Comments on the Revised Draft EIR for the Cachuma Water Rights Hearing

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Introduction

In 2003, the Pacific Institute assessed the potential for improving water-use efficiency among the five major water districts that withdraw water from the Santa Ynez River (the Cachuma contractors): Carpinteria Valley Water District (CVWD), Goleta Water District (GWD), Montecito Water District (MWD), City of Santa Barbara (SB), and the Santa Ynez River Water Conservation District, Improvement District #1 (SYRWCD, ID#1).[1] Because a full assessment of the conservation potential was beyond the scope of the study, the analysis focused on the potential for a limited number of technology-based water conservation and efficiency measures to save water, including installing residential high-efficiency clothes washers, ultra-low-flow toilets in residential and non-residential settings, and more efficient residential landscapes. Based on that 2003 analysis, Haasz and Gleick estimated that between 5,000 and 7,000 acre-feet per year (AFY) could be conserved cost-effectively, allowing the Cachuma contractors to "reduce their take of water from Santa Ynez River without a loss of service or quality of life." Misty Gonzales provided rebuttal testimony that questioned the validity of the 2003 Pacific Institute analysis. We provide a detailed assessment of her testimony below.

[1] Haasz, D. and P.H. Gleick. 2003. Comments on the Draft EIR for the Cachuma Water Rights Hearing.

In July 2007, a Revised Draft Environmental Impact Report (RDEIR) was released. This assessment reviews that RDEIR, particularly the analysis of water supply impacts, and updates the original 2003 analysis of the potential for additional efficiency improvements to return water to the Santa Ynez River. We conclude the following:

- The conclusions from the original 2003 Haasz and Gleick testimony – that 5,000 to 7,000 acre-feet of water could be conserved by Cachuma contractors, cost-effectively, remain valid, and they are still pertinent to the RDEIR.
- Rebuttal testimony from Ms. Gonzales on the previous Pacific Institute analysis contains numerous factual errors and omissions, and we stand by our original conclusions.
- Water demand projections used in the 2007 RDEIR are based on outdated estimates and ignore more recent water demand projections from the contractors themselves.
- Even the recent estimates from the contractors, however, fail to incorporate cost-effective, widely-available water efficiency improvements. In their 2020 demand projections, the Cachuma contractors ignore continued investment in conservation measures and naturally occurring conservation mandated under national plumbing codes.
- As a result, the 2020 demand estimates in the RDEIR likely overestimate future demand and potential shortages under the proposed alternatives.
- Cachuma contractors are failing to meet the requirements of the Memorandum of Understanding (MOU) of the California Urban Water Conservation Council, which all five contractors have signed.
- All of the Cachuma contractors could expand their current water conservation efforts, as indicated by their implementation record of the agreed-upon Best Management Practices (BMPs).
- Our review of Cachuma water utility rate structures suggest that the agencies are failing to implement common, well-understood economic policies for encouraging efficient water use.

- All of the Cachuma contractors could improve their rate structures by instituting inclining block rates with low fixed charges and larger price differentials between blocks.

The following analysis is based on data collected from the California Urban Water Conservation Council (CUWCC) Best Management Practice (BMP) reports and the Department of Water Resources Urban Water Management Plans (UWMPs). As signatories to the CUWCC Memorandum of Understanding, all Cachuma contractors are required to complete BMP reports annually and file them biennially with the CUWCC. Four of the five contractors submitted these reports for all of the filing periods; CVWD has not submitted these reports for 2005/2006 but has done so for all other years. According to the Urban Water Management Planning Act (Water Code Sections 10610 - 10656), agencies serving more than 3,000 customers or more than 3,000 acre-feet per year (AFY) are required to prepare urban water management plans at least once every five years in years ending in 0 and 5. CVWD, MWD, GWD, and SB submitted UWMPs to the Department of Water Resources (DWR) in 2001 and 2005. Although not required by law, the SYRWCD, ID#1 submitted a UWMP in 2001. SYRWCD, ID#1 did not prepare a UWMP in 2005.

Previous Pacific Institute Analysis

In 2003, an analysis of the water conservation potential by Haasz and Gleick of the Pacific Institute found that the Cachuma contractors could conserve between 5,000 and 7,000 AFY by installing residential high-efficiency clothes washers, ultra-low-flow toilets in residential and non-residential settings, and more efficient residential landscapes. These estimates remain valid, as conservation efforts over the past four years have not intensified. In addition, the cost of many water conservation devices, such as high-efficiency clothes washers, has continued to decline, making these investments even more financially attractive. Additional conservation beyond the 5,000 to 7,000 AFY remains for both the urban and agricultural sectors.

The RDEIR notes that "The Member Units presented rebuttal testimony, however, that disputed the testimony of CalTrout's witnesses."[2] Direct quotes and general comments made by Misty Gonzales in her rebuttal testimony are shown in bold and are immediately followed by responses from the Pacific Institute.

In Footnote 2, Ms. Gonzales notes that "The Pacific Institute Report has also not yet been peer-reviewed."

This is incorrect. See Ex. CT 63, page 1 for a partial list of reviewers. Since the prior Cachuma administrative proceedings, Waste Not, Want Not (which Ms. Gonzales refers to as "The Pacific Institute Report") has been adopted in work of the California Department of Water Resources and CalFed.

Ms. Gonzales testified that the Pacific Institute relies on a per-capita analysis to determine the conservation potential. She then states that "Per capita analyses are not generally the most reliable measure of achieved water conservation reductions. Measured end use information before and after the conservation retrofit is much more precise" (p.1, para. 2)

Ms. Gonzales claim is incorrect: To determine the conservation potential, Ms. Haasz and Dr. Gleick utilized an end-use analysis, which is identified as the preferable analysis by Ms. Gonzales. See, Haasz and Gleick written testimony at 2 ("we quantify conservation potential from . . . end-uses") [Ex. CT 50]. Haasz and Gleick calculated current consumption levels for each end-use evaluated (residential toilets, clothes washers, and landscape and non-residential toilets), with consideration given to water consumption for each individual member unit and the penetration rate of each end use evaluated. See, Id. at 3-5 (toilets); 6-7 (washers); 8-9 (landscape); 9-11 (CII)). Table 1 on page 2 of Haasz and Gleick's testimony identifies per-capita water use for the Cachuma contractors for illustrative purposes only. These numbers, however, were not utilized to calculate potential water savings.

[2] State Water Resources Control Board, Division of Water Rights. July 2007. Revised Draft Environmental Impact Report. Consideration of Modification to the U.S. Bureau of Reclamation's Water Rights Permits 11308 and 11310 (Applications 11331 and 11332) to Protect Public Trust Values and Downstream Water Rights on the Santa Ynez River Below Bradbury Dam (Cachuma Reservoir). Page 4-32.

