Californians Without Safe Water
A 2005 Update

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Executive Summary

The 1990 U.S. Census Bureau tabulates those households that consider their source of water to be shallow wells, springs, creeks, rivers, lakes, or cisterns. Some of these sources are commonly the water supply for urban water systems. However, when they are used by small communities or even individuals without proper treatment, there is an inherent risk of waterborne illness because of possible contamination from various contaminants, including urban and agricultural runoff, human activities, and human and animal wastes. A minimum of 81,251 California households may have a vulnerable source of water, according to these Census statistics.

Currently, the U.S. Census is the best available source of data, but it does not count households whose source of water does not meet water quality standards or the continued use of decrepit infrastructure.

An analysis of the 2001 Safe Drinking Water State Revolving Fund (SRF) Project Priority List[1] published by the California Department of Health Services (DHS) reveals that 249,981 Californians experience water outages caused by insufficient water source capacity; 4,077,757 residents have drinking water that is unfiltered surface[2] or well water that has fecal or *E. Coli* contamination; and 986,766 obtain water from systems with significant sanitary defects that involve sewage.

Many Californians without potable water reside in rural, poor communities. The remoteness of these communities often prohibits the option of hooking up to larger public water systems. In addition, these communities often lack guidance through the public funding maze in order to upgrade their system. Of course, some people choose to live in remote areas as a lifestyle choice; and yet others refuse sewer connections to save money.

Another concern is that of sewage disposal. In 1990, as many as 67,865 households did not dispose of their sewage by way of public sewer system, or septic tank. Cross-contamination with domestic water supplies can occur if effluent surfaces and runs off into the household's water source, or percolates into a sub-surface water source without adequate natural treatment[3]. This is a drinking water quality aspect of risk, and sanitation infrastructure should be considered a challenge in providing clean water in the state.

Action is needed to ensure that Californians have access to safe water.

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[1] DHS annually updates the SRF Project Priority List.

[2] A large number of Californians obtain drinking water that is unfiltered surface water that is nonetheless considered safe to drink (e.g., residents of San Francisco and Los Angeles).

[3] If the septic tank/leachfield is properly located, designed, constructed, and maintained, then the drinking water supply will not be contaminated.

Recommendations:

1. Reinstate the U.S. Census Bureau's long-form questions regarding "Source of Water" and "Sewage Disposal." These important questions were dropped from the 2000 Census because of lack of federal mandate or law. These statistics can assist communities in demonstrating the need for monies to improve water and sanitation facilities, especially in more risk-prone rural areas[4].

2. Analyze "Source of Water" data and "Sewage Disposal" data to locate and provide outreach to communities that may need assistance in delivering potable water to households.

3. Provide *predevelopment* funding so that poor communities can use consultants and other experts to complete technical grant forms (such as those for Proposition 50) that are beyond a community's knowledge and abilities, so that they may be successful in competing for State and federal loan and grant funds.

4. Ensure that State and federal loan and grant programs work closely with non-governmental organizations to provide outreach and advocacy to poor communities. Make certain that small, rural communities are not overlooked and are given a fair opportunity to compete for available bond monies.

5. Support the California Conference of Directors of Environmental Health (CCDEH) Land Use Committee's policy regarding "Hauled Water Not Acceptable for New Construction." Hauled water, given its inherent contamination risks, should not be allowed as an identified domestic water supply for new residential housing or commercial establishments.

6. Encourage the California Department of Health Services, Food and Drug Branch, to adopt additional requirements for hauled water.

7. While cognizant of property rights and tribal sovereign rights, new residential housing should not be sited where there is an inadequate or unknown water source. A reliable water source should be secured prior to construction, and if water is not secured before construction begins, public funds should *not* be spent to provide infrastructure. Local housing agencies should not approve construction of homes without a proven, reliable source of water.

8. Seek cooperation and dialogue between county environmental health departments, non-governmental organizations, State and federal loan and grant programs, farmers, and tribes, for assisting in the development of safe water systems for farmworkers

[4] For public water systems (15 or more service connections or serve at least 25 persons), the California Department of Health Services (DHS) and county health department surveillance programs also identify these needs. The U.S. Environmental Protection Agency (EPA) has a drinking water needs survey that is completed every four years (latest in 2003) that has demonstrated the need for monies in both rural and urban areas (Yamamoto 2005).

and tribal members. These are communities at risk due to a lack of safe water. Generally, there is limited county environmental health staffing and State Housing and Community Development staffing to provide input regarding farm-worker housing and labor camps. Local agencies have no input over environmental health issues with Indian tribes, which are sovereign nations. A cooperative dialogue will help ensure potable water for these Californian residents.

-Monique Wilber

Author's Postscript, December 2005:

In 2001, Department of Water Resources Deputy Director Jonas Minton and Statewide Water Planning Program Manager Kamyar Guivetchi requested that I research this important topic in California water. This report is not intended to be all-encompassing, but rather a starting point for dialogue and research. In that it has succeeded, with environmental justice for water resources an issue that has come to the forefront. The Environmental Justice Coalition for Water's "Thirsty for Justice"[5] and the Planning and Conservation League's "Investment Strategy for California"[6] frame environmental justice issues in California water resources. Consumer advocacy group Public Citizen's "Water for All" campaign also emphasizes protection of universal access to safe drinking water in its report "Water for People and Place."[7]

This update includes peer review comments, as well as editing, but the core data sources have not been changed. It should be noted that some of the core data such as the DHS Safe Drinking Water State Revolving Fund Project Priority List has been updated by DHS in their more recent reports, but it is not updated in this report. Other data reports which may track the topic have been brought to my attention recently, but not updated in this report, such as the compliance reports that DHS submits yearly on which water systems aren't meeting drinking water standards. This report is a snapshot in time of conditions and best data available in 2001/2002.

[5] Available at: http://www.ejcw.org/our_work/blueprint.html
[6] Available at: http://www.pcl.org/pcl/pcl_home.asp
[7] Available at: http://www.citizen.org/documents/Water-for-People_web.pdf

Section 1
Introduction

Scope of Study

This 2001/2002 study was to establish how many Californians did not have access to safe (that is, potable) water. The information was to be used in a 2003 update of the *California Water Plan*. With the water plan's publication date extended to 2005, this report was revised for format and technical issues, but still provides a "snapshot" of conditions in 2001/2002.

Document Overview

This document provides an overview of the following:

- Need for safe (potable) water in California;
- Indicators of the lack of safe water, and the methodologies of determination;
- Reasons that poor communities have more need;
- Lack of safe water for California's tribal population;
- Irrigation ditch water and hauled water issues; and
- Conclusions.

Section 2
The Need for Safe Water in California

It is one of the most basic human needs: water. Safe water is needed for human consumption to prevent dehydration, to provide water for cooking, and for hygienic and sanitation needs.

Potable water is, simply said, drinkable water. It is water that meets water quality standards and does not contain harmful amounts of microorganisms, sediments, or chemicals. It is water that is not contaminated at the source, or is appropriately treated, brought into a home, and not further contaminated by residents' unsafe water practices.

Some people in California do not have a safe source of water or sanitation facilities (U.S. Census, 1990). These people have a "vulnerable water supply." A vulnerable water supply can result in a higher incidence of disease. The Centers for Disease Control and Prevention (CDC) estimates that more than 2 billion people in the developing world are at risk for contracting waterborne diseases, and in the United States, those living in poverty in remote rural areas are also at risk. This includes California communities.

Waterborne diseases are a prime concern of vulnerable water supplies. These diseases produce symptoms of acute diarrhea and prolonged feverish illnesses with abdominal symptoms. For instance, due to untreated water, the hepatitis A virus, *salmonella*, and *shigella* have caused waterborne illness in young children living in poor urban areas in Texas (Leonard *et al.*, 1996). In addition, kidney failure can be caused by *E. coli,* which can be found where human or animal feces contaminate surface water sources. *Giardia*, a microscopic parasite that is also a fecal-related contaminant, has become one of the most common causes of waterborne disease (giardiasis) in humans in the United States. In recent years, outbreaks of cryptosporidiosis have been linked to the public drinking water supply (CDC, 2004). Contaminated surface water is a source of these illnesses, but filtration and disinfection, and safe water-handling practices can help reduce the risks.

U.S. Census data can be used, but with uncertainty[6], to indicate people at risk of waterborne illness—that is, those who often obtain water from untreated surface water sources such as rivers, lakes, and some springs. These people may also have shallow dug wells, which can become contaminated from rain runoff or flooding[7]. Other risky situations include households with inadequately treated water, or leaks or breaks in piping that may introduce microorganisms, or personal storage of water. In areas where the community runs short of water or has a contaminated supply, residents may obtain water from hauled-water tankers, or outdoor water spigots, and store their water in drums in the home. Such storage when combined with unsafe

[6] U.S. Census data is based on individual responses to questionnaires, which can be misleading. Caveats on this uncertainty are discussed in Section 3.3.

[7] Deep wells can also become contaminated when the construction and maintenance of the well is not properly done, but this is uncommon.

water-handling practices may contaminate the water. These practices consist of using water containers that are not disinfected; using hands and utensils to retrieve water; and using uncovered, unlined, wide-mouthed containers or drums that may not be of food-grade quality. Lack of water also contributes to poor personal hygiene such as reduced hand and body washing that can spread pathogens. Households without water connections also may not have sanitation facilities. They may use a bucket as a toilet and improperly dispose wastes, thereby causing an unsanitary condition due to flies, rodents, and other disease vectors that these conditions promote.

Besides vulnerable water supplies, inadequate sanitation facilities pose potential health hazards. Septic tanks that do not properly leach effluents into the soil[8] can lead to the surfacing of raw sewage. Septic tanks sited in soils or geologic formations that do not provide adequate treatment of wastewater as it passes through the soil can result in contamination of groundwater supplies.

[8] This is the process by which household sewage is strained and cleaned by soil before entering the aquifer

Section 3
Counting Californian Households

Census Data Indicators

Determining the number of California households lacking access to safe water is difficult, as data sets are not mutually inclusive, and document different standards of clean water, such as piping into the home, water source, water quality, treatment of water, existence of cross connection, and water infrastructure.

One source of data that indirectly tracks potable water supply is the U. S. Census Bureau. In its decennial census count, the Census Bureau asked people if their housing unit had complete plumbing facilities. A complete plumbing facility must have all of the following: hot and cold piped water, a flush toilet, and a bathtub or shower. The lack of complete plumbing facilities can be an indicator of substandard housing.

Although this Census question is important to public interest groups evaluating quality of life data, in particular substandard housing, it has been considered but not used for the purposes of this report. The Census data do provide an indicator for households without access to potable water, but the issue is more complex. The problems with decaying infrastructure and cross contamination in urban distribution systems for sewage and water must be addressed and are not reflected in the Census counts for complete plumbing facilities. Houses with "complete plumbing" may have an unsafe water source, and conversely, those with "incomplete plumbing" may have safe and potable water. It may be misleading to generalize that shared bathroom facilities in a building with many occupants means that the residents lack potable water. The lack of hot and cold water, flush toilet, and a bathtub or shower does not mean that the residents have no access to potable water.

Although not complete, a better data source for indicating the number of California households that may be without safe water is the U.S. Census Bureau questions regarding "Source of Water" and "Sewage Disposal." Households were questioned whether their water came from a public system or private company, an individual-drilled well, an individual-dug well, or other sources like springs, creeks, rivers, lakes, and cisterns. Households were also asked if the housing unit's sewage was disposed by a public sewer, a septic tank or cesspool, or by other means. Answers to these questions were self-reported by residents, which suggests data quality issues. Some residents may have misreported their water source or sewage disposal type due to ignorance or disregard. At this time, however, Census data appear to be the best source of information. Again, these Census data are being used as indicators, rather than evidence.

Although answers to the Source of Water and Sewage Disposal questions can indicate a potentially vulnerable water supply, they do not address decaying infrastructure or dubious water quality. For the purposes of this report, "vulnerable source water"

supplies are those from shallow wells, springs, creeks, rivers, lakes, and cisterns. The exposed nature of these sources increases the risk of waterborne diseases if the water is not treated properly. If treated properly, water from these sources may be acceptable for human consumption. In addition, if properly developed and protected, the quality of spring water, for example, can be like that of groundwater. If not properly developed and protected, though, additional treatment such as filtration and disinfection may be needed. Finally, although these Census indicators appear to be the best source of data, they are not completely unassailable. Even water from deep wells may be contaminated with arsenic, perchlorate, methyl tertiary-butyl ether (MTBE), or any other naturally occurring mineral or manufactured chemical.

Advocacy Organizations

Other sources of data come from advocacy programs. Advocacy programs are involved in measuring access to potable water for under-represented populations, but their work is done on a limited, regional basis. Advocacy programs also assist poor communities in obtaining funds.

Examples of California advocacy programs include the United Farm Workers of America (UFW), Self-Help Enterprises (SHE), and Great Northern Corporation.

The UFW has also tracked farm workers in California without access to potable water. Funded through a U.S. Environmental Protection Agency (EPA) grant, UFW gathered information in 2001 about a lack of potable water in farm worker communities. In Section 4 of this report, Community Case Studies details some of UFW's findings.

Self-Help Enterprises (SHE) of California assists rural low-income communities in the San Joaquin Valley of California with housing and community development needs. SHE's Community Development employees work with these communities to obtain safe drinking water and sanitary sewage disposal. Work includes helping community boards, public and private agencies, and residents to develop community water and sewer systems, conducting community surveys, preparing funding applications for new and improved systems, coordinating project work, and monitoring construction. In Section 4, Community Case Studies details some of SHE's experiences in working with vulnerable communities.

Great Northern Corporation in Weed, California, assists communities in need to obtain funding for their water and sewage disposal projects. GNC's projects are listed in Section 4, Community Case Studies.

The federal Bureau of Indian Affairs assists tribal communities in need through its Sanitation and Facilities Construction (SFC) program, which is charged with providing essential water supply and sewage disposal facilities for American Indian homes and communities. The SFC counts the number of homes within a tribal community that lack potable water, or that have serious deficiencies in water supply

or sanitation. In Section 5, Tribal Potable Water and Sanitation Deficiencies discusses tribal water issues.

Counting California: 1990 Census Data

The most recent data available from the Census for "Source of Water" and "Sewage Disposal" are from 1990. These questions were dropped from the 2000 Census, reportedly for lack of federal mandate.

