# Nitrate increases in the western portion of the Los Osos Valley Groundwater Basin

## Central Coast Regional Water Quality Control Board

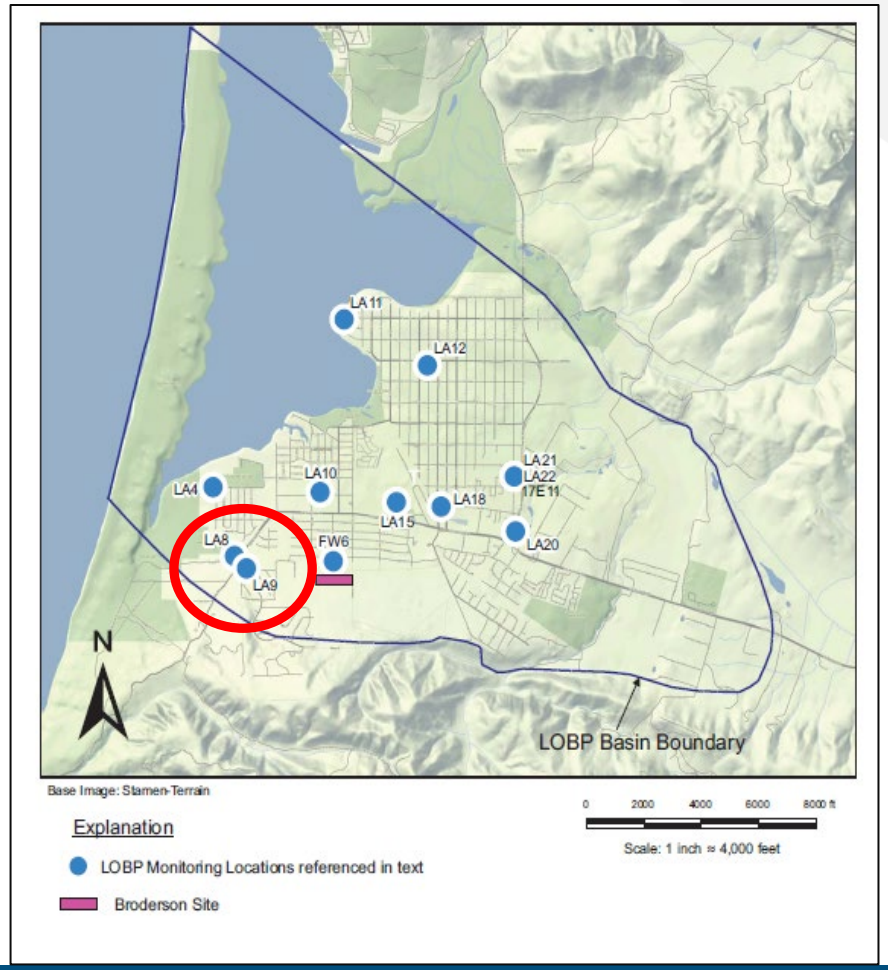
CALIFORNIA
Water Boards

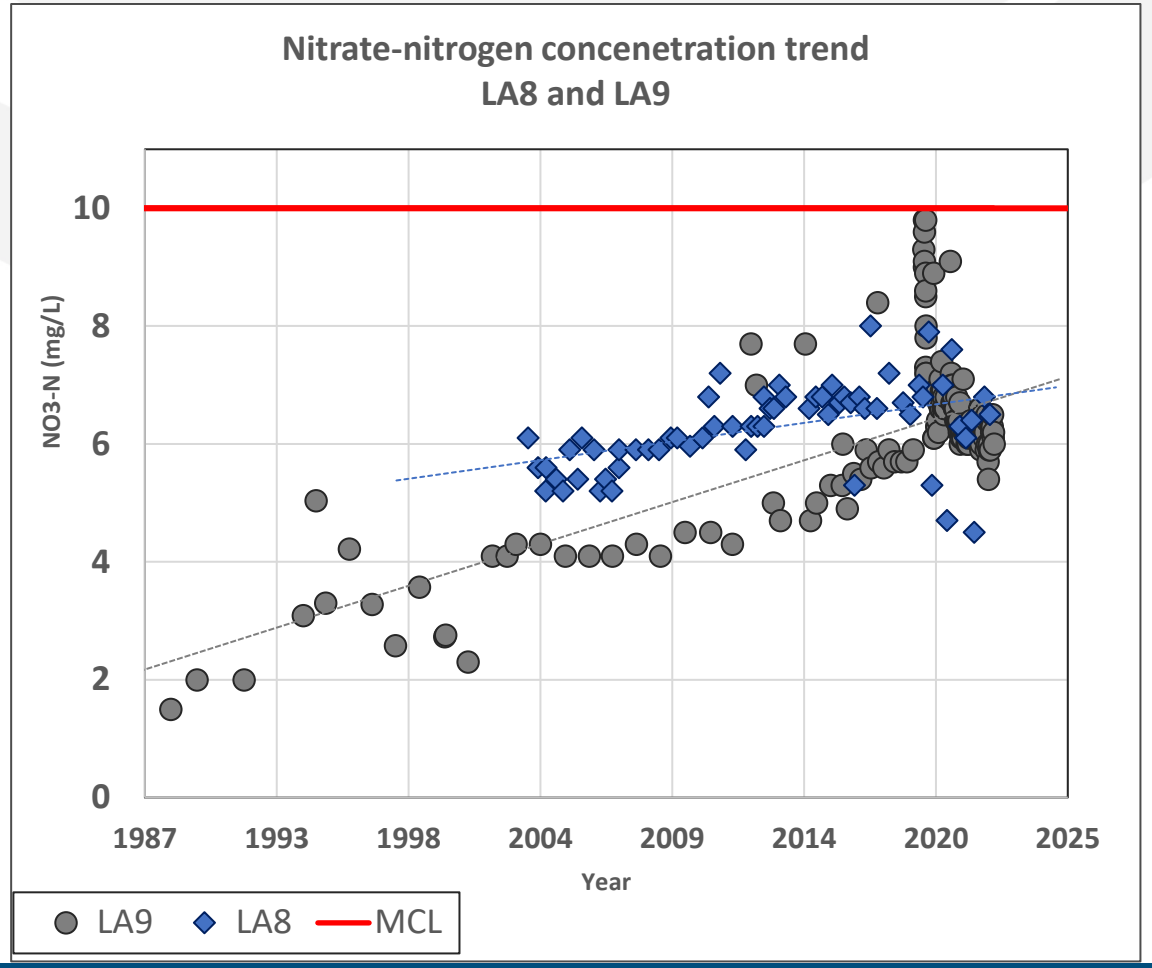
March 15, 2023

# Presentation overview

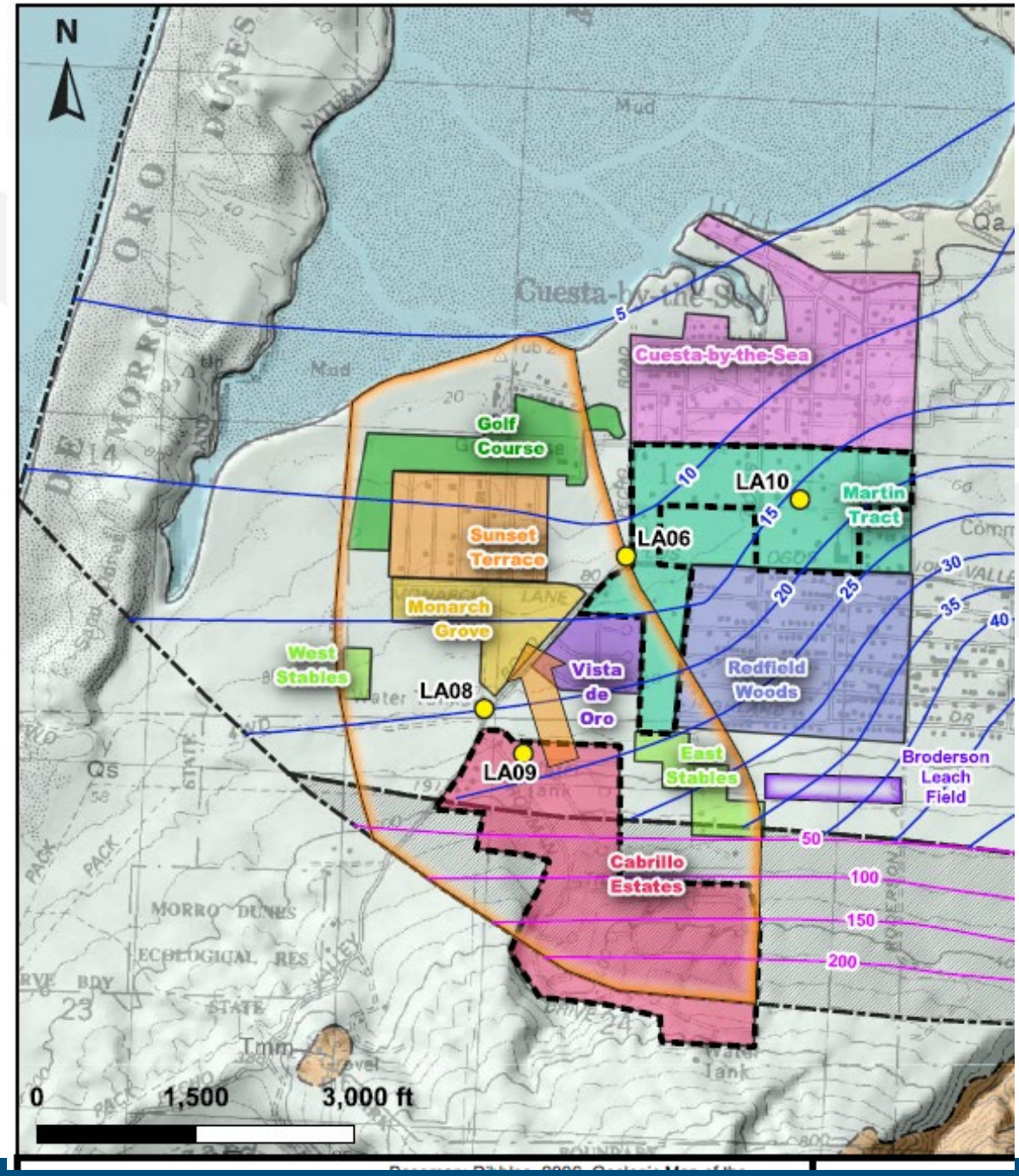
