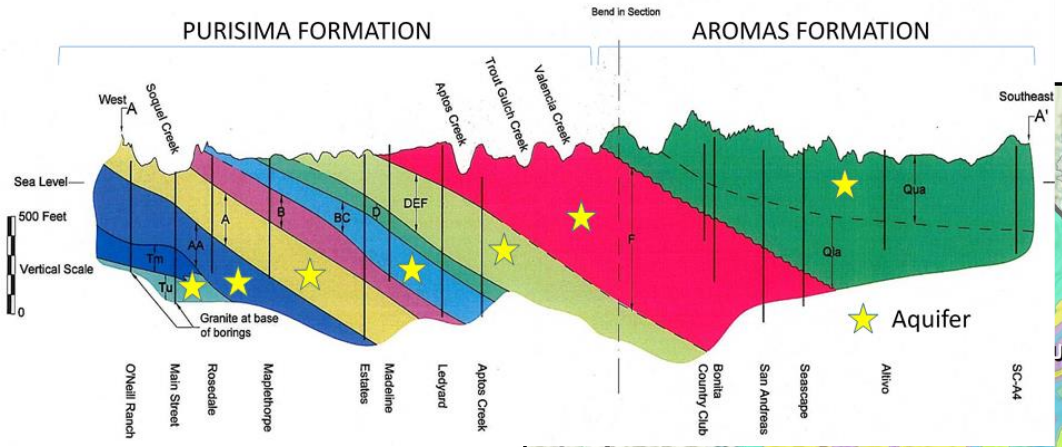
- Hydrogeologic
- Groundwater quality
- Connected surface water
- Sensitivity to pumping



