

Improving Water Conservation:
**Opportunities for San Francisco
Bay Area Water Supply Agencies**

June 2007



**Prepared by the Sierra Club
Loma Prieta Chapter**

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Photo of Hetch Hetchy by Ron Good, Restore Hetch Hetchy

1. Introduction

This report summarizes the findings of a research project undertaken by the Sierra Club, Loma Prieta Chapter's **Water Sustainability Campaign**. One of the goals of this campaign is to educate the public and water supply agencies in the San Francisco Bay Area on water conservation issues and opportunities.

The Campaign decided to review and evaluate the water consumption and conservation efforts of water supply agencies that form the Bay Area Water Supply and Conservation Agency (BAWSCA). The reason for focusing on this set of agencies was that one of the Campaign's goals is to advocate for better water use efficiency in the planning of the San Francisco Regional Water System. Since BAWSCA agencies represent the majority of consumers in this regional system, and sell water to residents, businesses, and water retailers in their service areas, our study focused on the agencies that have a direct impact on the future planning of this regional water system.

This report will cover the following three topics:

1. General overview of the regional water system and water usage
2. Current water conservation measures
3. Opportunities for increasing water conservation and water use efficiency

Subsequent reports will focus on more detailed water sustainability solutions.

2. Regional Water Source

The San Francisco Public Utilities Commission (SFPUC), a five-member body appointed by the Mayor of San Francisco, owns and operates the San Francisco Regional Water System, a complex system connecting the Hetch Hetchy Valley, Tuolumne River and Crystal Springs Reservoir. The system provides Hetch Hetchy water, flowing more than 160 miles from Yosemite National Park to the San Francisco Bay Area. It is driven wholly by gravity except where local watershed-treated waters are introduced. It supplies high quality water to 2.4 million residential, commercial and industrial consumers in the Bay Area, including most of the San Francisco peninsula as well as Fremont, Hayward, and several cities in the Santa Clara Valley.



Historical photo of Hetch Hetchy Valley, taken in 1908. The valley was flooded in 1923 to create the primary reservoir that serves the San Francisco Regional Water System.

Photo by Isaiah West Taber, Sierra Club

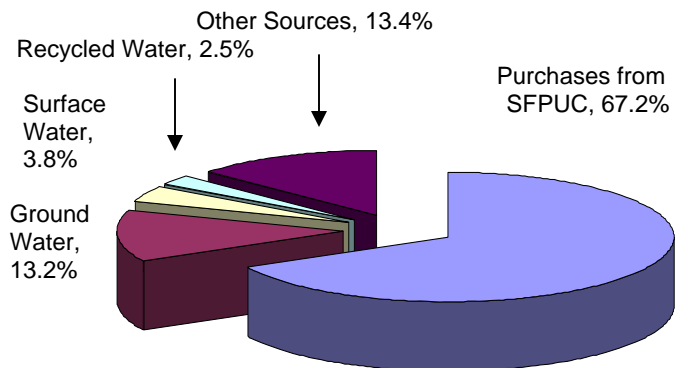
3. The Bay Area Water Supply and Conservation Agency (BAWSCA)

BAWSCA represents the interests of 25 cities and water districts, and two private utilities, which purchase water wholesale from the San Francisco Regional Water System. These entities provide water to 1.7 million people in Alameda, San Mateo and Santa Clara Counties. The majority of BAWSCA's water (67% in FY 2005-2006) comes from the SFPUC Regional Water System. Each year BAWSCA surveys its member agencies to assist in projecting suburban water demand. The following information comes from the most recent BAWSCA Annual Survey.

BAWSCA Supply by Source (FY 2005-2006):

Water Supply Source	Acre-feet*
San Francisco PUC	184,838
Groundwater ¹	36,232
Surface Water ²	10,338
Recycled Water ³	6,973
Other Sources ⁴	36,743
Total	275,124

*1 acre foot = 325,851 gallons



¹ Agencies using groundwater include Coastside County Water District, Daly City, San Bruno, California Water Service - South San Francisco, Mountain View, Santa Clara, Stanford University, Sunnyvale, and Alameda County Water District.

² Agencies using surface water include Coastside County Water District (Pilarcitos Reservoir), California Water Service (Bear Gulch Reservoir), and Stanford University (Searsville and Felt Lakes).

