



A Tradition of Stewardship
A Commitment to Service

NAPA COUNTY GRAND JURY

2009-2010

Final Report on

WATER

Our Precious, Critical Resource

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TABLE OF CONTENTS

1.	Letter to Presiding Judges		
2.	Letter to the Citizens of Napa County		
3.	Napa County Regional Park and Open Space District		
	a)	Summary	1
	b)	Background	3
	c)	Methodology	6
	d)	Discussion	7
	i)	Water Quality – Making Water Fit to Drink	7
	ii)	Are Napa County and Its Municipalities Prepared to Aid Residents in the Event of a Catastrophe?	9
	iii)	What is the County’s Strategy Recycled Water?	13
	iv)	Why Does Napa County Need Recycled Water?	13
	v)	City of American Canyon	13
	vi)	City of Calistoga	14
	vii)	City of Napa and Adjacent Unincorporated Areas of Napa County	14
	viii)	City of St. Helena	15
	ix)	Town of Yountville	16
	x)	Should Napa County’s Municipalities Fluoridate Water?	16
	xi)	What Would be the Benefit of Fluoridation to Napa County’s Residents?	18
	xii)	Implementing Water Fluoridation in Napa County	18
	e)	Findings	19
	f)	Recommendations	20
	g)	Commendations	21
	h)	Request for Responses	21
	i)	Definition, Glossary, Resources Reviewed, Appendix	23



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NAPA COUNTY GRAND JURY
P.O. BOX 5397
NAPA, CALIFORNIA 94581

May 31, 2010

The Honorable Stephen T. Kroyer
Presiding Judge
Superior Court of the State Of California
County of Napa
825 Brown Street
Napa, CA 94559

Dear Judge Kroyer:

Pursuant to Section 933(a) of the California Penal Code, the 2009-2010 Napa County Grand Jury submits to you its Final Report on Water: Our Precious, Critical Resource. Our investigation was conducted in a manner consistent with the California Penal Code, this Court's Charge, and the historic role of the Grand Jury - to protect the interests of the citizens of Napa County.

This is the eighth in a series of final reports we will be issuing before our term ends. I would like to acknowledge the hard work and dedication of the Grand Jury which our reports reflect. It is a privilege and a pleasure to work with them.

Respectfully submitted,

A handwritten signature in blue ink that reads "John K. Morris".

John K. Morris
Foreperson
2009-2010 Napa County Grand Jury



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P.O. BOX 5397
NAPA, CALIFORNIA 94581

To the Citizens of Napa County:

In order to fulfill the Napa County Grand Jury's mandate to investigate all branches of county government, to be assured they are being administered honestly, effectively, and in the best interest of Napa County citizens, the 2009-2010 Grand Jury investigated numerous agencies pertaining to water quality, water availability in the event of catastrophic loss, recycled water usage, and the desirability of fluoridating the current water supply.

The Grand Jury found water quality testing, in all municipalities in Napa County, met present California Department of Public Health and EPA Clean Drinking Water Act requirements.

The current County Emergency Response Plan (ERP) provides a general framework for a regional response for all emergencies including catastrophic loss. The Cities of American Canyon and Napa have their own ERPs while other municipalities do not.

The use of recycled water for industrial and/or landscape applications varies greatly in the County municipalities; from none being used in St. Helena to eighty-five percent usage in Yountville. As more City of Napa water customers convert to using recycled water for such usage the revenues for Napa City Water Department decline since recycled water is delivered by the Napa Sanitation District to customers at a lower rate than potable water. Napa Sanitation District and the City of Napa have agreements to manage transition from using potable to recycled water for new users.

None of Napa County's public water systems fluoridate their water supplies. Fluoridated water has a documented significant oral health benefit and fluoridating water in Napa County was recommended as a component for community dental health improvement. California Assembly Act AB 733 mandates fluoridation of public water systems having 10,000 or more connections. Despite this mandate to the City of Napa, neither it nor any County municipality has applied for funding to fluoridate their public water systems.

The Napa County Counsel's Office reviewed this final report on water issues and the Presiding Judge of the Napa County Superior Court certified that the report complies with Title 4 of the California Penal Code. The report was accepted and filed as a public document by the County Clerk.

Copies of the report are available for your review in the Napa City/County Library and on-line by following the link to the Grand Jury at <http://www.napacourt.com/>. We trust you will find this report informative.

Respectfully submitted,

The 2009-2010 Napa County Grand Jury

WATER

Our Precious, Critical Resource

SUMMARY

In order to fulfill the Grand Jury's mandate to investigate all branches of government assuring they are being administered efficiently, honestly, and in the best interest of Napa County's residents, the 2009-2010 Grand Jury investigated the activities of Napa County agencies associated with the supply of potable and recycled water and the treatment of wastewater.

Water is one of the most common materials on Earth. Three quarters of our Earth is covered with water though greater than 95 percent is salty and much of the rest is ice. Continuous availability of safe water is of concern worldwide. Access to water for personal use, food production, and industrial processes is vital to the overall health and well-being of any population. Significant regions in California and many other parts of the United States face the daunting task of ensuring sufficient potable water supplies in the event of a disaster or an extended drought.

The 2009-2010 Napa County Grand Jury probed the planning for, and the expected effectiveness and efficiency of, ensuring potable water delivery to residents of Napa County, especially after a disastrous event or extended water crisis. Additionally, inquiries were made into expanding the use of recycled water as an alternative for potable water usage in agriculture. Finally, the 2009-2010 Grand Jury explored the use of water as a vehicle for preventative treatment of tooth decay, especially in children and young adults.

Interviews were held with members of the Napa County's Executive Office, Flood Control and Water Conservation District, and Public Works. The Grand Jury interviewed members of Public Works from the municipalities of American Canyon, Calistoga, Napa, St. Helena, and Yountville, plus members of the Napa Sanitation District.