1990 Census figures show that 31,932 housing units in California obtained water from shallow wells, which may be at risk for contamination from stormwater, sewage, fertilizers, and pesticides. Another 49,319 housing units in California obtained water from some source *other than* shallow wells, drilled wells, or public or private water systems. This implies a "vulnerable water supply"[9] if the residents are consuming untreated surface water, which can lead to a higher incidence of waterborne disease. If so, 81,251 California households may be at risk and living with a vulnerable water supply[10]. A 1984 EPA study of national rural water conditions found that total coliform bacteria, an indicator of contamination, were present in the water supplies of 78% of households that use such untreated sources such as cisterns, springs, rivers, and lakes (EPA, 1997). The Census data also illustrate that 67,865 housing units in California disposed of their sewage by means other than a public sewer, septic tank, or cesspool[11], which could mean that residents use pit privies and outhouses, as well as composting toilets.[12][13]

[9] A "vulnerable water supply" is defined as a source other than drilled wells, or public or private water systems. Surface water from springs, creeks, lakes, irrigation ditches or dug wells, as well as hauled water stored in cisterns or drums are susceptible to contamination.

[10] A problem with using Census data is that due to the way that the question is framed to residents, statistics are obtained on only some of the households who do not have safe drinking water. Public water system water is not inherently "safe". There are many public water systems that do not filter their surface water supply, but just disinfect, and "boil water" orders are in place. In addition, there are other water systems who filter their surface water supply, but do not meet all the treatment requirements and therefore the drinking water may not be safe at all times (Yamamoto 2005).

[11] Cesspools are not considered a sanitary method of disposing of sewage. Cesspools may contribute to surface water contamination.

[12] It could also mean, of course, that the resident who answered the Census questionnaire was ignorant of where their wastewater goes.

[13] Author's note, 2005: In retrospect, the interpretation of Census data as presented could be misleading, so a caveat: In interpreting the Census data, missing could be a full understanding of the Census process and what the data can mean. Enumerators go everywhere to ask these questions, not just the places where people are supposed to be.

For example, in urban areas:

- Squatters in abandoned buildings (houses, commercial buildings, old hotels, apartments, etc.) may not have access to potable water or sewage disposal simply because those services are no longer being provided; and
- A homeless person in a tent, shanty, shelter, or emergency housing is also going to lack access to such facilities.

In more rural areas, the Census also considers housing as the following:

- Occupied shanties and structures built illegally on public lands that do not have an "approved" water or sewage system because they are working very hard at "flying under the radar";
- Class K housing, [14] that is a legitimate lifestyle choice, and where the source of water and method of sewage disposal is a part of that choice; and
- Migrant populations (e.g., farm workers) where the choice of what is used as housing can be driven by economic and other factors. For instance, it is not unusual to find that migrant workers in rural areas will occupy just about anything with walls and a roof (e.g., abandoned buildings, old barns, sheds, etc.). In regulated facilities (e.g., labor camps under the employee housing act), certain communal facilities are allowed by law, but would nonetheless still be characterized as "vulnerable" for purposes of this report.

There are significant problems where households are using individual water and sewage systems that are inadequate, but is it possible to separate these out of the summary Census data? Making the jump from how individual questionnaires are completed to a characterization of the status of legitimate housing stocks has the potential to be very misleading (Wilson, 2005).

"Vulnerable" Sources of Water

The Census allows us to look at data at different levels. County-level data and Census Designated Place (CDP) data give direction to problem areas in the state. In this report, the data are analyzed two ways. One way to discern the data is to look at the actual number of housing units; the second is to compare the percentage of housing units with a vulnerable supply by the total housing units in the county or CDP. [15]

The county with the most housing units with a "vulnerable" source of water (as footnoted in Counting California: 1990 Census Data above) is Mendocino with 6,050. Following Mendocino are the counties of Humboldt (5,548), Sonoma (4,569), San Bernardino (4,095), and Los Angeles (3,875). Reviewing the top 20 counties in this category reveals a mix of rural, urban, and farming counties.

[14] "Class K" housing standards are built to be owner-occupied, with a relaxed building code that allows alternative lifestyle choices and affordable housing. People may haul in water, or pipe in surface or spring water. Sewage disposal may consist of composting toilets, pit privies, or other non-conventional means of disposal. Class K housing standards generally apply in certain remote, rural areas of California.

[15] Please refer to the Appendix for appropriate tables.

When looking at the percentage of housing units with a vulnerable supply in a county, rural counties overwhelmingly dominate the top 20 counties. In order, the top five counties are Trinity (37.72%); Sierra (18.79%); Mendocino (17.98%); Humboldt (10.85%); and Alpine (10.39%).

Some homes built in the 1970s and 1980s in remote rural areas (with low population density) were built to "Class K" housing standards. Built to be owner-occupied, the relaxed building code allows alternative lifestyle choices and affordable housing. People may haul in water, or pipe in surface or spring water. Currently, Mendocino County is the only California county still approving Class K housing. This type of housing may well represent the high rural percentages of housing units at risk, but the higher risk may be a lifestyle choice by the residents living there, rather than a socio-economic issue.

In some of these counties, there are significant issues with non-standard housing that are not recorded – such as recreational vehicles, trailers, shanties, and shacks. Some occupants may be squatting on federal public lands. In urban areas, squatters may exist on private property. Census data may consider where people actually are, without consideration of where they are not supposed to be.

When looking at particular places in California, the CDP data is beneficial. By housing units, urban cities and rural towns appear to share the top 20 equally. They are Los Angeles (1,003); Hayfork – in Trinity County (306); Westhaven/Moonstone – in Humboldt County (185); Fresno (179); and Sacramento (179). Compared by percentage, though, the top five CDPs with vulnerable water sources are all rural. In first place is Westhaven/Moonstone (39.11%), followed by: Hayfork (27.10%); Lewiston – in Trinity County (21.68%); Klamath – in Del Norte County (18.40 %); and Covelo – in Mendocino County (16.70%).

Sewage Disposal

In terms of absolute numbers, urban counties outrank rural counties when analyzing the housing unit data, even though the number of housing units with "vulnerable sewage disposal" are only a small percentage of the total housing units in urban areas. The high urban numbers may be attributable to overcrowding in metropolitan areas, where housing costs are high. Conversely, the remote rural counties tend to have a higher percentage of their housing units at risk due to the small number of total homes.

For "vulnerable sewage disposal"[16], the top five counties (by housing units) are Los Angeles (26,354); Orange (3,281); San Bernardino (3,184); San Diego (3,145); and Santa Clara (2,087). By percentage, the top five counties are Trinity County (7.41%); Alpine (7.20%); Mendocino (3.84%); Lassen County (2.56%); and Humboldt County (2.54%).

[16] "Vulnerable sewage disposal" is defined as disposal of sewage by means other than a public sewer or septic tank.

As with the source of water data, the sewage disposal data may be influenced by Class K housing codes in the rural counties. People seeking alternative lifestyles may believe that water carriage of sewage is a waste of a natural resource and opt for pit toilets or some form of dry composting toilet. They may be at higher risk, but it is by choice. Like the source of water data, there are non-recorded, non-standard housing units that likely were not counted. In addition, the higher urban numbers reported below depend on residents' answers to Census questionnaires. Ignorance of wastewater disposal, homelessness, and squatting may make Census numbers questionable.

Reviewing data on a finer scale (by CDP), Los Angeles city ranked first with vulnerable sewage disposal with 10,252 housing units; then San Jose city (1,401); Long Beach city (1,353); San Diego city (1,249); and San Francisco city (1,224). This can be explained by the volume of housing numbers involved because of the large amount of housing in these cities. Rural and urban places intersperse the list of vulnerable sewage disposal by percentage. At the top of the list is rural Piru, in a farming area of Ventura County (8.62%); Concow in Butte County (6.20%); Florence/Graham in Los Angeles County (5.67%); Las Lomas in Monterey County (5.63%); and East Compton in Los Angeles County (5.57%).

Water Quality Data

The California Department of Health Services issues yearly a Project Priority List for disbursement of monies of the Safe Drinking Water State Revolving Fund. The 2001 report (the most recent for purposes of drafting this report) inventories the public water systems that applied for funds to upgrade their systems, as well as populations served, monies needed, and category of system issues[17]. Many of the systems are duplicated on the list, as they have more than one need, and a summary of population well exceeds—in fact, almost doubles—California's current population. Some of the very large population numbers are attributable to large urban systems. This list also does not include public water systems that may not have known how to best apply for funds. With those caveats in mind, however, the list does provide some insight into the magnitude of some of the more pressing water quality issues in California, by category, as presented in Table 3.1.

[17] There is also a DHS Prop 50 Project Priority List.

Table 3.1
Safe Drinking Water Revolving Fund 2001 Priority List Summary

Category	Population served	Costs
Repeated coliform bacteria maximum contamination	41,522	$25,585,171
Unfiltered surface water or wells that have fecal or *E. coli* contamination	4,077,757	$284,311,710
Filtered surface water that violates the surface water filtration and disinfection regulations	739,158	$58,809,116
Insufficient water source capacity resulting in water outages	249,981	$66,076,936
Nitrate/nitrite contamination exceeding the maximum contaminant level (MCL)	584,079	$70,175,534
Chemical contamination (other than nitrate/nitrite) exceeding a primary MCL	703,072	$42,663,732
Uncovered distribution reservoirs and low-head lines	18,717,968	$183,035,187
Significant sanitary defect involving sewage	986,766	$92,725,027
Disinfection facilities that have defects	4,402,120	$39,969,000

Derived from: California Department of Health Services (DHS), Safe Drinking Water State Revolving Fund, April 2001 Multi-Year Project Priority List

(Author's note, 2005: Future researchers would likely include infrastructure needs in their total, but it is not listed in this report.)

Section 4
Meeting the Water Needs of Economically Disadvantaged Communities

Infrastructure Challenges

Providing safe drinking water now and in the future will depend on investment in infrastructure. The EPA estimates that more than $76.8 billion is needed to protect public health in the United States. In 1997, EPA estimated that the total need for the following 20 years was $138.4 billion (EPA, 1997)[14].

The largest infrastructure need is installation and rehabilitation of transmission and distribution systems. These are critical in protecting the public from microbiological contamination caused by leaking or broken pipes. A major problem is cast iron or galvanized steel pipes that are disintegrating due to corrosion and old age (Yamamoto, 2005). In a few instances, communities are living with water mains that were installed when the community was built; some communities have wooden mains, which have been in service for more than 100 years.

Another infrastructure need is treatment. According to the CDC, surface water in the United States is considered safe to drink only if it has been adequately treated. Systems treat contaminants that can cause acute and chronic health effects, as well as taste and odor problems.

Storage is the third largest infrastructure need, according to the EPA. Elevated storage helps prevent backflow contamination by providing positive water pressure, as well as enhancing supply during peak usage. In many small water systems, though, ground level storage does not provide enough pressure to effectively prevent backflow conditions. Thus, with ground level storage, pumping provides the pressure, and these pumps need proper rehabilitation, replacement, and maintenance to provide pressure and assure water delivery (Yamamoto, 2005). Storage rehabilitation is required for structural integrity, and cleaning is needed to prevent contamination.

Source rehabilitation and development is the fourth infrastructure need, and is necessary for systems to provide adequate quantity and quality of drinking water (EPA, 1997).

Some communities that need infrastructure investments have small water systems, which serve up to 3,300 people each. While larger systems and cities also have infrastructure needs, they have more money available to them due to the number of users. With both small and large systems, the lack of adequate funding for

[14] 2005 update: The 2003 EPA Drinking Water Needs Survey indicates that the 20-year need is $276.8 billion. Available at: http://www.epa.gov/safewater/needs.html

maintenance may result in water main breaks and other aging infrastructure problems.

Water Quality Challenges

Many rural water systems are hooked up to community wells. Individual homeowners are hooked up to private wells. Most wells provide potable water. Some, however, are contaminated by arsenic, nitrates (from fertilizers or sewage disposal), and microorganisms. New wells require a well permit before well drilling. Private wells are generally not regulated for water quality, often only tested for water quality immediately after being drilled.

Funding Challenges

Small systems have higher than average per-household costs. This is because, in some instances, the water system must pay for major capital improvements, and there are few people to share the cost. Many small water systems do not reserve funds for replacement costs, and mutual water companies are limited to the amount of money they can set aside for future costs. This leads to poor facility conditions and the need for assistance to supply safe water (Yamamoto, 2005). These small systems frequently are located in rural areas with low-income levels. The remoteness of these communities prohibits the cost-saving option of hooking up to large public water systems. In addition, these communities often have no guidance through the public funding maze to get money for system upgrades.

Small rural systems may face a special challenge in trying to pay for improvements to meet potable water standards. Because of the relatively small size and low income of their communities, they do not have the rate base enjoyed by higher-population urban areas. Some suggest that this is a "social justice problem" because in the past, public programs have politically supported large urban water system compliance with drinking water standards, leaving little or no money for rural areas. Potential competition between medium and larger agencies for limited public funding further increases the chances that rural communities have little or no resources to compete for funds.

Small rural systems also face technical challenges in applying for grants and loans. A 2005 review of Proposition 50[15] Step I and Step II grant requirements require technical, scientific, economic, environmental, and engineering expertise for response. In general, poor communities do not have the expertise to apply for these grants, nor do they have the funding to hire a consultant to prepare a grant for them.

[15] In November 2002, California voters passed Proposition 50 (the Water Security, Clean Drinking Water, Coastal & Beach Protection Act of 2002), which provided funding, sometimes on a competitive basis, to water systems.

U.S. Department of Agriculture

Several programs offer grants and loans. One source of funding is the U.S. Department of Agriculture (USDA), which has provided grants and loans to rural communities. Table 4.1 gives a snapshot of grants and loans awarded for water quality projects in 2000. This funding table is illustrative of needs in California counties.

