**County of Santa Cruz Health Services Agency**
**Environmental Health Division**

# Onsite Wastewater Treatment Systems

## Local Agency Management Program


**Draft: 11/26/2019**

**Revision History**

| | | |
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# TABLE OF CONTENTS

**Appendices:**

A. Santa Cruz County Code Chapter 7.38, Sewage Disposal with Proposed Changes
B. Santa Cruz County Code Chapter 7.42, Septic Tank Pumping
C. Regulations for The Repair and Upgrade of Septic Systems
D. Enhanced Treatment System Regulations
E. Chamber leaching guidelines
F. Soil Evaluation and testing procedures
G. Winter Water Table Testing Procedures
H. State OWTS Policy
I. LAMP Checklist

# 1. Introduction

## Onsite Wastewater Treatment Systems (OWTS)

## Local Agency Management Plan (LAMP)

This document is the Local Area Management Program (LAMP) of the County of Santa Cruz (County) for 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 could not 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 is an expansion, refinement, and update of successful wastewater management approaches conducted by Santa Cruz County since 1985.

This LAMP presently applies to all unincorporated areas of Santa Cruz County. Additionally, the cities of Santa Cruz and Capitola have previously delegated authority for regulation of OWTS in the city limits to the County Health Officer. It is proposed that this LAMP would also apply within Santa Cruz and Capitola. The County is currently in discussions with Scotts Valley and is permitting OWTS replacements in Scotts Valley on an interim basis. It is not known yet whether Scotts Valley will develop their own LAMP or delegate authority to have OWTS in Scots Valley regulated under the LAMP. There have been no discussions with the City of Watsonville, which historically has issued permits for both OWTS and wells within their city limits.

## 1.1 Document Organization

The County of Santa Cruz LAMP's format is as follows:

- Section 1: Introduction and Background
- Section 2: Conditions for Onsite Sewage Disposal in Santa Cruz County
    - Hydrogeology
    - Soils
    - Surface Water and Watersheds
    - Existing Development Conditions
    - Policies for New Rural Development
- Section 3: Siting and Design Requirements for New and Replacement Systems
    - Standard Systems
    - Enhanced Treatment System
    - Variances and Non-conforming Systems
    - Prohibitions and Variances
- Section 4: Requirements for Existing OWTS
    - Failing Systems and Repairs
    - Remodels and System Upgrades
    - Operation and Maintenance
    - System inspection and Evaluation
    - Connection to Community Disposal Systems
    - Financial Assistance
- Section 5: Water Quality Monitoring and Assessment
- Section 6: Ongoing Management
    - Education and Outreach
    - Data Management and Reporting
    - Administration and Funding

The State OWTS Policy standards, County ordinance (with proposed amendments), specific pertinent County Regulations and Procedures are a part of this LAMP and are contained in the Appendices:

A. Santa Cruz County Code Chapter 7.38, Sewage Disposal, with proposed updates
B. Santa Cruz County Code Chapter 7.42, Septic Tank Pumping and Liquid Waste Transport
C. Regulations for The Repair and Upgrade of Septic Systems
D. Enhanced Treatment System Regulations
E. Chamber leaching guidelines
F. Soil Evaluation and testing procedures
G. Winter Water Table Testing Procedures
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## 1.2 OWTS Oversight – State and County Requirements

Oversight and regulation of OWTS is specified in a number of state and local regulations. The California State Health and Safety Code requires an appropriate means of sewage disposal for all homes and businesses and prohibits any discharge of sewage onto the ground surface. The Health and Safety Code designates the County Health Officer as the person for ensuring proper sewage disposal within a county jurisdiction. The Health Officer typically delegates these responsibilities to a county's Environmental Health Division. The Plumbing Code also includes requirements for installation of OWTS, but these are optional and may or may not adopted and utilized by a county or city.

Authority for regulation of OTWS is also derived from provisions regarding waste discharges and protection of water quality contained in the federal clean water act, the state Porter-Cologne water quality protection act and the state Water Code. The State Water Resources Control Board (State Board) establishes policies and programs for water quality protection, which are administered at the regional level by the Regional Water Quality Control Boards. Historically, the Central Coast Regional Water Quality Control Board (Regional Board) developed many standards for proper septic system installation and management that were contained in the Water Quality Control Plan for the Central Coast Region (Basin Plan). The Regional Board delegates authority to the county to implement those requirements for individual onsite systems, with discharges less than 10,000 gallons per day (gpd). Counties must comply with the minimum standards contained in the Basin Plan in order to maintain their local authority for regulatory permitting of septic systems.

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 adopted a new State OWTS Policy, effective May 13, 2013. The State OWTS Policy superseded the provisions in the Regional Board Basin Plans. The Central Coast Basin Plan was subsequently amended to be in conformance with the State-wide OWTS Policy. Both the OWTS Policy and the Basin Plan include provisions for continued local regulation of OWTS pursuant to the Tier 1 requirements for low risk systems or local Tier 2 requirements contained in a LAMP that is approved by the Regional Board.

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

- **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 standards 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 septic system installation in Santa Cruz County. It was developed in conformance with prior Basin Plan requirements and is now being updated to meet the State OWTS Policy. In addition to the standards for new conventional septic systems, the Code allows specific provisions for the management and repair or upgrade of existing septic systems, and for the use of enhanced treatment systems where standards for conventional systems cannot be met. Many critical elements of these standards were developed through review and negotiations with the Regional Board.

County EH engages in a broad spectrum of land-related processes and activities for OWTS management including such services as: 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 finance these management efforts.

## 1.3 Santa Cruz County Land Use, Topography, Geology, and Climate

*The Santa Cruz Mountains comprise approximately 75 percent of the County and are characterized by steep forested slopes and deep valleys.*

Santa Cruz County has roughly 27,700 Onsite Wastewater Treatment Systems (OWTS) that serve residential and commercial development in the rural and mountainous parts of the county. Approximately 61,000 people, or 22% of the county population, use OWTS. Ninety-two percent of the systems serve single family dwellings, 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 about 445 systems in Scotts Valley, 110 in Santa Cruz, 40 in Watsonville, 15 in Capitola, and 2,000 within unincorporated county sewer/sanitation districts. (This information is based on records of septic tank pumping, permits, inspections and older records that have not been verified.)

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 mostly 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.

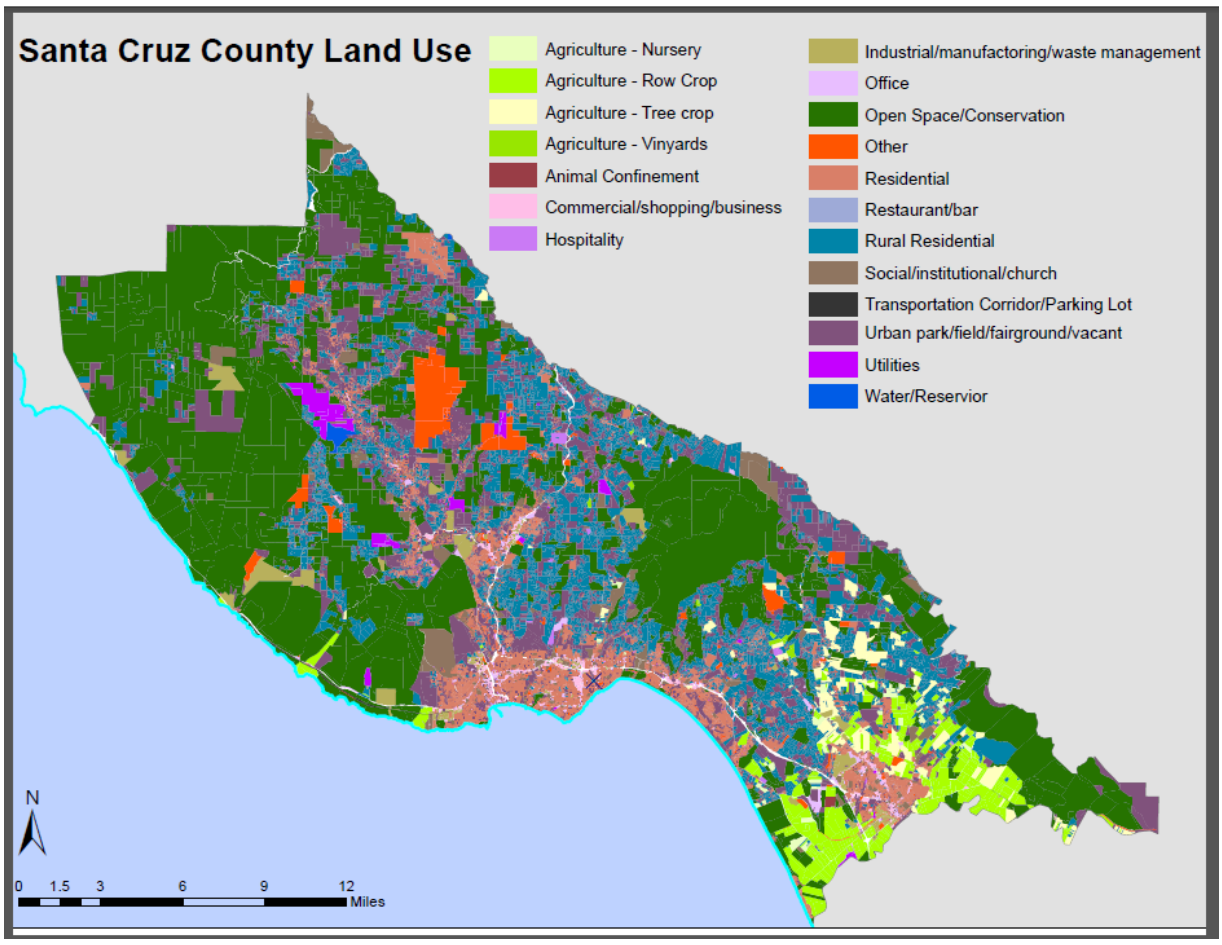
Along the coast, the ongoing tectonic activity is most evident in the gradual uplift of the coastline, as indicated by the series of uplifted marine terraces that sculpt the coastline. Coastal areas in the County are characterized by step-like marine terraces. The terrace deposits consist of sediments 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.

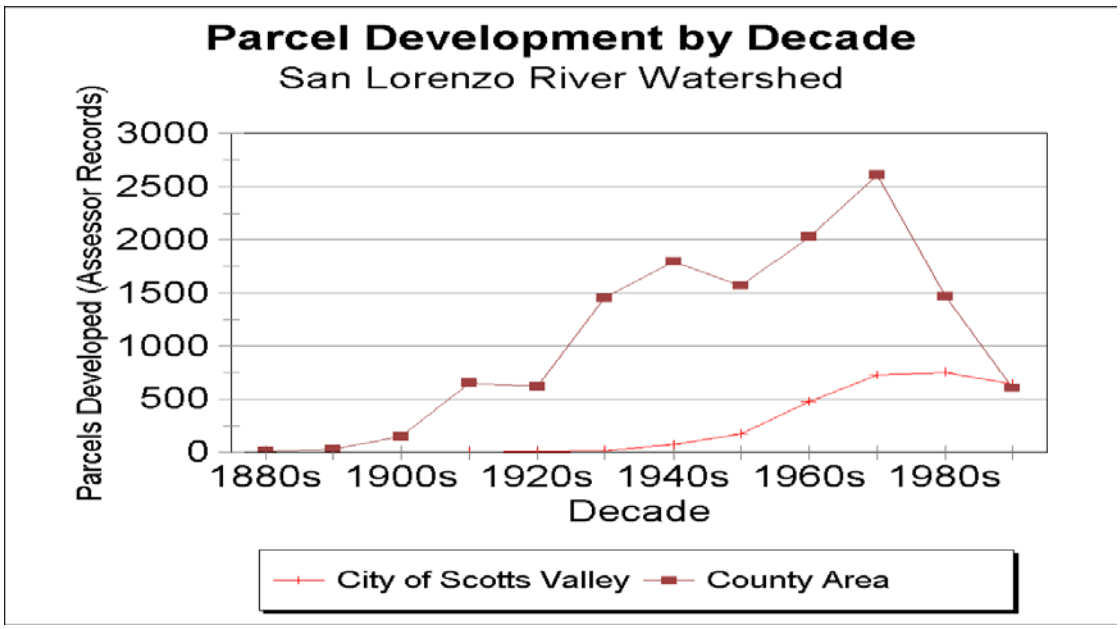
Approximately 75 percent of the County lies within the Santa Cruz Mountains, which supports area of very steep slopes exceeding 30 percent. The Mountain Region, including the unincorporated towns of Ben Lomond, Felton, and Boulder Creek, includes the Santa Cruz Mountain Range and is characterized by 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 and elevated groundwater and close proximity to streams in the valley bottoms. The North Coast Region, 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 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 all served by OWTS. 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

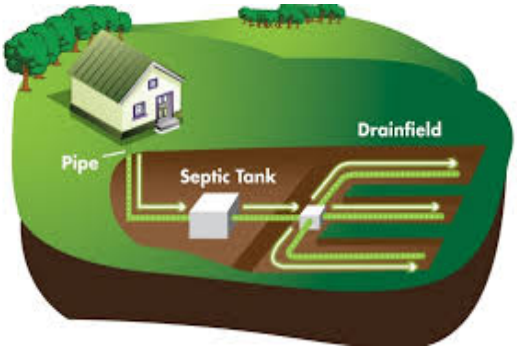
passage of Measure J, which mandated limits on the overall rate of growth and directed most growth into the urban areas with public services. The rate of new development served by OWTS has further declined in recent years, with only 11 new systems approved in 2017 and 17 approved in 2018. Most rural 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.

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. Most of this rainfall occurs in 3 months, and can often lead to elevated seasonal groundwater and transient saturated conditions where soils are fully saturated during storms and for several days afterward. Because most soils are relatively well-drained and permeable, well-designed OWTS are able to continue to perform satisfactorily in the winter.






## 1.4 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. Septic systems are designed to discharge sewage to the soil in such a manner that the sewage percolates underground and is further treated by soil organisms so that contaminants do not resurface nor reach groundwater or streams.

A septic system typically consists of a septic tank and a leaching device, such as a leachfield. The tank is usually 1500-2000 gallons in size and is designed to retain solids and grease and provide initial, primary treatment of the sewage. The sewage then typically flows by gravity to the dispersal device where the sewage soaks into the soil and most of the treatment takes place.

Dispersal devices typically consist of perforated pipe set along the top of one or more gravel-filled trenches. The sides and bottom of the trench provide the absorption area for the effluent to soak into the soil. The total amount of trench and absorption area needed is determined by the expected amount of sewage flow into the system and capabilities of the soil to absorb water. A sandy soil requires less absorption area than a clay soil. Other types of dispersal devices include seepage pits, chamber systems, drip dispersal or mounded bed systems.

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

- A pump chamber and pump may be used to send the sewage 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 overloading.
- A distribution box or flow divider ensures that the sewage is evenly distributed to all parts of the leaching system. If this is not installed properly, one part of the system can be overloaded and fail, while other parts remain dry.
- Enhanced treatment units may be used in place of or in addition to the septic tank to provide a much higher level of effluent treatment before the sewage is discharged to the soil. These units reduce organic loading and suspended solids, some designs provide for nitrogen removal, and some designs provide disinfection.