- Background on the problem, land-use, and hydrogeology
- Summary of historical modeling and recent technical investigations
- Data gaps and uncertainties
- Recommendations for additional data collection

# Increasing nitrate concentrations



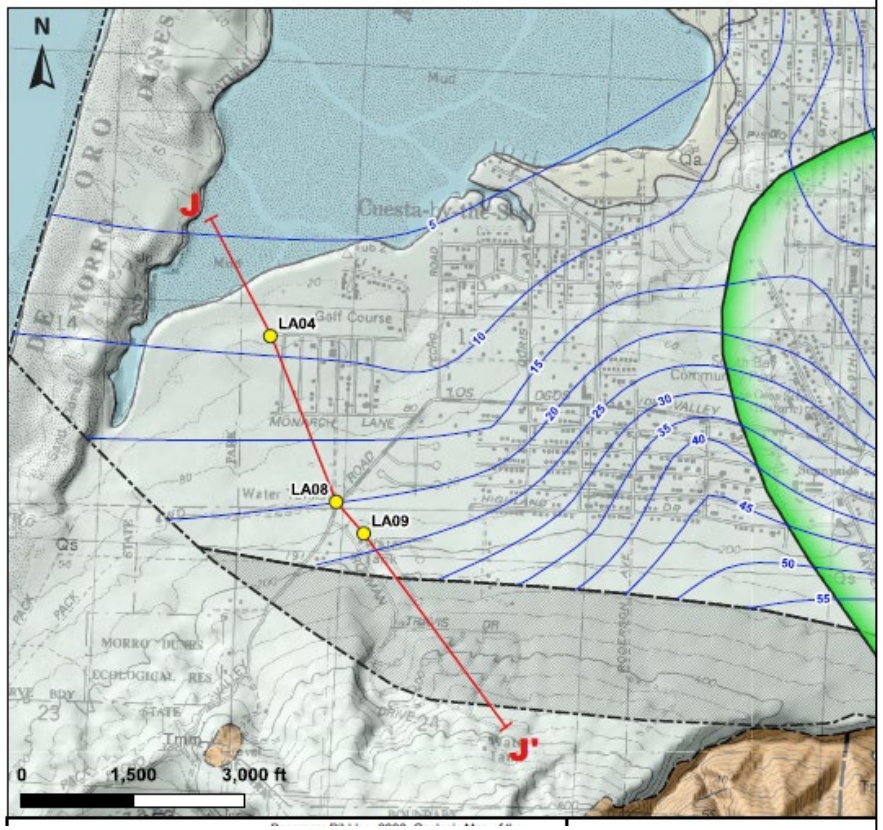



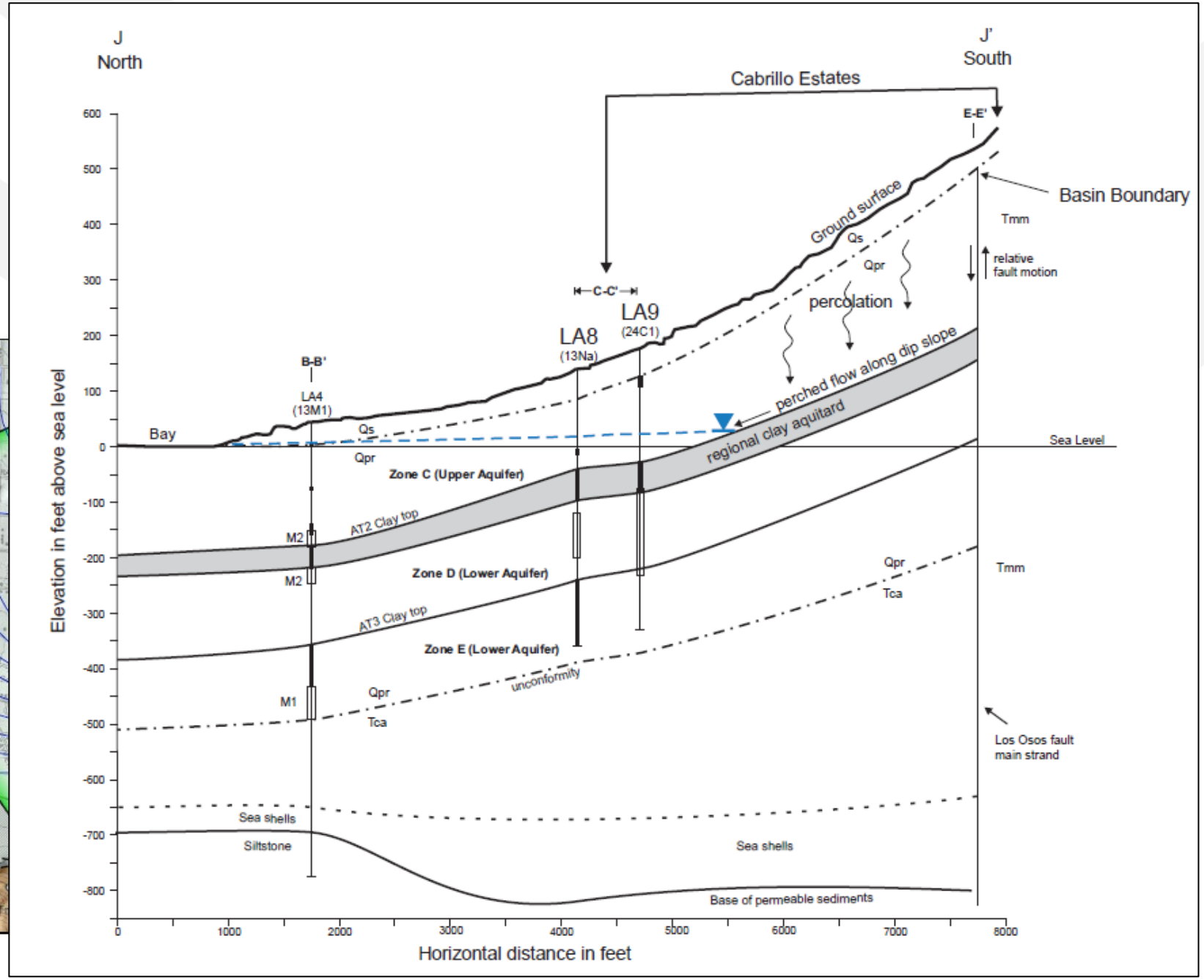
# Land use and potential nitrogen sources