Table 4.1
USDA FUNDING: WATER AND WASTE DISPOSAL SYSTEMS FOR RURAL COMMUNITIES IN CALIFORNIA, FISCAL 2000

County	2000 Census population	Grants*	Direct loans
Butte	203,171	329,000	1,733,000
Calaveras	40,554	300,000	100,000
Fresno	799,407	4,000,000	1,000,000
Imperial	142,361	725,000	0
Kern	661,645	878,500	406,950
Kings	129,461	225,000	1,090,100
Madera	123,109	20,000	1,567,883
Mariposa	17,130	80,310	0
San Bernardino	1,709,434	152,000	228,000
San Diego	2,813,833	147,000	100,000
Santa Barbara	399,347	1,015,600	1,472,400
Shasta	163,256	650,810	2,542,390
Siskiyou	44,301	2,283,850	735,950
Stanislaus	446,997	0	4,525,000
Tehama	56,039	620,620	625,000
Trinity	13,022	501,485	0
Tulare	368,021	2,596,290	2,632,097
Yuba	60,219	1,000,000	2,604,030
Totals		**$15,525,465**	**$21,362,800**

*Grants (block grants, formula grants, project grants, and cooperative agreements)
Source: USDA

Community Case Studies

United Farm Workers of America and Self-Help Enterprises

The United Farm Workers of America (UFW) received funding in 2001 from the EPA to conduct a field survey titled "Farm Worker Safe Drinking Water Program." The survey focused on the availability and quality of water primarily for Central Valley farm worker communities. UFW made personal contact with many small communities to determine what their water and sewer needs were, and to assist them with finding funding to improve their access to potable water.

Self-Help Enterprises (SHE) of the San Joaquin Valley was founded in 1965, principally for the purpose of helping rural low-income families build their own homes. SHE's goal is to provide technical assistance to low-income families and farm laborers needing aid with self-help housing, sewer and water development, housing rehabilitation, multi-family housing, and homebuyer programs. Its Community Development unit supports these communities in developing adequate and affordable drinking water and wastewater systems.

SHE and UFW have been working since the 1970s in assisting low-income families in the Central Valley. Both UFW and SHE have found that their constituencies lack the knowledge of available grant and loan programs to apply for monies that could support the water and sewer infrastructure changes needed in their communities. In some cases, communities have not been selected for Proposition 13 funding because they did not have enough of their own funds to provide, for example, an adequate cost-benefit analysis or quantification of their system leaks. According to SHE and UFW, one such example is Alpaugh, California.

***CASE STUDY:* ALPAUGH**

Alpaugh is in Tulare County in the Central Valley of California. It is a poor community, with 38% of the population living below the poverty line. Among the community's water challenges:

- Five houses have burned down because there is not enough water pressure for the local fire station to put the fires out;
- Hydrogen sulfide levels in the water are high, resulting in a "rotten egg" odor;
- The three-inch pipeline is old and made of asbestos cement pipe;
- Low-pressure conditions exist, partially resulting in intermittent coliform bacteria readings;
- Source water is exceeding both existing and future arsenic level standards;
- Alpaugh Irrigation District has filed for bankruptcy.

Author's Note 2005: This information was a snapshot of information available in 2002; conditions have since changed.

In addition, Proposition 50 funds have generally not been available to these types of communities, as the language of the funding is not geared to small, rural communities without a water district. That is, if the community is unincorporated, there is often no institutional infrastructure in place to provide support.

***CASE STUDY:* PLAINVIEW**

Plainview is another community receiving assistance from UFW and SHE. This area has an old pipeline system from the 1940s era, and half of the original pipes were formerly oil pipelines. There are two wells, one of which exceeds the maximum contaminant levels for nitrate, DBCP, and at times, coliform bacteria. Indeed, when workers repair the old pipes, they are working in mud that is contaminated with gray water and septic tank overflow. This is a town in need; over 90% of families are defined as low-income, and the average annual household income is $12,000.

Workers in Plainview often work in mud that is contaminated by sewage effluent.

Problems often occur because of the community's derelict infrastructure, which includes water delivery pipes interred in the 1940s, and previously used as oil distribution pipes.

Plainview Workers Courtesy of Paul Boyer and Aidan Poile, Self Help Enterprises, Visalia

***CASE STUDY:* REXLAND ACRES**

Rexland Acres, southeast of Bakersfield in Kern County, is trying to get funding for a sewer system. The community has 688 houses and commercial buildings that are affected with a high percentage of failing septic systems (see photo). These failing drainfields, in combination with deep seepage pit disposal, have contaminated the water supply with microorganisms and nitrates. Three Rexland Acres community wells have been closed due to a doubling of nitrates and microbial contamination in the last 20 years. SHE estimates that it will cost $5.9 million dollars to rectify the crisis.

Many rural communities have problems associated with failing septic drainfields, and sewage surfacing in yards. This lack of wastewater infrastructure is alarming due to possible cross-contamination issues with potable water, as well as the "yuck" factor.

Surfacing effluent, Rexland Acres Photo by David Warner, Self-Help Enterprises, Visalia

***CASE STUDY:* TOOLIVILLE**

The UFW reports that the community of Tooliville, located in the Central Valley, has had their well condemned due to unsafe level of nitrates, and the residents have been advised to buy their drinking water. They also need improvements to their water distribution system, which may improve the quality of the water by making it a fully circulating system with no place for water to stagnate.

Advocacy Projects

Advocacy groups help communities in need to obtain State and federal funding. The following tables illustrate some of the neediest communities that are receiving assistance from advocacy groups that were interviewed by the author, but these tables do not represent the total need in California. The information, however, is representative of the type of need that is prevalent.

Self-Help Enterprises

Table 4.2 highlights some of SHE's projects in 2002 that were awaiting funding at the time of the author's interview.

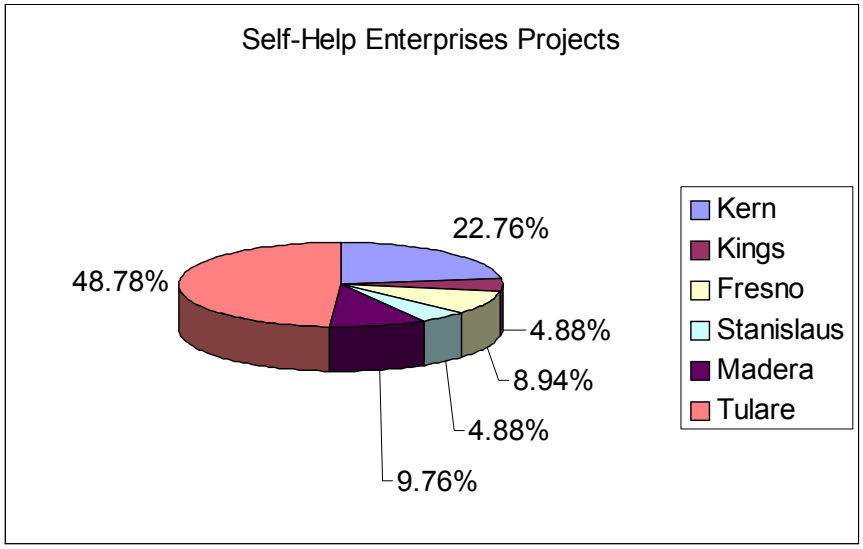
Table 4.2
Self-Help Enterprises Water & Sewer Projects 2002

Community	Project type	# Housing units	Problem	Funds needed
Merced County				
Planada	Sewer	1,000	Meeting discharge requirements	unknown
Fresno County				
Biola	Water	255	Dibromochloropropane (DBCP)	$545,000
Raisin City	Water	82	Multiple contaminants	$832,000
Tulare County				
Alpaugh	Water	200	Arsenic, bacteria, low pressure	$2,597,000
Burnett Street	Water	11	Outage-temp connection	$270,000
Ducor	Water	150	Lack of water	$500,000
Fairway Tract	Water	63	High nitrates, leaky lines	$308,800
Lemon Cove	Water	50	High nitrates	$100,000
London	Water	400	Low pressure, leaky lines	unknown
Pixley	Sewer	650	Cease and desist order	unknown
Plainview	Water	200	High nitrates, leaky lines	$922,400
Kern County				
Aerial Acres	Water	80	Future arsenic	unknown
Rexland Acres	Sewer	688	Failed septic systems, nitrates & bacteria in groundwater	$5,900,000
Buttonwillow	Water	420	old lines, storage, supply	unknown
Rancho Seco	Water	25	Old pipes, storage	$ 200,000+
Plainview	Water	214	Old service lateral failures in street	$ 30,000+
Lands of Promise	Water	60	Old pipes, storage being acquired from State, future arsenic	unknown
Rainbird	Water	83	Nitrates, uranium	unknown
Casa Loma	Water	215	Perchlorethylene (PCE), future arsenic	$ 50,000 to $500,000

Source: Self-Help Enterprises 2002

The pie chart below shows past and present community water and sewer projects assisted by SHE in the San Joaquin Valley and funded by USDA/Rural Development, Community Development Block Grants, and other State, federal, and private funds, as a percentage by county. Tulare County has the highest number, with 48.78% of all projects, followed by Kern County with 22.76%. Figure 4-1 is representative only of SHE's projects, not California in total.

Figure 4-1 Self-Help Enterprises Projects by Central Valley county



Source: Self-Help Enterprises 2002

Great Northern Corporation

Located in Weed, California, Great Northern Corporation assists projects generally north of Redding and into Oregon, and east to the Nevada border. GNC has assisted communities with water and sewer development and other community needs since the 1970s. The primary problems are failing infrastructure installed 40 to 50 years ago, although progress has been made in the past 17 years with bond money provided by the State to help the communities. Table 4.3 shows projects that GNC was working on in 2002.

Table 4.3
Great Northern Corporation Community Assistance Projects 2002

Community	Project Type	# Housing Units	Problem	Funds Needed
Mt. Shasta	Water		Water supply problems. Developing water conservation program.	unknown
Edgewood	Water	100	Bad water quality. High groundwater tables. An irrigation ditch surrounds the town, and when it is filled, causes problems to individual shallow wells and failing septic fields.	unknown
McDole/Mt. Hebron	Water	150	On individual wells, with history of plumes of pesticide in groundwater.	unknown
Newell	Water	350	Old internment camp built for 250,000 population. Water system is failing, problems with leaks, tanks, and pumps	unknown
Sawyer's Bar	Water	50	Logging community 30 miles from nearest town. Treatment plant failed and they have distribution problems. They are using surface water.	$36,000
Montague	Water	600	They obtain water through surface water flowing through irrigation ditch. They have a good treatment plant, but want to get on well water.	$100,000
Callahan	Water/ Sewer	37-50	They obtain raw water out of creek. Treatment plant failed. Need funds to drill well, difficulty finding water as they are drilling in lava flows, water is vertical rather than horizontal, hit or miss.	$750,000
Weed	Water		Distribution problems	$1,000,000
Weed area	Water		Private system is collapsing. Hook up to Weed system and drill new well.	$1,200,000
Grenada	Water/ Sewer		Private system has major leaks. Sewer and water lines in the same ditch, when they both leak, it depends on pressure as to which infiltrates the other.	$1,600,000
McCloud	Water		Distribution system needs rehabilitation. Leaky, some wooden pipes. Pressure changes cause things (such as lizards) to get sucked in.	$2,500,000

Source: Great Northern Corp., 2002.

UFW, SHE, and GNC are just three of the many community advocacy groups dedicated to helping disadvantaged communities obtain water and sewer improvements. The data presented above should not be viewed as complete. More advocacy groups, and many more small communities in California, trying to obtain water and sewer infrastructure rehabilitation and construction funding are not listed.

Section 5
A Focus on California's Native American Population

Tribal Potable Water and Sanitation Deficiencies

Because tribes are sovereign governments, California has no role in tribal water quality issues; U.S. EPA is their regulatory agency. However, conflict arises when tribes ask for access to State drinking water funds, but their water systems do not meet State requirements, which is a condition for access to the funds. The following discusses tribal potable water and sanitation deficiencies, but not the political issue.

American Indian tribal communities are vulnerable to housing deficiencies, which include access to safe water. The lack of infrastructure on tribal lands can be a result of low socio-economic conditions of the tribe or of the terrain the homes occupy. These deficiencies are of concern to the federal Indian Health Service (IHS) program, whose objective is to protect the health of American Indians. Federally recognized Indian tribes are sovereign nations, but many of the tribes are poor, and tribal members are still residents of California.

Most American Indian households on tribal lands have access to potable water, but some households are at risk of unsafe water. As with other rural California residents, the households may use buckets to retrieve surface water from springs or creeks, which is then hauled back to their homes. Others may use a pipeline that they lay into a creek, and the untreated water is then gravity-fed back to their house or trailer. Still others may use a community spigot or well, but still need to bring the water into their dwelling by means of a bucket. Many communities have failing septic systems that allow raw sewage to seep to the surface.

As discussed earlier, the costs of providing infrastructure to connect housing to potable water, or to repair deteriorating systems that compromise water quality and supply, are staggering to small, low-income communities. Some example projects from the California offices of the IHS were reviewed in 2001. Costs ranged from $10,000 to provide sewage treatment to $7.20 million to install a community sewage system to prevent septic tank failures. In the North Coast Hydrologic Region, $2.42 million could treat communal spring surface water for 32 homes, and guarantee a water supply in the late summer months when the community lacks a sufficient quantity of water. In Humboldt County, IHS estimated that $245,000 can provide homes with well and septic systems.

A number of American Indian homes are without water because of their location. Some housing is in remote, steep, and wet areas of the North Coast. These areas have slippery and remote terrain and are difficult to access and hard to serve. There may be community water systems on the reservation, but the higher, remote homes lack electricity to pump water uphill and provide enough pressure. The Sanitation Facilities Construction (SFC) Program of IHS reviews requests from tribes regarding

their water and sewage system problems. IHS has determined that correcting water and sanitation systems for tribal community members will result in a reduction of disease and reduce impacts on medical services needed. The IHS estimates that there has been a 91% decrease in gastrointestinal disease death rates among American Indians and Alaska Natives in the past 33 years, with the major factor being the SFC Program (IHS, 2000).

The SFC Program will send an engineer to review the water and sanitation deficiencies once a request is received, and the project will be evaluated and rated according to the extent of services lacking. A deficiency level of 5 is most severe, usually meaning that there is no water piped in or the supply is inadequate. A level 4 suggests potential health threats, such as inadequate piping, or water that does not meet quality standards, such as surface water supplies that are untreated. Level 3 is generally a maintenance problem, and includes overflowing septic fields.

In 2002, there were 370 Native American homes in California that had no potable water at all. Another 7,122 homes were rated a level 4 or 5, with inadequate water service that could pose a health risk. These ratings are given a priority. Another 5,523 homes qualified for a level 3 rating. A list of all of these sanitation needs goes to Congress and IHS requests funding. Funds generally come from EPA, USDA Rural Development, and the Department of Housing and Urban Development (HUD). The California IHS office estimates that they will receive $2.3 million dollars in funding, with an unmet need of $33.847 million in 2002 (IHS, 2001).

