

**Soquel Creek Water District**  
**Draft**  
**Integrated Resources Plan**

**June 1999**

**Montgomery Watson**  
In association with  
**Moore/Iacofano/Goltsman Inc.**

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# Section 1

## PAC Findings and Recommendations

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### Background

The Soquel Creek Water District (District) serves more than 45,000 customers through approximately 13,400 active services in Capitola, Aptos, La Selva Beach, Seacliff, Rio Del Mar, Seascape, and Soquel.

One hundred percent of the District's current water supply is groundwater from two aquifers, the Purisima and the Aromas Red Sands. Recently, symptoms of decline have appeared in both, indicating that sustainable levels of pumping have been exceeded, thereby increasing the potential for saltwater intrusion.

In order to plan for a sustainable water supply into the future, the District initiated a decision-making process for determining their water supply need and selecting the best alternative(s) to meet that need. This process is known as Integrated Resources Planning (IRP). The resulting IRP covers a thirty-year period.

### Public Advisory Committee

Since reliable long-term water supply is important to everyone who lives or works in the District's service area; and successful water supply planning calls for solutions that balance the many considerations in a way that is acceptable to the community; the District formed a Public Advisory Committee (PAC) to work with consultants and staff on all aspects of the IRP.

The PAC was composed of individuals who represent homeowners and business associations, environmental groups, government agencies, and private well owners within the District's service area.

The PAC used an open, community-based, collaborative discussion and decision-making process throughout its work. Members of the public periodically attended the meetings and provided comments and input to the PAC. PAC members were asked to review technical materials and presentations, attend meetings, raise questions and offer comments, bring information and direction back to their group or constituency, and reach agreement on recommendations to the District.

The PAC conducted its work in two phases. The first phase, begun in October 1997, included six meetings of the entire PAC and six smaller working group meetings to work on detailed tasks. It concluded with the PAC reaching agreement on a number of significant elements of the final recommendation including the following:

- PAC mission statement and ground rules;
- Current and long-term water needs of the District;
- Preliminary work on the status of the groundwater basin, and
- Initial draft of a section on water conservation programs for the District.

At the conclusion of the first phase, the PAC evaluated its progress and the process used to date. Based on this evaluation, the District Board authorized the second phase of the process. The second phase began in November 1998 using slightly revised ground rules, but the same open, collaborative public process used in Phase I. The PAC met eight times during the second phase as a full group.

The PAC completed and agreed upon the following products and elements in the second phase:

- Final version of the recommended Water Conservation Program;
- Reviewed the status of the groundwater basin and utilized the information from the groundwater model on the estimated level of overdraft and a preliminary understanding of basin recharge;
- Confirmation of the District's long-term water needs and available supplies;
- Evaluation criteria to assess water supply project alternatives;
- Evaluation and selection of water supply alternatives for further study, and
- Recommended strategy for an Integrated Resources Plan for the District including water supply projects to pursue.

## **Goals and Objectives**

The Mission Statement adopted by the PAC contained the following specific goals:

1. Understand and decide whether a water quality and water supply problem is imminent in the District;
2. Develop a common assessment of long-term water needs and water demand management alternatives for the area served by Soquel Creek Water District;
3. Consider water use and management issues throughout the watersheds and groundwater basins that are utilized by the District;
4. Decide whether a supplemental water supply is needed;
5. Develop criteria including environmental, social, and economic elements to evaluate all water supply alternatives equally and include evaluation of conservation as an alternative, and
6. Use the evaluation criteria to make a recommendation for water supply to meet projected demands.

## **Water Demand Projections**

To determine the District's water supply need, future water demands were projected. Using 1996 as existing conditions, the demand projections were developed to year 2030. The 1996 District pumping was approximately 5,480 AFY. High-end and low-end future demands were estimated for 2001, 2006, 2015, and 2030. At year 2030, the high-end demand projection is 7,500 AFY and the low-end demand projection is 6,800 AFY.

## Conservation Measures

A conservation program analysis was developed by Montgomery Watson to evaluate potential water savings from an expanded conservation effort using the list of best water management practices (BMP's) established by the California Urban Water Conservation Council (CUWCC). Each of these programs have established quantifiable savings projections. PAC members also identified a wide range of other conservation/demand management options. These were also evaluated and considered for implementation by the District. The PAC recommends that the District implement a comprehensive and aggressive conservation program incorporating the various components described below.

Each of the 16 BMP's established by the CUWCC, plus ten variations of these BMP's, were examined for implementation. Based on that analysis, nine are recommended for implementation by the District.

1. **Residential Water Audits.** The top 20 percent of single-family and multi-family home water users (on a gallons-per-account-per-day basis) are offered a free audit that includes indoor water conservation measures and development of an irrigation schedule. The audit needs to be repeated every five years to maintain savings.
2. **Large Landscape Water Audits and Incentives.** Audits to increase the irrigation efficiency of landscapes containing more than three acres of turf would be conducted according to methods developed by the California Department of Water Resources.
3. **Commercial/Industrial/Public Incentives for Irrigation System Upgrades.** This program offers a customized rebate for any device or technique that can be shown to reduce irrigation water use by more than 1,000 hundred cubic feet (CCF)/year per application and to reliably provide those savings for at least five years. The burden of proof for savings and durability of those savings rests with the applicant, however, and acceptance of the proof, for the purpose of setting the rebate level, is at the discretion of the District.
4. **Commercial/Industrial/Public Indoor Water Audits.** This measure targets the top 10 percent of commercial, industrial, and public (government, institutional) water users. Building owners would be contacted and offered a free interior audit together with incentives sufficient to achieve customer implementation of audit findings. Audits would be repeated every five years to maintain or improve the conservation level.
5. **Commercial/Industrial/Public Outdoor Water Audits.** Existing commercial and industrial building owners, with less than three acres of turf and whose buildings have high summer water use, would be offered an irrigation system audit to improve water use efficiency of the existing sprinkler system including establishing the correct watering schedule. Annual conservation reminders would be sent to the targeted businesses/industries, and an offer would be made to repeat the audit after five years.

