Water Supplies of the Cachuma Project Member Agencies
Testimony of Steve Mack, Water Supply Manager, City of Santa Barbara

I am currently employed as Water Supply Manager for the City of Santa Barbara and have served in that capacity from August 1990 to the present. I am responsible for developing, directing, and implementing water supply and water conservation programs consistent with the City of Santa Barbara's Long-Term Water Supply Program, prepared under my direction in 1991-93. I am experienced with the Santa Ynez River Hydrology Model, and have been Studies Administrator of fish, vegetation, and groundwater studies for the Santa Ynez River, working with other Cachuma Project Member Units. I participated in the negotiations and analyses for the Santa Ynez River Water Rights Settlement Agreement and I am familiar with the water supplies and water demands of the Cachuma Member Agencies. I have a Master of Science degree in Hydrology from the University of Alaska-Fairbanks in 1986, a Master of Science in Urban Planning from the University of Arizona in 1974 and a Bachelor of Arts from Baldwin-Wallace College in 1969.

My testimony discusses the normal and critical drought year water supplies for the Cachuma Project Member Units. It uses estimates of Cachuma Project supplies that allow for a reserve during severe droughts, because in real-time operations water managers do not know when a drought is over. My testimony will show that existing supplies are adequate for current demand and planned future demand during normal years. During drought years, however, the Cachuma Member Units will be forced to use more local and limited groundwater to make up deficiencies in the Cachuma Project. If Cachuma Project water supplies are more limited than planned for, then shortages in available supplies will increase during severe droughts, compared to demand, with the consequence that decreases in the level of consumption equal to or exceeding those undertaken during the last drought may be necessary. My testimony points out that the addition of the State Water Project has allowed the Member Units to absorb the additional shortages that will be incurred by the fish releases required by the Steelhead Biological Opinion, but, that opinion is based upon the availability of Reclamation to surcharge Lake Cachuma in order to provide long term passage and rearing flows for steelhead. In addition, the State Water Project water supply also is susceptible to shortages. My testimony summarizes the costs of Member Unit water supplies and shows that Cachuma Project supplies and local groundwater are the least costly. State Water costs South Coast water agencies an additional $250 per acre foot beyond high fixed operating and capital costs, and desalination requires approximately $10 million to restart the Santa Barbara facility and approximately $1200 per acre foot for actual delivery of water. My testimony ends with a replication of Table 4-16 from the State Board Draft EIR that evaluates drought water supplies based on inclusion of a reserve which better reflects actual operating circumstances. It depicts the shortages Cachuma Project Members may face when a severe drought returns. It also shows the large increase in those shortages when compared to historical operations.

The Cachuma Project is the principal component of a diversified water supply for all Cachuma Project Member Agencies with the exception of Improvement District No.1 which relies more heavily on local groundwater. All agencies operate independently of each other under the direction of elected board or councils. Table 1 below summarizes the total current normal

year water supplies for the Cachuma Project Agencies. These supplies include the reductions from Cachuma operations agreed to in the Steelhead Biological Opinion.

Table 1. Summary of Cachuma Project Member Agencies Current Normal Year Water Supplies (acre feet per year)

	City of SB	Goleta	Carpinteria	Montecito	ID#1	Total
Cachuma Project	8,277	9,321	2,813	2,651	2,651	25,713
State Water	2,200	4,500	1,650	2,280	525	11,155
Local Groundwater	1,104	2,350	3,000	200	2,910	9,564
Recycled	900	1,500				2,400
Other SYR&Tunnels	5,719			2,375		8,094
Total Supplies	18,200	17,671	7,463	7,506	6,086	56,926
Current Year Demand	14,342	14,000	4,300	6,073	5,792	44,507
Planned Future Demand	18,200	17,300	5,833	6,835	6,619	54,787

Each agency has supplies based on a water supply plan or program that identifies a supply target based on a planning document. All agencies have normal year supplies sufficient to meet their planned future demands. These planned future demands include development within the current service areas and possible annexation of adjacent areas to the current service areas.