Due to funding limitations, the SFC cannot complete all needed projects. Projects are chosen according to critical need, economic feasibility, and the ability of SFC to put in a project that meets water quality standards. IHS works cooperatively with the tribe to construct sanitation facilities such as wastewater treatment plants, septic drainfields, and bathroom additions to homes. In addition, the SFC installs stand pipes, water towers, water service lines, and wells to provide potable water to homes. Tribal members can take classes from the SFC through the Tribal Operator Certification Program to learn the operation and maintenance of water systems.

According to IHS, then, a total of 7,492 Native American homes with inadequate potable water service existed in California in 2002. Because of funding constraints, the majority of these people will be unable to turn on the tap to receive potable water on demand – something that most Californians take for granted. Table 5-1 illustrates the need of Californian Native Americans for safe water and sanitary sewage disposal.[15]

[15] Deficiency Levels: 5 = Severe deficiency, no piped-in water, or supply is inadequate.
4 = Potential health threats, i.e. inadequate piping, water not meeting standards, or untreated water.
3 = Maintenance problems, including overflowing sewage systems.

Table 5.1
2001 Indian Health Service Sanitation Deficiencies

Community	Funding needed	Deficiency level	Problem
Humboldt County	$245,000	5	10 homes with no water or no sewer.
Dry Creek Rancheria	$ 78,000	4	Water shortages in the summer months. Out of water 60 days per year.
Greenvale Rancheria	$100,000	4	Well and creek source, pumphouse, pressure tank. System is poorly designed and fails frequently. Surface water source with no treatment.
Grindstone Indian Rancheria	$500,000	4	Surface water supply does not meet Surface Water Treatment Rule and will not meet upcoming water quality standards.
Hoopa Valley Reservation	$100,000	4	3 homes on contaminated wells hauling water; 5 homes without adequate sewer systems.
Hoopa Valley Reservation	$250,000	4	Surface water supply will not meet Interim Enhanced Surface Water Treatment Rule (water quality standards).
Hoopa Valley Reservation	$250,000	4	20 homes on contaminated wells or hauling water.
Hoopa Valley Reservation	$320,000	4	Well is under the influence of surface water, intermittent high iron and manganese, water outages 6 times per year due to breaks.
Hoopa Valley Reservation	$750,000	4	Community water systems including filtration and disinfection. Redwood storage tanks in disrepair.
Hoopa Valley Reservation	$2,420,000	4	Individual and communal spring surface water sources for 32 homes. Untreated sources, insufficient quantity in late summer.
Karuk Tribe	$850,000	4	Pressure filter treatment system. Is not meeting current or upcoming turbidity standards during storm events.
Karuk Tribe, Redding	$250,000	4	Untreated surface water supply.
Laytonville Rancheria	$2,466,000	4	Existing arsenic in well at 60 ppb. Additional storage required for fire flows. Miscellaneous water system improvements.
Santa Rosa Reservation	$ 60,000	4	New DHUD home with no water. Well attempted and failed. Need to connect to community water system approximately one mile.
Smith River Rancheria	$395,000	4	Failing intake, water mains old and leaking, supply inadequate (10 days/year out of water), redwood tanks unsanitary and need replacing.
X-L Ranch Reservation	$400,000	4	Two community systems do not meet upcoming standards. One community has dilapidated well.
X-L Ranch Reservation (Pit River Indian Tribe)	$264,000	4	Scattered homes untreated individual systems or no water.
Big Sandy Rancheria	$500,000	3	Failing drainfields. Surfacing sewer. Community wells within 100 feet.

Community	Funding needed	Deficiency level	Problem
Blue Lake Rancheria	$175,000	3	Individual homes on wells, most inadequate. Failing individual septic tank and drainfield systems. Surfacing sewage.
Cahuilla Reservation	$ 10,000	3	Drainfield is failing. Septage on the ground during rainy season.
Dry Creek Rancheria	$100,000	3	Documented drainfields failing and sewage surfacing. Homes on portable toilets.
Hoopa Valley Reservation	$160,000	3	Numerous septic tank/drainfield failures reported with correlation to hepatitis outbreaks.
Hoopa Valley Reservation	$370,000	3	Old sewage treatment facilities not meeting discharge limits.
Hoopa Valley Reservation	$830,000	3	Individual septic systems with problems. High groundwater, no replacement area.
Hoopa Valley Reservation	$7,200,000	3	Numerous septic tank/drainfield failures reported with correlation to hepatitis outbreaks.
Jamul Indian Village	$ 50,000	3	Community drainfield failing. Existing liftstations requires renovations. Runoff fills septic tanks.
La Jolla Reservation	$ 12,000	3	Existing septic system failing. Sewage surfacing.
La Jolla Reservation	$ 40,000	3	Community drainfield systems failing. Sewage surfacing.
Laytonville Rancheria	$100,000	3	Conventional septic tank-drainfields (5) experiencing seasonal failures due to high groundwater and surfacing drainfield effluent.
Pinoleville Rancheria	$522,000	3	20 homes have drainfield failures. Sewage surfacing.
Rincon Reservation	$ 15,000	3	Standing water in sewer lines, drainfields appear undersized and close proximity to community well.
Rohnerville Rancheria Of Bear River	$515,000	3	Individual septic tank and drainfield systems. Failure in drainfields has been occurring due to seasonal high groundwater.
Round Valley Reservation	$3,795,000	3	Numerous drainfield failures due to poor soils throughout the reservation.
Smith River Rancheria	$700,000	3	Surfacing effluent on two properties due to high ground water. Suspect other failures. One effluent system caved in.
Susanville Indian Rancheria	$3,824,000	3	Water mains, storage tank are undersized. New source of water required. Old Army unsealed sewage lagoons are condemned by the State.
Susanville Rancheria	$155,000	3	No vehicle access to water storage tank. Tank in disrepair. Run out of water approximately 8 times a year.
Torres-Martinez Reservation	$ 30,000	3	Failed septic systems with sewage surfacing.
Torres-Martinez Reservation	$200,000	3	4 existing rental mobile home parks have well and pressure system problems. Wastewater disposal inadequate. Field visits indicated sewage on surface.
Trinidad	$600,000	3	Individual drainfields failing. Sewage surfacing.
Tule River Indian Reservation	$1,085,000	3	Numerous failing drainfields due to poor soils within the community.

Community	Funding needed	Deficiency level	Problem
Tuolumne Rancheria	$222,000	3	Scattered homes with failing drainfields and poor soils.
Upper Lake Rancheria	$828,000	3	31 homes with surfacing sewage in winter. Documented high bacteria counts. High groundwater.

Source: IHS SDS Narrative Report 02/08/01

Section 6
Special Concerns

Irrigation Ditch Water

Many California water districts began their corporate history in the 1800s. In the Sierra foothills, gold miners built a series of flumes and ditches to divert water to their mining claims. After the gold played out, the ditch systems assisted in the growth of towns and agriculture, and the ditches were expanded in their use. Ditches made the expansion of agriculture possible during the dry summer season by providing water to fields and orchards. The Wright Irrigation Act of 1871 (followed by the Bridgeford Act in 1897 and the California Irrigation District Act in 1917) allowed the formation of irrigation districts in the state.

Water was delivered by the irrigation districts to farmers by a series of main canals and open, unlined, earthen ditches, some of which are still in use today. Irrigation districts provided domestic water to some, but not many, residences in the first half of the 1900s.


Georgetown Ditch (Author, 2003)

Growth in the 1950s moved outward, and urban encroachment began in farming areas. This rapid growth rate led irrigation districts, which had ditches in the area, to provide domestic water to the new residences. By the 1960s, some irrigation districts, surrounded by sprawl, reinvented themselves and built domestic pipeline systems—abandoning their original ditch systems—to accommodate the growing communities. Others still supplied farmers with water and delivered domestic water to customers in the same earthen ditches. Some irrigation districts, such as the Placer County Water Agency in the 1960s, began alerting customers to the possible dangers of consuming water from irrigation ditches. The open canals and ditches can be contaminated with pathogens from humans and animals, and can collect farm and stormwater surface run-off that can contain pathogens, pesticides, and fertilizers.

The federal Safe Drinking Water Act was enacted in 1974 and mandated standards for water providers regarding safety and quality of drinking water.[16] This included unfiltered surface water, however, many irrigation districts did not fall into the

[16] California passed its own version of the Safe Drinking Water Act in 1976, but earlier versions of the state laws governing public water systems granted an exemption from those requirements if they met certain conditions, including being primarily an agricultural water supplier. Due to the 1996 amendments, in order to be in compliance with the federal law, California had to delete this exemption from its law (Yamamoto, 2005).

"public water system" category as the Act defined such systems to be those "supplying water for human consumption *through pipes*" (emphasis added). In 1996, the U.S. Congress and the President amended the federal Safe Drinking Water Act to redefine "public water system" to include irrigation districts supplying water for human consumption "through pipes or other constructed conveyances." Human consumption uses include water for drinking, bathing, showering, dishwashing, cooking, and maintaining oral hygiene. Oversight of small water systems (i.e., those with less than 200 service connections) is primarily the responsibility of "Local Primacy Agencies" or LPAs (e.g., the county health departments) or, in some counties and for all State and most federal facilities, the State Department of Health Services (DHS) (Yamamoto, 2005).

Under the new requirements, irrigation districts with DHS agreements are not subject to the Safe Drinking Water Act (Yamamoto, 2005). Nonetheless, some irrigation districts that provided domestic water were charged with lining and covering their ditches, or piping them, and providing filtration and disinfection. The costs associated with providing treated drinking water are often prohibitive to small irrigation districts. Besides the infrastructure expenditures for piping or covering the canals, treatment plants would need to be built, and storage provided. Other costs to the irrigation districts of these changes include administrative and operational costs, as well as liability and insurance. The districts can also advise customers that they must find an alternative means of an approved water supply that meets the standards, or they will lose their untreated ditch water, which is approved for non-consumptive purposes (such as irrigation) only. Alternative means can include drilled well, hauled water approved for drinking water, or the delivery of bottled water for consumption.

The more remote areas of the foothills of the Sierra Nevada (e.g., Nevada, Placer, and Tuolumne counties) and the farming region of Imperial County have been found to have the most residential users of untreated irrigation water. Although the counties now require proof of the availability of treated water when issuing building permits, homeowners in the past were allowed to use the ditch water as long as they had an approved point-of-entry system at their home to treat the water.

Households using non-potable ditch water have declined in recent years. One reason is that as urbanization pushes toward the remote foothill and agricultural areas, new residents demand the same level of municipal services to which they were accustomed in the city. As new infrastructure is built to accommodate the new housing tracts, former remote pockets of ditch water users are being connected to urban water services. Economies of scale play a part in this growth scenario as well. Many households coming on line become additional rate-payers to share the costs of installing infrastructure. Per-household costs decline, making connections affordable for the ditch users. Another reason for a decline in ditch water users is the reluctance of financial institutions to loan money on homes that are not connected to a public water system, which makes selling or refinancing the home extremely difficult. Counties also will not approve new building permits without proof of treated water.

Ditch water delivery is undependable, which reduces fire protection and increases house insurance rates, or even makes house insurance unattainable.

It is difficult to get an accurate count of households using non-potable ditch water. Water districts cannot trespass on private property to observe whether "irrigation" water from ditches is being used for irrigation only, or also for human consumption. Users of the ditch water can be reluctant to admit their use for domestic purposes, as they would be compelled by the water district and county environmental health department to remedy the problem. This reluctance, based on residents' fears of lack of anonymity during the Census, can skew counts of households with vulnerable water supply. According to the GAO (1998), the Imperial Irrigation District estimates that it has about 2,200 residential canal connections. Tuolumne Utility District estimates 230 customers may use ditch water (GAO, 1998). Placer County Water Agency had about 300 customers, and Nevada Irrigation District has 95 customers out of compliance (Campos, 2001). Due to the 1996 Safe Drinking Water Act requirements, irrigation districts that serve 15 or more connections with water that is used for human consumption must treat all of the water that is supplied for human consumption because they are considered a public water system. Because this water is intermingled with the agricultural water, irrigation districts had to research who their customers were and what they were doing with the water to avoid having to build costly treatment plants (to treat all their water), or install a separate piping system to distribute just the drinking water throughout their district (Yamamoto, 2005).

Why would homeowners not want to remedy the problem? The dilemma is related to cost. Older point-of-entry systems do not meet current regulations, and new systems can cost up to $5,000 per housing unit. A central water treatment system for a neighborhood can vary depending on the distance between residential customers and the proximity of existing water lines or treatment plants, but an example given by the General Accounting Office estimates the range to be between $2,600 and $17,000 per household. Households can also hook up to the nearest public water system, but again, cost is dependent upon the location of the household in relation to the nearest infrastructure, the terrain, and the number of households hooking up. In Placer County, the average cost per household, including the cost of pipelines from the water main to individual homes, the connection fees, and interest, was $15,000 to $18,000 (GAO, 1998). Drilling a private well can be costly, and as one Placer County Water Agency customer stated, "You could spend $10,000 drilling around your land and still find nothing. It's a dicey proposition" (Campos, 2001). Buying bottled or hauled water for drinking and cooking can cost up to $650 per year (GAO, 1998).

Public interest groups that advocate for low socio-economic communities have a concern in the leadership role that irrigation districts could play in assisting these small rural communities. Some rural communities are near irrigation districts and could take advantage of the irrigation districts' infrastructure to solve water problems. But the increased costs to supply water for human consumption is costly for those irrigation districts that still have a high percentage of their water used by

agriculture. The cost of treating that water to public water system standards is not bearable by the farmers. Until the community makes a significant change from agriculture to residential, change in the water rate structure and infrastructure improvements will be slow (Yamamoto, 2005).

Environmental justice can become an issue during water transfer agreements. For example, "clean" water may pass through these rural agricultural communities on the way to other regions (as part of a water transfer agreement), yet is not available to these communities whose water often fails water quality standards.

Hauled Water

An example of a lack of infrastructure and the cost for small systems can be found in the High Desert of California.

***CASE STUDY:* HOMESTEAD**

Some households haul water from treated sources, not in buckets, but in holding tanks in the backs of trucks or trailers. One such community is in the Homestead area, west of the small desert town of Mojave. The homeowners have tried to drill wells. However, the homes are located on the hillsides, while the main aquifer is on the valley floor. The wells that are drilled sometimes do not hit a water source, or they may hit fractured rock that is not a reliable source. If the homeowners decided to pump water uphill from the valley floor, the water would cost too much due to the electricity and the infrastructure needed. The utility district provides a main water tank, and each homeowner (there are about 35) is provided their own key to their own meter. They fill up their county-approved lined tank that is in the back of their own truck or trailer, and haul the water back home, where they transfer it to their own holding tank, usually a cistern.