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 currently includes information for all systems permitted county-wide from 1995 to 2017, and many of the pre-existing systems in the San Lorenzo Valley and Amesti Road areas that had information in the older paper files.

| | |
|---|---|
| Conventional System, Meets Standards | 6,175 |
| Conventional but not fully meeting standards | 209 |
| Pressure Distribution | 24 |
| Mounded Bed | 52 |
| Sand Filter | 22 |
| At-Grade | 5 |
| Enhanced Treatment, proprietary | 686 |
| Haulaway | 21 |
| Large Systems, >2500 gpd | 12 |
| Older Systems performing satisfactorily | 1,558 |
| Older systems before 1995, No info. in database | 18,983 |
| Total OWTS in County | 27,747 |

# 2: Conditions for Onsite Sewage Disposal in Santa Cruz County

Santa Cruz County has frequently challenging conditions for onsite sewage disposal as a result of diverse geology, topography, soils, rainfall, and past development patterns. 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. As a part of this, the County has worked to balance the realities of site constraints, existing development patterns, cost and feasibility of system improvements, and 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 repair standards in place, the rate of system failures dropped from 13% to 1-2% and water quality also improved significantly.

As a part of policy development the County has also been sensitive to issues of affordability and fairness to the 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 north east of Boulder Creek is designated by the California Department of Water Resources as a Disadvantaged Community (DAC) with 2016 median household less than $51,026. Although other areas have higher average incomes, there is considerable diversity, with an expensive vehicle and a well-kept house next door to a house with dilapidated retaining walls and blue tarps on the roof. As a part of maintaining and expanding housing stock the County wants to be able to allow building remodels and additions if the sewage disposal system can be upgraded to meet reasonable standards for water quality protection.

More recently there has been impetus to manage wastewater in a way that is conservative of available water and energy resources. A properly functioning onsite sewage disposal system returns a significant amount of water back to the groundwater basin. It has been calculated that during the dry season, some 15% of the baseflow in the San Lorenzo River comes from onsite system discharge, that has percolated through the soil and reached the River as clean groundwater. In the Mid-County Groundwater Basin, of the 1000 acre-feet per year of inland groundwater pumping, over 400 acre-feet per year 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 1500 af/y of overdraft. With regard to 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 in the field conditions. This work has included:

- County contribution to the US Soil Conservation Service to update the County Soil Survey, 1980
- Extensive water quality monitoring and investigation dating back to 1975, averaging about 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 asses 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 2200 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.

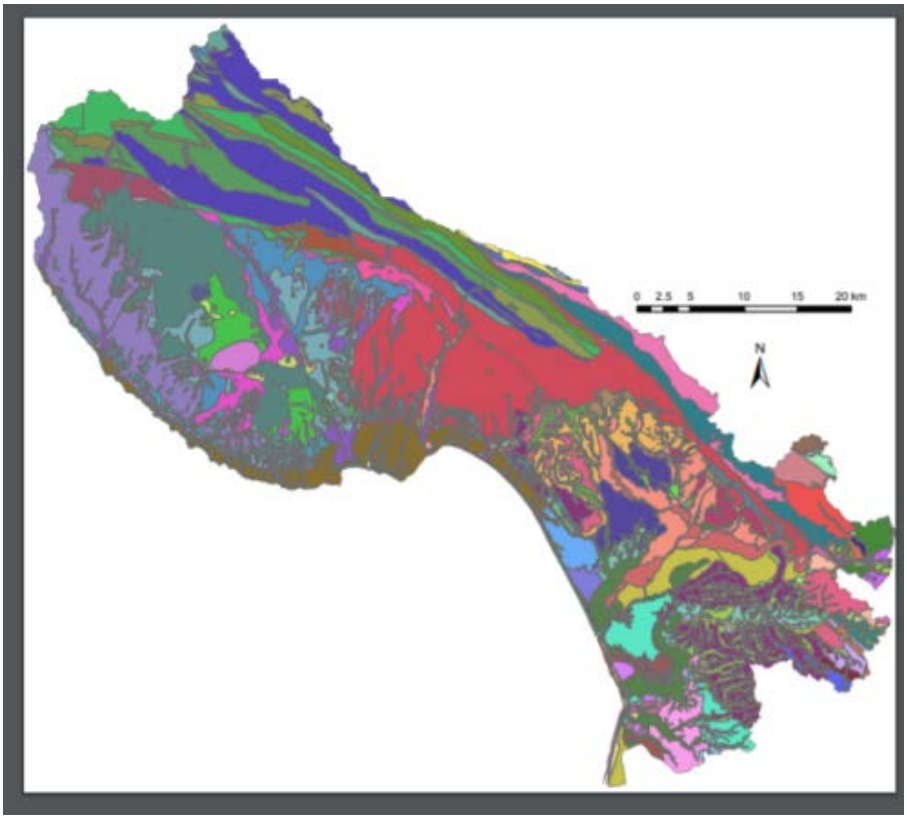
- Creation and analysis of a database of installation information, site information, inspection results, permits, complaints and pumping results for areas of concerns and eventually all onsite systems in the county.
- Follow-up investigations of systems with failing pumper reports.

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

## 2.1 Hydrogeology

Hydrogeology interacts with onsite sewage disposal through the impact on underlying groundwater basins, management plans for salt and nutrient management, and interaction with fractured bedrock. Further interactions occur with soils, shallow groundwater, and surface water is described in subsequent sections.

The geology of the county can be understood as four geologic regions, primarily divided by the three major faults in the county. 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 sandstones, which capture and store significant amounts of groundwater. These are the Santa Margarita sandstone and the Lompico sandstone, which are the primary aquifers of the Santa Margarita Groundwater Basin. 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 Snata Margarita Sandstone and other young sedimentary rocks occur over the granite as it slopes gradually to the south west to 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.

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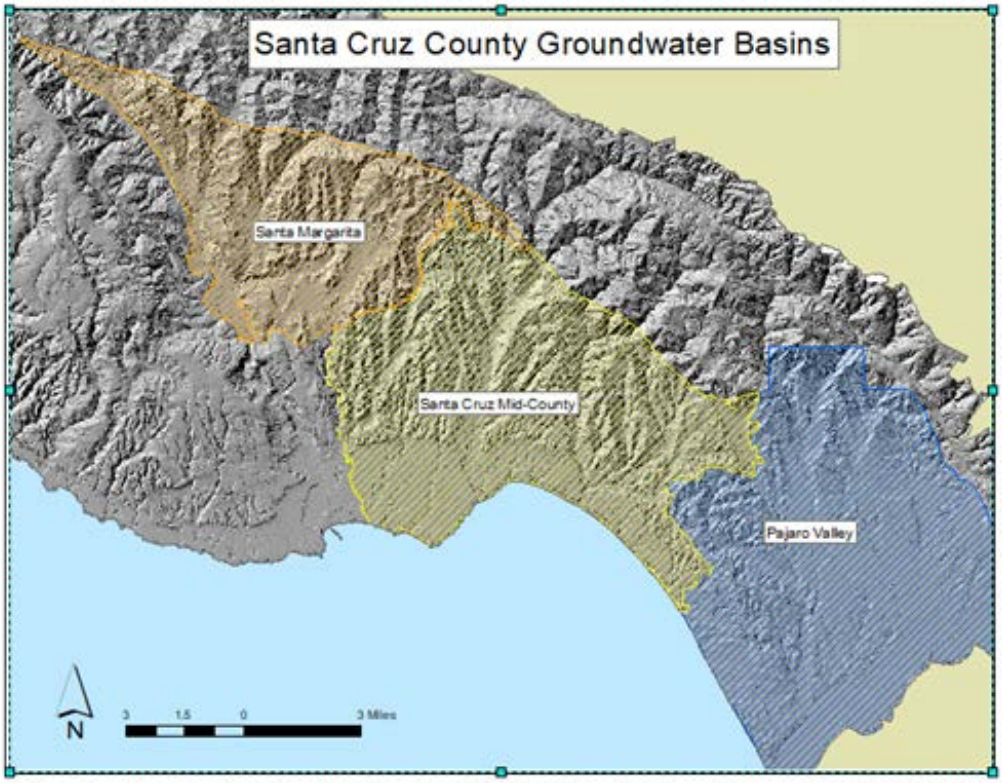
### 2.1.1 Groundwater Basins

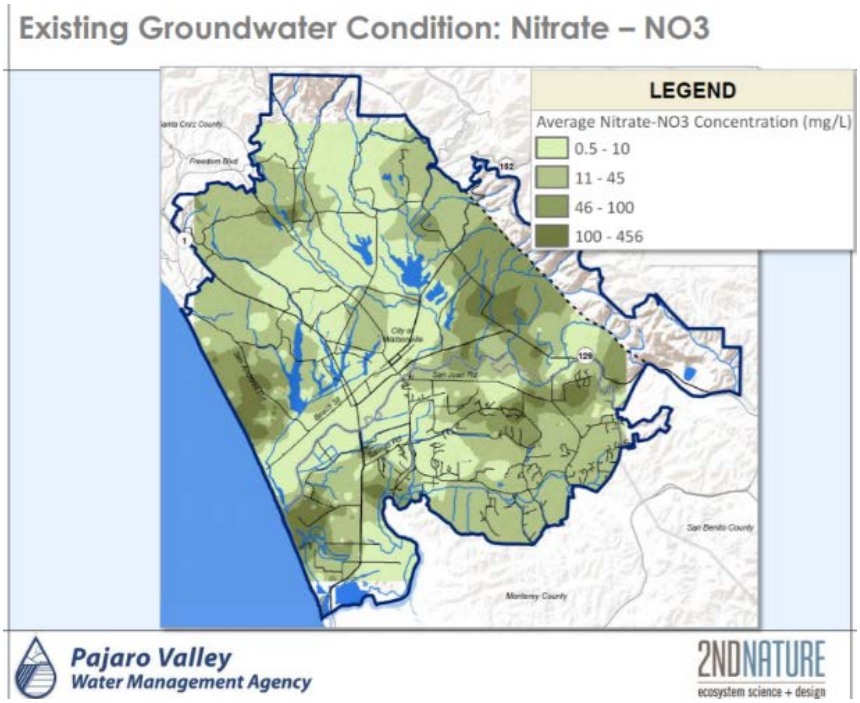
The three major groundwater basins occur in the County and are being actively managed under the provisions of the Sustainable Groundwater Management Act (SGMA). Groundwater management plans have been prepared for both the Pajaro Basin and the Santa Cruz Mid-County Basin. The Plan for the Santa Margarita Basin is in preparation and due to be completed in 2022. County EH is a key partner to all three of the groundwater agencies governing the County's basins.

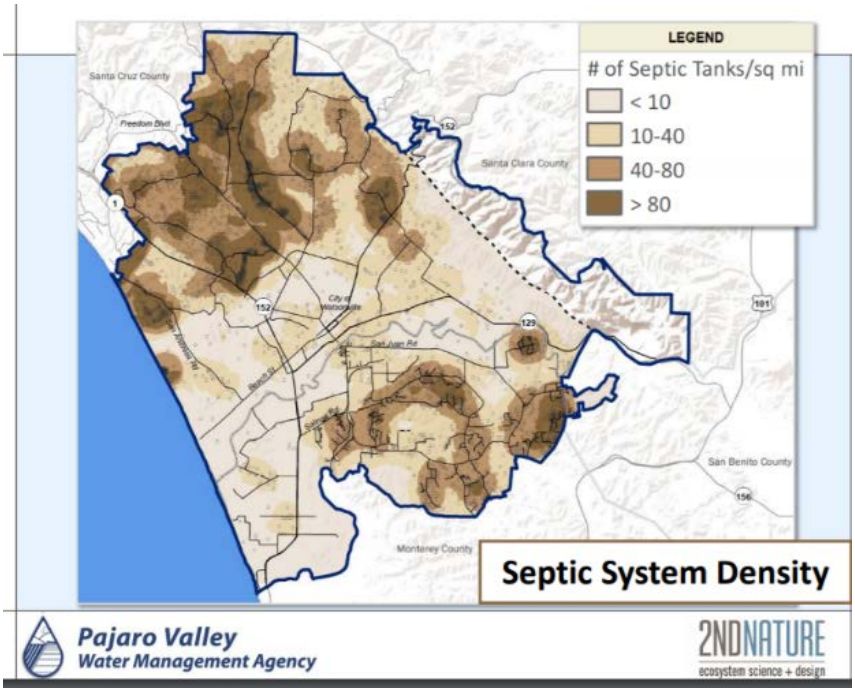



OWTS are potential contributors of non-point source pollution to groundwater and to surface waters recharging groundwater. As such, County EH tracks water quality of the three groundwater basins within Santa Cruz County. Of the three groundwater basins, only the Pajaro Basin is subject to significantly elevated levels of nitrate contamination from fertilizer, salt input form 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. Aside from seawater intrusion in Mi-County, salt and nutrients have not been identified as significant issues in either Mid-County of the Santa Margarita Basins.

PVWMA manages the Pajaro Basin that is shared by four counties including Santa Cruz, Monterey, San Benito and Santa Clara. PVWMA developed its SNMP in 2016. PVWMA monitors water quality of its surface and groundwater sources. DWR defines this basin as Critically Overdrafted. Salt from subsurface ocean 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 contamination for the Pajaro

Valley Groundwater Basin aquifer include: 87% agricultural, 5% stream runoff, 4% sewer leakage, and 4% septic systems. (PVWMA Salt and Nutrient Management Plan July 2, 2015).

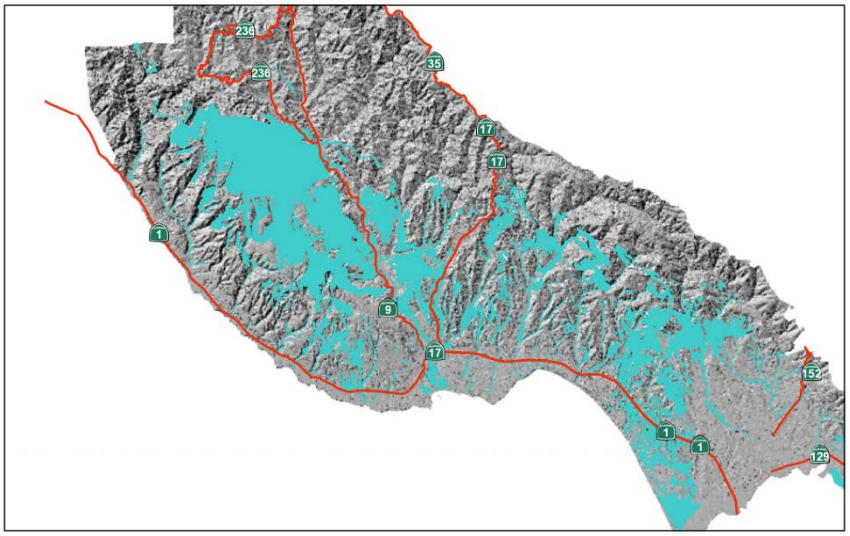


Both Mid-County and Santa Margarita have experienced some localized occurrence of elevated nitrate from OWTS. In Mid-County, one municipal well has had nitrate levels approach drinking water standards and has been taken out of service. This well is located in the densely developed La Selva Beach area, with sandy soils, small lots and extensive use of seepage pits for onsite sewage disposal. It appears that the well in question has at least 3 OWTS located within 250 feet, 8 OWTS within 300 ft. and 22 OWTS within 600 ft. 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. In the mid 1980's these wells experience an increase in nitrate levels but have remained well below drinking water standards.

If at some point the Central Coast Regional Water Quality Control Board identifies a groundwater basin or sub-basin in Santa Cruz County where the use of OWTS is causing or contributing to exceedances of nitrate or pathogen maximum contaminant levels (MCLs), the County will develop an Advanced Groundwater Management Program (AGMP) in close consultation with and approved by the Central Coast Regional Water Quality Control Board. It is expected an AGMP would require supplemental 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.