A caution is in order here. My testimony and the State Board Environmental Impact Report show summaries of Member Unit water supplies combined as in Tables 1 and 2 of my testimony. These summaries show a general picture of the water supplies, but imply an integration of supplies that does not exist. The Member Units are distinct, separate entities with separate elected boards or councils. Legal, political, and practical reasons limit the ability to combine and/or exchange supplies. In particular, because of the physical geographic separation, there is little that Improvement District #1 (ID#1) can do to help the Member Units on the South Coast during a drought and because of water treatment issues, little the South Coast Member Units can do to help ID#1. On the South Coast there is a central pipeline that does allow exchanges to a certain degree, but the infrastructure does not exist to allow exchanges or sales of local supplies to the degree implied by the summaries, even if that were legally and politically possible.

All agencies use their water supplies recognizing the possibility of local and statewide droughts and are prepared for shortages in Santa Ynez River supplies, including the Cachuma Project, and State Water Project shortages. These shortages will be made up by use of local groundwater, carryover in the Cachuma Project, drought water conservation programs and, in extreme emergency for the City of Santa Barbara and possibly other agencies, desalination. To avoid groundwater overdraft, including seawater intrusion, local groundwater is used conjunctively with surface water and is reserved for seasonal peaking and for drought water supply. Table 2 summarizes the drought year supplies for the Cachuma Project Member Agencies. This table shows that drought year supplies are less than planned future demand in general and additional strategies will be needed to meet demand during a severe drought.

Table 2. Summary of Cachuma Project Member Agencies Critical Drought Year Water Supplies (acre feet per year)

	City of SB	Goleta	Carpinteria	Montecito	ID#1	Total
Cachuma Project	3,330	3,750	1,132	1,066	1,066	10,344
State Water (50% delivery)	1,650	3,725	1,100	1,650	350	8,475
Local Groundwater	4,150	2,350	4,650	400	3,770	15,320
Recycled	900	1,500				2,400
Other SYR&Tunnels	800			442		1,242
Desalination	3,125					3,125
Total Supplies	13,955	11,325	6,882	3,558	5,186	40,906
Current Year Demand	14,342	14,000	4,300	6,073	5,792	44,507
Planned Future Demand	18,200	17,300	5,833	6,835	6,619	54,787

Below are brief explanations of each agency's supplies. The tables accompanying the descriptions show normal year supplies and critical drought year supplies compared with current and planned future demand.

Carpinteria Valley Water District

The Carpinteria Valley Water District encompasses about 8,900 acres with a mixture of agriculture (40 percent), residential (13 percent), and industrial/commercial/institutional (14 percent) and open space (33 percent) land uses. Domestic water service is provided to a population of about 17,900 and approximately 3,240 acres of irrigated crops, ranging from lemons and avocados to nursery products. The District had approximately 3,940 connections in 2002. It has three sources of water: Cachuma Project, Carpinteria Groundwater Basin, and State Water Project (SWP) water. As shown in Table 3, Cachuma Project water represents about 40 percent of the District's normal year supplies. Groundwater is extracted from the Carpinteria Basin which has a total perennial yield of about 5,500 acre-feet and is shared by many groundwater pumpers. Approximately 50 percent of total District water deliveries are for agricultural customers.

Table 3. Water Supply And Demand - Carpinteria Valley Water District

	Normal Year (acre-feet per year)	Critical Drought Year	Comment
Supplies			
Cachuma Project	2,813	1,162	Fixed percentage of Cachuma Project yield. Cachuma represents 41% of total supply
State Water Project	1,650	1,100	SWP Table A amount is 2,000 AFY plus 200 AFY of CCWA drought buffer; CVWD assumes 75% average annual delivery and 50% during drought
Local groundwater	3,000	4,650	Share of local groundwater basin
Total	7,463	6,912	
Demand			
Current (2001)	4,300		Approx. 50% for agricultural use
Planned Future (2020)	5,833	6,819	Because of Ag needs, assumes higher demand in drought

Sources: Fish Management Plan Environmental Impact Report (FMP EIR) 2003 and pers. comm. from C. Hamilton, Gen. Manager, June 2003).

