

## COMMENTS ON THE DRAFT PROGRAM ENVIRONMENTAL IMPACT REPORT FOR THE SAN FRANCISCO PUBLIC UTILITIES COMMISSION'S WATER SYSTEM IMPROVEMENT PROGRAM



*Figure shows water system facilities expected to fail in major earthquake on the San Andreas Fault*

VOLUME 1  
OCTOBER 1, 2007

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FOR THE SAN FRANCISCO PUBLIC UTILITIES COMMISSION'S  
WATER SYSTEM IMPROVEMENT PROGRAM**

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### List of Attachments

- Attachment 1 Detailed Comments on the Draft Program Environmental Impact Report for the Water Supply Improvement Program.
- Attachment 2 *“Impact of Earthquakes on BAWUA Customers, “* prepared by G&E Engineering Systems, Inc.
- Attachment 3 Ballot Arguments in Favor of San Francisco Water Bond Measures (November 2002)
- Attachment 4 Excerpts from The Greenbelt Alliance’s 2006 report *“At Risk: The Bay Area Greenbelt”*
- Attachment 5 BAWSCA’s *“Water Conservation Programs Annual Report FY 2006/07”* (also includes CD-ROM)
- Attachment 6 *“An Economic Evaluation of the Water Supply Reliability Goal in the SFPUC Water System Improvement Plan”* prepared by William W. Wade, Ph.D.
- Attachment 7 Affidavit of Anson B. Moran submitted to Federal Energy Regulatory Commission.

### Volumes 2 through 6 (Bound Separately)

BAWSCA Member Agencies’ Conservation, Smart Growth, and Local Supply Programs



Hand Delivery

October 1, 2007

Paul Maltzer, Environmental Review Officer  
San Francisco Planning Department  
WSIP PEIR  
1650 Mission Street, Suite 400  
San Francisco, CA 94103

**Re: Program Environmental Impact Report; Water System Improvement Program**

Dear Mr. Maltzer:

The Bay Area Water Supply and Conservation Agency (BAWSCA) appreciates the opportunity to offer comments on the comprehensive draft Program Environmental Impact Report (PEIR) which the Planning Department has prepared for the Water System Improvement Program (WSIP) being developed by the San Francisco Public Utilities Commission (SFPUC).

**1. BAWSCA'S INTEREST IN THE WSIP**

BAWSCA is an independent special district whose board of directors represents the 27 long-term contract customers of San Francisco in Alameda, San Mateo and Santa Clara counties. These neighboring communities include 16 cities, 9 water districts, an investor-owned public utility and Stanford University. The individual customers are listed, and their service areas are depicted, on Figure 1.

Figure 1. Map of BAWSCA Service Area



- |  |                                      |
|--|--------------------------------------|
| 1 Alameda County Water District          | 16 City of Millbrae                  |
| 2 City of Brisbane                       | 17 City of Milpitas                  |
| 3 City of Burlingame                     | 18 City of Mountain View             |
| 4 CWS - Bear Gulch                       | 19 North Coast County Water District |
| 5 CWS - Mid-Peninsula                    | 20 City of Palo Alto                 |
| 6 CWS - South San Francisco              | 21 Purissima Hills Water District    |
| 7 Coastside County District              | 22 City of Redwood City              |
| 8 City of Daly City                      | 23 City of San Bruno                 |
| 9 City of East Palo Alto                 | 24 City of San Jose (North)          |
| 10 Estero Municipal Improvement District | 25 City of Santa Clara               |
| 11 Guadalupe Valley MID                  | 26 Skyline County Water District     |
| 12 City of Hayward                       | 27 Stanford University               |
| 13 Town of Hillsborough                  | 28 City of Sunnyvale                 |
| 14 City of Menlo Park                    | 29 Westborough Water District        |
| 15 Mid-Peninsula Water District          |                                      |

Many of these customers rely on San Francisco for 100% of the water they distribute. All but one obtain more than 50% of their supply from the San Francisco regional system. Collectively, they purchase over two-thirds of the water which the SFPUC distributes, and pay over two-thirds of the cost of the regional water system. (In fiscal year 2006-07, customers represented by BAWSCA paid SFPUC over \$100 million.) The water purchased from San Francisco is redistributed to over 1.7 million residents in the neighboring communities that rely on the San Francisco regional system. Their interest, individually and collectively, in a reliable water system, and therefore in the Water System Improvement Program evaluated in the draft PEIR, is plain to see.

## **2. ORGANIZATION OF BAWSCA'S COMMENTS**

This letter addresses the major themes of the PEIR, with particular emphasis on the basic purpose of, and urgency for, the WSIP, and on the alternatives to it described in the draft PEIR. Attachment 1 to this letter contains our more specific, section-by-section review of the draft PEIR. We are also submitting separately bound volumes that provide additional information on, and illustrations of, wholesale customers' water conservation and efficiency measures, recycled water projects, and the "Smart Growth" that is encouraged by land use policies of San Francisco's neighboring communities. Finally, many of the individual wholesale customers which are members of BAWSCA will be submitting comments separately, addressing the elements of the draft PEIR that affect them directly and providing their individual perspectives on the PEIR and the program itself.

## **3. SUMMARY OF BAWSCA COMMENTS**

- The draft PEIR is a conscientious, and largely successful, effort to satisfy the requirements of the California Environmental Quality Act (CEQA) for program EIRs.
- However, the description of the program in the draft PEIR does not convey to the reader the fundamental purpose of, and driving motivation for, the WSIP: to protect the 2.5 million people who live in the area served by the San Francisco regional water system from the catastrophic consequences of the system's failure during an earthquake. Nor does it convey the urgency with which those residents, their elected officials, and the State Legislature expect the WSIP to be prosecuted to completion.

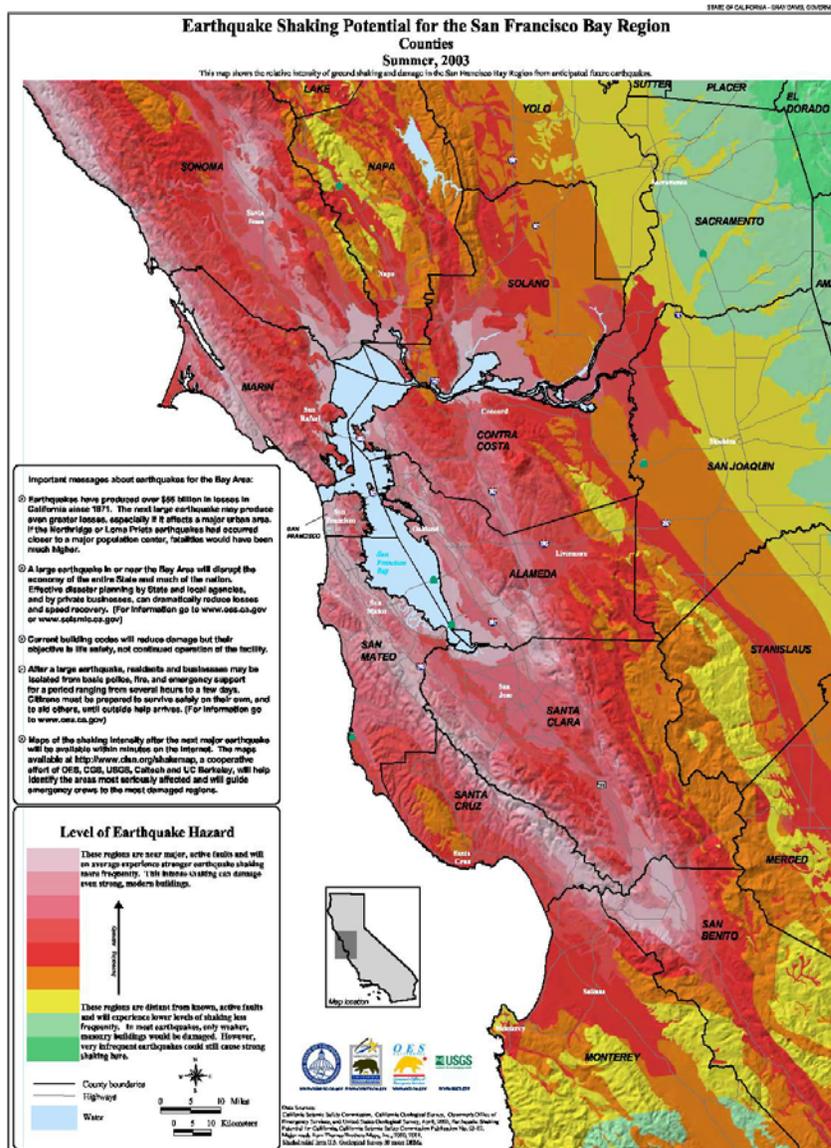
- Several of the alternatives to the WSIP presented in the draft PEIR are considerably worse from the environmental, public safety, public health, resource allocation and urban planning perspectives than the WSIP.
- The variant which would limit maximum systemwide rationing to 10% of normal use avoids significant environmental and economic harm in the Bay Area and can be achieved with no additional impact on flows in the lower Tuolumne River or to the agricultural economy in the San Joaquin Valley lands bordering the River. The economic impacts of the proposed program, which tolerates systemwide rationing up to 20% of normal use, are severe and are not adequately described in the draft PEIR.
- By contrast, the “Environmentally Superior Alternative” does indeed appear to be superior to the basic WSIP. It is described in only the most abbreviated, outline form in the draft PEIR. If we understand it correctly, its cornerstone is water agencies in the Bay Area providing economic incentives to encourage the Turlock Irrigation District and/or the Modesto Irrigation District, which currently divert large amounts of water from the Tuolumne River, to implement additional water conservation and reuse practices, thereby conserving at least the same amount of water as that to be diverted by the SFPUC over and above the City’s existing contractual commitments to its wholesale customers. BAWSCA endorses this alternative, although we believe its environmental values can be further enhanced, as we describe below in Section 7.

#### **4. THE FUNDAMENTAL PURPOSE OF THE WSIP -- PROTECTION AGAINST DISASTER**

The need for the WSIP is rooted in the hard science of plate tectonics. The San Francisco Bay Region lies on the boundary zone between two of the tectonic plates (the Pacific Plate and the North American Plate) that make up the Earth’s outer shell. The relentless motion of these plates as they grind past each other builds up strains that will eventually be released on the region’s many faults. A stark reality which those who live or work in the Bay Area must face is that geological forces of immense power will inevitably, violently and without warning be released in the earth beneath their homes, schools, hospitals, offices, factories, public utilities, and transportation systems. The map included below as Figure 2, entitled “Earthquake Shaking

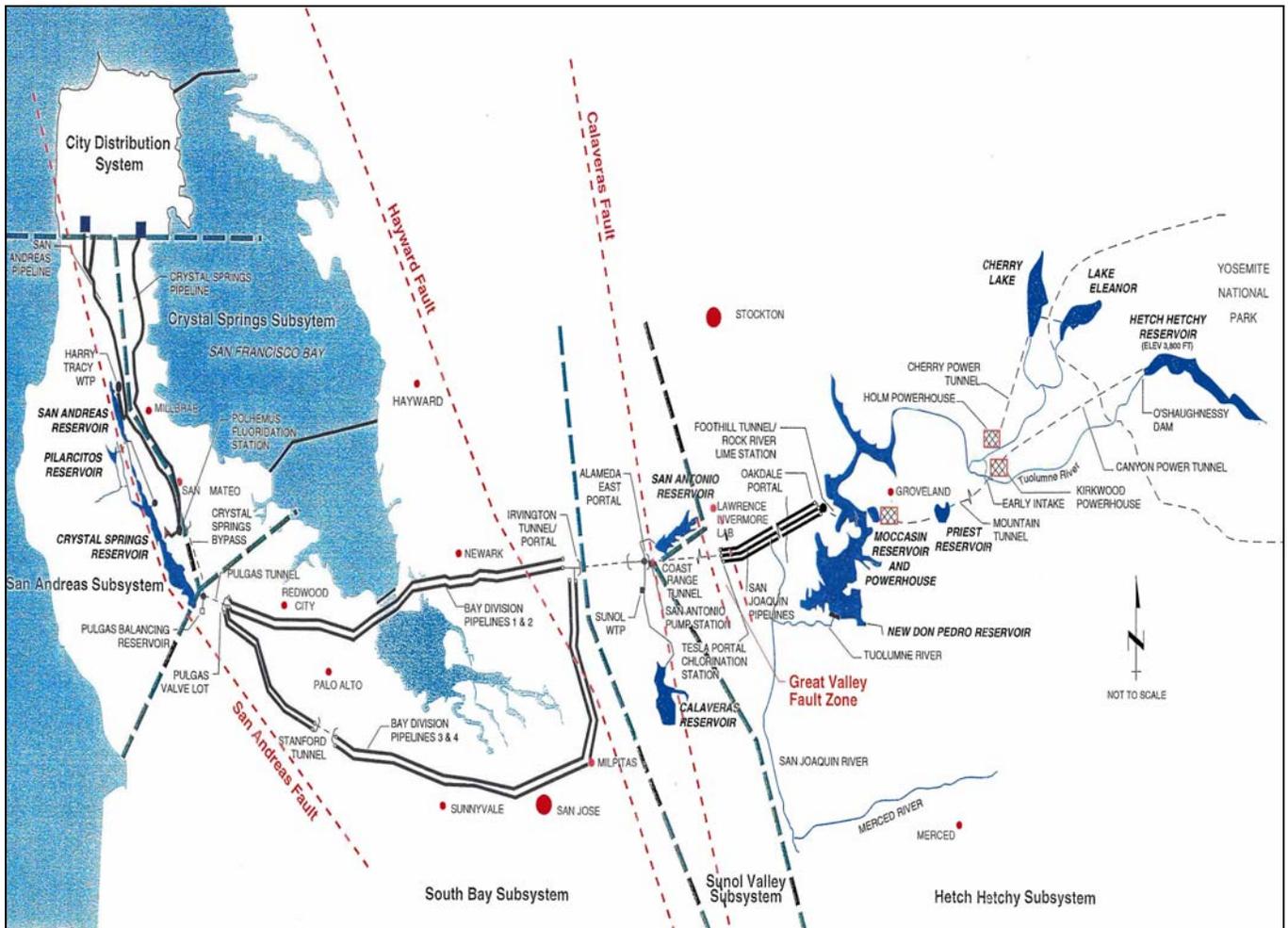
Potential for the San Francisco Bay Region Counties” graphically illustrates the potential of high intensity seismic activity concentrated in the four counties served by the San Francisco regional water system.

Figure 2.



Many of the regional water system facilities are located on, or very near, one or more active faults. The map reproduced as Figure 3 shows the location of the “backbone” storage, transmission, and treatment facilities in relation to the faults. The Calaveras Fault is directly below Calaveras Reservoir in Alameda County and crosses the pipelines that carry Hetch Hetchy water into the Bay Area. The San Andreas Fault is directly below both San Andreas and Crystal Springs Reservoirs in San Mateo County. The Hayward Fault intersects all four of the pipelines that deliver water from the East Bay to San Francisco, the Peninsula, and South Bay communities.

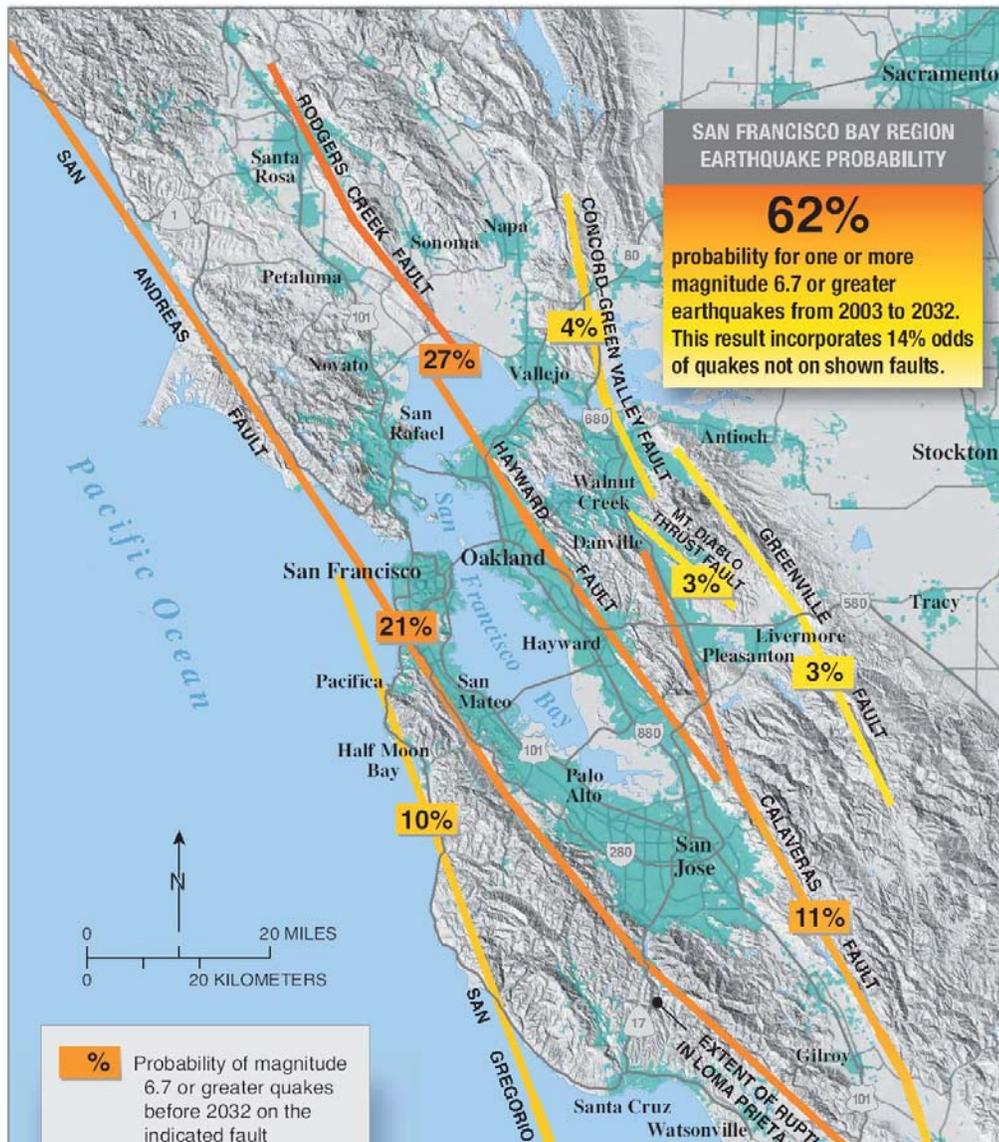
**Figure 3. Water System Facilities Cross Four Active Faults**



Source: San Francisco Public Utilities Commission

**The odds of a major earthquake striking the Bay Area in the near future are high.** On the basis of research conducted since the 1989 Loma Prieta earthquake, U.S. Geological Survey (USGS) and other scientists have concluded that there is a better than 60% chance of at least one magnitude 6.7 or greater earthquake, capable of causing widespread damage, occurring before 2032. (See Figure 4.)

**Figure 4. San Francisco Bay Region Earthquake Probability**



Source: USGS at <http://earthquake.usgs.gov/regional/nca/wg02/media.php>

The San Francisco earthquake of 1906 toppled buildings and shattered water systems from Santa Clara to Santa Rosa. Without water, San Francisco was unable to fight the fires that eventually consumed the City. The 1989 Loma Prieta earthquake caused billions of dollars of damage in San Francisco, Oakland, Santa Cruz and other communities. More recently, the consequences of the 1991 Oakland Hills firestorm would have been unimaginable had the municipal water system been inoperable. The following photographs (Figures 5 through 7) demonstrate the urgent need for the WSIP.

**Figure 5. Damage to San Francisco Marina District Buildings from 1989 Loma Prieta Earthquake**



*Source: U.S. Geological Survey*

**Figure 6. Aftermath of 1906 San Francisco Earthquake**



*Source: Karl V. Steinbrugge Collection, Earthquake Engineering Research Center, University of California, Berkeley.*

**Figure 7. 1991 Oakland Hills Firestorm**



*Source: NASA Ames Research Center*

**San Francisco Water System is old and poorly maintained.** Most of the backbone facilities of the regional water system are over 40 years old; many date from the 19th Century, as can be seen from Table 1 below, which identifies key components of the regional system that the SFPUC considers at high risk of failure.

**TABLE 1  
SFPUC Regional Facilities at High Risk of Earthquake Damage**

<u>Facility</u>	<u>Location (County)</u>	<u>Constructed</u>
Calaveras Dam	Alameda	1925
San Antonio Pump St.	Alameda	1968
Sunol Valley Treatment Plant	Alameda	1966
Alameda Siphons (3)	Alameda	1934,1953,1967
Irvington Tunnel	Alameda	1930
Bay Division Pipelines (4)	Alameda/Santa Clara/ San Mateo	1932,1936,1952,1967
Crystal Springs Pump St.	San Mateo	1975
Crystal Springs Bypass	San Mateo	1970
Lower Crystal Springs Dam	San Mateo	1898
Pilarcitos Dam	San Mateo	1866
San Andreas Dam	San Mateo	1875
San Joaquin Pipelines (3)	San Joaquin	1932,1953,1968
Coast Range Tunnel	Alameda/San Joaquin	1934

*Source: San Francisco Public Utilities Commission*

These structures were not designed to modern seismic engineering standards, and they have suffered decades of neglect. In June 1994, the San Francisco Board of Supervisors received a “Management Audit” of the San Francisco Water Department from the Board’s Budget Analyst.

The audit reported:

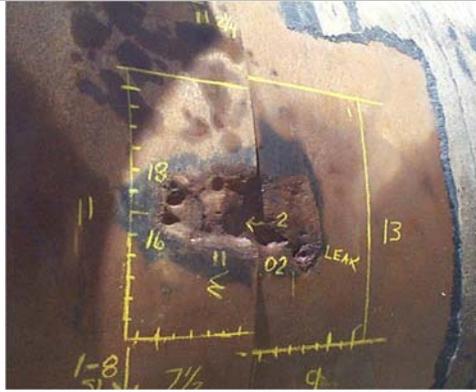
The Water Supply and Treatment Division [of the San Francisco Water Department] performs practically no preventive maintenance on the water supply facilities other than to its water treatment plants and certain valves in the Sunol area. As a result of this poor maintenance program, the Department’s water supply and treatment facilities are deteriorating more rapidly than they would if they had been maintained well. The water supply system has aged and, without proper maintenance, the potential for outages has increased. Pipeline corrosion, inoperable valves, and aged support structures contribute to reduced reliability.

Eight years later, a Public Utilities Infrastructure Task Force appointed by then-Mayor Willie Brown confirmed the assessment of a system in disrepair:

The Task Force and the PUC agree that the City's 100 year old public utility infrastructure is suffering from decades of deferred maintenance and less than benign neglect . . . .

As shown in Figure 8 below, the current state of disrepair of the regional water system infrastructure can no longer be tolerated.

**Figure 8. Deteriorating Water System Infrastructure**

<p>San Joaquin Pipeline showing extensive corrosion damage.</p>	<p>Water erupts from break in San Joaquin Pipeline in 2002.</p>	<p>One of two 70 year old pipelines crossing San Francisco Bay.</p>
		
<p>Source: San Francisco Public Utilities Commission</p>	<p>Source: San Francisco Public Utilities Commission</p>	<p>Source: Arthur Jensen</p>

**The system is likely to fail in a major earthquake.** Given the facilities' age, physical condition and proximity to active faults, it is not surprising that the engineering consensus is that many of these critical facilities would fail in a serious earthquake.

Calaveras Reservoir is normally the SFPUC's largest reservoir in the Bay Area. But, as shown in Figure 9, it has been drained to 30-40% of its capacity by order of the California Division of Safety of Dams, due to that agency's concern that it would not survive a large earthquake.

**Figure 9. Calaveras Reservoir at Reduced Capacity**



*Source: San Francisco Public Utilities Commission*

The following excerpts from engineering reports submitted to the SFPUC are illustrative. The reports consider three facilities that connect the Bay Area to the Hetch Hetchy water system and to Calaveras Reservoir.

**Bay Division Pipelines:** Given a large earthquake on the Hayward Fault in Fremont, it is very likely that both the Bay Division Pipelines No. 3 and 4 will break open. Leak rates will approach 300,000 gallons per minute. Total loss of water will be about 178 million gallons before breaks can be valved off. *Source: "Analysis of Bay Division Pipelines 3 & 4 at the Hayward Fault," prepared for the City of San Francisco Utilities Engineering Bureau, G&E Engineering Systems Inc., Report 22.02.06, Revision 0, August 24, 1999.*

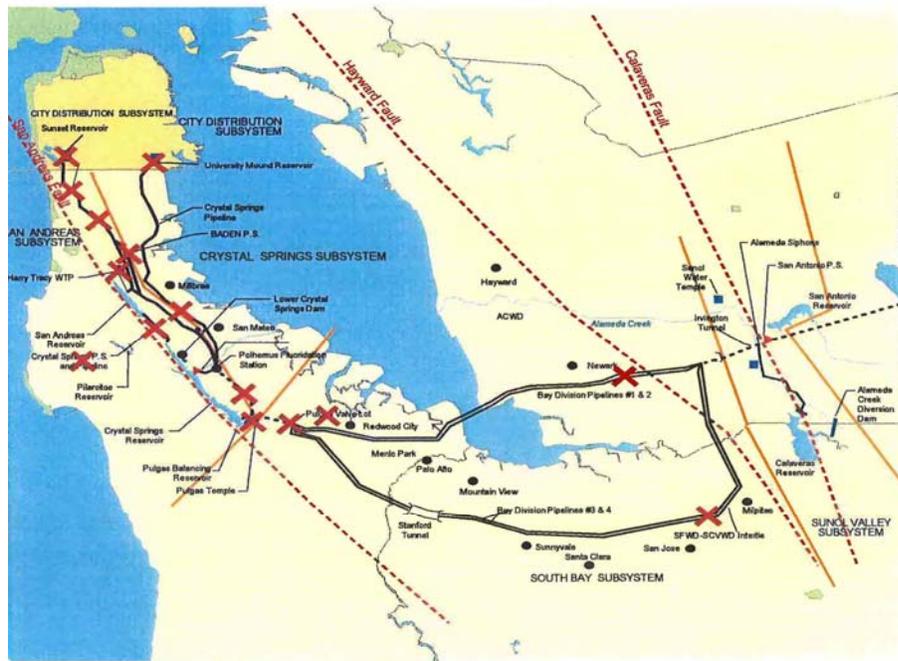
**Alameda Siphons:** The Alameda siphons are three buried pipelines, each 3,000 feet long, which cross the Calaveras fault. The pipelines, the oldest of which was constructed in 1934, are suffering from joint separation damage due to fault creep. Recent studies indicate that horizontal and vertical movements of up to 3 feet and 1.5 feet, respectively, can be expected during a maximum credible earthquake on the main trace of the Calaveras fault. None of these siphons were designed to withstand the movements associated with such a major seismic event. *Source: "Irvington Tunnel # 2 and Siphons Modifications," Executive Summary, Woodward-Clyde Consultants, prepared for the City of San Francisco Utilities Engineering Bureau, November, 1991.*

**Irvington Tunnel:** All Hetch Hetchy water plus that supplied by reservoirs located in the East Bay flows through this 3.5 mile long tunnel. It is a critical

lifeline facility to the 2.7 million people served by the system. Constructed in 1930, the tunnel has not been inspected or maintained since 1966 because it cannot be taken out of service due to high water demands and the lack of redundant facilities. Recent seismic studies have found the tunnel is subject to 6-inch movements on local minor faults that would result from major earthquake events on the nearby Hayward and Calaveras faults. The tunnel was not designed to accommodate even these small movements. Either fault is likely to generate, within the next 30 years, a maximum credible earthquake. *Source: "Irvington Tunnel # 2," Preliminary Engineering Study, Phase 4, Woodward-Clyde Consultants, prepared for the City of San Francisco Utilities Engineering Bureau, November 27, 1991.*

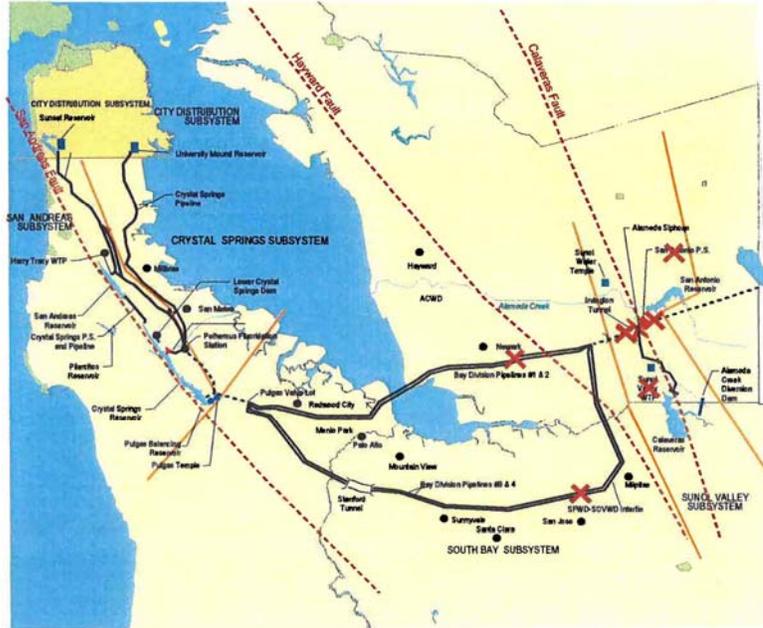
The maps reproduced as Figures 10 through 13 show the facilities that SFPUC expects to fail as a result of earthquakes.

**Figure 10. SFPUC Facilities Assumed to Fail in the Event of an Earthquake on the San Andreas Fault (Red Xs Indicate At-Risk Facilities)**



*Source: San Francisco Public Utilities Commission*

**Figure 11.**  
**SFPUC Facilities Assumed to Fail in the Event of an Earthquake on the Calaveras Fault**  
**(Red Xs Indicate At-Risk Facilities)**



Source: San Francisco Public Utilities Commission

**Figure 12.**  
**SFPUC Facilities Assumed to Fail in the Event of an Earthquake on the Hayward Fault**  
**(Red Xs Indicate At-Risk Facilities)**



Source: San Francisco Public Utilities Commission

**Figure 13.**  
**SFPUC Facilities Assumed to Fail in the Event of an Earthquake on the Great Valley Fault**  
**(Red Xs Indicate At-Risk Facilities)**



*Source: San Francisco Public Utilities Commission*

**Losing access to water for 30 days or more will create severe public health and safety dangers for millions of people.**

In 2001, the Bay Area Water Users Association (predecessor to BAWSCA) commissioned G&E Engineering Systems to describe the consequences to Bay Area communities from earthquake damage to SFPUC's water system. The report, a copy of which is included as Attachment 2, was prepared by John Eiding, a civil engineer greatly respected for his expertise in water system performance during and after earthquakes.

After confirming the SFPUC's own estimates of outages on the SFPUC water system from 20 to 60 days, Dr. Eiding pointed out some of the very practical consequences:

- ◆ Water will be unavailable for basic sanitation: bathing and flushing toilets will not be possible.
- ◆ Water will be unavailable for drinking or preparing food.
- ◆ Hospitals, skilled nursing facilities and other institutions such as universities, will have to close and relocate patients and students elsewhere.

- ◆ After a few days, firefighters will be without water necessary to fight fires, the incidence of which increases after earthquakes.

**Extended Loss of Water Will Have Disastrous Economic Consequences.** In October 2002, the Bay Area Economic Forum issued a report entitled "Hetch Hetchy Water and the Bay Area Economy."<sup>1</sup> The report based its conclusions on previous engineering analyses prepared for the SFPUC of the water system facilities likely to fail in a major earthquake on each of four active faults and on the time required to restore service.

The report is sobering:

A major reduction of water supplies will have serious effects on many of those most vulnerable -- the homebound elderly, children, hospital and nursing home patients, families displaced from their homes by earthquakes and fire. In attempting to minimize those impacts, local water agencies must make difficult choices within their service territories in assigning priority for water delivery. It is only after emergency, public health and drinking water needs are met that water might be made available for commercial and industrial uses. At the end of the rationing queue, and with few cost-effective alternatives, many businesses will be at serious risk.

Interviews with Bay Area commercial and industrial water users suggest the serious operational and economic impacts that would result from a Hetch Hetchy system failure. The most immediate and damaging impacts from a service interruption are in two areas:

*Health and Safety.* Businesses across the board say they would feel compelled to close buildings that could not provide running water in sinks, toilets and drains, and adequate water or pressure for fire sprinkling systems. Bottled water and portable toilets would be a limited and temporary solution at best.

*Plant operations.* Most large commercial and industrial complexes have rooftop cooling towers that run water through fan powered chillers. The water is then routed to building subsystems for drinking and sanitation, for filtration and use in industrial processes, and into closed fire protection and cooling system loops. Even a closed loop system loses water through evaporation and needs replenishing, or chillers will overheat and automatically close down. That in turn shuts off air conditioning, temperature-controlled laboratory environments, computer server clusters

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<sup>1</sup> The Bay Area Economic Forum is a partnership between the Association of Bay Area Governments and the Bay Area Council. The economic analyses in the Report were carried out by Dr. David Sunding and other economists from the University of California at Berkeley.

and water cooled equipment such as electrical generators and vacuum pumps.

Based on these considerations alone, most businesses experiencing a loss or severe reduction in water supply beyond 2-3 days would probably suspend operations or close down altogether.

*(Hetch Hetchy Water and Bay Area Economy, p. 14)*

The Bay Area Economic Forum report estimated that potential economic losses from a water supply interruption to the portions of the Bay Area served by the San Francisco regional water system would total at least \$28.7 billion for a major earthquake on the San Andreas Fault and \$17.2 billion for a similar event on the Hayward Fault. The components of the loss are quantified as shown Table 2:

**TABLE 2**  
**Economic Loss From Water Supply Interruption**

	<u>San Andreas Fault</u>	<u>Hayward Fault</u>
<b>Business Losses</b>		
Manufacturing	\$4.35 billion	\$3.45 billion
Wholesale/retail	7.70 billion	5.60 billion
Professional/scientific Technical	1.60 billion	.63 billion
Accommodations/Food Services	.54 billion	.20 billion
<b>Total Business Losses</b>	<b>\$14.2 billion</b>	<b>\$9.9 billion</b>
<b>Residential Losses</b>	<b>\$3.8 billion</b>	<b>\$1.5 billion</b>
<b>Fire Damage (water related)</b>	<b><u>\$10.7 billion</u></b>	<b><u>\$5.8 billion</u></b>
<b>TOTAL ESTIMATED LOSSES</b>	<b>\$28.7 billion</b>	<b>\$17.2 billion</b>

*Source: Bay Area Economic Forum Report "Hetch Hetchy Water and the Bay Area Economy," p. 29.*

In addition to these quantifiable near-term damages, the report observed that "the Bay Area economy would suffer irreversible long-term damage due to the failure of many businesses to reopen because of losses incurred during disruption, the permanent relocation of other businesses outside the region due to water security concerns, and the reluctance of new businesses to locate here for similar reasons. These permanent economic losses are difficult to estimate without more study, but would almost certainly be on a large scale."

