County of Santa Cruz Health Services Agency
Environmental Health Division

Onsite Wastewater Treatment Systems

Local Agency Management Program

October 14, 2021

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Onsite Wastewater Treatment Systems (OWTS)

Local Agency Management Plan (LAMP)

County of Santa Cruz

1 Introduction

This Local Area Management Program (LAMP) for the County of Santa Cruz (County) describes permitting and oversight of Onsite Wastewater Treatment Systems (OWTS, also known as septic systems). This LAMP is produced in accordance with requirements set forth by the State Water Resources Control Board (State Board) in the State OWTS Policy (2013) for County permitting of OWTS.

The purpose of the LAMP is to provide for the continued use of OWTS in Santa Cruz County while providing protection of water quality and public health. Due to historical development patterns, local climate, geology and soils, a majority of the 27,700 existing OWTS cannot meet the State Tier 1 Standards for Low Risk systems. However, with appropriate standards and management approaches, systems can be upgraded and utilized to continue to meet housing needs, recharge groundwater basins, and protect water quality. This LAMP updates and expands the successful wastewater management approaches conducted by Santa Cruz County since 1985.

This LAMP applies to all unincorporated areas of Santa Cruz County. It is proposed that this LAMP would also apply within Santa Cruz, Scotts Valley and Capitola, given that these cities have delegated authority for regulation of OWTS in the city limits to the County Health Officer. The City of Watsonville does not issue permits for OWTS and has a small number of legacy OWTS in the city limits. County and city codes will be amended as needed to extend County authority over OWTS to cities, including written agreements extending the LAMP to the city area.

1.1 OWTS Oversight – State and County Requirements

Oversight and regulation of OWTS is specified in the federal Clean Water Act, the state Porter-Cologne Water Quality Control Act (a.k.a. California Water Code), the California Health and Safety Code, and the California Building Standards Code. A summary of the regulatory framework is provided in Table 1-1.

Table 1-1: Overview of Federal and State Codes Relevant to OWTS

Code	Key details	Relevance to Santa Cruz County
Federal Clean Water Act[1]	Requirements for control of wastewater discharges and protection of water quality, designates State as Primacy Agency. Restore and maintain the chemical, physical, and biological integrity of the Nation's waters.	Provides overarching requirements for wastewater treatment and water quality protection
Porter-Cologne Water Quality Act[2] (a.k.a. California Water Code, Division 7)	• Defines the right of every human being to safe, clean, affordable, and accessible water adequate for human consumption, cooking, and sanitary purposes. • Provides requirements for OWTS (Chapter 4.5)	• Requires the State Board to establish policies and programs for water quality protection. • Regional Water Quality Control Boards administer programs
Water Quality Control Plan for the Central Coastal Basin (Basin Plan, California Water Code, Division 7, Chapter 4.0)[3]	• The Central Coast Regional Water Quality Control Board (Regional Board) establishes requirements for OWTS installation and management. • Local regulatory agencies have oversight for individual OWTS with discharges less than 2,500 gallons per day (gpd).	Local regulatory agencies must comply with the minimum standards to maintain authority for regulatory permitting of OWTS
California Code of Regulations, Title 23. Waters	• Division 3. State Water Resources Control Board and Regional Water Quality Control Boards • Chapter 22. State Policy for Water Quality Control, Section 2924	Water Quality Control Policy for Siting, Design, Operation and Maintenance of Onsite Wastewater Treatment Systems (OWTS Policy)
California Health and Safety Code,[4] Division 5	• Requires effective sewage disposal for all homes and businesses. • Prohibits sewage discharge to the ground surface. • Delegates responsibility to the County Health Officer or their designee for ensuring effective sewage disposal within a county jurisdiction	The Santa Cruz County Environmental Health Division is responsible for enforcing requirements per assignment by the County Health Officer
California Building Standards Code (Plumbing Code) part 5 Title 24 of the California Code of Regulations[5]	• Provides California amendments to the Uniform Plumbing Code of the International Association of Plumbing and Mechanical Officials. • Plumbing Code requirements are optional.	Santa Cruz County has jurisdiction between the building and the OWTS. Santa Cruz County Code 12.10.235 adopts the Plumbing Code.

In 1999, the California State legislature passed Assembly Bill (AB) 885, which called for the State Board to develop statewide standards for regulation of OWTS. On June 19, 2012, the State Board

[1] https://www.epa.gov/wqs-tech/water-quality-standards-regulations-california
[2] https://www.waterboards.ca.gov/laws_regulations/docs/portercologne.pdf
[3] https://www.waterboards.ca.gov/centralcoast/publications_forms/publications/basin_plan/
[4] https://leginfo.legislature.ca.gov/faces/codes_displayText.xhtml?lawCode=HSC&division=6.&title=&part=2.&chapter=3.&article=3.
[5] http://epubs.iapmo.org/2019/CPC/index.html

adopted a State OWTS Policy, which became effective May 13, 2013. On May 30, 2013, the Regional Board adopted Resolution No. R3-2013-0005 which amended the Basin Plan to incorporate by reference the provisions of the OWTS Policy and delete redundant or conflicting onsite wastewater system criteria. On January 21, 2014, the State Water Board adopted Resolution No. 2014-0003 approving the amendment of the Basin Plan, which was subsequently approved by the Office of Administrative Law on June 3, 2014. Both the OWTS Policy and the Basin Plan include provisions for continued local regulation of OWTS pursuant to Tiers 0, 1, 3, and 4 requirements or Tier 2 requirements for a LAMP that is approved by the Regional Board.

The State OWTS Policy establishes five tiered classifications to regulate management of OWTS:

- **Tier 0** – Functioning: OWTS, existing and properly functioning.
- **Tier 1** – Low Risk: OWTS, new or replacement and low risk that can meet State-wide Standards.
- **Tier 2** – LAMP-compliant: OWTS, new or replacement, managed per Local LAMP standards, developed to reflect local conditions.
- **Tier 3** – Impaired Waters: OWTS potentially impacting federally listed impaired water sources.
- **Tier 4** – Failing: OWTS experiencing failure**.**

OWTS that do not meet the specifications for any of the five Tiers specified above, must be permitted by the Regional Board.

The Santa Cruz County Code Chapter 7.38 'Sewage Disposal' (Appendix A) specifies the standards for OWTS installation in unincorporated Santa Cruz County and the cities of Santa Cruz, Scotts Valley and Capitola. It was developed in conformance with prior Basin Plan requirements and is now being updated to meet the State OWTS Policy and 2014 amended Basin Plan. In addition to the design and operational standards for new conventional OWTS, the Santa Cruz County Code allows specific provisions for the management and repair or upgrade of existing OWTS, and for the use of enhanced treatment systems where design and operational standards for conventional systems cannot be met. Many critical elements of these design and operational standards were developed through review and collaboration with the Regional Board.

County EH engages in a broad spectrum of activities relevant to OWTS management including:

- evaluations and investigations of existing systems;
- review of building plans for new construction and remodels served by OWTS;
- design review of OWTS repairs and modifications;
- issuance of OWTS permits, including inspections of installations;
- investigation of citizen complaints;
- water quality monitoring;
- record searches and field surveys of existing OWTS;
- qualification of various providers of OWTS services;
- oversight and financing of septage disposal;

- inspection of septage vehicles and pumper certifications;
- maintenance of permanent records for parcels' OWTS history;
- public education and outreach; and
- management of special regional areas of concern.

The County established County Service Area No. 12 (CSA 12) that provides for collection of annual fees from properties served by OWTS to help finance these management efforts. Permit fees finance County EH review and oversight of individual OWTS installations.

1.2 Santa Cruz County Land Use, Topography, Geology, and Climate

Santa Cruz County has roughly 27,700 OWTS that serve about 22% of the population (61,000 people) in the rural and mountainous parts of the county. Approximately 92% of the OWTS serve single family residences, 4.5% serve multiple residential uses, 3% serve commercial uses and 1% serve motels or camps. Most of the OWTS are located in unincorporated areas, with an additional 445 systems in the City of Scotts Valley, 110 in the City of Santa Cruz, 40 in the City of Watsonville, 15 in City of Capitola, and 2,000 within county sewer/sanitation districts. (This information is based on records of septic tank pumping, permits, inspections and older unverified records. Some of these records may reflect tank pumping at the time of tank abandonment and connection to sewer.)

The County has diverse topography, geologic features, and soils, including coastal terraces and alluvial valleys, steep foothills and mountains, known and potential earthquake faults and seismic hazards, and a wide range of soil types with varying constraints (e.g., expansion, liquefaction, slow permeability and fast permeability). The County is in the Coast Range physiographic province of California, which was formed by plate tectonic forces associated with the San Andreas Fault system. The northwest-southeast structural grain of the Coast Ranges is controlled by a complex of active faults within the San Andreas fault system. This province is characterized by low mountain ranges, generally parallel to the coast, with elevations of 1,500 to 3,000 feet. The Santa Cruz Mountains are primarily underlain at depth by a large, elongated prism of granite and metamorphic basement rock types, bordered to the northeast by the San Andreas strike-slip fault system and to the southwest by the San Gregorio/Nacimiento strike-slip fault system. Much of the basement material is overlain by sedimentary formations of varying age, texture, and permeability. Some sandy formations have very fast permeability.

Along the coast, the ongoing tectonic activity is most evident in the gradual uplift of the coastline, as indicated by the series of uplifted marine terraces that sculpt the coastline. Coastal areas in the County are characterized by step-like marine terraces. The terrace deposits consist of sediments deposited below sea level; however, the terraces are above sea level now due to a combination of changing sea levels and uplift of the coastal land mass. The coastal terraces are generally characterized by older soils with dense clay subsoils, slow permeability and perched winter groundwater conditions.

Approximately 75 percent of the County lies within the Santa Cruz Mountains, which includes area of very steep slopes exceeding 30 percent. The mountain area, including the unincorporated

towns of Ben Lomond, Felton, and Boulder Creek, is characterized by deep valleys such as the San Lorenzo Valley and intervening ridges such as those along Skyline Boulevard. OWTS in this area are frequently constrained by steep slopes and landsliding on the ridges, with elevated groundwater and close proximity to streams in the valley bottoms. The north coast area, including the unincorporated towns of Davenport and Bonny Doon, is characterized by broad, gently sloping marine terraces that extend along the Pacific Ocean as well as steep foothills that rise into the Santa Cruz Mountains. Conditions for OWTS in the north coast area are generally favorable, although clayey soils and perched groundwater can occur on the marine terraces. The South County Region consists of valley lowlands such as within Pajaro Valley, terraces, rolling hills, sloughs, and floodplains that are intensively used for irrigated and dry-farm crops, as well as the more arid, chaparral dominated mountain range above Watsonville. Portions of this area are subject to clay soils and perched groundwater on old terraces.

The urban areas along the coast and in Scotts Valley are sewered, but the suburban communities in the San Lorenzo Valley are served by OWTS (Figure 1-1). The San Lorenzo Valley was originally developed in the early 1900's for summer homes on small lots, which subsequently were converted to year-round use. While significant amounts of new rural development occurred in the 1970's, the rate of rural development slowed significantly after the 1978 passage of Measure J, which mandated limits on the overall rate of growth and directed most growth into the urban areas with public services (Figure 1-2). The rate of new development served by OWTS has further declined in recent years, with only 11 new systems approved in 2017 and 17 approved in 2018. Most rural development activity is related to remodels and OWTS repairs. In 2018, 38 permits for system upgrades to serve building remodels were approved, and 223 permits to repair or replace existing systems were approved.

Figure 1-1 – Santa Cruz County Land Use, Based on Assessor Land Use Records

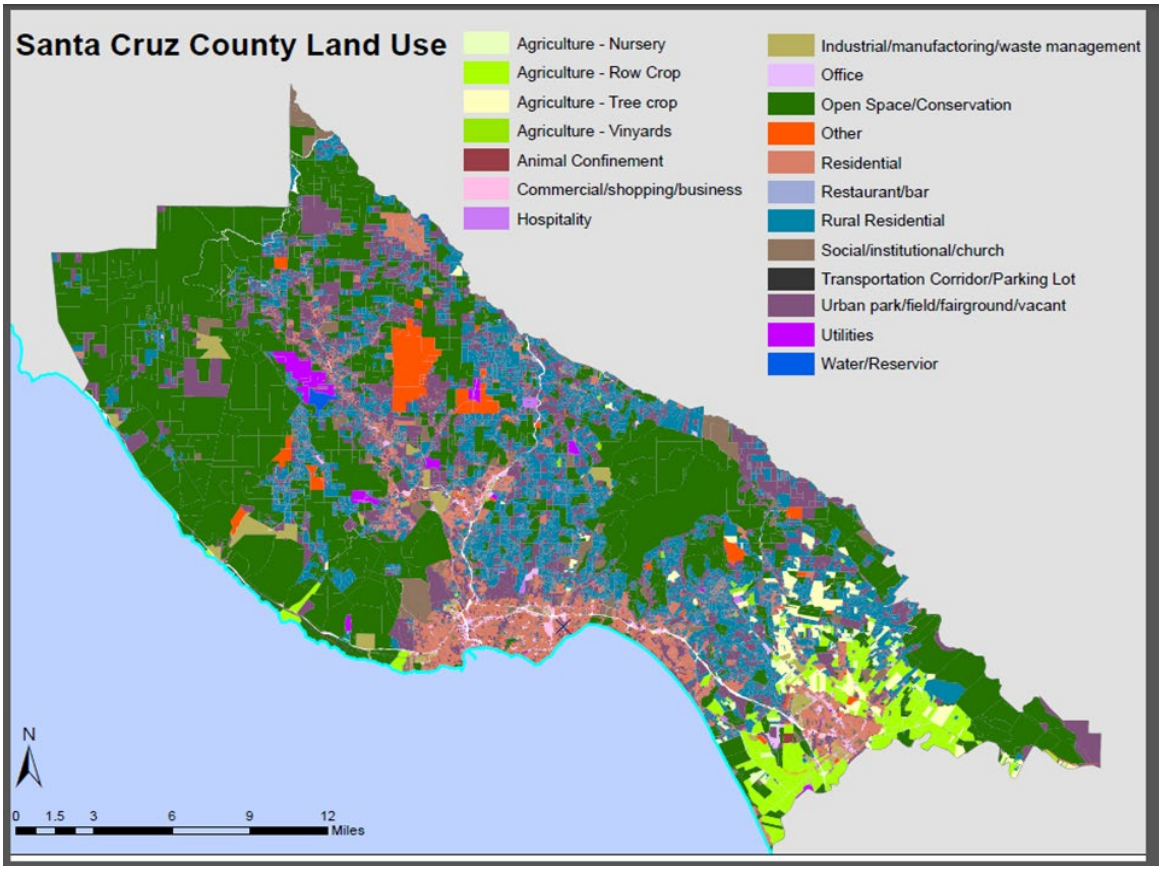
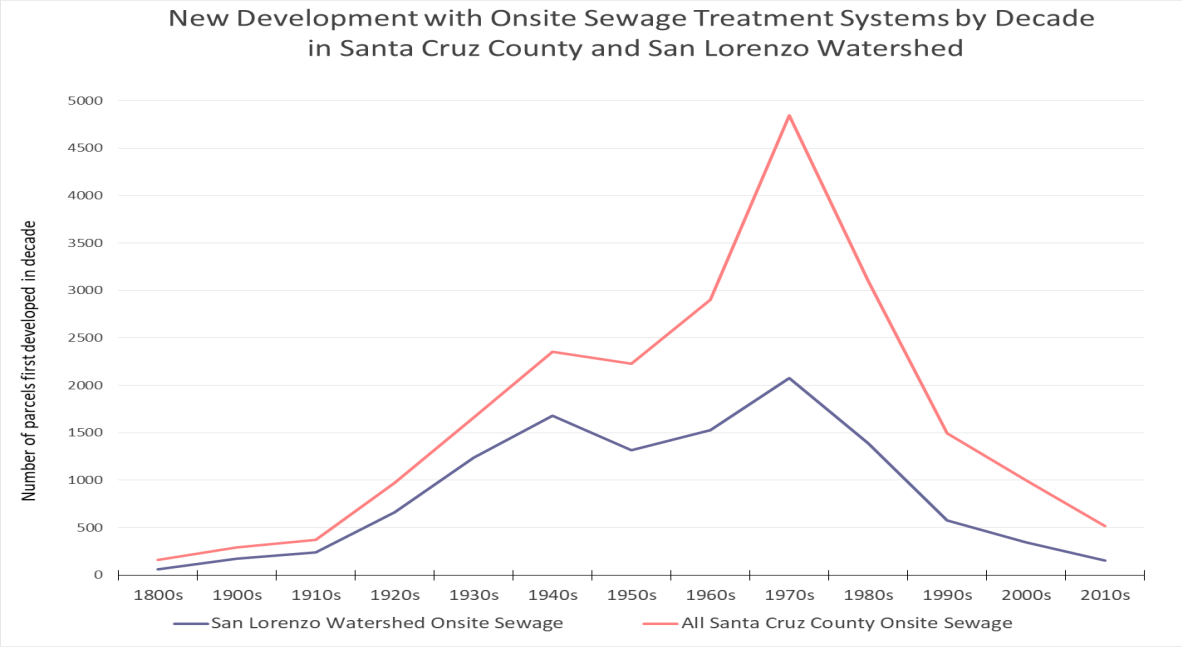


Figure 1-2 – Development Trends in County and San Lorenzo Watershed



The average annual rainfall in the County varies from 20 inches in the southern lowlands to 60 inches in the mountains above Boulder Creek and Bonny Doon (Figure 1-3)). Most of this rainfall occurs in 3 months and can often lead to elevated seasonal groundwater and transient saturated conditions. This causes soils to be fully saturated during storms and for several days afterward. Because most county soils are relatively well-drained and permeable, well-designed OWTS are able to continue to perform satisfactorily in the winter.

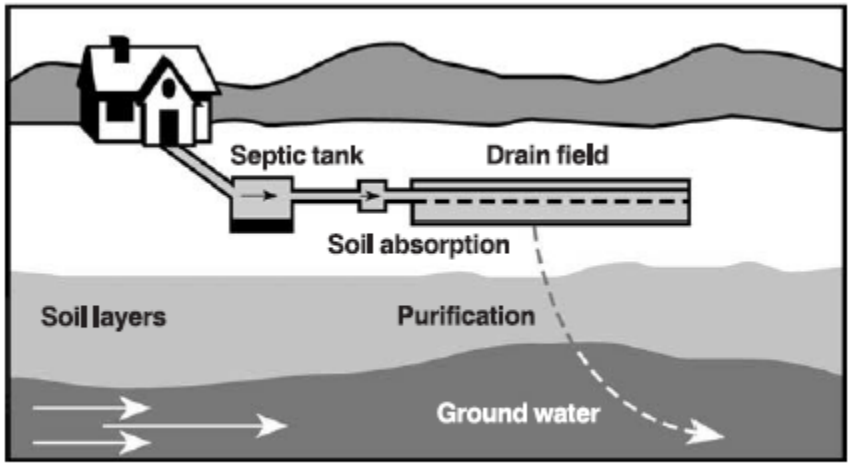
Figure 1-3 Average Annual Rainfall Distribution

1.3 Onsite Wastewater Treatment Systems Overview

Onsite Wastewater Treatment Systems (OWTS), commonly known as septic systems, are the primary method for treating and disposing sewage in rural areas where sewer systems are not available or too expensive to install. OWTS are designed to treat wastewater using a combination of physical processes for solid -liquid separation coupled with biological processes for inactivating pathogens and stabilizing organic matter and nutrients. Microorganisms in the soil also contribute to biodegradation mechanisms to prevent release of contaminants to the land surface and protect groundwater and surface water beneficial uses.

An OWTS typically consists of a septic tank and a leaching trench disposal system, such as a leachfield (Figure 1-4). The septic tank is usually 1,500-2,000 gallons in size and is designed to retain solids and grease and provide initial, primary treatment of the wastewater. The wastewater then typically flows by gravity to the dispersal system where the wastewater percolates into the soil and further treatment takes place.

Figure 1-4: Typical conventional OWTS



Source: NSFC, 2000.

Dispersal systems include perforated pipes set along the top of one or more gravel-filled trenches. The sides and bottom of the trench provide the absorption area for soil percolation. The total square footage of trench and absorption area needed is determined by the expected amount of wastewater flow into the system and absorption capabilities of the soil. A more permeable sandy soil requires less absorption area than a clay soil. Other types of dispersal systems include seepage pits, chamber systems, drip dispersal or mounded bed systems.

Besides the basic septic tank and dispersal system, an OWTS may include other components:

- A pump chamber and pump may be used to move wastewater to a higher, more suitable disposal area on the property. Pump systems include electrical controls, alarms, and excess storage capacity to ensure proper timing of pumping and safeguards in the event of power failures, pump breakdowns, or system overload.

- A distribution box or flow divider ensures that the wastewater is evenly distributed to all parts of the leaching trench disposal system. If this is not installed properly, one part of the system can be overloaded and fail, while other parts remain dry.
- Enhanced treatment systems may be used in place of or in addition to the septic tank to provide a much higher level of wastewater treatment before the wastewater is dispersed to the underground soils. Enhanced treatment reduces organic loading and suspended solids, some designs provide for nitrogen removal, and some designs provide disinfection for inactivation of pathogens.
- Alternative dispersal systems are used for subsurface release of treated wastewater where soil conditions or high groundwater are not appropriate for conventional systems. Alternative dispersal includes pressure distribution, drip dispersal, mounded beds, bottomless sand filters, or at-grade systems. These dispersal systems discharge the effluent subsurface.

Following is a table which shows information regarding the types of OWTS in Santa Cruz County, based on information in the County database. The database now includes detailed information for systems permitted countywide 1995 - 2019 and many of the pre-existing systems in the San Lorenzo Valley and Amesti Road areas that had information from older paper files. More generalized information is available in the database for the other systems.

Table 1-2: Types of OWTS in Santa Cruz County

Type of System	**Number**
Conventional	
Meets standards	6,175
Not meeting all standards	209
Pressure Distribution	24
Mounded Bed	52
Sand Filter	22
At-Grade	5
Enhanced Treatment System, proprietary	686
Haulaway	21
Large Systems, >2500 gpd	12
Older systems	
Performing satisfactorily	1,558
Pre- 1995, No information in database	18,983
Total OWTS in County	**27,747**

2 Conditions for Onsite Wastewater Disposal in Santa Cruz County

The complexities of geology, topography, soils, rainfall, and past development patterns pose challenges for OWTS in Santa Cruz County. Since the 1980's the County has developed specific policies to guide improvement of existing OWTS and minimize potential impacts from new OWTS

serving new development. The County strives to balance the realities of site constraints, existing development patterns, cost and feasibility of system improvements, with the need to improve water quality and public health protection. Prior to the mid-1980s, system repairs were only required to meet standards to the maximum extent feasible, with no minimum standards. With oversight programs and minimum repair standards in place, the rate of observed system failures dropped from 13% to 1-2% and water quality also improved.

As a part of policy development, the County has also been sensitive to issues of affordability and fairness to property owners. Many of the rural areas of the County are inhabited by property owners of limited financial means. A large swath of the San Lorenzo Valley northeast of Boulder Creek is delineated as a Disadvantaged Community (DAC) as shown by the California Department of Water Resources' DAC Mapping Tool based on U.S. Census American Community Survey data from 2012 through 2016 (Figure 4-1, page 95). Although other areas have higher average incomes, there is considerable diversity, with well-off households intermixed with households of limited means to upgrade their OWTS. As a part of maintaining and expanding housing stock, the County wants to be able to allow building remodels and additions if the wastewater disposal system can be upgraded to meet minimum standards that provide for water quality protection.

Conserving water and energy are also important considerations for wastewater management. A properly functioning OWTS returns a significant amount of water to the groundwater basin. During the dry season, about 15% of the baseflow in the San Lorenzo River is estimated to be discharged from OWTS and has percolated through the soil to reach the River as clean groundwater. In the Mid-County Groundwater Basin, of the 1,000 acre-feet per year (af/y) of inland groundwater pumping, over 400 af/y is returned to the groundwater system as return flow from OWTS. This is an important water budget component in a basin that has been experiencing 1,500 af/y of overdraft. Regarding climate impacts and ongoing cost of operation, there is a benefit to utilizing OWTS technology with less energy requirements whenever possible.

The County's onsite wastewater management and policy development has been supported by extensive field work to measure water quality and assess actual field conditions. This work has included:

- County contribution to the U.S. Soil Conservation Service to update the County Soil Survey, 1980.
- Extensive water quality monitoring and investigation dating back to 1975, averaging approximately 2,100 samples per year countywide.
- Evaluation of shallow groundwater quality in 100 boreholes downgradient of disposal systems in various soil and groundwater conditions (1981-82).
- Installation of 200 boreholes to assess shallow groundwater levels in San Lorenzo Valley Communities (1986), ongoing monitoring of 20 holes, with water quality testing in 10.
- Lot-by-lot surveys of 2,200 properties in the San Lorenzo Valley and 300 properties in the Amesti Road area for indications of failing systems, with follow-up corrections as needed.

- Creation and analysis of a database of installation information, site information, inspection results, permits, complaints and pumping results for areas of concerns and eventually all onsite systems in the county.
- Follow-up investigations of systems with failing pumper reports.

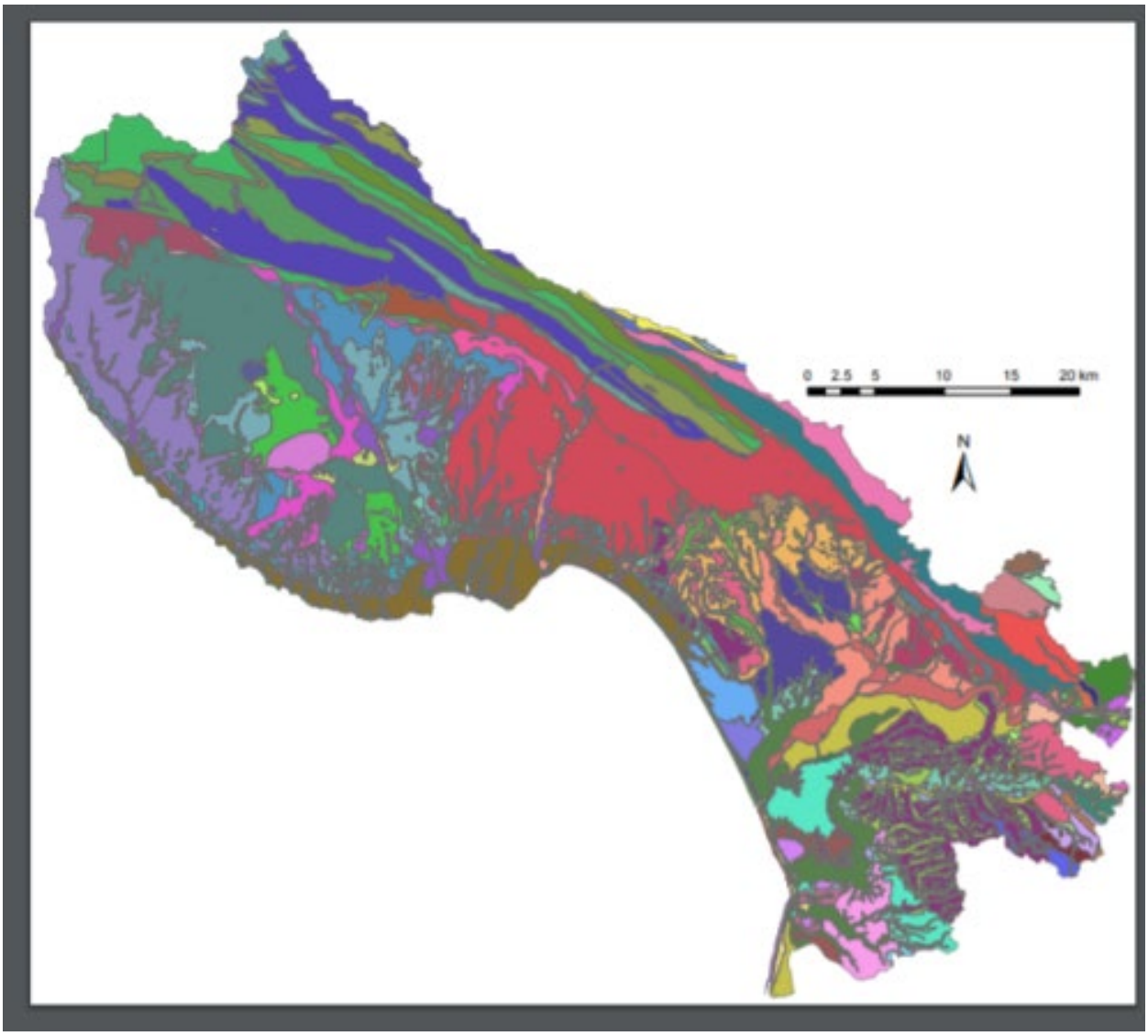
The results of this work are reflected in the LAMP requirements and are discussed more fully in the following sections.

2.1 Hydrogeology

There is an interplay between onsite wastewater discharges and hydrogeology. Soil conditions, fractured bedrock, and shallow groundwater affect the hydrodynamics of wastewater discharges. In addition, wastewater discharges affect the quality and availability of local groundwater and surface water resources.

Within Santa Cruz County, there are three major groundwater basins and four geologic regions, primarily divided by the three major faults in the county (Figure 2-1). The oldest sedimentary rocks occur along the entire northern part of the county. These are old, cemented sandstones and shales, with groundwater generally occurring sporadically in fractures. South of this zone, south of the Zayante fault, occur younger Santa Margarita and Lompico sandstones, which capture and store significant amounts of groundwater in the primary aquifers of the Santa Margarita Groundwater Basin (Figure *2-2*). Immediately to the east is the Purisima Formation and then the Aromas Formation, which both make up the Santa Cruz Mid-County Groundwater Basin. The Aromas extend under the deep alluvial deposits of the Pajaro Valley, which together make up the Pajaro Groundwater Basin. The western edge of the Santa Margarita Basin is defined by Ben Lomond fault and immediately to the west, the large granitic block of Ben Lomond Mountain. Deposits of Santa Margarita Sandstone and other young sedimentary rocks occur over the granite as it slopes gradually to the southwest toward the Pacific Ocean. Most of the granite is deeply weathered, but in places there are deposits of marble, which are honeycombed with caverns, solution channels, sink holes, springs, and other karst features.

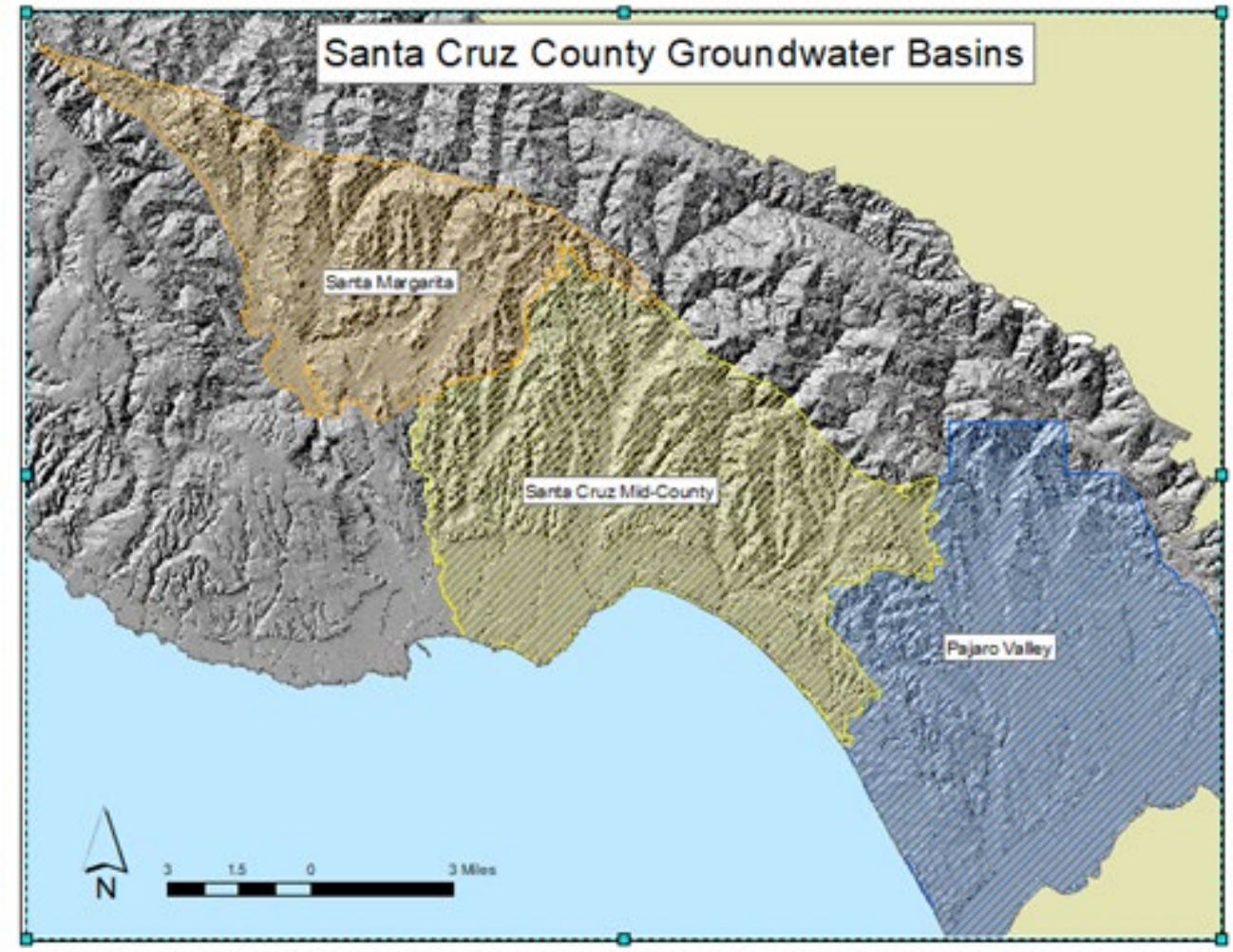
Figure 2-1: Geology of Santa Cruz County



2.1.1 Groundwater Basins

The three major groundwater basins in the County are being actively managed under the provisions of the Sustainable Groundwater Management Act (SGMA). Groundwater sustainability plans (GSPs) have been prepared for both the Pajaro Basin and the Santa Cruz Mid-County Basin. The GSP for the Santa Margarita Basin is due to be completed in 2022. County EH is a key partner to all three of the groundwater agencies governing the County's basins. PVWMA manages the Pajaro Basin that is shared by four counties including Santa Cruz, Monterey, San Benito and Santa Clara. PVWMA monitors water quality of its surface and groundwater sources. The California Department of Water Resources (DWR) designated this basin as being critically overdrafted.

Figure 2-2: Santa Cruz County Major Groundwater Basins



2.1.2 Domestic and Municipal Wells

OWTS discharge a plume of water into the subsurface that contains high concentrations of nitrogen, pathogens and other potential pollutants. The concentration of pollutants declines with distance and time of travel as biological treatment, filtration and dilution occur. A pumping well located too close to an OWTS may draw that plume of untreated water into the pumping well, degrading the quality of water produced. The potential for pollution is greater where wastewater effluent is discharged deeper into the subsurface through seepage pits. In order to prevent groundwater pollution, an adequate setback between wells and OWTS is required. Santa Cruz County Code has required a basic setback of 100 feet, which is expanded to 150 feet between seepage pits and public water system wells, and a minimum separation of 250 feet for a conventional OWTS located in fast percolating soil with a groundwater separation of less than 20 ft.

Increased setbacks to public water supply wells will now be required, as provided in the State OWTS policy:

1) 150 feet from a public water well where the depth of the effluent dispersal system does not exceed 10 feet in depth.
2) 200 feet from a public water well where the depth of the effluent dispersal system exceeds 10 feet in depth.
3) Where the effluent dispersal system is within 600 feet of a public water well and exceeds 20 feet in depth the horizontal setback required to achieve a two-year travel time for microbiological contaminants shall be evaluated and determined by a qualified professional. However, in no case shall the setback be less than 200 feet, where the dispersal depth exceeds 20 feet.