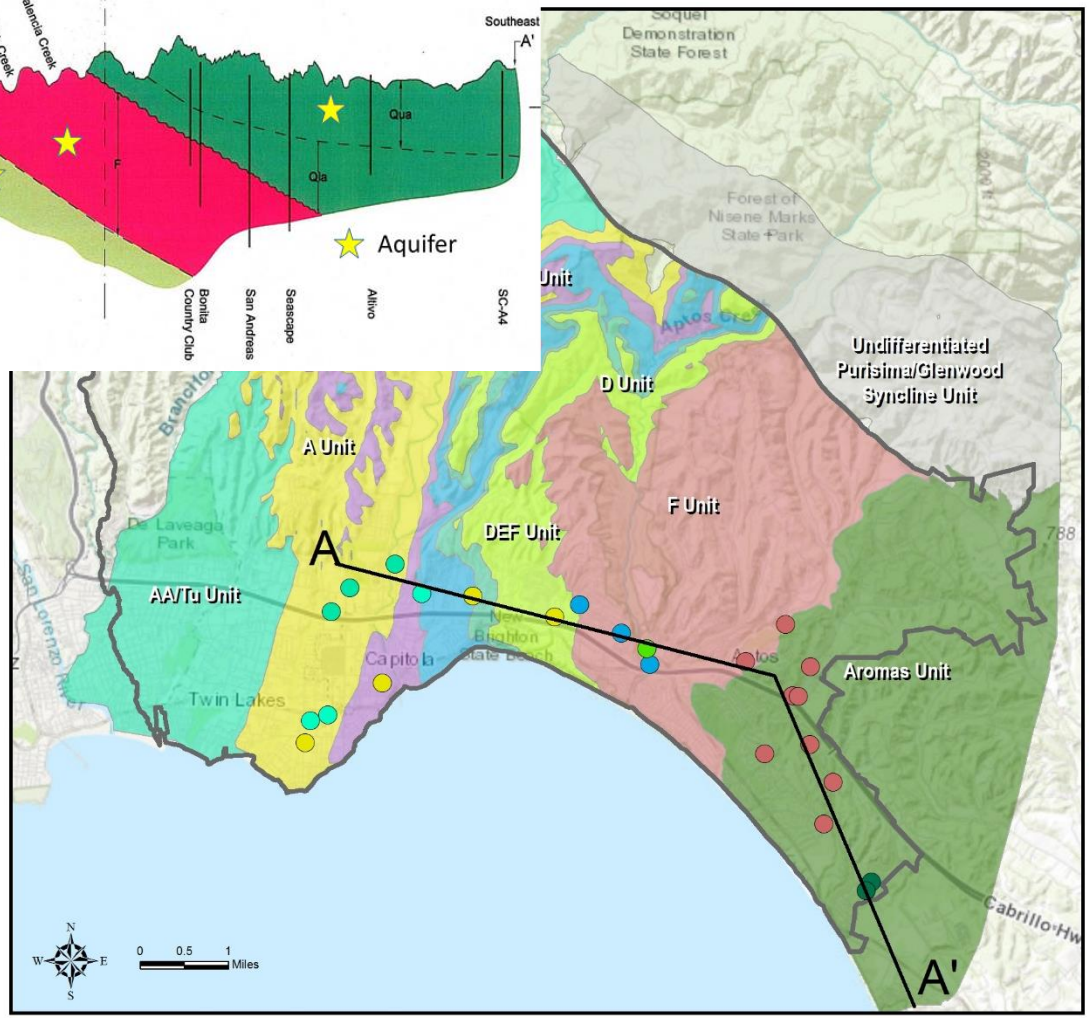
Implications for the GSP

Hydrogeologic Differences

Aromas Area is the Aromas Red Sands Outcrop and underlying Purisima F- Unit



Municipal wells often screened in both Aromas Red Sands and Purisima F unit



Aquifer of Deepest Municipal Production Well Screen

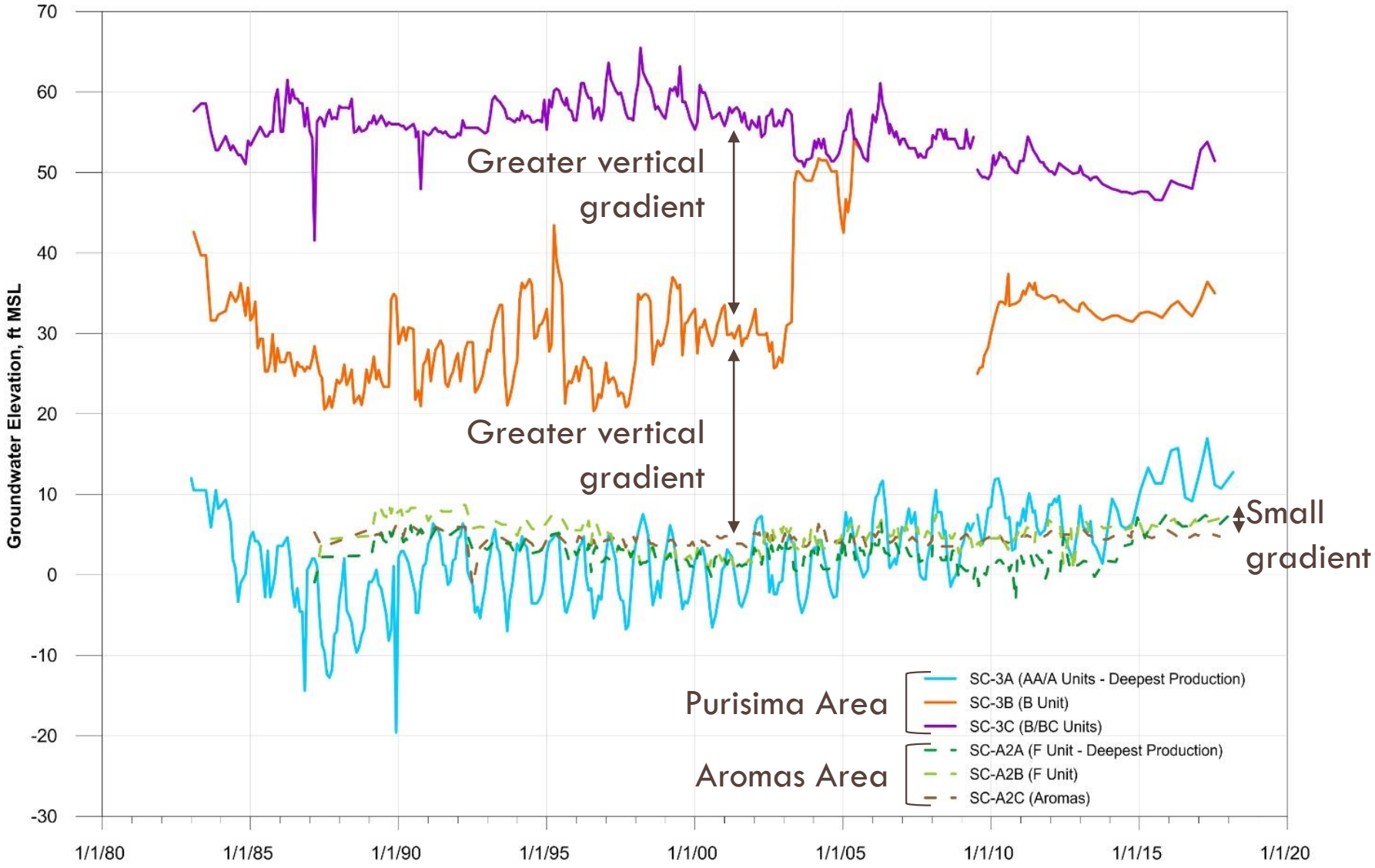
- Aromas
- F
- BC
- DEF
- A
- AA
- Tu

Santa Cruz Mid-County Basin

Outcrops

Unit

- Aromas
- F
- DEF
- D
- BC
- B
- A
- AA/Tu
- Undifferentiated Purisima/Glenwood Syncline



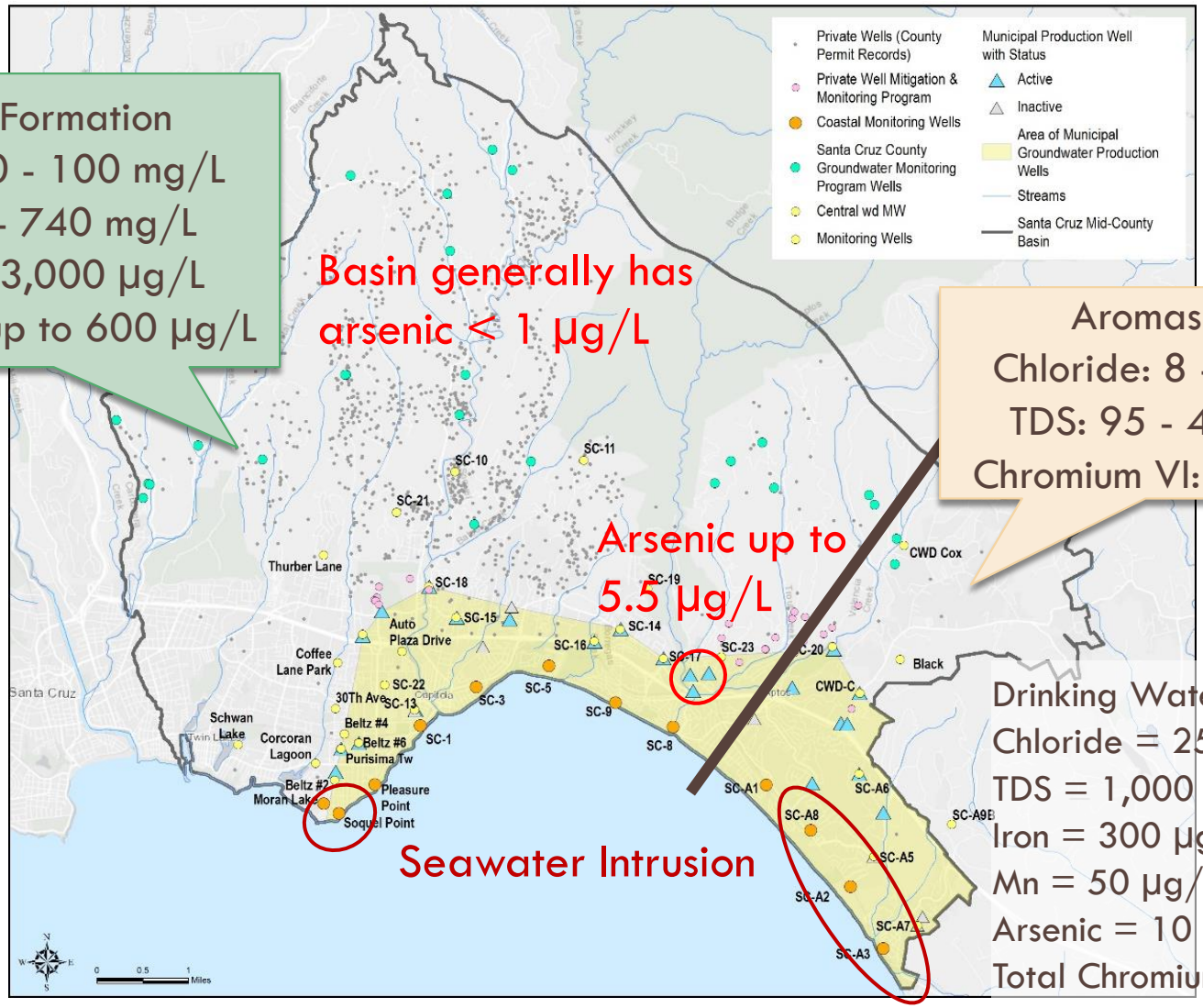
Leakage from Aromas Red Sands into Purisima F unit - hydrogeologically more similar

Limited leakage in deeper Purisima units because of aquitards

Groundwater Quality Differences

Natural Groundwater Quality

Purisima Formation
Chloride: 10 - 100 mg/L
TDS: 270 - 740 mg/L
Iron: up to 3,000 µg/L
Manganese: up to 600 µg/L