The EPA suggests that hauled drinking water is exposed to contamination during loading, unloading, transport, and storage. Water can become contaminated during the transfer process from the water source to the truck tank and from the truck tank to the owner's cistern. The tanks may not be adequately sanitized, and the more often the hatches and transfer pipes are opened and handled the higher the risk of microbiological contamination. Cisterns can become contaminated when roofs, lids, and vents are poorly constructed and maintained, allowing entrance to contaminants (CCDEH, 2002).

The US Environmental Protection Agency is not the only agency concerned with the safety of hauled water. The California Conference of Directors of Environmental Health (CCDEH) is an organization of county health directors. Specifically, its Land Use Committee is concerned that developers of new construction housing will identify hauled water as a domestic water supply. Currently, hauled water as a domestic water source is only allowed in particular cases to ensure public health for

existing housing units. Some counties have amended their general plans to prohibit the use of hauled water as a source of domestic water for new housing.

Section 7
Conclusions

There is no simple answer to the question, "How many Californian households lack potable water?"

The lack of potable water and its inherent risks are a worldwide problem. Californians in low socio-economic conditions are affected, whether they live in the heart of our cities, in rural mountain areas, in farm worker communities, on reservations, or on rancherias. Potable water is associated with the quality of water, or the quantity or the supply of the water, and how the water is delivered to the home. Associated attributes such as funding availability, water supply and source, water quality data, public health data, and infrastructure conditions must be considered when collecting data about households without potable water.

How many households? The US Census counts housing units without complete plumbing, and tells us about source of water and disposal of sewage. The Census does not tell us, though, if the housing units without complete plumbing have potable water, about the number of households that are located in communities with decaying infrastructure, or households that have water quality problems due to microbiological or chemical contamination. Census data can be misleading, as stated in Section 3, Counting California: 1990 Census Data. The Indian Health Service counts communities on rancherias and reservations that are in need of new sources of water, new infrastructure and rehabilitation, and sewage treatment. Through their work, the United Farm Workers, Self-Help Enterprises, Great Northern Corporation, and other groups have information about small Central Valley communities. This report has addressed relatively few communities, as data are scattered and incomplete. What about other communities in California?

There is no final answer for this question. It is a topic ready for further discussion and study, for the benefit of Californians who live with no or too little potable water.

(Author's note, 2005: Additional data have been brought forward, as mentioned throughout this report. Future researchers will want to use that information to provide a more thorough investigation. This report remains a snapshot of basic information available in 2001/2002)

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Appendix A

"Vulnerable" Water Source 1990 by Housing Units by Census Designated Place

	COUNTY NAME	Place	Housing units: Dug wells + Some other source	Housing Units: Percentage with "Vulnerable" Water Source
1	LOS ANGELES	Los Angeles city	1003	0.08%
2	TRINITY	Hayfork CDP	306	27.10%
3	HUMBOLDT	Westhaven-Moonstone CDP	185	39.11%
4	FRESNO	Fresno city	179	0.14%
5	SACRAMENTO	Sacramento city	179	0.12%
6	SANTA CLARA	San Jose city	177	0.07%
7	SAN DIEGO	San Diego city	176	0.04%
8	PLACER	North Auburn CDP	166	3.80%
9	SANTA CRUZ	Ben Lomond CDP	165	5.43%
10	BUTTE	Magalia CDP	140	3.34%
11	TRINITY	Lewiston CDP	134	21.68%
12	SONOMA	Santa Rosa city	129	0.27%
13	SAN BERNARDINO	Twentynine Palms Base CDP	124	8.09%
14	LOS ANGELES	Compton city	117	0.50%
15	HUMBOLDT	Willow Creek CDP	108	11.96%
16	SANTA CRUZ	Boulder Creek CDP	108	3.65%
17	HUMBOLDT	McKinleyville CDP	104	2.47%
18	CONTRA COSTA	Bethel Island CDP	99	7.67%
19	EL DORADO	South Lake Tahoe city	95	0.68%
20	SACRAMENTO	Rancho Cordova CDP	95	0.50%

Source: U.S. Census Bureau, 1990

"Vulnerable" Water Source 1990 by Percentage by Census Designated Place

	COUNTY NAME	Place	Housing Units: Percentage with "Vulnerable" Water Source	Housing units: Dug wells + Some other source
1	HUMBOLDT	Westhaven-Moonstone CDP	39.11%	185
2	TRINITY	Hayfork CDP	27.10%	306
3	TRINITY	Lewiston CDP	21.68%	134
4	DEL NORTE	Klamath CDP	18.40%	69
5	MENDOCINO	Covelo CDP	16.70%	80
6	MENDOCINO	Laytonville CDP	14.00%	63
7	MENDOCINO	Point Arena city	13.88%	29
8	BUTTE	Concow CDP	13.77%	91
9	HUMBOLDT	Willow Creek CDP	11.96%	108
10	YUBA	Loma Rica CDP	11.29%	82
11	FRESNO	Auberry CDP	8.31%	59
12	SAN BERNARDINO	Twentynine Palms Base CDP	8.09%	124
13	SANTA CRUZ	Aptos Hills-Larkin Valley CDP	7.83%	57
14	CONTRA COSTA	Bethel Island CDP	7.67%	99
15	HUMBOLDT	Hydesville CDP, California	7.50%	38
16	MARIN	Inverness CDP	7.42%	65
17	YUBA	Challenge-Brownsville CDP	7.01%	35
18	MONTEREY-SAN BENITO	Aromas CDP	6.12%	46
19	KERN	Buttonwillow CDP	5.84%	24
20	RIVERSIDE	Morongo Valley CDP	5.80%	48

Source: U.S. Census Bureau, 1990

"Vulnerable" Water Source by Housing Units 1990 by County			
	County	Housing units: Dug wells + Some other source	Housing Units: Percentage with "Vulnerable" Water Source
1	Mendocino County	6050	17.98%
2	Humboldt County	5548	10.85%
3	Sonoma County	4569	2.84%
4	San Bernardino County	4095	0.76%
5	Los Angeles County	3875	0.12%
6	Imperial County	3006	8.22%
7	Fresno County	2862	1.21%
8	Trinity County	2844	37.72%
9	Riverside County	2529	0.52%
10	Tulare County	2528	2.41%
11	Placer County	2447	3.14%
12	Santa Cruz County	2176	2.37%
13	Shasta County	2111	3.49%
14	San Joaquin County	1865	1.12%
15	Lake County	1852	6.43%
16	San Diego County	1692	0.18%
17	Nevada County	1600	4.28%
18	Siskiyou County	1533	7.61%
19	Butte County	1419	1.86%
20	Monterey County	1416	1.17%

Source: U.S. Census Bureau, 1990

"Vulnerable" Water Source by Percentage 1990 by County			
	County	Housing Units: Percentage with "Vulnerable" Water Source	Housing units: Dug wells + Some other source
1	Trinity County	37.72%	2844
2	Sierra County	18.79%	407
3	Mendocino County	17.98%	6050
4	Humboldt County	10.85%	5548
5	Alpine County	10.39%	137
6	Mariposa County	9.25%	712
7	Del Norte County	9.20%	836
8	Imperial County	8.22%	3006
9	Siskiyou County	7.61%	1533
10	Plumas County	6.99%	835
11	Lake County	6.43%	1852
12	Inyo County	5.39%	470
13	Modoc County	5.12%	239
14	Mono County	4.99%	532
15	Tuolumne County	4.65%	1170
16	Tehama County	4.34%	885
17	Nevada County	4.28%	1600
18	Amador County	4.21%	540
19	Shasta County	3.49%	2111
20	Calaveras County	3.42%	655

Source: U.S. Census Bureau, 1990

"Vulnerable" Water Source 1990 by Housing Units by Reservation

	County	Reservation	Housing units: Dug wells + Some other source	Housing Units: Percentage with "Vulnerable" Water Source
1	Humboldt County	Yurok Reservation	219	92.02%
2	Riverside County	Colorado River Reservation	159	24.84%
3	Humboldt County	Hoopa Valley Reservation	151	18.53%
4	Del Norte County	Yurok Reservation	92	21.05%
5	Mendocino County	Round Valley Reservation	86	17.30%
6	Tulare County	Tule River Reservation	73	31.88%
7	Inyo County	Big Pine Rancheria	53	36.30%
8	San Diego County	Barona Rancheria	46	28.40%
9	San Diego County	Rincon Reservation	44	8.89%
10	Imperial County	Fort Yuma (Quechan) Reservation	43	4.57%
11	San Bernardino County	Chemehuevi Reservation	41	5.55%
12	San Bernardino County	Colorado River Reservation	39	3.04%
13	San Diego County	Pala Reservation	37	11.08%
14	San Diego County	Los Coyotes Reservation	32	55.17%
15	Riverside County	Pechanga Reservation	19	8.64%
16	Mendocino County	Hopland Rancheria	15	22.39%
17	Riverside County	Torres-Martinez Reservation	15	3.48%
18	Riverside County	Agua Caliente	14	0.07%
19	Plumas County	Greenville Rancheria	13	68.42%
20	Inyo County	Bishop Rancheria	9	1.71%

Source: U.S. Census Bureau, 1990

Appendix B

"Vulnerable" Sewage Disposal by Housing Units 1990 by Census Designated Place

	COUNTY NAME	Place	Housing units: Sewage disposal; Other means	Housing units: Percentage with "Vulnerable" Sewage Disposal
1	LOS ANGELES	Los Angeles city	10252	0.79%
2	SANTA CLARA	San Jose city	1401	0.54%
3	LOS ANGELES	Long Beach city	1353	0.79%
4	SAN DIEGO	San Diego city	1249	0.29%
5	SAN FRANCISCO	San Francisco city	1224	0.37%
6	ORANGE	Santa Ana city	1088	1.45%
7	FRESNO	Fresno city	959	0.74%
8	LOS ANGELES	Compton city	850	3.66%
9	LOS ANGELES	East Los Angeles CDP	842	2.79%
10	ALAMEDA	Oakland city	768	0.50%
11	LOS ANGELES	Florence-Graham CDP	765	5.67%
12	SACRAMENTO	Sacramento city	739	0.48%
13	LOS ANGELES	Huntington Park city	735	5.06%
14	LOS ANGELES	South Gate city	608	2.65%
15	LOS ANGELES	Pomona city	583	1.52%
16	LOS ANGELES	El Monte city	559	2.06%
17	LOS ANGELES	Inglewood city	475	1.23%
18	LOS ANGELES	Rosemead city	452	3.20%
19	LOS ANGELES	Monterey Park city	435	2.14%
20	LOS ANGELES	Lynwood city	430	2.96%

Source: U.S. Census Bureau, 1990

"Vulnerable" Sewage Disposal by Percentage 1990 by Census Designated Place				
	COUNTY NAME	Place	Housing units: Percentage with "Vulnerable" Sewage Disposal	Housing units: Sewage disposal; Other means
1	VENTURA	Piru CDP	8.62%	35
2	BUTTE	Concow CDP	6.20%	41
3	LOS ANGELES	Florence-Graham CDP	5.67%	765
4	MONTEREY	Las Lomas CDP	5.63%	29
5	LOS ANGELES	East Compton CDP	5.57%	103
6	FRESNO	Auberry CDP	5.49%	39
7	SAN DIEGO	Valley Center CDP	5.24%	37
8	LOS ANGELES	Maywood city	5.24%	350
9	TRINITY	Hayfork CDP	5.23%	59
10	LOS ANGELES	Walnut Park CDP	5.22%	185
11	LOS ANGELES	Huntington Park city	5.06%	735
12	PLUMAS	Rainbow CDP	5.02%	34
13	TULARE	Cutler CDP	4.70%	44
14	MENDOCINO	Point Arena city	4.31%	9
15	HUMBOLDT	Westhaven-Moonstone CDP	4.02%	19
16	LOS ANGELES	Marina del Rey CDP	3.84%	208
17	HUMBOLDT	Redway CDP	3.72%	22
18	TRINITY	Lewiston CDP	3.72%	23
19	CONTRA COSTA	Bethel Island CDP	3.72%	48
20	LOS ANGELES	Compton city	3.66%	850

Source: U.S. Census Bureau, 1990

"Vulnerable" Sewage Disposal by Housing Units 1990 by County

	COUNTY	Housing units: Sewage disposal; Other means	Housing units: Percentage with "Vulnerable" Sewage Disposal
1	Los Angeles County	26354	0.83%
2	Orange County	3281	0.37%
3	San Bernardino County	3184	0.59%
4	San Diego County	3145	0.33%
5	Santa Clara County	2087	0.39%
6	Fresno County	1975	0.84%
7	Riverside County	1841	0.38%
8	Alameda County	1571	0.31%
9	Kern County	1381	0.70%
10	Sacramento County	1377	0.33%
11	Humboldt County	1297	2.54%
12	Mendocino County	1293	3.84%
13	San Francisco County	1224	0.37%
14	Monterey County	1061	0.88%
15	Ventura County	1049	0.46%
16	San Joaquin County	1022	0.61%
17	San Mateo County	972	0.39%
18	Contra Costa County	968	0.31%
19	Imperial County	846	2.31%
20	Sonoma County	749	0.47%

Source: U.S. Census Bureau, 1990

"Vulnerable" Sewage Disposal by Percentage 1990 by County

	County	Housing units: Percentage with "Vulnerable" Sewage Disposal	Housing units: Sewage disposal; Other means
1	Trinity County	7.41%	559
2	Alpine County	7.20%	95
3	Mendocino County	3.84%	1293
4	Lassen County	2.56%	265
5	Humboldt County	2.54%	1297
6	Mariposa County	2.52%	194
7	Imperial County	2.31%	846
8	Calaveras County	2.18%	418
9	Siskiyou County	1.99%	401
10	Colusa County	1.81%	114
11	Tuolumne County	1.72%	432
12	Plumas County	1.69%	202
13	Inyo County	1.37%	119
14	Mono County	1.24%	132
15	Merced County	1.22%	713
16	Del Norte County	1.19%	108
17	Madera County	1.18%	364
18	Modoc County	1.18%	55
19	Amador County	1.01%	130
20	Tehama County	0.90%	184