Source: Cleath-Harris Geologists, 2021

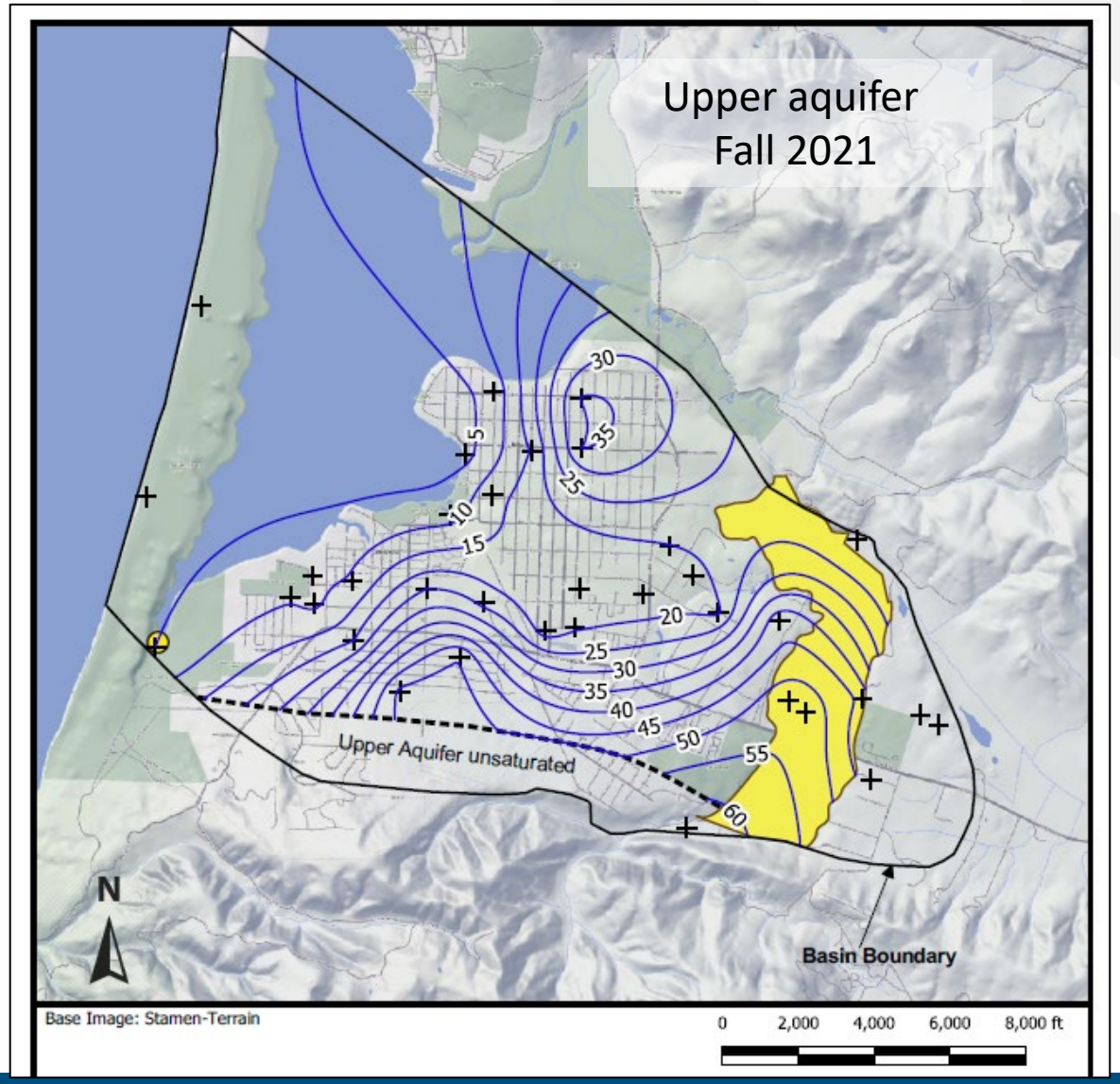
# Hydrogeology

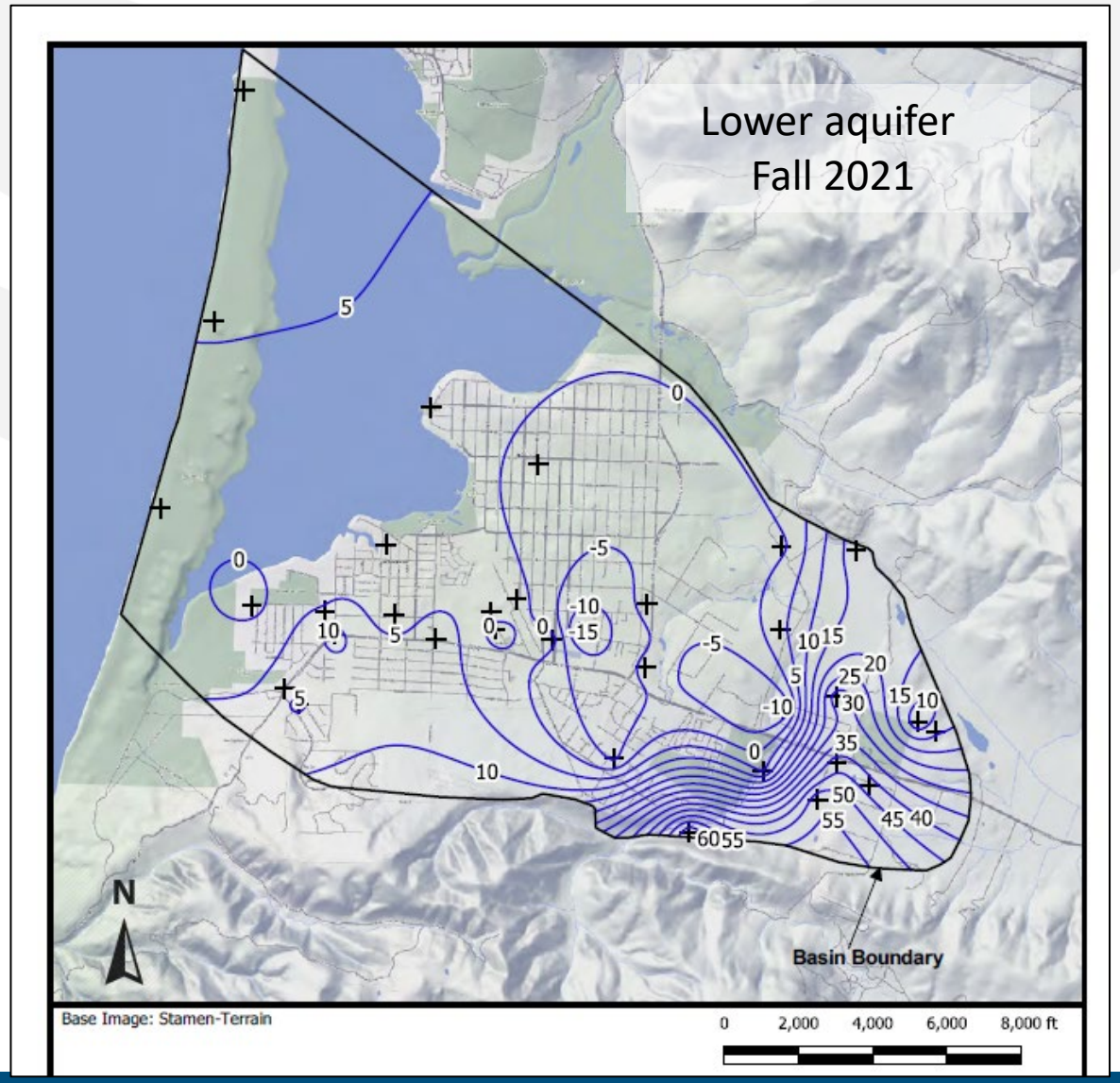


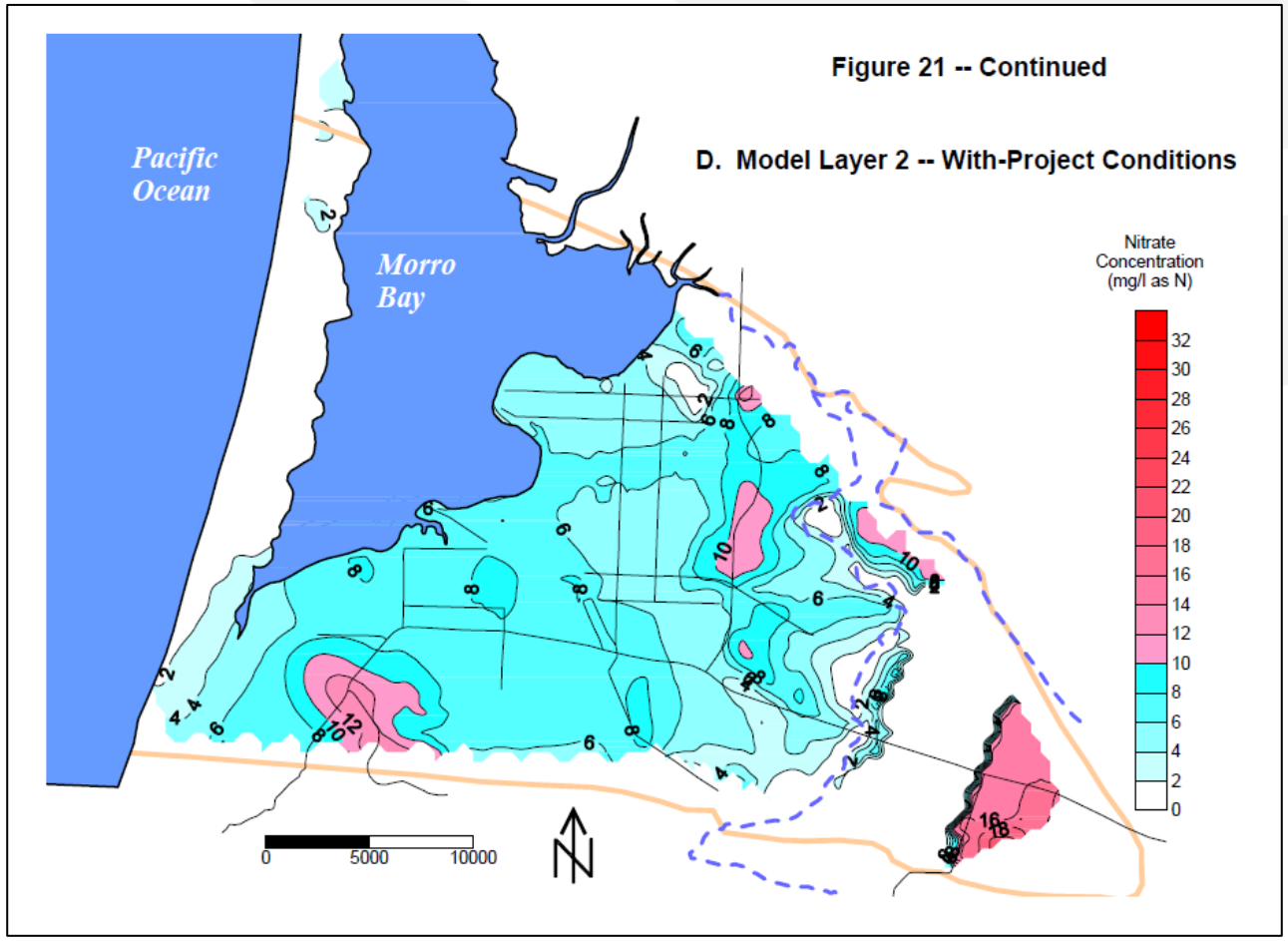

Source: Cleath-Harris Geologists, 2021

# Groundwater elevation contours



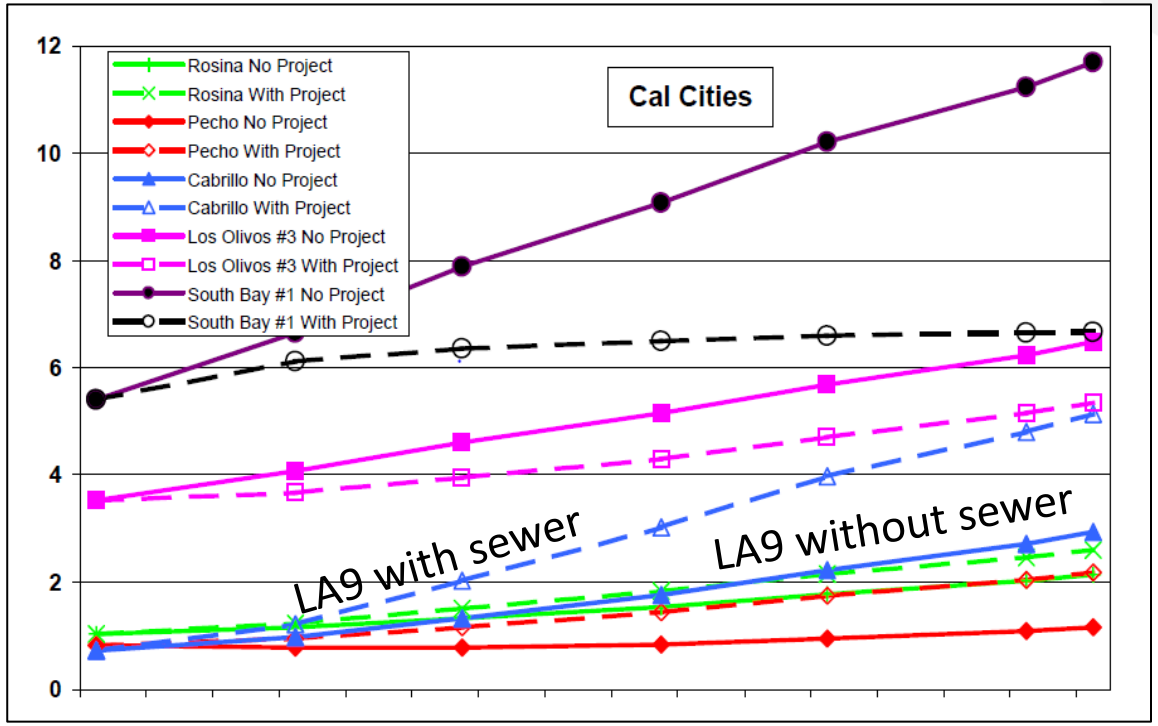



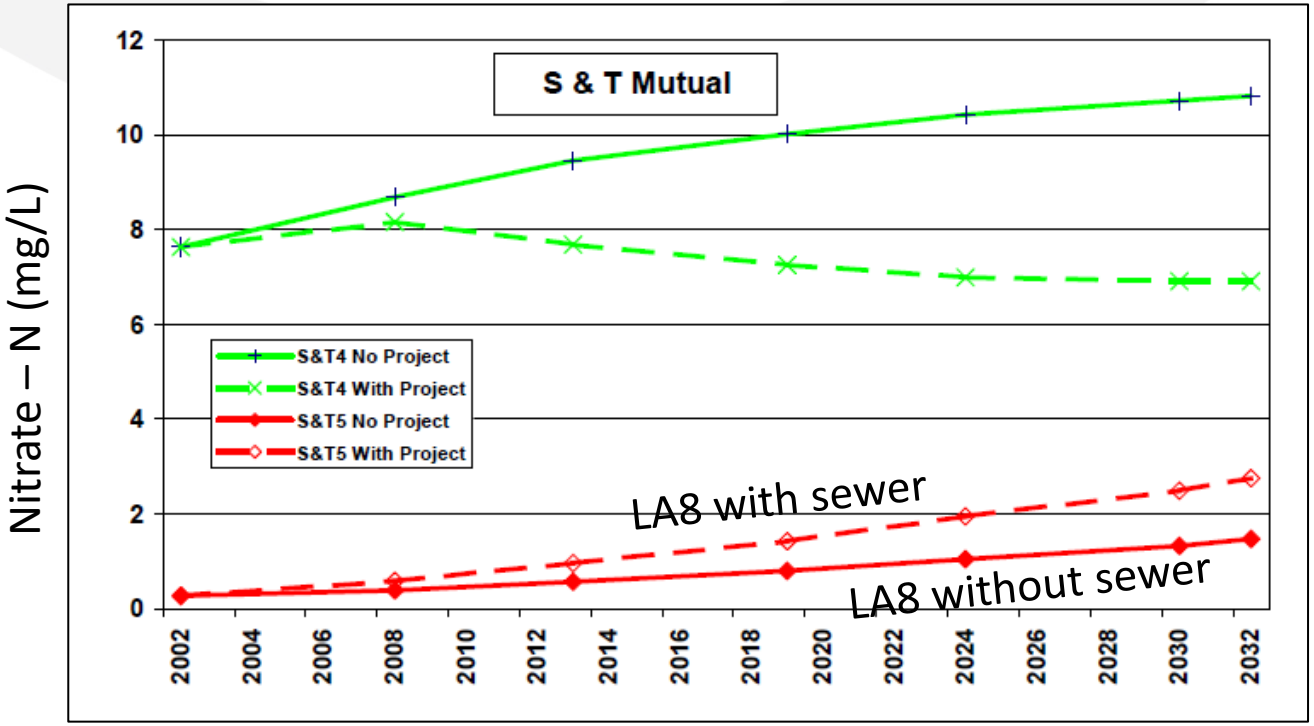