If any OWTS failure is found to occur within the above setbacks then the County EH staff will notify the operator of the affected public water system well and the State Board, Division of Drinking Water by telephone or email within 24 hours or no later than 72-hours. The water system will also be notified whenever an application is received for a new or replacement OWTS within the setback buffer of their well. The operator will be given a minimum of 10 business days to comment on the application. The County Geographical Information System (GIS) has spatial data on all public water supply wells and the County has contact information for all public water supply well owners. There are presently 170 public water supply wells that provide potable water to approximately 105 water systems in the County that serve more than 14 connections or that are non-community public systems. The County GIS also includes water supply well spatial data for another 30 state small systems with 5-14 connections.

The increased setbacks would likely prevent the elevated nitrate concentrations that have been detected in municipal supply wells in La Selva Beach, as indicated in
Figure 2-5. There are three OWTS located inside the previously required 150-foot buffer, and there are many OWTS within the new 200 feet and 600-foot buffers. These OWTS utilize seepage pits for disposal, which are over 20 feet deep in fast percolation soils. Any future repair or replacement of those OWTS will require use of enhanced treatment systems at a minimum.

In addition to the public supply wells, there are an estimated 8,000 properties served by individual private domestic wells in rural areas of the County. Wastewater disposal for all of these properties is accomplished by OWTS. In most cases, these occur on relatively large lots that were developed individually over time. Since 1970, any new lot created must be at least one acre in size if it would be served by both an individual well and an individual OWTS. For older lots, the minimum parcel size with a water supply well is 15,000 square-feet (sf) and a 100-foot setback must be maintained between the well and the onsite dispersal system. Areas of higher density OWTS are served by public water systems and do not have onsite private water supply wells. There are several rural subdivisions in the rural Bonny Doon area, that have one acre lots with both individual private water supply wells and onsite disposal systems.

There are rare occasions with existing developed lots where it is not possible to maintain a 100-foot setback between an OWTS and a domestic well on the same property. Typically, this occurs on smaller lots, or lots with other site limitations and the only suitable locations for the domestic well and the disposal system are less than 100 feet apart. These situations become apparent when either the domestic well or the disposal system needs to be replaced. If it is not possible to achieve separation, a number of measures are taken to reduce potential for impacts: 1) the

existing domestic well will be tested to determine if there is any current impact from the disposal system, 2) the domestic well log will be reviewed to confirm presence of sanitary seal and subsurface conditions that would affect the potential movement of contaminants, 3) the replacement disposal system will be located no closer than the existing system, will be as shallow as possible, and may utilize an enhanced treatment system, 4) a new domestic well will utilize a 100 foot sanitary seal, 5) any old domestic well within the 100 foot setback will be properly destroyed, and 6) the property owner will sign an acknowledgement of the reduced separation and the need to have the domestic well periodically tested for any indication of pollution (nitrate and E. coli).

2.1.3 Advanced Groundwater Protection Management Program

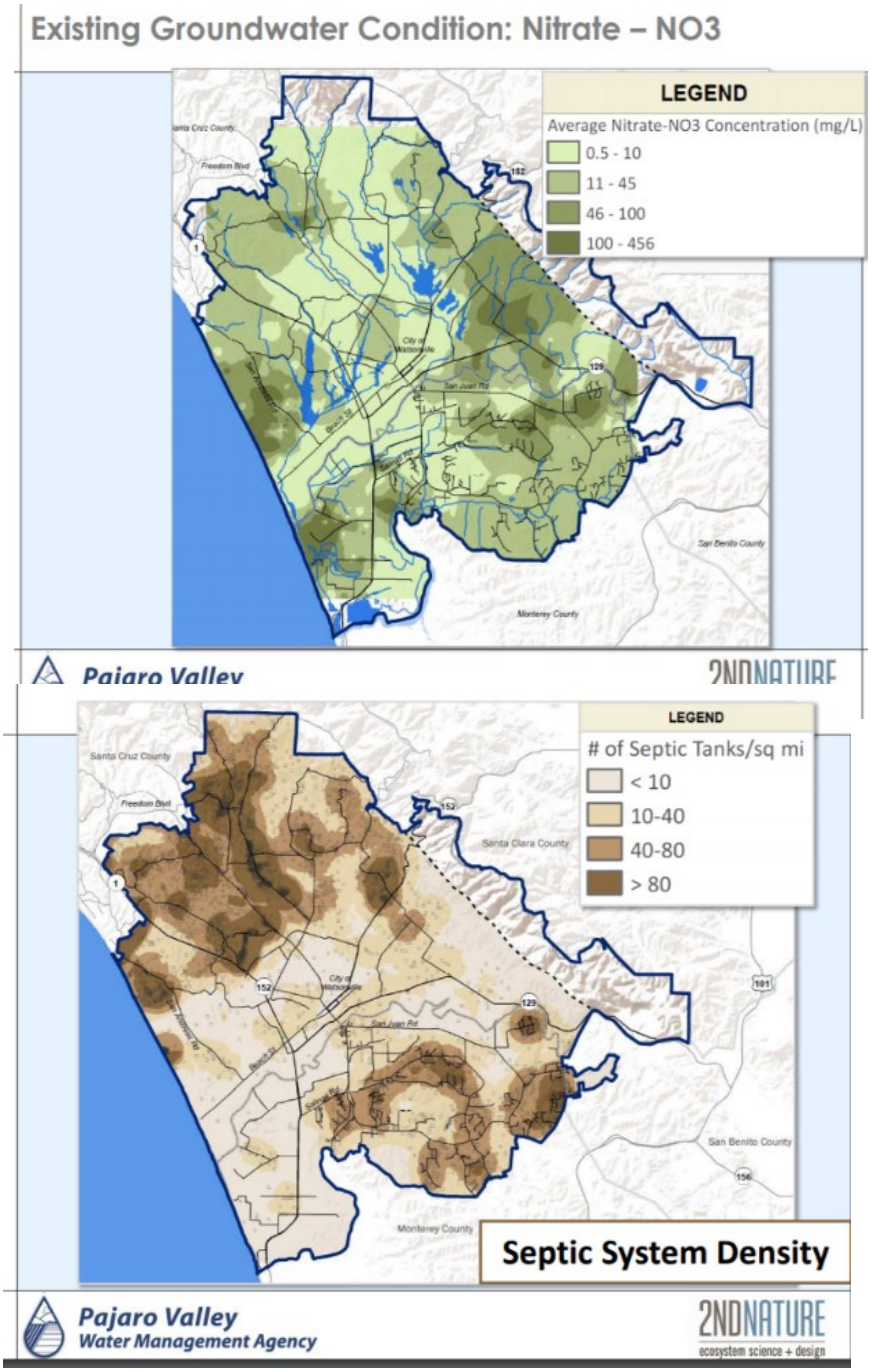
If at some point the County or Regional Board identifies a groundwater basin or sub-basin in Santa Cruz County where the use of OWTS is causing or contributing to significant degradation, the County will develop an Advanced Groundwater Protection Management Program (AGPMP) in close consultation with and approved by the Regional Board. During development of the AGPMP, the County and the Regional Board shall work together to identify the coverage area of the AGPMP (geographical area and site conditions where OWTS's are contributing to groundwater degradation). The AGPMP will require enhanced treatment for all new and replacement systems in such areas; mandatory, routine inspections and maintenance; connection to public sewers; shallow groundwater monitoring; or other appropriate actions. The enhanced treatment standards will be equivalent to Tier 3 requirements to the greatest extent practicable. The requirements for existing systems will be consistent with Tier 4 of the State OWTS Policy. The County will require conformance with current standards, including enhanced treatment standards, to the greatest extent practicable or as specified in the AGMP. Variances are not allowed for the requirements stated in sections 9.4.1 through 9.4.9 of the State OWTS Policy.

2.1.4 Nutrient and Salts Loading in Groundwater

OWTS are potential contributors of point source nitrate and salts to groundwater. As such, County EH and groundwater agencies track water quality of the three groundwater basins within Santa Cruz County. Of the three groundwater basins, only the Pajaro Basin is subject to significantly elevated levels of nitrate pollution from fertilizer, salt input from inland sources, and coastal seawater intrusion. The Pajaro Valley Water Management Agency (PVWMA) is utilizing recycled wastewater to address groundwater overdraft and has completed a Salt and Nutrient Management Plan (SNMP). Aside from seawater intrusion, salt and nutrients have not been identified as significant issues in the Mid-County GSP. The Santa Margarita Basin contributes significant baseflow to the San Lorenzo River, which is designated as impaired due to elevated nitrate concentrations. Nutrients in the Santa Margarita Basin are addressed through the San Lorenzo River Nutrient Total Maximum Load (TMDL). There are also some localized occurrences of elevated nitrate from OWTS in highly permeable soils.

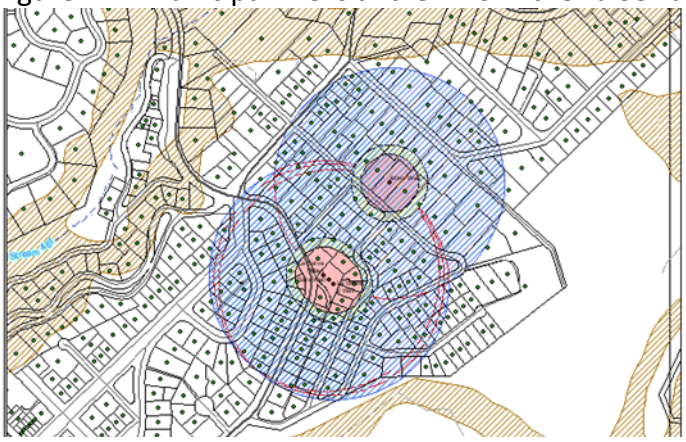
PVWMA developed its SNMP in 2016. Salt from seawater intrusion, and nitrate from agricultural fertilizer are the two primary water quality constituents of concern for Pajaro Basin groundwater. OWTS were determined to be less than 4% of the source of the aquifer's nitrate levels. According to a 2015 PVWMA study, the sources of nitrate pollution for the Pajaro Valley Groundwater Basin aquifer include: 87% agricultural, 5% stream runoff, 4% sewer leakage, and 4% septic systems. (Figure 2-3, PVWMA Salt and Nutrient Management Plan July 2, 2015).

Figure 2-3: Nitrate Levels and Sources of Nitrate in the Pajaro Groundwater Basin



Both Mid-County and Santa Margarita have experienced some localized occurrence of elevated nitrate from OWTS. In Mid-County, one municipal well has had nitrate levels approach drinking water standards and has been taken out of service (
Figure 2-5). This well is located in the densely developed La Selva Beach area, with sandy soils, small lots and extensive use of seepage pits for onsite wastewater disposal. It appears that the well in question has at least three OWTS located within 150 feet, eight OWTS within 200 ft and 22 OWTS within 600 ft (Figure 2-4). In the Quail Hollow area of the Santa Margarita Basin, several municipal wells are surrounded by development on one half acre lots in very sandy soils (
Figure 2-6). In the mid 1980's the Quail Hollow wells experienced an increase in nitrate levels but have remained well below drinking water standards (Figure 2-7).

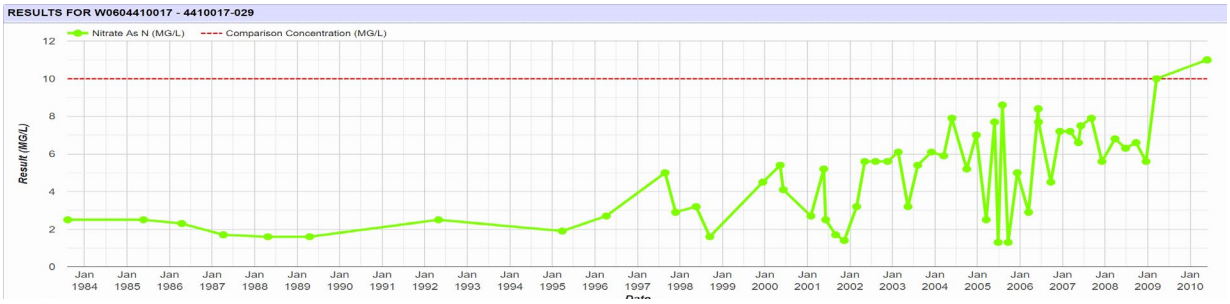
Figure 2-4: Municipal Wells and OWTS in the La Selva Beach Area



The Altivo well is to the north and the Sells well to the south. Inner buffer is 150 ft and outer buffer is 600 ft. Black dots are parcels with OWTS.

Figure 2-5: Nitrate Levels in La Selva Beach Wells, mg-N/L

Sells Well, 1984-2010



Altivo Well, 1985-2019

Figure 2-6: Quail Hollow Well Locations and OWTS (Dots)

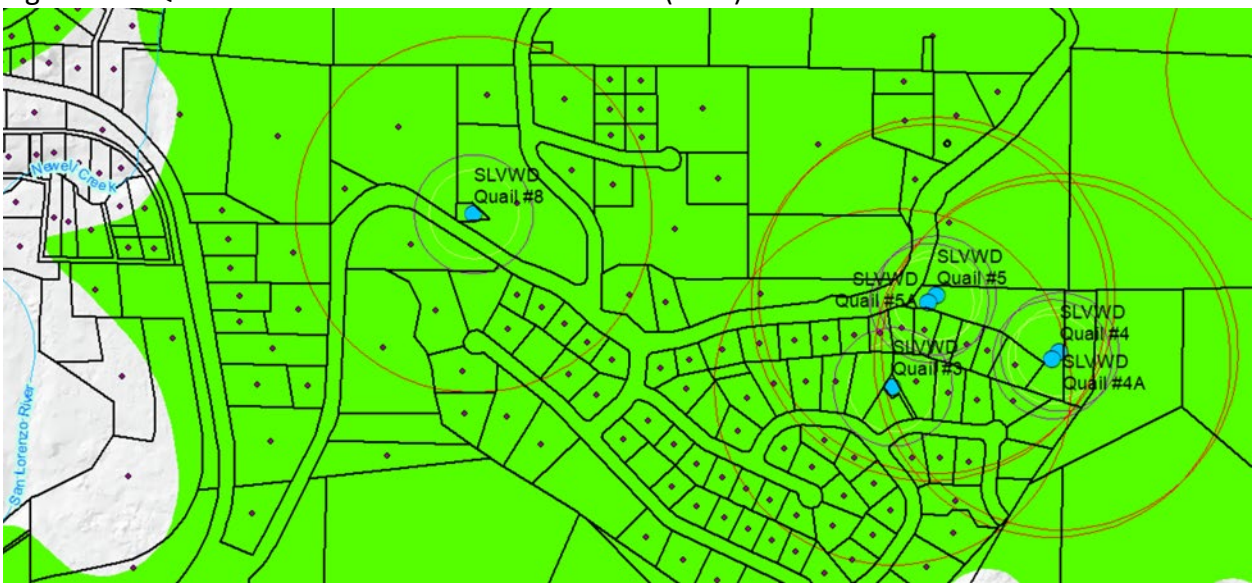
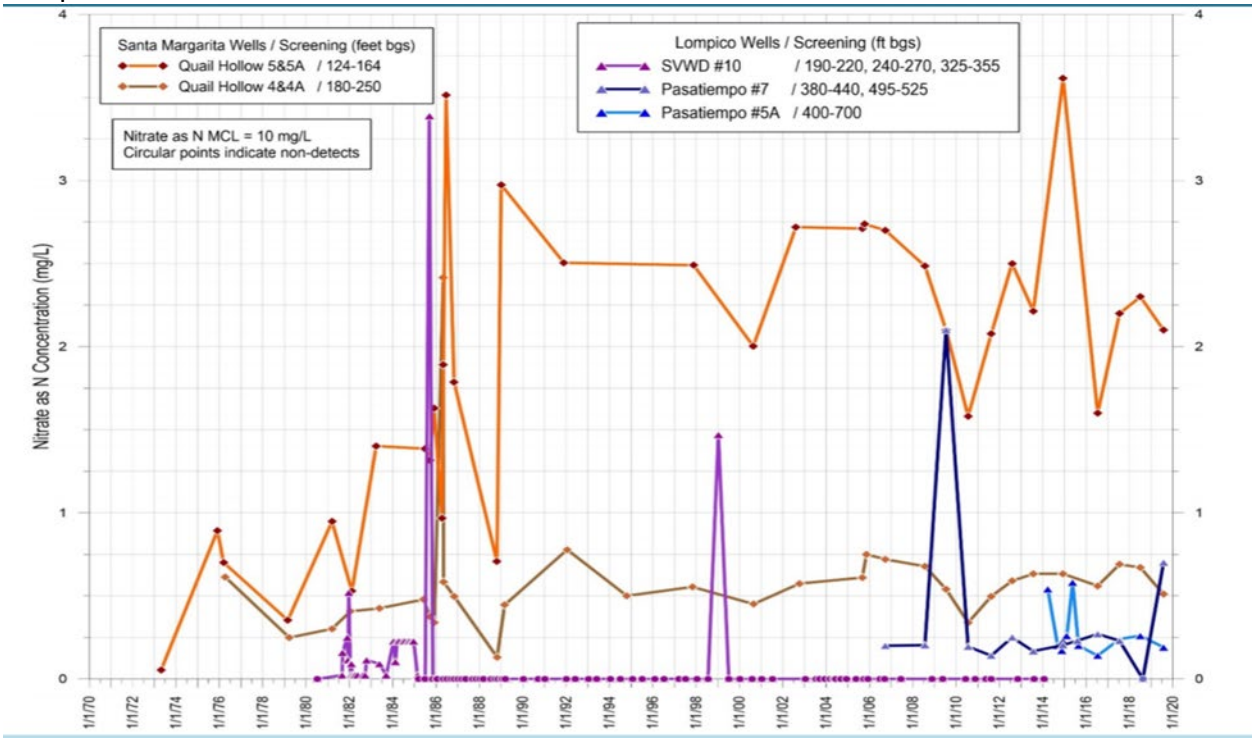


Figure 2-7: Nitrate Trends in Selected Santa Margarita Basin Wells, 1973-2020
Quail Hollow Wells, Santa Margarita Formation; and the Camp Evers/ Pasatiempo Areas Wells, Lompico Formation



Source: Montgomery and Associates, 2020

Santa Cruz County has required testing for nitrate, total dissolved solids, chloride, iron and manganese, for all new wells drilled since 2010. The new well data shows no significant nitrate pollution exceeding drinking water standards. Out of 257 wells, only 4 had values between 5.0 and 10 mg-N/L and only 25% had values between 5 and 1 mg-N/L. The State Groundwater Ambient Monitoring (GAMA) shows a similar pattern, with high nitrate levels only occurring in agricultural areas, and somewhat elevated levels in highly permeable soils.

Figure 2-8: Nitrate Measured in New Wells, 2010-2019.
Agricultural and turf parcels shown in yellow, highly permeable soils in green

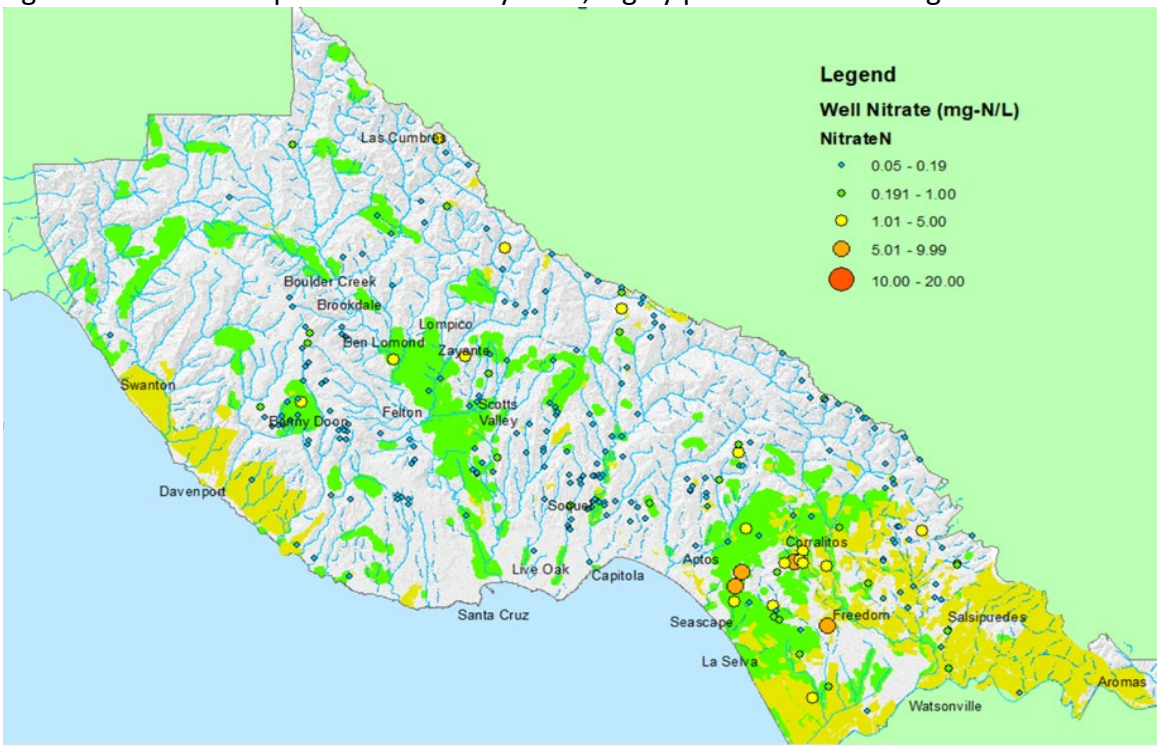
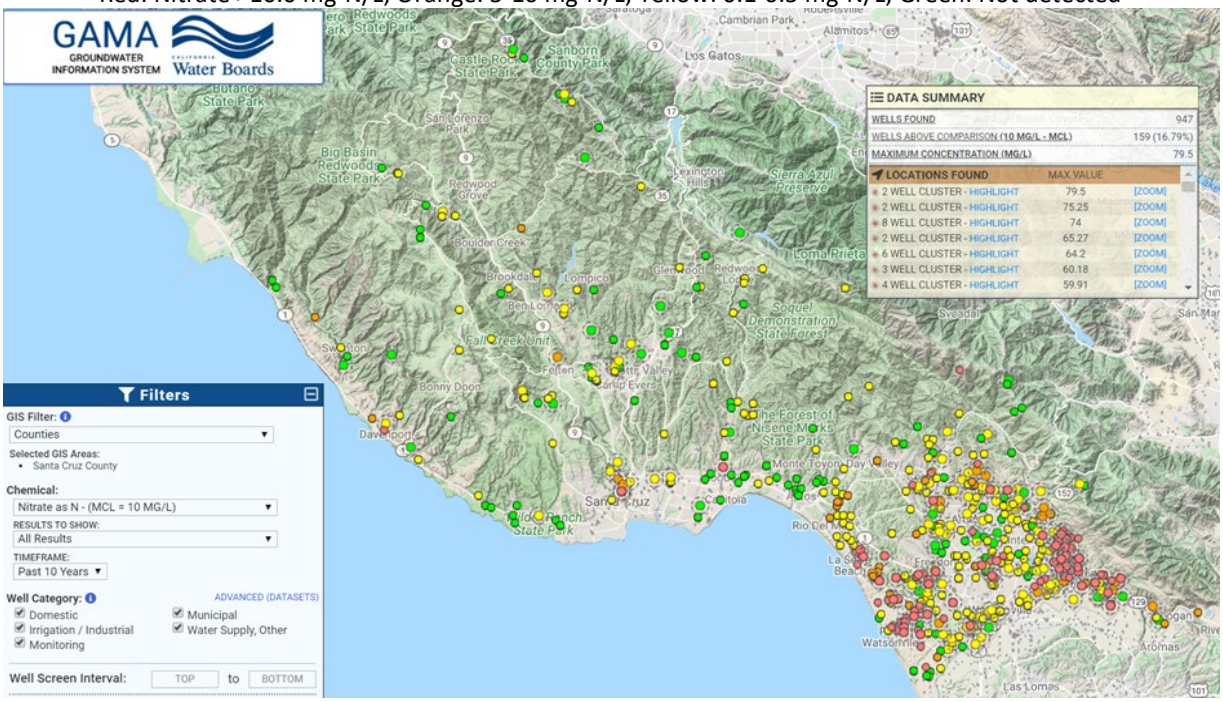


Figure 2-9: Nitrate Levels reported in State GAMA database, 2009-2019

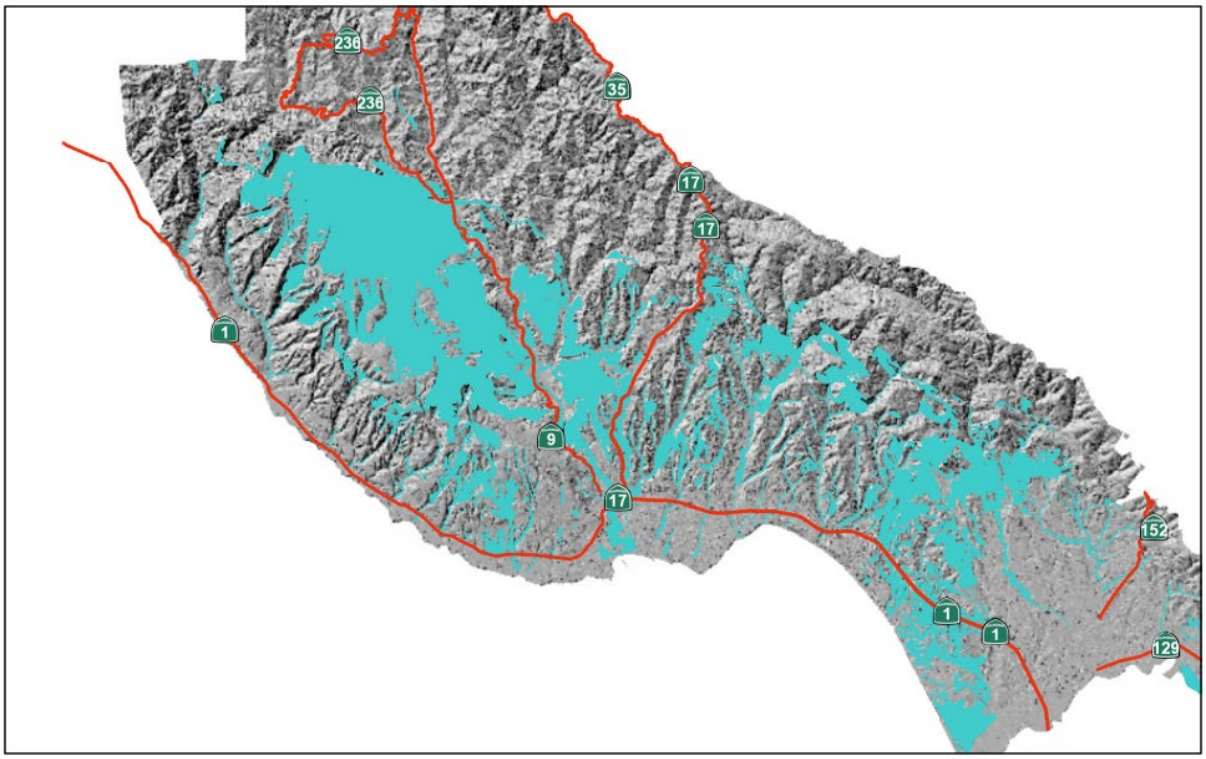
Red: Nitrate >10.0 mg-N/L; Orange: 5-10 mg-N/L; Yellow: 0.1-0.5 mg-N/L; Green: Not detected



2.1.5 Groundwater Recharge

The County has long recognized the importance of protecting the quantity and quality of waters recharging the county's groundwater basins. Primary groundwater recharge areas were mapped where moderately to highly permeable soils overlie important water bearing aquifer formations (Figure 2-10). The County established General Plan policies and provisions in the Santa Cruz County Code to protect recharge areas and to regulate wastewater disposal and other land uses overlying recharge areas. The objectives and effects of these policies is to maintain the quality and quantity of percolating waters. The County also recognizes the value of maintaining good quality groundwater recharge derived from the treated wastewater passing through OWTS. It is estimated for the Mid-County Groundwater Basin that 90% of the wastewater from properties served by OWTS returns to groundwater basin as recharge. Of the 1,000 af/yr pumped by inland private domestic wells, 400 af/yr is recharged back to the basin (SCMGA, 2019). Similarly, in the San Lorenzo Watershed it has been estimated that on average, 50% of the water used returns to the groundwater through OWTS (SCCHSA, 1995).

Figure 2-10: Primary Groundwater Recharge Areas in Santa Cruz County



2.1.6 Fractured Bedrock and Karst

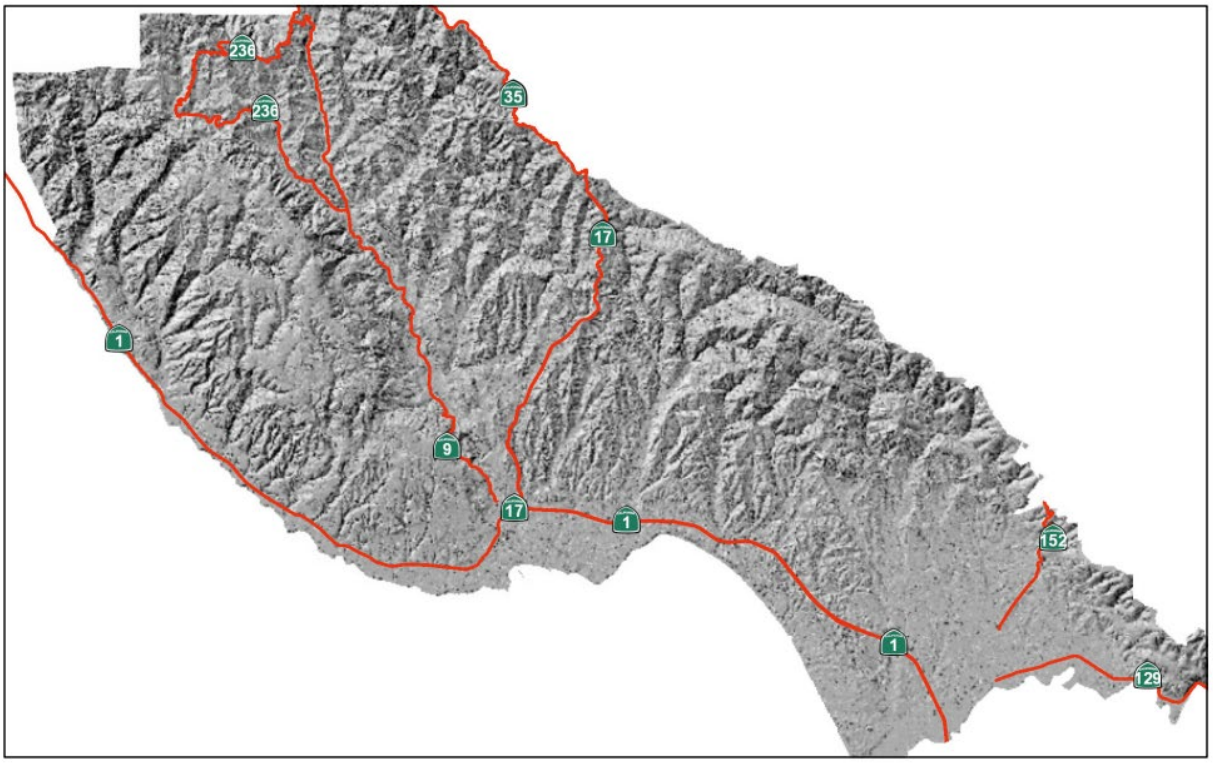
Where onsite wastewater disposal takes place in a location with limited soil depth over fractured bedrock, there is potential for the effluent to move rapidly for great distances with little treatment, resulting in groundwater pollution and/or surface water pollution where the water may exit the ground in springs or stream discharges. This is particularly a concern in karst areas underlain by marble or limestone. Karst occurs in some locations on Ben Lomond Mountain and karst springs are substantial sources of municipal water supply for the town of Felton and for the City of Santa Cruz from sources in the North Coast watersheds. The City of Santa Cruz and County embarked on a project to better map karst areas so that proper precautions could be taken in locating OWTS and other land uses that might contribute to pollution. Marble deposits and karst springs are now indicated in the County GIS and in the septic constraints layer. Provisions are being added to the County General Plan and Santa Cruz County Code Chapter 7.38, Sewage Disposal, to require geologic site evaluation if karst features are present and proper design to prevent adverse impacts of wastewater disposal. There is also a general provision to prohibit installation of a leachfield in fractured bedrock, wherever that may be found to occur. It has been seen occasionally, but rarely, in areas of Santa Cruz Mudstone and other hard sandstone or shale formations. In most cases underlying bedrock is deeply weathered as a result of the high rainfall and dense vegetation of the Santa Cruz Mountains. Presence of fractured bedrock would be identified on a case-by-case basis by soil observations and excessively rapid percolation test results.

2.1.7 Steep Slopes and Slope Stability

Over three quarters of Santa Cruz County is considered mountainous, with relatively narrow valleys, steep hillslopes, and mostly narrow ridgetops. Much of the geology is unstable and subject to slope failure and landsliding. OWTS cannot be located on excessively steep slopes due to construction challenges and threat of inducing further instability by introducing liquid into unstable slopes. There is also some concern of increased potential for effluent moving laterally and seeping out of steep slopes, although this has rarely been observed in Santa Cruz due to the prevalence of very deep soils. There are areas in mid-county where presence of clay lenses in the Aromas formation have caused localized saturation and slope failure even on slopes less than 30%.

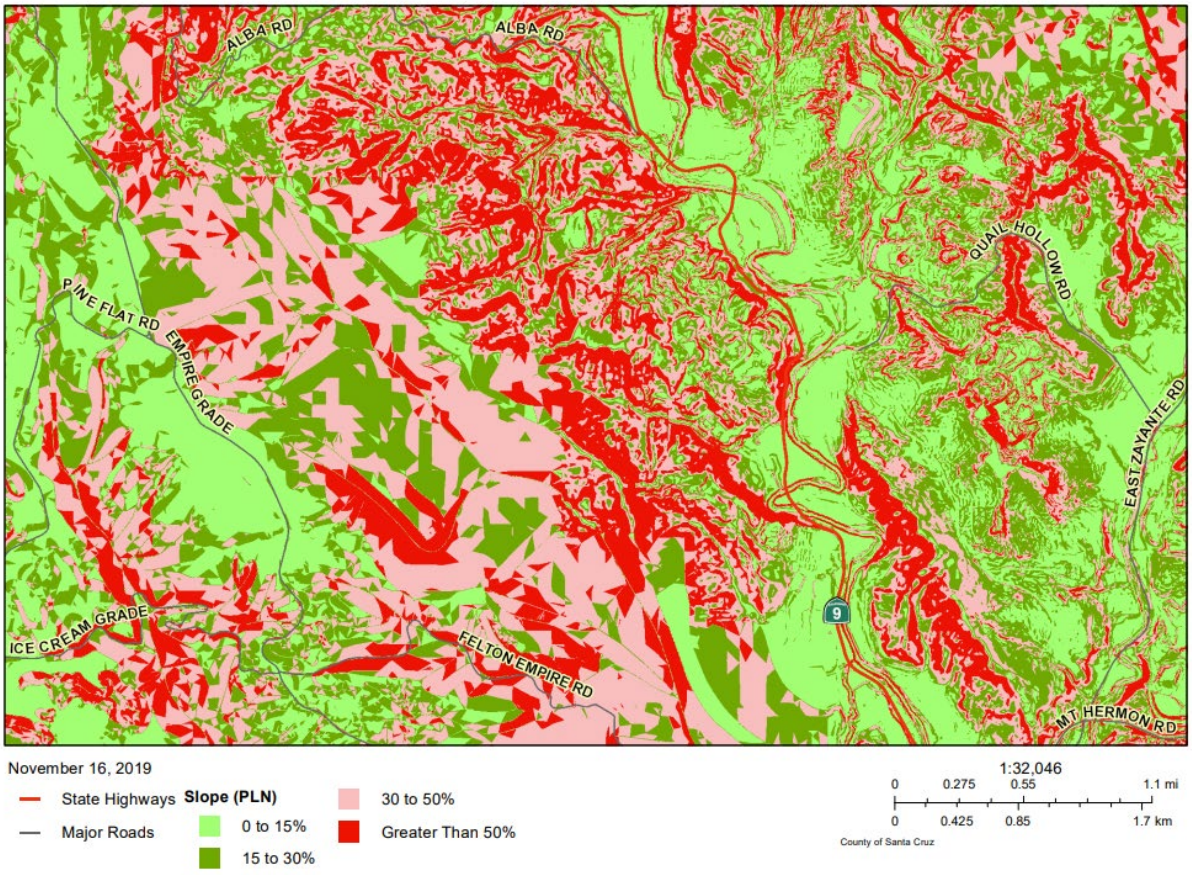
County code presently prohibits installation of OWTS to serve new development on slopes steeper than 30% but allows OWTS for repairs and replacements on slopes up to 50%. Systems cannot be placed in areas where grading was done to meet the slope requirements. Code also requires a safe setback from the edge of a steep slope, cut or embankment. Of the 28% of the records in the database that have information on slope in the area of the dispersal system 60% have slope less than 10%, 10% have slope 10-15%, 20% have slope15-30%, 7% have slope of 31-50%, and 3% are on slopes over 50% slope. Only 6% of the records indicate an embankment near the dispersal system requiring a set-back.

