Report of the
Monte Rio Wastewater Task Group

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Sponsored by:

Sonoma County

Community Development Commission

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Foreword

In December 2007, County officials called a meeting in Monte Rio and announced that they had decided not to move forward with a project to build a sewage treatment plant at Sheridan Ranch, downstream from Monte Rio.

The collapse of the Sheridan Ranch project left Monte Rio without any proposal on the horizon to resolve problems with onsite wastewater treatment systems, some acknowledged and some unrecognized. The most visible result has been that properties in the downtown business area have remained vacant for more than a decade, but great numbers of properties in Monte Rio, commercial and residential, have challenges because of small parcel size, steep terrain, inadequate soil conditions or close proximity to the River or Dutch Bill Creek.

Redevelopment and MRWTG

Most of the parcels in the Monte Rio area are also within the Russian River Redevelopment project area. Among the objectives of Redevelopment is to enhance and revitalize the economic base of the area. To address the economic impact that results from limitations due to inadequate septic system restrictions the Sonoma County Community Development Commission (CDC) which administers the Redevelopment project appointed a task group to study the problem and propose solutions. Dubbed the Monte Rio Wastewater Task Group (MRWTG) the group includes Monte Rio residential and business property owners, non-residents who have expertise in wastewater treatment and Supervisor Efren Carrillo. CDC has provided staff support and guidance through the process. The task group has been meeting at least monthly since October 2009. Meetings have been open to the public.

Early on, the task group agreed on the following statement of purpose:

> *"To define the issues, research wastewater methods, systems and governance, educate the public, and recommend to the CDC the most cost effective, approvable wastewater solution(s) for property owners and tenants of the Monte Rio area* that will allow them to improve and build on their properties and protect public health and the environment.*
>
> **Including but not limited to the Monte Rio Waiver Prohibition Area"*

This report and the October 16 Symposium are parts of the process that emerged from that agreement.

Process

One of the objectives of the task group is to engage the community in the process, understanding that most people do not have the time or inclination to attend the many meetings that it takes to hash out complex issues. The process that has evolved is one where the task group gathers information and understandings and feeds it back to the community at specific check-in points. In this way the task group has a chance to absorb a lot of information and to take the time to digest it and reflect back to the community in a concise way.

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Define the Issues

The task group set out to educate itself on the issues. The group identified five study topics and self-selected into study groups to investigate each topic and report back to the full group. Over a five-month period each study group developed and presented their findings, usually accompanied by slides and in some cases included a panel of experts on the topic. At the end of that process the group began planning to present the information in a community symposium.

Research Wastewater Methods, Systems and Governance

Any sustainable solution will require some form of governing structure. The next step for the task group will be to research how that can be done. Governance could take the form of an independent district, such as a septic management district or it might be part of a larger entity, such as a Community Services district. The task group will work with advisors and public agencies to understand the options. Part of that process will be to establish the scope of the project. Issues of growth and the nature of management will be part of this discussion. The task group will conduct another community meeting to present those options and get feedback. The approach to governance will be a key decision that will impact the rest of the effort.

As part of its study of the issues, the task group had presentations from vendors of various onsite and small community systems. Information that the group received on current options for onsite and small scale systems is included in the report but the task group did not attempt to evaluate those systems for applicability to Monte Rio – that will require an engineering studywhich will be part of a later stage once governing structure and the shape of the project have been determined.

Educate the public

Public participation and feedback is crucial to the success of this project. As part of its mission the task group will present its findings to the public and ask for feedback at key points. This report and the October 16 symposium are the first of those check-in points. More check-ins are planned as studies are completed.

There will be other meetings. The task group has formulated its process along the way and the process may evolve further as new information is learned and additional advisors or agencies become involved. The public is welcome and encouraged to participate and learn along with the group. The task group meets monthly, usually on the third Monday.

Recommend to the CDC

This document describes a set of problems related to the treatment and disposal of our wastes. The end product of the task group will be to recommend a solution or a package of solutions to those problems. Since this is a task group of the CDC the recommendation will be addressed to CDC, but will be a recommendation to the community based on everything the task group has learned from experts and heard from the community. What that recommendation will be is still very much an unknown, but it is likely to affect most residents and businesses in Monte Rio. The more you are involved in the process, the more likely that you will be satisfied with what comes out of it.

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Introduction

Why there are issues with onsite wastewater systems in Monte Rio

Every human has a need to dispose of bodily waste in a safe and healthful way. Most of us use water for the purpose of cleansing our homes and for conveying our wastes to some other place. We use the same cleansing/conveyance system to dispose of water that is used for other purposes. For most of us, this fouled soup simply "goes away" at the press of a lever or lift of a drain plug and that's the end of it.

In urban areas the water really does just go away – through a complex maze of pipes and pumps that convey all manner of household waste, industrial waste and storm water to an industrial sewage treatment facility that sorts it all out. By various means impurities are skimmed, consumed by bacteria, filtered out and disinfected. Solids are hauled away to special landfills and the water, mostly clean, is sent to any place it can be used for irrigation or steam generation. Water that can't be used is stored until it can be dumped into the River when it is flowing enough to dilute it sufficiently.

In rural areas that are not connected to centralized sewer plants, wastewater doesn't quite just go away. It is conveyed to an onsite system, usually a septic system, which consists of a tank in the ground where solids are separated from liquid which then flows out of the tank and is dispersed into the soil. Modern conventional dispersal systems are made up of a network of underground pipes called a leach field. Soil in the leach field and its resident bacteria consume and filter out impurities as the water passes back into the water table. Bacteria in the septic tank consume much of the solids in the tank. The rest is periodically pumped out and hauled away to a sewage treatment plant where it goes through the same process as everything else that passes through the plant.

There isn't much to go wrong in a septic tank if it's pumped out every few years, but the leach field is another story. The proper function of a leach field system depends on depth of soil, quality of soil, amount of available land, slope of the terrain and distance to the water table or bedrock. The more soil there is between the leach lines and the water table the better. Flatter ground works better than sloping terrain. Farther from the River is better than closer. Under water is really not good.

Soil that absorbs and filters water is the great resource in all of this. Soil with active plant, insect and microbe life does the same work as industrial sewage treatment plants, and some would say more effectively. You just need a lot of it.

Problem 1

The state agency charged with regulating water quality and enforcing the Federal Clean Water Act is the State Water Resources Control Board and its regional arm the North Coast Regional Water Quality Control Board (NCRWQCB). Their regulations for our area are contained in their "Basin Plan", which has been in effect since 1971. Among other things, the Basin Plan contains regulations that define where and how leach fields can be built. Two regulations impact a majority of parcels in Monte Rio: 1) Leach fields cannot be built on a slope greater than 30% and 2) Leach fields cannot be built within 100 feet of

the River's 10 year flood level. Most of Starrett Hill is affected by the first rule and most of the flats along the River and Dutch Bill Creek are affected by the second.

Problem 2

We think of Monte Rio as being a rural community, however its building density is more like that of a suburb with many small parcels and homes close together. Very few parcels in Monte Rio are large enough to accommodate a standard leach field built to current standards. The alternative is to install a non-conventional leaching system that incorporates additional filtration. These are expensive, and on some parcels even exotic systems won't work.

The concentration of septic systems in a small area results in a concentration of contaminants in a small area and can lead to plumes of insufficiently treated wastewater entering the water table. This is very difficult to monitor or even detect.

Problem 3

Some septic systems in Monte Rio are failing. Surfacing water is a sure sign of failure, but the crucial factor is how much soil is filtering how much water.

Septic system failure usually means the leach field has failed. Conventional leach fields have a life expectancy of 30-40 years and they eventually fail as a natural process. Some advances in biotechnology may extend that life, but most leach fields will eventually fail.

Not all failures are visible. The distance to the water table can change with the seasons. In the winter when ground water levels are high there may not be enough soil between the leach field and the water table for adequate treatment.

Most onsite systems in Monte Rio were built before there were regulatory codes. A significant number are simply cesspools made of wooden boxes. Some are discharging directly into the water table.

Problem 4

Monte Rio is not part of any wastewater control district. That leaves the job of enforcing the regulations that pertain to on-site systems to the County Permit and Resource Management Department (PRMD), whose main tool is the issuance and withholding of building permits. Most existing homes were in place before the Basin plan was in effect. Their systems did not go through construction oversight under current rules and would most likely not be approved today. PRMD has allowed repairs of existing systems that do not conform, but changes in use, expansion or substantial rebuild triggers a new permit process and that requires conformance. This is true for homes and businesses. Moreover, the area in and around Monte Rio is designated a "waiver prohibition" area, which means that the PRMD will not grant any waivers from Basin Plan specifications on an individual basis. According to both PRMD and NRWQCB removal of the waiver prohibition is extremely unlikely. This makes expansion or replacement of buildings costly if not infeasible and it is virtually impossible to build new ones.

As an issuer of permits, PRMD is a reactive agency. They respond to requests for permits and inspections and to complaints of violations. They do not provide pro-active management or inspection to assure that existing systems are actually working. Since no one else is managing Monte Rio's onsite systems PRMD must assure that systems that they approve will work even under the supervision of the property owner, successor property owners and sometimes their tenants.

Problem 5

Regulations are becoming more stringent. A law passed in 2000 but not yet implemented targets all onsite wastewater treatment systems in the state with new rules designed to assure that they are working. Although the law, designated AB 885, has been on the books for ten years, it is still working its way through the implementation process. Those regulations may be imminent or they may stall, but they will be in place sooner or later. The law is not going away.