As a result of its investigations, the Grand Jury recommends:

- The City of Napa Public Works Department (PWD) and the Napa Sanitation District (NSD) merge to form a municipality-wide utility department to benefit the City of Napa's residents and optimize the availability and economics of potable and recycled water. Further, the County, its municipalities, and the NSD investigate the benefits to all the

County's residents of a countywide utility district to further optimize potable and recycled water resources

- Municipalities within the County develop, expand, and formalize agreements to provide water allocations to address a catastrophic loss of water
- Each County municipality prepare a plan to ensure rapid repair of the water delivery systems that includes procedures for emergency water delivery to facilities responsible for providing health and safety aid to the community's population, especially local hospitals, shelters, and emergency centers
- NSD proactively and aggressively identify funding sources to accelerate expansion of recycled water service in Napa
- The City of Napa apply for funding capital improvements to fluoridate the City's water supplies for its three treatment plants in compliance with Assembly Bill (AB) 733
- American Canyon, Calistoga, St. Helena, and Yountville prepare capital cost proposals to fluoridate their water supplies
- All County municipalities evaluate means to increase the capacity, and enhance the survivability of municipal reservoirs and water storage facilities
- Calistoga, St. Helena, and Yountville prepare its own detailed plan that supplements and complements the County's Emergency Response Plan (ERP)
- Cities of American Canyon and Napa are encouraged to complete their updated Urban Water Management Plan (UWMP) plans as scheduled and train appropriate city and County officials to carry out their specific responsibilities. St. Helena is encouraged to update its plan on a periodic basis
- Napa County Flood Control and Water Conservation District (NCFCWCD) survey and develop a management plan for groundwater resources throughout the County
- The Board of Supervisors (BOS) develop regulations to ensure adequate groundwater supply for future needs
- The County and its municipalities continue development and expansion of recycled water projects to alleviate future water shortages
- St. Helena accelerate its planning process to distribute and use recycled water

BACKGROUND

Access to water for personal use, agricultural operations, and industrial processes is vital to the overall health and well-being of any population. Many parts of the United States and significant regions in California face the daunting task of ensuring sufficient potable water supplies. Napa County is not immune from these concerns. Surveys and studies as far back as 1960 have examined various aspects of water supply and water usage in the County. The issue remains on the front page of our local and regional newspapers and in other media. The 2009-2010 Napa County Grand Jury undertook an examination of water in Napa County from several viewpoints:

- How is the quality of potable water for Napa County's municipalities ensured?
- What is the ability of the County and its municipalities to deliver water to its residents in the event of a catastrophe? Recent events in Haiti and Chile have highlighted the immediacy of this concern.
- What is the role of recycled water in mitigating the short and long term demand on the County's municipal potable water supplies?
- Can Napa County's municipalities improve their resident's oral health through fluoridating their municipal waters?

To answer these questions the Grand Jury has researched and investigated Napa County and all municipal agencies responsible for water supplies and wastewater treatment. The Grand Jury did not look into the non-municipal water districts within the County.

Sources of Water for Napa County's Residents

The County's residents rely primarily on water supplied through the Sacramento River North Bay Aqueduct (NBA) for potable water supplies. See Figure 3 in the Appendix for a map of the NBA. Additional local water sources are used to a greater or lesser extent by individual municipalities.

The following table summarizes the annual and per capita usage for Napa County's municipalities.

Table 1: Napa County Potable Water Usage by Municipality¹

Municipality	Population Served	Annual Potable Water Usage	
		Total, acre-feet* ²	Per Capita, gpd**
American Canyon	17,000	3,437	180
Calistoga	5,302	827 ³	139
Napa	84,780	15,797	166
St. Helena	6,800	1,977.5	259
Yountville	2200	510	206

*: One acre-foot of water corresponds to 325,851 gallons

** : gpd = gallons per day

1: Data for 2008 supplied by municipal Public Works Departments.

2: This number may be influenced by all metered use including domestic, commercial, industrial, park irrigation, etc.

3: This number may reflect the substitution of recycled water for potable water that previously was used for landscape applications

American Canyon sources raw water from the NBA and treats it at the facility in Jamieson Canyon. It also receives some treated water from the City of Vallejo.

The City of Napa water is provided from three sources: the NBA, Lake Hennessey, and Milliken Reservoir. Water from the NBA is treated at the Jamieson Canyon Water Treatment Plant (JCWTP). The raw water from Hennessey and Milliken is treated at facilities located at each site.

Yountville's main raw water source is Rector Reservoir. Groundwater is used in emergency situations.

St. Helena's main raw water source is Bell Canyon Reservoir. Water is treated on site. Additionally, the City of Napa supplies St. Helena with about 800 acre-feet of treated water annually. Another 700 acre-feet of groundwater completes the potable water supply.

Calistoga receives treated water from the City of Napa and raw water from Kimball Reservoir. The raw water from Kimball Reservoir is treated on site.

What is Potable Water and How Do We Obtain It?

Potable water is defined as water that is safe and suitable for human consumption. The extent to which raw water must be treated depends on its source. Surface water typically requires more treatment than ground water.

For the residents of Napa County, the potable water meets both federal and state standards that stipulate limits for microbiological and chemical contaminants and esthetic qualities. Some California standards for drinking water are more

stringent than the Environmental Protection Administration's (EPA) especially for some trace organic chemicals. Water treatment removes extraneous and potentially harmful particulate matter, microorganisms, and chemical contaminants.

Can Napa County and Its Municipalities Supply Potable Water to Residents in the Event of a Catastrophe?

It is generally accepted that on average, an individual cannot survive more than a week without water. A lack of adequate potable water can quickly become a life-threatening situation. Sufficient water is vital to treat the sick and injured, provide for human consumption and basic hygiene, support the work of search and rescue, and sustain the resumption of normal productive and commercial activities.

The 1983 Urban Water Planning Act requires California communities with 3000 or more connections or using 3000 acre-feet or more water annually to develop plans that incorporate the best approaches to respond to threats, including: flooding, wildfire, earthquakes, and technological and biological hazards. Napa County, and the Cities of American Canyon, and Napa were required to develop such plans. St. Helena voluntarily developed its plan.

Water is Not an Endless Resource to be Used Only Once!

All County municipalities need to provide adequate long term water supplies for human, agricultural, and industrial uses. It is unpredictable what the level of contribution the NBA will have to the County's long term municipal supplies. Increased use of recycled water can mitigate the demand on potable water supplies.

What is Recycled Water?

Recycled water is the fastest growing water supply in California. Recycled water is wastewater effluent that is treated and disinfected to provide a non-potable supply that is safe and suitable for landscape irrigation and some industrial processes. In California, recycled water is regulated by the California Department of Public Health (CDPH) for quality and usage. There are several categories of recycled water. The highest quality is "disinfected, tertiary treated water" and the Grand Jury refers to this quality when speaking of recycled water. Recycled water is widely used and accepted as an environmentally responsible way to conserve scarce and expensive potable water supplies throughout the arid and semi-arid portions of the United States.

Recycled water is clean, clear, and safe. No health-related incidents have ever been linked to the use of recycled water. Recycled water quality standards are more stringent than those for surface streams, rivers, and the Bay. The production, distribution, and use of recycled water are regulated by the California Department of Health Services and the California Regional Water Quality Control Board. California's regulations are some of the most stringent in the world.