### 2.1.2 Groundwater Recharge



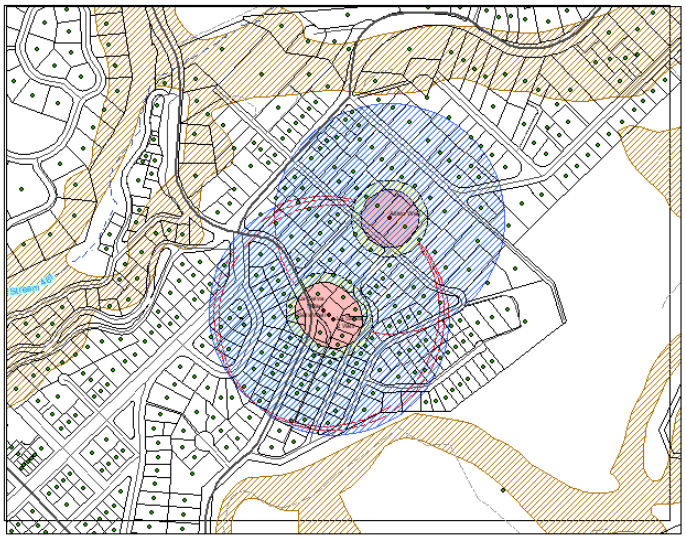

The County has long recognized the importance of protecting the quantity and quality of waters recharging the county's groundwater basins. Primary groundwater recharge areas were mapped where highly permeable soils overly important water bearing aquifer formations. The County established General Plan policies and provisions in the County Code to protect recharge areas and to regulate sewage 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.

### 2.1.3 Wells

OWTS discharge a plume of water into the subsurface that contains high concentrations of nitrogen, pathogens and other contaminants. The concentration of contaminants 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 contamination into the well, degraded the quality of water produced. The potential for contamination is greater where effluent is discharged deeper into the subsurface through seepage pits. In order to prevent, that contamination, 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 ft between seepage pits and public water system wells, and 250 ft if the OWTS is located in fast perking soil with a groundwater separation of 5-8 ft.

Increased setbacks to public water supply wells are now 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.



If any OWTS failure is found to occur within the above setbacks, the operator of the affected public water system well will be notified within by telephone or email 24 hours. The water system will also be notified in the event that 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 GIS shows all public water sources and the county has contact information for all systems. There are presently 170 public water supply wells that supply approximately 105 water systems in the County that serve more than 14 connections. The County GIS also includes water supply wells for another 30 state small systems that supply 5-14 connections.

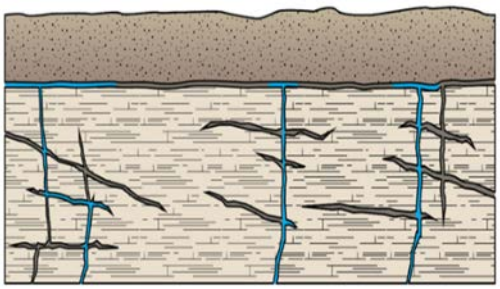
The increased setbacks would likely prevent the excessive nitrate levels that have been detected in municipal supply wells in La Selva Beach, as indicated in the figure. The OWTS are all located outside the previously required 150 buffer, but there ae many systems within 200 ft and 600 foot buffers. These systems utilize seepage pits that are over 20 ft deep in fast percolation soils. Any future repair or replacement of those systems will require use of enhanced treatment at a minimum.

In addition to the public supply wells, there are an estimated 8,000 properties served by individual domestic wells in rural areas of the County. Sewage disposal for all of these properties is accomplished by onsite dispersal systems. In most cases, these occur on relatively large lots that were developed individually over time. Since 1970, no lot could be created that would be served by both an individual well and an individual sewage disposal system. For older lots, the minim parcel size with a well is 15,000 sf and required 100 ft setbacks must be maintained. Areas of higher density OWTS are served by public water systems and do not have onsite wells. There are several rural subdivision in the rural Bonny Doon area, that do have one acre lots with both individual wells and onsite disposal systems.

There are rare occasions with existing developed lots where it is not possible to maintain a 100 ft 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 well and the disposal system are less than 100 ft apart. These situations become apparent when either the well or the disposal system needs to be replaced. If it is not possible to achieve separation, a number of measures ae taken to reduce potential for impacts: 1) the existing well will be tested to determine if there is any current impact from the disposal system, 2) the 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 enhanced treatment, 4) a new well will utilize a 100 ft sanitary seal, 5) any old well within the 100 ft setback will be properly destroyed, and 6) the property owner will sign an acknowledgement of the reduced separation and the need to have the well periodically tested for any indication of contamination.

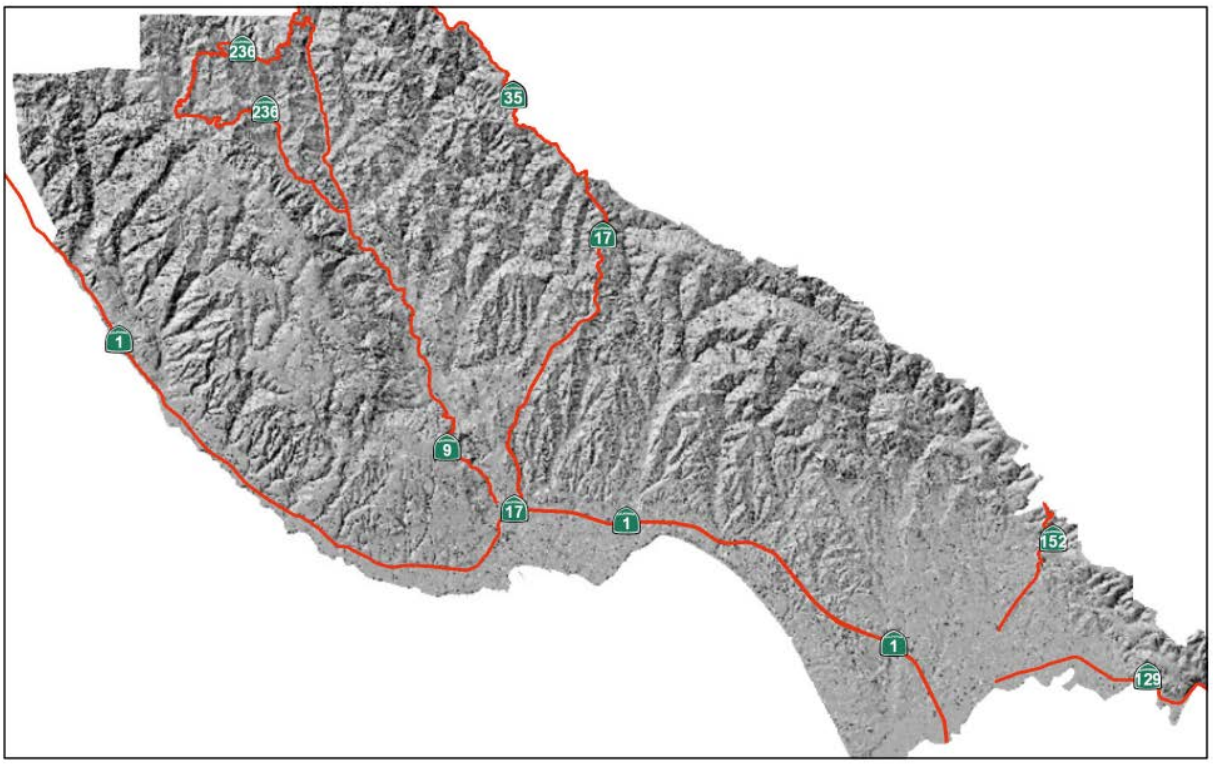
### 2.1.4 Fractured Bedrock

Where onsite sewage disposal takes place in location with limited soil and fractured bedrock, there is potential for the effluent to move rapidly for great distances with little treatment, resulting in groundwater contamination and/or surface water contamination where the water may exit the ground in springs or stream discharges.



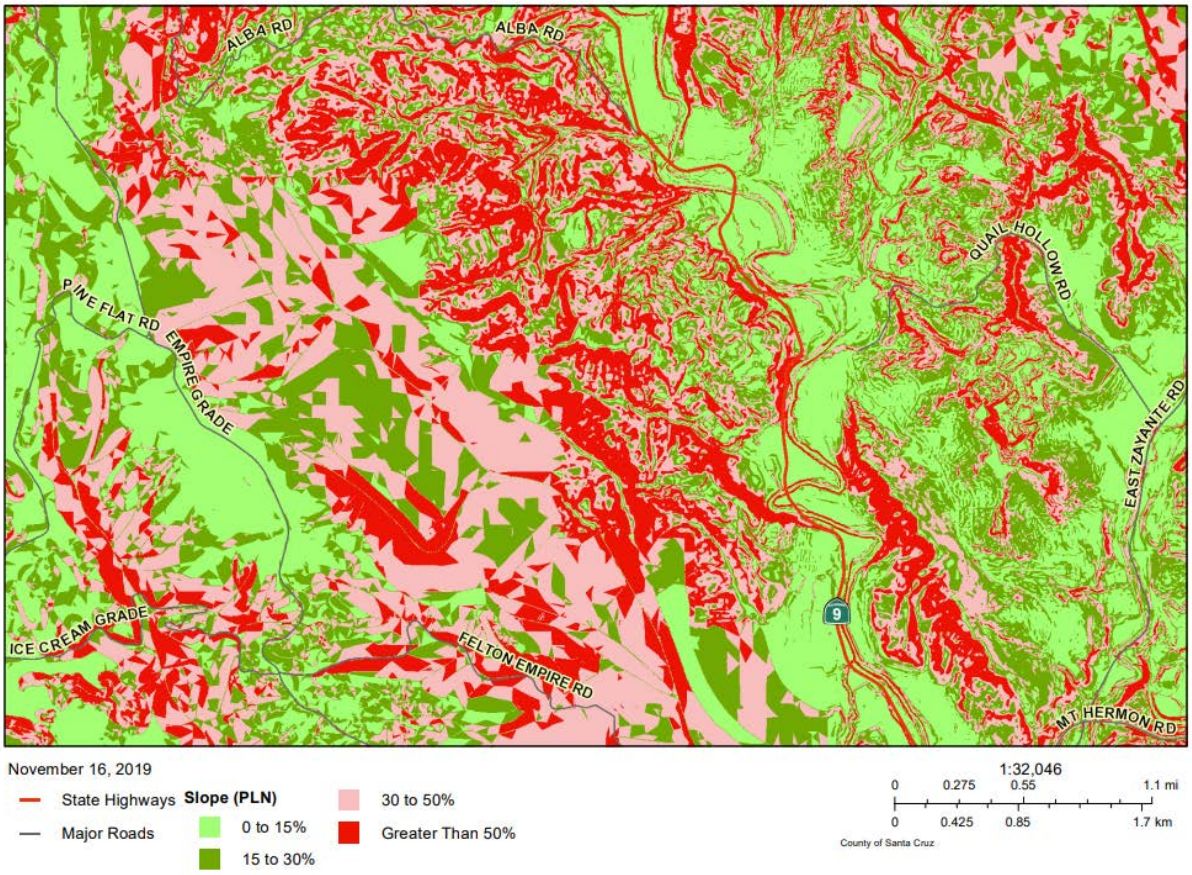
This is particularly a concern in karst areas underlain by marble or limestone. Karst occurs on Ben Lomond mountain and karst springs are substantial sources of municipal water supply for the town of Felton and for the City of Santa Cruz from sources in the North Coast watersheds. The City and County 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 County Code Chapter 7.38, Sewage Disposal, to require geologic site evaluation in karst features are present and proper design to prevent improper sewage disposal. There is also a general provision to prohibit installation of a leach field in fractured bedrock, where ever 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 is identified by soil observations and excessively rapid percolation test results.

### 2.1.5 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 slope failure due to saturation even on slopes less than 30%.

County code 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 required to meet the slope requirements. Code also requires a safe setback from the edge of a steep slope, cut or embankment. 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 at all times that an OWTS is proposed on a slope over 30% and in other situations where there is evidence of other stability concerns. In order to assess slopes, County EH staff utilize the County GIS, which includes several layers based on a 10 meter Digital Elevation Model. In the field, staff utilize clinometers and site specific topographic surveys of the property. An example of the GIS slope map is shown below for the area northwest of Felton.




## 2.2 Soils

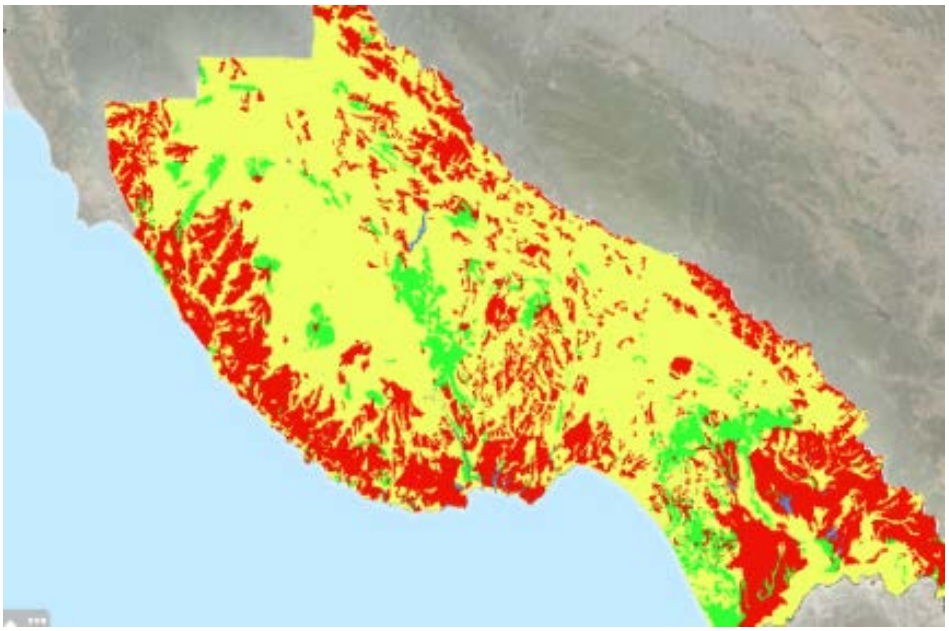
Suitable soil is one of the most important aspects of OWTS design. The soil must be able to absorb and treat the effluent, eliminating pathogens before the effluent percolates to groundwater or downgradient surface water. Soil characteristics are a function of underlying geology, topography, climate 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' (Bowman et alia, 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 sewage 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 suitable at greater depths.

Historically, 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.

There are many different soil characteristics but the absorptive capacities can generally fall into three general classifications, based on their hydrologic group:



Green: Very Permeable (Hydro Group A)

Yellow: Permeable (Hydro Group B)

Red: Low to Very Low Permeability (Hydro Groups C/D)

Areas of the County in red are the lowest permeability, typically with permeability in the range of 31-120 minutes per inch. The green areas ae the soils with fast permeability, generally faster than 6 minutes per inch. In sizing the dispersal system, Santa Cruz County has assigned a soil percolation category or range, and the system is sized based on that category and the number of bedrooms and/or projected wastewater flow.

Leaching Area Requirements (infiltration area square feet)

| | Percolation Rate (MPI) | | | | Peak Design Water |
|---|---|---|---|---|---|
| | **1-5** | **6-30** | **31-60** | **61-120** | **Use Gal/Day** |
| 1 bedroom | 500 | 600 | 900 | 2150 | 215 |
| 2 bedrooms | 625 | 750 | 1125 | 2700 | 270 |
| 3 bedrooms | 750 | 900 | 1350 | 3250 | 325 |
| 4 bedrooms | 875 | 1050 | 1575 | 3750 | 375 |
| Additional Bedrooms | 125 | 150 | 225 | 550 | 55 |

To consider soil percolation rates for OWTS permits, the SC County Inspector conducts both 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, informs a general characterization of the soil's percolation rate for the area of the leachfield

### 2.2.1 Shallow Soils

Treatment of effluent is the most effective in aerated, anaerobic soil conditions. It is thus important to have adequate soil depth for percolation prior to the effluent reaching groundwater or an impermeable layer that can cause localized soil saturation or mounding. This 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 ae few areas of extensive shallow soil. Where these conditions do occur it is generally up on ridges of resistant rock where slopes are too steep for use of OWTS. Shallow soils also occur on some soil units overlying Santa Cruz Mudstone in the Pasatiempo area and the North Coast: Bonny Doon Soils and Maymen Soils. Some of the hard sandstones also have areas of shallow soil, but deeper soils can often be found close by.