Ms. Gonzales' testimony argues that the Pacific Institute misidentifies Member Units per-capita usage (p.1, para. 2).

The per-capita numbers included in the Pacific Institute are for *residential use only*, are explicitly identified as such, and are based on the water agencies' own data as reported in their Urban Water Management Plans. They do not include water use for non-residential or agricultural purposes, as suggested by Ms. Gonzales' testimony. Furthermore, the per-capita figures are included for illustrative purposes only. They are not utilized to calculate conservation savings.

Ms. Gonzales states that "According to a study completed by the American Water Works Foundation in 1999, a household fully retrofitted with available water conservation equipment can reduce indoor per capita use to 49.6 gpcd. Lowering the figure to 35 gpcd will require additional conservation measures…beyond the scope of the current list of 14 BMPs" (p. 1, para.4).

The Pacific Institute's 35 gpcd figure is an estimate of the conservation potential (i.e., amount of water that would be used if the most efficient conservation technologies, available as of 2003, were installed). See, Haasz and Gleick at 2-3 [Ex. CT 50]. The AWWARF study does not evaluate conservation potential, and in this regard Ms. Gonzales appears to misunderstand the scope and purpose of the study. The AWWARF study reports observed water use characteristics in homes (for example, frequency of toilet flushing, duration of shower use, etc). Residential End Uses of Water at xxi [Ex. CT 66]. The 49.6 gpcd figure, for which Ms. Gonzales does not provide a citation, is presumably only the reported amount of water use for a household fully retrofitted with available water conservation equipment prior to 1999. This is an outdated number relative to the analysis conducted by the Pacific Institute.

Furthermore, Mary Ann Dickinson—executive Director of the California Urban Water Conservation Council—testified on behalf of the Member Units, supported the Pacific Institute's conclusion that the BMPs do not represent full cost-effective conservation potential. Reporter's Transcript (RT):1069. Pacific Institute analyzed the full potential for

improving water use efficiency among the Cachuma contractors, and did not limit its analysis to implementation of the BMPs, which represent the "floor" for water conservation practices. Haasz at RT:901.

Ms. Gonzales notes that "the 'achievable' water savings for Cachuma agencies will appear lower than that of higher gpcd agencies" (p.2, para.1).

Some of the Cachuma contractors have made conservation investments, and the Pacific Institute incorporates these investments into its calculations. Haasz and Gleick at 5-7, 10-12 [CT 50]. Additional, cost-effective conservation is still possible, (Id.) – a conclusion that Gonzales does not appear to refute.

Ms. Gonzales comments that the Pacific Institute analysis does not account for the larger properties in Montecito (p.2, para.2).

The Pacific Institute's analysis of landscape conservation is based on outdoor water use. Haasz and Gleick at 9 [Ex. CT 50]. The Pacific Institute calculated water use from monthly sales data obtained from the Montecito Water Agency. These data identify how much water customers are using to water their lawns, and therefore do reflect the amount of water used at larger properties.

Ms. Gonzales comments that the Pacific Institute does not account for the use of recycled water (p.2, para.3).

Whether water is potable or recycled does not make a difference in the Pacific Institute results. Presumably, if potable water is conserved, it can be left in the river. If recycled water is conserved, it can be used to replace potable water currently used to meet non-potable demand, and the potable water in turn can be left in the river. If the member districts were using recycled water for every non-potable use, then this argument could be relevant but this is far from the case. See, SWB 2003 draft EIR at 4-26 – 4-30 [Staff Ex. 10].

Ms. Gonzales argues that the Pacific Institute's estimates of water savings potential from landscape savings are not realistic because they do not consider conservation

savings already achieved or the programs in place to promote landscape conservation (p.3, para.1).

As previously mentioned, the Pacific Institute **does** account for water savings that have already been achieved. Much of Haasz and Gleick's landscape savings assumptions were based on data provided by the County of Santa Barbara in a CALFED grant proposal. See Almy, R. 2001. Santa Barbara County Distribution and Installation Program for the Weather TRAK ET Controller. CALFED Water Use Efficiency Proposal Solicitation Package. [Ex. CT 53].

Ms. Gonzales argues that the Member Units have relatively low per capita residential water consumption (p.3, para.1), implying little conservation potential remains.

Santa Barbara, Goleta and Carpinteria do have a relatively low per capita use, and that is acknowledged in the Pacific Institute report. It is still nowhere near potential use, and as noted above, the Institute's analysis relied on an end-use approach, not simply reviewing per-capita estimates. Haasz and Gleick at 2 [Ex. CT 50]. We also note that the remaining Member Units' per capita consumption is significantly higher, more than double, than Santa Barbara, Goleta, and Carpinteria. Id.

Ms. Gonzales states "The potential savings or cost-effectiveness of weather based irrigation controllers have not yet been systematically quantified in a statistically significant study" (p.3, para.2).

All data to date demonstrate that ET controllers are effective at saving water. Waste Not Want Not at 78 [Ex. CT 63]. Ms. Gonzales presents no data to indicate otherwise. Furthermore, the Pacific Institute's cost estimates for implementation of the ET Controller Program are based on the County of Santa Barbara's own estimates. Haasz and Gleick at 8 [CT 50].

Ms. Gonzales states "Behavioral changes are difficult to estimate dependably for water supply planning purposes" (p.4).

The Pacific Institute acknowledges that behavioral issues are more difficult to predict and measure than technical fixes, hence the focus of the analysis on non-behavioral improvements in water efficiency. Haasz and Gleick at 8 [Ex. CT 50]. The Pacific Institute conducted an extensive literature review and determined that 25-40 percent of outdoor water use could be quickly and economically saved through proven approaches, even considering this behavioral factor. Waste Not Want Not at 74-82 [Ex. CT 63]. Furthermore, ET controllers, in large part, address and mitigate the behavioral aspect of landscape conservation, and savings from implementation of this measure account for 25 of the estimated landscape savings. Haasz and Gleick at 8-9 [Ex. CT 50].

Ms. Gonzales questions the methodology used to determine toilet savings (p.5-6). Haasz and Gleick used two commonly applied methods to estimate savings, one based on CUWCC assumptions and one based on population and toilet turnover. Haasz and Gleick at 3 [Ex. CT 50]. The CUWCC assumptions could only be utilized for Santa Barbara and Goleta because these agencies have data on their existing stock of toilets. Id. Savings for the other agencies were calculated as described in detail at p. 3-5 of Haasz and Gleick's written testimony.