### **The State Legislature Acts**

In 2002, the California legislature enacted AB 1823, the Wholesale Regional Water System Security and Reliability Act (Water Code Section 73500 *et seq.*). In passing this landmark legislation, the Legislature made specific and important findings about the risks the WSIP is designed to minimize.

The reliability of [the San Francisco regional] water infrastructure system is of vital importance to the health, welfare, safety, and economy of the region that it supplies.

In turn, this region is of vital importance to the entire State of California, because of the resident industries, universities, and commercial enterprises that employ millions of Californians and generate billions of dollars in exports and tax revenues to the state.

The regional water system is old, and designed to outdated seismic safety standards. The system either crosses, is located on, or is adjacent to, three major active earthquake faults, including the Calaveras fault, the San Andreas fault and the Hayward fault. Engineering investigations have disclosed that the system is at risk of catastrophic failure in a major earthquake. Many areas in all four counties served by the system face interruptions in their supplies of potable water for up to 30 days, and some areas could be without water for as long as 60 days.

Interruptions in water supply of this magnitude and duration to a densely populated metropolitan region would be disastrous for public health and safety and for the regional and state economy. In addition, uncontrolled releases of water from pipelines, tunnels, and reservoirs could create severe flood damage and environmental harm to fish and wildlife habitat in the communities in which water facilities are located.

Californians in neighboring counties, including those Californians outside the immediate service area of the regional system, will benefit from the implementation of the act adding this section. Access to a reliable supply of water is an important component of the infrastructure necessary to a prosperous metropolitan economy.

The state has concerns for the health, safety, and the economic strength of the region that warrant requiring San Francisco to take prudent steps to upgrade the regional water system in a timely manner.

*(Stats. 2002, Chapter 831, Section 1(c) through (h))*

### **San Francisco's Response**

While San Francisco opposed AB 1823, once it became law San Francisco political leadership, and its voters, took action. Measures passed by the voters in November 2002 embodied San Franciscans' recognition of the dangers posed by the fragile condition of the regional water system and their intention that the system be rehabilitated without delay.

Measure A authorized the SFPUC to issue \$1.6 billion in revenue bonds to restore the system, by far the largest bond issue in the City's history. The principal argument in favor of the measure, signed by a majority of the Board of Supervisors, warned:

If a serious quake were to occur today, there is a high probability that water delivery to San Francisco could be interrupted for more than two months. This would threaten our ability to fight fires after an earthquake and lead to an economic disaster as we attempted to recover without a stable water supply.

(Arguments in favor, including that submitted by former San Francisco Mayor and current United States Senator Diane Feinstein, are attached as Attachment 3.)

Measure E amended the City's Charter to give the SFPUC direction to fix the system and new authorities to enable it to do so quickly and efficiently. The measure added Section 8B.120 to the Charter; the new section reads, in part:

Hetch Hetchy Water and Power System is an irreplaceable asset of the people of the City and County of San Francisco. The system is fundamental to the economic vitality of San Francisco and the Bay Area. The voters of the City and County of San Francisco are committed to preserving and protecting the system as well as safeguarding the extraordinary quality of the water from Yosemite and local watersheds. The voters find that the protection, maintenance and repair of the system are among their highest priorities.

San Francisco faces an unprecedented challenge: to restore its aging water system to ensure a reliable Bay Area water supply through the next century. Repairs must be accomplished as quickly as possible to avoid system outages, which could be caused by natural disasters such as earthquake.

## **Conclusion**

It is now over five years since Governor Gray Davis signed AB 1823 into law. Much planning and analysis (including this draft PEIR) has been completed since then. But very little actual construction has been accomplished. The City and its neighboring communities remain at risk of being cut off from water after a major earthquake.

### **5. MOST OF THE ALTERNATIVES CONSIDERED IN THE DRAFT PEIR ARE WORSE THAN THE WSIP**

**A. No Program Alternative.** The No Program Alternative is unacceptable as a matter of social policy. It offers no environmental benefits when compared to the WSIP as proposed, and it risks an environmental, as well as human, disaster. Finally, it is of doubtful legality.

Abandoning the program will extend indefinitely the period of time that 2.5 million people remain exposed to the risks that the WSIP is designed to avoid. The draft PEIR identifies several of the consequences of the No Program Alternative under the heading of Feasibility.

The No Program Alternative would place the regional system at significant risk to seismic hazards, increased facility failures, and increased supply shortages on a day-to-day basis, as well as result in prolonged service disruptions to many customers in the event of an earthquake or other emergency due to inadequate facility redundancy and operational flexibility. In addition, this alternative could add substantial long-term costs due to the increased likelihood of facility failures and increased need for emergency repairs and replacement in the event of an earthquake or other emergency." We agree. We also agree that it "would raise some fundamental institutional issues regarding the ability of the SFPUC to fulfill its basic mission to provide reliable, high quality and affordable water to its customers.

*(draft PEIR p. 9-27)<sup>2</sup>*

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<sup>2</sup> While only feasible alternatives to a project need to be evaluated in an EIR (14 Cal. Code Regs. §15126.6(a)), consideration of the No Project Alternative, even if infeasible, is mandatory (14 Cal. Code Regs. §15126.6(e)(1)).

From the perspective of environmental harm, if an earthquake were to disrupt the supply of water to the Bay Area and the fires that typically accompany earthquakes in cities were to burn through large areas, a significant amount of carbon would be released to the atmosphere and polluted runoff would contaminate local streams and San Francisco Bay. The uncontrolled release of water from damaged pipelines could result in erosion and other environmental harm. In terms of human impact, water cascading from a shattered dam could result in far more serious consequences for those unfortunate enough to live or work in the path of the flood waters.

Moreover, a conscious adoption by San Francisco of the No Program Alternative would violate its contract obligation to wholesale customers to use its best efforts to keep the system in “good working order and repair” and would trigger reviews by the California Department of Public Health and the California Seismic Safety Commission, under AB 1823.

**B. The “No Purchase Request Increase” Alternative.** The stated purpose of this Alternative is to “avoid or minimize the potential growth-inducing effects and secondary effects of growth associated with providing more water to the regional customers.” (draft PEIR p. 9-41) But the draft PEIR acknowledges that limiting the amount of water San Francisco sells to its neighboring communities to 184 mgd (instead of the 209 mgd anticipated by the WSIP) is unlikely to have the desired effect. (“Thus, the growth-inducement potential under this alternative could be similar to that of the proposed program.... [T]he growth would occur anyway[.]” (draft PEIR p. 9-47) Furthermore, the draft PEIR also states that “withholding additional supply from the regional system to the wholesale customers would not necessarily reduce the growth in the communities within the service area.” (draft PEIR p. S-77) The draft PEIR observes on page 9-40 that, in the event that the SFPUC were to limit future water sales, the neighboring communities that purchase water from San Francisco would most likely pursue supplemental supply sources to accommodate the growth that is already planned for their communities. The draft PEIR also recognizes that tapping these alternative sources would itself have negative environmental impacts, but does not rigorously analyze those impacts.

Assuming that this Alternative could achieve its objective (limiting growth in the neighboring communities), the environmental impacts associated with growth would not be avoided. If growth were not to occur in the neighboring communities, it would be displaced to the periphery of the Bay Area, and eastward into the Central Valley. We agree with the draft PEIR's conclusion that the environmental impacts associated with such displaced growth, largely low-density and dispersed, would likely be far greater than those associated with the high-density, infill development which the WSIP seeks to accommodate in the existing SFPUC service area.

**(1) Growth Within the Existing Service Area Minimizes the Environmental Impacts of Development.** "Smart Growth" is a philosophy of land-use planning that is designed to avoid urban sprawl by advocating compact, transit-oriented development, with a range of housing choices. Why is Smart Growth smart? In addition to significant social and economic benefits of providing housing near where people work, Smart Growth offers considerable environmental benefits. Increased use of public transportation results in less traffic congestion, with a decrease in environmentally damaging emissions. Compact, dense housing results in lower per capita use of water and energy, with attendant environmental benefits. (See U.S. Environmental Protection Agency: *What Are The Environmental Benefits of Smart Growth*) A 2000 study found that compact development in New Jersey would produce 40 percent less water pollution than more dispersed development patterns. (Rutgers University, Center for Urban Policy and Research. *The Costs and Benefits of Alternative Growth Patterns: The Impact Assessment of the New Jersey State Plan 2000*, available at <http://www.nj.gov/dca/osg/plan/impact.shtml>.)

A concise, comprehensive statement of the purpose and benefits of Smart Growth appears in a recent issue of The Yodeller, published by the San Francisco Bay Chapter of the Sierra Club. Its author, Katie Crecelius, a founding member of the Marin Environmental Housing Collaborative, makes the following points:

- The Bay Area economy needs thoughtful, controlled, "smart" development. Stopping real-estate development would stifle

our economy, upon which we depend for jobs and for tax income to pay for parks, police, schools, roads, etc.

- The lack of housing affordable to workers creates significant difficulties for Bay Area employers in recruiting and retaining employees.
- To support thoughtful development while protecting Bay Area open-space buffers and greenbelts, elected officials need to allow higher densities in infill areas.
- To begin to reduce greenhouse-gas emissions, we need increased opportunities for public transportation. Public transportation ridership depends upon population and job concentration near transit stops.
- To reduce vehicle miles traveled, the Bay Area needs housing located near job centers. This housing needs to be affordable for households of all income ranges.
- Land within walking distance of public transportation is precious. Such a scarce resource should be fully utilized.

*(The Yodeller, September-October, 2007, p.4)*

Planned growth in San Francisco's neighboring communities is consistent with these goals and realities. Most of San Francisco's neighboring communities are already built up and largely urbanized, located close to transit corridors and transportation hubs. Most of the large development projects recently built or currently planned within the SFPUC service area will utilize compact building design in already existing communities near a variety of transportation choices. Such development creates a range of housing opportunities and choices while preserving open space, natural beauty, and critical environmental habitats.

Four examples indicated below as Figure 14 demonstrate the Smart Growth trend in San Francisco's neighboring communities. Other examples are collected in Volumes 2 through 6.

### Figure 14. Examples of Smart Growth

Bay Meadows Project in San Mateo, is a mixed-used development located on a former practice horseracing track adjacent to the actual horseracing track. It is a thriving residential, office and retail community that includes 734 housing units for multifamily and single family residents, 98,000 square feet for retail purposes as well as 750,000 square feet of office space. It is also approximately a half a mile away from the Hillsdale Commuter Rail Station, providing a convenient commute to San Jose and San Francisco. The Sierra Club currently features Bay Meadows in "Building Better, A Guide to America's Best New Development Project" and has also endorsed an expansion of the Bay Meadows Project to create Bay Meadows II.



Whisman Station in Mountain View, is located on the former 40-acre GTE complex site. This project features 500 units, all within easy walking distance from a new lightrail station.



The Crossing in San Bruno, is a 20-acre mixed use master planned development located on a former U.S. Navy facility. The Crossing is located near shopping and is less than one half mile from the new San Bruno BART Station. The Crossing has received national attention for both its transit-oriented development characteristics and its potential to redefine the City of San Bruno. The Crossing will include 1,063 multifamily and senior housing residences, 300 to 500 hotel rooms, a recreation center and commercial uses.



Rivermark in Santa Clara consists of 1800 units of medium and high density housing. Its compact design requires significantly less irrigation than more traditional single family developments. Rivermark makes extensive use of recycled water. In April 2004, Rivermark won 17 awards from the Home Builders Association of Northern California including the Community of the Year Award for High Density Homes in Northern California.



(2) **The PEIR Should Include a More Thorough Analysis of the Consequences of Displaced Growth.** The California Department of Finance forecasts that, by 2030, more than 45 million people will live in California, an increase of 37% over the State's population in 2000. (Cal. Dept. of Finance Projections available at <http://www.dof.ca.gov>) These people will live somewhere. If growth does not occur in the SFPUC service area, it is likely to occur instead on the eastern and southern fringes of the Bay Area, as well as in the communities on the western borders of the San Joaquin Valley. These fast growing communities are already under extreme development pressure. A recent California Supreme Court case indicates that the environmental consequences of displaced growth should be considered in the preparation of an EIR. (*Muzzy Ranch, Co. v. Solano County Airport Land Use Commission* (2007) 41 Cal. 4th 372.) However, the draft PEIR does not compare the impacts of such displaced growth to the impacts of the growth the WSIP will accommodate in San Francisco and its immediately adjacent neighboring communities. At a minimum, such a comparison should address the following four potential impacts.

(a) Air Pollution. One consequence of the expansion outward from the urban core of the Bay Area is the need to drive. Although most Californians (even city dwellers) love their cars, residents of more compactly developed areas drive less than those who live in low-density, suburban/exurban areas where driving is a necessity. (Sierra Club, *Sprawl Report 2001*; see also Sierra Club *Fact Sheet. Population Growth and Suburban Sprawl: A Complex Relationship*) The Metropolitan Transportation Commission estimates that the weekday vehicle miles traveled (VMT) per person in Solano County will increase by 71% between 2007 and 2030. (MTC *Projections 2007 and Projections 2030*) By contrast, the MTC projects VMT in San Mateo County to increase over the same time period at less than a third of that rate. Increased air pollution is the one of the most obvious effects of increased automobile traffic. Pollution caused by motor vehicles has demonstrable environmental and health impacts, as well as contributing to the inexorable warming of our planet's atmosphere.

(b) Water Pollution. Increased driving can also affect water quality. Exhaust particles from tailpipes are deposited on roadways, leaving a toxic residue that is washed into waterways by rainfall. Such storm water runoff is a major contributor to water

quality problems. (EPA, *Our Built and Natural Environment* (2001) at p. 15; see also NRDC *Paving Our Way to Water Shortages*) More cars require more roads, impervious to runoff. Not only does increasing the area of impervious surfaces lead to higher runoff volumes, but it can cause larger and more frequent incidents of local flooding, longer periods of below-normal stream levels, reduced groundwater recharge, and other negative effects such as increased sedimentation, increased water acidity, and higher water temperatures. (EPA, *Our Built and Natural Environment* at p.19)

(c) Water Demand and Infrastructure. Displaced growth outside of the service area will not only impact water quality, but will also put increased stress on water supplies. People living in the hotter inland counties have substantially higher per-capita water use than those living in more urbanized coastal areas. Unlike the Smart Growth within the SFPUC service area, characterized by dense, compact housing, inland areas generally have single family homes on large lots. These larger lots have higher water use--especially outdoor water use. In fact, outdoor water demand for typical residential lots in an inland area is between two and three times higher than in the more compactly developed areas that make up most of the SFPUC service area. (Public Policy Institute, *Lawns and Water Demand in California*, (2006))

According to the Sierra Club, households in low density subdivisions (one-acre lots) use more than twice as much water per household as households in more densely developed areas (1/3 acre lots). ([www.sierraclub.org/sprawl/density/water.asp](http://www.sierraclub.org/sprawl/density/water.asp)) Water consumption is again reduced by half when there are ten households per acre. Much of San Mateo County's population lives in areas where there are between 10 and 25 people per acre. This population density is expected to increase by 2030, as most areas will add 1-5 people per acre, and some areas of the county will add as many as 25 people per acre. (MTC *Projections 2005* as expressed in *Focusing Our Vision: Network of Neighborhoods*, available at <http://gis.abag.ca.gov/website/fov/viewer.htm>.) By comparison, average density in San Joaquin County is only eight persons per acre.

Adding population to already built-up areas requires little in the way of increased infrastructure. By contrast, displaced growth in the outer fringes of the Bay Area will require new roads, treatment plants, storage tanks, and water distribution and sewer collection mains, all of which carry their own environmental impacts.

(d) Loss of Agricultural Land and Endangered Species Habitats.

Outside San Francisco itself, and the densely populated Bay Plain, the Bay Area still supports orchards, ranches, and farms. Indeed, these agricultural lands are essential components of the increasingly popular Farmers' Markets which provide local produce to urban residents. According to the Greenbelt Alliance, these are the lands most directly threatened by development, while San Francisco and the neighboring communities to which it supplies water contain very few such areas.

The Greenbelt Alliance's 2006 report "At Risk: The Bay Area Greenbelt" stresses that the neighboring communities that are San Francisco's wholesale customers are NOT the communities at risk of conversion to sprawl. (See excerpts from Report included as Attachment 4.) In a county-by-county analysis, the report highlights the following about the BAWSCA area:

- San Mateo County is singled out as "a leader in protecting land over the last five years." The report notes that since 2000, "four new BART stations in the County and the connection of BART to Caltrain at Millbrae have created valuable new opportunities for regional integration and smart growth in San Mateo County."
- Since 2000, the City of San Jose has protected more than 20,000 acres of land. The City envisions the gradual redevelopment of the industrial North First Street area (served only by SFPUC water) as a high density residential area.
- In Alameda County, the report acknowledges Fremont's hillside protection ordinance and describes the County as having "made significant progress in securing its greenbelt." The "hot spots" at risk of conversion to sprawl are outside the SFPUC service area, mainly in the east county cities of Livermore, Pleasanton, and Dublin.

While sprawl is a concern in the eastern portion of Alameda County, the Central Valley is at even greater risk of losing its agricultural base to overdevelopment. The Central Valley's best farmland is being developed quickly and with alarming inefficiency, often by converting actively farmed land into "ranchettes." (American Farmland Trust, *The Future is Now: Central Valley Farmland at the Tipping Point*) These properties can be as large as 20 acres and are not farmed at all. Not only do such ranchettes house very few people on a large amount of land, they also pose challenges to agriculture from land use conflicts, making it increasingly expensive for those who wish to continue to farm the land. Finally, they contribute to land price inflation, which provides incentives for farmers to sell even more land for development.

Displaced growth will also destroy land that is the habitat of important species. In fact, habitat destruction is the main factor threatening 80 percent or more of the species listed under the Endangered Species Act. (EPA, *Our Built and Natural Environments* at p. 13) For example, in 2001, the U.S. Fish and Wildlife Service designated more than four million acres of land near Livermore, on the eastern fringe of the Bay Area, as essential for the recovery of the threatened California red-legged frog, which breeds in the weedy creeks hidden in the hollows of this landscape. Today, only 11 percent of that original landscape remains as a viable habitat for this threatened species. (See Attachment 4.)

The Natural Resource Defense Council lists ten ways to improve the Bay Area's environment. The top four are: conserve energy, conserve water, drive less, and move to a compact neighborhood. (*The Green Gate: NRDC's Environmental Guide to the San Francisco Bay Area*) The WSIP accommodates growth while permitting all four of these goals to be achieved. Displaced growth that is likely to occur under the "no more water" alternative likely will achieve none of them.

**(3) Most of the Planned Growth to be Accommodated by the WSIP Has Already Been Analyzed in CEQA-Approved Documents.** The draft PEIR compares the growth projections used as the basis for each of the wholesale customers' 2030 water demand estimates, and the growth projections presented in general plans of jurisdictions in the SFPUC service area that have already undergone CEQA analysis. The draft PEIR concludes that these

two growth projections are generally comparable. We agree. Attachment 1 contains a more detailed discussion of the adequacy of the draft PEIR's analysis of growth-induced impacts.

**(4) A Decision by San Francisco to Restrict Water Deliveries to Neighboring Bay Area Communities Jeopardizes San Francisco's Water Rights.** A

fundamental principle of California water law is that appropriative water rights, including those obtained prior to 1914, may be lost through non-use. *Smith v. Hawkins* (1895) 110 Cal. 122. A pronouncement by San Francisco that it will forego any future increase in diversions from the Tuolumne River, beyond those necessary to satisfy existing contractual commitments, risks the permanent loss of those valuable rights, with consequences that need to be described in the final PEIR.

In addition, such a decision, motivated by a desire to exercise control over development outside San Francisco's jurisdictional boundaries, would be inconsistent with (1) the premises underlying the Raker Act, (2) BAWSCA agencies' status as co-grantees of the Raker Act, (3) San Francisco's responsibility under California law as fiduciary of assets acquired from the federal government, and (4) the existing policy of the SFPUC Resolution No. 93-0084.

**Conclusion**

The "No Purchase Request Increase" Alternative is not likely to achieve its stated goal of limiting growth in San Francisco's neighboring communities. Moreover, this goal runs counter to sound public policy. This Alternative will discourage Smart Growth in the urbanized core of the Bay Area, and will encourage instead sprawl at the periphery and in the Central Valley, with environmental impacts far more significant those of the WSIP. Finally, its feasibility is questionable given the hazardous legal and political uncertainties that surround this misguided alternative.<sup>3</sup>

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<sup>3</sup> Under CEQA, a program's legality must be considered in determining feasibility. (See Guidelines section 15364 ("Feasible" means "capable of being accomplished . . . taking into account economic, environmental, legal, social, and technological factors."))

**C. The Aggressive Conservation/Water Recycling/Local Groundwater**

**Alternative.** The wholesale customers already have a diverse supply portfolio, including water recycling and local groundwater, as well as desalination. These alternative sources meet one third of the customers’ supply needs. Given the wholesale customers’ current low water use and the conservation and local supply projects that they already have in place or have built into their projections of demand, we agree with the draft PEIR’s conclusion that it is not feasible to reduce demand for water from the regional system by an additional 19 mgd.

**(1) The Draft PEIR Rightly Concludes that the Assumption of an Additional 19 Mgd of Water Conservation and Recycling is Infeasible.**

(a) Residential per capita water use in the Bay Area is lower than in any other region of California. BAWSCA member agencies and their customers are dedicated to conserving and recycling water. While residential per capita use in the San Francisco Bay Area is the lowest of any of the ten hydrologic regions in the State, the 1.7 million residential customers of BAWSCA members use less than the average for the Bay Area as a whole. (See Table 3.)

**TABLE 3  
Total Residential Demand by Hydrologic Region**

<u>Region</u>	<u>Total Residential Demand (Gallons Per Person Per Day)</u>
Colorado River	338
South Lahontan	265
Tulare Lake	242
San Joaquin River	220
South Coast	132
North Lahontan	133
Sacramento River	177
Central Coast	116
North Coast	123
San Francisco Bay Region*	97
<b>SF Wholesale Customers</b>	<b>88</b>

*Source: California Department of Water Resources, The California Water Plan Update, May 2005, Bulletin 160-05 Public Review Draft*

*\* The San Francisco Bay Region includes all or portions of nine Bay Area counties*

Even though the wholesale customers' per capita use is less than that in all other regions of the State, residential per capita water demand is still projected to decrease 3%, from 88 gallons per capita per day (gpcpd) in 2005 to 86 gpcpd in 2030. (*Projected Water Usage for BAWSCA Agencies*, Brown and Caldwell (2006)) Gross per capita water demand (which includes water use by industrial, commercial, institutional, and municipal customers) in the wholesale service area is also projected to decrease, from 165 gpcpd in FY 2005 to 160 gpcpd in 2030. (*BAWSCA Annual Survey, FY 2005/2006, Projected Water Usage for BAWSCA Agencies*, Brown and Caldwell)

(b) Wholesale customers have outpaced southern California companies in water conservation. Some have argued that the Bay Area should be able to achieve savings similar to those achieved by the Metropolitan Water District in Southern California: a 16% reduction in water use from 1990 to 2003 despite a 14% increase in population. (*From Tuolumne to Tap: Pursuing a Sustainable Water Solution in the Bay Area*, Tuolumne River Trust (July 2007) p. 22) In fact, the customers served by the BAWSCA agencies have reduced their use significantly over a similar period. Despite an 18% increase in population between 1986 and 2003, overall water demand remained flat and residential per capita demand decreased by 11%. Today's residential per capita water use is 15% less than it was in 1986, before the last drought, and 23% less than before the drought of 1976-1977. (*BAWSCA Annual Survey, FY 2005/2006*)

Moreover, despite its recent downward trend, per capita use in Southern California is still higher than that of the wholesale customers, and will remain higher in 2030. (*Regional Urban Water Management Plan* (MWDSOC, November 2005); *Projected Water Usage for BAWSCA Agencies*) Consider the following comparisons:

- In 1986, the gross per capita water use in Metropolitan Water District's service area was 200 gpcpd, 10% higher than for the wholesale customer area in that year (182 gpcpd).
- Metropolitan Water District's gross per capita water use in 2030 is projected to be 191 gpcpd, 19% higher than the corresponding projected demand of 160 gpcpd in the

wholesale customers' service area in 2030. (*Projected Water Usage for BAWASCA Agencies*)

Looking to the future, the wholesale customers are projecting a 19% increase in population and 31% increase in employment. (*SFPUC 2030 Purchase Estimates Technical Memorandum, URS (2004)*) Despite this increase in population and jobs, wholesale customer water demand (including sources other than the regional system water) is predicted to increase by only 19%. (*SFPUC 2030 Purchase Estimates Technical Memorandum*)

**(2) The Neighboring Communities Have Committed to Increased Water Use Efficiency as Part of Their Plans for 2030.** The wholesale customers, collectively, anticipate 13 mgd savings from implementation of conservation programs in their service areas as well as 25 mgd of conservation savings due to continuous implementation of the existing plumbing codes. These conservation savings have already been built into the forecast of demand used in the PEIR. In developing their 2030 purchase estimates, the wholesale customers examined the nine quantifiable California Urban Water Conservation Council Best Management Practices for Urban Water Conservation plus an additional 23 water conservation measures. (*SFPUC Wholesale Customer Water Conservation Potential*)

In addition to conservation "best management practices" implemented by individual wholesale customers, BAWSCA has implemented regional water conservation programs since 1998 and has expanded these programs to include:

- Water Efficient Residential Washing Machine Rebate Program
- School Water Education Program
- Large Landscape Audit Program
- Low Water Use Landscape Education Classes (for landscape designers and gardeners)
- Water Efficient Landscape Educational CD-ROM
- High-Efficiency Toilet Rebate Program

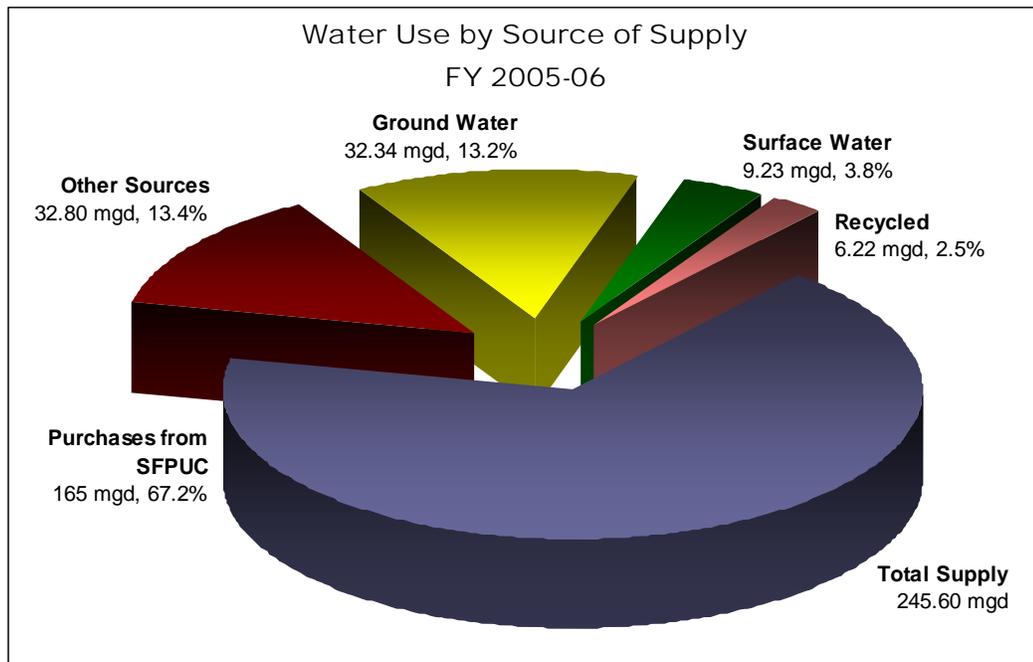
In addition, in fiscal year 2007-2008, BAWSCA will be adding a commercial washing machine rebate program. BAWSCA has joined with the SFPUC in the "Water Saving Hero" public

education campaign, with billboards, posters, newspaper display ads, and radio spots featuring ordinary people adopting simple water conservation practices in everyday life. The Fiscal Year 2006-2007 report on BAWSCA's conservation programs, along with a Water Efficient Landscape educational CD, is included as Attachment 5.

**(3) Collectively, the Agencies that Purchase Water From the SFPUC Have a Diversified Portfolio of Water Supplies to Meet the Demands of Their Customers.** In addition to purchases from the regional water system, BAWSCA agencies have already developed local water supplies (including surface water, desalinated water, groundwater, and recycled water), as well as contracts with the State Water Project and Santa Clara Valley Water District.

Figure 15 below shows the distribution of supply sources utilized by the BAWSCA agencies in FY 2005/2006. (BAWSCA Annual Survey, FY 2005/2006)

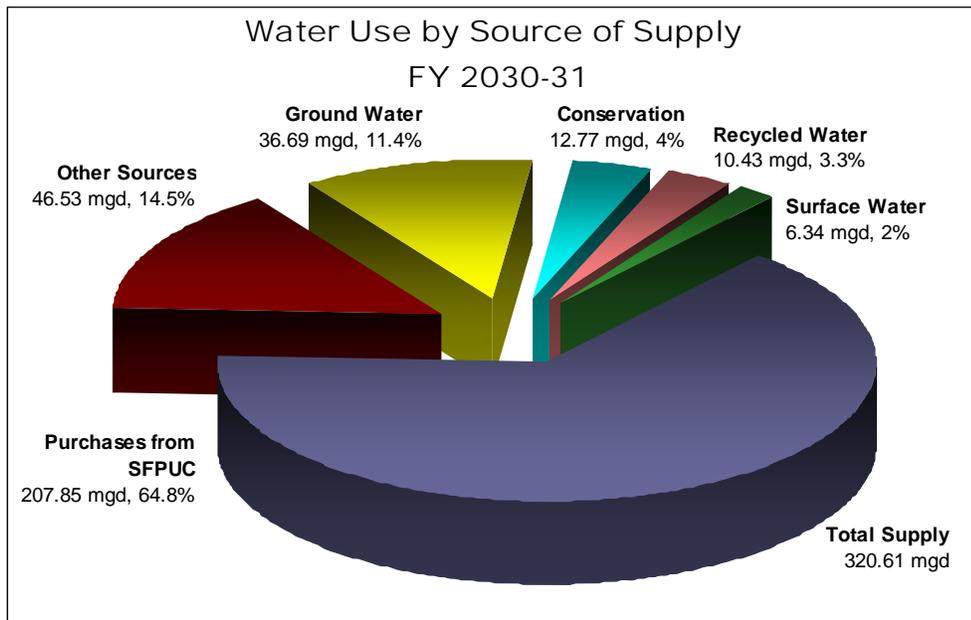
**Figure 15.**



Currently, 81 mgd (about 33% of the total wholesale customer water demand) is provided by sources other than the San Francisco regional water system.

By 2030, the contribution from sources other than the San Francisco regional system is projected to increase by 40%, to 113 mgd. (*BAWSCA Annual Survey, FY 2005/2006*) Desalination will increase from 5 mgd to 10 mgd and recycled water from 6 mgd to 10 mgd. The largest contribution to increased water supply from a non-regional system source will come from water conservation: 38 mgd, which includes the 13 mgd in new conservation programs shown in Figure 16, and the 25 mgd attributable to installation of water-efficient, code-compliant plumbing fixtures which is embedded in the wholesale customers' demand projections themselves and therefore not evident in Figure 16.

**Figure 16.**



By contrast, San Francisco is nearly 100% reliant on the regional system for meeting demands of its in-City and other retail customers such as the San Francisco Airport. San Francisco has had plans for decades to increase its groundwater and recycled water supplies, but San Francisco's only recycled water plant, the McQueen Treatment Plant in Golden Gate Park, was shut down in 1981. Since that time, San Francisco has developed less than 1 mgd of tertiary-treated

recycled water which is used for wash-down operations within the water treatment plant itself. (*San Francisco Urban Water Management Plan (2005)*) The additional 10 mgd of conservation, recycling and groundwater in the San Francisco retail area that the WSIP projects to be achieved by 2030 will finally bring San Francisco more in line with the water supply operations of its wholesale customers.

**(4) There are Significant Negative Impacts Associated with this Alternative Including Impacts on Public Health, Demand Hardening and Environmental Impacts Identified in the Draft PEIR.** The goal of the Aggressive Conservation Alternative is to address the impacts to the Tuolumne River, Alameda Creek, and the Peninsula watershed that are associated with the preferred Program. In fact, the Modified WSIP alternative does a significantly better job at reducing the overall identified impacts. Moreover, the Aggressive Conservation Alternative creates three additional potentially significant water supply and system operations impacts when compared to the Modified WSIP. Specifically, the Aggressive Conservation Alternative would have the following impacts beyond the Modified WSIP:

- Impacts on the rainbow trout fishery resources between Alameda Creek and Calaveras Reservoir;
- Impacts on the recreational experience of hikers on the Alameda Creek in the Sunol Regional Wilderness resulting from reduced in stream flows during winter and early spring months; and
- Impacts on visual effects along the Alameda Creek in the Sunol Regional Wilderness area resulting from WSIP-induced reduction in stream flows.

(a) Demand Hardening makes droughts harder to bear, such that increased rationing may have significant economic and lifestyle impacts. One by-product of the Aggressive Conservation Alternative is the hardening of demand in the service area. Water conservation activities “harden” demand since they incorporate continuous water savings into baseline demands. Therefore, the next increment of water use reduction becomes significantly more difficult to achieve. When demand is hardened, a water supplier faces greater challenges

in achieving rationing targets without significant impacts on residential, business and industrial customers.<sup>4</sup>

A recently released study “Measures to Reduce the Economic Impacts of a Drought-Induced Water Shortage in the SF Bay Area” (Public Financial Management/Bay Area Economic Forum (PFM/BAEF) (May 2007)) examined the economic impacts of water rationing on the commercial and industrial sectors in the SFPUC’s service area. One key finding of this analysis addressed the impact of demand hardening and acknowledged that “Residential demand becomes more difficult to reduce as additional conservation measures are implemented; demand hardening is real.” (PFM/BAEF Report)

The draft PEIR also recognizes the consequences of demand hardening:

As a result of the water use efficiency or demand “hardening” that would be further institutionalized through this alternative, customers would have limited options for accommodating a period requiring 20 percent or more rationing in terms of what water uses they could cutback. Customers would have already increased their water use efficiency and eliminated less efficient uses such as many types of conventional outdoor use (e.g., landscape irrigation, car washing). In these cases, the water use cutbacks required to achieve 20 percent or more rationing would involve reductions in more essential water uses, such as indoor uses for cleaning and bathing, which could cause greater hardship on customers.

