

Fact Sheet: Nitrate and Total Dissolved Solids in Groundwater

San Pasqual Valley Groundwater Basin Groundwater Sustainability Plan

The San Pasqual Valley Groundwater Basin Groundwater Sustainability Plan (GSP) is committed to ensuring the Basin remains sustainable through projects and management actions such as education and outreach, regular monitoring, reporting, coordination and collaboration with other entities to perform monitoring and implementation of regional projects.

Groundwater Quality Regulations

The Environmental Protection Agency established Primary and Secondary Drinking Water Regulations which set maximum contaminant levels (MCLs) to protect public health and/or welfare. Primary MCLs are legally enforceable standards established to protect human health, and Secondary MCLs are voluntary standards focused on human welfare considerations, such as odor and taste. Nitrate has been established as a Primary MCL contaminant, and TDS as a Secondary MCL contaminant.

The California Department of Public Health (CDPH) regulates public water systems and requires water quality monitoring and reporting. Action is required to ensure water delivered to consumers meets drinking water standards for all regulated contaminants, including TDS and Nitrate. Private wells are not subject to drinking water regulations by CDPH.

How does TDS and Nitrate Get into my Well Water?

TDS and Nitrate travel through the soil and are carried by rain or irrigation water into groundwater supplies and get into wells that tap groundwater. TDS and Nitrate contamination occurs most often in shallow wells, wells near a TDS/Nitrate source, wells in sandy soil, or wells that are improperly constructed or maintained.

The San Pasqual Valley GSP and related material, as well as announcements and meeting information, are available on our website. For more information about the GSP and the most recent basin conditions, please visit:

www.sandiegocounty.gov/content/sdc/pds/SGMA/san-pasqual-valley.html



Total Dissolved Solids

What is TDS?

TDS is a measure of all the dissolved substances in water, including organic and suspended particles. TDS is one of the most frequently used analyses to measure salinity. TDS concentrations are measured in a laboratory and reported in units milligrams per liter (mg/L).

Effects of High Concentrations of TDS

High concentrations of TDS can damage crops, affect plant growth, degrade drinking water, and damage home or industrial equipment. The economic impact can result in fallowed farmland, unsuitable drinking water, and other environmental issues. Groundwater that has TDS above the Secondary MCL may cause water to appear cloudy or discolored and/or have an undesirable taste and odor.

TDS Secondary MCL:

Recommended: 500 mg/L
Upper: 1,000 mg/L
Short Term: 1,500 mg/L



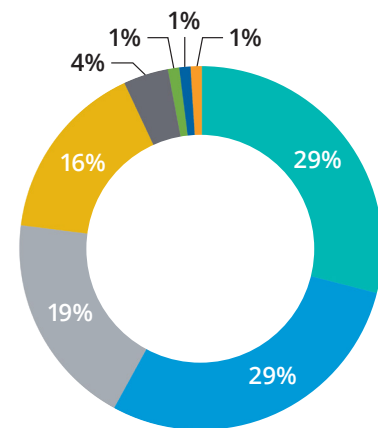
Summary of Recent TDS Concentrations:

Maximum: 2,550 mg/L
Minimum: 462 mg/L
Sampling: 3rd/4th Quarter 2021



Sources of TDS in the San Pasqual Valley Groundwater Basin

Surface water inflows and imported water used for irrigation, and the concentration of TDS in those sources through evaporation, are among the significant factors contributing to elevated TDS concentrations in the basin. Other sources are shown in the graph below:



Sources of TDS

- Evapoconcentration from Irrigation
- Surface Water Inflows
- Evapoconcentration from Riparian Areas
- Imported Water
- Commercial Crop Fertilizer Use
- Dairy
- Manure Application
- Landscape Fertilizer Use

Source: San Pasqual Valley Salt and Nutrient Management Plan, 2014

What Potable Water Users Can Do When TDS is Present

- Conduct regular well sampling and analysis for TDS
- Conduct wellhead condition maintenance
- Consider using bottled water for drinking if produced groundwater has an undesirable taste because of elevated TDS concentrations



Nitrate

What is Nitrate?

Nitrate is formed in the soil when nitrogen and oxygen combine. Nitrate presence in groundwater is generally associated with fertilizer use, septic systems, or livestock waste. Nitrate can also be present in surface water. Nitrate concentrations are typically reported as either Nitrate as Nitrogen (as N) or Nitrate as Nitrate (as NO₃), are measured in a laboratory, and results are reported in units of milligrams per liter (mg/L).

Effects of High Concentrations of Nitrate

Nitrate can interfere with the ability of red blood cells to transport oxygen to the tissues of the body, producing a condition called methemoglobinemia, which is of greatest concern in infants and pregnant women (“blue baby syndrome”). Nitrate is only a concern for ingestion (eating and drinking). It is not absorbed through skin. Nitrate can also be harmful to animals.