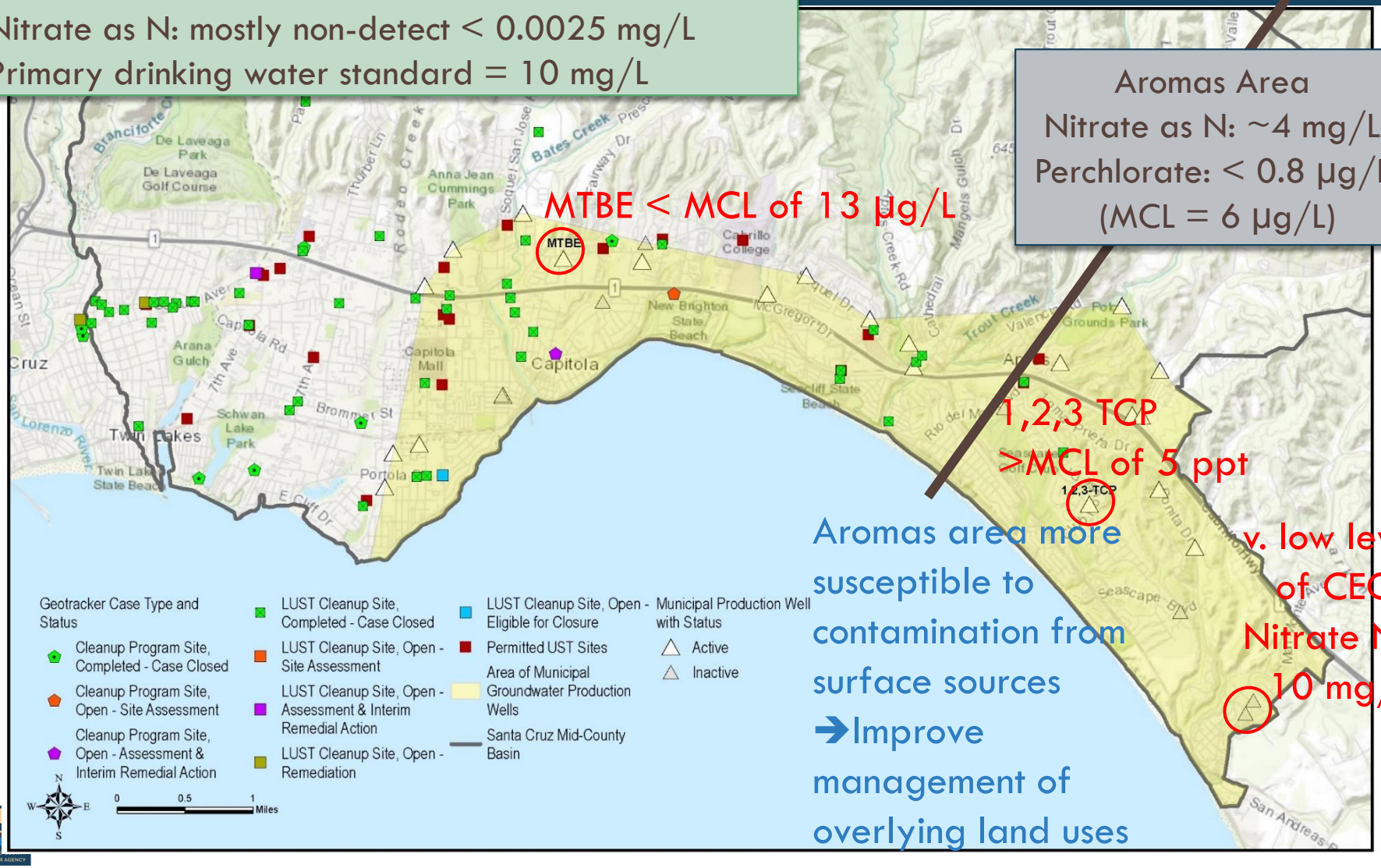
Aromas Area
Chloride: 8 - 58 mg/L
TDS: 95 - 470 mg/L
Chromium VI: 5-40 µg/L

Drinking Water Stds
Chloride = 250 mg/L (S)
TDS = 1,000 mg/L (S)
Iron = 300 µg/L (S)
Mn = 50 µg/L (S)
Arsenic = 10 µg/L (P)
Total Chromium = 50 µg/L (P)

Land Use Effects on Groundwater Quality

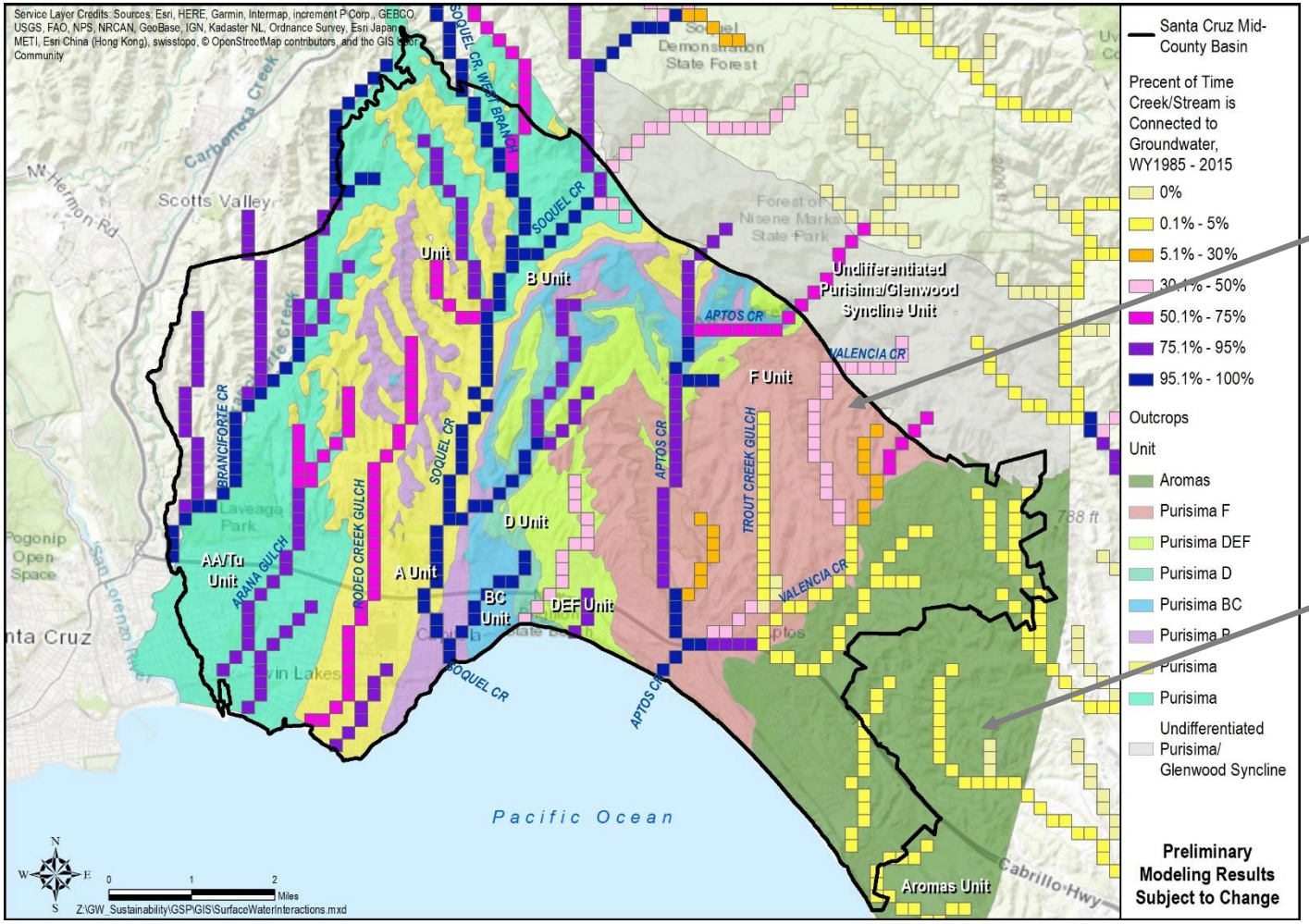
Purisima Area
Nitrate as N: mostly non-detect < 0.0025 mg/L
Primary drinking water standard = 10 mg/L

Aromas Area
Nitrate as N: ~4 mg/L
Perchlorate: < 0.8 µg/L
(MCL = 6 µg/L)



Connected Surface Water Differences

Greater depth to groundwater below creeks in Aromas area results in less connection to surface water

