TO: BOARD OF DIRECTORS

FROM: BRUCE BUEL BBB

DATE: OCTOBER 5, 2007

AGENDA ITEM
E-3
OCT. 10, 2007

RECEIVE DRAFT WATER CONSERVATION PROGRAM

ITEM

Receive draft Water Conservation Program, edit draft and set date for public hearing [ADOPT RECOMMENDATION].

BACKGROUND

NCSD initiated development of a Water Conservation Program in 2006, your Honorable Board held initial hearings on a previous rough draft program, and created an Ad Hoc Water Conservation Committee (Mike Winn and Larry Vierheilig) to guide the process. The Ad Hoc Committee has met frequently with NCSD's new Water Conservation Coordinator Celeste Whitlow and with District Legal Counsel. Attached is the draft Water Conservation Program written by Celeste Whitlow based on the guidance from the Ad Hoc Committee.

Celeste Whitlow is scheduled to present the draft plan at this meeting. Staff is seeking feedback and edits to this draft so that a revised draft can be scheduled for a subsequent public hearing. Staff also requests that your Honorable Board address at least the following water conservation policy issues at this meeting or at a subsequent meeting:

WCP Policy Issues

1. Should NCSD implement a Water Conservation Program with a goal of reducing overall consumption by 15% (not each account) within three years?

2. Should NCSD adopt a policy that Water Conservation savings shall be credited only to ratepayers within District Boundaries, not to serve annexations from outside or land use changes inside the District boundaries?

3. Should NCSD take a leadership role in proactively encouraging NMMA Purveyors and Well Users to achieve a 15% use reduction?

4. Should NCSD adopt a three-tier inclining block rate structure for all residential customers (single family and multiple-family) to encourage conservation?

5. Should NCSD adopt a rate design that rewards frugal users for continuing to conserve water?

6. Which of the Optional Programs should NCSD implement if the CORE WC PROGRAM is implemented?

7. What process should NCSD follow to track the success of the adopted WC Program?

RECOMMENDATION

Staff recommends that your Honorable Board receive staff's presentation, discuss the draft program, provide edits to revision and set a public hearing for the Board's November 14, 2007

Meeting. Following are staff's recommendations regarding the seven policy issues set forth above:

WCP Policy Issues

1. Should NCSD implement a Water Conservation Program with a goal of reducing overall consumption by 15% (not each account) within three years?

   STAFF RECOMMENDATION: Yes, staff believes that Water Conservation is the most cost effective option to partially resolve the District's water supply imbalance and that the State will require NCSD to implement an effective Water Conservation Program as part of any grant award. Additionally, the Board adopted this goal as part of NCSD's Urban Water Management Plan 2005 Update.

2. Should NCSD adopt a policy that Water Conservation savings shall be credited only to ratepayers within District Boundaries, not to serve annexations from outside or land use changes inside the District boundaries?

   STAFF RECOMMENDATION: Yes, staff recommends that the Board use the 15% savings to offset the amount of new supplemental water developed by the District. By developing less new water, NCSD will save both the capital cost of that portion of the project as well as variable costs associated with operations.

3. Should NCSD take a leadership role in proactively encouraging NMMA Purveyors and Well Users to achieve a 15% use reduction?

   STAFF RECOMMENDATION: Yes, staff believes that the District is the logical catalyst to encourage participation by the other purveyors. Following adoption of an effective District Water Conservation Program, staff recommends that the District coordinate with the other purveyors and report back with results to the Board. Staff anticipates that the NMMA Technical Group can also be used to explore these issues once it is formed.

4. Should NCSD adopt a three-tier inclining block rate structure for all residential customers (single family and multiple-family) to encourage conservation?

   STAFF RECOMMENDATION: Yes, staff believes that a multi-tier inclining block rate structure is essential to achieving a meaningful reduction in demand amongst larger users and it should be implemented when NCSD next adjusts its water rates. The research detailed in the Draft WCP shows that rates are the most effective practice in reducing demand and that all other practices rely on the rates to motivate the consumer. Bob Reed has demonstrated that if the relatively small number of customers who use more water than one standard deviation above the median were to reduce their consumption to one standard deviation, then total demand would drop by 14%. Staff further believes that applying the multi-tier inclining block rate structure to all residential classes will be more equitable than the current structure and that the program will have more credibility.

5. Should NCSD adopt a rate design that rewards frugal users for continuing to conserve water?

   STAFF RECOMMENDATION: Yes, staff believes that reducing the Base Charge will encourage frugal users to stay within the first tier allowance, thus saving water where there is the greatest number of customers. In addition, reducing the base charge shifts a greater percentage of the revenue collected into the commodity charge segment of collections, thus further promoting the impact of the inclining block rate structure.

6. Which of the Optional Programs should NCSD implement if the CORE WC PROGRAM is implemented?

   STAFF RECOMMENDATION: Staff believes that the High Efficiency Clothes Washer Rebate program, the Indoor Plumbing (Non-Toilet) Retrofit Program, and the Irrigation efficiency Equipment Program offer the best return for funds invested. Additionally, staff recommends that a series of pilot programs be implemented, starting with the xeriscape/turf replacement and ET-Controller Rebate Measures.

7. What process should NCSD follow to track the success of the adopted WC Program?

   STAFF RECOMMENDATION: Staff recommends that the Program be evaluated twice per year – once in spring when the District reviews the April 1 Water Storage Calculation and once in fall after the peak summer use period. Each review should evaluate the change in consumption per connection for the prior 12 month period along with details on program implementation.

ATTACHMENTS

- Draft Water Conservation Program

T:\BOARD MATTERS\BOARD MEETINGS\BOARD LETTER\BOARD LETTER 2007\WCP Preview.DOC

Nipomo Community Services District

Water Conservation Program

Saving water now for Nipomo's future...

Nipomo Community Services District

President	Michael Winn
Vice President	Larry Vierheilig
Director	Cliff Trotter
Director	Ed Eby
Director	Jim Harrison
General Manager	Bruce Buel
Conservation and Public Public Outreach Specialist	Celeste Whitlow

October 2007

This page intentionally left blank.

I. Table of Contents

II. Table of Charts, Graphs, Tables

III. Executive Summary

(The Executive Summary is a very brief overview of the proposed water conservation program. For the specifics and details of the program, please refer to the complete report.)

INTRODUCTION: The District faces several challenges in meeting the water demands of its customers, including having only groundwater as a source of water for the District, consumption of groundwater exceeding the rate of natural recharge, and years of delay before supplemental water will be delivered to the District.. Reducing customers' water demands is the only way to meet the short-term need to save water, and the cheapest way to moderate long-term water needs.

The water conservation program goal is to achieve an overall 15% reduction in water use by the District. Other benefits to be achieved from this conservation include the maintenance of the District's primary water source, the Nipomo Mesa Management Area groundwater; fiscal savings from decreased need to buy/produce water, and from decreased operating and maintenance expenses; fiscal savings from decrease, delay or deferment of water and wastewater facility upgrades, repairs and expansions; decrease in environmental damage by decreasing byproducts from energy used to obtain and deliver water; and decrease in stormwater systems pollution due to decreased fertilizer- and pesticide-laden runoff from overwatering landscapes.

WATER CONSERVATION PROGRAM: The proposed water conservation program has been designed to achieve the most savings with the least funding. The criteria for including a measure in the program were: amount of potential water savings; cost to the District (savings:cost ratio); years to pay off the initial investment in equipment or rebate; and ease of designing, promoting and administering the program or measure. Once the measures were analyzed, they were given ranking scores.

The program is divided into two basic parts: the "core measures" and the "non-core measures." The core measures are an integrated set of water conservation measures that are designed to support each other and, as a unit, support the non-core measures. The core measures include public outreach and education, advertising, workshops, technical assistance (leak detection and water audits), and a conservation-based multi-tiered water rate structure. Due to the way that the core measures amplify the impact of each other, they are an example of the whole being greater than the sum of the individual parts. The core measures are designed to be used intact; splitting them apart and only using some of them would greatly decrease the overall efficiency and savings of the program.

The non-core program contains measures that are not all essential to the success of the program. Indeed, it is not anticipated or desired for the Board to accept all of the non-core measures. For some measures (those which would be expensive and difficult to implement) it is recommended that a small pilot program be performed first. Non-core measures included rebates for plumbing retrofitting, high-efficiency clothes-washer rebates, a cash-for-turf replacement program, and rebate/provision of "smart" evapotranspiration-based irrigation system controllers. It is recommended that the latter two measures first undergo small pilot programs before launching larger programs.

RECOMMENDATIONS: The water conservation program measures recommended are as follow:

Core Program Measures: It is recommended that all of the core measures be adopted. These include a three-tiered, inclining block, conservation-based rate structure, public education and

outreach/ advertising measures, and technical assistance measures, the combination of which is estimated to be able to produce approximately 11% water conservation savings over all categories.

Non-Core Measures Program: It is recommended that the following three non-core measures be adopted, the combination of which will produce another 3.5% water savings: high-efficiency clothes washer rebates; indoor plumbing (non-toilet) retrofit and leak detection aids; and irrigation efficiency equipment.

SUMMARY: The NCSD and its customers are facing water challenges that can only be met with proper planning and customer support. Water conservation plays a vital role in meeting these challenges. Fortunately, there is a wealth of information and statistics compiled by those who have been down this road before us, and we are now on notice regarding the anticipated impending "permanent drought" that may affect us as early as 2050, the anticipated multi-year drought in the nearer future, and the insecurity of the provision of State water. Throughout the State of California, politicians and managers of water suppliers are taking the lead in initiating plans now for the events predicted to occur in the future.

People in the future will look back on those making water policy decisions at this crucial point, and will view us as either heroes or failures. By moving forward now in a decisive manner, we stand a chance of being regarded as the former and not the latter and, more importantly, secure the District's customers' rural way of life in a sustainable manner.

IV. Introduction

"Nothing so needs reforming as other people's habits."
--Mark Twain

The Nipomo Community Services District faces both immediate and long-term challenges to providing water to its customers. The dramatic 12% decrease in above-sea-level groundwater stored in the Nipomo Mesa aquifer from April 2006 to April 2007 dictates immediate concern for protecting the long-term viability of the aquifer. The recently released Intergovernmental Panel on Climate Change report released in February of this year predicts a drastic change in climate, with California facing a "permanent drought" by as early as 2050.[1] According to an article published 8/10/2007 in the journal *Science*, starting in 2009 at least five out of ten of the following years are expected to be hotter than 1998, the warmest year recorded.[2]

Water suppliers throughout California are aggressively asking for increased water conservation from their customers[3,4,5,6,7] and some are instituting new ordinances relating to amount and type of irrigation for new construction, "smart" irrigation controllers, and golf course turf and irrigation.[8] For at least one California county, a state of water emergency has been declared,[9] and another county has asked for federal disaster aid with an emergency declaration possible in the very near future.[10]

In addition, reliance on State Water may not be a prudent decision as the reliability of the source may be in question. Because of the environmental litigation regarding the Delta smelt, a 30%-to-50% reduction in water transfers going south of the Delta may be ordered by the court.[11] The condition of California's levee system makes it vulnerable to failure from flooding or earthquake, contaminating the Delta system (from which much of the State water going south is derived) with saltwater from San Francisco Bay.[12] FEMA is now questioning whether some of the Delta levees can withstand the next flood.[13]

---

[1] Alan Zeremba, B. Boxall. *Permanent Drought Predicted for the Southwest.* Los Angeles Times. 04/06/2007.
[2] Kerr, Richard A. *Humans and Nature Duel Over the Next Decade's Climate.* Science 10, August 2007, 317:746-747.
[3] Rockenstein, Denise. *Citizens asked to reduce water use as Lower Lake faces shortage.* Lake County Record Bee, 08/28/2007
[4] *Metropolitan Launches Serious Water-Saving Message in Most Extensive Outreach, Education Effort in District. History.* Businesswire.com, 08/06/2007
[5] Halter, Reese. *California Focus: State Likely Faces a Drier Future.*
[6] Simmons, Ann. *Palmdale Water Board Orders Conservation Measures.* Los Angeles Times, 08/30/2007.
[7] Duarte, Jesse *Water shortage hurts Upvalley vineyards; St. Helena's lower reservoir at less than half its capacity.* Napa Valley Register, 08/31/2007.
[8] Atagi, Colin. *New Plans to Curb Water Usage.* Desert Sun, 08/31/2007.
[9] Abrams, Jonathan. *Water Emergency is Declared in Riverside County.* Los Angeles Times, 07/20/2007.
[10] Hearden, Tim. *Supervisors Ask for Drought Aid.* Redding Record Searchlight 08/29/2007.
[11] Dobuzinskis, Alex. *Court Could Devastate Water Supply: Half of Southland's Iported Resources from North at Risk.* Los Angeles Daily News, 08/30/2007.
[12] *If the Levees Fail in California.* Business Week (www.businessweek.com), 08/20/2007.
[13] Miller, Inga. *Will Levees Hold? FEMA Unsure.* The Modesto Bee, 08/31/2007.

The combination of the Delta ruling and an anticipated multi-year drought has driven California politicians and water suppliers to initiate planning to meet their responsibility to providing water to constituents and customers.

According to California Governor Arnold Schwarzenegger, *"Due to climate change, we can expect a decrease in our snow pack by as much as 40 percent by the year 2050, which means more flooding in the winter and less drinking water in the summer. We can't afford to wait any longer. We need a water management strategy that tackles all our long-term water needs. That means increasing water storage, developing new conveyance systems, fixing the Delta, restoring key water resources and aggressively moving forward with conservation efforts... I want California to remain at the forefront of water conservation and be the model for the next generation of smart water users. That's why in my water infrastructure plan I've proposed California's largest investment in water conservation ever."*[14]

The recent court ruling regarding a probable significant decrease for six months of the year (June to December) of Delta water being pumped out to its water agency clients, combined with last winter's weak rainfall numbers and predictions for a multi-year drought, is causing many water agencies to put their customers on notice now: if significant voluntary conservation is not soon demonstrated, they can anticipate mandatory rationing in the future. Water managers throughout the state are leading the way in ensuring that they meet their responsibilities to their customers. Much of the San Francisco Bay area is introducing the specter of rationing, including Alameda County Water District (which gets 40% of its water from the Delta) and the Santa Clara Valley Water District (which gets 50% of its water from the Delta system).[15] Silicon Valley is also looking toward the possibility of mandatory water rationing, its first in 16 years.[16]

At least one city is investigating the feasibility of requiring recycled water use for selected residential, commercial and industrial developments. "Wastewater," said Santa Rosa Water Resources Planner Jennifer Burke, "is drought-proof and sustainable."[17]

The Metropolitan Water District is looking towards the possibility of rationing,[18] and that means that the water agencies supplied by MWD will have to pass that on to their customers. The general manager of Western Municipal Water District (which supplies the western half of Riverside County), John Rossi, said that some kind of mandatory conservation would be addressed. According to Tim Quinn, president of the Association of California Water Agencies, "The crisis is indefinite, and will last beyond the one-year court order."

Randy Van Gelder, general manager of San Bernardino Valley Municipal Water District, which imports Delta water for several cites, believes that the court decision will have a lasting impact, unlike the effect of a natural drought. Long before the court ruling, the Inland Empire was suffering from the effects of an eight-year drought impacting the Colorado River, with Sierra Nevada snow pack at its lowest levels since 1990, and 30% of normal snowfall in local mountains (water from which recharges the aquifers). If the worsening water situation persists, a number of Southern California areas may be adopting a rate structure that penalizes those who use over a certain level of water.[19] Mr. Van Gelder also indicated that, unless there is significant and substantial rainfall this

---

[14] *California Governor Schwarzenegger Pushes Compehensive Water Plan."* www.allamericanpatriots.com. 05/10/2007.
[15] Curiel, Jonathan. *Forced Water Conservation May Follow Dry Winter.* San Francisco Chronicle, 09/05/2007.
[16] Rogers, Paul. *Water Rationing Could Be on the Horizon.* San Jose Mercury News, 09/05/2007.
[17] McCoy, Mike. Santa Rosa May Force Use of Wastewater. Santa Rosa Press Democrat, 09/10/2007
[18] Dobuzinskis, Alex. *Court Could Devastate Water Supply: Half of Southland's Imported Resources from North at Risk.* Los Angeles Daily News, 08/30/2007.
[19] Bowles, Jennifer. *Ruling spurs 'great deal of uncertainty' over water supply.* Riverside Press Enterprise, 09/05/2007.

winter, authorities may turn to water rationing. Mr. Van Gelder said the anticipated decrease in rainfall and State Water deliveries might translate into less water to keep lawns green, and in a few years may produce restrictions on the amount of residential lawn allowed.[20]

The Los Angeles Department of Water and Power, faced with uncertainty about the reliability of State Water deliveries in the future, is focused on safeguarding their water supplies, and is preparing water rationing contingency plans. If rationing occurs in L.A. it will be a first for the city. David Nahai, president of Department of Water and Power commissioners, said "If that is what will be needed in order to safeguard our water supplies, well, so be it. But we'll have to see just what this plan is that Metropolitan Water District will be putting forward."[21]

The impact on agriculture of the uncertainty of water deliveries is predicted to be significant. Many farmers are concerned that the amount of reduction of State water delivered may make growing crops unprofitable, leading to a reduction in work force. According to Greg Zlotnick, special counsel for the Santa Clara Valley Water District, which provides Delta water to 1.7 million people in Silicon Valley, "It's our quality of life that is at stake and the regional economy as well."[22]

Another scenario worrying economists is the impact on local economies should farmers, faced with the questionable reliability of State water deliveries, decide to sell their water allotment to water-strapped cities. It is predicted that these cities will make big-money offers for the water. Fallow fields, especially in San Joaquin Valley which is already economically depressed, would decimate local economies.[23]

California is looking to its politicians to solve California's water crisis. A Chico Enterprise Record editorial claims that the water shortage has a silver lining: forcing politicians to do what it takes to definitively solve this long-standing problem: "Let's see. Perhaps the court's forced cutbacks will force the politicians' hand. Maybe they'll finally have to quit ignoring the warning signs and face up to the problem. Maybe they'll spend money on delta restoration. Maybe they'll force cities and farmers to do more in the way of recycling water and conserving water...."[24]

At least one water supplier, San Lorenzo Valley, has already implemented mandatory restrictions. After requests for voluntary conservation of 20% were not successful, San Lorenzo imposed mandatory restrictions, including banning irrigation during the daytime. The next step, said Jim Mueller, the agency's director, would be water rationing and fines.[25]

Locally, the Nipomo Mesa has been the perennial recipient of a large part of new residential development in the San Luis Obispo County. Despite the County's certification of a Level of Severity III (use exceeds resource) for water resources in the Nipomo Mesa Management Area, construction of new developments continues. Under consideration now by the County is the State affordable-housing mandate, and the County is considering targeting the Nipomo Mesa with 80% of the new multi-family, high-density affordable-housing.

Many of the District's customers, aware of the limited water availability, look at the possible large increase in new housing in the Nipomo Mesa and the requests to voluntarily conserve water, and believe their sacrifices in conserving water will be used to provide water for new development. It is recommended that Board address this issue if full public support of a water conservation program is desired.

---

[20] Edwards, Andrew. Time to Conserve Water is Now, Officials Say. Inland Valley Daily Bulletin. 09/09/2007

[21] Contingency Plans Drawn Up for Possible SoCal Water Rationing. Associated Press. 09/06/2007.

[22] Weiser, Matt. *Less Delta Water Means Dry Times.* Sacramento Bee. 09/06/2007.

[23] *Politicians Frozen Amid Water Crisis.* Chico Enterprise Record. 09/07/2007.

[24] *Politicians Frozen Amid Water Crisis.* Chico Enterprise Record. 09/07/2007.

[25] Associated Press. *Water Restrictions: Mandatory Water Restrictions for San Lorenzo Valley Residents.* 09/06/2007.

District customers would be more enthusiastic about conserving water if they knew that their sacrifices would not simply be used to provide water for new housing.

The target water conservation goal is an overall 15% for the District's customers, using 2006's consumption figures as the starting point (.65 AF/Y per account). The year 2006 was chosen because it is the last year for which complete water consumption statistics are available. The average per-account usage in 2006 is also very close to the average per-account usage for the years 2001-2006 (.68 AF/account), and so is viewed as representative of a longer-term pattern for the District's customers.

It is believed that a goal of 15% water conservation is a reasonable goal that can, with the District's support, be achieved with a reasonable amount of customer effort.

In addition, 15% is:

- The stated goal in the District's *2005 Urban Water Management Plan.*
- A median average goal from the Kennedy/Jenkins report.
- Recommendation from the Hand RCD Study (to be achieved by 2010).

Much of what humans do on a daily basis, including how they use water, is done by habit. For the NCSD to meet the challenges we face, we must convince our customers to use less water, which will require a multi-faceted approach by the District to help them change their water-use habits.

