

Water Watch in Sonoma County



Children of a culture born in a water-rich environment,
we have never really learned how important water is to us.

We understand it, but we do not respect it.

William Ashworth



League of Women Voters of Sonoma County

October 2004

League of Women Voters of Sonoma County

Acknowledgements

The League of Women Voters of Sonoma County wishes to thank all those who contributed to the publication of *Water Watch in Sonoma County*. A committee of dedicated League members worked for two years researching various water topics, planning public programs presenting this information, and diligently drafting a report. Numerous employees of governmental agencies contributed information through interviews, public presentations and written information. The agencies are listed in Appendix 2. Other League members worked over this past year to edit, update and ready the information for publication. We especially thank the many community members who reviewed this publication and contributed valuable comments, corrections and updated information.

During our study, we have found the issue of water to be wide-ranging, complex and often alarming. There was no one source of information to help us understand water policy decisions made by our officials. This prompted us to publish this report to help others learn about water in Sonoma County in a comprehensive way.

The League of Women Voters, a nonpartisan political organization, encourages the informed and active participation of citizens in government, works to increase understanding of major public policy issues, and influences public policy through education and advocacy.

Note: This publication is available for a donation of \$7.00 per copy (including shipping and handling) from League of Women Voters of Sonoma County, 100 E Street, Suite 209, Santa Rosa, CA 95404. For information call (707) 546-5943. The document is also available online at <http://www.sonco.lwvnet.org>

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EXECUTIVE SUMMARY

Over the next 20 years, Sonoma County is expected to grow from its current level of 471,000 to 600,000 residents. As the population grows, so will the demand for water.

Competition for water among residential, commercial and agricultural users will escalate. The habitats of fish and other wildlife will change. The already complex network of agencies charged with protecting water supply and quality will be challenged to work together more efficiently. The welfare of Sonoma County's future population, economy and biotic habitat depends on our response to the challenge now facing our citizens. We need to be informed, and we need to be watchful.

This report discusses the management of water and measures being taken to address the issue of supplying safe, adequate water, while protecting our aquatic habitats. Below are the essential conclusions in each of the five sections in this report.

Where Do We Get Our Water Supply?

The Russian River watershed provides surface water and groundwater for most of Sonoma County. Surface water is drawn from the Russian River through nearby collector wells. Groundwater is drawn from wells located all over the county that tap into the underground aquifer. This supply must serve urban and rural domestic needs, industry and agriculture, while protecting the habitat of fish, wildlife and other organisms.

When the supply of surface water decreases, groundwater, primarily from municipal wells, is drawn on more heavily. Overdraft occurs when more water is drawn from the aquifer than is returned to it. Overdraft is apparently occurring in some water-scarce areas of the county, where rural property owners are finding that the water levels in their wells have dropped. Some wells have even dried up, making deeper wells necessary. Recharge of the groundwater is affected by runoff conditions, such as development of open space, and climatic change.

Currently, California is only one of two states with no laws regulating groundwater. Any regulatory action occurs at local levels. Although the U.S. Geological Survey is now surveying certain areas of the county, there is no historical data about groundwater levels, demand, or recharge rates. Up to this point, Sonoma County has been hesitant to require data about the availability and capacity of water before approving new development in all areas.

How Is Our Water Supply Managed?

Federal, state and local water agencies operate under a variety of laws and regulations. Federal agencies have specific functions regarding the protection of fish, game, wildlife and aquatic habitats.

The California Water Department of Water Resources manages the water resources of the state and protects, restores, and enhances the natural and human environments.

The State and Regional Water Quality Control Boards enact regulations to protect the quality of our surface waters, issue permits for various discharge activities and monitor water for contaminants.

The Sonoma County Water Agency (SCWA) is the main provider of water to eight cities and five water districts through a water contract, which is under negotiation for its 12th amendment. The members of the Board of Supervisors serve as Directors of the Water Agency. This dual responsibility has advantages but also leads to potential conflicts of interest.

The regulations and purposes of the different agencies often conflict with each other and this leads to confusion and uncertainty over water policy.

How Do We Keep Water Safe for People, Plants and Animals?

The Federal Clean Water Act and Safe Drinking Water Act determine the overall quality of our water supply through a variety of regulations, including allowable contaminant levels. The state and regional agencies enforce

those provisions and monitor for compliance.

All public water systems must continuously monitor water to meet the safe drinking water standards and report on the quality of the water supply. At times municipal systems discover contamination in their wells and are forced to shut them down, either periodically or permanently. There are no similar testing requirements for private well users. As a result, private users in certain areas have accidentally discovered contamination in their drinking water—sometimes years after the initial contamination.

Water may be contaminated through many sources – runoff from urban areas and agricultural land, leaking septic systems, industrial plants, inadequate wastewater treatment facilities, logging, agricultural practices, gravel mining, etc. Some of our citizens argue for more stringent standards to cover a variety of unregulated chemicals present in the water supply. The resources to increase testing, monitoring and enforcement may not be available.

A few neighboring communities have adopted the “precautionary principle,” which holds that a substance should be proven safe before its use is authorized, rather than proof of harm after wide distribution.

How Can We Provide Enough Water for Future Needs?

The 2000 Urban Water Management Plan, developed by the Sonoma County Water Agency, forecasts that the county has enough water to meet the needs of its increasing population until the year 2020. Conditions have changed since that plan was developed. The Association of Bay Area Governments has increased the population projections, and a recent court decision decreased the amount of water available to the SCWA.

In response, the Water Agency has asked all of its customers to take action to reduce the demand for water. They must seek additional supplies, be more aggressive about conservation and develop projects using recycled water for

municipal and agricultural purposes. The Water Agency has leverage over its own customers only, but everyone in the county should understand the need for conservation and reuse of water, and the benefits of exploring new technologies.

Residents are concerned that increased usage of groundwater to supplement surface water will increasingly affect water availability to rural residents. Groups have begun to lobby our county and cities to develop groundwater management plans to coordinate land use and water management.

How Do We Balance Our Water Needs?

Competing water interests have long been an issue in California. Competing values and complex legal requirements challenge us to address water supply needs for the future while protecting our environment.

Human impacts can be found on every major California river, resulting in reduced and impaired native fish populations. A critical challenge is to provide more balance in the uses of water to protect and restore native fish and wildlife. To meet this challenge, agencies often have conflicting approaches, resulting in confusion and uncertainty.

To deal with the problems that face us as Sonoma County citizens, we are beginning to educate ourselves about the issues and form groups to take action. We must recognize the limits of the supply of surface and ground water and learn about the links between land use, ecosystem protection and water. We must act to

- Incorporate conservation and reuse strategies in our daily lives
- Protect the quality of our drinking water
- Preserve our essential fish, wildlife and aquatic habitats

Most importantly, we must talk with our decision-makers and urge them to begin planning for more effective water management. Progress will come if governmental agencies, nonprofit organizations and ordinary citizens can work together.

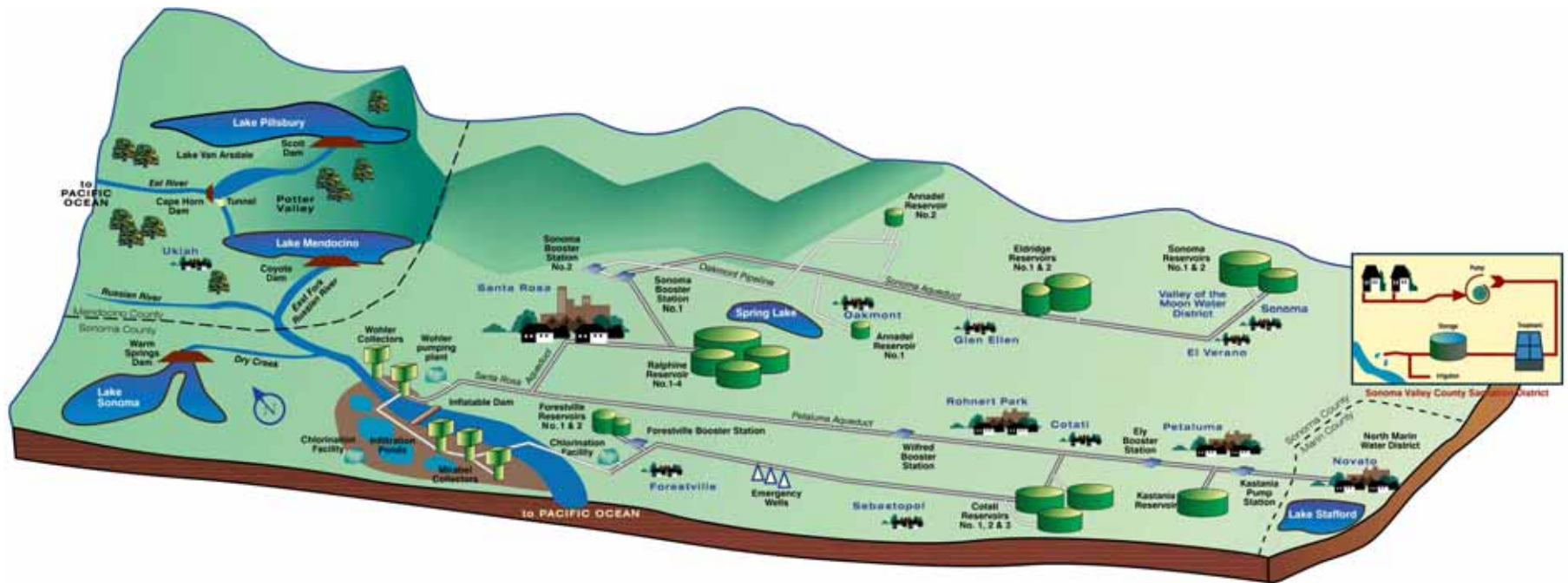


Figure 1. Surface water collection and distribution system.
(Reprinted with permission from the Sonoma County Water Agency)

INTRODUCTION

The supply and quality of our water are becoming increasingly important issues for Sonoma County, as the competition among water users increases and the regulations regarding water quality become more complex. To sustain the welfare of Sonoma County's future population, economy, agricultural industry and biotic habitat, we must find solutions to the current challenges of providing an adequate water supply and safeguarding its quality.

This report describes our water system and its management, and addresses the question of how to supply safe, adequate water to a projected population of 600,000 in the next 20 years, while protecting the aquatic habitat.

Five questions are addressed.

Where do we get our water supply?

How is our water supply managed?

How do we keep water safe for people, plants, and animals?

How can we provide enough water for future needs?

How can we balance water needs?

Officials in Sonoma County and its cities are now making important decisions on water issues currently facing our region. It is our hope that this report will provide a better understanding of these issues so that informed citizens can participate in the decision-making process as these issues are addressed.

All the water that will ever be, is right now. National Geographic, October 1993

1. WHERE DO WE GET OUR WATER SUPPLY?

Residents of Sonoma County use surface water drawn from rivers, streams, ponds and lakes, and groundwater found in the pore spaces in the soils and rock aquifers below the surface. Surface water and groundwater are interconnected. Rain falling on open ground and surface water in streams, ponds and lakes are the sources that recharge groundwater. Groundwater also can infiltrate into streams to provide surface flows.

All of the land area that drains into any water body, such as a river, lake, or stream, is called a watershed. When water flows through a watershed, whether it is on the surface or below the ground, it is part of the same resource and part of the total water budget for that watershed. However, in law and for the purposes of this publication, surface water includes only the interconnected water underlying and adjacent to surface streams, and flowing with the streams (subterranean streams). Groundwater refers to underground water extracted from wells and not directly adjacent to a body of surface water.

Most of Sonoma County lies within the Russian River watershed, although the southern part of Sonoma County lies within another watershed that flows to San Francisco Bay. The water supply of the county is mainly drawn from the Russian River watershed. Coastal streams that flow directly to the ocean also provide water supplies to residents, for example, Jenner Gulch for the community of Jenner. The water study in this publication is limited to the Russian River and its tributaries, the Eel River diversions, and the groundwater in Sonoma County.

The Sonoma County Water Agency (SCWA) regulates water flow from reservoirs and collects and distributes water to contractors and customers. Municipalities, agricultural landowners and householders also maintain wells that provide for their needs.

This section describes the Russian River system, how surface water reaches the users, and how groundwater provides the water supply for some users and supplements the surface water supply for others.

1.1 The Russian River System

The Russian River watershed (Fig. 1) encompasses 1,485 square miles in Mendocino and Sonoma Counties. The main stem of the river is about 110 miles long. The river flows south from Redwood and Potter Valleys, turning west near its confluence with Mark West Creek, and entering the Pacific Ocean at Jenner. Ranging in altitude from the summit of Mt. St. Helena (4,343 feet) in the Mayacmas Mountains to sea level at Jenner, the watershed consists of alluvial valleys and mountainous upland terrain.

Four major water resource development projects have altered the natural flows of the Russian River. They are (1) the Potter Valley Diversion, a tunnel linking the Eel River watershed with the Russian River watershed and creating a hydroelectric plant; (2) Scott Dam, on the Eel River, creating Lake Pillsbury; (3) Coyote Valley Dam on the Russian River, creating Lake Mendocino; and (4) Warm Springs Dam on Dry Creek, creating Lake Sonoma.

1. Potter Valley Diversion. In 1908, San Francisco industrialist W.W. Van Arsdale completed an interbasin diversion tunnel through a mountain ridge from a small Eel River reservoir (now Van Arsdale Reservoir) in Mendocino County to create the Potter Valley hydroelectric plant. Water from the reservoir generates electricity when it passes through the Potter Valley power plant, ultimately discharging into the East Fork of the Russian River.