Haasz and Gleick did not include leakage in their calculations of potential savings from ULFTs because their calculations estimated potential savings from future installations, and newer ULFT models are not as susceptible to degradation as some of the older models. Waste Not Want Not at 43 [Ex. CT 63].

Haasz and Gleick identify Santa Barbara at 50% ULFT penetration for multi-family units and 34% for single family units, not 50% for total ULFT penetration as indicated by Ms. Gonzales. Haasz and Gleick at 5-6 [Ex. CT 50]. Replacement of the remaining stock in Santa Barbara would likely only result in a negligible amount of savings. Id. at 6. Haasz and Gleick do quantify the savings from 100% implementation of ULFTs in the remaining Member Units to determine the full scope of potential savings. This level of implementation can be cost-effective. Haasz and Gleick at 12-13 [Ex. CT 50]. Ms.

Gonzales provides no reference or supporting material in support of her assertion that the costs to retrofit toilets increases exponentially near 100% saturation.

Ms. Gonzales argues that the methodology to determine washing machine savings is "unorthodox" and questionable because it ignores load size. In addition, costs are not accurately depicted for high-efficiency washers (p.6-7).

This is false: Haasz and Gleick do not use an "unorthodox' measure of water efficiency in their calculations; rather they use the well-understood and applied tool of "water factors." The water factor identifies gallons per cubic foot of tub volume per load. Ex. CT 63 at 57. Thus, their calculations for water efficiency explicitly consider load size.

Ms. Gonzalez asserts that costs identified for HE washers by the Pacific Institute are outdated, but herself relies on a study ("REUW Study," dated 1999) that precedes the Waste Not Want Not report (dated 2003) by several years. Haasz and Gleick describe the significant number of California agency rebates provided for high-efficiency washers (64,000 since 1999). Haasz and Gleick at 6 [CT 50]. This information supports the Institute's analysis, and demonstrates both that consumers are purchasing high-efficiency washing machines and that water agencies have determined that it is cost-effective to encourage such purchase through rebates.

Ms. Gonzales argues that the Pacific Institute misapplies data and studies regarding urban landscape water conservation (p.7-9).

The Pacific Institute estimates a range of 25-40% savings that could potentially be achieved through landscape conservation measures. Waste Not Want Not at 69 [Ex. CT 63]; Haasz and Gleick at 9 [Ex. CT 50]. The Pacific Institute conducted an extensive literature review and determined that this range of outdoor water use was conservative and could be quickly and economically saved through proven approaches. Waste Not Want Not at 74-82 [Ex. CT 63]. The studies identified by Ms. Gonzales informed the Pacific Institute's estimate, but the quantitative values from these studies were not directly incorporated into the Pacific Institute's estimates. See, e.g., Waste Not Want Not at 76, Table 3-3 (showing Pittenger estimates of potential savings at 65-75 percent, which

exceeds the Pacific Institute's estimated range), Table 3-5 (showing Seattle Public Utilities' estimates of potential savings of up to 100 percent, which exceeds the Pacific Institute's estimated range); Table 3-7 (showing CDWR, or WUCOL as referred to by Ms. Gonzales, estimates of potential savings at up to 80 percent, which also exceeds the Pacific Institute's estimated range). Similarly, the Pacific Institute did not misuse data from the "Spectrum Study." Contrary to Ms. Gonzales' assertion, Haasz and Gleick do not attribute 100% of savings to scheduling, maintenance and practices. CT 63 at 75, FN 24.

In sum, the rebuttal testimony from Ms. Gonzales contains numerous factual errors and omissions, and it does not refute the analysis or conclusions of the 2003 Pacific Institute testimony prepared by Haasz and Gleick for the Cachuma administrative hearing proceedings. We stand by our original conclusions as presented in that testimony: 5,000 to 7,000 acre-feet of water could be conserved by the Cachuma contractors and thus offset any potential water supply impacts from the newly identified range of alternatives in the RDEIR.

Future Demand Projections

2020 Demand Projections Fail to Include Most Recent Estimates

The 2007 RDEIR "compares the Member Units' demand to their water supply from all sources, including the Cachuma Project and the SWP, in a critical drought year like 1951 under the project alternatives" (pg. 4-21). The Cachuma contractors' demand and supply from all sources is presented in Table 1. According to the 2007 RDEIR, the Cachuma contractors' water demand in 2000 was 46,000 acre-feet per year (46 KAFY) and is projected to increase to 56 KAFY by 2020. Given current demand, the DEIR finds that a net shortage occurs under Alternatives 3B, 5B, and 5C and a surplus occurs under Alternatives 2, 3C, and 4B in a critical drought year (Table 1). In 2020, "there would be a

net shortage for all alternatives under future year 2020 demand levels ranging from -8,612 af under Alternative 4B to -11,767 af under Alternative 5B."[3]

Table 1. Cachuma Contractors' Supply and Demand in Critical Drought Year (1951)[4]

	Alt 2	Alt 3B	Alt 3C	Alt 4B	Alt 5B	Alt 5C
Total Supply	47,218	45,764	47,131	47,675	44,520	45,620
Year 2000 Demand	46,007	46,007	46,007	46,007	46,007	46,007
Year 2000 Surplus or Shortage	1,211	-243	1,124	1,668	-1,487	-387
Year 2020 Demand	56,287	56,287	56,287	56,287	56,287	56,287
Year 2020 Surplus or Shortage	-9,069	-10,523	-9,156	-8,612	-11,767	-10,667

Source: Table 4-17 in the 2007 DEIR

The water demand projections used in 2007 RDEIR are based on outdated estimates and ignore more recent water demand projections from the contractors themselves. As a result, they overestimate future demand. Table 2 compares the Cachuma contractors' 2020 water demand projections according to the 2003 DEIR[5], the revised 2007 DEIR, and each agency's 2005 UWMP. As shown in Table 1 above (and Table 4-17 of the DEIR), the 2007 RDEIR estimates that 2020 water demand will be 56,287 AFY. Citations indicate that these estimates are based on demand projections in the previous 2000/2001 UWMPs combined with input from water managers. The 2005 UWMPs, however, suggest that future demand will be closer to 51 KAFY, or 10% less than was previously forecasted. The 2005 UWMPs, however, were not mentioned in the 2007

[3] State Water Resources Control Board, Division of Water Rights. July 2007. Revised Draft Environmental Impact Report. Consideration of Modification to the U.S. Bureau of Reclamation's Water Rights Permits 11308 and 11310 (Applications 11331 and 11332) to Protect Public Trust Values and Downstream Water Rights on the Santa Ynez River Below Bradbury Dam (Cachuma Reservoir). Page 4-24.
[4] Ibid.
[5] State Water Resources Control Board, Division of Water Rights. August 2003. Revised Draft Environmental Impact Report. Consideration of Modification to the U.S. Bureau of Reclamation's Water Rights Permits 11308 and 11310 (Applications 11331 and 11332) to Protect Public Trust Values and Downstream Water Rights on the Santa Ynez River Below Bradbury Dam (Cachuma Reservoir).