6. **Residential Water Efficient Landscape and Irrigation System Incentives.** This program offers incentives to single-family and multi-family customers for the installation of water-efficient landscaping and irrigation systems. To qualify, customers must have drip irrigation on plant material, timers or controllers, and soil and rain sensors.
7. **Ultra-Low-Flush Toilet Replacement.** The District would continue and enhance its current toilet replacement program offering rebates to customers who replace their high water-use toilets with 1.6 gallons per flush (gpf) models. This measure would create increased savings in the short term because the low-flow fixtures are installed sooner than the natural replacement rate. Over the long run, no total increase in savings would occur; however, since the federal Energy Policy Act mandates that only 1.6-gpf toilets can be sold.
8. **Incentives for Commercial/Industrial/Public Toilet Shower Replacement.** Cash rebates would be offered to encourage replacement of existing high water-use toilets and urinal valves in the Commercial/Industrial/Public sectors and low-flow showerheads could be replaced for all Commercial/Industrial/Public customers that have significant numbers of showerheads (like schools).
9. **Irrigation Advisory Service.** This measure would offer all irrigators advice on when and how much to water based on the calculated irrigation water needed for turf grass, using evapotranspiration (ET) information from a series of local weather stations. ET information could be published daily in the local newspaper.

## **Additional Conservation Recommendations of the PAC**

The following suggested measures expand upon the conservation Best Management Practices, (BMP), and suggest collaborations or partnerships between the District and other organizations that could produce additional water savings.

1. **Communication with County and City Regarding Water Resource Management.** It is recommended that the District take steps to clearly communicate with the County and City regarding the District's estimated current and projected ability to adequately supply water for new development. This will enable planning for future growth, which reflects the District's ability to serve that growth as well as contribute to the broader goal to achieve regional-level coordination for water resource management. Specifically, the PAC recommends the following steps be taken by the District:
  - 1.1. An annual report should be submitted by the District to the County Planning Department, County Board of Supervisors, and City of Capitola. If the District has entered any of the three shortage levels outlined in Appendix V of the *Soquel Creek Water District 1995-2015 Drought Contingency Plan*, the annual report should include a request to the County to review its growth limits.
  - 1.2. Set criteria that clearly define the groundwater conditions that constitute a shortage emergency and invoke the provisions of the *Soquel Creek Water District 1995-2015 Drought Contingency Plan* with the following modifications:

**A. First Level: Conservation Emergency.**

Triggers include up to 15 percent supply shortage, or overdrafting and threat to future water supply/quality.

The District shall hold a public hearing regarding the water supply shortage, shall take action to reduce water use and shall consider the following potential actions:

- a) Conditional or limited will-serve letters to customers;
- b) Moratorium on new water hookups;
- c) Request the County to place a moratorium on new wells within the aquifer;
- d) Request the County to monitor and meter all wells within the groundwater basin;
- e) Voluntary use reductions outlined in table 5 and in Appendix V of the *Soquel Creek Water District 1995-2015 Drought Contingency Plan*;
- f) Mandatory use reductions outlined in Table 5 and in Appendix V of the *Soquel Creek Water District 1995-2015 Drought Contingency Plan*;
- g) Particularly in short-term emergency situations, take other appropriate actions to reduce water use.

**B. Second Level: Supply Emergency**

Triggers include a more than 15 percent supply shortage, and threat to current and future water supply/quality, and evidence of salt water intrusion.

The District shall hold a public hearing regarding the water supply shortage and shall take the following actions:

- a) Moratorium on new water hookups;
- b) Request the County to declare a moratorium on new well drilling;
- c) Mandatory use reductions outlined in Table 5 and in Appendix V of the *Soquel Creek Water District 1995-2015 Drought Contingency Plan*;
- d) Particularly in short-term emergency situations, take other appropriate actions to reduce water use.

*Legal case history requires that these steps be supported by sound data.*

- 1.3. Declare a groundwater emergency consistent with the provisions of Stage 1 of the District's Drought Contingency Plan (up to 15% shortage), with its associated conservation measures.
  - 1.3.1. Revise the District's Drought Contingency Plan by adding the following measure to Stage 1 – "Issue conditional will serve letters and clearly communicate to all applicants about the District's projected supply shortage and the necessity of resolution in order to approve additional connections."
- 1.4. Initiate discussions with other agencies with water use jurisdiction within the aquifers used by the District to establish similar water emergency and conservation measures.