Fluoridation of Our Municipal Water Supplies

None of the municipal water systems in Napa County are fluoridated except for a small portion of treated water American Canyon occasionally receives from Vallejo.

The California Dental Association (CDA) estimates that due in large measure to the fluoridation of municipal water systems, approximately half of United States children between five and seventeen years of age have not had a cavity in their permanent teeth. The decline of tooth decay in the United States during the past sixty years is attributed largely to the use of fluoride. In fact, "water fluoridation has been hailed as one of the 10 great public health achievements in the twentieth century." Despite the impressive gains in oral health nationwide, dental disease still affects more school-age children than any other chronic health condition after the common cold. Access to fluoridated water is expected to reduce the rate of tooth decay by about 49 percent in baby teeth and 59 percent in permanent teeth.

METHODOLOGY

Interviews Conducted

The Grand Jury conducted numerous interviews and discussions in the course of its investigation. They included fourteen members from the following agencies and organizations:

- City of Napa, Public Works Department, Water Division
- Napa County Board of Supervisors
- Napa County Executive Office
- Napa County Flood Control and Water Conservation District
- Napa County Flood Control and Water Resources
- Napa Sanitation District
- Public Works Departments from the County of Napa, Cities of Napa, American Canyon, St. Helena and Calistoga, and the Town of Yountville
- Queen of the Valley Medical Center
- St. Helena Hospital

Documents Reviewed

The Grand Jury reviewed the documentation and information from websites cited in the Resources Reviewed and Appendix set forth below and responses to email questions from several interviewees.

DISCUSSION

Water Quality – Making Water Fit to Drink

None of Napa County's raw surface water is fit to drink for both esthetic and health reasons. All the County's municipalities employ sophisticated technology to render water drinkable. This technology is carefully and continuously monitored to make sure the water reaching homes meets federal and state requirements. Although the water treatment process varies somewhat according to the water source, the elements of the process are the same for all the facilities in the County. Pumped groundwater does not require the extent of filtration to remove particulates and haze since this water is quite clear as it leaves the ground. Figure 1 depicts a typical water treatment process.

Upon entering the treatment plant, raw water is treated to adjust pH and with chemicals called flocculants and coagulants that cause finely suspended particles to clump together and other chemicals to precipitate. This treatment is performed in large open basins at larger facilities or enclosed tanks at smaller plants. After treatment, the coagulated and flocculated material settles to the bottom of open settling basins or tanks and is removed as sludge.

The water is subsequently filtered and disinfected with a chlorine compound such as sodium hypochlorite, the primary constituent of bleach. The pH is then adjusted with caustic soda, sodium hydroxide, and treated with ortho/polyphosphate that chelates or binds with some metals to reduce water discoloration and deposits in pipes. The finished water is pumped into storage tanks prior to distribution.

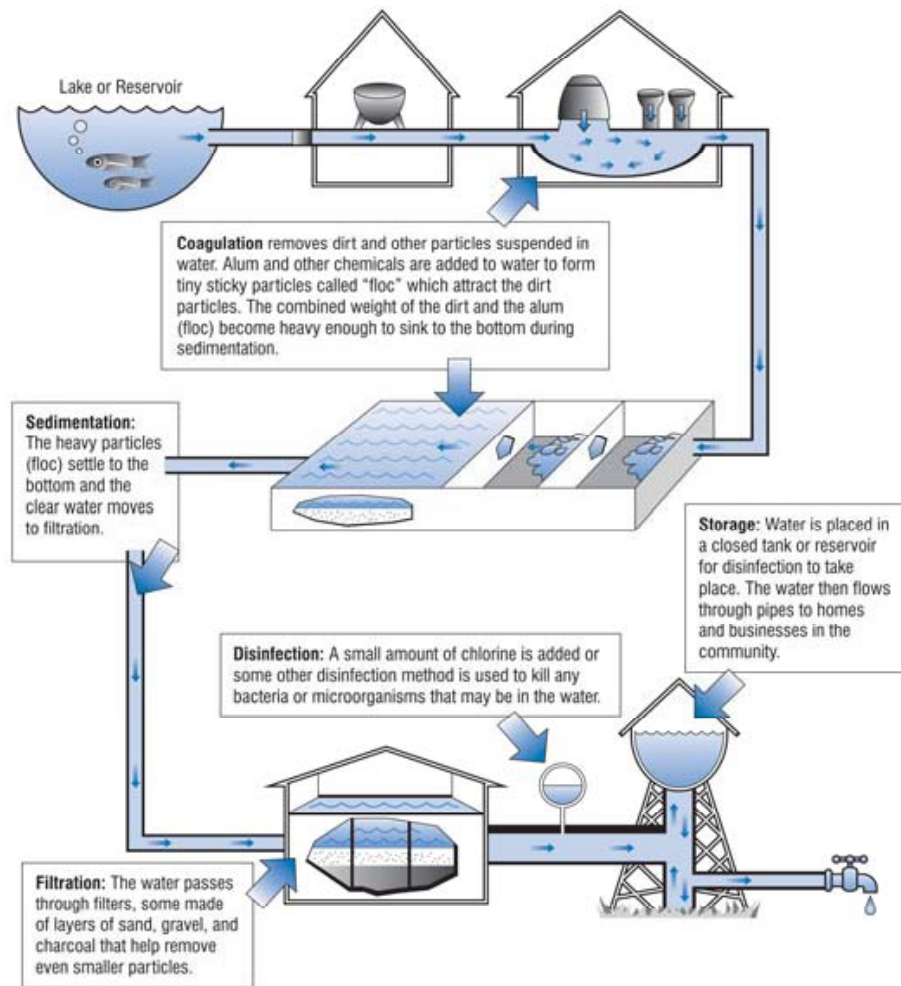


Figure 1: Diagram of Water Treatment Process (Safe Drinking Water Act, Environmental Protection Agency, 2004)

The treatment process is diligently monitored. Testing and frequency are stipulated by both federal and state requirements. Some parameters are evaluated continuously online, such as temperature and pH. Other parameters are tested following manual sampling on a regularly scheduled basis (24/7/365). If irregularities occur, an alarm notifies the technician to take action. According to established federal and state guidelines, testing is also performed for some trace compounds and microorganisms, such as *E.coli*, lead, and copper. Special testing for mercury and other elements is done by outside laboratories. Ultimately, the goal is to ensure the water leaving the treatment plant is safe and pleasant to drink. The Grand Jury observed that all test records of the JCWTP appeared to be in order and met State reporting requirements. The certified technicians calibrate the testing equipment and document the calibrations according to established

written protocols. Each of the County's municipalities publishes an annual water quality report. These reports are listed in the Appendix.