The Potter Valley hydroelectric plant still generates a very small amount of electricity for the city of Ukiah, about 0.24 percent of the total generating capacity of Pacific Gas and Electric Company. PG&E acquired the Potter Valley plant in 1929 and still owns and operates the plant, but in the recent past it has considered offering it for sale. (The water diversion is only allowed as long as the water is generating electricity. If PG&E sells the plant, this source of water to the Sonoma County Water Agency

may be eliminated.) The average annual diversion of Eel River water to the Russian River over the past ten years exceeded 180,000 acre-feet¹. The water diverted from the Eel River varied each year depending on the seasonal rainfall level. During a dry summer, spring, and early fall, about 97 percent of the water in the South Fork of the Eel River had been channeled into the Russian River. This diversion left the Eel River fishery at risk. The Federal Energy Regulatory Commission, in consultation with the National Marine Fisheries Service, ruled that the flow must be cut by 15 percent to leave enough water in the river to protect the endangered salmonids under Section 7 of the Endangered Species Act. Although this decision is being appealed, SCWA reports PG&E is currently reducing the water diversions to 132,000 acre-feet per year.

2. Scott Dam, which created Lake Pillsbury, was built in 1921 on the Eel River, upstream from Van Arsdale Reservoir. The water from Lake Pillsbury flows into Potter Valley, through the tunnel and on to Lake Mendocino (behind Coyote Valley Dam). The water from Lake Pillsbury is the source of most of the Russian River's summer flow.

Environmental leaders and fishery advocates have recently asked a federal court to overrule federal regulators and order the decommissioning of Scott Dam, which would drain the lake and open up fish spawning grounds. This action could significantly restrict water supplies for Sonoma, Mendocino and Marin Counties, especially during the summer. The court has not yet responded.

3. Coyote Valley Dam, which created Lake Mendocino, was completed in 1959 by the Army Corps of Engineers on the East Fork of the Russian River, just north of Ukiah in Mendocino County. Lake Mendocino Reservoir stores about 122,400 acre-feet of water. Sonoma County was the local sponsor for the project, and provided much of the funding and political support. This

¹ An acre-foot is one acre of water one foot deep or 325,851 gallons. A typical household uses about one half acre-foot of water per year.

sponsorship made Lake Mendocino water available to Sonoma County, with SCWA controlling the rights to about 87 percent of the water. Mendocino County shares some water storage permits with SCWA.

4. Warm Springs Dam in Sonoma County was constructed in 1982 by the Army Corps of Engineers, creating Lake Sonoma. Fed by tributaries of Dry Creek, this reservoir is larger in capacity than Lake Mendocino, storing 381,000 acre-feet of water. Dry Creek acts as an outlet for the lake and flows into the Russian River. Lake Sonoma also acts as a flood control basin and provides recreational and environmental benefits.

The Russian River (with the diversions from the Eel River) provides the water supply for many of the residents of Mendocino, Sonoma, and Marin Counties. Some municipalities, such as Cloverdale, draw water from wells in areas adjacent to the Russian River, while others contract with the Sonoma County Water Agency for surface water. Still others rely on SCWA for surface water and supplement it with groundwater.

1.2 Surface Water Collection and Distribution

The amount of surface water available varies according to rainfall levels. The water levels in streams and reservoirs depend on runoff from rainfall and on evaporation. The State Water Resources Control Board authorizes the SWCA to monitor water levels and adjust flows within allowed limits. The Sonoma County Water Agency then collects and distributes water from the Russian River to eight primary contractors², as well as numerous other water customers (serving about 570,000 people in Sonoma and Marin Counties).

SCWA operates seven conventional wells along the Russian River near Forestville and five collector wells adjacent to the Russian River. An additional well will become operative in 2005. Three wells are near the Wohler Bridge and three are at Mirabel Park. With the sixth well in production, the total capacity will increase to 92 million gallons per day.

In the collector system (Fig. 2 on page 4) water is diverted from the river into a series of sedimentation ponds. The six collector wells extract the water from the gravels underlying the ponds adjacent to the Russian River. The gravel effectively filters the water before collection. A typical collector has a 13-foot-diameter concrete caisson (pipe) extending down 90 to 120 feet below the streambed. Each collector well houses two large electric pumps. Perforated pipes extend in a spoke-like fashion into the gravel.

In addition, SCWA operates three groundwater extraction wells located adjacent to Santa Rosa near the Laguna de Santa Rosa. These wells were originally constructed in 1977 in the Santa Rosa plain for emergency purposes, but they are now producing water year-round to supplement the supply from the Russian River. These wells, on Sebastopol Road, Occidental Road and Todd Road, have a total maximum capacity of 7.6 million gallons per day.

The water from the Russian River and the groundwater wells is then distributed by the aqueduct transmission system to the homes and businesses served. The system consists of storage tanks, pipelines, and six pumping stations to maintain the water flow within the aqueduct. The total capacity of the distribution system is currently 84 million gallons per day. SCWA is in the process of planning projects to expand the capacity of the aqueduct system.

² Cities of Cotati, Petaluma, Rohnert Park, Santa Rosa, and Sonoma, plus the Water Districts of Forestville, Valley of the Moon, and North Marin.

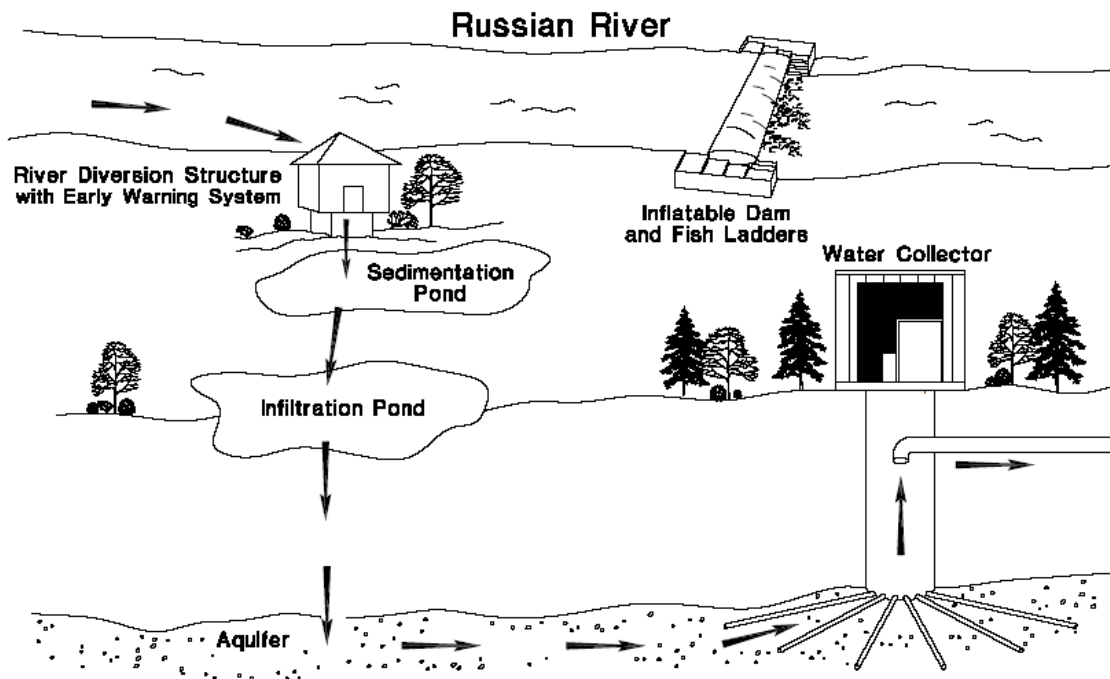


Figure 2. Water collector wells at the Wohler Bridge on the Russian River
(Reprinted by permission of the Sonoma County Water Agency)

1.3 Groundwater

The complex geologic features of Sonoma County make it difficult to know the actual amount and availability of groundwater. Groundwater is found at several different depths in the alluvial deposits of our valleys, as clays, sands, silts, and gravels form layers beneath the ground surface. Each of the sandy and gravelly layers carries some water, with many connections among layers. Interconnections are enhanced by water wells that are drilled to considerable depths and may often cross connect upper and lower layers of water.

About 40 percent of California's water supply is groundwater. In 2002, Sonoma County reported³ that approximately 40,000 wells existed within the county, serving 90,000 residents. Groundwater provides drinking water in part to 42 percent of the population, with

³ Sonoma County General Plan Update 2020, draft, Water Resources Element.

nearly all of the county's residents dependent on groundwater as either a primary or backup drinking water supply source. Sonoma County issues about 500 well permits each year. Only Fresno County has more wells than Sonoma County in all of the state, and Sonoma has more domestic wells than any other county.

Groundwater is the major source of water for Sebastopol, while Cloverdale, Healdsburg and Windsor water is provided by wells located adjacent to the Russian River. Rohnert Park and Cotati get most of their water from groundwater supplemented with flows from the SCWA-managed system. Sonoma and Petaluma supplement their SCWA-supplied water with groundwater. In fact, all municipalities buying water from SCWA are now required to augment surface supplies with groundwater for standby or supplemental purposes.

Groundwater Availability

Groundwater supply is dependent on recharge of the aquifers from streams and rainfall that percolates through the soil. Overdraft occurs

when more water is extracted from an aquifer than is returned to it by recharging. As the number of rural wells increases and municipal wells pump more water to serve increasing populations, rural wells in certain areas have dried up or decreased significantly in water level. Groundwater overdrafting appears to be affecting areas in Petaluma, Rohnert Park, Penngrove, Sebastopol, and Healdsburg. The documented water level of one property in the Cooper Road area near Sebastopol dropped by over 50 feet in the past five years, and well drillers report a general decline of 60 feet in groundwater levels in the areas from south Sebastopol to Lone Pine Road. Property owners in the Penngrove area have reported that water levels have dropped even more. As water levels drop or wells stop producing, homeowners and ranchers are forced to drill deeper, larger wells at great expense or pay to haul water to their homes.

The extent to which groundwater can provide a reliable future water supply is not known. Various attempts are being made to gather this information, however. Seven major groundwater basins⁴ have been designated in the county. The U. S. Geological Survey (USGS) in cooperation with Sonoma County Permit and Resource Management Department (PRMD) is gathering regional groundwater information in three of those basins – Sonoma Valley, Alexander Valley, and Russian River Valley. The study will be completed over the next four years and computer models of groundwater areas will be provided for these basins. Some of the elements to be addressed are water quality, salt-water intrusion, thermal issues, nitrate plumes, and the rate of recharge. In the near future USGS plans to begin similar studies of the Santa Rosa Plain and the Petaluma Valley.

In 2001 the Sonoma County Board of Supervisors commissioned a pilot study of groundwater conditions in the Joy Road, Mark

West Springs, and Bennett Valley areas of Sonoma County—areas known for increasingly dwindling groundwater supplies. Kleinfelder, Inc. completed the study and issued its findings in a report dated September 17, 2003.⁵

The Kleinfelder report found that groundwater conditions are changing in those areas, and water supply problems are evident in the Joy Road and Bennett Valley study areas. However, it suggested that more information is needed and recommended further study. Specific findings:

- The water levels in new wells show a groundwater decline over several decades.
- The trend in depth to water in new wells shows evidence of an overdraft condition.
- Lower depths to water in new wells correlate with development.
- Additional development will likely increase overdraft in those areas.

In its planning, SCWA assumes that its primary contractors will increase their use of water from local groundwater sources. This assumption makes the study of county groundwater basins critical. Eventually, the various studies and surveys will help us better understand the location and capacity of groundwater in Sonoma County.

Although surface water allocations are regulated in California, groundwater allocations are not similarly controlled. In fact, California is only one of two states nationwide without state groundwater laws. Generally, any regulatory actions for groundwater occur at local levels. In California 28 counties have groundwater ordinances, and over 167 public water suppliers in California have groundwater resource management plans.

Currently, Sonoma County has no groundwater resource management plan, but there is increasing public interest in developing such a plan. In fact, the 2004 Sonoma County Grand Jury recommended that the county and each of its cities include a “water element” in

⁴ A groundwater basin for purposes of the USGS/SCWA evaluation is an area underlain by impermeable formations capable of furnishing a water supply. There is little natural movement between basins.

⁵ The complete text and graphics of the September, 2003 Kleinfelder Report can be accessed at http://www.sonoma-county.org/prmd/docs/gw_pilot/index.htm

their general plans and develop a comprehensive groundwater management plan.⁶ The 1992 Groundwater Management Act (AB303) provides a framework for groundwater management plans, which can be developed by any agency, city or county that provides water service.

The laws governing groundwater have been patched together from court decisions over more than 100 years. Consequently, groundwater law is very complex and situation specific. Briefly, water rights are property rights, but those who hold these rights do not own the water itself – they only possess the right to use it. Percolating groundwater rights consist of the following:

1. Overlying rights accrue to the owners of land overlying the groundwater. The amount of the correlative right is not determined until a suit is tried in court. In general, overlying rights take priority over an appropriative right.

2. Appropriative rights accrue to those who first use the water in a beneficial way – “first in time, first in right.” Appropriative rights are limited to the use of “surplus” water that is in excess of the cumulative water requirements of all overlying owners. Merely pumping and using the water may appropriate surplus groundwater. Public water suppliers that pump groundwater are appropriators who are legally limited to “surplus” water.

3. Prescriptive rights are acquired by those who continuously use the water for a period of five years. These rights cannot be acquired against public utilities, municipalities or other public entities. The rights are limited to the extent of maximum annual groundwater extraction during the prescriptive period.

In an overdrafted basin, unchallenged pumping by public agencies may establish prescriptive rights against private pumpers (overlying owners). Essentially those public agencies with the biggest “straw” may establish water rights over all others. In water disputes, the courts must decide who can extract groundwater, how much water can be extracted

(based on the amount of groundwater storage in the aquifer), and who will be designated to enforce the courts’ decisions.