- 1.5. Encourage regional solutions to water supply/quality problems by forming alliances with other water management agencies.
  - 1.6. Request that the County and City of Capitola, in their future land use planning decisions, not exceed the projected water demands through 2030 (which are based on current General Plans) by not increasing densities, expanding urban services lines or other land use changes that would result in overall increased water demand within the Soquel/Aptos groundwater basin.
  - 1.7. Expand the drought tolerant landscaping requirements with County and City of Capitola input and explore the possibility of working with the other water agencies and the Mayor's Select Committee to create uniform water conservation legislation throughout the County.
  - 1.8. Work with the County of Santa Cruz to quantify non-District pumping within the aquifers.
  - 1.9. Support a countywide water resource monitoring and management program.
  - 1.10. Investigate a countywide assessment to support water monitoring throughout the County of Santa Cruz, to include private wells.
2. **Conservation Pricing.** Pricing methods including multi-tier, “Fair Use Management” or “fee-bates” reward those who conserve and charge those who use substantially above average amounts of water at a greater per unit cost. Establishment of any of these pricing methods should be accompanied by an appeal process allowing the District to hear special cases such as unavoidable high water use to care for sick or elderly residents.
3. **Leak Detection.** The District can develop a priority list of projects for reducing water system loss to achieve 6% and 5% system loss with anticipated costs associated with each level of reduction. Active sonic leak detection for all water lines and connections can be an effective option.
4. **Expanded Rebate Programs.** Expanding programs in their scope, moving up the implementation timelines, and increasing rebates to achieve fuller utilization can make the savings greater. Three options to increase savings include:
- 4.1. A new rebate program for front-load laundry washers could save both water (est. 4.5 gppd) and energy and would include a special rebate program for laundromats or laundry facilities in multi-family complexes.
  - 4.2. Accelerate and increase the participation in the Ultra-Low-Flow Toilet Rebate Program through the mandatory replacement at time of transfer or remodel (exceeding 50% of existing square footage) for all residences and commercial facilities.
  - 4.3. Provide low-flow showerheads with shutoff valves and hose shutoffs without cost during water audits.
5. **Landscape Incentives.** Drought tolerant landscaping can help address the approximately 50% increase in water consumption during the summer months.

- 5.1. Irrigation rebates are an option and could be combined with reasonable mandatory replacement or installation at time of transfer or remodel (exceeding 50% of existing square footage) for all residences and commercial facilities.
- 5.2. Drought tolerant landscaping or drought tolerant lawn replacement rebates and technical assistance in selecting plant or lawn variety would encourage and accelerate water savings as well as provide the District with data on participation.
6. **Mandatory Rationing.** Mandatory reduction remains an option. Allowances would be made for special needs such as large families and customers would have one year to make reductions.
7. **Submetering.** Savings can be encouraged when people know their usage or become aware of changes such as leaks in their particular residential unit. The District could provide incentives/rebates for apartment or condominium submeter installation or require installation without cost to the District. Two areas to focus upon include:
  - 7.1. Mandatory installation of submeters for apartments or condominiums within 3 years.
  - 7.2. Mandatory installation of submeters for mobile homes within 5 years with cost protections for residents.
8. **Pressure Reduction.** Develop pressure reduction options for individual residences and commercial customers as well as for neighborhoods or subdivisions. Two possible target areas include:
  - 8.1. Individual residences particularly in areas of high system pressure.
  - 8.2. Mandatory pressure reduction on new developments over a pre-determined number of units or square feet.
9. **Education Programs.** Model education programs represent an investment in future water savings. Some options include:
  - 9.1. Establish and/or expand existing education programs to reach private well users outside the District but within shared aquifers to increase their conservation.
  - 9.2. Establish a partnership with the Life Lab program to have children grow and study drought tolerant plants at school and then plant them at home.
  - 9.3. Establish and/or support existing educational or nursery programs for drought tolerant plants. Use a nonprofit partnership program such as the Homeless Garden Project for growing or installing plants. Provide incentives for verified replacement of "traditional" landscaping or provide free plants to customers along with conservation information.
10. **Gray Water.** Start a gray water task force to include representatives of the County, Cities, a nonprofit organization, and the business community. Include the publishing of technical assistance materials, providing audits, and the development of a contractor education and/or certification program. Work in partnership with the County's Environmental Health Department to ensure protection of public health.

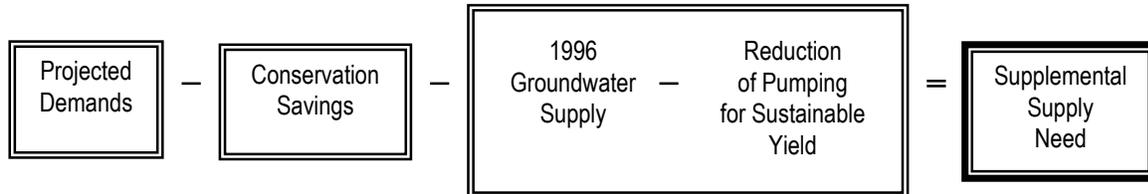
11. **Conservation Institute.** Begin a summer water conservation institute in conjunction with UCSC, Cabrillo, and vocational training programs to provide assistance with retrofits and landscaping conversion.
  
12. **Low Water Use Incentives.** Establish a reward system for low water use, which might include one or more of the following options:
  - 12.1. Provide a financial incentive to those who use substantially less water.
  - 12.2. Consider establishing a market based conservation program such as would be suggested by the “Fair Use Management” approach. Shares representing a certain quantity of water would be allocated to each customer according to type of use, with a portion of unused shares available for sale to those willing to pay the market price, thus addressing the finite nature of the resource at any given time.
  - 12.3. Use rewards such as tokens or coupons that can be exchanged for drought tolerant plants or car washes at facilities that use recycled water for use below a certain level or for each unit of water not used within a certain allotment.
  
13. **Conservation Committee.** Establish, as quickly as possible, a water conservation committee with District, private, and governmental participation and a budget to carry out projects.