Source: U.S. Census Bureau, 1990

"Vulnerable" Sewage Disposal 1990 by Housing Units by Reservation				
	County	Reservation	Housing units: Sewage disposal; Other means	Housing units: Percentage with "Vulnerable" Sewage Disposal
1	San Diego County	Rincon Reservation, CA	62	12.53%
2	Riverside County	Agua Caliente Reservation, CA	59	0.28%
3	Imperial County	Fort Yuma (Quechan) Reservation, AZ--CA	57	6.06%
4	Riverside County	Torres-Martinez Reservation, CA	52	12.06%
5	San Diego County	Los Coyotes Reservation, CA	32	55.17%
6	Humboldt County	Yurok Reservation, CA	27	11.34%
7	Mendocino County	Round Valley Reservation	19	3.82%
8	Humboldt County	Hoopa Valley Reservation, CA	14	1.72%
9	Riverside County	Pechanga Reservation, CA	14	6.36%
10	Inyo County	Bishop Rancheria, CA	11	2.09%
11	San Diego County	La Jolla Reservation, CA	10	19.61%
12	San Diego County	La Posta Reservation, CA	9	100.00%
13	San Diego County	Pala Reservation, CA	9	2.69%
14	Fresno County	Cold Springs Rancheria, CA	8	9.76%
15	Del Norte County	Yurok Reservation, CA	7	1.60%
16	Mendocino County	Pinoleville Rancheria, CA	6	15.79%
17	Riverside County	Santa Rosa Reservation, CA	6	30.00%
18	San Diego County	San Pasqual Reservation, CA	6	3.41%
19	Riverside County	Cabazon Reservation, CA	5	2.40%
20	San Diego County	Viejas Rancheria, CA	5	2.81%

Source: U.S. Census Bureau, 1990

Appendix C

2001 Water Deficiencies

derived from:
State of California
Department of Health Services (DHS)
Safe Drinking Water State Revolving Fund
April 2001 Multi-Year Project Priority List

Category	Population	System Name	Category Description
A	0		**Demonstrated illness attributable to the water system or system under court ordered compliance.**
B			**Microbial contamination of the water supply resulting in a repeated coliform bacteria maximum contam**
	3600	Amador County Water Agency-Sutter Creek	
	110	Artois CSD	
	540	BARTHELS MOBILE RANCH	
	20000	Beaumont-Cherry Valley WD	
	400	Beaver Point Water System	
	25	BUNDY CANYON CHRISTIAN School	
	52	Cachagua Rd. WS #4	
	200	Canon Manor Water System	
	160	Cassel Park MWC, Inc.	
	150	Colusa CSA #2 -Stonyford	
	250	Coulterville CSA 1	
	225	Crescent Water Association	
	1300	Durham High School	
	100	FAIRWAY DOWNS	
	165	Feather Ridge Estates Water	
	50	FLORISTON WATER	

Category	Population	System Name	Category Description
	46	Forest Knoll	
	231	GOLD RUSH MOBILE HOME	
	308	GOLDEN POND RV/M OVERLAND	
	75	GRANITEVILLE WATER WORKS	
	5851	Holtville - City of	
	60	Indian Springs School	
	350	LAKE MORENA OAK SHORE	
	50	Lincoln Chan Farm	
	195	MADONNA MUTUAL WATER	
	40	Modern Village MWC	
	60	MULBERRY UNION SCHOOL DIST	
	500	Oak Park	
	68	OAK RUN ELEMENTARY SCHOOL	
	101	Orland MHP	
	25	PALO VERDE COUNTY WATER DISTRICT	
	450	Princeton Water District	
	100	SID/Rural Residential Point	
	300	SIETE ROBLES MUTUAL WATER CO	
	210	Sky Ranch Water System	
	150	SLEEPY VALLEY WATER CO INC	
	200	SPENCER VALLEY SCHOOL DIST	
	186	Spring Valley School	
	40	Sunrise Mobile Home Park	
	100	THOUSAND TRAILS/SOLEDAD CYN PROBATION	
	100	Trailer City	
	145	Trinity Knolls Mutual Water	
	3500	TUD-COLUMBIA	
	180	TUD-DITCH CONVEYANCE Conversion Pro	
	30	TUD-MOUNTAIN BOY RD. Ditch Conveyance	
	45	Whispering Pines Apartments	

Category	Population	System Name	Category Description
	350	Wilson Elementary School	
	89	Woodridge Mutual Water	
	60	YOLO COUNTY AIRPORT	
B	**41522**	**TOTAL**	Total Costs for Category: $25,585,171
C			**Unfiltered surface water or wells that have fecal of E. coli contamination.**
	2000	Agate Bay Water Company	
	200	Alderpoint County Water	
	260	ARROYO SECO WATER SYSTEM #2	
	26643	ATASCADERO MUTUAL WATER CO	
	320	BIG BEND RESORT	
	350	Big Rock C.S.D.	
	22	Brandon Creek Mutual	
	200	CAMP ARBOLADO	
	230	CAMP SCOTT & CAMP SCUDDER	
	200	Captain Cooper School	
	475	Carmel Riviera MWC	
	65	Carmet Water Company	
	38700	Carmichael Water District	
	2539	Centerville C.S.D.	
	45	Cherokee Acres MHP	
	15900	City of Arcata	
	1437	City of Blue Lake	
	13000	City of Eureka	
	164	Clear Ridge Water Association	
	70	Coastlands MWC	
	36	Cortland Pines MWC	
	180	COUNTY SERVICE AREA 7	

Category	Population	System Name	Category Description
	75	DARWIN COMMUNITY	
	85000	El Dorado ID - Main	
	630	Gasquet C.S.D.	
	74000	GOLETA WATER DISRICT	
	54	Greenhaven Homeowner's Water Assoc.	
	65	Harmony Hills Water System	
	9454	Healdsburg, City of	
	135	Idylwild Water System	
	300	Lake County CSA 18 - Starview	
	100	Lake County CSA 22 - Mt. Hannah	
	400	Lake County CSA 7 - Bonanza Springs	
	1000	Lake Forest Utility Company, Inc.	
	495	Lakeside Park Association	
	100	Lewiston Valley Water Co., Inc.	
	0	LOPEZ PROJECT	
	3.70E+06	LOS ANGELES-CITY, DEPT. OF WATER & POWER	
	140	LUTHER VILLAGE CAMP	
	1000	Manila Community Services Dist.	
	13500	McKinleyville C.S.D.	
	25	MILL POND CAMPGROUND 2	
	432	Mineral City Water System, Inc.	
	8800	Nevada ID - E. George, Banner Mount	
	9920	Nevada ID - Loma Rica	
	4740	Nevada ID - North Auburn	
	795	Nevada ID - Snow Mountain	
	25	Nickill's Mobile Home Park	
	1600	North Tahoe PUD - Dollar Cove	
	10000	North Tahoe PUD - Main	
	25	PALM VILLA MOBILE HOME PARK	
	43	Palomino Estates MWC	

Category	Population	System Name	Category Description
	26000	Paradise Irrigation District	
	250	PARADISE RANCH MOBILE HOME PARK	
	300	Pine Grove Water System	
	60	Plumas County Bldg. & Grounds	
	32	Rancho Chaparral Water Co.	
	35	River Oaks Resort	
	200	Riverview Acres Water System	
	250	Rolling Hills Rancho	
	41	ROSARIO PARK WATER SYSTEM	
	500	ROVANA WATER COMPANY	
	25	Ruth Lake Marina	
	125	SAN DIMAS CYN IMPROVEMENT ASSN	
	12100	Santa Ynez River Water Cons. District	
	25	SIERRA EAST MOBILE HOME PARK	
	480	SKY-LONDA MUTUAL WATER COMPANY	
	5100	SOLVANG WATER DEPARTMENT	
	1500	Stinson Beach County Wtr Dist	
	45	Sunrise Shores Mutual Water Co.	
	150	Tahoe Park Water Co - Skyland System	
	2500	Tahoe Park Water Company	
	1000	Tahoe Swiss Village Utility	
	350	Taylorsville Water	
	800	WEAVER UNION SCHOOL DISTRICT (Merced)	
C	**4077757**	**TOTAL**	Total Costs for Category: $284,311,710

Category	Population	System Name	Category Description
D			**Filtered surface water that violates the surface water filtration and disinfection regulation.**
	8000	ACWA Buckhorn Plant	
	317	ALPINE MEADOWS	
	87137	ANTELOPE VALLEY-EAST KERN WATER AGENCY	
	70700	Arcade WD - Town & Country	
	60	Azalea Glen	
	100000	AZUSA LIGHT AND WATER	
	12861	Bella Vista Water District	
	180	Berryessa Pines Water System	
	2000	Bidwell Water Company, Inc.	
	200	BIG HILL WATER CO-MONTE GRANDE	
	160	BIG REDWOOD PARK IMPROVEMENT	
	35	Big River Vista Mutual Water Company	
	68	BRACKENBRAE MWC	
	100	Bud Fine MWC	
	150	Cache Creek Mobile Home Park	
	70	Callahan Water District	
	500	Caltrans Collier Tunnel RS	
	5800	CAMBRIA COMM SERVICES DIST	
	300	CAMP LOMA MAR	
	250	Capell Valley Water Co.	
	475	Carmel Riviera MWC	
	60000	CASITAS MUNICIPAL WATER DIST	
	80	Casterlin School	
	48	CHIRIACO SUMMIT	
	2000	Christian Valley Park CSD	
	60	Clearwater Mutual Water Company	
	120	Coast Springs Water Company	
	105	Crescent Bay Improvement Company	

Category	Population	System Name	Category Description
	230	Davenport WS - County Sanitation District	
	350	Donner Summit Public Utility D	
	240	DUTCH FLAT MUTUAL WATER CO	
	263	Elk Creek CSD	
	66000	Elsinore Valley MWD	
	25	Ford's Acres Mobile Home Park	
	25	Fort Ross School District	
	1400	Garberville Water Co.	
	6711	Georgetown Divide PUD	
	125	Hat Creek Mutual Water Co.	
	3000	Heber Public Utility District	
	2300	Kelseyville Co Waterworks District	
	35	Kimtu Meadows MWC	
	94	KNIGHTS FERRY COMMUNITY	
	222	KYBURZ MUTUAL WATER CO	
	2500	Lake Alpine Water Company	
	800	Lake County CSA 2 - Spring Valley	
	450	Lewiston Park MWC	
	75	LOMA MAR MUTUAL WATER COMPANY	
	25	MC CABE UNION SCHOOL DIST	
	3200	Meadow Vista County Water Dist	
	300	Napa County Public Works-LBRID	
	600	Napa County Public Works-NBRID	
	4840	Nevada ID - Lake of Pines	
	795	Nevada ID - Snow Mountain	
	75	NORTH KAWEAH MUTUAL WATER CO	
	300	Northstar C.S.D.	
	210	Occidental Community Services District	
	500	Pleasure Cove Resort	
	131723	POMONA- CITY, WATER DEPT.	

Category	Population	System Name	Category Description
	77	Rancho Del Paradiso Water Co.	
	25	RED HILL MARINA	
	20000	Ruth Lake Recreation Area	
	60	Seawood Estates Mutual Water	
	800	SENIOR CANYON MUTUAL Water Co	
	500	Sereno Del Mar/Carmet/Salmon Creek	
	336	SHADY GLEN MOBILE HOME PARK	
	75	SID-Blue Ridge Oaks	
	120	SID-Pleasant Hills Ranch	
	2660	Sierra Lakes County Water Dist	
	55	Sonoma County CSA 41-Freestone	
	250	Sonoma County CSA 41-Jenner	
	250	Spanish Flat Water District	
	151	SUMMIT MUTUAL WATER CO	
	125	Tennant C.S.D.	
	129700	THREE VALLEYS MWD	
	4300	Union Public Utility District	
	25	VALLEY MOBILE PARK	
	300	Villa Del Monte MWC	
	60	Washington County Water Dist	
	25	WEST MAIN MUTUAL WATER CO	
	75	Westport County Water District	
D	**739158**	**TOTAL**	Total Costs for Category: $58,809,116

Category	Population	System Name	Category Description
E			**Insufficient water source capacity resulting in water outages.**
	115	ALLENSWORTH COMMUNITY	
	125	ALPINE OAKS MOBILE ESTATES	
	43	Alpine Village	
	99	ANZA MUTUAL WATER COMPANY	
	1200	ARROWHEAD MANOR WATER CO	
	40	Arrowhead Ranch Water	
	95	Assisi Road Water System #1	
	12861	Bella Vista Water District	
	168	Big Bend Water Users Association	
	700	BIG HILL WATER CO- BIG HILL	
	99	Blairsden Water Users Association	
	100	Boulevard Heights Mutual Water	
	150	Carrick Water System	
	930	City of Loyalton	
	3107	City of Rio Dell	
	5000	City of Seaside	
	240	Colusa County Service Area No. 1	
	26	COMMANCHE WELL WATER SYSTEM	
	170	CRAGVIEW COMMUNITY SERVICE DISTRICT	
	28	CROWLEY LAKE MUTUAL WATER CO 1	
	800	Cuyama Community Services District	
	75	DARWIN COMMUNITY	
	2000	Del Oro Water Co.-Lime Saddle	
	15000	Del Oro Water Co.-Paradise Pines	
	5050	Descanso CWD	
	2800	Donner Lake Water Company	
	100	DOUBLE R MOBILE HOME PARK	
	3000	East Blythe Co Water Dist	
	55000	EAST VALLEY WD	

Category	Population	System Name	Category Description
	45	Echo Valley WS #5	
	2300	Farm Mutual W.C. (The)	
	415	FOREST PARK MWC	
	6500	Fort Bragg, City of	
	25	Fort Ross School District	
	1400	Garberville Water Co.	
	5160	GOLDEN HILLS CSD	
	300	GREENBELT WATER COMPANY	
	100	HIDDEN LAKE WATER DISTRICT #1	
	32	Honeydew Elementary School	
	65000	Humboldt Bay MWD	
	332	JUNIPER RIVIERA CO WD	
	175	Keene Water System	
	52	Klamath C.S.D.	
	200	LA HONDA ELEMENTARY SCHOOL	
	59	Lake View Water Co.	
	340	LAKE WOHFORD RESORT	
	340	Lakeside Woods MWC	
	120	Langley-Valle Pacifico WS	
	72	LATROBE ELEMENTARY SCHOOL	
	75	LITTLE BALDY WATER CO.	
	500	LIVE OAKS SPRINGS	
	96	LLANO FARMS MUTUAL WATER CO	
	25427	LOS ANGELES CO WW DISTRICT 29&80	
	51	Los Ranchos De Uvas Water Company	
	500	LSID-STRATHMORE SYSTEM	
	40	MADERA COUNTY MAINTENANCE DISTRICT #5	
	200	Mariposa Pines Mutual	
	110	MILLERS HOT SPRINGS	
	120	Monterey Vacation R.V. Park	