Figure 2-11: Steep Topography of Santa Cruz County



County EH staff work with the County Geologist and Environmental Planning staff to identify areas where slope stability is a concern and to review geologic reports addressing the necessary OWTS location and design to minimize impact on slope stability. Such reports will now be required whenever an OWTS is proposed on a slope over 30% and in other situations where there is evidence of other soil stability concerns. Slopes are assessed based on the 10-meter Digital Elevation Model incorporated in the County GIS. In the field, slopes are measured using clinometers and site-specific topographic surveys of each property. An example of the GIS slope map is shown below for the area northwest of Felton.

Figure 2-12: Example of County Slope Map for Area Northwest of Felton



2.2 Soils

Suitable soil is one of the most important aspects of OWTS design. The soil must be able to absorb and treat the effluent, eliminating pathogens before the effluent percolates to groundwater or downgradient surface water. Soil characteristics are a function of underlying geology, topography, climate and vegetation. Soils typically consist of an upper A horizon typically 12-18 inches deep rich in decaying plant material, organisms, and organic material. The deeper B horizon may extend to 3-6 feet below the surface, with less organic material and more clay, but with the presence of tree and shrub roots. The deeper C horizon transitions into weathered bedrock, which is frequently soft and permeable to a depth of 10-20 feet.

A U.S. Department of Agriculture Soil Conservation Service *Natural Resources Conservation Service* (USDA-NRCS) report - 'Soil Survey of Santa Cruz County, CA' (USDA-SCS, 1980) characterizes 84 soils classifications for Santa Cruz County. The soils information is accessed as a data layer in the County's GIS database that is viewed in conjunction with OWTS information for each parcel countywide. Most of the soils in Santa Cruz are very deep as a result of the high rainfall and dense vegetation cover, but there are localized occurrences of soils that may be thin, sandy or clayey, depending on the underlying geology. Because most soils in Santa Cruz County are relatively deep and consistent, a typical absorption trench for wastewater disposal is installed with the bottom of the trench at four feet, with 12 to 18 inches of cover over the top of the trench. Trenches may be

installed deeper if there is limited area on the site and/or if the soil conditions are more suitable at greater depths.

Figure 2-13: Example of a Soil Observation Pit, Zayante Coarse Sand

Prior to 1992, the standard disposal trench depth was 8-12 feet below the surface in most areas of the county if there was not a concern for presence of shallow groundwater. The use of the deeper trenches, with dispersal well below the shallow root zone, has contributed to the recharge of the groundwater basins from OWTS discharge. One of the trade-offs of moving to shallow dispersal systems will be the reduction of wastewater return flow contributing to groundwater recharge.

Soil permeability is a critical consideration for managing wastewater treatment and dispersal in OWTS. Santa Cruz County uses standardized USDA hydrologic soil classification[6] that ranges from high permeability, low runoff potential (Group A) to low permeability, high runoff potential (Group D) to determine dispersal area is needed for an OWTS (Figure 2-14):

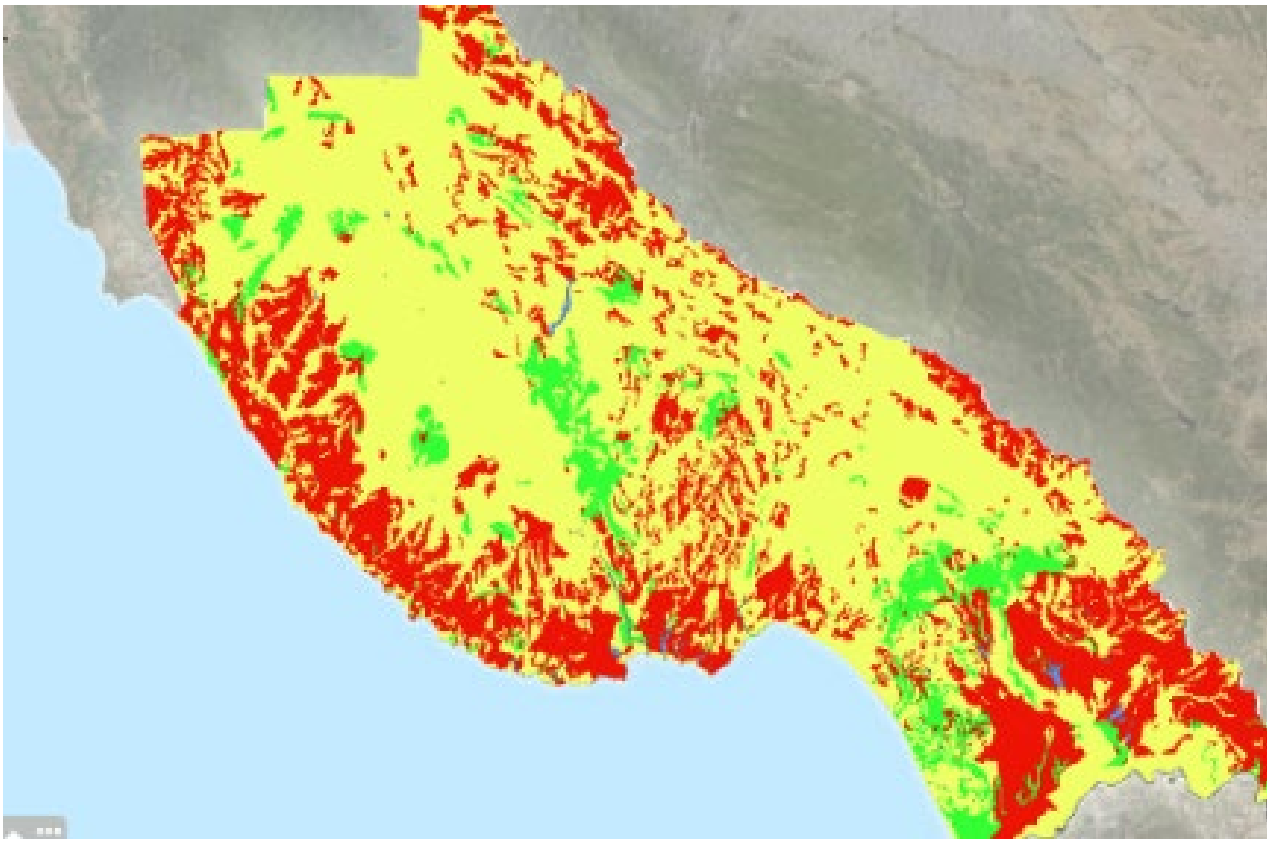
- Fast permeability sandy soils (percolation rate faster than 5 MPI, permeability 6-20 inches/hour), hydrologic group A
- Moderate permeability loams (percolation 5-30 MPI, permeability 0.2-6 in/hr) hydrologic group B
- Slow permeability clayey soils (slower than 30 MPI, permeability less than 0.2 in/hr) hydrologic group C and D

In Santa Cruz County, OWTS have been sized based on the soil percolation category and the number of bedrooms and/or projected wastewater flow. A review of available data for installed or proposed OWTS in Santa Cruz County indicates the percentage of parcels with soils of various percolation categories:

- 0.1% - faster than 1 MPI
- 12.9% - 1-5 MPI
- 76.3% - 5-30 MPI
- 9.5% - 30-60 MPI
- 1.0% - 60-120 MPI
- 0.2% - slower than 120 MPI (unsuitable)

[6] https://directives.sc.egov.usda.gov/OpenNonWebContent.aspx?content=17757.wba

Figure 2-14: Soil Permeabilities Based on Hydrologic Group



Green: Very Permeable (Hydro Group A), Fast Percolation Rate (<5 MPI)
Yellow: Permeable (Hydro Group B), Medium Percolation (5-30 MPI)
Red: Low to Very Low Permeability (Hydro Groups C/D), Slow to Very Slow Percolation Rate (>30 MPI)
Source: County GIS and USDA-SCS, 1980

To consider soil percolation rates for OWTS permits, the SC County Inspector conducts office research for soil maps, historical percolation tests, field observations and notes, and on-site inspection in the field to evaluate the soil conditions. File and database research, together with field inspection and testing, informs a general characterization of the soil's percolation rate for determining the leachfield size. Soil suitability for wastewater disposal is determined by a combination of reviewing soil maps, percolation test results, exploratory excavation soil logs and soil structural and textural characteristics. Laboratory analyses of soil texture may be required by the Health Officer. Percolation rate alone shall not determine soil suitability. Soil texture shall determine soil suitability where percolation test results are unclear or nonrepresentative.

2.2.1 Shallow Soils

Treatment of effluent is most effective in aerated followed by anaerobic soil conditions. It is thus important to have adequate soil depth beneath the horizon of disposal for percolation prior to the effluent reaching groundwater or an impermeable layer that can cause localized soil saturation or mounding. Saturated soils or mounding can occur where there is very shallow soil over hard

bedrock, dense clay subsoil, or perched groundwater. Occurrence of perched groundwater is discussed in the following section on groundwater and poorly drained soils.

Given the generally deep weathering of soil and underlying bedrock in Santa Cruz County, there are few areas of extensive shallow soil. These conditions tend to on ridges of resistant rock where slopes are too steep for use of OWTS. Shallow soil depth also occurs on the Maymen and Boony Doon soil units that overly the Santa Cruz Mudstone geologic formation in the Pasatiempo and north coast areas. Some of the areas with hard sandstones also have localized areas of shallow soil, but deeper soils can often be found close by. Of the installation records, only 5% indicated an impervious layer less than 5 feet below the bottom of the dispersal field.

For undeveloped parcels or developed parcels with no subsurface soil information, soil excavation to a depth to at least the separation distances as provided in Table 3-4 below the bottom of the proposed dispersal system is required, and soils must be demonstrated to percolate at least 60 MPI within the first three feet below the dispersal system's point of dispersal. If acceptable soil depth is not adequate, the designer may propose an enhanced treatment system with improved effluent treatment and/or a shallower effluent dispersal system using pressurized drip, at-grade dispersal system, or mound technologies. All of these maintain at least 6-12 inches of soil cover over the dispersal system.

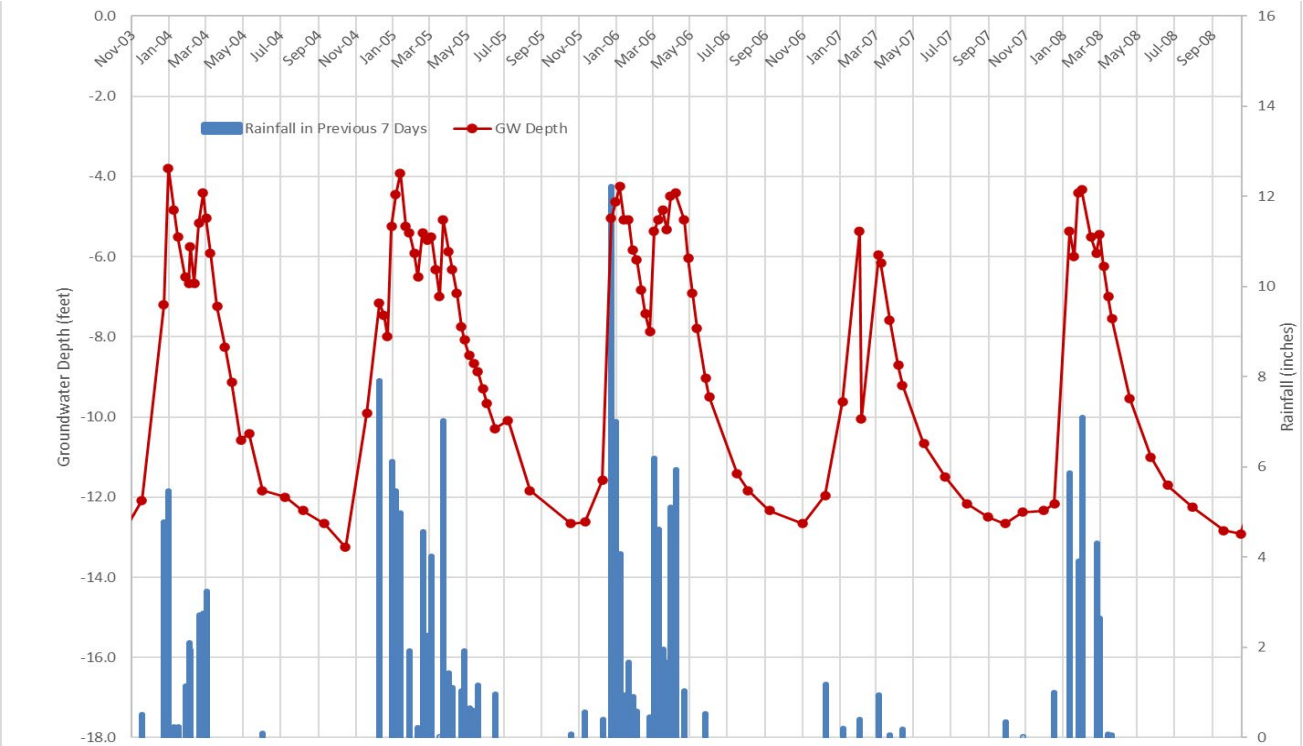
2.2.2 Poorly Drained Soils and High Groundwater

Treatment of effluent is not as rapid or effective in saturated soil conditions, and more time and distance of travel is needed for treatment and inactivation of potential pathogens such as viruses and bacteria. Soil saturation can also limit the absorption of effluent and lead to surfacing and discharge of untreated effluent, creating a public health hazard and degrading water quality. To prevent these adverse impacts, dispersal systems need to be located in soil zones that are not prone to becoming saturated, soils with an adequate percolation rate, and have an adequate separation to groundwater. Groundwater includes perched saturated zones, as well as the shallowest local hydraulically unconfined aquifer unit.

After steep slopes, the occurrence of shallow groundwater is probably one of the biggest constraints for locating OWTS in the county. Watsonville Loam, which occurs in 7% of the county on flat terrace deposits, tends to have perched groundwater during the winter. But elevated groundwater can occur during the winter with almost every other soil type, depending on topography and rainfall. Groundwater levels in Santa Cruz County often fluctuate over 20 feet from dry season to wet season. During extreme rainfall events, soils may be fully saturated for up to several days. Even though these soils experience transient saturation, most are well-drained with good permeability and can continue to absorb effluent and groundwater levels drop rapidly after the rains stop. An example of this is shown in the plot for one of the shallow monitoring wells (BC1) in downtown Boulder Creek for the period of 2004-2008, which included a wet winter (2006, 67.8 inches total annual rainfall) and a dry winter (2007, 25 inches total annual rainfall) (

Figure 2-15). The average nitrate level in this well is 3.89 mg-N/L and the median level is 2.0 mg-N/L, based on 100 samples from 1988 to 2000.

Figure 2-15: Fluctuation of Groundwater in Response to Rainfall, Boulder Creek, 2004-2008 (BC1)



A study was conducted in 1981-82 to better understand the relationship between shallow groundwater, OWTS performance and water quality. Study participants collected 285 samples over two winters from 86 boreholes constructed at various distances downgradient from leachfields under various shallow groundwater levels. An analysis of the results showed no statistically significant occurrence of fecal coliform at distances greater than 25 feet from a leachfield, even when the leachfields were partially intruded by groundwater (

Table 2-1, Figure 2-16). Within 25 feet, fecal coliform levels were statistically greater when leachfields were saturated, but that effect was not observed beyond 25 ft. All boreholes showed a significant increase in fecal coliform during rainfall events, but that also included control boreholes that were not under the influence of any nearby leachfields. Downgradient nitrate levels were actually higher when the leachfields were deeper and when there was greater groundwater separation (SCCHSA, 1989, An Evaluation of Wastewater Disposal and Water Quality in the San Lorenzo River Watershed). In this study, nitrate levels were much higher in sandy soils (mean of 3.06 mg-N/L) than in clay soils (mean of 0.83 mg-N/L). At distances greater than 25 feet from a leachfield, soil texture and permeability have a much greater influence on nitrate concentration than groundwater separation or horizontal setback.

County EH has made a strong effort to characterize areas subject to persistent, shallow, seasonal groundwater. File information includes observations of the date and depth of presence or absence of groundwater. In the San Lorenzo Valley, some 70 boreholes were drilled in 1986-88, and some 25 of these have been maintained for ongoing monitoring throughout the winter season.

Where high seasonal groundwater is suspected based on observed field conditions and/or file information, winter water table testing is generally required as a part of site analysis required for approval of a new OWTS to serve new development. The consultant is required to install several piezometers and make multiple observations over the wet season in order to characterize the range of groundwater occurrence. Winter water table observations will only be accepted if there has been at least 6 inches of rain in the previous 30 days AND at least 60% of the average annual rainfall has occurred. During the 2020 winter water table testing period, 35 parcels were subject to winter groundwater observations.

Table 2-1: Water Quality Results for Shallow Groundwater Monitoring Wells, 1981-82
Wells were downgradient of leachfields in various soil types in the San Lorenzo Valley.

FECAL COLIFORM DATA (MPN/100 ml)-- Logmean
Range
Number of Observations

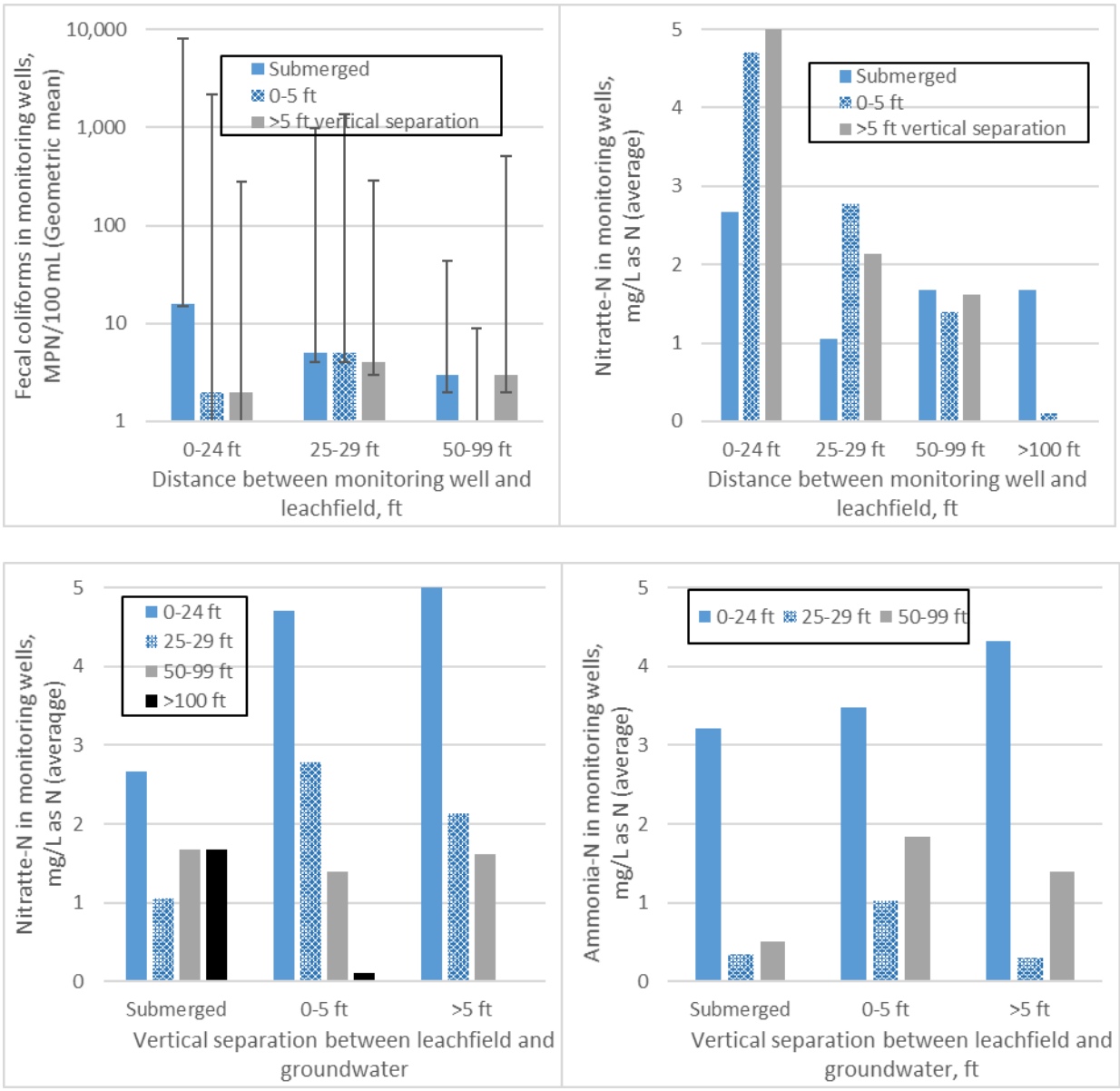
Separation of Leachfield from Groundwater	Distance of Monitoring Well from Leachfield		
	0-24 feet	25-49 feet	50-99 feet
Less than 0 feet (Submerged)	16 *** 0 - 8100 54	5 0 - 980 31	3 0 - 40 9
0 - 5 feet	2 0 - 2182 21	5 0 - 1360 21	1 0 -8 19
Greater than 5 feet	2 0 - 280 11	4 0 - 280 7	3 0 - 509 19

NITROGEN DATA (mg-N/L) : Nitrate: Mean (Maximum)
Ammonia: Mean (Maximum)

Separation of Leachfield from Groundwater	Distance of Monitoring Well from Leachfield			
	0 -24 feet	25 - 49 feet	50 -99 feet	over 100 feet
Less than 0 feet (Submerged)	2.67 (21.9)*** 3.21 (42.1)***	1.06 (8.5) 0.35 (4.8)	1.68 (8.4) 0.51 (2.3)	0.44 (1.54) 0.74 (2.5)
0 -5 feet	4.71 (41.8)*** 3.48 (48.3)***	2.78 (34.3) 1.03 (11.2)	1.39 (12.1) 1.84 (17.4)	0.11 (0.2) 0.12 (0.23)
Greater than 5 feet	5.05 (16.0)*** 4.33 (36.9)***	2.13 (8.7) 0.30 (0.96)	1.61 (9.8) 1.40 (9.3)	

*** Denotes groups with mean water quality parameters significantly different from other groups. Differences among undesignated groups are not statistically significant at the 0.05 probability level.

Figure 2-16. Graphical Summary of Shallow Monitoring Well Data Downgradient of Leachfield. Fecal coliforms (geometric mean of samples from 1980-1981) and nitrate-N (average of samples collected from 1980-1981). Data represent about 200 samples; 48% of observations are from wells near submerged leachfields, 32% from wells near leachfields with less than 5 ft separation, and 20% of observations from wells near leachfields with over 5 ft vertical separation.



When system replacements occur outside of the winter water table testing period, the designer and EH staff estimate the expected groundwater level based on available groundwater information from surrounding parcels or from extrapolated groundwater information that has been developed for some parts of the San Lorenzo Valley. The EHLUIS database contains site information for approximately 15,000 of the OWTS in the county, including groundwater

information for about half of those sites. Twenty percent of that information is based on direct observations at the site and the rest is based on extrapolations from available data. Based on the information from sites with groundwater information, 6% have seasonal groundwater less than 3 feet from the surface, 14% have groundwater at 3-6 feet, 37% have groundwater at 6-10 feet, and 22% have groundwater at 10-15 feet.

Once the expected highest level of persistent seasonal groundwater is established, the OWTS design must provide an adequate separation, or an enhanced treatment system may be proposed with shallow effluent dispersal technology and enhanced treatment to mitigate a reduced separation to groundwater. The County used to approve a minimum one-foot separation, but under the State OWTS policy, the County will not approve a separation less than 2 feet. Table 3-4 defines the allowed minimum distance to groundwater depending on site conditions.

2.2.3 Sandy Soils and Nitrate

OWTS located in sandy soils release higher concentration of nitrate to underlying groundwater and downstream waterways. This is due to the rapid permeability and rapid movement of effluent, aerobic conditions, and limited occurrence of saturated or anaerobic conditions that would lead to denitrification. Investigations in the San Lorenzo Watershed determined that OWTS in sandy soils contributed 10-15 times as much nitrate to the San Lorenzo River as OWTS in less permeable soils (SCCHSA, 1995b). Elevated nitrate levels have also been observed in other areas of the County with OWTS in sandy soils: Bonny Doon, Valencia Creek and La Selva Beach. Drinking water standards for nitrate have been exceeded in groundwater in La Selva Beach, although that may be partially attributable to past agriculture in the area, or to direct interception of a plume(s) from nearby seepage pits.

In order to prevent any increase in nitrate levels in the San Lorenzo River, which is a municipal drinking water source, enhanced treatment systems with nitrogen reduction are required for all new, repairs, and upgraded OWTS in sandy soils in the San Lorenzo Watershed. This requirement will be extended to other sandy soils areas in the county that show evidence of elevated nitrate levels from OWTS discharge in groundwater or surface water.

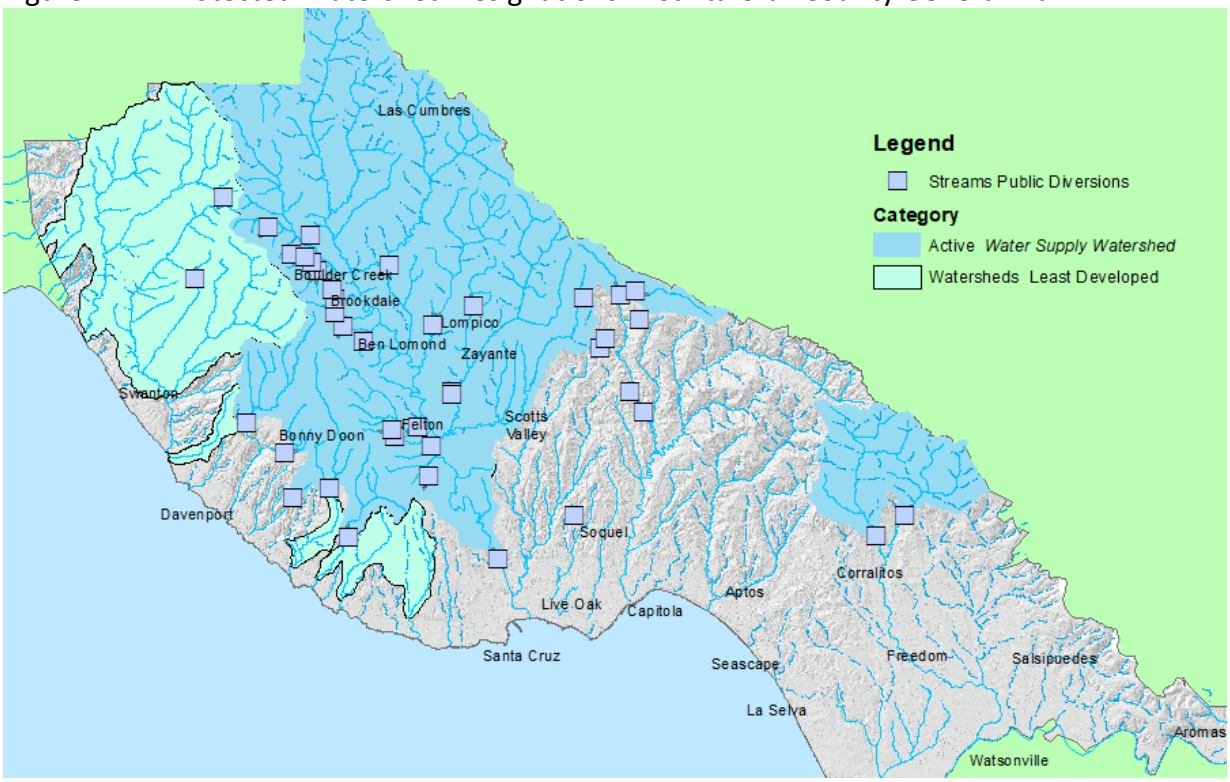
2.3 Surface Water and Watersheds

Santa Cruz County has a number of important surface water bodies and watersheds and multiple interrelated policies and regulations to protect and improve surface water quality relative to operation of existing and new OWTS. The City of Santa Cruz relies on surface water for 95% of its supply and the San Lorenzo Valley Water District obtains on average about 50% of its supply from surface water. Additionally, virtually all county streams support recreational use and threatened salmonid habitat. Some streams have been designated as impaired, in some cases due to OWTS, and programs are being implemented to protect and improve water quality.

2.3.1 Water Supply Sources and High-Quality Waters

The County of Santa Cruz General Plan designates water supply watersheds and least distrubed watersheds, and establishes numerous policies and programs for their protection and improvements. Many of these policies involve wastewater disposal and are carried over into Santa Cruz County Code. For new construction, the County has established limits that specifically protect water resources in terms of proximity to floodplains, groundwater recharge areas, and water supply watersheds for drinking water. These water resource protections prevent potential impacts from OWTS. In particular, two limits to parcel size establish protections for drinking water (Figure 2-17).

Figure 2-17: Protected Watershed Designations in Santa Cruz County General Plan



- Water Supply Watersheds: To protect countywide water resources, the County General Plan requires a 10-acre minimum for creating new parcels in watersheds that supply drinking water. These areas include most of the San Lorenzo, North Coast and Corralitos watersheds. In the San Lorenzo and North Coast water supply watersheds, new development using OWTS is prohibited on existing parcels less than one acre in size, leaving many existing parcels unbuildable. The area within 1 mile upstream of the north coast water supply intakes is designated as a "Water Quality Constraint Area" and a 2.5-acre minimum parcel size is required for new development on existing parcels.
- Least Disturbed Watersheds: The County's 'Least Disturbed Watershed' (Least Developed) designation establishes a 40-acre minimum limit to parcel size for new parcels in certain areas to protect "clear and running streams."

Additional requirements are added for the operation and repair of existing OWTS located within close proximity to water supply intakes:

- Where the effluent dispersal system is within 1,200 feet from a public water systems' surface water intake point, within the catchment area and upstream of the intake point, the dispersal system shall be located more than 400 feet from the high-water mark of the stream.
- Where the effluent dispersal system is located more than 1,200 feet but less than 2,500 feet from a public water system's surface water intake point, within the catchment area and upstream of the intake point, the dispersal system shall be located more than 200 feet from the high-water mark of the stream.
- For replacement OWTS that do not meet the above horizontal separation requirements, the replacement OWTS shall meet the horizontal separation to the greatest extent practicable. In such case, the replacement OWTS shall utilize enhanced treatment and other mitigation measures, unless the Health Officer finds that there is no indication that the previous system is adversely affecting the public water source, and there is limited potential that the replacement system could impact the water source based on topography, soil depth, soil texture, and groundwater separation.
- For new OWTS, installed on parcels of record existing as of May 13, 2013, that cannot meet the above horizontal separation requirements, the OWTS shall meet the horizontal separation to the greatest extent practicable and shall utilize enhanced treatment for pathogens so that effluent from the enhanced treatment does not exceed a 30-day average total suspended solids of 30 mg/L and shall further achieve an effluent fecal coliform bacteria concentration less than or equal to 200 Most Probable Number (MPN) per 100 milliliters and any other mitigation measures prescribed by the Health Officer.

The County GIS has all of the public water system surface intakes mapped (Figure 2-17), along with the required setback zones described above. If County EH staff become aware of any OWTS failure within those zones then they will notify the operator of the public water system and the State Board, Division of Drinking Water by telephone or email within 24 hours or no later than 72-hours upon knowledge of OWTS failure. The public water system operator will also be notified in the event that an application is received for a new or replacement OWTS within the setback buffer of the intake and will be given a minimum of 10 business days to comment on the application.

2.3.2 Impaired and Vulnerable Surface Water

This LAMP is intended to address OWTS that are contributing to impairment of county waterbodies due to pathogens or nutrients. Impaired surface waters are those waterbodies that have been formally designated as impaired pursuant to Section 303(d) of the Clean Water Act. For these surface waters, the presence of some contaminant has caused water quality degradation to the point that it is threatening a beneficial use of that waterbody. Vulnerable surface waters are waterbodies near points of wastewater discharge that may become impaired if pollution control measures are not enforced. While there are a number of designated impaired waterways in Santa Cruz County, other waterbodies could be considered vulnerable, and programs should be in place and enforced to provide vital water quality protection.

Once a waterbody is listed as impaired, a Total Maximum Daily Load (TMDL) is developed for that waterbody. A TMDL establishes the maximum amount of a pollutant allowed in a waterbody, determines the sources of those pollutants, and establishes numeric targets to reduce or eliminate impairment. The TMDL also includes an implementation plan and serves as the starting point or planning tool for restoring water quality. Multiple waterbodies in Santa Cruz County are considered impaired and are included on the federal 303(d) list of impaired waterbodies. Several TMDLs have been developed and others are planned for the future, with a focus on mitigating sediment, pathogens, and nutrient loading to impaired water bodies. Table 2-2 ranks the significant controllable sources of impairment for each waterbody, as indicated by the Regional Board in the TMDL staff reports with loading calculations for various sources.

Table 2-2: Summary of Impaired Waterbodies and Pollutant Sources Within Santa Cruz County
For listing of specific water bodies in each watershed, see the Section 303(d) List.

Sources, in order of importance, with 1 the most important, when determined. ND= Not Determined										
Water Body	Constituent	MS4, Urban lands	Sewers and Laterals	Home-less	Pets	Live-stock	Onsite Systems	Agricul. Manure Fertilizer	Landfill runoff	Extent of Impairment
Aptos/Valencia Creek	Pathogens	1	3	ND	2	4	ND	ND	ND	Aptos downstream of Valencia Cr, Valencia Cr. downstream of Cox Rd and Valencia Rd, Trout Gulch
Corralitos Cr	Pathogens	1	6	2	3	4	5	ND	ND	Downstream of Browns Valley Rd and Salsipudes Cr.
Pajaro River	Fecal Coliform	1	3	ND		2	ND	ND	ND	Pajaro River
Pajaro River	Sediment	Yes						ND	ND	Pajaro River and Corralitos Cr.
Pajaro River	Nitrate/ Nutrients	2	3			3		1	ND	Various streams in Pajaro Watershed
Pinto Lake	Phosphorus/ Cyanotoxins	2				4	2	1	ND	Pinto Lake Watershed
San Lorenzo Estuary	Pathogens	2	1	4	3	6	5	ND	ND	
San Lorenzo, Lompico	Pathogens	2	3	5	4	6	1	ND	ND	
Branciforte	Pathogens	1	3	4	2	6	5	ND	ND	
Carbonera, Camp Evers	Pathogens	1	6	3	2	5	4	ND	ND	
San Lorenzo Watershed	Nitrate	4	2			3	1	ND	ND	
San Lorenzo Watershed	Sediment	Yes						ND	ND	
Soquel Creek and Lagoon	Pathogens	1	2	4	3	3	ND	ND	ND	Soquel Creek downstream of Porter St. and Noble Gulch
Watsonville Sloughs	Pathogens	Yes	Yes			Yes		Yes	Yes	Watsonville, Harkins, Hanson, Gallighan, Struve

Note: MS4 refers to municipal separate storm sewer systems from urban areas.

Table 2-3 presents a summary of the data for the major waterbodies potentially impacted by OWTS outside of the San Lorenzo River Watershed. Sample locations are shown in Figure 2-19. A comparison of fecal bacterial and nitrate data for the major waterbodies outside of the San Lorenzo River Watershed is shown in

Figure 2-18. Valencia Creek shows elevated nitrate compared to Soquel and Aptos Creek. This is likely related to the sandy soils of the Valencia Creek Watershed, but there is no evidence of impairment. There are 2,140 OWTS in the Aptos and Valencia watersheds, mostly in Valencia, and 3,000 OWTS in the Soquel watershed. Both Soquel and Aptos/Valencia Creeks have TMDLs for pathogens, but the impairment is in the lower urbanized watersheds and not attributed to OWTS. Water quality of the San Lorenzo watershed is discussed in Section 2.3.4.