The regulations that have been proposed will require that onsite systems must be inspected regularly and repaired within a reasonable time if they fail inspection. There are additional proposed requirements that might affect the swaths of Monte Rio that are within 600 feet of the River and Dutch Bill Creek at 10 year flood level. It is not certain whether either waterway would fall under this rule if it goes into effect, but the River is listed as an "impaired waterway", which is one of the criteria that trigger the more stringent rules.

Summary

The essence of the problem is that there is not enough suitable soil within the populated areas of Monte Rio to absorb all of the wastewater that it produces with conventional septic tank/leach field systems. It's too concentrated, too steep and too close to rivers and streams according to long-standing state regulations. This is not true for every property, but it is true for a very large number of properties and it is true in aggregate. As a result, property owners are severely restricted on the use and expansion of their property, it can be difficult to replace structures lost by fire or other events and there is potential degradation of ground and surface water. The status quo is not sustainable.

How Septic Systems Work

Introduction

A conventional septic system consists of two primary parts: The septic tank and a dispersal system (leachfield). The septic tank serves to separate the solids from the liquid. The liquid is then discharged to the dispersal system where it enters into the soil. In order to dispose of all of the wastewater from a residence, the dispersal system needs to be relatively large, leachfield sizes can range from 60 to 165 feet of leachline per bedroom in the residence.

Treatment in a Septic System

There are a variety of wastewater constituents that are discharged from a typical residence. The septic tank reduces the wastewater strength by removing the solids. The septic tank does not significantly reduce bacteria, viruses or most chemical components. The treatment in a septic system occurs as the wastewater filters through the soil after being discharged through the dispersal system. In order for this to be effective, there needs to be at least three feet of permeable soil below the dispersal system and five feet or more of soil depth to the highest seasonal groundwater table. In addition, horizontal setbacks from rivers, drainage courses and water wells are necessary to allow for sufficient distance for remediation of the wastewater by the soil. These horizontal setbacks range from 50 to 100 feet. In the case of a river, the setback is measured to the ten-year flood elevation.

Soil

The type of soil on a parcel is extremely important to the proper operation of a septic system. Heavy clay soils will not effectively accept all of the wastewater from a residence which can range from 60 to 75 gallons per person per day. In addition, clay soils are more susceptible to clogging of the infiltrative surface. Gravelly soils and very sandy soils will not perform an adequate job of remediating the wastewater. Bacteria and viruses can travel easily through these soils. Shallow soils (where there is a layer of bedrock or impermeable soil underlaying the topsoil) are generally ineffective for wastewater remediation. Soils with a high winter groundwater table will allow the introduction of wastewater into the groundwater where contaminants can travel freely. The ideal soil for a septic system consists of a deep, well drained, permeable soil.

Proper Function of Septic Systems

There are various perceptions of what constitutes a properly functioning septic system.

A property owner may be content as long as the toilet flushes.

The County will take an abatement action when a septic system is discharging sewage directly to the surface of the ground or to a water way. This is considered an immediate threat and is a violation of both State and local laws.

The Regional Water Quality Control Board (RWQCB) sets standards for protection of surface water and ground water. They will consider septic systems to be individually or collectively failing when the discharge from the septic systems causes their adopted standards for water quality to be exceeded. In essence, septic systems are expected to provide a degree of treatment of the wastewater, year around, that would meet the same standards as for a wastewater treatment plant.

Septic System Limitations in the Monte Rio Area

There are a variety of factors in the Monte Rio area that can adversely affect the ability of septic systems to meet the discharge specifications of the RWQCB. These include:

Inadequate setbacks between the leachfield and receiving water bodies:

Many systems are located too close to the banks of the Russian River and tributary streams or too close to the ten-year flood plain. Without adequate setbacks to these water bodies, there can be incomplete filtration of the wastewater before it reaches the water body.

Density of septic systems:

Many areas in the Monte Rio have concentrations of systems on small parcels. This results in a concentration of contaminants into a small area resulting in a plume of contaminants that can reach a water body. This is particularly true of nitrate contamination that is not easily removed by on-site septic systems. The nitrate contamination can cause blooms of algae in surface water and can be toxic to infants when it reaches groundwater used as a drinking water source.

Contributions to pathogen contamination of the Russian River:

The Russian River, in the stretch between Fife Creek and Dutch Bill Creek has been listed by the RWQCB onto the 303D list of water bodies degraded by pathogens. At this time, it is not known what contribution on-site systems have to the pathogen load of the river. There is currently a study being completed which will provide more information.

Failures from inadequately constructed systems:

Most of the onsite systems in Monte Rio were constructed before the adoption of regulatory codes. There are still a significant number of cesspools which consist of little more than a wooden box in the ground. These systems can overflow from too much wastewater entering into them. These overflows can be intermittent or seasonal and are not easily detected or monitored. In addition, some systems have illegal overflow pipes which discharge into waterways and have been installed to prevent sewage from backing into the residence.

Inadequate treatment of wastewater by the leachfield:

This can occur when there is inadequate soil depth to groundwater, to clay soils or to bedrock to provide for proper filtration of the wastewater discharge from the leachfield. There are areas in Monte Rio where the wintertime ground water levels are very high. In some cases, leach fields and cesspools are discharging directly to the groundwater. This will facilitate the movement of bacteria and viruses in the ground water table. In other areas of Monte Rio, the soil mantle is very thin. This can lead to partially treated wastewater seeping along rock or hardpan layers and discharging into water ways. Finally, there are many areas on the alluvial terraces of the river that have coarse sand and gravel soils that do not allow for effective treatment of the wastewater.

Steep slopes

Cuts and seeps on steep slopes can lead to discharge of untreated sewage from sewage disposal systems.

Summary

The question of how effective septic systems are in Monte Rio must be looked at as the totality of issues that affect their proper operation. It is likely that the existing septic systems in Monte Rio are affecting the water quality of surface water and ground water.

Current Regulations

History of Regulation

The history of water quality regulation in the United States began in 1899 with the passage of the Rivers and Harbors Act. Throughout the ensuing century many more laws were passed culminating in the Federal Water Pollution Control Amendments of 1972, commonly known as the Clean Water Act (CWA). Major amendments were passed in 1977 and 1987.

The CWA is administered by the Federal Environmental Protection Agency (EPA) which sets and enforces standards of water quality partly through delegation to individual state agencies through the National Pollutant Discharge Elimination System (NPDES). The EPA has designated the portion of the Russian River between Fife Creek and Dutch Bill Creek as an impaired water body for indicator bacteria, sediment, and temperature under Section 303(d) of the Clean Water Act.

In California the agency charged with enforcing the CWA is called the State Water Resources Control Board (SWRCB) which regulates nine regional water quality control boards, the Monte Rio area falling under the jurisdiction of the North Coast Regional Water Quality Control Board (NCRWQCB).

California also has its own water quality law called the Porter-Cologne Water Quality Control Act enacted in 1969. This law empowers the 9 Regional Water Quality Control Boards to order the abatement of discharges of waste that create or threaten to create pollution of the waters of the State, whether surface waters or ground water. Each RWQCB has a Basin Plan which sets forth how the regional board will regulate water quality within its territory. Basin Plans are periodically amended for a variety of reasons. The development, through studies and testing, of pollutant loading limits, also known as Total Maximum Daily Loads (TMDLs), and of Action Plans to achieve the loading limits can result in amendments to the Basin Plan. TMDLs are specific to each water body and are conducted under the CWA when a water body is listed as impaired under Section 303(d).

The University of California at Davis (UC Davis) maintains an inventory of all TMDLs developed in the State, which is an on-going process. We currently await the results of the TMDL study for the Russian River in the Monte Rio area, due to be published soon. Federal law requires that TMDLs become formally incorporated into the Basin Plan so as to become the basis for enforcement actions by the Regional Board (NCRWQCB). Once a TMDL is adopted, the Porter-Cologne Water Quality Control Act requires that the NCRWQCB establish standards for implementation of that TMDL. The TMDL program in the North Coast Region is currently operating under a consent decree from the Supreme Court due to the length of time it has taken to come into compliance with the Porter-Cologne Act.

Seemingly overlapping the existing laws already in place, the State legislature passed AB-885 in the year 2000 directing the State Water Resources Control Board to develop statewide standards specifically for septic systems, now formally called On-site Wastewater Treatment Systems (OWTS) by January 1, 2004.

The Sonoma County Permit and Resource Management Department (PRMD) is the local regulatory agency responsible for implementing State law regarding OWTS in Sonoma County. The County has adopted a local code and regulations for OWTS. Permits for most OWTS (including repairs) are issued by PRMD. The RWQCB also issues permits for OWTS with high volume discharges.

Waiver Prohibition

In 1997, the Sonoma County Board of Supervisors passed a resolution titled Waiver Prohibition which effectively memorialized the fact that no new septic systems were approvable for new development in the Monte Rio area under the State Basin Plan. The purpose of this declaration was to qualify the Waiver Prohibition Area for funding priority under the State Small Community Grant Program so that a sewer system could be built, thereby eliminating the area's dependence on septic systems.

Even before the Waiver Prohibition ordinance was passed waivers generally were not issued in the Monte Rio area for new construction because of the prevalent site constraints which would violate the Basin Plan so the Waiver Prohibition has had no actual effect. The resolution remains in effect today.

Code Compliant OWTS as defined by the Basin Plan

New construction anywhere in Sonoma County not served by a sewer system, based on the State Basin Plan, requires a Code-Compliant On-Site Wastewater Treatment System (OWTS), historically known as a septic system. The definition of a Code Compliant OWTS is one that meets the basin plan standards without a waiver.