Occasionally water quality suffers from esthetic defects without compromising its safety. Many residents can recall that the City of Napa's water had some unpleasant color and/or odor twice in 2009. In early 2009, raw water from the NBA had an unpleasant odor due to some algae product that contaminated the water following overflow from a pond upstream of the NBA intake. Later in that year, while the JCWTP was shut down during the completion of plant improvements when Napa was sourcing its municipal supply from Lake Hennessey, another esthetic glitch occurred. This happened as a result of churning in Lake Hennessey. Churning can occur during the change of seasons, when warmer water from the bottom of the reservoir rises carrying anaerobic bioconversion products. Under normal circumstances, the City of Napa has the luxury of switching from Lake Hennessey during churning events. As noted previously, churning does not affect water safety.

Are Napa County and Its Municipalities Prepared to Aid Residents in the Event of a Catastrophe?

The Napa County's Emergency Operations Plan (EOP) addresses the planned response to extraordinary emergencies associated with natural disasters, technological incidents, and national security. The Plan, originally approved in 2001 and periodically revised, established an emergency management agency to respond to any significant emergency affecting Napa County. The Napa County Social Services Department and the Public Health Unit Leader are designated in the County's EOP for assuring the availability of potable water.

The County's EOP states that water availability and distribution is a major concern. In an emergency, one of the City of Napa's water sources, Lake Hennessey, may be inaccessible due to pipeline damage. The three Napa sources are on solid ground and are expected to be usable after a major earthquake. However, Napa is also connected to the State Water Project at Jamieson Canyon and has available a tertiary source in the Milliken Dam water treatment facility. According to the EOP, if the ability to distribute water is available, any facility remaining in operation is able to supply the emergency water needs to the City of Napa and its immediate neighbors.

All five municipal water reservoirs within Napa County have been recently upgraded. Table 2 below summarizes the nominal capacity of these reservoirs. In addition, approximately another three dozen private reservoirs throughout the County could be used during an emergency. St. Helena and Calistoga have backup wells. Although dam failure is unlikely, a nearby major earthquake may

be strong enough to cause failure. It should be noted that a major earthquake could require all dams in the county to be drained to 50 percent of capacity as a safety precaution. In addition, the survivability of water tanks is low. Therefore, contingency plans should be in place to provide supplemental potable water to Napa County communities in case potable water is found to be inadequate.

Table 2: Napa County Municipal Reservoirs and Their Capacity

Municipality	Reservoir	Nominal Capacity, acre-feet*
American Canyon	None	N/A
Calistoga	Kimball	335
Napa	Lake Hennessey	31,000
Napa	Milliken	2,000
St. Helena	Bell Canyon	2,050
Yountville	Rector	4,000

*: 1 acre-foot of water corresponds to 325,851 gallons

Federal and state laws dictate that in the case of catastrophe all hospitals must be prepared to provide one and one-half gallons of water per person per day for all patients and staff for up to ninety-six hours. Queen of the Valley Medical Center must provide water for 200 patients and 800 staff and is planning to install an on-site water tank by year end 2010 to meet this need. St. Helena Hospital is licensed by the State of California to operate its own water system for its entire facility. Four wells and a treatment plant are on-site. In addition, they have a one million gallon water tank that is buried on the property. Reciprocal arrangements have been made with neighboring agencies for emergency purposes. St. Helena Hospital also stores five-gallon bottles of water to provide for the patients and staff.

The County and the Cities of American Canyon and Napa have disaster response plans in place. Interviews by the Grand Jury indicated that Calistoga, St. Helena, and the Town of Yountville lacked specific and detailed plans to respond to a major disaster. Some public officials were unaware that any emergency plans exist.

In 2004 the BOS in cooperation with the cities and special districts, approved the “Napa Operational Area Pre-Disaster Hazard Mitigation Plan.” The Plan has very little information related directly to catastrophic water loss. Each city’s water supply is briefly described but there is no discussion about how the County or its municipalities would actually respond to a catastrophic water loss. Section 4,

Objective 2.3.1 of the Mitigation Plan, discusses ensuring a viable fire-fighting water supply, which could be an additional source of water. This Section makes the following recommendation:

Purchase and maintain for each fire district an emergency water pumping, surface lines, and hydrant systems to pump water from existing sources, transport and provide pressurized portable surface lines to temporality (sic) replace damaged water mains and hydrants.

The estimated funding required for this project is \$2,500,000 spread over a five to ten year period. Although this Plan was passed by the BOS in 2004, there is no indication that any work on the project has been done.

The Urban Water Management Planning Act requires all urban water suppliers, serving more than 3,000 customers or supplying more than 3,000 acre-feet annually, to develop an Urban Water Management Plan (UWMP). Napa City's Plan describes and evaluates sources of water, projected population, and future water needs. It also outlines demand management measures and strategies for responding to water shortages. Under the Act, the City is required to submit a completed plan to the State Department of Water Resources (DWR) every five years. The Napa City Plan was last updated in 2005.

Napa County's municipalities receive water from four sources:

- Groundwater
- Imported water from the NBA
- Recycled water
- Reservoirs

A 1991 "Water Resource Study for the Napa County Region" indicated that while most of the County has an adequate supply of potable water at this time, many of the County's municipalities and outlying areas are predicted to have an inadequate water supply by 2020 if water management issues are not addressed. Recommendations included a groundwater survey and its subsequent management to ensure ongoing consistent supply in the future. There was a hydro-geologic County survey in 1973 and a regional survey in 1960. There have been no updates. Historical data for a number of wells was reported in 1995. Groundwater in the Milliken-Sarco-Tulocay (MST) area was surveyed in 1997 and for the period from 2000 to 2002. In 2008 the County conducted follow-up monitoring in MST with plans for further monitoring in 2009. The groundwater levels in MST wells have continued to decline for all monitoring periods. In 2003 the BOS revised the 1996 groundwater ordinance intended to regulate the County's groundwater resources. The focus is on known groundwater deficient

areas including MST, Capell Valley, Pope Valley, Chiles Valley, and Carneros basins. Due to agricultural and residential changes in groundwater demand since 1991, this information is out of date. The adequacy of future supply assumes sufficient rainfall and a normal increase in demand. Local communities could face supply shortages in the near future if there is an abnormal increase in demand for water or a period of insufficient rainfall. A “perfect storm” scenario is a possibility if the County, while experiencing long-term drought is subjected to a major disaster. The impact of these combined threats would have a devastating effect on the County’s ability to provide the basic necessities.