Montecito Water District

The Montecito Water District encompasses an area of approximately 9,890 acres of which about 70 percent is residential, while the remainder is a mixture of commercial/recreation (1 percent), open space (18 percent), and agriculture (11 percent). The District produces water from the following sources: Cachuma Project, Jameson Reservoir/Doulton Tunnel (located along the Santa Ynez River above Cachuma Lake), diversions along Fox and Alder Creeks (tributaries to the Santa Ynez River), SWP water, and groundwater (see Table 4). The District does not provide water to all properties in the service area. Many are served by private wells and stream diversions, and nine private water companies. The District estimates its long-term share of the groundwater basins' perennial yield at 400 acre-feet per year. The District pumps from the Montecito Basin which has a perennial yield of about 1,650 acre-feet per year. Approximately 67 percent of the water use is for residential uses. The remainder is delivered to agricultural customers and for recreational uses (i.e., golf courses and parks).

Table 4. Water Supply And Demand – Montecito Water District

	Normal Year (acre-feet per year)	Critical Drought Year	Comment
Supplies			
Cachuma Project	2,651	1,095	Fixed percentage of Cachuma Project yield. Cachuma represents 34% of total supply
Jameson Lake, Fox and Alder creeks	2,000	312	Diversions on the upper Santa Ynez River. Drought year values are from SYRHM.
Doulton Tunnel	375	130	Drought year values are from SYRHM.
State Water Project	2,280	1650	SWP Table A amount is 3,000 AFY plus 300 AFY of CCWA drought buffer; MWD assumes 76% average annual delivery of Table A amount
Local groundwater	200	400	District's portion of Montecito Groundwater Basin's safe yield of1,650 AFY. Maximum pumping is 400 AFY.
Total	7,506	5,045	
Demand			
Current (2000)	6,073		12% is losses and transfers to City of S.B (300 AF).
Planned Future (2020)	6,835		Slight increase in all uses, allows for reserve

Sources: FMP EIR 2003 and pers. comm. from T. Mosby, Operations Manager, June 2003).

City of Santa Barbara

The City of Santa Barbara encompasses approximately 12,000 acres of which about 90 percent is developed. The developed area comprises residential (43 percent), commercial/industrial/ institutional (26 percent), open space (24 percent), and transportation corridors (7 percent). The City produces water from the following sources: Cachuma Project, Gibraltar Reservoir/Mission Tunnel/Devil's Canyon Creek (located along the Santa Ynez River above Cachuma Lake), water transferred from Jameson Reservoir by agreement with Montecito Water District, recycled water, SWP water, desalination, and groundwater (see Table 5). The City's long-term share of the groundwater basin's perennial yield is estimated at 1,400 acre-feet per year. The total safe yield of the Santa Barbara Groundwater Basin (includes Storage Unit #1, Storage Unit #3, and the Foothill Storage Unit) is estimated at 1,900 acre-feet per year. Almost all deliveries are for M&I uses in the City; agricultural demands are estimated at about 70-100 acre-feet per year.

The City's approach in using its supplies is to maximize its use of Gibraltar and Mission Tunnel and recycled water, use its Cachuma water with the exception of keeping at least a 3,000 AF carryover in Cachuma Reservoir, use SWP water to keep the carryover target whole and for

droughts, use groundwater for seasonal peaking and droughts, and use desalination in severe droughts, if needed. During severe drought the City assumes a 10% reduction in demand will be possible and reasonable.

Table 5. Water Supply And Demand – City Of Santa Barbara

	Normal (acre-feet per year)	Critical Drought Year	Comment
Supplies			
Cachuma Project	8,277	3,420	Fixed percentage of Cachuma Project yield. Cachuma represents 45% of total supply
Gibraltar Reservoir and Devils Canyon	4,310	0	
Mission Tunnel	1,109	500	Infiltration; tunnel from Gibraltar Reservoir
Juncal Reservoir	300	300	Water from Montecito Water District per prior agreement
State Water Project	2,200	1,650	SWP Table A amount is 3,000 AFY plus 300 AFY of CCWA drought buffer;
Local groundwater	1,104	4,150	City's portion of the Santa Barbara Groundwater Basin's safe yield of about 1,850 AFY; used for seasonal peaking and to replace surface water shortages due to drought
Recycled	900	900	
Desalination		3,125	For use only during emergency. Currently in storage mode. Max. capacity = 3,125 AFY
Total	18,200	14,045	
Demand			
Current (2002)	14,342		
Planned Future (2009 per LTWSP)	18,200		

Source: FMP EIR 2003.