RDEIR. This suggests that the demand estimates in the 2007 RDEIR are based on outdated, overestimates of future demand. **By failing to use the more recent estimates, the DEIR overestimates potential shortages.**

Table 2. Cachuma Contractors' 2020 Water Demands.

	2003 DEIR[6]	2007 RDEIR[7]	2005 UWMP[8]
Carpinteria Valley Water District	5,423	5,833	4,906
Montecito Water District	6,835	6,835	7,305
City of Santa Barbara	17,760	18,200	14,000 -15,000
Goleta Water District	16,000	17,300	15,890
Santa Ynez River Water Conservation District, ID#1	9,050	8,119	8,119
Total	**55,068**	**56,287**	**50,220 - 51,220**

Note: Because Santa Ynez has not completed a 2005 UWMP, we used the estimate from the 2007 RDEIR.

2020 Demand Projections Fail to Include Cost-Effective Conservation and Efficiency

The Cachuma contractors' own estimates of 2020 demand are also too high because they fail to include a substantial amount of currently cost-effective efficiency improvements. Instead, the approaches used to project future demand in the 2000 and 2005 UWMPs include inappropriate forecasting methods. These flaws are then incorporated into the 2003 DEIR and the 2007 RDEIR. The most important flaws are described below.

The member agencies project future demand in a variety of ways.

[6] Table 4-19 of the 2003 DEIR; page 4-36
[7] Table 4-19 of 2007 DEIR; page 4-24
[8] URS Corporation. December 2005. Goleta Water District Urban Water Management Plan. Goleta, California.
Kennedy/Jenks Consultants. July 2007. Carpinteria Valley Water District Urban Water Management Plan 2005 Update. Ventura, California.
City of Santa Barbara Public Works Department. 2005. Urban Water Management Plan. Santa Barbara, California.
Mosby, T. 2005. Final Urban Water Management Plan – Update 2005. Montecito Water District. Montecito, California.

- MWD estimates future demand by multiplying the average number of new connections per year (38 new connections per year) by the current water use per meter.[9] The value for "current water use" fails to include substantial cost-effective conservation improvements.
- SB developed two scenarios to estimate future demand. For the high estimate, they assume that water demand will increase at the same rate as population. For the low estimate, they assume that conservation offsets population growth, thereby maintaining demand at its current level of 14,000 AFY.[10] This approach simply assumes that the rate of conservation improvements is identical to the rate of population growth, independent of actual assessments of efficiency potential.
- GWD evaluated five demand scenarios. The scenarios were developed using previous District demand projections, applying a regional population growth rate to water demand, using historic water demand growth rates as a predictor of future demand, and combining data from other local jurisdictions. The demand projection in the 2005 UWMP was an average of the five scenarios.[11] Again, none of these scenarios are based on the potential for efficiency improvements, but are simple assumptions geared to historical trends.
- Few details are provided on the CVWD future demand projections; the UWMP, however, states that projections "are based on the small increases in the District's customer base and the trend of increased residential demands."[12]

The methods described above assume that current water use will look much like today; none are based on real end-use analysis or efficiency evaluations. Table 3 compares the five Cachuma contractors' current and projected residential per-capita demand. Not surprisingly given the above-described assumptions, per-capita demand is generally

[9] Mosby, T. 2005. Final Urban Water Management Plan – Update 2005. Montecito Water District. Montecito, California.
[10] City of Santa Barbara Public Works Department. 2005. Urban Water Management Plan. Santa Barbara, California.
[11] URS Corporation. December 2005. Goleta Water District Urban Water Management Plan. Goleta, California.
[12] Kennedy/Jenks Consultants. July 2007. Carpinteria Valley Water District Urban Water Management Plan 2005 Update. Ventura, California.

expected to remain nearly constant. The largest decreases are around 10 percent, for the smallest contractors; while the contractor with the largest per-capita use, Montecito, actually appears to project a 50% *increase* in per-capita demand.

Table 3: Per-Capita Water Demand of the Cachuma Contractors

	Residential Per-Capita Demand (gpcd)		
	2000	2005	2020
Carpinteria	85	73	75
Goleta	82	65	79
Montecito	201	277	312
Santa Barbara	85	87	91
Santa Ynez	249	262	
Total	**101**	**96**	**100**

Note: Per-capita estimates for 2000 are based on data submitted to the CUWCC. Estimates for 2005 are based on the CUWCC reports for all agencies except Carpinteria. Carpinteria did not file BMP reports for the 2005/2006 reporting period. Carpinteria's 2005 estimates are based on their 2005 UWMP. Estimates for 2020 are based on the population and water demand estimates in each agency's 2005 UWMP. Note that Santa Ynez has not submitted a 2005 UWMP.

In reality, we would expect per-capita demand to **decline** as a result of continued investment in conservation measures and naturally occurring conservation mandated under national plumbing codes. New homes will have fixtures that meet current plumbing codes, such as 1.6 gallons per flush (gpf) toilets and 2.5 gallons per minute (gpm) showerheads. New homes are also more likely to have newer, more efficient clothes washers and dishwashers. In addition, fixtures and appliances in older homes will be replaced with more efficient models as the older ones wear out. Of course, indoor efficiency improvements can be offset by increases in outdoor waste, but a wide range of outdoor efficiency technologies and programs are also being implemented (or can be implemented cost-effectively) throughout California to address this water use. For example, landscape ordinances that limit turf area can help mitigate this effect and promote more efficient use, while irrigation timers, soil moisture monitors, or a wide range of other approaches are being implemented that show the potential to reduce outdoor landscaping from 10 to 50 percent.[13]

[13] Seattle Public Utilities Commission. 1998. Water Conservation Potential Assessment. Appendix 1. Seattle, Washington. http://www.seattle.gov/util/stellent/groups/public/@spu/@csb/documents/webcontent/spu01_002152.pdf

In conclusion, demand projections used in the 2007 RDEIR are based on old estimates of future demand that are 10% higher than more recent estimates put forth by the Cachuma contractors themselves in their UWMPs. Even these recent estimates likely overestimate future demand because they fail to take account of cost-effective conservation improvements that could occur by 2020 as a result of agency conservation programs and the natural replacement of older fixtures and appliances with newer, more efficient models. Given these inadequacies, the RDEIR should, at a minimum, adjust the figures for future demand to reflect the Cachuma contractors' most recent estimates. The RDEIR should also include a more thorough analysis of future demand that combines multiple scenarios and as well as conservation improvements.