## **Water Needs Assessment**

The District’s water supply needs were determined using the following components:

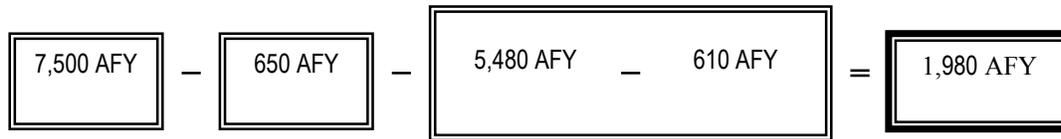
- Water Demand Projections – Using 1996 as existing conditions, the demand projections were developed to year 2030. High-end and low-end future demands were estimated using the land use-based approach and the parcel-based approach for development, respectively. The high-end projections assume that new development will occur at the density range allowed by the County of Santa Cruz General Plan. The low-end projections assume that development will occur at lower densities based on parcel size.
- Existing Groundwater Production – The actual District production for 1996 was used.
- Groundwater Model Results on Basin Sustainable Yield – The Soquel-Aptos Integrated Groundwater and Surface Water Model (IGSM) was developed and used to simulate basin baseline conditions and develop the basin sustainable yield for the Purisima formation. Assuming that pumping changes are limited to the District wells only, the analysis indicated that 1996 aquifer pumping levels need to be reduced by approximately 610 AFY in selected production wells to alleviate the undesirable conditions of depressed and declining coastal monitoring well water levels. Depending on the outcome of the sustainable yield of the Aromas formation (yet to be determined), additional pumping reduction for District wells within the Aromas formation may be required.
- Recommended Conservation Program – The PAC recommended conservation measures are projected to result in an estimated water savings for the District of approximately 650 AFY by the year 2030.

After accounting for current and projected demand, factoring in potential savings from an aggressive conservation program, and addressing a minimum level of pumping reduction to correct overdraft and avoid undesirable impacts, it was determined that the District needs to augment its current supply by approximately 1,200 to 2,000 AFY over the next 30 years.

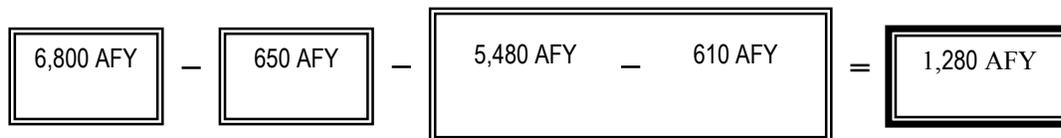


Using the upper and lower range year 2030 demand projections, the District’s need is determined as follows.

Upper Range of Need:



Lower Range of Need:



## Water Supply Options

The Public Advisory Committee identified and considered various water supply options in the IRP process. The list of water supply options was then narrowed down by the PAC to three supply options: desalination; off-stream diversion; and recycled water. Each option was evaluated using the same set of criteria that included economic feasibility, availability and reliability of supply, environmental quality implementation risk and uncertainty, water quality, operational flexibility, ability to meet future needs, and public safety. Their recommendations follow.

## Supplemental Water Supply Option Recommendations

Based on the Water Needs Assessment, the PAC recommends the following supplemental supply options for the District's consideration.

1. **Off-Stream Diversion Option.** Pursue the Off-Stream Diversion Project to offset winter demands and inject water into the aquifer contingent upon the following:
  - 1.1. Determine that there is capacity within the aquifer to absorb the amount of water available for injection without losing water to the ocean. Determine the aquifer response when water is injected/recharged to evaluate the overall benefit to groundwater levels along the coast. Use an independent peer review, Technical Advisory Committee or consultant to verify findings.
  - 1.2. Work with California Department of Fish and Game and other interested entities to understand their issues related to fisheries protection and other stream resources.
  - 1.3. Analyze the environmental impacts, especially related to the biological health of the stream system, and mitigate accordingly.

If the above studies demonstrate to the District Board that the project is feasible and impacts can be addressed, then proceed with the project in the following manner:

- 1.4. Working with the appropriate agencies, identify possible stream enhancement activities, such as riparian and streambed restoration, erosion control, fish habitat and other environmental enhancement projects.
  - 1.5. Obtain all necessary environmental and other permits and approvals.
  - 1.6. Develop a stream-flow monitoring program that includes baseflow and other types of monitoring as identified by the permitting agencies.
  - 1.7. Develop an interactive Public Information Program regarding all aspects of the project.
  - 1.8. Utilize an open participation process with the neighborhood surrounding the project in developing the facilities design. Pay particular attention to ways of minimizing visual, noise, and other potential impacts to surrounding areas.
2. **Desalination Option.** Consider participating in the development of a regional desalination supply, if, in the future, the District's Board determines it is necessary. If the District pursues this option, consideration should be given to working with the City of Santa Cruz to locate the plant site proximate to the existing ocean outfall or working with other water agencies that may pursue a desalination project. Track the most up-to-date technologies for more cost-effective treatment options.
  3. **Recycled Water Option.**
    - 3.1 Consider participating in the development of a recycled water supply for non-potable applications (such as irrigation), if, in the future, the City of Santa Cruz or another agency implements this supply option.

- 3.2 Identify and encourage the installation of dual water systems in existing and new developments with large turf areas (e.g., playing fields, golf courses) and other major non-potable water uses (e.g., industrial users) for future applications of recycled water.
- 3.3 Request that the County and Cities consider dual water system installations for new developments of major non-potable water users by non-District customers (e.g., Cabrillo College, County parks, major industrial projects, etc.).

## **Additional Recommendations**

1. **Baseflow of Soquel Creek.** The District should continue to work with other agencies and private interests to protect and enhance the baseflow of Soquel Creek. Efforts should include monitoring groundwater levels along Soquel Creek; developing a watershed management plan; cooperatively working with others to evaluate the adjudication of the Creek; and consideration of a Watermaster.
2. **Imported Supply.** The District should work with the County and the Pajaro Valley Water Management Agency (PVWMA) to evaluate and maximize the potential indirect increase in the amount of water available in the District's portion of the Aromas Red Sands Aquifer. This increase could result from the importation of water, other supply projects to the Pajaro Valley, or a decrease of pumping in the Pajaro Basin.
  - 1.1 Use the updated PVWMA groundwater model to evaluate the effect of groundwater pumping in the Pajaro area (particularly Corralitos) on water levels, gradients, and yields in the Aromas formation in the southern part of the District.
  - 1.2. Evaluate the potential impact on water levels and yields within the District that could result from importation of water and in-lieu recharge in the Pajaro Basin, particularly in the Corralitos area.
  - 1.3. If there are indirect benefits to the District, work with PVWMA to consider changes in the Pajaro Basin Management Plan to maximize benefits to the District in return for District support in proportion to those benefits.
3. **On-Stream Reservoir.** Retain this option for the distant future should the need for an additional project arise.
  - 2.1. Work with the State Water Resources Control Board and Scotts Valley Water District to retain a modified application for a water rights permit on the West Branch of Soquel Creek to not preclude a possible reservoir project at the Glenwood site.
  - 2.2. Seek County support for this application.
  - 2.3. Do not sell land holdings in the Glenwood area.
  - 2.4. Request that the County retain this option as a possible future regional project in the General Plan.