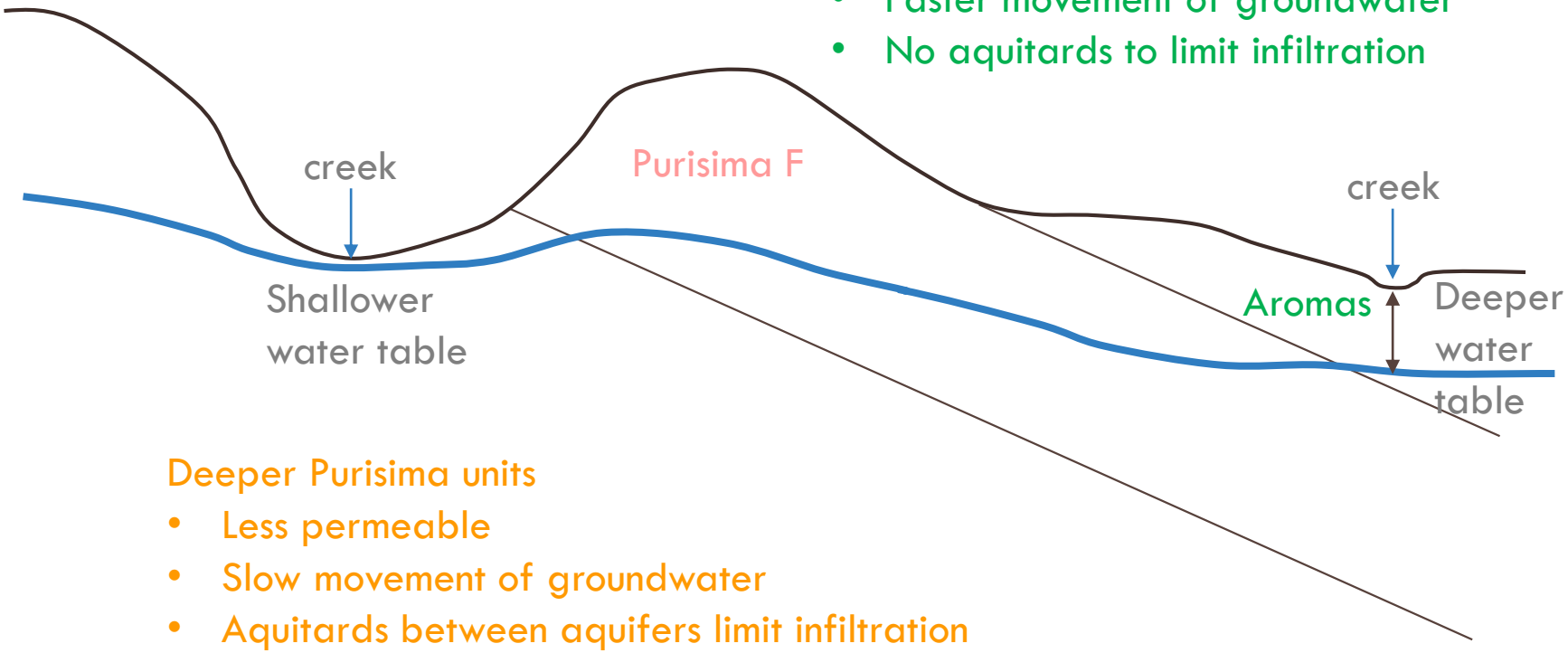


More connection in Purisima units

Aromas area < 5% connection Groundwater > 100 ft below creeks

Conceptual Diagram

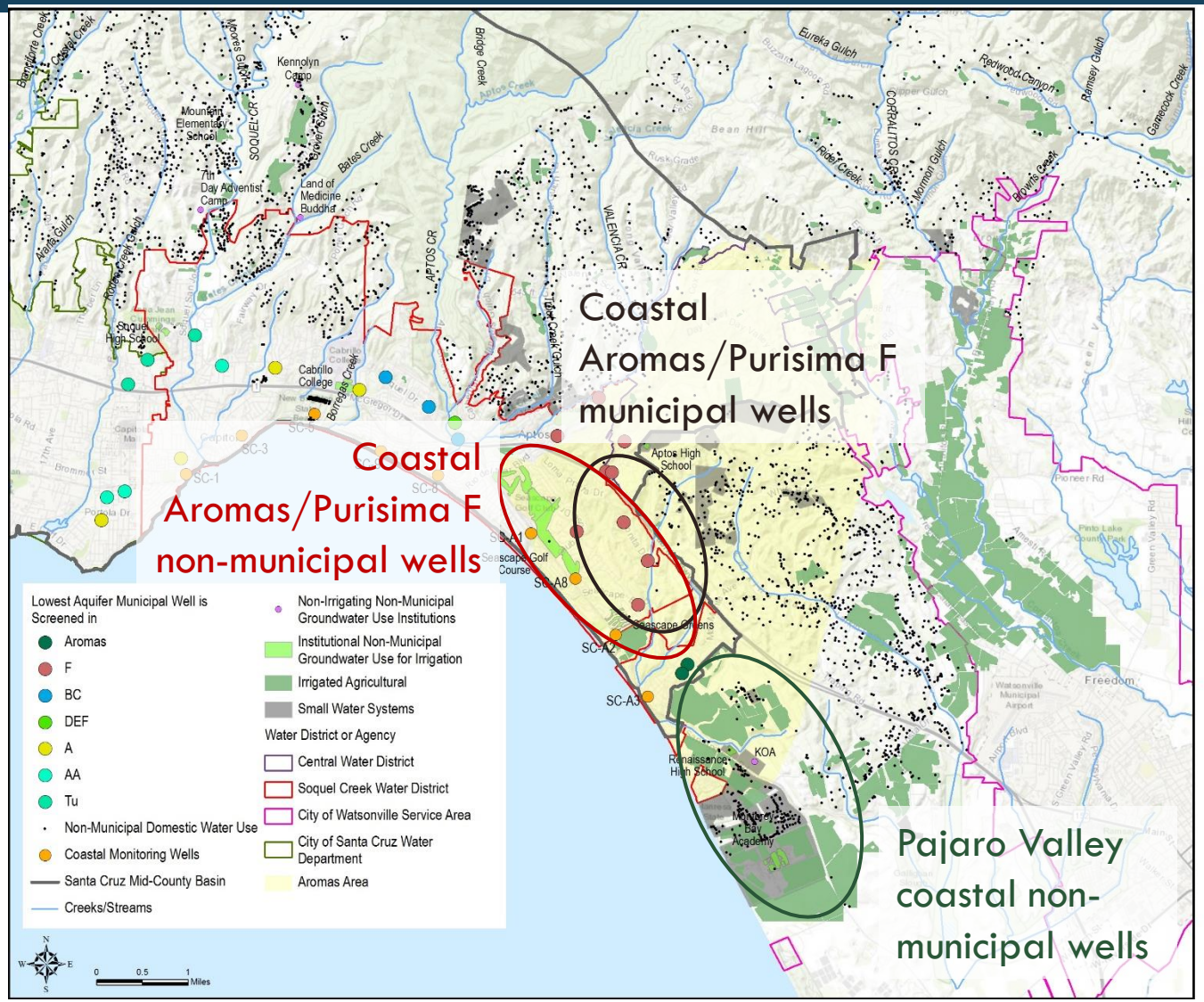
Aromas Red Sands & Purisima F
- More permeable
- Faster movement of groundwater
- No aquitards to limit infiltration