BMP Activity

All of the Cachuma contractors have signed the CUWCC Memorandum of Understanding (MOU), thereby committing to develop and implement the designated BMPs. The CUWCC establishes implementation targets for each agency based on characteristics of the agency's service area and the year they signed the MOU. Agencies are given credit for conservation efforts implemented prior to signing the MOU. Every two years, agencies are required to submit reports that describe their progress towards implementing these BMPs. The CUWCC then determines whether the agency has met or is on track to meet the implementation requirements.

Despite modest conservation efforts, the Cachuma contractors fail to meet the requirements set forth in the CUWCC MOU. The Cachuma contractors' progress on implementing the BMPs is shown in Table 4. **None of the five contractors has met the requirements for all of the BMPs**. GWD and SB are the best performers and have met or are on track to meet the requirements of eight and nine of the 14 BMPs, respectively. By contrast, CVWD, MWD, and SYRWCD, ID#1 have met or are on track to meet only five of the 14 BMPs.

All of the Cachuma contractors could expand their current conservation efforts, as indicated by their implementation record of the BMPs. It is important to note that the CUWCC BMPs were developed in the early 1990s and represent the most basic level of conservation that agencies should be implementing. As recommended in Haasz and Gleick 2003, "more detailed analysis is necessary to determine the mix of conservation options most appropriate for individual water agencies and the associated savings . . . ." (page 2). Below, we provide some guidance for evaluating current and future demand and developing effective conservation programs that go beyond the BMPs.

The first step towards developing an effective conservation program is to gather adequate and reliable information. In order to estimate the potential water savings of a conservation program targeting landscape use, for example, it is necessary to have a somewhat reliable estimate of current use. To the extent information is not available or resource prohibitive to obtain, proxy data can be used from similar regions throughout the state. The California Urban Water Conservation Council (CUWCC) is a good repository for such data. Ideally this data would be collected in such a way as to reflect seasonal and geographic variability, and should include the following:

- Total water use, by month: This allows agencies to estimate both indoor and outdoor demand;
- Identification of the "big" users, both in the residential and in the commercial, industrial, and institutional sectors;
- Indoor Residential Demand: estimate of the stock of appliances and fixtures currently in use, including the distribution of toilets by flush volume, the number of washing machines and dishwashers, and the percentage of machines that are high efficiency. Estimates for the penetration of high-efficiency machines are available from the Department of Energy if direct measurement is not feasible;
- Outdoor Residential Demand: total use by month, average lot size (with geographic variability), average ET (also allowing for spatial variability between coastal and inland lots), irrigation methods, and landscape type;

- Commercial and Institutional Uses: in addition to the toilet, washing machine (if applicable) and landscape uses mentioned for the residential sector, a full audit of large sites would allow the agencies to better target their programs for maximum water savings.

Adequate and reliable information on the existing uses can help water agencies develop effective conservation programs. If the commercial and industrial sectors are the big users, then audits targeting these users and rebates for common process technologies may help curb their water demand. In many regions, however, future demand is of primary concern. A thorough understanding of the primary drivers of projected increases in water demand can provide key information for conservation managers. If outdoor demand is a primary driver, for example, then developing landscape ordinances that limit turf area or require the installation of soil moisture sensors or ET controllers may help lessen this demand.

Conservation efforts will likely be more cost-effective and successful if done on a regional scale. Collaboration allows the agencies to benefit from economies of scale and save more water for less money than it would cost them individually. The issue is a regional one and should be addressed as such.

Table 4. BMP Coverage Reports

BMP	BMP Description	Goleta Water District	Montecito Water District	City of Santa Barbara	Carpinteria Valley Water District	Santa Ynez River Water Conservation District, ID#1
1	Residential Water Use Surveys	On Track	Not on Track	Met Requirement	Not on Track	Not on Track
2	Residential Plumbing Retrofit	Met Requirement	Met Requirement	Met Requirement	Met Requirement	Met Requirement
3	System Water Audit/Leak Repair	Met Requirement	Not on Track	Met Requirement	Not on Track	Met Requirement
4	Metering with Commodity Rates	Met Requirement	Met Requirement	Met Requirement	Met Requirement	Met Requirement
5	Large Landscape Programs	Not on Track	Not on Track	Not on Track	Not on Track	Not on Track
6	Washing Machine Rebates	Filed Exemption	Not on Track	Filed Exemption	Not on Track	Not on Track
7	Public Information Programs	Met Requirement	Met Requirement	Met Requirement	Met Requirement	Met Requirement
8	School Eduction Programs	Met Requirement	Met Requirement	Met Requirement	Met Requirement	Met Requirement
9	CII Conservation Program	Not on Track	Not on Track	On Track	Not on Track	Not on Track
11	Conservation Pricing	Met Requirement	Not on Track	Met Requirement	Not on Track	Not on Track
12	Conservation Coordinator	Met Requirement	Met Requirement	Met Requirement	Met Requirement	Met Requirement
13	Waste Water Prohibition	Not on Track	Not on Track	Not on Track	Not on Track	Not on Track
14	Residential ULF Replacements	Not on Track	Not on Track	Not on Track	Not on Track	Not on Track

Note: The data shown in Table 4 give credit for conservation efforts that occurred prior to the agency signing the MOU.
Source: CUWCC Coverage Reports. Available at http://bmp.cuwcc.org/bmp/read_only/list.lasso

Water Rates

The RDEIR states that "Water rates are some of the highest in the state and constitute a strong incentive to conserve water."[14] While rates are generally high among the Cachuma contractors, high rates alone do not necessarily send a strong conservation signal to customers. In this next section, we evaluate the rate structures of the Cachuma contractors and compare those with rate structures in other Western agencies. **Our analysis shows that all of the Cachuma contractors fail to implement rate structures and pricing policies that encourage water conservation and efficiency, even those that are in compliance with BMP 11.**

Unit Cost of Water

Water agencies institute a variety of rate structures and pricing policies to collect sufficient revenue to recover costs, including flat rates, uniform rates, block rates, and seasonal rates. In the past, flat rates or decreasing block rates, in which the unit price of water decreases as use increases, were among the most common type of rate structures. As water agencies began to realize that pricing affects use, uniform rates and increasing block rates became common. With uniform rates, the unit price for water remains constant. With increasing block rates, however, the unit price for water increases as the volume consumed increases, with prices set for each "block" of water use; customers who use low or moderate volumes of water are charged a lower unit price and rewarded for conservation; those using significantly higher volumes pay higher unit prices.