The threats addressed by Napa City’s ERP that could cause a major disruption in the City’s water supply include:

- Earthquakes
- Floods
- Waterborne Diseases
- Vandalism
- Terrorism
- Backflow Conditions
- Construction Accidents
- Chemical Spills
- Power Outages
- Fires

Napa City’s ERP specifically discusses the use of the Standardized Emergency Management System, which allows rapid and effective coordination at the field level. The City has tank storage of 28 million gallons of potable water available. The City also has the capability to draw raw water from both Lake Hennessey and the Milliken Reservoir. Raw water would have to be treated prior to drinking. Interconnectivity among communities enables water redistribution during emergencies. The ERP notes the flexible design of the Napa City’s water system and its ability to minimize negative impacts on public health and safety in the worst of emergencies.

Section 9.5 of American Canyon’s 2005 UWMP addresses the City’s response to a catastrophic loss of water. This section also notes that the City completed its own ERP in 2004. The plan describes the City’s “standardize[d] response and recovery protocols” to a disaster and is similar to Napa City’s response outlined in their ERP. California’s Department of Water Resources has extended the due date to revise the current UWMP to 2011.

While the City of St. Helena is not required to have an UWMP, they have a Plan in place. Section 9.3 contains a very brief outline of the City’s response to a

catastrophic loss of water. Calistoga and Yountville are not required to have a UWMP.

What is the County's Strategy regarding Recycled Water?

Each resident uses about two gallons per day (gpd) for drinking, food preparation, and similar tasks. This two gpd usage, in the County's municipalities, represents only about one-half to one and one-half percent of the total daily consumption. Some thirty to forty gpd of potable water are used for various purposes inside and outside the house for such tasks as dishwashers, laundry, washing windows, landscaping, and washing cars. Recycled water would be appropriate for many exterior uses.

Why Does Napa County Need Recycled Water?

Recycled water reduces demand on potable water and benefits everyone in Napa. It maintains a constant water supply for our local landscaping, vineyards, and golf courses. There is no countywide strategy coordinating the distribution and use of recycled water to alleviate demands on potable water. This is unlike the potable water supply that is coordinated by, and among, the various Water and Public Works Departments.

Each of the County's municipalities has its own wastewater treatment plant. These treatment plants distribute recycled water for irrigation to different degrees ranging from none at all (St. Helena) to a very significant proportion of its wastewater (Yountville).

City of American Canyon

The City of American Canyon owns and operates its own wastewater treatment plant (WWTP) and water treatment plant. All the wastewater received at the City's WWTP undergoes tertiary treatment, making it suitable for recycled water uses, such as irrigation and industrial use. Presently sixty-nine acre-feet of recycled water are used to offset potable water usage. Recycled water is delivered to the City's only recycled water customer, Green Island Vineyards. The remaining treated wastewater is discharged into the North Slough and a constructed wetland.

American Canyon received a recycled water planning grant from the California State Water Resources Control Board and in 2003 completed a Recycled Water Facilities Plan that established a planning-level system layout and budget for distribution piping, pumping, and storage facilities. The City's Recycled Water

Implementation Plan (RWIP) includes a phased system expansion including storage tanks and a storage pond. Significant portions of the recycled water distribution system have already been constructed in conjunction with the recent construction of new housing. Construction of the recycled water processing system was completed in 2008. The City expects sixteen city parks and streetscape areas to begin using recycled water in 2011.

The building of a one million gallon tank for recycled water storage is complete. The recycled water will be used for irrigation of landscaping around the new American Canyon High School. A 2.5 million gallon potable water tank will be built as soon as funds become available.

The rates for recycled water recommended in the RWIP are lower than the rates for potable water for the City's targeted customers. The RWIP proposes a recycled water rate of 50 percent of the City's established potable water rate for landscape and industrial use, and 75 percent of the raw water rate for vineyards. In addition to financial incentives, American Canyon will perform periodic reviews and updates of their recycled water marketing and public outreach activities.

City of Calistoga

Approximately 100 to 200 acre-feet of recycled water are used within the City of Calistoga annually. There are about twenty users of recycled water including the fairgrounds, schools, most public parks, city lands, a resort property, a multi-family apartment building, small hotels, and churches. Calistoga's Public Works Department regularly checks the various locations where recycled water is used to ensure there are no discharge violations or misuse.

City of Napa and Adjacent Unincorporated Areas of Napa County

The City of Napa, NSD, and surrounding unincorporated areas in southern Napa County collaborate to promote the use of recycled water in this area. As recycled water use expands, this represents a decline in revenues for the Napa Water Department. This competition for revenues from potable and recycled water presents a barrier to expansion since the City of Napa Water Department receives revenue from potable water while the NSD receives its from recycled water. This effectively puts the two agencies in competition although they have a memorandum of understanding for transition of a customer from potable to using recycled water. This is not the case with other municipalities since responsibility for the supply of potable water and distribution of recycled water reside within the same department. Consolidating NSD and City of Napa Water Department would

benefit the community in a number of ways. Consolidation would make recycled water a common goal for both agencies and encourage the expansion of the community's recycling water program. It would assist the City in meeting its conservation goals and would expand opportunities for receiving state and federal funds.

NSD's price structure for recycled water is not based on market rates or cost of production and distribution. The price for recycled water is a small fraction of that for potable water. American Canyon, whose size is closest to that of Napa's, prices its recycled water at 50 to 75 percent of that for potable water.

NSD provides wastewater collection, treatment, and disposal services to the residents and businesses in the City of Napa and surrounding unincorporated areas of Napa County. The Soscol Water Recycling Facility (SWRF) is a secondary and tertiary biological physical-chemical treatment facility that treats a mixture of domestic and industrial wastewater.

The Regional Water Quality Control Board permits NSD to discharge into the Napa River from November 1 through April 30 (wet season period). The average discharge of treated water to the Napa River is approximately 14.7 million gallons per day (mgd). NSD provides secondary treatment at its wastewater facility whenever discharging to the Napa River.

From May 1 through October 31 (dry season period) discharge of wastewater into the Napa River is prohibited. Wastewater is either stored in stabilization ponds or treated and reused for landscape irrigation in industrial parks, golf courses, pasturelands, and vineyards. High quality, Title 22, unrestricted use recycled water, also more formally known as "disinfected tertiary treated recycled water," is provided to all users.

NSD has constructed recycled water pipelines, also known as "purple pipe," from the treatment plant to South County agricultural, industrial, Napa Valley College (NVC), and as far north as Imola Avenue adjacent to Napa State Hospital (NSH). These pipelines serve fourteen to twenty customers. Among these is NVC which uses fifty acre-feet annually to irrigate sports fields. Due to the pipeline's proximity to NSH, recycled water could be used for its landscape water needs if the State finds funds to install the "purple pipe." NSH currently uses Napa City potable water for irrigation.