For undeveloped parcels or developed parcels with no subsurface soil information, soil excavation to a depth of 10 feet below the bottom of a proposed conventional dispersal system is required, and soils must be demonstrated to percolate at least 60 MPI in the first 3 feet below the dispersal system. If acceptable soil depth is not adequate, the designer may propose an enhanced treatment system with improved effluent treatment and/or shallow effluent dispersal using pressurized drip, at-grade dispersal, or mound technologies.

### 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 virus and bacteria. Soil saturation can also prevent 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 saturated and provide adequate separation to groundwater. Groundwater includes perched saturated zones, as well as the shallowest local hydraulically unconfined aquifer unit.

After steep slope, the occurrence of shallow groundwater is probably one of the biggest constraints for locating OWTS. Watsonville Loam, which occurs in 7% of the County on flat terrace deposits, is expected 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. Most soils are well-drained with good permeability and can continue to absorb effluent and dry-out rapidly after the rains stop.

A study was conducted in1981-82 to better understand the relationship between shallow groundwater, OWTS performance and water quality. 285 samples were collected 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 ft from a leachfield, even when the leachfields were partially intruded by groundwater. Within 25 feet, fecal coliform levels were statistically greater when leachfields were saturated, but that effect did not carry beyond 25 ft. All boreholes showed a significant increase in fecal coliform during rainfall events, but that also included 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 Wastewater Disposal and Water Quality in the San Lorenzo River Watershed)

Santa Cruz 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. At least 60% of the average annual rainfall is required and at least 6 inches in the previous 30 days, in order for winter water table observations to be accepted.

Once the highest level of persistent seasonal groundwater is established, the OWTS design must provide an adequate separation, based on soil permeability, or an enhanced treatment system may be proposed with shallow effluent dispersal technology and/or enhanced treatment to mitigate a reduced separation to groundwater. Reduced separation may also be allowed for system repairs that are located at distance from a water course. 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.

### 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 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. Elevated nitrate levels have also been observed in other areas of the County with OWTS in sandy soils: 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.

In order to prevent any increase in nitrate levels in the San Lorenzo River, which is a municipal drinking water source, enhanced treatment with nitrogen reduction is required for all new and upgraded OWTS in the San Lorenzo Watershed.

## 2.3 Surface Water and Watersheds

Santa Cruz County has a number of important surface water bodies and watersheds and many 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 of the county streams support recreational use and threatened salmonid habitat. A number of streams have been designated as impaired, in some cases due to OWTS, and programs are being implemented to improve water quality. Much of this work is being coordinated through integrated regional water management programs. All of these programs have come to bear in the San Lorenzo River Watershed, the largest and most important watershed within the County.

### 2.3.1 Water Supply Sources and High-Quality Waters

The County of Santa Cruz Geenral Plan designates water supply watersheds and least distrubed watersheds, and establishes numer ous policies and programs for the their protection and improvements. Many of these policies involve sewage disposal and carried over into 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 resources protections prevent potential impacts of OWTS. In particular, two limits to parcel size establish protections for drinking water:

- Water Supply Watersheds: To protect countywide water resources, the County General Plan requires a 10-acre minimum limit to parcel size 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 parcels less than one acre in size, leaving many existing parcels unbuildable. Within 1 mile of the north coast intakes a 2-1/2 acre minimum parcel size is required.
- Least Disturbed Watersheds : The County's 'Least Disturbed Watershed' 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 systems' 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 onsite sewage disposal system that do not meet the above horizontal separation requirements, the replacement onsite sewage disposal system shall meet the horizontal separation to the greatest extent practicable. In such case, the replacement onsite sewage disposal system 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 onsite sewage disposal system, installed on parcels of record existing as of May 13, 2013, that cannot meet the above horizontal separation requirements, the onsite sewage disposal system shall meet the horizontal separation to the greatest extent practicable and shall utilize supplemental treatment for pathogens and any other mitigation measures prescribed by the Health Officer.

The County GIS has all of the public water system surface intakes mapped, along with the required setback zones described above. If County EH staff become aware of any OWTS failure within those zones, the operator of the public water system will be notified by telephone or email within 24 hours. The water system 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. The operator will be given a minimum of 10 business days to comment on the application.

### 2.3.2 Impaired and Vulnerable Waters

This LAMP is intended to address OWTS that are contributing to impairment of county waterbodies due to pathogens or nutrients. Impaired waters are those waterbodies that have been formally designated as impaired pursuant to Section 303(d) of the Clean Water Act. For these waters, the presence of some contaminant has caused water quality degradation to the point that it is threatening a beneficial use of that water body. Vulnerable waters might be those that become impaired if water quality were to worsen. While there are a number of designated impaired waterways in Santa Cruz County, other water bodies, including water supply streams could be considered vulnerable and programs should be in place to provide general 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 for reducing each source as needed eliminate impairment. The TMDL also includes an implementation plan to and serves as the starting point or planning tool for restoring water quality. Multiple water bodies 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. Prime constituents of concern are sediment, pathogens,

and nutrients. The following table ranks the significant controllable sources of impairment for each water body, as estimated by the RWQCB.

TABLE: Impaired Water Bodies and Pollutant Sources Within Santa Cruz County

| 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 | Agriculture Manure Fertilizer | Landfill runoff | Extent of Impairment |
| Aptos/Valencia Creek | Pathogens | 1 | 3 | No | 2 | 4 | No | 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 | No | | 2 | No | 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 | Nutrients | Yes | | | | Yes | Yes | Yes | ND | TMDL in preparation |
| 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 | SLR, Shingle Mill, Carbonera |
| San Lorenzo Watershed | Sediment | Yes | | | | | | ND | ND | |
| Soquel Creek and Lagoon | Pathogens | 1 | 2 | 4 | 3 | 3 | No | ND | ND | Soquel Creek downstream of Porter St. and Noble Gulch |
| Watsonville Sloughs | Pathogens | Yes | Yes | | | Yes | | Yes | Yes | Watsonville, Harkins, Hanson, Gallighan, Struve Sloughs |

As can be seen in the table, OWTS have been identified as a source of impairment in the following Santa Cruz waterbodies:

- San Lorenzo River and tributaries: pathogens and nitrate
- Salsipuedes Creek: fecal coliform (not in Corralitos Creek)
- Pinto Lake: nutrients

TMDLs have been completed for San Lorenzo, Corralitos and Salsipuedes Creeks and one is in preparation for Pinto Lake. The TMDLs for the San Lorenzo River and Salsipuedes Creek address OWTS by prohibiting any discharge of human waste and directing the County of Santa to implement an

approved Santa Cruz County Onsite Wastewater Management Plan (or another Implementation Program to address onsite wastewater disposal systems). At the time of TMDL adoption, the County was implementing the Wastewater Management Plan for the San Lorenzo River Watershed, which had been approved by the Regional Board in 1995. Most of the programs of that plan were being implemented throughout the county. Those programs are carried over into this LAMP, with upgrades as needed to fully address the State OWTS Policy. Additional efforts will also be expanded to the Salsipuedes and Pinto Lake watersheds. These efforts essentially constitute an Advanced Protection Management Program (APMP), as required by the State OWTS Policy 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. If any additional water bodies in Santa Cruz County are listed as impaired due to OWTS the watersheds will be brought not the APMP.

### 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 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 a key component of the Santa Cruz Integrated Regional Water Management Plan and the Sustainable Groundwater Management Plans for the three priority groundwater basins in the county.

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

### 2.3.4 San Lorenzo Watershed

The San Lorenzo River Watershed represents many of the challenges of ongoing OWTS management:

- Water supply watershed, providing water supply for 95,000 people
- Designated as impaired, with TMDLs for nitrate and pathogens
- One of the highest density of OWTS in the state, well in excess of the recommended 1 acre parcel size
- The large majority of development 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 environmental impact

- Since 1986, it 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.

Santa Cruz County contains over 27,700 septic systems, 15,200 of which are in the San Lorenzo River Watershed. The great majority of these septic systems are over 40 years old and are located on parcels that could not fully meet today's standards for installation of a new septic system due to small lot size, close proximity to a stream, high groundwater, steep slope, or clay soil. Many of these systems had already 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 septic system 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 septic system 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. This threatened the main water supply of the City of Santa Cruz. As a result, in 1982, the RWQCB issued Resolution 82-10, an order prohibiting any new development and prohibiting the continued use of existing septic systems 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 septic systems 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 county wide operations of OWTS. In May 1995, the SWRCB lifted the septic system prohibitions for this region and adopted the San Lorenzo Wastewater Management Plan, which is essentially an Advanced Protection Management Program (APMP) for the watershed. Subsequently County EH applied most of the same standards and procedures to the all OWTS in the county.

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

- Episodes of bacterial contamination occur occasionally at locations throughout the Watershed, but no stations have persistently high levels in excess of 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 wastewater contamination.
- Approximately 25% of the episodes of contamination in excess of bathing standards are estimated to have resulted from wastewater contamination. (The majority of high bacteria levels result from waterfowl, domestic animals, and cumulative urban nonpoint contamination unrelated to wastewater disposal.)

- During area surveys, 3-6% of the systems were found to be failing, discharging untreated sewage to the ground surface; another 7-9% were illegally discharging graywater which also has a high bacteria and pathogen level.
- Failing systems have been observed in areas throughout the Watershed, discharging sewage to roadside ditches, public right of ways, or other areas where there was significant risk of public contact.
- Although there are some areas with greater concentrations of problems, sewage failures have been observed throughout the study area.
- Many systems appearing to be functioning properly are releasing significant amounts of nitrate into groundwater and surface water, with potential adverse impacts on water supplies.
- Primarily as a result of wastewater disposal, nitrate levels in groundwater aquifers have increased 4-10 times. Further increases could threaten water supplies in Quail Hollow and other areas.
- Nitrate levels in the San Lorenzo River have increased 2-3 times since the mid 1960's, potentially resulting in increased biological growth which may be adversely affecting the quality of the water supply for the City of Santa Cruz. Septic systems, particularly in sandy soils are the primary source of the increased nitrate.

Since the County EH began the program in 1986, septic system failure rates in the watershed, and countywide have dropped from 13% to 1-2%. 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 standard system. Those that couldn't fully meet standards either installed enhanced treatment systems or have used non-conforming systems that required rigorous water conservation and regular inspections to confirm satisfactory performance. Water quality in the San Lorenzo River has improved and the failure rates of these OWTS have declined. Ongoing work continues through collaboration among County EH, contractors, and property owners, to upgrade all systems over time. Repair of most of these systems will be relatively straight forward, and 5-10% of the upgrades are expected to be more challenging for the owner, the designer, the contractor, and County staff to design and install a workable system that meets minimum requirements for protection of water quality.

In 2012, the City of Santa Cruz conducted a sanitary survey for its source watersheds, including the San Lorenzo Watershed. Title 40 of the Code of Federal Regulations defines a Sanitary survey as: "an onsite review of the water source, facilities, equipment, operation and maintenance of a public water system for the purpose of evaluating the adequacy of such source, facilities, equipment, operation and maintenance for producing and distributing safe drinking water". Following is a characterization of contaminant sources within the San Lorenzo River Watershed from a City of Santa Cruz 2012 report - San Lorenzo Valley and North Coast Watersheds Sanitary Survey for SCWD, SLVWD, LCWD Page 3-11, Potential Containment Sources in the Watershed.

The two most significant potential impacts of wastewater disposal on the drinking water supplies in the San Lorenzo watershed are the release of pathogenic organisms and excessive nutrients. However, close focus to wastewater management by the County as well as connection of some on-site systems to community wastewater treatment with off-site disposal has reduced the risk of contamination by wastewater. Wastewater facilities in the SVLWD, are limited to residential septic systems, none of which are located near the diversion locations.

**Bacteria:** Several studies have been conducted to evaluate the proportion of the bacterial contributions resulting from wastewater discharge versus the proportion resulting from other sources, including waterfowl, livestock, pet waste, failing septic systems, sewer system leaks, encampments, and urban runoff. Ground-water monitoring conducted in Boulder Creek and as part of the County's ongoing monitoring program has shown that fecal coliform levels decrease to background levels more than 25 feet from septic systems. Beginning in 1981 (Johnson and others, 1982), the County has assessed fecal coliform concentration in shallow ground water underlying developed areas. The absence of fecal coliforms indicates that incidents of bacterial contamination of surface waters do not result from cumulative contamination of ground water but result from failures and discharges to the ground surface from individual systems.

Rapid detection of failing septic systems under the Wastewater Management Program, especially through the 1990s and the resulting system repairs and/or upgrades have substantially improved dry-season bacteria levels in the San Lorenzo River upstream from Santa Cruz (Santa Cruz County, 2003). As discussed below in Section 3.3 (urban runoff), results of recent microbiological source tracking indicate that birds are by far the major source of microbial contamination in the river, although human waste is a significant contributor, particularly during the wet season and downstream from suburban areas, such as Felton, and within the City of Santa Cruz (Ricker and Peters, 2006).

**Nitrate:** Although nitrate concentrations in the San Lorenzo River had increased five to seven times over background levels (Ricker, 1995), as discussed in Section 5. It was estimated that 50 to 80 percent of this increase is attributable to nitrate from wastewater (Ricker, 1989). Approximately two thirds of the nitrate load in the river comes from the area of the watershed underlain by the highly permeable Santa Margarita sandstone. Unlike bacteria, there has been a significant cumulative release of nitrate from septic systems in the watershed, particularly in areas underlain by sandy soils. A Nitrate Management Plan was first implemented in 1995 and was subsequently formalized as a total maximum daily load (TMDL) for nitrate in 2000 as a result of the rising nitrate levels and is discussed in Section 4.9.1. The extensive effort in improving wastewater management since 1995 has also resulted in reduced nitrate levels. More recently, nitrate levels in the San Lorenzo River are not apparently increasing and County staff has indicated that further reductions to nitrate concentrations will be challenging (J. Ricker, Personal Communication, 2012). 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 SCWD as well as for SLVWD.

An updated sanitary survey was completed in 2018 (Kenndy/Jenksand drew the following conclusion:

> After many years of study, the County and the Regional Board have concluded that the large majority of existing septic systems do not consistently contribute significantly to dry-season microbial concentrations measured in surface waters. Occasionally, failing septic systems are responsible for significant localized degradation of bacterial quality in surface waters during summer months. However, bacterial contributions from septic systems are probably greater during or following wet periods when runoff can convey surfacing sewage from failing systems to the San Lorenzo River. Efforts made since 1995 to improve septic system performance have reduced the septic failure rate and therefore the water quality degradation related to septic systems.

Despite the potential limitations and the observed impacts of onsite wastewater disposal systems, experience over the last two decades has shown that there has been good success in making substantial improvement in system performance in order to reduce OWTS impacts in the San Lorenzo Watershed to acceptable levels:

- Over 85% of the existing systems have been found to be functioning well, without any surface discharge of sewage.
- Since 1986, systems were being replaced or upgraded at a rate of 3-5% per year, primarily as a result of voluntary actions by the property owners.
- An estimated 75-90% of the upgraded systems are meeting the repair standards for conventional systems, which provide for larger disposal area, shallow disposal depth, greater stream setback, and more groundwater separation than previously occurred.
- The 10-25% of systems which have not met repair standards are subject to increased monitoring and management by the County and the property owner. These types of systems are now being addressed through more stringent enforcement of the repair standards, increased use of alternative technologies, more frequent inspection, required management, and development of community disposal facilities.
- Policies limiting density of development have previously been implemented which have substantially limited increases in nitrate discharge. Other measures are being implemented which will reduce the amount of nitrate currently being discharged.
- Increased property owner education and oversight by County inspectors has resulted in more frequent tank pumping, use of water conservation methods, and better system management by the property owners.
- Rechecks during the wet winter of 1992-93 of upgraded systems and potential problem systems showed very low levels of failures (less than 2%) in areas already subject to management program activities.