Sonoma County PRMD issues permits for construction and use of new wells, but does not have a permitting or regulatory program for reporting on the volumes of groundwater use. Consequently, Sonoma County does not know how many wells are currently in use, how much water is being pumped, or if more water is being pumped out than nature is putting back. It is the responsibility of the well owners to maintain their wells and monitor the water quality.

As part of the 1959 General Plan, Sonoma County classified groundwater availability for all areas of the county, under categories numbered 1 to 4, with “1” for water-rich areas and “4” for water-scarce areas. Development in the areas with “3” and “4” designations requires drilling tests to determine availability of water. No data are required for wells in areas classified as “1” and “2”. However, since 1959 the geology of Sonoma County is better known, and groundwater conditions and development patterns have changed significantly. A draft of the new Sonoma County General Plan proposes to require more extensive testing to determine the availability of water in the “3” and “4” areas of the county.

In response to public concerns about dropping water levels, the Board of Supervisors in March 2004 approved rules requiring new businesses in unincorporated areas to monitor their groundwater usage to help provide data on groundwater. This monitoring requirement is expected to affect about 60 projects each year. In addition, the Supervisors have adopted tougher rules on well testing that could make it more difficult for residents and businesses to build in water-scarce areas. Property owners may have to demonstrate that their wells will provide adequate amounts of water. The county’s current test standards require wells to yield at least one gallon per minute over four hours for a new home to be built. These regulations require increased testing time in water-scarce areas to better determine water capacity over an extended time.

⁶ For a copy of the complete report, see http://www.sonomasuperiorcourt.com/pages/gjury_info.php

Very little is understood about the capacity of our watershed to recharge the aquifer (Fig. 3 below). In general, the groundwater in Sonoma County has been of good quality and quantity. Several trends may begin to affect the availability of groundwater in the future.

In an urban environment, the recharge of groundwater becomes a challenge since pavement impedes the infiltration of water into the ground where the rain falls. The water is directed into surface streams where flows may recharge groundwater in the nearby stream area, but may take most of the flow downstream. Consequently, development in these recharge areas can increase surface runoff and reduce groundwater quality and recharge capability. Although the Resource Conservation Element of the Sonoma County General Plan recommends “preserving watersheds and groundwater recharge areas,” urban development continues to occur in the primary areas of recharge (around the Laguna de Santa Rosa in Rohnert Park, Cotati, Sebastopol and southwestern Santa Rosa). Such development has potentially serious impacts for the future.

Another potential negative effect on the groundwater supply is the global shift in weather patterns. NASA's Global Change Master Directory, which is updated daily, provides access to data sets and services relevant to global change research. (For more information, see <http://www.globalchange.nasa.gov> or <http://www.gcmd.nasa.gov>.) Forecasts suggest that rainfall events in northern California may change in frequency and duration. Less frequent storms with higher accumulated rainfall totals would cause streams and rivers to flood more frequently, carrying the rapidly flowing water out to the ocean, without allowing as much recharge potential. Check dams and other strategies are being proposed in other parts of California to increase the recharge potential.

As cities increasingly rely on wells to supplement SCWA-supplied water, and more wells are being drilled in the rural areas for domestic and agricultural uses, concern is being voiced on how new deep wells may deplete the groundwater. No comprehensive regulatory process exists for examining pumping influence or controlling potential groundwater overdraft.

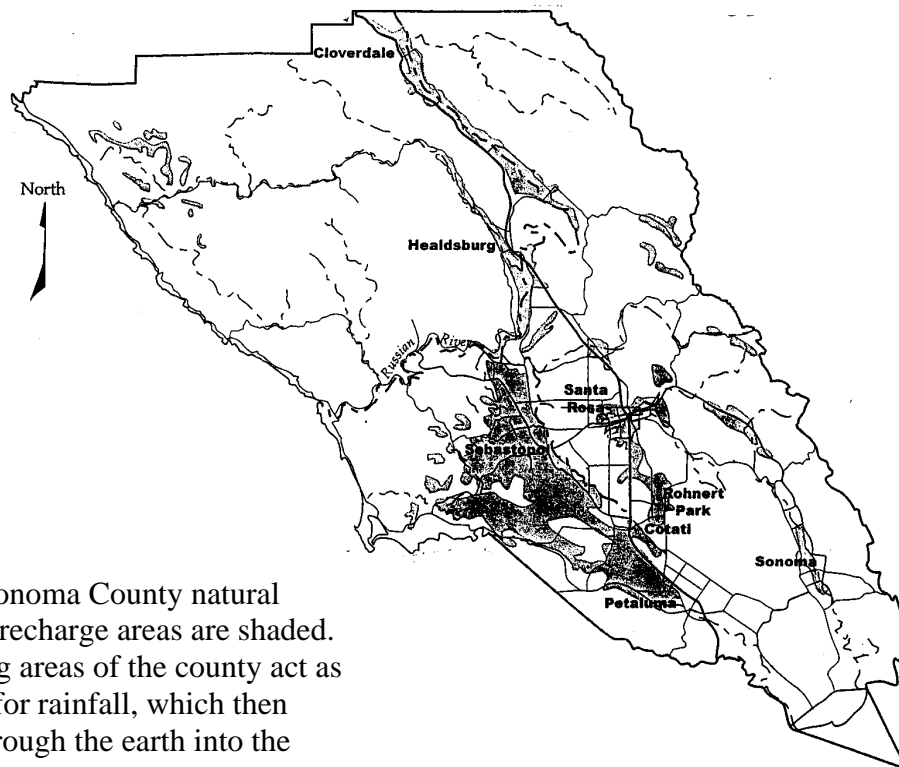


Figure 3. Sonoma County natural groundwater recharge areas are shaded. The low-lying areas of the county act as catch basins for rainfall, which then percolates through the earth into the aquifers.

Issues for Consideration

- In the interest of long-range sustainability, more information needs to be gathered to establish capacity, recharge rate, and characteristics of each water basin. Since Sonoma County has no historical record on groundwater levels, should it require existing well users to report annually on the volume of water used and its quality?
- Should Sonoma County require stringent testing for all new development to determine water quality and availability before issuing well permits?
- Should Sonoma County and each of its cities begin to develop a groundwater resource management plan for the county?

The American West is facing a serious crisis. In the long run, we will not have enough water to meet the fast-growing needs of city residents, farmers, ranchers, Native Americans, and wildlife. The demand is increasing; the supply is not. It is time for Americans to become proactive in our efforts to resolve the problem. Crisis management is not a long-term solution.

U.S. Department of Interior, 2003

2. HOW IS OUR WATER SUPPLY MANAGED?

The management of water use and quality is a complex and controversial matter, with federal, state, regional and county agencies acting to implement a variety of laws and regulations related to water. The principal agencies discussed in this report are (1) federal agencies, (2) California agencies, (3) Regional Water Quality Control Boards (North Coast Regional Water Quality Control Board for most of Sonoma County and all of the Russian River), (4) Sonoma County agencies and (5) Special Districts.

Other agencies also have regulatory and planning roles that influence local water policy in Sonoma County. See Appendix 3 for a more complete listing of those agencies. Because of the large number of agencies with jurisdiction over local water policy and the competition among water needs and uses, conflicts between the agencies increasingly make it difficult to establish coherent, rational water policy.

2.1 Federal Agencies

There are a variety of federal agencies with jurisdiction over specific functions associated with water, including the production of hydroelectric power, navigability, flood control,

fishery issues, endangered species protection and clean water standards. In addition to regulatory functions, at times the federal government must step in to adjudicate water disputes between states (as in apportioning water in the Colorado River) and settle disputes between water users (as in the Klamath River Watershed).

Section 3 of this report discusses the implementation of federal standards in safeguarding our water quality. Appendix 3 provides more information about the roles of the Environmental Protection Agency, Federal Energy Regulatory Commission, National Marine Fisheries Service, United States Fish and Wildlife Service and the U.S. Army Corps of Engineers, as well as contact information.

2.2 California Agencies

Department of Water Resources

<http://www.water.ca.gov>

The California Department of Water Resources manages the water resources of the State in cooperation with other agencies, and protects, restores, and enhances the natural and human environments. The major responsibilities of the department include these:

- Prepare and update the California Water Plan to guide development and management of the State’s water resources.
- Plan, design, construct, operate, and maintain the State Water Project to supply good quality water for municipal, industrial, agricultural, and recreational uses and for fish and wildlife protection and enhancement.
- Protect and restore the Sacramento-San Joaquin Delta.
- Regulate dams, provide flood protection, and assist in emergency management to safeguard life and property.
- Educate the public on the importance of water and its proper use; and collect, analyze, and distribute water-related information to the general public and to the scientific, technical, educational, and water management communities.
- Serve local water needs by providing technical assistance; cooperating with local agencies on water resources investigations; supporting watershed and river restoration programs; encouraging water conservation; exploring conjunctive use of ground and surface water; facilitating voluntary water transfers; and, when needed, operating a state drought water bank.

More information about the Department, including a draft of the new California Water Plan, can be found on its website.

Water Resources Control Board

<http://www.swrcb.ca.gov>

The State Legislature created the State Water Resources Control Board (SWRCB) in 1967. Under dual legal authority, the State Board allocates rights to use surface water and protects water quality along with nine Regional Water Quality Control Boards (see below). The California Code of Regulations Title 23 “Waters” contains the regulations for the administration of water rights and water quality activities of SWRCB. The Board is the permitting jurisdiction for surface water. Its mission is to “preserve, enhance and restore the

quality of California water resources and ensure their proper allocation and efficient use for the benefit of present and future generations.” The Governor appoints the five members of SWRCB.

The Division of Water Rights, under SWRCB, works to “establish and maintain a stable system of water rights in California to best develop, conserve, and utilize the water resources in the state in the best interest of the public, while protecting the vested rights, water quality and environment.

Water rights law for California began in the 19th century. Native American Indian tribes were granted water rights based on treaties dating back to the middle and later parts of the 19th century. The 1908 Supreme Court Winters decision⁷ required that water rights predating the early 20th century dam-building compacts between states must be satisfied before all other water allocations. Native Americans with reservations along western rivers hold those prior rights. Other tribes that do not live on riverside reservations may be able to claim prior rights to groundwater supplies.

In 1872, California Civil Code sections applicable to water rights were enacted. These sections establish the basis for the permitting process. The 1913 Water Commission Act and the 1943 Water Code guide the allocation and regulation of surface water and subterranean streams.

State water rights permits limit the SCWA’s Russian River diversions and rediversions to 75,000 acre-feet of water per year, although the Agency has petitioned for a 35 percent increase in that allocation to accommodate growth in Sonoma and Marin Counties. SWRCB (Order 91-07) has declared the Russian River in Mendocino County to be fully appropriated during July through October, and very little of the water remains available for appropriation in Sonoma County.⁸

⁷ For more information on this decision, refer to *Cadillac Desert*, Marc Reisner, Penguin Books, London, 1986, p. 271

⁸ Urban Water Management Plan, 2000, page 3-3.

A key water-right decision made by the SWRCB is the 1986 Decision 1610, which established a minimum in-stream flow in Dry Creek and in the Russian River downstream of Lake Mendocino to support fish and wildlife and other beneficial uses in the basin. This decision acknowledged the need for a fisheries study to determine the actual minimum flow for the fish. The flows that were established were supposed to be temporary. The fish study was never done until three species were listed by NOAA as threatened.

In the summer of 2004, the Sonoma County Water Agency (SCWA) petitioned SWRCB to grant temporary emergency changes in its water permits. The Agency asked to reduce the minimum stream flow in the Russian River in order to save enough water in Lake Mendocino for the chinook migration runs in the fall. In response, SWRCB issued a temporary urgency change order in July 2004 allowing reduced stream flows at specified points along the Russian River. As a condition to the order, SWRCB ordered monitoring of the fish populations and water temperature, the preparation of a Water Quality Monitoring Plan for the Russian River, and reports of storage conditions of Lake Mendocino. At the same time, they requested SCWA to prepare a “Water Conservation Status Report” for the service area, specifying the water savings resulting from the measures during the term of the temporary urgency change.

2.3 Regional Water Quality Control Boards

<http://www.swrcb.ca.gov/regions.html>

The next levels of water management are the Regional Water Quality Control Boards (RWQCBs), semi-autonomous subagencies of SWRCB. Together, the RWQCBs and SWRCB are the principal state agencies responsible for the coordination and control of water quality within the California Environmental Protection Agency. Each board appoints an executive officer to oversee civil service staff. The

technical staff is comprised of engineers, geologists, and scientists.

California Water Code Section 13201 provides for the Governor to appoint nine members to each of the Regional Water Quality Control Boards. Each member shall reside or have a principal place of business within the region. Appointments are made to fulfill seven categories of representation: water supply, conservation, and production; irrigated agriculture; industrial water use; municipal government; county government; recreation, fish and wildlife; public; and two water quality members. Appointments are subject to confirmation by the state Senate. Recent efforts in state government to streamline bureaucracy may result in reducing the number of members on the regional boards or even eliminating the regional boards entirely.

The RWQCBs protect the beneficial uses of surface waters and ground waters, and implement their own regulations and policies as well as statewide regulations and policies developed by SWRCB. These regulations and policies are derived from the law found within section 13000 *et seq.* of the California Water Code.

Each RWQCB makes water quality planning and regulatory decisions for its region. The RWQCBs adopt Water Quality Control Plans or Basin Plans that determine the beneficial uses of surface and groundwater, assign water quality objectives to protect those uses, and establish implementation programs to achieve those objectives. SWRCB must approve the Basin Plans developed by the RWQCBs. The RWQCBs are also charged with protecting water quality and beneficial uses of surface waters and groundwater through permitting actions. The RWQCBs also work to prevent and mitigate water pollution, taking enforcement actions where necessary to prevent pollution and nuisance. The boundaries of the RWQCBs are based on major state watersheds. Most of Sonoma County and the entire Russian River watershed are under the jurisdiction of the **North Coast Regional Water Quality Control Board** (*<http://www.swrcb.ca.gov/rwqcb1>*). Southern

Sonoma County falls under the San Francisco Bay Regional Water Quality Control Board.