Category	Population	System Name	Category Description
	150	Montgomery Creek School	
	100	Oakridge Dr. Subdivision MWC	
	343	PINE HILLS MUTUAL WATER CO.	
	625	PIONEERTOWN WATER USERS	
	2500	Quincy CSD	
	297	RAMONA WATER CO	
	111	RECHE CANYON	
	60	Rural Canyon Water Company	
	30	San Miguel WS #3	
	11213	SBDNO COUNTY SERVICE AREA 70L	
	4428	SBNDO COUNTY SERVICE AREA 70J	
	6603	SO CA WATER CO-WRIGHTWOOD	
	175	SPLIT MOUNTAIN PARK	
	96	Spring Canyon MWC	
	45	SPRINGCREST WATER AND POWER	
	2500	STRATHMORE PUBLIC UTIL DIST	
	30	TIMBER MOBILE HOME PARK	
	72	Vierra Meadows Mutual Water Co.	
	130	VOLCANO COMMUNITY WATER	
	100	WILLOWS ASSN.	
	1100	YERMO WATER CO	
	66	Z Ranch MWC	
E	**249981**	**TOTAL**	Total Costs for Category: $66,076,936

Category	Population	System Name	Category Description
F			**Nitrate/nitrite contamination exceeding MCL.**
	5000	Agua Dulce Town Council Water Stewa	
	40	AILEEN OLSON LABOR CAMP	
	400	AIRPORT MUTUAL WATER SYSTEM	
	3000	ANTELOPE VALLEY JOINT UNION H.S.	
	55	Apple Ave. WS #3	
	400	ARROYO VERDE MWC	
	250	CAMP JOSEPH PAIGE, CAMP CLINTON B.	
	26000	CAMROSA WATER DISTRICT	
	1000	Chualar Water District	
	30	CITRUS SOUTH TULE SCHOOL	
	9743	City of Greenfield	
	13000	City of Hollister	
	667	City of Modesto, DE Grayson	
	1780	City of San Juan Bautista	
	42500	City of San Luis Obispo	
	9616	City of Soledad	
	100	COUNTRY VIEW ALZHEIMER CENTER	
	200	CUYAMA JOINT UNION DIST ELEM	
	42	DELSUR GARDENS PARK WATER SYSTEM	
	89	DELTA VIEW SCHOOL	
	55000	EAST VALLEY WD	
	1877	EASTON COMMUNITY SERVICES DISTRICT	
	200	FAIRWAY TRACT WATER CO	
	70	FAWCETT FARMS SYSTEM	
	50	FENDERSON WATER SYSTEM	
	25	GLEENINGS FOR THE HUNGRY	
	240	GRAND-VIEW GARDENS	
	125	Grizzly Lake RID-(Crocker/Welch)	
	12440	GROVER BEACH WATER DEPARTMENT	

Category	Population	System Name	Category Description
	8250	Hillcrest Water Co. Region 5	
	35000	Jurupa CSD	
	40	KERN SEVENTH DAY ADVENTIST ELEM SCH	
	45	LAKE MORENA TRAILER RESORT	
	200	LEMON COVE WATER CO	
	120	LONE OAK MUTUAL WATER CO	
	26	LOVELL SCHOOL	
	240	MAPLE SCHOOL WATER SYSTEM	
	462	MAPLE WATER COMPANY	
	150	Mecchi Water Company	
	67	Moro Cojo Mutual Water Association	
	68	Murphy Hill Mutual Water #2	
	49	Murphy Hill Water System #1	
	500	Oak Park	
	580	OROSI HIGH SCHOOL	
	340	Pajaro/Sunny Mesa CSD II	
	40	Palm View RV Park	
	2500	PLAINVIEW MUTUAL WATER COMPANY	
	75	Porta Yosemite Mobile Home Park	
	1725	PRATT MUTUAL WATER CO	
	280	Queens Motel WS	
	25	Quintero Labor Camp #1 (Wright Rd)	
	235	RANCHO ESTATES MUTUAL WATER	
	175	RANCHO SAN ANDREAS	
	16000	Riverview WD	
	175	RODRIQUEZ LABOR CAMP	
	25000	Rubidoux CSD	
	100	S.P.C. A. of Monterey County	
	104059	SAN GABRIEL VALLEY WC - FONTANA	
	540	Sanger Unified School Distric- FAIRMONT SCHOOL	

Category	Population	System Name	Category Description
	25	Santa Ana Water Project Authority	
	25	Santa Ana Water Project Authority	
	200000	Santa Ana Watershed Project Authority	
	480	SANTA ROSA MUTUAL WATER CO	
	220	SEQUOIA UNION SCHOOL	
	60	SEVENTH STANDARD MUTUAL	
	65	SOLANO VERDE MUTUAL WATER CO	
	224	South Midway City Mutual Water Co.	
	140	Springfield Mutual Water Company	
	350	TEVISTON C.S.D.	
	93	TICO MUTUAL WATER CO	
	200	TOOLEVILLE NO-PROFIT	
	250	Twin Valley, Inc.	
	78	Union Heights MWC	
	0	UNITED WTR CONS DIST	
	109	VEGA ROAD WATER SYSTEM #1	
	320	Vista Grande Water System	
	100	WEST MC KINLEY WATER SYSTEM	
	100	WHISPERING SANDS	
	200	WILLIAMS MUTUAL WATER COMPANY	
	35	Windsor Christian Academy	
F	**584079**	**TOTAL**	Total Costs for Category: $70,175,534

Category	Population	System Name	Category Description
G			**Chemical contamination (other than nitrate/nitrite) exceeding a primary MCL.**
	10700	ARVIN COMMUNITY SERVICES DIST	
	23947	ATWATER, CITY OF	
	30000	BELLFLOWER - SOMERSET MWC	
	1200	BIOLA COMMUNITY SERVICES DIST	
	500	BROADVIEW TERRACE WATER	
	100	Butteville Union School	
	16250	CALIFORNIA WATER SERVICE - SELMA	
	400	CENTRAL VALLEY WATER COMPANY	
	91000	CITY OF DOWNEY	
	39000	City of Yuba City	
	7000	CLAWA WHOLESALE	
	2000	Cobb Area County Water District	
	450	CO-CSA 70 F MORONGO VALLEY	
	695	CO-CSA 70 W-3	
	30	COMMUNITY WELL WATER SYSTEM	
	500	CURTIS WATER COMPANY	
	1000	DEL REY COMMUNITY SERV DIST	
	500	Dell Wayne/Village Green MHP	
	14544	DINUBA, CITY OF	
	17	Ed's Water Company #2	
	66000	Elsinore Valley MWD	
	1000	Fern Valley WD	
	40	FOUNTAIN TRAILER PARK WATER	
	130	FOUR SEASONS MOBILE HOME PARK	
	3750	FOWLER, CITY OF	
	80	Gomez Ranch	
	45	HILLCREST MOBILE HOME PARK	
	2170	HILLVIEW WC-OAKHURST/SIERRA LAKES	

Category	Population	System Name	Category Description
	2600	Idyllwild WD	
	6700	KERMAN, CITY OF	
	90000	KERN COUNTY WATER AGENCY	
	8000	LA PUENTE VALLEY CWD	
	200	LAKE SHORE PARK MAINTENANCE	
	4600	Lakeport, City of	
	80	Lapena Ranch Housing	
	16000	LINCOLN AVENUE WATER CO.	
	18100	LOS BANOS-CITY	
	1000	MALAGA COUNTY WATER DISTRICT	
	364	Manana Woods MWC	
	225	MARINA VIEW HEIGHTS MAINT	
	3450	Mather AFB - Wherry Housing Area	
	57000	MONTEREY PARK-CITY, WATER DEPT	
	71	Mount Weske Estates Mutual Water Co	
	280	NORTH EDWARDS WD	
	200	OASIS SCHOOL - COACHELLA	
	525	Olivet Elementary School	
	500	ONYX WC	
	8331	PARLIER, CITY OF	
	70	PIKE RANCH MUTUAL WATER CO	
	625	PIONEERTOWN WATER USERS	
	125	PIUTE MOUNTAIN SCHOOL WATER	
	300	Prunedale Mutual Water Association	
	200	RAINBIRD VALLEY MUTUAL	
	2500	RICHGROVE CSD	
	1100	Riverside CSA #122	
	25	ROSS CORNER WELL 1	
	130	ROUND VALLEY SCHOOL	
	300	San Antonio Elementary School	

Category	Population	System Name	Category Description
	151064	SAN GABRIEL VALLEY WATER CO - EL MON	
	7744	Sebastopol, City of	
	20	SHAFTER	
	1250	SLO CWWD NO. 1 - SAN MIGUEL	
	450	SOUTH FORK SCHOOL WATER SYSTEM	
	5520	Southern Calif WC - Yorba Linda	
	175	WESTERN SKY MOBILE HOME PARK	
	200	Yosemite West Water System	
G	**703072**	**TOTAL**	Total Costs for Category: $42,663,732
H			**Uncovered distribution reservoirs and low-head lines.**
	2844	Angels, City of	
	89	Arastradero Mutual Water Co	
	120	AUBURN VALLEY COUNTRY CLUB	
	24500	BANNING, CITY OF	
	175	BENZENBERG PHILLIP G H	
	1150	C.C.W.D., West Point	
	1300	CAL DOMESTIC WATER CO.	
	16500	CARPINTERIA VALLEY WATER DISTRICT	
	165000	CASTAIC LAKE WATER AGENCY	
	225000	Contra Costa Water District	
	180	COUNTY SERVICE AREA 7	
	300	Crescent Mills IVCSD	
	75	DARWIN COMMUNITY	
	85000	El Dorado ID - Main	
	300	El Sobrante MWC	
	110000	Escondido - City of	
	6400	Imperial - City of	
	1650	KINNELOA IRRIGATION DIST.	

Category	Population	System Name	Category Description
	950	Leavitt Lake CSD	
	75	LITTLE BALDY WATER CO.	
	300	Madden Creek Water Company	
	1600	McCloud C.S.D.	
	3200	Meadow Vista County Water Dist	
	400	MERCED ADULT CORRECTIONAL FACILITY	
	150	MESCAL CREEK WATER INC.	
	17750000	METROPOLITAN WATER DIST. OF SO CAL	
	11100	MONTECITO WATER DIST	
	26000	Paradise Irrigation District	
	350	PAUMA VALLEY MUTUAL WATER CO	
	275	PIONEER SCHOOL	
	11500	Placer CWA - Auburn/Bowman	
	7500	Placerville, City of - Main	
	500	PLEASANTIMES MUTUAL WATER CO	
	19048	Rainbow MWD	
	69300	REDLANDS CITY MUD-WATER DIV	
	490	San Lucas County Water System	
	39000	Vallecitos WD	
	90100	Vista I.D.	
	45000	West Sacramento, City of	
	547	YUIMA MUNICIPAL IDA	
H	**18717968**	**TOTAL**	Total Costs for Category: $183,035,187

Category	Population	System Name	Category Description
I			**Systems meeting existing MCLs but not proposed microbial MCLs or the California Cryptosporidium A**
	8000	ACWA Buckhorn Plant	
	3600	Amador County Water Agency-Sutter Creek	
	6546	AVENAL, CITY OF	
	100000	AZUSA LIGHT AND WATER	
	14000	Bay Point-Southern California Water	
	2000	Bidwell Water Company, Inc.	
	24000	Calexico - City of	
	4800	Calistoga, City of	
	9500	Cal-Water Service Co.-Oroville	
	230	Camanche South Shore-EBMUD	
	120	CANTUA CREEK RELOCATION	
	264	Castle City Mobile Home Park	
	26800	City of Benicia	
	1568	City of Montague	
	42500	City of San Luis Obispo	
	650	City of Trinidad	
	130308	City of Vallejo	
	225000	Contra Costa Water District	
	1200	Cuesta La Honda Guild, Inc.	
	540	Deer Creek Park Association	
	125000	Desert Water Agency	
	1200000	East Bay MUD	
	85000	El Dorado ID - Main	
	66000	Elsinore Valley MWD	
	110000	Escondido - City of	
	30	FELGER FARMS	
	150	Fouts Springs Boy's Ranch	
	130	FRESNO COUNTY SERVICE AREA 30	

Category	Population	System Name	Category Description
	1330	Garberville Water Co.	
	5160	GOLDEN HILLS CSD	
	74000	GOLETA WATER DISRICT	
	1500	Graeagle Water Company	
	3000	HURON, CITY OF	
	2600	Idyllwild WD	
	1400	Indian Valley CSD-Greenville	
	500	Jensen Water Company	
	100	Junction City School	
	308	JUNE LAKE PUD VILLAGE	
	90000	KERN COUNTY WATER AGENCY	
	6900	LAKE ARROWHEAD CSD	
	2700	LAKE DON PEDRO C S D	
	50	Lake Perris SRA	
	0	LOPEZ PROJECT	
	5000	MAMMOTH CWD	
	177961	Marin Municipal Water District	
	2500	MARIPOSA PUBLIC UTILITY DIST	
	17750000	METROPOLITAN WATER DIST. OF SO CAL	
	2455	Nice Mutual Water Company	
	37670	North Coast County Water Dist	
	55000	North Marin Water District	
	77	O.W.I.D.-Bangor	
	205	O'NEILL CATTLE FEEDING CO	
	490	Pine Mountain Mutual Water Co.	
	11500	Placer CWA - Auburn/Bowman	
	2910	Placer CWA - Colfax	
	30500	Placer CWA - Foothill	
	2500	Plumas County Flood Control	
	34000	Ramona MWD	