Goleta Water District

The Goleta Water District (GWD) encompasses an area of approximately 32,000 acres of which about 4,000 acres are agricultural (12 percent), 5,760 acres (18 percent) are residential, 640 acres (2 percent) commercial, and 21,600 acres (68 percent) open space. The District serves the University of California, Santa Barbara, the Santa Barbara Airport, schools, recreational facilities, and the newly established City of Goleta. The District produces water from the following sources: Cachuma Project, recycled water, SWP water, and groundwater (Table 6).

The majority of the District's water supply is from the Cachuma Project. The District has 7,000 acre-feet per year of SWP Table A amount, plus 450 acre-feet per year of the Central Coast Water Agency's (CCWA) drought buffer. However, the District's right to the CCWA facility capacity for the delivery of SWP water is only 4,500 acre-feet per year. In 1995, the District began making deliveries from a new recycled water project developed in cooperation with the Goleta Sanitary District, a separate public agency. The recycled water project has a capacity of approximately 1,500 acre-feet per year and the District is currently delivering approximately 1,000 acre-feet per year to the University of California, Santa Barbara, several golf courses and other users who were previously using potable water. The District's right to produce groundwater from the local Goleta Basin has been adjudicated through the *Wright v. Goleta Water District* Judgement. The District has an adjudicated right to extract approximately 2,350 acre-feet per year, and any surplus water available.

GWD maximizes its use of Cachuma water, maximizes its use of recycled water, provides the remaining demand from SWP water, up to 4,500 afy or the amount available, and to the extent necessary, will develop groundwater. It expects the SWP to develop between 3800-4500 afy from the Table A amount held. In a 50% delivery year, the assumption used for SWP drought deliveries in this testimony, GWD would get 3725 AF.

Table 6. Water Supply And Demand – Goleta Water District

	Normal	Critical Drought Year	Comment
	(acre-feet per year)		
Supplies			
Cachuma Project	9,321	3,861	Fixed percentage of Cachuma Project yield; Cachuma represents about 55% of total supply
State Water Project	4,500	3,725	SWP Table A amount is 7,000 AFY plus 450 AFY of CCWA drought buffer. The District assumes 51-60 percent average annual delivery of Table A amount and drought buffer. The District's right to CCWA facility capacity is 4,500 AFY.
Local groundwater	2,350	2,350	District's portion of the Goleta Basin. Safe yield estimated at 3,410 AFY.
Recycled water project	1,500	1,500	Approximate capacity of built out project. Current production is approximately 1,000 AFY.
Total	17,671	11,461	
Demand			
Current (2000)	14,000		Includes approximately 1,000 AFY of recycled water
Planned Future (2020)	17,300		Includes approximately 1,500 AFY of recycled water

Sources: FMP EIR 2003, K Walsh, GWD General Mgr 2003.

Santa Ynez River Water Conservation District, Improvement District #1

The SYRWCD ID#1 encompasses an area of approximately 10,850 acres of which about 5,000 acres are residential, 150 acres are commercial, 400 acres are institutional, 2,600 acres are agricultural, and 2,700 acres are grazed or undeveloped. SYRWCD ID#1 produces water from the following sources: Cachuma Project, SWP water, groundwater from the Santa Ynez Upland, and underflow from the Santa Ynez River (see Table 7). The latter supplies are developed in two well fields in the river (4 cfs and 6 cfs fields) and a gallery well in the riverbed, which is currently inactive. Approximately 50-60 percent of the water deliveries are for agricultural customers; the remainder is for residential uses. SYRWCD ID#1 supplies M&I water to the City of Solvang as a customer. The District has a Table A amount for SWP of 2,000 acre-feet per year, which includes a Table A amount of 1,500 acre-feet per year for the City of Solvang. Cachuma Project water represents an important source of SYRWCD ID#1's total water supply.