The North Coast Regional Water Quality Control Board (NCRWQCB) issues permits to regulate the quality of discharges of stormwater and domestic, industrial, and other wastewater to surface waters or ground waters. (The San Francisco Bay Regional Water Quality Control Board regulates the discharges into San Francisco Bay, including those from Petaluma and Novato.) These permits contain limits on chemical, biological, and physical characteristics of the wastewater to ensure the protection of the beneficial uses of North Coast waters. Enforcement actions may be taken for violations of permit conditions and limits. Principally a pollution control agency, NCRWQCB also conducts investigations, including limited monitoring of water quality and planning activities. The NCRWQCB administers grants for watershed projects by public and private partners.

Key permits and activities of the NCRWQCB include the following:

Storm Water Permits. Large cities or other municipalities must obtain storm water permits for discharges of urban runoff from municipal storm drain systems. The only municipality currently under a permit with the NCRWQCB is Santa Rosa, with the county of Sonoma and the SCWA as co-permittees. The permit for Santa Rosa requires specific practices associated with street cleaning, roadside maintenance, toxic/sewage spill responses, and public outreach, to name a few. Currently, the permit covers the city of Santa Rosa and the immediate area around it.

Waste Discharge Permits. Permits must be issued for the management of wastewater treatment plants including the Laguna Subregional Wastewater Treatment Facility (operated by Santa Rosa), Windsor, Healdsburg, Forestville, Occidental, Russian River County Sanitation District and others.

Pretreatment program for the city of Santa Rosa for industrial discharges to the wastewater collection and treatment system.

National Pollutant Discharge Elimination System (NPDES) Permits.

Permits for storm water and wastewater controls associated with gravel extraction.

In January 2004 the U. S. District Court for the Northern District of California ruled that the City of Healdsburg must seek a NPDES permit, in addition to its waste discharge permit, for its secondary-treated wastewater discharge into former gravel mining pits adjacent to the Russian River. It found that the wastewater migrates from the pits into the river. This raises the question of precedent for other dischargers into the Russian River, as well as plans for indirect discharge into the river. This decision is being appealed.

2.4 Sonoma County Agencies

Board of Supervisors

<http://www.sonoma-county.org/board>

The Board of Supervisors oversees all county operations, including Community Development Department and Permit and Resource Management Department. PRMD is responsible for the permitting of construction of new water wells and issuance of permits for gravel mining in the riparian corridor. The Supervisors also serve as Directors of the Sonoma County Water Agency and oversee the various wastewater districts. At times, these different roles conflict.

Various elements in the current Sonoma County General Plan determine water policy, especially in land use and resource conservation. The Citizens' Advisory Committee for the proposed update of the General Plan has recommended that a "Water Resources" element be included in the new General Plan. This elevates water issues to a more prominent level in the county planning process. The element includes objectives and policies to

- Protect the quality of surface and groundwater resources
- Assure that there is sufficient groundwater for all new development
- Protect the natural environment

- Assure that public water suppliers manage groundwater to meet future growth

The Sonoma County Board of Supervisors is in the process of reviewing the entire Draft General Plan. A majority of the Board could vote to revise it or remove the water element entirely from the General Plan.⁹

Sonoma County Water Agency

<http://www.scwa.ca.gov>

The Sonoma County Water Agency (SCWA) manages much of the urban water supply for Sonoma County. SCWA was created by the State Legislature in 1949 and “is empowered to produce and deliver potable water for municipal and industrial purposes; prevent the waste or diminution of water supplies; control and conserve flood and storm waters to reduce potential damage to life and property; provide sanitary sewage services; and provide recreational services in connection with flood control and water conservation activities.” SCWA is also empowered to generate electricity. SCWA is an independent government body; however, its Board of Directors consists of the members of the Board of Supervisors, who appoint a general manager.

SCWA has two principal water supply functions: flow regulation and delivery. The Agency regulates the flow of the Russian River for the benefit of agricultural, municipal and in-stream beneficial uses, including the Agency’s water transmission system. Decision 1610 of the State Water Resources Control Board (adopted April 17, 1986) gives SCWA authority to control the water supply storage space of Lake Mendocino and Lake Sonoma and release of those waters. Its authority, however, is limited because many other government agencies also control or influence water policies. For example, SCWA manages water release in summer, but the Army Corps of Engineers manages the water release during the winter for flood control.

SCWA delivers water on a wholesale basis to eight primary water contractors through the Agency’s water transmission system. The responsibility for supplying water to the contractors is entrusted to the Agency through an agreement entitled “Eleventh Amended Agreement for Water Supply.” The original agreement was executed in 1974, and the eleventh amendment to the agreement was adopted in 2001. This agreement specifies pricing formulas, water entitlements, transmission capacities, and planned system upgrades. The primary contractors include the cities of Cotati, Petaluma, Rohnert Park, Santa Rosa, and Sonoma, plus the Water Districts of Forestville, Valley of the Moon, and North Marin. These cities and districts are currently finalizing negotiations for a “Restructured Agreement for Water Supply” (Amendment No. 12) with SCWA. In the new agreement, the Forestville Water District will opt out and Windsor will be included as a primary contractor.

A Water Advisory Committee (WAC) is made up of appointed representatives from each of SCWA’s eight water contractors. WAC advises SCWA on programs, conservation efforts and water projects. Meetings are held monthly and are open to the public.

SCWA also sells water to a number of other water districts and companies, including Marin Municipal Water District, the Town of Windsor, and the Lawndale Mutual, Penngrove, and Kenwood Water Companies. In addition, SCWA manages 11 sanitation zones and districts for wastewater treatment, reclamation and disposal for residences and businesses.

SCWA is responsible for developing the Urban Water Management Plan (UWMP), a document that describes the availability of water, water use, reclamation, and water conservation for SCWA and its primary water contractors. The Plan is designed to ensure that the water supply will be adequate for planned growth for the next 20 years (within the control of the contractors, not well users in unincorporated areas or cities). The most recent plan was

⁹ Sonoma County General Plan can be found at <http://www.sonoma-county.org/prmd/gp2020/1998/index.html>
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completed in 2000; however, SCWA is updating the plan for release in 2005.

As the Board of Supervisors serves a dual role in the management and delivery of water, there is concern in our community about possible conflicts of interest. The Board of Supervisors must manage water as a resource for the county and plan for the availability of water for its population. However, as Directors of the Water Agency, they also have a mandate to serve the contractors of the agency and run the agency independently. These dual roles mesh both policymaking and oversight and implementation responsibilities. The Board of Supervisors' political responsibilities to both rural and urban development could affect their land use decisions on urban growth that may lead to possible water supply shortages in the rural areas. Perhaps there are efficiencies inherent in this system, but there are no checks and balances in the decision-making process.

The 2004 Sonoma County Grand Jury¹⁰ recognized this conflict when they recommended that the Board of Supervisors establish an independent Regional Water Resources Management Board with authority over all water matters in the county. It should have its own funding sources and enforcement powers and function as the coordinating body for all the county's water issues. The independent board is

needed to develop a regional vision of all water issues facing the county, emphasizing sustainability.

2.5 Special Districts

SCWA and large municipal water agencies provide water and sewer for most of the residents in Sonoma County, but there are a number of special districts in the county providing those services to residents living in unincorporated areas.

There are ten independent water districts in the county and three independent sanitation districts (including Bodega Bay and Forestville, which provide both water and sewer). Each of the districts elects its own Board of Directors, which function under state laws governing community services districts and special districts. There are eight dependent sanitation districts, operating under the SCWA's authority and oversight. The Sonoma County Local Area Formation Commission (LAFCO) must approve all annexations into municipal or special utility districts.

Public water systems are defined as those systems serving five or more residences. There are a number of smaller water systems operating domestic wells for more than one household. Unless they serve five or more residences, they have no reporting or monitoring requirements.



¹⁰ For a copy of the complete report, see http://www.sonomasuperiorcourt.com/pages/gjury_info.php

Issues for Consideration

- Should the Board of Supervisors approve the new “Water Resources Element” in the proposed General Plan?
- In the interest of long-range sustainability, should the Board of Supervisors monitor water consumption, establish criteria for the level of development and exercise oversight responsibilities?
- Are the legal responsibilities of the SCWA Directors and the Board of Supervisors different? Does the dual role of the Board of Supervisors as policymakers and oversight authorities serve the needs of our region’s water customers?
- What is the effect on unincorporated well users when urban water contractors supplement their supply by drawing groundwater from wells? When conflicts arise over the availability of water, which group of users takes precedence? How will water be supplied to all?
- There are a number of Federal, State, Regional and local agencies with authority over water policy, each with its own purview and responsibilities. Do they help or hinder in the delivery of adequate water to the mix of users, while at the same time safeguarding the quality of water for people, plants and animals?

If you could tomorrow morning make water clean in the world, you would have done, in one fell swoop, the best thing you could have done for improving human health...

William C. Clark 1988

3. HOW DO WE KEEP WATER SAFE FOR PEOPLE, PLANTS AND ANIMALS?

The safety of surface water and groundwater, in streams and bodies of water, in wells and as delivered by water agencies, is the major factor in water quality. Other factors, such as taste, hardness and acidity also enter into assessment of water quality, but freedom from pollution is the primary concern in regulation of water quality.

Water quality is a complex problem. For example, changes in water quantity can aggravate or lessen the impacts of pollutants in streams. Further, instream, upstream, and feeder stream characteristics and the level of treatment of wastewater discharge affect the quality of water downstream and the need for filtration and chlorination of drinking water. These complexities make it difficult to provide a yes or no answer to the question of whether or not water is safe. This section deals with the sources of pollution, the laws that establish protections against pollution, how those laws are being implemented in Sonoma County, and what information is available on the quality of water

in the county. Also discussed is gravel mining in the Russian River, a multifaceted issue that can affect water safety and wildlife habitat.

3.1 Sources of Pollution

The term “pollution” covers a multitude of substances that are unsafe or undesirable in a water supply. Some sources of pollution are easily traced, while others require careful observation and analysis.

Pollution that can be traced to a specific source, such as a pipe from an industrial plant or sewage treatment facility, is referred to as *point source* pollution. Major sources are municipal and industrial wastewater discharges from both urban and rural areas. *Nonpoint source* pollution is dispersed and is most commonly storm water runoff from urban, industrial, rural, and agricultural areas. Virtually all types of contaminants can be present in storm water runoff.

Agricultural runoff in some areas can result in flows of livestock urine and manure into rivers, lakes, estuaries, and streams, affecting wildlife and humans alike. Another important nonpoint source of pollution is runoff from roads and urban streets. Such runoff contains oil, grease, heavy metals, turf-applied fertilizers, pesticides, and herbicides. Nonpoint sources are currently the most prevalent unchecked pollution sources. Although point sources have been regulated under permits for over thirty years, they still contribute heavily to water contamination. Pollutants in the Russian River include heavy metals and metal salts, as overflow and storm water runoff from the condensate ponds of the Geysers generating projects. Other pollutants include MTBE, a gasoline additive that has been released to waters of Lake Sonoma from motorboats on the lake.

3.2 Legislation to Maintain Water Quality

Congress enacted the *Clean Water Act (CWA)* in 1972 to mandate that the nation's waters be fishable and swimmable. The CWA established an objective to restore and maintain the chemical, physical and biological integrity of the nation's waters. It provides a comprehensive framework of standards, technical tools and financial assistance to address the main factors that can cause pollution and adversely affect water quality.

The Clean Water Act is designed to protect inland surface waters, wetlands, bays, sounds, and estuaries. These are among nature's most productive ecosystems, providing essential habitat for fish, shellfish, birds and other aquatic and terrestrial wildlife. Wetlands, riparian corridors and feeder streams are important parts of those ecosystems; they act to recharge groundwater, reduce flooding and purify water. Wetlands are often at the crossroads where land use and water policies meet. Protection of the San Pablo Bay wetlands at the southern end of Sonoma County and the Laguna de Santa Rosa is

of current concern to many because such wetlands provide a natural water flow cleanser, as well as providing nutrients for the ecosystem. Yet they continue to be threatened by development, some agricultural practices, and discharges from water treatment plants.

The North Coast Regional Water Quality Control Board Basin Plan (see section 2.3) is the implementing tool of the CWA and contains water quality objectives to protect the beneficial uses of water. These standards establish protections for people, fish, and wildlife. For example, the Basin Plan includes discharge prohibitions for nonpoint source pollution from agriculture, storm water runoff, logging, construction, and related activities.

The plan prohibits anyone, particularly in logging and gravel mining operations, from causing the discharge of soil, silt, bark, slash, sawdust, organic or earthen material into any stream or watercourse in quantities harmful to fish, wildlife, or other beneficial uses. The plan also prohibits operations that cause more than a 20 percent increase in turbidity¹¹ over the natural levels. Compliance with this plan has been somewhat lax. NCRWQB has taken enforcement actions on violators of the Basin Plan and permits, with fines and penalties imposed on municipal/community, industrial, and agricultural entities.

The Clean Water Act requires that states adopt numeric criteria for priority pollutants as part of the states' water quality standards to protect human health and the environment. In 1991, the State Water Resources Control Board adopted specific plans to comply with CWA; but a court ruling in 1994 invalidated them. Thereafter, SWRCB and the U.S. Environmental Protection Agency agreed to pursue a collaborative approach to bring California into compliance with the CWA.