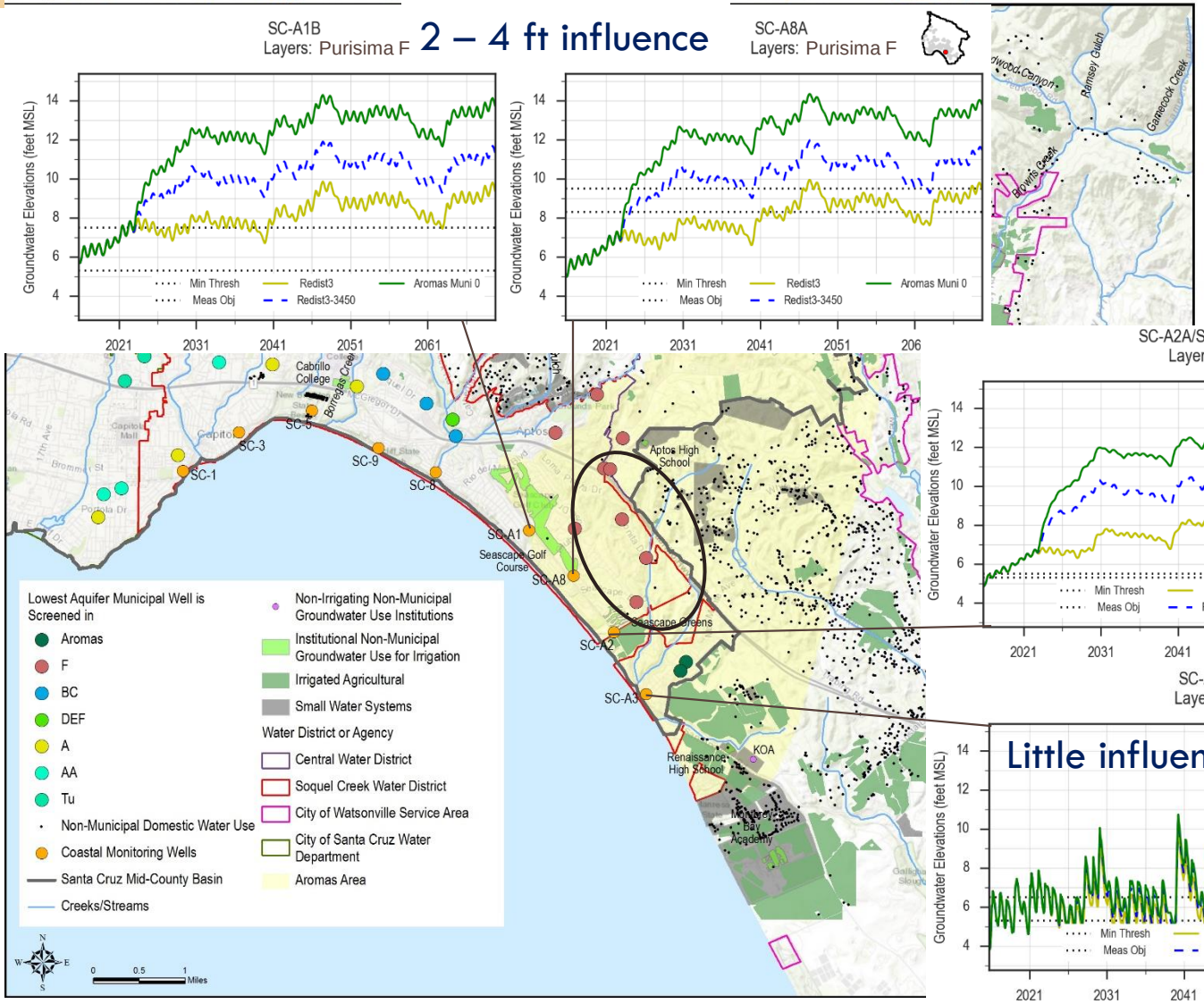
Deeper Purisima units
- Less permeable
- Slow movement of groundwater
- Aquitards between aquifers limit infiltration
- Groundwater table mimics topography

Sensitivity to Pumping

Recent Sensitivity Runs



Eliminate Coastal Aromas/Purisima F unit municipal pumping



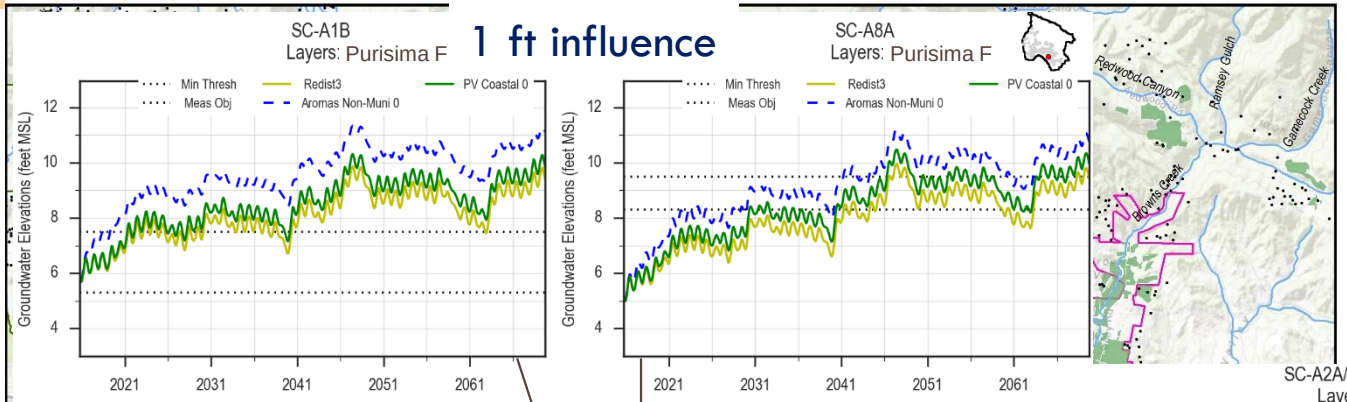
- Pumping of 380-830 AFY eliminated
- 4 SqCWD wells
- 2 CWD wells

No Aromas/PurF muni pumping

Redistribute & reduce muni pumping

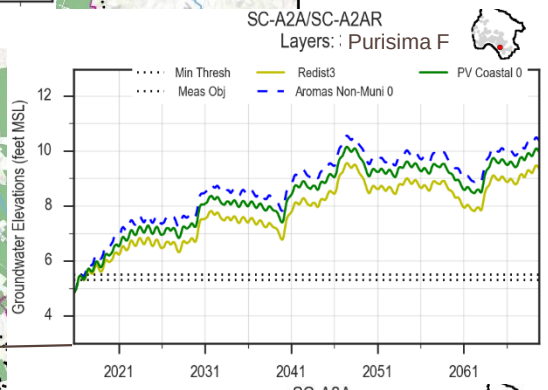
Redistribute muni pumping

Eliminate Coastal Aromas/Purisima F unit non-municipal pumping



Pumping of 263 AFY eliminated

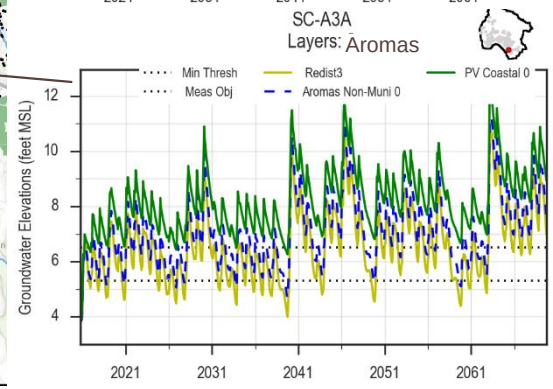
- 122 AF ag use
- 136 AF institutional use
- 5 AF domestic use