³ Agencies using recycled water include Redwood City, Milpitas, San Jose, Santa Clara, Palo Alto, and Sunnyvale.

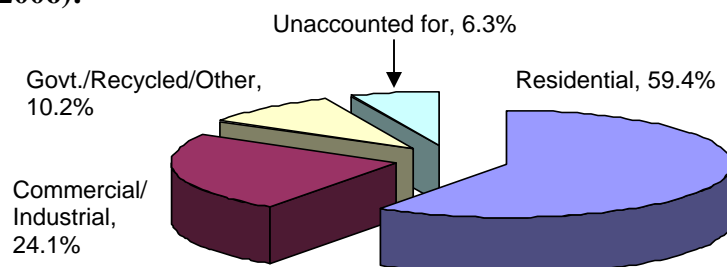
⁴ Agencies using other sources include Milpitas, Mountain View, Santa Clara, Sunnyvale (from Santa Clara Valley Water District), and Alameda County Water District (State Water Project).

4. BAWSCA Water Consumption

As with the source of supply, BAWSCA's water demand by customer class varies little from one year to the next. Among BAWSCA agencies in FY 2005-06, the residential sector accounted for 59.4% (145.9 mgd) of the 245.6 mgd consumed. (mgd = million gallons per day)

Water Demand by Sector (FY 2005-2006):

	Acre-feet
Residential	163,440
Commercial/Industrial	66,284
Govt./Recycled/Other	27,982
Unaccounted for	17,418
Total	275,124



Gross Water Consumption Per Capita (FY 2005-2006):

Among BAWSCA agencies in FY 2005-06, the average gross per capita water consumption was 148.6 gallons per capita per day (gpcpd). The lowest water consumption locations on a per capita basis were Daly City (65.2 gpcpd), East Palo Alto (78.4 gpcpd), Westborough (78.5 gpcpd), North Coast (80.9 gpcpd), and Skyline (87.0 gpcpd). The highest per capita users were Hillsborough (311.3 gpcpd), San Jose (317.4 gpcpd), Purissima Hills (329.5 gpcpd), Menlo Park (338.9 gpcpd) and Guadalupe Valley (610.8 gpcpd).

This water consumption data includes recycled water use, but according to BAWSCA only two of the above locations actually use recycled water (0.1% of Daly City's supply, and 9.2% of San Jose's supply). Here is the full list, from lowest to highest gross per capita water consumption:

BAWSCA Member	*Total Consumption (ccf)	*Per Capita Consumption (PCC) (gpcpd)	PCC Rank
Daly City	3,331,582	65.2	1
East Palo Alto	983,564	78.4	2
Westborough	459,831	78.5	3
North Coast	1,579,110	80.9	4
Skyline	76,938	87.0	5
San Bruno	1,868,846	95.4	6
Stanford University	1,446,902	107.0	7
Mid-Peninsula	1,434,648	112.9	8
Brisbane	191,963	124.5	9
Hayward	8,924,063	124.9	10
Millbrae	1,291,729	127.8	11
Redwood City	5,315,929	130.5	12
Coastside	1,111,523	131.1	13
CWS - Mid-Peninsula	7,945,376	131.4	14
CWS - South SF	3,886,698	140.0	15
Alameda	23,112,968	145.8	16
Estero	2,531,846	150.9	17
Burlingame	2,121,360	155.3	18
Mountain View	5,750,554	163.6	19
Sunnyvale	10,673,793	163.8	20
Milpitas	5,400,800	170.3	21
Palo Alto	6,180,611	203.8	22
Santa Clara	11,540,998	217.6	23
CWS - Bear Gulch	6,187,553	227.2	24
Hillsborough	1,665,884	311.3	25
San Jose**	2,362,632	317.4	26
Purissima Hills	964,747	329.5	27
Menlo Park	1,688,803	338.9	28
Guadalupe Valley**	130,538	610.8	29

* Inclusive of recycled water. ** Service area predominantly commercial/industrial.
ccf = 100 cubic feet; approximately 748 gallons gpcpd = gallons per capita per day