City of St. Helena

Presently the City of St. Helena does not recycle its wastewater. The City is submitting an application to the United States Department of Agriculture for a grant for improvements to the wastewater plant and distribution of recycled water.

Town of Yountville

Eighty-five percent of the wastewater in the Town of Yountville is recycled and is sold primarily to vineyards.

Should Napa County’s Municipalities Fluoridate Water?

None of the municipal water systems in Napa County are fluoridated. Reducing tooth decay through fluoridation of municipal water supplies has been documented extensively. CDA estimates that due in large measure to fluoridation of municipal water systems, about half of United States children between five and seventeen years old have not had a cavity in their permanent teeth. In fact, “water fluoridation has been hailed as one of the 10 great public health achievements in the twentieth century. The decline in prevalence and severity of tooth decay in the United States during the past 60 years has been attributed largely to the increased use of fluoride.” Despite the impressive gains in oral health nationwide, dental disease still affects more school-age children than any other chronic health condition after the common cold. Dental disease is five times more prevalent than asthma in California. Access to fluoridated water could be expected to reduce the rate of tooth decay by about 49 percent in baby teeth and 59 percent in permanent teeth. About 100 United States and international organizations, as well as the CDC, have endorsed, encouraged, and supported fluoridation of public water systems.

The economic value of having access to fluoridated water has been demonstrated. At a 1999 meeting, International Collaborative Research on Fluoride, it was estimated that the United States population saved about \$40 billion in oral health care costs over the past forty years due to water fluoridation. Another article examined the cost of fluoridating municipal water relative to the cost of averted disease and loss of productivity. Per person savings range from \$15.95 to \$18.62 depending on the size of the community with less though significant cost savings for smaller communities (about 5,000 persons). The CDA estimates that every dollar invested in water fluoridation saves about \$140 in dental & oral health bills annually. On the other hand, a lack of oral health care, including absence of access to fluoridated water, exerts a cost on California’s health care system. In 2004, Denti-Cal, California’s Federal Medicaid Dental program expenditures in the County were in excess of \$800,000. The distribution of those expenditures across the ages of Denti-Cal recipients is summarized in the table below.

Table 3: 2004, Napa County Denti-Cal Expenditures by Age

Age	Number	\$ (000's)	% of Total Dollars
0-5	716	119.3	14.8
6-12	848	163.5	20.3
13-20	474	112.6	14.0
21 and older	1,575	409.2	50.9
Total	3,613	804.7	100

It is likely much of these monies were spent to repair tooth decay. Perhaps if access to fluoridated water was available, using a 49 percent decline in cavities in baby teeth and 60 percent in permanent teeth from fluoridated water, in 2004 the County would have saved more than \$150,000. Given the increase in the numbers treated and costs of dental care since 2004, today these savings would be greater.

The potential health benefits of fluoridated water to County residents have been studied. In a November 2007 Napa County Community Health Needs Assessment Fact Sheet, dental services were identified as a recommended priority. At that time, based on projections from statewide statistics, a conservative estimate of about 6,680 Napa County residents, newborn to nineteen years of age, have decay requiring treatment, corresponding to about 5 percent of Napa County's population. Epidemiological evidence suggests that this number would be markedly lower if there was access to fluoridated water.

Napa County is significantly behind the curve with respect to fluoridation of its PWS. In 2006, 69 percent of the US population received fluoridated water from municipal water systems. In 2008, 60 percent of California residents received fluoridated water from municipal water systems.

One goal of the US Department of Health and Human Services (HHS) "Healthy People 2010" initiative (www.healthypeople.gov) is to increase the percentage of the population receiving optimally fluoridated water to 75 percent from the current level of 69 percent by 2010. In 2006 the Council of State Governments adopted a resolution encouraging states to "support and adopt community water fluoridation standards." The State of California has encouraged its counties to invest in fluoridation of its public water systems in various ways including initiatives through CDPH. In 1995 the California legislature passed AB 733, titled "Fluoridation Act," which was signed into law by Governor Wilson. This bill was sponsored by the CDA. AB 733 mandates fluoridation of public water systems having 10,000 or more connections. Prior to passage of AB 733, California ranked close to the bottom, forty-eight out of fifty states plus the District of Columbia, in the percentage of its population receiving community

fluoridated water. AB 733 was subsequently clarified in 2004 by Senate Bill (SB) 96, also sponsored by the CDA. Both AB 733 and SB 96 are unfunded mandates and stipulate exemptions and requirements for its implementation. CDPH is responsible for identifying funds to purchase and install fluoridation equipment for PWS.

What Would be the Benefit of Fluoridation to Napa County's Residents?

One estimate suggests that across the state, California taxpayers could have saved about \$385 million in dental care costs five years after introduction of fluoridation in community water systems.

Aside from the capital costs to build the capability of adding fluoride to its municipal water systems, the cost of providing fluoridated water in community water systems is estimated to be about \$0.68 to \$0.72 per resident annually depending on the size of the community. With Napa County's 2008 population estimated by the United States Census Bureau to be 133,400, this translates to a cost of operating a fluoridated water supply countywide at approximately \$100,000 annually. This is less than the amount Denti-Cal is estimated to have spent on tooth decay treatment in 2004. Based on this information, the Grand Jury believes water fluoridation is the most economical and cost effective approach to implementing a major oral health preventive measure for the County's residents. Further, using the above CDA estimate that each \$1.00 invested in fluoridated water translates into \$140 savings in bills for dental services, this \$100,000 annual investment would yield some twelve or more million dollars in savings.

Implementing Water Fluoridation in Napa County

In 1998 the CDA, Dental Health Foundation, and CDPH formed a partnership to administer a multimillion dollar California Endowment grant for water fluoridation projects. CDPH has responsibility to identify monies for such purchases. It does not appear that any Napa County municipality has sought funding to provide this demonstrated public health benefit. Since the City of Napa has more than 10,000 water connections, it is mandated by AB733 to fluoridate its water. In a March 2, 2003, *Napa Valley Register* article Phil Brun, general manager for the Napa Water Department, was quoted "...Napa County ranks 17 out of 166 districts on the state's priority list..." prepared by Department of Health Services. Despite this high ranking, the City of Napa has not applied for funds. This article was the last of a flurry of articles and letters, both for and against fluoridation, in the *Napa Valley Register* appearing during 2002 and 2003. The City of Napa PWD has estimated the capital costs to implement fluoridation

at its three treatment plants to be \$1.1 million. Even if the capital costs for the other treatment plants throughout the County were estimated at the highest of those for the City of Napa plants, the total cost for the County's municipal water systems would be less than \$3.5 million.