While the District's customers use only a portion of the Nipomo Mesa's groundwater, the District, by taking the leadership role in responsible stewardship of this limited resource, stands a better chance for setting a responsible course for the future of the aquifer underlying the Nipomo Mesa.

Water saved by conservation practices can be a dependable, cost-effective source of supplemental water.[26,27] It saves considerably for utilities in capital and operating costs, and for customers in the amount they pay for water.[28]

By implementing a goal-oriented, cost-effective Water Conservation Program, which is practical in design, the District can not only best serve its customers, but place itself at the forefront of resource stewardship by protecting Nipomo's water resource—and, therefore, Nipomo's economic viability—for future generations.[29]

BASICS OF THE PROGRAM:

All statistics and analyses of District water production and consumption are based on the annual California Department of Water Resources Public Water System Statistics which the District must file with the State each year.

The excerpts of referenced sources at the end of this document are provided as examples of information given in the sources, and not meant to provide detailed information of all referenced sources in this document.

---

[26] G. Henderson. *City of San Luis Obispo 2006 Water Resources Status Report.* 2006
[27] Vickers, Amy. *Handbook of Water Use and Conservation.* Amherst, MA: Water Plow Press. 2001.
[28] Ibid.
[29] Troxel, Wyatt. *Saving Water Now a Critical Issue.* www.dailybulletin.com. 08/26/2007.

Projections of monetary values of costs and benefits reflect an annual 3% increase. Projections of number of meters and estimated population are based on the average percent-change (increase) from 2003 to 2006, a 3.22% average annual increase.

Estimates on amount of savings to anticipate from a measure are based on existing studies, adjusting for Nipomo's climate when necessary (i.e., when using the estimates from a landscape study based in southern Nevada, proportional analysis was used to arrive at figures that would reflect Nipomo's much lower evapotranspiration rate). In all cases, the estimates based on other studies were actually lower than could have been justified, with the desire to be more conservative in estimations of savings.

Estimates of a conservation measure's percentage of shared program costs are based on estimations of percentage of those costs that will be attributable to that measure.

The FY2008 budget for the water conservation program is based on previous budgets for water conservation and current estimates of amount of resources needed to provide the support the District's water customers need in meeting the program's conservation goals. For all measures presented, costs for the initial year of the program are much greater than the costs of subsequent years. For some measures (toilet and other hardware installations), the costs are required only at the initiation of the program, when the actual costs for promoting the measure to customers, and purchase/rebates, are provided to the customers. After the initial installation of the hardware, subsequent years until the end of the expected life of the hardware (up to 20 years) are profit.

There are two basic categories of water-conservation measures recommended:

1. **Core program measures.** A grouping of measures which are the bedrock support upon which rests the success of the other program measures. The non-core water conservation measures are designed based on the core program measures remaining intact. The core program measures are meant to be implemented together and intact. The core program measures depend upon each other, and the other program measures depend on the core program measures. Public education, advertising, conservation-based rate pricing and technical assistance to customers are all part of the core program measures.
2. **Non-core-program measures ("stand-alone" measures).** These are measures that are not dependent on each other, but are dependent upon the core program measures. It is not recommended, desired, or anticipated that all of the non-core measures will be implemented. This is a category where analysis and study will help the District select which measures will be implemented, and when they will be implemented.

The core elements support all other measures; therefore, costs for the core elements are apportioned to each of the non-core elements. The percentage of each non-core element's share-of-core-elements costs is based on an estimation of the amount of support services each non-core element will require. For some non-core elements (e.g., showerhead replacement), all costs are in the very beginning of that element's program, and follow-up over the years of the program is not required. For some non-core elements (i.e., those that involve changing of habits or behaviors), yearly follow-up is required as reinforcement of the gains of the element.

A conservation goal of an average15% has been chosen by the District. This goal is reasonable, and it is believed that it can be obtained with reasonable effort by the District and its customers.

The non-core elements of the program have been selected based on the following criteria:

1. The amount of potential water savings.
2. Cost to district (savings:cost ratio).
3. Years to pay off initial investment in equipment or rebates.

4. Ease of designing, promoting and administering the program for the measure.

To attain this goal, non-core elements have been proposed and rated as to benefit to the District. The non-core elements were chosen for their ability to make it easier for the District's customers to conserve water.

Rebates or outright purchase of equipment for customers reap many benefits.

- Rebates encourage customer participation in the program. Designing, launching and administering a water conservation program requires a great deal of staff time and effort, as well as funds for public-education and advertising support of the program. Programs that do not include rebates, or which have rebates in amounts that aren't sufficient to generate enough customer interest to get them to participate, end up spending staff time and effort, and supportive funding, with very little return.
- A well-designed and planned water conservation program produces water savings sufficient to warrant the water supplier's funding of customer rebates. The rate of return of a strong rebate program has inspired water suppliers all over the country to invest in these measures.
- Rebates communicate to all customers, even those not participating in the program, the value and efficacy of the recommended measure (i.e., the District would not be offering a rebate if the measure was not believed to be of value in saving water and funds).
- Rebates are a strong focal point of advertisements. Even a small pilot program, especially of a measure that has not previously been used in the region, can generate media interest and publicity. This, in turn, communicates to customers the value of the program.
- The amount of the rebate influences customers' willingness to participate in the rebate program. Since the majority of shared program costs (public education, advertisement, etc.) occur in the initial years of the measure, it is important for the amount of the rebate to be sufficient to encourage participation; otherwise, the shared program costs are not efficiently used, and the non-core program measure will not be optimally utilized.

A total of 13 core measures and 8 non-core measures are presented. It is not anticipated nor desired of the Board that they approve all of these measures. With adoption of the intact core program measures, it is anticipated that with only the high-efficiency clothes-washer rebate program, non-toilet hardware retrofit measures, and small-item irrigation efficiency items the District will be able to come very close to meeting the goal of 15% water conservation. The programs for these measures would be easily accomplished.

While the selection or omission of non-core elements can be flexible, core elements cannot be omitted without crippling the results of the non-core measures chosen and funded by the District. Without the core elements of the program, the District will have to spend more on its programs to get less.

If the core program is not accepted intact, then other non-core measures will need to be chosen to accomplish enough water conservation savings to justify the water conservation program. Some of these non-core measures will require a great deal of staff time to accomplish. Funding for extra staff has not been included in the projected costs, but can be provided at the Board's request.

If the Board decides to omit portions of the recommended program, the Board is respectfully requested to select other measures to provide the needed savings and serve the same role in the overall program as the omitted core measures.

V. PROGRAM GOALS

1. Maintain the long-term health of the District's primary water source, the Nipomo Mesa sub-area of the Santa Maria Groundwater Basin.
2. Staff-recommended water use reduction of 15% for the District.
3. Gain support of Nipomo residents for the water conservation program.
4. Share the burden and costs of water conservation equitably across all customer types.
5. Educate the community on Nipomo's unique water balance, the link between use and supply, and the consumers' responsibility for protecting groundwater quality.
6. Promote awareness regarding Nipomo's limited water sources, the dependence on the Nipomo Mesa aquifer for 100% of water delivered to customers, and the risk of contamination by seawater should saltwater intrusion occur.
7. Keep the community informed regarding the status of the multifactorial conditions that impact water supply in the Nipomo Mesa.
8. Provide education and support for the public in water-efficiency measures for indoor and outdoor water use.
9. Provide leadership by example by demonstrating practical and attractive water-efficient devices and landscapes on District property.
10. Avoid, defer or decrease of expansion and costs of water and wastewater facilities.
11. Reduce energy combustion byproducts that play a role in air pollution and climatary change.
12. Reduce costs and impact on the environment.
13. Enforce existing ordinances, and implement new ordinances as required.
14. Comply with all regulations and ordinances.
15. Accurately assess success of program by program monitoring, economic analysis, and revision, as necessary.
16. Increase the District's credibility as a resource steward.

VI. OVERVIEW OF BENEFITS FROM WATER USE EFFICIENCY

BENEFIT RECIPIENT	TYPE OF BENEFIT	DESCRIPTION OF BENEFIT
Water Utility	Supply System O&M	Short- and long-term O&M costs reduced secondary to lower energy expenses related to reduced pumping and use of chemicals in water treatment and disposal.*
Water Utility	Supply System Capital Invest.	Capital facilities can be deferred or downsized.
Water Utility	System Reliability	Less water purchased from other water purveyors/sources, and more reliability of supply yields, depending on available capacity.
Wastewater Utility	System O&M	Short- and long-term reductions in O&M costs resulting from lower energy expenses because of reduced loading on collection systems, pumping volume, aeration, and chemical use in wastewater treatment.
Wastewater Utility	Disposal System Capital Investment	Capital facilities for land disposal can be deferred or downsized. There are additional benefits when wastewater discharge restrictions are present.
Environment	Quality Enhancement	Decreased need for dams and reduced construction disturbance in natural waterways of third-party suppliers who provide supplemental water.
Environment	Quality Enhancement	Decreased in pollution entering stormwater systems secondary to decreased fertilizer- and pesticide-laden runoff from overwatering landscapes.
Environment	Quality Enhancement	Reduced green solid waste to landfill with reduction of overwatering and excessive growth of plants/turf; reduced pollution from trucking; reduced landfill space.
Environment	Quality Enhancement	Higher stream flows for fish and wildlife habitat of third-party suppliers who provide supplemental water.
Environment	Quality Enhancement	Reduced pollution, less addition to landfill due to deferred or downsized of construction of capital facilities.
Environment	Quality Enhancement	Deferment or downsizing of desalination plant, deferring or limiting impact on ocean wildlife and habitat.
Community	Aesthetic Quality	Diminished aesthetic effects on waterways from avoided or deferred capital projects.
Community	Environmental Justice	Fewer social equity issues with facility concerns.
Community	Public Health	Leakage reduction programs lower risk of contamination in the distribution system; water supply reliability supports health and hygiene.
Community	Economic	Increased economy on the same resource, creation of water conservation jobs, customer savings in utility bills.
Community	Economic/Political	Fiscal savings from avoided or delayed new capital expenditures or debt.

*The Electric Power Research Institute estimates that 4 to 5% of all electricity used in the U.S. is used for pumping water[30]

[30] *AWWA M50 Water Resources Planning Manual of Water Supply Practices.* American Water Works Association. June 2001.

VII. Water Use Characteristics

1. PRODUCTION:

1.1. Production, Non-Revenue Water, and "Unaccounted Losses."

For the years 2001-2006, the District produced a total of 16,197.78 acre-feet of water (average of 2699.63 acre-feet/year), delivered a total of 15,202.42 AF (average of 2533.74), and percentage of loss was a total of 995.36 AF (average of 165.89). The percent losses averaged 6.21% per year (Table 1).

Table 1: PRODUCTION and LOSSES 2001 - 2006

Year	Total Produced	Total Delivered	System Losses	Losses as %of Prod	% Change
Yr.2001	2395.02	2238.07	156.95	6.55%	
Yr.2002	2630.79	2340.53	290.26	11.03%	9.84%
Yr.2003	2743.33	2567.08	176.25	6.42%	4.28%
Yr.2004	2907.83	2810.24	97.59	3.36%	6.00%
Yr.2005	2794.04	2638.51	155.53	5.57%	-3.91%
Yr.2006	2726.77	2607.99	118.78	4.36%	-2.41%
TOTALS	**16,197.78**	**15,202.42**	**995.36**		**13.80%**
AVERAGE	**2699.63**	**2533.74**	**165.89**	**6.21%**	**2.76%**

For accurate financial planning, projections and estimations of cost are made by the marginal (next-increment) cost.[31],[32] Using the $2000/AF estimated next-increment cost of water, the yearly average monetary loss from non-revenue water and "unaccounted-for losses" in the production-distribution system is $331,780.00.

The total percentage increase in production from 2001-2006 was 13.85%, and the average production increase each year was 2.31%.

1.2. Status and reliability of water source.

The District's sole source of water is groundwater from the Nipomo Mesa aquifer. The District currently uses eight active wells, one active well in Nipomo Valley, and one standby well. The cost for the District to pump and deliver groundwater to District customers is approximately $500/AF.

The aquifer under the Mesa has been in a steady pattern of consumption-greater-than-recharge for several years. Over the years the level of groundwater stored in the aquifer has dropped 58'. The District, along with approximately 800 other parties, has been involved since July 1997 in litigation over the Santa Maria Groundwater Basin pumping rights. A majority of parties, including the District, have entered into a Stipulated Agreement which, among other things, requires the District to import 2500 acre-feet/year of supplemental water toward mitigation of a long-term overdraft of the aquifer. The District's plans are actually for 3000 AF/Y of supplemental water, with the excess going to meet the demands of current customers.[33] Currently it is estimated that the time to deliver this supplemental water to the Nipomo Mesa is three-plus years if negotiations are successful; eight to ten years otherwise.

---

[31] HDR Engineering, Inc. *"Utility Billing System Enhancements, City of San Luis Obispo, Volume 1 – Utility Rate Structure Evaluation."* March 2006

[32] Stavins, Robert. *As Reservoirs Fall, Prices Should Rise, an Economic Perspective.* Environmental Law Institute (The Environmental Forum, November/December 2006.

[33] *Nipomo Community Services District Draft Ordinance, Chapter 3.24, Emergency Water Shortage Regulations (Third Draft).* April 2007.

To meet the District's long-term needs, and to establish a long-term reliable source of potable water, the District is investigating the construction of a desalination plant. It is estimated to take 10 years for water from desalination to be available.[34]

Nipomo's summer temperatures average 75 degrees, and winter temperatures 38 degrees. The average rainfall for Nipomo is 16.82" per year. In the 2006-2007 rain season, Nipomo received only 6" of rain (35.6% of normal). California may be entering a multi-year drought. It is predicted that in the decade starting in 2009 that five of the following ten years will have temperatures higher than current record temperatures.[35] In addition, it is predicted that the American Southwest may enter a "permanent drought" as early as the year 2050[36]. In a Department of Water Resources hearing on 08/23/2007, experts testified that in Southern California last winter's rainfall was the lowest since rainfall records were started in 1877. Global climate change will have a dramatic impact on California's water resources, reduce the Sierra snowpack by at least 25% by 2050, decrease spring runoff into the Sacramento-San Joaquin Delta, and contribute to more severe droughts. The consensus of opinion of experts who testified 08/23/2007 at a hearing of the State Water Resources Control Board was that increased conservation and better use of local groundwater and reclaimed water were the best strategies to deal with these challenges.[37]

The District has contracted with Boyle Engineering to assess the supplemental water options available. At this time, the original eight supplemental-water options have been narrowed down

Table 2: INCREASED CONSUMPTION
January-April* 2006 and 2007

Type	Jan-April 2006 (Acre-Feet)	Jan-April 2007 (Acre-Feet)	Difference	Jan-April 2006 %Increase	2006 Consum. (Acre-Feet)	Projected 2007 Consum**
SFR	431.79	610.76	178.97	41.45%	2010.23	2843.44
MFR	28.82	33.94	5.12	17.77%	93.83	110.50
CI	30.43	30.46	0.03	0.10%	104.19	104.29
Landsc	59.74	75.90	16.16	27.05%	298.38	379.09
Other	38.19	21.28	-16.91	-44.28%	84.92	47.32
AG	3.27	5.26	1.99	60.86%	16.44	26.44
TOTAL	**592.24**	**777.60**	**185.36**	**31.30%**	**2607.99**	**3511.09**

*There is a two-month delay in the bimonthly billing cycle. Example: Consumption billed in March is actually for January.
**Based on increased rate of consumption from January-April 2007.
SFR= Single-family residence
MFR=Multi-family Residence
CI=Commercial, Institutional (businesses, schools)
Landsc=Large landscape accounts
Other=NCSD facilities, construction hydrant-water use
AG=Agriculture

[34] *Evaluation of Supplemental Water Alternatives-Technical Memorandum No. 1, Constraints Analysis.* Boyle Engineering, June 2007.
[35] Kerr, Richard A. *Humans and Nature Duel Over the Next Decade's Climate.* Science 10, August 2007, 317:746-747.
[36] Alan Zeremba, B. Boxall. *Permanent Drought Predicted for the Southwest.* Los Angeles Times, 04/06/2007.
[37] Herdt, Timm. *Changes in climate tied to water supply.* Ventura County Star, 08/24/2007.

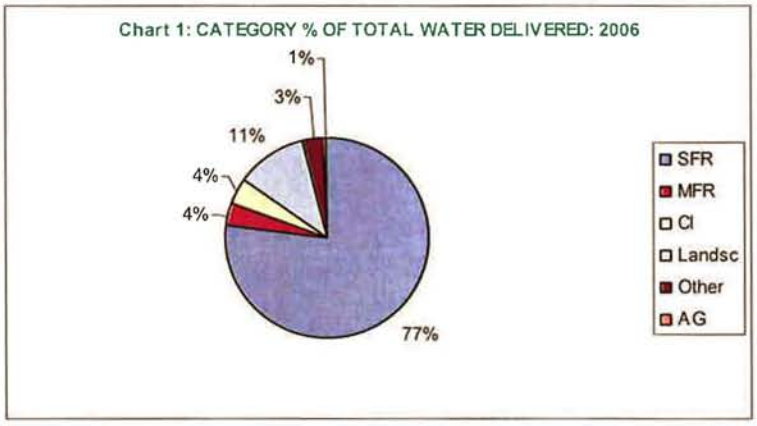
to two: obtaining, through an agreement with San Luis Obispo County, a portion of SLO County's allotment through a turnout in Nipomo (short-term solution), and building a desalination plant (long-term sustainable solution).

The estimated cost for desalination is $2000/AF plus the cost of purchase or lease of the land for the desalination facility, and time to completion of the project is estimated at between 6.5 and 10.5 years. The estimated cost for the Santa Maria/State Water allocation option is approximately $2000/AF,[38] and time to completion of project is estimated as three-plus years.

The District has contracted with Science Applications International Association (SAIC) for geohydrological study of the Nipomo Mesa. As part of this study it was ascertained that, between April 2006 and April 2007, the Nipomo Mesa aquifer had a 12% decrease in above-sea-level groundwater storage. Some wells were found to be pumping below sea level.

This puts the Nipomo Mesa aquifer at risk for saltwater intrusion and collapse. As the rate of overdraft (rate of water taken from the aquifer greater than the rate of nature's replenishment of the aquifer) continues and increases, the risk to the aquifer also continues and increases.

The rate of water consumption by District customers has increased since the 12% decrease in groundwater storage documented in April 2007. Comparing the months January through April in 2006 with the same months in 2007, the 2007 time period showed single-family-residence consumption increase of 41%, and total increase (all categories combined) of 31.3%. (Table 2) This contrasts with the average per-year percent increase in water consumption from 2001-2006 of 16.53%. (Table 3) If the percent-increase between January-April 2006 and January-April 2007 continues throughout 2007, the total consumption (all categories combined) for 2007 would be 3511.09 AF, 472 AF beyond what would have been expected based on the average %increase in consumption per year, 2001-2006.



If the aquifer beneath the Nipomo Mesa was to experience collapse or saltwater contamination, it would force the District to import all of the water necessary to satisfy the demand of District customers until a desalination plant, or other long-term source of water, was completed.

Depending on State Water for a water source is problematic. The amount of water delivered from the Colorado River has decreased 30% due to the decreased Sierra snow-pack last winter,[39] an average of 25% reduction in Sierra snow-pack is predicted by the year 2050,[40] and a major source of State Water, the Delta system, is at risk due to litigation over the Delta smelt (which may reduce by as much as 50% the amount of water sent south) and a degraded levee system which, if it fails, could result in saltwater contamination from saltwater intrusion from San Francisco Bay.[41]

---

[38] *Evaluation of Supplemental Wtaer Alternatives-Technical Memorandum No. 1, Constraints Analysis.* Boyle Engineering, June 2007

[39] Dobuzinskis, Alex. *Court Could Devastate Water Supply: Half of Southland's Imported Resources from North at Risk.* Los Angeles Daily News, 08/30/2007.

[40] Herdt, Timm. *Changes in climate tied to water supply.* Ventura County Star, 08/24/2007.

[41] *If the Levees Fail in California.* Business Week (www.businessweek.com), 08/20/2007.

1.3. Wastewater Recycling. Water recycling, also known as "water reclamation" or "water reuse," is the process of treating wastewater, and then storing, distributing, and using the recycled water. Recycled water, as a result of treatment of wastewater, is suitable for a controlled beneficial use that otherwise would not occur. Recycled non-potable water is recycled in semi-arid areas, such as California, where public policy emphasizes water recycling. Recycled non-potable water frees up large amounts of potable water previously used for activities such as landscape irrigation. In California, an average of 525,000 AF/Y of recycled water is used annually. In 2002, uses for recycled water included agriculture irrigation (46%), landscape irrigation and impoundment (21%), seawater barrier (5%), groundwater recharge (5%), and industrial use (5%). California State law encourages the development of water recycling projects to meet California's water needs (Water Reclamation Law, Water Code Sections 13500-13556).