*(draft PEIR, p. 9-54.)*

Although the information on effects of water shortages during drought is limited, studies completed to date indicate that rationing cutbacks of 15 to 20 percent can have substantial economic impact on commercial, industrial and residential sectors as well as lifestyle effects on residents. [R]equiring rationing of up to 20 percent during a drought of customers who have already implemented aggressive conservation and water recycling would result in more severe economic and lifestyle effects.

*(draft PEIR, p. 9-31)*

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<sup>4</sup> Consider the example of toilet upgrades. In the past, a common toilet may have used seven gallons per flush (“gpf”). Today, the current standard toilet uses 1.6 gpf. The latest High Efficiency Toilets (“HET”) improve performance by at least an additional 20%, to 1.28 gpf or less. Whereas in the 1980s a residential customer could save seven gallons by the simple act of flushing the toilet only once every other use, similar conservation-driven behavior now will save less than two gallons. The State of California has recognized the existence of demand hardening and the negative impact it has on the ability of retail water users to duplicate their response to previous droughts (DWR, 2005).

As a water agency and its customers significantly increase water use efficiency and harden the water demand, the planned level of drought rationing and its impacts on the customers and community must be given serious consideration. Just because customers have been able to reduce water use historically during a drought by some percentage does not mean that the same customers can achieve similar water reductions in the future with similar efforts. See discussion in Section 6 below for more detail about the impacts of rationing.<sup>5</sup>

(b) Aggressive conservation could negatively impact greenscapes.

While residences in most of the neighboring communities have higher outdoor water use than those in the completely urbanized San Francisco, the water used to maintain these green spaces is by no means wasted. The California Legislature has recognized the social and environmental values of greenscapes in metropolitan areas. "Landscapes are essential to the quality of life in California by providing areas for active and passive recreation and as an enhancement to the environment by cleaning air and water, preventing erosion, offering fire protection, and replacing ecosystems lost to development." (California Water Code Section 65593)

Trees and shrubs not only sequester carbon, thereby reducing emissions of greenhouse gasses, but provide shade that can lower energy costs. According to the Sierra Club, mature trees and tall shrubs around homes can lower air-conditioning costs by up to 40 percent. (*Sierra Magazine*, July/August 2007 at p. 50) Indeed grass sequesters CO<sub>2</sub> and stores it underground in roots and soil. (M. Pollan, The Omnivore's Dilemma, p. 197-98)

San Francisco itself appreciates the benefits of the urban forest. The San Francisco Department of the Environment's 2007-2009 Strategic Plan notes that "trees provide environmental and economic benefits through improving air and water quality, increasing property values, lowering building energy use, and providing an experience of nature." (Department of the Environment, City and County of San Francisco: *Strategic Plan 2007-2009*, December 4, 2006 at p.

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<sup>5</sup> Demand hardening is, in itself, not a reason to limit water-conserving activities. However, conservation must be accommodated by providing greater reliability during drought, through measures such as increased surface or groundwater storage or water transfers. The environmental impacts of increased storage sufficient to bolster the drought reliability of the system have not been considered in the draft PEIR, although the option of additional dry year water transfers from agricultural areas has.

12; see also *City and County of San Francisco Urban Forest Plan* (2006)) In addition, “trees improve public health and well being by reducing UV radiation exposure, providing restorative healing for people with illness, and creating safe public spaces.” (Department of the Environment, City and County of San Francisco: *Strategic Plan 2007-2009* at p. 12) In order to maintain its urban forest, the San Francisco’s Department of Public Works has a total of ten water trucks that water the City’s trees on a weekly basis.

(c) Increased water use during summer/fall is not just for landscaping. Contrary to recent suggestions, the increase in water use in the wholesale customers’ service area during the warm summer and fall months is not due solely to outdoor irrigation. Rather, the increased water use in warmer weather is substantially caused by the use of water for cooling critical public health, educational, commercial, and industrial facilities.

San Francisco’s climate differs from that of the majority of its neighboring communities. In the summer, fog typically blankets the western half of San Francisco -- cooling the entire city -- while most other parts of the Bay Area enjoy a moderate Mediterranean climate with sunny warm days. While these weather differences impact water use for outside irrigation, other important uses of water are also affected by warmer weather, uses that have nothing to do with lawn watering.

- Water is used for cooling purposes in many industrial processes (such as chip fabrication), other manufacturing facilities, and computer server “farms” essential to operation of the internet.
- Hospitals, schools, libraries, and other commercial/industrial buildings contain people and equipment that generate heat and must be cooled. Cooling towers that recycle water are one cost-effective method of heat exchange and use less electrical power, and have fewer environmental impacts than some alternatives.

Cooling towers are used in many buildings inside San Francisco. However, since San Francisco’s weather pattern is cool in summer and relatively uniform throughout the year, its building cooling demands are also relatively consistent throughout the year. Water used for

cooling inside San Francisco cannot therefore readily be segregated as a seasonal use through the inspection of water records. Conversely, in the warmer portions of the Bay Area, where summer temperatures typically hover in the high 70s to 90s, use of water for cooling purposes shows up as a seasonal increase in water use during the summer and fall periods.

It therefore is wrong to assume that the increased seasonal use in the BAWSCA service area is driven solely by outdoor landscaping.

**6. THE "VARIANT" WHICH LIMITS WATER RATIONING DURING DROUGHTS TO 10% OF NORMAL SYSTEMWIDE USE IS ENVIRONMENTALLY AND ECONOMICALLY SUPERIOR**

The WSIP preferred program incorporates a goal of limiting rationing during droughts to a maximum of 20% systemwide. We believe that presenting this goal as a single systemwide percentage without describing how the reductions will be allocated between San Francisco's retail users and the wholesale customers is misleading. For example, if San Francisco were to administer the rationing program so that reductions within San Francisco were limited to 10%, achieving a 20% systemwide reduction would require an average cutback in use by wholesale customers collectively of nearly 25%.

The environmental and economic consequences of a 25% year round reduction in water use in the wholesale service area would be severe and are not addressed in the draft PEIR. For example, the draft PEIR does not address the impact on commercial and industrial entities, for which water is either a significant component of the end product or essential to manufacturing processes, or both. While the draft PEIR does not address such impacts, there is good research on this issue. A copy of the report, "An Economic Evaluation of the Water Supply Reliability Goal in the SFPUC Water System Improvement Plan," prepared by William Wade, Ph.D., a resource economist, is included as Attachment 6.

The report's principal findings are troubling, though not surprising. Two points stand out:

- A small number of industrial sectors, for which water is a critical component of the production process, represent a very large share (over 80%) of total manufacturing output in the region. Chief among these industries are computer/electronic products and food and beverage products (\$207 billion in 2001). The emerging biotech industry is also water-dependent.

- These industries are particularly sensitive to curtailments in water supply. The impact of a 20% water supply deficiency on shipments from these industries located in the wholesale customer service area is estimated at nearly \$7.7 billion annually, whereas a 10% cutback results in “only” a \$2.5 billion cost. The difference (\$5.2 billion) far exceeds the \$181 million cost estimated by the SFPUC staff of improving the SFPUC system’s reliability from 80% to 90%, as shown on the SFPUC’s Water Supply Matrix: Water Supply Options 2030 included as Exhibit A to the Wade Report.<sup>6</sup>

The impact of this potentially extreme rationing is severe when considered in light of the City’s experience in the last drought. The Governor’s Advisory Drought Planning Panel in its December 2000 Critical Water Shortage Contingency Plan reported:

Among large urban agencies’ water development projects, the City and County of San Francisco experienced the greatest reduction in storage, having only about 22 percent of its total system storage capacity left by 1991.

The implications of that depletion in storage was made evident in the SFPUC’s response to a survey distributed in 1990 by the California Department of Water Resources:

Q: What are your alternatives if 1991 is as dry or drier than 1990 and if 1991 is as dry as 1977?

A: If 1991 is as dry or drier than 1990 or 1977, a rationing program to cut normal use by 50 percent will be necessary to avoid running out of water if 1992 is also dry.

The SFPUC itself summed it up clearly in its June 1993 Report to the Federal Energy Regulatory Commission:

“Nowhere else in the state was rationing imposed on a major urban area to such a degree for so long a period.”

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<sup>6</sup> As discussed previously, based on the experience of the last drought, a 20% reduction on a systemwide basis would require reductions greater than 20% in San Francisco’s neighboring communities. The economic impacts would therefore be more severe than those projected in the Wade report, which assumes that a 20% reduction in industrial/commercial customers’ water supply would be the worst case.

In addition, the SFPUC's then-General Manager, Anson Moran, in a 1994 affidavit submitted to the Federal Energy Regulatory Commission, eloquently described the consequences of shortage:

The consequences of potential shortages include economic, socio-economic, environmental, and personal (human) impacts.

What makes San Francisco's situation unusual is the consequence of being wrong in our forecast. Because of our entitlement structure, and limited conveyance and treatment capacity, an additional, unforecasted year of drought could literally result in empty reservoirs, no entitlements, and little or no alternate source of water. We could have no water to serve our 2.3 million customers.

In the spring of 1991 these consequences achieve a sobering clarity. I became acutely aware of the physical constraints of the City's water conveyance, treatment and delivery facilities; the availability of, and limitations to movement of supplemental emergency water supplies into the City's system; and the uncertainty as to when the drought would finally end. Due to the extremely limited conveyance and treatment capacity system to bring other emergency sources of water to the City, the City must rely on storage in the Tuolumne River basin to ride out droughts. The City just does not have other sources to call on during drought, such as turning on pumps. In addition, I had first-hand information as to the direct and indirect adverse impacts that were occurring to the City's customers as the result of water shortages.

Situated within the drought, I weighed all the above factors and supported the operation rule that is currently used by the City in practice, and incorporated in the planning studies submitted to FERC. That plan was tested as it was developed and is the direct product of real, on-the-line decision making. When considering all the factors associated with the City's entitlements to water, its physical system, and the dire consequences of just being wrong in the forecasting of the length of drought that may hit the City, I can not agree with any comment that the City's operation rule is overly conservative.

Mr. Moran's complete affidavit is included as Attachment 7.

Furthermore, the WSIP must also be analyzed in light of the City's own policy, found in the City Charter, to assign a higher priority to water delivery than to power generation. Limits on generation of electric power to avoid impacts on water availability should be incorporated into all variants and alternatives in order to both reduce the need to impose rationing, as well as

stress on other water supply sources required to offset avoidable shortages in SFPUC water deliveries during droughts.

The WSIP anticipates that water to offset San Francisco's diminished entitlements to Tuolumne River which occur during dry years will be secured through agreements with Turlock Irrigation District (TID) and/or Modesto Irrigation District (MID), to utilize "credits" to San Francisco's water bank account" in New Don Pedro Reservoir. A dry-year transfer with TID/MID, providing access to additional Tuolumne River water for the Bay Area during drought, need not (and should not) come at the expense of either diminished flows in the lower Tuolumne River nor agricultural production. Rather, it could be supplied through conjunctive use of the substantial groundwater reserves available. Central Valley growers, including those in TID/MID, regularly rely on short-term increases in groundwater pumping during dry years - - precisely what conjunctive management of groundwater is intended to do.

The draft PEIR states that the 10% "variant" would "result in slightly increased average annual Tuolumne River diversions over the 82-year hydrologic record compared to the proposed program, but due to rounding, the levels of diversion appear to be the same." (draft PEIR, Table 8, fn. a) The final PEIR should describe more precisely the volumetric difference in a dry year to meet the 10% goal, although we expect that this amount will be relatively modest, particularly when compared to MID and TID diversions.

**7. BAWSCA SUPPORTS THE ENVIRONMENTALLY SUPERIOR ALTERNATIVE AND RECOMMENDS THAT THE FINAL PEIR EVALUATE IT IN MORE DETAIL**

The draft PEIR describes a Modified WSIP Alternative, which it identifies as the Environmentally Superior Alternative. This alternative differs from the WSIP as proposed, by incorporating three interrelated components:

One: Modifications to the planned operations of three local reservoirs intended to lessen the impact of the WSIP on local streams (Alameda Creek and Pilarcitos Creek) and on riparian habitat (the oak woodlands near Crystal Springs Reservoir).

Two: Additional water conservation, local groundwater and recycling projects to be carried out by the wholesale customers, intended to compensate for the reductions in system

supply caused by the three operational modifications described above and, potentially, to reduce demand for additional diversions from the Tuolumne River.

Three: A “transfer” of “conserved water” from Turlock Irrigation District (TID), Modesto Irrigation District (MID), or some other agency which would reduce demand within their service areas for water from New Don Pedro Reservoir, thereby avoiding the reduction in flows in the Tuolumne River below New Don Pedro that would otherwise occur as San Francisco’s diversions to the Bay Area gradually increase as envisioned by the WSIP.

The draft PEIR explains why this is considered to be the environmentally superior alternative:

The Modified WSIP Alternative is considered to be the environmentally superior alternative. It would reduce key impacts of the proposed WSIP on natural resources along the lower Tuolumne River, along Alameda Creek below the diversion dam, at Pilarcitos Creek, and in Crystal Springs Reservoir, but it would continue to meet the WSIP’s primary goals and objectives. Like the WSIP, this alternative would maximize the use of existing facilities and the largely gravity-driven system without also requiring the construction of additional major facilities called for under many other alternatives, or substantially increasing the energy demand of the system or need for pumping. While some of the other alternatives would avoid or lessen certain WSIP impacts, they would also result in substantial additional impacts that the WSIP would not generate, because these alternatives would require substantial additional major facilities and affect other environmental resources in different geographic locations in addition to those affected by the WSIP. . . .

The Modified WSIP Alternative includes implementation of more conservation, water recycling and local groundwater projects within the regional service area than under the WSIP, which would require construction of some additional facilities in some areas not affected by the WSIP. However, while construction of these facilities would cause temporary construction disruption and related environmental impacts, long-term implementation of these regional conservation, water recycling, and local groundwater projects would offset impacts of the operational modifications proposed under the Modified WSIP Alternative on the Tuolumne River. Depending on the extent of these projects implemented by wholesale customers in collaboration with the SFPUC, they could also help reduce the amount of additional diversion required from the Tuolumne River to serve the 2030 customer purchase requests.

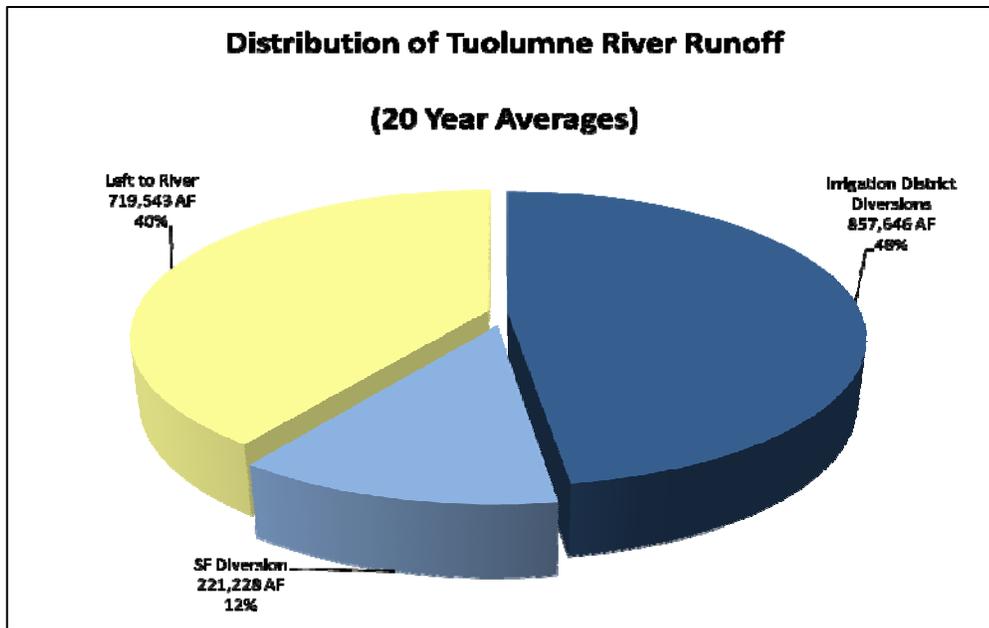
*(draft PEIR, p. 9-96)*

BAWSCA supports the Environmentally Superior Alternative and recommends that the Final PEIR provide a more detailed description of how its centerpiece (the reduction in demand for water from New Don Pedro) is to be achieved.<sup>7</sup>

**Agricultural Conservation**

As Figure 17 indicates, San Francisco and the wholesale customers are not the most significant users of Tuolumne River water. In fact, almost half of the Tuolumne River runoff is used for agricultural production. San Francisco’s diversion currently represents about 12% of that flow and would increase only to 13% by 2030, assuming the increase in demand projected in the WSIP.

Figure 17.



Source: Turlock Irrigation District

Central to the Modified WSIP is the “transfer” of water conserved by TID and MID such that demand from New Don Pedro Reservoir would be reduced, avoiding the reduction in flows in

<sup>7</sup> A more in-depth analysis would also be responsive to San Francisco Board of Supervisors’ Resolution 321-08.

the Tuolumne River below La Grange that would otherwise occur under the WSIP, and where the WSIP's significant environmental impacts would occur.<sup>8</sup>

The large majority of the water currently diverted by TID and MID is, as their names suggest, used for agricultural irrigation. The draft PEIR does not describe how approximately 15,000-20,000 acre feet per year (AF/Y) of the approximately 800,000 AF/Y applied to irrigated agriculture in the two districts could be conserved. Some possibilities are mentioned indirectly in the portion of the draft PEIR that addresses possible environmental impacts of mitigation measures themselves:

- Water use efficiency and conservation for agricultural, residential and commercial users
- Land use changes, either agricultural to urban, or more water intensive (e.g., pasture) to less intensive (e.g., orchard)
- Conjunctive use of groundwater
- Recycled water
- Tiered water pricing
- Land fallowing of agricultural lands.

*(draft PEIR, p. 6-63)*

Agriculture in the Central Valley is part of our shared history and culture and contributes significantly to California's economy. For this reason, BAWSCA does not support the notion of permanently fallowing agricultural lands as an on-going source of water for the Bay Area. Similarly, decisions about which crops to cultivate are best made by individual growers familiar with local conditions and market forces.

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<sup>8</sup> Two of the subsidiary aspects of the Environmentally Superior Alternative uniquely affect individual BAWSCA member agencies and warrant specific caveats. First, BAWSCA support for meeting Coastside County Water District's increased demand by pumping from Crystal Springs rather than by gravity flow from Pilarcitos Lake is conditioned on the economic impact of that approach (increased power costs) being borne by all users of the regional water system, including San Francisco, rather than solely by Coastside County Water District. Second, BAWSCA support for increased stream flow in a particular reach of Alameda Creek despite its possible impact on system yield is not meant to suggest that BAWSCA disagrees with Alameda County Water District comments that more water should be released and allowed to flow through lower Alameda Creek to the Bay, in order to support restoration of steelhead to the upper reaches of the Creek.

Nor do we believe that greater urbanization of the Central Valley is likely to result in less water use, on a per acre basis, than agriculture.<sup>9</sup> Finally, the pricing of water is an internal matter statutorily delegated to the elected governing boards of the irrigation districts, whose informed judgment should be respected, particularly by urbanized communities 100 miles away.

Rather, we propose a bold and visionary approach, suggested only obliquely by the Environmentally Superior Alternative, in which Bay Area water agencies would provide economic incentives to encourage TID and/or MID, the Cities of Modesto and Turlock, or individual growers, canners and orchardists to voluntarily implement water conservation measures at no cost to them, that would save both money and water, with resulting benefits to all stakeholders. There appear to be several opportunities available in both districts to conserve water.

The point of this comment is not to identify the most promising of these opportunities. The irrigation districts are much more capable of doing that. Rather, the point of the comment is merely to corroborate the feasibility of the concept at the center of the Environmentally Superior Alternative and demonstrate the benefits that it can provide to agriculture, the urban Bay Area, and to the lower Tuolumne River.

Arrangements of this precise kind are now in place in California, on a much greater scale. For example, the Imperial Irrigation District has contracted to transfer over 300,000 acre feet a year to San Diego and other coastal cities served by the Metropolitan Water District of Southern California. The IID's "Efficiency Conservation Definite Plan" adopted in May 2007 contains very detailed analyses of the costs/benefits and water savings achievable by a range of irrigation efficiency measures. It provides a possible road map for the Bay Area and TID and/or MID to follow.<sup>10</sup>

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<sup>9</sup> In the TID/MID area, an acre of homes uses about the same amount of water as an acre of irrigated crops.

<sup>10</sup> The Environmentally Superior Alternative has the additional benefit of not jeopardizing San Francisco's water rights. And the water rights of MID and MID can also be fully protected by virtue of Water Code provisions designed to encourage water conservation and the use of recycled water and groundwater in lieu of surface water, e.g., Water Code Sections 1010-1011. We understand that TID

From a purely financial perspective, Bay Area water agencies should be willing to provide monetary contributions sufficient to support implementation of the most cost-effective mix of these alternatives. Many might be prepared to subsidize water conservation in the TID/MID area at levels that go beyond those necessary to simply offset the diversions by San Francisco to meet gradually increasing urban demands in the Bay Area. In fact, BAWSCA's board of directors has recommended that the final PEIR should explore the feasibility of Bay Area water customers financially supporting water efficiencies in TID/MID that will result in more water remaining in New Don Pedro than is currently the case, even after taking increased diversions by San Francisco into account. This additional water could then be available to support greater flows in the lower Tuolumne River, deployed at times and in volumes most beneficial for salmon and other important species in the lower Tuolumne River.

In sum, BAWSCA believes there are opportunities for partnerships with agricultural interests such that more water can flow through the lower Tuolumne while still providing the water necessary to accommodate environmentally sound, infill growth planned in San Francisco and its neighboring communities.

**Additional Conservation and Recycling in the BAWSCA Service Area.**

BAWSCA also supports the component of the Environmentally Superior Alternative that calls for additional water conservation, recycling and local groundwater development to be achieved in the BAWSCA service area. But, just as we believe the agricultural conservation component of this alternative can be improved, so that the WSIP results in more water being made available in the lower Tuolumne River than would be the case under any of the other alternatives, we also believe that this component can be improved. Specifically, rather than involve SFPUC in this aspect, we recommend that BAWSCA and its member agencies be given the responsibility for achieving these results.

In enacting the Bay Area Water Supply and Conservation Act in 2002, the Legislature took note of the anomalous situation which the wholesale customers of SFPUC occupy in relation to San Francisco. They are dependent for a vital and limited resource on a monopoly supplier not

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has utilized these statutory filing mechanisms to document savings achieved through installation of drip irrigation systems that have already replaced flood irrigation in areas of that district.

regulated by the California Public Utilities Commission and in which they have no political representation. (Water Code Section 81301(a))

The Legislature also found that:

The San Francisco regional system is . . . susceptible to severe water shortages during periods of below average precipitation because of insufficient storage and the absence of contractual arrangements for alternative dry year supplies.

The lack of a local, intergovernmental, cooperative governance structure for the San Francisco regional system prevents a systematic, rational, cost-effective program of water supply, water conservation, and recycling from being developed, funded, and implemented.

*(Water Code Section 81301(b), (c))*

BAWSCA has express statutory authority to:

- “Plan, finance, acquire, construct, maintain and operate facilities for the collection, transmission, treatment, reclamation, reuse and conservation of water.” (Water Code Section 81420);
- “Conduct studies of the water supplies available to its members and their current and future demand for water,” as well as “develop plans for projects and programs that can assist its members to meet those future water needs.” (Water Code Section 81445);
- Carry out any “project” or “work” which are broadly defined to include water conservation measures and programs, facilities for the conjunctive use of surface water and groundwater and facilities for the transmission of recycled water.” (Water Code Sections 81306, 81308, and 81420)

Since its formation in 2003, BAWSCA has developed, and implemented, at its own expense, effective water conservation programs that augment those administered by its member agencies. The range of these programs has steadily expanded, as the current Water Conservation Report (Attachment 5) demonstrates. We submit that the development of an additional 5 to 10 mgd of

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water savings through conservation, local groundwater or recycled water within communities that are members of BAWSCA (over and above those agencies' current commitments) will be far more feasible if the initiative and coordination is taken by BAWSCA -- an independent government agency established specifically for that purpose, which is representative of and responsive to the communities in which those projects and programs are to be built or implemented.

In order to generate funds for these programs, SFPUC should include in wholesale rates a "water conservation" charge. The amount of this charge should be determined by BAWSCA's board of directors, the revenue should be collected by SFPUC and forwarded to BAWSCA regularly, and the utilization of the funds should be decided by BAWSCA's board of directors. The SFPUC should limit its conservation, groundwater, and recycling activities to programs and projects within the limits of the City and County of San Francisco or on outside properties owned by the City, such as the Sharp Park Golf Course in Pacifica.

Thank you for considering this letter, the detailed comments which appear at Attachment 1, and the materials in the accompanying Volumes.

Sincerely,



Arthur R. Jensen  
General Manager

Enclosures

cc: Board of Directors, Bay Area Water Supply and Conservation Agency

# ATTACHMENT 1

## Detailed Section-by-Section Comments on the Program Environmental Impact Report for the Water System Improvement Program

Below are the comments from the Bay Area Water Supply and Conservation Agency that are more narrowly focused and presented as a section-by-section review of the draft PEIR.

### Summary Section

p. S-2 to p. S-23: The summary section does not highlight historical examples of problems encountered with operation of the existing regional water system which need immediate attention and which are the premise of the need for the WSIP. Below are some examples of failures on the regional water system over the last twenty years:

- San Joaquin Pipeline No. 3 (SJPL 3) failed in the San Joaquin Valley at the same time that the Sunol Valley Water Treatment Plant was shutdown for maintenance. This situation caused an immediate loss of water supplied from two sources including the Hetch Hetchy and Calaveras Reservoir supplies.
- San Andreas Pipeline No. 3 ruptured, flooding school property on the Peninsula.
- A loss of supply from Hetch Hetchy was caused by failures on the SJPL system near Mountain Tunnel.
- During heavy rains the Hetch Hetchy supply was lost for a period of six weeks at the same time power outages occurred at the Harry Tracy Water Treatment Plant.
- During heavy rains, San Mateo Creek was flooded in an attempt to lower Crystal Springs Reservoir elevation which rose to within inches of spilling over the 4 foot high stop logs. DSOD demanded that the reservoir be lowered to avoid the stop logs from floating out of their holding rack which can cause disastrous flooding. Lack of reservoir storage capacity can also cause uncontrolled spills. During one such event the Mills Hospital first floor in San Mateo was flooded.
- A valve-exercising program that is part of necessary maintenance of the transmission system has been nonexistent due to fear that valve might be able to be reopened, leaving major pipelines closed and causing regional water losses.
- A planned dewatering of the Stanford Tunnel to inspect the integrity of the tunnel was halted to avoid risks involved in having an extended shutdown.
- A landslide occurred on the peninsula near the existing Crystal Springs Bypass Tunnel. This tunnel was shut down as a precaution so that if further land movement caused the tunnel to break it would not result in flooding. If the line failed it could produce an estimated 900 mgd rush of water into San Mateo Creek causing public health, safety and

environmental harm. The Harry Tracy Water Treatment Plant is the only source of water to the north of the tunnel, serving the northern peninsula and San Francisco. SFPUC staff stayed on site around the clock to put the tunnel back in service in case treatment plant operations were disrupted.

- Multiple emergency shutdowns of the water treatment facilities have been made due to aging and unreliable equipment.
- The San Antonio Pipeline failed causing immediate shutdowns and flooding.

p. S-2, Program Description, 2<sup>nd</sup> paragraph: This paragraph should clarify that the City and County of San Francisco is the single largest customer of the regional water system, using 1/3 of the total water developed, and being nearly 100% dependent on the regional water system.

p. S-2, Program Description, 2<sup>nd</sup> paragraph: The draft PEIR states “Some of the wholesale customers have sources of water in addition to what they receive from the SFPUC regional system, while others rely completely on the SFPUC for supply.” In fact, 13 of the BAWSCA agencies have diverse water supply portfolios that include recycled water, desalinated water, local groundwater, and local or imported surface water. Figure A below provides detail on the current diversified water supply portfolios of the combined BAWSCA agencies. BAWSCA agencies have committed to increasing the diversity of their water supply portfolio in the future with increased use of recycled water, conjunctive use of groundwater supplies, and implementation of water conservation as shown in Figure B below.

Figure A

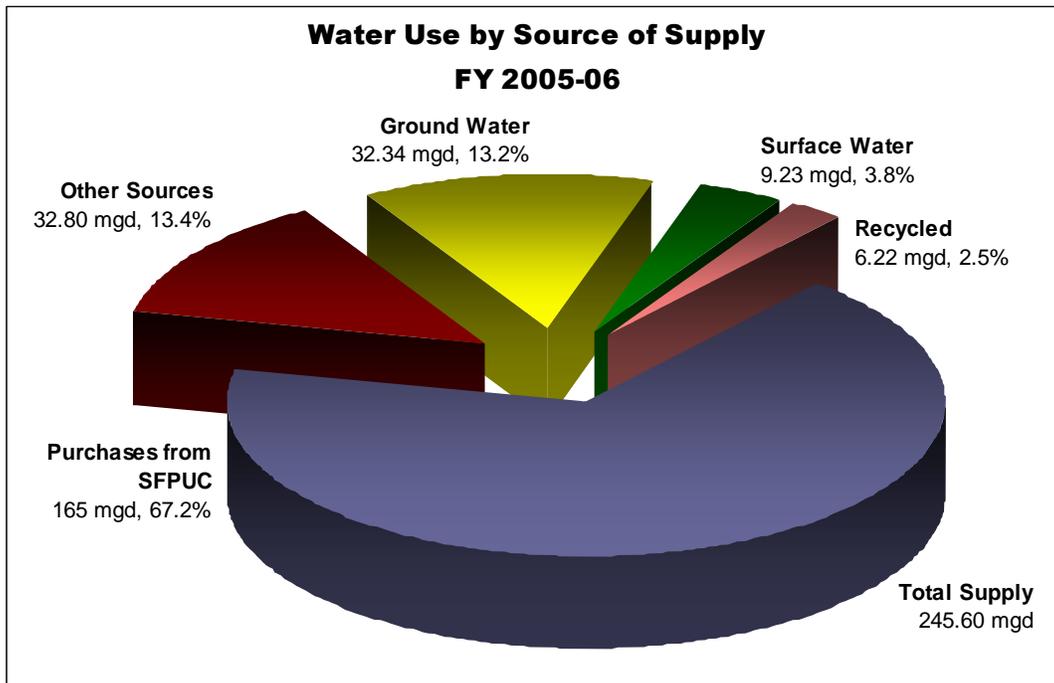
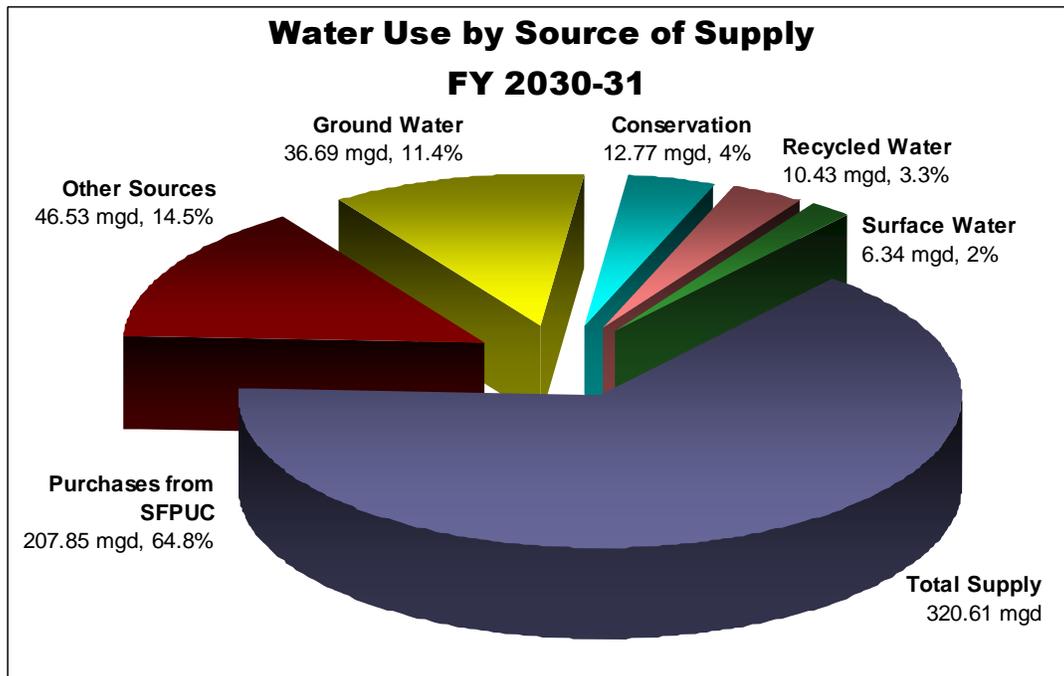


Figure B



p. S-5, Figure S.3 and p. 5.1-6, Figure 5.1-2: This figure shows historical and projected water deliveries, not water demands. Some of the projected water demand will be met by sources other than purchases from the SFPUC regional water system. The data label for the projected period (right-hand side of graph) should be changed to read “Annual Average Forecasted Deliveries” (not “.....Forecasted Demand”).

p. S-23, Figure S.7: The Master Schedule shown should be updated to reflect most current WSIP Quarterly Report. Also, please clarify whether this timeline shows the project close-out dates adopted by the Commission or revised project close-out dates that have not yet been formally adopted by the Commission.

p. S-26, Facility Construction Effects, 4<sup>th</sup> bullet: The report identifies certain facilities as having historical significance. Information about whether these identified sites are classified in local or state registries as historical sites should be provided.

p. S-65, 1st bullet (Proposed Program): Regarding the concern raised by some commentors about the impact of this program objective, fundamental principals dictate that water quality from the best source is the most reliable means of eliminating uncertainties associated with contamination and public health risk. Water quality regulations are becoming more stringent

with many more trace organics being detected, raising public health concerns. Options for source water downstream of the current intake are influenced by runoff and contamination from many other sources due to human activity. The uncertainty about endocrine disruptors and other contaminants may result in increased health risk and higher levels of treatment. A treatment scheme capable of producing a similar water quality would include reverse osmosis and activated carbon among other processes which require more energy and disposal problems that have negative impacts on the environment. Public concern over drinking water is a leading issue resulting in diminished public confidence and higher use of bottled water which carries its own set of issues related to trace organic contamination and disposal of packaging and containers.