FINDINGS

The 2009-2010 Grand Jury finds:

1. Water quality testing in all municipalities in Napa meets current California Department of Public Health and EPA Clean Drinking Water Act requirements. Water Quality Reports are available annually from all Napa County municipalities.
2. In the event of supply disruption from the NBA, the County and its municipalities will depend on water from municipal reservoirs and water storage facilities.
3. The current County Emergency Response Plan (ERP) provides a general framework for a regional response to all emergencies. The Cities of American Canyon and Napa have their own ERPs; other municipalities do not.
4. A major earthquake would likely cause a significant disruption to water delivery infrastructure throughout the County.
5. State law requires the City of Napa and American Canyon to have UWMPs in place and to update them every five years. At present, these are current and are being updated to comply with current law and regulations.
6. Although not required, St. Helena voluntarily prepared a UWMP.
7. Napa County has not completed a detailed hydro-geological study of its groundwater resources since 1973.
8. Recycled water is a non-potable supply option to alleviate demands on potable water programs.
9. In Yountville, eighty-five percent of wastewater is recycled.
10. Calistoga uses 100 to 200 acre-feet per year of its wastewater and distributes it to about twenty locations.
11. St. Helena is not currently using recycled water but is "looking into it."
12. As more City of Napa water customers convert to using recycled water the revenues for Napa City Water Department decline since recycled water is delivered to customers at a lower rate than potable water.
13. Napa Sanitation District and the City of Napa have agreements to manage transition from using potable to recycled water for new users.
14. None of Napa County's public water systems fluoridate their water supplies.

15. Fluoridated water has a documented significant oral health benefit and fluoridating water in Napa County was recommended as a component for community dental health improvement.
16. AB 733 mandates fluoridation of public water systems having 10,000 or more connections.
17. Annual savings in oral healthcare to County residents is projected to exceed the estimated costs of operating water fluoridation systems at the County public water systems.
18. No County municipalities have applied for funding to fluoridate their public water systems.

RECOMMENDATIONS

The 2009-2010 Grand Jury recommends:

1. Municipalities within the County develop, expand, and formalize agreements to provide water allocations to address a catastrophic loss of water.
2. All County municipalities evaluate means to increase the capacity, and enhance the survivability, of municipal reservoirs and water storage facilities.
3. Calistoga, St. Helena, and Yountville prepare their own detailed plans that supplement and complement the County's ERP.
4. Each County municipality prepare a plan to ensure rapid repair of the water delivery system and include procedures for emergency water delivery to facilities responsible for providing immediate health and safety aid to the community's population, especially local hospitals, shelters, and emergency centers.
5. Cities of American Canyon and Napa are encouraged to complete their updated UWMP plans on schedule and train appropriate city and County officials to carry out their specific responsibilities. St. Helena is encouraged to update their UWMP plan on a periodic basis.
6. NCFWCWD conduct a countywide hydro-geologic groundwater survey and develop a management plan as a County priority.
7. BOS develop regulations to ensure adequate groundwater supply for future needs.
8. The City of Napa and NSD identify a process for, and develop an implementation plan to, integrate NSD and PWD into a single department.
9. The County and all municipalities continue development and expansion of recycled water projects to alleviate future water shortages.

10. The County, all municipalities, and NSD investigate the process and economics for the formation of a countywide utility district to benefit the County residents and holistically manage the availability, distribution, and economics of potable and recycled water.
11. St. Helena accelerate its planning process and implementation of distribution and use recycled water.
12. NSD proactively and aggressively identify funding sources to accelerate expansion of recycled water service in Napa.
13. That within six months the City of Napa apply for funding sources for capital improvements to fluoridate water supplies for its three treatment plants in compliance with AB 733.
14. That within six months American Canyon, Calistoga, St. Helena, and Yountville prepare capital cost proposals for fluoridation of their water supplies.

COMMENDATIONS

The 2009-2010 Grand Jury commends:

- American Canyon for its plan to use recycled water to irrigate fields at its new high school and for building recycled water storage capability for other beneficial uses within the City.
- Calistoga for its current uses of recycled water and showing forward thinking in seeking to expand recycled water distribution and use.
- The Town of Yountville for being the first municipality in the County to recycle a large percentage of its wastewater.
- The members of the Flood Control and Water Conservation District and all municipal Public Works departments who have assisted the Grand Jury with reports, maps, and other information sources. The personnel were helpful, efficient, and expert in their contributions.

REQUEST FOR RESPONSES

The 2009-2010 Grand Jury requests responses to recommendations from:

- BOS Recommendations 1,6,7,8,9,10,12
- NCFWCD Recommendations 1,6
- Napa Sanitation District Recommendations 8,9,0,12
- Public Works Department of American Canyon Recommendations 1,2,4,5,8,9,10,13

- Public Works Department of Calistoga Recommendations 1,2,4,9,10,14
- City of Napa Public Works Department, Water Division Recommendations 1,2,4,5,8,9,10,13
- City of St. Helena Public Works Department Recommendations 1,2,4,9,11,14
- Town of Yountville Public Works Department Recommendations 1,2,4,9,14
- Mayor, American Canyon Recommendations 3,5,9,10,14
- City Council, Calistoga Recommendation 14
- Mayor, St. Helena Recommendations 5,8,9,10,13
- City Council, St. Helena Recommendations 3,5,9,11,14
- Mayor, Yountville Recommendation 14

DEFINITION, GLOSSARY, RESOURCES REVIEWED, APPENDIX

Definition

“Tertiary Treated Water,” “Disinfected Tertiary Recycled Water,” “Unrestricted Use Recycled Water” are used synonymously in this Report. This means the wastewater has undergone Primary, Secondary, Tertiary, and Disinfection treatment processes:

- **Primary treatment** physically removes large solids using grates, screens, and settling tanks.
- **Secondary treatment** promotes growth of bacteria and other microbes that break down the organic wastes. Secondary treatment prevents pollution of streams, rivers, or lakes from this organic waste by degrading most of the organic matter before the water is released into the environment.
- **Tertiary treatment** is used only where it is needed to protect the receiving waters from excess nutrients. In tertiary treatment, the concentrations of phosphorus or nitrogen are reduced through biological or chemical processes. In most cases the water is also filtered.
- **Disinfection** kills disease-causing organisms most commonly by the same chemical used for drinking water. If this tertiary treated water will then be discharged into a river, the remaining active chlorine is removed after disinfection by a chemical process.

The figure below illustrates the wastewater treatment process. The use of this recycled water is carefully controlled by State regulations, Title 22. A table in the Appendix lists the uses allowed for various types of recycled water.