The CUWCC BMPs includes conservation pricing (BMP 11). According to the CUWCC, "we view pricing not as a substitute for a utility's existing or planned conservation programs but as something intended to work in tandem with them and enhance their

[14] State Water Resources Control Board, Division of Water Rights. July 2007. Revised Draft Environmental Impact Report. Consideration of Modification to the U.S. Bureau of Reclamation's Water Rights Permits 11308 and 11310 (Applications 11331 and 11332) to Protect Public Trust Values and Downstream Water Rights on the Santa Ynez River Below Bradbury Dam (Cachuma Reservoir). Page 4-32.

impact."[15] The CUWCC recognizes uniform, seasonal, and increasing block rates as forms of conservation pricing. As shown in Table 4, GWD and SB have implemented conservation pricing and are in compliance with BMP 11, while MWD, CVWD, and SYRWCD, ID#1, have not.

Although the CUWCC recognizes uniform rates as forms of conservation pricing, increasing block rates are considered a more effective way to promote water conservation and efficiency. A recent study on water rate structures in the southwest United States found that per-capita water use is typically lower in cities with dramatically increasing block rates.[16] In addition to encouraging water-use efficiency, increasing block rates provide a number of other benefits, such as providing water at a lower cost for basic needs and stabilizing revenue for the utility.[17]

Table 5 and Figure 1 show the current water rate structures for the Cachuma contractors. Irvine Ranch and Seattle are shown for comparative purposes. Water rates among the Cachuma contractors are generally high as a result of recent investment in capital-intensive water supply projects, such as the desalination plant in Santa Barbara and the Coastal Branch of the State Water Project, but these rates do not consistently include designs that encourage efficiency improvements. The MWD charges a uniform rate of $5.01 per thousand gallons. SB, GWD, and CVWD have instituted increasing block rates. CVWD and GWD have modest increases between blocks, ranging from $0.20 to $0.89 per thousand gallons, which send a weak price signal to customers. SB, however, has a steep increase of $2.40 per thousand gallons between the first and second blocks at a relatively low water use rate of 3,000 gallons per month, which places an early premium on water uses and sends a strong price signal to customers to reduce their water use. Increases between subsequent blocks are small ($0.32 per thousand gallons) and send only a weak price signal to customers.

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[15] California Urban Water Conservation Council. 1994. Setting Urban Water Rates for Efficiency and Conservation: A Discussion of Issues. Prepared by David Mitchell and Michael Hanemann.
[16] Western Resource Advocates. 2003. "Comparative Analysis of Water Providers in the Southwest: Water Use and Demand-Side Efficiency." In Smart Water: A Comparative Study of Urban Water Use Efficiency Across the Southwest. Boulder, Colorado.
[17] Western Resource Advocates. 2006. Water Rate Structures in New Mexico: How New Mexico Cities Compare Using This Important Water Use Efficiency Tool. Boulder, Colorado.

In comparison, rate structures in Irvine Ranch and Seattle provide a much stronger incentive to conserve water. The unit price for water is relatively low at low use rates. As use increases, unit prices rise dramatically. In Seattle, for example, the unit price for the third block is 1.5 times higher than that of the second block. In Irvine Ranch, the unit price of water in the fifth block is twice as high as that of the fourth block.

Table 5. Residential Water Rates, September 2007.

Municipality [Water Provider]	Rate Structure Type	Fixed Monthly Service Charge	Unit Rate per 1,000 Gallons of Water Consumed
Carpinteria Valley Water District(1)	Increasing Block Rate (three blocks)	$54.12	$3.72 - up to 5,236 gal $4.61 - 5,237 to 11,220 gal $5.20 - over 11,220 gal
Montecito Water District(2)	Uniform	$29.48	$5.01
Goleta Water District(3)	Increasing Block Rate (two blocks)	$18.42	$4.76 – up to 2,992 gal $4.96 – over 2,992 gal
City of Santa Barbara(4)	Increasing Block Rate (three blocks)	$11.16	$3.54 - up to 2,992 gal $5.94 - 2,993 to 14,960 gal $6.26 - over 14,960 gal
Santa Ynez River Water Conservation District(5)	Uniform	$24.40	$2.86
Irvine Ranch Water District(6)	Increasing Block Rate (five blocks)	$7.50	$0.82 - up to 40% of allocation $0.98 - 41-100% of allocation $1.96 - 101-150% of allocation $3.92 - 151-200% of allocation $7.84 - over 200% of allocation
Seattle Public Utilities Commission(7)	Increasing Block Rate (three blocks)	$8.05	$3.85 – up to 3,740 gal $4.48 - 3,741 to 9,724 gal $11.43 – over 9,724 gal

Source:
(1): Carpinteria Valley Water District Website: http://www.cvwd.net/water_rates.htm
(2): Montecito Water District Website: http://www.montecitowater.com/fees_charges.htm
(3): Goleta Water District Website: http://www.goletawater.com/rates/index.htm
(4): City of Santa Barbara Website:
http://www.santabarbaraca.gov/Government/Departments/PW/Rates.htm
(5): Santa Ynez River Water Conservation District Website: http://www.syrwd.org/view/53
(6): Irvine Ranch Water District Website: http://www.irwd.com/AboutIRWD/rates_residential.php
(7): Seattle Public Utilities Website:
http://www.seattle.gov/util/Services/Water/Rates/RESIDENTIA_200312020910286.asp
Note: gal=gallons
Rates for Irvine Ranch are based on an average water allocation of 13,464 gallons.