Some of the standards which must be met for a Code-Compliant OWTS are:

1. 100 feet setback from ten-year floodplain
2. No leachfields on slopes in excess of 30%
3. 100 feet setback from year-round streams
4. 50 feet setback from ephemeral streams, as defined in the Basin Plan
5. 25 feet setback from cut banks
6. Deep, high quality soils

Achieving approval for such a system in the Monte Rio area is all but impossible due to the various insurmountable site characteristics of the area. Only one has ever been approved – that of the Monte Rio School, which has a large parcel with uniquely beneficial soil characteristics which enable it not to require a waiver.

PRMD Remodel Policy

The current PRMD Remodel Policy was implemented on July 29, 2009, and addresses remodels, repairs, and rebuilds of existing structures on septic systems. There are four classes of OWTS, including the above-referenced "Code-Complying OWTS," the first of which is not even considered to meet the definition of an OWTS:

1. **Cesspool**: A cesspool (redwood box in the ground) is not considered to be a viable OWTS although many still exist. No permits whatsoever will be issued when the building is served by a cesspool.

2. **Class-3 OWTS**: When a Class-3 OWTS is present (and fully functional), residential additions are limited to a cumulative increase of 500 square feet. beginning on July 29, 2009, with no added bedrooms allowed. Remodeling is acceptable as long as not more than 50 % of the exterior wall framing is replaced. For commercial buildings, additions and remodeling can only take place when the projected sewage flow in gallons per day can be justified by engineering. For both residential and commercial, 100% OWTS expansion area (reserve area) must exist and the structure must have been occupied within the last two years.

3. The former Class-2 septic system designation was eliminated in the adoption of the new standards on July 29, 2009.

4. **Class-1 OWTS**: A Class-1 OWTS is defined as "best possible system," given whatever site constraints exist, but not up to the standards of a Code-Complying OWTS. This type of system is allowable under County policy to allow some flexibility for remodels and repairs. A Class-1 OWTS cannot be used to justify additional bedrooms, but in some cases can be utilized to justify additions larger than 500 sq.ft. and greater than 50% exterior wall framing replacement. To achieve Class-1, a qualified design professional must be engaged and a pre-treatment system elevating the quality of the effluent must be utilized in most cases. Waivers for slopes over 30%, depth to ground water, setbacks to water courses or cut banks are often necessary in the Monte Rio area in order to gain approval for a Class-1 OWTS. **NOTE**: This type of waiver is not affected by the "Waiver Prohibition," which applies only to new construction.

   The cost range for a Class-1 OWTS is usually $40,000 – 60,000 for a hillside installation and $30,000 – 60,000 for a floodplain application.

   Sufficient area must be available for effluent disposal plus 100% expansion area.

5. **Code-Compliant OWTS**: As discussed previously, a Code-Compliant OWTS is required for any new construction. It is defined as "a system that meets all current State and County OWTS standards and requirements."

Sometimes Nothing Can Be Done

Sometimes when an existing septic system fails nothing can be done to remediate the situation. Some of the property characteristics that could create this outcome are:

1. The lot is too small.
2. The only place a new OWTS can be placed is too close to the River or stream.
3. 100% expansion area cannot be achieved.
4. System will be too close to a cut bank, and effluent "breakout" will result.
5. Elevated ground water (pollution of groundwater).
6. Extremely poor soils (soils not capable of providing adequate treatment to the effluent.
7. Owner cannot afford the cost and cannot borrow the money.

Wastewater Disposal – The Problem

If the property owner can afford the cost, there are indeed many approvable wastewater treatment solutions under current regulations. Today there are many manufacturers of available on-site equipment capable of converting raw sewage into "high quality" (tertiary treated) effluent. The problem is: how do you dispose of it? Even though highly treated, such effluent still contains pathogens and must be further treated in the environment before reaching human contact. You cannot, for example, water your lawn with it, nor water your plants or wash your car with it. It may look like clear water, but it will still make people sick. The available methods for discharging this effluent are:

1. **Subsurface:** In most soils approximately 100 ft. of leachline per bedroom will be required plus 100% expansion area. For example, a 3-bedroom house would require space on the property for 300 lineal feet of leachlines plus an additional equal area for future expansion (reserve). Most properties in the Monte Rio area are too small for this, even for one or two bedrooms.
2. **Above-ground spray irrigation**: Only allowed on government-monitored land where the public is not exposed.
3. **Subsurface drip irrigation**: ($35,000 – $150,000) Difficult to construct, high maintenance, requires easement to County for monitoring.
4. **"Mound" or "At-Grade" systems**: ($40,000 - $80,000) Must be less than 12% slope; requires enough space plus 200% expansion area.
5. **Off-site disposal**: Pipe it somewhere else.

Pending Regulations

AB-885:

AB 885 directs that septic systems shall not pollute the waters of the state (whether ground water or surface water). The text of the law is included in the appendix of this document. Although AB-885 has been the law in California since 2000, the State has so far not completed a system of regulations to implement the law's requirements. When these regulations are ultimately adopted, they likely will

impose serious burdens on most homes and businesses in the Monte Rio area. While draft regulations currently posted on the State's website are expected to change, at this point they include, but are not limited to, the following:

1. No septic systems within 600 feet of impaired water bodies, unless highly engineered and monitored.
2. Abatement of all cesspools and other existing systems not at least up to Class-3 OWTS standards.
3. Mandated County inspections including possible dye tests to prove pollution of roadside ditches, drainage courses, creeks, and ultimately the Russian River.

Likely results of the mandated inspections will include the discovery of many non-compliant septic systems, including some that were installed without permits. Property owners will be required to bring these systems into compliance. The full text of AB 885 is in Appendix A of this document.

The NCRWQCB has the authority to issue "Cleanup and Abatement" or "Cease and Desist" Orders and has stated its intent to use it to effectively abate properties. A property under an Abatement order cannot be occupied.

A Perspective from Management Staff of The North Coast Regional Water Quality Control Board on the Monte Rio Situation:

Several months ago the Monte Rio Wastewater Task Group invited regulators from the various governmental agencies to our meeting so that we could all get a better understanding of the current and pending regulatory climate. Among those present was Mr. Luis Rivera, Assistant Executive Officer of the NCRWQCB. Paraphrasing, he indicated that one will not find another community in this whole state that has the unique confluence of sewage disposal issues that exist in Monte Rio. The community will either do something about this problem or we will issue Cease and Desist Orders as we have done in other areas of the state.

Prior Efforts

Introduction

Wastewater pollution in Monte Rio caused by septic systems in Monte Rio was identified in 1944 in a study commissioned by the Board of Supervisors after a polio outbreak in the early 1940's. Door to door studies conducted in the 1970s identified a high rate of septic system failures in the Monte Rio and Guerneville areas. The recognition of problems with septic systems in Monte Rio is not new.

Beginning in 1997, an effort was made to solve the wastewater problems in Monte Rio. That effort involved a Citizens Advisory Committee, County staff and private engineers, who studied the area, presented options and designed a solution in the form of a sewage treatment plant that would have been located at Sheridan Ranch, downstream from Monte Rio. Although that effort did not ultimately succeed, much work was done and much knowledge was gained and documented along the way.

The purpose of this chapter is to highlight the information contained in those documents. That information will be useful both to inform any future effort as to what was done and what was not done and to save duplicating past efforts.

Time Line

5/96	**West County Sanitation Project Staff Report (Water Agency); Monte Rio identified as one of the problem areas**
3/97	**CAC appointed to advise the County**
7/97	**RFP to identify "most suitable project"**
11/97	**Engineer contracted ~$125k**
3/98-9/98	**Engineer's reports: Technical Memoranda 1, 2 and 3**
6/03	**Initial Prop 218 vote to set up an assessment district passed**
	90% Engineering completed- Increased cost estimate
	$2.5 Million USDA grant lost
8/05	**Increased assessment Prop 218 protest vote upholds the increased assessment.**
1/08	**Project abandoned and the assessment district dissolvedby the County Board of Supervisors.**

Documents

West County Sanitation Project Staff Report

In May of 1996 the Sonoma County Water Agency presented a workshop in Forestville to its Board of Directors to discuss wastewater problems and options for unincorporated communities in the West County. The document that was included with the presentation was called West County Sanitation Project Staff Report. That meeting and document highlighted wastewater issues in several River Communities including Mirabel Heights, Forestville, Graton, Monte Rio, Camp Meeker, Occidental and the communities between Forestville and Guerneville. Water Agency staff presented a range of options and cost estimates for them for each community. Among the options were onsite management, community-centered sewer systems and several concepts for regionalization, connecting several collection systems to the Russian River plant in Guerneville. One of the issues at the time was that the EPA had demanded repayment of $1.2 million of the money they had granted to build the plant because they considered it to be underutilized.

The section of that paper that discussed Monte Rio acknowledged that no pollution studies had been done for Monte Rio. Pollution studies had been done, however, for Camp Meeker in 1989, and for Mirabel Heights and Summerhome Park in 1990. Those studies documented failure rates of 33% in Summerhome Park, 60% in Camp Meeker and 70% in Mirabel Heights and concluded that significant public health hazards existed in those areas. Staff concluded that Monte Rio had characteristics that were similar to those communities in terms of terrain, lot sizes and the age of most septic systems and that therefore it was likely that a high failure rate existed in Monte Rio as well. At the time of the study, both Camp Meeker and Mirabel Heights were under Building Moratorium and Waiver Prohibition, but Monte Rio was not.