Recycled water use has many benefits, including restoration of wetlands and marshes; defer or delay the impact of a drought by conserving potable water; improvement of soil by providing additional sources of water, nutrients and organic matter; provision of drought protection; and the social benefits of providing more jobs.[42]

Drawbacks of recycled water use include negative public perception, possibility of excessive heavy metals applied to soil, and the unintended use of recycled water for potable-water purposes due to human error.

Currently, in California, approximately 5 million AF/Y is being collected for recycling, and out of this amount approximately 14% ends up as recycled water.[43]

Recycling of water requires tertiary treatment of wastewater. The District's wastewater treatment facility currently treats to only a secondary treatment level. Therefore, an additional drawback for the District for recycling wastewater would be the costs of upgrading the facility to the tertiary level of treatment, and adding wastewater recycling functions to the facility.

Translating to District-relevant figures, projected for the years 2008-2027, over that period of time, if wastewater recycling were possible for the District, a total of 882.704 AF of the District's potable water would be saved (average 44.135 AF per year), saving approximately $2,518,629.54 in total (average $125,931.47 per year). The percentage of potable water freed up by the use of recycled water would be approximately 1.37%.

1.4. Summary: Comparing the amount of water produced to the amount of water delivered, over the last six years the District has had a yearly average of 6.21% in losses.

The District continues a long-term trend to draw more water from the aquifer than can be replenished by nature. In the last year, the amount of groundwater stored in the aquifer above sea-level has decreased by 12%. The District customers' water consumption increased between January-April 2006 and January-April 2007, and if the rate of increase persists throughout 2007, it is projected that the District's customers will use 3511.09 AF in 2007, an increase of 472.04 AF from that which would be expected based on the average increase per year from 2001 to 2006.

The District currently has one source of water, groundwater from the Nipomo Mesa aquifer. It will take at minimum three-plus years to get supplemental water to the District. Currently the

---

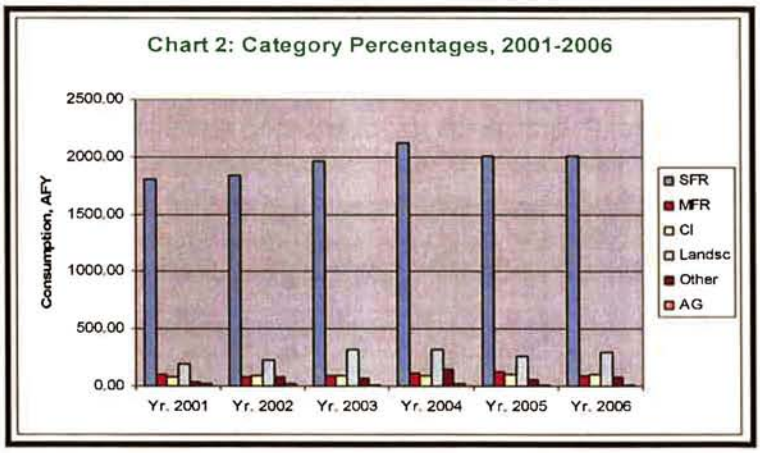
[42] *Water Facts (No. 23): Water Recycling.* California State Department of Water Resources. http://www.owue.water.ca.gov/recycle/docs/WaterFact23.pdf.

[43] Karajeh, Fawzi. State of California Department of Water Resources. Telephone call on 09/05/2007. (916) 651-9669.

plans for supplemental water are accessing State water (short-term) and construction of a desalination plant (long-term). The reliability of State water as a source of supplemental water is questionable due to a possible 30% to 50% reduction in delivery of contracted amounts secondary to the impact of a combination of climatary and legal problems. The District does not have the current capabilities to recycle wastewater into water suitable for non-potable uses.

The District's only current source of water, the Nipomo Mesa aquifer, because of overdraft, is at risk of contamination and collapse.

At this time the only option available for achieving a decrease in overdraft of the aquifer is to decrease consumption. This can only be achieved by water conservation.



2. CONSUMPTION:

2.1. Categories of Consumption.

The District's customers are split up into six categories:

Table 3: METERS AND USAGE BY CATEGORY (2006)

Category	# of Meters	AFY Usage	Avg. AFY/Meter
SFR	3423	2010.23	0.587
MFR	390	93.83	0.241
CI	96	104.19	1.085
Landsc	83	298.38	3.595
Other	varies	84.92	varies
AG	3	16.44	5.480

Single-Family Residence (SFR): SFRs are residences that traditionally have one house per lot, and one meter per parcel, although this is changing with the addition of secondary units to some residences. The SFR category has the largest number of meters (85.7%) in the District. The average use per meter is 0.587 acre-feet/year (AFY). This category in 2006 used 77% of the total District metered water consumed, 2010.23 AF/Y.

Multiple-Family Residences (MFR): Residences that have more than one residential unit per parcel (apartments, duplexes, etc.). Usually there is one meter for the entire parcel; individual units are not billed by the District. MFR meters are 9.8% of total District Meters. MFR category in 2006 used 3.6% of all metered water consumed by the District, 93.83 AF/Y.

Commercial / Industrial (CI): There are only 96 CI meters (2.4% of all meters) in the District. There are no Industrial meters and relatively few Commercial businesses. CI category in 2006 consumed 104.19 AF (4%) of all District water used.

Landscape (LANDSC): Landscape meters are for large areas of landscape (parks and landscape/turf areas of homeowners associations). There are 83 landscape meters (2.1%) in the District. In 2006 this category consumed 298.38 AF (11.4%) of all metered water used in the District.

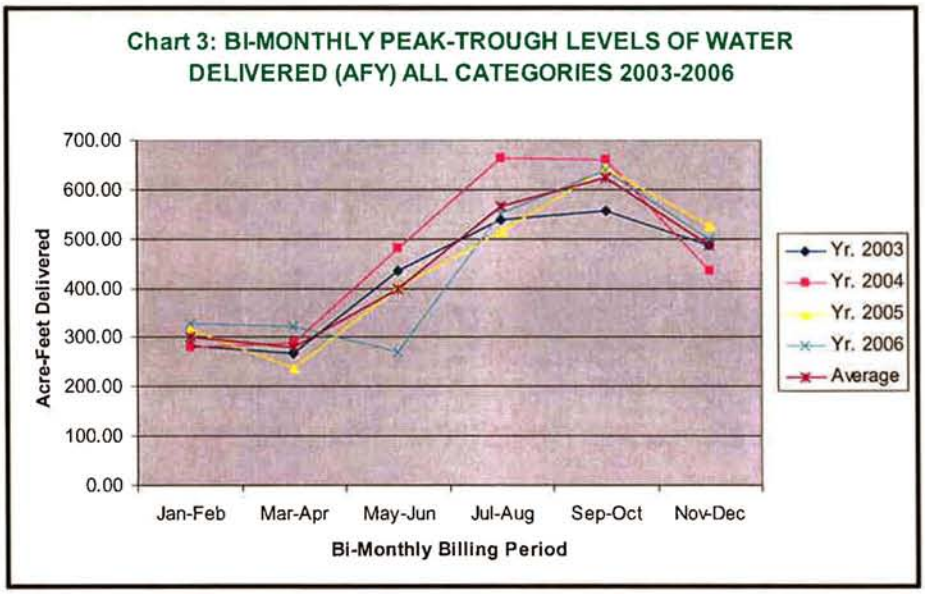
Other: The Other category includes the NCSD facilities and hydrant water used by construction projects, sprayed on bare soil during construction to decrease the amount of airborne dust. The number of Other meters constantly changes, due to the variability and temporary nature of the

construction hydrant-water use. The hydrant water is metered and charged at a flat rate. This category used 84.92 AF in 2006 (3.3% of metered water used in the District).

Agriculture (AG): The District only has 3 AG accounts (0.008% of all District meters). This category used 16.44 AF in 2006, or 0.63% of all metered water consumed in the District.

For the years 2001-2006, by far, the "single-family residence" (SFR) customer category used the highest percentage of the total used by all categories (77.8%). The "landscape" category was the next-highest percentage of total use (11.45%). (Table 3, Chart 1)

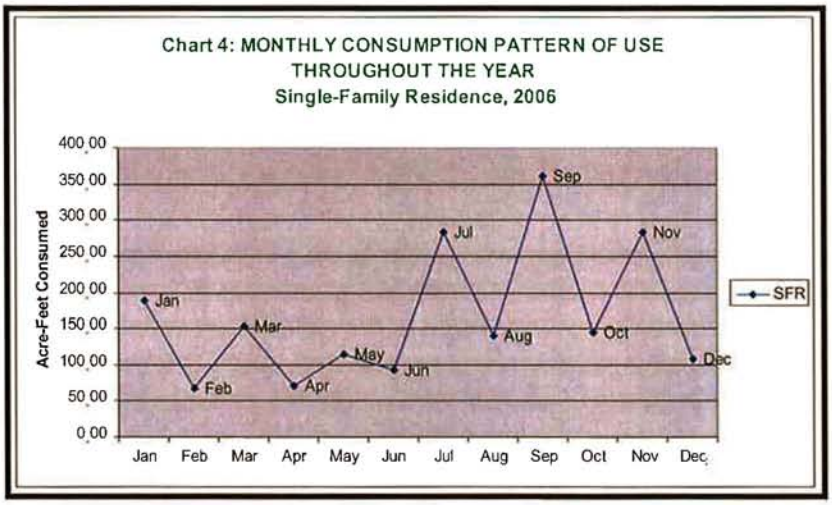
The District's water delivery (consumption) from 2001 to 2006 showed little relative change in the percentage-of-total figures for the customer categories. The largest increase over the six-year period was in the "Other" category (water for NCSD and Blacklake facilities, and hydrant water used for construction), which demonstrated a 136.28% increase over the six years (48.98 AF over six years, and a 22.71% average increase per year). The "agriculture" category showed a decrease of 12.79% from 2001 to 2006 (a decrease of 2.41 AF over six years, with an average decrease per year of 2.13%). The SFR category showed an 11.45% increase from 2001-2006 (206.59 AF over six years, and an average increase per year of 1.91%). (Table 3; Chart 1,2)



All categories, combined: For all categories, combined, the average per-meter usage was .684 AF/Y for the years 2001-2006.

2.2 Seasonal Patterns of Consumption.

Note: Because of the nature of the billing cycle, amounts billed in one billing cycle actually were for the previous two months. Example: A customer's bi-monthly bill sent in March is actually for water consumed in January and February.



The Nipomo Mesa is characterized by typical Mediterranean climate patterns, with the majority of the rainfall occurring in the cool winter months; summer months are generally warm and dry. The average annual precipitation is approximately 16.82" The warmest month of the year is September, and the coldest month of the year is December. (Table 4, Chart 3)

The District's bi-monthly billing cycle (one-half of the customers are billed each month) have a large disparity between the total amounts billed for the two months (reflected in Chart 4). For this reason, instead of selecting the peak and trough months for comparison, the peak and trough bi-monthly billing periods were selected.

Table 4: AVERAGE SEASONAL WATER USE, (% OF ANNUAL USE) 2003-2006 (AF)

Category	Avg.Lowest BiMonth	Avg.Highest BiMonth	Average, Total Use	Seasonal Use (%)
SFR	212.04	482.20	2045.88	62.18
MFR	15.21	20.79	105.6	86.42
CI	12.3	20.80	97.62	75.60
LANDSC	24.23	74.76	301.26	48.26
OTHER	12.74	22.72	89.47	85.44
AG	1.59	3.66	16.13	59.14
		TOTAL:	**2655.96**	**417.04**
		AVG.SEASONAL USE TOTAL:	**442.66**	**69.51**
Formula[44]: Average % Change =		100 x (lowest bimonthly period x 6). / annual use		

California water purveyors estimate the amount of a SFR's water consumption due to irrigation by assuming no irrigation is occurring during the lowest-use (trough, winter) months, when it tends to be cold and rainy. Therefore, the difference between the consumption in peak and trough months, or billing periods, is considered to be due to irrigation.

From 2003-2006, the average peak (high-use) bi-monthly billing period was September-October. The average trough (low-use) billing period was March-April. As would be expected, all categories showed an increase in use when comparing the winter bimonthly billings periods with the summer bi-monthly billing periods. For the years 2003-2006, for all categories combined, the average seasonal use (peak-season use as a percentage of total annual use) was 69.51%. Refer to Tables 5 and 7 for a breakdown of average seasonal water use by individual category. Refer to Table 5 for the formula used to determine seasonal use.

The average percent change—comparing peak (summer) use with trough (winter) use—for all categories combined, for the years 2003-2006, for all categories (both combined and

[44] *Water Conservation Programs—A Planning Manual (M52)*. American Water Works Association. 2006.

individually) showed an increase (Table 6). The average %increase for all categories was 108.38%. The three highest-increase categories were AG landscape-irrigation (208.54% increase), agriculture (130.19% increase), and single-family residence (127.41% increase).

Table 5: AVERAGE % CHANGE IN SEASONAL USE, 2003-2006

Category	Avg.Lowest BiMonth	Avg.Highest BiMonth	Average, Total Use	%Change
SFR	212.04	482.20	2045.88	+127.41
MFR	15.21	20.79	105.6	+36.69
CI	12.3	20.80	97.62	+69.11
LANDSC	24.23	74.76	301.26	+208.54
OTHER	12.74	22.72	89.47	+78.34
AG	1.59	3.66	16.13	+130.19
			Total:	+650.27
			Average %Change:	+108.38

Formula:

$$\text{Average \% Change} = \frac{100 \times (\text{Highest} - \text{Lowest})}{\text{Lowest}}.$$

For SFR, MFR and Landscape categories, both the average seasonal water use and the %increase figures indicate that there are large potentials to save water used in the landscape. Because of the variables involved in customers in the other categories, further analysis would be necessary to discern where water savings could be made. However, there are sizeable seasonal percentages in all categories; therefore, it is estimated that the other categories could realize some savings due to seasonal use.

Table 6: SEASONAL WATER USE, PEAKS AND TROUGHS, 2003 - 2006

Year	Category	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	TOTAL (AFY)
2003	SFR	152.89	68.38	129.42	76.85	205.25	116.77	280.13	138.74	280.27	133.54	278.30	103.93	1,964.47
2004	SFR	143.34	74.71	144.07	83.08	215.89	130.03	332.61	157.36	335.38	156.86	270.62	75.92	2,119.87
2005	SFR	170.34	81.08	119.33	70.62	181.89	119.49	288.09	126.06	364.29	151.33	309.02	107.40	2,088.94
2006	SFR	188.84	68.16	153.99	70.79	114.46	92.55	282.78	139.92	361.93	145.19	284.22	107.40	2,010.23
2003-2006 Total		655.41	292.33	546.81	301.34	717.49	458.84	1,183.61	562.08	1,341.87	586.92	1,142.16	394.65	8,183.51
Bi-Month Subtotal		947.74		848.15		1,176.33		1,745.69		1,928.79		1,536.81		
Bi-Month Average		**236.94**		**212.04**		**294.08**		**436.42**		**482.20**		**384.20**		

Year	Category	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	TOTAL (AFY)
2003	MFR	4.92	7.35	4.20	8.57	5.56	11.37	6.80	11.15	7.89	13.83	6.97	7.37	95.98
2004	MFR	4.99	9.49	5.33	9.10	7.48	12.27	9.17	12.53	8.51	12.07	11.80	8.01	110.75
2005	MFR	8.92	11.66	9.02	10.99	8.80	13.5	9.44	11.04	13.98	8.81	10.65	5.03	121.84
2006	MFR	9.38	4.11	9.54	4.91	9.51	4.86	10.98	5.82	11.91	6.17	11.79	4.85	93.83
2003-2006 Total		28.21	32.61	28.09	33.57	31.35	42.00	36.39	40.54	42.29	40.88	41.21	25.26	422.40
Bi-Month Subtotal		60.82		61.66		73.35		76.93		83.17		66.47		
Bi-Month Average		**15.21**		**15.42**		**18.34**		**19.23**		**20.79**		**16.62**		

Year	Category	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	TOTAL (AFY)
2003	CI	7.24	4.14	5.15	4.38	12.63	7	11.71	6.14	10.66	7.27	10.02	6.16	92.50
2004	CI	7.14	4.67	7.24	6.03	9.18	7.15	11.21	8.34	10.68	8.47	9.06	5.11	94.28
2005	CI	6.98	4.39	6.01	5.90	6.90	7.74	7.26	8.21	14.18	12.42	13.44	6.08	99.51
2006	CI	7.71	6.94	8.79	6.74	7.80	7.1	12.88	8.75	11.41	8.10	10.84	7.13	104.19
2003-2006 Total		29.07	20.14	27.19	23.05	36.51	28.99	43.06	31.44	46.93	36.26	43.36	24.48	390.48
Bi-Month Subtotal		49.21		50.24		65.50		74.50		83.19		67.84		
Bi-Month Average		**12.30**		**12.56**		**16.38**		**18.63**		**20.80**		**16.96**		

Year	Category	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	TOTAL (AFY)
2003	Landsc	15.86	15.92	16.28	14.48	34.03	35.06	35.03	31.80	36.17	36.20	32.41	21.47	324.71
2004	Landsc	14.85	7.92	12.78	11.12	27.70	41.88	42.92	37.08	43.23	42.11	27.28	12.34	321.21
2005	Landsc	19.52	7.78	7.67	5.25	37.07	19.39	26.32	18.32	32.84	26.14	36.70	23.73	260.73
2006	Landsc	18.41	9.54	19.08	10.25	6.43	23.98	39.33	28.30	49.33	31.83	38.59	23.31	298.38
2003-2006 Total		68.64	41.16	55.81	41.10	105.23	120.31	143.60	115.50	161.57	136.28	134.98	80.85	1,205.03
Bi-Month Subtotal		109.80		96.91		225.54		259.10		297.85		215.83		
Bi-Month Average		**27.45**		**24.23**		**56.39**		**64.78**		**74.46**		**53.96**		

Year	Category	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	TOTAL (AFY)
2003	Other	1.02	2.53	5.03	0.79	3.53	2.19	7.20	7.02	9.12	17.36	10.30	6.62	72.71
2004	Other	9.52	1.87	5.63	3.21	3.89	21.03	18.68	29.04	25.23	15.26	8.12	4.81	146.29
2005	Other	2.05	0.83	0.44	0.38	2.70	2.8	2.24	14.66	7.09	5.94	11.46	3.37	53.96
2006	Other	9.83	0.96	3.18	32.31	0.81	1.89	13.75	4.33	5.56	5.30	5.03	1.97	84.92
2003-2006 Total		22.42	6.19	14.28	36.69	10.93	27.91	41.87	55.05	47.00	43.86	34.91	16.77	357.88
Bi-Month Subtotal		28.61		50.97		38.84		96.92		90.86		51.68		
Bi-Month Average		**7.15**		**12.74**		**9.71**		**24.23**		**22.72**		**12.92**		

Year	Category	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	TOTAL (AFY)
2003	AG	2.08	0	1.69	0.00	2.92	0	2.93	0.00	3.61	0.00	3.48	0.00	16.71
2004	AG	2.11	0	1.52	0.00	3.15	0	4.33	0.08	3.20	0.23	3.17	0.05	17.84
2005	AG	1.70	0.05	1.50	0.00	2.32	0.12	2.86	0.13	3.77	0.42	0.53	0.13	13.53
2006	AG	3.42	0.02	1.60	0.03	1.60	0.04	3.14	0.16	2.83	0.58	2.76	0.26	16.44
2003-2006 Total		9.31	0.07	6.31	0.03	9.99	0.16	13.26	0.37	13.41	1.23	9.94	0.44	64.52
Bi-Month Subtotal		9.38		6.34		10.15		13.63		14.64		10.38		
Bi-Month Average		**2.35**		**1.59**		**2.54**		**3.41**		**3.66**		**2.60**		

Table 7: SEASONAL USE PER CATEGORY AND IMPACT OF 15% CONSERVATION FOR ONE YEAR (BASELINE YEAR 2006, SEASONAL USE PERCENT BASED ON 2003-2006 AVERAGES)											
Year	Type	TOTAL (AFY)	Meters	Avg. AFY/ Meter	Seasonal Use (%)	Seasonal Use (AF/Meter/Yr)	Seasonal Use (Gal/Meter/Day)	SeasonalUse (G/M/D) w/15%consrv	SeasonalUse Savings(G/M/D) w/15%consrv	Total Savings AF/Yr	$$Savings @$2000/AF
2006	SFR	2010	3423	0.587	62.18	0.365	326	277	49	187.508	$375,016.84
2006	MFR	94	390	0.241	86.42	0.208	186	158	28	12.163	$24,326.49
2006	CI	104	96	1.085	75.60	0.820	732	623	110	11.815	$23,630.06
2006	Landsc	298	83	3.595	48.26	1.735	1,549	1,316	232	21.599	$43,197.06
2006	Other*	85			85.44	0.000				10.883	$21,765.79
2006	AG	16.44	3	5.480	59.14	3.241	2,893	2,459	434	1.459	$2,917.00
TOTALS:		**2608**	**3995**	**10.988**		**6.370**	**5,686**	**4,833**	**853**	**245.427**	**$490,853.25**

Table 8 demonstrates the water and money savings the District would obtain by a 15% conservation for all categories, individually and combined. Water usage is based on the water usage in 2006, and the seasonal use % is based on the 2003-2006 averages.