## Section 2

# Public Advisory Committee Process

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### Overview of PAC Process

On July 1, 1997, the Soquel Creek Water District Board accepted the “Report on the Community-Based Integrated Resources Plan Process” prepared by CONCUR. As recommended in that report, a Public Advisory Committee (PAC) was formed to make recommendations regarding the current and future water demand and supply for the District and water resources management activities in the groundwater basins utilized by the District. The PAC was composed of individuals representing a broad spectrum of stakeholders in the area including homeowners associations, environmental groups, business, governmental agencies, private well owners within the District service area, and others. The PAC used an open, community-based, collaborative discussion and decision-making process throughout its work. Members of the public periodically attended the meetings and provided comments and input to the PAC. PAC members were asked to review technical materials and presentations, attend meetings and raise questions and offer comments, bring information and direction back to their group or constituency and reach agreement on recommendations to the District.

The PAC agreed to a mission statement, a set of ground rules and working arrangements and an outline for an eventual product early in the process. The PAC conducted its work in two phases. The first phase included six “plenary” meetings (of the entire PAC) and six meetings of smaller working groups of the PAC to work on detailed tasks.

The first phase concluded with the PAC reaching agreement on a number of significant elements of the final recommendation including the following:

- PAC mission statement and ground rules,
- Current and long-term water needs of the District,
- Preliminary work on the status of the groundwater basin, and
- Initial draft of a section on water conservation programs for the District.

At the conclusion of the first phase, the PAC evaluated its progress and the process used to date. Based on this evaluation, the District Board authorized the second phase of the process. The second phase began in November 1998 using slightly revised ground rules, but the same open, collaborative public process as in Phase I. The diagram on the following page shows the work the PAC completed during Phase II. The PAC met eight times during the second phase as a full group.

The PAC completed and agreed upon the following products and elements in the second phase:

- Final version of the recommended Water Conservation Program,
- Reviewed the status of the groundwater basin and utilized the information from the groundwater model on the estimated level of overdraft and a preliminary understanding of basin recharge,
- Confirmation of the District’s long-term water needs and available supplies,

- Evaluation criteria to assess water supply project alternatives,
- Evaluation and selection of water supply alternatives for further study, and
- Recommended strategy for an Integrated Resources Plan for the District including supplemental water supply projects to pursue.

The PAC was assisted by a number of resource specialists during the course of the study. District staff provided technical support, policy guidance, and logistical support and assisted in note taking and documentation. Montgomery Watson provided technical water resources expertise for water supply, water demand, water projects definition and evaluation, water conservation and groundwater modeling tasks. Luhdorff and Scalmanini provided technical expertise in groundwater basin evaluation and recharge. A Technical Advisory Committee (TAC) composed of: Carl Hauge, Department of Water Resources; Randall Hanson, USGS; Bruce Laclergue, water resources manager, Santa Cruz County; Andrew Fisher, hydrology professor, UCSC; and Martin Feeney, consulting hydrogeologist, provided technical oversight of the groundwater modeling used in the basin yield assessment. The TAC was convened on several occasions to review and critique technical data and modeling assumptions. They were also provided drafts of technical documents to review and comment on.

Individual presentations were made during the course of the study by a number of specialists in particular fields such as: Bill Kocher, water director, City of Santa Cruz, on the feasibility of a conjunctive use project with the City; Justine Gerbrandt regarding her findings on private well use in the groundwater basin; Gary Greene, noted expert on the Purisima Formation, regarding the groundwater basin characteristics; John Fawcett, Luhdorff and Scalmanini, regarding the feasibility of injection wells; and Bruce Laclergue, water resources manager, Santa Cruz County, regarding the feasibility of surface recharge.

Phase I was facilitated by CONCUR, who were also involved in note-taking and report drafting and documentation. Moore, Iacofano, Goltsman (MIG), facilitated the second phase, and were also involved in note taking, documentation and water resources policy options.

## **Public Advisory Committee Members**

1. **Aptos Chamber of Commerce**  
*Jeff Eckles*
2. **Cabrillo College**  
*Cliff Nichols*
3. **California Department of Fish and Game**  
*Dennis Baldwin*
4. **Capitola Chamber of Commerce**  
*Peter Hubback*
5. **Central Water District**  
*Clarke Wales*
6. **City of Capitola Planning Commission**  
*Rick Jones*
7. **Coastal Watershed Council**  
*Donna Meyers*
8. **County Board of Supervisors**  
*Jan Beautz, Dave Reetz (Alternate)*
9. **County Planning Department**  
*Mark Deming*
10. **Environmental Council of Santa Cruz (resigned August 1998)**  
*Barbara Graves*
11. **Friends of Soquel Creek (resigned November 1998)**  
*Ned Spencer, Steve Leinau (Alternate)*
12. **LAFCO**  
*Pat McCormick*
13. **Mar Vista Water Corporation**  
*Jim Smith*
14. **Natural Resources Conservation Service**  
*Rich Casale*
15. **Pot Belly Beach Club**  
*Carl Sprague*
16. **Rio Del Mar Homeowners Association**  
*Ron Castle, Robert Galway (Alternate)*
17. **Santa Cruz County Environmental Health Services**  
*John Ricker*
18. **Santa Cruz County Resource Conservation District**  
*Karen Christensen*
19. **Save Soquel**  
*Judy Parsons, Katherine Sweet (Alternate)*
20. **Seacliff Homeowners Association**  
*Barbara McGee, Guy Sanchez (Alternate)*
21. **Soquel Creek Water District**  
*Laura Brown*