Category	Population	System Name	Category Description
	69300	REDLANDS CITY MUD-WATER DIV	
	500	Resort Improvement Dist. No.1	
	374600	Sacramento, City of	
	1223400	San Diego - City of	
	1000000	San Diego - City of	
	1845	San Joaquin County - Colonial Heights	
	944000	San Jose Water Company	
	93932	SANTA BARBARA WATER DEPT	
	2000000	Santa Clara Valley Water District	
	993	SCWC Niland	
	2000	SCWC-Calipatria	
	750000	SF Public Utilities Commission	
	500000	Sonoma County Water Agency	
	250000	Stockton East Water District	
	5669	Thermalito Irrigation District	
	46500	Tracy, City of	
	11000	TUD - SONORA/JAMESTOWN WATER SYSTEM	
	620	TUD-Scenic View/Scenic Brook	
	105000	VENTURA WATER DEPARTMENT	
	3700	Weaverville C.S.D.	
	750	Weimar Water Company	
	485	Westhaven C.S.D.	
	600	WESTSIDE SCHOOL	
I	**27875146**	**TOTAL**	Total Costs for Category: $183,035,187

Category	Population	System Name	Category Description
J			**Significant sanitary defect involving sewage.**
	50	AVENUE E TRAILER PARK	
	0	CALLEGUAS MUNICIPAL WATER DIST	
	5800	CAMBRIA COMM SERVICES DIST	
	700	Camp Meeker Water Systems, Inc.	
	13000	City of Eureka	
	420	City of Tehama	
	52100	City of Tustin	
	550	Clear Creek CSD	
	225000	Contra Costa Water District	
	32000	CRESCENTA VALLEY CWD	
	300	Diamond Park Mutual Water Co.	
	665	EASTWOOD FARMS CWU	
	25	FULL CIRCLE PROGRAMS, INC.	
	30	Full Circle Sonoma	
	47865	GRIFFITH PARK	
	70	Harbor View Water Association	
	5000	IVANHOE PUBLIC UTILITY DIST	
	4000	LAKE AMADOR RECREATION AREA	
	1780	LAND PROJECT MUTUAL WATER CO	
	177961	Marin Municipal Water District	
	3450	Mather AFB - Wherry Housing Area	
	11000	MENDOTA-CITY	
	124400	Moulton Niguel Water District	
	55000	North Marin Water District	
	26000	Paradise Irrigation District	
	250	PARADISE RANCH MOBILE HOME PARK	
	85	Ponderosa Community Services District	
	1300	Rio Alto Water District	
	80	River Inn MHP	

Category	Population	System Name	Category Description
	18591	SANGER, CITY OF	
	159409	SCWC - SOUTHWEST	
	2660	Sierra Lakes County Water Dist	
	2500	STRATHMORE PUBLIC UTIL DIST	
	1875	Swan Lake Mobile Home Park	
	6000	Sweetwater Springs CWD - Guerneville	
	4000	Sweetwater Springs CWD - Monte Rio	
	450	The Oaks Community Association (Mobile Home Park)	
	2400	TWAIN HARTE COMMUNITY SERVICES DIST	
J	**986766**	**TOTAL**	Total Costs for Category: $92,725,027
K			**Disinfection facilities that have defects.**
	380	Alpine Springs County Water District	
	1200	ARROWHEAD MANOR WATER CO	
	60	Avalon Apartments	
	50	Banning Weigh Station - Caltrans	
	230	BIG OAK TRAILER COURT	
	80	BIG OAKS LODGE	
	3100	Borrego Springs WC	
	1200	Borrego WD	
	33765	CAL. CITIES - ORCUTT	
	20000	CAL. STATE POLYTECHNIC UNIV.- POMONA	
	51120	CALIFORNIA WATER SERVICE - LIVERMORE	
	1407	Cal-Trans Brookside Rest Area	
	5800	CAMBRIA COMM SERVICES DIST	
	200	CAMP CISQUITO	
	400	CAMPS MUNZ AND MENDEN HALLPROBATIO	
	26800	City of Benicia	
	58000	City of Pleasanton	

Category	Population	System Name	Category Description
	78120	City of Westminster	
	35	Corral de Tierra Estates	
	21000	CUCC - Antelope	
	3725	CUCC - Arden	
	42000	CUCC - Lincoln Oaks	
	31000	CUCC - Parkway	
	18232	CUCC - Rosemont	
	26075	CUCC - Suburban	
	4500	DELHI CWD	
	100000	DOMINGUEZ WATER CORP	
	200	ELKHORN ESTATES	
	66000	Elsinore Valley MWD	
	33	Feather Falls School	
	12994	FILLMORE WATER DEPT	
	25	FLORES WATER SYSTEM	
	475000	FRESNO, CITY OF	
	192000	GLENDALE-CITY, WATER DEPT.	
	180	Green Mountain Water Company	
	47865	GRIFFITH PARK	
	21000	Hemet - City of	
	130	JOSHUA VIEW TRAILER PARK	
	25	KERN CO P&R - GREENHORN MT. PARK WA	
	300	KEYS COMMUNITY SERVICES DISTRICT	
	120	Marconi Conference Center	
	97000	Mesa Consolidated WD	
	6380	Nevada ID - Lake Wildwood	
	10000	PETER PITCHESS HONOR RANCHO LA CO	
	3000	QUARTZ HILL HIGH SCHOOL	
	141	RANCHO SAN JOAQUIN	
	100	River Highlands CSD	

Category	Population	System Name	Category Description
	150	RIVERKERN MUTUAL WATER CO	
	12000	ROSAMOND CSD	
	300	SAN FRANCISCO YMCA-JONES GULCH	
	45000	San Juan Suburban Water District	
	2000000	Santa Clara Valley Water District	
	250	SEMI TROPIC SCHOOL WATER SYSTEM	
	750000	SF Public Utilities Commission	
	150	SLEEPY VALLEY WATER CO INC	
	200	So Trinity Unified School Dist.	
	8150	Southern Calif WC -Cowan Hgts	
	104517	Stockton, City of	
	25	Treasure Creek Woods MWC	
	20000	Valley of the Moon Water District	
	30	West Water Company	
	26	Whitewater Rest Area	
	350	Willowside School	
K	**4402120**	**TOTAL**	Total Costs for Category: $39,969,000
L			**Systems meeting existing MCLs but not future non-microbial MCLs or AIs.**
	240	AERIAL ACRES WATER SYSTEM	
	11563	ANTELOPE VALLEY E KERN WTR AGY	
	87137	ANTELOPE VALLEY-EAST KERN WATER AGENCY	
	1000	ARROWBEAR PARK CWD	
	12576	BALDY MESA CWD	
	1000	BODFISH WATER COMPANY	
	75	BRADLEY UNION SCHOOL DISTRICT	
	1300	CAL DOMESTIC WATER CO.	
	66000	CALIFORNIA WATER SERVICE - BEAR GUL	
	39100	CALIFORNIA WATER SERVICE - SAN CARL	

Category	Population	System Name	Category Description
	109000	CALIFORNIA WATER SERVICE - SAN MATEO	
	155300	California Water Service - Stockton	
	56200	CALIFORNIA WATER SERVICE-S SAN FRAN	
	4800	Calistoga, City of	
	12270	Cal-Water Service Co.-Marysville	
	200	Captain Cooper School	
	60000	CASITAS MUNICIPAL WATER DIST	
	165000	CASTAIC LAKE WATER AGENCY	
	26800	City of Benicia	
	39000	City of Yuba City	
	50000	COVINA IRRIGATION CO.	
	800	Cuyama Community Services District	
	54670	CWS Los Altos Suburban	
	2500	DEL SUR	
	1000000	East Bay MUD	
	350	ECHO VALLEY SCHOOL	
	90	EDNA BEAMAN SCHOOL	
	70	El Camino High School Water System	
	25	FULL CIRCLE PROGRAMS, INC.	
	604	GLENNVILLE SHOPPING CENTER	
	3300	Glenshire Mutual Water Company	
	1600	HOME GARDEN CSD	
	80	KEELER COMMUNITY	
	26800	LA PUENTE VALLEY CWD	
	0	LOPEZ PROJECT	
	8000	LOS ANGELES CO WW DIST 37- ACTON	
	300	Moss Landing School Water System	
	184	MUSTANG MUTUAL WATER SYSTEM	
	3787	Northern California Youth Center	
	2937	Pine Valley MWC	

Category	Population	System Name	Category Description
	69300	REDLANDS CITY MUD-WATER DIV	
	4807	RUNNING SPRINGS WATER DISTRICT	
	25	San Benacio School Water System	
	50000	SAN BERNARDINO VALLEY WD	
	151064	SAN GABRIEL VALLEY WATER CO - EL MON	
	944000	San Jose Water Company	
	2000000	Santa Clara Valley Water District	
	80000	SANTA MONICA-CITY, WATER DIVISION	
	31	SCHWEIKART WATER SYSTEM	
	750000	SF Public Utilities Commission	
	2260	SO CA WATER CO - MORONGO	
	1416	SO CA WATER CO-VICTORVILLE 5	
	870	SO CAL WC/MOR DEL NORTE	
	125	SUNRISE WMD	
	129700	THREE VALLEYS MWD	
	0	UNITED WTR CONS DIST	
	1300	WARRING WATER SERVICE INC	
	150	WASHINGTON UNION SCHOOL	
	2150	YUCAIPA VALLEY CWD ID-1	
	34000	YUCAIPA VALLEY WD ID-A&2	
L	**6225856**	**TOTAL**	Total Costs for Category: $405,784,000

Category	Population	System Name	Category Description
M			**Other waterworks standards defects.** *Note - primarily infrastructure repairs/upgrades.*
M		**Total Projects for 'Category' = M (1552 Projects)** (too numerous to list)	Total Costs for Category: $2,946,232,015
N			**Iron and/or manganese violations.**
	150	ACAMPO WATER SYSTEM	
	250	AMERICAN LEGION POST 376	
	41	Arlington Elementary School	
	406	BARRETT LAKE MOBILE HOME PARK	
	90460	CAL. WATER SERVICE CO.- HERMOSA/REDO	
	152820	CAL. WATER SERVICE CO.-EAST L.A.	
	600	Cal-American/Hidden Hills WS	
	4502	Calif Rehab Center - Norco	
	184040	CALIFORNIA WATER SERVICE - BAKERSFIELD	
	0	CALLEGUAS MUNICIPAL WATER DISTRICT	
	38754	CAMARILLO WATER DEPT	
	170	CAMP MINKALO	
	220	CAMP OWEN WATER SYSTEM	
	38700	Carmichael Water District	
	2500	Central Water District	
	210	City of Blythe, Hidden Beaches	
	66000	CITY OF LAKEWOOD	
	56000	City of Palo Alto	
	3107	City of Rio Dell	
	39000	City of San Bruno	
	98300	City of Santa Clara	
	28310	City of Santa Paula	
	8847	CITY OF SIGNAL HILL	
	3300	City of Williams	

Category	Population	System Name	Category Description
	200	CUYAMACA WATER DISTRICT	
	2590	CWS Las Lomas	
	4500	DELHI CWD	
	500	Dell Wayne/Village Green MHP	
	145	DELTA ISLAND ELEMENTARY SCHOOL	
	486	DURAND WATER COMPANY, INC	
	253705	EASTERN MWD	
	302	FAIR OAKS WATER SYSTEM	
	100	FAIRWAY DOWNS	
	68	FAIRWAY ESTATES	
	12994	FILLMORE WATER DEPT	
	5368	FIREBAUGH CITY	
	8460	Florin County Water District	
	246	Franklin Elementary School	
	15000	Fruitridge Vista Water Company	
	240	GARDEN FARMS	
	29630	HAWTHORNE-CITY, WATER DEPT.	
	100	HOOD WMD	
	2600	Idyllwild WD	
	350	Lassen County Water District #1	
	38000	Los Alisos Water District	
	100	Maharishi Vedic School	
	173	Mar Vista Water Company	
	500	MATT DILLON WATER COMPANY	
	7500	MAYWOOD MUTUAL WATER CO. #1	
	1000	MONO VILLAGE WATER DISTRICT	
	96	Mooreland Avenue Apartments	
	800	Newell County Water District	
	350	Oak Grove School	
	9900	Olivehurst PUD	

Category	Population	System Name	Category Description
	154558	OXNARD WATER DEPT	
	4000	Pajaro/Sunny Mesa Community Srvcs D	
	343	PINE HILLS MUTUAL WATER CO.	
	250	PINE VALLEY TRAILER PARK	
	5000	PLEASANT VALLEY MUTUAL WATER CO	
	430	Plumas Eureka CSD	
	300	Prunedale Mutual Water Association	
	575	RIVER LAND RESORT	
	2453	RIVERDALE PUBLIC UTILITY DISTRICT	
	450	RIVERSIDE COUNTY	
	490	San Lucas County Water System	
	610	SAN MIGUELITO MWC	
	6813	SATIVA-L.A. CWD	
	36000	SCWC - ARTESIA	
	159409	SCWC - SOUTHWEST	
	8000	SCWMD - Arden Park Vista	
	41840	Southern CA Water Co - Cordova Water	
	84737	Southern Calif WC - West Orange	
	1000	SQUIRREL MOUNTAIN WC	
	60	Strawberry Campground	
	6000	Sweetwater Springs CWD - Guerneville	
	102000	TORRANCE-CITY, WATER DEPT.	
	7500	TRACT 349 MUTUAL WATER CO.	
	2626	Trinity Co. W.W. Dist #1	
	11000	TUD - SONORA/JAMESTOWN WATER SYSTEM	
	550	Twin Hills School Dist-Apple Blosso	
	300	Twin Hills School Dist-Twin Hills S	
	200	Unitarian-Universalist Fellowship	
	2400	VENTURA CWWD NO. 19 - SOMIS	
	132	Vierra Canyon WS	

Category	Population	System Name	Category Description
	80	Willow Creek School	
	50	Woodside Water Association	
	70000	Yorba Linda Water District	
N	**1922846**	**TOTAL**	Total Costs for Category: $116,801,439
O			**Other water system deficiencies.** *Note - primarily infrastructure repairs/upgrades.*
O		**Total Projects for 'Category' = O (1041 Projects)**	Total Costs for Category: $2,515,832,157
		(too numerous to list)	
		Total Projects for all 'Categories' = (3579 Projects)	**$7,660,818,023 Grand Total**

note: Duplicate water systems in each category were removed to prevent double-counting for the category.
Categories M and O were not tallied as they mainly included infrastructure repairs; important, but not the focus of this study.
Not all water systems with water quality problems may have applied for the Fund; therefore, this list is not inclusive of all Californian residents.

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Surface water intake pipe, Upper Falls, near Fallen Leaf Lake, California.

This pipe was originally used as a potable water supply for homes, and is now used for irrigation.

Photo: M. Wilber, 2002