# Simulated nitrate in upper aquifer




Source: Yates and Williams, 2003

# Simulated effects of sewer project on LA8 and LA9



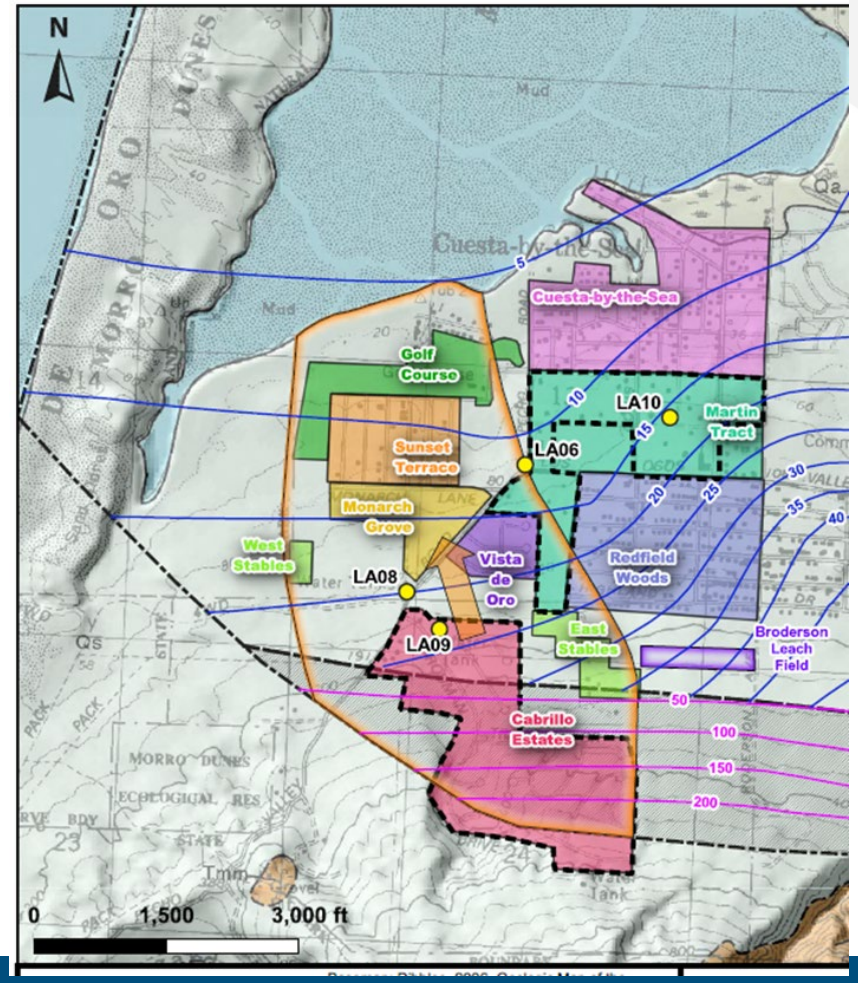




Source: Yates and Williams, 2003

# Recent Technical Investigations

- November 2019, presentation on nitrate trends to the BMC
- September 2021, S&T/Cleath-Harris perform investigation into source of nitrate in LA8 and LA9
- September 2022, S&T identifies wastewater indicator compounds in well LA8; refines manure loading estimates
- November 2022, Central Coast Water Board staff inspect commercial horse boarding facilities
- March 2023, wastewater indicator compounds sampled in well LA9