## Chapter 2 – Existing Regional Water System

p. 2-8, Sunol Valley Facilities: Please add a description of the San Antonio Pumping Facility to this section and explain its importance to reliable operation of the overall system.

p. 2-12, Bay Division Facilities: Further clarity would be helpful regarding the SCVWD intertie and its function. The statement is made that SCVWD is currently returning supplies to the SFPUC at an average rate of 5 mgd through the intertie. This is confusing since it does not state whether this is short-term or long-term. In fact, this action is in accordance with the agreement with SCVWD and the action is short-term. Please clarify since statement implies the intertie supplies a long-term supplemental supply of 5 mgd.

p. 2-27, System Maintenance: It is important that this section be modified to highlight problems with the existing system operation which require resolution by the WSIP. Specifically, this section should:

- Highlight that the WSIP improvements are necessary to overcome aging infrastructure and operational problems impacting the health and safety of the 2.5 million customers of the system.
- Clarify those operational areas and issues which act as drivers for the WSIP. There is no information on what is expected to occur during a major seismic event or other facility failures which occur too frequently. Include examples of how operations and maintenance are being impacted.
- Provide information on the difficulty operations staff currently face whenever it is necessary to shutdown portions of the existing system for maintenance purposes. The most extreme examples include no ability to take Irvington and Pulgas Tunnels out of service. The report should clarify why the Irvington Tunnel inspection frequency is different than the desired 10-year cycle for tunnel inspections.

p. 2-28, System Maintenance: Some additional examples of recent outages that support the need for the WSIP are:

- San Joaquin Pipeline No. 3 (SJPL 3) failed in the San Joaquin Valley at the same time that the Sunol Valley Water Treatment Plant was shutdown for maintenance. This situation caused an immediate loss of water supplied from two sources including the Hetch Hetchy and Calaveras Reservoir supplies.
- San Andreas Pipeline No. 3 ruptured causing flooding of school property on the Peninsula.
- A loss of supply from Hetch Hetchy was caused by failures on the San Joaquin Pipeline system near Mountain Tunnel.
- During heavy rains the Hetch Hetchy supply was lost for a period of six weeks at the same time power outages occurred at the Harry Tracy Water Treatment Plant.
- During heavy rains, San Mateo Creek was flooded in an attempt to lower Crystal Springs Reservoir elevation which rose to within inches of spilling over the 4 foot high stop logs. DSOD demanded that the reservoir be lowered to avoid the stop logs from floating out of their holding rack which can cause disastrous flooding. Lack of reservoir storage capacity can also cause uncontrolled spills. During one such event the Mills Hospital first floor in San Mateo was flooded.
- A valve-exercising program that is part of necessary maintenance of the transmission system has been nonexistent due to fear that valve might be able to be reopened, leaving major pipelines closed and causing regional water losses.
- A planned dewatering of the Stanford Tunnel to inspect the integrity of the tunnel was halted to avoid risks involved in having an extended shutdown.
- The text cites one example related to the landslide that occurred on the peninsula near the existing Crystal Springs Bypass Tunnel. The text should cite the consequences if the endangered portion of the system had been damaged: It was estimated that if the line failed it could produce a 900 mgd rush of water into San Mateo Creek causing public health and safety and environmental concerns. The Harry Tracy Water Treatment Plant is the only other source of water to the north of the Crystal Springs Bypass Tunnel, serving the northern peninsula and San Francisco. SFPUC staff were stationed at the site on a 24 hour-7 day basis to put the tunnel back in service in case the treatment plant operations were disrupted.
- Multiple emergency shutdowns of the water treatment facilities have been made due to aging and unreliable equipment.
- The San Antonio Pipeline failed causing immediate shutdowns and flooding of rights of way.

### Chapter 3 – Program Description

p. 3-9, Table 3.2: The WSIP goal for seismic reliability is different than what was presented in the NOP for this PEIR. The demand level for basic service 24 hours after a major seismic event has been increased from 215 mgd to 229 mgd. The text discusses detailed analyses conducted since the level of service goals were formulated by the Commission. Clarifying language is needed to explain how these subsequent studies support refining this goal.

p. 3-14, 3<sup>rd</sup> paragraph, Water Supply Studies: The statement is made “As described below, the Commission selected the 20 percent maximum system wide reduction in water service during drought periods for further study.” The draft PEIR does not provide sufficient justification for the stated 20% rationing goal. Such a critical decision should be an informed, well-documented decision. The justification for the decision to have a 20% rationing goal should be included in the PEIR. The document should provide more analysis of the possible extent of rationing throughout the service area, up to 40% in some communities. It should also address the environmental and public health impacts of extreme rationing. These include loss of greenspace and landscaping and loss of water for sanitation, cooling and domestic use. In addition, a comparison to the rationing goals of other major water utilities having comparable levels of water use and demand hardening should be presented.

p. 3-14, 4<sup>th</sup> paragraph, Water Supply Studies: The last sentence of this paragraph should be changed to provide greater clarity. Specifically, the sentence should clarify that the “12 to 40 percent” reductions apply to the wholesale customers NOT the individual retail water customers within each jurisdiction, who will also experience different levels of reduction.

p. 3-18, Table 3.3: It is important to note that the BAWSCA agencies have **already committed** to the identified levels of water conservation (13-15 mgd) and recycling (9-10 mgd) in 2030 shown on this table in comparison to the conservation (0-4 mgd) and recycling (0-4 mgd) values identified for the SFPUC. To date, the SFPUC has not committed to any level of increased water conservation or recycling in 2030, and have treated water conservation and recycling in San Francisco as a component of the WSIP.

p. 3-19, Table 3.4: City of Menlo Park is 100% reliant on water from the SFPUC. Footnotes “a” and “c” should not be used for this city.

p. 3-22, Purchase Estimates: The draft PEIR does not fully describe how the wholesale customers have included conservation potential into their demands. Each wholesale customer conducted a cost-effectiveness analysis to select conservation measures to which it would commit above and beyond implementation of the plumbing codes and the measures recommended by the California Urban Water Conservation Council. In addition, the draft PEIR should describe in detail the wholesale customers’ diversified water supply portfolio.

p. 3-22, Recycled Water Potential, second sentence: The numbers in this sentence need to be corrected. The corrected sentence should read “The studies indicated that there is a range of about 20.1-25.0 mgd recycled water potential in addition to the existing and planned recycled water supply within the BAWSCA area.” (RMC, 2004).

p. 3-25, bullet “E. Regional Recycled Water Projects,” WSIP Project Refinement and Other WSIP Components: This bullet refers to the SFPUC consideration of the development of recycled water projects in areas outside of their jurisdiction in coordination with other agencies. While the SFPUC and other willing jurisdictions can partner to implement mutually agreeable projects, it is important to note that SFPUC participation is not necessary and in fact, may not be desired. The Bay Area Water Supply and Conservation Agency (BAWSCA) was created by the wholesale customers of the San Francisco regional water system with an expressed power to develop, implement, and fund regional water resources programs, including recycled water projects, as may be deemed appropriate by the Board of Directors. In addition, San Francisco may not necessarily be the lead agency in any such joint project. As a public agency, BAWSCA can be the lead agency in any project that it chooses to develop. Please clarify text accordingly.

p. 3-27, Water Quality Level of Service: Other water quality regulations of significance to the SFPUC that should be referenced are the Stage 2 disinfection by-products rule, Candidate Contaminant List, California Action Levels, and California Public Health Goals.

p. 3-27, Section 3.5.2 & 3.5.3: System performance under major seismic and reliability event scenarios with a completed WSIP show deliveries surpassing the some level of service objectives. For example, the last paragraph on p. 30 states “With implementation of the WSIP projects, this delivery capability would increase to 313 mgd, surpassing the level of service objective.” Clarifying language is needed to explain which level of service objective is the limiting criterion for sizing a particular project and how, in some scenarios, meeting some objectives allows other level of service objectives to be exceeded. In general, if a facility is sized to meet one of several objectives, the facility may be able to operate beyond other minimum levels of performance.

p. 3-31, Table 3.7: The phrase “Delivery During a Hetch Hetchy Water Quality Event” should be clearly defined with a footnote to this table and language in the text. If there is a “water quality event,” it is unclear whether any water can be served.

p. 3-32, Other Goals and Objectives, 1<sup>st</sup> paragraph: The statement is made “The SFPUC has included these program goals as fundamental elements of the WSIP, although the WSIP does not establish quantitative levels of service for the sustainability and cost-effectiveness goals.” Do guiding principles exist regarding these goals in the absence of quantifiable levels of service?

p. 3-39, Proposed System Operations Strategy: BAWSCA is pleased that the future regional system operations assumed in this PEIR includes “Assigning a higher priority to water delivery over hydropower generation.” The continuation of this priority, called “Water First Policy,” is consistent with the legislature’s intent upon passing AB1823.

p. 3-39, Proposed System Operations Strategy: The text should add other operating objectives that are used by the SFPUC in operating the regional water system: minimizing reservoir spillage; meeting local reservoir replenishment requirements; and providing effective emergency response and recovery.

p. 3-39, Proposed System Operations Strategy: When citing the operating objective of maximizing local reservoir storage, there is no mention that this strategy can result in reservoir spills and, in extreme cases, downstream flooding. The WSIP should address downstream flood control improvements to support this operating strategy.

p. 3-43, 1<sup>st</sup> paragraph, Water Supply and Storage Operations Strategy: Section 6 of the current Interim Water Shortage Allocation Plan sets forth an Annual Schedule which is to be followed by the SFPUC and its wholesale customers during periods of water shortage. Under this schedule, the SFPUC is to provide to its wholesale customers an estimate of the available water supply and, by March 31<sup>st</sup> of any drought year, a formal declaration of the existence of a water shortage emergency.

p. 3-43, Instream Flow Releases: The draft PEIR assumes that the SFPUC’s current agreement with TID and MID, to pay them to provide all the additional water, if any, required for fishery releases when FERC imposes new requirements in 2016, will continue. Please provide specific strategies or approaches which may be used to provide additional water for fishery releases if needed.

p. 3-46, 1<sup>st</sup> full paragraph, Water Delivery Operations Strategy: The statement is made “At present, depending on hydrologic conditions and the transmission capacity of pipelines, the replenishment of local reservoirs can take more than one year to complete.” Will the WSIP increase replenishment rates and decrease replenishment time? If so, by how much in terms of mgd or months?

p. 3-46, 1<sup>st</sup> full paragraph, Water Delivery Operations Strategy: The statement is made “The addition of redundant facilities and hydraulic capacity upgrades would also increase the system’s transmission capability so that local reservoirs in the Alameda and Peninsula watersheds can continue to be replenished during maintenance periods to maintain higher average annual storage levels, thus ensuring that water would be available for use during emergencies or droughts, while also continuing to meet ongoing customer demands.” BAWSCA concurs that this is an important operational necessity. The ability to replenish the local reservoirs is a critical component of providing water supply reliability.

p. 3-48, 1<sup>st</sup> paragraph, Maintenance and Asset Management Strategy: The statement is made “The SFPUC has limited ability to shut down some of the tunnels and pipelines while still meeting customer demand. The transmission system needs additional tunnels and/or pipelines to provide redundant capabilities to enable shutdown, inspection, and maintenance of some major components of the existing system.” The PEIR should strongly state the fact that currently some tunnels and pipelines cannot be taken out of service for inspection, routine maintenance or emergency repairs without major reductions in water delivery.

p. 3-49, Table 3.10, Project SJ-3: The project description for the San Joaquin Pipeline System states “Note: While the current preferred alternative would construct 16 miles of pipelines, as much as 22 miles of pipelines could be constructed depending on the results of a conditions assessment of the existing pipelines.” BAWSCA supports this statement and has expressed support for the continued retention of this modification as part of its comments on the NOP for this specific project:

The project scope indicates that an 86 inch pipeline connected to the west of the San Joaquin River from the cross over to Tesla portal be constructed. The CER [Conceptual Engineering Report] for this project indicates that, depending on the condition assessment of the existing San Joaquin River crossings, a fourth crossing denoted as Alternative 5 may be considered. This potential should be included in the NOP for review until the final determination is made.

p. 3-51, Table 3.10, Project SV-4: The project description makes the statement “The new tunnel would be a redundant water transmission facility to the existing Irvington Tunnel.” While this is a true statement, it fails to address why this redundancy is important. The statement made earlier in the PEIR on p. 3-48, 1<sup>st</sup> paragraph should be referenced as part of this description (“The transmission system needs additional tunnels and/or pipelines to provide redundant capabilities to enable shutdown, inspection, and maintenance of some major components of the existing system.”) so that the purpose for this tunnel is clearly understood.

p. 3-63, Table 3.12: Table 3.12 indicates significant overall need for staffing increases, however does not refer to a staffing plan that demonstrates whether or how the work can be accomplished. . The staffing needs for shutdown support during construction should be analyzed and addressed in such a plan and the final PEIR should more fully analyze and disclose the staffing challenges.

p. 3-82, Proposed Construction Schedule: The statement is made “there would be an intense period of construction from 2009 to 2010, when 18 of the 22 projects would be constructed concurrently.” Is this correct? Will all the projects be constructed concurrently in one year or rather will they be “in construction” during this period? Change wording as appropriate.

p. 3-86, Required Actions and Approvals: Affected wholesale customers must review, approve and possibly fund any additional conservation, recycling and groundwater projects that are proposed in their service areas as part of an alternative.

#### **Chapter 4 – WSIP Facility Projects – Setting and Impacts**

p. 4.16-13, Geology, Soils, and Seismicity, Impact 4.16-2: It is stated “implementation of the WSIP would collectively result in *beneficial* effects related to the seismic safety of the regional water system.” The “beneficial effects related to the seismic safety of the regional water system” after implementation of the WSIP should be illustrated with graphic and tabular data from previous seismic vulnerability studies.

#### **Chapter 5 – WSIP Water Supply and System Operations – Setting and Impacts**

p. 5.1-4, Section 5.1.3, Proposed Water Supply Option and System Operations: The text describes the proposed water supply option for non-drought year and drought year water supplies. One identified component of the drought year water supply is rationing. The following sections of the chapter discuss the impacts of the various water supply components, but give very little detail about the direct and indirect impacts of the rationing component beyond what is identified with associated drought year groundwater pumping. Additional information about rationing impacts should be presented in this section.

p. 5.1-5, 1st full paragraph, Proposed Water Supply Option and System Operations: The statement is made “Although no major changes are proposed under the WSIP with respect to regional system operations, there would be some operational refinements (described in Chapter 3, Section 3.7).” These refinements to operations should be clarified to include modification of reservoir seasonal storage levels and more flexibility for system maintenance.

p. 5.1-17, Proposed Water Supply Option and System Operations: The report states that spills or releases from local reservoirs will occur and states that they will last only a few days. The report does not acknowledge that a full reservoir cannot control a maximum credible event or storm which will then cause the reservoir to spill uncontrolled. Downstream impacts due to flooding should be addressed.

## Chapter 6 – Mitigation Measures

p. 6-189, References: The tables in Section 6.6 refer to a number of published regulations and policies. Full citation (derived from reference lists embedded in Chapters 4 and 5) would enhance the utility of Tables 6.3 through 6.7.

## Chapter 7 – Growth-Inducement Potential and Indirect Effects of Growth

Part 1 of BAWSCA’s comments stressed that the large majority of the planned growth to be accommodated by the WSIP has already been analyzed in CEQA-approved documents. There are two areas in which analysis of the impacts of growth can be expanded. However, the potentially un-analyzed impacts of growth are either the same as those already analyzed, or so small as to be insignificant.

The first category of potentially un-analyzed growth impacts are those that have been analyzed in CEQA documents, mostly general plans from jurisdictions served by the regional water system, although not for the same length of time as called for in the WSIP. The reason for this potential discrepancy is that none of the general plans’ horizons extend to 2030. The draft PEIR concludes that the growth accommodated by the WSIP in years beyond those analyzed in general plans (mostly the years 2020-30) would have impacts that are substantially similar to, though incrementally greater than, the impacts identified in local general plan CEQA documents (p.7-60; see also Table E.5.1.) We agree with this assessment.

The second category of potentially un-analyzed growth impacts are those that might occur in territories not covered in prior CEQA documents at all. However, this growth represents an insignificant portion of the total planned regional growth. Appendix E.5 of the draft PEIR lists those planning documents that have already received CEQA analysis. Table 7.4 shows the projected changes in population and employment for all the jurisdictions within the service area. A comparison of these two documents reveals that less than 8% of the total population growth in the wholesale service area, and less than 5% of the employment growth, has not undergone CEQA review for the effects of the WSIP’s planned growth. Put another way, the impacts of over 90% of the growth that will be accommodated by the WSIP have already been addressed in previous CEQA analyses.

## Chapter 8 – WSIP Variants and Impact Analysis

Chapter 8 describes and analyzes the potential environmental effects of three identified WSIP variants: All Tuolumne (Variant 1); Regional Desalination for Drought (Variant 2); and 10% Rationing (Variant 3).

The use of variants in a proposed program is not common in CEQA documents. The overview clearly distinguishes the discussion in this chapter from the CEQA alternatives presented in Chapter 9. The text needs to further explain the utility of the analysis in the context of CEQA. One of the variants (Variant 2 – Regional Desalination for Drought) is carried forward into the formal CEQA alternatives analysis.

A comparison of the results of the impact analyses for each of these variants provides a useful sensitivity analysis for the project components in the proposed WSIP as well as some of the early policy decision making. For example:

With the exception of the Bay Area Regional Desalination Project (BARDP) component of Variant 2, all three variants would have the same significant unavoidable or potentially significant unavoidable impacts as the proposed program....The greatest differences among the proposed program and the variants are associated with facilities-related impacts of the BARDP (p. 8-77, WSIP Variants and Impact Analysis)

...although the water supply and system operations impacts of the variants differ somewhat from those of the proposed program, the magnitude of the differences is small and not sufficient to change either the significance determinations or the mitigation measures identified for the WSIP. (p. 8-77, WSIP Variants and Impact Analysis)

...with the exception of the BARDP component of Variant 2, the variants would have the same areas of controversy, the same unavoidable effects, and the same irreversible environmental changes as the proposed program. (p. 8-83, WSIP Variants and Impact Analysis)

By slightly changing the proposed water source or level of rationing for each of the variants, the resulting impacts analysis provides an understanding of the sensitivity of impacts associated with the proposed program. Two important conclusions can be made based on the results of this sensitivity analysis:

1. The environmental impacts of a Bay Area Regional Desalination Project are far greater than the impacts of providing additional water supply reliability through increased diversions from the Tuolumne River.
2. Greater reliability can be provided with a 10% rationing limit without causing any increased impacts to the environment.

## Chapter 9 - CEQA Alternatives

p. 9-4, Table 9-2: There should be an attempt to quantify the existing level of service beyond “not defined” in order to better correlate with the conclusions presented in Table 9-6 “Summary of Ability of Alternatives to Meet Program Objectives.” Quantitative data on existing system performance for this purpose could be extracted from Chapter 3, Tables 3.6 and 3.7.

p. 9-16, Table 9-6: While this table identifies whether the individual alternatives meet the program objectives, including “Ensure cost-effective use of funds,” nowhere in this chapter are the actual total costs of individual alternatives presented. CEQA does not require an economic analysis, however a presentation of the economics of the proposed program and identified alternatives is crucial as part of the final decision making process. Given the wide range of costs associated with the supply components of the various alternatives, full disclosure of the known costs of the alternatives being considered is important as part of the public debate concerning the decision being made.

p. 9-16, Table 9-6, Water Quality Objectives: One water quality objective is “Design improvements to meet current and foreseeable future federal and state water quality requirements.” In evaluating whether an alternative meets this objective, consideration must be given to the fundamental principles that dictate that water quality from the best source is the most reliable means of eliminating uncertainties associated with contamination and public health risk. Water quality regulations are becoming more stringent with many more trace organics being detected, raising public health concerns. Options for source water downstream of the current intake are influenced by runoff and contamination from many other sources due to human activity. The uncertainty about risks from endocrine disruptors and other contaminants may result in increased health risk and higher levels of treatment. A treatment scheme capable of producing a similar water quality would include reverse osmosis and activated carbon among other processes which require more energy and disposal problems that have negative impacts on the environment. Public concern over drinking water is a leading issue resulting in diminished public confidence and higher use of bottled water which carries its own set of issues related to trace organic contamination and disposal of packaging and containers.

p. 9-17, Table 9-7: Another column should be added to this table showing the results of the water supply and system operations impact analysis results for the Proposed Program to more easily see the comparison to the alternatives. In reviewing this table, some summary comparisons can be made:

- Comparing to the Proposed Program, the Modified WSIP reduces 17 water supply and system operations impacts from “Potentially Significant, Mitigatable” to “Less than Significant”

- Comparing to the No Purchase Request Alternative, the Modified WSIP reduces 7 water supply and system operations impacts from “Potentially Significant, Mitigatable” to “Less than Significant”
- The No Action Alternative has the same identified “Potentially Significant, Mitigatable” water supply and system operations impacts as the Proposed Program

p. 9-26, last paragraph, No Program Alternative, Sec. 9.2.2: If the wholesale customers were to seek alternative supplies, they would have to use some, if not most of the Bay Area portion of the of the existing San Francisco regional waster system infrastructure. The draft PEIR does not fully disclose the constraints on this system. Understanding of these constraints is essential to know if the environmental impacts of the potential use of alternative supplies by the wholesale customers has been thoroughly analyzed and disclosed. For example, if the existing San Francisco regional system infrastructure is not available for these purposes, then the environmental impacts from the construction of a new supplemental water distribution system necessary to deliver alternative supplies could be greater than the impacts of the WSIP and should be disclosed as part of the final PEIR.

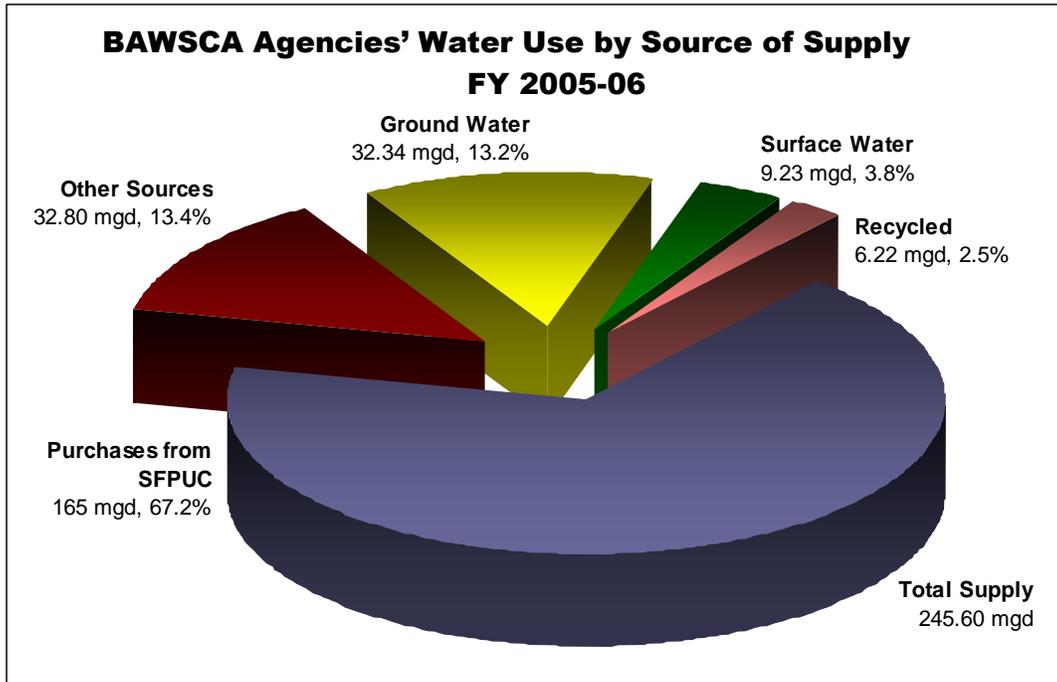
p. 9-26, last paragraph, No Program Alternative, Sec. 9.2.2: Regarding the statement that agricultural water use is decreasing because agricultural water users are selling water rights or contracts to urban agencies, another model to explain this result has also appeared. Specifically, some urban customers are investing in conservation in the agricultural regions and contracting to buy the conserved water, without land fallowing or selling of water rights.

p. 9-28, first paragraph, No Program Alternative, Sec. 9.2.2: The draft PEIR states that the wholesale customers have factored in additional conservation and recycling into their 2030 demands. In fact, by 2030, the wholesale customers expect to have an additional 9 mgd of recycled and desalinated water as well as 13 mgd from active conservation. (BAWSCA Annual Survey, FY 2005-06.)

p. 9-48 and 9-49, Aggressive Conservation/Water Recycling and Local Groundwater Alternative: The evaluation and analysis of the Aggressive Conservation/Water Recycling and Local Groundwater Alternative in the PEIR must consider the existing water demands and supply sources as well as projections for future water demand and water supply diversity.

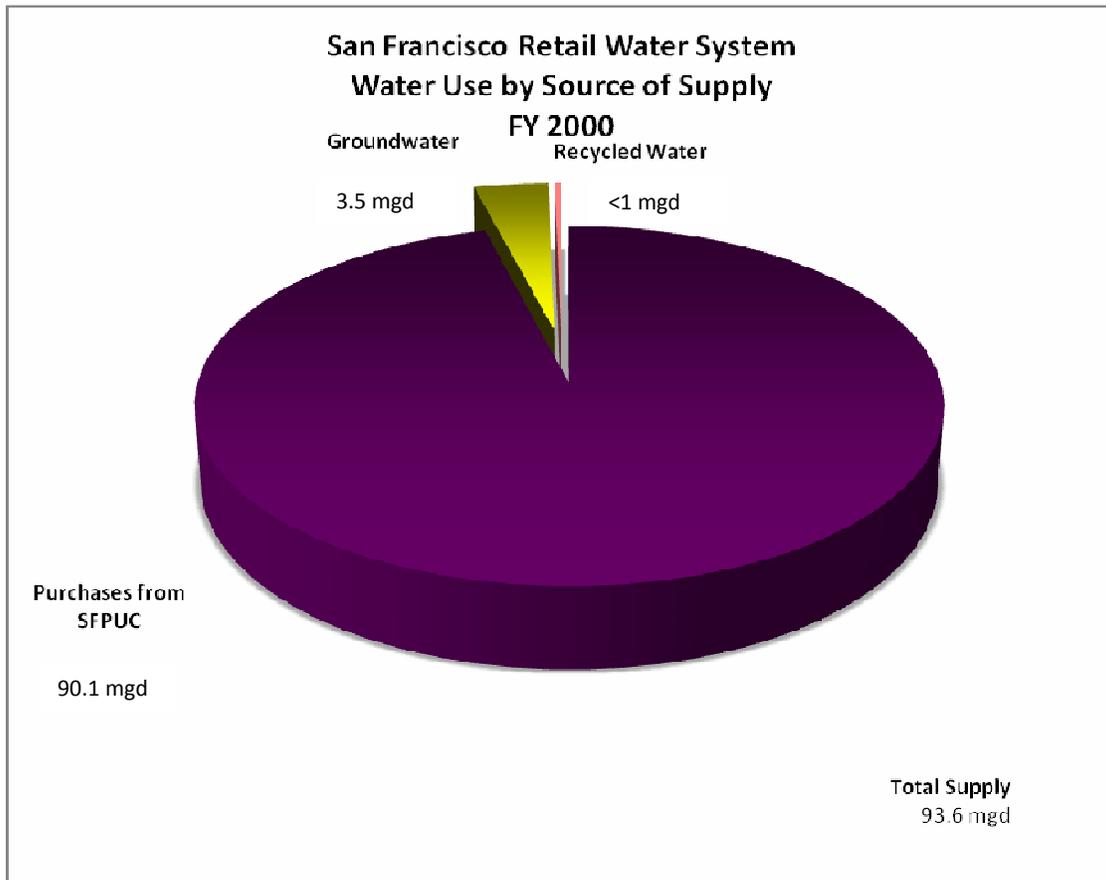
First, the diversification of water supplies today is very different when comparing the City and County of San Francisco with the BAWSCA agencies. Thirteen of the BAWSCA agencies have diverse water supply portfolios that include recycled water, desalinated water, local groundwater, and local surface water. Figure C below provides detail on the current diversification of existing water supply portfolios. By comparison, Figure D shows the sources of supply for the San Francisco Retail System in the year 2000.

Figure C



*[Remainder of page intentionally left blank.]*

Figure D



BAWSCA agencies have committed to increasing the diversity of their water supply portfolio in the future with increased use of recycled water, conjunctive use operation of groundwater supplies, and implementation of water conservation in 2030 as shown in Figure E below. Again, for comparison purposes, Figure F shows the planned sources of supply for the San Francisco Retail System in 2030 including an assumption that the conservation and water recycling component of the WSIP is implemented.

Figure E

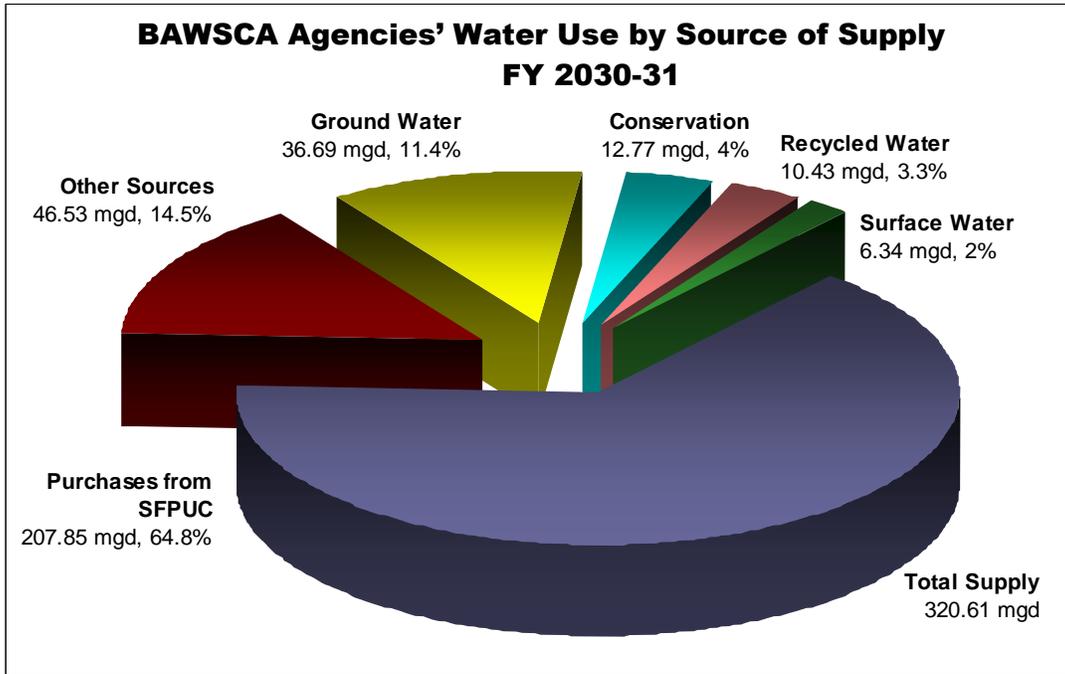
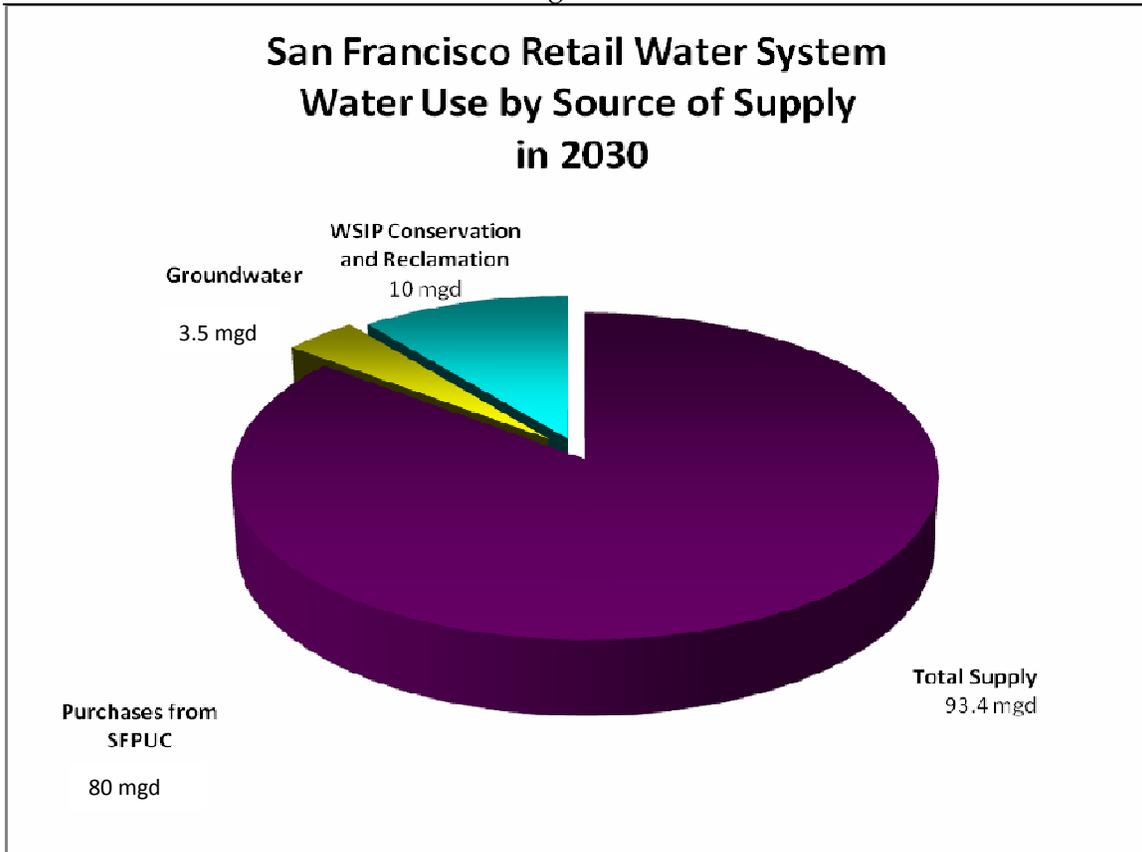


Figure F



**Other Comments Relating to Section 3.4.4, Water Demand Studies, and Supporting Studies for PEIR**

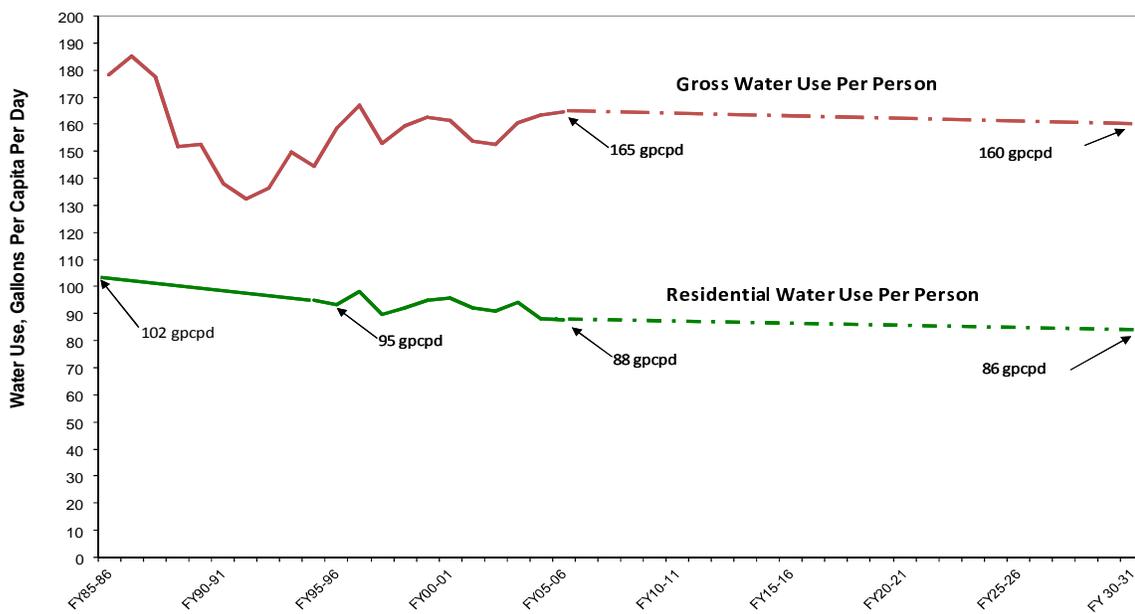
Since the release of the draft WSIP PEIR, several organizations have made critical statements questioning BAWSCA member agencies’ water use characteristics and demand projections, which are included in the PEIR’s supporting documents.