The staff report discussed three Non-Regional options and two Regional options for Monte Rio. The Non-regional options were:

1) STEP system with community leach field
2) Annexation to the Russian River CSD
3) An individual treatment facility (sewer plant)

The two regional options would have:

1) Annexed Monte Rio, Occidental and Camp Meeker into the Russian River CSD, or
2) Annexed the communities in option 1 plus Forestville, Mirabel Heights and Graton into one large centralized system.

The Staff Report acknowledged that there was a great deal of opposition to the regional options, mostly due to potential growth impacts. In the wake of the staff report, Mirabel Heights built a collection system and connected to the Forestville plant, Oddfellows Park developed a community septic system and the County initiated a process to find a solution for Monte Rio. The remainder of this chapter will focus on the efforts and output of that process.

State Mandates and the Citizens Advisory Committee

In 1997, the North Coast Regional Water Quality Control Board (NCRWQCB) issued a directive to the Board of Supervisors to develop plans to eliminate non-code septic systems along the Russian River. In the same year the County appointed a Citizens Advisory Committee (CAC) in Monte Rio to participate in the process of finding a solution and to provide feedback. The CAC held regular public meetings and worked with the County to review information developed by County staff and by consulting engineers.

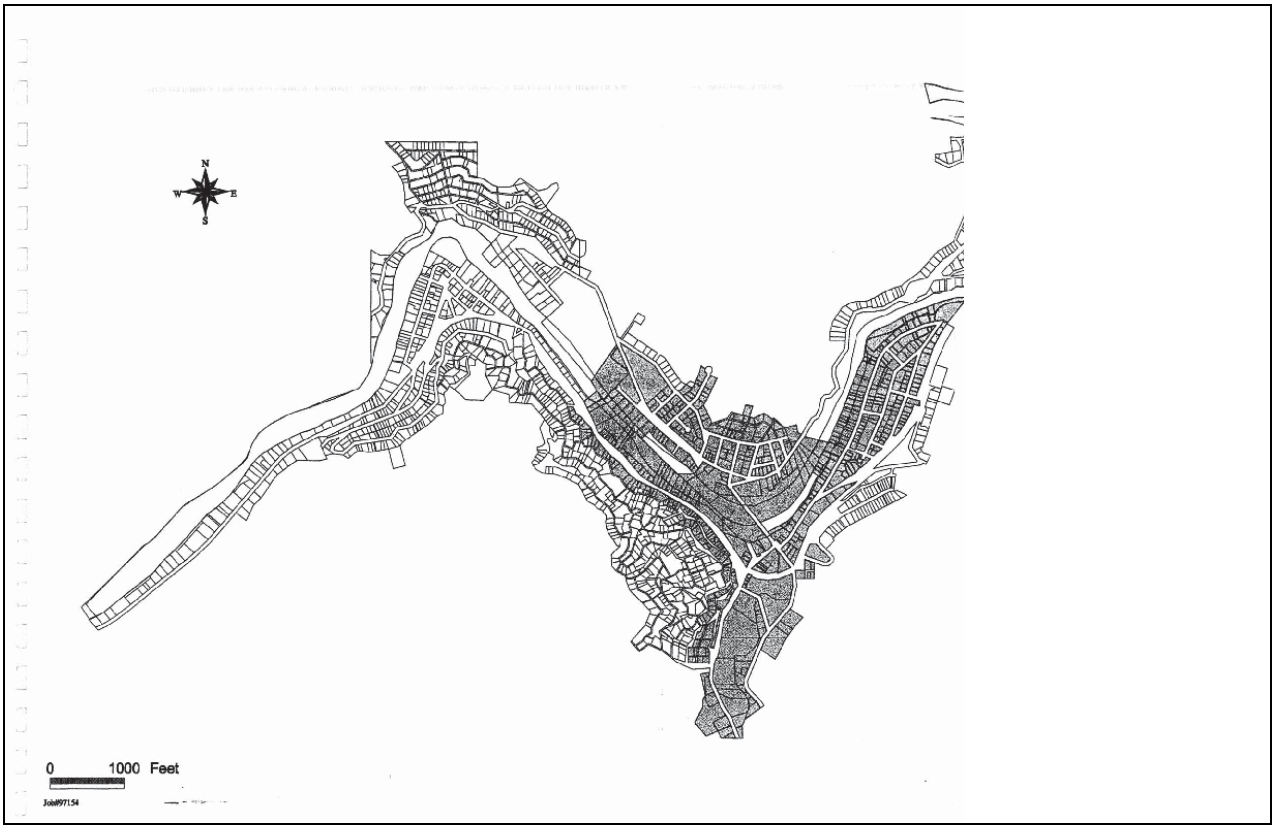
Engineering documents

In November 1997, Questa Engineers were hired to identify the "most suitable" project for Monte Rio. The output of that effort is contained in three documents called Technical Memorandum 1, 2 and 3.

TM #1 – Service Area Characteristics and Project Alternatives

This document presented a proposed configuration for the Monte Rio Wastewater service area that encompassed what became known as the "core" area. The document stated that the definition of the core area was driven by funding constraints. Four other alternatives were studied, and the one chosen was intended to get the most effect within the budget.

The map below shows the recommended "core" area.



It also identified five project alternatives for further study. This document did not make recommendations regarding project alternatives. The alternatives were:

- No Project
- On-site Wastewater Management program
- STEP system to a community leach field
- STEP system to winter storage/summer spray disposal
- Connection to the Guerneville system

The "No Project" alternative assumed that the waiver prohibition would remain in place and that individual property owners would be required to bring their own systems into compliance. It also assumed eventually the State or County would conduct by the State or County enforcement and abatement activity.

The On-site Wastewater Management program would have included annual or bi-annual inspections. Individual property owners would be responsible for bringing their own systems into compliance just as in the "No Project" option but more alternative methods might be considered under management by an On-site Wastewater Management entity. Appendix B contains a listing and descriptions of many of these alternatives, including:

- Standard Septic/Leachfield
- Non Standard
    - Pressure Dosed Shallow Trench
    - Mound System
    - At-Grade System
    - Sub-Surface Drip Irrigation
    - Evaporation, Transpiration and Absorption
    - Intermittent Sand Filter
    - Recirculating Sand Filter
    - Fixed Activated Sludge Treatment (FAST)
    - Wetland
    - Peat Filter
    - Trickling Filters
    - RUCK (Separate Grey/Black treatment)
    - Synthetic Filter

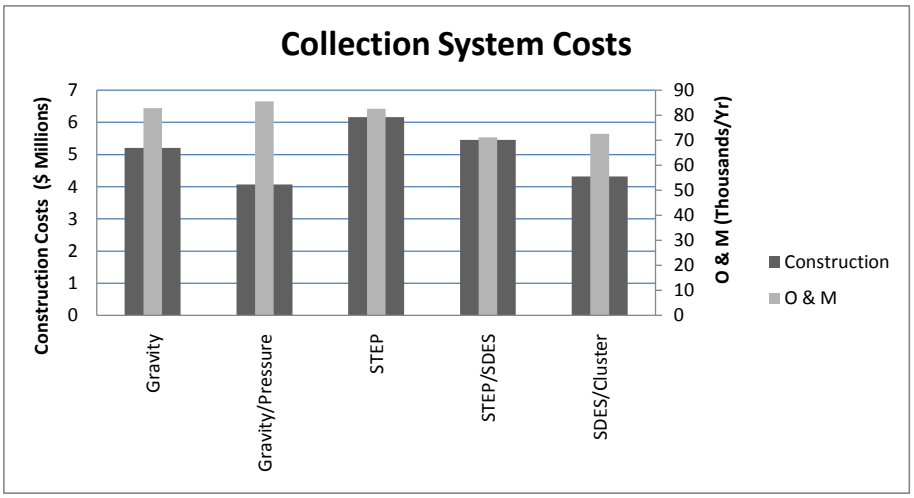
TM #2 – Collection Systems

This document contains descriptions and relative costs for both construction and operations and maintenance (O&M) for five alternative collection systems:

- Conventional Gravity Sewer
- Combined Gravity/Pressure Sewer

- Septic Tank Effluent Pump (STEP)
- Combined STEP – Small Diameter Effluent Sewer (SDES)
- Gravity Sewers – Effluent Pump with Cluster Septic Tanks

The relative costs for construction and annual O&M for the different types of collection systems are shown in the table below.



The memorandum concludes as a preliminary recommendation that option 5 (SDES/Cluster) was the preferred option.