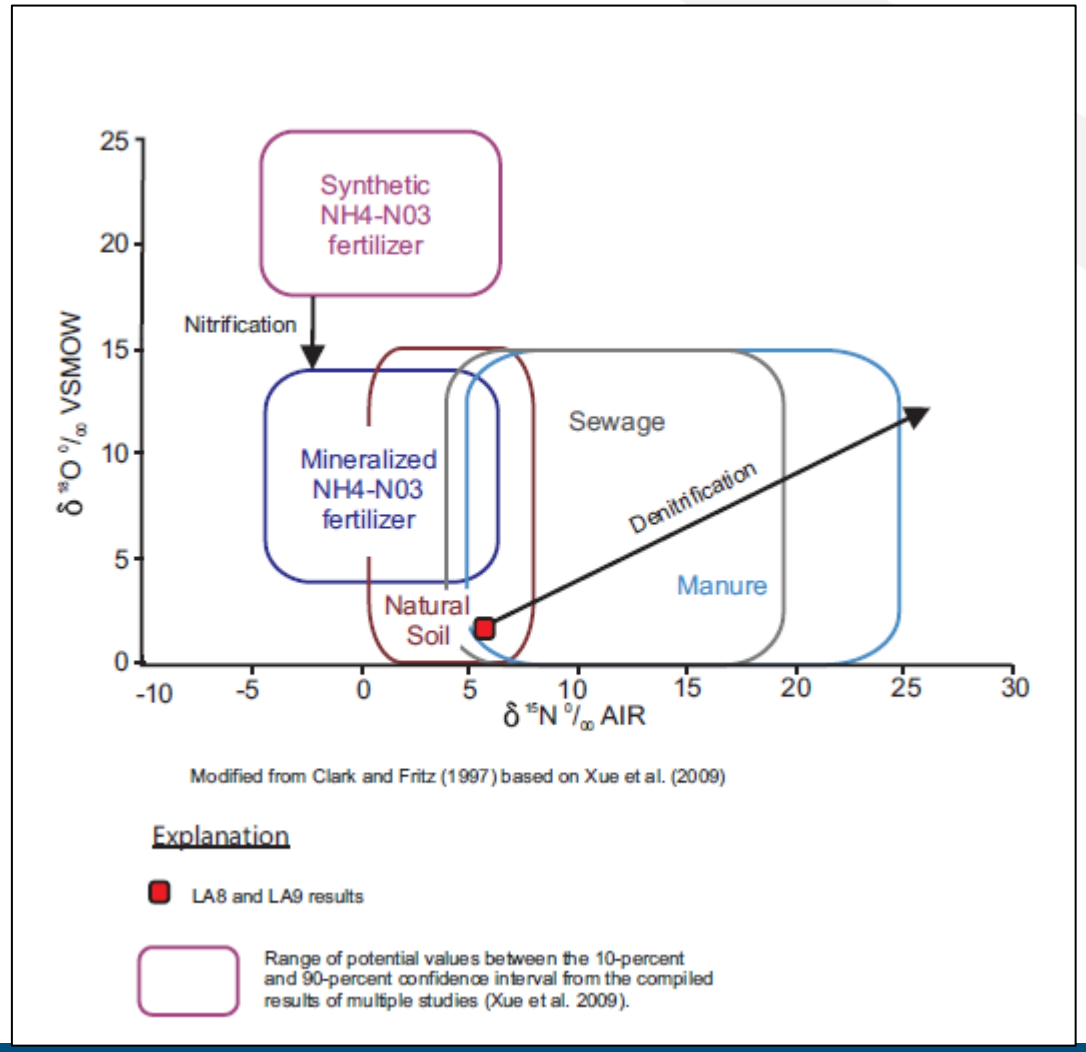
# Nitrogen loading estimates




| | Estimated N Load (lbs/yr) | | | Estimated load per unit acre N (lbs/acre/yr) | |
|---|---|---|---|---|---|
| **Source** | **Low** | **High** | | **Low** | **High** |
| **Cabrillo Estates** | 2270 | 6347 | | 24 | 48 |
| **Commercial horse boarding** | 462 | 2700 | | 66 | 386 |
| | | | | | |
| **Redfield Woods (west of Broderson)** | 3956 | 9633 | | 53 | 128 |
| **Sunset Terrace** | 1410 | 3453 | | 41 | 100 |
| **Vista de Oro** | 680 | 1938 | | 48 | 116 |