The California Toxics Rule (CTR) reinstated numeric water quality criteria for

¹¹ Turbidity is a measure of cloudiness of water, and is an indicator of the concentration of suspended materials, such as silts and clays.

priority pollutants and expanded the list of those pollutants to 126 for California. SWRCB adopted the State Implementation Plan, effective May 22, 2000. The state plan primarily addresses the process of implementing the toxics criteria for permitted discharges into non-ocean surface waters. The Regional Control Boards are gradually imposing these stricter standards as National Pollution Discharge Elimination System (NPDES) discharge permits are renewed. For example, the CTR standards will be implemented when the Laguna Subregional Reclamation Facility seeks to renew its NPDES permit in 2005. Additional treatment of recycled water will be needed to meet the effluent limits imposed under the CTR. Preliminary testing indicates that it may be very difficult to meet the discharge limits for 5 of the 126 priority pollutants (cyanide, copper, lead, gamma-BHC and endosulfan II). Although the CTR requires monitoring and mitigation for these 126 pollutants, many more chemicals may be discharged into the water and most have not been proven to be safe in our environment.

The CWA also requires states to review the condition of the various water bodies every two years. As a result, both the Russian River and the Laguna de Santa Rosa have been listed as “impaired,” so that even more scrutiny of management practices is required. The Russian River has been listed for temperature, sediment/siltation and pathogens, and the Laguna has been listed for dissolved oxygen, total phosphates and temperature.

The CWA and the state laws, which are included in the Basin Plan objectives, apply to water in the natural environment. Standards also exist for protecting the quality of water at the point of delivery and the point of use. These standards generally derive from laws designed to protect public health. In 1974, Congress enacted the *Safe Drinking Water Act (SDWA)* to protect the quality of drinking water the public receives from public water systems that serve 15 connections or that regularly serve more than 25 people. The SDWA charges EPA with setting standards for maximum contaminant levels (MCLs) of pollutants, setting monitoring and

reporting standards and establishing protective zones around groundwater sources of drinking water. States are responsible for implementing these standards.

In California the State Department of Health Services (DHS) is responsible for carrying out the provisions of SDWA. The Drinking Water Source Assessment Program requires states to develop a program to assess sources of drinking water and encourages states to establish protection programs. According to DHS guidelines, such a program is a partnership between local, state, and federal agencies.

3.3 Monitoring Water Quality

In California, public water systems must continuously monitor water for primary and secondary maximum contaminant levels and other specific contaminants¹² and must report the result to the State Department of Health Services and to consumers. Some of the contaminants tested for are arsenic, lead, copper, asbestos, the gasoline additive methyl tertiary butyl ether (MTBE), coliform bacteria, radioactive elements, inorganic contaminants, pesticides, herbicides, chloromethane, trihalomethane, chloride, sulfate, dissolved oxygen, suspended solids and dissolved solids. Many other chemical analyses can also be performed. Santa Rosa, for example, conducted over 2000 laboratory tests looking for over 100 contaminants during 2003. Its annual report to consumers shows that it detected 19 contaminants, all at concentrations well below a level that poses a health threat. Monitoring by other municipalities in Sonoma County shows that water delivered to consumers for all of the municipal water districts is similarly safe.

It is important to note that meeting drinking water standards is often easier than meeting aquatic life standards. Complying with one does

¹² A list of current MCLs can be found at <http://www.dhs.ca.gov/ps/ddwem/chemicals/mcl/regextract.pdf>. An additional group of chemicals lacking MCLs is required to be sampled. These can be located at <http://www.dhs.ca.gov/ps/ddwem/chemicals/unregulated/R-60-00Eregulation.pdf>

not automatically guarantee compliance with the other. Much of the justification for CTR is to protect aquatic life that is often far more sensitive than humans to trace amounts of contaminants (such as copper). For instance, there is great concern now that trace amounts of atrazine, a common household pesticide, is causing multiple sexual organ development and other deformities in frogs.

Two municipal wells in Sebastopol historically have experienced contamination above the maximum contaminant levels, resulting in the permanent shutdown of Municipal Well No. 5 and intermittent removal from service of Municipal Well No. 4. A standby municipal well in Santa Rosa has also been permanently removed from service due to contamination. The contaminants affecting all of these wells belong to a class of chemicals known as halogenated volatile organic compounds or HVOCs, commonly found in dry-cleaning solvents and industrial de-greasing compounds.

Public water systems must publish and distribute an annual water quality report based on MCL testing and required monitoring. No similar testing regime exists for private water wells or systems that have fewer than five connections. People responsible for these wells are not required to monitor and report on contaminants. No public agency performs monitoring and reporting for these private wells.

NCRWQCB and other agencies have found several areas in Sonoma County to have groundwater contamination affecting drinking water wells. These areas include the Roseland area of Santa Rosa, the West College area at Clover Drive area in Santa Rosa, southwest Sebastopol near Elphick and Witter Roads, and the Grove Street area of Healdsburg. The RWQCBs are responsible for directing cleanup and abatement of discharges that affect the beneficial uses of water, including drinking water. The difficulty often lies in identifying the sources of the pollution causing the contamination of the affected wells. Because there was delay in notifying residents of contamination to the Clover Drive area, the

county now has instituted a procedure to notify nearby residents when contamination of wells is first discovered.

Identification of contaminants is an ongoing process, and EPA continues to evaluate potential contaminants and to reevaluate MCLs. Among substances for which there are no standards or MCLs are endocrine disrupters and pharmaceuticals, which can enter the water system if wastewater enters streams or rivers before the substances break down or are removed.

Bacterial contamination of municipal water supplies is well regulated. Chlorine is added, according to law, as a precaution against possible pathogen contamination in the pipes during distribution to consumers. The chlorine content in the SCWA water supply is about 0.06 parts per million (ppm) at the injection point and about 0.02 ppm at the end of the distribution system—as at the household faucet. There is increasing community concern about the effect of the added chlorine in our water supply. In fact, some treatment facilities have moved to use UV radiation instead of chlorine as a disinfectant.

SCWA also operates pH¹³ adjustment corrosion control facilities where sodium hydroxide is added to the water supply to reduce acidity in water transport lines. This acidity can increase the dissolved metal content in water at the tap.

In spite of the Clean Water Act and all of the agencies charged with monitoring our water, it is practically impossible to prevent all pollution from all sources. In some cases the laws governing clean water are violated, yet some of the sources of pollution go unchecked due to staffing limitations and limited resources. Other sources of contamination remain because regulatory standards have not yet been established. However, pollution control activities are occurring, in both the traditional arena of effluent controls for discharges out of

¹⁴ Ph is a measurement of acidity and alkalinity. On a pH scale of 1 to 14, with 1 being very acid and 14 being very alkaline, the neutral point is a pH of 7.

pipes, and the newer controls for discharges from runoff contaminated from various land uses.

Under state law, all who discharge into California waters must apply to their RWQCB for waste discharge and NPDES permits. These permits spell out requirements for what, when, where and how much can be discharged into a waterway or to groundwater. For point sources of pollution, these waste discharge permits generally are issued to individual entities. For nonpoint source discharges, management practices are generally used to control wastes. Some controls are specified in individual permits, as in municipal area-wide permits. Under some circumstances, mitigation practices are implemented through planning activities.

The failure of community and private septic systems, resulting in discharge of untreated wastewater into waterways and groundwater, is a serious concern. Treatment plants are very expensive to build and maintain, often beyond the reach of most rural residents and communities. Historically, municipal systems must step in to incorporate these failing systems in their sewer systems or help to finance community treatment plants. This is often impossible in the short term in unincorporated areas of Sonoma County, given the size of the county and the number and geographic spread of wells and septic systems.

In taking a watershed approach, the RWQCBs consider both point and nonpoint pollution sources in evaluating overall water quality problems. Once sources are identified, practices to eliminate or mitigate pollution can be identified and implemented. Further, when planning activities are relied on for implementation, conflicts can arise between implementing agencies. For example, logging must be regulated in sensitive areas where discharges of earthen materials could cause sedimentation of streams. Different agencies, such as Department of Fish and Game, Department of Forestry and the RWQCBs, are responsible for implementing sediment pollution controls, and disagreements in methods of control can arise.

EPA is making an effort to improve water quality by requiring measures to ensure that the total maximum daily load (TMDL)¹⁴ of a particular pollutant is not exceeded. Lengthy planning and regulatory processes are required in California to establish a TMDL and an associated implementation plan to ensure that the TMDL is achieved. Overall, our water quality has improved over the years, but continuing improvement depends on vigilant enforcement.

Some local communities, such as San Francisco are taking the protection of water quality a step forward by adopting the “precautionary principle.” This principle holds that a substance should be proven safe before its use is authorized in a community, instead of being discovered to be harmful after wide distribution.

3.4 Gravel Mining

An issue that creates ongoing conflict is the extraction of gravel from the Russian River. Gravel, an essential component of concrete and roadbeds, is produced as coarse sediment is eroded from hills and mountains and deposited in streambeds. It is a significant component of river habitats, and is necessary for the life cycle of endangered salmonids in the Russian River. Gravel beds filter much of the water used in Sonoma County. The gravel and sand beds of the middle reach of the Russian River do such a good job of filtering our drinking water that the only water treatment required by the California Department of Health Services is chlorination. As gravel moves downstream, it also can damage fish habitat by filling the pools where young fish mature. Often, natural transport and storage of gravel is altered by human activities.

The 1975 Surface Mining and Reclamation Act gave counties the duty and power to regulate surface mining except for instances where vested

¹⁴ TMDL is the quantity of pollutant that receiving water can assimilate while retaining the identified beneficial uses. Information on the TMDL program for US EPA in California can be found at <http://www.epa.gov/region9/water/tmdl/index.html>

rights to conduct surface mining had been previously granted. Through the Aggregate Resource Management Plan (ARM Plan), Sonoma County regulates gravel mining on the Russian River in the county, except for a number of sites that Syar Industries holds vested rights to mine.¹⁵ One goal of the current plan (November 1994) is to meet future gravel needs from local resources (hard rock quarries and the Russian River aquifer).

Three methods have been used to remove gravel from the aquifer: (1) deep pit mining, (2) in-stream gravel bar skimming, and (3) terrace mining.

Deep pit mining has proved to be highly destructive and is no longer allowed. It has lowered the riverbed, thus disturbing fish migration, accelerating erosion, undermining bridges and roadways and lowering the water level in adjacent wells. Many of these negative impacts still remain from years of deep pit mining.

In-stream gravel bar skimming scrapes gravel from the tops of gravel bars in the river. The 1994 ARM Plan implemented a number of measures to minimize damage from in-stream mining. These include monitoring the elevation of the river bottom to ensure that it is not dropping further, testing the water level in selected adjacent wells, protecting designated in-stream vegetation, and checking a variety of data to ensure that the volume of gravel in the river remains stable and that gravel removed is replaced by “recharge” or new gravel washed down the river.

Terrace mining withdraws sand and gravel from pits dug adjacent to the river. A berm is built to keep the water that accumulates in the pit

from entering the river and to keep water and fish in the river from entering the pit. Mining companies must submit plans showing pollution prevention measures, as well as plans for reclaiming the land surrounding new and existing pits. The 1994 ARM Plan calls for phasing out terrace mining over a period of ten years,¹⁶ though the terraces have consistently provided between a third and half of the county’s gravel needs, depending on the year. Controversy continues as government representatives and regulators grapple with balancing effects of mining with the continued need for gravel for construction and other uses within the county. The effects of mining include damage to water quality, loss of prime topsoil and riparian vegetation, risks of gravel pit capture by the river during floods, and bank erosion.

The gravels and sands of the Russian River represent a substantial natural reservoir, as the spaces between the sand grains and gravels and cobbles are filled with water every winter. This stored water provides the base flows during the summer. Much of this is subsurface flow and provides the cold, clear water in natural deep pools that is necessary for salmonid growth and protection.

Some in our community are alarmed by the accumulated amount of gravel removed from the Russian River over the years. They suggest there has been such a decrease in the depth of the gravel beds in the river that the natural filtration capability of the gravel has been seriously compromised, and therefore would require construction of a hugely expensive filtration plant for our drinking water.

¹⁵ Syar’s sites are between Wohler Bridge and Healdsburg. For Syar’s sites, the California Board of Mining and Geology approves reclamation plans, and the U.S. Army Corps of Engineers provides a permit under the CWA.

¹⁶ Given the phase-out plan, “if the ten-year period is uninterrupted by legal actions, the expiration dates would be March 28, 2005 on the East, and April 16, 2006 on the West side of the River.” *Annual Report on Aggregate Production in Sonoma County in 2000*, p. 10.

Issues for Consideration

- As regulatory agencies increase their scrutiny of discharge, contaminant levels and nonpoint source pollution, it becomes increasingly difficult for municipal agencies to plan and pay for the needed levels of testing and remediation. Even with gradually phased-in standards, the planning and construction time for treatment plant upgrades often extends 10 to 15 years. Also, it is difficult for municipalities to make sense of conflicting regulations issued by the various levels of regulatory agencies.
- The line between surface and groundwater regulation has become increasingly blurred. Will this have an effect on the agencies responsible for monitoring and regulation? Do agencies have sufficient authority and resources for monitoring and enforcement of water quality standards?
- When we regulate the quality of our water, how do we reconcile urban, agricultural and environmental needs?
- Perhaps we need to consider source control of pollutants, pipeline upgrades, and innovative conservation measures to protect water quality and quantity?
- Do we need to add standards to regulate additional chemicals, such as endocrine disrupters and certain pharmaceuticals?
- When government agencies relax the standards for clean water and allow exemptions for certain companies, farms, or industries, it undermines the intent of the Clean Water Act. How do we ensure that the Clean Water Act is enforced uniformly by all jurisdictions for the protection of current and potential drinking water supplies in the entire watershed?
- According to the ARM Plan, terrace mining is to phase out beginning in 2005, but public discussions of the alternatives have not begun. What will replace the terraces as a source of gravel? What needs to be done to prepare for the transition? Who will plan and implement it?