Table 2-3: Summary of Nitrate and Fecal Indicator Data for Selected Santa Cruz County Waterbodies

Locations: Aptos, Soquel and Watsonville sites	**Years of E.coli Record**	**Geomean E.coli**	**Years of NO3N Record**	**Average NO3N Concentration (mg-N/L)**
APTOS CREEK @ MOUTH (A0)	30	925	8	0.17
APTOS CREEK @ VALENCIA CREEK (A2)	26	131	8	0.03
VALENCIA CREEK @ APTOS CREEK (A1)	22	834	10	0.64
SOQUEL CREEK @ BATES CREEK (S4)	15	161	12	0.04
WEST BRANCH SOQUEL C @ SAN JOSE-OLIVE SPRINGS (S6)	23	138	11	0.07
PINTO LAKE @ BOAT RENTAL	29	59	3	0.21

Figure 2-18. Bacteria and Nitrate-N Levels in Aptos and Soquel Creek Watersheds.

The horizontal line across each graph represents the target level (400 MPN/100 mL for fecal coliforms [or E. Coli], 0.33 mg/L as N for nitrate-nitrogen). The box represents 75% of the data for each time period and the 95% confidence interval is represented by the horizontal lines above and below the box. The horizontal line within the box represents the median value. The height of the box reflects the range of data. The datapoints above the 95% confidence interval represent outliers.

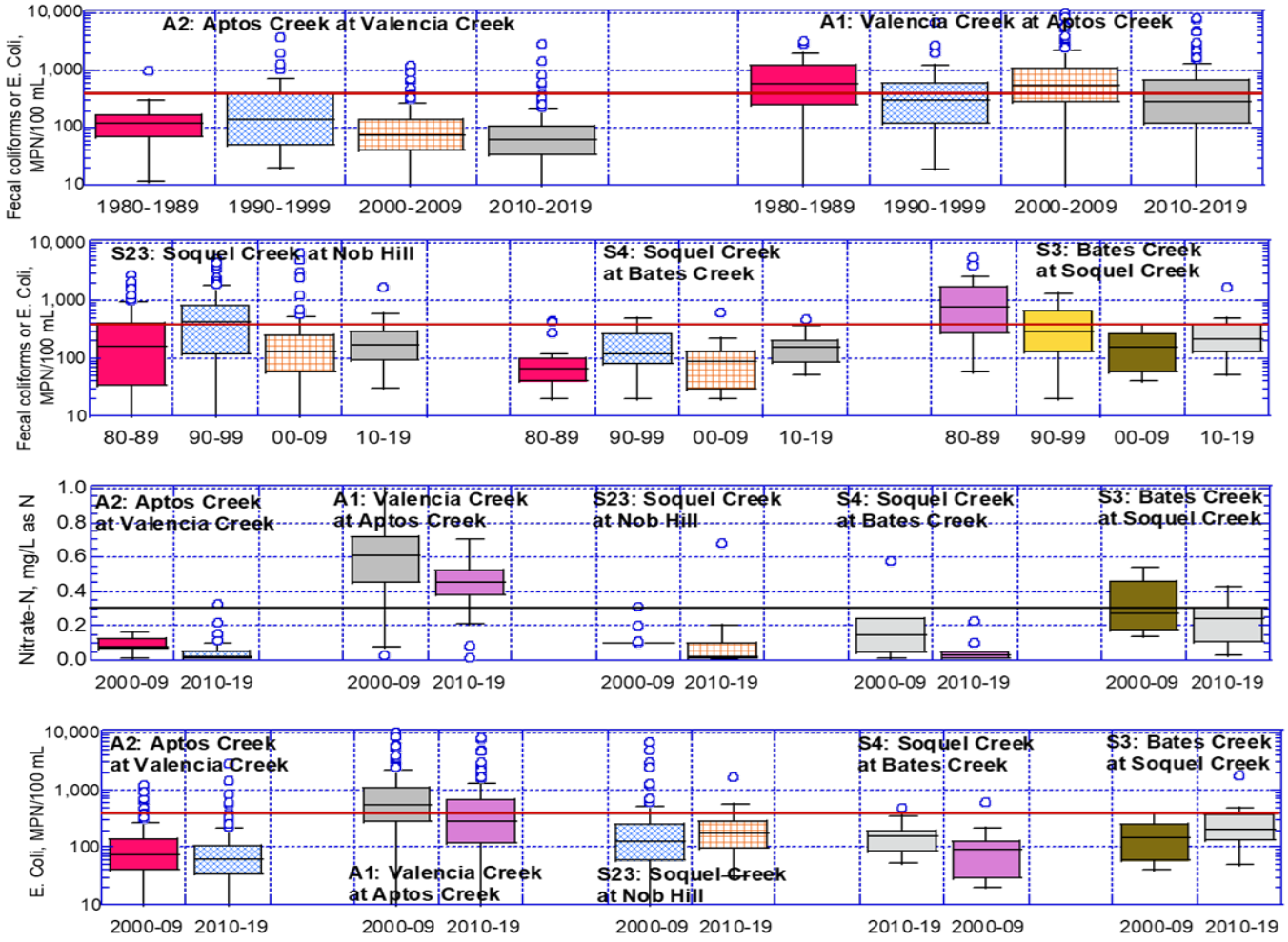
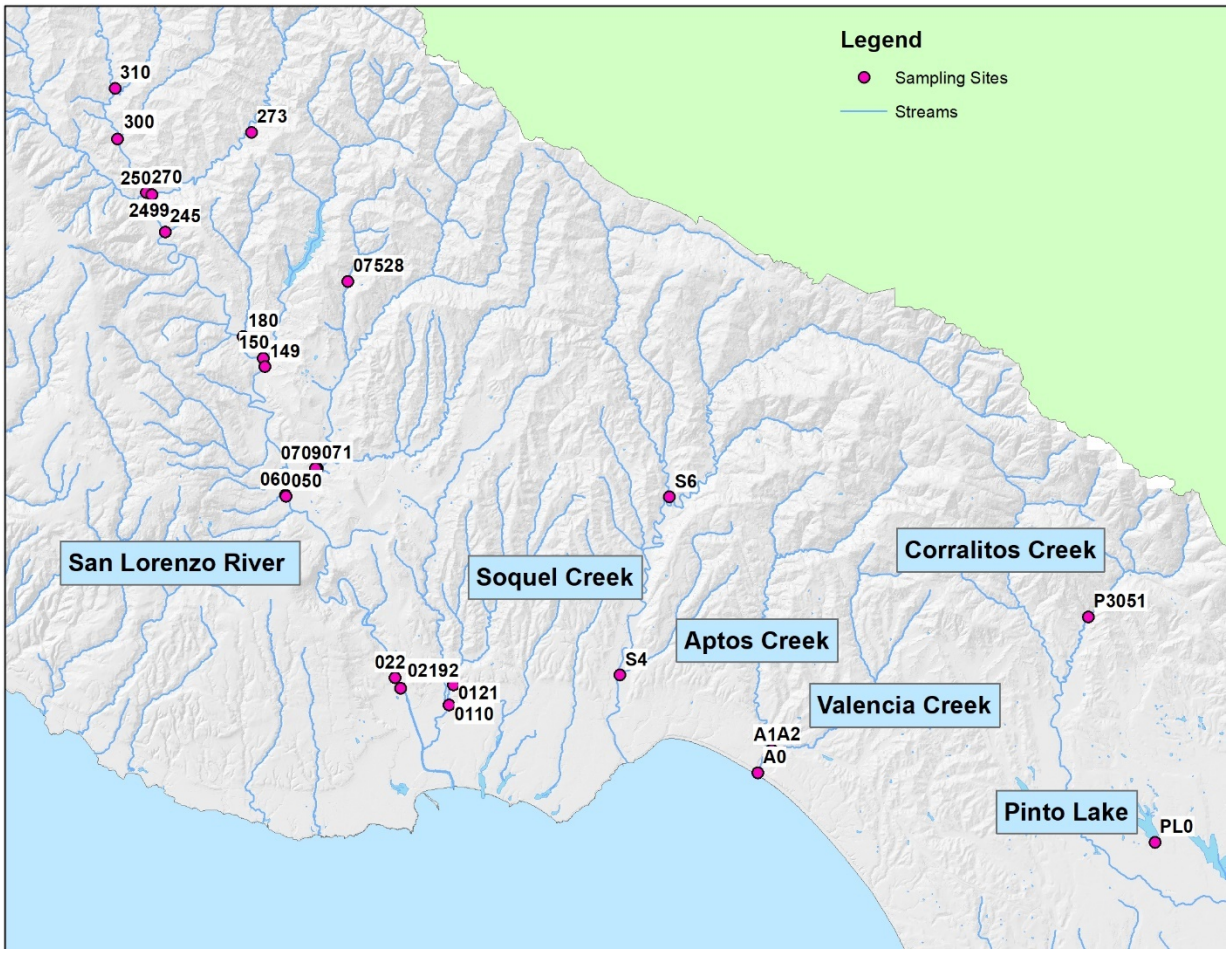


Figure 2-19: Selected Stream Water Quality Sampling Locations



2.3.3 Watershed Management

OWTS have historically been managed in Santa Cruz County in the context of larger watershed management and regional water management programs. Many of the OWTS policies in Santa Cruz County Code were originally developed as a part of the 1979 San Lorenzo River Watershed Management Plan, and then also incorporated into the County's Local Coastal Plan and 1980 General Plan, along with many other water resource protection policies and programs. More recently, onsite wastewater management is also considered as a component of the Santa Cruz Integrated Regional Water Management Plan and the Sustainable Groundwater Management Plan for the Santa Margarita Groundwater Basin, and to a lesser extent in the Mid-County Basin and the Pajaro Basin.

County EH staff have also worked closely with other agencies and community groups to promote good onsite wastewater management in conjunction with other management efforts:

- Resource Conservation District of Santa Cruz County
- Land Trust of Santa Cruz County
- Valley Women's Club (San Lorenzo Valley)
- Coastal Watershed Council
- San Lorenzo Valley Water District
- City of Santa Cruz Water Department
- Rural Bonny Doon Association
- Onsite Wastewater Technical Advisory Committee

2.3.4 San Lorenzo River Watershed

The San Lorenzo River Watershed is an area that has received a higher level of OWTS oversight as it presents many challenges for ongoing OWTS management:

- It is a water supply watershed, providing water supply for 95,000 people.
- It is designated as impaired due to OWTS, with TMDLs for nitrate and pathogens.
- Areas of the watershed have some of the highest densities of OWTS in the state, well in excess of the recommended 1-acre parcel size.
- The large majority of development in the San Lorenzo Watershed (85%) pre-dates current OWTS standards, and most parcels could not meet those standards.
- There have been numerous attempts to sewer the watershed, but all have ultimately failed due to high cost and anticipated environmental impact.
- Since 1986, the San Lorenzo Watershed has been the focus of a targeted onsite wastewater management program that has shown great success in terms of reduced failure rate and improved water quality.

The San Lorenzo River Watershed contains 15,200 of the 27,700 OWTS in Santa Cruz County. The great majority of these OWTS are over 40 years old and are located on parcels that could not fully meet today's standards for installation of a new OWTS due to small lot size, close proximity to a stream, high groundwater, steep slope, or clay soil. Many of these systems have been repaired or replaced at least once. However, many of the repairs were done prior to 1986 when there were little or no standards for OWTS repairs. There were no minimum size requirements and systems were allowed to be installed very deep, with little regard to soil conditions or winter groundwater levels.

Poor OWTS conditions in the San Lorenzo Valley during the 1970's and early 1980's led to frequent failures and elevated nitrate and bacteria levels in the watershed's major perennial stream, the San Lorenzo River, which also serves as the City of Santa Cruz's main drinking water source As a result, in 1982, the Regional Board issued Resolution 82-10, an order limiting new development and prohibiting the continued use of existing OWTS in the San Lorenzo Valley, calling for implementation of a municipal sewer system for the area. However, in 1985, the proposed sewer

project failed, due to high cost, lack of grant funds, and substantial community opposition to sewering.

In 1986, County EH proposed an alternative solution, whereby OWTS could be allowed to continue their use, provided that they were upgraded over time to meet a minimum set of standards necessary to improve the water quality in the San Lorenzo River. These standards were the precursor for many of the provisions in this LAMP for countywide operations of OWTS. In May 1995, the Regional Board lifted the septic system prohibitions for this region and adopted the San Lorenzo Wastewater Management Plan, which is essentially an APMP for the watershed. Subsequently County EH applied most of the same standards and procedures to all OWTS in the county.

The following impacts from existing disposal systems were observed prior to 1989, at the onset of the program (SCCHSA, 1989):

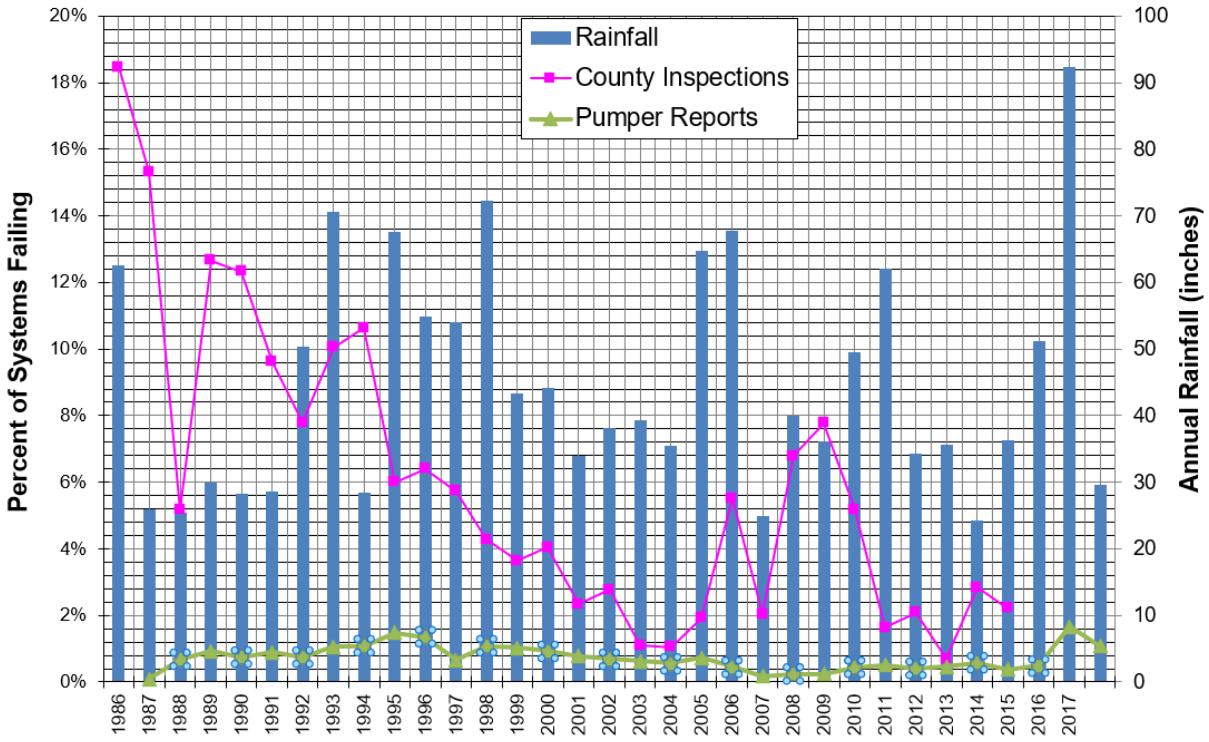
- Episodes of bacterial pollution occurred occasionally at locations throughout the Watershed, but no stations persistently exceeded standards as a result of onsite wastewater disposal.
- An estimated 6-12% of the samples collected from the River and its tributaries during 1986-1989 showed evidence of fecal coliform pollution from wastewater.
- About 25% of the violations of recreational water fecal indicator standards were estimated to have resulted from wastewater pollution. Other causes of elevated bacteria levels include waterfowl, domestic animals, and cumulative urban nonpoint pollution unrelated to wastewater disposal.
- During area surveys from 1986-89, 3-6% of the systems were found to be failing, discharging untreated wastewater to the ground surface; another 7-9% were illegally discharging graywater which also has a high bacteria and pathogen level.
- Failing systems were observed in locations throughout the San Lorenzo Watershed, discharging wastewater to roadside ditches, public right of ways, or other areas where there was significant risk of public contact.
- Onsite wastewater disposal in sandy soils led to elevated nitrate levels in Quail Hollow area groundwater (about a 4 to10 fold increase over baseline levels).
- Nitrate levels in the San Lorenzo River had potentially increased 2-3 times since the mid 1960's (although early nitrate data may be suspect). There was concern that elevated nitrate was possibly causing increased biological growth that could be adversely affecting the quality of the water supply for the City of Santa Cruz. OWTS, particularly in sandy soils are the primary source of the increased nitrate.

Since the County EH began its wastewater management program in 1986, OWTS failure rates in the San Lorenzo watershed, and countywide have dropped from 13% to 1-2% (Figure 2-20). The records sometimes show a slight uptick in failures from during wetter years, as indicated by both septic pumping records (2017) and county inspections (2006). In recent years there have not been enough county inspections performed to draw conclusions about failure rates.

Over this time, more than 5,200 systems have been repaired or upgraded and 85% of these have been able to fully meet the repair standards for a conventional system. Those systems that

couldn't fully meet standards either installed enhanced treatment systems or have used non-conforming systems that require rigorous water conservation and regular inspections to confirm satisfactory performance. Reassessment of upgraded OWTS during the wet winter of 1992-93 and potential problem systems showed very low levels of failures (less than 2%) in areas already subject to management program activities. Ongoing work continues through collaboration among County EH, contractors, and property owners, to upgrade all systems over time.

Figure 2-20: Percentage of OWTS Observed Failures in San Lorenzo Watershed
Percentage of County EH inspections/surveys observed to be failing
Percentage of total systems in watershed reported failing in pumpers reports



Water quality in the San Lorenzo River has somewhat improved since the wastewater program began implementation in 1986. As indicated in Figure 2-23, summer nitrate concentrations declined in the upper watershed (Station 245 below Boulder Creek and Station 180, at Ben Lomond) and have been stable in the lower watershed (Station 060, Felton at Big Trees). See Figure 2-19 for sample station locations.

Water quality in the San Lorenzo River is influenced by numerous factors including precipitation patterns, land-use, stormwater, and other activities within the watershed. A forty year timeseries (1980-2019) of nitrate and fecal coliform (or E.coli) levels in the lower watershed (Station 060, Felton at Big Trees and Station 02192, Santa Cruz) is shown in Figure 2-21 along with flow and rainfall data for the same timeframe. See Figure 2-19 for sample station locations. Nitrate levels tend to be slightly higher at the upstream site (Big Trees) and range from 0.05 to 0.8 mg/L as N (median 0.5 mg/L as N for 209 observations). Nitrate levels at Station 02192 (City of Santa Cruz

Water Intake) range from 0.01 to 0.7 mg/L as N (median 0.3 mg/L as N for 235 observations). This decline can likely be attributed to the denitrification that takes place in the River as it flows an undisturbed reach in Henry Cowell State Park.

Boxplot comparisons of nitrate and indicator bacteria levels are shown in Figure 2-22 in 10-year increments for five sites in the San Lorenzo watershed. The frequency of sampling has varied throughout the years from quarterly to weekly, however the trends are fairly consistent. For the two stations in the lower watershed, there is not a significant difference across the decades from 1990 to 2019 for either site, with the exception of data from 1980-1989, when reported nitrate concentrations were lower for both sites (mean value about 0.2 mg/L as N). For the upstream site (Big Trees), fecal coliform levels were slightly higher in the 1980s than subsequent decades. Bacterial levels fluctuate seasonally, and elevated levels of coliform bacteria tend to occur in the aftermath of storm events (Figure 2-27).

A summary of summer (May 1-Sept 30) nitrate levels at four stations in the San Lorenzo watershed is shown in Figure 2-23 in 10-year increments. The trends are similar to those observed for the annual data (see Figures 2-24 and 2-25). The nitrate TMDL targets summer nitrate concentration, with an objective of 0.33 mg-N/L. That target is not met at Big Trees or Boulder Creek, but it is met for the San Lorenzo River upstream of Love Creek, where the influx of nitrate from the sandy soils of the Santa Margarita Groundwater Basin begins to occur.

Another approach for evaluating year-to-year changes in nitrate loading to the San Lorenzo is estimating changes in nitrate load or flux (mass of nitrate in the river at a specific location per time). The median annual flux at the Big Trees monitoring station is shown in Figure 2-24 in comparison to annual rainfall. There is not a statistically significant trend in nitrate flux over this forty-year period, even though the population of Santa Cruz County has increased about 25% in the intervening years. Year-by-year comparisons of nitrate concentrations are shown in Figure 2-25 for the same time period. In general, nitrate concentrations tend to be lower in high rainfall years.

Figure 2-21: Nitrate, Bacteria, Flow, and Rain in the Lower San Lorenzo River Watershed, 1980-2019. Monitoring data provided by the City of Santa Cruz Water Department, flow data from USGS, and rainfall data from CIMIS. Horizontal lines represent target levels per TMDLs.

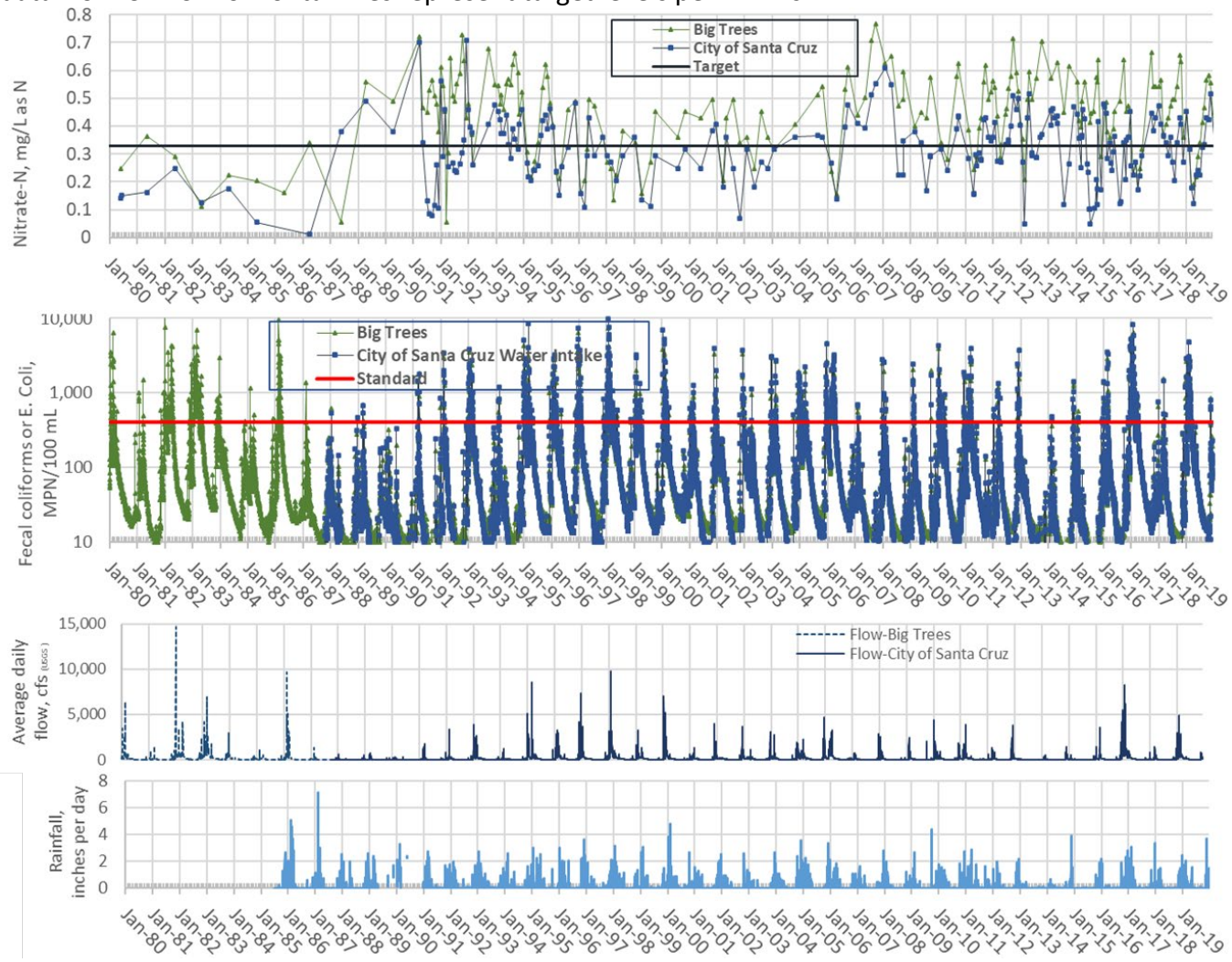


Figure 2-22. Nitrate and Fecal Coliform, San Lorenzo River, 1980-2019.

Boxplot comparisons of nitrate and fecal bacteria levels at five stations in the San Lorenzo River Watershed (Three upstream stations: 300, 250, and 180) and two stations in the lower San Lorenzo River (data for sites 060 and 02192 are from City of Santa Cruz). The red horizontal line represents the recreational water standard of 400 MPN/100 mL. The dark horizontal line in the nitrate plots represents the target nitrate concentration of 0.33 mg/L as N. The box represents 75% of the data for each time period and the 95% confidence interval is represented by the horizontal lines above and below the box. The horizontal line within the box represents the median value.

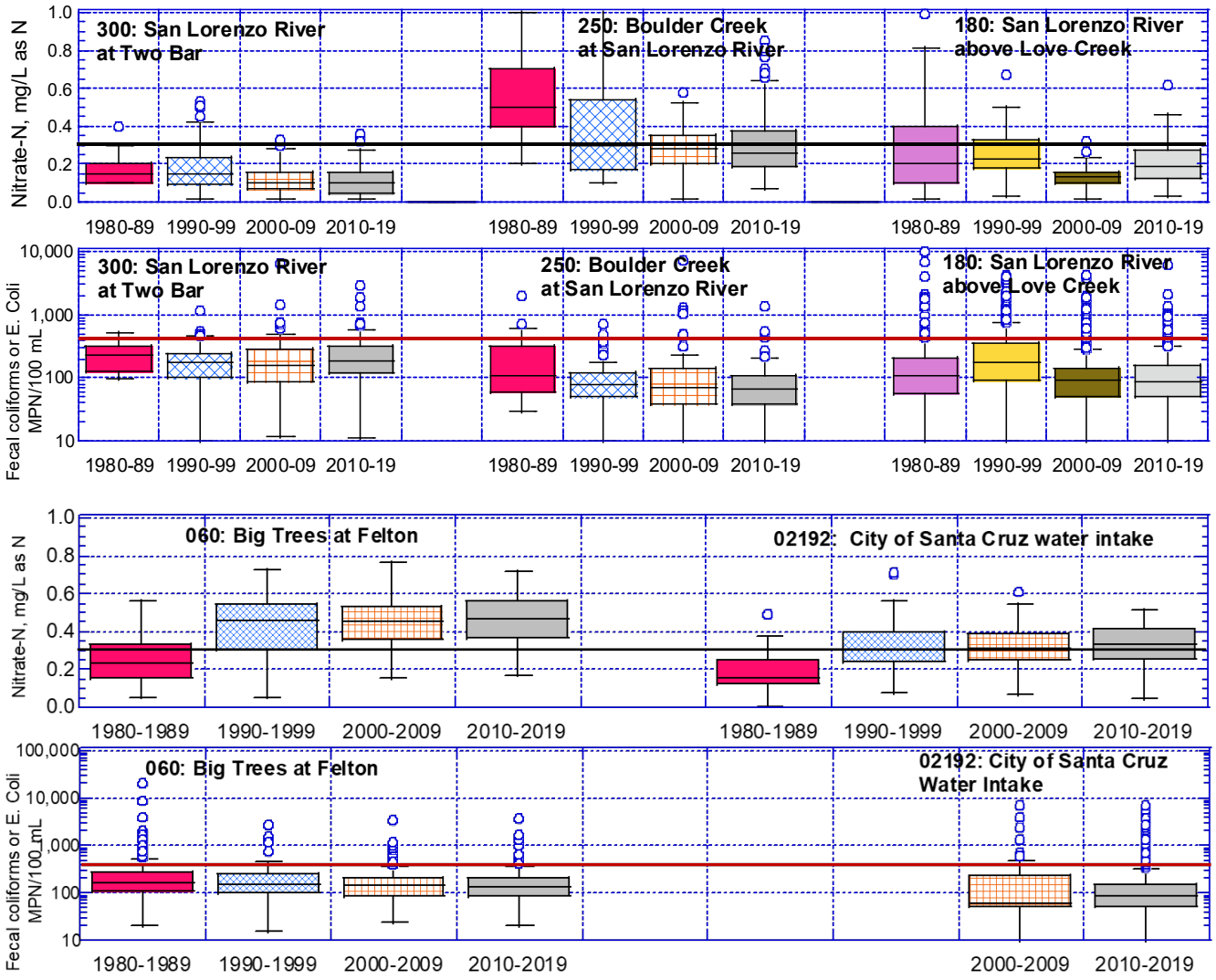


Figure 2-23: Summer Nitrate Concentrations, San Lorenzo River, 1980-2019
Boxplot comparisons of summer (May 1-Sept 30) nitrate levels at four stations in the San Lorenzo River Watershed (Three upstream stations: 300, 250, and 180) and two stations in the lower San Lorenzo River (data for sites 060 and 02192 are from City of Santa Cruz). The horizontal line represents the target nitrate concentration of 0.33 mg/L as N.

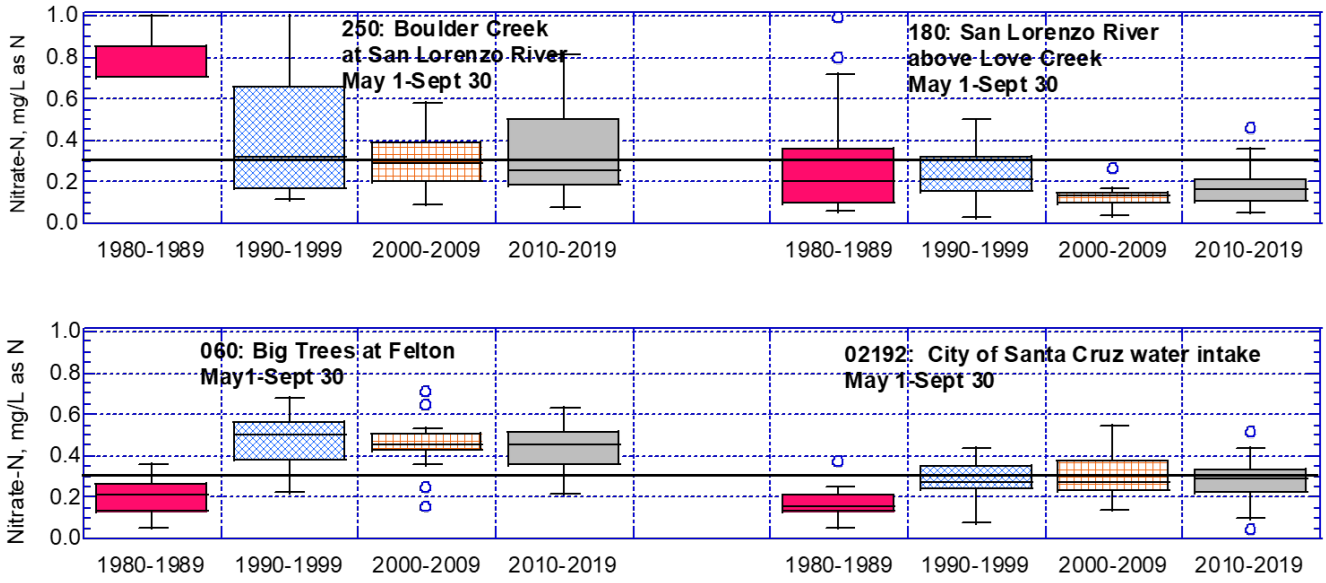


Figure 2-24: Summer Nitrate Load, San Lorenzo River at Big Trees.
Median annual nitrate flux at Big Trees monitoring station (060) between 1980 and 2019 in comparison to annual rainfall. Flow data from USGS[7] gage at Big Trees. Rainfall data are from the California Irrigation Management Information System (CIMIS), site 104 (De Laveaga).