No Aromas/PurF non-muni Basin pumping

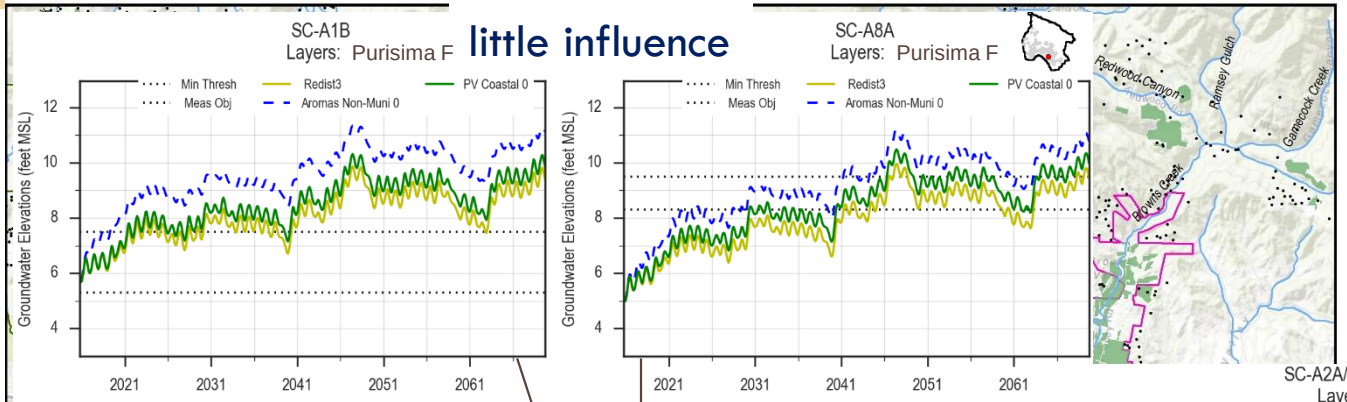
No Aromas/PurF PV non-muni pumping

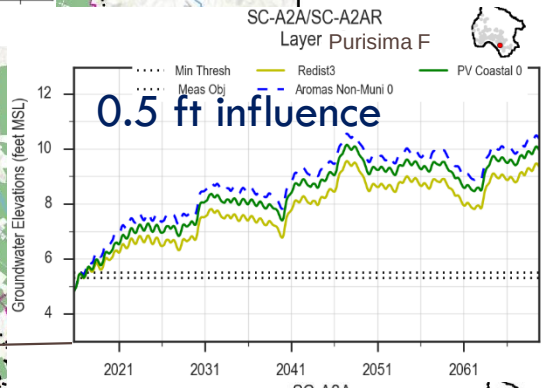
Redistribute muni pumping

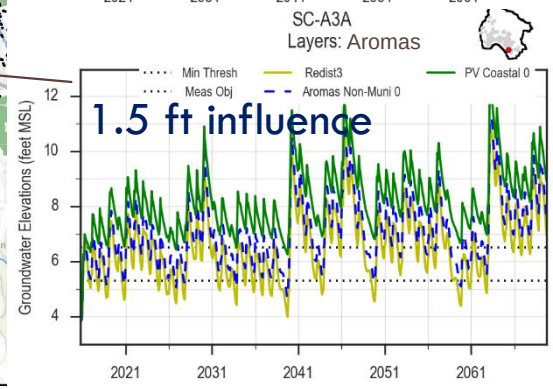


Little influence but greater than municipal

Eliminate Pajaro Valley coastal Aromas/ Purisima F unit non-municipal pumping







Pumping of 2,533 AFY eliminated

- 1,774 AF ag use
- 611AF institutional use
- 148 AF domestic use

No Aromas/PurF non-muni Basin pumping

No Aromas/PurF PV non-muni pumping

Redistribute muni pumping

Pumping Impacts Summary

- Coastal municipal pumping in the Aromas/Purisima F impacts protective elevations in Purisima F and not much in the Aromas (southernmost well)
- Coastal non-municipal pumping in the Aromas/Purisima F impacts protective elevations in Purisima F and not much in the Aromas (southernmost well)
- Coastal Pajaro Valley Aromas pumping impacts protective elevations mostly in the southernmost coastal well (SC-A3A) and has lesser impacts with distance in the Mid-County Basin's Purisima F wells

Discussion of Differences between the Aromas and Purisima Areas

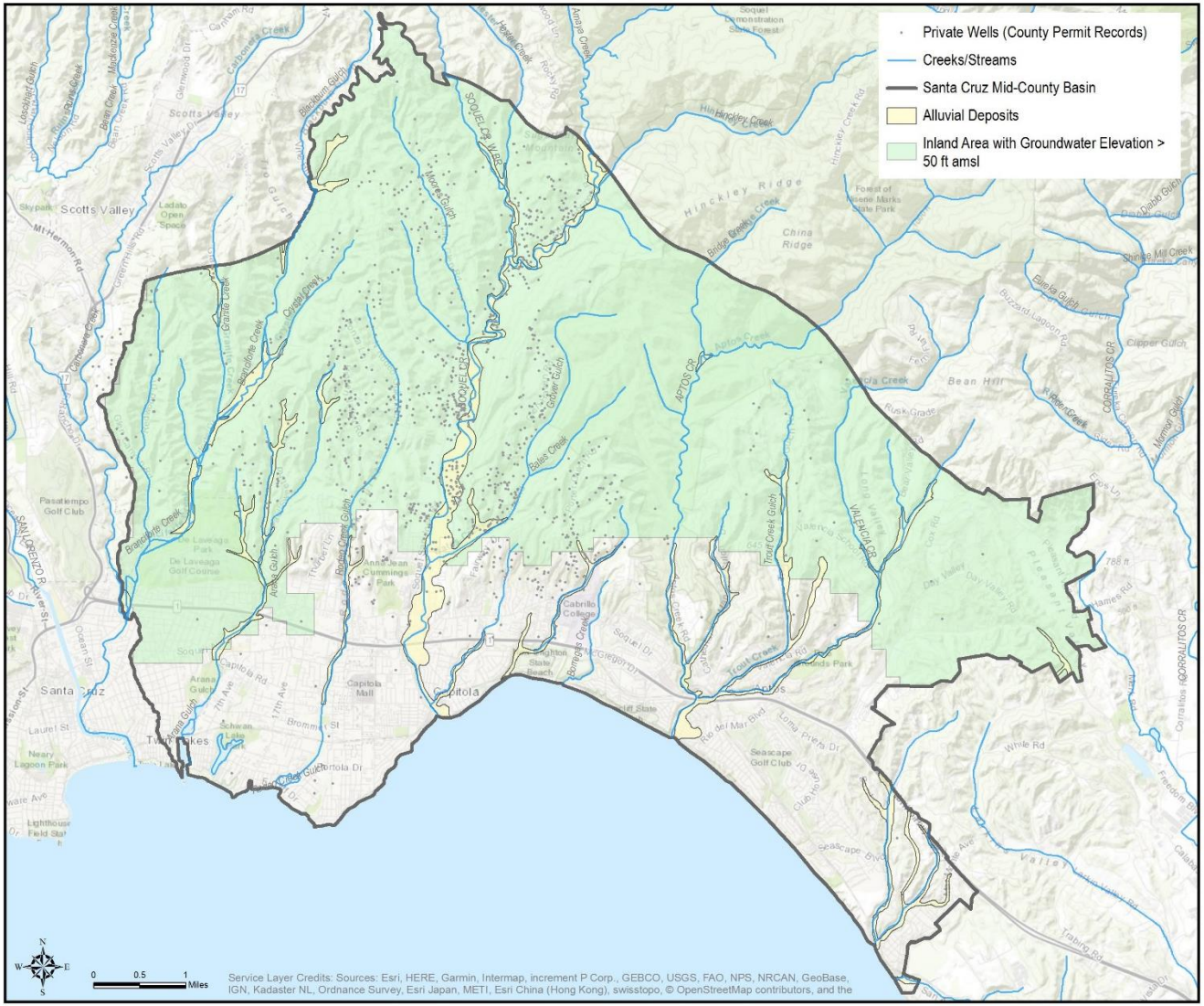
Implications for the GSP

Implications for the GSP

- Given there are differences between the Aromas & Purisima areas, are Management Areas needed?
  - Area within a basin for which a GSP may identify different sustainable management criteria, monitoring, or project and management actions based on unique local conditions for water use, water source, geology, aquifer characteristics, or other factors
  - Need to consider:
    - Reason for creation of each management area: do we need to manage certain areas differently to other areas within the Basin?
    - Level of monitoring and analysis: do the different management areas warrant different monitoring and analysis?