TM #3 – Treatment and Disposal Alternatives Evaluation

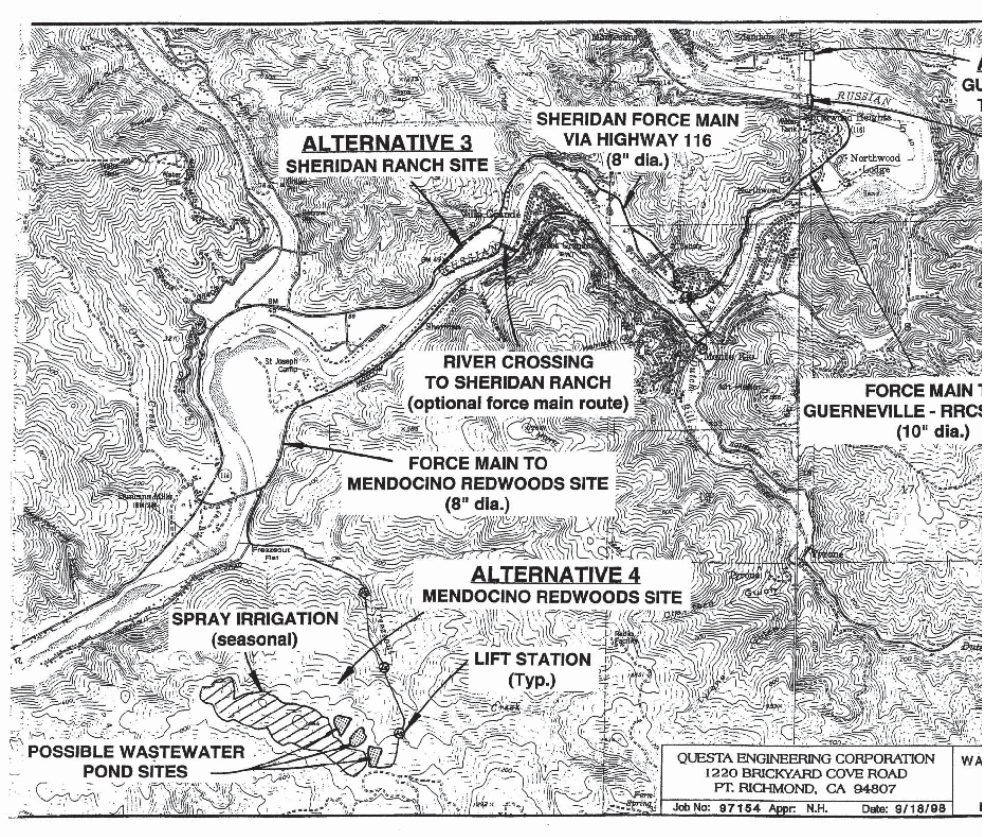
This document reviewed five alternatives for treatment and disposal of wastewater. The alternatives were:

- No project
- Septic Management
- Sheridan Ranch
- Mendocino Redwoods
- Connection to RRCSD

The No Project and Septic Management alternatives make the same assumptions as the No Project and Septic Management alternatives discussed in TM #2.

The Sheridan Ranch and Mendocino Redwoods alternatives studied the possibilities of locating a sewage treatment plant at either Sheridan Ranch or on property above Freezeout Road that was owned by

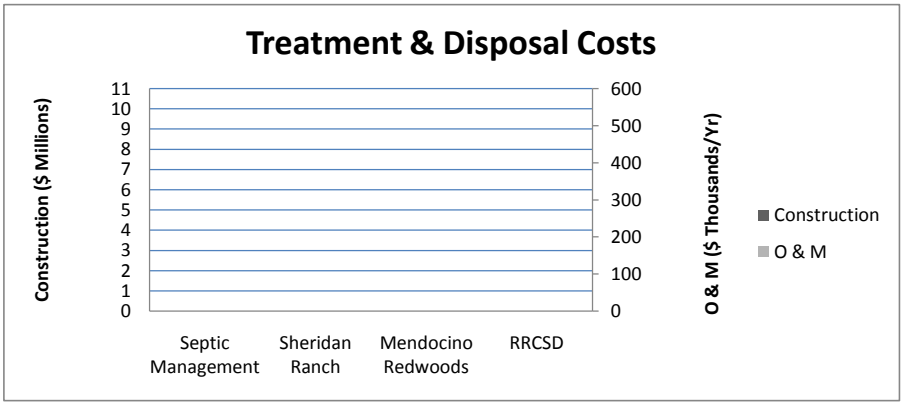
Mendocino Redwoods at the time. The map below shows the geographical locations of the different alternatives:



The Memorandum includes an evaluation of the different alternatives based on the following criteria:

- Environmental Impact – How well does the solution eliminate water quality problems and health hazards?
- Reliability – How dependable is the solution with respect to ongoing maintenance and assurance that water quality will not be degraded?
- Flexibility – To what degree will the solution allow additional development and uses of property?
- Resource Utilization – What resources will the solution require in terms of energy and materials for construction and ongoing operations?
- Costs

The relative costs for construction and annual O&M for the different types of treatment and disposal systems are shown in the table below:



The Memorandum concludes that based on their evaluation of all criteria, the Sheridan Ranch alternative is the “apparent best alternative”.

Local Communities Solutions Summary

There are many small communities in Sonoma County that have community wastewater solutions. Most of these communities have followed a conventional treatment approach which has a collection system connected to all potential wastewater sources, residential and commercial, feeding into a wastewater treatment facility which then treats the wastewater to an approved level for eventual discharge or reuse. A few have done something different. We are calling these systems non-conventional - a community-based treatment approach which uses technologies differing from conventional wastewater treatment, and even can be a hybrid of different technologies, including some elements of a conventional treatment, and, importantly, has been approved by regulatory agencies.

The advantages of conventional treatment are that it works, costs are well known, the technology is well understood, and regulatory agencies are familiar with this approach and will approve it. Costs are typically shared by all connections on a use of service basis – costs are based on the estimated amount of water treated and are equally shared based on use of treatment. A disadvantage is that the costs can be high – high construction costs for the collection system and the treatment facility, and possibly high ongoing operation and maintenance costs.

The advantages of non-conventional treatment are that this approach can be fit to local conditions and can have much lower initial construction costs, and ongoing operation and maintenance costs. Disadvantages can be that the local, regulatory and environmental community may have to be convinced that the selected approach will work. Thus, a non-conventional approach will likely require much more study and investigation prior regulatory approval. Typically, repair and compliance costs, and some aspects of ongoing operation and maintenance costs are borne by the customer and these costs, if the particular connection needs substantial improvements, can be orders of magnitude higher than the initial and ongoing O&M costs of conventional treatment.

The rest of this chapter describes conventional treatment and lists the nearby communities that use this approach with some of the distinguishing characteristics of these communities' systems. Following that are some examples of non-conventional treatment – communities that took a different approach based on local circumstances and appear to have wastewater treatment that works, is cost effective, and approved by regulatory agencies.

Conventional Treatment

There are several conventional wastewater treatment facilities for small communities in the local area. The Russian River County Sanitation District facility in Guerneville is described in detail as an example of the elements involved in conventional treatment. Other local facilities are listed below the description to provide additional details on their operations and facilities.

The Russian River County Sanitation District (RRCSD) treatment plant is located at the end of Neely Road in the Russian River watershed in Guerneville, California. Constructed in 1983, the plant is designed and operated to provide its service area with tertiary-treated wastewater for an average daily dry-weather flow of up to 710,000 gallons per day (gpd). The plant currently treats an average dry-weather flow of approximately 300,000 gpd.

The RRCSD service area covers approximately 2,700 acres and includes the unincorporated areas of Rio Nido, Guerneville, Guernewood Park, and Vacation Beach. The RRCSD treatment plant provides service to approximately 3,300 parcels using a gravity collection system and treats wastewater from approximately 3,200 equivalent single-family dwellings. The treatment plant cleans the community's wastewater to tertiary recycled-water standards (also referred to as *advanced water treatment*), which is the highest level of treatment defined by the State of California (referred to as Title 22). This level of treatment allows for unrestricted reuse in virtually all recycled-water applications. Wastewater goes through three treatment steps before it is considered tertiary recycled water: primary treatment, biological treatment (secondary), and filtration (tertiary). This is followed by disinfection, whereby a disinfection process, currently ultraviolet light disinfection (UV), is used to destroy pathogenic microorganisms. These steps are necessary before tertiary recycled water is used for agricultural or landscape irrigation or released into the Russian River.

Between October 1 and May 14 each year, tertiary recycled water from the treatment plant is discharged into the Russian River up to a maximum of 1% of the flow of the River. Between May 15 and September 30, river discharge is prohibited, and the recycled water is used to irrigate the Northwood Golf Course and forests outside the plant.

Using the RRCSD Treatment Plant as an example, conventional treatment includes the following steps and facilities:

1. Headworks: Raw sewage from domestic and commercial sources enters the treatment plant at the headworks. At this point, large inorganic solids in the waste stream are removed.
2. Aeration Basins: The wastewater undergoes biological treatment in the aeration basins. Air is injected into the wastewater to promote the growth of microorganisms which feed on organic materials in the sewage.
3. Secondary Clarifiers: Wastewater undergoing biological treatment in the aeration basin is pumped to the clarifiers to separate the water and solids. The suspended heavier materials settle to the bottom of the clarifiers as a thin mud - called sludge - and returned to the aeration basins. Secondary treated wastewater flows over the weirs of the clarifier and is sent to the tertiary filters.
4. Tertiary Treatment Filters: The clear effluent – or treated wastewater - from the secondary clarifiers is filtered through an approved tertiary filter to produce recycled water. This filtering process removes the remaining suspended solids in the effluent. The solids which accumulate in the filters must be occasionally flushed out during a backwash cycle and returned to the aeration basins to prevent clogging.

5. Disinfection: The clear effluent from the tertiary filters flows into the chlorine contact chamber, where bacteria are destroyed. After disinfection, any remaining chlorine residual is neutralized with sulfur dioxide. In the near future, a disinfection upgrade will replace the chlorine contact chamber with a UV system. In a UV system, ultraviolet light is used to break the cell wall of bacteria organisms. A UV system reduces chemical use and chemical byproducts that might form.
6. Solids Handling: The solids – or sludge - remaining in the wastewater system after the secondary treatment process are mixed with polymer and applied to a press for disposal to landfill sites. The sludge is used as filler in landfills.
7. Storage Reservoirs: Two reservoirs with a combined capacity of 4.5 million gallons are used to store recycled water from the tertiary filters. Recycled water is transported directly from the 3.5 million gallon holding pond reservoir to the seasonal discharge locations, including nearby forests and the Northwood Golf Course.