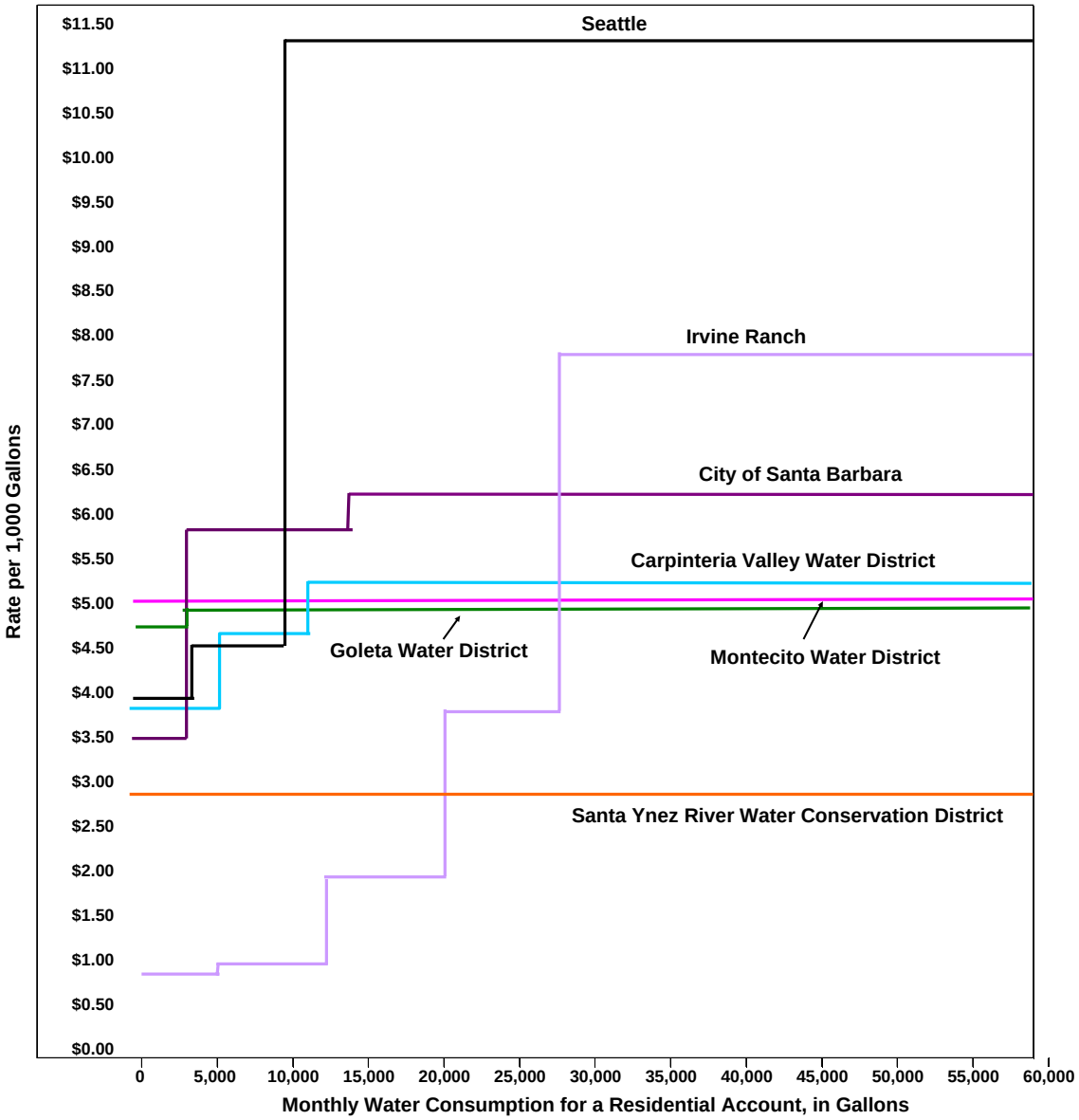

Figure 1. Cachuma Contractors' Water Rates, September 2007.

Of the Cachuma contractors, SB and CVWD provide their customers with the biggest incentive to conserve water. These agencies send a modest conservation price signal to their customers by rewarding moderate use through lower unit rates and penalizing excessive use through higher unit rates. In comparison to Irvine Ranch and Seattle, however, even the best rate structures among the Cachuma contractors falls short. **All of the Cachuma contractors could improve their rate structures by instituting inclining block rates with high price differentials between blocks.**

Fixed Costs

The customer's water bill includes consumption charges as well as any fixed service charges. The customer then pays the average price for water, defined as the fixed service charge plus the total consumption charges, divided by the total volume used. A high fixed service charge relative to the customer's overall bill can decrease the effectiveness of inclining block rates.

Figure 2 shows the fixed service charge for residents served by each of the Cachuma contractors, Irvine Ranch, and Seattle. The fixed service charges in Carpinteria and Montecito are particularly high, and thus likely send mixed price signals to their customers. Service charges are more moderate in Goleta and the City of Santa Barbara, but still higher than those in Seattle and Irvine Ranch.

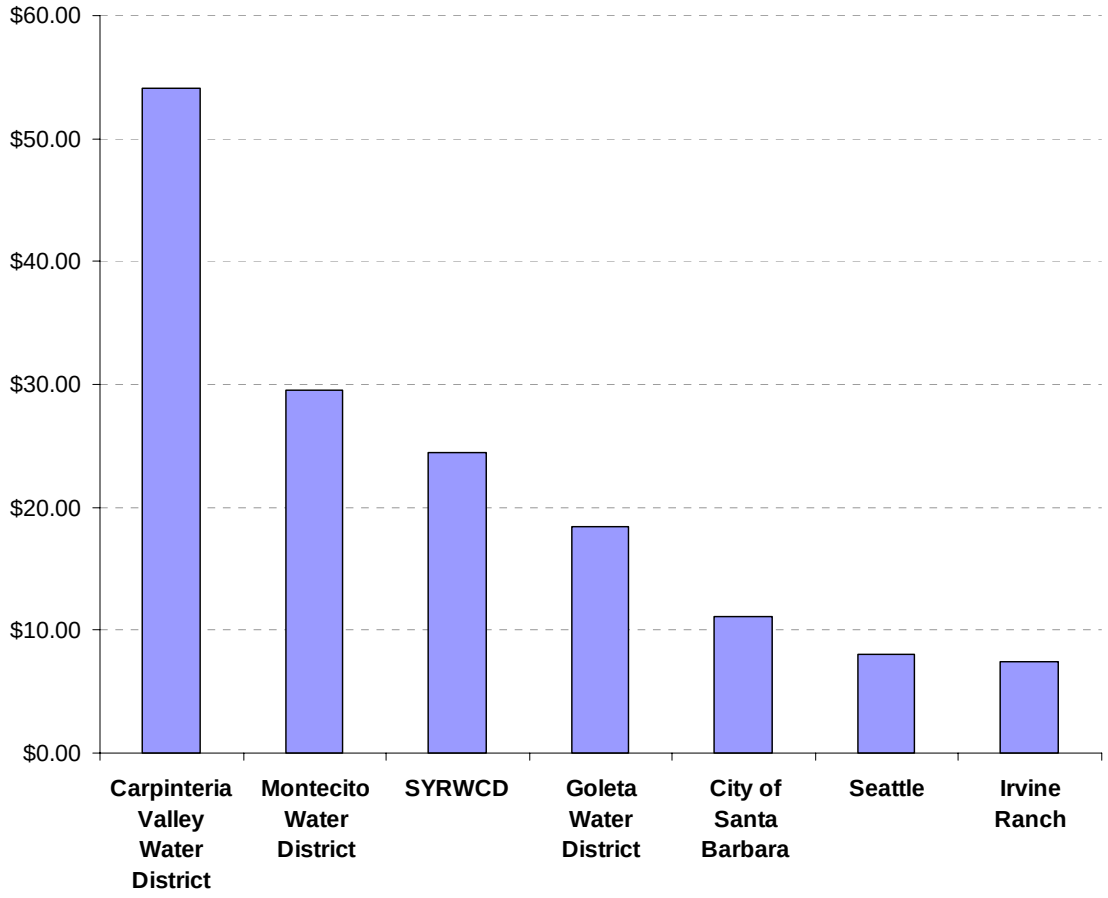

Figure 2. Fixed Service Charges for Residents Served by the Cachuma Contractors.