If all District categories saved an average of 15% of seasonal water consumption, it would translate to a decrease of 245.427 AF/Y and a financial savings of $490,853.25.

If the SFR, MR and Landscape categories showed a15% average seasonal water conservation, it would mean a total savings of 221.270 AF/Y, or $442,540.39.

Projected out until year 2026, with 3.22% increase in meters and population each year, and 3% increase in cost of water per year (baseline marginal cost of water of $2000), by the year 2026 a total of 7,716.141 acre-feet of water (385.807 average per year) will have been saved, translating to a savings of $83,885,673.82 over the 20 years, and an average savings per year of $8,388,567.38.(Table 9)

(Tables 11, 12) With 15% conservation of seasonal water use, wastewater inflow would be reduced a total of 3858.071 AFY (1257.156 MGY) over 20 years, with an average of 192.904 MGY (million gallons per year). (Table 9)

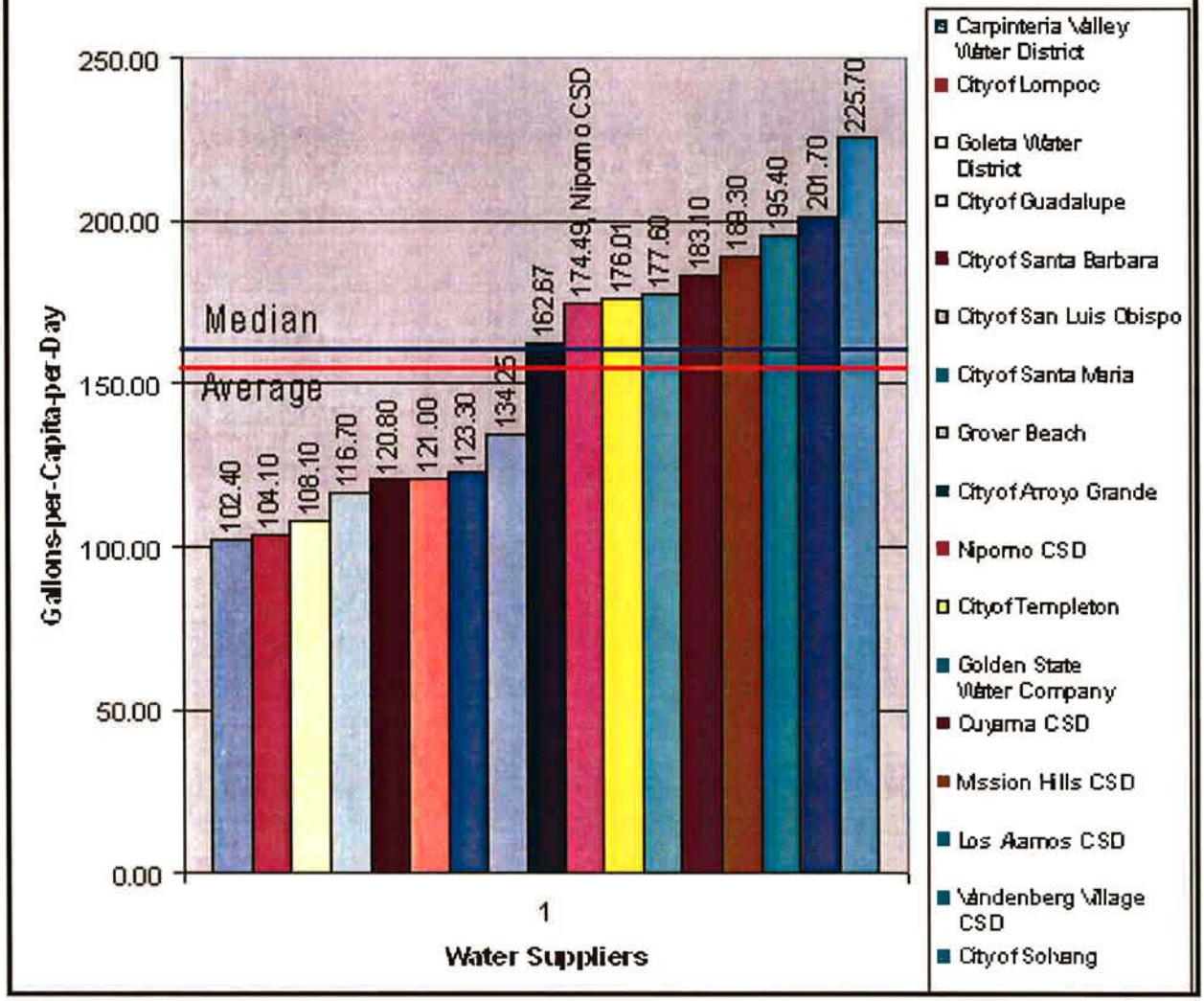
In summary, with a 15% decrease in water used during the seasonal, peak (summer), months, a total of close to $84million dollars in marginal cost of water can be saved over 20 years.

Table 8: PROJECTIONS OF SAVINGS FOR ALL CATEGORIES COMBINED WITH 15% CONSERVATION OF SEASONAL INCREASE, 2007 - 2027 (Base Year Water Use and Meters=2006; Avg.Seas %= Avg. 2003-2006)

Year	Pro-jected Popula-tion	Pro-jected # of Meters	Total Annaul AFY Reqd	Avg. Sea. Use%, All Categ.	Avg.Seas Use AF/Y	Avg.Seas Use w/ 15%Cnsv	AFY Seas Use Saved w/15% Cnsv	Cost of H2O/AF w/3% inflat.	Cost of Seasonal Increase H2O Reqd/Yr	Cost of Seasonal Increase H2O Reqd/Yr 2/ 15% consv.	$$ Saved w/15% Seas.Conserv.	Sewage InFlow Saved (AFY) w/15% Seas. Consv.	Sewage InFlow Saved (MGY) w/15% Seas. Consv.
2007	13,773	4124	2,691.978	69.510	1,871.194	1590.515	280.679	$2,000.00	$5,383,955.35	$3,181,029.26	$2,202,926.09	140.340	45.730
2008	14,217	4257	2,778.766	69.510	1,931.520	1641.792	289.728	$2,060.00	$5,724,257.90	$3,382,091.92	$2,342,165.98	144.864	47.204
2009	14,675	4394	2,868.352	69.510	1,993.792	1694.723	299.069	$2,121.80	$6,086,069.87	$3,595,863.09	$2,490,206.78	149.534	48.726
2010	15,148	4535	2,960.827	69.510	2,058.071	1749.360	308.711	$2,185.45	$6,470,750.83	$3,823,146.06	$2,647,604.76	154.355	50.297
2011	15,637	4682	3,056.283	69.510	2,124.422	1805.759	318.663	$2,251.02	$6,879,746.22	$4,064,794.86	$2,814,951.36	159.332	51.918
2012	16,141	4833	3,154.816	69.510	2,192.913	1863.976	328.937	$2,318.55	$7,314,592.91	$4,321,717.50	$2,992,875.41	164.468	53.592
2013	16,661	4988	3,256.526	69.510	2,263.611	1924.070	339.542	$2,388.10	$7,776,924.86	$4,594,879.40	$3,182,045.46	169.771	55.320
2014	17,199	5149	3,361.515	69.510	2,336.589	1986.101	350.488	$2,459.75	$8,268,479.33	$4,885,306.99	$3,383,172.35	175.244	57.103
2015	17,753	5315	3,469.889	69.510	2,411.920	2050.132	361.788	$2,533.54	$8,791,103.38	$5,194,091.57	$3,597,011.82	180.894	58.944
2016	18,325	5487	3,581.757	69.510	2,489.679	2116.227	373.452	$2,609.55	$9,346,760.82	$5,522,393.43	$3,824,367.39	186.726	60.845
2017	18,916	5664	3,697.231	69.510	2,569.946	2184.454	385.492	$2,687.83	$9,937,539.59	$5,871,446.20	$4,066,093.38	192.746	62.806
2018	19,526	5846	3,816.429	69.510	2,652.800	2254.880	397.920	$2,768.47	$10,565,659.58	$6,242,561.48	$4,323,098.10	198.960	64.831
2019	20,155	6035	3,939.469	69.510	2,738.325	2327.576	410.749	$2,851.52	$11,233,481.02	$6,637,133.76	$4,596,347.26	205.374	66.921
2020	20,805	6229	4,066.476	69.510	2,826.607	2402.616	423.991	$2,937.07	$11,943,513.32	$7,056,645.69	$4,886,867.63	211.996	69.079
2021	21,476	6430	4,197.577	69.510	2,917.736	2480.076	437.660	$3,025.18	$12,698,424.48	$7,502,673.63	$5,195,750.85	218.830	71.306
2022	22,168	6637	4,332.905	69.510	3,011.803	2560.032	451.770	$3,115.93	$13,501,051.15	$7,976,893.56	$5,524,157.59	225.885	73.605
2023	22,883	6851	4,472.597	69.510	3,108.902	2642.567	466.335	$3,209.41	$14,354,409.28	$8,481,087.40	$5,873,321.87	233.168	75.978
2024	23,621	7072	4,616.791	69.510	3,209.132	2727.762	481.370	$3,305.70	$15,261,705.43	$9,017,149.73	$6,244,555.70	240.685	78.427
2025	24,382	7300	4,765.635	69.510	3,312.593	2815.704	496.889	$3,404.87	$16,226,348.87	$9,587,094.83	$6,639,254.03	248.444	80.956
2026	25,168	7535	4,919.277	69.510	3,419.390	2906.481	512.908	$3,507.01	$17,251,964.32	$10,193,064.34	$7,058,899.98	256.454	83.566
	TOTALS:		**74,005.096**	xxxxx	**51,440.942**	**43,724.801**	**7,716.141**	n/a	**$205,016,738.52**	**$121,131,064.70**	**$83,885,673.82**	**3858.071**	**1257.156**
	AVERAGE YEARLY SAVINGS:		**3,700.255**		**2,572.047**	**2186.240**	**385.807**		**$10,250,836.93**	**$6,056,553.24**	**$8,388,567.38**	**192.904**	**62.858**

Table 9: TOTAL WATER DELIVERED, NCSD, PER CAPITA: 2001-2006						
Year	Total Meters	Pop. Est.	Total AFY	AFY Capita	Gallons/ Yr/Capita	Gallons/ Cap/Day
2001	3412	11,396	2,238.07	0.20	63,993.70	175.33
2002	3472	11,596	2,340.53	0.20	65,766.86	180.18
2003	3709	12,388	2,567.08	0.21	67,523.53	185.00
2004	3751	12,528	2,810.24	0.22	73,091.85	200.25
2005	3879	12,956	2,638.51	0.20	66,360.79	181.81
2006	3995	13,343	2,607.99	0.20	63,688.60	174.49

Chart 5: COMPARISON OF CONSUMPTION, SANTA BARBARA AND SAN LUIS OBISPO COUNTIES, 2006

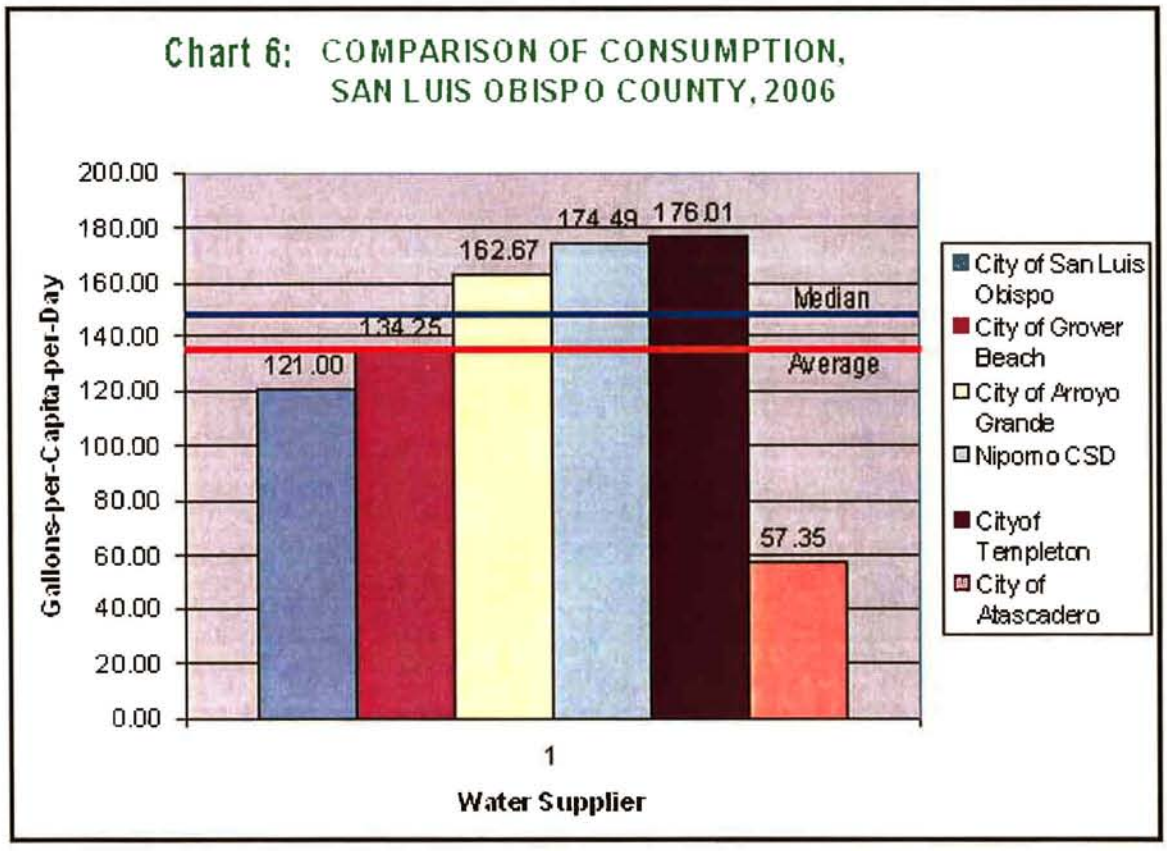


2.3. Per-Capita Consumption.

The District's gallons-per-capita-per-day (G/C/D) consumption from 2001 – 2006 began in 2001 at 175.33, and ended in 2006 at 174.49, demonstrating a less-than 1-G/C/D difference. The highest yearly G/C/D was in 2004 (200.25). The average G/C/D over six years was 184.85. (Table 10)

Comparing available per-capita consumption rates for customers of Santa Barbara and San Luis Obispo Counties, the District's use is above the average (153.92 G/C/D) and the median (162.67). (Chart 5). The lowest use was in the Carpinteria Valley Water District (102.4), 70% less than the District's G/C/D; the highest use was in the City of Solvang (225.7, 29% more than the District. Note that six water suppliers' figures were considered outliers and were not included.

Comparing available per-capita consumption rates for customers of only San Luis Obispo County, the District's use is above both the average (137.63) and the median (148.46). The District's consumption (174.49) was only 1.5 GPCD below the top consumer, Templeton (176.01). When Atascadero's consumption figures are considered an outlier and not included, the average rises to 153.68 and the median rises to 162.67.(Chart 6)



A 2003 study of California water usage for typical single-family residences (SFR) assumed an average monthly water usage to be 1,500 cubic feet,[45] or 15 hcf[46]. For comparison, NCSD's 2003 monthly SFR use was 21.4 hcf, or 42.7% more than the average California residence.

[45] Black and Veatch. *California Water Charge Survey 2003.* Black and Veatch Management Consulting Division, Irvine, California.

SUMMARY: The District's costumers have steadily over the years used water at a rate greater than the rate nature can recharge the aquifer. Recently the rate of consumption has increased 41.45% for single-family residents and 31.3% for all customer categories combined. If this increased rate of consumption continues, in 2007 the District's customers will have consumed 472 AF than would have been expected based on the average yearly increase from 2001 to 2006 (11.45% for SFR, 16.53% for all customer categories combined).

As is expected, during the summer (peak) months the District's customers use more water than in the trough (winter) months. For the SFR category, 62.18% of the average account's annual use of water is due to landscape irrigation. For all categories combined, an average of 69.18% of an account's annual use of water is dedicated to landscape irrigation.

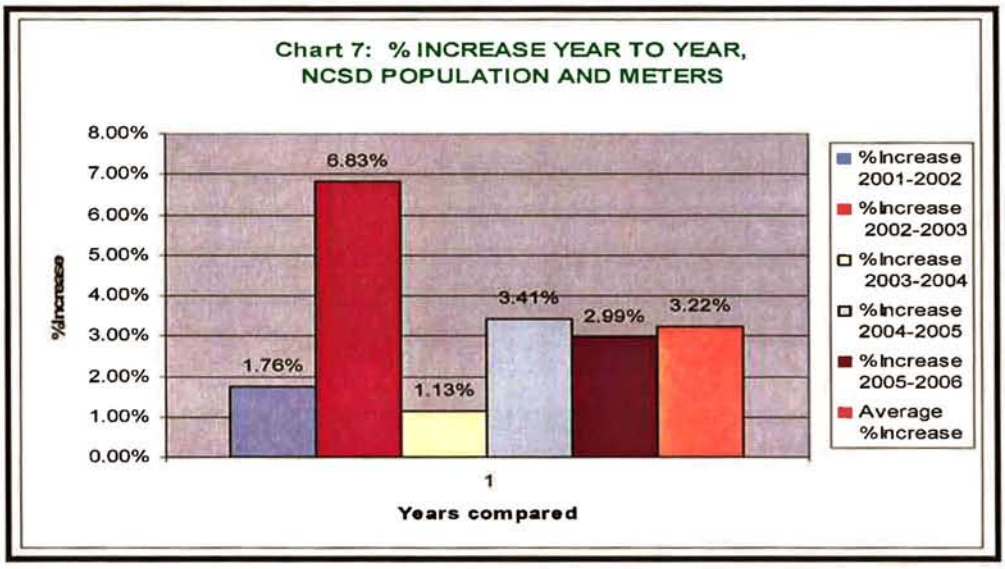
From 2001 to 2006, there was an overall decrease of less than 1 G/C/D (175.33 to 174.49), with an average for those years of 182.84 G/C/D. Comparing the District's G/C/D consumption in 2006 with available numbers from water purveyors in Santa Barbara and San Luis Obispo Counties showed the District to be above both the median and mean. When comparing the District's G/C/D consumption with that of San Luis Obispo County water suppliers alone, the District was again above the median and the mean, and also only 1.5 gallons less than the top supplier (Templeton). In general, an area's climate (and, where water charges are high, the wealth of the community) is considered to have the most impact on rate of water consumption. Templeton's average rainfall (15") is similar to the District's, but has average seasonal temperatures which are more extreme. Templeton's summer temperatures average 92 degrees (compared to Nipomo's 75 degrees), and winter temperatures average 31 degrees (Nipomo's is 38 degrees). In general, more extreme temperatures (both high and low) translate to higher water consumption, especially during the summer when a landscape's evapotranspiration rate rises to meet the heat challenge.

The District's customers use water at a higher rate than the majority of other local water suppliers' customers. In addition, a large part of the District's customer's water bills is due to landscape irrigation. Therefore, it appears that there is a good potential for water conservation, especially in the amount of water used for landscape irrigation.

[46] Black and Veatch. *California Water Charge Survey 2003.* Black and Veatch Management Consulting Division, Irvine, California

PROJECTIONS

(Refer to Chart 7, Table 11, 12)



AVERAGE %INCREASE IN POPULATION AND METERS, 2001 – 2006: 3.22%
PROJECTIONS BASED ON 3.22% AVERAGE INCREASE,

BASELINE YEAR 2006:

- Projected Population in Year 2026 (20 years): 25,169
- Projected Number of Meters in Year 2026 (20 years): 7,536
- Projected Water Needs in the Year 2026 if Consumption Rate Remains the Same: 4,919.47 AFY
- Projected Total Water Needed Over 20 Years: 74,007.94 AF
- Projected Total Water Needed Over 20 Years w/15% Conservation: 62,906.75 AF
- Projected Water Savings Over 20 Years w/15% Conservation: 11,101.19 AF
- Projected Cost of Water over 20 Years (with 3%/year inflation): $205,024,604.62
- Projected Cost of Water w/15% Conserv. Over 20 Years (with 3%/year inflation) $174,270,913.93
- Projected Savings in Cost of Water w/15% Conserv. Over 20 Years: $ 30,753,690.53

Looking to the future globally, "In 25 to 30 years, there could be 9 billion people on Earth—and one-third of them are projected to be 'suffering a severe water shortage.'"[47]

[47] Bistany, Andrea S. *Navigating the Rising Currents of U.S. Water Reuse*. Environment & Technology. 2006.