Other local conventional treatment facilities investigated by the Committee:

Forestville – 0.3-0.5 million gallons per day (mgd) dry weather flows, winter discharges, summer irrigation. Membrane pressure filtration. Facility footprint is 4.3 acres with .1 acre for treatment plant.

Graton – 0.14 mgd, being upgraded to tertiary treatment, winter discharge, summer irrigation. Facility footprint is 30.5 acres.

Bodega Bay – no discharge, holding ponds and summer irrigation. Gravity pressure filters. Facility footprint is 4.06 acres.

Windsor – 3 mgd dry-weather flow. Upflow sand filters, UV disinfection. Facility footprint is 87 acres; treatment plant footprint is 5.5 acres.

Healdsburg – 1.5-2.0 mgd dry-weather flows. Facility footprint is 35 acres; treatment plant footprint is 2.0 acres. Filtration process is membrane bio-reactors (MBR), membrane filters submerged in aerated secondary treated wastewater. Large vacuum pumps create suction inside the hollow fibers, water moves through microscopic holes in the wall of the fiber. The holes in the wall of the fiber are so small that they strain out all bacteria, and some viruses. The last step in the treatment process is UV disinfection.

Non-Conventional Wastewater Treatment

For the purposes of this report non-conventional treatment describes wastewater treatment that differs from the conventional treatment described above, yet appears to be meeting wastewater treatment regulations and needs in our area. These appear to be successful operations that could provide alternatives for wastewater solutions for the Monte Rio area.

Odd Fellows Park

Odd Fellows Park is a mixed private development that has 205 residential connections with a mix of

summer- and weekend-use cabins and full-time residents that has. Originally, all residences were on individual septic systems, some of which were failing. The current system was designed and constructed in 2001-2002 to accommodate 46,000 GPD peak design flow. The collection system consists of 17 interceptor tanks, four effluent lift stations (duplex) and one central effluent collection sump (triplex). The dual disposal system is comprised of a summer disposal field with six zones and a winter disposal field with three zones. There are 5,900 lineal feet (1.2 miles) of leachline and 22,500 lineal feet (4.3 miles) of trench for collector sewer.

One primary design objective was to flood proof the system to prevent inflow and silt intrusion. Electrical controls were installed above flood elevation with backup power supply for reliability. A hybrid Septic Tank Effluent Pumped (STEP) / Septic Tank Effluent Gravity (STEG) collection system was used to remove solids and convey effluent wherever possible. The design strategy was to use as few pumps as possible, while maintaining reliability. A central effluent collection sump is used for pumping to disposal field which is located beneath the baseball diamond. Use of a telemetry control panel at the central sump aids monitoring and trouble shooting. Project costs were $10,500 per household in 2001 for engineering and construction costs.

Stinson Beach

Onsite Wastewater Management Program

Stinson Beach is a coastal community of approximately 650 homes**.** The Onsite Wastewater Management Program approach was chosen by Stinson Beach residents through the process of community meetings and a bond vote in a special election – the Onsite Program was chosen by the process of elimination of over 10 different sewer plans and chose the alternative of onsite systems. With the recognition of septic system issues in the early 1960's the Stinson Beach County Water District (SBCWD) was formed in November 1962. After many studies and the failed bond election, in 1975 SBCWD sponsored a study which determined that onsite systems were the most cost-effective approach and developed a program for managing these onsite systems. After much discussion, revision of procedures, and numerous conditions which have resulted in the program now in existence, the San Francisco Regional Water Quality Control Board (SFRWQCB) agreed to allow SBCWD to upgrade and maintain onsite systems, and allowed the resumption of building new septic systems within the District.

Onsite Wastewater Management Program consists of:

- District Wastewater Code which sets out the rules of the Management Program
- Permitting of Septic Systems by District. All systems require a discharge permit which are renewed after every-other-year (at a minimum) inspections. New construction must meet the District Code. Existing construction may comply with best available technology. Failure to comply with the District code is enforced by termination of water service (the District is also the water supplier). Current fees are $35 per month for the Management Program. System upgrades are the responsibility of the property owner.
- Monitoring of results. There is a monitoring program to evaluate groundwater quality and quality of the neighboring seawater.

Sea Ranch/Gualala

The Sea Ranch is served by a combination of centralized and decentralized sewer services where 1532 parcels are on septic and 758 parcels are served by one of two sewer treatment plants owned by the Sonoma County Water Agency. The staffers at The Sea Ranch Association are contracted by the County to maintain and operate the wastewater treatment plants. The community's central treatment plant can handle 27,000 gallons of water per day, while its north one can take 160,000 gallons daily. Effluent from the north treatment plant is sent to a treatment plant located at The Sea Ranch but operated by Gualala CSD for advanced (tertiary) treatment and then returned to irrigate the Sea Ranch golf course. Treated wastewater (secondary) from the central sanitation plant is also used for irrigation. The treatment plants began operation in the early 1970s and the service area of the entire system is 4,600 acres.

The water company is responsible for about 40 miles of pipeline, seven water tanks, and a 300-acre surface water reservoir.

The Sea Ranch Association, under contract to the County of Sonoma, currently monitors about 1,186 onsite septic systems. The company educates homeowners about how the systems work; how they should best take care of them, and what they should do if a system begins to fail. It issues renewable/revocable operating permits to system owners in the community. The maximum time allowed for a permit is three years. Upon review of the operational status of a system, a permit may be renewed for an additional three years. If there are any operational difficulties noted during a system review, the system owner is given a specified time frame to affect required repairs and a permit is reissued for one year. If at the end of that year the system is operating properly, a new permit is issued for three years.

Bohemian Grove

The Bohemian Grove near Monte Rio replaced their numerous septic tanks and leachfields with a secondary wastewater treatment facility. This system includes new collection lines, a booster pump station, solids removal, pre-aeration tank, a high-pressure pump station, two aerator ponds and final irrigation within the redwoods. Operated by Russian River Utility.

Observations

There are many small conventional treatment facilities in this area. They meet regulatory requirements for treated wastewater. Typically, conventional facilities require relatively large footprint for the facility and any needed ponds or reservoirs. They have high construction costs and relatively high ongoing operations and maintenance costs. The table below shows the reported annual costs of the wastewater treatment operations discussed in this chapter.

There are several non-conventional wastewater treatment operations in this area which are described above. They all were treatment responses to circumstances which became opportunities for a different approach. Some of the systems described (Sea Ranch) is a mixed treatment solution – conventional treatment for some and onsite wastewater treatment (but inspected) for others. For the individual systems the cost of compliance falls on the individual property owner.

Issues and questions remain when any of these solutions are applied to the Monte Rio area and, by definition, a non-conventional solution would be customized for the Monte Rio area. These systems appear to be working in the examples shown. Much work would have to be done, including discussions/negotiations with appropriate regulatory agencies, to determine what could work for the Monte Rio area.

Local Communities Wastewater Rates

	Annual Cost	Comments
Guerneville	$ 1,098	2010
Forestville	$ 1,207	2010
Graton	$ 1,428	2010
Bodega.	$ 465	2010
Windsor	$ 779	5001-6000 gallons/mn
Healdsburg	$ 881	35.55 + 5.41/unit, 7 units/mn
Odd Fellows Park		
Stinson Beach	$ 417	inspection fees in addition
The Sea Ranch		
On-Site Wastewater	$ 205	2010
Sewer/ESD	$ 878	2010
Bohemian Grove	NA	

Examples of Contemporary Decentralized Wastewater Management Technology

Introduction

Many newer technologies focus on decentralized wastewater management (DWM), with the objective of providing suitable wastewater treatment solutions to small communities that are less costly but no less effective than centralized systems.

DWM community systems can involve septic tanks for solids retention and the use of small-diameter pipelines to convey the clarified effluent. The methods used for effluent disposal vary with the size of the system and the local reuse opportunities.

The elements of decentralized wastewater management include the following, but not every DWM system will incorporate all of them:

Wastewater pretreatment

Pretreatment objectives are to remove solids, oil and grease and other floatable and settleable materials. The remaining wastewater can then be disposed of using a variety of cost-effective techniques.

Individual septic tanks at the point of origin can be an integral part of DWM pretreatment because each tank manages the solids separately from the septic tank effluent.

Wastewater collection

Where onsite treatment and disposal are no longer feasible, a wastewater collection system is often needed. Effluent wastewater collection systems (for example, small-diameter pipelines conveying clarified effluent) tend to be more cost effective than gravity sewers, or pressure systems with or without grinder pumps.

Wastewater treatment

As set forth below, vendors and engineers have provided examples of a variety of pretreatment methods. They focus on elimination of solids, removal of pathogens, nutrients, and toxics, facilitating beneficial reuse of wastewater.

Effluent reuse or disposal,

Reuse and disposal options include land application (e.g. surface application, spray application or drip application), and reuse applications (e.g. agricultural irrigation, landscape irrigation or groundwater recharge).

Biosolids and septage management.

Septage, the material pumped out of septic tanks, requires further stabilization prior to disposal or reuse, often accomplished by composting and land application. Examples described by vendors and engineers (see below) include biological elimination of solids.

Further material pertaining to DWM can be found on the EPA website (http://water.epa.gov/aboutow/owm/index.cfm) and the Water Environment Research Foundation (WERF) website (http://www.werf.org).