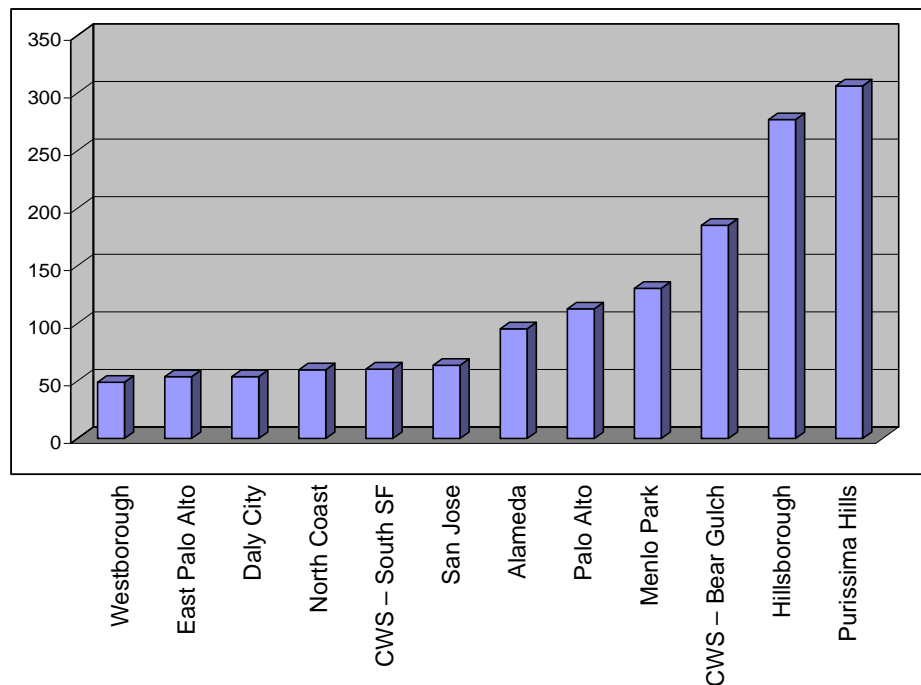
Residential Water Use Per Capita (FY 2005-2006):

Average residential per capita consumption in the BAWSCA service area was 88.8 gpcpd in FY 2005-06. BAWSCA reports that Westborough Water District (South San Francisco) had the lowest residential per capita consumption at 48.8 gpcpd, while Purissima Hills Water District, which includes Los Altos Hills, Los Altos and nearby unincorporated areas, had the highest at 306.1 gpcpd. The most affluent communities have the greatest amount of residential water use, and a higher proportion of their water use is for landscaping. Here are the locations with the lowest and highest residential water consumption:

BAWSCA Member	*Residential Consumption (ccf)	*Residential Per Capita Consumption (RPCC) (gpcpd)	RPCC Rank
<u>The Lowest:</u>			
Westborough	285,965	48.8	1
East Palo Alto	672,672	53.6	2
Daly City	2,741,036	53.7	3
North Coast	1,162,940	59.6	4
CalWater - South SF	1,674,840	60.3	5
San Jose	472,376	63.5	6
<u>The Highest:</u>			
Alameda	15,094,917	95.2	22
Palo Alto	3,410,810	112.5	23
Menlo Park	649,848	130.4	24
CalWater - Bear Gulch	5,041,339	185.1	25
Hillsborough	1,481,727	276.9	26
Purissima Hills	896,148	306.1	27

* Includes multi-family and single family accounts.

Residential Per Capita Consumption (gallons per capita per day)



*Source: BAWSCA
FY 2005-2006
Annual Survey*

Projected Changes in Water Consumption from 2001 to 2030

In FY 2004-2005 SFPUC conducted planning studies to support the development and implementation of the SFPUC Water System Improvement Program (WSIP). The results project the following changes in the WSIP service area from 2001 to 2030:

- 19.1% increase in service area population
- 1.6% increase in residential water use
- 31% increase in service area employment
- 19 % increase in total water demand
- 14% reduction in average single family residential water use per person
- 4.1% increase in average gross water use per person
- 7.8% (25 mgd) reduction in use due to implementation of existing water saving plumbing codes

Projected BAWSCA-Wide Total Water Demand

BAWSCA estimates its total projected demand in 2030 will be 320 mgd (30% greater than the 246 mgd in FY 2005-2006), and its 2030 purchases from SFPUC will be 208 mgd (26% greater than the 165 mgd in FY 2005-2006).