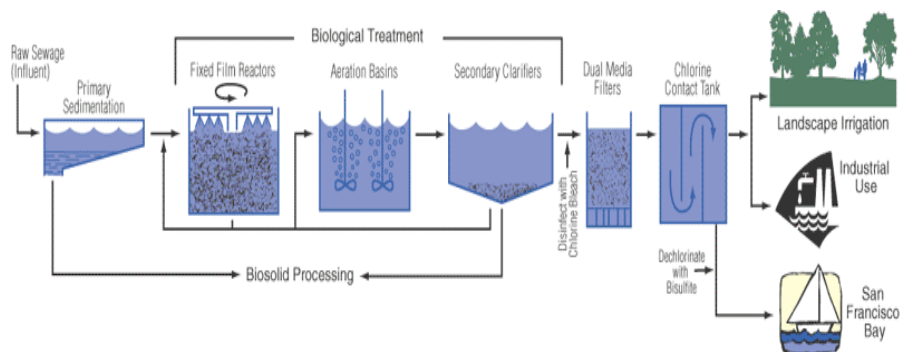


Figure 2: Diagram of Wastewater Treatment (City of Redwood City Public Works)

Glossary

- AB 733**---California Assembly Act which mandates fluoridation of public water systems having more than 10,000 connections
- BOS**---Board of Supervisors
- California “Title 22”**---California Regulations Relating to Drinking Water
- CDA**---California Dental Association
- CDPH**---California Department of Public Health
- CDC**---Centers for Disease Control
- CSWRCB**---California State Water Resources Control Board
- EOP**---Emergency Operations Plan
- EPA**---Environmental Protection Agency
- ERP**---Emergency Response Plan
- gpd**---Gallons per day
- HHS**---Health and Human Services
- JCWTP**---Jameson Canyon Water Treatment Plant
- MST**---Milliken-Sarco-Tulocay
- Mgd**---Million of gallons per day
- NBA**---North Bay Aqueduct
- NCFCWCD**---Napa County Flood Control and Water Conservation District
- NSD**---Napa Sanitation District
- NSH**---Napa State Hospital
- NVC**---Napa Valley College
- PWS**---Public Water Systems
- RWIP**---Recycled Water Implementation Plan
- SDWA**---Safe Drinking Water Act
- SWRF**---Soscol Water Recycling Facility
- Tertiary Treated Water**---Being or relating to the purification of wastewater by removal of fine particles, nitrates, and phosphates. See diagram in Appendix and full definition in section above.
- UWMP**---Urban Water Management Plan
- WWTP**---Wastewater Treatment Plant

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Appendix

Recycled Water Uses Allowed in California (East Bay Municipal Utilities District, 2009)

Treatment Level				
Use of Recycled Water	Disinfected Tertiary Recycled Water	Disinfected Secondary – 2.2 Recycled Water	Disinfected Secondary – 23 Recycled Water	Undisinfected Secondary Recycled Water
Irrigation of:				
Food crops where recycled water contacts the edible portion of the crop, including all root crops	Allowed	Not Allowed	Not Allowed	Not Allowed
Parks and playgrounds	Allowed	Not Allowed	Not Allowed	Not Allowed
School yards	Allowed	Not Allowed	Not Allowed	Not Allowed
Residential landscaping	Allowed	Not Allowed	Not Allowed	Not Allowed
Unrestricted-access golf courses	Allowed	Not Allowed	Not Allowed	Not Allowed
Any other irrigation uses not prohibited by other provisions of the California Code of Regulations	Allowed	Not Allowed	Not Allowed	Not Allowed
Food crops, surface-irrigated, above-ground edible portion, and not contacted by recycled water	Allowed	Allowed	Not Allowed	Not Allowed
Cemeteries	Allowed	Allowed	Allowed	Not Allowed
Freeway landscaping	Allowed	Allowed	Allowed	Not Allowed
Restricted-access golf courses	Allowed	Allowed	Allowed	Not Allowed
Ornamental nursery stock and sod farms with unrestricted public access	Allowed	Allowed	Allowed	Not Allowed
Pasture for milk animals for human consumption	Allowed	Allowed	Allowed	Not Allowed
Non-edible vegetation with access control to	Allowed	Allowed	Allowed	Not Allowed

Treatment Level				
Use of Recycled Water	Disinfected Tertiary Recycled Water	Disinfected Secondary – 2.2 Recycled Water	Disinfected Secondary – 23 Recycled Water	Undisinfected Secondary Recycled Water
prevent use as a park, playground or school yard				

Treatment Level				
Use of Recycled Water	Disinfected Tertiary Recycled Water	Disinfected Secondary – 2.2 Recycled Water	Disinfected Secondary – 2.3 Recycled Water	Undisinfected Secondary Recycled Water
Orchards with no contact between edible portion and recycled water	Allowed	Allowed	Allowed	Allowed
Vineyards with no contact between edible portion and recycled water	Allowed	Allowed	Allowed	Allowed
Non food-bearing trees, including Christmas trees not irrigated less than 14 days before harvest	Allowed	Allowed	Allowed	Allowed
Fodder and fiber crops and pasture for animals not producing milk for human consumption	Allowed	Allowed	Allowed	Allowed
Seed crops not eaten by humans	Allowed	Allowed	Allowed	Allowed
Food crops undergoing commercial pathogen-destroying processing before consumption by humans	Allowed	Allowed	Allowed	Allowed
Ornamental nursery stock, sod farms not irrigated less than 14 day before harvest	Allowed	Allowed	Allowed	Allowed

Treatment Level				
Use of Recycled Water	Disinfected Tertiary Recycled Water	Disinfected Secondary –2.2 Recycled Water	Disinfected Secondary – 23 Recycled Water	Undisinfected Secondary Recycled Water
Supply for impoundment:				
Non-restricted recreational impoundments, with supplemental monitoring for pathogenic organisms	Allowed²	Not Allowed	Not Allowed	Not Allowed
Restricted recreational impoundments and publicly-accessible fish hatcheries	Allowed	Allowed	Not Allowed	Not Allowed
Landscape impoundments without decorative fountains	Allowed	Allowed	Allowed	Not Allowed
Supply for cooling or air conditioning:				
Industrial or commercial cooling or air conditioning involving cooling tower, evaporative condenser, or spraying that creates a mist	Allowed³	Not Allowed	Not Allowed	Not Allowed
Industrial or commercial cooling or air conditioning not involving cooling tower, evaporative condenser, or spraying that creates a mist	Allowed	Allowed	Allowed	Not Allowed

Figure 2: 1999 Map of North Bay Aqueduct (Riesenberg, Felix, 2010)