The San Lorenzo River and many of its tributaries continue to experience elevated levels of fecal indicator bacteria (FIB), 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 contamination present in the San Lorenzo River during the summer months, but 25% of the samples showed presence of human contamination during the wet winter months (County EH, 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 River, particularly during wet periods (City of Santa Cruz, 2016). These results indicate the ongoing need for oversight of OWTS, including water quality testing and follow-up investigations to identify and upgrade failing systems to meet basic requirements.

The thirty-year record of planning and management protecting the San Lorenzo River is represented by the thirty-year period of record of reports summarizing those analyses, including:

1. County Planning: San Lorenzo River Watershed Management plan, 1989
2. County EH: An Evaluation of Wastewater Disposal and Water Quality in the San Lorenzo River Watershed, September 1989.
3. County EH: San Lorenzo River Watershed Management Plan, February 1995.
4. County EH: San Lorenzo Nitrate Management Plan, Phase II Final Report, February 1995.
5. County EH: SAN LORENZO WASTEWATER MANAGEMENT PLAN PROGRAM STATUS REPORT 1996-1998 March 2000.
6. Regional Board: San Lorenzo River Watershed Nitrate Total Maximum Daily Load for Santa Cruz, California (Listed Waters: San Lorenzo River, Carbonera Creek, Shingle Mill Creek, and Lompico Creek) Prepared by Central Coast Regional Water Quality Control Board September 15, 2000.
7. County EH: EVALUATION OF URBAN WATER QUALITY TASK 4 REPORT SAN LORENZO RIVER WATERSHED MANAGEMENT PLAN UPDATE August 2001.
8. County EH: SAN LORENZO RIVER WATERSHED MANAGEMENT PLAN UPDATE December 2001.
9. County EH: San Lorenzo River Watershed Management Plan Update 2002.
10. County EH: SAN LORENZO WASTEWATER MANAGEMENT PLAN PROGRAM STATUS REPORT 1999-2001 May 2003.
11. County EH: SAN LORENZO RIVER SALMONID ENHANCEMENT PLAN Fisheries Enhancement Strategy for the San Lorenzo River, March 2004.
12. County EH: Assessment of Sources of Bacterial Contamination at Santa Cruz County Beaches, March 2006.
13. Regional Board: Total Maximum Daily Loads for Pathogens in San Lorenzo River Watershed Waters (Including San Lorenzo River Estuary, San Lorenzo River, Branciforte Creek, Camp Evers Creek, Carbonera Creek and Lompico Creek), Santa Cruz, California Final Project Report Prepared on February 27, 2008 For the March 20-21, 2008 Water Board Meeting.
14. County EH: Phase 1 Conjunctive Use and Enhanced Aquifer Recharge Project, August 2011.
15. City of Santa Cruz: San Lorenzo Valley and North Coast Watersheds Sanitary Survey January 2013.
16. City of Santa Cruz, Constituents of Emerging Concern, August 2016 Report
17. Kennedy/Jenks Consultants: San Lorenzo River and North Coast Watersheds Sanitary Survey Update, prepared for the Santa Cruz Water Department and San Lorenzo Valley Water District, February, 2018.
18. County EH: SAN LORENZO WASTEWATER MANAGEMENT PLAN PROGRAM STATUS REPORT 2008-2016, 10, 24, 2018.
19. County EH: County of Santa Cruz Onsite Wastewater Management Program 2017 Annual Report, 01/15/2019

## 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. In the early half of the 20$^{th}$ 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 a number of 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, in an effort to identify failing OWTS and require them to be brought up to the repair standards that were adopted in 1986: San Lorenzo Valley, Pasatiempo, Amesti Road, and the Delaney/Salsipuedes subdivision. Feasibility studies have been conducted for sewering all of those 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. There are no active efforts to extend sewer service to those areas. 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 ae within the sanitation district sphere of influence.

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 would be required to abandoned and replaced with an OWTS that meets current requirements.

Most older development originally occurred along stream corridors. A review of county GIS information indicates that about 15% of the parcels with OWTS also have streams on them. On the older, smaller lots it was often not possible to achieve a 100 foot setback between the OWTS and a ~~from the~~ stream. ~~Only 18~~Approximately 60 ~~developed parcels~~existing OWTS are located within the 400 foot setback buffer 1200 ft upstream from a public water system surface water intake and an additional 24 OWTS are within the 200 foot buffer between 1200 and 2500 ft upstream of an intake. Some ~~480 systems~~50 OWTS ~~ar~~may be located within ~~600~~150 ft of a public water supply well, 40 are located between 150 and 200 ft, and 700 are between 200 and 600 ft from a public well, although it cannot~~'t~~ be determined if these~~y~~ are in violation of ~~that~~ the setback requirements without further analysis and a determination of the existing dispersal depth. A number of these and surface diversions wells are currently in an inactive status. Septic systems 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 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 onsite sewage disposal 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 1998, following passage of the 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 and Groundwater Recharge Areas (10 acre) and Least Disturbed Water sheds (40 acres). 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 in/yr and one half acre for average rainfall over 40 in/yr. With average annual rainfall in Santa Cruz ranging from 25-60 inches, county policies for new parcels easily meet the State Policy.

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

- For water supply watershed the minim parcel size is one acre, and 2.5 acre 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 those standards cannot be met, the parcel is unbuildable.

## 2.6 Summary of OWTS Conditions and Limitations by Area

Following is a brief description of conditions relative to onsite sewage 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 indifferent parts of the areas.

North Coast-Bonny Doon: 1450 systems; Water Supply Watersheds, Least Disturbed Watersheds; Individual Wells; Large Parcels; Localized areas of high groundwater, karst, sandy soils, clay terrace soils

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

Pasatiempo: 800 systems; Small lots, public water, inside Urban Services Area with nearby sewer line, Mix of sandy soils, clay soils, perched groundwater, shallow bedrock, seepage pits

Carbonera/Branciforte: 2,100 systems; Pathogen and Nitrate TMDL; Older homes, larger lots, some sandy soils, some shallow groundwater

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

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

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

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

Salsipuedes/Delaney: 75 systems: small lots (15,000 sf); clay soils, low income community near sewer

Manfre/Buena Vista Road: 240 systems; small lots; some clay soils

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

### 2.6.1 GIS Mapping of Septic Constraints

The County's Geographic Information System (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 clicking on the parcel. This information can be viewed in relation to septic system density, relationship to well density, streams, soils, and other attributes. Most of the septic system constraints described in this LAMP are also mapped:

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

# 3. New and Replacement Systems

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 deviations from the new system standards for the repair or replacement of existing systems, including minimum thresholds and prohibitions. The basic standards and allowable deviations are described in the Regulations for Repair and Upgrade of Existing Septic Systems. These regulations apply to the 78% of the properties in the County that were developed prior to establishment of current standards for new systems. 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. The Repair Upgrade Regulations only apply to properties that were first developed prior to September 16, 1983, which is the date that relatively complete and rigorous standards for onsite sewage disposal were adopted into the Basin Plan for the Central Coast Region, and required to be applied throughout the Region, including Santa Cruz County.

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 OWTS installation and repair, 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 and OWTS repairs. These requirements recognize that there are many developed parcels in the County that cannot fully meet the current standards for new development. Although system installations should meet all the requirements to the greatest extent possible, minimum requirements ae established for different categories of systems, as defined for Santa Cruz County:

- New System is an onsite sewage disposal 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 onsite sewage disposal systems.
- Replacement system is an onsite sewage disposal 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, residential remodel greater than 500 square feet. System upgrades to current standards are required in order do a major remodel.
- System Repair (or Major Repair) is a replacement of the dispersal system in order to correct a failure of an existing dispersal system. It may also include a replacement of the septic tank.
- Minor Repair includes the installation or replacement of a distribution device, diversion valve, damaged or clogged dispersal pipe, 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:

1. A Standard System meets all of the standard requirements for a conventional system of septic tank and dispersal device as specified in Sections 7.38.095-7.38.150 and enables building additions consistent with the number of bedrooms for which the septic system is sized, and consistent with building and zoning department regulations. No construction may occur over the septic system 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 waived for Limited Expansion Systems). Five types of nonstandard systems are recognized:
    a. A Limited Expansion System is a permitted system repair that meets all of 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. As long as the system performs well, no annual inspection fee is charged.
    b. A Low-Flow System is a permitted system repair that meets all of the requirements for a standard conventional system except for the required amount of dispersal area. Use of 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.

c. A Haulaway System is a system that requires that effluent be pumped out on a seasonal or full time 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 volume of wastewater discharge. An annual fee is charged on the tax bill, pumping reports are monitored by EH, and the property will be periodically checked by County EH for signs of failure or sewage discharge to an unapproved dispersal device.

d. An Enhanced Treatment System is a 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, installation 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 systems in Sandy Soils in the San Lorenzo Watershed and Water Supply Watersheds in Bonny Doon and the North Coast Planning Areas. Enhanced treatment with nitrogen reduction is required for any new system and any system which will serve a bedroom addition, a remodel adding more than 500 square feet, or other expansion of use which will result in an increase in volume or strength of wastewater flow. Enhanced treatment is required for all repairs in sandy soils where the dispersal system depth is more than 4 feet below the natural ground surface.

(2) For Large Systems that serve more than 5 residential units or which have peak daily flows greater than 2500 gallons per day and are located in the San Lorenzo Watershed, or a designated Water Supply Watershed, or an area subject to nitrate contamination of groundwater. For all new or replacement systems in the designated areas, enhanced treatment shall be required.

3. A Prestandard System is an existing septic system 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 only a one time addition of up to 500 sq.ft. of habitable space with no bedroom additions or increase in volume of wastewater discharge.

## 3.2 Summary of Design Requirements

Following is a summary of the key requirements for new and replacement systems:

Leaching Area Requirements (sidewall and bottom area (square feet)

The amount of required leaching area is a function of the percolation category of the soils and the number of bedrooms per residential unit, or design flow for commercial uses:

| **Percolation Rate (MPI)** | **1-5** | **6-30** | **31-60** | **61-120** | **Maximum Water Use Gal/Day** |
|---|---|---|---|---|---|
| **Absorbtion Rate (g/sf/day)** | **0.43** | **0.36** | **0.24** | **0.10** | |
| 1 bedroom | 500 | 600 | 900 | 2150 | 215 |
| 2 bedrooms | 625 | 750 | 1125 | 2700 | 270 |
| 3 bedrooms | 750 | 900 | 1350 | 3250 | 325 |
| 4 bedrooms | 875 | 1050 | 1575 | 3750 | 375 |
| Additional Bedrooms | 125 | 150 | 225 | 550 | 55 |

- If there is inadequate room on the parcel, installation of **50 – 99%*** of the standard leaching area may be allowed for low-flow systems, provided water conservation measures are installed.
- Soils not percolating in the range 1-120 MPI or not able to install at least **50%*** of standard leaching area must use an enhanced treatment system or haul-away system.
- If enhanced treatment is used, the required amount of leaching area may be reduced by 50%, due to reduced organic load and limited formation of clogging biomat.

Trench Depth

Maximum depth of 4 feet (2.5 feet flow) in sandy soils ( faster than 6 mpi) or 6.5 feet (5-foot flow) in other soils. Soils in Santa Cruz are mostly 4-6 ft. deep and underlain by deeply weathered and permeable parent material. With the exception of sandy areas, there have been no documented water quality impacts from the standard 10 foot deep disposal trenches historically used. Deeper disposal of adequately-treated effluent also maintains the recharge benefits of OWTS.

Chamber Leaching

Chamber leaching devices approved by 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%.

Minimum Setbacks to Leaching Devices

- Setbacks from cuts or embankments shall be 2 times the height of the bank, up to a setback of 25 feet. If an impermeable layer, or high groundwater is present, the setback shall be 4 times the height, up to 50 feet.

- Setbacks from streams shall be at least 100 feet if possible but may be reduced to a minimum of 50 feet, if groundwater separation is greater than 5 feet and percolation rate is slower than 1 mpi.

- Setbacks from drainage ways shall be 25 feet.

Slope

The limit is 30%, however installation on slopes up to 50% may be allowed for repairs or upgrades, if the leach pipe is installed at least 2 feet deep and a minimum of 5 feet of permeable soil is maintained below the leachfield and there are no other constraints, and a geologist's report determines that installation will not contribute to slope instability.

Groundwater Separation:

Minimum separation requirements From the Bottom of Any Leaching Device and Seasonally High Groundwater, dependent on soil percolation rate, setback from well or water body

| | **25-50 FEET (To Water Body)** | **50 - 100 FEET (To Water Body)** | **100- 250 FEET To Water Body or well** | **> 250 FEET To Water Body or well** |
|---|---|---|---|---|
| **STANDARD SYSTEM - NEW** GROUNDWATER SEPARATION | Not Permitted | Not Permitted | 50': <1 MPI - ET<br>20': 1-5 MPI<br>8': 6-30 MPI<br>5': 31-60 MPI | 8': 1-30 MPI<br>5': 31-60 MPI |
| **STANDARD SYSTEM – REPAIR/UPGRADE** | Not Permitted | Not Permitted | 3 FEET | 2 FEET |
| **ENHANCED TREATMENT** | 5 FEET | 3 FEET | 2 FEET | 2 FEET |
| **Seepage Pit- Repair/Upgrade Only** | | | 10 feet, with Enhanced treatment | 10 feet |
| **GREYWATER SUMP** | 3 FEET | 2 FEET | 2 FEET | 2 FEET |

Enhanced Treatment Systems

- Enhanced treatment is required for new development, bedroom additions, or additions greater than 500 square feet in Zayante or Baywood Soils, or any soil that percolates faster than 6 MPI.
- Enhanced Treatment is also required for repair or upgrade of any large system serving more than 5 residential units or discharging more than 2500 gpd, regardless of soil type.
- Enhanced treatment will be used for system replacements to mitigate conditions where conventional requirements cannot be met: reduced dispersal area, reduced separation to groundwater, or reduced setback to a stream or well.
- Use of an approved enhanced treatment system requires installation of monitoring telemetry; an ongoing service contract with an approved service provider (OSSP); submittal of annual reports of system operation, maintenance and monitoring results; and, periodic inspections by EH to confirm satisfactory performance.

Seepage Pits: Seepage pits may be used to repair an existing individual onsite sewage disposal system, or to expand an existing system in conjunction with a building addition, alteration, expansion or reconstruction, if the existing system utilized seepage pits and leaching trenches cannot be installed due to unsatisfactory soil conditions or lack of sufficient space. Seepage pits shall not be permitted for new installations. The bottom of the seepage pit must have at least a 10 ft separation from winter groundwater.

Minimum parcel size for new development:

- 1-acre minimum parcel size required for new development on existing lots 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).
- New parcels created must be 1 to 40 acres in size, depending on presence of resources and constraints

### 3.2.1 Variances and Prohibitions

There a number of situations where a variance to the requirements for a new conventional OWTS may be allowed for replacement systems under specific conditions as described in the LAMP, County Code and regulations.. 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
- Setback to Water Lines less than 10 ft, if water line is double cased.
- Setback to Retaining Walls – less than twice the height
- Setback to embankments – less than 25-50 ft., if allowed by geologist's report
- Setbacks to waterways for system replacements, if required and mitigated by site conditions

- Setback to domestic water wells from 100 to a minimum of 50 ft, if approved by owner of the well.
- Easements for repairs/upgrade/lot lines for buildable lots
- Slope in dispersal area from 25% up to 50%, if approved by a geologist report
- Winter groundwater separation down to 2-3 ft.
- Depth of dispersal system, if soil conditions require and minimum groundwater separation is maintained
- Dispersal area, if mitigated by water conservation and/or enhanced treatment
- Leaching allowed under paving if required to accommodate required dispersal area

For new development on undeveloped properties, variances to requirements for conventional systems may be allowed if an enhanced treatment system is used, and as long as 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.