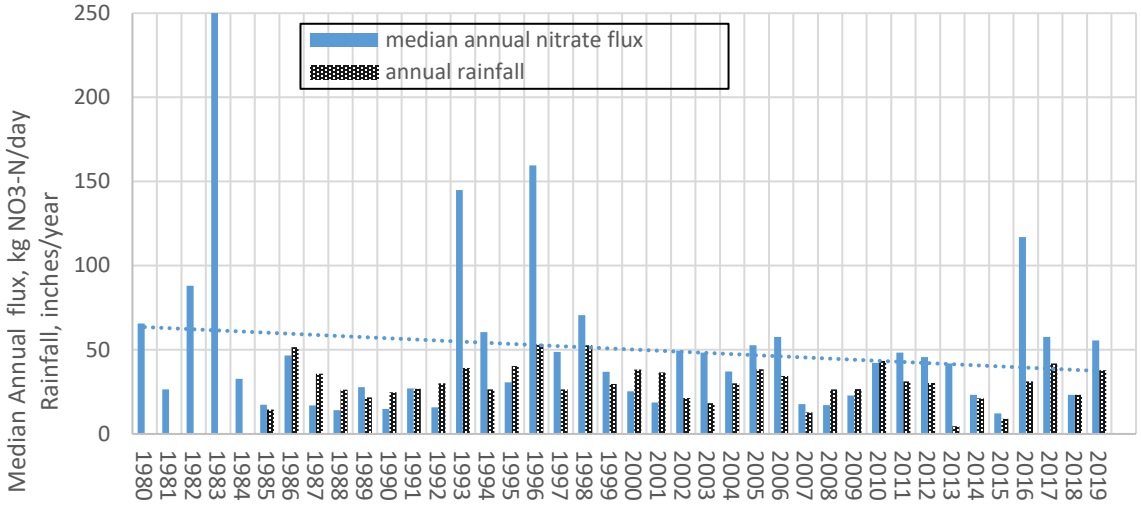
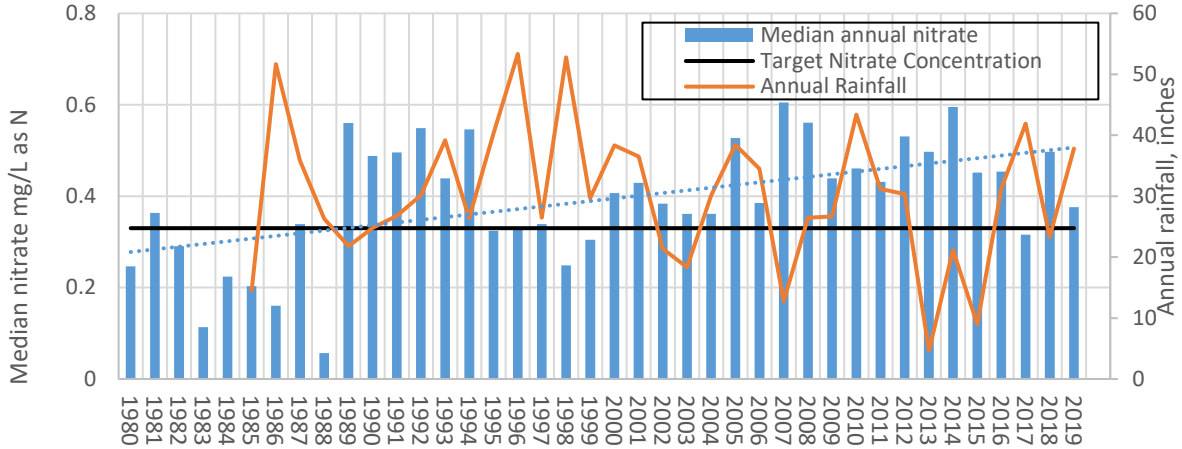
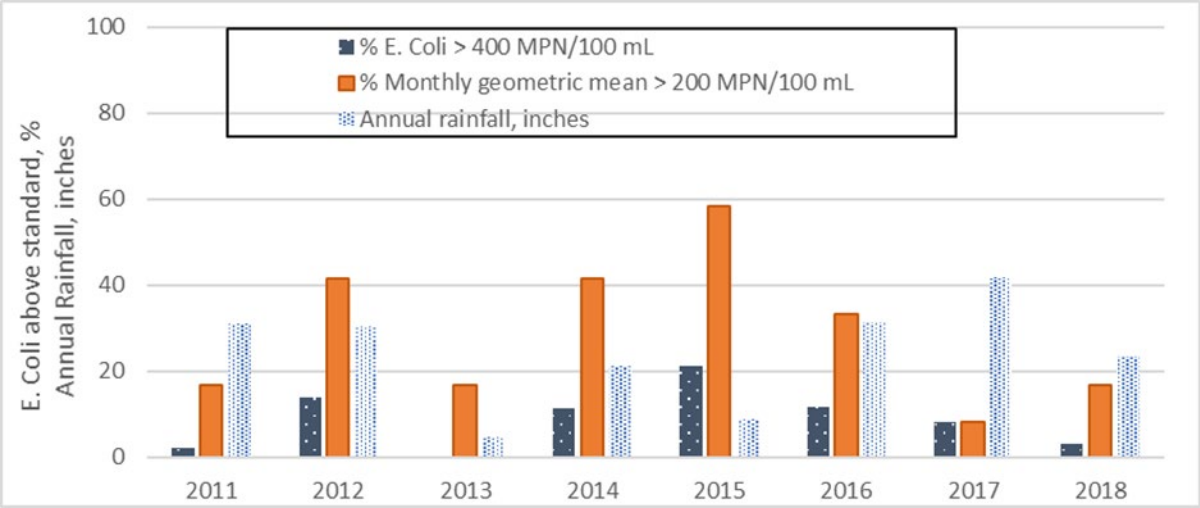


Figure 2-25: Summer Nitrate Concentration, San Lorenzo River at Big Trees
Median annual nitrate concentration at Big Trees monitoring station (060) between 1980 and 2019 in comparison to annual rainfall. Monitoring data from the City of Santa Cruz. Rainfall data are from the California Irrigation Management Information System (CIMIS), site 104 (De Laveaga). The dark horizontal line represents the target nitrate concentration (mg/L as N)

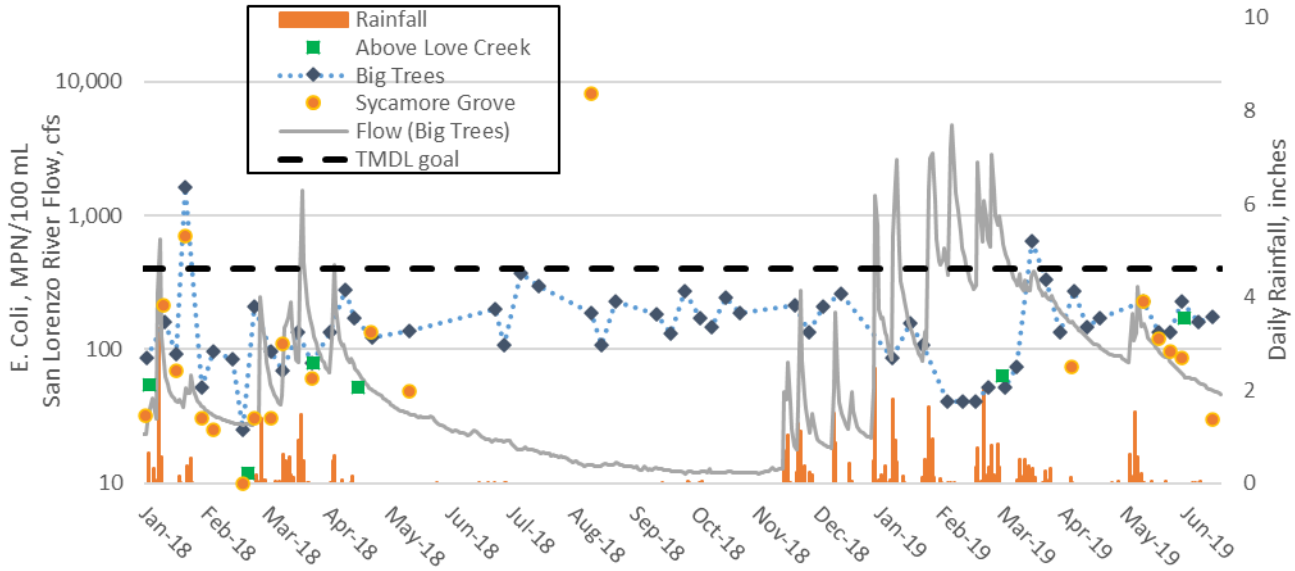


[7] https://waterdata.usgs.gov/nwis/rt

Figure 2-26: Exceedance of E. coli Objective for San Lorenzo River at Big Trees, 2011-18
Summary of annual exceedances of E. Coli goal for single sample (400 MPN/100 mL) and geometric mean (200 MPN/100 mL) at the Big Trees monitoring site (060) between 2011 and 2018. Annual rainfall amounts are also shown. E. Coli data are from weekly grab samples taken by the County of Santa Cruz Environmental Health Program. Rainfall data are from the California Irrigation Management Information System (CIMIS), site 104 (De Laveaga).



Summary of E. Coli monitoring data for upstream sites (Love Creek [180], Big Trees [060], and Sycamore Grove [022]) from January 2018 through June 2019. Monthly rainfall amounts are also shown. E. Coli data are from weekly grab samples taken by the County of Santa Cruz Environmental Health Program. Rainfall data are from the California Irrigation Management Information System (CIMIS), site 104 (De Laveaga).



Most of the San Lorenzo River Watershed and the North Coast Streams serve as municipal water supply sources (Figure 2-17). State drinking water regulations require that sanitary surveys be conducted every five years to evaluate potential sources of pollution that might threaten the water source or require a higher level of treatment. The first survey was conducted in 1996 and has been updated approximately every 5 years since then. These surveys have identified discharge of nitrate and pathogens from OWTS as potentially significant sources of pollution to the municipal water supply. The 2013 Sanitary Survey (City of Santa Cruz Water Department, 2013) concurred with previous County findings that birds are the major source of fecal coliform pollution and that fecal coliform from OWTS results from surface failures rather than any cumulative pollution of groundwater. OWTS in sandy soils are a significant source of nitrate in the River and since San Lorenzo River water is pumped to Loch Lomond reservoir, the linkage between nitrate, algae production and the resulting odors and disinfection-by-product precursors will continue to be a challenge, especially for the Santa Cruz Water Department as well as for the San Lorenzo Valley Water District.

The 2018 Sanitary Survey (Kennedy/Jenks, 2018) also concluded that the large majority of existing OWTS are not a major source of dry-season microbial concentrations measured in surface waters, except for localized impacts from OWTS failures. However, bacterial contributions from OWTS are probably greater during or following wet periods when runoff can convey surfacing wastewater from failing systems to the San Lorenzo River. Efforts made since 1995 to improve OWTS performance have reduced the septic failure rate and therefore the water quality degradation related to OWTS.

The San Lorenzo River and many of its tributaries continue to experience elevated levels of fecal indicator bacteria, but these levels come from many sources besides onsite wastewater disposal. Levels continue to be periodically above the threshold considered impaired (10% of samples exceeding standards). Analyses using ribotyping for microbial source tracking done in 2002-04 indicated no human pollution present in the San Lorenzo River during the summer months, but 25% of the samples showed presence of human pollution during the wet winter months (SCCHSA, 2006). Recent testing by the City of Santa Cruz also showed presence of some “contaminants of emerging concern” pharmaceuticals and other compounds originating from humans in the San Lorenzo River (City of Santa Cruz, 2016). Of the 96 constituents tested only 20 were detected, predominantly in the wet periods. The types of CEC’s present in the San Lorenzo surface water were also very different from the types found in groundwater in the La Selva Beach area (Carollo, 2017). These results indicate the ongoing need to prevent surface failures by oversight of OWTS, water quality testing, follow-up investigations to identify and correct failing systems, and encouragement of property owners to continue to voluntarily upgrade their failing systems to meet basic requirements.

2.4 Existing Development Conditions

Santa Cruz County Assessor records show that 78% of the developed properties with OWTS were developed before 1983, when many of the current OWTS standards went into effect (Figure 1-2). In the early half of the 20th century, much of the development occurred along valley bottoms and along stream corridors. Much of the development at the time was

originally for summer vacation homes. By the 1970s, most of the vacation homes were converted to year-round use and a number of small lot rural subdivisions were created. Rapid rural development peaked in 1979, with over 700 homes built that year on OWTS. During the last decade, the average rate of new rural development served by OWTS has been 50 homes/year.

There are several areas in the county with high density of OWTS on small lots (less than 15,000 sf). These are listed in section 2.6. In the last thirty-five years, County EH has conducted parcel by parcel investigations in four of these areas, San Lorenzo Valley, Pasatiempo, Amesti Road, and the Delaney/Salsipuedes subdivisions, in an effort to identify failing OWTS and require them to be brought up to the repair standards that were adopted in 1986. Feasibility studies have been conducted for sewering those four areas but have not proceeded due to high cost and in some cases environmental concerns. There are a number of areas of high density OWTS in the Aptos area that are within the urban services line and the Sanitation District Sphere of Influence, but presently outside the sanitation district. Several other areas of high density OWTS are well outside the urban services area and at some distance from any sewer lines: Monte Toyon and La Selva Beach. There are also two pockets of high density OWTS to the west of Watsonville in the Buena Vista and Manfre Road area, that are within the sanitation district sphere of influence. There are presently no active efforts to extend sewer service to those areas, but County EH will look for potential opportunities for funding assistance or other incentives for sewering (see Section 4.6).

Because 78% of the parcels were developed before 1983, and predate current standards, a large number of the OWTS do not meet current standards and many parcels cannot meet current standards. Seepage pits were installed extensively in Pasatiempo, Aptos, La Selva Beach and the Amesti Road area. Cesspools were never permitted and there are no known areas where cesspools occur. If a cesspool is found, it will be required to be abandoned and replaced with an OWTS that meets current requirements.

Most older development originally occurred along stream corridors. A review of County GIS information and the OWTS database indicates that about 15-25% of the parcels with OWTS also have streams or drainageways on them. On the older, smaller lots it was often not possible to achieve a 100-foot setback between the OWTS and a stream. Approximately 6%, or 560 of the OWTS with site information in the database are located between 50 and 100 feet from a stream, and 80 (less than 1%) have a stream setback between 25 and 50 feet.

Approximately 60 existing OWTS are located within the 400-foot setback buffer 1200 feet upstream from a public water system surface water intake and an additional 24 OWTS are within the 200-foot buffer between 1200 and 2500 feet upstream of an intake. Some 50 OWTS may be located within 150 feet of a public water supply well, 40 are located between 150 and 200 ft, and 700 are between 200 and 600 feet from a public well, although it cannot be determined if these are in violation of the setback requirements without further analysis and a determination of the existing dispersal depth. A number of these wells and surface diversions wells are currently in an inactive status. OWTS that are located within protective setbacks will be evaluated at the time that a system failure occurs or there is otherwise a

need for system replacement. Systems located near surface water intakes will be investigated for any sign of current system failure.

2.5 Policies for New Rural Development

New rural development in Santa Cruz County is limited by a number of policies, including restrictions on both existing lots of record and the creation of new lots. Since 1978, all new rural lots served by OWTS had to be at least one acre in size. Between 1970 and 1978, the minimum parcel size was 15,000 sf if public water was available, but one acre if a well was to be used. After 1978, following passage of Measure J, the Growth Management measure, a number of policies were enacted to focus growth in urban areas and limit the impacts of growth in rural areas. Minimum parcel sizes for new parcels were enacted for Water Supply Watersheds (10 acres) (Figure 2-17) , Groundwater Recharge Areas (10 acres) (Figure 2-10) and Least Disturbed Watersheds (40 acres) (Figure 2-17). The rural development matrix was established, which determined the minimum parcel size based on the extent of constraints and critical resources that occurred on a parcel. Since 1998, there have been no rural subdivisions served by OWTS, other than the occasional minor land division of four lots or less.

The allowable average densities under the State OWTS Policy for new lots is related to average annual rainfall and is one acre for 25-35 inch per year (in/yr) and one-half acre for average rainfall over 40 in/yr. With average annual rainfall in Santa Cruz County ranging from 25-60 inches, County policies for new parcels easily meet the State OWTS Policy.

Santa Cruz County also limits new development on existing parcels of record under several circumstances, with no exception available even when utilizing enhanced treatment systems:

- Within a water supply watershed, the minimum parcel size is one acre and 2.5 acres when within one mile of the intake for the north coast watersheds.
- For parcels without public water supply, the minimum parcel size is 15,000 sq. ft.
- For parcels on some older subdivisions in the Aptos area, the minimum parcel size is 15,000 sf ft.
- Parcels must also meet the technical standards of stream setback (100 ft), slope (less than 30%), and outside the flood plain. If any of those three standards cannot be met, the parcel is deemed unbuildable.

2.6 Summary of OWTS Conditions and Limitations by Area

Following is a brief description of conditions relative to onsite wastewater disposal in various areas of Santa Cruz County, from North to South. The descriptions represent noteworthy conditions, but many of these areas have a mix of opposite conditions in different parts of the areas. (The number of OWTS refers to the approximate number of parcels with OWTS.)

North Coast-Bonny Doon: 1,450 OWTS; Water Supply Watersheds, Least Disturbed Watersheds, individual wells, large parcels, localized areas of high groundwater, karst, sandy soils, and clay terrace soils

San Lorenzo Valley: 12,000 OWTS; Water Supply watershed, pathogen and nitrate TMDL, older dense communities with public water supply, some shallow groundwater, streams, and areas of sandy soils

Pasatiempo: 800 OWTS; small lots, public water, inside urban services area with nearby sewer line, mix of sandy soils, clay soils, perched groundwater, shallow bedrock, and seepage pits.

Carbonera/Branciforte: 2,100 OWTS; pathogen and nitrate TMDL, older homes, larger lots, some sandy soils, and some shallow groundwater.

Soquel Watershed: 2,620 OWTS; older homes, larger lots, wells, some shallow groundwater, and some clay soils

Aptos/Valencia Watershed: 3,360 OWTS; older homes, larger lots, sandy soils, and some small lot (7,000-15,000 sf) subdivisions (Bonita, Huntington, Monte Toyon, Rio del Mar Lodge) on public water with seepage pits, somewhat near sewer lines.

Corralitos Watershed: 1,560 OWTS; water supply watershed, narrow canyons, larger lots, some older small lots, some public water, and agriculture.

Pinto Lake/Amesti Road: 500 OWTS; small lots, public water, clay soils perched groundwater, seepage pits, and generally long travel distance to lake.

Salsipuedes/Delaney: 75 OWTS: small lots (15,000 sf), small lots, small public water system, clay soils, perched groundwater, and low-income community near sewer.

Manfre/Buena Vista Road: 240 OWTS; small lots, public water, clay soils, designated disadvantaged community.

La Selva Beach: 850 OWTS; very small lots (5,000-12,000 sf), seepage pits, sandy soils, public water, high nitrate in groundwater, one mile from sewer, and outside urban services area.

2.7 GIS Mapping of Septic Constraints

The County's GIS provides a useful tool for OWTS management. All parcels with records of permits, septic tank pumping, or investigations are identified with the associated information available by selecting a parcel's polygon and viewing the information digitally. This information can be viewed in relation to OWTS density, relationship to well density, streams, soils, and other attributes. Most of the OWTS constraints and other information described in this LAMP are also mapped:

- Steep slopes
- Suspected landslide areas
- Streams
- Public water sources and setback zones
- Karst Areas
- Sandy Soils
- Clay soils
- Floodplains

- Sanitary sewer lines
- Stormdrains and ditches
- Nitrate Concern Areas

3 New and Replacement OWTS

This LAMP is intended to provide an explanation and summary of the requirements for system design, installation, and maintenance. However, for details and legal specifics, the County code and adopted regulations should be consulted. Santa Cruz County Code Chapter 7.38, Sewage Disposal, provides the basic requirements for OWTS design, installation and use in the county. It also provides the authority for specific variances from the new system standards for the repair or replacement of existing systems, including minimum thresholds and prohibitions. The basic standards and allowable variances are described in the county's Appendix A Chapter 7.38 Sewage Disposal (takes precedence), Appendix C Summary of Onsite Wastewater Treatment System Requirements, and Appendix D Enhanced Treatment System Regulations. The upgrade and repair standards and allowable variances in these documents apply to all OWYS in Santa Cruz County's area of jurisdiction including the 78% of the properties in the county that were developed prior to September 16, 1983, which is the date that stricter standards for onsite wastewater disposal were adopted into the Basin Plan. They are designed to guide the trade-offs between continued use of existing systems, improvements needed for water quality and public health protection, addressing housing needs, and manageable costs for property owners to continue to encourage them to properly repair and upgrade their systems at the first indications of failure.

Where requirements for a standard system cannot be met, in many cases the deficiency can be mitigated by use of an enhanced treatment system and/or alternative method of dispersal. The specific requirements for enhanced treatment systems are described in a separate set of regulations. Since enhanced treatment systems began to be allowed in 1989, a total of 775 systems have been installed, with 25% serving new development, 25% for system upgrades to support remodels, and 50% for repair of failing systems.

3.1 System Categories

A permit is required for new OWTS installation or upgrade, relocation, and repair including tank replacement, subject to approval by County EH, under authority delegated by the County Health Officer. Santa Cruz County has established requirements for different categories of OWTS. These requirements recognize that there are many developed parcels in the County that cannot fully meet the current standards for new development. Although OWTS installations will meet all the requirements as specified in County Code Sections 7.38.042-7.38.186 to the greatest extent possible, minimum requirements are established for different categories of OWTS, as defined for Santa Cruz County:

- New OWTS is an onsite wastewater treatment and dispersal system that is installed to serve a new structure or new use on a parcel where there are no pre-existing legal structures or legal OWTSs.
- Replacement system is an onsite wastewater treatment and/or dispersal system that is installed to serve an existing legal use or development. Replacement systems include both repairs and upgrades.
- Upgrade System is a replacement system or addition to an existing system that is needed to serve an expansion of an existing legal use, including a bedroom addition, accessory dwelling unit, or residential remodel greater than 500 sq. ft. System upgrades to current standards are required in order do a major remodel.
- System Repair (or Major Repair) is a replacement of the treatment and/or dispersal system in order to correct a failure of an existing dispersal system. It may also include a replacement of the septic tank, if the tank requires replacement.
- Minor Repair includes the installation or replacement of a distribution device, diversion valve, damaged or clogged dispersal pipe resulting in a re-pipe but not replacement of a trench within the existing trench, greywater disposal system, or other repair work requiring a minor repair permit. Minor maintenance activities such as replacement of sanitary tees, effluent filters, lids, etc. do not require a permit.
- Tank Replacement is a replacement of septic tank, grease trap, or other treatment unit that is required due to failure, old age, and/or inadequate size.

Systems are also classified depending on the history of the system, the characteristics of the property, and the potential to upgrade the structure served (Table 3-1):

1. A Standard System meets all of the standard requirements for a conventional system of septic tank and dispersal device as specified in County Code Sections 7.38.095-7.38.180 and enables building additions consistent with the number of bedrooms for which the OWTS is sized, and consistent with building and zoning department regulations. No construction may occur over the OWTS and/or expansion area.
2. Nonstandard System (formally designated as “System with Special Operating Characteristics”) does not meet all the requirements for a conventional standard system, but it does meet the more specialized requirements for the different types of nonstandard systems. Approval of a nonstandard system requires recordation of a “Notice of Onsite Sewage Disposal System with Special Operating Characteristics” on the deed and payment of an annual inspection fee to fund ongoing oversight of the system (the fee is waived for Limited Expansion Systems). Four types of nonstandard systems are recognized:
    a. An Enhanced Treatment System is a wastewater treatment system that utilizes special designs and/or additional technology to provide effluent treatment or dispersal to a much better level than a conventional system. This can allow reduced dispersal area, dispersal to otherwise unsuitable soils, reduced groundwater separation, specialized shallow dispersal in high groundwater areas, OWTS installation within public water source set-back buffers, or compliance with TMDLs and Advanced Management Programs. Enhanced treatment systems are specifically required in the following circumstances:

(1) For new and replacement OWTS in sandy soils in the San Lorenzo Watershed, and any other areas of sandy soils with current or anticipated elevated nitrogen levels in surface or groundwater, including Valencia Creek Watershed, Mill Creek Watershed (Bonny Doon), and La Selva Beach.
(2) For Large OWTS that serve more than 5 residential units, or which have peak daily flows greater than 2500 gpd but less than 10,000 gpd, and are located in the areas described above.

b. A Limited Expansion System is a permitted system repair that meets all the requirements for a standard conventional system except for availability of adequate system replacement area. Use of a Limited Expansion system requires water conservation measures and enables only a one-time addition of up to 500 sq. ft. of habitable space with no bedroom additions, and no increase in the volume of wastewater discharge. If the system performs well, no annual inspection fee is charged.
c. A Low-Flow System is a permitted system repair that meets the requirements for a standard conventional system except for the required amount of dispersal area. A Low-Flow system requires water conservation measures and enables only a one-time addition of up to 500 sq. ft. of habitable space with no bedroom additions, and no increase in volume of wastewater discharge. An annual fee is charged on the tax bill and the property will be periodically checked for signs of failure.
d. A Non-Conforming Interim System is a repair to a failing system that does not fully meet standards due to dispersal size or deferred installation of enhanced treatment. No building additions will be allowed and the system will need to be brought up to standards at the time of property transfer. An annual fee is charged on the tax bill and the property will be periodically checked for signs of failure.
e. A Haulaway System is a system that requires that effluent be pumped out on a seasonal or basis to prevent failure, and/or ensure that requirements for groundwater separation are met. Use of a haulaway system enables only a one-time addition of up to 500 sq. ft. of habitable space with no bedroom additions or increase in wastewater discharge. An annual fee is charged on the tax bill, pumping reports are monitored by County EH, and the property will be periodically checked by County EH for signs of failure or wastewater discharge to an unapproved dispersal device.

3. A Prestandard System is an existing OWTS installed prior to 1983 which shows no indication of failure, but which does not meet all requirements for a standard system. Without any further upgrade (but with a satisfactory septic pumpers inspection report), such a system enables a one-time addition of up to 500 sq. ft. of habitable space with no bedroom additions or no increase in volume of wastewater discharge, unless the system is upgraded to meet conventional or enhanced treatment standards as defined in Section 3-2 and County Code Sections 7.38.095-7.38.186.

Table 3-1: Types of Systems, Requirements, and Building Allowances

System Type	Conditions	Requirements	Building Allowed
New	Conventional: meets standards	Minimum Parcel size (7.38.045)	New residence; Possible ADU
	Enhanced Treatment for: reduced groundwater separation, fast or slow soil percolation	Minimum Parcel size Maintenance Contract Deed recordation	
Upgrade	Conventional, meets standards		ADU; Bedroom Addition; and/or >500 sf addition
	Enhanced Treatment for: • reduced groundwater or surface water separation, • fast or slow soil percolation • under pavement with traffic rated cover • reduced dispersal area • existing seepage pits	• Maintenance Contract • Deed recordation	
Repair: Replaces old or failing system	Conventional, meets standards as much as possible, improvement over old system and old system not causing impairment ; Low flow system may be approved.	• Meets conventional standards as much as possible • Must comply with Prohibitions (7.38.042)	One-time addition less than 500 sf
	Enhanced Treatment for: • reduced groundwater or surface water separation, • fast or slow soil percolation • under pavement with traffic rated cover • reduced dispersal area up to 50% • existing seepage pits	• Maintenance Contract • Deed recordation	
	• Low Flow System • Nonconforming Interim (deferred enhanced treatment)	• Water efficiency measures installed • Must comply with Prohibitions (7.38.042) • Must install enhanced treatment at time of property transfer • Deed Recordation • Annual Inspection	No Addition
Existing System	• Meets standards for water separation • Not failing, good pumper report • Not seepage pit	• Ongoing maintenance	If dispersal size adequate under new standards: • Bedroom Addition, ADU • >500 sf addition
	• Does not fully meet standards • Not failing, good pumper report	• Prestandard, before 1983 • Ongoing maintenance	One-time addition less than 500 sf
	Failing: surfacing effluent	Repair required	Depends on Repair

Note: Standards for conventional systems are specified in County Code Section 7.38.095-180; Additional requirements for enhanced treatment systems and conventional non-standard systems are specified in Sections 7.38.182-186.

3.2 Summary of Design Requirements

Following is a summary of the key requirements for new and replacement systems. Detailed requirements are contained in Santa Cruz County Code Chapter 7.38 (Appendix A) and key elements are summarized in Appendix C.

3.2.1 Dispersal Area Requirements

The amount of required infiltration area for conventional dispersal systems is a function of the infiltration capacity of the soils, wastewater BOD concentration, and the expected wastewater flow based on the number of bedrooms per residential unit or projected design flow for commercial uses. Infiltration capacity is a function of the soil texture and structure. Acceptable wastewater application rates are typically assigned based on soil texture and/or percolation test results. A considerable margin of safety is usually built into conventional OWTS design standards and takes into account that the infiltration rate will be reduced considerably by formation of biological mat at the infiltrative surface as a result of wastewater organic loading, and potentially anaerobic saturated conditions. For example, a percolation test result of 5 minutes per inch (MPI) would be equivalent to 41.3 gallons per square foot per day. (This assumes you take into account the sidewall area during the perc test.) However, for dispersal system design purposes, a soil with a percolation rate of 5 MPI is typically assigned a conventional dispersal system wastewater application rate of 0.43-1.2 gal/sf/day, depending on the jurisdiction.

5 minutes for a 1 inch drop in a 6 inch diameter 6 inch deep perc hole
= 2.8 inches per square inch per hour
x 144 square inches per square foot = 403 cubic inches per square foot per hour
x 1/1728 cubic foot per cubic inches = 0.23 cubic foot per square foot per hour
x 24 hours per day = 5.6 cubic feet per square foot per day
x 7.48 gallons per cubic foot = 41.3 gallons per square foot per day

The State OWTS Policy and EPA OWTS Manual specifies the relationship between percolation rate and/or soil texture and wastewater application rate. The EPA Manual also provides for an increased application rate with the use of treated effluent, which is approximately double the application rate for untreated effluent. Santa Cruz County has consistently allowed a doubling of the application rate for treated effluent (BOD less and 30 mg/L), and it is proposed that this continues.

Table 3-2 presents a summary of the application effluent rates from Table 3 of State OWTS policy and also shows the allowed increase for treated effluent in a simplified table that can be used for sizing new and replacement OWTS in Santa Cruz County. However, the detailed application rates specified in Tables 3 and 4 of the State OWTS policy may also be used. Soil texture and structure is not proposed to be used to determine effluent application rates, except in the case of replacement systems, where there is available site information.

Alternative dispersal systems (drip, chambers, mounds, etc.) will typically require the same square footage of dispersal area, but some may have a different minimum infiltration area requirement than presented below in.

Table 3-2, depending on manufacturer's guidelines. The OWTS designer must ensure appropriate infiltration areas are calculated based on the proposed disposal system and level of effluent treatment.

If there is inadequate room on a developed parcel to accommodate a conventional dispersal system for repair, OWTS, installation of 60 – 99% of the standard dispersal area may be allowed as a nonstandard low-flow system, provided, water conservation measures are installed, water use is monitored to ensure that flows are kept within the reduced design flows, and a notice is recorded on the deed regarding the limitations on remodels and use of the system.

Soils percolating faster than 5 MPI must use an enhanced treatment system that provides for nitrogen reduction; disinfection may be required based on vertical separation to groundwater. See Table 3-4 for conditions requiring nitrogen and pathogen reduction. Nitrogen reduction may be waived for soils percolating 1-5 MPI in specific areas where nitrogen is not a concern as long as all other setbacks and separation to groundwater are met. Soils with a percolation rate slower than 60 MPI are non-standard and not in compliance with SCCC 7.38.095 through 7.38.180, therefore are not suitable for a new standard OWTS. System replacements on existing parcels may occur in soils percolating 60-120 MPI. Enhanced treatment may also be recommended for soils percolating slower than 60 MPI.

Table 3-2: Dispersal System Application Rates
From State OWTS Policy Table 3. Some application rates may be doubled for enhanced treatment with effluent less than 30 mg/L BOD as noted in the following table. Application rates may be interpolated if the percolation rate falls between the indicated values. Application rates from Table 3 and 4 of the State OWTS Policy may be utilized for conventional systems. Those application rates may be doubled with enhanced treatment that reduces Biological Oxygen Demand (BOD) and Total suspended solids (TSS) to less than 30mg/L.

Percolation Rate MPI	Application gal/sf/day	
	BOD=150 mg/L Conventional	BOD<=30 mg/L
<1	--	1.60
1	1.20	1.60
5	1.20	1.60
10	0.80	1.60
15	0.73	1.46
20	0.66	1.32
25	0.59	1.18
30	0.53	1.06
35	0.48	0.96
40	0.42	0.84
45	0.37	0.74
50	0.31	0.62
55	0.26	0.52
60	0.20	0.40

90-120	--	0.20

Table 3-3: Design Flow per Bedroom

Number of Bedrooms	1	2	3	4	5	6	Per Additional Bedroom
Standard Design Flow (gpd)	250	300	375	450	525	600	75
Low Flow System (gpd) Repair Only, with Limitations*	150	200	250	300	350	400	50

*Low Flow Systems require water conservation devices, flow monitoring, deed recordation, annual fee, periodic inspection, and limits on remodels. Low flow systems with enhanced treatment would not be eligible to also double the application rate, and further reduce the size of the dispersal area. Alternative design flows for enhanced treatment systems may be proposed by the designer in order to ensure proper operation of the treatment components, provided the hydraulic capacity for soil absorption of peak design flows is maintained.

3.2.2 Dispersal Depth and Expansion Area

Effluent treatment takes place in the soil and is aided by the presence of oxygen. Treatment is optimized by shallow and dispersed effluent disposal. With minor exceptions allowed for repaired dispersal systems, standard dispersal trenches will have a maximum depth of 4 feet and a maximum infiltration area of 4 square feet per linear foot (sf/lf). In situations where slopes are steeper or surface soils are dense clay, the trenches may be set a maximum of ten feet below the surface but will maintain the dispersal area of 4 sf/lf. Deeper trenches with enhanced treatment may be used for new development and system upgrades for bedroom additions that have adequate separation to surface waters and groundwater as defined in Table 3.4, and adequate separation from public water sources as provided in Sections 9.4.10, 94.11 and 9.4.12 of the State OWTS Policy.

For repaired dispersal systems on parcels with limited suitable disposal area, deeper trenches up to a depth of 10 feet below the ground surface with up to 10 sf/lf of infiltrative surface will be considered on a case-by-case basis, with adequate justification provided by a qualified professional. See Table 3-4 for conditions requiring nitrogen and pathogen reduction.

Conventional dispersal systems are expected to have a limited lifetime of 20-40 years, as infiltrative surfaces become clogged with biomat and roots. Because of that, approval of new and replacement OWTS requires designation and protection of expansion area on the parcel to accommodate a replacement dispersal system that meets current requirements. Due to the many constraints on small lots in the county, preserving expansion area may require use of deeper dispersal systems with protective separations to groundwater or with enhanced treatment systems. A property that cannot demonstrate 100% expansion area is not eligible for a major remodel or bedroom addition.

Chamber leaching devices approved by County EH may be utilized in lieu of gravel trenches. Use of such devices will allow the required dispersal area to be reduced by no more than 30% if the chamber leaching device is IAPMO certified. This is consistent with the State OWTS Policy, Uniform Plumbing Code and practice in other jurisdictions. (See Appendix E)

3.2.3 Seepage Pits:

Seepage pits shall not be permitted for new installations. Seepage pits may be used to repair an existing individual OWTS, or to expand an existing system in conjunction with a building addition, alteration, expansion or reconstruction, if the existing system utilized seepage pits and when leaching trenches cannot be installed due to unsatisfactory soil conditions or lack of sufficient space. Enhanced treatment with nitrogen reduction is required for all replacement seepage pits or where existing seepage pits are used to support a bedroom addition, major remodel or other increase in wastewater flow. The separation to groundwater may not be less than 10 feet.

3.2.4 Minimum Setbacks to Dispersal System and Separation from Groundwater

Treatment of effluent for removal of pathogens, nutrients and other contaminants requires adequate time in the soil for treatment. To that end, dispersal systems need to be located at sufficient distances from embankments or steep slopes to prevent surface discharge of inadequately treated effluent and to prevent discharge of pathogens or nitrate to wells or waterways. Adequate separation from groundwater is also important because wastewater is more rapidly treated in unsaturated soil and the presence of shallow groundwater or an impermeable layer can promote more rapid lateral movement of inadequately treated effluent. Soil permeability is also an important factor in that effluent can move more readily through a sandy permeable soil, with less time for treatment and attenuation of contaminants. Inadequate separation from groundwater or impermeable layer can also limit the ability of the soil to absorb effluent and lead to surfacing effluent.

With the high variability of factors that can affect the movement of contaminants, there is considerable variation in established standards for groundwater separation. The EPA (2002) indicates that 2-4 feet is adequate for pathogen treatment. The State OWTS policy calls for 5-20 ft, depending on soil permeability, and specifies an absolute minimum of 2 feet. Other states generally require from one to four-foot separation (Hall, 1990). A 1982 study of shallow monitoring wells in the San Lorenzo Valley showed no significant occurrence of fecal coliform in shallow groundwater beyond 50 ft from leachfields even when groundwater separation was less than 5 feet. In that study the amount of groundwater separation had no relationship to the amount of nitrate measured in downgradient wells, which showed somewhat elevated levels of nitrate up to 100 feet from the leachfields (SCCHSA, 1989).

Limited groundwater separation, slopes and waterway setback are some of the most significant constraints for siting OWTS in Santa Cruz County. Additionally, there are many properties that were developed before current standards were established, and that cannot meet current standards for stream setback and groundwater separation. Although they can't fully meet current standards, replacing and upgrading those systems results in a significant improvement in water quality protection and at least 90% of the year they fully meet current groundwater separation standards. Because these factors are so widespread and influential, it is important to establish standards that are not overly protective but that provide the minimum protection of water quality that is needed. Santa Cruz County has expended considerable effort to map areas with high groundwater and measure the levels that occur.

Because groundwater levels can fluctuate 10-20 feet from the dry season to the wet season, winter groundwater determination is limited to periods when there has been at least 60% of average annual rainfall and there has been at least 6 inches of rain in the previous 30 days.

Given all these considerations, Santa Cruz County established standards for groundwater separation and stream setback that have been implemented since 1995. Standards have been made more stringent now to meet the required two foot minimum separation and other requirements of the State OWTS Policy as presented in Table 3-4 and the subsequent section, Other Important Setbacks. Table 3-4 presents stream setback and treatment requirements relative to groundwater depth. Other water feature setback requirements are specified below. See Enhanced Treatment Table 3-5 Appendix D for specifications on type of treatment required. Table 3-4 provides OWTS design setback and treatment conditions for existing, new, and replacement OWTS that are within the Pajaro River Watershed, Soquel Lagoon Watershed, Aptos Creek Watershed, San Lorenzo River Watershed, and Corralitos/Salsipuedes Creek Watershed that comply with the Human Fecal Material Discharge Prohibition in section 5.4.2.2 of the Basin Plan.

