

Groundwater Quality

- 1. Groundwater Quality Background
- 2. Federal and State Water Policy Framework
- 3. Start Process of Developing Sustainable Management Criteria for Degraded Groundwater Quality



Groundwater Quality Background

Georgina King, Montgomery & Associates



Groundwater Quality Background:

Groundwater Testing for Public Health





Private

Wells

- Routine testing of treated and untreated water
- Needs to comply with state water quality reporting
- County requires once-off testing of nitrate, TDS, and chloride for new wells
- Testing for iron and manganese (since 2013)



• Concentrations above **primary drinking water** standards may have an adverse effect on human health

• Concentrations above <u>secondary standards</u> are not health threatening but are not recommended for aesthetic reasons



 Basin groundwater is generally of good quality and does not regularly exceed primary drinking water standards

Constituents of concern

	Naturally Occurring Constituents	Anthropogenic Constituents	
רו בפרבת	Iron (Fe)	Nitrate (NO ₃)	
	Manganese (Mn)	Volatile Organic Compounds (VOCs)	
	Arsenic (As)	Methyl tert-butyl ether (MTBE)	
	Total Dissolved Solids (TDS)		







Monterey Aquifer - Groundwater Elevations in SVWD #9



SANTA MARGARITA Groundwater Agency



9

Groundwater Quality Background Contaminated Groundwater Quality



Groundwater Quality Background Nitrate Total Maximum Daily Load (TMDL)



- Nitrate in groundwater does not currently exceed primary drinking water standards
- Groundwater contributing to elevated nitrate concentrations in the SLR

San Lorenzo River Nitrate TMDL Problem Statement: Nitrate concentrations have increased in the San Lorenzo River watershed since the 1950s. In addition, nitrate concentrations are threatening violations of the Water Quality Control Plan, Central Coast Region (Basin Plan) as one constituent or factor that may contribute to taste and odor problems in drinking water.

TMDL has Nitrate as N target of 0.34 mg/L by 2020 at SLR at Felton Sept 2011 – Sept 2018 average nitrate as N was 0.48 mg/L

Groundwater Quality Background Nitrate Sources





Nitrate to San Lorenzo River, County of Santa Cruz, 1995

- Septic Systems in Sandy Areas
- Natural Sources in Sandy Areas
- Septic Systems in Non-Sandy Areas
- Natural Sources in Non-Sandy Areas
- Sewer Discharge from B.C. Country Club
- Scotts Valley Nitrate Plume
- Livestock and Stables

Fertilizer

50% of nitrate sources are from sandy areas 67% of nitrate sources from septic systems are from sandy areas

Groundwater Quality Background Nitrate Sources



Groundwater Quality Background Nitrate Trends



 Differences by aquifer unit
 Within aquifer, differences with depth

> Increases around 1980



Groundwater Quality Background Septic Tank Improvements



- Upgraded treatment process at Boulder Creek County Club to reduce nitrogen in effluent
- Denitrification of Scotts Valley effluent prior to reuse to reduce nitrogen discharge
- Past parcel inspections and ongoing water quality monitoring to identify septic problems
- Nitrate monitoring as a part of groundwater accretion studies
- Septic failure rate reduced from 13% in 1986 to 2% in 2015
- Requirement for upgraded shallow and enhanced treatment systems to reduce septic nitrate discharge in sandy soils
- In process of reviewing/upgrading septic system requirements relative to State Policy
- Work with stable and livestock owners for improved manure management



Groundwater Quality Background Organic Compounds



• Volatile Organic Chemicals (VOCs) and pesticides



Green = completed cleanup

Still cleaning up:
Watkin-Johnson superfund site
Scotts Valley Dry Cleaners
King's Cleaners
Former Santa Cruz Lumber Company (orange symbol)

Ongoing monitoring

Ben Lomond Landfill

No gas stations currently leaking

Groundwater Quality Background Organic Compounds



Well	PCE MCL = ο.οο5 μg/L	TCE MCL = ο.οο5 μg/L	cis-1,2- DCE MCL = 0.07 μg/L	Chloro- benzene MCL = 0.1 µg/L	MTBE MCL = 13 µg/L
SLVWD Quail Hollow #4A	ND	ND	ND	ND	ND
SLVWD Quail Hollow #5A	ND	Below MCL	ND	ND	Below MCL
SLVWD Olympia #2	ND	ND	ND	ND	ND
SLVWD Olympia #3	ND	ND	ND	ND	ND
SLVWD Pasatiempo #5A	ND	ND	ND	ND	ND
SLVWD Pasatiempo #7	ND	ND	ND	ND	ND
SLVWD Manana Woods #2	ND	ND	ND	ND	ND
SVWD #3B	ND	ND	ND	ND	ND
SVWD Orchard Well	ND	ND	ND	ND	ND
SVWD #9	ND	Below MCL	Below MCL	ND	Below MCL
SVWD #10A	ND	ND	ND	ND	ND
SVWD #11A	ND	ND	ND	Below MCL	ND
SVWD #11B	ND	ND	ND	ND	ND

Groundwater Quality Background

Groundwater Quality Background Organic Compounds





Groundwater Quality Background Contaminants of Emerging Concern



- No regulations for CECs yet
- CECs, including pharmaceuticals and personal care products (PPCPs), are detected at low levels in the Basin's water sources
- CEC pathways to surface and groundwater resources is similar to nitrate since they are found in wastewater
- No CECs in SLVWD and SVWD water
- San Lorenzo River has CECs: sweeteners, antibiotics, DEET, foaming agents, other prescription drugs

Groundwater Quality Background Water Quality Summary





Naturally Occurring Constituents

- Iron & Manganese: in Lompico & Butano above secondary standards
- Arsenic: in the Lompico above primary standards
- TDS: below secondary standards in all aquifers except in the Monterey Formation when groundwater levels are drawn down during pumping



Contaminated Groundwater Constituents

- Nitrate: in Santa Margarita and Lompico aquifers but currently below drinking water standards
- CECs: not found in groundwater but are found in surface water
- Organic compounds: very low levels below primary standards in 3 municipal wells



Questions?