**22. Soquel Property Owner**

*Richard Nutter*

**23. Stockton Beach Grill**

*Lee Walters*

**Technical Advisory Committee Members (TAC)**

**1. United States Geological Services (USGS)**

*Randall Hanson*

**2. State Department of Water Resources**

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**3. County Hydrologist**

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**Technical Consultants**

**1. Linsley, Kraeger, and Associates**

**2. Luhdorff & Scalmanini**

**3. Montgomery Watson**

## **Mission Statement**

*Ratified by Public Advisory Committee members on October 22, 1997.*

The Public Advisory Committee (PAC) is composed of individuals who represent community groups, homeowners associations, environmental groups, businesses, governmental agencies, elected officials, recreational groups, and private well owners within the Soquel Creek Water District (District) service area.

The PAC will use a community-based, collaborative decision-making process to review information and make recommendations to the District regarding a current and future source of water demand and supply for the customers served by the District. The PAC will also make recommendations to the District regarding opportunities to work cooperatively with other entities regarding the management of water resources within the watersheds and groundwater basins that are utilized by the District.

The PAC is committed to cooperatively participating in a facilitated process to examine and reach agreement on water demand, water supply and the future water needs of the District and a plan for meeting those needs, in a manner that:

- utilizes existing information developed by District staff, consultants, other governmental agencies, and individuals;
- identifies areas where additional information is needed;
- establishes a common base of information.

PAC members will endeavor to accomplish the following specific goals:

- Understand and decide whether a water quality and water supply problem is imminent in the District;
- Develop a common assessment of long-term water needs and water demand management alternatives for the area served by the District;
- Consider water use and management issues throughout the watersheds and groundwater basins that are utilized by the District;
- Decide whether a supplemental water supply is needed;
- Develop criteria including environmental, social, and economic elements to evaluate all water supply alternatives equally and include evaluation of conservation as an alternative, and
- Use the evaluation criteria to make a recommendation for water supply to meet projected demands.

The Public Advisory Committee meetings, carried out during six plenary sessions, will be supported by a parallel joint fact-finding process, conducted by convening six separate working group meetings. Each working group meeting will focus on specific technical questions raised by the PAC during plenary sessions such as the methods and assumptions used in studies by

technical consultants, the relationship between current water demand and supply, and future water demand and supply.

## Section 3

# Statement of Future Water Demand Projections

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*Reviewed and revised at the November 13, Working Group meeting. Reviewed and Ratified by the PAC on December 9, 1997.*

### Background

According to a 1997 technical report developed by Montgomery Watson<sup>1</sup>, a consulting firm working for the Soquel Creek Water District (District), total water demands in District are expected to increase at approximately 1 percent per year over the next twenty years. This increase is due to the development of vacant lands and increased density of developed lands. The following sections summarize Montgomery Watson's methodology, assumptions and findings regarding future water demands in the District. The section titled "Findings" will also provide an overview of historic and current water demands.

### Methodology

The methodology used by Montgomery Watson to arrive at future water demands in the District combined four main elements. These are the boundaries of the study area, land use data, population growth rates and water use factors.

The study area boundaries were the Santa Cruz County Local Agency Formation Commission (LAFCO) approved Sphere of Influence (SOI) for the Soquel Creek Water District. For interim projections, the Urban Service Line (USL) was used.

Land use data was obtained from Santa Cruz County and the City of Capitola, and by conducting a field survey of currently vacant land parcels. These vacant lands were designated for growth based on general plan policies and land use designations.

Portions of population growth rates from the Association of Monterey Bay Area Governments (AMBAG) were used to obtain future water demands associated with increased density or "infill" in developed areas.

Water use factors were derived from a combination of District billing records, previous water use studies, and standard water use factors. These factors represent the typical water consumption for that land based on its planned land use designation. For example, suburban residential and urban residential are two County General Plan land use designations for which water use factors were calculated.

The Montgomery Watson methodology is a departure from the often-used approach to water demands projections of applying per capita use factors to population growth rates without benefit of actual land use data. Population growth rates are estimates and become less accurate when the boundaries of the study area do not follow available data exactly. In addition, population growth rates do not account for changes in land-use patterns. Therefore, Montgomery Watson employed

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<sup>1</sup> Johnson, Karen and Catherine Engberg. 1997. Soquel Creek Water District Integrated Resources Plan: Draft Water Demand Projection Update.

a methodology which applies land-use designations in accordance with Santa Cruz County and City of Capitola General Plans.

Montgomery Watson developed a low and high range of water demands for each planning year. This range was based on land use and growth rate assumptions, which are described in the following section.

### **Overall Assumptions**

Key overall assumptions used to arrive at future water demands were as follows:

- A. The District study area boundary is the District Sphere of Influence (SOI) as defined by the Santa Cruz County Local Agency Formation Commission.
- B. Billings records used are from drought years (1988 to 1991). Further analysis determined that the overall impact from the drought was less than 2.5 percent. Because this impact is not significant, no adjustments were made.
- C. All land use designations reflect the General Plan of either Santa Cruz County or the City of Capitola.
- D. Vacant lands of significant size within the District Urban Service Line will be built out within the next five years.
- E. Unaccounted-for-water estimate is eight percent for the District.
- F. Low-range and high-range projections are based on low and high development densities provided by the County of Santa Cruz.