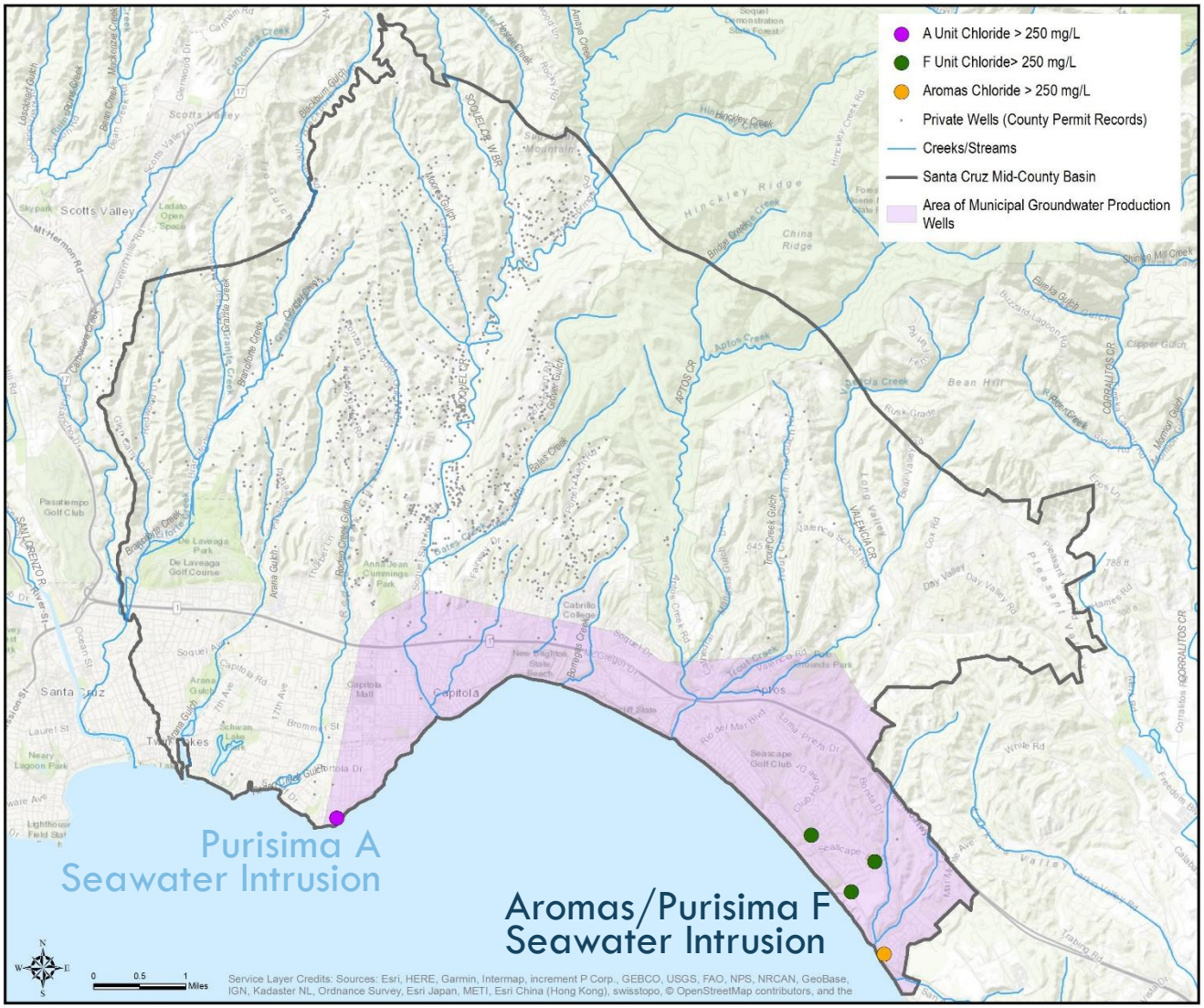
Inland Areas with groundwater > 50 feet above sea level

- **Small influence on coastal groundwater levels**
- **If land use changes, there may be demand for more groundwater in the future**



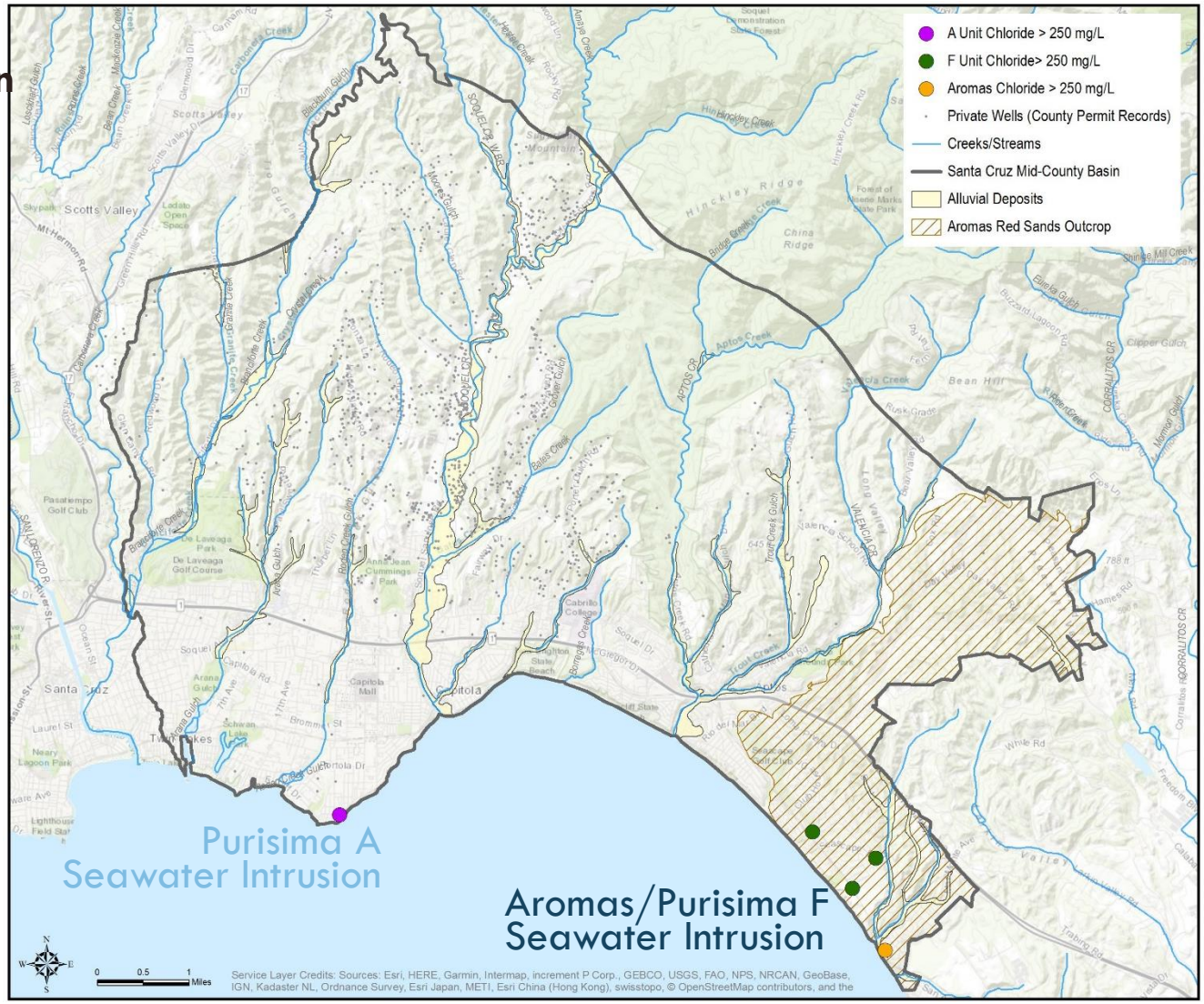
Area of Municipal Production

- **Most of the Basin's pumping (muni & institutional)**
- **Vulnerable to seawater intrusion**
- **Likely that projects and management actions will be focused in this area**