Table 10: ANNUAL WATER DEMAND PROJECTIONS, 2007 – 2026 (WITH AND WITHOUT CONSERVATION)									
Year	Projected Population	Projected # of Meters	AFY Reqd	AFY Reqd w/ 15% Cnsv.	AFY Saved	Cost of Water/AF w/3% inflat.	Cost of Water Reqd/Yr	Cost of Water Reqd/yr w/15% Conserv.	$ Saved w/15% Conserv.
2007	13,773	4124	2,692.081	2288.269	403.812	$2,000.00	$5,384,161.93	$4,576,537.64	$807,624.29
2008	14,218	4257	2,778.873	2362.042	416.831	$2,060.00	$5,724,477.53	$4,865,805.90	$858,671.63
2009	14,676	4394	2,868.462	2438.193	430.269	$2,121.80	$6,086,303.39	$5,173,357.88	$912,945.51
2010	15,149	4536	2,960.940	2516.799	444.141	$2,185.45	$6,470,999.10	$5,500,349.23	$970,649.86
2011	15,637	4682	3,056.400	2597.940	458.460	$2,251.02	$6,880,010.19	$5,848,008.66	$1,032,001.53
2012	16,142	4833	3,154.937	2681.697	473.241	$2,318.55	$7,314,873.56	$6,217,642.52	$1,097,231.03
2013	16,662	4989	3,256.651	2768.153	488.498	$2,388.10	$7,777,223.25	$6,610,639.76	$1,166,583.49
2014	17,199	5149	3,361.644	2857.398	504.247	$2,459.75	$8,268,796.58	$7,028,477.09	$1,240,319.49
2015	17,754	5315	3,470.022	2949.519	520.503	$2,533.54	$8,791,440.68	$7,472,724.58	$1,318,716.10
2016	18,326	5487	3,581.894	3044.610	537.284	$2,609.55	$9,347,119.44	$7,945,051.52	$1,402,067.92
2017	18,917	5664	3,697.373	3142.767	554.606	$2,687.83	$9,937,920.87	$8,447,232.74	$1,490,688.13
2018	19,527	5846	3,816.575	3244.089	572.486	$2,768.47	$10,566,064.96	$8,981,155.22	$1,584,909.74
2019	20,156	6035	3,939.620	3348.677	590.943	$2,851.52	$11,233,912.03	$9,548,825.23	$1,685,086.80
2020	20,806	6229	4,066.632	3456.637	609.995	$2,937.07	$11,943,971.57	$10,152,375.83	$1,791,595.74
2021	21,477	6430	4,197.738	3568.078	629.661	$3,025.18	$12,698,911.69	$10,794,074.94	$1,904,836.75
2022	22,169	6638	4,333.072	3683.111	649.961	$3,115.93	$13,501,569.16	$11,476,333.78	$2,025,235.37
2023	22,884	6851	4,472.768	3801.853	670.915	$3,209.41	$14,354,960.03	$12,201,716.02	$2,153,244.00
2024	23,622	7072	4,616.969	3924.423	692.545	$3,305.70	$15,262,291.00	$12,972,947.35	$2,289,343.65
2025	24,383	7300	4,765.818	4050.945	714.873	$3,404.87	$16,226,971.44	$13,792,925.73	$2,434,045.72
2026	25,169	7536	4,919.466	4181.546	737.920	$3,507.01	$17,252,626.25	$14,664,732.31	$2,587,893.94
		TOTALS:	**74,007.936**	**62,906.75**	**11,101.19**	n/a	**$205,024,604.62**	**$174,270,913.93**	**$30,753,690.69**
		AVERAGES:	**3,700.397**	**3,145.337**	**555.060**	n/a	**$10,251,230.23**	**$8,713,545.70**	**$1,537,684.53**

Wastewater Treatment Estimations:

Table 11: 2006: AMOUNT OF WATER DELIVERED THAT FLOWS INTO SEWER AND IMPACT OF 5% INDOOR WATER CONSERVATION ON SEWER INFLOW										
MG Water Dlvd. To Town	# of Town Meters	# of Sewer HookUps	% Meters w/Sewer HookUps	MG Dlvd to Meters w/ Sewer HUps	MG InFlow Sewer	%MG Dlvd to Meters that Inflows to Sewer	Sewer Inflow from 5% Indoor H2O Conserv.	Decrease in Sewer Inflow w/5% Indoor H_2O Consv.	%Sewer Inflow from 5% Indoor Conserv.H_2O	%Change in Sewer Inflow from 5% Indoor H_2O Consv.
631.825	3,352	2,281	68.05%	429.95	215.3500	**50.09%**	204.23	11.12	94.83%	-5.45%

Based on 2006 figures for the District, an estimated 50% of water delivered to residents with sewer hookups ends up in wastewater treatment at Southland Wastewater Treatment Facility. A water conservation of 5% of water used indoors would result in a 5.45% (11.12 MG/yr) decrease in the amount of inflow entering Southland.

SUMMARY: Using the District's consumption figures for 2001-2006, the average per-year increase was 3.22%. Projected over 20 years, using a marginal price of water of $2000/AF, in the year 2026 the District's projected 25,169 customers, using 7,536 meters, will (without water conservation) consume 4,919.47 AF; with 15% water conservation, they will consume 4,181.57 AF, a savings of 737.92 AF.

During the 2007-to-2026 time period, without water conservation, they will have consumed 74,007.94 AF, and the District will have spent a total of $205,024,604.62 over the years (incorporating 3% annual inflation).

With 15% water conservation, during the same time period, they will have consumed only 62,906.75 AF (a savings of 11,101.19 AF) and the District will have only spent $174,270,913.93 (a savings of $30,753,690.69).

In addition, if a 5% water conservation can be achieved in the District's customers' homes, it will translate to 5.45% (11.12 MG/yr) decrease in sewer inflow.

With water conservation, there can be substantial savings in money spent on purchase/production of water, water and wastewater treatment facilities, and delivery infrastructure. In addition, expansions in both water and wastewater systems can be deferred or delayed.[48]

[48] Vickers, Amy. *Handbook of Water Use and Conservation.* Amherst, MA: WaterPlow Press. 2001

VIII. Water Conservation Program: Core Program Measures

Criteria for conservation measure's inclusion in the water conservation program:

- A benefit-cost ratio greater than 1.0.
- Reasonable cost.
- Reasonable water savings.
- Nonquantifiable but positive effects (community benefits).

---

1. *CORE (SHARED-COSTS) WATER CONSERVATION PROGRAM MEASURES*

- **1.1. Conservation-based rate structure**
- **1.2. Public outreach materials and efforts**
  - **1.2.1. Printed materials, bill stuffers, direct mailings**
  - **1.2.2. Communication through the media (advertisement, press releases)**
  - **1.2.3. Customer promotional/giveaway items**
- **1.3. Public outreach events**
  - **1.3.1. Workshops**
  - **1.3.2. School outreach program**
  - **1.3.3. Community events**
- **1.4. NCSD landscape/demonstration garden**
- **1.5. Technical Assistance**
  - **1.5.1. Water audits, assist in leak detection**
  - **1.5.2. Provision of free, small-area landscape designs (i.e., design for an 8' shady border)**
  - **1.5.3. Provision of a list of xeriscape-knowledgeable landscapers, landscape designers, and nurseries**
  - **1.5.4. High-use letters offering assistance (water audit, information) and explaining rate schedule**
  - **1.5.5. Low-use letters congratulating water efficiency**

The core of the water conservation program is comprised of the interconnected, integrated measures which support the success of the other core measures and the success of the other non-core measures. The core measures are the bedrock upon which the other, non-core measures are built, and the glue which holds together the water conservation program.

The core measures are designed to work together, providing mutual support and support for the entire water conservation program. Removing any of the core measures will weaken the water conservation program and detract from the maximum benefits realized from the funds invested by the District in the water conservation program.

1.1. CONSERVATION-BASED WATER RATE STRUCTURE (BMP 4, 11)

> *"One of the most effective tools for water conservation is the rate structure. Rate structures and practices that promote the efficient use of water should be the goal to ensure sufficient resources to meet competing uses."*
>
> -- *Water Conservation Measures.* Municipal Research and Services Center of Washington (http://www.mrsc.org/)

Refer to "Water Use Characteristics, Consumption," page 16, for details of the District's customers' consumption specifics and potential for savings.

Summary and comparison of usage. Analysis of DWR *Public Water System Statistics* reports from 2001 to 2006 indicates that the lion's share of NCSD's water use is consistently in the SFR category (77% in 2006), with the irrigation category being a far-distant runner-up (11% in 2006) (refer to Chart 1, 2 and Table 3, 4). In the SFR category, the element which has the most

potential for conservation savings is the seasonal landscape-irrigation portion.[49] In the years 2003 to 2006, the average SFR highest bi-monthly billing period was September-October (482.20 AF), and the lowest was March-April (212.04 AF). The amount of the usage calculated to be due to SFR irrigation is the difference between the peak (summer) amount used and the trough (winter) amount used.

(Table 5). The average seasonal (peak summer) water use (percentage of annual use) for years 2003-2006, for all categories, is 69.15%, and for SFR category alone is 62.18%.

From 2001 through 2006, the SFR water usage increased each year, except for one year of a decrease (refer to Chart 3, Table 3).

A 2003 study of California water usage for typical SFRs assumed an average monthly water usage to be 1,500 cubic feet, or 15 hcf.[50] For comparison, NCSD's 2003 monthly SFR use was 21.4, or 42% more than the average California residence.

When the District's per-capita water consumption is compared with other local water suppliers, the District is consistently above both the mean and median. When comparing the District with only San Luis Obispo County water suppliers, the District was a very close second (1.5 G/C/D less) to the #1 supplier (Templeton), with the highest per-capita consumption (Chart 5, 6).

The City of San Luis Obispo has a well-established water conservation program, and is a model of what can be achieved in water conservation, while maintaining the beauty of the residential landscapes. In 2005, the average daily per-capita use by NCSD's customers was 181.81 gallons, and 122 gallons by the City of San Luis Obispo's (SLO) customers. NCSD's daily per-capita water use was 49% more than SLO's use. As an example of how this translates into usage, for a SFR it would cost $144.30 to fill an average swimming pool in SLO, and only $65.98 for NCSD's (Town Division) SFR customers.

SLO City's program includes both conservation-based rate water and wastewater pricing and incentives in the forms of rebates, as well as public education and outreach. Over the years these measures have produced changes in customer choices and habits such that efficient use of the City's water resources is a way of life. The majority of landscaping in single-family residences in the City is certainly not barren or cactus-dominated.

At a time when the Nipomo Mesa is experiencing the immediate need for supplemental water, water conservation is the cheapest and most immediate source available. The minimum time until other supplemental water approaches would deliver wet water to our District is greater than three years. Conserved water is available immediately, and without the cost of building a delivery system.

Water conservation pricing as an integral part of a water conservation program. Pricing of water can be a powerful incentive for conservation, can increase revenue, and can defer expansion of water and wastewater facilities.[51,52] More importantly, at a time when demand for water is rapidly increasing, and water supplies are remaining static or decreasing, conservation pricing of water,

---

[49] A&N Technical Services, Inc. BMP Costs and Savings Study: A Guide to Data and Methods for Cost-Effectiveness Analysis of Urban Water Conservation Best Management Practices. March 2005. The California Urban Water Conservation Council.

[50] Black and Veatch. *California Water Charge Survey 2003.* Black and Veatch Management Consulting Division, Irvine, California

[51] A&N Technical Services, Inc. *BMP Costs and Savings Study: A Guide to Data and Methods for Cost-Effectiveness Analysis of Urban Water Conservation Best Management Practices.* March 2005.

[52] Stallworth, Holly. *Conservation Pricing of Water and Wastewater.* April 2000. Environmental Protection Agency.

reflecting the complete costs involved in obtaining, treating and distributing it, can send a clear message to the consumers regarding the worth and availability of water.[53,54]

Conservation water pricing (inclining block rate structure) can stimulate customers to use less water and use it more wisely, and to fix leaks and address other water-wasting conditions. The water saved will translate into decreased wastewater sent for treatment, and a delay in the need to upgrade facilities and/or fund other improvements or expansions. To achieve the maximum water-conservation impact, conservation water pricing should be accompanied by a program of public education, water accounting and audits, plumbing retrofits, and other water conservation measures.[55,56,57]

In 2005 four Florida water management districts funded and published the largest study ever conducted regarding the impact water rates have on single-family residential water use. This study demonstrated that water use decreases with increases in water price. Changes triggered by increases in water price vary depending on property value and access to other sources of water. Water providers can decrease water use—without decreasing revenues—by using increasing block rates. Fixed charges do not encourage conservation. Water providers can stimulate water conservation by decreasing charges for fixed rates and increasing charges related to the amount of water used. To gain maximum impact from water-conservation pricing, customers need pricing and water use information included with the bill (i.e., how their use compares with the provider's average residential customer use).[58]

A study of water rate structures in New Mexico found that increasing block structures were most effective in encouraging efficient water use.[59]

The Irvine Ranch Water District was stated in one reference (published in 1997) to have saved 43% of landscape water use by implementing an increasing block rate structure, public education, and separate metering[60]. In another reference (published in 2001), they were said to have, by implementing a increasing block rate structure, been able to decrease outdoor irrigation by nearly 50%. IRWD determines the indoor use to be, on average, 80 G/C/D, and above that amount is considered to be outdoor irrigation.[61]

The Utah State Water Plan, *Utah Water Resources: Planning for the Future*, published in 2001 by the State Department of Natural Resources, indicates that incentive pricing of water is crucial to conserving water. One city in Utah planned to implement an increasing block structure, and considered it a "key element in reaching its goal to reduce water demand 15 percent in five years."[62] To achieve results, implementation of incentive pricing must be done carefully. Identified elements of a successful program must include clearly identifying on customers' bills the fixed rates and the rated charges for water. The program should be implemented in such a manner that decrease in water usage does not cause a revenue shortfall. Efficient water use

---

[53] Ibid.
[54] Whitcomb, John B. 2005. *Florida Water Rates Evaluation of Single-Family Homes.* July 2005.
[55] Stallworth, Holly. *Conservation Pricing of Water and Wastewater.*
[56] Hutchins-Cabibi, Taryn (Western Resource Advocates). *Better Water Rate Structures Can Encourage New Mexicans to Conserve.* February 2006
[57] Whitcomb, John B. 2005. *Florida Water Rates Evaluation of Single-Family Homes.* July 2005.
[58] Vickers, Amy. *Handbook of Water Use and Conservation.* Amherst, MA: WaterPlow Press. 2001.
[59] Hutchins-Cabibi, Taryn (Western Resource Advocates). *Better Water Rate Structures Can Encourage New Mexicans to Conserve.* February 2006
[60] Highlights of Irvine Ranch Water District's landscape conservation program. *Water Conservation News.* July 1997
[61] Vickers, Amy. *Handbook of Water Use and Conservation.*
[62] *Utah's Water Resources: Planning for the Future.* May 2001. State of Utah Division of Natural Resources

should be rewarded by low commodity rates, and excessive water should be discouraged by higher rates. Staff should be available to help customers with steps to conserve water.[63]

In 1995 Albuquerque, New Mexico, instituted an integrated water conservation program which included incentive rate structure, and by 2003 had reduced the per-capita use by 23%. [64]

Short-run elasticity estimates. Short-run estimates are used for estimates of customer water use response (short-term) to change in rates charged for water. Long-range estimates are made for long-range planning. Estimate of demand response to changes in the real price of water can be made by: (DeltaP x ETA_{price}=Decrease in use), where DeltaP is the change in price, x ETA_{price} is the price elasticity.[65]

Table 12: Short Run Elasticity Estimates for Conservation Rate Design	
Single Family Residential Customers	Range of Estimates
Winter Season	-.00 to -.10
Summer Season	-.10 to .20
Multiple Family Residential Customers	
Winter Season	-.00 to -.05
Summer Season	-.05 to -.10

Source: Designing, Evaluating, and Implementing Conservation Rate Structures. July 1997

For example, using the tabled figures, a 10% rate increase in the summer for SFR would be expected to produce a 1% decrease in water consumption.[66]

SUMMARY AND RECOMMENDATIONS: We are faced with both short- and long-term pressures to conserve water, and our per-capita usage has shown little end-result conservation since 2001. The current two-tier-rate billing categories appear to be too generous (the lower-tier range being too large), and have not produced conservation results. There is much evidence to indicate that incentive water pricing, if done with the right support measures, inspires consumers to use less water.

A strong, conservation-based rate structure is a cornerstone of a successful water conservation program. Like public outreach and education, it is the support structure by which all other measures can succeed or fail. The finest plumbing-retrofit program in the country will fail if customers don't know about it (public outreach) and if there is no real pocketbook incentive to participate in the program (conservation-based rate structure). Without a strong conservation-based rate structure, the true potential of the funding invested in the other measures will not be realized, and more money will have to be spent on the other measures to get less of a return.

Based on the savings of other water agencies with the implementation of a strong, three-tiered, conservation-based rate structure, and a strong public-outreach/media effort, it is believed that the District has a large potential for water and money savings. It is believed that, from the SFR category alone, 15% reduction in water use would be achievable in approximately three years.

CONSERVATION-BASED PRICING AS A STAND-ALONE MEASURE. If the conservation-based rate pricing were not part of the core program, and savings calculated for that measure

---

[63] *Utah's Water Resources: Planning for the Future.* May 2001. State of Utah Division of Natural Resources

[64] *Albuquerque, New Mexico: Long-range planning to address demand growth. Cases in water conservation: how efficiency programs help water utilities save water and avoid costs.* Environmental Protection Agency. July 2002. (http://www.epa.gov/owm/water-efficiency/utilityconservation.pdf)

[65] A&N Technical Services, Inc. *BMP Costs and Savings Study: A Guide to Data and Methods for Cost-Effectiveness Analysis of Urban Water Conservation Best Management Practices*

[66] Ibid.

alone (treating conservation rate pricing as a measure similar to toilet retrofitting), the savings would be considerable, even when attributing a shared-program cost of 10% (Table 14).

In the SFR category, the element which has the most potential for conservation savings is the irrigation (seasonal) portion of the annual usage.[67] In the years 2003 to 2006, the average SFR highest bi-monthly billing period was September-October (482.20 AF), the lowest was March-April (212.04 AF), and the seasonal use percent of annual usage is 62.18%.

If the SFR category alone was to save 15% of its seasonal water use (even with accounting for a gradual ramp-up to the 15% savings, with 5% in 2008, 10% in 2009, and 15% in 2010), for the 20-year period 2007-2026 (baseline year 2006), it would translate to the following.

(Table 14) SFR Savings from 15% decrease in seasonal water use:

Total AF (SFR) savings over 20 years:	4769.21
Average AF savings:	256.13
Total NET $$$ savings over 20 years:	$14,754,153.56
Average AF/Y savings:	737,707.68
% Water Savings (AF/Y)	6.92%
Savings:Cost ratio	1109.7:1
Years to pay off initial investment:	<0.5

In addition, with 15% of the SFR category's seasonal water use, over 20 years, the total decrease in in-flow to the wastewater treatment facility would be approximately 2600 AF (847 MG), and a yearly average of approximately 130 AFY (42 MG/Y).

[67] Henderson, Gary, Munds, R. City of San Luis Obispo 2006 Water Resources Status Report, June 2006.