Table 3-4: Groundwater Separation Based on Stream Setback, Treatment, and Soil Percolation (MPI)

Horizontal Setback to Stream	25-50 Feet	50 - 100 Feet	> 100 Feet
Conventional Systems:			
New System on undeveloped parcel	Not Permitted	Not Permitted	<1 MPI – Not Permitted 1-5 MPI Not permitted in nitrate concern area 1-5 MPI =20 feet outside nitrate concern area 5-29.9 MPI = 8 feet 30-60 MPI = 5 feet >60 MPI – Not Permitted
Upgrade System, increase in flow by ADU, bedroom addition or major remodel	Not Permitted	Not Permitted	<1 MPI – Not Permitted 1-5 MPI Not permitted in nitrate concern area 1-5 MPI = 20 feet outside nitrate concern area 5-29.9 MPI = 8 feet 30-60 MPI = 5 feet >60 MPI – Not Permitted
Repaired System, no increase in flow	Not Permitted	<1 MPI – Not Permitted 1-5 MPI Not permitted in nitrate concern area 1-5 MPI – 20 feet outside nitrate concern area 5-29.9 MPI = 5 feet 30-60 MPI = 5 feet >60 MPI – Not Permitted	<1 MPI – Not Permitted 1-5 MPI Not permitted in nitrate concern area 1-5 MPI = 8 feet outside nitrate concern area 5-29.9 MPI = 5 feet 30-60 MPI = 5 feet >60 MPI – Not Permitted
Greywater Sump	5 feet	5 feet	3 feet
Enhanced Treatment System [a,b] (BOD, TSS, TN <30 mg/L;-Fecal coliform/E.coli Reduction to 200 MPN/100 ml)			
New System on undeveloped parcel	Not Permitted	Not Permitted	2 feet
Upgrade System, increase in flow by ADU, bedroom addition or major remodel	Not Permitted	2 feet	2 feet
Repaired System, no increase in flow	4 feet	2 feet	2 feet
Seepage Pit-Repair/Upgrade Only	Not Permitted	Not Permitted	10 feet

[a] Enhanced treatment with nitrogen reduction is required for all new, repaired, and replacement OWTS with soils that percolate faster than 5 MPI in nitrate concern areas (see Figure 3-1, Sec.3.2.6)

[b] Groundwater separation less than 2 ft can only be approved by Regional Water Board

Figure 3-1: Nitrate Concern Areas

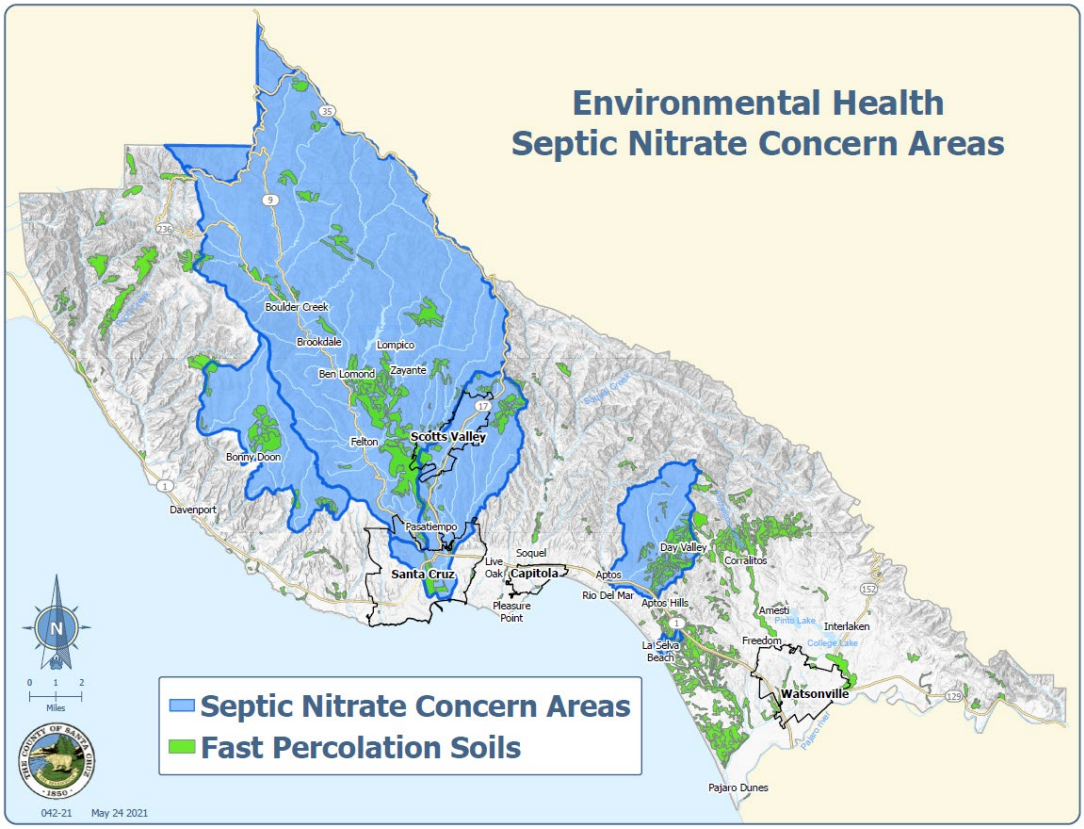


Table 3-5*:* Other Important Setbacks (for Septic Tanks and Dispersal Systems):

Where setbacks to streams, wells, karst features, drainageways, and stormwater infiltration devices cannot be met, enhanced treatment shall be utilized, consistent with Table 3-4.

The minimum separation shall be 10 feet from the bottom of the dispersal device to an impermeable layer that percolates slower than 120 MPI. With enhanced treatment and shallow drip dispersal, that separation can be reduced to not less than 3 feet.

Private individual, water line	10 feet
Water Main	25 feet
Stream, well, spring, watercourse [a], private water supply well, well site [b], sinkhole or other karst feature that may rapidly convey water	100 feet
Public water supply well	150 feet/200- feet[e]
Vernal pools, wetlands, lakes, ponds, ocean, or other surface water bodies	200 feet
Stormwater Pipeline Tightline, upgradient ditch or swale	10 feet
Drainageway that carries stormwater less than 12 hours after significant rainfall, stormwater infiltration device	25 feet
Drainageway that carries water 12 hours to 7 days after significant rainfall or curtain drain down-gradient from dispersal device	50 feet
Steep Slope[c]	25 feet
Embankment[d]	4 times height of bank to maximum of 25 feet

[a] The edge of the watercourse is the natural or levied bank for creeks and rivers.

[b] Well site would include any potential well location on an adjacent property that is 50 feet from the property line.

[c]Steep slope is a slope of greater than one and one-half feet horizontal to one foot vertical (67 percent).

[d] Fifty feet if slope area is composed of fractured material or if slope area or embankment is intersected by impermeable strata or shallow groundwater.

[e] 200 feet from a public water well where the depth of the effluent dispersal system exceeds 10 feet in depth. If the dispersal system depth exceeds 20 feet below grade and is within 600 feet of a public water well, then a horizontal setback is required to achieve a two-year travel time for microbiological contaminants as evaluated by a qualified professional. However, in no case, shall the setback be less than 200 feet.

3.2.5 Slopes, Embankments and Unstable Areas

Much of the Santa Cruz Mountains consist of steep slopes, and unstable geology. Many of the properties have cuts and embankments. Lateral movement and surfacing of effluent have been rarely documented, but there are a number of situations where effluent disposal from

OWTS has contributed to slope failure. Although County code has restricted the installation of new OWTS on slopes steeper than 30% for many years, older systems do occur on steeper slopes and system replacements have been allowed on slopes up to 50%. The State OWTS policy and this LAMP prohibit the installation of dispersal systems on slopes greater than 30% or within 100 ft of unstable land masses unless allowed through a geotechnical report prepared by a qualified professional. Such a report could also address reduced setbacks to embankments, if necessary. If deemed suitable by a qualified professional, installations on slopes between 30% and 50% will be allowed for repairs, upgrades and ADU's.

3.2.6 Enhanced Treatment Systems

An enhanced treatment system is required in the following situations:

- For new or replacement OWTS in Zayante or Baywood Soils, or any soil that percolates faster than 5 MPI. See Table 3-4 for setback requirements and conditions requiring nitrogen and pathogen reduction. This requirement can be waived for parcels that are greater than 10 acres or outside the nitrate concern areas of San Lorenzo Watershed, North Coast Water Supply Watersheds, Valencia Watershed and La Selva Beach area (Figure 3-1); and maintain a private well setback of more than 150 ft.
- For repair or upgrade of any large system serving more than 5 residential units or discharging more than 2500 gpd but less than 10,000 gpd, regardless of soil type.
- For new or replacement OWTS to mitigate conditions where standard system requirements cannot be met: reduced dispersal area, reduced separation to groundwater.
- For replacement OWTS where reduced setback to a stream or well is required.

Use of an approved enhanced treatment system requires the installation and continuous operation of monitoring telemetry; an ongoing service contract with an approved service provider; water quality monitoring; submittal of biannual reports for the first two years of operation and thereafter annual reports of system operation, maintenance and monitoring results; and, periodic inspections by County EH to confirm satisfactory performance. Specific requirements for enhanced treatment are described in Appendix D.

3.2.7 Minimum parcel size for new development

Santa Cruz County has a number of restrictions on parcel size for new development. For creation of parcels served by an OWTS, the General Plan and Code requires a minimum parcel size of at least one acre. The State OWTS Policy specifies an allowable subdivision density based on average annual rainfall. With the annual average rainfall in areas of Santa Cruz County varying from 25 inches in Watsonville to 60 inches above Boulder Creek, the allowable density would be 0.5 to 1.0 acre per dwelling unit. Other limits on parcel size for new development include:

- 1-acre minimum parcel size required for new development on existing lots of record in San Lorenzo and North Coast/Bonny Doon water supply watersheds.
- 2 ½ acre minimum parcel size required for new development on existing lots in North Coast/Bonny Doon water supply watersheds where the parcel is located within 1 mile of the water supply intake (designated as Water Quality Constraint Areas).

- Pursuant to policies in the General Plan, new parcels created must be 1 to 40 acres in size, depending on zoning and presence of resources and constraints.
- Any new lot created must be demonstrated to be capable of meeting requirements for onsite sewage disposal. Previously, only conventional systems were allowed, but it is proposed that enhanced treatment systems will be acceptable for creation of new lots, if requirements are met.

3.2.8 Variances

There are a number of situations where a variance to the requirements for a new standard OWTS may be allowed for replacement systems under specific conditions as described in the LAMP, Santa Cruz County Code and regulations. Standard systems must meet the requirements to the greatest extent possible and must meet the alternative minimum requirements with mitigations or site conditions needed to protect water quality and public health as discussed elsewhere in this document. The following types of variances may be allowed for replacement systems on developed parcels:

- Setback to Foundation or Property Lines – less than 5 ft, as authorized by Building Official or Health Officer.
- Setback to water mains from 25 to 10 ft and to less than 10 ft for private individual water lines if water line is double sleeved.
- Setback to embankments – less than 25-50 ft., if allowed by geologist's report
- Setbacks to waterways for system repairs, if required and mitigated by enhanced treatment and/or site conditions.
- Easements for repairs/upgrade/lot lines for buildable lots.
- Slope in dispersal area from 30% up to 50% for replacement, if approved by a geologist report.
- Winter groundwater separation down to 2-3 ft. mitigated by enhanced treatment and greater separation from waterways.
- Depth of dispersal system, if soil conditions require and minimum groundwater separation is maintained.
- Dispersal area, if mitigated by water conservation and enhanced treatment
- Leaching allowed under paving mitigated with enhanced treatment and if required to accommodate required dispersal area.
- Use of reduced dispersal area for low flow system with water conservation measures, limits on building, deed recordation and periodic inspections.
- Use of an interim nonconforming system with deferred installation of enhanced treatment to time of property transfer, with water conservation measures, limits on building, deed recordation and periodic inspections.

For new development on undeveloped properties, variances to requirements for standard systems may be allowed if an enhanced treatment system is used, and if none of the prohibitions specified below apply.

Records will be maintained in the permit database any time one of these variances is approved and will be reported as a part of the annual reporting. Additionally, minor deviations may be approved by the inspector in the field, required by field conditions, when an inspection in the field makes clear that no individual or cumulative public health hazard will result, and when only slight changes in approved plans are required. These changes are noted in filed notes and on as-built plans.

3.2.9 Prohibitions:

In no case will a variance be allowed or an individual OWTS be permitted by the County in any of the following circumstances:

(A) Where the property line of the parcel upon which the system is proposed to be constructed is within 200 feet of a public sewer and connection to the sewer thereto is determined to be feasible. "Feasible" means that sewer service is both (a) available by annexation to or contract with an existing sanitation district, County service area or city under existing Local Agency Formation Commission spheres of influence and County land use policies, and (b) that connection is technically feasible based on engineering and technical factors.

(B) Where the parcel upon which the system is proposed to be constructed is undeveloped and less than the required minimum size specified in Code Section 7.38.045.

(C) Where the system is proposed to be installed on a parcel other than the parcel upon which the use to be served by the system is located, except as provided in SCCC 7.38.060.

(D) Where the system utilizes a cesspool of any kind or size.

(E) Where the separation of the bottom of dispersal system to groundwater is less than 2 feet, except for seepage pits, which shall not be less than 10 feet.

(F) Where the system receives wastewater discharge from whole-house water treatment systems or backwash from swimming pool or spa.

(G) Where the parcel is undeveloped, and the proposed system would be located on slopes over 30% or within 100 feet of a well or water body.

(H) The following types of systems may not be permitted under this LAMP by the County, but may be permitted by the State Water Boards:

1) OWTSs receiving a projected flow over 10,000 gpd.

2) OWTSs that utilize any form of effluent disposal that discharges on or above the post installation ground surface such as sprinklers, exposed drip lines, free-surface wetlands, or a pond.

3) OWTSs dedicated to receiving significant amounts of wastes dumped from RV holding tanks.

4) Systems which receive wastewater other than domestic wastewater, such as medical and dental office wastewater, food and beverage industry wastewater, winery waste or brewery waste.

5) OWTS that receive high-strength wastewater.

(I) Except as provided for in paragraphs 6 and 7 below, new or replacement OWTS are prohibited with minimum horizontal setbacks less than any of the following:

1) 150 feet from a public water well where the depth of the effluent dispersal system does not exceed 10 feet in depth.

2) 200 feet from a public water well where the depth of the effluent dispersal system exceeds 10 feet in depth.

3) Where the effluent dispersal system is within 600 feet of a public water well and exceeds 20 feet in depth the horizontal setback required to achieve a two-year travel time for microbiological contaminants shall be evaluated. A qualified professional shall conduct this evaluation. However, in no case shall the setback be less than 200 feet.

4) Where the effluent dispersal system is within 1,200 feet from a public water systems' surface water intake point, within the catchment of the drainage, and located such that it may impact water quality at the intake point such as upstream of the intake point for flowing water bodies, the dispersal system shall be no less than 400 feet from the high-water mark of the reservoir, lake or flowing water body.

5) Where the effluent dispersal system is located more than 1,200 feet but less than 2,500 feet from a public water systems' surface water intake point, within the catchment area of the drainage, and located such that it may impact water quality at the intake point such as upstream of the intake point for flowing water bodies, the dispersal system shall be no less than 200 feet from the high-water mark of the reservoir, lake or flowing water body.

6) For replacement OWTS that do not meet the above horizontal separation requirements, the replacement OWTS shall meet the horizontal separation to the greatest extent practicable. In such case, the replacement OWTS shall utilize an enhanced treatment system and other mitigation measures, unless a qualified professional provides information to the satisfaction of the Health Officer that there is no indication that the previous system is adversely affecting the public water source, and there is limited potential that the replacement system could impact the water source based on topography, soil depth, soil texture, and groundwater separation.

7) For new OWTS, installed on parcels of record existing as of May 13, 2013, that cannot meet the above horizontal separation requirements, the OWTS shall meet the horizontal separation to the greatest extent practicable and shall utilize enhanced treatment for pathogen and total nitrogen concentration reduction and any other mitigation measures prescribed by the Health Officer.

3.2.10 Proximity of Collection Systems to New or Replacement OWTS

Sewer systems are operated in Santa Cruz County's urban areas by the Cities of Santa Cruz, Scotts Valley, and Watsonville, various Sanitation Districts operated by the County of Santa Cruz, and the private Salsipuedes Sanitary District (Figure 3-2). The County General Plan establishes an Urban Service Boundary, where all new development should be served by public sanitation. Sewer lines are not intended to be extended outside of the Urban Service Boundary and are generally not to be extended outside the sphere of influence of the City of Santa Cruz or sanitation district. In some cases, the Local Agency Formation Commission (LAFCO) has approved annexations or extraterritorial service

to serve individual parcels close to an existing sewer line that may have a failing OWTS. However, this is not generally done to support new development on individual parcels unless it is part of a much larger General Plan land use amendment.Figure 3-2Figure 3-2: Primary Sewered areas of Santa Cruz County
Grey: Municipal; Lime: Santa Cruz Sanitation District; Purple: Freedom Sanitation District; Red: Salsipuedes Sanitary District

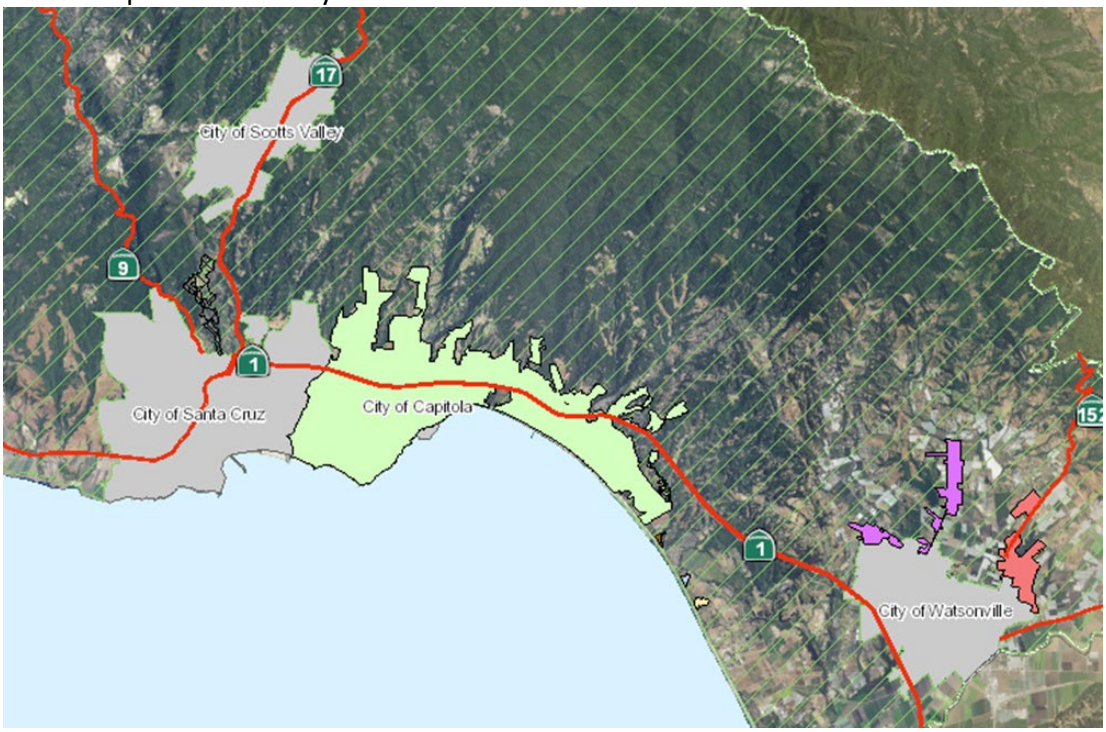
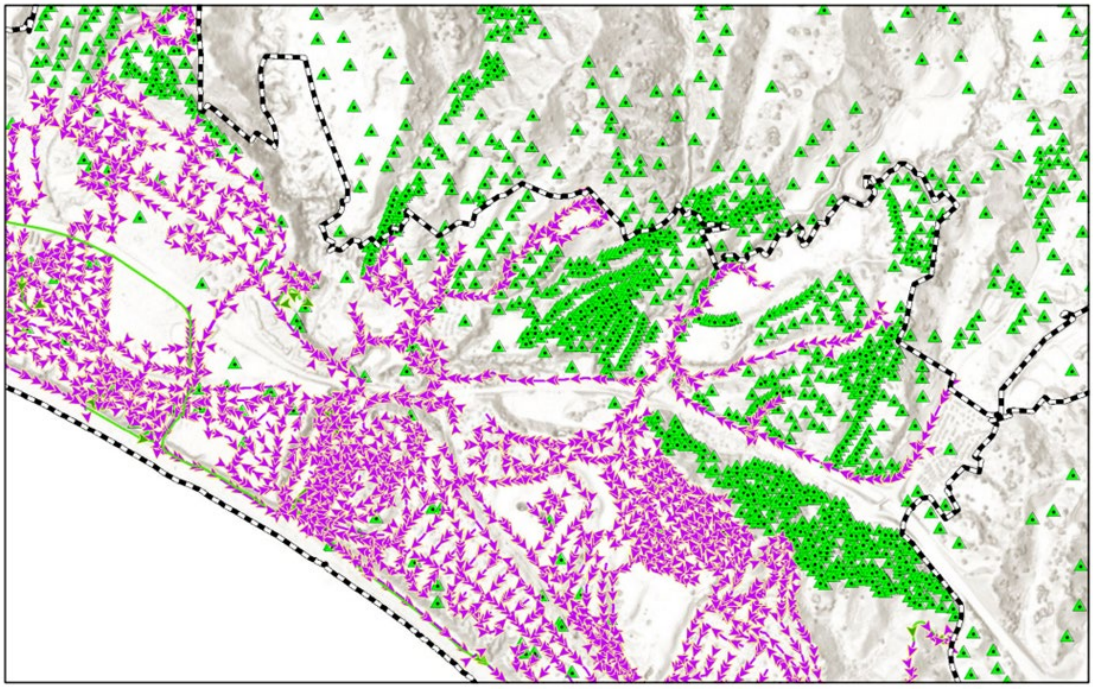


Figure 3-3: OWTS in Relation to Sewer Lines: Sanitation District sphere of influence



3.3 Site Evaluation

For all new and replacement OWTS installations, a site evaluation and soil characterization by a qualified professional and witnessed by County EH staff will be required. This includes a soil profile excavation to the minimum depth of required groundwater separation below the bottom of the proposed dispersal device and percolation testing in the area of the disposal field and expansion area. The maximum depth of observation may be reduced if enhanced treatment is proposed with a reduced separation to groundwater or impermeable layer. The requirements for percolation tests may be waived if a qualified professional can provide adequate information to document the soil texture, soil structure, and soil grade to establish a maximum soil application rate to the satisfaction of the Health Officer. The specific soil profile requirements are contained in the code (Appendix A) and the soil test procedures (Appendix F). Based on mapped information, file information, and observations of site soils and topography, staff will determine whether or not shallow winter groundwater is likely to be present, and if so, winter water table observation will be required pursuant to the Winter Water Table Testing Procedures (Appendix F). Site testing for groundwater will be required unless the system designer demonstrates to the satisfaction of Environmental Health staff that there is already adequate information regarding the location to determine that groundwater separation requirements can be met. During the field visits, EH staff will measure slope, setbacks to streams, wells, and embankments and make observations of other issues such as slope stability concerns. EH Staff will also utilize the Santa Cruz County GIS database for other information such as nearby public water sources, proximity to sewer lines, presence of karst, or other issues that may influence the location and design of the OWTS. If an OWTS is proposed within 200 feet of a public water supply source, the operator of the public water supply source will be notified.

3.4 Qualifications for Persons Who Work on OWTS

Specific qualifications and licenses are required to design, construct, maintain, repair and/or replacement of an OWTS in Santa Cruz County. Design, construction, maintenance, repair and replacement of an OWTS shall be conducted by a qualified professional or service provider in accordance with the following requirements:

- Site evaluations, soil investigations and percolation testing for system design shall be conducted by a registered California professional, including Civil Engineer, Professional Geologist, Certified Engineering Geologist, Registered Environmental Health Specialist, or other qualified professional as approved by EH
- Reports justifying installation on a steep slope, reduced setback to an embankment or other concern of slope stability shall be prepared by a California registered Professional Geologist or Engineering Geologist.
- System designs, including site evaluation, will be prepared by a California registered Civil Engineer, registered Geologist or registered Environmental Health Specialist, or other qualified professional as approved by EH.
- Qualified installers that install an OWTS must be a contractor duly licensed by the California State Contractor's Board to install OWTS. Acceptable licensure types are Class A, Class B, Class C-36, and Class C-42. The Class B license holder is limited to installing an OWTS in conjunction with a new construction projects as appropriate under applicable State contractor's law.
- Liquid waste haulers are required to maintain a separate license to operate in Santa Cruz County and shall comply with all the requirements of Chapter 7.42 (Appendix B).
- Onsite System Service Providers (OSSP) are an individual or company approved by County EH and certified by an OWTS manufacturer or proprietor to conduct maintenance and replace needed parts for each type of enhanced treatment or alternative dispersal system they service, or other qualified OSSP as approved by County EH.
- County EH has a certification program for OSSPs and a registration program for liquid waste haulers. County EH will develop a Qualified Professional annual registration program for all qualified professionals to demonstrate that their qualifications are in good standing and based on demonstrated experience and satisfactory performance.

County EH maintains a directory of Qualified Persons to work on OWTS. This information is included as part of the web-based resources maintained on the County's OWTS website. This lists the name, address and phone contact information for professional services providing septage disposal, maintenance services, system design, and permitting assistance. County EH intends to require registration of qualified professionals to work in the County, similar to other jurisdictions. That registration can be suspended for violations of County code and permit requirements.

4 Operation of Existing Systems

In order to ensure satisfactory OWTS performance, County EH implements various components to promote operation and maintenance of existing OWTS, to provide for inspections and evaluations as needed to identify problem systems, to require the correction

of failing systems, to provide for upgrade of systems at the time of building remodels. The County also conducts more in-depth oversight through advanced protection management programs in areas that impact impaired or vulnerable waterbodies and groundwater. Those programs typically include evaluation of potential for developing or connecting to community wastewater disposal systems and opportunities for financial assistance to address OWTS problems.

4.1 Operation and Maintenance

Operation and maintenance of existing OWTS is ultimately the responsibility of the property owner. The County promotes this through education and outreach, facilitating septic tank pumping and sludge disposal, and overseeing service providers for enhanced treatment systems. Compilation of file information on permit history, inspections, and pumping and making that information available also provides more information to qualified professionals and property owners, particularly those that may be interested in purchasing a house with an OWTS.

4.1.1 Education and Outreach for OWTS Owners

Public information regarding OWTS is generated by County EH and then disseminated to the public through County EH watershed groups, Realtors, or other County agencies relative to the building permitting process. Within the past five years, an OWTS brochure was mailed to all residents in the San Lorenzo Watershed.

County EH provides periodic web-based news articles and brochures regarding OWTS construction, performance, and maintenance with special emphasis on the benefits of water conservation. Also, hard copy brochures on water conservation, graywater disposal, and general OWTS use are produced and are widely distributed. Accordingly, County EH provides this information on the County's webpage, and through in-person meetings with owners and operators, either during front desk walk-in questions, or during a permit process consultation.

County EH provides site-specific education for OWTS users tailored to the specific parcel and system. During these consultations, information on proper OWTS use and maintenance is provided to make sure the users have a clear understanding of how to identify and respond to maintenance and repair issues. County EH emphasizes the importance timely responses to OWTS failures and provides checklists for maintenance, repair, or replacement of critical items. County EH provides to OWTS owners and buyers low-cost evaluations of OWTS through file reviews and site inspections. These evaluations analyze the status of a parcel's OWTS. Additionally, County EH staff will review proposed plans and designs for replacement or repair of OWTS to advise potential permit applicants in advance of the OWTS owner formally initiating a permit application. These services are regularly provided to the public, or to consultants and contractors employed by owners for assistance with OWTS design, permitting, or simple maintenance.

File Reviews: County EH provides as a public service a full evaluation and interpretation of all available information on properties served by OWTS and/or private water systems. This evaluation answers question such as:

- Has the OWTS had problems during the winter or in the past?

- What system upgrades might be needed to add bedrooms?
- Will the property likely need an enhanced treatment system?
- What is the age and construction of the private water supply well?

This service helps to protect prospective home buyers from problems and surprises related to private water supply wells and OWTS after real estate purchases and help to prevent protect home sellers and buyers from surprises, lawsuits, or failed sales. Just getting a septic tank pumper's report is not enough to characterize a parcel's OWTS. County EH recommends that a seller obtain the OWTS file review and system review early in the process of selling a property in order to make those reports available to all prospective buyers, and to provide early notice of any problems that might need attention in order to successfully complete a sale.

On-Site System Review: An on-site review of the property and system can be performed by County EH staff or the approved contractors and consultants currently on the list maintained by the County EH office. Information from an OWTS site review will be provided to the applicant on a standard report completed by EH staff or by a qualified professional.

To ensure that new home buyers are properly informed prior to purchasing an OWTS, and to ensure that older OWTS are evaluated, it is proposed that an OWTS evaluation be required prior to a real estate transaction, with deficiencies addressed during the transfer or the new owner taking responsibility to correct the deficiencies. Such evaluations are already required when a building permit for a remodel is obtained. Within sewered areas, an evaluation of the sewer lateral is already required at the time of sale by all the sewer agencies in the county. If deficiencies are found, those can be corrected during the transfer or the new owner may agree to take responsibility to correct the deficiencies.

4.1.2 Septic Tank Pumping and Septage Disposal

Septic tanks must be periodically pumped out to remove accumulated solids and grease to prevent discharge of solids that would clog the dispersal system. The recommended frequency of pumping is 5-10 years, depending on occupancy, water use, presence of garbage disposal and lifestyle. Septic tanks can only be pumped by a licensed liquid waste hauler in good standing with the County. The hauler must also be approved to discharge septage at an approved disposal facility. There are two approved facilities within Santa Cruz County: the Santa Cruz City Wastewater Treatment Plant and the Watsonville City Wastewater Treatment Plant. Pumpers also go to a disposal site in Marina (Monterey County) or to another approved out-of-county disposal site. From 2010 to 2018, 46 million gallons of septage and grease were generated (9% was grease trap waste). The septage and grease were distributed among the disposal facilities as follows: 71% went to Santa Cruz, 12% to Watsonville, 12% to Marina, and the remaining 5% went out of county.

The Santa Cruz City Wastewater Treatment Plant septage disposal facility was developed in 1986 and became operational around 1988. Prior to that time, most of the septage went to two approved land disposal sites on ridgetops above the San Lorenzo Valley. Those sites have been closed and Santa Cruz County Code no longer allows for land disposal sites. There

appears to be more than adequate disposal capacity at the treatment plants. The septage is mixed in and treated with the incoming wastewater flow. Prior to 1988, Santa Cruz City Wastewater Treatment Plant did not take septage, but because it received grant funding as a regional treatment plant, the plant was upgraded to take septage and the County agreed to administer the billing and collecting disposal fees from the septage haulers.

Santa Cruz County Code Chapter 7.42 was amended in 1987 to establish the requirements for septic tank pumping and septage disposal. It was subsequently amended in 2019 to eliminate the provisions for approval of land disposal sites and to make other minor revisions (Appendix B). Since 1987, septic tank pumpers have been required to provide a report to the property owner and County EH for every tank pumped that indicates:

- Size, material, and condition of the tank, baffles, lids, inlets and outlets
- Indications of leachfield failure, back-up, or greywater bypass
- Volume pumped and disposal location
- Diagram of tank location

This information is entered into the Environmental Health Land Use Information System (EHLUIS) and is available for review by inspectors and members of the public. The database also calculates the number of septic tank pumps for each parcel in the last 1, 3 and 7 years. Frequent pumping, particularly during winter months, can be an indication of a system that is not functioning properly.

A current septic tank pumping report from within 3 years is required to be submitted whenever a building permit is applied for in order to indicate whether the OWTS is performing satisfactorily. Additionally, most real estate transactions require a satisfactory pumpers report as a condition of a real estate transaction. Although these reports, may include a hydraulic load test of the leachfield, they may not be indicative of performance of the OWTS during wet winter conditions or possible increased loading from a new homeowner, particularly if the home has not been occupied.

4.1.3 Nonstandard and Enhanced Treatment Systems

Nonstandard systems include enhanced treatment systems, alternative dispersal systems, and conventional systems that cannot fully meet standards. Enhanced treatment and alternative dispersal systems require routine inspection and maintenance. This is best done by a qualified and approved OSSP. County EH maintains a list of approved OSSP for different types of systems. The permits for enhanced treatment and alternative dispersal systems require that the property owner have and maintain a service contract with a qualified OSSP. The OSSP in turn is required to submit to County EH an annual report of system condition and maintenance performed. These are maintained in the files and in a database. Some systems require water quality testing of effluent and influent quality, and this information is maintained in a separate database. Nonstandard OWTS are inspected by County EH at least every 3 years to verify the information submitted by the OSSP. If a service contract lapses and/or annual reports are not submitted, County EH inspections are conducted annually and the annual service charge for the system is increased from $167 to $501.

Enhanced treatment systems and other approved nonstandard systems are subject to a number of other requirements to ensure proper management and adequate performance:

- restriction on volume of water use, property use, and/or future development to ensure the capacity of the OWTS is not exceeded;
- requirement of a service contract with an OSSP and regular monitoring and maintenance of any pumps, filters, grease traps, alarm systems, disposal system monitoring risers, groundwater monitoring wells, and other OWTS components;
- regular inspection and monitoring by the property owner, OSSP and County staff;
- payment of an annual fee by the property owner to cover the costs of the County for OWTS inspection;
- signed acknowledgement by the property owner accepting these conditions and limitations; and,
- recordation on the deed of a notice notifying potential buyers and future owners of the presence and limitations of the nonstandard system.

When a permit for a nonstandard system is issued, the County notifies the owner of its limitations and the requirements for satisfactory operation and the owner is required to sign an acknowledgment accepting those conditions prior to permit approval. When the installation is complete, the conditions are specified in a "Notice of System with Special Operating Requirements and Limitations" which the County records on the deed. Annual inspection and administration fees are collected through the special charge on the property tax bill under County Service Area 12 (CSA 12N).

There are different levels of charge for the annual inspection, depending on the type of OWTS, the amount of monitoring required, and whether the OWTS is subject to a service agreement with a certified OSSP. For the 2019-2020 fiscal year, the charges are as follows:

- Managed Enhanced Treatment Systems (with OSSP) (Level 6) $167.00
  Level 6 is for an enhanced treatment system which is receiving annual maintenance and reporting by an OSSP.
- Enhanced Treatment Systems (No OSSP) (Level 3) $501.00
  Level 3 is for systems where there is no OSSP and/or the service contract and reporting has lapsed. These require a higher level of County oversight and enforcement to require compliance with OSSP requirements.
- Nonconforming OWTS (Level 4) $101.00
  Level 4 is for a conventional system that does not fully meet the standards for disposal area and requires inspection every three years. This includes Low Flow Systems and Nonconforming Interim Systems.
- Limited Expansion OWTS (Level 5) No Charge
  Level 5 systems substantially meet all standards except for expansion area.

Level 1 and 2 are previous designations that are no longer used.

4.2 OWTS Inspection and Evaluation

Improved OWTS maintenance and management is a critical element contributing to the long-term effectiveness of the wastewater management program. This will be accomplished

through re-inspection programs, and various efforts to promote adequate maintenance by property owners. After the initial evaluations and upgrades have been completed, properties will continue to be checked for indications of OWTS failure as needed. The frequency of inspection will vary depending on the type of OWTS, the condition and past performance of the OWTS, and the presence of site constraints.

Existing OWTS are subject to performance evaluation and inspection under any one of the following circumstances:

- Septic tank pumping
- Property transfer
- Building permit application
- Periodic inspection as a condition of a permit for a nonstandard system
- Investigation in response to a complaint or observed water quality degradation
- Follow-up inspection in response to a failing pumpers report
- Area-wide survey of OWTS as a part of an APMP (Section 4.5)
- Winter rechecks to follow up on a potentially marginal condition observed in a previous inspection

OWTS subject to a winter re-inspection are low flow OWTS and OWTS which are identified during surveys or complaint investigations for follow-up inspections. Other OWTS subject to a recheck are those in which a graywater bypass has been required to be reconnected to a substandard OWTS, the washer has been required to be removed, a onetime intermittent failure has been observed, the OWTS has had frequent pumping and/or signs of failure identified in a pumper's report, or any others where the inspector believes a follow-up investigation during wet conditions is warranted. A graywater bypass is an indication of back-up or failure that induces the owner to disconnect the washer, shower or other plumbing fixture from the OWTS in order to reduce loading on the OWTS. Enhanced treatment OWTS and low flow OWTS are subject to an inspection every two to three years.