Prohibitions:

In no case will a variance be allowed or an individual onsite sewage disposal system 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 water softeners 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) Onsite sewage disposal systems receiving a projected flow over 10,000 gallons per day.

2) Onsite sewage disposal systems 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) Onsite sewage disposal systems dedicated to receiving significant amounts of wastes dumped from RV holding tanks.

4) Systems which receive wastewater other than domestic wastewater, such as winery waste or brewery waste.

(I) Except as provided for in paragraphs 6 and 7 below, new or replacement onsite sewage disposal system 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 professional geologist 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.

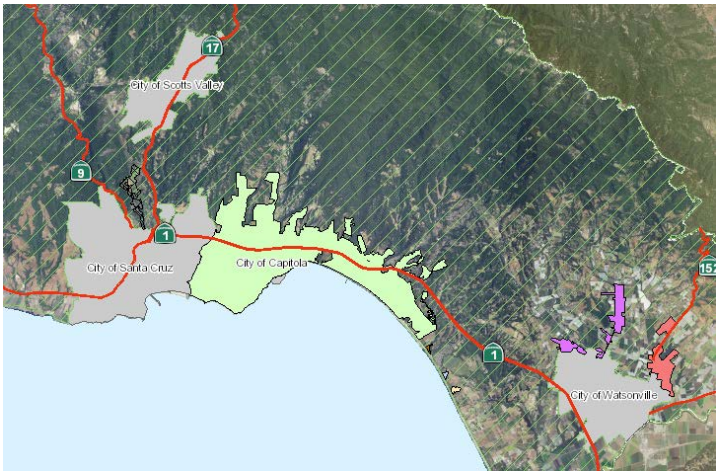
6) For replacement onsite sewage disposal system that do not meet the above horizontal separation requirements, the replacement onsite sewage disposal system shall meet the horizontal separation to the greatest extent practicable. In such case, the replacement onsite sewage disposal system shall utilize 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.

7) For new onsite sewage disposal system, installed on parcels of record existing as of May 13, 2013, that cannot meet the above horizontal separation requirements, the onsite sewage disposal system shall meet the horizontal separation to the greatest extent practicable and shall utilize supplemental treatment for pathogens and any other mitigation measures prescribed by the Health Officer.

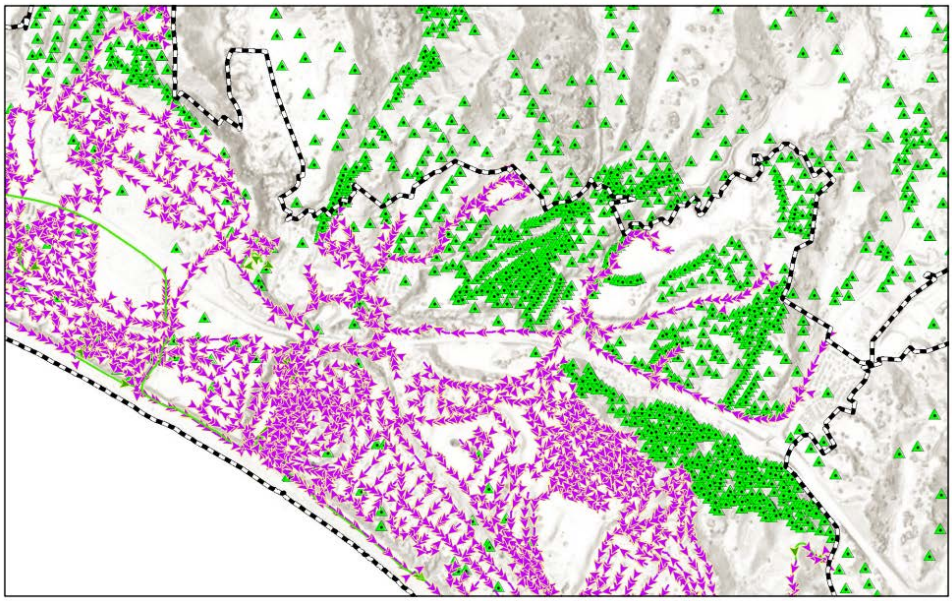
### 3.2.2 Proximity of Collection Systems to New or Replacement OWTS

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 Salsipudes Sanitary District. The main sewered areas are shaded on the following map.




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 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 septic system. 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.

County Code does require connection to a public sewer if it is technically and legally feasible, instead of installing a new or replacement OWTS, if the parcel is within 200 ft of a sewer line. Public sewer district boundaries and sewer lines are mapped on the GIS and staff will check the maps when they receive an application for an OWTS in the vicinity of a sewer system.



Sanitation District sphere of influence (Black and white line), sewer lines (purple) and location of OWTS (green) in Aptos area.

## 3.3 Site Evaluation

For all new OWTS installations, a site evaluation and testing by a qualified professional and witnessed by EH staff will be required. This includes a soil excavation to a depth of 10 ft below the bottom of the proposed dispersal device and at least three percolation tests. The specific 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 G). During the field visits, staff will measure slope, setbacks to streams, wells, and embankments and make observations of other issues such as slope stability concerns. Staff will also consult the GIS 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 a system is proposed near a public water supply source, the operator of that system will be notified.

For system replacements, the percolation rate range of the soil shall be estimated (if not already established by percolation tests) by the applicant based on soil characteristics and mapped information. During application review EH staff will review mapped soil information and file information and conduct a field visit. A percolation rate range will be assigned to the soils by the EH specialist based on the Soil Survey and soil textures observed at the site. If there is inadequate information, or concurrence on the estimated percolation rate range of the soil cannot be achieved among the inspector and the designer, a test hole excavation will be required to observe soil texture characteristics (as well as a check for water table level). If required, a percolation test will be performed by a qualified professional who is familiar with the Santa Cruz County percolation test requirements. The results of the percolation test shall then be the basis for determining the leachfield area required.

## 3.4 Qualifications for Persons Who Work on OWTS

Specific qualifications and licenses are required to design, construct, maintain, repair and/or replace 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 shall be conducted by a registered California professional, including Civil Engineer, Professional Geologist, Certified Engineering Geologist, Registered Environmental Health Specialist, Soil Scientist 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 will be prepared by a California Registered Civil Engineer, 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, such as an A, C-36, C-42 or B license holder (provided the B-license holder is installing the OWTS in conjunction with a new construction project 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 EH and certified by an OWTS manufacturer or proprietor to conduct operation, maintenance and service activities for each type of supplemental treatment or alternative dispersal system they service, or other qualified OSSP as approved by EH.
- EH has a certification program for OSSPs and a registration program for liquid waste haulers. EH will develop a Qualified Professional annual registration program for all qualified professionals to demonstrate that their qualifications are in good standing, and will be subject to EHB discretion.

EH maintains a directory providing for Qualifications for Persons who 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.

# 4. Operation of Existing Systems

A key part of the program to ensure satisfactory OWTS performance are the 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 water bodies. Those programs typically include evaluation of potential for developing or connecting to community sewage disposal systems and opportunities for financial system to address septic 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 sludger 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 property owners, particularly those that may be interested in purchasing a house with a septic system.

### 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 Permit process.

General education of the public is accomplished through periodic web-based news articles and brochures regarding septic system construction, performance, and maintenance with special emphasis on the benefits of water conservation. Also, hard copy brochures on water conservation, graywater disposal, and general septic system 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.

Site-specific education of a septic system user can occur at the counter or on site for systems that are subject to monitoring. These visits provide an opportunity to give direct instruction to the occupant(s) regarding the proper use and maintenance of the septic system. County EH provides to public residents low cost evaluations of OWTS as: 1) File Searches and 2) Site Inspections. These evaluations analyze the health and overall characterization of a parcel's septic system. Additionally, the County REHS Inspector will review proposed plans and designs for replacement or repair to advise potential permit applicants in advance of the public formally initiating a permit application. These services are regularly provided to the public, or to professional services 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 septic systems and/or private water systems. This evaluation answers question such as:

- Has the septic system had problems during the winter or in the past?
- Can bedrooms be added?
- Will the property need an enhanced technology system?
- How new is the well?

This service helps to protect prospective home buyers from problems and surprises related to wells and OWTS after related to real estate purchases and help to prevent protect home sellers and buyers from surprises, lawsuits, or failed sales. Just getting a septic tank pumpers report is not enough to characterize a parcel's OWTS. County EH currently recommends that a seller obtain OWTS file and site evaluation reports 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.

Site Visits: A site review of the property can be performed by a County REHS or the 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 Site Review Information Summary Report.

In order to ensure that new home buyers are properly informed prior to purchasing a system, and to ensure that older systems are evaluated, it is proposed that a system evaluation be required prior to a real estate transaction. Such evaluations are already required when a building permit for a remodel is obtained.

### 4.1.2 Septic Tank Pumping and Septage Disposal

Septic tanks must be periodically pumped out to remove accumulated solids and grease in order to prevent discharge of solids that would clog the dispersal device. The recommended frequency of pumping is 5-10 years, depending on occupancy, water use, 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. Santa Cruz County has 2 approved facilities at the Santa Cruz City Wastewater Treatment Plant, or at the Watsonville City Wastewater Treatment Plant. Pumpers may also go to a disposal site in Marina 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). 71% went to Santa Cruz, 12% to Watsonville, 12% to Marina, and the rest out of county.

The Santa Cruz 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 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 sewage flow. Prior to 1988, Santa Cruz 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.

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 working well.

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 system is performing satisfactorily. Additionally, most realtors 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 system during wet winter conditions or possible increased loading from a new homeowner.

### 4.1.3 Enhanced Treatment Systems and Onsite System Service Providers

Enhanced treatment systems (ETS) require periodic inspection and maintenance. This is best done by a qualified and approved Onsite System Service Provider (OSSP). EH maintains a list of approved OSSP for different types of ETS. The permits for EHT require that the property Owner have and maintain a service contract with a qualified OSSP. The OSSP in turn is required to submit an annual report of system condition and maintenance performed to EH. 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. Systems are inspected by EH every 3 years to verify the information submitted by the OSSP. If a service contract lapses and/or annual reports are not submitted, 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 can be operated without failures if they are managed properly. However, because they do not meet all standard system requirements, 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 system is not exceeded;
- requirement of a service contract with and OSSP and regular monitoring and maintenance of any pumps, filters, grease traps, alarm systems, disposal system monitoring risers, groundwater monitoring wells, and other system 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 system inspection; and
- 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. These are specified in a "Notice of System with Special Operating Requirements and Limitations" which the County records on the deed. Beginning with the 1993-94 tax year, annual inspection 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 system and the amount of monitoring required. The level of nonstandard sewage disposal systems (enhanced treatment systems, alternative systems, haulaway systems, or nonconforming systems) depending on the type of system and whether the system is subject to a service agreement with a certified Onsite System Service Provider (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.
- Alternative/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.
- Nonconforming Systems (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.

## 4.2 System Inspection and Evaluation

Improved system maintenance and management is a critical element contributing to the long-term effectiveness of the wastewater management program. This will be accomplished through regular 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 septic system failure ad needed. The frequency of inspection will vary depending on the type of system, the condition and past performance of the system, and the presence of site constraints.

Existing OWTS are subject to performance evaluation and inspection or 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 systems as a part of an Advanced Protection Management Program
- Winter recheck to follow up on a potentially marginal condition observed in a previous inspection

Systems subject to a winter re-inspection are low flow systems and systems which are identified during surveys or complaint investigations for follow-up inspections. Other systems subject to a recheck are those in which a graywater bypass has been reconnected to a substandard system, the washer has been removed, a onetime intermittent failure has been observed, the system 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. Enhanced treatment systems and low flow systems are subject to an inspection every two to three years.

Systems needing annual inspection or recheck are identified in the computer database and re-inspections are done during wet weather to ensure that the systems are working properly under conditions when they would be most likely to fail. During the visit, aspects of system operation and appropriate methods of water conservation/flow reduction, if needed, will be discussed with the occupant of the home. If the system is not operating properly, additional maintenance efforts (i.e. more stringent water conservation) or system 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 system, and it appears that closer supervision will be necessary to ensure proper functioning, the system 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.

When a system is repaired utilizing a nonstandard system, specific maintenance and operation requirements are specified. These requirements may limit the amount and type of wastewater that may be discharged to the system and may impose other maintenance requirements appropriate to the site and system. The nonstandard system provisions ensure that there will be adequate monitoring of systems that need a high degree of maintenance. For those parcels with site and system characteristics that do not meet new system standards the regular inspection will take place on the average once every three years. For alternative treatment systems, which require a maintenance contract with an approved OSSP, inspections will include a physical inspection of the site for signs of system failure.

System evaluations start with a report that identifies the systems 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 for the parcel, and/or maps of land use and site information:

- **EHLUIS Database – OWTS System Components:** The EHLUIS database stores OWTS records by parcel number. Each parcels' period of record is reviewed to examine data for permit, inspections, and non-permit-related parcel surveys. This review determines a characterization of each septic system's physical components, and general geophysical characteristics of the parcel such as ground surface slope, soil profiles, and proximity to surface and groundwater resources.

- **Geographic Information Systems (GIS) Mapping - Parcel land use characterizations:** Parcel-specific land use data is maintained within the County's Geographic Information System (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 septic system'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 county-wide 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.

- **EHLUIS Database – Historical Permit Activity:** Historical parcel-specific septic systems 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, FORTIS, in order to most fully inform analysis of a parcels' current status.

- **EHLUIS Database – Maintenance Records of Septic Tank Inspection Reports:** 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 system observed when a septic system is serviced. With pumping records in the database, pumping efforts are monitored, and if necessary, additional action may be taken to ensure adequate pumping.

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. 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.

## 4.3 Failing Systems and Repairs

OWTS are considered to have operational problems when conditions are found such as surfacing effluent, discharge of graywater, back up of plumbing in the house, or water quality degradation of nearby water resources, as indicated by water quality sampling. 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 sewage. 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 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 septic system failure with surfacing effluent that directly endangers the public health can be abated through the County Emergency Abatement Process.

During installation of a new or replacement system, 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 sewage, 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 sewage disposal system. A notation will also be made in the County's land use 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 system 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 system 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. Septic system 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 OWTSD 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 work with EH to address any septic issues, including avoiding primary and replacement dispersal areas, pumping the tank to document satisfactory system performance, or obtaining a permit for necessary system upgrades. Once EH requirements are met, 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 EH to be sure that the building plans are still in conformance with EH requirements. At theat time EH may also put a hold on the permit to ensure that all EH requirements are fully satisfied before the project is complete and signed off.

Following are the EH requirements for building remodels:

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

## 4.5 Advanced Protection Management Program

Advanced protection management programs (APMP) 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. This higher level of OWTS oversight has been implemented in the San Lorenzo River Watershed, the Amesti Road area (Pinto Lake Watershed), and Delaney subdivision (Salsipuedes Creek area). Implementation for other areas will be conducted as needed if additional areas are identified with surface water or groundwater impairment.

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 are wide conditions and history, and identification of particular areas or systems for further assessment.
- Water quality sampling and data analysis of surface water bodies, road side ditches, and wells in order to better characterize water quality conditions and problematic areas.
- Parcel by parcel inspections for signs of system failure or greywater discharges.
- Required repair and upgrade of failing systems.

- Special studies to investigate sources and causes of degraded water quality.
- Feasibility study of the potential use of centralized sewage collection and treatment.
- Distribution of information and community meetings to discuss residents and owners, the program, the findings, and the options for improved OWTS management.
- Continued oversight of systems through water quality monitoring, and rechecks of marginal systems.