Table 13: *PROJECTED COSTS* AND SAVINGS OF CONSERVATION-BASED RATE PRICING, WITH A 100% MARKET PENETRATION, SINGLE-FAMILY RESIDENCE CATEGORY, SEASONAL USE, OVER 20 YEARS (SAVINGS: 5% 2008, 10% 2009, 15% 2010)

Year	#SFR Meters	#SFR Meters w/100% MP	Estimd. Popul. w/100% MP	SFR AFY (Seasonal) Required w/o Measure	Saved: AFY, SFR Meters (5-10-15%)	Cost of Water/AF w/3% inflat.	$$Savings/ Year (w/ 3% infl/yr)	Rebate ($0.00 ea)	5% Share of Shared Program Costs	Office Admn Costs (10% of Prg.Costs)	Total Costs	NET SAVINGS (Total Savings minus Total Costs)	Years to Pay Off Original Invest. (Rebates, Costs)
2008 - 5%	3647	3647	12,545.65	1290.210	64.51	$2,060.00	$132,891.61	$0.00	$3,445.00	$344.50	$3,789.50	**$129,102.11**	**<0.5**
2009 - 10%	3764	3764	12,949.62	1331.755	133.18	$2,121.80	$282,571.67	$0.00	$344.50	$34.45	$378.95	**$282,192.72**	
2010 - 15%	3886	3886	13,366.59	1374.637	206.20	$2,185.45	$450,630.89	$0.00	$354.84	$35.48	$390.32	**$450,240.57**	
2011 - 15%	4011	4011	13,797.00	1418.900	212.84	$2,251.02	$479,095.44	$0.00	$365.48	$36.55	$402.03	**$478,693.42**	
2012 -15%	4140	4140	14,241.26	1464.589	219.69	$2,318.55	$509,357.99	$0.00	$376.44	$37.64	$414.09	**$508,943.90**	
2013 - 15%	4273	4273	14,699.83	1511.749	226.76	$2,388.10	$541,532.09	$0.00	$387.74	$38.77	$426.51	**$541,105.58**	
2014 - 15%	4411	4411	15,173.16	1560.427	234.06	$2,459.75	$575,738.51	$0.00	$399.37	$39.94	$439.31	**$575,299.20**	
2015 - 15%	4553	4553	15,661.74	1610.673	241.60	$2,533.54	$612,105.61	$0.00	$411.35	$41.14	$452.49	**$611,653.12**	
2016 - 15%	4699	4699	16,166.05	1662.536	249.38	$2,609.55	$650,769.87	$0.00	$423.69	$42.37	$466.06	**$650,303.81**	
2017 - 15%	4851	4851	16,686.60	1716.070	257.41	$2,687.83	$691,876.40	$0.00	$436.40	$43.64	$480.04	**$691,396.36**	
2018 - 15%	5007	5007	17,223.90	1771.328	265.70	$2,768.47	$735,579.46	$0.00	$449.49	$44.95	$494.44	**$735,085.02**	
2019 - 15%	5168	5168	17,778.51	1828.364	274.25	$2,851.52	$782,043.08	$0.00	$462.98	$46.30	$509.28	**$781,533.80**	
2020 - 15%	5335	5335	18,350.98	1887.238	283.09	$2,937.07	$831,441.61	$0.00	$476.87	$47.69	$524.56	**$830,917.05**	
2021 - 15%	5506	5506	18,941.88	1948.007	292.20	$3,025.18	$883,960.45	$0.00	$491.17	$49.12	$540.29	**$883,420.16**	
2022 - 15%	5684	5684	19,551.81	2010.732	301.61	$3,115.93	$939,796.70	$0.00	$505.91	$50.59	$556.50	**$939,240.20**	
2023 - 15%	5867	5867	20,181.38	2075.478	311.32	$3,209.41	$999,159.89	$0.00	$521.09	$52.11	$573.20	**$998,586.70**	
2024 - 15%	6056	6056	20,831.22	2142.308	321.35	$3,305.70	$1,062,272.83	$0.00	$536.72	$53.67	$590.39	**$1,061,682.44**	
2025 - 15%	6251	6251	21,501.99	2211.291	331.69	$3,404.87	$1,129,372.35	$0.00	$552.82	$55.28	$608.10	**$1,128,764.25**	
2026 - 15%	6452	6452	22,194.35	2282.494	342.37	$3,507.01	$1,200,710.29	$0.00	$569.41	$56.94	$626.35	**$1,200,083.94**	
2027 - 15%	6660	6660	22,909.01	2355.991	353.40	$3,612.22	$1,276,554.35	$0.00	$586.49	$58.65	$645.14	**$1,275,909.22**	
			TOTALS:	**36,704.737**	**4769.21**	**n/a**	**$14,767,461.09**	**$0.00**	**$12,097.76**	**$1,209.78**	**$13,307.54**	**$14,754,153.56**	
			AVERAGES:	**1747.845**	**256.13**	**n/a**	**$738,373.05**	**$0.00**	**$604.89**	**$60.49**	**$665.38**	**$737,707.68**	

It is uncertain what percentage savings the District would get from conservation in the other customer categories, based on conservation-based rate structure alone.

(Table 15). However, the average seasonal (peak summer) water use (percentage of annual use) for years 2003-2006, for all categories is 69.15%. If all categories decreased an average of 15%, it would translate to:

(Table 15) All-category savings from 15% decrease in seasonal water use:

Total AF (all categories) savings over 20 years:	7102.51
Average AF/Y savings:	381.44
Total NET $$$ savings over 20 years:	$21,979,026.77
Average AF/Y savings:	$ 1,098,951.34
% Water Savings (AF/Y)	10.31%
Savings:Cost ratio	1652.6:1
Years to pay off initial investment	<0.5

In addition, with 15% of the all-category's seasonal water use, over 20 years, the total decrease in in-flow to the wastewater treatment facility would be approximately 3351 AF (1157 MG), and a yearly average of approximately 177 AFY (57 MGY).

Table 14: *PROJECTED COSTS* AND SAVINGS OF CONSERVATION-BASED RATE PRICING, WITH A 100% MARKET PENETRATION, ALL CATEGORIES, SEASONAL USE, OVER 20 YEARS (SAVINGS: 5% 2008, 10% 2009, 15% 2010)

Year	SFR #Meters	(SFR) #Meters w/100% MP	Estimd. Popul. w/100% MP	SFR AFY (Seasonal) Required w/o Measure	Saved: SFR AFY/SFR Meters (5%)	Cost of Water/AF w/3% inflat.	$$Savings/ Year (w/ 3% infl/yr)	Rebate ($0.00)	5% Share of Shared Program Costs	Office Admn Costs (10% of Prg.Costs)	Total Costs	NET SAVINGS (Total Savings minus Total Costs)	Years to Pay Off Original Invest. (Rebates, Costs)
2008 - 5%	4256	4256	14,642.09	1921.436	96.072	$2,060.00	$197,907.86	$0.00	$3,445.00	$344.50	$3,789.50	**$194,118.36**	<0.5
2009 - 10%	4393	4393	15,113.56	1983.306	198.331	$2,121.80	$420,817.81	$0.00	$344.50	$34.45	$378.95	**$420,438.86**	
2010 - 15%	4535	4535	15,600.22	2047.168	307.075	$2,185.45	$671,098.79	$0.00	$354.84	$35.48	$390.32	**$670,708.47**	
2011 - 15%	4681	4681	16,102.54	2113.087	316.963	$2,251.02	$713,489.41	$0.00	$365.48	$36.55	$402.03	**$713,087.39**	
2012 -15%	4832	4832	16,621.05	2181.128	327.169	$2,318.55	$758,557.69	$0.00	$376.44	$37.64	$414.09	**$758,143.60**	
2013 - 15%	4987	4987	17,156.24	2251.361	337.704	$2,388.10	$806,472.74	$0.00	$387.74	$38.77	$426.51	**$806,046.23**	
2014 - 15%	5148	5148	17,708.67	2323.855	348.578	$2,459.75	$857,414.40	$0.00	$399.37	$39.94	$439.31	**$856,975.09**	
2015 - 15%	5314	5314	18,278.89	2398.683	359.802	$2,533.54	$911,573.84	$0.00	$411.35	$41.14	$452.49	**$911,121.35**	
2016 - 15%	5485	5485	18,867.47	2475.920	371.388	$2,609.55	$969,154.31	$0.00	$423.69	$42.37	$466.06	**$968,688.25**	
2017 - 15%	5661	5661	19,475.01	2555.645	383.347	$2,687.83	$1,030,371.91	$0.00	$436.40	$43.64	$480.04	**$1,029,891.87**	
2018 - 15%	5844	5844	20,102.10	2637.937	395.690	$2,768.47	$1,095,456.38	$0.00	$449.49	$44.95	$494.44	**$1,094,961.94**	
2019 - 15%	6032	6032	20,749.39	2722.878	408.432	$2,851.52	$1,164,651.98	$0.00	$462.98	$46.30	$509.28	**$1,164,142.70**	
2020 - 15%	6226	6226	21,417.52	2810.555	421.583	$2,937.07	$1,238,218.39	$0.00	$476.87	$47.69	$524.56	**$1,237,693.83**	
2021 - 15%	6427	6427	22,107.16	2901.055	435.158	$3,025.18	$1,316,431.69	$0.00	$491.17	$49.12	$540.29	**$1,315,891.40**	
2022 - 15%	6633	6633	22,819.02	2994.469	449.170	$3,115.93	$1,399,585.41	$0.00	$505.91	$50.59	$556.50	**$1,399,028.91**	
2023 - 15%	6847	6847	23,553.79	3090.891	463.634	$3,209.41	$1,487,991.62	$0.00	$521.09	$52.11	$573.20	**$1,487,418.43**	
2024 - 15%	7068	7068	24,312.22	3190.417	478.563	$3,305.70	$1,581,982.10	$0.00	$536.72	$53.67	$590.39	**$1,581,391.71**	
2025 - 15%	7295	7295	25,095.07	3293.149	493.972	$3,404.87	$1,681,909.59	$0.00	$552.82	$55.28	$608.10	**$1,681,301.48**	
2026 - 15%	7530	7530	25,903.13	3399.188	509.878	$3,507.01	$1,788,149.09	$0.00	$569.41	$56.94	$626.35	**$1,787,522.74**	
2027 - 15%	7772	7772	26,737.22	3508.642	526.296	$3,612.22	$1,901,099.31	$0.00	$586.49	$58.65	$645.14	**$1,900,454.17**	
			TOTALS:	**54,662.263**	**7102.51**	**n/a**	**$21,992,334.31**	**$0.00**	**$12,097.76**	**$1,209.78**	**$13,307.54**	**$21,979,026.77**	
			AVERAGES:	**2602.965**	**381.44**	**n/a**	**$1,099,616.72**	**$0.00**	**$604.89**	**$60.49**	**$665.38**	**$1,098,951.34**	

The following is recommended:

Single-Family Residence: It is requested that the Board adopt a three-tiered, inclining block rate structure, with the lowest tier to encourage the lowest-amount users to continue their low rate of water consumption, and the highest tier to provide pocketbook incentive to decrease the amount of that tier's water consumption.

All other categories: It is requested that the Board adopt an inclining block rate structure for all non-residential customers.

Results of this tier system will be tracked for results and modified as necessary to meet the goals.

SUMMARY: The NCSD and its customers are facing water challenges that can only be met with proper planning and customer support. Water conservation plays a vital role in meeting these challenges. Fortunately, there is a wealth of information and statistics compiled by those who have been down this road before us. We can gain the benefit of their experience in designing a rate structure that provides customers incentive to use water efficiently, and make choices and change habits that are in line with the reality of California's limited water supply.

A conservation-based rate structure has been shown to induce significant water savings, and is considered to be the cornerstone of water conservation programs. Without the monetary incentive to save water, other elements of a conservation program will produce less benefit and more money will have to be spent in public outreach, advertising, and other support measures.

It is estimated that a strong, three-tiered conservation-based inclining block rate structure would (conservatively) produce 15% water savings on seasonal (the amount of water consumption estimated to be used for outdoor irrigation needs) water use. For the SFR category alone, it is estimated that this would translate to a 6.92% reduction in the District's overall annual water use, in all categories. It is estimated that a three-tiered conservation-based rate structure for all categories would produce a 10.31% decrease in consumption of annual water use for all categories.

The District's adoption of a strong conservation-based rate structure will communicate to our customers both the scarcity and value of water, and give them the feedback they need when making budgetary choices which are impacted by the costs of water.

1.2. PUBLIC OUTREACH MATERIALS AND EFFORTS

- **1.2.1. Informative statements, printed materials, bill stuffers, direct mailings**
- **1.2.2. Communication through the media (advertisement, press releases)**
- **1.2.3. Customer promotional/giveaway items**

==========

1.2.1. Informative statements, printed materials, bill stuffers, direct mailings.

To produce sustainable water conservation and reduction in demand, a well-organized water conservation education program, complementing the implementation of specific conservation measures, is crucial. An effective conservation program helps water customers change their water use habits. If customers do not permanently change how they use water, many conservation successes can be easily erased as customers revert to old habits. Evidence of this is the immediate rebound of water consumption occurring after the effects of a drought resolve and media attention to local water scarcity disappears.

Statements: To help provide customers with the tools they need to achieve water conservation goals, an informative water use statement (bill), going beyond simply providing the basic information and use, is an important part of the public outreach program.[68] Ideally, meter reading should be done on a monthly basis. This not only enables easier customer budgeting for their water bills, but also provides more immediate feedback to habit changes that result in increases or decreases in customer water use. Water bills should be part of the education/outreach process, and assist customers in reducing their use. By making the customer's water bill part of a public education program, customers are provided another habit-changing reminder or trigger, at little to no extra cost.

Each customer's bill should provide a comparison of current year versus prior years water usage, the fixed charges and commodity charges for water, the amount of water used and the costs incurred at each step of the rate schedule, the customer's use relative to other customers' water use (i.e., "During this billing cycle you used 20% more [or less] than the average water customer"), reminders of seasonal programming changes needed for irrigation systems, internet websites and other references for saving water.[69]

Currently the customer statements are sent out on a bi-monthly basis. The information on the statement includes a history of charges and payments, a comparison between the current and previous year's usage, and a figure representing the average usage.

Printed Material: To accomplish the change in habits necessary to produce long-term water conservation success, frequent prompts and reminders must be part of the water conservation program.

To provide integration and cohesiveness to the multi-method approach to public education, the "Water Use It Wisely" logo will be featured on materials and in advertisement. This colorful yet simple logo provides a simple message: use water wisely. Materials will be focused on informing the customers of the tools available to them for water conservation. However, out of all the water conservation tools available, the number-one, most important element is the person using the tool, and this will also be communicated to customers.

A variety of printed materials, delivered in a variety of ways, will provide the periodic prompts and reminders necessary to produce long-term water conservation habits. These materials will be provided as bill stuffers, direct mailings, at events, at schools, in the District's office lobby, and distributed to businesses.

RECOMMENDATIONS: To take full advantage of low- or no-cost opportunities to present water conservation reminders to customers, the following is recommended:

- Conversion to monthly billing cycle when feasible.
- Include on the statement:
    - Comparison between the customer's current and past years' usage;
    - The costs incurred for each step of the tiered rate structure;
    - Delineation of fixed charges and commodity charges;
    - Customer's use relative to other customers' use;
    - Reminder of seasonal programming changes needed for irrigation systems;
    - Internet websites and other references for water conservation information.

See *Appendix III* for the proposed customer water billing statement.

---

[68] *Fact Sheet: Water Conservation Measures.* National Drinking Water Clearinghouse. December 1998.
[69] *Utah's Water Resources: Planning for the Future.* May 2001. State of Utah Division of Natural Resources.

COST: The estimated costs for changing the information on the customer water statements are: **AWAITING FIGURES**

The budgeted funding for brochures, mailings, and other printed public-outreach materials is **$22,200.**

1.2.2. Communication through the media (advertisement, press releases).

Communication through the media, in the form of advertisements and press releases, also successfully communicate the message to our customers. Press releases are free; advertisement is not. It is believed that regular advertisements in the Adobe Press will be a strong reinforcement of the District's water conservation message.

RECOMMENDATION: Regular advertising in the *Adobe Press*.

COST: **$4000**

1.2.3. Customer promotional/giveaway items.

Educational promotional items can provide another prompt to remember the need for water conservation, and impart information. Imprinted with the District's name and contact information, they also can serve as a link between the District and its customers. At events, it is the promotional items that draw event attendees to the booths. For an informational "vendor" like the NCSD, event booths really need the promotional items to draw the attendees to the booth.

RECOMMENDATIONS: Educational promotional items for use at events and other public functions.

COSTS: Budgeted funds for promotional items is **$3600.**

1.3. PUBLIC OUTREACH AND EDUCATIONAL EVENTS

- **1.3.1. Workshops**
- **1.3.2. School outreach program**
- **1.3.3. Community events**

==========

1.3.1. Workshops.

To assist our customers in saving water and money by efficient use of water in the landscape, two sets of workshops are planned. Each set of workshops will have four workshops each. The topics will be:

- **Irrigation.** Basics on irrigation, including assessing landscape for water needs, choosing emitters/heads, timing and duration of irrigation cycles, need for monthly maintenance and reprogramming to fit climatary needs.
- **Soil/Compost**. Basics of soil physics and biology, composting as a way to increase soil fertility and water-holding capacity, assessing for needs for amendments, fertilizer basics.
- **Drought-tolerant/Xeriscape Plants.** Use and selection of drought-tolerant plants in the landscape, grouping for hydrozones.
- **Principles of Landscaping**. Following the 7 principles of xeriscape (see *Appendix II*).

The workshops will serve both as education and outreach, but will also be required as a condition of some water-conservation measure rebates.

RECOMMENDATIONS: Two sets of four workshops (a total of eight workshops), scheduled two to four weeks apart.

COSTS: Budgeted funds for eight workshops (speaker stipends, hospitality) is **$3400.**

1.3.2. School outreach program.

Included in the school outreach program will be funding for the yearly student art contest (prizes, publicity/ads, reception, and production of winners' art-work into calendars for distribution to school classrooms), and materials for classroom support (financial support of the Nipomo High School Envirothon, student books and other materials, the initiation of a District lending library of DVDs, available for use by teachers for classroom activities, and provision of Science Discovery demonstrations/classes for selected elementary school classrooms).

RECOMMENDATIONS: Provision of education/outreach school support measures.

COSTS: Budgeted funds for these outreach efforts is **$6900.**

1.3.3. Community events.

The District's participation in events serves to both inform and educate those who attend the events, and are a good opportunity to build connections in the community.

The majority of the "hardware" for events (canopy, tables, etc.) has been purchased. Funding will be for entry fees, costs of the events, and banners as needed.

RECOMMENDATIONS: Participation in community events.

COSTS: Budgeting for events is **$1500.**

1.4. NCSD LANDSCAPE/DEMONSTRATION GARDEN.

The current NCSD facility landscaping was not designed to be water-efficient, and includes an invasive species of groundcover (*Hedera helix*). Some of the trees have been planted in areas near buildings or sidewalks that will suffer damage as the trees mature.

In order to provide both an example and an inspiration to our customers, and to "practice what we preach," a redesign of the District's landscape to a water-efficient landscape is in process.

The new landscaping will be designed to demonstrate landscaping approaches to different landscape needs (sunny slope, bordering a walkway, under a shady tree, etc.). It will be installed in phases, with the first phase to incorporate the front of the District facility and the area near the back exit driveway.

The project is currently out for landscape-design proposals. Once the decision has been made on the design, removal of existing plant material and installation of new plant material and irrigation system elements will begin.

RECOMMENDATIONS: Continue District landscape redesign, with the initiation of Phase I of the project.

COSTS: Budgeting for installation of Phase I and appropriate signage is **$12,000.**

1.5. TECHNICAL ASSISTANCE

- **1.5.1. Water audits, assist in leak detection**
- **1.5.2. Provision of free, small-area landscape designs (i.e., design for an 8' shady border)**
- **1.5.3. Provision of a list of xeriscape-knowledgeable landscapers, landscape designers, and nurseries**
- **1.5.4. High-use letters offering assistance (water audit, information) and explaining rate schedule**
- **1.5.5. Low-use letters congratulating water efficiency**

==========

1.5.1. Water audits, assist in leak detection. (BMP 1)

The California Urban Water Conservation Council's Best Management Practice 1 recommends water survey programs (including water audits) for 15% of single-family residential and multi-family residential customers within 10 years.

Water audits are very important to any water conservation program. Water audits identify leaks and water use inefficiency, educate customers, serve as a public-outreach measure, and sometimes include installation of water-efficiency devices or plumbing retrofits. Some water-conservation measures, such as provision of irrigation controllers to customers, have been demonstrated to be unsuccessful without first accomplishing a water audit and bringing the existing system up to optimum performance and uniformity.

According to the California Department of Water Resources, most water audits of residential landscapes find a distribution uniformity of 50% or less (recommended uniformity is >70%).[70]

Most irrigation inefficiency occurred during the fall. Sites maintained by contract landscapers were irrigated less efficiently. Sites less than two acres achieved the highest percentage water savings. Water audit savings diminished over time (20.1%, 7.6%, and 6.5% over three years.)[71]

Water audits are performed to assess for leaks and inefficiency of water use (i.e., absence of distribution uniformity of landscape irrigation systems, where the amounts of water delivered to areas of the landscape are unintentionally without uniformity).[72]

Residential. Studies show that home water audits can result in water savings when plumbing retrofit devices are installed and customers are given practical guidance about more efficient outdoor water-use practices, particularly for lawn irrigation. Results of water audits vary, but those that involve installing some kind of efficiency device and spending time with the customer to educate them about reduced outdoor water use have reported savings for combined indoor and outdoor use ranging from 20 to 30 G/D per SFR. A trained technician can accomplish an indoor water audit in less than an hour (excluding follow-up analysis and paperwork). The cost of contracting a water auditor varies from $40 to $75 per home.