Source: Cleath-Harris Geologists, 2021and Central Coast Water Board

# Chemical source tracking



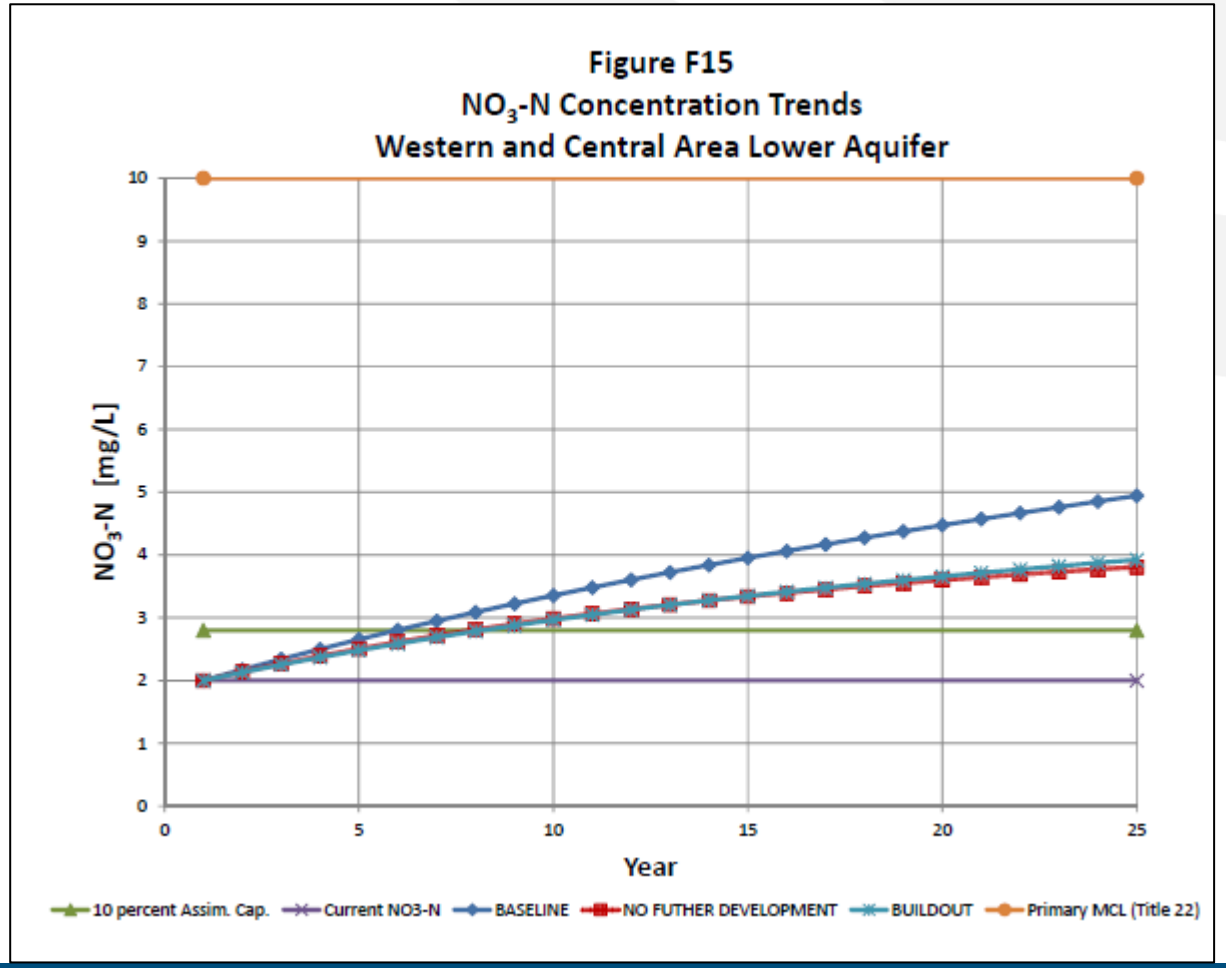

**Pharmaceuticals and Personal Care Products– LA8**

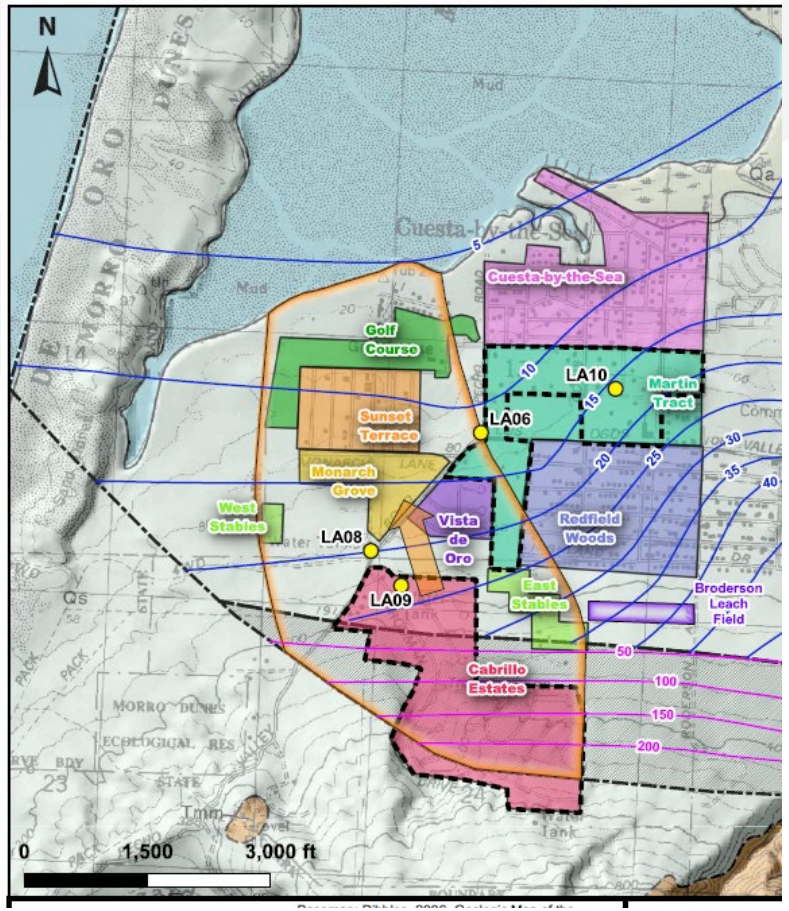
| Constituent | Units | Concentration | Reporting Limit | Source |
|---|---|---|---|---|
| Amoxicillin | ng/L | 26 | 20 | Antibiotic |
| Sulfamethoxazole | ng/L | 7.9 | 5 | Antibiotic |
| 4-Nonylphenol | ng/L | 1700 | 400 | Household cleaning products |
| Acesulfame K | ng/L | 130 | 20 | Aspartame artificial sweetener |
| Salicylic Acid | ng/L | 360 | 200 | Products containing aspirin |

5 detections out of 57 constituents analyzed

Source: Cleath-Harris Geologists, 2021, 2022

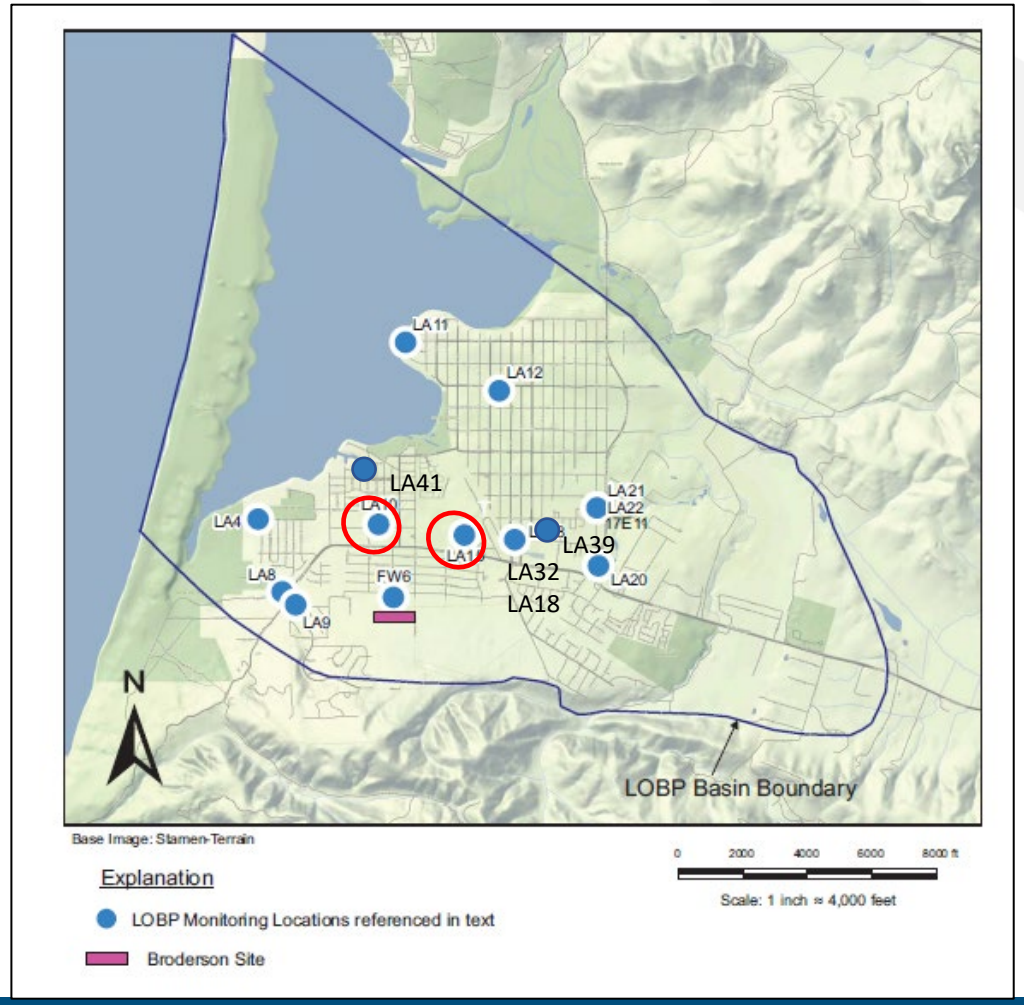
# Legacy septic nitrate in the lower aquifer