By 2030 BAWSCA predicts its agencies will have made significant commitments to diversifying their water supply portfolio. But it estimates that conservation and recycled water will be used to meet only 15% of the projected water demand in the service area in 2030, with the SFPUC supply still accounting for 65% of the total supply (down from 67% today).

5. Current BAWSCA Water Conservation Measures – Best Management Practices

BAWSCA's FY 2005-2006 member survey gauged the level of implementation of water conservation Best Management Practices (BMPs) by BAWSCA agencies. The results show some implementation of conservation BMPs by the agencies, but there is much need for improvement in this area. More aggressive program development, promotion and implementation would help. BAWSCA offers three primary conservation programs to its members: Residential Washing Machine Rebate Program, Conservation Landscape Audit Program and "Our Water" School Education Program.

6. California Urban Water Conservation Council (CUWCC) Membership

The California Urban Water Conservation Council was created to increase efficient water use statewide through partnerships among urban water agencies, public interest organizations, and private entities. The Council's goal is to integrate urban water conservation Best Management Practices into the planning and management of California's water resources.

According to CUWCC, currently only thirteen BAWSCA agencies are signatories to the CUWCC Memorandum of Understanding (MOU). Those signing the MOU pledge to develop and implement fourteen CUWCC comprehensive conservation Best Management Practices (BMPs).

The Thirteen BAWSCA Signatories to the CUWCC Memorandum of Understanding are:

- Alameda County Water District
- California Water Service Company (Bear Gulch District, Mid-Peninsula District, and South San Francisco District),
- Coastside County Water District (Half Moon Bay, El Granada, Miramar)
- City of Hayward
- Mid-Peninsula Water District (Belmont, San Carlos and Redwood City area)
- City of Millbrae
- City of Mountain View
- North Coast County Water District (Pacifica, coastal area)
- City of Palo Alto
- Purissima Hills Water District (Los Altos Hills and area)
- City of Redwood City
- City of San Jose
- Westborough Water District (South San Francisco)



CUWCC Best Management Practices (BMPs) by BAWSCA Members

The CUWCC recognizes the following 14 water conservation BMPs. BAWSCA member agencies have a mixed record of CUWCC program implementation. BAWSCA notes that some of its members' programs may not be fully implemented to meet current BMP requirements.

<u>CUWCC BMP Program:</u>	<u>Number of Participating BAWSCA Agencies:</u>
Residential Water Surveys	16
Residential Retrofits	22
System Water Audits, Leaks	28
Metering	29
Large Landscape Conservation Audits	14
Residential Clothes Washer	29
Public Information	28
School Education	21
Commercial Water Audits	10
Ultra Low Flow Toilet/Urinals	13
Conservation Pricing	29
Conservation Coordinator	24
Water Waste Prohibition	22
Residential Ultra Low Flow	20

Source: BAWSCA FY 2005-2006 Annual Survey

7. BAWSCA Water Conservation Opportunities

The Pacific Institute recently undertook a study of Bay Area water agencies and concluded that the agencies are significantly overestimating their projected future need for water from the SF Regional Water System. The study was produced by the Pacific Institute for Studies in Development, Environment, and Security, an independent nonprofit research organization that is

one of the nation's leading centers for assessing potential water conservation and water use efficiency.

Study author Heather Cooley and Pacific Institute President Peter Gleick presented their findings at a Sustainable Water Supply Briefing sponsored by the SFPUC for its water agency customers on September 28, 2006.

The Pacific Institute analysis found that these inflated water demand estimates resulted from a failure to consider factors such as increased water rates reducing water use, variability in water use in both quantity and purpose among users in the non-residential sector (commercial and industrial), and economic slowdowns reducing projected water demand for the non-residential sector.

Several other studies presented at the Sustainable Water Supply Briefing demonstrated that substantial cost-effective reductions in per-capita demand are possible with technologies that are currently being implemented in other urban areas.