BAWSCA would like to offer the following comments and information on Section 3.4.4 “Water Demand Studies” of the PEIR and in response to the statements that have been made. Below is a summary of those comments made and BAWSCA’s responses for purposes of clarifying similar issues in the PEIR.

- **Critical Statement:** The wholesale customers anticipate that the single-family residential per-capita outdoor water use will increase from 39 gpcpd in 2001 to 40 gpcpd in 2030; Per capita water use is projected to increase for the wholesale customers, further indicating that they lack effective conservation programs.

BAWSCA Response: As documented in the technical memorandum “*Projected Water Usage for BAWSCA Agencies*” (Brown and Caldwell, Nov. 2006), while the single-family residential per-capita outdoor water use for the BAWSCA member agencies will increase from 39 gpcpd in 2001 to 40 gpcpd in 2030, total single family residential per-capita use will decrease from 96 gpcpd to 86 gpcpd over the same period (although current 2005-06 per capita use is actually 88 gpcpd) and gross per capita use will decrease from 165 gpcpd currently to 160 gpcpd in 2030. Figure G below presents historical and projected gross and residential per capita use in the BAWSCA area.

Figure G



Data Sources  
Historical Data: BAWSCA Annual Surveys  
Projected Data: Projected Water Usage for BAWSCA Agencies Technical Memo, Brown and Caldwell, Nov. 2006

- Critical Statement: The SFPUC's "Proposed Program" ignores conservation, efficiency, and recycling measures that their own studies found could eliminate the need to divert more water from the Tuolumne by at least 74%.

BAWSCA Response: This statement is incorrect. In fact, the WSIP includes implementation of over 23 mgd of conservation and recycling in the BAWSCA service area by 2030 as well as an additional 10 mgd of conservation and recycling in San Francisco by 2030.

- Critical Statement: The SFPUC should conduct a study to determine the maximum technical potential for conservation and efficiency savings within the SFPUC service territory.

BAWSCA Response: Such a study was completed in March 2006, the "*SFPUC Investigation of Regional Water Supply Option No. 4 (RWSO4)*" (URS, March 2006). This study presented the results of a comprehensive analysis of water conservation, water recycling, and naturally renewable groundwater projects that could be implemented to meet future water demands without additional diversion from the Tuolumne River. While this report does identify areas of potential additional opportunities that could be implemented to reduce the need for additional Tuolumne River diversion, the study concludes:

The total "high range" yield for the three categories of RWSO4 projects is approximately 28.5 mgd. The "high range" yield is the **maximum** possible from the combination of water conservation, recycling, and renewable groundwater projects. Because some of these projects are only considered potentially eligible and because the feasibility of many of the projects is unknown, this Technical Memorandum concludes **that RWSO4 will not meet** the 35 mgd increase in normal year SFPUC system demand by the year 2030. (emphasis added)

- Critical Statement: "the non-residential sector is responsible for over 80% of the projected 2030 demand increase."

BAWSCA Response: This statement is incorrect. 53.4% of the projected total increase in demand is associated with non-residential water use. The difference in the non-residential sector between 2001 actual (91 mgd) and 2030 projected (120.5 mgd) is 29.5 mgd, which represents 53.4% of the total increase in demand.

- Critical Statement: “over 40 percent of the increase in non-residential demand is due to outdoor use.”

BAWSCA Response: This statement is incorrect. As documented in the technical memorandum “*Projected Water Usage for BAWSCA Agencies*” (Brown and Caldwell, Nov. 2006), the difference in the non-residential sector between 2001 (actual) and 2030 (projected) is 29.5 mgd. Of this amount, the increase in *outdoor use* is 9.4 mgd, or 32%.

- Critical Statement: The PEIR and associated demand studies failed to account for the impact rising price of water has on consumption.

BAWSCA Response:

First, all of the BAWSCA agencies meet the CUWCC Best Management Practice #11 for Pricing.

Second, the demand studies that form the basis for the PEIR did incorporate the future cost of water (estimated at \$1,070/acre-foot) when analyzing the cost-effectiveness of each individual conservation and water recycling measure. This allowed the individual BAWSCA member agencies to identify the cost-effective water supply alternatives available to them based on the future cost of water.

Third, the demand studies that form the basis for the PEIR are based on an end-use model. This type of model differs from straight per capita or land use-based forecasting approaches in that it uses growth in number of accounts and a complete breakdown of water uses by account type (end uses) to forecast water demands. Using an end-use model allows more consideration of the effects of targeted conservation measures than is possible with a per capita or land use demand model. One characteristic of utilizing an end-use model is that very specific conservation measures are identified and evaluated for all end uses of water that can be identified. The result is that water use and available conservation activities are broken down very specifically. These individual conservation measures are then applied to end uses and the resulting water demand after conservation activities is determined. Because of this, applying a general elasticity value to this resulting demand, in an attempt to “mimic” the effect of pricing increases, would in fact then double-count much of the already identified and planned savings. Put another way, the specific conservation measures evaluated as part of an end use model provide clarity and specificity as to how a customer would achieve conservation savings in response to pricing structures designed to encourage water conservation.

- Critical Statement: “A study conducted by the Irvine Ranch Water District in California, for example, showed that evapotranspiration controllers reduced outdoor water use for large residential users by 24 percent.”

BAWSCA Response: BAWSCA is currently awaiting results from a multi-year study being conducted on weather-based irrigation controllers and their effectiveness. This study is a grant-funded effort in the San Francisco Bay Area headed by EBMUD and includes EBMUD, SCWA, CCWD, ACWD, SCVWD, and the City of Davis. Results of the study will not be out for another year or so. It is important to review the results of this study prior to implementing any irrigation controller rebate program, as the study should demonstrate actual water savings potential in *climatologic and hydrologic areas similar to the BAWSCA agencies*, as opposed to studies from Southern California or elsewhere in the country.

- Critical Statement: “Recent conservation assessments indicate that there are a substantial number of cost effective technologies that can drastically reduce residential water demand – both indoor and outdoor – to levels far below those projected for the wholesale and retail customers. For example, a 1997 study by the American Water Works Association (AWWA) found that conservation could reduce indoor water use from 65 gpcpd to 45 gpcpd for single-family homes, a savings of over 30 percent.”

BAWSCA Response: According to the report *Water and Energy Savings From High Efficiency Fixtures and Appliances in Single Family Homes* (EPA, 2005):

The mean daily household indoor use for the three groups during the baseline was 175 gpcpd, which dropped 39 percent to 107 gpcpd after the installation of the new high-efficiency fixtures and appliances.

For the houses studied in the service area of East Bay Municipal Utilities District in the San Francisco Bay Area, the pre-retrofit total residential water use was 187.6 gpcpd and the post-retrofit use was 123.9 gpcpd, a difference of 63.7 gpcpd or 33.95%. These findings support the fact that household retrofits with efficient plumbing fixtures can significantly reduce residential water use. However, the study shows that residential water use in other parts of the San Francisco Bay Area is significantly higher currently than that for BAWSCA, including that for BAWSCA’s projected 2030 use. As stated earlier in these comments, total single family residential per capita water use will decrease from the current level of 88 gpcpd to 86 gpcpd in 2030.

# ATTACHMENT 2

# **Impact of Earthquakes on BAWUA Customers**

## *Summary Report*

*Prepared for:  
Bay Area Water Users Association*

*Prepared by:*

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*G&E Report 54.01.01, Revision 0X  
November 23, 2001  
(includes minor revisions by BAWUA)*

## **Introduction**

This report describes what might happen to deliveries of water to BAWUA customers resulting from earthquake-induced damage to the SFPUC water system after two significant and likely earthquakes: a magnitude 7.9 earthquake on the San Andreas fault or a magnitude 7.1 earthquake on the Hayward fault. Unless otherwise noted below, estimated restoration times refer to SFPUC regional system. Damage to local distribution systems may further impede water from reaching the actual end-user. Water deliveries may be non-potable during the time water is restored to customers.

## **San Andreas M 7.9 Earthquake**

This earthquake will be very damaging to the main pipelines, tunnels, water treatment plants and pump stations in the Peninsula portions of the SFPUC system. No new water supply from the SFPUC system will be available until repairs are made to the most critical pipeline and tunnel infrastructure; this will take between 20 and 30 days, depending on location within the SFPUC system. Projected impacts to BAWUA customers are as follows:

- ◆ 349,000 people (Brisbane, Burlingame, Colma, Foster City, Hillsborough, Millbrae, Pacifica, San Mateo, South San Francisco, parts of Belmont and Daly City): Water supply is lost to almost all customers in about 24 hours. No water via the piped system for about 30 days. After 30 days, about 35% of customers will have water restored, ramping up to 100% of customers in about 58 days.
- ◆ 140,000 people (San Bruno, most of Daly City): Water supply is lost to almost all customers in about 24 hours. There is no water to most of the piped system for several days. Then, water supply is restored to most people at severe rationing levels within 30 days. After 30 days water is supplied to most people at near normal levels.
- ◆ 277,000 people (East Palo Alto, Los Altos Hills, Menlo Park, Palo Alto, Redwood City, Woodside, parts of Belmont and North San Jose): Water supply is lost to almost all customers in about 24 hours. There is no water via the piped system for about 20 days. After 20 days, about 35% of customers will have water restored, ramping up to 100% of customers in about 34 days.
- ◆ 334,000 people (Mountain View, Santa Clara, Stanford University and Sunnyvale): Water supply is lost to almost all customers in about 24 hours. No water to most of the piped system for a few days. After 14 days, about two-thirds of customers will have water restored, ramping up to 100% of customers at near normal levels in about 34 days.
- ◆ 511,000 people (Hayward, Fremont, Newark and Union City). Damage to local distribution pipelines, especially those near the bay, will cause between 3% and 20% of customers to lose all water supply for up to a few days after the earthquake
- ◆ 800,000 people (San Francisco). Damage to local distribution pipelines, especially those serving the lower elevation north waterfront, downtown and South of Market areas, will lead to loss of all water supply to those areas within 8 to 24 hours after the earthquake. Water supply to the western and higher elevation parts of the City will be

lost to localized areas within a few hours after the earthquake. Damage to all the major transmission pipelines serving San Francisco will prevent re-supply of the City, causing most of the City to lose nearly all water supply within about 72 hours. Limited portions of the City served by unbroken parts of the salt-water auxiliary water supply system may have access to salt water for fire fighting purposes. For up to 30 days, a portion of the City could get non-potable water if it is decided to pump Lake Merced water into the potable water system; most of the remainder of the City will have no water. Some of the transmission pipelines are restored to service 30 days after the earthquake, and about three-quarters of the City will then have water. Essentially all customers get water restored within 45 days.

### **Hayward M 7.1 Earthquake**

This earthquake will be very damaging to the main pipelines, tunnels, water treatment plants and pump stations in the East Bay portions of the SFPUC system. No new water supply from the SFPUC system will be available to the East Bay and parts of the South Peninsula areas until repairs are made to critical pipeline and tunnel infrastructure; this will take between 20 and 30 days, depending on location within the SFPUC system. Given the expected damage patterns, BAWUA customers should expect the following:

- ◆ 200,000 people (East Palo Alto, Hayward, Woodside, parts of Menlo Park, North San Jose, Palo Alto and Redwood City). Water supply is lost to almost all customers in about 24 hours. There is no water via the piped system for about 20 days. After 20 days, about 35% of customers will have water restored, ramping up to 100% of customers in about 35 days. For up to 60 days after the earthquake, water supply will be intermittent (sufficient at night time, on-and-off in the day time).
- ◆ 725,000 people (Fremont, Milpitas, Newark, Santa Clara, Sunnyvale, Union City and parts of Stanford University). Water supply is lost to almost all customers in about 24 hours. There is no water to most of the piped system for a few days. Water supply to about one-half of customers is restored within 15 days. Then, water supply to about two-thirds of customers is restored within 20 days, which is when the SFPUC system is sufficiently repaired to start making limited deliveries again. For up to 60 days after the earthquake, water supply will be intermittent.
- ◆ 800,000 people (San Francisco). Damage to local distribution pipelines, especially those near the bay, will cause between 5% and 20% of customers to lose all water supply within 24 hours after the earthquake, with most of these customers reconnected to the system within ten days after the earthquake. For up to 60 days after the earthquake, there may be insufficient water available to supply all of San Francisco, if the decision is made to divert limited water supplies to meet the requirements of Peninsula and South Bay suburban customers. If the decision is made to divert water, then San Francisco customers will have to greatly reduce demand, or else there will be localized intermittent water outages.
- ◆ 710,000 people (northern Peninsula and areas not listed above). Damage to local distribution pipelines, especially those near the bay, will cause between 2% and 15% of customers to lose all water supply for up to a few days after the earthquake. For up

to 60 days after the earthquake, water supply will be intermittent (sufficient at night time, on-and-off in the day time).

### **Impacts to Affected BAWUA Customers**

For the first one to three days after either a San Andreas M7.9 or Hayward M7.1 earthquake, a large portion of affected people will likely stay home, to take care of immediate family matters and damage to local residences. If residential structures suffer little to moderate damage, most people will continue to live at home, while some will relocate to stay with friends or family outside the affected zone. If residential structures suffer considerable damage, people will have to relocate to various types of emergency shelters like school gymnasiums.

During the first few days, most people in the areas with water outages will obtain drinking and cooking water from bottled water suppliers. Within a day or two, water supply for sanitation and washing purposes will become a high priority for people. People without water at their residences beyond one or two days will either relocate to emergency shelters / hotels, move in with family outside of the affected area, or suffer the inconvenience of obtaining bottled water and/or water from emergency distribution locations for all of their needs.

Faced with water outages that could last up to 20 to 60 days, there will be substantial impacts to local communities. Most emergency care facilities (hospitals) will likely have to relocate their patients to other hospitals if their facility loses piped water supply for more than a day or so. People will tend to become "disillusioned" with their water agencies if piped water is not restored within about 4 to 10 days. Economic activity in the areas without piped water supply will drop by about 50-70%; most affected businesses will furlough their employees for the interim; "marginal" companies may not ever recover.

A large earthquake will ignite fires in many locations. Many of these fires will ignite due to leaking natural gas pipes; short circuits in electrical systems; unattended cooking and tipped-over heating appliances when PG&E electric power is restored; spillage of flammable materials, etc. Fire fighters will be able to make good use of local water supplies in tanks until the water within the tanks runs out, likely within 6 to 18 hours after the earthquake. Fire fighting efforts at fire locations that are located too far away from a water supply (either because of broken water pipes, or the system has become depressurized), will be largely ineffective; the buildings (and a few around them) will be left to burn down. If it is very windy at the time of the earthquake (about 2% to 5% chance), fires that cannot be rapidly controlled before the local water supply is exhausted will likely spread; in densely constructed areas, one or two uncontrolled ignitions could lead to conflagrations involving 10s to 100s to 1000s of structures.

### **Basis of this Report**

This report was prepared using the findings described in the "Phase II – Regional System Overview" report of the SFPUC Facilities Reliability Program (January 2000), coupled with trends that have occurred to local water distribution systems in recent earthquakes around the world. Further engineering evaluations of individual components of each water system can refine the results presented herein. The water outages described in this report are no more severe than what has actually been experienced to modern metropolitan urban areas that have recently experienced large earthquakes. For example, the city of Kobe, Japan (population 1,500,000 people), was impacted by a magnitude 7 earthquake in 1995; the resulting damage to the water

system resulted in water outages lasting up to 90 days. For BAWUA customers, the dominant reason for lengthy water outages is damage to pipelines that cross soil liquefaction areas (the San Francisco Bay Area has many such pipelines and many such soil areas); and that major pipelines cross faults (the SFPUC system has all 4 of its major pipelines cross the Hayward fault). Another important cause of damage is the intense level of ground shaking that will occur near the faults, which will greatly overload the vintage water facilities built near them, like reservoir outlet towers and tunnels – most of these facilities were not designed for anything much more than about one-quarter the level of ground shaking that they will likely be subjected to in future earthquakes.

For the interested reader, detailed reports on the performance of water systems in recent earthquakes are available from the American Society of Civil Engineers ([www.asce.org](http://www.asce.org)), Technical Council on Lifeline Earthquake Engineering: Kobe, Japan, 1995 (monograph 15); Izmit, Turkey 1999 (monograph 17); Chi-Chi Taiwan, 1999 (monograph 18); Bhuj, India, 2001 (monograph 19). In all of these earthquakes, damage to water systems led to water outages lasting between weeks to several months for urban areas of 100,000s to 1,000,000s of population.

# ATTACHMENT 3



# Water Bonds

## Digest

by Ballot Simplification Committee

**THE WAY IT IS NOW:** San Francisco's water system supplies drinking water to about 2.4 million people in San Francisco and the Bay Area. This water is stored at Hetch Hetchy Reservoir and in other reservoirs in the Sierra and in Alameda and San Mateo counties. Some of the water is piped more than 150 miles to reach the Bay Area. Many of the water system's pipelines, tunnels and other facilities are in need of repair or replacement. Some of these are located on or near fault lines, and are vulnerable to damage in an earthquake.

**THE PROPOSAL:** Proposition A is a revenue bond that would authorize the City to borrow \$1,628,000,000 to pay for improvements to its water system. The money would be used to:

- Upgrade and strengthen the system's pipelines, tunnels and other facilities against earthquakes;
- Upgrade the system used to store water and pipe it to the Bay Area;
- Upgrade the water distribution system in San Francisco;
- Meet future water quality standards; and
- Increase water system capacity.

Rates charged to water system customers in San Francisco would be increased over time to repay these bonds. San Francisco landlords could pass on to tenants in rent-controlled units half the increase in water rates resulting from the bond. Suburban water system users would finance and pay for their share of improvements to the water system.

If in the future the San Francisco Board of Supervisors determines that it is cheaper to pay for water system improvements by joining with suburbs to create a Regional Water Financing Authority, then a surcharge will be imposed on San Franciscans to cover the additional costs including to pay for the operating expenses of the Authority.

**A "YES" VOTE MEANS:** If you vote "Yes," you want the City to borrow \$1,628,000,000 to make water system improvements, to be paid for with increased water rates.

**A "NO" VOTE MEANS:** If you vote "No," you do not want the City to borrow \$1,628,000,000 for these purposes.

### Controller's Statement on "A"

City Controller Edward Harrington has issued the following statement on the fiscal impact of Proposition A:

In my opinion, should the proposed bond issue of \$1,628,000,000 be authorized and bonds issued at current interest rates, based on a single bond sale and level redemption schedules, the cost would be approximately \$85,000,000 annually for thirty (30) years for a total approximate cost including debt service of \$2,551,000,000.

This bond amount represents increases ranging between 5% and 12% annually between 2003 and 2015 in water rates for San Francisco consumers, the source of repayment for these bonds. For the average single family residential service in San Francisco this cost is equivalent to an increase of approximately \$26.42 per month above the current rate of \$14.43 per month, for a total of \$40.85 per month by 2015.

The City typically does not issue all authorized bonds at one time; if these bonds are issued over several years, the actual debt service may be somewhat less than the maximum amount shown herein.

Before the bonds are issued, the City will need to amend the Residential Rent Stabilization and Arbitration Ordinance. This amendment is to provide landlords the ability to pass through 50% of the costs resulting from increased water rates to residential tenants. Under current financing assumptions, the average tenant in a four unit building would pay approximately \$10.56 per month by 2015.

### How Supervisors Voted on "A"

On July 22, 2002 the Board of Supervisors voted 8 to 3 to place Proposition A on the ballot.

The Supervisors voted as follows:

**Yes:** Supervisors Ammiano, Daly, Gonzalez, Leno, Maxwell, McGoldrick, Newsom, and Peskin.

**No:** Supervisors Hall, Sandoval, and Yee.

**THIS MEASURE REQUIRES 50%+1 AFFIRMATIVE VOTES TO PASS.**

ARGUMENTS FOR AND AGAINST THIS MEASURE IMMEDIATELY FOLLOW THIS PAGE. THE FULL TEXT BEGINS ON PAGE P-19. SOME OF THE WORDS USED IN THE BALLOT DIGEST ARE EXPLAINED ON PAGE P-3.

# A

## Water Bonds

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### PROPONENT'S ARGUMENT IN FAVOR OF PROPOSITION A

Should a major earthquake strike San Francisco's Hetch Hetchy water system must be ready.

If a serious quake were to occur today, there is a high probability that water delivery to San Francisco could be interrupted for more than two months. This would threaten our ability to fight fires after an earthquake and lead to an economic disaster as we attempted to recover without a stable water supply.

When San Franciscans came together in common purpose to build Hetch Hetchy nearly 100 years ago, we showed we were a city that knew how to do things right. Now, it is time for our generation to show that we know how to safeguard this civic treasure.

After years of study and rigorous review, the city is going forward with Proposition A to seismically-strengthen and repair the deteriorated system.

Hetch Hetchy brings more than vital water; it provides tremendous financial benefits to the people of San Francisco. Because of our ownership of the system, San Francisco will pay for just 30 percent of the cost of regional repairs. Our suburban customers will pay the rest - \$2 billion. And our water rates will be competitive with neighboring counties in the Bay Area. Hetch Hetchy also provides San Francisco free water and power for critical city needs such as the Municipal Railway, Public Schools, San Francisco General Hospital and other city facilities.

Now is the time to safeguard this civic treasure. The system crosses three major earthquake faults and is vulnerable.

A city cannot live without water. That's why Board President Tom Ammiano and Supervisors Peskin, Maxwell, Daly, Leno and McGoldrick have joined with the Chamber of Commerce, environmental activists and leaders from throughout San Francisco to support Proposition A.

Please Vote YES on Proposition A.

*Supervisors Tom Ammiano, Aaron Peskin, Sophie Maxwell, Chris Daly, Mark Leno and Jake McGoldrick*

*San Francisco Chamber of Commerce*

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### REBUTTAL TO PROPONENT'S ARGUMENT IN FAVOR OF PROPOSITION A

Proposition A triples water rates, raises rents and gives away control of our water system to the suburbs.

Don't fall for the scare campaign. Though our water delivery system must be made seismically safe, there is an alternative plan that would cost 75% less - and keeps San Francisco voters, not suburban politicians, in control of our water system.

The political establishment supports this measure because it helps to create a new bureaucracy called The Regional Water Finance Authority. This Authority will control spending and set your water rates. You the ratepayer or renter will pay the costs of this new bureaucracy.

Current law requires a vote of the public to increase water rates. This important decision must remain in the hands of voters and certainly not the hands of politicians.

Please read the ballot question and you will see that the devil is in the details. See through the fear campaign and keep what Congress gave San Francisco more than 80 years ago.

Please join us in saying **NO to THE WATER GRAB**. Vote No on Prop A!

*The Coalition for San Francisco Neighborhoods*

*San Francisco Taxpayers & Homeowners Association*

*San Francisco Hotel Council*

*The Residential Builders Association*

*The Coalition for Better Housing*

*The San Francisco Association of Realtors*

*San Francisco Apartment Association*

*Professional Property Management Association of San Francisco*

*Golden Gate Restaurant Association*

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# Water Bonds

## PAID ARGUMENTS IN FAVOR OF PROPOSITION A

**SENIORS SUPPORT THE REPAIR AND RENEWAL OF OUR WATER SYSTEM! PAY NOW OR PAY MUCH MORE LATER. VOTE YES ON PROP A.**

*Margaret Griffin, Vice-President, SENIOR ACTION NETWORK  
Denise D'Anne, Treasurer, SENIOR ACTION NETWORK*

The true source of funds used for the printing fee of this argument is SENIOR ACTION NETWORK.

Hetch Hetchy is the largest source of high quality drinking water in California. It delivers water to all San Franciscans and several peninsula communities -- about 3 million people are served.

The Hetch Hetchy water system needs overhauling: new pipes that are seismically upgraded to meet modern safety standards; reinforcement of city reservoirs, such as in the Sunset, that provide water to 60% of San Francisco and serve as emergency supply; and modernized pump stations that move water throughout the city.

It would be foolhardy not to repair this system. Throughout California, there are communities searching for high quality drinking water. We have it and we must keep it.

I urge you to vote "Yes" on Proposition A.

*Dianne Feinstein, U.S. Senator, former Mayor, former Supervisor*  
The true source of funds used for the printing fee of this argument is Save Hetch Hetchy Committee - Yes on A: A Business & Labor Coalition to Safeguard Our Water Supply.

The three largest contributors to the true source recipient committee are: 1. California Alliance for Jobs 2. Engineering and Utility Contractors Association 3. San Francisco Chamber of Commerce 21st Century Committee.

State Senator Jackie Speier says "it is not a question of *if* a major earthquake will strike the Bay Area. It is a question of *when*." I agree.

Hetch Hetchy's aging pipes cross three active earthquake faults: the Calaveras, the Hayward, and the San Andreas. A 7.0 earthquake could cut water to 2.4 million residents of the Bay Area for up to 60 days. Emergency crews would be unable to fight fires, and hospitals would be unable to function properly. This is a risk that we cannot afford to take.

Senator Speier and I speak with passion borne of a love of this great city when we implore you to help Save Hetch Hetchy for our generation and for generations to come.

History will judge us by our vote on November 5.

**Please, vote yes on A.**

*Jane Morrison, Chair, San Francisco Democratic Party*

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**Join the San Francisco Democratic Party in Voting YES on A.**

Proposition A is a vital public safety priority for all San Franciscans. We must protect our water supply and preserve the Hetch Hetchy system.

A major earthquake will strike sooner, or later.

We must be ready.

Don't Delay. Vote YES ON A!

*San Francisco Democratic Party*

The true source of funds used for the printing fee of this argument is Save Hetch Hetchy Committee - Yes on A: A Business & Labor Coalition to Safeguard Our Water Supply.

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**The San Francisco Chamber of Commerce Urges YES on A.**

As representatives of the business community, we know that our economy will wither if we cannot protect our water supply. A major earthquake will knock out water to our city for months. That will create an immediate danger as we fight fires in the aftermath of an earthquake, and a long-term disaster as we try to rebuild our economy without water.

We have waited too long already. Now is the time for the entire city to unite behind Proposition A.

*A. Lee Blitch, President and CEO, San Francisco Chamber of Commerce*

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**The Harvey Milk Democratic Club Urges Yes on A.**

Rebuilding Hetch Hetchy is a priority that must be shared by every San Francisco community. For our health, for our safety and for the economic security of our city - VOTE YES ON A.

*Harvey Milk Democratic Club*

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## PAID ARGUMENTS IN FAVOR OF PROPOSITION A

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The three largest contributors to the true source recipient committee are: 1. California Alliance for Jobs 2. Engineering and Utility Contractors Association 3. San Francisco Chamber of Commerce 21st Century Committee.

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### **It's a sound plan. Vote Yes on Prop A.**

A Blue Ribbon Panel made up of experts in water supply, planning, finance and the environment met to independently evaluate the Prop A Capital Improvement Program.

We found the plan to be solid, well designed and achievable. We urge San Franciscans to support this long overdue measure.

Restoring the Hetch Hetchy water supply system is necessary to protect the public health and is good for all San Franciscans.

**Please vote YES on A.**

*Jim Chappell*, President, SPUR (San Francisco Planning & Urban Research Association), Blue Ribbon Panel Convener

The true source of funds used for the printing fee of this argument is Save Hetch Hetchy Committee - Yes on A: A Business & Labor Coalition to Safeguard Our Water Supply.

The three largest contributors to the true source recipient committee are: 1. California Alliance for Jobs 2. Engineering and Utility Contractors Association 3. San Francisco Chamber of Commerce 21st Century Committee.

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The Hetch Hetchy system was an engineering marvel when it was constructed nearly 90 years ago. However, now it does not meet modern earthquake safety requirements. Many of the water system's pipelines and structures are at the end of their useful life and require replacement or rehabilitation before they fail.

Water from the dam in the Sierra Nevada flows across three major earthquake faults as it travels in pipelines over 167 miles to the City of San Francisco and the Bay Area. The risk of a significant earthquake is high. Furthermore, there are system components without redundancy. Standards and technology have improved dramatically since construction in 1914, and should be implemented to help protect this vital system and assure all City users of a constant water supply.

We must rehabilitate and/or replace pipelines and structures as well as incorporate modern seismic safety standards to protect our water supply system.

**Please join the American Society of Civil Engineers, San Francisco Section, in support of Proposition A.**

*Jennifer Webber*

The true source of funds used for the printing fee of this argument is Save Hetch Hetchy Committee - Yes on A: A Business & Labor Coalition to Safeguard Our Water Supply.

The three largest contributors to the true source recipient committee are: 1. California Alliance for Jobs 2. Engineering and Utility Contractors Association 3. San Francisco Chamber of Commerce 21st Century Committee.

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Vote Yes on Prop A.

The Hetch Hetchy water system is the pride of our city, but all agree that it is in need of repair.

We San Franciscans must demonstrate that we won't neglect one of our most precious possessions by protecting Hetch Hetchy from earthquakes and collapse. Proposition A will help preserve this vital system and keep it in the hands of San Francisco while maintaining our partnership with our suburban customers. The economic benefits that San Francisco enjoys will continue.

**Proposition A should be a priority for everyone.**

Please Vote Yes on Prop A.

*Jim Lazarus*, Former Deputy Mayor

The true source of funds used for the printing fee of this argument is Save Hetch Hetchy Committee - Yes on A: A Business & Labor Coalition to Safeguard Our Water Supply.

The three largest contributors to the true source recipient committee are: 1. California Alliance for Jobs 2. Engineering and Utility Contractors Association 3. San Francisco Chamber of Commerce 21st Century Committee.

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Vote Yes on Prop A!

We work in San Francisco to keep your lights on, but we know it's just as important to have water come from the tap.

Please join us in supporting Proposition A it's about protecting a vital resource, it's about clean water, and it's about jobs.

Yes on A.

*IBEW Local 1245*

The true source of funds used for the printing fee of this argument is IBEW Local 1245.

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Proposition A will allow San Francisco to produce recycled water for the first time. This can help recharge the Westside Basin Aquifer and reduce our dependence on the Hetch Hetchy reservoir.

Vote Yes on A!

*San Francisco Tomorrow*

The true source of funds used for the printing fee of this argument is San Francisco Tomorrow.



# Water Bonds

## PAID ARGUMENTS IN FAVOR OF PROPOSITION A

The Hetch Hetchy water system is San Francisco's life line. SPUR believes that Proposition A is a well researched, well-prepared investment in the long term future of our water system.

Improvements to the system will be paid for over time. Customers who live outside the city will pay their share up front. The plan puts the most important work first, in the interests of shoring up the system's ability to withstand earthquakes.

Because this is a revenue bond, it will be paid for out of customers' fees; it will not raise taxes.

Together with Proposition E, a companion measure that gives the Public Utilities Commission the tools it needs to get the job done on time and on budget, we can protect our water supply for the next century.

SPUR recommends a yes vote on Prop A.  
For the full ballot analysis, see [www.spur.org](http://www.spur.org)

### SPUR

The true source of funds used for the printing fee of this argument is SPUR Urban Issues Committee.

The three largest contributors to the true source recipient committee are: 1. John Weeden 2. Frankie Lee 3. Vince Hoenigman.

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Join me in voting Yes on Prop A.

The Hetch Hetchy water system is part of what makes San Francisco a unique place to live, but the system is aging and in need of repair.

Proposition A would direct our money to where it is needed to fix the rusting and decaying pipelines. These repairs will keep our water clean and make sure an earthquake will not leave us without water.

Now is the time to cast a vote that will keep San Francisco a one-of-a-kind city.

Please, vote yes on A.

### Congresswoman Nancy Pelosi

The true source of funds used for the printing fee of this argument is Save Hetch Hetchy Committee - Yes on A: A Business & Labor Coalition to Safeguard Our Water Supply.

The three largest contributors to the true source recipient committee are: 1. California Alliance for Jobs 2. Engineering and Utility Contractors Association 3. San Francisco Chamber of Commerce 21st Century Committee.

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### San Franciscans Unite to Preserve Hetch Hetchy - Vote YES on A.

San Francisco has always been a city of great vision. Proposition A is our chance to renew that vision by preserving our water system.

Nearly 80 years ago, our city united to create the world-class Hetch Hetchy water system. Now, we must unite again to invest in system repairs and to ensure San Francisco's continued ownership of this vital utility.

**Please join us in voting YES on A.**

*Senator John Burton  
Assemblyman Kevin Shelley*

The true source of funds used for the printing fee of this argument is Save Hetch Hetchy Committee - Yes on A: A Business & Labor Coalition to Safeguard Our Water Supply.

The three largest contributors to the true source recipient committee are: 1. California Alliance for Jobs 2. Engineering and Utility Contractors Association 3. San Francisco Chamber of Commerce 21st Century Committee.

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Proposition A will ensure that we take the necessary steps to fix our water system. The repair of Hetch Hetchy will guarantee us clean water for years to come.

The rebuild will also create jobs and give people skills to continue in the industry after the Hetch Hetchy project is completed.

We must support Proposition A. The clean water and jobs are a win-win for all San Franciscans.

**Please vote Yes on A.**

### Supervisor Sophie Maxwell

The true source of funds used for the printing fee of this argument is Save Hetch Hetchy Committee - Yes on A: A Business & Labor Coalition to Safeguard Our Water Supply.

The three largest contributors to the true source recipient committee are: 1. California Alliance for Jobs 2. Engineering and Utility Contractors Association 3. San Francisco Chamber of Commerce 21st Century Committee.

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### Help Keep San Francisco Safe - Vote Yes on A.

San Francisco didn't just fall down in 1906 - it burned down. One of the major reasons was lack of water in the aftermath of the earthquake.

Our Hetch Hetchy system is now more than 80 years old. Experts say it will not withstand a major quake. That is why we must unite and Vote Yes on A.

### Sheriff Michael Hennessey

The true source of funds used for the printing fee of this argument is Save Hetch Hetchy Committee - Yes on A: A Business & Labor Coalition to Safeguard Our Water Supply.