SYRWCD ID#1 currently participates in a water exchange program with other Cachuma Project Member Units. Under the program, South Coast Member Units purchase SWP water, which is then delivered directly to SYRWCD ID#1 from the CCWA pipeline near Santa Ynez. The South Coast Member Units then take an equivalent amount of Cachuma water in exchange. This program allows the Member Units to avoid the cost of pumping SWP water to Cachuma Lake and provides fully treated water to SYRWCD ID#1.

Table 7. Water Supply And Demand – Santa Ynez River Water Conservation District, ID#1

	Normal (acre-feet per year)	Critical Drought Year	Comment
Supplies			
Cachuma Project	2,651	1,095	Fixed percentage of Cachuma Project at 10.31%; Cachuma Project represents approximately 40% of total supply.
Santa Ynez Uplands Groundwater Basin	1,430	2,320	Production for normal year is based on an average of the last five years (1998-2002) which reflects Well Nos. 3, 4, and 5A remaining out of production (destroyed or water quality problems) and Well No. 7 producing at a reduced rate due to lower water levels. Drought supply is based upon average annual production during the 1987-1991 drought adjusted for Well Nos. 3, 4, and 5A and reduced production from Well No. 7.
Gallery Well	0	0	Currently inactive due to SWTR. Maximum permitted diversion is 515 AFY
Santa Ynez River Underflow	1,480	1,450	This is estimate of future maximum production from two permitted well fields

State Water Project	525	350	SWP Table A amount is 2,000 AFY plus 200 AFY of CCWA drought buffer. District's Table A amount is 500 AFY plus 200 AFY of drought buffer. The remaining 1500 AFY is allocated to the City of Solvang under a water supply contract. District assumes 75% delivery of its 700 AFY allocation in normal year and 50% during drought.
Total	6,086	5,215	
Current (2002)	5,792		
Planned Future (2020)	6,619		

Sources: FMP EIR 2003, Chris Dahlstrom, ID No.1 General Mgr 2003).

The Cachuma Project Agencies use critical period planning to evaluate the yield and appropriate operational drafts of the Cachuma Project. This evaluation is done using the Santa Ynez River Hydrology Model (SYRHM). The Agencies, working with the Santa Barbara County Water Agency, agreed that a 25,714 AF annual draft is the appropriate draft of the Lake. Modeling showed that this level draft would result in no worse than a 20% shortage during the critical historical drought period which occurred from 1946 to 1951. This modeling was done based on water use according to the 89-18 water rights order and did not include releases for maintenance of fish.

The 1946-1951 drought is the worst drought during the available historical record used for the SYRHM which includes the years 1918 through 1993. Two other severe droughts occurred during that period – a drought during the early 1930's and the recent 1986-1991 drought. In recent history, severe local droughts have been separated by as many as 40 years or as few as 12 years. This means the Cachuma Project agencies have to be prepared for drought at all times.

In May 2003, Cachuma Reservoir had approximately 130,000 AF of storage. With a dry winter, the storage level could be below 100,000 AF in the spring of 2004. 100,000 AF is the marker for taking shortages from the Cachuma Project, because of the possibility of impending drought.

The 1986-1991 drought is a good example of the difference between modeling analysis and actual history. Actual shortages at the end of that drought were 45% because project agencies took higher drafts at the start of the drought and because in 1991, project agencies did not know that 1991 would be the last year of the drought – water was left in the reservoir for the following year. In modeling runs, the reservoir is allowed to drop to lower levels because the model knows when the drought is over. It is important to recognize that a reserve is necessary because drought emergencies will not behave identically to history and can be worse than history. The drought supply estimates for the Cachuma Project used in tables 2 through 7 are based on keeping a reserve for a following year of drought.

The State Water Project has been added since the last severe drought, which ended in 1991. The major impact of State Water Project water supply has been to add drought protection for the Cachuma Project Water Agencies. It has filled the holes in local water supply that were

identified in water supply modeling done by the SYRHM and made evident by the 1986-1991 drought emergency. Tables 3 through 7 above show all Cachuma project agencies fully using State Water to meet existing demand and planned future demand. It is important to note that the estimates in Tables 3 through 7 include State Water deliveries discounted to show that deliveries of full Table A amount are not expected in every year. For the drought year supplies, State Water was assumed to be able to deliver fifty percent of the sum of the Table A amount and drought buffer.