Assumptions for each specific time period are presented with the corresponding tables and figures in the Findings section that follows.

### **Findings**

Tables one through four, as well as figures one through four (pages 4–10), provide background information on historic and current water demand in the District. The methodology and assumptions described above only apply to findings starting with Figure 5 on page 11. Findings from page 11 to the end are from the Montgomery Watson 1997 report.

**Table 1** on the next page presents water consumption and the number of service connections in the Soquel Creek Water District from 1964 to 1997. The last column in the table gives data for water consumption per service connection in the District. Using 1964 as a base year, percent increases were calculated for both water consumption and service connections. Figures 1 through 4 that follow are graphical representations of the data in table 1.

**Table 1.** Soquel Creek Water District Regular Service Connections and Water Consumption 1964–1997

FY Ending	Water Consumption AFY (a)	% Increase (Base yr 1964)	Yearly % Change	Service Connections (b)	% Increase (Base yr 1964)	Yearly % Change	Water Consumption per Connection (c)
1964	1,492.00	(d)		6,405			0.2329
1965	1,579.75	5.88%	5.88%	6,839	6.78%	6.78%	0.2310
1966	1,742.35	16.78%	10.29%	7,239	13.02%	5.85%	0.2407
1967	1,731.61	16.06%	-0.62%	7,454	16.38%	2.97%	0.2323
1968	1,960.45	31.40%	13.22%	7,753	21.05%	4.01%	0.2529
1969	1,904.16	27.62%	-2.87%	8,075	26.07%	4.15%	0.2358
1970	2,275.03	52.48%	19.48%	8,277	29.23%	2.50%	0.2749
1971	2,323.31	55.72%	2.12%	8,578	33.93%	3.64%	0.2708
1972	2,682.19	79.77%	15.45%	9,008	40.64%	5.01%	0.2978
1973	2,811.02	88.41%	4.80%	9,358	46.10%	3.89%	0.3004
1974	2,810.03	88.34%	-0.04%	9,581	49.59%	2.38%	0.2933
1975	2,856.13	91.43%	1.64%	9,797	52.96%	2.25%	0.2915
1976	3,220.93	115.88%	12.77%	10,405	62.45%	6.21%	0.3096
1977	3,180.93	113.20%	-1.24%	10,979	71.41%	5.52%	0.2897
1978	2,819.86	89.00%	-11.35%	11,331	76.91%	3.21%	0.2489
1979	3,422.30	129.38%	21.36%	11,679	82.34%	3.07%	0.2930
1980	3,640.85	144.02%	6.39%	12,045	88.06%	3.13%	0.3023
1981	3,863.69	158.96%	6.12%	12,535	95.71%	4.07%	0.3082
1982	3,742.06	150.81%	-3.15%	12,837	100.42%	2.41%	0.2915
1983	3,761.36	152.10%	0.52%	13,047	103.70%	1.64%	0.2883
1984	4,347.91	191.41%	15.59%	13,360	108.59%	2.40%	0.3254
1985	4,563.88	205.89%	4.97%	13,653	113.16%	2.19%	0.3343
1986	4,662.48	212.50%	2.16%	13,833	115.97%	1.32%	0.3371
1987	4,934.97	230.76%	5.84%	14,077	119.78%	1.76%	0.3506
1988	5,060.80	239.20%	2.55%	14,266	122.73%	1.34%	0.3547
1989	4,773.29	219.93%	-5.68%	14,391	124.68%	0.88%	0.3317
1990	4,785.42	220.74%	0.25%	14,668	129.01%	1.92%	0.3262
1991	4,565.12	205.97%	-4.60%	14,777	130.71%	0.74%	0.3089
1992	4,523.03	203.15%	-0.92%	14,809	131.21%	0.22%	0.3054
1993	4,602.70	208.49%	1.76%	15,067	135.24%	1.74%	0.3055
1994	4,842.64	224.57%	5.21%	15,210	137.47%	0.95%	0.3184
1995	4,658.51	212.23%	-3.80%	15,249	138.08%	0.26%	0.3055
1996	4,993.50	234.68%	7.19%	15,320	139.19%	0.47%	0.3259
1997	5,188.41	247.75%	3.90%	15,517	142.26%	1.29%	0.3344

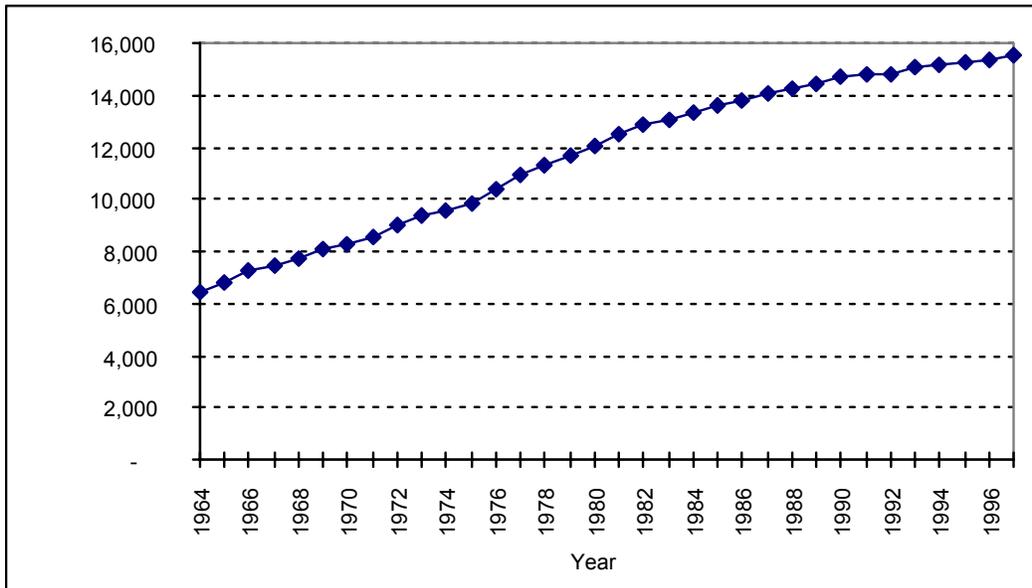
(a) Sources: “The History of the Soquel Creek Water District 1961–1988” page 43. Customer Service Annual Consumption Reports, July 1971 to June 1997.