## 4.6 Connection to Community Disposal Systems

When a failing system is found or there is a proposal for an upgrade as a part of a building permit, 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 sewage 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: Boulder Creek, Ben Lomond, Glen Arbor and Felton. In general, community collection systems have been found to be very expensive, and have not been pursued. There ae presently 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.

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)

Where a concentration of problems is found, with site conditions which limit the potential for successful onsite system repair and there is a feasible potential for developing community disposal, interim improvements are required while County EH staff evaluates the potential for a community 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 systems 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 possible financing assistance, provide technical advice, and generally help facilitate and support the work. The County did implement a low-cost loan program using Clean Water Act Funds to help fund costs of repair, design, and construction for use of enhanced treatment systems in the San Lorenzo Watershed, but there was limited interest in the program. This could be further considered in the future.

# 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 over time. Water quality monitoring also ensures that the water quality is suitable for beneficial uses, primarily drinking water, recreational use and habitat. Santa Cruz County's water supply for all uses- commercial, agricultural, and domestic - is derived locally from within the County, without importing water from outside its boundary. Countywide water supply is 20% surface water and 80% groundwater, with northern half of county residents served primarily by surface water.

Santa Cruz County has been monitoring beach and freshwater swimming areas water quality since the 1970's. It 1975, the county established the water quality laboratory to conduct extensive monitoring of inland waters to inform the County's watershed management activities. Numerous studies and reports have been prepared over the years. Additionally, all drinking water providers are required to periodically test their water sources. All of this water quality information is to measure trends in water quality, identify sources of degradation and guide management efforts for improved water quality.

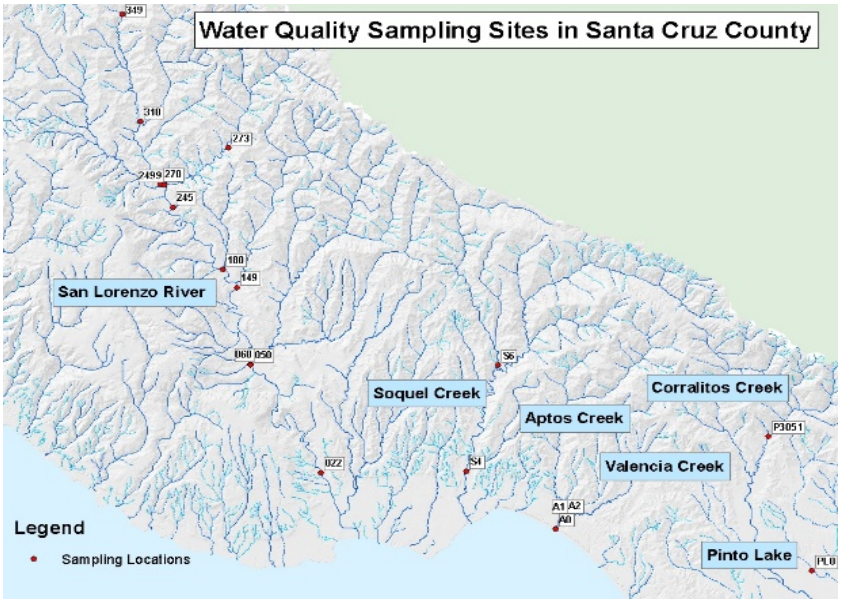
Nitrate and pathogen-indicating bacteria are the two most significant water quality parameters that County EH monitors to track the effects of wastewater disposal from OWTS. County EH monitors these and other water quality constituents within its watersheds for both surface water and groundwater. Water quality of groundwater is monitored from data sources of groundwater wells operated by individual, small, and large water systems. Surface water quality is monitored from water supply diversion points for the water systems and from County-monitored locations of streams and beaches countywide.

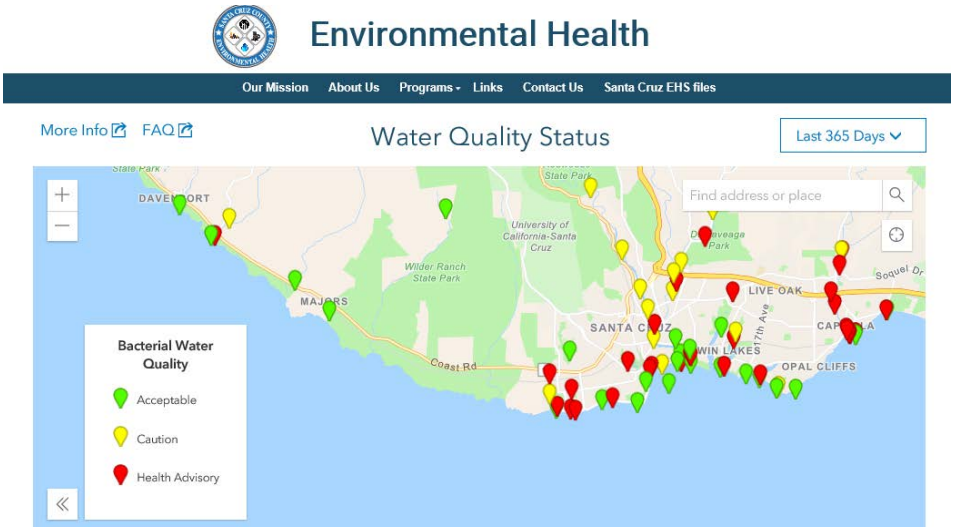
## 5.1 County EH Water Quality Lab Monitoring

The County EH Water Quality Laboratory (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).

Nitrate and pathogen-indicating bacteria are the two most significant water quality parameters that County EH monitors to track the effects of wastewater disposal from OWTS. County EH monitors these and other water quality constituents within its watersheds for both surface water and groundwater. Water quality of groundwater is monitored from data sources of groundwater wells operated by individual, small, and large water systems. Surface water quality is monitored from water supply diversion points for the water systems and from County-monitored locations of streams and beaches countywide.

For surface water, the County EH Lab posts results of pathogen-indicator bacteria on a public website hosted by County EH, reporting three bacterial types: *Escherichia* coli (E. coli); 2) Enterococcus; and 3) Total Coliforms. The website 'Santa Cruz County Water Quality Reports' posts data for sixteen freshwater sampling locations under the category 'Creeks and Lagoons' and for twenty ocean sample collection sites under the category 'Beaches'.




In Santa Cruz County, the majority of groundwater monitoring is conducted in conjunction with development and operation of wells delivering water supplies for drinking water and agricultural irrigation. County EH operates the well permitting program for drinking water systems, and also conducts regional water management planning for countywide groundwater aquifers. As such, County EH can access water quality data for Domestic Wells,

Public Water Systems, Domestic Wells, New Well Development, and Groundwater Data Related to Waste Discharge Requirements

County EH has historically done water quality monitoring of shallow wells in the San Lorenzo Valley and is re-establishing that program. County EH is also considering pursuit of additional shallow groundwater monitoring wells countywide. EH can also access well data for moderately deep domestic wells (150-300 feet) as a part of the well permitting program. Groundwater data collected to date has not indicated any significant groundwater impact from OWTS except for the La Selva Beach area.

The County EH Water Quality 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 provides monitoring through field sample collection, laboratory analysis, and data management and reporting. The lab has the capabilities to provide the following analyses:

- Indicator bacteria: Recreational & Drinking water
- Heterotrophic plate counts
- Geochemical analyses
- pH, conductivity, turbidity
- Alkalinity, Hardness
- Anion analyses
- Chloride, Bromide, Fluoride, Sulfate; Nitrate-N; Orthophosphate-P
- Pending: Iron, Manganese; Solids testing
- Source Tracking - qPCR
- Microbial Source Tracking
- indicator bacteria,
- Coliphages
- Viruses
- Cyanobacteria
- eDNA: Invasive and Protected Species
- Source tracking - Biochemical tests
- Identify dominant microorganisms in samples
- Determine potential interferences in indicator bacteria tests
- Source tracking - ELISA (Enzyme-Linked ImmunoSorbent Assay)
- Cyanotoxins
- Herbicides : 2,4-D; Glyphosate; Atrazine

The Lab routinely uploads beach water quality data to State's Beach Water Quality database, which eventually is loaded into CEDEN. The lab has recently updated the county's water quality database and is developing capabilities to upload data to CEDEN.

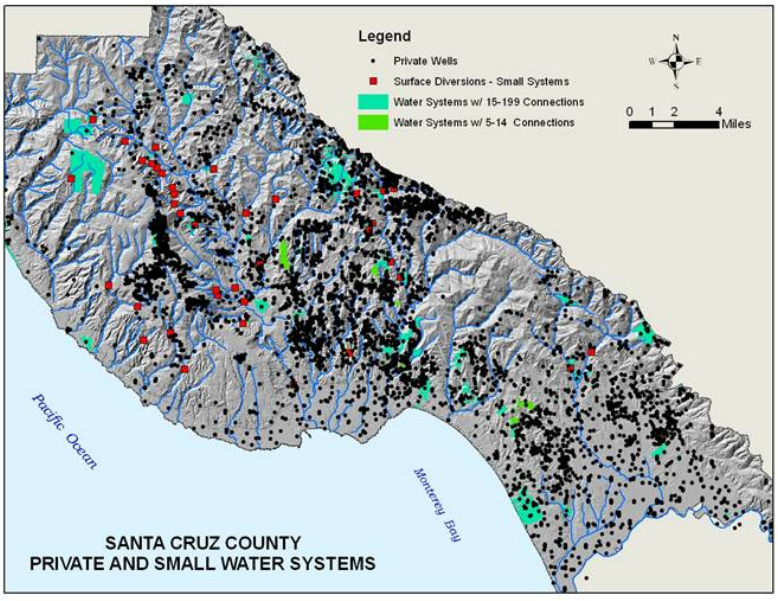
## 5.2 Domestic Well Sampling

Santa Cruz County's private wells are categorized by their number of service connections:

- Individual Water Systems (IWS) wells: Connections 1 - 4
- State-Small Water Systems (SWS) wells: Connections 5 – 14
- Small Public Water Systems under County LPA oversight: 15 – 199 connections

For all wells, including agricultural wells, County EH requires water sampling for wells at the time of initial drilling installation. For IWS wells (1-4 connections), sampling is required initially at the time of installation, and then subsequently if an additional property is added to the well. Any subsequent sampling is done at the well owner's discretion. Sor 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 at the initial drilling, and then continues annually with a SWS's submittal of annual Consumer Confidence Reports (CCRs) which are submitted to the 'Drinking Water Watch' database.

County EH requires that these water quality constituents be measured at the time of initial drilling coincident with a well permit and an individual water system permit: total coliform, E. coli, nitrate, chloride, total dissolved solids, iron and manganese.




Santa Cruz County contains approximately 8,000 private domestic wells and approximately 200 public water system wells.

### Small Water Systems (SWS)

For SWS wells, County EH operates the County's 'Drinking Water Program', designed to ensure that all SWS wells deliver a reliable and adequate supply of groundwater or surface water to their customers. The County contains approximately 140 SWS wells serving roughly 2,500 households. In addition to water quality sampling provided at installation, SWS wells have added annual CCR reporting requirements that include these analyte constituents:

- Total Coliform Bacteria (State Total Coliform Rule)
- Fecal Coliform or E. coli (State Total Coliform Rule)
- E. coli (Federal Revised Total Coliform Rule)

- Lead (ppb)
- Copper (ppm)
- Sodium (ppm)
- Hardness(ppm)
- Nitrate (as nitrogen, N) (ppm)
- Haloacetic Acids (ppb)
- Chlorine (Cl2) (ppm)
- Chromium (ppb)
- Chloride (ppm)
- Sulfate (ppm)
- Total Dissolved Solids (TDS) (ppm)
- Iron (ppb)
- Turbidity (Units)

Groundwater quality data is available from these databases and data sources:

1. County EH Well Drilling Permit data (EXCEL) – IWS and SWS wells
2. County EH Water Quality Laboratory (Access Database)– Surface Waters and Select groundwater Monitoring Wells
3. State Board Drinking Water Division (Drinking Water Watch Database) - SWS wells
4. GAMA (Geotracker)

Well water testing may occasionally be done as a part of real estate transactions, but the County is not generally provided with that data.

## 5.3 Water Quality of Large Public Water Systems

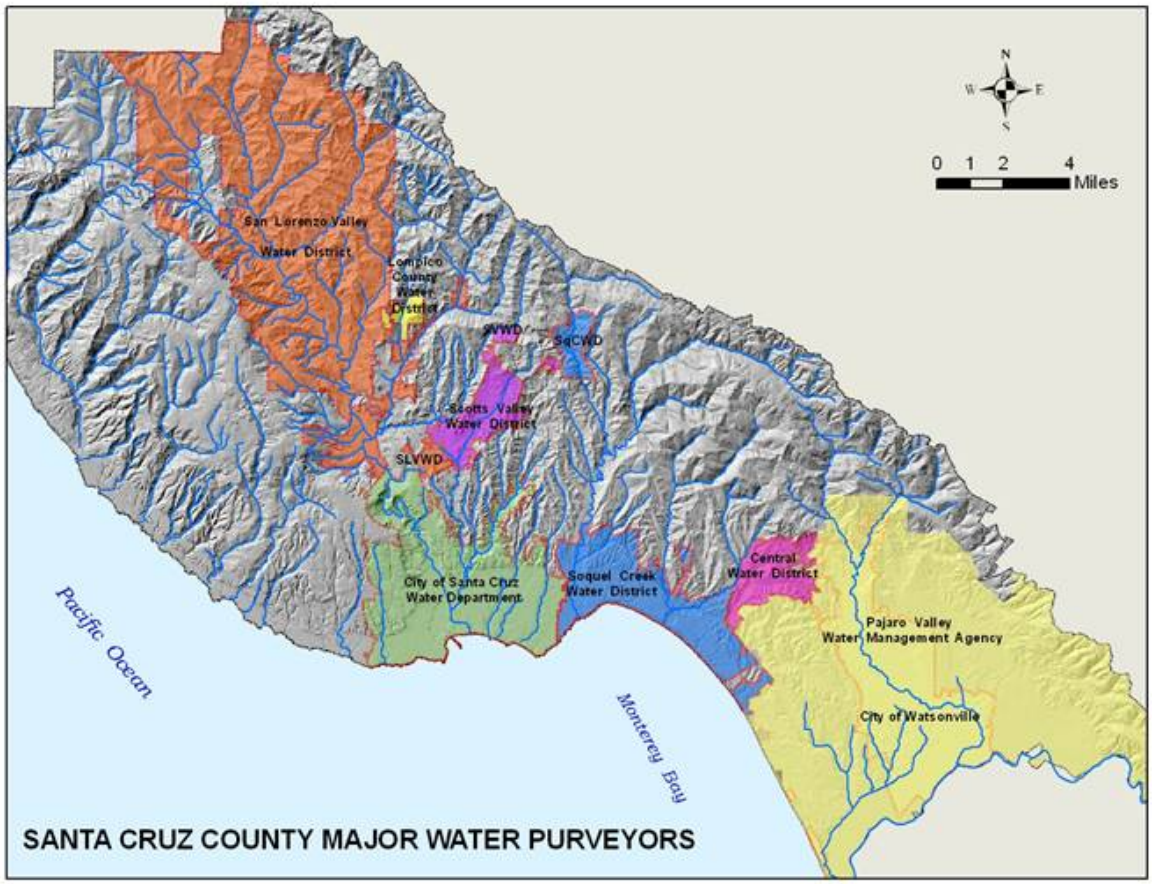

**State OWTS Policy §9.3.2.3 'Water Quality of Public Water Systems'** requires reviews to be conducted for water quality of public water systems. Public water systems include Small Water Systems of 5-199 connections, and Large Water Systems (LWS) having over 200 connections. For both SWS and LWS, the federal Environmental Protection Agency (EPA) requires water systems to treat and test their water for a list of certain federally mandated water quality constituents, and to report them annually by publishing and publicly posting a yearly Consumer Confidence Report (CCR). The specific data can also be made available upon request.