The presence of State Water has allowed Cachuma Project agencies to agree to releases of Cachuma Project water to benefit downstream fish, but only to a limited extent. The Cachuma Project agencies participated in the Santa Ynez River Fish Management Plan and funded extensive modeling to determine impacts of fish releases on local water supplies. State Water, to the extent it is estimated to be available, was used to provide some of the additional supply needed to make up for water lost to downstream releases.

State Water is an important addition to the diverse portfolio of supplies for Santa Barbara County water agencies and all members of the Cachuma Project, but it is limited. State Water has several characteristics that limit its usefulness.

- State Water deliveries are variable – State Water cannot meet full Table A amounts in most years. Santa Barbara County water agencies differ in their planning approach to this variability. Many assume 50 percent delivery capability. At one time we assumed that the State's Drought Water Bank would be available to replace unavailable Table A amount with water purchased for a nominal fee. However in 2003 there was no water available in the drought water bank.

- State Water is limited. The State Water pipeline was constructed at great cost. Cachuma Member Agencies have finite capacities. These capacities were determined at the time the joint powers agency was establish to construct and operate the local State Water Project facilities. The South Coast water agencies cannot increase their respective Table A amounts without constructing additional capacity.

- State Water cannot be carried over – the available supply must be used in each contract year, which is a calendar year.

- It is difficult to plan on the actual amount of State Water that will be available. State Water is available on a calendar year basis, but the actual amount of water that will be available is not known until well into the year. For example, in 2003 deliveries were projected to be approximately 50 percent in February, but the May delivery projection was 90%.

- State Water is relatively expensive. The extension of the State Water Project to Santa Barbara County had high capital costs which are fixed for project participants. The project also has much higher variable costs than existing surface and groundwater supplies. We estimate that State Water costs approximately $250 per AF more than Cachuma Project water.

The Cachuma Project Member Agencies have a number of water supply sources with varying fixed and variable costs. There are three water supplies common to the Cachuma Project

Member Agencies – Cachuma Project water, local groundwater and State Water Project water. The Cachuma Project has fixed capital costs of approximately $2.5 million per year, annual operating costs of approximately $1 million to the Bureau of Reclamation and local operation and maintenance costs through the Cachuma Operation and Maintenance Board of $1.4 million (2003-2004 estimate). Treatment of this water to potable drinking water standards is approximately $60 per AF. The total cost of Cachuma Project water, including treatment, is approximately $250 per AF.

Groundwater has the fixed cost of drilling and developing the well, which is variable for each installation, and an operating cost of approximately $50 per AF.

State Water has fixed costs of approximately $1400 per AF for the total Cachuma Project Member Agencies' Table A amount of 13,700 AF. The variable cost of delivering the water to Cachuma Reservoir is an additional $250 per AF and potable water treatment for South Coast participants is also needed ($60/AF).

Recycled water has high capital costs largely because of the requirement of a distribution system separate from the potable water distribution system. The City of Santa Barbara, for example, designed its recycled water project to include all potential sites that could be connected for a target cost of $1300 per AF. For the City of Santa Barbara, the additional cost of treating recycled water is approximately $60 per AF above the cost of treating potable water. In practice, once a recycled water project is completed, there is little opportunity to increase its use because of the limitations on the use of recycled water.

The City of Santa Barbara has a desalination facility with a capacity of 3,125 AFY that is currently in long term storage. City staff estimate that bringing that facility back into operation would cost at least $10 million and actual operation would produce water at a cost of approximately $1200 per AF.

The release of water to maintain oversummering habitat and provide passage flows for steelhead trout have significant impacts on the Cachuma Project deliveries for the member agencies. Tables 1 through 7 above use Cachuma Project deliveries based on Alternative 3C which includes the fish releases agreed to in the Biological Opinion. Table 8 below, which is patterned after Table 4-16 in the State Board Draft EIR, compares the impacts of the different alternatives. Shortages greater than those of Alternative 3C would provide greater hardship on the Cachuma Project Member Agencies. Table 8 differs from Table 4-16 of the EIR in that Table 8 has shortages based on keeping a reserve in the last year of the worst year of the historical critical period and adds rows to show the percent change to better measure the impact of the alternatives. Observations on the information included in Table 8 and differences from Table 4-16 from the EIR include:

- Under Annual Average Deliveries and Number of Shortages, Table 8 shows that Alternative 3A increases the number of years with substantial shortages by 33.3% over current operations and 40% over historical operations. Alternative 3C and current operations have the same number of shortages according to the SYRHM results.
- The section on Critical Drought Year shows that the real shortage in the worst year of the historical critical period would be 50 percent with historical operations. The shortage in the critical drought year would be increased by 16% which is similar to the shortage for Alternative 3C which is 21% greater than Alternative 1. These are the shortages that the Cachuma Project Member Agencies were aware of during the development of the Fish Management Plan and which the Member Agencies willingly and cooperatively accepted as part of the Fish Management Plan process.

- Alternative 3A would increase the critical year shortage 30% over Alternative 1, historical operations, and 12% over Alternative 2, current operations. These are shortages well in excess of the shortages agreed to in the Fish Management Plan process.

- The section on the critical three-year drought shows similar trends and magnitudes as the critical year section. Again, the shortages that the member agencies agreed to are substantial and the lack of a surcharge as proposed in Alternative 3A would make those shortages much larger.

In conclusion, the Cachuma Project Member Units have diversified supplies which are based on the Cachuma Project. Using the 1946-1951 drought as the critical drought period and including a reserve, analysis shows that at current demands no shortages should happen, but shortages may happen at future planned growth levels. The State Water Project filled the supply gap which was demonstrated by the 1987-1991 drought but it is a supply limited by the capacity of the existing pipeline and subject to drought, as well. The Cachuma Project Member Units accepted significant impacts to their water supplies with the development of the Fish Management Plan and subsequent Steelhead Biological Opinion which included surcharging Lake Cachuma three feet. Without the surcharge the Member Units would incur additional significant impacts.

Table 8. Impacts on Cachuma Project Deliveries to Member Units (similar to Table 4-16 in State Board Draft EIR, except deliveries used include a reserve, the change in shortages is calculated differently, and the alternatives are compared to Alternative 1 which is the historical baseline)

Water Supply Parameter	Alt 1, Historical Operations	Alt 2, Current Operations	Alt 3A, No Surcharge	Alt 3B, 1.8' Surcharge	Alt 3C, 3' Surcharge	Alt 4A&B, BNA Exchange
Annual Average Deliveries and Years of Shortages						
Average Annual Deliveries	25,308	25,115	24,901	24,986	25,122	25,169
Reduction compared to current operations (Alt 2)	193	-	(214)	(129)	7	54
Reduction compared to historical operations (Alt 1)	-	(193)	(407)	(323)	(186)	(139)
Number of years with 10% or greater shortages	5	6	8	7	6	6
Number of years with 10% or greater shortages - difference from Alt 2	-1	0	2	1	0	0
% change in years with 10% or greater shortages - difference from Alt 2	-16.7%	0.0%	33.3%	16.7%	0.0%	0.0%
Critical Drought Year (based on 1951 drought compared to 25,714 af target draft)						
Shortage in Critical Year	12,740	14,790	16,500	15,940	15,380	15,090
%shortage in deliveries in critical year	50%	58%	64%	62%	60%	59%
%shortage in deliveries in critical year - difference from Alt 2	-8%	0%	7%	4%	2%	1%
% change in deliveries in critical year - difference from Alt 2	-14%	0%	12%	8%	4%	2%
% change in deliveries in critical year - difference from Alt 1	0%	16%	30%	25%	21%	18%
Critical 3 year Drought Period (based on 1949-51 drought, compared to annual target draft of 25,714 af						
Shortage in Critical Years	22,800	27,030	31,220	29,460	27,750	24,530
%shortage in deliveries in critical years	30%	35%	40%	38%	36%	32%
%shortage in deliveries in critical years - difference from Alt 2	-5%	0%	5%	3%	1%	-3%
% change in deliveries in critical years - difference from Alt 2	-16%	0%	16%	9%	3%	-9%
% change in deliveries in critical years - difference from Alt 1	0%	19%	37%	29%	22%	8%