When the well is dry, we know the worth of water. *Benjamin Franklin (1706-1790)*

4. HOW CAN WE PROVIDE ENOUGH WATER FOR FUTURE NEEDS?

In all county and municipal planning operations, the question of future availability of water looms large. This section discusses projections that have been made and some of the ways that have been proposed to meet the projected requirements. These include finding new supplies, conserving the water we have and reusing wastewater. New technologies for conservation and reuse will lead to greater success in these efforts.

4.1 Projections

In the summer of 2004 SCWA reported that it is currently serving 570,000 residents in

Sonoma and Marin Counties. In the 2000 Urban Water Management Plan (UWMP), SCWA predicted an adequate supply of potable water to meet projected needs, including planned growth, through the year 2020, given certain assumptions made in the plan (see Appendix 2). This plan projected that the population for the water contractors would increase from 342,578 in 2000 to 439,961 in 2020. It also assumed that continuing sedimentation of Lake Pillsbury, Lake Mendocino and Lake Sonoma, and small increases in diversions along the Russian River would result in a gradual reduction in the water supply available to the Agency's water transmission system. This reduction amounts to

approximately 1,000 acre-feet each five years between now and the year 2020.¹⁷

Circumstances have changed since the UWMP was adopted. The Association of Bay Area Governments (ABAG) has projected even higher population figures, increasing the demand for water. Also, the projected 15 percent decrease in the diversion of Eel River water into the Russian River (see sec.1.1) makes the need for potable water even greater. This reduction is especially critical for communities and farms in the upper reaches of the Russian River, where users depend on regular releases of water from Lake Mendocino for their wells, drinking water and irrigation.

State water permits limit SCWA's Russian River diversions and rediversions to 75,000 acre-feet per year. One of the assumptions of the UWMP is the completion of SCWA's Water Supply and Transmission System Project (WSTSP), which planned for the use of an increase of water from the Russian River to 101,000 acre-feet per year. Because of the Eel River decision, SCWA cannot implement the WSTSP with its anticipated increase in capacity.

In response, SCWA sent its contractors and customers a letter in August 2003 outlining the status of its projected capacity limits. The contractors were asked to evaluate the amount of water demanded by existing and approved development projects, as well as those proposed, but not yet approved. SCWA issued a report in April 2004 with the projected water demands from its contractors. For the Restructured Water Supply Agreement, the contractors are currently negotiating a formula to allocate water. Those contractors with aggressive water conservation programs are arguing for water allocation on a per capita basis, rather than past history of water demand. All of the contractors and customers are evaluating their current water usage, seeking additional water supplies (primarily

groundwater) and analyzing the effectiveness of more aggressive water conservation and reuse programs.

It should also be mentioned that peak water demand occurs during the summer when water supply is at its lowest level. Water contractors are currently negotiating a memorandum of understanding for water allocations during times of low water availability.

4.2 Additional Water Supplies

Although plans are proceeding to supplement surface water with groundwater, until the groundwater surveys are completed (see sec.1.3), we do not know how much groundwater is available for use and is being used in each watershed. For example, until the USGS Santa Rosa Plain Study is completed, we will not know how groundwater extractions affect the Russian River. If protecting our watershed is important for future water supply, it should be a major part of our plans in all jurisdictions.

Most municipalities already have groundwater wells used for drinking water alone or to supplement SCWA water. Santa Rosa's six wells in the Bennett Valley area are operational for emergency use only. Recently, however, the city has contracted with West Yost & Associates to provide additional information on the best ways to supplement its water from SCWA, including the use of these wells on a regular basis. In a report dated July 22, 2004, the consultant's analysis concluded that increasing the pumpage from the Farmers Lane wells will have minimal impact, if any, on private wells, local groundwater levels, and existing contamination sites located in the area. It recommended a well-monitoring program when regular pumping begins.

Lake Sonoma could be a source of additional water, especially if the Eel River Diversion is further reduced or eliminated in the future. Not all of the water in Lake Sonoma can be used for drinking water, however, because some of the lake's capacity must be reserved for flood control and recreation.

¹⁷ The Urban Water Management Plan, p. 3-6.

Releasing the water from Lake Sonoma may be problematic. Some fishery biologists say that large amounts of water from Lake Sonoma could not be released down Dry Creek without damage to the fish habitats and migrating fish. Instead, a pipeline would have to be constructed through the Dry Creek Valley to the Russian River. There is also some concern that the natural gravel aquifers have been so depleted by gravel mining that the released water, when taken into the collectors at Wohler Bridge, might not be adequately filtered. A water filtration plant at an estimated cost of more than \$600 million would thus be required.

The National Marine Fisheries Service proposes that water could be released by pipeline from Lake Sonoma to the Middle Reach of the Russian River, where it would be filtered through the natural gravel aquifer before reaching the SCWA underground collectors downstream. With this approach, construction of a new water filtration plant would be avoided.

Another controversy centers on water rights in the Dry Creek Valley. SCWA and private well owners each claim rights to the water. When does surface water become groundwater? This issue may have to be adjudicated in the courts in the near future, but it may have some

bearing on the proposal to release additional water supplies from Lake Sonoma to serve the customers in Sonoma County.

4.3 Conservation

One definition of sustainability is not to use natural resources faster than they can be replenished. The California Urban Water Conservation Council has formulated Best Management Practices for urban conservation (see Appendix 4). These practices include plumbing retrofits, leak detection, metering all connections, billing by volume of use, large landscape conservation programs, and public education programs. All contractors and customers of the SCWA are required to implement these practices, but other communities in Sonoma County are not required to do this. The water usage of other communities is miniscule compared with that of SCWA's contractors and customers.

Water conservation practices are already in use in Sonoma County to some degree. The jurisdictions vary in the scope of implementation, resulting in significantly different consumption rates. Some examples of water usage are shown in Table 1.

Table 1. Comparison of annual water usage of typical single-family detached-home customers (October 2003).

<u>Retail Water Utility</u>	<u>Typical Annual Use Gallons/unit</u>	<u>Number of Customers</u>
Rohnert Park	147,460	7,717
North Marin Water District	130,152	13,576
Forestville Water District	124,104	782
Windsor	121,383	7,440
Sonoma	120,026	3,519
Cotati	114,008	1,917
Petaluma	111,029	17,223
Marin Municipal WD	106,000	50,995
Valley of the Moon WD	103,392	6,051
Santa Rosa	103,180	40,628

Since Santa Rosa is the largest consumer of water in the county, it has taken the lead in implementing an aggressive comprehensive conservation program. The city has provided a free low-flow toilet and showerhead retrofit program, an ongoing Peak Reduction Program to reduce peak water demand, rebates for commercial and some residential low-water capacity washing machines, and pilot projects for installing low-volume pre-rinse spray nozzles for restaurants and EvapoTranspiration sprinkler controllers in commercial landscape areas. Additionally, the city is currently working on a NASA space-imaging system to detect the kind of landscaping on each parcel of land and project how much irrigation water should be applied. When the system is perfected, customers can compare their water usage with the recommended usage.

In addition to an ongoing public education program, Santa Rosa provides customers with a two-year history of monthly water use on every other utility bill. From these data, customers can compare water use from one month to the next and one year ago to current water use. To date, the City's commitment to water conservation has reduced wastewater flows to the treatment plant by 1.6 million gallons per day.¹⁸

City and county planners are required by the Urban Water Management Plan to accommodate the increased population with increased conservation in residential, agricultural, commercial, and industrial use of water. One instance of city-county cooperation was demonstrated when SCWA assisted Petaluma in developing an award-winning Industrial Water Conservation Program (designs of Pacific Technologies).

Pacific Institute released a report in November 2003 entitled *Waste Not, Want Not: The Potential for Urban Water Conservation in California*.¹⁹ This report suggests that one-third

¹⁸ For more information about Santa Rosa's conservation program, visit <http://www.ci.santa-rose.ca.us/wc> or call the Water Conservation Hotline at (707) 543-3985.

¹⁹ The full report can be accessed online at <http://www.pacinst.org>.

of California's current urban water use can be saved with existing technology. Further, it estimates that 85 percent of this water "can be saved at costs below what it would cost to tap into new sources of supply and without the many social, environmental, and economic consequences that any major water project will bring." By using many of the strategies outlined in this report, Pacific Institute estimates that California could reduce its urban water use from approximately 185 gallons per capita per day (GPCD) to around 123 GPCD.

Some cities already incorporate aggressive conservation programs, and there may not be as much opportunity to save water as this report suggests. For example, Santa Rosa estimates its residents already use only 130 GPCD with a total residential use of 94 GPCD and indoor water use of 63 GPCD. As water availability decreases in the county, other communities will incorporate more of the suggestions from the report.

Aggressive conservation practices generate some concern in our communities. Often such practices reduce urban water usage but do not reduce residents' water bills, because the supply and distribution of water often is a fixed cost that must be paid by the contractors, regardless of the amount of water used. In fact, this pricing mechanism may act as a disincentive to conserve. There is also concern about the use of the water conserved. Will that water be used to supply growth to the area, to maintain water levels in our streams and rivers, or to sell and export to new customers of the water system?

Water conservation practices are important in rural areas as well as in urban areas, since groundwater is part of the overall water source in the county. According to the State Water Resources Control Board, 80 percent of the water in the state is used for agriculture. In the interest of sustainability, efficient agricultural use of water would consider both the method of irrigation and the selection of the crop type. Some plants are water intensive but others are low-water users.

4.4 Water Reuse

Five main wastewater treatment plants serve SCWA's water contractors. The agency operates and maintains the plants in the Forestville and Sonoma Valley areas and Santa Rosa, Petaluma and Novato operate the other three plants independently. The Regional Water Quality Control Boards regulate treatment plant discharge and develop discharge requirements. Additional requirements are anticipated in the future as research analyzes the impacts of toxins, pharmaceuticals, pesticides and herbicides and the California Toxics Rule (see sec. 3.2) is implemented in 2005.

Santa Rosa operates the Oakmont Wastewater Treatment Plant and the Laguna Subregional Reclamation Facility. The Oakmont Plant operates only during the irrigation season to provide recycled water to the golf courses, and is shut down during the winter. The Laguna Facility (the largest wastewater treatment plant in Sonoma County) provides advanced tertiary treatment²⁰ of wastewater collected from Santa Rosa, Rohnert Park, Cotati, and Sebastopol, and the South Park County Sanitation District, and septic waste from most of Sonoma County.

The Laguna Facility uses a number of efficient processes to treat the wastewater. An ultraviolet system was installed at the plant in 1998 as a replacement for chlorine, sulfur dioxide and ammonia as a means of disinfection and treatment. Doing away with chemical treatment eliminated the need for many safety precautions, and avoided toxicity problems associated with chlorine use.

In addition to the treatment of liquids, the Laguna Facility also reuses composted biosolids. The biosolids are mixed with tree waste and other organic material, composted and sold to landscape contractors and other large users of compost. Biosolids are also reused by application on agricultural land used for growing winter wheat, oat hay and various pasture blends.

The Laguna Facility is currently permitted by the Regional Water Quality Control Board to treat 21.34 MGD Average Dry Weather Flow, or 7.8 billion gallons per year, now that the Geysers Recharge Project is completed (2003). After treatment, at least 4 BGY of treated water per year (with an average of 11 MGD over a multi-year period) will be discharged at the Geysers Project. This leaves about 2.1 BGY available for agricultural and urban reuse and 1.7 BGY for discharge in the Russian River, through the Laguna de Santa Rosa in wet weather. The discharged recycled water could be used for additional irrigation in dry years, but in wet years disposal remains an issue since irrigation requires water storage. Currently, the recycled water is being pumped up to the Geysers Recharge Project, and very little wastewater is discharged into the river.

In sending recycled water to the Geysers Recharge Project, Sonoma County is creating a unique natural resource. Most geothermal areas produce a mixture of steam and water. In the Geysers area, only steam is produced, which is then converted into electrical energy by turbines. The molten rock that is the heat source is about five miles below the surface of the earth. When water is added to the heated layers of rock above it, steam is produced. Energy produced over the years has depleted much of the existing steam fields. As wastewater has been injected from Lake County and now from Sonoma County, energy production has begun to increase again.

Injection of recycled water into the steam fields, as an alternative to discharge into the river, has served to counter objections to the river discharge. A side effect of the injection, however, is increased seismic activity close to the Geysers Project, with frequent earthquakes measuring less than 4.0 on the Richter scale.

In addition, recycled water is used for urban irrigation on parks, golf courses and commercial areas (primarily in Rohnert Park), agricultural irrigation for vineyards (Cotati), pastureland (Santa Rosa Plain), created wetlands (adjacent to the Laguna Facility on Llano Road), and a few parks and municipal land areas in Santa Rosa. Overall in 2003, the Subregional Distribution

²⁰ A treatment process for wastewater that includes biological treatment, clarification, coagulation, filtration and disinfection

System irrigated 6,383 acres through the months of March through November, reusing a total of 3,334 million gallons (approximately 1/3 of the amount of water sent to the Geysers each day).

Because of increased population projections in the general plans for the cities in the subregional area and the stricter standards for discharge under the California Toxics Rule, the Subregional System has begun to carry out the Incremental Recycled Water Program. The Santa Rosa Board of Public Utilities and Santa Rosa City Council certified the Final Environmental Impact Report on the Program in December 2003. The Draft Recycled Water Master Plan approved in January 2004 proposed several methods to handle the projected increase in wastewater flows. The parts of the program that were approved are shown below.