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## PAID ARGUMENTS IN FAVOR OF PROPOSITION A

Proposition A is needed to protect one of the City's most valuable assets: Hetch Hetchy and our City's water supply. Failure to protect our water supply would place this City at great economic risk. Prop A will also make ecological improvements to our water system that is long overdue.

I ask all San Franciscans to join me in supporting Proposition A.

*City Treasurer Susan Leal*

The true source of funds used for the printing fee of this argument is Susan Leal.

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### **Join District 11 Democrats and Vote Yes on Prop A.**

Water is a precious resource that must be safeguarded, and fixing our unique Hetch Hetchy water system will help do that.

Proposition A will allow San Francisco's entry into the use of recycled water - a much needed conservation measure.

Proposition A is a fair proposal.

**Vote Yes on A.**

*District 11 Democrats*

The true source of funds used for the printing fee of this argument is Save Hetch Hetchy Committee - Yes on A: A Business & Labor Coalition to Safeguard Our Water Supply.

The three largest contributors to the true source recipient committee are: 1. California Alliance for Jobs 2. Engineering and Utility Contractors Association 3. San Francisco Chamber of Commerce 21st Century Committee.

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### **Organized Labor Supports Prop A.**

Making prudent investment in vital infrastructure is the basis of a strong community.

Proposition A is a fair and balanced measure that creates jobs for working men and women and will allow us to upgrade our water system so it can withstand a major earthquake.

**Please join us in voting Yes on Prop A.**

*Operating Engineers Local 3*

The true source of funds used for the printing fee of this argument is Save Hetch Hetchy Committee - Yes on A: A Business & Labor Coalition to Safeguard Our Water Supply.

The three largest contributors to the true source recipient committee are: 1. California Alliance for Jobs 2. Engineering and Utility Contractors Association 3. San Francisco Chamber of Commerce 21st Century Committee.

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### **The San Francisco Labor Council Urges Yes on Prop A.**

Proposition A will create thousands of jobs and help preserve millions of dollars of city revenue we need to fund basic services. Organized labor urges all working people to join with us in supporting Proposition A.

Save Hetch Hetchy!

*Robert Boileau, Vice President, San Francisco Labor Council*

The true source of funds used for the printing fee of this argument is Save Hetch Hetchy Committee - Yes on A: A Business & Labor Coalition to Safeguard Our Water Supply.

The three largest contributors to the true source recipient committee are: 1. California Alliance for Jobs 2. Engineering and Utility Contractors Association 3. San Francisco Chamber of Commerce 21st Century Committee.

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In life, until some unforeseen loss, we take for granted the commonplace - such as air, water, the social and physical infrastructure around us, and parenthetically, the municipal professionals who help support that network.

Our members kept Hetch Hetchy water flowing despite years of unconscionable deferred maintenance; Prop A provides the tools to repair and retrofit San Francisco's water-related infrastructure to safe, 21st Century standards.

**Yes on Prop A.**

*Professional & Technical Engineers, Local 21 (IFPTE/AFL-CIO)*

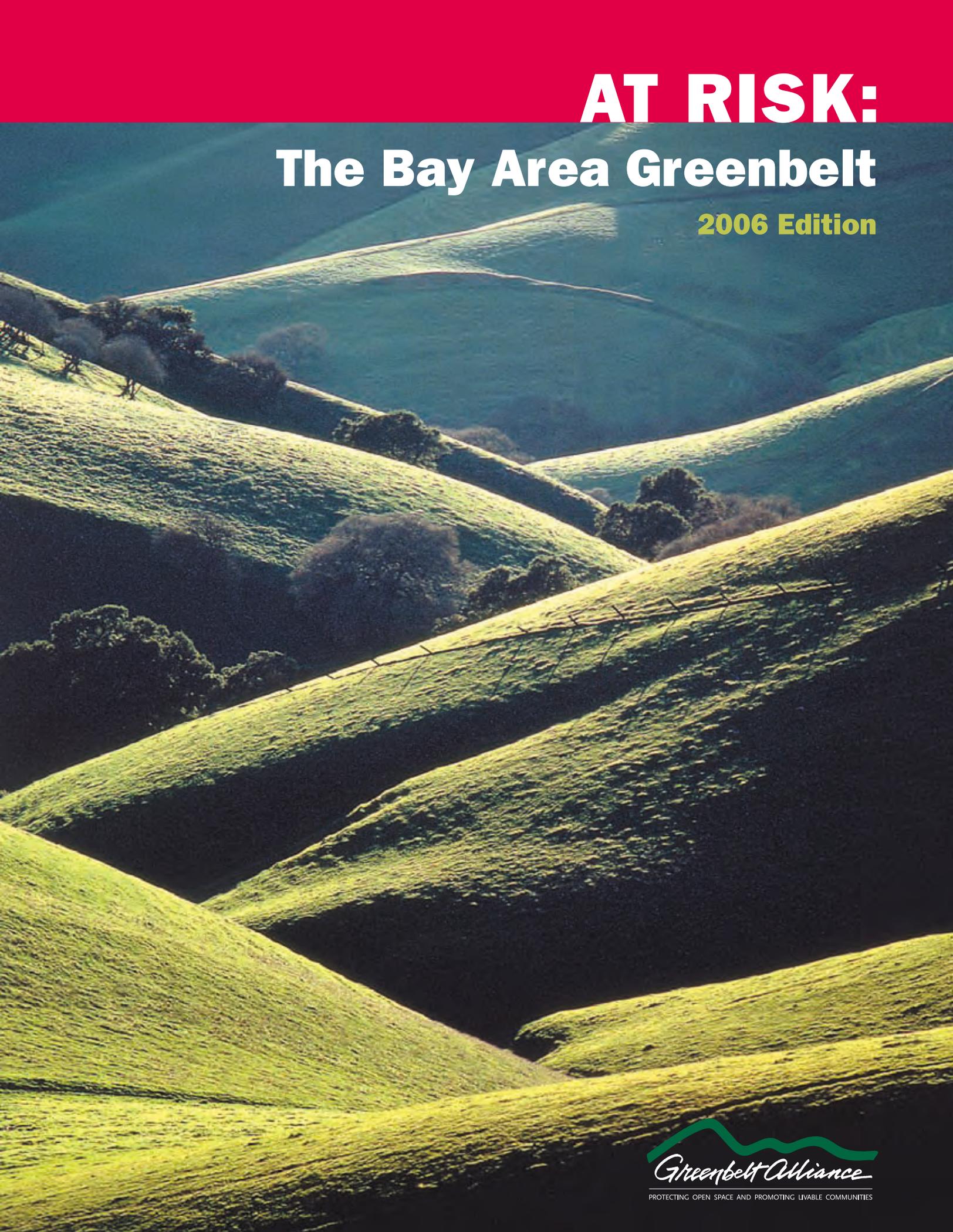
*Howard Wong, A.I.A., President*

*Kathleen Price, P.E., San Francisco Vice President*

*Ron K. Dicks, Vice President, Legislative & Political Action*

The true source of funds used for the printing fee of this argument is Professional & Technical Engineers, Local 21 (IFPTE/AFL-CIO).

# ATTACHMENT 4



**AT RISK:**

**The Bay Area Greenbelt**

**2006 Edition**

Greenbelt Alliance would like to thank the many individuals around the Bay Area who helped to provide the information compiled in this report, as well as our generous supporters.

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# Alameda County

*County progress, Tri-Valley pressure*

## General Assessment

Alameda County has made significant progress in securing its greenbelt, but challenges remain. The 2000 elections in particular were a landmark in the county's land-use history, with voters passing crucial greenbelt protection measures. Going forward, more responsible city policies will be needed, as well as continued vigilance against developer-backed attempts to roll back growth limits.

## Hot Spots

The east county cities of Livermore, Pleasanton, and Dublin remain the focus of land-use controversies in Alameda County. Virtually all of the county's 15,000 acres that remain at high risk are around these cities. The flat ranchlands north of Livermore remain a prime target of developers, despite an urban growth boundary protecting the area. Developer Pardee Homes placed an initiative on the 2005 ballot to allow 2,450 houses on 1,500 acres of the land, but failed thanks to the concerted efforts of local activists. Despite the progress made in recent years, the growth pressures in these Tri-Valley cities could still increase Alameda County's total urbanized area by more than 10% in just the next 10 years.

## Bright Spots

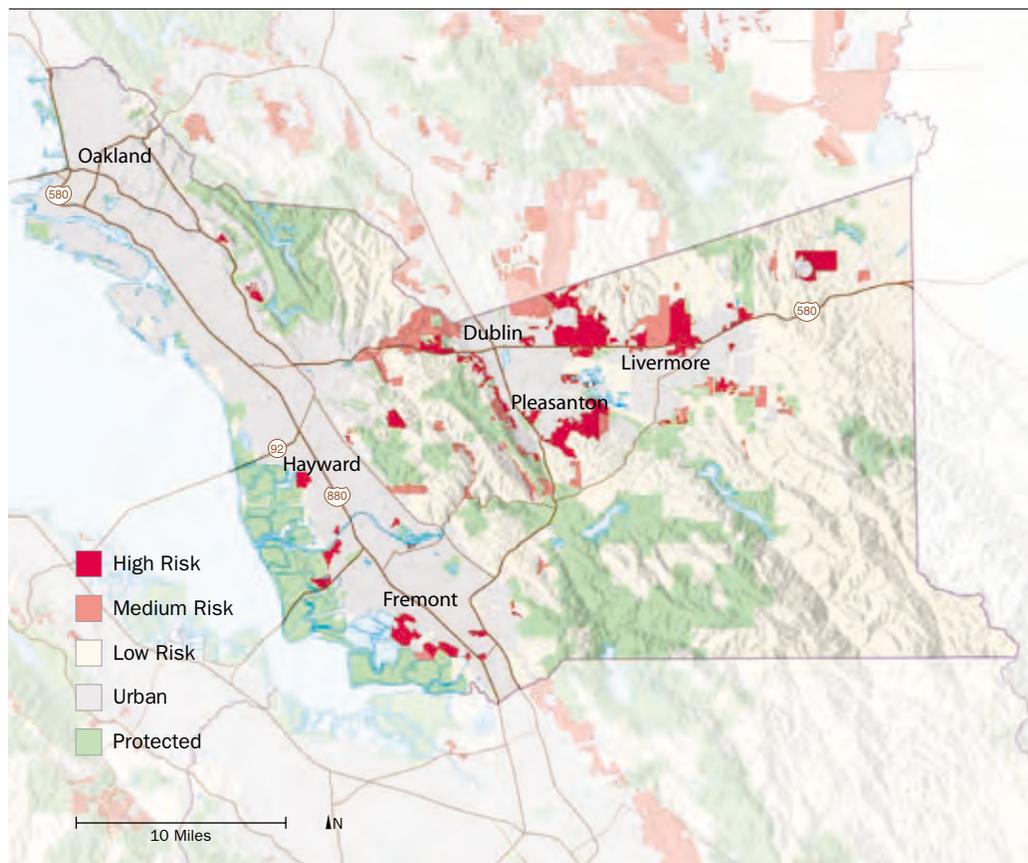
The passage of Measure D by county voters in 2000 laid down a key cornerstone for long-term greenbelt protection in Alameda County. The measure established a county urban growth boundary, prohibited subdivision of ranchlands in the east county, and encouraged investment in existing urbanized areas, extending regulatory protection to as much as 150,000 acres of farm, ranch and habitat lands. In the same election,

Dublin voters passed Measure M to protect 4,000 acres of hill country, and county voters overwhelmingly passed the transit-friendly transportation sales tax Measure B.

Progress continued in 2002, when Fremont also passed a hillside protection ordinance, and the Livermore City Council established the North Livermore Urban Growth Boundary, connecting to the existing South Livermore Urban Growth Boundary to complete the boundary around the city. In 2004, voters in the western parts of Alameda and Contra Costa County bolstered financial support for the western, more heavily used parts of the East Bay Regional Park District, by passing Measure CC in the 2004 elections.

	ACRES
High Risk	15,000
Medium Risk	11,100
Low Risk	203,000
Urban	144,000
Protected	104,700
Total	477,800

The County Board of Supervisors also has maintained its important policy of requiring large minimum lot sizes for rural parcels, helping to preserve the viability of remaining agricultural lands.



# San Mateo County

*From greenbelt protection to smart infill*

## General Assessment

San Mateo County solidified its status as a leader in protecting greenbelt land over the last 5 years. With large public land holdings and active land protection activities by the Mid-Peninsula Regional Open Space District and the Peninsula Open Space Trust, San Mateo’s total acreage of land at risk is relatively small, totaling 10,200 acres.

## Hot Spots

As with Marin County, San Mateo’s primary challenge lies in making its already urbanized areas more affordable and livable, so that it can continue to accommodate its share of future Bay Area growth and improve social equity. In general, a changing economic and political climate has contributed to a lessening of growth pressures around the coastal cities of Half Moon Bay and Pacifica, although much of the land around those cities remains at medium risk of development.

## Bright Spots

The Mid-Peninsula Regional Open Space District won authorization to expand its jurisdiction all the way to the Pacific Coast in 2004, 6 years after voters recommended the change. This move complements the Peninsula Open Space Trust’s “Saving the Endangered Coast” campaign, launched in 2001, which has protected more than 14,000 acres in western San Mateo County. A major effort to restore some of the Bay’s lost wetlands by acquiring and restoring salt ponds has also protected baylands on the edge of Menlo Park.

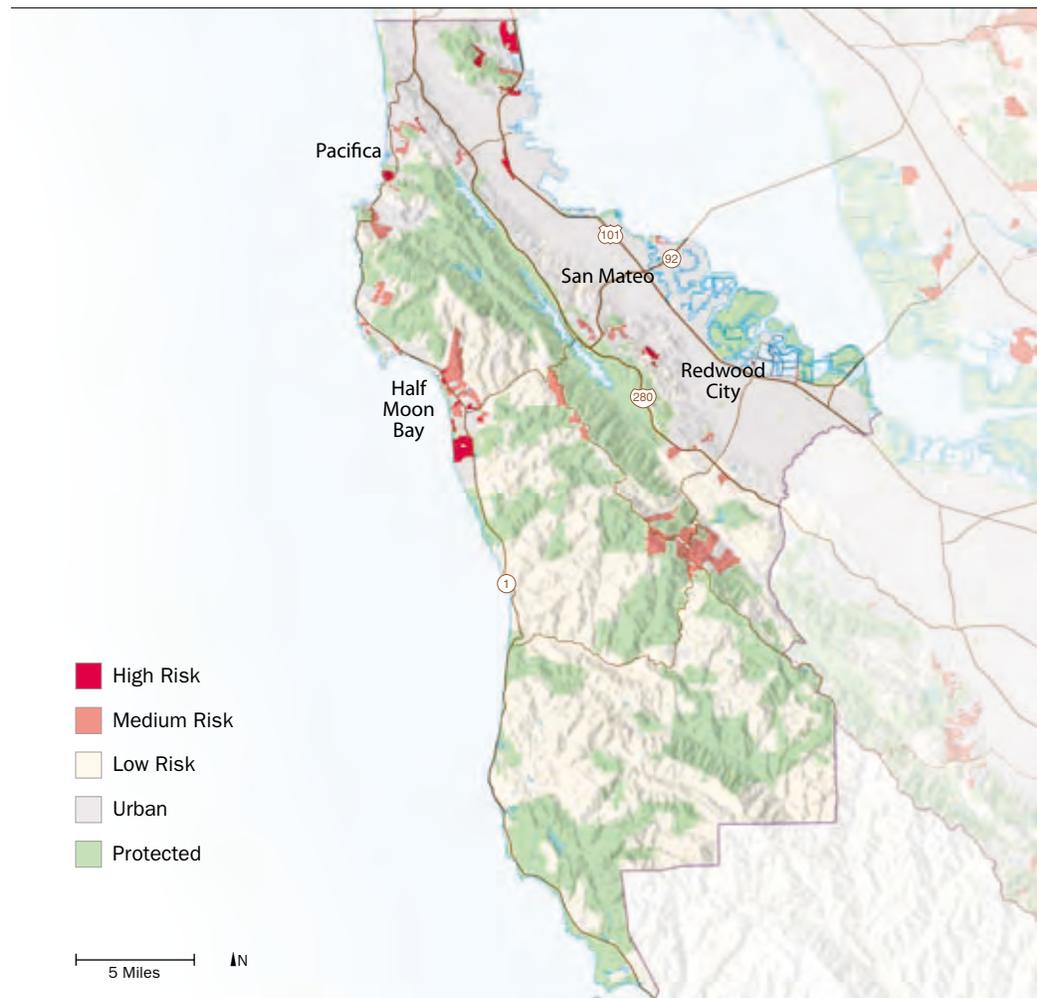
In 2000, Mori Point, a coastal promontory above Pacifica that had

been the focus of many development proposals, was permanently protected as part of the Golden Gate National Recreation Area.

Since 2000, four new BART stations in the county and the connection of BART to CalTrain at Millbrae have created valuable new opportunities for regional integration and smart growth in San Mateo County. In 2004, Measure A, a transit-friendly transportation sales tax, won voter approval, further enhancing San Mateo County’s infill potential. In 2005, the City of San Mateo approved a good example of transit-oriented development, Bay Meadows Phase II,

	ACRES
<b>High Risk</b>	<b>2,000</b>
<b>Medium Risk</b>	<b>8,200</b>
Low Risk	100,400
Urban	71,100
Protected	107,800
<b>Total</b>	<b>289,500</b>

which would replace the aging Bay Meadows racetrack with a new neighborhood next to a CalTrain station. The “Grand Boulevard” effort to revitalize El Camino Real will also help accommodate new growth and better use urbanized land in both San Mateo and Santa Clara County.



# Santa Clara County

*A sprawling past and changing future*

## General Assessment

Today, Santa Clara County faces crucial decisions about its future. The proposal to develop housing for up to 80,000 people in Coyote Valley in southeast San Jose, and ongoing sprawl pressure in Morgan Hill and Gilroy, mean that planning actions made in south Santa Clara in the next few years will shape the county for decades to come.

## Hot Spots

Ever since the City of San Jose began its latest round of planning for the development of Coyote Valley in 1999, it has been one of the largest development hot spots in the Bay Area. The City's goal is the creation of 25,000 homes and 50,000 jobs on 6,800 acres of land—essentially the creation of an entire new town. Unfortunately, the City's plans for the valley thus far have not lived up to its stated smart growth goals.

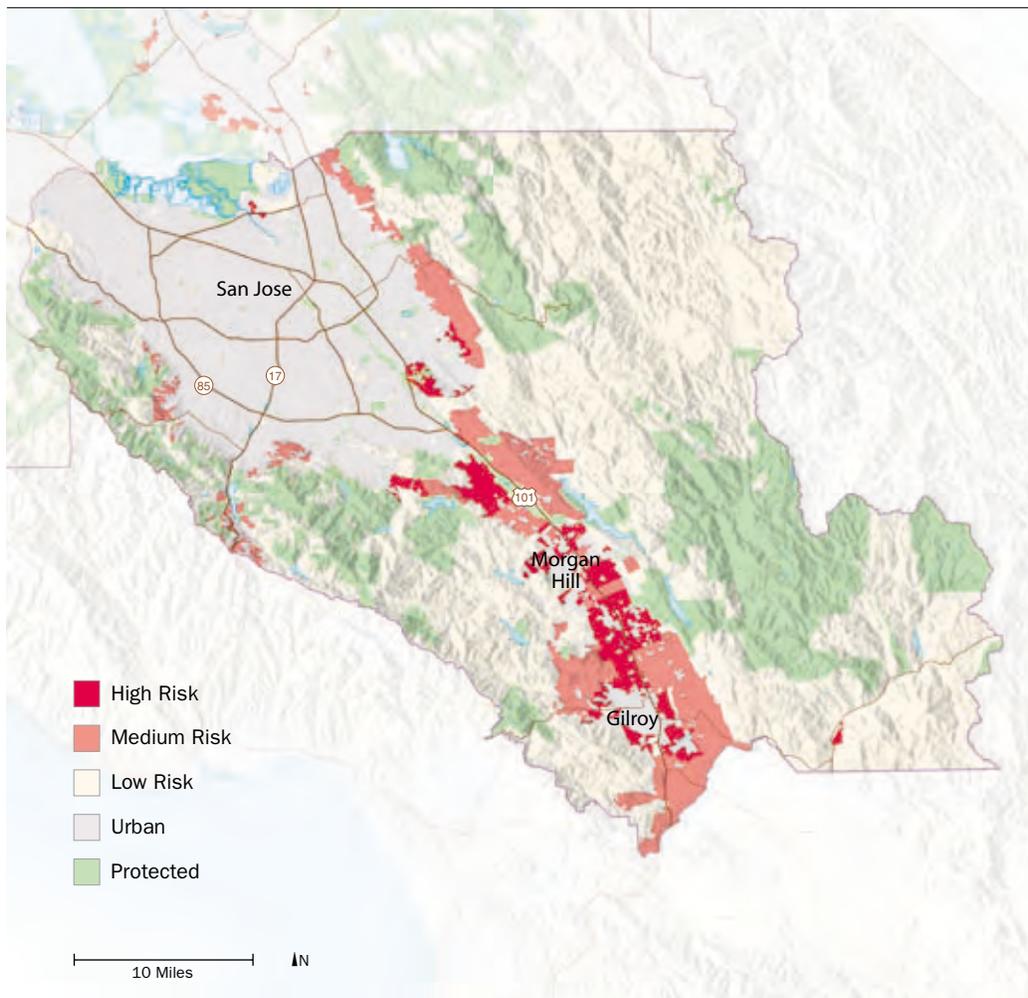
The far southern end of the county also remains a key hot spot, as Morgan Hill and Gilroy grapple with sprawl pressures both from Silicon Valley and the south. Morgan Hill began studying an expansion of its urban growth boundary in 2003; 1,250 acres of farmland outside the boundary are now at risk. Likewise, the Gilroy City Council voted in 2002 to allow development on 660 previously protected acres of the Santa Clara County Agricultural Preserve. In 2005, Gilroy passed up an opportunity to join the county's open space district. South of Gilroy, Sargent Ranch, 6,500 acres of farmland and wildlife habitat, remains under threat in spite of the defeat in 2001 of a major development proposal.

## Bright Spots

With these threats, there have also been some important improvements in the county. In 2000, San Jose residents voted to strengthen the City Council's urban growth boundary, protecting more than 20,000 acres. In 2001, the City Council passed 15 general plan amendments encouraging infill and affordable housing, and the City now has large-scale plans to redevelop the industrial North First Street area and add thousands of new homes to the downtown. In 2002, county property owners voted to provide \$80 million over 10 years to fund the Santa Clara County Open Space Authority.

	ACRES
High Risk	21,300
Medium Risk	54,000
Low Risk	377,600
Urban	185,100
Protected	201,800
Total	839,800

In 2006, Santa Clara County voters will decide on an initiative to prevent sprawl development and parcelization on rural county land.



# ATTACHMENT 5



## **WATER CONSERVATION PROGRAMS ANNUAL REPORT FY2006/07**



**Prepared by:**

**Nicole Sandkulla, Sr. Water Resources Engineer**

**Benjamin Pink, Water Resources Planner**

**September 2007**

## Introduction

The Bay Area Water Supply and Conservation Agency (BAWSCA) represents the interests of 25 cities and water districts and two private utilities, that purchase water from the San Francisco regional water system. A map showing the agencies is presented in Figure 1. The entities provide water to 1.7 million people, businesses and community organizations in Alameda, Santa Clara and San Mateo counties.

BAWSCA has been implementing efficient water conservation programs for its member agencies for over five years. Although the main responsibility for conservation lies within the individual member agencies, BAWSCA offers regional programs that serve to augment the programs offered by the agencies.

BAWSCA member agencies implement water conservation for several significant reasons including:

- Water conservation extends the limited supply of water available for both current and future water needs;
- Water conservation is good public policy;
- Water conservation increases the drought reliability of the existing water system; and
- Water conservation saves money for both the agency and the customer.

In FY 2006/2007, 20 member agencies participated in one or more of the four conservation programs offered by BAWSCA with a total budget of over \$632,000.

## Organization of this Report

This report is broken down into these specific sections:

- BAWSCA Area Water Supply and Demand Characteristics
- BAWSCA Water Conservation Programs Overview
- BAWSCA Conservation Programs in Detail

Figure 1: BAWSCA Agencies Map



**Legend**

- |  |                                   |
|--|-----------------------------------|
| 1 Alameda County Water District          | 20 City of Palo Alto              |
| 2 City of Brisbane                       | 21 Purissima Hills Water District |
| 3 City of Burlingame                     | 22 City of Redwood City           |
| 4 CWS – Bear Gulch                       | 23 City of San Bruno              |
| 5 CWS – Mid-Peninsula                    | 24 City of San Jose (North)       |
| 6 CWS – South San Francisco              | 25 City of Santa Clara            |
| 7 Coastside County Water District        | 26 Skyline County Water District  |
| 8 City of Daly City                      | 27 Stanford University            |
| 9 City of East Palo Alto                 | 28 City of Sunnyvale              |
| 10 Estero Municipal Improvement District | 29 Westborough Water District     |
| 11 Guadalupe Valley MID                  |                                   |
| 12 City of Hayward                       |                                   |
| 13 Town of Hillsborough                  |                                   |
| 14 City of Menlo Park                    |                                   |
| 15 Mid-Peninsula Water District          |                                   |
| 16 City of Millbrae                      |                                   |
| 17 City of Milpitas                      |                                   |
| 18 City of Mountain View                 |                                   |
| 19 North Coast County Water District     |                                   |

## **BAWSCA Area Water Supply Characteristics**

### **Current Diverse Water Supply Portfolio**

The water supply for the BAWSCA agencies comes from a variety of sources as seen in Figure 2. The majority of the water used by the BAWSCA agencies is purchased from the San Francisco Public Utilities Commission (SFPUC) coming from the Tuolumne River.

In addition to purchases from the regional water system, BAWSCA agencies have developed local water supplies (including surface water, desalinated water, groundwater, and recycled water), as well as contracts with the State Water Project and Santa Clara Valley Water District, to meet the water needs of their customers.

Figure 2 shows the breakdown of supply sources utilized by the BAWSCA agencies in FY 2005/2006. Currently, about 33% of the total BAWSCA agencies' water demands are met by sources other than the San Francisco Regional Water System. By 2030, this proportion will increase to 35%.

### **Increasing Diversity in 2030 Water Supply Portfolio**

BAWSCA agencies have also committed to increasing the diversity of their water supply portfolio in the future with increased use of recycled water, conjunctive use operation of groundwater supplies, and implementation of water conservation. Figure 3 provides the breakdown of water use by supply source in 2030 as projected by the BAWSCA agencies. Factoring in the level of conservation that the agencies have committed to, total water demand in 2030 is projected to be 308 MGD.

### **Per Capita Water Demand Continues to Decrease**

The per capita water demand for residential uses will continue to decrease. Residential per capita water demand of the wholesale customers is projected to decrease 3%, from 89 gpcpd in 2005 to 86 gpcpd in 2030. Today's residential per capita water use is 15% less than before the drought that began in 1986 and 23% less than before the drought of 1976-1977. Residential per capita water use of wholesale customers is less than in other parts of California, and is less than the average for the San Francisco Bay Region as a whole. Projected gross per capita water demand, including water used by businesses and industry, for the BAWSCA agencies is expected to stay about the same in 2030. Gross per capita water demand was 162 gallons per capita per day (gpcpd) in 2001 compared to projected use of 160 gpcpd in 2030. This actually represents a decrease of 2 gpcpd or 1%.

The per capita water demand for residential uses will continue to decrease. Residential per capita water demand of the wholesale customers is projected to decrease 3%, from 89 gpcpd in 2005 to 86 gpcpd in 2030. Today's residential per capita water use is 15% less than before the drought that began in 1986 and 23% less than before the drought of 1976-1977. Residential per capita water use of wholesale customers is less than in other parts of California, and is less than the average for the San Francisco Bay Region as a whole.

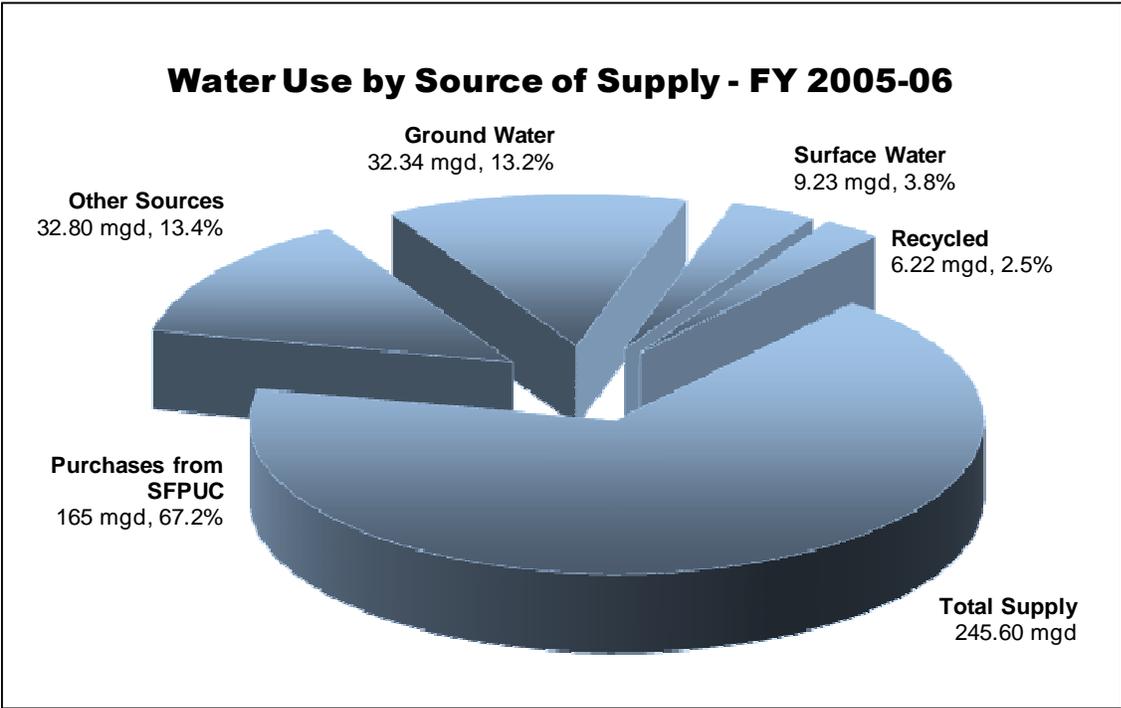


Figure 2: Current Diverse Water Supply Portfolio

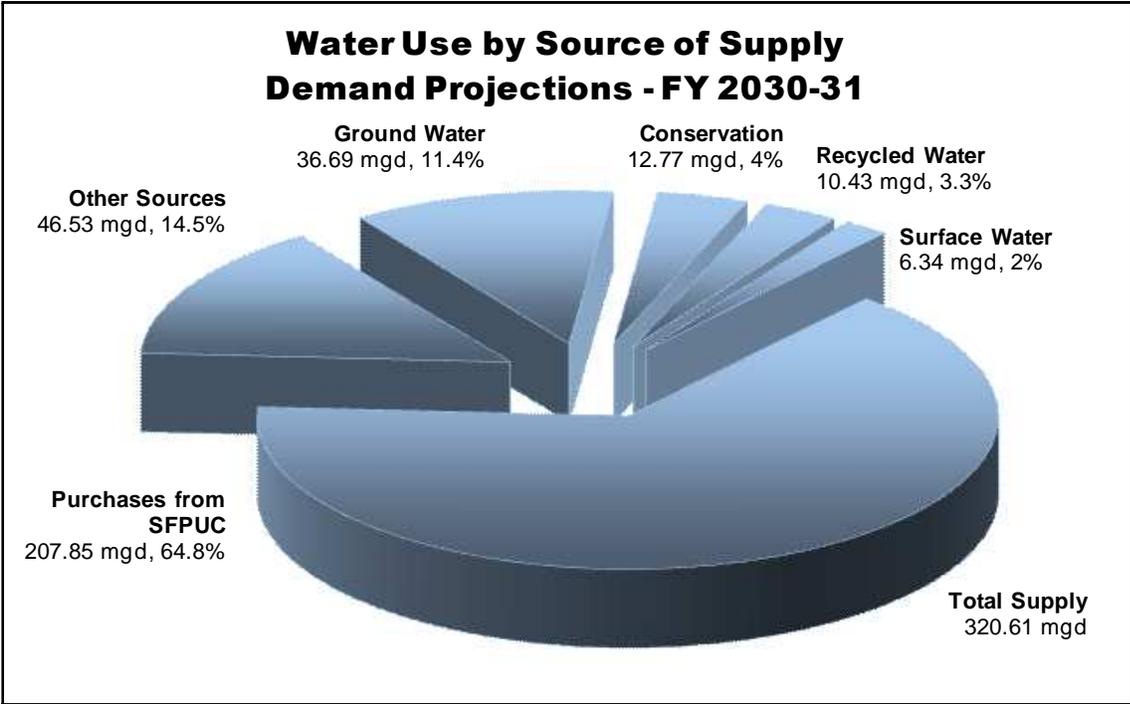


Figure 3: Future Diversity in Water Supply Portfolio

## BAWSCA Water Conservation Programs Overview

BAWSCA has been implementing efficient water conservation programs for its member agencies for over five years. Although the main responsibility for conservation lies within the individual member agencies, BAWSCA offers regional programs that serve to augment the programs offered by the agencies.

BAWSCA member agencies implement water conservation for several significant reasons including:

- Water conservation extends the limited supply of water available for both current and future water needs;
- Water conservation is good public policy;
- Water conservation increases the drought reliability of the existing water system; and
- Water conservation saves money for both the agency and the customer.

In creating its water conservation program, BAWSCA has followed several key principles:

1. The programs are developed for the BAWSCA agencies and by the BAWSCA agencies. It is very important that BAWSCA's conservation programs are designed to meet the specific needs and requirements of the BAWSCA agencies.
2. The programs must offer increased water savings at a lower cost to the agency and the customer.
3. Most programs are paid for by participating BAWSCA agencies; those that participate pay the full cost of the program.

In FY 2006/07, BAWSCA offered the following regional water conservation programs to its member agencies:

- Residential Washing Machine Rebate Program
- School Education Program (Water-Wise School Education Kits)
- Large Landscape Audit Program
- Landscape Education Classes
- Landscape Educational CD-Rom

Each of these programs is better administered at a regional level through BAWSCA rather than at the local agency level. BAWSCA provides these programs in a cost-effective and efficient manner. BAWSCA is also active in investigating and securing grant awards for regional conservation programs that fit the needs of its member agencies.

Twenty member agencies now participate in one or more of the conservation programs offered by BAWSCA. BAWSCA agencies have expressed a continued desire to participate in the ongoing and new conservation programs that BAWSCA will be offering in FY2007/08. The new BAWSCA

Commercial Clothes Washer Rebate Program for FY2007/08 already has nine agencies signed up to participate for a total of \$77,600 which is equivalent to 353 commercial clothes washer rebates at \$220 each.