---

[70] Vickers, Amy. *Handbook of Water Use and Conservation.* Amherst, MA: Water Plow Press. 2001.
[71] Whitcomb, J.B. *Landscape Water Audit Evaluation.* Contra Costa Water District. August 1994.
[72] Vickers, Amy. *Handbook of Water Use and Conservation.* Amherst, MA: Water Plow Press. 2001.

An indoor water audit should contain an explanation of the purpose of the audit, a determination of the water use, test and repair leaks, provision of retrofit devices, follow-up analysis and recommendations, with education of the customer.[73]

Residential landscape. A residential landscape water audit takes about 1.5 hours. The highest yield of water savings usually occurs for both residential and nonresidential customers who rely on irrigation controllers that are incorrectly programmed or who have malfunctioning or poorly designed irrigation systems. Audits that educate customers one-on-one about water efficiency concepts, recommend site-specific conservation measures, and provide or install an efficiency device along with back-up technical support should result in a 10% to 15% reduction in landscape water demand. The most successful water audits should require an explanation of the purpose of the audit, review of outdoor water use, evaluation of lawn, landscape and irrigation features, measurement of water use of the irrigation equipment (distribution uniformity), provide landscape water-efficiency recommendations, leaving information and installation of conservation devices, and post-audit follow-up[74].

Large landscape. Water audits of large landscapes can take up to 8 hours. The Cachuma Resource Conservation District (USDA Service Center in Santa Maria) performs these specialty water audits for free. The service provides the audit and detailed recommendations, but does not do follow-up to verify that the recommended changes and fixes have been accomplished.

RECOMMENDATIONS: Offer water audits to SFR customers. Water audits are staff-time-intensive, and current staff is not sufficient to perform the anticipated requests for water audits. At this time staff is researching options for accomplishing this important part of the water conservation program. Options include temporary hire of students, who will need to be trained before they can perform the audits, and contracting for the audits (unable to locate local audit contractors to date). The Atascadero Mutual Water Company hires two temporary staff each year to perform the audits in spring and summer, and this program has worked well for them. The City of San Luis Obispo has two full-time staff who do water audits and other services for the city's water conservation program. Once the need for water audits has been assessed, a better estimation of needed staff for audits and the optimal way to access staff to do the audits can be made, and funding estimated.

COST: Not yet determined.

1.5.2. Provision of free, small-area landscape designs (i.e., design for an 8' shady border).

It is believed that many District homeowners may be open to changing landscaping and decreasing lawn size, but do not want to hire a landscape designer and may not want to do the entire project at once. Providing free small-area landscape designs to meet the needs of different landscape settings would give homeowners basic designs from which to work.

The District would pay a landscape designer experienced in xeriscape designs to create a series of small landscape designs for, as an example, an 8-foot walk-way border or four corners to use in decreasing a larger, rectangular lawn to a smaller, ovoid lawn.

RECOMMENDATIONS: Provision of free small-area landscape designs to District SFR customers.

---

[73] Vickers, Amy. *Handbook of Water Use and Conservation.* Amherst, MA: Water Plow Press, 2001.
[74] Vickers, Amy. *Handbook of Water Use and Conservation.* Amherst, MA: Water Plow Press, 2001.

COST: Budgeting is for **$1000.**

1.5.3. Provision of a list of xeriscape-knowledgeable landscapers, landscape designers, and nurseries

A common complaint from homeowners wishing to change their landscapes to a more water-efficient environment is the inability to locate knowledgeable landscape professionals and plant nurseries. By maintaining lists of landscape maintenance specialists, landscape designers and nurseries which have experience in supporting a water-efficient landscape, the District's customers will have additional tools by which they can succeed in conserving water.

RECOMMENDATIONS: Maintenance and provision of lists of landscape professionals knowledgeable in water-efficient/xeriscape landscapes.

COST: **Negligible**; staff will be compiling these lists anyway.

1.5.4. High-use letters offering assistance (water audit, information) and explaining rate schedule

1.5.5. Low-use letters congratulating water efficiency

Many sources speak highly of the impact of personal contact with customers in effecting water conservation goals.

According to Ron Munds (City of San Luis Obispo), measures which provide one-to-one contact with customers are very effective in promoting water conservation and reducing water usage. In his experience, high-use letters to customers produce over time a decrease in water consumption of those contacted, even if the customers don't take advantage of any of the offers for information or services that accompany the letters.

It is believed that the District would benefit from this measure, which would be easy to accomplish and take minimal staff time.

RECOMMENDATION: Monthly provision of letters to high-use customers, offering services (water audits, leak detection) and providing information for decreasing water use. In addition, monthly letters to the low-use customers, congratulating them for their wise use of the District's water resources, will serve as a reinforcement for desirable behavior.

COST: **Variable but minimal**, related to preparing addresses for merging with a form letter and charges for postage.

---

2. *"UNACCOUNTED FOR LOSSES," NON-REVENUE WATER.*

2.1. Supply-side (District) monitoring for increase in District's unaccounted-for losses; if the amount rises to 10%, consider formal system-wide audit for leaks and other problems.

2,2, Demand-side (customer) leaks, non-point-of-use losses.

2.2.1. "Oops" door-hangers.

==========

2. *"UNACCOUNTED FOR LOSSES," NON-REVENUE WATER.*

The American Water Works Association recommends the term "non-revenue water" to replace the previous, inaccurate term, "unaccounted-for losses."

Water system uses of water are divided into two categories:

1. Revenue water consumed has two categories:
   a. Billed metered consumption (SFR, MFR, CI, Landscape, Agriculture customers).
   b. Billed unmetered consumption. None.

2. Non-revenue water is the difference between the amount produced by the system and the billed authorized consumption, and includes three categories:
   a.. Authorized but unbilled consumption: Unbilled metered consumption (water used at NCSD office facilities), unbilled unmetered consumption (hydrant water used for fighting fires, water used for flushing lines).
   b. Apparent Losses: Unauthorized consumption, theft, customer metering inaccuracies, data handling errors.
   c. Real Losses: Leaks in transmission and distribution mains, leaks and overflows at utility tanks, leaks at service connections up to the point of customer metering.[75]

Table 1: PRODUCTION and LOSSES 2001 - 2006

Year	Total Produced	Total Delivered	System Losses	Losses as %of Prod
Yr.2001	2395.02	2238.07	156.95	6.55%
Yr.2002	2630.79	2340.53	290.26	11.03%
Yr.2003	2743.33	2567.08	176.25	6.42%
Yr.2004	2907.83	2810.24	97.59	3.36%
Yr.2005	2794.04	2638.51	155.53	5.57%
Yr.2006	2726.77	2607.99	118.78	4.36%

The amount of water used for fire-fighting and flushing lines and fighting fires is usually considered relatively small.[76]

Water not accounted for by metered consumption can be, but may not be, attributable to leaks in the water system. Theft and other unauthorized consumption, for instance, also contribute to the amount of water that cannot be accounted for by metered consumption.

For the years 2001-2006, the District produced a total of 16,197.78 acre-feet of water (average of 2699.63 acre-feet/year), delivered a total of 15,202.42 AF (average of 2533.74 AF/Y), and percentage of loss was a total of 995.36 AF (average of 165.89 AF/Y). The percent losses averaged 6.21% per year (Table 1).

Using the $2000/AF estimated next-increment cost of water, the yearly average monetary loss from unaccounted losses in the distribution system is $331,780.00.

---

[75] *Water Audit Methodology*. America Water Works Association, 2007.
[76] Vickers, Amy. *Handbook of Water Use and Conservation*. Amherst, MA: WaterPlow Press, 2001.

The total percentage increase in production from 2001 to 2006 was 13.85% (average production increase each year was 2.31%).

2.1 Supply-side (District) monitoring for increase in District's unaccounted-for losses; if the amount rises to 10%, consider formal system-wide audit for leaks and other problems.

The percent loss is compared to the cost-effectiveness standard set by the American Water Works Association (AWWA).[77] The current standard suggests that if a system's percent unaccounted-for-losses exceeds 9%, a distribution system audit could be cost effective. Based on the District's production information, the average yearly system loss was 6.21%, which is within the current AWWA standard; therefore, a distribution system audit would not be expected to be cost effective. In addition, the 6.21% average loss is below the 10% threshold in the California Urban Water Conservation Council (CUWCC) Best Management Practice 3 for unaccounted losses.[78]

2.2. Demand-side (customer) leaks, non-point-of-use losses.

A faucet leak of one drop per second results in a loss of 2400 gallons per year; based on the number of SFR District meters in 2006, that would equal 25.211 AF/Y. Leaks in the home and residential landscape can result in losses of, on average, 14% (9.5 G/C/D) of the home water use.[79] For each 5% (182 homes projected in 2008) of the District's SFR customers' water leaks which are located and corrected, projected over 5 years, it would translate into a total savings of 89.47 AF, and $175,913.12 in water costs. Average annual savings over 5 years would be 17.89 AF, $35,182.62 in water costs. Included in the estimation is $100 for each residence in estimated water audit costs, and $1,820 in initial office administrative costs. Note that the projections were only made for 5 years because savings have been shown to decrease with time until a new audit and leak correction is performed. Note also that this is only for one 5% SFR account increment that underwent water audit with subsequent corrections. Each year that this increment was performed would provide a new batch of savings (and costs).

Residential leaks can be located by the customer or by the District. It is anticipated that, given the correct instructions and tools (dye tabs for toilet leaks, etc.), that some customers would be willing and able to find and fix their own leaks, but some customers would not.

Leaks, once located, can be corrected by the customer or the District. Some water suppliers make this the responsibility of the customer. Other water suppliers believe that the increase in compliance and resulting water-loss savings justifies having the water supplier pay.

Residential water audits (indoor and outdoor) would identify leaks, as well as educate the customer and provide water-saving measures/fixtures to further decrease water usage in the homes. Water audits would also benefit other non-core program measures ("smart" controller, turf-replacement), and would benefit all measures by educating and establishing contact customers on water conservation.

Water audits of commercial, large landscape, and agriculture accounts may result in water savings, as well. The state-funded Cachuma Resource Conservation District (USDA Service Center, Santa Maria) will provide, free of charge, water audits for large landscape and agriculture accounts. A water audit of Nipomo Park has already been performed, and demonstrated that, just by bringing the

[77] *Water Conservation Programs—A Planning Manua, M52I.* American Water Works Association, 2006.
[78] *Memo of Understanding, BMP-3.* California Urban Water Conservation Council, 2007.
[79] Vickers, Amy. *Handbook of Water Use and Conservation.* Amherst, MA: WaterPlow Press, 2001.

irrigation system up to 70% or greater uniformity would save them over $24,000/year in water costs. Contacting customers in these two categories with the offer of a free water audit may benefit both the District and the customer in saving water and money spent on irrigation, especially if pocketbook-incentive (conservation-based rate structure) and staff follow-up is provided as incentive to get the recommendation changes made.

Of special interest is the fact that the Cachuma Resource District now has access, once the water audit has been performed by the CRD, to funding for bringing large irrigation accounts up to irrigation efficiency

2.2.1. "Oops" door-hangers.

In an effort to assist SFR customers to use water efficiently, the District has instituted an "Oops!" doorhanger program by which SFRs with obvious water use problems (broken/geysering sprinkler, irrigation water flowing into the street, etc.) receive a friendly notification. Currently the utility crew places these hangers as they encounter problems during the course of their regular duties.

Expansion of the program by devoting staff time to the effort, as part of the public outreach program, would be expected to increase the efficacy of the program.

To date there have been no complaints about the doorhangers, which were designed to be friendly and helpful. One residence where a doorhanger was placed the next reading had an $800 water bill. When the customer called about the amount of the bill, she said she had received the doorhanger, but had not done anything about it. In this case, notification was accomplished but customer action was not. Therefore, an expansion of the program to include recording addresses and dates the doorhangers were left would allow for appropriate follow-up to offer information or help where appropriate.

RECOMMENDATIONS:

1. Because the District's percent loss is 6.21%, at this time formal distribution system water audits may not be cost effective. However, the level of losses should continue to be regularly monitored. If water losses were to increase to 10%, a full-scale system audit may be warranted.
2. SFR leaks, if located and corrected, could produce substantial water savings. When combined with other water-conservation program measures, such as using the opportunity to provide low-flow showerheads and other plumbing retrofits, even more water savings can be accomplished. It is recommended that a goal be set to provide water audits to 5% of SFR customers. The District can consider making simple repairs, such as replacing a toilet flapper-valve.
3. There is potential for water and money savings in the large landscape and agriculture accounts which are not now irrigating at maximum efficiency. Recommendation is made for contacting these accounts with the offer of the free water auditing services provided by the State of California. Simple, non-intrusive follow-up, offering information and assistance, opening a line of communication with these accounts, would be beneficial to the District, and is recommended.
4. It is believed that expansion of the "Oops!" doorhanger program would increase both the impact of the program and the compliance with fixing the problem. If staff is brought on for another reason (assisting in water audits, for example), the "Oops!" doorhanger program could become part of the staff's responsibilities.

COMPARISON AND DISCUSION OF CORE WATER CONSERVATION PROGRAM MEASURES

The core water conservation program measures work together to form a supportive matrix by which each core measure is supported by, and supports, the other core measures. The core program measures also form the bedrock upon which other, non-core measures rely.

The majority of the core measures are considered vital, yet not-quantifiable-in-savings, parts of the entire water conservation program. These are:

- Public outreach materials and efforts.
- Public outreach events.
- NCSD landscape/demonstration garden.
- Technical assistance (including "Oops!" doorhangers).

Two of the Core measures, however, do have clearly quantifiable savings, when part of the Core program and in support of Non-Core measures. These are:

- Multi-tiered conservation-based rate structure.
- Leak detection and correction.

Table 15: COMPARISON OF CORE PROGRAM MEASURES

Measure	Target Category	Total Savings Avg. AFY	Avg. AFY Consum. For All Categ,s	% AF Savngs for All District Categ's	Total $ (not NET) Savings	Total$ Costs	Savings: Costs Ratio	Years to pay off Initial Invest.
Conservation-based rates	SFR	256.13	3698.743	6.92%	$14,767,461.09	$13,307.54	1109.7:1	<0.5
Conservation-based rates	All Categories	381.44	3698.743	10.31%	$21,992,334.31	$13,307.54	1652.6:1	<0.5
Leak detection, fixes	SFR (5%)	17.89	3698.743	0.48%	$196,351.48	$20,438.36	9.6:1	<1.0

Multi-tiered, conservation-based rate structure. This measure is, by far, the most cost-effective, with the highest savings:cost ratio of all measures offered. There are no rebates or costs for equipment required for this program, staff time to support the measure is minimal, the initial program costs will e paid off in less than one-half year, and the savings do not diminish with time. This measure achieves 100% market penetration for each customer category, or group of categories, because the multi-tiered rate structure will be applied to 100% of the people in the defined category/ies. This measure is economical too because, whether it is applied to 100% of the targeted category/ies or 50%, the costs of the program are the same. Based on the many studies performed on the impact of conservation-based rate structures, we can anticipate a conservative estimate of 15% savings (5% the first year, 10% the second, and 15% the third and subsequent years).

The savings:cost ratios for both conservation-based rate measures (for SFR category only, and for all categories) are very, very high.

For the conservation-based rate structure program to achieve maximum benefit, it must be a strong incentive rate structure. There must be clear incentive for all customers to use less, but the incentive must be strongest for those who are at the high-end of amount of water use. It is this latter category of customers which are the greatest burden, per customer, on the system, and which force expansion of facilities sooner than other users.

Conservation-based rate structure for the residential categories is the top priority, although equity of responsibility for conserving water in the District, across all categories of consumers, is important. The SFR category uses, as a category, the highest percentage of water and, it is estimated, have the greatest potential to save an impressive amount of water. It is estimated that the majority of the customers in the other categories can also conserve water, but it is not as easy to predict how much can be saved by the non-residential categories. Studies have shown that the majority of water customers, in all categories, respond to a strongly tiered conservation-based rate structure by using less water. Even if the rate structure simply triggers the customer to undergo a water audit and make the changes necessary to optimize water use efficiency, it is the pocketbook-based incentive that triggers the greatest and most predictable change.

It is recommended that the residential categories be charged by a three-tier inclining-block conservation-based rate structure. It is recommended that all other categories be charged on an incentive-based rate structure. It is recommended that this measure be started in 2008.

Leak detection, fixes. This measure also has specific findings for water savings. However, as is the case with all measures, these savings are dependent on appropriate public education other supportive measures is noted. If 5% of the SFR category underwent water audit each year, the savings would be almost 1/2% of the annual use of all categories combined, with a 9.6:1 savings:cost ratio, and the initial investment would be paid back in less than one year. This measure's savings decreases with time, as new leaks or irrigation distribution uniformity problems arise; therefore, the projected total savings is limited to five years.

3.1 CORE PROGRAM DISCUSSION AND RECOMMENDATIONS. With just the 15% savings with conservation-based rate structure for all categories (10.31% the annual water usage for all categories) and just one year of leak detection and correction measure's savings of .48% (with only one 5%-increment of customers undergoing water audit and leak fix), an almost 11% savings of the annual water consumption for all categories would be estimated.

RECOMMENDATIONS:

1. **Multi-tiered, conservation-based rate structure is strongly recommended.** Without a doubt, the most important measure of the Core program is the multi-tiered, conservation-based rate structure. It provides tremendous returns in water savings, with little effort and expenditure, and provides the pocketbook incentive for other measures to succeed, as well.
2. **Full-system, formal water audit of the District's production and delivery system is not recommended at this time.** Because the District's percent loss is 6.21%, at this time formal distribution system water audits may not be cost effective. However, the level of losses should continue to be regularly monitored. If water losses were to increase to 10%, a full-scale system audit may be warranted.
3. **SFR water audits and assistance, where possible, with leak fixes, is recommended, with a goal of water audits in 5%-of-SFR household increments.** SFR leaks, if located and corrected, could produce substantial water savings. When combined with other water-conservation program measures, such as using the opportunity to provide low-flow showerheads and other plumbing

retrofits, even more water savings can be accomplished. The District can consider making simple repairs, such as replacing a toilet flapper-valve.

4. **An outreach program to non-residential customer accounts, with the offer of free water audits, and then non-intrusive follow-up, is recommended.** There is potential for water and money savings in the large landscape and agriculture accounts which are not now irrigating at maximum efficiency. Simple, non-intrusive follow-up, offering information and assistance, opening a line of communication with these accounts, would be beneficial to the District, and is recommended.
5. **The "Oops!" doorhanger program should be expanded.** It is believed that expansion of the "Oops!" doorhanger program would increase both the impact of the program and the compliance with fixing the problem. If staff is brought on for another reason (assisting in water audits, for example), the "Oops!" doorhanger program could become part of the staff's responsibilities.

IX. Water Conservation Program: *Non-Core* Program Measures

IX. Water Conservation Program: *Non-Core Program Measures*

1. ***HARDWARE RETROFITS AND REBATES FOR RESIDENCE***
   - **1.1. Toilet replacement rebates/mitigation**
   - **1.3. High-efficiency washing machine rebates**
   - **1.3. Rebates for hot water on demand/recirculation rebates**
   - **1.4. Provision of plumbing retrofit kits**

2. **HARDWARE RETROFITS AND REBATES FOR LANDSCAPE**
   - **2.1. Smart irrigation controller provision or rebate**
   - **2.2. Rebates for conversion from turf to drought-tolerant plantings**
   - **2.3. Provision of landscape irrigation efficiency items**

BENEFITS AND COSTS OF RESIDENTIAL WATER CONSERVATION

A number of benefits occur for utilities, residential customers, and nonresidential property-owners who conserve water.

BENEFITS:

- Water savings.
- Reduced wastewater flows.
- Reduced costs for water, sewer, and associated electric and gas utility services.
- Reduced costs for clothes-washing and dishwashing detergents.
- Reduced size and extended septic system life.
- Improved safe yield and pumping reliability in wells.
- Improved local environment (instream flows, wetlands protection, topsoil preservation).
- Pollution prevention (reduced energy combustion by-products and chemical use).