Examples Presented by Vendors and Engineers

The following examples have been provided by the specified companies and have not been researched or corroborated independently by the task group. According to the vendors all of these systems meet NSF-40 standards in design and manufacture.

Orenco Systems, Inc.

A. Orenco's technologies include:

I. Wastewater Collection & Conveyance:
- Effluent sewer collection systems (STEP/STEG, pumping and gravity)
- A fraction of the cost of traditional sewers; compatible with existing infrastructure
- Ideal for use with media filters, SBRs, MBRs, oxidation ditches, lagoons, etc.
- For use in residential clusters, subdivisions, and communities

ii. Decentralized Wastewater Treatment
- Secondary treatment systems: AdvanTex® recirculating media filter
- Tertiary treatment systems: disinfection, nutrient removal (TN, NH3, TP)

- For use in residential clusters, subdivisions, commercial facilities, and communities
- One property or thousands

B. Orenco's collection system is a low-pressure effluent sewer also known as a STEP or STEG system. It uses primary tanks at each home and transfers the liquid to a centralized system and a pumping system through a forced main and a hydraulic grade line and into a collection main. This can be used in a cluster configuration to connect 10 or 20 or 30 homes to one tank and one pumping or gravity system to one tank as well.
C. The single-family homes tend to have a 1,000 to 1,500 gallon tank and removes the fats, oils and greases and down to secondary treatments. It provides 24-hours of emergency storage. Typically the solids do have to be pumped out a 10-12 year frequency depending on the number of people living in the homes and depends on the usage. You can identify abuses that might occur at each individual lot. In most cases we are going to be pressurizing into a small diameter line.
D. Some of the benefits of effluent sewers are that they are flexible in design. If you have a varying topography or you have rock or ground water, all various situations you might run into own an individual lot, were you systems can be at adopted in those situations. It allows for phased build-out. Install the collection line itself and then the septic tank could be installed in phases. If you wanted to identify a select area of your community that wanted to be sewered first, you could obviously phase, use phase one on that site and then expand out as you see necessary.
E. It can be integrated into existing infrastructure. So if you a gravity sewer or collection system you could integrate it into our system. And we have storage and minimal impact during construction. These lines can be bored into the ground.
F. Low initial capital costs. One of the benefits of this system is you install the small diameter lines and connect to the individual septic tanks. You can lay the lines in front of areas that don't need to be connected initially and install the larger cost of the system at a later time. There are no manholes and no lift stations. There are very low operational costs. We recommend the operator visits every other year for periodic checks.
G. Very low energy consumption: about a dollar a month per home. Repair and replacement costs are very, very low.
H. Orenco manufactures the AdvanTex System, a recirculating filter that's configured like a recirculating sand filter — a packed bed filter technology that Orenco engineers have helped to perfect since the 1970s. Like recirculating sand filters, AdvanTex is reliable and low-maintenance. It is superior to other packed bed filters, however, in its serviceability and longevity. AdvanTex can treat high volume commercial and multi-family flows in a very compact space.

Lescure Engineers, Inc.

Description of Orenco AdvanTex Project at Western Hills:

Western Hills Mobile Home Park (WHMHP) has provided crucial affordable housing stock in Mendocino County since it was established in 1960s. The park, situated on a terrace above the Russian River consists of 30 residential units and 20 overnight or vacation units. The park was served by an aging sanitary sewer (SS) collection system, and failing leach field. Lescure Engineers was hired to perform site and soils evaluation and to design a replacement SS collection, treatment & disposal system for a design flow of 10,000 GPD. The system utilizes 62,000 gallons of tankage, four AdvanTex AX100 textile filters for treatment and four subsurface drip disposal zones totaling approximately 8,100 linear feet of Geoflow Classic drip tubing. A duplex pumping system is used for the discharge system while double duplex pumps (4) are specified for the treatment system. The pumps are controlled by a single telemetric control panel that is equipped with redundant alarm systems. An initial alarm will trigger an onsite flashing beacon, and send an e-mail to the system operator & park manager. If the initial alarm is not answered timely an onsite audible alarm will sound. The telemetric controller was specified by Lescure Engineers and constructed by Orenco Systems Inc. Jeffrey Loes wrote an article about the project for the Winter 2009 edition of COWA news a publication of the California Onsite Wastewater Association.

Superior On-Site Solutions (SOS), Distributor for Hoot Aerobic Treatment Systems

A. The patented Hoot Treatment System is essentially a municipal wastewater treatment plant that is miniaturized and sized for a residence or business. Certified by NSF as a "Class-1 Treatment Unit", the Hoot System is a complete five-stage, activated-sludge aerobic treatment unit that uses advanced aeration and timed-recirculation to effectively process and treat wastewater.

B. Hoot System technology can designed to service not only single-family homes, but also entire subdivisions and communities, as well as commercial locations including office/business complexes, restaurants, hotels, churches, schools/camps, wineries, prisons and golf courses.

C. Because of the Hoot System's high level of treatment performance, it can be used for distressed properties with steep slopes or structurally deficient soils, as well as at home sites in close proximity to water sources, such as underground aquifers, lakes, rivers and oceans.

D. With various system sizes and models, Hoot offers the most flexibility in wastewater collection, treatment and dispersal: Hoot Systems can be installed on-site or in "cluster" configurations; and the processed water can be conveniently recycled and reused on the

property (ie landscape irrigation) or collected and transferred (either by gravity or pump) to a common dispersal area.

E. Hoot Systems are ideal solutions for repairs and upgrades and can be easily integrated with an existing system's infrastructure, such as an existing septic tank, to provide comprehensive and cost-effective wastewater treatment.

F. The most commonly designed Hoot System in California is the "Hoot H-600", which features a single concrete tank that is easy to install and capable of handling up to a five bedroom home in Sonoma County.

G. Overview of Hoot System Residential Repair Project:

In 2005, a six-bedroom home, immediately adjacent to an agricultural field, had a conventional septic system that was experiencing a failed leachfield. The existing septic tank was in very good condition and was kept and used as the Pretreatment Tank, and a Hoot H-600 was installed for advanced treatment and processing. The Hoot System disperses the treated water to 750 linear feet of Geoflow subsurface drip tubing under a beautiful lawn.

H. Overview of Hoot System Cluster Integration Project at Land of Medicine Buddha:

The Land of Medicine Buddha (LMB) is green certified non-profit retreat center located in Santa Cruz County that hosts Buddhist classes and retreats and offers rental facilities for workshops, conferences, and trainings. With multiple buildings located across 170 acres generating between 1,000 – 2,500 gallons per day of wastewater, LMB's conventional onsite system pumped the effluent to a leach field which was failing. In 2006, Hoot System technology was designed to treat and disperse the wastewater being collected by the center's existing collection lines and septic tanks. Utilizing two H-1000BNR treatment units in parallel, the Hoot technology processes and treats the water then pumps it to four Geoflow subsurface drip dispersal irrigation zones totally 3,000 linear feet. The system effectively manages the wide difference of daily flows and features redundant pumps and blowers that are operated by two control panels with remote monitoring for alarms and system problems.

SludgeHammer

A. SludgeHammer's unique system uses nature's way of breaking down biomat turning potentially toxic leachate into water that can reenter the local water table or be stored and reused by drip irrigation for landscaping.

B. SludgeHammer's patented, unique, bacteria blend breaks down all forms of organic effluent creating a water end-product that will make a septic system virtually maintenance-free. SludgeHammer's specially designed and engineered aeration pumps will not wear out. The only maintenance a SludgeHammer system needs is an occasional boost in the bacteria that makes the system work so well.

C. The SludgeHammer was originally developed for rejuvenation of clogged leachfields and remains the most cost effective method to restore function to older systems. This is crucial where lot size or configuration make installing new systems unfeasible. The company has developed models that are listed under NSF Standard 40 as "advanced treatment" units. These fit into standard septic tanks and treat the effluent to a higher level.

D. SludgeHammer has systems that allow denitrification within the septic tank and, when supplemented with UV sterilization, a high level of groundwater protection is possible even on systems that cannot realistically be linked to cluster systems.

Conclusion

There is some bad news in all of this, but there is also some good news.

The Bad News

The status quo with regard to wastewater management in Monte Rio is not sustainable over the long run. Our dwellings and their wastewater systems were mostly built for part-time use at a time when indoor plumbing was relatively new and the science of environmental absorption of human waste was not as well understood as it is now. Most existing systems would not be allowed to be built today. Furthermore, we are using those systems much more heavily. There are more of us living here for more of the year and we expect to be able to use (and dispose of) far more water than our predecessors did.

We've also learned a lot more about human impacts on the environment. With increased awareness Americans demanded cleaner water and Congress responded in the early 70's with the Federal Clean Water Act. State laws and local regulations were put into effect designed to prevent the pollution of ground water, including pollution by human wastes. The Basin Plan for this region includes definitions of compliance for septic systems. Most Monte Rio properties cannot accommodate a conventional leach field in accordance with the Basin Plan standards. Parcels are too small or too steep or too close to a River or creek.

It has not been proven that Monte Rio's septic systems are polluting the River and that may never be proven. Nonetheless, it is likely that insufficiently treated wastewater is reaching our groundwater and eventually the River and creeks. Studies in nearby communities have shown significant septic failure rates. It's important to understand that compliance with the Basin Plan standards for septic systems, and not necessarily pathogens in the River will be the determining factor for government action.