Figure 4 shows the level of participation in BAWSCA water conservation programs since FY 2001/02. Detailed information on each program appears in the following sections. As the data in Figure 4 shows, overall participation levels in each of the BAWSCA programs has been on the rise since FY2001/02.

Figure 5 shows the level of participation in BAWSCA water conservation programs in terms of total dollars spent by all agencies per program since FY2001/02. The figure shows that in terms of the total dollars spent per program, the Residential Washing Machine Rebate Program is the highest.

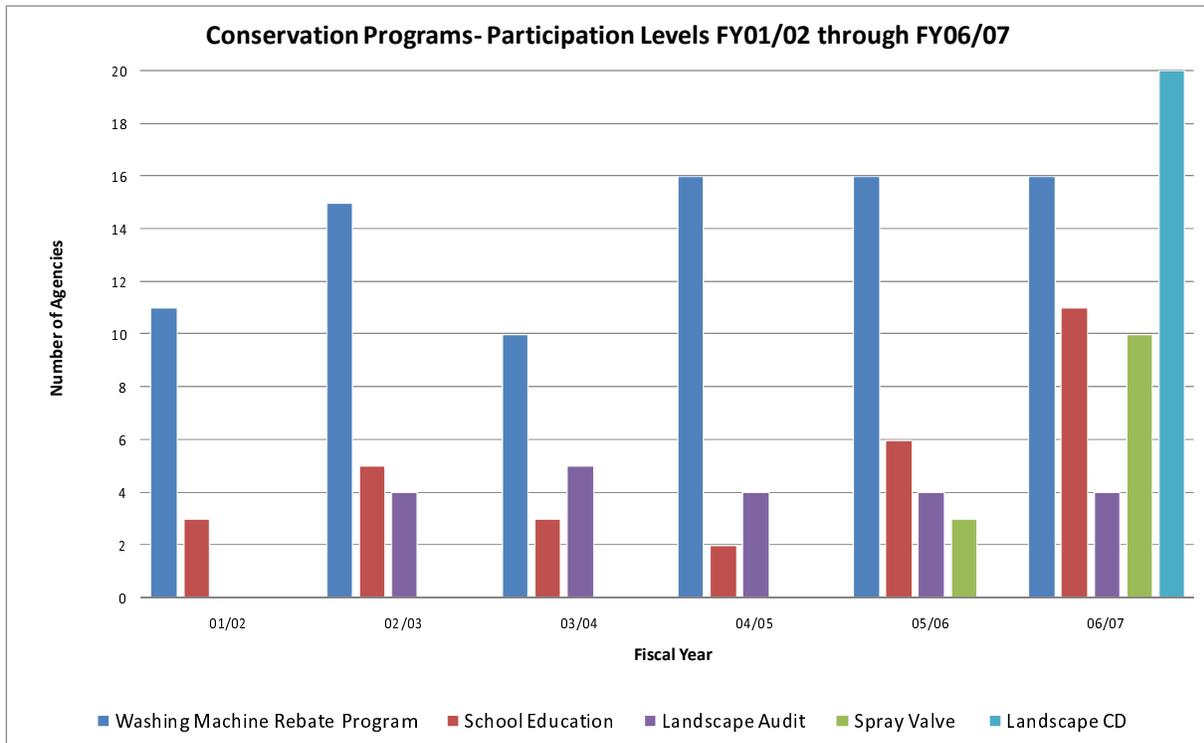


Figure 4: Agency Participation in BAWSCA Programs Increases in Last Five Years

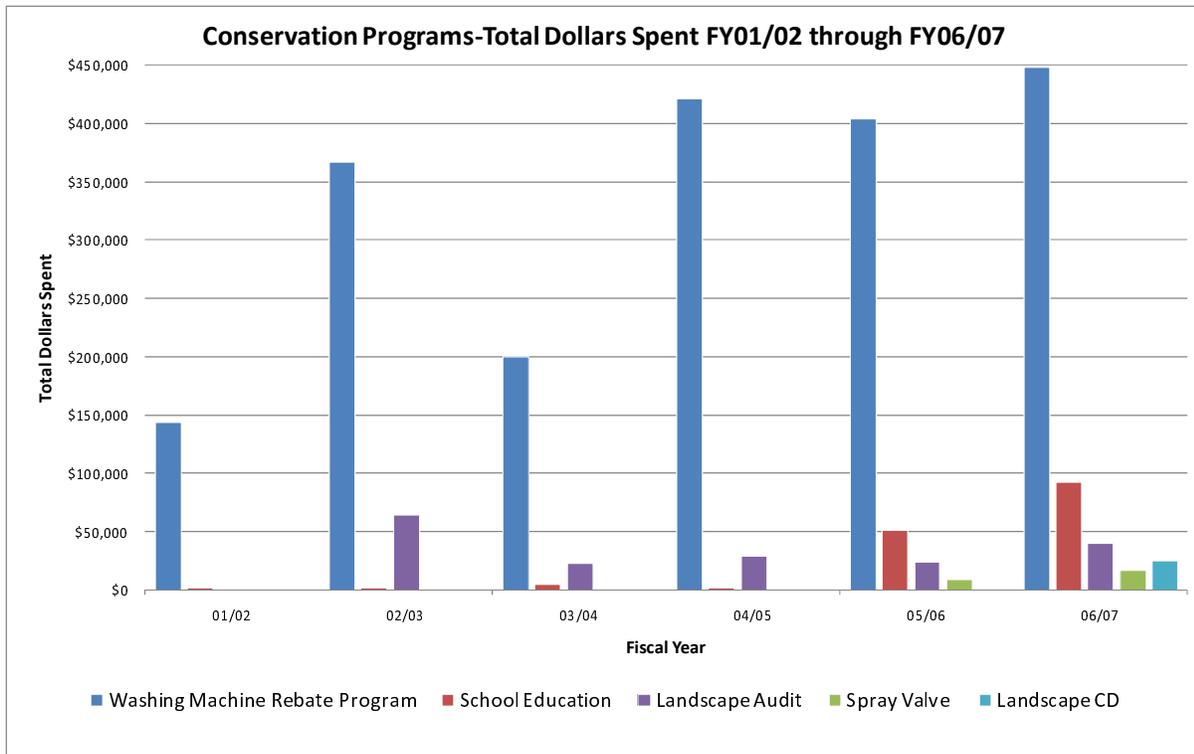


Figure 5: Agency Funding For Programs with BAWSCA Quadruples in 5 Years

## BAWSCA Conservation Programs in Detail

### I. Residential Washing Machine Rebate Program Continues Success

The Residential Washing Machine Rebate Program (WMRP) began on October 1, 2001. In 2002, the regional program expanded with eight other Bay Area water agencies joining to offer a single Bay Area Water Utility Clothes Washer Rebate Program covering a region of 2.7 million residential customers. In addition to BAWSCA, other participants in this regional program include Contra Costa Water District, Zone 7 Water Agency, East Bay Municipal Utility District, Alameda County Water District, Santa Clara Valley Water District, Marin Municipal Utility District, Sonoma County Water Agency, City of Davis, and beginning July 1, 2006, the SFPUC.

For the last several years, the participating Bay Area water agencies have been successful in applying for and receiving grant funding from the State including Proposition 13 and Proposition 50 funds. The total grant amount awarded to the Bay Area under Proposition 13 was \$2.1 million and BAWSCA's share of this amount was \$236,250. This grant award was utilized by the BAWSCA agencies for the WMRP starting in July 2004. The total grant amount awarded to the Bay Area under Proposition 50 was \$1,534,350 and BAWSCA's share of this amount was \$187,500. This grant award was utilized by the BAWSCA agencies starting in July 2006.

In May 2007, this program was awarded a \$2,981,350 Proposition 50 Grant and BAWSCA's share is \$300,000. This grant award is planned to be utilized beginning January 2008. Through BAWSCA's successful efforts to secure these grants, all BAWSCA member agencies have had access to grant funds to increase customer participation and achieve overall cost-effectiveness of the program while funds were available.

BAWSCA member agency participation in this program has been strong since it began. There are 16 agencies that participated in the FY2006/07 program. Details for level of program implementation and BAWSCA agency participation are shown in Table 1.

To date, a total of 14,640 rebates have been paid to customers for an estimated savings of 229.8 AF/Yr.; or enough water to serve over 900 households per year.

Table 1: Residential Washing Machine Rebate Program Summary FY2001/02 to 2006/07

Residential WMRP	FY 2001/02	FY 2002/03	FY 2003/04	FY 2004/05	FY 2005/06	FY 2006/07
Number of Participating BAWSCA Agencies	11	15	10	16	16	16
Total Rebates	1,244	3,091	1,805	2,914	2,332	3,254
Est. Savings (AF/Yr.)	19.5	48.4	28	46	37	50.9
Total \$ Paid to Customer	\$125,325	\$336,200	\$178,400	\$379,375	\$404,113	\$449,100

## II. School Education Program Grows Based on First Year Success

The Water-wise School Education Kit Program involves the distribution of a kit to 5<sup>th</sup> grade students. The kit enables the students to install water saving devices and perform a water audit in their home. The concept with the kit is that it provides a water conservation curriculum that can be easily implemented by teachers, easily understood and taken back into the home by the students, and includes methods to quantify the water savings as a result of taking the actions in the curriculum. The kits are consistent with BAWSCA's approach to offering public education and outreach regarding water conservation.

BAWSCA has contracted with Water-wise Consulting Company for implementation of this program. Water-wise offers a turn-key program in which they work directly with the school and teachers in the individual service area to provide the kits, which are produced by Water-wise, into the classrooms.

The kits are typically taken home by the students, who may share the learning experience with family members. The energy and water efficient devices contained in the kits are installed in the home and the family is able to calculate the water savings resulting from each device. Essentially, the kit allows the student to perform in-home water audit.

After the student performs the audit and installs the water and energy saving devices, affidavits signed by the parents are returned to the school, collected by the teacher, and forwarded to Water-wise for program documentation of implementation and resulting savings.

The following projected cumulative 10 year savings are expected per participating student sponsored:

- 2,098 Kwh of electricity
- 441 therms of gas
- 174,515 gallons of water
- 174,515 gallons of wastewater

The Water-wise School Education Kit Program assists participating agencies in implementing several Best Management Practices for Urban Water Conservation:

- BMP 1: Residential Surveys
- BMP 2: Residential Audits
- BMP 8: School Education

FY2005/06 was the first year that BAWSCA agencies participated in this program. The program was continued again successfully in FY2006/07. This program has proven to be a cost-effective means of achieving water conservation savings in the home and educating students on the value of water. Table 2 provides the detailed information for this program's implementation. To date, 4,425 students have participated in this program with an estimated total lifetime water savings of 1,422 AF.

Table 2: School Education Program Summary FY2005/06 and FY2006/07

BAWSCA School Education Program (Water-wise School Education Kits)	FY 2005/06	FY 2006/07
# Participating BAWSCA Members	6	11
Number of Participants (# of kits disbursed)	1,554	2,871
Est. Annual Water Savings/Kit (gallons)	17,451	17,451
Est. Total Lifetime Savings for Kits Installed (based on 60% installation rate) (acre-feet)	499.3	922.4
Total Spent By All Agencies	\$51,671	\$93,023
Cost of Lifetime Water Savings (\$/AF)	\$103	\$101

**III. Landscape Audit Program Continues to Improve and Expand**

The Landscape Audit Program was first offered to BAWSCA member agencies in FY 2002/03. This BAWSCA program offers access to a turn-key program that enables the participating BAWSCA agency to meet the requirements of the California Urban Water Conservation Council’s Best Management Practice (BMP) #5 in a cost-effective manner.

The program offers services for the development and monthly distribution of landscape water budgets for selected accounts and actual large landscape surveys to assess landscape watering needs. A key component of the program is ongoing monitoring/tracking of actual water use and estimated water savings for the sites surveyed.

The large landscape audit program has been improving since its inception as a BAWSCA program. For FY2007/2008, modifications to the scope of services were made to accommodate large residential properties into the program in addition to commercial sites. This will allow participation in the program by BAWSCA agencies that have large residential sites with large areas of outdoor landscaping.

Details of program implementation and agency participation are shown in Table 3. Results from the FY2006/2007 program show a savings of 25% reduced water use relative to 2002. Taking into account the effect of significant rainfall experienced in March and April 2006, the actual savings achieved as a result of the program are about 10%-15% of overall water use. The estimated cost of water saved is about \$50 to \$75 per acre-foot.

Table 3: Landscape Audit Program Summary FY2002/03 to 2006/07

Landscape Audit Program	FY 2002/03	FY 2003/04	FY 2004/05	FY 2005/06	FY 2006/07
# Participating BAWSCA Members	4	5	4	5	6
Est. Savings for that Year (acre-feet)*		299	212	520	543
Total spent by all agencies	\$65,132	\$23,802	\$29,663	\$24,720	\$23,362
Cost Per Acre/Foot Saved		\$59	\$90	\$37	\$43

\*savings are calculated on a calendar year basis

**IV. High Efficiency Toilet/Urinal Direct Install Program**

The Direct-Install High-Efficiency Toilet Replacement Program was eagerly anticipated as an important water conservation program for FY2006/07. Targeted at the commercial and multi-family residential sectors, this program should have been a turn-key, relatively easy to implement program that could provide real results in terms of water savings. Unfortunately, the FY2006/07 program had several implementation issues that resulted in the program not being successful. At the end of the fiscal year, BAWSCA chose not to exercise the option to extend the contract with SJ Water and instead let the contract expire.

The BAWSCA agencies have expressed a continued desire for this program in FY2007/08. As such, BAWSCA staff has been working to repackage this program with an alternative contractor. BAWSCA staff will bring this item before the Board of Directors in the coming months for potential action.

**V. Regional Landscape Education Classes Well Attended**

This year BAWSCA collaborated with the City of Millbrae and Redwood City to offer landscape classes throughout the springtime from the beginning of February through the end of April. These classes were designed to introduce homeowners to the concepts of sustainable landscape design, focusing on creating a beautiful water-efficient garden. A total of 12 classes were held around the service area of the BAWSCA member agencies. Figure 6 presents a copy of the front side of the flyer for the classes.

BAWSCA specifically sponsored a total of four landscape education classes over the course of the month of April that were held in Palo Alto, Burlingame, Half Moon Bay, and Hayward. The BAWSCA sponsored classes were entitled: *Landscaping with Native Plants* (instructors Chris Todd and Patricia Evans), *Sustainable Landscape Design* (instructor Alrie Middlebrook), *Smart Gardening* (instructor Steve Gill), and *Water-wise Landscape Design* (instructor Candice Stein). The classes had an attendance of as high as 50 people. Total attendance for the four BAWSCA classes was approximately 110 people. Each person attending the classes was offered a free landscape educational CD-Rom produced by BAWSCA entitled *Water-Wise Gardening in the Bay Area*.

**BAWSCA**  
Bay Area Water Supply & Conservation Agency

Water Efficient  
Landscaping Class Series 2007

Learn how to beautify your garden and use water more efficiently in these Bay Area water-wise landscaping classes. Classes are FREE and offered on a first come first served basis. Call today to reserve your space.

For Millbrae Classes Call: 650-259-2348  
For Redwood City Classes Call: 650-780-7436  
For All Other Classes Call: 650-349-3000

**All classes are FREE!**  
**Reserve your space TODAY!**  
For Millbrae Classes:  
Call 650-259-2348  
For Redwood City Classes:  
Call 650-780-7436  
For All Other Classes:  
Call 650-349-3000  
Or Email [Landscape@bawsc.org](mailto:Landscape@bawsc.org)

TITLE	DATE	TIME	LOCATION
Water Wise Landscape Design	2/10/07	9-11:30am	Millbrae
Landscaping With Native Plants	3/4/07	1-4pm	Millbrae
Drought Tolerant Plants	3/17/07	9am-12pm	Redwood City
Irrigation Scheduling and Maintenance	3/24/07	9am-12pm	Redwood City
Water Wise Irrigation	3/31/07	9am-12pm	Millbrae
Garden Design	4/7/07	9am-12pm	Redwood City
Landscaping With Native Plants	4/12/07	6-9:pm	Burlingame
Sustainable Landscape Design	4/14/07	10am-1pm	Hayward
Drought Tolerant Plants	4/19/07	6-9pm	Redwood City
Smart Gardening	4/21/07	10am-2pm	Half Moon Bay
Irrigation Scheduling and Maintenance	4/26/07	6-9pm	Redwood City
Water Wise Landscape Design	4/28/07	10am-1pm	Palo Alto

Class Descriptions On Back Of Page

Figure 6: Flyer for the 2007 Water Efficient Landscaping Class Series

## VI. Region-wide Native Garden Tours

This year BAWSCA sponsored two native garden tours that took place in the months of April and May. Each tour was designed to showcase homes around the Bay Area that have beautiful water conserving gardens comprised primarily of California native plants.

The first tour was the *Going Native Garden Tour*, which took place in San Mateo and Santa Clara Counties on Sunday April 29<sup>th</sup>. This tour showcased 45 gardens that were visited a total of 6,688 times. The locations of the gardens in this tour ranged from as far north as the Cities of Belmont and Redwood City and south to Saratoga in Santa Clara County.

The other tour, *Bringing Back the Natives Garden Tour*, took place in Alameda and Contra Costa Counties on Saturday April 28 and May 5. This tour featured 63 total gardens that were visited by a total of 13,330 people over the two Saturdays. Gardens in this tour ranged in location from Berkeley and Walnut Creek to Fremont, Alameda, and Hayward. Figures 7 and 8 show the flyers for the two native garden tours.

**GOING NATIVE GARDEN TOUR**

*Fifth Annual*  
**Going Native Garden Tour**

Sunday, April 29, 2007, 10 am-4 pm

**SPONSORS :**  
Bay Area Water Supply & Conservation Agency • Mediterranean Garden Society • Native Habitats • Santa Clara Valley Water District • Watershed Watch

**SUPPORTERS :**  
Acterra • Bay Nature Magazine • California Native Plant Society (Horticulture Program) • California Native Plant Society (Santa Clara Valley Chapter) • Don Edwards San Francisco Bay National Wildlife Refuge • Ecological Landscaping Association (California) • Friends of Guadalupe River Park & Gardens • Gardening With Natives (CNPS-SCV) • National Wildlife Federation • Neighborhood Development Center (City of San Jose) • Santa Clara Valley Audubon Society • Sierra Club (Loma Prieta Chapter) • UOCE Master Gardeners • Western Horticultural Society

More and more Bay Area homeowners are turning to California native plants to make their gardens aesthetically pleasing, attractive to birds and butterflies, water-wise, and low maintenance. You are invited to visit examples of home gardens landscaped with California native plants on our fifth annual tour.

A variety of gardens will be open for viewing, from townhomes to acre lots, from newly planted gardens to established ones. You won't have to go far to see one: these native gardens are located all over the Santa Clara Valley. Some will feature talks, others will have plants for sale. Visit as many as you like — for ideas, for photos, for inspiration.

**Free admission • Registration required at [www.GoingNativeGardenTour.org](http://www.GoingNativeGardenTour.org)**

Web registrations must be received by noon of April 28 or until the tour reaches capacity, whichever comes first. Garden information, maps, and directions will be emailed to registrants on or before April 16. For information, visit [www.GoingNativeGardenTour.org](http://www.GoingNativeGardenTour.org), or email [info@GoingNativeGardenTour.org](mailto:info@GoingNativeGardenTour.org).

Photo: Arrival Kamas, Aki Kuba

Figure 7: Flyer for the 2007 Going Native Garden Tour

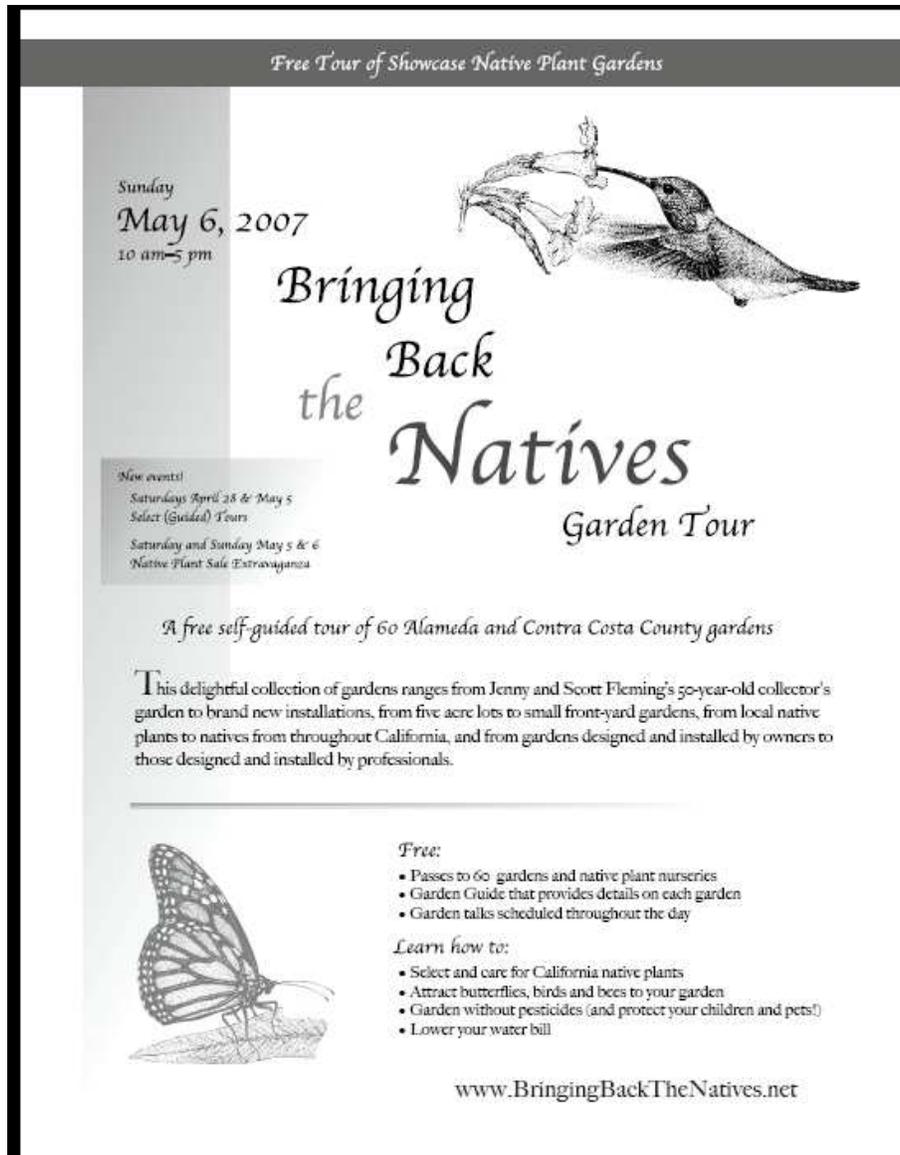


Figure 8: Flyer for the 2007 Bringing Back the Natives Garden Tour

## VII. Innovative Landscape Educational CD-Rom is Released

This year BAWSCA completed the landscape educational CD-Rom entitled *Water-Wise Gardening in the Bay Area*. This new CD-Rom is full of information on how to garden beautifully while saving water. It displays outstanding water efficient garden photographs, with links to the plants that compose them. The photography is primarily composed of sites in the Bay Area, specifically those locations in the service areas of BAWSCA member agencies in Alameda, San Mateo, and Santa Clara Counties. The software offers a searchable plant database and a garden resource encyclopedia containing a multitude of water-wise, how-to gardening information. Also included are watering recommendations that are specifically tailored to the user's location within the Bay Area. The user can create their own plant shopping list as they navigate through the photography, which they then can print and take to

their local water-wise nursery. The watering tips are customized for the user based on their location in the Bay Area; for example coastal residents will see watering schedules that reflect coastal fog rather than hotter inland conditions.

The CD-Rom was made available to the BAWSCA member agencies. **A total of 6,825 CDs were ordered by 20 of the BAWSCA agencies.** Based on the size of this order, a reduced price was secured from the contractor which benefitted all agencies participating. BAWSCA will also be making the CDs available to interested citizens free of charge.

The CD-Rom came enclosed in a four-panel mailer that is shown in Figure 9 below.



Figure 9: Mailer Panel from the Water-Wise Gardening CD-Rom

## VIII. Additional Activities

### **BAWSCA Website Update**

In addition to the water conservation programs listed above, one significant activity undertaken in FY2006/07 was the updating of the conservation areas on the BAWSCA website. The website content was updated to reflect all current conservation programs. The updated site now displays content in four categories related to water conservation: Residential Indoor, Residential Outdoor, Commercial Programs, and School Programs. There is now also a page of water conservation related links that direct users to other important conservation websites. The updated site can be viewed at <http://www.bawasca.org/conserv.html>.

### **Drought Outreach Campaign: Water Saving Hero**

In May 2007, San Francisco Public Utilities Commission (SFPUC) and BAWSCA announced a request for a ten percent voluntary water use reduction due to the continuing dry conditions. In July 2007 the SFPUC and BAWSCA partnered to launch a regional public education campaign focusing on our dry year message. The initial campaign success prompted other water agencies including the Santa Clara Valley Water District, Contra Costa Water District and Zone 7 Water Agency to join. The result was the launch of an unprecedented campaign aimed at reminding residents and businesses to curb water use in the summer and fall period.

The campaign's theme is [be a] "Water Saving Hero" and features ordinary people adopting simple water conservation practices in their everyday lives, such as washing full loads of laundry and watering gardens during the cool morning hours. The ads are currently featured on billboards, transit stations, buses, trains, newspapers and the radio throughout the region. The effort also features a new website [www.WaterSavingHero.com](http://www.WaterSavingHero.com), where any Bay Area residents can link directly to their local water agency's conservation programs and cash rebate information.

The campaign ads and billboards will run through the fall of 2007. Figures 10 and 11 below are examples of billboard and print advertising as part of this campaign.



Figure 10: Ray Samuels Water Saving Hero Campaign Ad



Figure 11: Frank Chen Water Saving Hero Campaign Ad

## BAWSCA Water Conservation Programs for FY2007/08

For FY2007/08, BAWSCA will offer the following programs:

1. Residential Washing Machine Rebate Program
2. School Education Program (Water-wise School Education Kits)
3. Landscape Audit Program
4. High Efficiency Toilet/Urinal Direct Install Program
5. Landscape Education Classes
6. Native Garden Tours
7. Landscape Educational CD-Rom
8. Commercial Clothes Washing Machine Rebate Program (NEW)

Response to BAWSCA's program offerings for FY2007/08 has been very good to date. The Landscape Audit Program has six agencies signed up to participate; this includes several new agencies participating this year. The School Education Program has nine agencies signed up. The Residential Washing Machine Rebate program has 16 agencies signed up.

In addition, a new program will be added for FY2007/08: the Commercial Clothes Washing Machine Rebate Program. This unique program is a partnership between the energy utility, PG&E, and the water agencies. The program involves offering a combined water and energy rebate to commercial customers who retrofit their facilities with new high efficiency commercial washing machines. This program is a benefit to BAWSCA in that it is a partially grant funded program; all program administration costs, rebate processing service costs, and marketing costs will be paid by the grant. The only cost to the participating BAWSCA member agencies is the cost of the water rebate itself. As a new program, the Commercial Washing Machine Rebate Program already looks to be very successful with a total of 13 agencies already signed up.

### **Prospective Program**

In addition, BAWSCA has expressed interest in joining with the SFPUC to launch the Cooling Tower Feasibility Study. This would be a study of the potential water savings available in the BAWSCA/SFPUC service area through the implementation of a cooling tower conductivity controller retrofit program. A grant application for partial funding of this study was submitted to the State Department of Water Resources but was not successful. BAWSCA intends to pursue the study with SFPUC without the grant funding.



# ATTACHMENT 6

**AN ECONOMIC EVALUATION OF THE  
WATER SUPPLY RELIABILITY GOAL  
IN THE SFPUC WATER SYSTEM IMPROVEMENT PLAN**

**Report to the  
San Francisco Bay Area Water Supply & Conservation Agency**

**By  
William W. Wade, Ph.D.  
Energy and Water Economics  
May 2005**

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# AN ECONOMIC EVALUATION OF THE WATER SUPPLY RELIABILITY GOAL IN THE SFPUC WATER SYSTEM IMPROVEMENT PLAN

William W. Wade

## 1. Introduction and Executive Summary

In February 2005, the San Francisco Public Utilities Commission (SFPUC) authorized its General Manager to forward to the San Francisco Planning Commission a draft report summarizing the principal goals of its Water System Improvement Plan. The final version of the document, "Water System Improvement Plan: Prepared for the Programmatic Environmental Impact Report," (WSIP) was sent to the Planning Commission and publicly released on February 28, 2005.

The Bay Area Water Supply & Conservation Agency (BAWSCA) is a regional government agency established in 2003. It comprises the 28 cities, water districts and other water suppliers in San Mateo, Santa Clara and Alameda counties that purchase some or all of their water from the SFPUC.

BAWSCA commissioned Energy and Water Economics to review the portion of the WSIP that addresses water supply reliability during drought, specifically, the goal of providing no more than 80 percent of normal demand during a "design drought."

The principal findings of this report are:

- (a) The process by which the SFPUC selected the goal of 80 percent reliability was superficial and far below the analytic standard employed by comparable urban water agencies in California and the United States.
- (b) SFPUC's analytic process failed to consider the costs to Bay Area communities of the water shortages that would be imposed through mandatory rationing to accommodate a 20 percent system-wide supply shortfall.

- (c) Even a preliminary review of published economic literature shows that the loss of production from water-intensive Bay Area industries resulting from a 20 percent cutback in their water supply would far exceed the estimated cost of improving the SFPUC system's reliability from 80 percent to 90 percent.

Based on these findings, this report recommends that the SFPUC revisit the WSIP's reliability goal. In doing so, it should employ economic principles commonly used in water supply planning to identify the most efficient level of water reliability. In the short run, this reconsideration should focus on the relative cost-benefit ratios of the provisionally selected 80 percent goal in comparison with a goal of a 90 percent reliable supply.

## **2. The SFPUC Adopted its Drought Reliability Goal Without Considering the Costs of Water Shortages to its Customers**

Reliable delivery of basic utility services (electricity, natural gas, communications, water and sewer) is an expected part of contemporary urban life -- at least in developed industrial societies such as California.

There are a variety of definitions of reliability. The CalFed Bay Delta program formalized water reliability as:

“. . . the probability that a system does not fail, or conversely, it is the probability of a system failure subtracted from one.”

More simply put, reliability is the measure of a utility's ability to deliver uninterrupted service. It is apparent that the larger the investment in long-term reliability, the less frequent and less severe will be the shortages experienced.

The objectives of water supply reliability planning are (1) to determine the most effective way of achieving an additional increment of reliability at the least cost, and (2) to ascertain whether the benefits, in terms of avoided shortage costs and losses, justify the costs of adding that increment. This is commonly referred to in the utility planning literature as Least Cost Planning (LCP). LCP has been embraced widely in California.

The approach uses information about the costs and losses associated with shortages of varying severity and duration as well as the costs of long-term and contingency water management options. In order to make an informed judgment about the appropriate level of supply reliability, the decision-maker needs to know not merely the cost of providing an increment of additional supply, but the costs to society of NOT providing that supply increment -- the economic impacts and other costs of shortage.

The SFPUC adopted its 80 percent reliability goal with very limited information about the costs of achieving three levels of reliability:

<u>Option A</u>	<u>Option B</u>	<u>Option C</u>
100 percent	90 percent	80 percent

and no information about the costs of providing less than 100 percent reliability.

The goals of these alternatives appear on a one-page chart entitled "Water Supply Matrix" that was presented to the SFPUC but is not included in the WSIP. It is attached as Exhibit A. The facilities or other measures associated with the incremental costs of 90 percent or 100 percent reliability are not identified clearly, but apparently reflect the cost of increasing the height of Calaveras Dam in Alameda County and/or various mixes of options including desalination, recycling, groundwater, transfers and conservation.

The cost of each level, in millions of dollars, was estimated as follows:

<u>Option A</u>	<u>Option B</u>	<u>Option C</u>
100 percent	90 percent	80 percent
\$1,222	\$603	\$422

Thus, the difference between achieving an 80 percent level of reliability and a 90 percent level was estimated at \$181 million, over 25 years.

SFPUC did not attempt to quantify the economic costs and losses of a 20 percent shortage, nor the costs of the less demanding levels of rationing that would be required to cope with less severe, but more frequent, droughts. Neither does the

SFPUC anticipate how shortages would be distributed geographically. In the 1987-1992 drought, the SFPUC imposed different levels of rationing on its in-City retail customers and its wholesale customer agencies in the neighboring counties.<sup>1</sup>

The WSIP is fatally flawed, from the perspective of economic analysis, by its failure to include the effect of shortage costs in its evaluation process. Determining an efficient level of reliability requires consideration of two curves -- one representing the incremental costs of reliability improvements and the other representing the costs of incrementally more severe water shortages. The intersection of these two curves – the point where incremental costs are equal – is the least cost mix of resources, the efficient level of reliability management.