<u>Project</u>	<u>Targeted Amt million gal/yr</u>
Indoor Water Conservation (added)	300
Urban Reuse (added)	500
Agricultural Reuse (added)	1000
Geysers Recharge Project (added)	400
Discharge in the River (existing amount permitted)	<u>4500</u>
Total	6700

Discussions are now underway in the county to extend the distribution of recycled water for reuse by creating more storage and pipeline capacity. Areas being considered include the Dry Creek Valley and other north county locations, as well as areas east of Santa Rosa and Rohnert Park.

As water becomes a more precious commodity, developers are working to include in their planning the use of recycled water for irrigation, in both commercial and residential areas. Vintage Greens in Windsor now uses recycled water for irrigation in the front yards and some back yards, and a proposed residential development in Rohnert Park is interested in building a water storage reservoir to hold recycled water for use in summer irrigation.

Rohnert Park, Oakmont and other communities have constructed distribution systems to reuse water for the irrigation of parks, golf courses, street landscaping and commercial areas. Santa Rosa is planning an incremental approach to expanding the recycled water distribution system citywide. Petaluma is expanding reuse for urban landscape and park irrigation and has been recycling water for agricultural irrigation for over 20 years.

Reuse of recycled water is beginning to generate some community concern because the water still may contain heavy metals, pharmaceuticals and other contaminants. There is worry that the treated wastewater will leach through or run off agricultural fields and urban parks, possibly contaminating the groundwater and surface waters. Spreading biosolids on agricultural fields may allow heavy metals into our foods.

In addition, some homeowners want to experiment with systems for collecting gray water from showers, sinks and washing machines to reuse for irrigation, but the Public Health Department has not approved these systems because of their public health implications. Other landowners collect rainwater during the winter and store it in cisterns for summer irrigation.

4.5 Emerging Technologies

New technologies are developed every year for water conservation and reuse. Some of these technologies work better in specific locales than elsewhere. Others entail large costs or need societal changes to be successful. Each new technology must be evaluated for its applicability and viability in a specific setting and community. Among the emerging technologies are the following:

Living systems for wastewater treatment. These decentralized systems, pioneered by John Todd, can radically cut costs by reducing the distances water has to travel to be treated when serving individual neighborhoods, business parks

or even single large buildings. Without relying on chemicals for treatment, the wastewater is treated through use of bacteria and algae, plant communities, and ultimately engineered ecosystems including large fish and shellfish. Twenty-three systems have been installed in the United States and more in Europe.

Created wetlands. The wetlands provide an appropriate habitat for microbial populations to purify wastewater. Currently there are created wetlands in Sonoma County which purify agricultural runoff containing nitrogen fertilizers and animal wastes, heavy industrial waste and municipal sewage. An added benefit is that often habitat for birds and other wildlife is improved. This approach can be used on organic compounds, however, industrial wastes contain heavy metals and some level of them is always going to be around as waste.

Examples of created wetlands in Sonoma County are the redwood grove research at Sonoma State University, (using intensive irrigation methods to grow redwood trees) and the created wetlands just south of the Laguna Facility. Wetlands have been constructed in Arcata, California, and Petaluma will be constructing a new wastewater treatment plant with a large created wetland for treating effluent. The aim is full reuse capability and an end to

discharges to the Petaluma River. Worldwide, more than 600 municipalities use created wetlands.

Augmenting water supplies through recovering rainwater. This strategy can be used in households or water systems. Large volumes of rainwater may be guided from rooftops to different varieties of storage areas, to be reclaimed and used for irrigation. Systems for collecting rainwater are in use across the country. On a broader scale, communities in other areas of California use check dams, retention basins or similar strategies to slow down water in high rain events to increase recharge. This can even supplement drinking water, but it is unknown how large-scale water sequestration is likely to affect surrounding ecosystems.

Restoration of water storage in the aquifer. Since 1950, gravel and sand mining has resulted in a large loss of natural storage in the middle reach of the Russian River, between Ukiah and Healdsburg. Expert hydrogeologist Dr. Robert Curry has proposed a program to cease gravel mining, allowing natural replenishment over a 20-year period to restore half the volume of gravel and sand that has been lost. The resulting storage of water that is currently “lost” to the ocean would greatly benefit the salmonid fisheries and also provide more water for users.

Issues for Consideration

In response to the SCWA advisory of short-term water limitations, communities are seeking additional sources of water, including more aggressive pumping of wells. How will this affect wells in the surrounding unincorporated areas?

How can we encourage all of our jurisdictions to promote the use of aggressive water conservation strategies and the expansion of reclaimed water use as the best answer to sustainability of the whole for now and the future?

How can we educate ourselves about water as an increasingly scarce resource and help promote conservation and reuse in our homes and businesses?

How can we help to promote emerging technologies as strategies to conserve and reuse water?

...Individuals should never underestimate their own influence and the role they can play in changing things for the better. I think they should speak up in their communities and say, "Stop polluting our rivers. Stop wasting water. I cannot take this any more."

Kofi Annan, United Nations Secretary-General

5. HOW DO WE BALANCE WATER NEEDS?

Competing water interests have long been an issue in California. Over the years, society's aim of conquering nature has become a search toward sustainability and coexistence with nature. Still, competing values and complex legal requirements make it difficult to address water supply needs for the future while protecting our environment.

As we near the limits of our available surface water and groundwater, competitors have begun jockeying for position in water allocation. How do we, as a community, balance the needs of rural and urban water customers, industry, and agriculture, while preserving our essential fish, wildlife and aquatic habitats? This section explores some of the ways to achieve such a balance.

5.1 Surface Water vs. Groundwater

Generally, rural users rely on groundwater for their domestic and agricultural needs, while urban users rely on surface water, supplemented by groundwater. As more rural users discover their well water levels dropping, their awareness arises, and they begin asking questions about capacity, recharge and overdrafting. They are concerned about urban areas increasing their reliance on groundwater to supplement their consumption of surface water and how the aquifer depletion may affect their own water. Yet, alarmingly, there seems to be no agency willing to assume the responsibility to balance the needs of consumers of surface water and groundwater.

California recognized over 100 years ago that regulation was needed to help allocate water among competing users. The State Water Resources Control Board regulates surface water

(see sec. 2.2); the California Code identifies 22 kinds of districts or local agencies with statutory authority to manage surface water. Although no state agency regulates groundwater use, certain local agencies have been given statutory authority to impose some forms of groundwater management.

Specifically, Water Code 10750, *et seq.*, permits certain agencies to develop groundwater management plans (GMPs). A GMP is created as a collaborative approach to managing land use and water. Cities and counties can adopt ordinances to manage groundwater within their boundaries; 28 GMPs have been successfully adopted in California. A GMP must contain specific components,²¹ including the following:

- Outline of the boundaries of the agencies in the basin
- Plan for coordination among the agencies
- Description of the aquifer, historical data, management concerns, and a water budget (historical and projected water demand and supply)
- Monitoring plan for groundwater levels, quality, and subsidence and surface water flow and quality
- Plan for provision of a reliable supply
- Monitoring program to track changes

The California Department of Water Resources provides complete information on the requirements for a Groundwater Management Plan and on grants available for assistance in funding the planning.

Although the Sonoma County Board of Supervisors and the Water Agency have not yet expressed an interest in groundwater

²¹ Components of a GMP are outlined in SB1938 (2002), amended WC 10750 *et seq.*

management, perhaps the increasing number of water conflicts in future years will encourage them to collaborate with other jurisdictions to develop a Groundwater Management Plan to ensure a long-term supply of good quality water from both surface and ground water sources.

5.2 Human Needs vs. Habitat Protection

On every major California river there have been human impacts²² that have resulted in reduced and impaired native fish populations. Controversies continually arise over stream-flow patterns, water temperature, and stream channel diversions. The Russian and Eel Rivers are symptomatic of these conflicts. For decades, summer dams have been constructed on the Russian River for recreational use, but they have become problematic because they prevent fish from swimming upstream to spawn. Also, construction practices used for their installation can cause pollution. The lack of fish ladders at Scott Dam (Lake Pillsbury), Cape Horn Dam (Van Arsdale Reservoir) on the Eel River, and Coyote Dam (Lake Mendocino) on the east fork of the Russian River is of special concern. Deep water pockets and resting pools are required for migrating fish to successfully find their way upriver. Human activities, including channelization, riparian removal, sudden releases from dams, elevation drops at the fronts of dams, and gravel mining operations along the main channel, affect the dynamic processes in rivers, eliminating or impairing deep water pockets and resting pools downstream. Recently, some state and county projects have mitigated some of the barriers to fish passage. One such project is the new fish ladder constructed at Healdsburg.

A critical challenge during the 1990s was to provide more balance in the uses of water to protect and restore native anadromous²³ fish and

wildlife. A number of key decisions were made to balance the needs of development and natural habitat. New federal protection for wildlife was reinforced in the Public Trust Doctrine, which was upheld in 1994, after a fifteen-year court fight over the protection of Mono Lake. This Doctrine holds that certain natural resources, including running water, fish, wildlife and other instream values, are the property of all and held in trust by the state. Another key water decision was the 1986 SWRCB Decision 1610, which established a minimum in-stream flow in Dry Creek and in the Russian River downstream of Lake Mendocino to support fish and wildlife and other beneficial uses. SCWA must manage flows to comply with Decision 1610.

Recent local actions emphasize protection of the fishery resources. The December 1997 Memorandum of Understanding negotiated between the SCWA and two federal agencies (U.S. Army Corps of Engineers and the National Marine Fisheries Services) established the process for consultation under Section 7 of the Endangered Species Act to evaluate the effect of certain policies and activities on the survival rates of three species—steelhead trout and coho and chinook salmon. As a result, the steelhead and chinook are currently listed as threatened, and the coho is listed as endangered by the state and threatened by NOAA. The Endangered Species Act required a biological assessment of the effects of the Potter Valley water diversion on listed species, which resulted in an ordered reduction of 15 percent in the amount of water diverted to help restore the Eel River fishery. In January 2002, Essential Fish Habitat (EFH) guidelines were established for fishery management councils to identify and conserve habitat for fish.

Not all agencies are in agreement regarding the best course of action to protect fish habitat. Running contrary to the SWRCB minimum stream flow decision, the U.S. Army Corps of Engineers and SWCA have recently proposed to reduce the summertime flow of the Russian River by as much as 75 percent to improve fish

salt water, and return to spawn in freshwater.

²² The US EPA maintains lists of water bodies impaired by pollutants. These listings are required by section 303(d) of the Clean Water Act. The list for California can be found at <http://www.epa.gov/region09/water/tmdl/index.html>.

²³ Anadromous fish hatch in freshwater, spend their life in

habitat. In January 2004 a Russian River draft Biological Assessment was released; however, this was subsequently independently reviewed, and its analysis was found to be insufficient. If the Biological Assessment is certified, NOAA will start to work on its biological opinion. To finalize this course of action, NOAA must issue its opinion in the coming months, and SWCA must complete its EIR on the long-range plan and apply for appropriate permits from the North Coast Regional Water Quality Control Board. This proposal is extremely controversial because it may adversely affect the groundwater supply for domestic consumption and irrigation along the river, and it significantly impacts the river economy during the low-flow summer season.

County Supervisors approved an environmental restoration plan on Austin Creek in September 2004. This plan would allow a gravel company to alter how they mine the Russian River tributary near Guerneville. Instead of skimming the gravel bars each summer, gravel would be taken from concentrated areas to create deep pools for the fish during the summer. This action balances the needs of the fish with the mining of gravel, an important resource for our community.

Finally, it is important to note that future water conflicts may be resolved in favor of Native Americans, who have prior water rights on nearly every western river. The 1908 Winters Decision (sec. 2.2) may give Sonoma County Native Americans prior groundwater rights, and the Round Valley Native Americans already have rights to Eel River water for sustaining their fishery.

5.3 Role of Interest Groups

In recognition of the increasing importance of the Russian River as a resource for our community, various interest groups have formed recently. Some of the groups have formed to promote the preservation and beneficial management and use of the Russian River. Other groups are forming to educate themselves and

others about the overuse of our public water supply.

The Russian River Watershed Council (RRWC)²⁴ was formed in 2000 to protect, restore, and enhance the biological health of the Russian River and its watershed through a community-based process, which facilitates communication and collaboration among all interested parties. It recently adopted a Russian River Management Plan and is implementing it in conjunction with a Technical Advisory Committee. The Council is composed of economic and environmental organizations, agency representatives with local, state, and federal jurisdictions, and members of the public at large from Sonoma and Mendocino counties.

The Russian River Watershed Association (RRWA)²⁵ is composed of a group of cities and public agencies working together cooperatively to coordinate regional programs for clean water, fisheries restoration, and watershed enhancement, as well as to secure funding for projects and seek regulatory relief. Participants in RRWA include the cities of Ukiah, Cloverdale, Healdsburg, Rohnert Park, Santa Rosa, and Windsor, the county water agencies of Mendocino and Sonoma, and the Mendocino County Inland Water and Power Commission. RRWA participants are developing projects to improve the watershed and to help local governments meet requirements for clean water and other needs collectively at reduced cost.

Other groups have come together to protect the Russian and Eel Rivers. The most active groups include Friends of the Eel River, Friends of the Russian River, Russian River Keeper and the Russian River Watershed Protection Committee (RRWPC). RRWPC is a nonprofit corporation focusing mainly on water and wastewater issues.