Santa Cruz County contains seven Large Public Water Systems (LWS) operated by various water districts or agencies. These LWS water purveyors provide planning and management of sustainable supply and water quality of public water systems. Partially financed by State Proposition 50 funds, an Integrated Regional Water Management Plan (IRWMP) coordinates efforts and numerous water projects of the Large Water Systems. 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 seven LWSs in Santa Cruz County are:

1. San Lorenzo Valley Water District (SLVWD)
2. Scotts Valley Water District (SVWD)
3. City of Santa Cruz Water Department (City SC)
4. Soquel Creek Water District
5. Central Water District
6. City of Watsonville
7. Pajaro Valley Water Management Agency




## 5.4 State Water Quality Data – NPDES permits, CEDEN, and GAMA

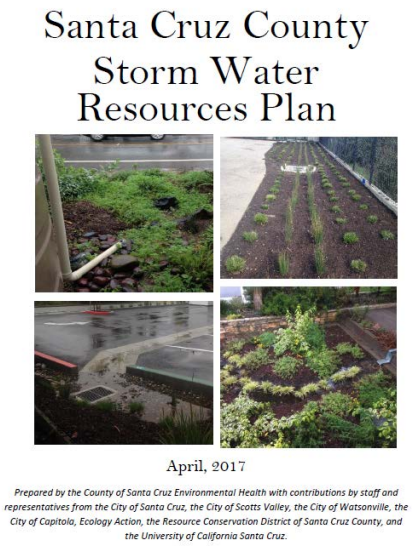
The County also supports and has access to other water quality sampling data from other monitoring programs that are related to federal permitting for the National Pollutant Discharge Elimination System (NPDES) administered by the U.S. Environmental Protection

Agency (EPA). This involves monitoring as a part of a discharge permit, and one of the biggest programs is the municipal stormwater discharge program.


The County of Santa Cruz is covered under the State General Permit for Storm Water Discharges from Small Municipal Storm Sewer Systems (MS4s). The General Permit requires the County of Santa Cruz Public Works Department to develop and implement a comprehensive storm water management program (SWMP) to reduce the amount of pollutants discharged in urban runoff, and to improve and protect water quality. Santa Cruz County produced a SWMP in 2010.

Under its MS4 General Permit, the County of Santa Cruz implements specific types of urban runoff pollutant control measures and submit reports to the Regional Board. Urban runoff includes stormwater that is discharged by municipal storm drainage systems and any other water that flows, is discharged, or infiltrates into the storm drainage system. The activities described in the SWMP are based on EPA stormwater regulations, the State Board's General Permit for Discharges of Stormwater from Small Municipal Separate Storm Sewer Systems (Small MS4s) and a Model Urban Runoff Program (MURP). Potential surface discharges from failing OWTS are also addressed in the stormwater program.

## Projects Prioritization Plan - SRP




In 2014, California enacted SB 985, requiring a Stormwater Resource Plan (SRP) for State bond grant funding of storm water -related projects.

In response, in 2016, the County of Santa Cruz developed a draft SWRP and adopted a final plan in February 2017. The plan documents the County's regional approach to manage watershed health, water quality, water supply, and stormwater management. This SWRP is a comprehensive document outlining countywide stormwater project priorities, as well as regional stormwater permit compliance.

Partnering agencies who developed this Santa Cruz County SWRP include:

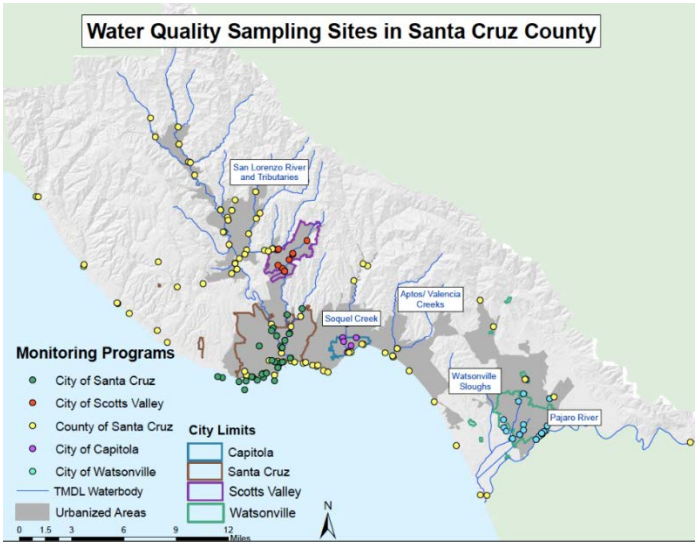
- City of Capitola Public Works Department
- City of Santa Cruz public Works Department
- City of Scotts Valley Public Works Department

- City of Watsonville Public Works & Utilities Department
- County EH, Water resources Division
- Resource Conservation District of Santa Cruz County
- Ecology Action, Santa Cruz
- University of California Santa Cruz, Storm Water Program
- Regional Water Management Foundation

**Wasteload Allocation Attainment Program for Watersheds in Santa Cruz County**
July 2015

Since 2009, all the holders of MS4 permits within Santa Cruz County have been meeting regularly through a Stormwater Information Network (SIN). Collaborating through SIN, County EH led a planning process to produce a collaborative planning document – the Wasteload Allocation Attainment Plan (WAAP). The County and City of Capitola collaborated to produce a WAAP in August 2012. This WAAP was updated in July 2015 through a joint effort drafted by the County of Santa Cruz and the Cities of Capitola, Santa Cruz, Scotts Valley, and Watsonville. The WAAP outlines implementation of activities that will achieve TMDL wasteload allocations. This plan addresses: development of an implementation and assessment strategy; source identification and prioritization; best management practice (BMP) identification, prioritization, implementation, analysis, and assessment; monitoring program development and implementation; coordination with stakeholders; and other pertinent factors.

Santa Cruz County MS4 permittees coordinating programs within the Stormwater Information Network (SIN) are:




- City of Capitola
- City of Monterey
- City of Santa Cruz
- City of Scotts Valley
- City of Watsonville
- Monterey County
- Santa Cruz County
- U.C. Santa Cruz

Other contributors to the development of a regional stormwater management plan include Integrated Regional Water Management Groups, the Santa Cruz County Sanitation District, the Regional Water Quality Control Board, Resource Conservation District of Santa Cruz County, Santa Cruz Integrated Regional Water Management Group, Water Supply Agencies, Monterey Bay National Marine Sanctuary Water Quality protection Program, San Lorenzo River Alliance, Coastal Watershed Council, Surfrider Foundation, and members of the public interested in the Stormwater Management

## Data Exchange Network – Surface Water Quality


The State Board operates its Surface Water Quality Assessment Database as being primarily compatible with data formatted per specifications and parameters of the California Environmental Data Exchange Network (CEDEN). CEDEN is a web-based cloud portal available to either download and use or upload and share data for California's statewide water bodies, including streams, lakes, rivers, and the coastal ocean. Various nonprofit and governmental entities in California monitor water quality to ensure compliance with State requirements to protect 303 (d) – listed Impaired waters. CEDEN aggregates statewide data in order to facilitate data sharing for regional environmental planning and management.

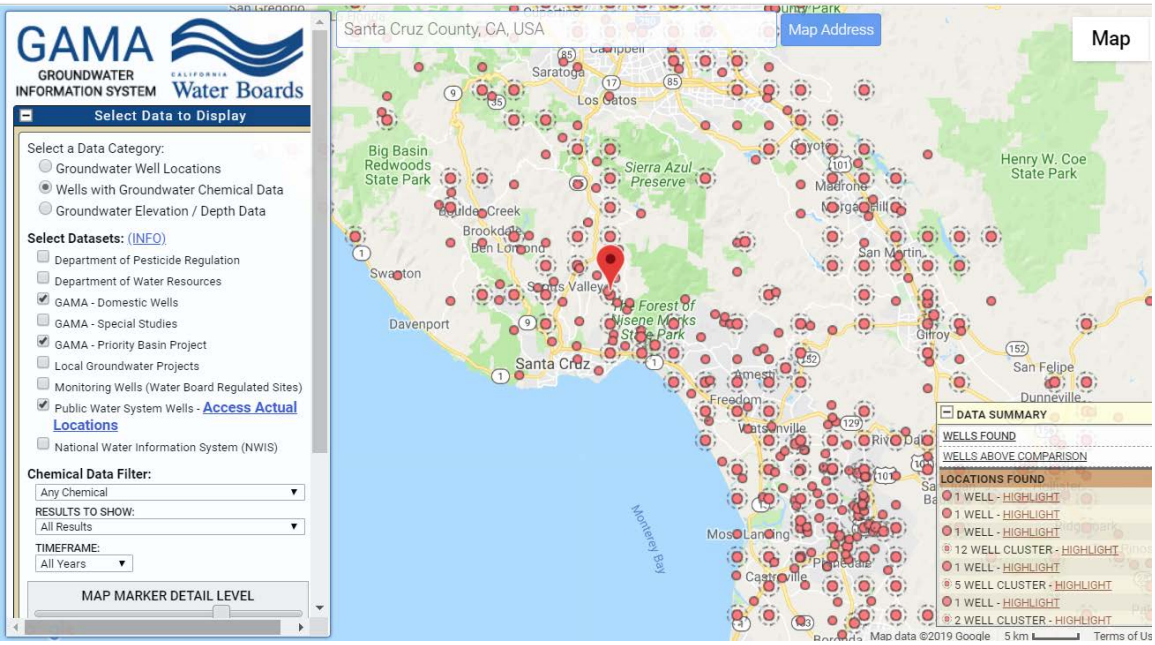
## Groundwater Sampling Related to GAMA Program

The Groundwater Quality Monitoring Act of 2001 - Assembly Bill 599 (AB 599 Liu) - was established to improve comprehensive groundwater monitoring and increase the availability of information about groundwater quality to the public. AB 599 specified that the comprehensive monitoring program integrate projects established in response to the Supplemental Report of the 1999 Budget Act (GAMA Program), strive to take advantage of and incorporate existing data whenever possible, and prioritize groundwater basins that supply drinking water.

The GAMA program is California's comprehensive groundwater quality monitoring program that was created by the State Board in 2000, and later expanded by AB 599, which required the State Board to integrate existing monitoring programs and design new program elements as necessary, resulting in a publicly accepted plan to monitor and assess groundwater quality in basins that account for 95% of the state's groundwater use. The goals of GAMA are to:

- Improve statewide comprehensive groundwater monitoring.
- Increase the availability to the general public of groundwater quality and contamination information.
- Establish ambient groundwater quality on a basin wide scale.
- Continue periodic groundwater sampling and groundwater quality studies in order to characterize chemicals of concern and identify trends in groundwater quality.
- Centralize the availability of groundwater information to the public and decision makers to better protect our groundwater resources.

The GAMA program maintains a web-based mapping tool for users to gather data and information regarding groundwater quality in California. The following map is an example of GAMA's data  tool depicting wells with groundwater chemical data, including domestic wells, and public water system wells.




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. The State Board also requires that all data submittals be accompanied by a Quality Assurance Project Plan (QAPP) or QAPP-equivalent document for the data to be used in the assessment of a primary line of evidence.

Currently, County EH is working to reorganize and streamline its internal databases so that they are better coordinated and consolidated internally for data generated by County EH itself. These data sets, each with separate databases, include data sources from County EH programs of: 1) OWTS; 2) drinking water systems; 3) the EH water quality laboratory. Corollary work is required to format County EH data collection, compilation, storage, and reporting according to formatting compatible with CEDEN and other State mandated databases – to upload and share County of Santa Cruz data. A third component of this work is to develop efficient systems for retrieving data from the databases of others such as the State and other groups – to download and use others' data to inform local environmental resources planning and analyses. For OWTS, many datasets available statewide, as gathered by State and local City and nonprofit agencies that exactly pertain to County EH's management and tracking water quality impacts from OWTS.

# 6 Program Management

In Santa Cruz County, OWTS are managed by the Environmental Health Division of the Health Services Agency. Within Environmental Health, permitting an inspection is completed by the Land Use Program staff, with assistance from the Water Quality Laboratory and the Water Resources Program staff. EH staff work closely with Planning Department on building permit review, discretionary permit review, geologic hazard assessment and biotic resource review. EH works with Public Works Department staff on stormwater management, including location of onsite stormwater infiltration devices and potential for extending sewer service to properties currently on OWTS. EH wastewater management activities are funded by permit fees and annual service charges collected on the tax bill of properties served by OWTS through County Service Area No. 12 (CSA 12).

## 6.1 OWTS Data Compilation

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. 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. Septic system 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 septic system 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 a septic system 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 ae 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
  - Septic system 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, 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 (FIB), nitrate, temperature, dissolved oxygen, conductivity, turbidity, flow and groundwater level, among other parameters.

## 6.2 Data Management and Reporting

All of the County data systems have provisions for relating and exporting data in order to summarize data, look at 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 annual reports on:

- Complaints received, investigations and inspections conducted, results of inspections, and outcomes
- Septic Tank pumping records, including volumes pumped, frequency of pumping, and indications of system malfunction
- Permits for new and replacement systems, including variances approved
- Summary of water quality data obtained.

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.

## 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 2.0 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 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 in order 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.

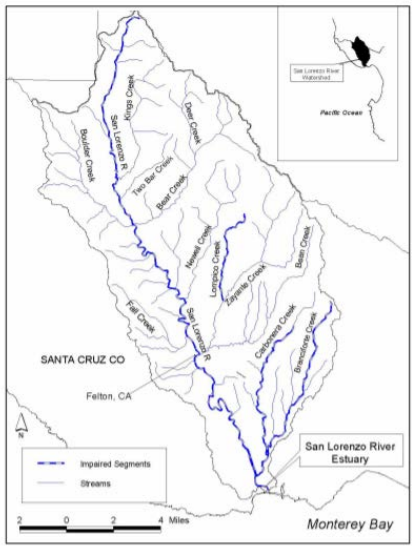
Every OWTS-owning parcel in the county pays the CSA 12 fee. Every OWTS parcel in the San Lorenzo watershed pays an additional CSA 12A fee, and every parcel with a permitted nonstandard system pays an additional CSA 12N Fee. A parcel can fall into the first, second, or all three of the fee categories. 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 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 septic system performance and maintenance,
- water quality monitoring to evaluate impacts of wastewater disposal,
- educational programs for property owners, realtors and others for enhanced septic system management.
- oversight of existing systems including inspections, evaluations, investigations, and monitoring of nonstandard systems .
- data management and reporting.

The CSA12 fee of $6.90/year (FY 19-20) 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 septic system maintenance; and maintenance of the computerized record keeping database systems for tracking septic tank pumping, inspections, and permitting.




The additional CSA12A fee of $18.54/year (FY 19-20) 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 septic system 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 septic systems 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 septic systems in this watershed.

Beginning in 1993-94, an additional charge under CSA 12N is collected for those parcels served by nonstandard systems: alternative, nonconforming, and haul-away systems. 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 300 septic systems with special operating characteristics have been approved for use in Santa Cruz County. The additional CSA 12N fee is charged to parcels served by nonstandard sewage disposal systems (enhanced treatment systems, alternative systems, haul away systems, or nonconforming systems) as designated by the County Health Officer pursuant to Chapter 7.3 8 of the 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 2019-20 year are:

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

# Appendix

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.** Regulations for The Repair and Upgrade of Septic Systems
D. Enhanced Treatment System Regulations
E. Chamber leaching guidelines
F. Soil Evaluation and testing procedures
G. Winter Water Table Testing Procedures
H. State OWTS Policy
I. LAMP Checklist