For example, the Seattle regional water system reduced water withdrawals by 15 percent from 1985 to 2005, while serving 20 percent more users, and it is currently committed to reducing water use by an additional one percent annually (see Regional 1% Water Conservation Program, August, 2006 City of Seattle, at: http://savingwater.org/docs/water_conservation_report.pdf).

The Metropolitan Water District of Southern California decreased water use by 16 percent from 1990 to 2003, despite a 14 percent increase in service area population (see "Hearing: Water: Is it the 'Oil' of the 21st Century?" Peter Gleick 2003 Testimony before the Subcommittee on Water Resources and Environment of the Committee on Transportation and Infrastructure United States Congress, at: http://www.pacinst.org/publications/testimony/gleick_june_2003.htm).

In contrast, BAWSCA estimates an actual *increase* in per capita demand for water agency customers between now and 2030. Their proposed conservation programs will reduce demand by only 7.2 percent by 2030, a figure which is low compared to other regions. Thus it appears our local water agencies are overlooking significant opportunities for reducing water use through conservation.

The Sustainable Water Supply Briefing findings also revealed that BAWSCA agencies with the largest projected demand increases seem to share some disconcerting similarities, such as the lack of conservation rate structures, large increases in projected outdoor water use, and significant projected water losses in the future.

8. Specific Recommendations

In order to provide a sustainable water supply for the future, SFPUC and BAWSCA must develop a comprehensive approach to solving the San Francisco Bay Area's water supply problems. The agencies need to re-evaluate projected future water demands, and meet those demands by investing in cost-effective, aggressive water conservation programs (e.g., promoting high-efficiency water fixtures and appliances, rebates, etc.), water recycling projects (e.g., double-piping in new residential and industrial developments) and groundwater management. System-wide watershed restoration projects also need to be undertaken.

BAWSCA and its local water agency members are key to this conservation effort. SFPUC and BAWSCA need to produce more accurate water demand projections and to pursue a sustainable water plan. The basis of a sustainable plan involves capping water sales at current levels. With more aggressive regional water use efficiency, conservation and recycling programs, we can ensure our water supply will meet future demands, while we protect and restore the watersheds on which we all depend.

To ensure our water supply will meet future demands, we urge BAWSCA leadership to:

1. Adopt watershed stewardship goals
2. Set water conservation/recycling goals
3. Identify ways to reduce demand growth
4. Fully implement BAWSCA water conservation and efficiency programs
5. Become CUWCC Memorandum of Understanding signatories
6. Fully participate in CUWCC Best Management Practices
7. Establish tiered conservation rate structures

9. References for Further Information

For more information about the SFPUC's regional water system, please visit: <http://sfwater.org>

For more information about BAWSCA, please visit: <http://www.bawasca.org/>

For more information about the California Urban Water Conservation Council (CUWCC), please visit: www.cuwcc.org

The BAWSCA *Annual Survey FY 2005-2006* is available at: [http://www.bawasca.org/docs/BAWSCASurveyFY05-06Revised\(2\).pdf](http://www.bawasca.org/docs/BAWSCASurveyFY05-06Revised(2).pdf)

For more information about the September 28, 2006 Sustainable Water Supply Briefing, please visit: http://sfwater.org/detail.cfm/MC_ID/13/MSC_ID/165/C_ID/3228/Keyword/Sustainable%20Water%20Supply%20Briefing

The Pacific Institute has recently released two especially significant reports;

"The World's Water 2004-2005," available at: www.pacinst.org/press_center/the_worlds_water_2004-2005/index.htm, and

"Waste Not, Want Not – Urban Usage Report," available at: www.pacinst.org/reports/urban_usage/

The Bay Institute released a report entitled, "The Bay Institute Ecological Scorecard: 2005 San Francisco Bay Index," which measures conditions for the whole Bay. The report links deteriorating health of the Bay to decreased water flows from area creeks and rivers. You can find it at: www.bay.org/main.htm

For more information about the Tuolumne River Watershed, please visit the Tuolumne River Trust Web site, at: www.tuolumne.org

For more information about the Sierra Club, Loma Prieta Chapter's efforts on behalf of our regional water system and watersheds, please visit <http://www.lomaprieta.sierraclub.org/WaterSustainability.html>, or contact Bill Young at 650-390-8494, bill.young@sierraclub.org