During the past five years, two citizens' organizations have been formed to promote

²⁴ More information on RRWC can be found at <http://www.rrwc.net>

²⁵ More information on RRWA can be found at <http://www.scwa.ca.gov/rrwa.html>.

education, awareness and action on water issues countywide. The O.W.L. Foundation (Open Space, Water Resource Protection, Land Use) was formed in 2003 by county residents living near Penngrove, and SWIG (Sebastopol Water Information Group) formed recently as part of the O.W.L. Foundation. Both citizens' groups

join with others in working to bring attention to the declining groundwater levels in our aquifers and promoting the need for Sonoma County to develop a Groundwater Management Plan. (For more information on both O.W.L. and SWIG, see <http://www.penngrove.info>.)

Issues for Consideration

- How can we ensure the availability of water for both rural and urban users?
- How can we provide enough water to meet our domestic, commercial and agricultural needs, while protecting our natural environment?
- Should we encourage the establishment local basin plans or regional groundwater management plans with standards tailored to the capacity and characteristics of each?
- Is it important for jurisdictions to develop water budgets, estimating the supply of water as well as the demand for water? Should we begin to restrict development or require more extensive conservation/reuse programs to free up potable water for that new development?
- Is it important to develop an inventory of ground and surface water supplies with a centralized database to evaluate current and potential needs and uses? Who will develop and maintain it?
- How can we ensure that proposed projects include assessments of economic, social, and environmental benefits to protect the long-term use of our water resource? Will those projects consider both the upstream and downstream impacts?
- How can we encourage all jurisdictions to develop policies that achieve water quality and temperature essential for maintaining the populations of native fish and other wildlife?
- How can we promote the collaboration of public and private entities for the sustainability of our all of our natural resources?

CONCLUSION

As competing water users increase their demands, Sonoma County is beginning to experience conflicts comparable to those of other areas in water-scarce California – urban vs. rural, commercial vs. agricultural, and human needs vs. environmental preservation. Since other communities have already survived decades of water wars, it is important to look to them for positive models of collaboration and long range planning in the interest of sustainability of our water resource.

In the future, individual citizens will play important roles in determining how Sonoma County addresses the competing demands for good-quality water to meet residential, commercial, and agricultural needs, while protecting our natural habitats.

Here are some of the actions that we can take:

- Educate ourselves about where our water comes from – its quantity and quality (sec. 1)
- Learn more about the roles of the various agencies, their functions regarding water and their competing interests and potential collaborations (sec. 2)
- Demand that our public agencies work to protect the quality of our water (sec.3)
- Respect the value of water by using various strategies in our daily lives to reduce our use of water and reuse water when we can (sec.4)

- Keep up to date on the projections for increased demands for water from the various sectors of our community (sec. 4)
- Understand the relationships between land use and water supply and recharge (sec. 4)
- Understand the integrity of our watershed ecosystem – humans must coexist with and protect our natural habitat (sec. 5)
- Join others in urging our decision-makers to adopt sensible long-range plans for a sustainable supply of good-quality surface water and groundwater. Such plans should aim at a consistent, systematic collection and distribution system. They should also anticipate future changes in population, geography, natural processes and climate, especially their effect on the quality and quantity of water.

The next steps will be action to preserve our water resources and promote collaboration among public agencies and private organizations and individuals to plan for the long-range sustainability of our water resources. To protect water as a vitally important resource, we must honor the Public Trust Doctrine, which holds that our natural resources belong to us all and are held in trust by the state. We must also work together to resolve disagreements and clarify overlapping or uncertain jurisdictions.



APPENDIX 1: Glossary of Acronyms

ABAG	Association of Bay Area Governments
ARM	Aggregate Resource Management Plan (Sonoma County)
BPU	Santa Rosa Board of Public Utilities
CDF	California Department of Forestry
CDHS	California Department of Health Services
CTR	California Toxics Rule
CWA	Clean Water Act
DFG	Department of Fish and Game
GCMD	Global Change Master Directory
MCL	Maximum Contaminant Levels
NCRWQCB	North Coast Regional Water Quality Control Board (also NCWQB)
NOAA	National Oceanic Atmospheric Administration
NMFS	National Marine Fisheries Service
NPDES	National Pollutant Discharge Elimination System
PRMD	Sonoma County Permit & Resource Management Department
RRWA	Russian River Watershed Association
RRWC	Russian River Watershed Council
RWQCB	Regional Water Quality Control Board (also RWQB)
SCBOS	Sonoma County Board of Supervisors
SCWA	Sonoma County Water Agency
SIP	State Implementation Plan (for California Toxics Rule)
SDWA	Safe Drinking Water Act
SWRCB	State Water Resources Control Board
TMDL	Total Maximum Daily Load (Contaminants)
USEPA	U. S. Environmental Protection Agency
USGS	U. S. Geological Survey
UWMP	Urban Water Management Plan (Sonoma County Water Agency)
WSTSP	Water Supply and Transmission System Project

APPENDIX 2: Assumptions Underlying the 2000 Urban Water Management Plan

On the supply side, the assumptions in the UWMP include the following:

- We will continue to get from the Potter Valley 85 percent of the water that we have received in the past.
- SCWA will continue to have seniority in new water rights to Russian River water. However, according to the Department of Health Services, SCWA is unlikely to get any new water rights until it resolves issues related to the impact of the managed flow of the river on species of endangered fish.
- The Water Supply and Transmission System Project will be completed.
- The contractors will increase their use of water from local sources. (That is, the contractors must develop and rehabilitate wells so they can supplement SCWA water during critical periods, at least until SCWA acquires additional water rights and completes improvements to the distribution system. This makes the study of the county groundwater basins critical.)

Assumptions on the demand side include the following:

- The contractors will increase their use of recycled water for urban irrigation under the Incremental Recycled Water Project. Ultimately, increased use of recycled water will require increased storage.
- The contractors will increase conservation. All are required by the new contract to implement Best Urban Water Management Practices.
- The contractors will enforce emergency measures during dry years. The current contract requires signatories to pass ordinances restricting water use for two levels of water shortage. If there is a drought, people who use water from SCWA will have to restrict their use of water.
- The contractors have supplied good data for projected growth. Only Santa Rosa, Petaluma, and Cotati used data from their General Plan projections, which are in turn based on the projections of the Association of Bay Area Governments (ABAG), which are updated regularly. Some contractors are not in general plan areas and therefore could not use general plan data.
- Without access to the computer model, it is impossible to measure the degree to which the anticipated surplus would be adequate should some of the assumptions fail the test of time.

Another assumption not mentioned in the UWMP is that the contractors and customers will remain the same. SCWA may add more contractors or customers over that time period.

APPENDIX 3: Who's in Charge?

(Compiled by the League of Women Voters of Sonoma County)

We are indebted to each of these agencies for information published in their brochures and publications, and for the participants in our public forums. In addition, we have followed articles printed in newsletters and local newspapers, including *The Press Democrat*. The League is also grateful for the contributions of the Sonoma County Water Agency, Santa Rosa Department of Public Utilities, North Coast Water Quality Control Board, Russian River Watershed Council, Friends of the Russian River, Russian River Water Protection Committee, and Friends of the Eel River.

Organization (Website URL)	Address	Authority
FEDERAL		
Environmental Protection Agency Region 9 http://www.epa.gov/region09/lib-hot.html (866) EPA-WEST, (415) 947-8000	US EPA Region 9 75 Hawthorne Street San Francisco, CA 94105	The Environmental Protection Agency administers the Clean Water Act, Clean Air Act, and National Environmental Policy Act reviews.
Federal Energy Regulatory Commission http://www.ferc.gov (866) 208-FERC	Federal Energy Regulatory Commission 888 First Street NE Washington, DC 20426	The Federal Energy Regulatory Commission administers hydroelectricity generation, which affects water flow through dams generating electricity.
National Marine Fisheries Service http://www.nmfs.noaa.gov (707) 575-6077 Community Based Restoration	National Marine Fisheries Service 777 Sonoma Avenue Santa Rosa, CA 95404	The National Marine Fisheries Service, a department of the National Oceanic and Atmospheric Administration, administers fishery issues associated with commercial fishing, international waters and endangered species.
United States Fish and Wildlife Service http://www.fws.gov (707) 562-3000	US Fish and Wildlife Service San Pablo Bay National Wildlife Refuge PO Box 2012 Vallejo, CA 94592-0012	The United States Fish and Wildlife Service shares responsibility with NMFS for administration of endangered species issues.
US Army Corps of Engineers http://www.spn.usace.army.mil (415) 977-8112	US Army Corps of Engineers 333 Market Street San Francisco, CA 94105	The US Army Corps of Engineers has jurisdiction in all waterways of the United States to ensure navigability, flood control and environmental protection.
STATE		
CA Department of Water Resources http://www.water.ca.gov (916) 653-5791	CA Dept. of Water Resources PO Box 942836 Sacramento, CA 94236	The Department's mission is to manage the water resources of California in cooperation with other agencies, to benefit the State's people, and to protect, restore, and enhance the natural and human environments.
CA State Water Resources Control Board http://www.swrcb.ca.gov (916) 341-5250	CA State Water Resources Control Board PO Box 100 Sacramento, CA 95812	The State Board's mission is to preserve, enhance and restore the quality of California's water resources, and ensure their proper allocation and efficient use for the benefit of present and future generations.
North Coast Regional Water Quality Control Board http://www.swrcb.ca.gov/rwqcbl (707) 576-2220	North Coast Regional Water Quality Control Board 5550 Skylane Blvd., Ste A Santa Rosa, CA 95403	The North Coast Board is responsible for protecting water resources in the Russian River watershed, and all other coastal streams and rivers to the Oregon border. The WQB is lead agency for the North Coast Watershed Assessment Program.

Who's in Charge (cont.)

Organization (Website URL)	Address	Authority
STATE (Continued)		
CA Department of Health Services http://www.dhs.cahwnet.gov (707) 576-2145 Drinking Water	CA Dept of Health Services 50 D Street Santa Rosa, CA 95404	CA Department of Health Services is responsible for monitoring drinking water quality and toxic substances control.
CA Department of Fish and Game http://www.dfg.ca.gov (707) 744-8704 Russian River	CA Dept of Fish and Game PO Box 47 Yountville, CA 94599	CA Dept of Fish and Game is responsible for the management and protection of California wildlife resources, and administers hunting, and fish and stream permits.
CA Coastal Commission http://www.coastal.ca.gov (415) 904-5200	CA Coastal Commission 45 Fremont Street, Suite 2000 San Francisco, CA 94105	CA Coastal Commission is the lead planning and land use review agency for coastal management to regulate coastal and water uses consistent with the CA Coastal Act of 1976.
CA Public Utilities Commission http://www.cpuc.ca.gov (415) 703-2782	CA Public Utilities Commission 505 Van Ness Avenue San Francisco, CA 94102	CA Public Utilities Commission regulates privately owned telecommunications, electric, natural gas, water, passenger transportation companies, rail and publicly owned rail transit.
CA Independent System Operator http://www.caiso.com (916) 351-4400	CA Independent System Operator 151 Blue Ravine Road Folsom, CA 95630	CA Independent System Operator manages the utility backbone of the state by managing the transmission and operation of electric distribution lines within the state.
Northern California Power Agency (916) 781-3636	Northern California Power Agency 180 Cirby Way Roseville, CA 95678-6420	Northern California Power Agency is a joint powers agency composed of municipalities, rural electric districts, irrigation districts, and other publicly owned entities that are interested in the purchase, aggregation, scheduling, and management of electrical energy.
SONOMA COUNTY		
Sonoma County Board of Supervisors http://www.sonoma-county.org (707) 565-2241	Sonoma County Board of Supervisors 575 Administration Drive Santa Rosa, CA 95403	Sonoma County Board of Supervisors is responsible for approving land use decisions and acting as directors for the Sonoma County Water Agency.
Sonoma County Water Agency http://www.scwa.ca.gov (707) 521-6207	Sonoma County Water Agency 2150 College Avenue Santa Rosa, CA 95401	Sonoma County Water Agency is responsible for water supply, flood control and channel maintenance within Sonoma County and has jurisdictional influence on operations for Coyote Dam in Mendocino County for flow releases.
Sonoma County Dept. of Public Health http://www.sonoma-county.org/health (707) 565-6565	Sonoma County Environmental Health 3273 Airway Drive, Suite D Santa Rosa, CA 95403	Sonoma County Dept. of Public Health administers sanitation permits for restaurants, wells, sewage treatment systems and public swimming facilities.
Santa Rosa Board of Public Utilities Laguna Subregional Treatment Facility http://www.recycledwaterprogram.com (707) 543-3940 Miles Ferris, Director	Santa Rosa Utilities Department City of Santa Rosa 69 Stony Circle Santa Rosa, CA 95401	The Laguna Subregional Wastewater Treatment Facility, located on Llano Road, collects and treats effluent from Cotati, Rohnert Park, Sebastopol, Santa Rosa and unincorporated residential areas.

**APPENDIX 4: California Urban Water Conservation Council
Best Management Practices
(Appendix F, Urban Water Management Plan)**

All contractors and customers of SCWA are required to implement the Best Management Practices. The 2000 Urban Water Management Plan includes a survey of the status of the implementation in all of the jurisdictions.

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| BMP 1 | Water survey programs for single-family residential and multifamily residential customers |
| BMP 2 | Residential plumbing retrofit |
| BMP 3 | System water audits, leak detection and repair |
| BMP 4 | Metering with commodity rates for all new connections and retrofit of existing connections |
| BMP 5 | Large landscape conservation programs and incentives |
| BMP 6 | High-efficiency washing machine rebate programs |
| BMP 7 | Public information programs |
| BMP 8 | School education programs |
| BMP 9 | Conservation programs for commercial, industrial, and institutional accounts |
| BMP 10 | Wholesale agency assistance programs |
| BMP 11 | Conservation pricing |
| BMP 12 | Conservation coordinator |
| BMP 13 | Water waste prohibition |
| BMP 14 | Residential ultra low-flow toilet replacement programs |