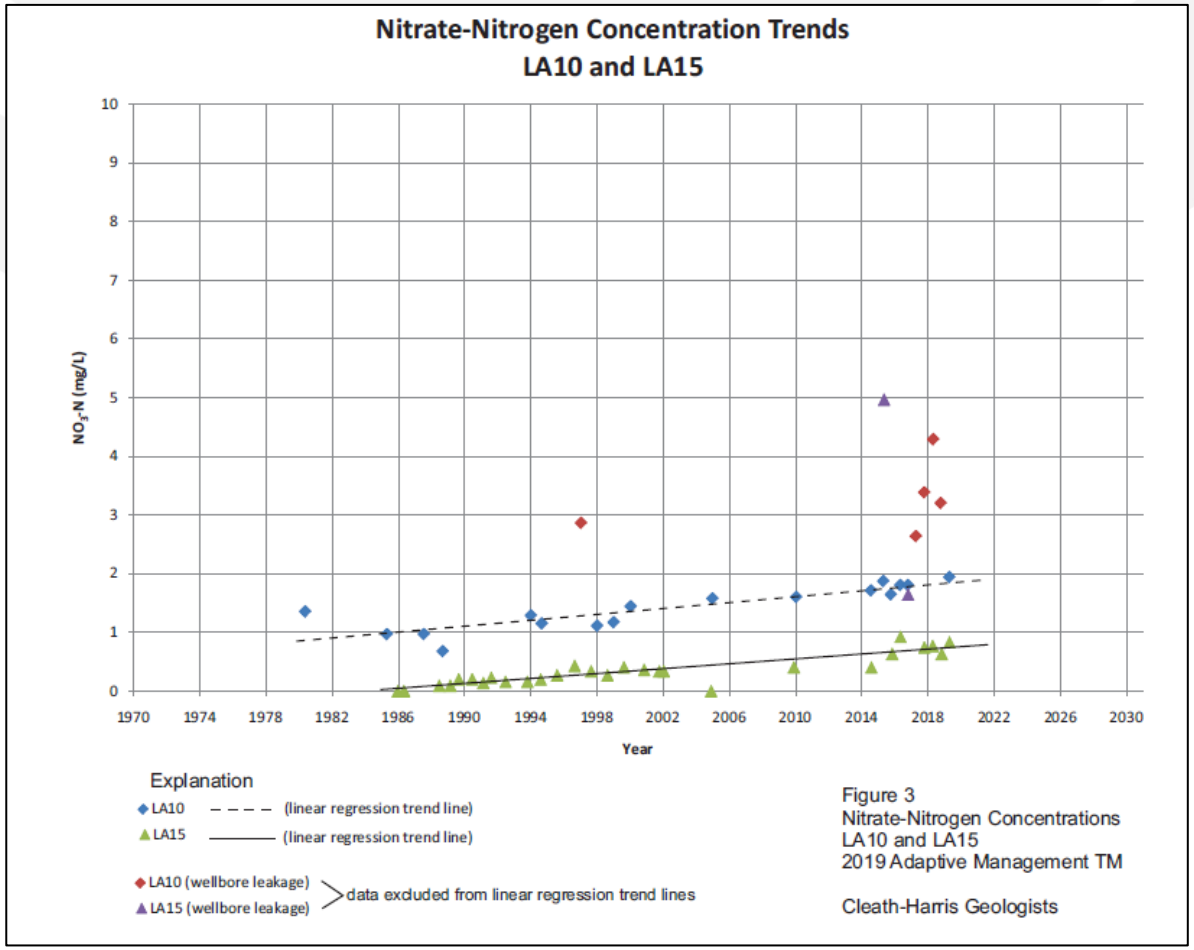



Source: Salt and Nutrient Management Plan for the Los Osos Groundwater Basin, prepared by San Luis Obispo County

# Wells with increasing concentrations

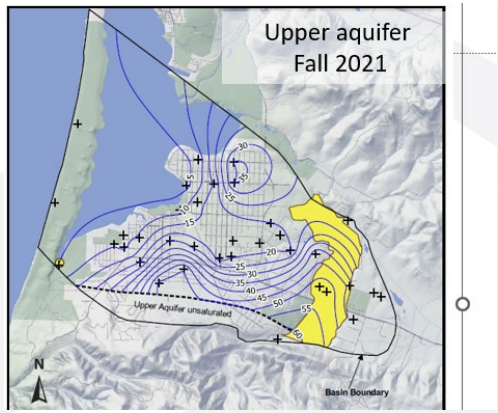


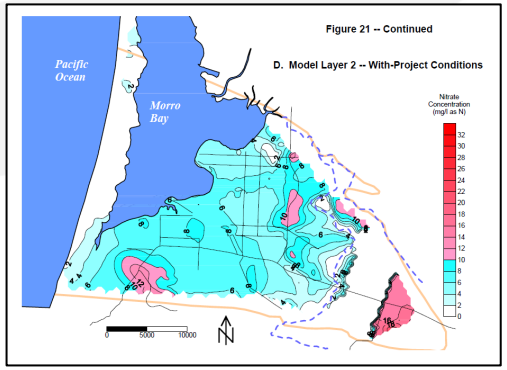



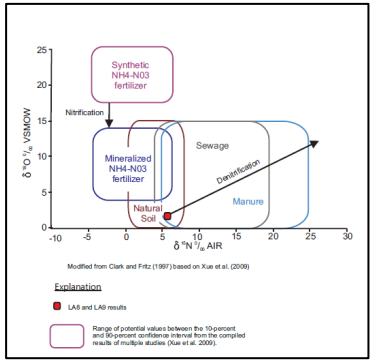

Source: Cleath-Harris Geologists, 2019

# What we know

- Upper aquifer groundwater flow direction suggests a Cabrillo Estates and/or horse boarding source; lower aquifer more ambiguous
- Historical modeling indicates Cabrillo Estates and horses boarding source in upper and lower aquifer; recent modeling indicates Cabrillo Estates and horse boarding for upper aquifer
- Chemical fingerprinting identifies wastewater
- Manure can’t be ruled out based on chemical data



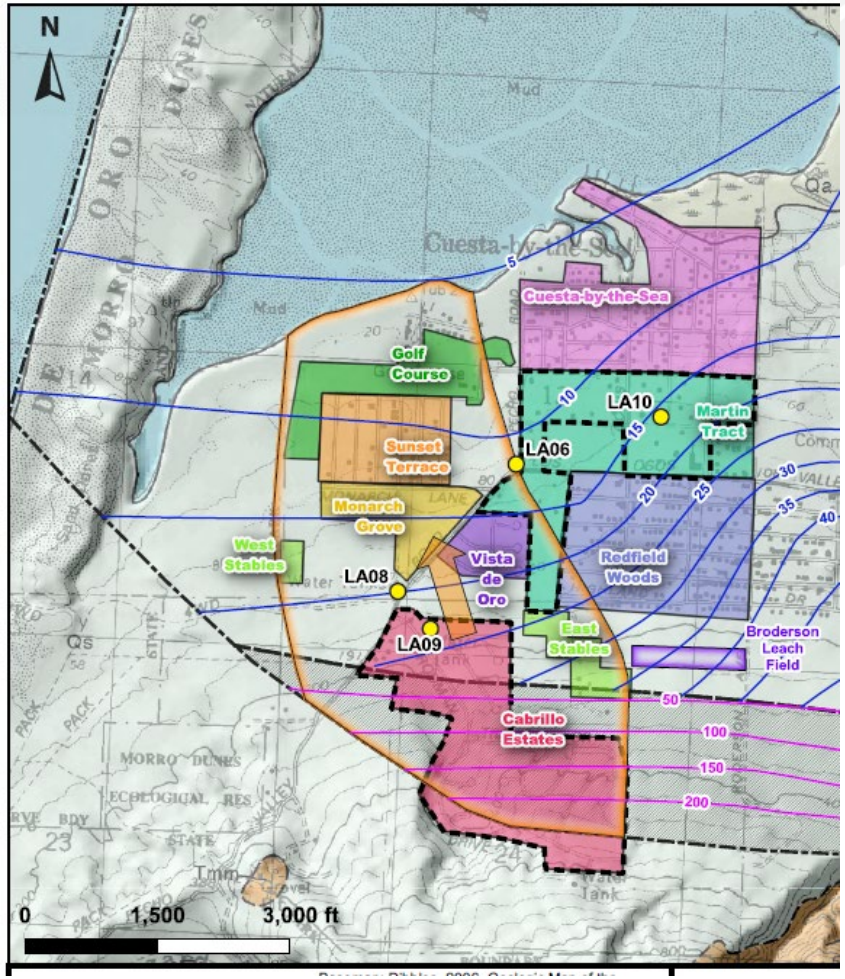
# What we don’t know from existing investigations

- Is nitrate present in high concentrations in the upper aquifer downgradient from Cabrillo Estates and horse boarding facilities?
- What is the capture zone for wells LA8 and LA9 in the lower aquifer?
- Is wastewater from ongoing source and/or legacy?

# Recommendations for identifying nitrate source

- Sample the upper aquifer for nitrate concentrations in vicinity of LA8 and LA9

- Identify lower aquifer capture zones for wells LA8 and LA9



# Questions and Discussion