Average Price Curve

The average price curve provides an indication of the effectiveness of water rate structures. Typically, average price curves initially trend downward, as the fixed costs are distributed. The curve can then trend upward, downward, or remain flat. Curves that continue to trend downward indicate that the unit price decreases as use increases, thereby rewarding customers for high use. Curves that trend upward, by contrast, indicate that the unit price increases as use increases, thereby penalizing customers for wasting water. The steepness of the curve provides an indication of the strength of the price signal.

Figure 3 shows the average price curve for the Cachuma contractors, Irvine Ranch, and Seattle. The average price for the Cachuma contractors initially declines, as expected. For customers in CVWD, MWD, and GWD, the average price continues to decline as use increases, while it increases slightly for customers in SB. The average price for water in Seattle and Irvine Ranch initially decline, but rise steeply as use increases. Thus while two of the Cachuma contractors have inclining block rates; inclining block rate structures do not, in and of themselves, promote efficient use. Fixed rates that are too high or consumption charges that are too low can counteract efforts to promote efficient use.

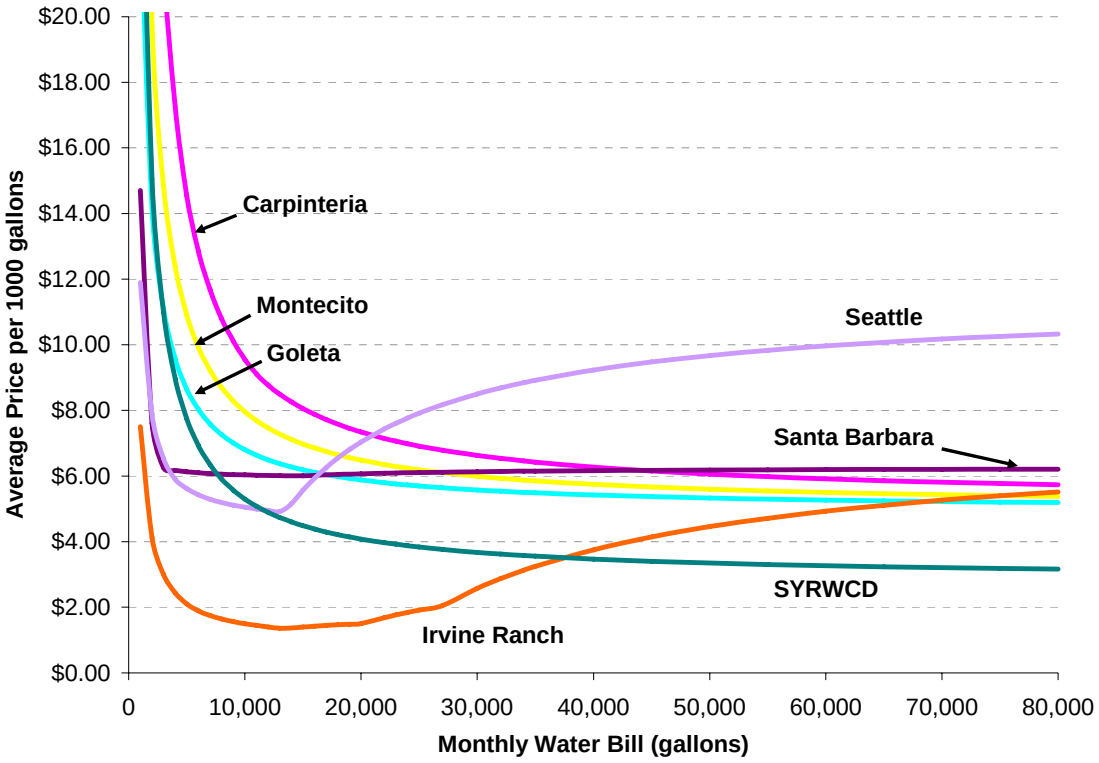

Figure 3. Average Price Curve for the Cachuma Contractors

Conclusions

The potential water supply impacts of the range of alternatives for modifying the U.S. Bureau of Reclamation's water right permits for the Cachuma Project depend in part on the water that might be made available by increasing the efficiency of water use and reduce waste. The water demand projections in the RDEIR are a critical piece in

determining the ultimate impacts of the various alternatives and efforts to mitigate those impacts. Thus it is important to get these numbers correct. Our analysis indicates that the demand projections used in the 2007 RDEIR are based on old estimates of future demand that are 10% higher than more recent estimates put forth by the Cachuma contractors themselves in their Urban Water Management Plans. Even these recent estimates likely overestimate future demand because they fail to take account of continued conservation improvements that will occur by 2020 as a result of agency conservation programs and the natural replacement of older fixtures and appliances with newer, more efficient models.

An end-use analysis by Haasz and Gleick in 2003 found that the Cachuma contractors could conserve between 5,000 and 7,000 acre-feet per year (AFY) cost-effectively by adopting a limited number of widely-available technologies for the residential and commercial/industrial sectors. These estimates remain valid, as conservation efforts over the past four years have not intensified. In addition, the cost of many water conservation devices, such as high-efficiency clothes washers, has continued to decline, making these investments even more financially attractive. Additional conservation potential remains for both the urban and agricultural sectors.

Despite this potential, conservation efforts in the region have failed to keep pace with requirements set forth in the CUWCC MOU. While some agencies are performing better than others, all agencies still have significant room for reducing waste through proven programs. Our analysis provides recommendations for a detailed study to determine the conservation options most appropriate for each agency, which would include collecting adequate and reliable information about how water is used. In addition, these conservation efforts will likely be more cost-effective and successful if done on a regional scale. Collaboration allows the agencies to benefit from economies of scale and save more water for less money than it would cost them individually.

The Cachuma contractors have failed to implement water rate structures in the region that promote water conservation and efficiency improvements. While water rates are

generally high, reliance on high fixed rates combined with relatively low consumption charges has countered efforts to reward conservation and penalize waste. Adopting more conservation-oriented rate structures and pricing policies could reinforce and strengthen current and future conservation efforts and further minimize the potential for water supply impacts from the alternatives identified in the 2007 RDEIR.