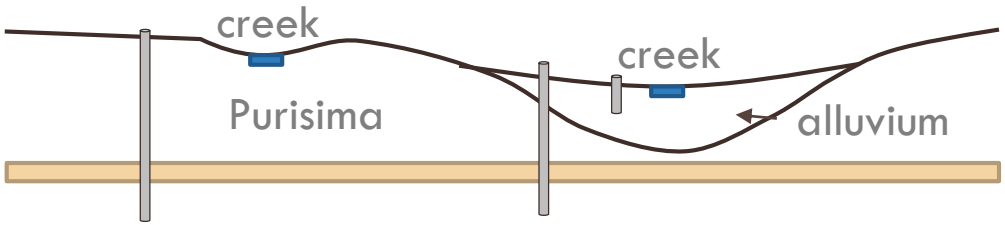


Aromas Area

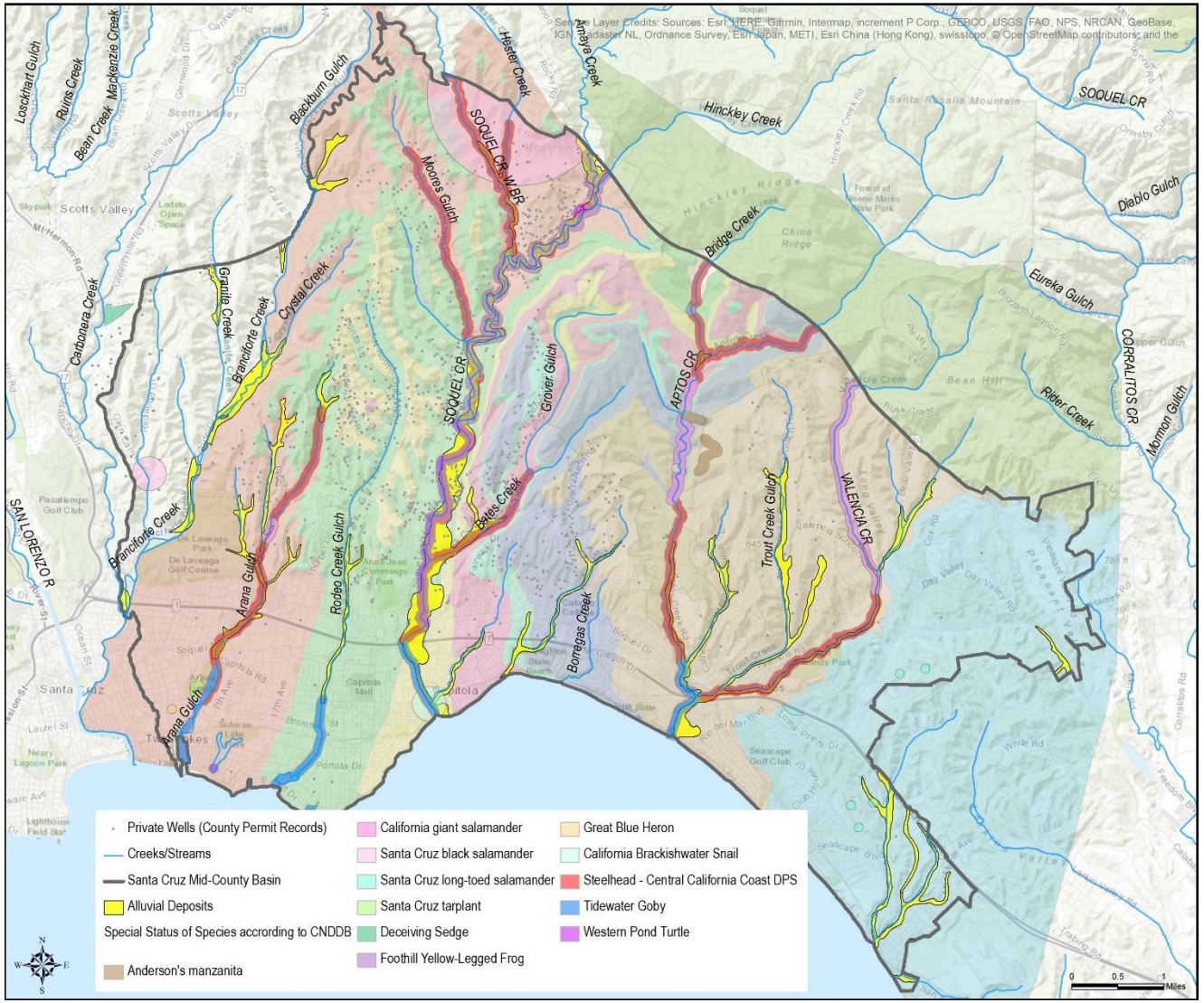
- **Vulnerable to contamination from surface sources**
- **Intruded by seawater**



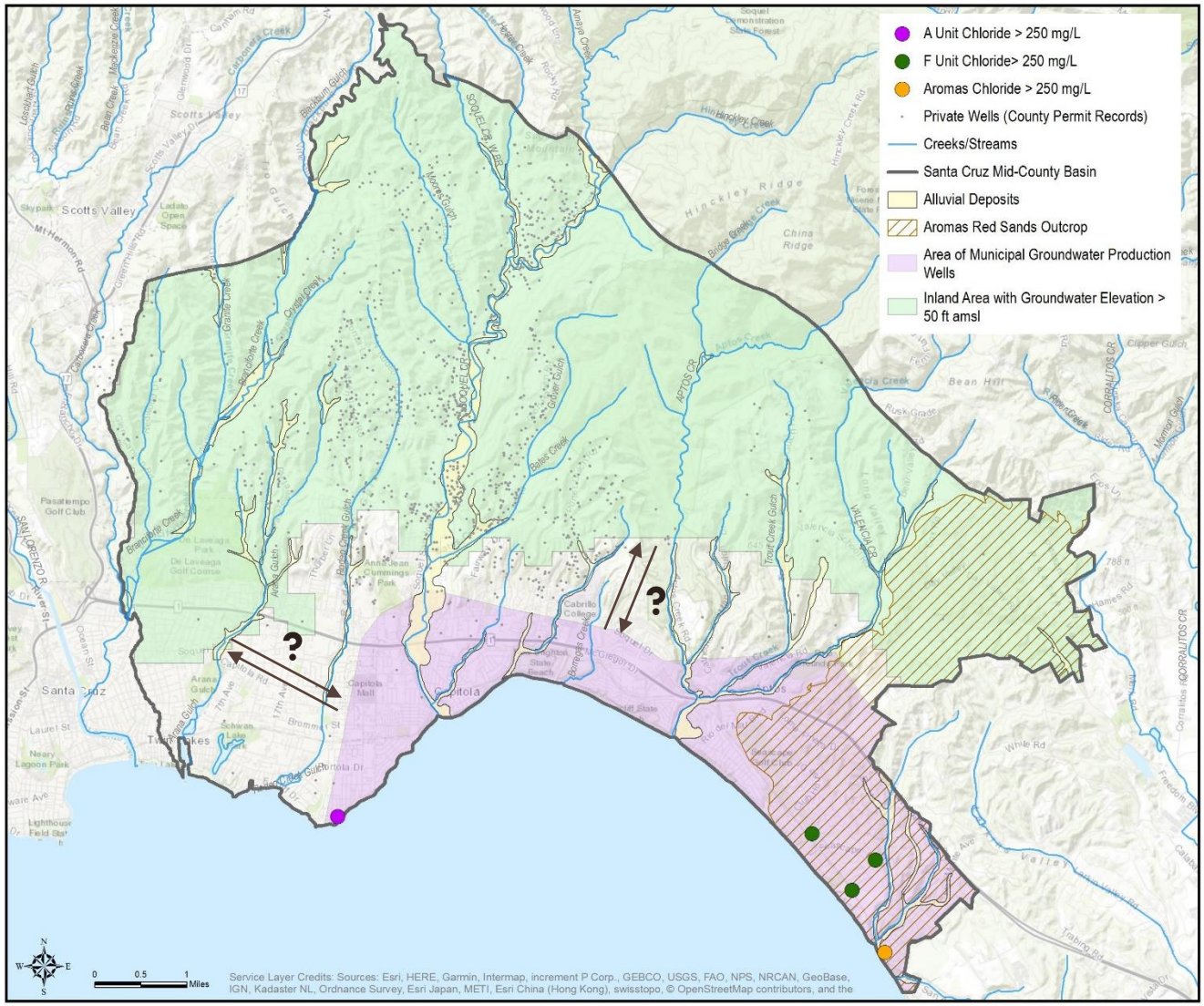
Alluvial Areas



- **Still to be determined if non-municipal wells have an influence on creek flows**



Potential Management Areas



Discussion

Summary Table of Model Scenarios

1. Eliminate pumping from 6 coastal Aromas/Purisima F unit municipal wells
2. Eliminate pumping from coastal Aromas/Purisima F unit non-municipal wells
3. Eliminate pumping from coastal Pajaro Valley Aromas non-municipal wells