This can be illustrated by a simple figure, drawn from a recent California Department of Water Resources publication.<sup>2</sup>

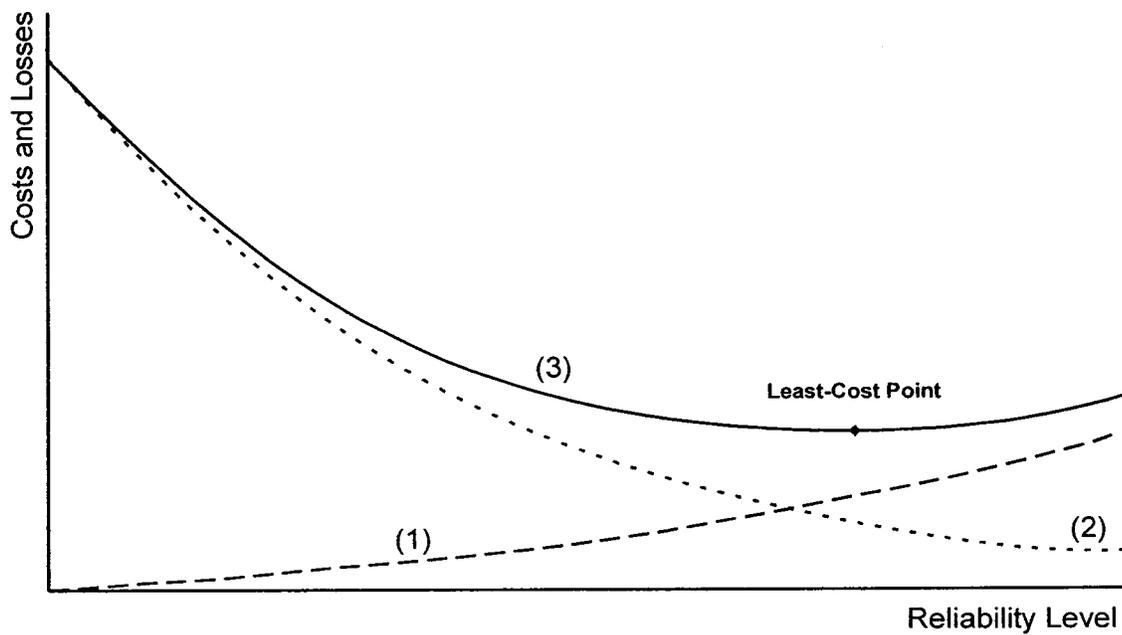
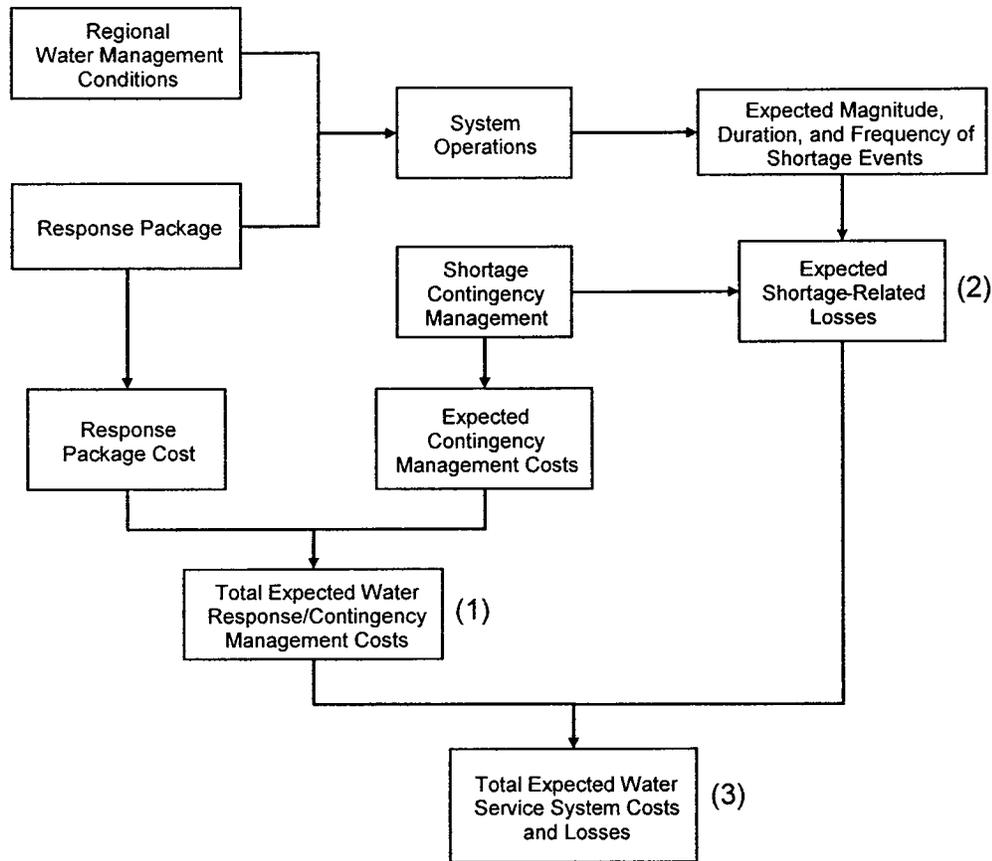
Figure 1 contains three cost curves. Curve 1 is the cost of increasing reliability, which includes both the cost of supply augmentation and the agency's costs of managing the drought. Curve 2 is the societal cost of enduring water shortages. Both the total expected water management and contingency management costs (Curve 1) and the expected shortage-related losses (Curve 2) are a function of the level of demand reduction or supply enhancement response options implemented. Both curves are affected by the availability, cost, and effectiveness of contingency management (e.g., transfers, rationing programs, etc.). While the total cost of the management and response options increases as reliability increases, the expected shortage-related losses decrease as a consequence of the increased reliability. The total expected water service system cost (Curve 3) is the sum of these costs and losses. The lowest point

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<sup>1</sup> In general, inside City use was to be reduced by approximately 14 percent, while wholesale communities faced an aggregate 27 percent reduction, under the 10/60 formula employed by SFPUC to achieve a system wide 22 percent goal.

<sup>2</sup> CDWR, LCPSIM Background, 2002.

Figure 1. Least Cost Planning Conceptual Diagram



on this curve represents the level of reliability provided by the most economically efficient mix of resource costs and remaining shortage costs.<sup>3</sup>

The SFPUC did not attempt to determine the costs of shortage. Without both reliability enhancement costs and shortage costs imposed on society, SFPUC is unable to make even the most rough-cut approximation of the balance between the costs of improved reliability and its benefits. Without this information, no economic basis exists to find the least cost point among the three options.

### **3. The Economic Costs to the Bay Area of Water Shortages Can be Determined**

The State Water Resources Control Board began its hearings on water quality standards for the Bay Delta in 1987. The extended California drought began at approximately the same time. Together, these two events became the impetus for a substantial effort by economists to quantify the costs of urban water shortages and, reciprocally, the value of reliable water supplies. The California Urban Water Agencies (CUWA), a consortium of major California urban water suppliers including the SFPUC, played an important role in this process.

Examples of the economic literature that emerged at the time of the Bay Delta hearings and the last drought are included in the references to this Report. Two studies in which the author of this report participated addressed the economic effects of water shortage on the two major customer segments of urban water suppliers: residential and industrial.

In a study commissioned by the Metropolitan Water District of Southern California, the author estimated the economic value of landscape losses based on a scientific horticultural survey of drought effects on Santa Barbara vegetation.<sup>4</sup> Research sponsored by CUWA into industrial water use revealed that shortages of

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<sup>3</sup> The minimum point of the two cost curves is equivalent to the intersection of the incremental cost curves.

<sup>4</sup> William Wade, Mary Renwick, et al., "The Cost of Water Shortages: Case Study of Santa Barbara," Metropolitan Water District of Southern California, 1991.

between 15 to 30 percent produced extremely large economic losses due to decreased production in water-intensive industries.<sup>5</sup>

The water shortage cost literature generated by the last drought evolved into more formalized water reliability valuation studies and eventually led to the modeling process called Least Cost Planning, described by the above Figure 1. Least Cost Planning methodologies today underlie Integrated Resource Planning.

More immediately relevant, SFPUC relied on the work done by the author to estimate the regional economic costs to the Bay Area from water shortages. In a report submitted in 1993 to the Federal Energy Regulatory Commission (FERC),<sup>6</sup> the SFPUC utilized the output elasticities of water identified in CUWA's 1991 report to correlate an industrial firm's change in production to a reduction in water supply.<sup>7</sup>

The SFPUC report to FERC estimated the direct economic impact, as measured by the reduced value of shipments, of a 15 percent cutback in supply to the largest water using industrial sectors in the SFPUC service area at \$305 million per year.

When the secondary impacts<sup>8</sup> of the reduced industrial output are taken into account, SFPUC estimated the total loss would increase to \$397 million per year.

Some of the key findings in SFPUC's 1993 report include:

- The economic impact resulting from a water supply cutback will be concentrated in two industries: electronic components and accessories, and computer and office equipment. Other industries could experience larger production cutbacks, but their economic impact will be small by comparison, except for the beverage industry.

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<sup>5</sup> William Wade, Julie Hewitt, et al., "Cost of Industrial Water Shortages," Spectrum Economics Report to CUWA, November 1991.

<sup>6</sup> Hetch Hetchy Water and Power Department, Response to Data Request Concerning FERC Opinion 420: New Don Pedro Project, June 8, 1993.

<sup>7</sup> The output elasticity of water estimates the percentage change in production due to the percentage change in water input.

<sup>8</sup> Secondary impacts reflect reduced economic activity in other sectors of the economy due to reduced spending by firms and employees of the industry directly affected.

- A 15 percent cutback in water supply could reduce direct shipments from the electronic component industry by \$68,000,000, and \$163,000,000 from the computer equipment industry. The secondary impact could increase the loss from these two industries to \$294,000,000.
- A 15 percent cutback in water supply could result in more than 2,000 jobs lost in the two industries and their ancillary service areas.
- At a 15 percent cutback in water supply, the beverage industry would experience the largest production cutback of 10.4 percent and lost sales of approximately \$72,400,000.”

The direct economic cost of a 15 percent reduction in deliveries to key water-dependent industries (\$305 million in 1990 dollars) is itself larger than the cost (\$181 million, apparently in 2005 dollars) of enhancing the SFPUC’s reliability level from 80 percent to 90 percent. The direct loss figure does not take into account indirect losses in other industrial sectors. Nor does it include the costs to government in terms of reduced sales tax and income tax revenues.

Nearly 15 years have passed since the data on which the SFPUC’s 1993 report was based were collected. Is there any reason to think that a comparable reduction in water deliveries in, for example, 2010 would have less serious economic impacts?

Based on more recent published economic analyses of water supply and on the author’s preliminary review of water use and census data, the answer is “NO.” In fact, recent production values for a similar subset of water-dependent industries shows that the costs of water shortage will be greater than during the last drought.

**4. The Cost of a Renewed Water Shortage, Measured Solely in Terms of Reduced Industrial Output, Will Greatly Exceed the Cost of Improving System Reliability to 90 Percent**

In the Bay Area, a higher percentage of water is used for industrial, commercial and governmental operations (38%) than is the case in California generally (32%).<sup>9</sup> This allocation is a bit more pronounced in the SFPUC wholesale service area, where, in 2001 for example, 39% of the water distributed was devoted to these non-residential

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<sup>9</sup> CDWR, Urban Water Use in California, Bulletin 166-4 (August 1994).

uses. In those wholesale communities where significant industrial activity is concentrated, the percentage of water devoted to industrial/commercial/institutional use is even higher, as can be seen in Table 1.

	<b>Residential</b>	<b>Non-Residential</b>	<b>Purchases from SFPUC (MGD)</b>
Guadalupe Valley M.I.D.	13%	87%	0.3
San Jose (North)	19%	81%	4.9
Menlo Park	40%	60%	3.8
Santa Clara (North)	44%	56%	4.0
South San Francisco (CWS)	44%	56%	8.3
Milpitas	45%	55%	11.2
Brisbane	50%	50%	0.4
Mountain View	51%	49%	11.0
Palo Alto	58%	42%	13.3
Sunnyvale	60%	40%	9.7

Source: SFPUC Water Demand Forecast, Appendix C, 2004

The companies that account for the majority of industrial sector water use are those in the computer equipment and electronic component manufacturing categories.<sup>10</sup> These water-dependent industries that are the backbone of the Bay Area economy. The significance of their contribution to the regional economy has grown dramatically since the CUWA survey was completed in 1991, as can be seen from a comparison of Table 2 and Table 3.

<sup>10</sup> Hetch Hetchy Water and Power Department Report, pp. 106-07.

**Table 2: Value of Manufacturing Shipments - 1990**  
(in millions of dollars)

	<b>Alameda</b>	<b>San Mateo</b>	<b>Santa Clara</b>	<b>Total</b>
<b>Total Manufacturing</b>	\$15,300	\$4,400	\$36,600	\$56,300
<b>Water Critical Industries</b>	\$9,700	\$1,600	\$273,00	\$38,600
<b>Percentage of County</b>	63%	36%	75%	69%

Source: CUWA, Cost of Industrial Shortages, Appendix C, 1991

Note: Census of Manufacturers 1987 forecast to 1990 by the Center for Continuing Study of the California Economy.

The share of total manufacturing output represented by water critical industries in the three counties for 1990 was 69 percent. This rose to 83 percent in 2001.

**Table 3: Estimated Value of Manufacturing Shipments - 2001**  
(in millions of dollars)

	<b>Alameda</b>	<b>San Mateo</b>	<b>Santa Clara</b>	<b>Total</b>
<b>Total Manufacturing</b>	<b>\$38,346</b>	<b>\$13,116</b>	<b>\$155,875</b>	<b>\$207,336</b>
Fabricated metal products	\$1,972	\$562	\$2,352	\$4,886
Computer and electronic products	\$16,297	\$6,214	\$125,346	\$147,857
Electrical equipment and appliances	\$908	\$175	\$2,191	\$3,274
Food products	\$2,498	\$806	\$1,397	\$4,701
Beverage products	\$2,154	\$362	\$712	\$3,228
Paper manufacturing	\$749	\$171	\$616	\$1,535
Chemical manufacturing	\$2,000	\$2,328	\$3,262	\$7,590
<b>Water Critical Industries Subtotal</b>	<b>\$26,578</b>	<b>\$10,617</b>	<b>\$135,876</b>	<b>\$173,072</b>
<b>Percent of County</b>	<b>69%</b>	<b>81%</b>	<b>87%</b>	<b>83%</b>

Note: Estimated value of shipments based on ratio of wages and salaries to shipments from 1997 Census of Manufacturing and wages and salaries provided for 2001. Placeholder values until publication of 2002 Census of Manufacturing.

Table 3 shows that the total value of manufacturing shipments nearly quadrupled between 1990 and 2001, (from \$56.3 Billion to \$207.3 Billion) while the value of shipments from water critical manufacturing industries more than quadrupled (from \$38.6 Billion to \$173.1 Billion).

In some industries, water is an essential element of the production process, not ancillary to plant production for employee use. For example, about 75 percent of water use in the food products industry is employed directly in the process. Water essentially is the product for many beverage processors. Microchips are manufactured in a wet environment with much necessary rinsing. Biotechnology, an emerging industry in the Bay Area, requires water. Genentech, for example, is the largest industrial user of water in South San Francisco. Over 75% of the water used in its South San Francisco plant is employed directly in the manufacturing process, while R&D uses account for most of the remainder. Genentech's explanation of the importance of water is short and to the point:

- "What are our raw materials?
- Genetically modified cells
- Water"<sup>11</sup>

What would be the effects of a new round of water rationing imposed on these industries? The 1991 CUWA study estimated the impact of 15% and 30% water supply reductions on the water critical industries in six Northern California counties. Using the same methodology employed in the CUWA study, it is possible to estimate the effect of 10%, 15% and 20% cutbacks on the water critical industries of Alameda, San Mateo and Santa Clara counties, benchmarked to 2001 revenues. The results are shown on Table 4.

Table 4 shows that the estimated value of current production losses in these water critical industries ranges from \$2.5 billion to \$7.7 billion per year. The estimates are based on the countywide values in Table 3, adjusted to reflect the portion of each county's industrial customers served by the SFPUC, as presented in the Bay Area

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<sup>11</sup> Genentech – A Biotech Case Study: Water Sustainability in Silicon Valley (May 2004).

Economic Forum 2002 report "Hetch Hetchy and the Bay Area Economy." The figures are San Mateo 100%, Alameda 50% and Santa Clara 80%.

**Table 4: Effect of Water Shortage on BAWSCA Water Critical Industries**

	Output Elasticities of Shortage		Lost Value of Shipments – 2001 (in millions of dollars) Imposed Supply Shortage		
	15%	30%	10%	15%	20%
Fabricated metal products	0.15	0.41	\$51	\$211	\$281
Computer and electronic products	0.18	0.27	\$2,064	\$4,643	\$6,191
Electrical equipment and appliances	0.18	0.27	\$43	\$96	\$129
Food products	0.27	0.35	\$86	\$167	\$222
Beverage products	0.69	1.14	\$139	\$343	\$458
Paper manufacturing	0.40	0.70	\$42	\$109	\$145
Chemical manufacturing	0.12	0.20	\$71	\$178	\$238
<b>Subtotal: Water Critical Industries</b>	na	na	<b>\$2,495</b>	<b>\$5,747</b>	<b>\$7,663</b>

Note: BAWSCA industry is assumed to be 100% of San Mateo; 80% of Santa Clara; 50% of Alameda; following the assumption in Sunding et al., p. 23.

These estimates are conservative in that they use the production relationships developed 15 years ago in the CUWA study. In the intervening years, water use efficiency in these industries has improved as companies have invested in water conservation. The industrial water use survey reported in the CUWA study found ongoing conservation projects aimed at reuse and recirculation of water costing many thousands of dollars for each acre-foot saved.<sup>12</sup> The SFPUC 1993 study for FERC reported that "managers interviewed felt they had squeezed most of the potential water savings out of cooling, personal and landscape uses."<sup>13</sup> These improvements in efficiency have "hardened" demand. As a result, a reduction in water supply today will produce a greater loss in production than the corresponding reduction would have done 15 years ago.

<sup>12</sup> See Section 6 of Cost of Industrial Water Shortages.

<sup>13</sup> Hetch Hetchy Water and Power Department Report, p. 115.

Moreover, the estimated losses in Table 4 do not include the secondary economic impacts -- the "ripple" effects that the loss of output and wages in these water critical industries would have on other sectors of the economy. Nor do they account for the loss in sales and income tax revenue to local governments.

Additionally, water shortages will impose costs on the commercial sector of the economy. Two of the most important components of this sector in the Bay Area are hotels/motels and restaurants. Those two categories are among the largest users of water in the region -- accounting for over 40% of all commercial water use.<sup>14</sup> Most of the water use in the hospitality/tourism sector is "indoor" use: very little is devoted to landscape irrigation. Costs to the commercial sector are not included in the \$2.5 - \$7.7 billion cost estimate, nor are the effects of rationing on hospitals, schools and other institutional users.

#### **5. The SFPUC Also Failed to Take the Costs of Shortages to Residential Customers into Account**

Costs that water shortages impose on residential customers should not be overlooked. The value of water supplies for residential uses can be estimated by residential customers' "willingness to pay." Economists measure a person's willingness to pay for a good with reference to the demand curve. The aggregate demand curve allows estimates of how much people are willing to pay for each additional unit of the good or service. Consumers pay a charge for water that can be seen as a lower bound estimate of their willingness to pay. We know that consumers are willing to pay at least that much because they *do* pay that much. They may be willing to pay considerably more than this—particularly if the alternative were water shortages. The difference between what they are *willing to pay* and what they are charged is the *consumer surplus*, also known as the net benefit.

The California Department of Water Resources has developed a data base of consumer surplus values, which represent an amount each household would be willing to pay in addition to its existing water bill to avoid a shortage of a given size. (See

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<sup>14</sup> Hetch Hetchy Water and Power Department Report, p. 104.

Appendix Table 1.) A preliminary calculation using CDWR values, updated to 2005 dollars, the Association of Bay Area Governments just-completed census of households, and residential water use data compiled by SFPUC and BAWSCA suggests that residential customers in the SFPUC wholesale service area attach high values to greater reliability. Table 5 shows the magnitude of annual residential values at stake but omitted in the WSIP planning process. The number of projected households from ABAG's 2005 projections is multiplied by the percentage of Single Family and Multi-Family Households and then by the respective willingness to pay values from Appendix Table 1. The results are shown at the bottom of Table 5.<sup>15</sup>

These numbers show that, given today's population, the value to residents in the SFPUC wholesale service area territory of avoiding a 20 percent shortage is approximately \$97 million per year. Any supply portfolio that could improve that reliability with an annualized cost of less than that amount would be of benefit to the residential customers in the region. The values on Table 5 may be low.<sup>16</sup> As shown in the table, the benefit from improving reliability increases over time, as the population grows.

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<sup>15</sup> Costs on Table 5 assume that a single-family housing unit uses, on average, 0.3 AF of water per year while a multi-family housing unit uses, on average, 0.2 AF per year. They also assume that 95% of residential water use in San Mateo County is supplied by the SFPUC, with the corresponding percentages being 31% and 23% in Alameda and Santa Clara counties, respectively.

<sup>16</sup> Rationing systems adopted during a drought could shift a larger burden of a system-wide shortfall to the residential sector. Hence, a system-wide 20% shortfall might impose the cost of a 25% shortage on residential customers. Moreover, CDWR adjusts upward the values for both demand hardening and for multiyear events.

<b>Table 5: Residential Reliability Values for BAWSCA Households</b>							
<b>Households</b>	<b>2000</b>	<b>2005</b>	<b>2010</b>	<b>2015</b>	<b>2020</b>	<b>2025</b>	<b>2030</b>
San Mateo	254,104	261,280	268,450	278,650	289,550	298,260	305,390
Santa Clara	565,863	595,550	628,670	660,850	692,440	725,090	762,720
Alameda	523,366	542,540	564,780	590,880	618,870	647,370	677,400
Total	1,343,333	1,399,370	1,461,900	1,530,380	1,600,860	1,670,720	1,745,510
Source: ABAG Projections 2005							
Single Family Housing	72.4%						
Multi-Family Housing	27.6%						
Source: SFPUC 2004 Demand Forecast							
<b>Annual Reliability Values BAWSCA Area - (in millions of dollars)</b>							
WTP to avoid 15% shortage	\$63	\$65	\$68	\$71	\$74	\$77	\$80
WTP to avoid 20% shortage	\$93	\$97	\$101	\$105	\$110	\$114	\$118
WTP to avoid 25% shortage	\$132	\$136	\$142	\$148	\$154	\$160	\$166

Source: CDWR WTP \* 2005 ABAG Household Projection adjusted to reflect percentages of county population served by SFPUC [0.95 for San Mateo; 0.23 for Santa Clara; 0.31 for Alameda].

**6. Conclusion: The SFPUC Should Reconsider the Water Reliability Goal in the WSIP, Taking Economics into Account**

The industrial and residential shortage cost estimates provided in this report are preliminary and approximate. They are starting points used simply to illustrate that SFPUC has omitted them from the WSIP, that they are large, and that they far exceed the SFPUC's estimates of incremental costs to improve system reliability to 90%, or, for that matter, 100%. They could be used, along with estimates of the cost of reliability options, to develop lifecycle benefits to compare with lifecycle costs of proposed options, in order to assess whether the improvement in reliability is beneficial from the point of view of avoided social and economic costs. The analytic process is more complicated than simply comparing values in Tables 4 and 5 to engineering and construction costs. To fully develop the analysis, the SFPUC would have to develop the costs of an array of reliability management alternatives, together with the expected shortage in each year of the project life of those supply alternatives. The California Department of Water Resources and the Metropolitan Water District of Southern

California have been employing analytic methods of this kind for nearly 20 years. References cited in this paper will lead the interested reader to the appropriate tools and approaches.

## APPENDIX

**Table 1: Residential Reliability Values**

Willingness to Pay to Avoid Event (2005 Dollars)			Value per Acre-Foot (2005 Dollars)
	AF/Year/Household		
Foregone Use	0.3	0.2	
0%	\$0	\$0	\$0
5%	\$23	\$15	\$76
10%	\$68	\$45	\$226
15%	\$130	\$87	\$434
20%	\$205	\$137	\$685
25%	\$289	\$193	\$964
30%	\$376	\$251	\$1,254
35%	\$463	\$309	\$1,544

Source: LCPSIM II, Feb 2005, updated with CPI.

Based on Carson and Mitchell. SWRCB Bay-Delta Hearings, State Water Contractors Exhibit 51. "Economic Value of Reliable Water Supplies." June 1987.

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Nicole Sandkulla, BAWSCA

# EXHIBIT A

<b>WATER SUPPLY MATRIX</b>			
<b>Water Supply Options 2030</b>			
	<b>A</b> 100% Delivery	<b>B</b> 90% Delivery	<b>C</b> 80% Delivery
<b>Amount Delivered During Designed Drought</b>	300	277	254
<b>Existing Firm Yield</b>	226	226	226
<b>Difference (Amount Delivered During Designed Drought minus Firm Yield)</b>	74	51	28
<b>Increased Surface Storage</b>			
Increased Calaveras (420,000)	30		
Increased Calaveras (200,000)		10	10
<b>SFPUC System Water Supply Options</b>			
Desalination	14		
<b>WSIP Cost of Project Bundles (\$M)</b>	\$734	\$167	\$167
<b>Non WSIP SFPUC System Water Supply Options</b>			
Conservation	5.6	5.6	5.6
Recycling	19	14	
Ground Water	7	7	7
Transfers	15	15	15
<b>Supply Options</b>	90.6 MGD	51.6 MGD	37.6 MGD
<b>Total 25 Year Cost for Non WSIP Options (\$M)</b>	\$488	\$436	\$255
<b>Baseline Assumptions:</b>			
1) Assumes consistency with Stewardship Policy and Principles. 2) Meet Purchase Requests. 3) Calaveras rebuilt at 97,000 acrefeet (minimum at original capacity). 4) Design drought of 8 1/2 years. 5) Existing yields assumes annual average of 86 mgd for fish flows at O'Shaughnessy, Cherry, Eleanor and Moccasin. Does not include payments for flows nor recreational releases.			

# ATTACHMENT 7

1 UNITED STATES OF AMERICA  
2 FEDERAL ENERGY REGULATORY COMMISSION

3 Turlock Irrigation District  
4 and  
5 Modesto Irrigation District

Project No. 2299

6 AFFIDAVIT OF ANSON B. MORAN

7 I, Anson B. Moran, do hereby declare as follows:

8 1. I am General Manager of the Public Utilities Commission  
9 for the City and County of San Francisco, and have been so employed  
10 since December, 1993. Prior to my appointment to this position, I  
11 was General Manager of the Hetch Hetchy Water and Power Department  
12 since 1988. Prior to that position, I was Assistant General  
13 Manager, Finance for the San Francisco Public Utilities Commission.  
14 I Joined the Public Utilities Commission in 1980.

15 2. I serve on the Boards of the California Water Education  
16 Foundation and California Municipal Utilities Association, and am  
17 currently Chairman of the California Urban Water Agencies. I have  
18 a Bachelor of Science in Electrical Engineering from Worcester  
19 Polytechnic Institute and a Master of Arts in Urban Studies from  
20 Occidental College.

21 3. I am responsible for the actions of the Hetch Hetchy  
22 Water and Power Department and San Francisco Water Department which  
23 supply water to a population of approximately 2.3 million people  
24 within the counties of Tuolumne, Alameda, Santa Clara, San Mateo,  
25 and San Francisco.

26 4. In this affidavit, I address the subject of the planning  
27 and operation the City's water facilities during drought.

1 Specifically, I address the basis of the procedures the City used  
2 to determine the rationing that was implemented during the recent  
3 drought, and which are incorporated in the City's water supply  
4 planning studies.

5 5. The City's "operation rule" was developed during the  
6 course of the recent 1987-1992 drought. Never before had such a  
7 sustained drought been experienced by the City. The onset of the  
8 drought really began in 1986, the point in time when the City's  
9 reservoirs were last filled, and continued until June, 1993 when  
10 the City's reservoirs finally refilled to full capacity. This  
11 drought spanned approximately 7 years.

12 6. Water deliveries to City customers at the time the  
13 drought began amounted to approximately 293 million gallons per day  
14 (MGD) (328,000 acre-feet per year). During the 1987-1992 period the  
15 City received from Tuolumne River runoff an average of only 151,500  
16 acre-feet per year, and from local Bay area water sources  
17 approximately 20,700 acre-feet per year. The deficit between water  
18 supplies and water demands during the drought became readily  
19 apparent as the drought progressed, requiring an extreme dependence  
20 on Tuolumne River reservoir storage to partially close the gap.

21 7. The City proceeded with operations at the onset of the  
22 drought in accordance with procedures based on the experience of  
23 many years of historical operation, including the knowledge of  
24 previous drought events such as had occurred in 1976-1977. The  
25 operation of the City's facilities in accordance with rules based  
26 only on historical data proved to be a mistake.

1 8. The City learned the painful lesson as to the adverse  
2 impacts that are caused by not planning for a drought worse than  
3 any experienced to date. This lesson was driven home when the  
4 hydrology of the Tuolumne River and the City's operations through  
5 1990 and early 1991 had created a situation where a 45 percent  
6 rationing program among City customers was initiated - a level of  
7 rationing that was found to be intolerable and not achievable.

8 9. The City and its customers implemented numerous  
9 drought-related and long-term water conservation programs to lessen  
10 water demand, with water demand ultimately being reduced by  
11 approximately 30 percent as compared to pre-drought deliveries.  
12 The City also purchased water from other entities to narrow the gap  
13 between supplies and demands. These actions along with a  
14 fortuitous storm during the spring of 1991 allowed the City to  
15 regain control of its system and efforts moved forward to better  
16 plan for the reliability of the City's water deliveries.

17 10. Significant questions regarding how the City would  
18 operate its water system had to be addressed. Several of these  
19 questions were as follows:

- 20 • How much water should the City maintain in storage in one  
21 year to assure water deliveries during the next year?  
22 • To what level and for what duration can the City expect  
23 its customers to reduce water use?  
24 • How long a period should the City expect the drought to  
25 continue?  
26 • During the drought period, what water supplies (e.g.,  
27 inflow to City reservoirs) should be expected to occur?  
28

1 The answers to these fundamental questions are intertwined, and  
2 result in the operation rule that the City now uses to guide City  
3 water delivery operations.

4 11. However, underlying the answers to these questions is an  
5 appreciation of the risk that is inherent in operating to any rule.  
6 In the case of the City's water deliveries, risk is the product of  
7 the probability (frequency) of water shortages and the consequences  
8 of those shortages.

9 12. The frequency of potential shortages is forecasted with  
10 modeling tools that integrate assumptions for each of the above  
11 questions.

12 13. The consequences of shortages include economic, socio-  
13 economic, environmental, and personal (human) impacts.

14 14. What makes San Francisco's situation unusual is the  
15 consequence of being wrong in our forecast. Because of our  
16 entitlement structure, and limited conveyance and treatment  
17 capacity, an additional, unforecasted year of drought could  
18 literally result in empty reservoirs, no entitlements, and little  
19 or no alternate source of water. We could have no water to serve  
20 our 2.3 million customers.

21 15. In the spring of 1991 these consequences achieve a  
22 sobering clarity. I became acutely aware of the physical  
23 constraints of the City's water conveyance, treatment and delivery  
24 facilities; the availability of, and limitations to movement of  
25 supplemental emergency water supplies into the City's system; and  
26 the uncertainty as to when the drought would finally end. Due to  
27 the extremely limited conveyance and treatment capacity system to

1 bring other emergency sources of water to the City, the City must  
2 rely on storage in the Tuolumne River basin to ride out droughts.  
3 The City just does not have other sources to call on during  
4 drought, such as turning on pumps. In addition, I had first-hand  
5 information as to the direct and indirect adverse impacts that were  
6 occurring to the City's customers as the result of water shortages.

7 16. Situated within the drought, I weighed all the above  
8 factors and supported the operation rule that is currently used by  
9 the City in practice, and incorporated in the planning studies  
10 submitted to FERC. That plan was tested as it was developed and is  
11 the direct product of real, on-the-line decision making. When  
12 considering all the factors associated with the City's entitlements  
13 to water, its physical system, and the dire consequences of just  
14 being wrong in the forecasting of the length of drought that may  
15 hit the City, I can not agree with any comment that the City's  
16 operation rule is overly conservative.

17  
18 I declare under penalty of perjury that the foregoing is true and  
19 correct.

20  
21 Date: Jan 26, 1994 Anson B. Moran

22 Anson B. Moran  
23  
24  
25  
26  
27

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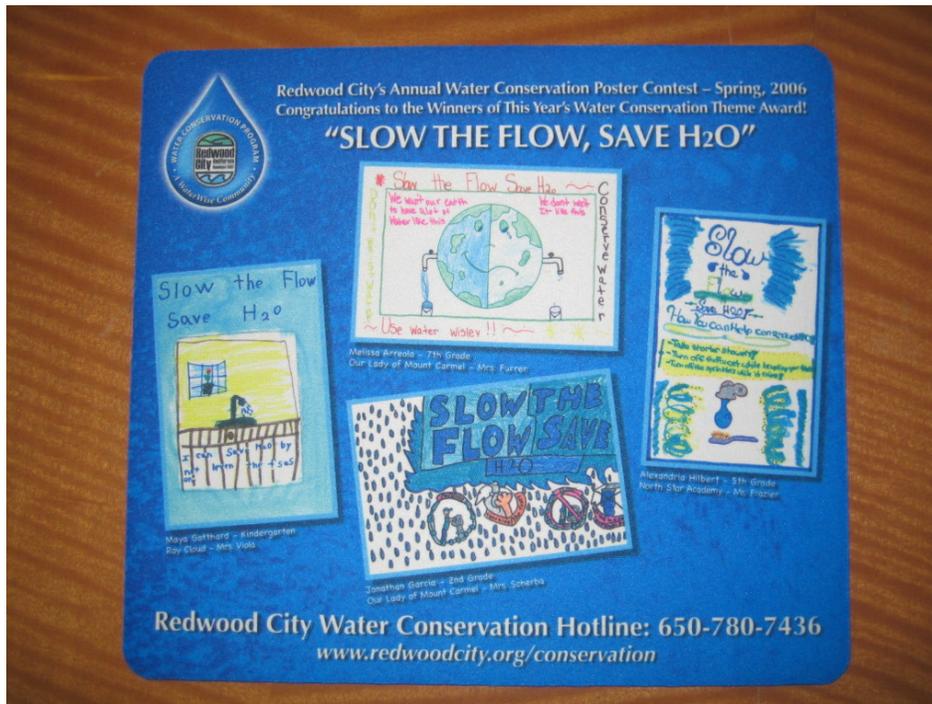
*Rivermark in Santa Clara*

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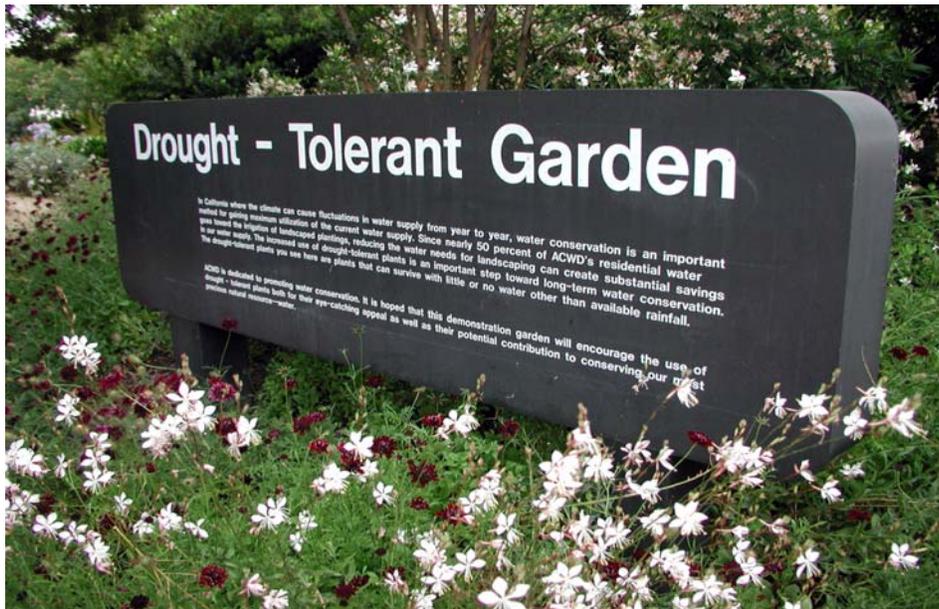
*Mouse pad from Redwood City Water Conservation Program*

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