Nitrate Primary MCL:

Nitrate (as N) MCL: 10 mg/L
Nitrate (as NO₃) MCL: 45 mg/L



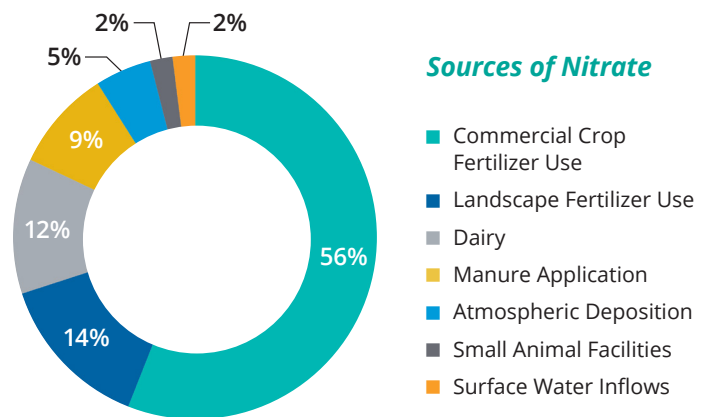
Summary of Recent Nitrate Concentrations (as N):

Maximum: 26 mg/L
Minimum: 0.4 mg/L
Sampling: 3rd/4th Quarter 2021



Sources of Nitrate in San Pasqual Valley Groundwater Basin

The largest contributing sources of Nitrate concentration in the basin are commercial fertilizer and landscape fertilizer use. Other sources are shown in the graph below:



Source: San Pasqual Valley Salt and Nutrient Management Plan, 2014

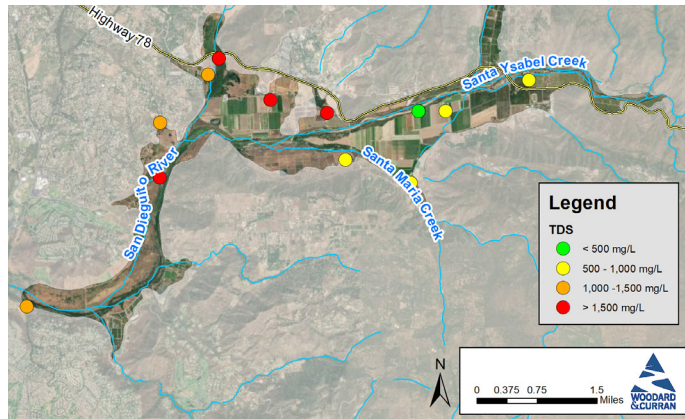
What Potable Water Users Can Do When Nitrate is Present

- Conduct regular well sampling and analysis for Nitrate
- Conduct wellhead condition maintenance
- Evaluate the well setbacks from potential Nitrate sources (e.g., animal enclosures, septic systems)
- Avoid or reduce fertilizer use
- For guidance on Residential Well Treatment Devices, refer to: www.waterboards.ca.gov/drinking_water/certlic/device/watertreatmentdevices.html
- Use bottled water for drinking and cooking until better water quality conditions are restored

Options and Resources: TDS and Nitrate

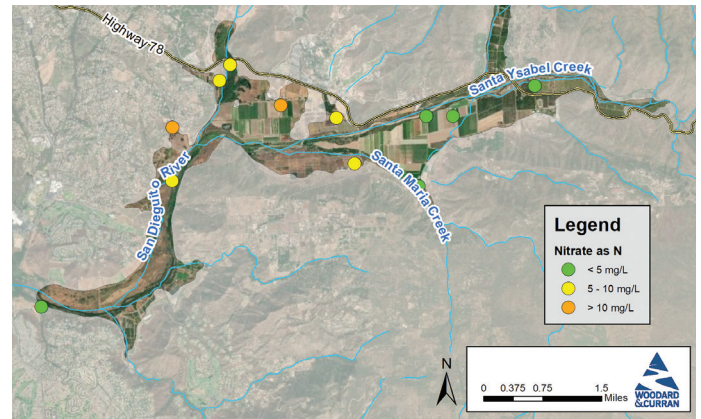
The Groundwater Sustainability Agency will conduct regular sampling of monitoring wells in the basin. The maps below show recent TDS and Nitrate concentrations for these wells. Nitrate concentrations in several of the wells in the western portion of the basin have exceeded the Primary MCL (10 mg/L as N). TDS concentrations in several wells in the western portion of the basin exceed one or more of the Secondary MCLs for TDS.

TDS Concentrations in Wells



Source: San Pasqual Valley Salt and Nutrient Management Plan, 2014

Nitrate Concentrations in Wells



Groundwater Quality Testing for TDS and Nitrates

Domestic well owners are encouraged to have their well water tested annually by a local state-certified laboratory. Testing should be more frequent if there is a change in the water taste, odor, or appearance.

- Information on water quality sampling can be found at: www.waterboards.ca.gov/gama/docs/wellowner_guide.pdf
- A list of State certified laboratories can be found at: www.waterboards.ca.gov/drinking_water/certlic/labs

Wellhead Condition Maintenance

Domestic well owners should check the wellhead (the part of the well that's above ground) and the well cap (the part that covers the wellhead) several times a year. Cracks or openings could provide a conduit for insects, small animals, rainwater, or other contaminants.

Resources

There are many resources available that provide additional information about groundwater quality, well maintenance and safety. Please review the resources listed below for more information.

County of San Diego, Department of Environmental Health and Quality:

T: 858.505.6688

www.sandiegocounty.gov/content/sdc/deh.html

U.S. Environmental Protection Agency

Office of Ground Water and Drinking Water:

www.epa.gov/safewater

California Water Boards, State of California, Division of Drinking Water:

T: 916.449.5577

www.waterboards.ca.gov/drinking_water/programs

Safe Drinking Water Hotline:

T: 800.426.4791