COSTS:

- Price of conservation device (hardware).
- Cost to install device.
- Cost of any necessary renovation of existing plumbing, appliances, or related connections.
- Changes in water-use habits.[80]

1. HARDWARE RETROFITS AND REBATES FOR RESIDENCE (BMP 1, 2)

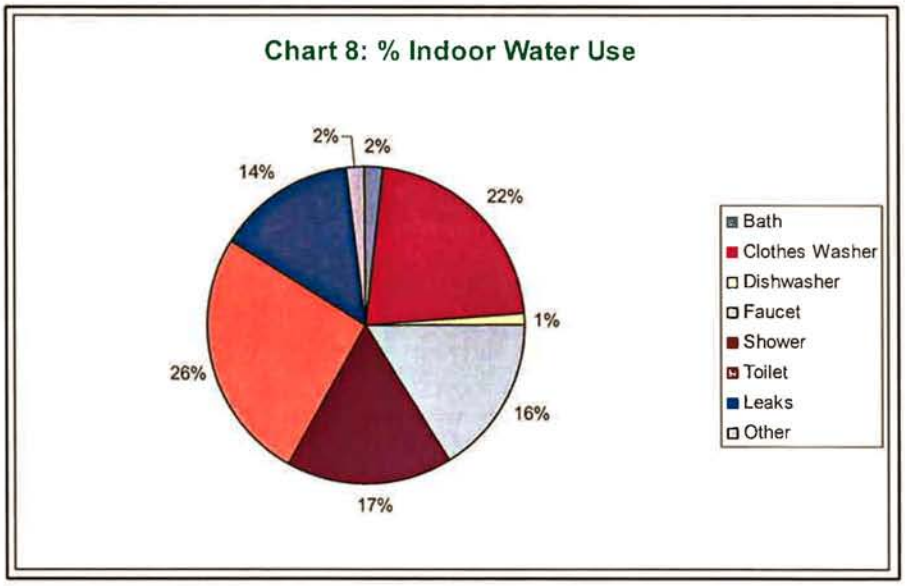
Hardware retrofits and rebates, in general, produce immediate results that persist over the life of the hardware. Unlike behavioral modification approaches (taking shorter showers, turning off water while brushing teeth, etc.) re-education and reinforcement are not necessary to continue the benefit.[81,82]

[80] Vickers, Amy. *Handbook of Water Use and Conservation.* Amherst, MA: Water Plow Press. 2001.
[81] Vickers, Amy. *Handbook of Water Use and Conservation.* Amherst, MA: Water Plow Press, 2001.

The County of San Luis Obispo has certified a Level of Severity III (the highest level) for the water supply water for the Nipomo Mesa. It is anticipated that part of the efforts to address this will be County planned and implemented. It is anticipated that indoor plumbing retrofits will be part of the County's program. As such, information on indoor plumbing retrofits is provided, but the need for NCSD to plan and implement these measures will not be known until the County informs us of their intentions.

1.1. Toilet rebates/replacements residential:

Studies done have repeatedly demonstrated dependable savings fro m replacement of high-flow toilets with low-flow toilets. Indeed, when the City of San Luis Obispo instituted a water conservation program, they found that toilet replacement was a cornerstone of their program, and has produced since its initiation in 1994 an annual water savings of 1,400 acre-feet.[83]



Toilet replacement measures are the most rewarding in water savings when the measure is first implemented in the city or district. As more toilets are replaced by the program, and as time passes and toilets are replaced by homeowners and businesses because of failure or owner decision, the market becomes "saturated" and there is less opportunity for the replacement program to be used. However, the savings from toilet conversion to low-flow devices are remarkable, and worth having in the program.[84]

Savings are estimated for targeted households at 32.2 gpd, and untargeted households 21 gpd. Costs and savings depend on the scale of the program (rebate, distribution, or direct installation).[85]

The Metropolitan Water District of Southern California's low-volume toilet program showed an average net savings per single-family residence (SFR) of 41.2 gallons/household/day (G/H/D). Mean savings were 29.9 G/H/D with one 1.6 gallons/flush (G/F) toilet, 20.6 G/H/D with two 1.6 G/F toilets, and 19.1 G/H/D with three 1.6 G/F toilets. Estimated net savings per 1.6 G/F toilet installed was 21.6 gallons/day (G/D). Multi-family residences (MFR) demonstrated an average net savings of 44.0 G/H/D. Mean savings were 44 G/H/D with one 1.6 G/F toilet and 34 G/H/D with two 1.6 G/F toilets (toilets installed in a household after the first one usually show less savings because usually the most heavily used toilet is replaced first). Estimated net savings per 1.6 G/F toilet installed was 40.3 G/D. A

---

[82] A&N Technical Services, Inc. *BMP Costs and Savings Study: A Guide to Data and Methods for Cost-Effectiveness Analysis of Urban Water Conservation Best Management Practices.* The California Urban Water Conservation Council, March 2005.

[83] Henderson, Gary, Munds, R. *City of San Luis Obispo 2006 Water Resources Status Report, June 2006.*

[84] Vickers, Amy. *Handbook of Water Use and Conservation.*

[85] A&N Technical Services, Inc. *BMP Costs and Savings Study: A Guide to Data and Methods for Cost-Effectiveness Analysis of Urban Water Conservation Best Management Practices.* The California Urban Water Conservation Council, March 2005.

toilet-replacement program by the Tampa Water Department demonstrated an average savings per SFR of 38 G/H/D. In New York City, New York, average water savings of 9.3 gallons/capita/day (G/C/D) in households with 1.6 G/F toilets were demonstrated. In El Paso, Texas, their household savings from low-volume toilets was 8% reduction in monthly residential water consumption. In the City of Barrie, Ontario, Canada, the mean savings from low-volume toilets in a SFR was 16.38 G/C/D.[86]

COST-BENEFIT ANALYSIS: Refer to Table 16 for detailed accounting.

Since this is not a habit-modification measure, continual follow-up is not required, the costs of the program (rebate, shared program costs, office administration costs) are a one-time expenditure, at the beginning of the program, and the benefits continue to accrue over years.

If the District was to undertake such a program, the projected net savings over a 20-year period (2007-2026) would be:

Savings in AF over 20 years:		167.79
Average AF/Y savings:		8.83
Total net savings in $$$ over 20 years:		$413,338.64
Average net $$$/year savings:		$ 20,484.53
Years until costs are paid off:	<2.5	
% Water savings (AF/Y)		0.24%
Savings:Cost ratio		10.9:1

The toilet retrofitting measure figures are based on a one-time selection of 10% of the District's customer applicants (365), with $100 rebate for each of those selected. If the program was undertaken by the District, if the savings were sufficient, and if saturation had not yet been reached, the program could be expanded.

There is some question regarding the saturation (customers who already have ULFTs). Reportedly, a previous District ULFT program utilized poor-performing ULFTs, and these poor-performing toilets require in some cases multiple flushes, negating the savings of the ULFT which is only intended to be flushed once for each use.

This measure could also be expanded by including the poor-performing, previously-placed ULFTs in the rebate program.

[86] Vickers, Amy. *Handbook of Water Use and Conservation.* Amherst, MA: Water Plow Press. 2001.

Table 16: *PROJECTED COSTS AND SAVINGS* OF ULTRA-LOW-FLOW TOILET REFIT PROGRAM WITH A 10% MARKET PENETRATION, OVER 20 YEARS (SINGLE-FAMILY RESIDENCE, 21.6 G/H/D SAVINGS)

Year	#SFR Meters	(SFR) #Meters w/10% MP	Estimd. Popul. w/10% MP	SFR AFY Required w/o Measure	Saved:SFR AFY/All Customers (21.6 gphd avg)	Cost of Water/AF w/3% inflat.	$$Savings/ Year (w/ 3% infl/yr)	Rebate ($100 ea)	5% Share of Shared Program Costs	Office Admn Costs (10% of Prg.Costs)	Total Costs	NET SAVINGS (Total Savings minus Total Costs)	Years to Pay Off Original Invest.
2008	3647	365	1,256	214.255	8.83	$2,060.00	$18,192.30	$36,500.00	$3,445.00	$3,650.00	$43,595.00	**-$25,402.70**	**<2.5**
2009				214.255	8.83	$2,121.80	$18,738.07	$0.00	$0.00	$0.00	$0.00	**$18,738.07**	
2010				214.255	8.83	$2,185.45	$19,300.21	$0.00	$0.00	$0.00	$0.00	**$19,300.21**	
2011				214.255	8.83	$2,251.02	$19,879.22	$0.00	$0.00	$0.00	$0.00	**$19,879.22**	
2012				214.255	8.83	$2,318.55	$20,475.60	$0.00	$0.00	$0.00	$0.00	**$20,475.60**	
2013				214.255	8.83	$2,388.10	$21,089.86	$0.00	$0.00	$0.00	$0.00	**$21,089.86**	
2014				214.255	8.83	$2,459.75	$21,722.56	$0.00	$0.00	$0.00	$0.00	**$21,722.56**	
2015				214.255	8.83	$2,533.54	$22,374.24	$0.00	$0.00	$0.00	$0.00	**$22,374.24**	
2016				214.255	8.83	$2,609.55	$23,045.46	$0.00	$0.00	$0.00	$0.00	**$23,045.46**	
2017				214.255	8.83	$2,687.83	$23,736.83	$0.00	$0.00	$0.00	$0.00	**$23,736.83**	
2018				214.255	8.83	$2,768.47	$24,448.93	$0.00	$0.00	$0.00	$0.00	**$24,448.93**	
2019				214.255	8.83	$2,851.52	$25,182.40	$0.00	$0.00	$0.00	$0.00	**$25,182.40**	
2020				214.255	8.83	$2,937.07	$25,937.87	$0.00	$0.00	$0.00	$0.00	**$25,937.87**	
2021				214.255	8.83	$3,025.18	$26,716.01	$0.00	$0.00	$0.00	$0.00	**$26,716.01**	
2022				214.255	8.83	$3,115.93	$27,517.49	$0.00	$0.00	$0.00	$0.00	**$27,517.49**	
2023				214.255	8.83	$3,209.41	$28,343.01	$0.00	$0.00	$0.00	$0.00	**$28,343.01**	
2024				214.255	8.83	$3,305.70	$29,193.30	$0.00	$0.00	$0.00	$0.00	**$29,193.30**	
2025				214.255	8.83	$3,404.87	$30,069.10	$0.00	$0.00	$0.00	$0.00	**$30,069.10**	
2026				214.255	8.83	$3,507.01	$30,971.18	$0.00	$0.00	$0.00	$0.00	**$30,971.18**	
2027				214.255	8.83	$3,612.22	$31,900.31	$0.00	$0.00	$0.00	$0.00	**$31,900.31**	
			TOTAL:	**4,285.100**	**167.79**	**$51,740.75**	**$456,933.64**	$36,500.00	$3,445.00	$3,650.00	$43,595.00	**$413,338.64**	
			AVERAGE:	**81.031**	**8.83**	**$2,767.65**	**$24,441.70**					**$20,484.53**	

One-time investment with benefits reaped over years.

RECOMMENDATIONS: Projections are for demonstration of savings from such a program. It is not recommended that the District undertake such a program at this time, but wait until San Luis Obispo County develops its program for development water-impact mitigation for the Nipomo Mesa Management Area.

1.2. Provision of plumbing (non-toilet) retrofit kits.

This usually involves replacement of showerheads, installation of faucet aerators, provision of leak-detection tablets, and other water-conservation support items. In the past, when SLO City's water conservation program was initiated, showerheads were considered a "cornerstone" of the program.[87]

The results of showerhead replacement vary depending on saturation (the number of devices already in place) and retention of the showerhead. Showerhead replacement works best when the new showerhead is of good quality, when the old showerhead is removed from the premises (i.e., replacement or rebate to homeowner after installation, in exchange for the old showerhead) and when the new showerhead is actually installed[88].

Expected water savings for showerheads are from 5.2 to 5.8 G/D, for toilet dams (to decrease the amount of water in the toilet tank) 4.2 G/D, for aerators 1.5 G/D, and for leak tablets 8 G/D with a leak, 0.64 G/D overall.

Expected energy savings depend on whether the household refitted has an electric or gas water heater. In homes with an electric water heater, when a high-flow showerhead is replaced with a low-flow unit, and when a low-flow aerator is placed on a high-flow kitchen faucet, 1,568 kWh in annual savings can be expected. In homes with gas water heaters, 86 therms in savings can be expected.

Cost of retrofit kits vary, depending on quality and quantity ordered, as well as the number of items in each kit, starting as low as $2.00.[89]

RECOMMENDATIONS: Provide interested customers with an indoor-plumbing refit kit consisting of a showerhead, Teflon tape, toilet leak detector, faucet aerator, and shower timer. The price for each set would be $24.84 each (plus delivery), with an initial order of 250 sets. The total for these kits would be $6210.00.

The savings for the showerheads would be estimated at 5.8 G/D each and for the leak detection 0.65 G/D each overall (taking into account those that identified a leak and those that didn't). The savings from the Teflon tape and shower timer would be in support of the shower-savings program. The kitchen faucet aerator would be estimated to provide 1.5 G/D water savings. A total of 7.3 G/D for each kit would be estimated.

COST-BENEFIT ANALYSIS:	Refer to Table 17.
Savings in AF over 10 years:	20.443
Average AF/Y savings:	2.044
Total net savings in $$$ over 10 years:	$33,822.47
Average net $$$/year savings:	$ 2,357.97
Years until costs are paid off:	Less than 3 years.
% Water savings AF/Y:	0.06%
Savings:Cost ratio	3.3:1

[87] Henderson, Gary, Munds, R. *City of San Luis Obispo 2006 Water Resources Status Report, June 2006.*

[88] Vickers, Amy. *Handbook of Water Use and Conservation.* Amherst, MA: Water Plow Press. 2001.

[89] A&N Technical Services, Inc. *BMP Costs and Savings Study: A Guide to Data and Methods for Cost-Effectiveness Analysis of Urban Water Conservation Best Management Practices.* March 2005. The California Urban Water Conservation Council.

Table 17 : *PROJECTED COSTS AND SAVINGS* OF INDOOR SMALL-ITEM PLUMBING RETROFIT (EXCLUDING TOILET); 6.15% MARKET PENETRATION, OVER 10 YEARS (SINGLE-FAMILY AND MULTI-FAMILY RESIDENCE CATEGORIES) (7.3 gallons/meter/day Estimated Savings)

Year	(SFR & MFR) #Meters	Estimd Popul. w/6.15 % MP	SFR AFY Required w/o Measure	Saved: SFR AFY	Cost of Water/AF w/3% inflat.	$$Savings/ Year (w/ 3% infl/yr)	Cost of Equip.	10% Share of Shared Program Costs	Office Admn Costs (10% of Prg.Costs)	Total Costs	NET SAVINGS (Total Savings minus Total Costs)	Years to Pay Off Initial Invest.
2008	250	860	137.810	2.044	$2,060.00	$4,211.18	$6,250.00	$6,890.00	$1,314.00	$14,454.00	-$10,242.82	<3
2009	One-time investment, with benefits reaped over years.		137.810	2.044	$2,121.80	$4,337.52	$0.00	$0.00	$0.00	$0.00	$4,337.52	
2010			137.810	2.044	$2,185.45	$4,467.64	$0.00	$0.00	$0.00	$0.00	$4,467.64	
2011			137.810	2.044	$2,251.02	$4,601.67	$0.00	$0.00	$0.00	$0.00	$4,601.67	
2012			137.810	2.044	$2,318.55	$4,739.72	$0.00	$0.00	$0.00	$0.00	$4,739.72	
2013			137.810	2.044	$2,388.10	$4,881.91	$0.00	$0.00	$0.00	$0.00	$4,881.91	
2014			137.810	2.044	$2,459.75	$5,028.37	$0.00	$0.00	$0.00	$0.00	$5,028.37	
2015			137.810	2.044	$2,533.54	$5,179.22	$0.00	$0.00	$0.00	$0.00	$5,179.22	
2016			137.810	2.044	$2,609.55	$5,334.60	$0.00	$0.00	$0.00	$0.00	$5,334.60	
2017			137.810	2.044	$2,687.83	$5,494.64	$0.00	$0.00	$0.00	$0.00	$5,494.64	
TOTAL:			**1378.100**	**20.443**	**$23,615.59**	**$48,276.47**	**$6,250.00**	**$6,890.00**	**$1,314.00**	**$14,454.00**	**$33,822.47**	
AVERAGE:			**137.810**	**2.044**	**$2,361.56**	**$4,827.65**	**$625.00**	**$689.00**	**$131.40**	**$1,445.40**	**$2,357.97**	

The highest estimations of savings for this measure is when they are provided as part of a water audit and installed for the homeowner. Neither one of these measures is recommended as a condition of receiving the kit. However, when a water audit is performed it would certainly be efficient to offer the kit at the same time to reinforce the benefit of the water audit, and when a kit is offered it would be efficient to ask if they would like to have a water audit performed.

1.3. Hot water on demand:

(BMP2) These devices deliver hot water to a shower or sink without having to first drain the cold water in the pipes between the water heater and the faucet. Water savings are dependent upon the volume of cold water in the pipe. Not all homes have the type of plumbing configured to use a host water demand system. The cost runs from $200 uninstalled to $500 installed. Water savings are from 6 to 20 gpd, but the savings and cost depend on the plumbing layout of the residence. A Palo Alto study of hot water recirculation on demand found water savings for a household of four occupants varied from about 900 gallons to about 3000 gallons per point of use, per year. Santa Clara Valley Water District found a decrease of 2% in household water use, or 8.6 G/D).[90]

Estimated savings for analysis: 8.6 G/D.

COST-BENEFIT ANALYSIS:	Refer to Table 18.
Savings in AF over 10 years:	9.633
Average AF/Y savings:	0.963
Total net savings in $$$ over 10 years:	$10,170.46
Average net $$$/year savings:	$ -42.41
Years until costs are paid off:	<5
% Water savings, all meters:	0.03%
Savings:Cost ratio:	2.3:1

RECOMMENDATIONS: There are many variables that impact successful implementation of this measure, including physical characteristics and dimensions of the under-sink cabinet where the unit would be installed and distance from the source of hot water. There is also relatively little documentation of the water/cost savings.

Therefore, although this measure remains an interesting and potential water-conservation measure, further study and documentation is warranted before including it in the District's water-conservation program.

[90] A&N Technical Services, Inc. *BMP Costs and Savings Study: A Guide to Data and Methods for Cost-Effectiveness Analysis of Urban Water Conservation Best Management Practices.* The California Urban Water Conservation Council, March 2005.

Table 18: PROJECTED COSTS AND SAVINGS OF HOT-WATER-ON-DEMAND INSTALLATIONS 2.7% (100 HOMES) MARKET PENETRATION, OVER 10 YEARS, SAVINGS: 8.6 GALLONS/HOUSEHOLD/DAY (SINGLE-FAMILY RESIDENCE CATEGORY)

Year	#SFR Meters	Estimd. Popul. w/2.7% MP	SFR AFY Required w/o Measure	Saved: SFR AFY/All Meters	Cost of Water/AF w/3% inflat.	$$Savings/ Year (w/ 3% infl/yr)	Cost of Rebate ($50 ea)	10% Share of Shared Program Costs	Office Admn Costs (10% of Prg.Costs)	Total Costs	NET SAVINGS (Total Savings minus Total Costs)	Years to Pay Off Initial Invest.
2008	100	344	58.700	0.963	$2,060.00	$1,984.45	$5,000.00	$6,890.00	$689.00	$12,579.00	**-$10,594.55**	**<5**
2009	**One-time investment in rebates, with returns over years.**		58.700	0.963	$2,121.80	$2,043.98	$0.00	$0.00	$0.00	$0.00	**$2,043.98**	
2010			58.700	0.963	$2,185.45	$2,105.30	$0.00	$0.00	$0.00	$0.00	**$2,105.30**	
2011			58.700	0.963	$2,251.02	$2,168.46	$0.00	$0.00	$0.00	$0.00	**$2,168.46**	
2012			58.700	0.963	$2,318.55	$2,233.51	$0.00	$0.00	$0.00	$0.00	**$2,233.51**	
2013			58.700	0.963	$2,388.10	$2,300.52	$0.00	$0.00	$0.00	$0.00	**$2,300.52**	
2014			58.700	0.963	$2,459.75	$2,369.53	$0.00	$0.00	$0.00	$0.00	**$2,369.53**	
2015			58.700	0.963	$2,533.54	$2,440.62	$0.00	$0.00	$0.00	$0.00	**$2,440.62**	
2016			58.700	0.963	$2,609.55	$2,513.84	$0.00	$0.00	$0.00	$0.00	**$2,513.84**	
2017			58.700	0.963	$2,687.83	$2,589.25	$0.00	$0.00	$0.00	$0.00	**$2,589.25**	
TOTALS:			**587.000**	**9.633**	**$23,615.59**	**$22,749.46**	**$5,000.00**	**$6,890.00**	**$689.00**	**$12,579.00**	**$10,170.46**	
AVERAGE:			**58.700**	**0.963**	**$2,361.56**	**$2,274.95**	**$500.00**	**$1,378.00**	**$137.80**	**$2,515.80**	**-$42.41**	