OWTS needing annual inspection or recheck are identified in the computer database and re-inspections are done during wet weather to ensure that the OWTS are working properly under conditions when they would be most likely to fail. During the visit, aspects of OWTS operation and appropriate methods of water conservation/flow reduction, if needed, will be discussed with the occupant of the home. If the OWTS is not operating properly, additional maintenance efforts (i.e. more stringent water conservation) or OWTS improvements will be required. Based on the results of the re-inspection, the frequency of follow-up inspections may be reduced if no problems are found or expected. However, if there are still problems with the OWTS, and it appears that closer supervision will be necessary to ensure proper functioning, the OWTS will be required to be upgraded, incorporated into the nonstandard system program, and/or the levels of inspection and the annual inspection charge may be increased if it is already in the program.

OWTS evaluations start with a report that identifies the OWTS needing inspection, and which extracts relevant information from EHLUIS database records for those systems, including system characteristics, past pumping results and past inspection results. Staff may further

consult EHLUIS, County electronic file records (Laserfiche) for the parcel, and/or GIS maps of land use and site information:

- **EHLUIS Database – OWTS System Components, Site Conditions, and History:** The EHLUIS database stores OWTS records by parcel number. Each parcel's period of record is reviewed to examine data for permits, installations, siter characteristics, pumping records, complaints, inspections, and non-permit-related parcel surveys. This information includes a characterization of each OWTS's physical components, and general geophysical characteristics of the parcel such as ground surface slope, soil profiles, and proximity to surface and groundwater resources. In 1987, the County adopted an ordinance requiring submittal of a pumping and inspection report to the property owner and to the County every time a septic pumper pumps a tank. This allows the County and the property owners to maintain a maintenance record for each parcel. Pumpers' Reports are reviewed for pumping operators' information regarding the status of the system's current operational health, including any noted observations of the OWTS observed when a OWTS is serviced. With pumping records in the database, pumping efforts are monitored, and if necessary, additional action may be taken to ensure adequate pumping.
- **Geographic Information Systems (GIS) Mapping - Parcel land use characterizations:** Parcel-specific land use data is maintained within the County's GIS database including records for OWTS. A parcel considered for operation of an OWTS is examined within the County GIS mapping system for analysis of the parcel's characterizations including things such as: soils, water resources, well locations, elevation contours, protected biological status of various flora and fauna, geology, jurisdictional boundaries, easements, building structures, land use code, ownership, and others. Data for every permit record related to a parcel's OWTS management is exported from the County EH OWTS database and converted to a three-tiered GIS layer for a OWTS's component information. This GIS layer is a matter of public record, searchable as a data layer that stores an overall OWTS system characterization for each parcel. In this way, County EH integrates its OWTS database with the countywide GIS system that is shared with other County land use departments regulating parcels through development review permits, such as the Public Works Department, Cannabis Licensing Office, and Planning Department.
- **Paper Files and Electronic Laserfiche Files–**Current parcel-specific OWTS records are stored by County EH in hard copy until: 1) they are scanned as digital files to be permanently stored for the parcel's period of record; and 2) their primary system characterization data and geophysical characteristics are entered into the County EH OWTS database, EHLUIS, for reporting and analysis. If a parcel's historical data has not yet been translated into EHLUIS, then its scanned digital files are viewed within the County's digital document management software system, Laserfiche, in order to most fully inform analysis of a parcels' current status.

After a review of background data, the inspector will make a site visit, contacting the occupant of the property and making observations for signs of surfacing effluent, soggy soils, greywater discharge, high level alarms, effluent level in risers, and status of any electrical

control panel. Santa Cruz County Code Section 7.38.215 establishes the right of the County Health Officer, and the Officer's delegated authorities within County EH, to conduct field investigations for any suspected operations relating to OWTS, with proper notification of the occupant of the property. For any approved nonstandard system, the right to conduct inspections is also included in the terms of the acknowledgment that the owner signs and that is recorded on the deed.

4.3 Failing Systems and Repairs

OWTS are considered to have operational problems when conditions are found such as surfacing effluent, discharge of graywater, plumbing backing up into the house, or water quality degradation of nearby water resources, as indicated by water quality sampling or complaints. Required solutions may include immediate temporary actions as well as long term improvements. When a problem is identified either through the survey/inspection process or through complaint investigations, a series of actions are taken to have the situation corrected by the property owner. In most cases the property owner is cooperative, and the County's role is to provide assistance and oversee the work. However, if the property owner does not respond to the request to repair their system, follow-up actions become progressively more stringent and punitive.

When a problem is first identified and/or a complaint is received, it is entered into the computer database for tracking and the assigned staff person investigates the situation. If the owner is present when the inspection is conducted, the problem is discussed, and many corrections can be initiated by this minimal enforcement effort.

If the owner is not present when a problem is identified, or if they fail to take action after the initial verbal contact, a Notice to Repair Septic System is mailed to the owner of record giving not more than 15 calendar days from the date of mailing to respond with a proposal to correct the problem. The notice also requires immediate pumping of the septic tank as needed to prevent surface discharge of wastewater. For situations where the failure is creating a significant health hazard, the owner is given only 3 days to start corrective actions. Most owners respond to the first notice and begin to take action to correct the problem. On the average, the repair is completed within 30 days of discovery of the failure.

If no response to the first notice is received, a second and final Notice to Repair Septic System is mailed, and a violation re-inspection fee is levied against the owner. If there is still no response after an additional 15 days, another field inspection is made, and another violation re-inspection fee is levied against the owner. An administrative hearing with the County Director of Environmental Health is then scheduled and the owner of record is duly noticed. If the hearing is ignored by the owner, or if the hearing produces no action from the owner, the matter is referred to the District Attorney or County Counsel for criminal or civil prosecution.

During the enforcement process, if the owner fails to respond to official notices, an overt OWTS failure with surfacing effluent that directly endangers the public health can be abated through the County Emergency Abatement Process. The house can also be posted as unfit for occupancy.

During installation of a new or replacement OWTS, there may be violations of the standards or permit conditions. In some cases, work being done without County permit or approval may be discovered. Because these do not necessarily result in surface discharge of wastewater, civil or criminal action may not be effectively brought to secure compliance. In these cases, if after due process the owner fails to comply, a notice of violation will be recorded against the property, which clouds the title and warns any prospective buyer or lender of inadequacies of the OWTS. A notation will also be made in the County Planning Department permit information system that will prevent the owner from obtaining any other County permit for building, etc., until the violation is corrected. If work is started without permit approval, double fees for the permit will be charged.

The large majority (92%) of OWTS repairs or upgrades do not result from a County inspection and are voluntarily initiated by the property owner. These may result from a home improvement, a property transfer, recommendations made by a septic tank pumper, or the homeowner's own observation that their OWTS is in 'pre-failure' or other problematic condition. Problems may be indicated by slow drains, frequent pumping required, odor, soggy ground, or occasional surfacing effluent during times of heavy loading. OWTS repairs and replacements are required to conform to the Regulations for the Repair and Upgrade of Septic Systems.

4.4 Remodels and System Upgrades

County EH reviews all building permit applications on properties that are served by an OWTS and that involve, additions, increases in bedrooms, or other construction the property that could impact the OWTS or the replacement area. Before applying for a building permit, the property owner should contact County EH to address any septic issues, including locating and avoiding primary and replacement dispersal areas, pumping the tank to document satisfactory system performance, or obtaining a permit for necessary system upgrades. Once County EH requirements are met, County EH issues a "Clearance to Apply for Building Permit" and the applicant may submit plans and apply for the building permit. During building permit review, the plans are routed to County EH to verify that the building plans are still in conformance with County EH requirements. At that time County EH may also place a hold on the building permit to ensure that all County EH requirements are fully satisfied before the project is completed and signed off.

Following are the County EH requirements for building remodels:

- A one-time addition of up to 500 sq. ft. with no bedroom addition is allowed if the existing OWTS does not show any history of problems and is shown to be functioning well as indicated by a satisfactory pumper's report within the last 3 years. The building addition cannot encroach into required OWTS replacement area.
- Bedroom additions and additions greater than 500 sq. ft. can be approved if the OWTS is working satisfactorily, meets groundwater separation and horizontal setback requirements, is adequately sized for the proposed number of bedrooms and has adequate expansion area. If these conditions are not met, the OWTS must be upgraded to meet the upgrade standards, including the possible use of an enhanced treatment system.

4.5 Advanced Protection Management Program

Advanced protection management programs (APMP) are a required management program for all OWTS located near a water body that has been listed as impaired due to nitrogen or pathogen indicators pursuant to Section 303(d) of the Clean Water Act. APMPs are implemented to provide a more comprehensive approach to OWTS management and oversight for areas that impact impaired or vulnerable waterbodies. Such programs may also be called for in the TMDL that has been adopted to address the impairment. The requirements of an APMP will be in accordance with a TMDL, if one has been adopted, which supersedes all other requirements in Tier 3 of the OWTS Policy. This LAMP requires a higher level of OWTS oversight in the San Lorenzo River Watershed, the Amesti Road area (Pinto Lake Watershed), and Delaney subdivision (Salsipuedes Creek area). Implementation for other areas as presented in Table 2-2 will be conducted as needed if additional areas are identified with significant surface water or groundwater impairment. Areas within Pinto Lake Watershed, Valencia Creek Watershed, Mill Creek Watershed (Bonny Doon), and La Selva Beach will be considered.

The APMP includes the following elements:

- File review and entry of all historical file information into EHLUIS, the OWTS database. This allows an assessment of area wide conditions and history, and identification of particular areas or OWTS for further assessment.
- Water quality sampling and data analysis of surface water bodies, roadside ditches, and private water supply wells in order to better characterize water quality conditions and problematic areas.
- Parcel by parcel inspections for signs of OWTS failure or greywater discharges.
- Required repair and upgrade of failing OWTS.
- Special studies to investigate sources and causes of degraded water quality.
- Development of specific approaches and technologies that will result in significantly reducing impairment caused by OWTS. This includes the requirement for nitrogen reduction for fast percolation soils in areas with elevated nitrate. This will also include working with Water Board staff to assess technologies and approaches to reduce phosphorus discharge from OWTS to Pinto Lake.
- Groundwater separation requirements of the LAMP (Table 3-4) should be more than adequate to prevent fecal contamination of groundwater and surface water from new and replacement OWTS. The primary method to reduce fecal contamination in impaired waterways will be to prevent, identify and correct surface failures with discharge of inadequately treated effluent.
- Feasibility study of the potential use of centralized wastewater collection and treatment.
- Distribution of information and community meetings to discuss with residents and owners, the program, the findings, and the options for improved OWTS management or developing community sewers.
- Continued oversight of OWTS through water quality monitoring and rechecks of marginal systems.

- Analysis and reporting of OWTS performance and water quality information.

4.6 Connection to Community Disposal Systems

When a failing OWTS is found or there is a proposal for an upgrade as a part of a building permit, County EH staff consult mapped information for nearby community sewer systems. Sewer connection is required if a sewer is within 200 feet and it is feasible to connect. For problematic areas with larger concentrations of substandard systems, consideration is also given to extending sewer service, or developing new community wastewater collection systems. To date, sewer line extensions have been evaluated for Amesti Road (Pinto Lake), Delaney Subdivision (Salsipuedes), and Pasatiempo/Rolling Woods (San Lorenzo Watershed). The development of new community disposal systems has also been evaluated for the major communities of the San Lorenzo Valley that includes the unincorporated communities of Boulder Creek, Ben Lomond, Glen Arbor and Felton. In general, community collection systems have been found to be very expensive, and property owners were not in favor of pursuing a project. There are presently low-interest loans, but no grant funds for sewering and any projects must be funded by assessment districts, subject to the approval of a majority of the property owners. Sewer feasibility for downtown Boulder creek is now being re-evaluated in response to requests from the community.

In the past 20 years, sewer line extensions to areas served by OWTS have been completed in the following areas:

- Graham Hill Road, Rolling Woods, Orchard Drive (San Lorenzo)
- County Fairgrounds (Salsipuedes)
- North Polo Drive in Aptos (Valencia Creek)
- There is currently interest in the Boulder Creek business community to re-evaluate the feasibility of sewering downtown Boulder Creek.

Where a concentration of OWTS problems is found, with site conditions which limit the potential for successful OWTS repair, County EH staff will take the following steps:

- Document extent of system failures and non-compliance with current standards for upgrade and repair.
- Document extent of water quality impacts.
- Evaluate potential availability of grants or loans.
- Prepare high level feasibility study of the cost of developing a community collection system.
- Share information with all property owners in the affected area and determine support for proceeding with a project.
- Work with County Sanitation District staff to form an assessment district with majority support to initially fund the local cost of designs and environmental review.
- Pursue funding assistance if available.
- If there continues to be majority support from property owners for funding the project, proceed with funding and construction.

If there is a feasible potential and property owner support for developing community centralized treatment and disposal systems, interim improvements of existing OWTS will be

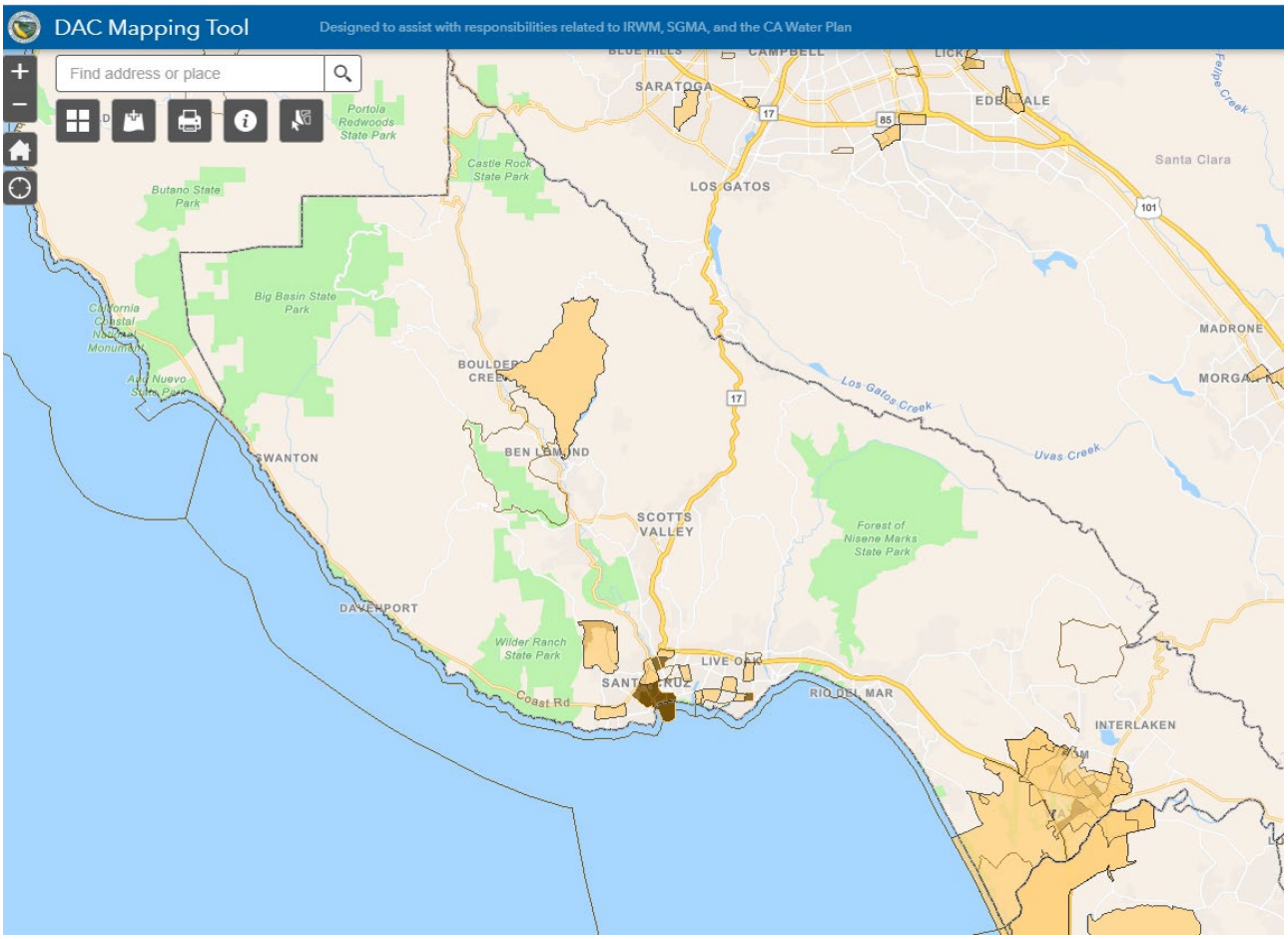
required while County EH staff evaluates the potential for a community centralized treatment and disposal system approach. Interim measures usually involve water conservation, use of nonconforming repairs, and/or seasonal pumping of the tank as necessary to prevent surfacing of effluent until a final solution can be developed.

4.7 Financial Assistance

Construction and financing of the necessary improvements to individual OWTS are primarily the responsibility of the individual property owner. The role of County EH is to require that improvements be performed according to County standards, provide information on financing assistance, provide technical advice, and generally help facilitate and support the project. The County has also sought out ways to provide financial assistance as many homeowners ae challenged by the cost of OWTS replacement, which can range from $20,000 for a simple conventional system to $70,000 for an enhanced treatment system. There are some areas of the county designated as disadvantaged communities and there ae many other low-income homes and neighborhoods that would meet the income definition of disadvantaged, but which are located in larger more affluent census blocks.

Immediate financial assistance can be provided through the nuisance abatement process, although this ultimately costs the homeowner more due to administrative costs. The County has conducted considerable past research on state, federal and local opportunities to help fund improvements. The County did implement a low-cost loan program from 2004 to 2009 using Clean Water Act Funds to help fund costs of design and construction for use of enhanced treatment systems to replace failing OWTS in the San Lorenzo Watershed. A total of eleven replacements were funded. Despite extensive public outreach, only 12% of the available $2.2 million was utilized. At the end of the program, the collapse of the real estate market during the recession left homeowners with inadequate equity to qualify for loans. County EH staff will continue to seek out and pursue possible mechanisms for funding assistance through grants or low interest loans. Potential sources include State Revolving Fund, Community Development Block Grants, or other housing development funds.

Figure 4-1: Disadvantaged Communities in Santa Cruz County


DAC Mapping Tool
Designed to assist with responsibilities related to IRWM, SGMA, and the CA Water Plan
Find address or place
SARATOGA
LOS GATOS
Santa Clara
MADRONE
BOULDER CREEK
BEN LOMOND
SCOTTS VALLEY
DAVENPORT
SANTA CRUZ
LIVE OAK
RIO DEL MAR
INTERLAKEN
Portola Redwoods State Park
Castle Rock State Park
Butano State Park
Big Basin State Park
Año Nuevo State Park
Wilder Ranch State Park
Forest of Nisene Marks State Park
Los Gatos Creek
Uvas Creek
Coast Rd
17
85
101

5 Water Quality Monitoring and Assessment Program

The Santa Cruz LAMP provides for ongoing water quality monitoring to track the potential impact of OWTS use on groundwater and surface water as well as the effectiveness of this LAMP in addressing those impacts. Water quality monitoring also ensures that the water quality is suitable for beneficial uses as defined by the Basin Plan that includes drinking water, recreational use, fisheries habitat, and ecosystem services. Santa Cruz County's water supply is derived locally from within the county, without importing water from outside its boundary. Countywide non-agricultural water supply is 40% surface water and 60% groundwater, with northern half of county residents served primarily by surface water.

Nitrate and fecal indicator bacteria are the two most significant water quality parameters that County EH monitors to track the potential effects of stormwater, sewer leaks, OWTS, and other sources. County EH utilizes a variety of data sources to monitor these and other water quality constituents within its watersheds for both surface water and groundwater:

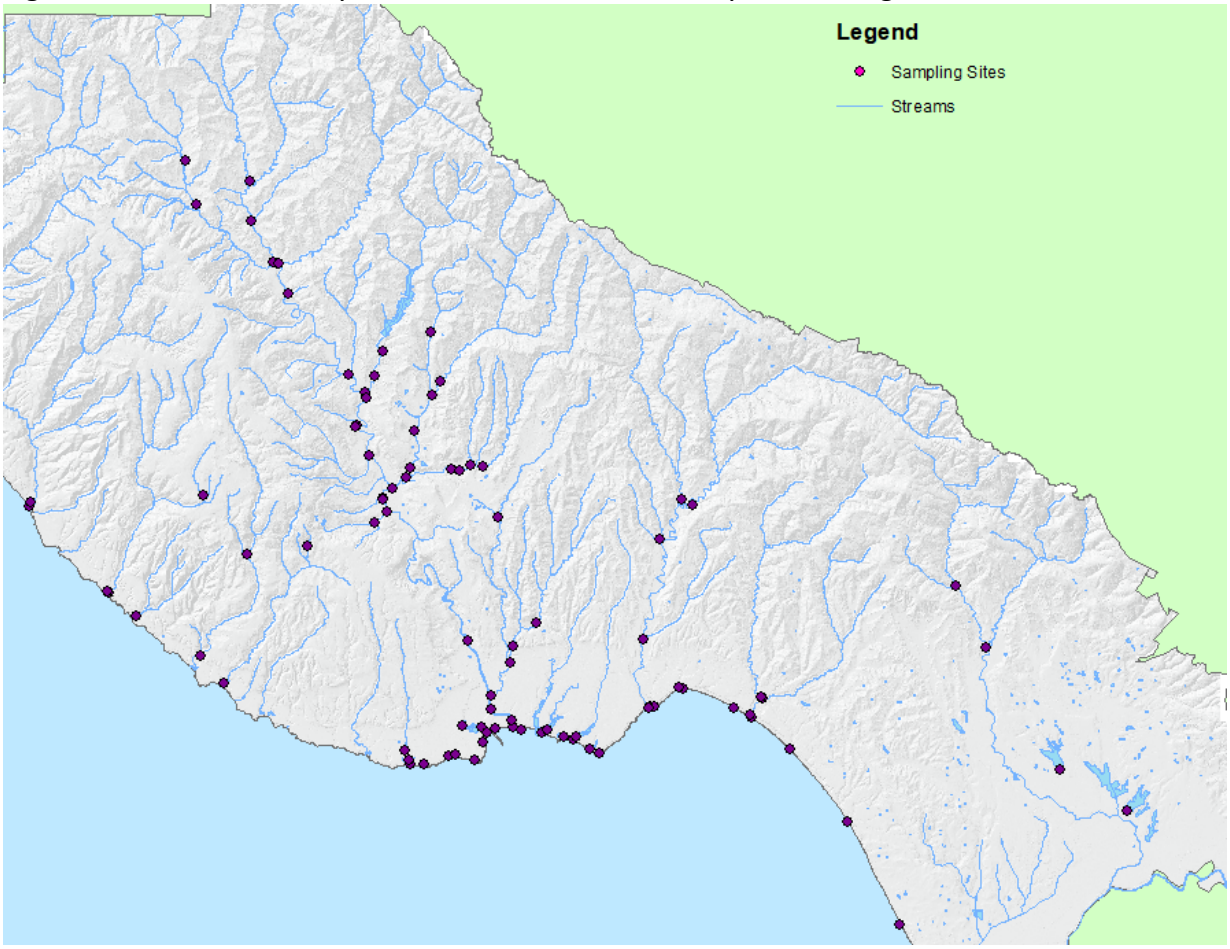
- Surface water data is mostly provided by the County Water Quality Lab, which has monitored water quality of beaches, natural bathing areas, streams and some groundwater since the 1970's.
- Surface water quality data is also provided by other entities, including City of Santa Cruz monitoring of their surface water sources, citizen monitoring programs, stormwater monitoring efforts, and others.
- Groundwater quality is provided by required testing or private wells upon installation, source water monitoring of small and large public water systems, and state and federal monitoring programs and number of datasets that provide surface and groundwater quality data.

County EH reviews all available data to evaluate water quality trends, compliance with objectives, and assessment of potential sources of pollution, including OWTS. Numerous reports have been presented on overall watershed health, beach water quality, effectiveness of the San Lorenzo Wastewater Management program, stormwater program effectiveness and progress in achieving TMDL objectives. The State OWTS policy provides for assessment of water quality trends relative to OWTS every five years.

5.1 Surface Water Quality Monitoring

The County EH Lab monitors surface waters countywide, including streams and ocean beaches, per CA Health & Safety Code §115885, as well as some limited shallow monitoring wells for tracking groundwater. Monitoring sites occur within the County's five principal watersheds: North Coast (Waddell, Scott, San Vicente, Laguna, Majors Creeks) San Lorenzo River and tributaries, Soquel Creek, Aptos Creek, and Pajaro (Corralitos Creek, Salsipuedes Creek, Pinto Lake, Pajaro River and Watsonville Sloughs).

Figure 5-1: Routine County EH Lab Surface Water Quality Monitoring Locations

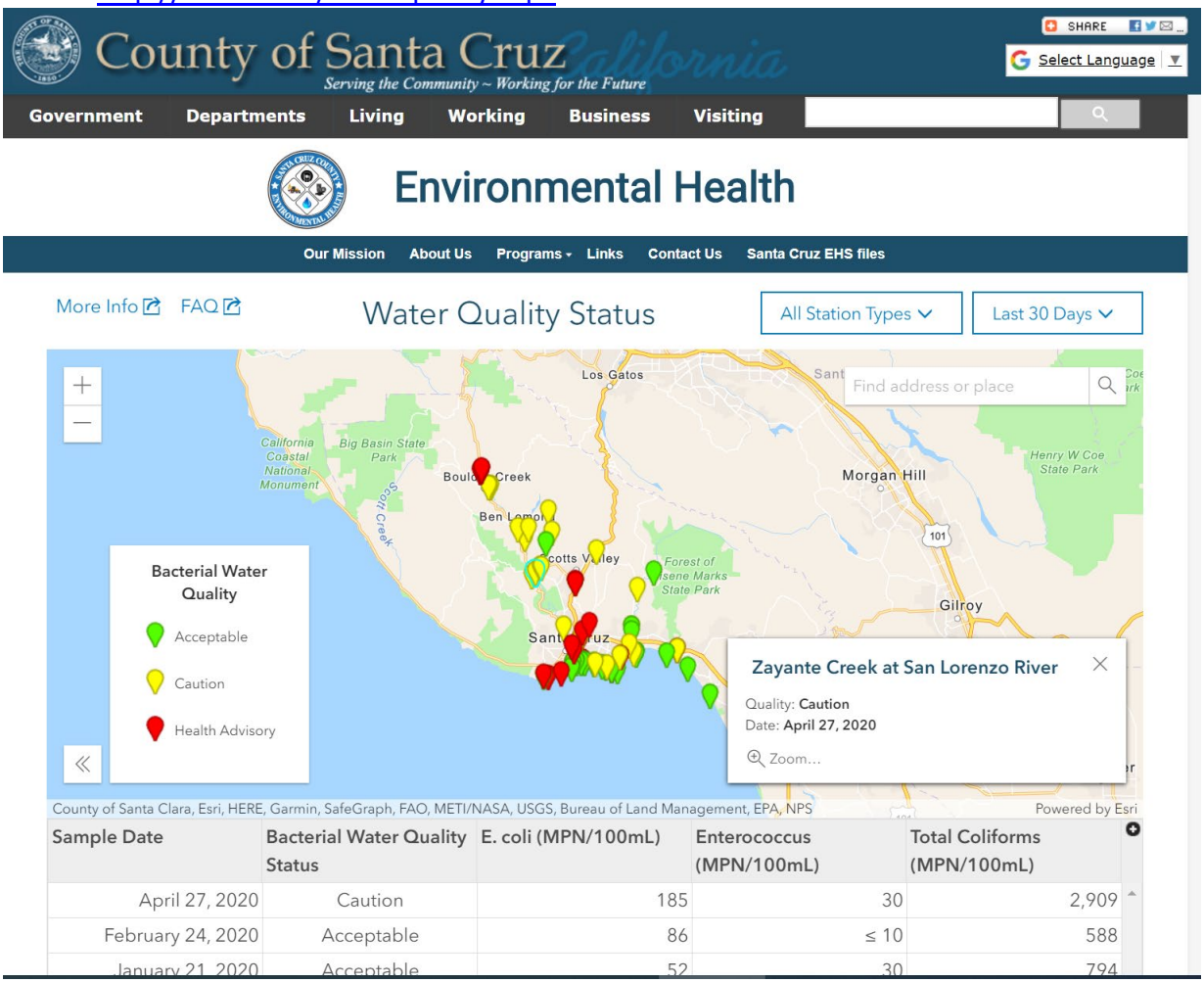


County EH conducts routine monitoring of nitrate and fecal indicator bacteria and other water quality parameters throughout the year. Additional samples are collected from ditches, storm drain outfalls and other stream locations as a part of source investigations or in response to complaints.

The County EH Lab posts results of fecal indicator bacteria on a public website [8] hosted by County EH, reporting three bacterial types: 1) *Escherichia* coli (E. coli); 2) Enterococcus; and 3) Total Coliforms. The website posts data for over 100 sampling locations under the categories: Ocean, Streams, Urban Streams, Sloughs, and Lakes and Ponds.

[8] http://scceh.com/waterquality.aspx

Figure 5-2: EH Surface Water Quality Website for Fecal Indicator Bacteria
http://scceh.com/waterquality.aspx



Sample Date	Bacterial Water Quality Status	E. coli (MPN/100mL)	Enterococcus (MPN/100mL)	Total Coliforms (MPN/100mL)
April 27, 2020	Caution	185	30	2,909
February 24, 2020	Acceptable	86	≤ 10	588
January 21, 2020	Acceptable	52	30	794

The County EH Lab provides comprehensive support for the County EH OWTS program and for the annual water quality data reporting requirements of this LAMP. The County EH Lab conduct field sample collection, laboratory analysis, and data management and reporting. The EH Lab is state certified for recreational water and drinking water microbiology and inorganic chemistry. An overview of analytical capabilities is given in Table 5-1.

Table 5-1: Overview of Analytical Capabilities of the Santa Cruz County EH Lab

Category	Test	Purpose or Application
Microbiology tests		
	Indicator Bacteria	
	Coliforms-ELAP certified	
	Drinking Water: Total Coliforms and E. Coli	Safe Drinking Water Act Compliance (rTCR)
	Total Coliforms and E. Coli enumeration-ELAP certified	Recreational water, illicit discharges, TMDLs
	Fecal Coliforms (44.5 C)	E. Coli verification
	Enterococci-ELAP certified	Recreational water, illicit discharges, TMDLs
	Heterotrophic Plate Count -ELAP certified	Groundwater, surface water, and drinking water screening
	Bacterial and coliphage screening (Iron bacteria)	
	Bacterial screening (Pseudomonas, Legionella, Vibrio)	Triggered by illness or indicator test results
	Microbiological investigations	
	Microbial Profiling	Isolate DNA for investigations
	Microbial Source tracking	Identify potential sources of microorganisms
	Coliform or Enterococci speciation	Identify dominant bacteria
	Cyanobacteria	Cyanotoxin screening
Geochemical parameters		
	pH, conductivity, Turbidity	General characterization; solids proxy
	Alkalinity	Carbonate in freshwater samples
	Hardness (Total and Calcium); Magnesium (calculation)	Calcium and magnesium (freshwater)
	Chlorine, Free and Total	Drinking water or chlorinated water systems
	Dissolved anions: chloride, fluoride, bromide, sulfate	Dominant anions (freshwater)
	Dissolved minerals: potassium, sodium	Baseline and temporal screening
	Reduced Minerals (Iron, Manganese)	Groundwater screening
	Boron	Irrigation water, illicit discharges, or stormwater
	Copper, Zinc	Stormwater and illicit discharges
Nutrients		
	Nitrogen	
	Ammonia-Nitrogen	Spills and illicit discharges
	Nitrate-Nitrogen , Nitrite-Nitrogen	TMDLs, Freshwater and stormwater monitoring
	Total-Nitrogen	Nitrogen balance
	Ortho-Phosphate (as P)	Mitigation of algal blooms
	Total-Phosphorus	Phosphorus balance
Organics		
	UV-absorbance	Surrogate for dissolved organics
	Algal toxins	Health risks, NPDES, TMDLs
	Microcystins and Nodularins	
	Anatoxin-a	
	Cylindrospermopsin	
	Saxitoxins	
	Pesticides	Freshwater investigations
	Glyphosate	
	Pyrethroids, Fipronil, 2,4-D	
Specialized tests		
	Irrigation suitability: pH, alkalinity, conductivity, calcium, magnesium, sodium, potassium, boron, chloride, sulfate nitrogen	Water quality evaluation for irrigation systems
	Storm drain analysis: Compliance and investigatory	Site investigations
	On-site wastewater treatment: pH, conductivity, indicator bacteria, nutrients, boron, potassium, anions	Field investigations of treatment efficacy and alternative technologies

The EH Lab routinely uploads beach water quality data to State's Beach Water Quality database, which eventually is loaded into California Environmental Data Exchange Network

(CEDEN). The EH Lab has recently updated the County's water quality database and is developing capabilities to upload all freshwater data to CEDEN. The EH Lab also provides analysis of data, trend analysis and compliance review in support of the County stormwater program, beach water quality program and TMDL compliance.

Surface water quality data related to OWTS performance is also provided to the City of Santa Cruz Water Department (City), other public water systems that use surface water, Pajaro Valley Water Management District (PV Water), various stormwater and discharger programs, several citizen and academic monitoring efforts, and the Water Board's Central Coast Ambient Monitoring Program (CCAMP).

The City conducts routine monitoring of its raw water sources on the San Lorenzo River at Felton and at the City Limits (Tait Street), as well as at its North Coast sources on Laguna, Majors and Liddell creeks. Constituents of interest potentially related to OWTS are nitrogen, indictor bacteria, total organic carbon, and taste and odor. The City has conducted special studies testing for disinfection byproducts, constituents of emerging concern (pharmaceuticals, pesticides, etc.) and specific pathogens such as giardia and cryptosporidium. City staff have also conducted regular monitoring of the San Lorenzo Lagoon for fish numbers, nutrients, dissolved oxygen, algae growth, stratification and other parameters related to condition of the lagoon for fish habitat. City and County EH staff communicate regularly and share data and observations regarding the quality of the water sources and potential impact of OWTS.

Other large and small public water systems conduct routine monitoring of their drinking water supply sources, but most of these drinking water supply sources are located in relatively undisturbed watershed areas with limited presence of OWTS. Three sources that would have some influence by OWTS are: Mill Creek, water source for Davenport that captures some of the Bonny Doon area; and, Corralitos Creek and Browns Creek, which serve the City of Watsonville. Data from these sources can be accessed by EH staff from the state's drinking water database.

- PV Water conducts monitoring of surface and groundwater for nutrients and salts. They readily share data with County EH.
- The stormwater jurisdictions in the county conduct monitoring of storm drains and receiving waters as a part of the municipal stormwater program. Data is shared and presented in a joint annual report prepared by County EH and city staff. Much of the EH Lab monitoring data is incorporated into the annual stormwater report. The City of Watsonville conducts monitoring in the slough system. Scotts Valley and Capitola contract with the County EH Lab to conduct additional monitoring within their areas. The City of Santa Cruz Public Works Department conducts monitoring of ocean waters, storm drains, the San Lorenzo River, Branciforte and Carbonera Creeks for fecal indicator bacteria (FIB), nutrients, caffeine and some other constituents as a part of their stormwater management program and compliance with their wastewater discharge permit. Although most of the stormwater monitoring relates to urban runoff in sewered areas, OWTS are identified as potential sources of pollutants and OWTS

management is specified as one of the components of the County Stormwater Management Program.

- CCLEAN is a long-term effort funded by the City of Santa Cruz, City of Watsonville, and other wastewater dischargers, to measure the relative effects on Monterey Bay water and sediment quality of discharges from wastewater plants, rivers and stormwater.
- The Coastal Watershed Council conducts citizen monitoring along the San Lorenzo River and other nearby streams for Snapshot Day.
- Watsonville Wetlands Watch conducts monitoring of the slough system for FIB and nutrients; some locations have some limited influence from OWTS.
- UCSC has monitored harmful algal blooms and algal toxins at Pinto Lake and the San Lorenzo River Lagoon, CSUMB has also conducted monitoring efforts at Pinto Lake and Watsonville Sloughs.
- CCAMP provides routine and periodic and in-depth sampling of surface waters for a variety of constituents. Data is uploaded to CEDEN and reported on the CCAMP website where data analysis and comparison can be done.