The 1997 Directive from the NCRWQCB to the Board of Supervisors is still in effect. Although most properties in Monte Rio are not in compliance, State and local regulators have so far not attempted to force the entire community to come into compliance. If they chose to use them, the enforcement tools they have at their disposal are blunt and draconian. They can abate properties, which would make them legally uninhabitable. State Water Boards can force a community to build a sewer system under threat of severe fines, and they have done so in other communities.

The County permits repairs with non-code-compliant systems in some cases, but often the requirements for those repairs make them very costly, creating an incentive to make repairs without permits. New construction or significant expansion of existing buildings requires code-compliant systems that are usually technically or financially infeasible here.

Regulatory pressure is increasing. Regulations to enforce AB885 are working their way through the process, and will be in place sooner or later. It is likely that these regulations will introduce regular mandatory inspections of septic systems. If inspections discover failures or violations, property owners will be forced to repair their systems.

Most of us have been out of compliance with the Basin Plan for 40 years. Sooner or later compliance with those standards will be required for all. AB 885 will provide further impetus for compliance and a mechanism to monitor compliance. We can't keep doing what we're doing.

The Good News

We have a choice:

- We can do nothing and wait for Regulators to make the next move.
- We can take the initiative and propose our own solution.

Under the first scenario the next move could be years away, although that is not assured. The danger is that the next move would likely be an imposed solution. That could be unpleasant and costly. If we wait until then to act we would have few options and little flexibility.

Under the second scenario we have a chance to control our own destiny. We can and we must bring the community into compliance with the State's requirements, not just because it's the law but because it's the right thing to do.

There are many options for treating wastewater in a small community that are better than what we are currently doing. Some were explored during the last effort and some were not. Some are conventional and others are not. Some require out-of-the-box thinking. Regulators have said that they would prefer to have the community proposed solution. The County has indicated that non-conventional approaches are not out of the question if they can be appropriately managed, controlled and held accountable.

The confluence of factors; greater regulation and enforcement, steadily improving technology and acknowledgement of non-conventional approaches, offer a great opportunity to provide environmentally sound and appropriately scaled 21st century wastewater management for our small community. As an EcoTourism destination we should be a showcase for the latest and greatest.

We have to do the work. If we wait for it to be done for us we will probably not like the result. On the other hand, if the community gets ahead of the issue, regulators have indicated that they will work with us. We will need to form a management entity. We will need to consult with engineers. We will need to find money to create all of it and we will need to acknowledge that pooping for free is a luxury of the past. We do not have unlimited time. The day of reckoning could be years away, but a good solution will take many years to implement.

Most of all, we need to agree as a community that at the end of the day each of us wants to be fully confident that we are not fouling our own nest.

Next Steps

The task group process has evolved as the group worked through identifying its tasks and defining its scope. At each stage the next steps become clearer as the task group gains understanding and receives community input. What follows is a brief outline of what the task group has done and what it plans to do next. At the time of this writing the task group is completing step 3.

1) Forming – the group exchanged stories and ideas about what to do. The group developed its Statement of Purpose (see the introduction) and outlined the areas of study.
2) Research – the group broke out into study groups to study and present information to the rest of the group and to the public.
3) **Community check-in (Symposium) – The task group presents the information it gathered to the community and requests feedback in an all-day symposium.**
4) Governance and feasibility – The task group will investigate how to form a governing entity and develop a request for proposal for feasibility studies.
5) Community check-in – Format to be determined
6) TBD

Appendix A – Text of AB 885

Assembly Bill No. 885

CHAPTER 781

An act to add Chapter 4.5 (commencing with Section 13290) to Division 7 of the Water Code, relating to water.

[Approved by Governor September 27, 2000. Filed with Secretary of State September 27, 2000.]

LEGISLATIVE COUNSEL'S DIGEST AB 885, Jackson. Onsite sewage treatment systems.
Existing law authorizes a California regional water quality control board to prohibit, under specified circumstances, the discharge of waste from individual disposal systems or community collection and disposal systems that use subsurface disposal. This bill would require the State Water Resources Control Board, on or before January 1, 2004, and in consultation with the State Department of Health Services, the California Coastal Commission, the California Conference of Directors of Environmental Health, counties, cities, and other interested parties, to adopt, specified regulations or standards for the permitting and operation of prescribed onsite sewage treatment systems that meet certain requirements. The bill would require each regional board to incorporate the state board's regulations or standards into the appropriate regional water quality control plans. The bill would make a statement of legislative intent relating to assistance to private property owners with onsite sewage treatment systems.

The people of the State of California do enact as follows:

SECTION 1. Chapter 4.5 (commencing with Section 13290) is added to Division 7 of the Water Code, to read:

CHAPTER 4.5. ONSITE SEWAGE TREATMENT SYSTEMS

13290. For the purposes of this chapter:
(a) ''Local agency'' means any of the following entities:
(1) A city, county, or city and county.

(2) A special district formed pursuant to general law or special act for the local performance of functions regarding onsite sewage treatment systems within limited boundaries.
(b) ''Onsite sewage treatment systems'' includes individual disposal systems, community collection and disposal systems, and alternative collection and disposal systems that use subsurface disposal.

13291. (a) On or before January 1, 2004, the state board, in consultation with the State Department of Health Services, the California Coastal Commission, the California Conference of Directors of Environmental Health, counties, cities, and other interested parties, shall adopt regulations or standards for the permitting and operation of all of the following onsite sewage treatment systems in the state and shall apply those regulations or standards commencing six months after their adoptions:
(1) Any system that is constructed or replaced.
(2) Any system that is subject to a major repair.
(3) Any system that pools or discharges to the surface.

(4) Any system that, in the judgment of a regional board or authorized local agency, discharges waste that has the reasonable potential to cause a violation of water quality objectives, or to impair present or future beneficial uses of water, to cause pollution, nuisance, or contamination of the waters of the state.
(b) Regulations or standards adopted pursuant to subdivision (a), shall include, but shall not be limited to, all of the following:

(1) Minimum operating requirements that may include siting, construction, and performance requirements.
(2) Requirements for onsite sewage treatment systems adjacent to impaired waters identified pursuant to subdivision (d) of Section 303 of the Clean Water Act (33 U.S.C. Sec. 1313(d)).
(3) Requirements authorizing a qualified local agency to implement those requirements adopted under this chapter within its jurisdiction if that local agency requests that authorization.
(4) Requirements for corrective action when onsite sewage treatment systems fail to meet the requirements or standards.
(5) Minimum requirements for monitoring used to determine system or systems performance, if applicable.
(6) Exemption criteria to be established by regional boards.
(7) Requirements for determining a system that is subject to a major repair, as provided in paragraph (2) of subdivision (a).
(c) This chapter does not diminish or otherwise affect the authority of a local agency to carry out laws, other than this chapter, that relate to onsite sewage treatment systems.
(d) This chapter does not preempt any regional board or local agency from adopting or retaining standards for onsite sewage treatment systems that are more protective of the public health or the environment than this chapter.
(e) Each regional board shall incorporate the regulations or standards adopted pursuant to subdivisions (a) and (b) into the appropriate regional water quality control plans.

13291.5 It is the intent of the Legislature to assist private property owners with existing systems who incur costs as a result of the implementation of the regulations established under this section by encouraging the state board to make loans under Chapter 6.5 (commencing with Section 13475) to local agencies to assist private property owners whose cost of compliance with these regulations exceeds one-half of one percent of the current assessed value of the property on which the onsite sewage system is located.

13291.7. Nothing in this chapter shall be construed to limit the land use authority of any city, county, or city and county.

Appendix B – References

Government Sites

EPA	
EPA Office of Wastewater Management	http://water.epa.gov/aboutow/owm/index.cfm
EPA Septic (Onsite) Systems	http://cfpub.epa.gov/owm/septic/index.cfm
EPA Wastewater in Small Communities	http://water.epa.gov/type/watersheds/wastewater/smcomm_index.cfm
It's Your Choice "A Guidebook for Local Officials on Small Community Wastewater Management Options"	http://www.epa.gov/owm/septic/pubs/septic_its_your_choice.pdf
State Water Resources Control Board	
Septic Tanks -AB 885	http://www.swrcb.ca.gov/water_issues/programs/septic_tanks/
North Coast Regional Water Quality Control Board	http://www.waterboards.ca.gov/northcoast/
Basin Plan for the North	http://www.waterboards.ca.gov/northcoast/water_issues/programs/basin_plan/
Sonoma County	
PRMD Septic Systems	http://www.sonoma-county.org/prmd/divpages/wellsepdiv.htm
PRMD Policies	http://www.sonoma-county.org/prmd/docs/policies/index.htm
CDC - Monte Rio Wastewater Task Group Page *(Links to MRWTG meeting notes and documents)*	http://www.sonoma-county.org/cdc/redev_mrww_task_group.htm

Industry and Research Sites

California On-site Wastewater Association	http://www.cowa.org/
California Wastewater Training and Research Center	http://www.csuchico.edu/cwtrc/
History of Septic Systems in the USA	http://www.septicprotector.com/HistoryofSepticSystems.html
National Environmental Services Small Flows Clearinghouse	http://www.nesc.wvu.edu/wastewater.cfm
Water Environment Research Foundation (WERF)	http://www.werf.org

Local Sites

Monte Rio Citizens for a Sensible Wastewater Solution *(Discussion group, links and file repository)*	http://groups.yahoo.com/group/mr_csws
Stinson Beach CWD Onsite Wastewater Management Homeowners Guide	http://stinson-beach-cwd.dst.ca.us/wastehome.html
Stinson Beach CWD Wastewater Do's and Don'ts	http://stinson-beach-cwd.dst.ca.us/wastedad.html