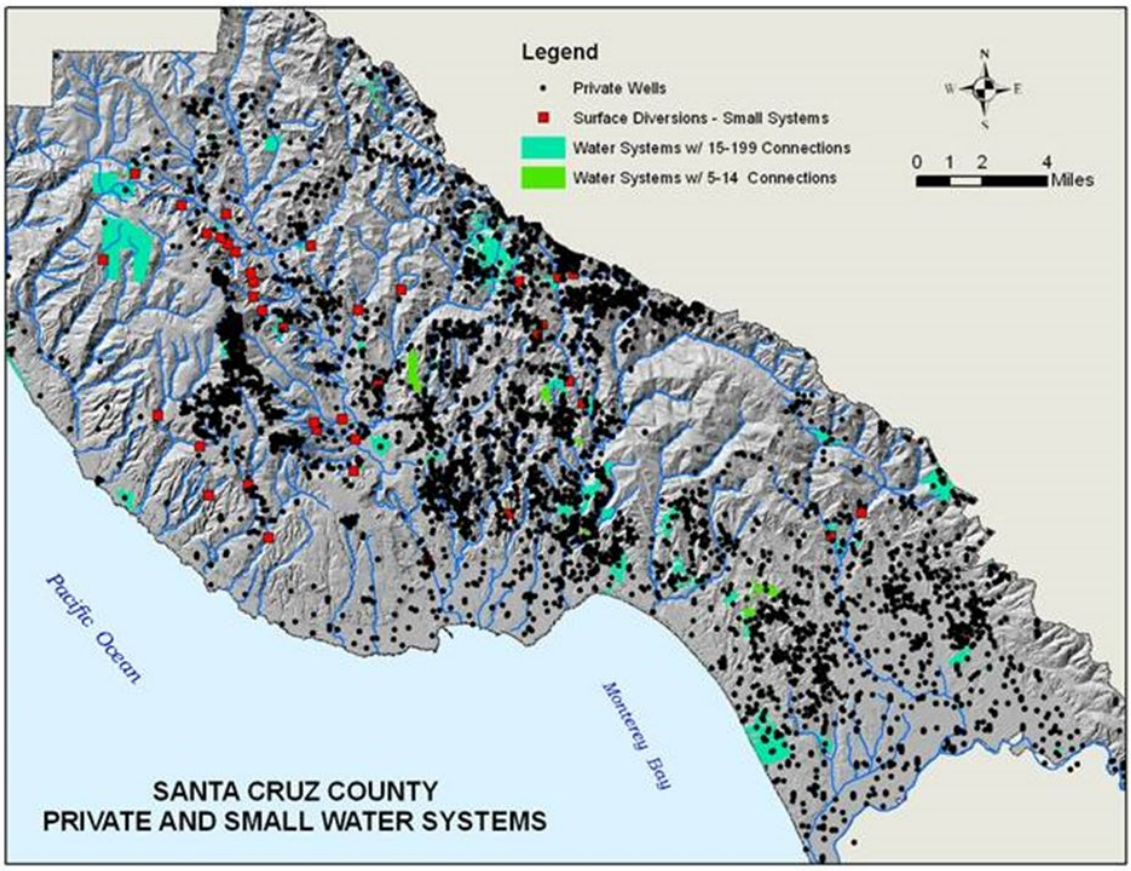
5.2 Groundwater Monitoring

Groundwater quality data is available from several different sources, including sampling of new wells and individual water systems, routine testing of wells serving public water systems, monitoring programs conducted by groundwater sustainability agencies, monitoring of contaminated sites, and some past testing by the EH Water Quality Lab. Much of this data is made available through the Water Board's GAMA Groundwater information System (Figure 2-9). Since 2010, County EH has required water sampling for all wells at the time of initial drilling installation. For Individual Water System (IWS) Permits (1-4 connections), sampling is required initially and again if an additional property is developed and sharing the well and the previous data is over three years old. Testing is done for total dissolved solids, chloride, nitrate, iron and manganese. For an IWS permit, testing is also required for yield, total coliform and E. coli. Since 2010, the chemistry data has been entered in a spreadsheet and the data can be plotted to show geographic distribution of results.

There are presently 200 public water supply wells that provide potable water to approximately 105 water systems in the County that serve more than 14 connections or that are non-community public systems. The County GIS also includes water supply well spatial data for another 30 state small systems with 5-14 connections. For State Small systems, broader sampling is done initially, and then bacteriologic sampling is done quarterly. For small public water systems (15 to 199 connections), water quality sampling occurs periodically at a frequency that varies from monthly to triennially, depending on the type of water system, the constituent, and sampling history. The data is maintained in the state's Safe Drinking Water Information System (SDWIS) and can be accessed by staff through Water Quality Inquiry or through Drinking Water Watch, which is accessible to the public. Sampled constituents include:

- Total Coliform Bacteria Most Probable Number
- Fecal Coliform or E. coli
- E. coli
- Lead and Copper (as needed)
- Sodium
- Hardness
- Nitrate (as nitrogen, N)
- Chlorine Residual
- Total Chromium or Hexavalent Chromium
- Chloride
- Sulfate
- Total Dissolved Solids (TDS)
- Iron
- Manganese
- Turbidity
- Total Organic Carbon, as needed
- Total Trihalomethanes, as needed

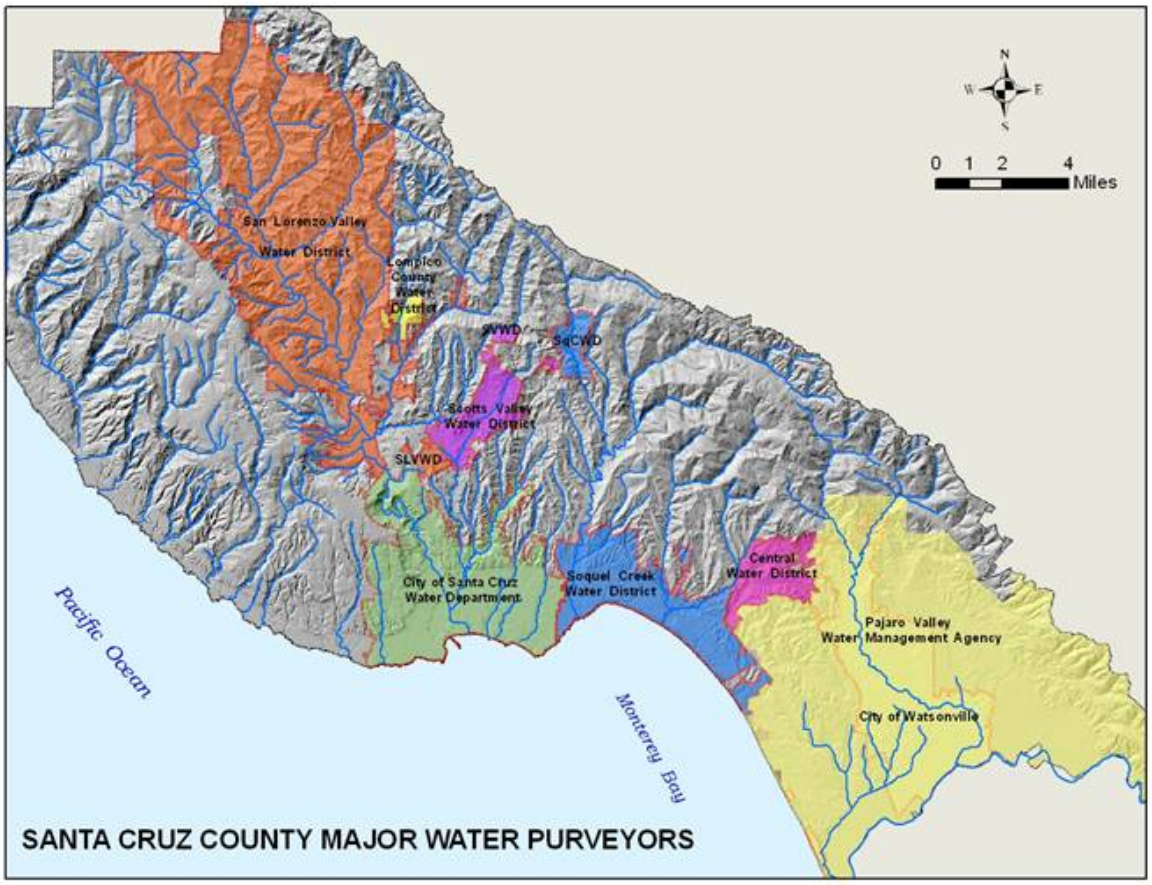
Figure 5-3: Private Wells and Small Water Systems in Santa Cruz County



Santa Cruz County contains nine Large Public Water Systems (LWS) with more than 200 connections operated by various water districts or agencies (Figure 5-4). Each LWS monitors their surface and groundwater sources for water quality and publishes annual Consumer Confidence Reports (CCRs) to attest to compliance with State drinking water standards.
The nine LWSs in Santa Cruz County are:

- San Lorenzo Valley Water District (SLVWD)
- Scotts Valley Water District (SVWD)
- Santa Cruz Water Department (City SC)
- Soquel Creek Water District
- Central Water District
- City of Watsonville
- Big Basin Water Company
- Mt. Hermon Association
- Forest Lakes Mutual Water Company

Figure 5-4: Large Public Water Systems in Santa Cruz County



Water System water quality data can be extracted from WQI and utilized to monitor for potential impacts of OWTS. In 2019, there were 389 analyses for nitrate from 135 sources and 86 systems. This also included surface water sources. Most (241) of the results were less than 1 mg-N/L, while 74 were greater than 5 mg-N/L, all within the agricultural area of the Pajaro Valley.

Under the Sustainable Groundwater Management Act (SGMA) there are three Groundwater Sustainability Agencies (GSAs) in the county that are now conducting groundwater monitoring and annual reporting to document compliance with the water quality goals of their groundwater sustainability plans. These include Pajaro Valley Water Management Agency, Santa Cruz Mid-County Groundwater Agency and the Santa Margarita Groundwater Agency. Much of this monitoring represents a continuation of monitoring historically conducted by their member agencies, but the monitoring does include additional monitoring wells. Monitoring includes nitrate.

Groundwater quality data is collected from monitoring efforts during the investigation and remediation of contaminated sites. Some of this data includes information of interest relative to potential impacts of OWTS. This information is available through the State Geotracker

program and much of it is also published on the GAMA website and can be downloaded for further analysis.

The County EH Lab has historically monitored groundwater quality in some deeper supply wells throughout the county and in shallow groundwater (2-15 feet) in the San Lorenzo Valley as a part of developing the San Lorenzo Wastewater Management Plan. Over 500 samples were analyzed from 30 different shallow monitoring wells in Valley communities. The mean values were all less than 10 mg-N/L, with only 4 having a mean value greater than 5 mg-N/L. This program was discontinued but may be started up again if new surface or groundwater quality data indicates that there is water quality impairment indicating a need for further investigation.

5.3 Data Reporting and Assessment

Fecal indicator bacteria data obtained by the County EH Lab are validated and reviewed to identify anomalies and determine if follow-up testing is needed. If levels of indicator bacteria exceed the state standards, sites are resampled to identify potential causes. The data are posted to the County's water quality website. All data are summarized and inspected regularly to evaluate trends and optimize sampling frequencies for the beach water quality program, stormwater program, TMDLs, and the annual LAMP reporting. Every 5 years more detailed trend analysis will be conducted and reported. This analysis will utilize available datasets for surface and groundwater. A summary of available current and historical water quality data related to OWTS performance is contained in Section 2 of the LAMP.

County EH is continuing work already underway to establish procedures that can efficiently integrate the County's water quality data with that of CEDEN and with the State's Water Quality Assessment Database. County EH is investigating ways to better accessing and coordinate datasets maintained by the County and the State regarding drinking water quality. The County is also working with the other agencies in the GSAs to establish new data management systems to maintain all data required by SGMA. It is anticipated that this will be completed by 2021.

6 Program Management

In Santa Cruz County, OWTS are managed by the Environmental Health Division of the Health Services Agency. Within Environmental Health, permitting and inspection is completed by the Land Use Program staff, with assistance from the Water Quality Laboratory (EH Lab) and the Water Resources Program staff. County EH staff participates with the Planning Department on building permit review, discretionary permit review, geologic hazard assessment and biotic resource review. County EH works with Public Works Department staff on stormwater management, establishing consistent policies for separation between OWTS and stormwater conveyance and infiltration devices, and reviewing individual building proposals for compliance with those requirements. EH staff also work with DPW Sanitation staff on considering the potential for extending sewer service to properties currently on OWTS.

County EH wastewater management activities are funded by permit fees and annual service charges collected on the tax bill of properties served by OWTS through CSA 12.

6.1 OWTS Data Compilation

County EH maintains records of OWTS activities in several different systems:

- Paper files are created when a permit application is received, or a complaint investigation is initiated. An electronic record is also initiated. Once the complaint is resolved and an installation is complete and signed-off, the paper file is scanned, the relevant information is entered in the database, and the paper file is purged. During the active life of a project, paper files are available for review by the public at the counter.
- All records are permanently maintained as scanned records in an electronic filing system (Fortis, or Laserfiche). This includes permit records, pumper reports, plot plans, inspection records, emails, correspondence, field notes, and notes from discussions at the counter. There is some delay between the time a paper record is generated and the time it takes to be scanned and entered into the electronic database. The electronic records are available from terminals at the counter and are also available online over the internet: https://www.scceh.org/Home/SantaCruzEHSfiles.aspx
- Records of all activities are entered into an electronic database the Environmental Health Land Use Information System (EHLUIS) that can be used to summarize information for a parcel, track problem systems, analyze trends and provide for reporting of activities. EHLUIS is available to staff but is not available to the public. EHLUIS includes the following elements:
    - Background Summary Records are created for each OWTS (there may be multiple OWTS on one parcel). Records are also included for vacant parcels or sewered parcels where there has been some related activity, such as grease trap pumping, water quality complaint investigation, or permit application.
    - History by APN shows a listing of all the records for that parcel on one screen. These records can be selected for more in-depth inquiry.
    - Permit information is shown for all OWTS permits, well permits, building application clearances, requests for system evaluations, and individual water system permits. A permit record is created at the time of application submission and is updated as the project proceeds to permit approval and completion. All permits have been entered since July 1, 1991, and there are now over 31,000 permit records. OWTS permits were entered going back to 1983. Data entry fields will be modified to capture information on variances that are allowed for individual permits.
    - Installation Records capture information on the nature of the OWTS and the site conditions, including tank size and material, date of installation, dispersal system size and depth, slope, soil, percolation rate, groundwater depth, stream setback, well setback, embankment setback, and use of other system components such as pumps, distribution box, valves, greywater sump, etc. Installation records have been entered for all systems installed between 1991 and 2018, with older installations back to 1968 entered for special study areas including the San Lorenzo Valley and Amesti Road area. There are 18,200 installation records in the database, some of them representing multiple installations over time on one parcel.

  - Pumping records are entered for each time an OWTS is pumped indicating the tank size, material and conditions and any signs of failure or greywater discharge, past high level or liquid flowback when pumping. There are presently 35,000 records in the database going back to October of 1987, when pumping reports were first required to be submitted.
  - Inspection records are entered for complaint investigations, area surveys of individual parcels, rechecks, or the routine inspections required for nonstandard systems. There are currently 14,300 inspection records going back to January 1984.
- The County Geographic Information System (GIS) displays some 100 layers of information, much of which is relevant to OWTS. A significant amount of this is publicly available over web-based GIS application, GISWeb: https://gis.santacruzcounty.us/gisweb/. Some of the most relevant layers include:
  - Parcels with OWTS and links to information from EHLUIS
  - Domestic wells, public water system wells, public water systems surface diversions, water supply watershed boundaries, and water system service areas
  - Streams, watersheds, groundwater basins and groundwater recharge areas
  - Soils, geology, slope, landslides, geologic reports
  - Biotic resources
  - Sanitation districts and sewer lines
  - OWTS constraints: clay soils, sandy soils, public water sources, karst
- The Envision data system is used to track permit records, complaints, individual systems, and time accounting of staff time spent on permits, complaints, facilities, and the outcomes.
- Records of enhanced treatment systems are maintained in a spreadsheet, including system type, OSSP, date of service contract, and date of most recent inspection report. A separate spreadsheet tracks the water quality results for enhanced treatment system monitoring.
- The Water Quality Database contains records of County water quality sampling going back to the 1970's. It also includes flow data and monitoring data of shallow groundwater levels. This database has some 220,000 records of fecal indicator bacteria, nitrate, temperature, dissolved oxygen, conductivity, turbidity, geochemical data, nutrient speciation, cyanotoxins, flow and groundwater level, among other parameters.

6.2 Data Management and Reporting

All the County data systems have provisions for relating and exporting data in order to summarize data, evaluate trends, and relate various factors such as variations from standards. From 1986 through 2016, reports have been provided of OWTS management activities relative to the San Lorenzo Wastewater Management Program. Pursuant to the State OWTS Policy, data will be extracted to provide by February 1 annually reports on:

- Number and location of complaints received pertaining to OWTS operation and maintenance, investigations and inspections conducted, results of inspections, and outcomes.

- Septic Tank pumping records, including volumes pumped, frequency of pumping, indications of system malfunction, and applications and registrations issued as part of the local septic tank cleaning registration program pursuant to Section 117400 et seq. of the California Health and Safety Code.
- Number, location, and Tier of permits for new and replacement systems, including variances approved.
- Summary of water quality data obtained as required per section 9.3.2 et. al of the State OWTS Policy.

Every five years, the County will prepare an analysis of the water quality data and system data to provide an assessment of overall OWTS performance, with recommendations for any further management needs for protection of water quality. All permanent records of County permitting actions will be made available within 10 working days upon written request for review by a Regional Board. The records for each permit will reference the Tier under which the permit was issued.

6.3 Program Administration and Funding

The OWTS program is conducted by primarily by the Land Use Program, which consists of one Program Manager, 5 district inspectors and 2 clerical staff. Approximately 1 full time equivalent (FTE) is devoted to permitting of wells and water systems, but the remainder is devoted to OWTS permitting, and oversight, including building permit review for properties served by OWTS. Water Resources staff provide about 1.5 FTE for water quality monitoring, data analysis, and reporting. Efforts were somewhat reduced in 2008-10 and 2018-19 due to staff vacancies in both programs. Approximately half of the revenues come from permit fees and the other half comes from annual service charges collected from properties served by OWTS within the countywide onsite wastewater district, CSA 12.

CSA 12 was originally created to provide OWTS oversight to two relatively small subdivision in the San Lorenzo Watershed. In 1989, CSA 12 was expanded to cover the entire county outside the boundaries of the cities and the existing sewer sanitation districts. At the same time, a special Zone A (CSA 12A) was created within the San Lorenzo Watershed to fund the additional oversight activities of the San Lorenzo Wastewater Management Program. Charges were first collected in Fiscal Year 1990-1991. In 1993 a third category of fees was added for oversight of Nonstandard systems (CSA 12N). Fees are established and levied each year by resolution of the Board of Supervisors. The CSA 12 and 12A fees pre-date Proposition 218 and have not been increased since 1996. The CSA 12N fees are considered development related fees and can be increased but have been stable since 2009-10.

Every OWTS-owning parcel in the county pays the CSA 12 fee. Every OWTS parcel in the San Lorenzo watershed pays an additional CSA 12A fee, and every parcel with a permitted nonstandard system pays an additional CSA 12N Fee. A parcel can fall into the first, second, or all three of the fee categories. The fee levels for Fiscal Year 2019-20 are as follows:

1. CSA 12: $6.90 per parcel - County wide Septic System Maintenance.
2. CSA 12A: $18.54 per parcel - Zone A- San Lorenzo Wastewater Management.
3. CSA 12 N: $101.00; $501.00; or $167.00 – three tiers for Nonstandard Systems,

depending on the type of system, maintenance of a service contract and reporting, and degree of oversight required.

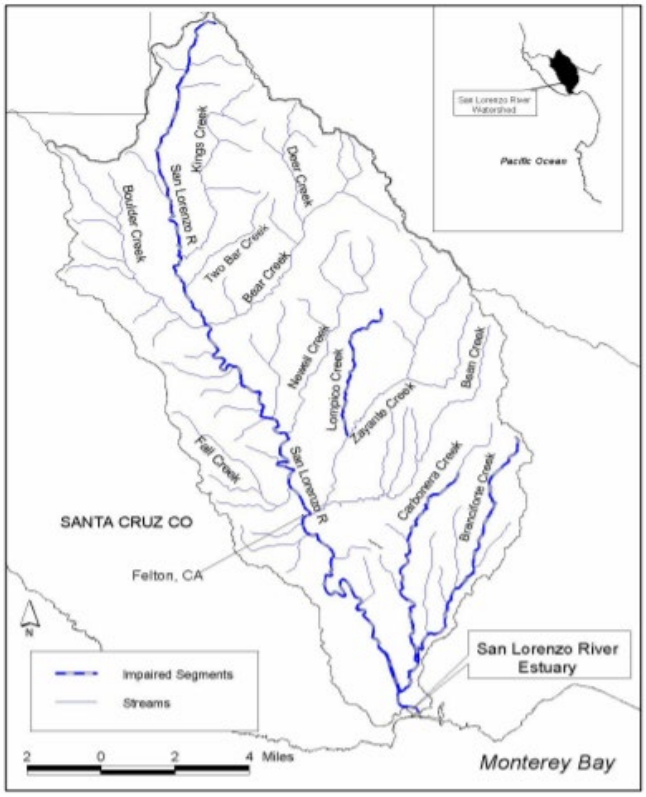
The charges fund the following activities:

- development and operation of septic tank sludge disposal facilities,
- development and maintenance of a computerized information system to track OWTS performance and maintenance,
- water quality monitoring to evaluate impacts of wastewater disposal,
- educational programs for property owners, realtors and others for enhanced OWTS management.
- oversight of existing systems including inspections, evaluations, investigations, and monitoring of nonstandard systems.
- data management and reporting.

Figure 6-1: Boundaries of County Service Area No. 12 (CSA 12), Septic Maintenance

The CSA12 fee of $6.90/year (FY 20-21) is charged to all parcels operating an OWTS. For septic tanks to be properly maintained, they must be pumped out regularly to remove accumulated solids. Regular pumping is dependent on the availability of a suitable location for disposal of the septic tank sludge. The CSA 12 fees provide funding to pay for countywide OWTS program permitting management; administration, collection and treatment of septic tank sludge at the City of Santa Cruz Sewage Treatment Plant; public education on OWTS maintenance; and maintenance of the computerized record keeping database systems for tracking septic tank pumping, inspections, and permitting.

Figure 6-2: Boundaries of CSA 12 Zone A, San Lorenzo Septic Management



The additional CSA12A fee of $18.54/year (FY 20-21) is charged to all parcels operating an OWTS within the San Lorenzo River Watershed. The San Lorenzo River Watershed area has the highest need for proper OWTS management within the County. Accordingly, County EH has managed this region for the last twenty-three years with a concentrated planning and management regime according to the SWRCB's approval of the County's 1995 Wastewater Management Plan for the San Lorenzo River Watershed, following a period of strict wastewater discharge prohibitions imposed by the State from 1982-1995. This Management Plan provides a comprehensive wastewater management program for the San Lorenzo Watershed which includes regular water quality testing to identify problems; field inspections and evaluations of all OWTS approximately once every six years; and other efforts to promote better wastewater management. This increased level of management is partially funded by the added annual fee paid by all properties with OWTS in this watershed.

Beginning in 1993-94, an additional charge under CSA 12N is collected for those parcels served by nonstandard OWTS. This charge pays the costs of the County's monitoring efforts, which are needed to ensure that the systems are continuing to perform adequately. Over 860 nonstandard OWTS have been approved for use in Santa Cruz County. The additional CSA 12N fee is charged to parcels served by nonstandard wastewater disposal systems (enhanced treatment systems, alternative dispersal systems, haul away systems, or nonconforming systems) as designated by the County Health Officer pursuant to Chapter 7.38 of the Santa Cruz County Code, depending on the type of system and whether the system is subject to a service agreement with a certified onsite system service provider (OSSP), and where payment

of a charge is required as a condition of a sewage disposal system permit. These CSA12N charges for the FY 20-21 are:

- $ 167.00: Managed Alternative Dispersal/Enhanced Treatment Systems (with OSSP) (Level 6)
- $ 501.00: Alternative Dispersal/Enhanced Treatment Systems (with no OSSP) (Level 3)
- $ 101.00: - Nonconforming Conventional Systems (Level 4)

7 Definitions

(A) “Abatement” means the installation, construction, alteration, enlargement, reconstruction, replacement, improvement or reconditioning of any OWTS, or the filling in and abandonment of any OWTS which cannot be repaired, and/or the construction, alteration, enlargement, reconstruction or replacement of any required building sewer line connecting with a public sewer, so as to eliminate a violation of this chapter.

(B) “Bedroom”. For the purposes of sizing an OWTS, any room that could be utilized as a bedroom shall be counted as a bedroom as determined by the Health Officer, including any room in a dwelling that is at least 70 square feet in area, that by its design can furnish the minimum isolation necessary for use as a sleeping area .

(C) “Cesspool” means an excavation in the ground receiving domestic wastewater, designed to retain the organic matter and solids, while allowing the liquids to seep into the soil. Cesspools differ from seepage pits because cesspool systems do not have septic tanks and are not authorized for continued use. The term cesspool does not include pit-privies and out-houses.

(D) “Construction” means the installation, major repair, alteration, enlargement, replacement, improvement or relocation of an OWTS.

(E) “Curtain drain” means a trench filled with drain rock that is designed to intercept and divert ambient groundwater with surface discharge via piping to another location. Curtain drains are typically used to dewater areas upslope of a retaining wall or a foundation and lower the water table. Curtain drains are also known as French drains.

(F) “Dispersal system” or “disposal system” means a leachfield, seepage pit, mound, at-grade, subsurface drip field, evapotranspiration and infiltration bed, or other type of system for wastewater subsurface discharge. Alternative dispersal system means a dispersal system that is not a trench or seepage pit and includes mounded bed, drip dispersal, or at-grade systems. Chambers in trenches are not considered alternative dispersal systems.

(G) “Domestic wastewater” means wastewater with a measured strength less than high-strength wastewater and is the type of wastewater normally discharged from, or similar to, that discharged from plumbing fixtures, appliances and other household devices including, but not limited to toilets, bathtubs, showers, laundry facilities, dishwashing facilities, and garbage disposals. Domestic wastewater may include wastewater from commercial buildings such as office buildings, retail stores, and some restaurants, or from industrial facilities where the domestic wastewater is segregated from the industrial wastewater. Domestic wastewater

may include incidental recreational vehicle (RV) holding tank dumping but does not include wastewater consisting of a significant portion of RV holding tank wastewater such as at RV dump stations. Domestic wastewater does not include wastewater from industrial processes.

(H1) “Drainageway” means a natural or artificial channel that flows for no more than seven days after significant rainfall

(H2) “Drainage Device” means a ditch, swale or stormwater facility that carries stormwater for less than 12 hours after significant rainfall and that is used for the treatment and/or dispersal of roof runoff or other site drainage, such as a vegetated swale and infiltration/percolation trench or basin.

(I) “Finding of compliance” means a determination by the Health Officer that the design and specifications for an OWTS to serve a property for which it is intended are in conformance with standards in effect at the time the finding is made.

(J) “Environmental Health Division” means the Environmental Health Division of the Santa Cruz County Health Services Agency.

(K) “Expansion Area” means a designated area on a parcel where there is adequate room and soil conditions to accommodate a replacement of the dispersal systems that meets the requirements of County Code Chapter 7.38.

(L) “Health Officer” means the Santa Cruz County Health Officer or their authorized representative.

(M) “High-strength wastewater” means wastewater having a 30-day average concentration of biochemical oxygen demand (BOD) greater than 300 milligrams-per-liter (mg/L) or of total suspended solids (TSS) greater than 330 mg/L or a fats, oil, and grease (FOG) concentration greater than 100 mg/L prior to the septic tank or other OWTS treatment component.

(N) “Infiltrative surface” or “effective depth” or “flow depth” or “sidewall area” means the trench sidewall area below the distribution pipe where effluent may leach laterally into the soil. This area is in addition to the bottom area.

(O) “Karst” means a type of underlying geology that may have the presence of subsurface fissures, caverns, sinkholes or other features resulting from dissolution of limestone or marble that could lead to the rapid subsurface movement of untreated sewage.

(P) “Lot or parcel size” means the total horizontal area included within the property lines of the lot(s) or parcel(s) upon which an OWTS is installed; provided, that the area of any rights-of-way for vehicular access may be deducted for purposes of determining the size of any lot(s) or parcel(s) having a gross area less than one acre, where the Health Officer has determined that the vehicular access would have an adverse impact on the OWTS.

(Q) “Major repair” or “repair” means a replacement of an old or malfunctioning OWTS.

(R) “Minor maintenance” means replacement of septic tank tees, ells, filter, lids, sewer tight lines, pump, valve, electrical component, or other minor maintenance work not specified as a minor repair.

(S) “Minor repair” means installation of a distribution device, diversion valve, damaged or clogged dispersal pipe, greywater system, or other minimal repair work requiring a minor repair permit as determined by the Health Officer.

(T) “New System” or “New development” means an OWTS that is installed to serve a new structure or new use on a parcel where there are no pre-existing legal structures or legal OWTS.

(U) “Nitrate Concern Areas” are those areas where effluent discharge from OWTS in fast percolating soils have caused elevated levels of nitrate in surface water or groundwater, including the San Lorenzo River Watershed, North Coast Water Supply Watersheds, Valencia Creek Watershed and La Selva Beach area, as shown on the map of Nitrate Concern Areas maintained by the Director of Environmental Health.

(V) “Onsite Wastewater Treatment System (OWTS)” means individual treatment and disposal systems, community collection and disposal systems, and alternative collection and disposal systems that use subsurface disposal of sewage. These may include any of the following types of systems:

(1) “Conventional system” means a system which utilizes a septic tank (with or without a lift pump) and leaching trench dispersal system or seepage pits.

(2) “Standard system” means a conventional system which is constructed in accordance with the specifications for a standard system as described in SCCC 7.38.095 through 7.38.180.

(3) “Nonstandard system” means a system which is not in conformance with all the standards contained in SCCC 7.38.095 through 7.38.180 or which utilizes enhanced treatment. Nonstandard systems include enhanced treatment systems, nonconforming interim sewage disposal systems, limited expansion systems, low-flow systems, and haulaway systems.

(4) “Nonconforming interim sewage disposal system” means a conventional system design that provides for insufficient leaching area that is not in compliance with SCCC 7.38.150(A)(3), that is in soils that percolate in the range 60 to 120 MPI, that requires seasonal haulaway of effluent to function properly and meet required groundwater separation, or which is not in compliance with other requirements for a standard system contained in SCCC 7.38.095 through 7.38.180. Use of a nonconforming interim sewage disposal system requires use of water conservation devices.

(5) A Low-Flow System is a permitted system repair that meets the requirements for a standard conventional system except that it has a reduced amount of dispersal area and requires water conservation measures to keep the flow within design capacity and enables only a one-time addition of up to 500 sq. ft. of habitable space with no bedroom additions, no increase in volume of wastewater discharge, and must monitor average monthly flows with a wastewater meter. An annual fee is charged on the property tax bill and the property will be periodically checked for signs of failure.

(5) “Limited expansion system” means a conventional system that has sufficient leaching area but does not have sufficient area to accommodate a replacement system in compliance with the requirements for a standard system contained in SCCC 7.38.095 through 7.38.180.

(6) “Enhanced treatment system” means a system that utilizes an additional component (except a septic tank or dosing tank), that performs additional wastewater treatment so that the effluent is of a higher quality prior to discharge of effluent into the soil. An enhanced treatment system may utilize a wastewater treatment system that reduces pathogen, nitrogen, total suspended solids and biological oxygen demand concentrations and/or nonconventional means of dispersal such as mounded beds, pressure-distribution, at-grade dispersal, or drip dispersal.

(7) “Alternative dispersal system” means a dispersal system that is not a trench or seepage pit and includes mounded bed, drip dispersal, or at-grade systems. Chambers in trenches are not considered alternative dispersal systems.

(8) “Haulaway system” means an existing sewage system for which the Health Officer has ordered that the outlet of the septic tank, or other sewage holding container, be permanently or seasonally sealed, and the accumulated sewage pumped out and hauled away to an approved disposal site.

(9) “Greywater system” means a system for the year-round disposal of greywater originating from a clothes-washer, laundry sink, shower, bathtub, hand sink or similar source of low strength wastewater. This does not include “greywater” irrigation reuse systems pursuant to Health and Safety Code Section 17922.12

(W) “Pollution” means the introduction of a substance into surface or groundwater that degrades the quality of water so that it is in violation of established water quality standards or otherwise diminishes the suitability for beneficial uses.

(X) “Public Water System” is a water system regulated by the California Division of Drinking Water or a Local Primacy Agency pursuant to Chapter 12, Part 4, California Safe Drinking Water Act, Section 116275 (h) of the California Health and Safety Code. This does not include community systems serving less than 15 connections.

(Y) “Public Water Well” is a groundwater well serving a public water system. A spring which is not subject to the California Surface Water Treatment Rule (SWTR), CCR, Title 22, sections 64650 through 64666 is a public well.

(Z) “Qualified Professional” means an individual licensed or certified by a State of California agency or the Health Officer to design, install, and/or maintain OWTS and to practice as professionals for other associated reports, as allowed under their license or registration. Qualified professionals must obtain an annual registration from the Environmental Health Division.

(AA) “Replacement System” means an existing OWTS that has its treatment capacity expanded, or its dispersal system replaced or added onto. This includes major repairs, upgrades and additions.

(BB) “San Lorenzo Watershed” means all of the land area that drains into the San Lorenzo River upstream of its mouth at the Pacific Ocean.

(CC) “Sewage” means waste substance, liquid or solid, which is associated with human occupancy, or which contains, or may be contaminated with human or animal excretion or excrement, offal or feculent matter, or matters or substances that may be injurious or dangerous to health.

(DD) “Soil” consists of the natural organic and inorganic material near the earth’s surface which, in contrast to the underlying rock material, has been formed over time by the interactions between climate, relief, parent materials and living organisms.

(EE) “Stormwater infiltration device” means a subsurface trench, pit or bed or a surface rock bed designed to infiltrate stormwater and/or dissipate the flow at the discharge point of a pipe or ditch carrying stormwater.

(FF) “Upgrade or Addition” means partial or total replacement of an OWTS or addition of dispersal area or treatment components in order to meet current standards and support a remodel or addition to the structure or use that system serves. Installation of an additional OWTS to serve an accessory dwelling unit on a developed parcel is considered an upgrade.

(GG) “Water Body” means a body of non-flowing water, including vernal pools, ponds, lakes, tidal areas, and the ocean.

(HH) “Water supply watershed” means that area of a watershed that contributes surface water flow to a public water system water supply intake located in the San Lorenzo River Watershed or North Coast or Bonny Doon planning areas.

(II) “Watercourse” means a perennial or intermittent stream fed from permanent or natural sources, including rivers, creeks, runs, and rivulets, usually flowing in a particular direction (for at least seven days after rainfall) in a definite channel having a bed or banks, and usually discharging into some other stream or body of water.

(JJ) “Water quality constraint area” means the following areas which are located within one mile of intakes used for public water supply and are located within the watersheds of those intakes:

(1) City of Santa Cruz intakes on Reggiardo, Laguna, and Majors Creeks, and Liddell Spring;

(2) Bonnymeade Mutual intake on Reggiardo Creek;

(3) Davenport water system intakes on Mill and San Vicente Creeks.

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9 Appendices

A. Santa Cruz County Code Chapter 7.38. Sewage Disposal
B. Santa Cruz County Code Chapter 7.42, Septic Tank Pumping and Liquid Waste Transport
C. Summary of Onsite Wastewater Treatment System (OWTS) Requirements
D. Enhanced Treatment System Regulations
E. Septic Tanks, Distribution Boxes and Chamber Leaching Systems Approved for Use in Santa Cruz County
F. Site Evaluation and Soil Testing Procedures
G. State OWTS Policy
H. LAMP Completeness Checklist