(b) Source: District records—Annual New Services Report. Based on 5/8” equivalent regular services—fire services not included.

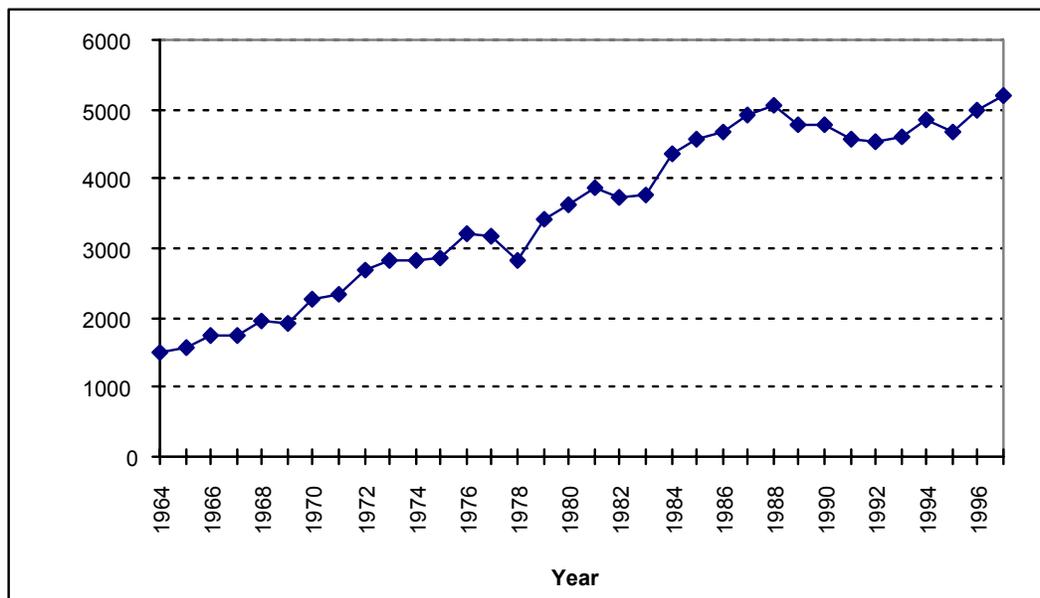
(c) Acre-feet per connection

(d) Estimate

**Figure 1** shows a steady rise in service connections from 6,405 in 1964 to 15,517 in 1997. **Figure 2** illustrates the water consumption in the District to be 1,492 acre feet in 1964, rising to 5,188 acre feet in 1997. There are three notable decreases in water consumption during this period: 1977–1978; 1981–1983; and 1988–1992.

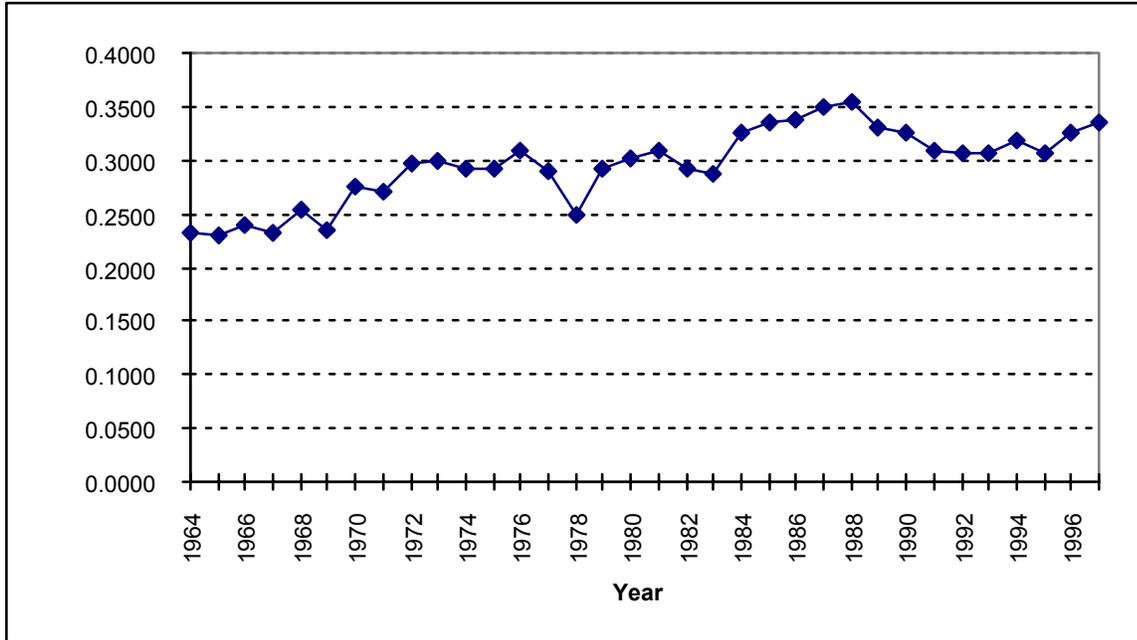


**Figure 1.** District Regular Service Connections 1964–1997



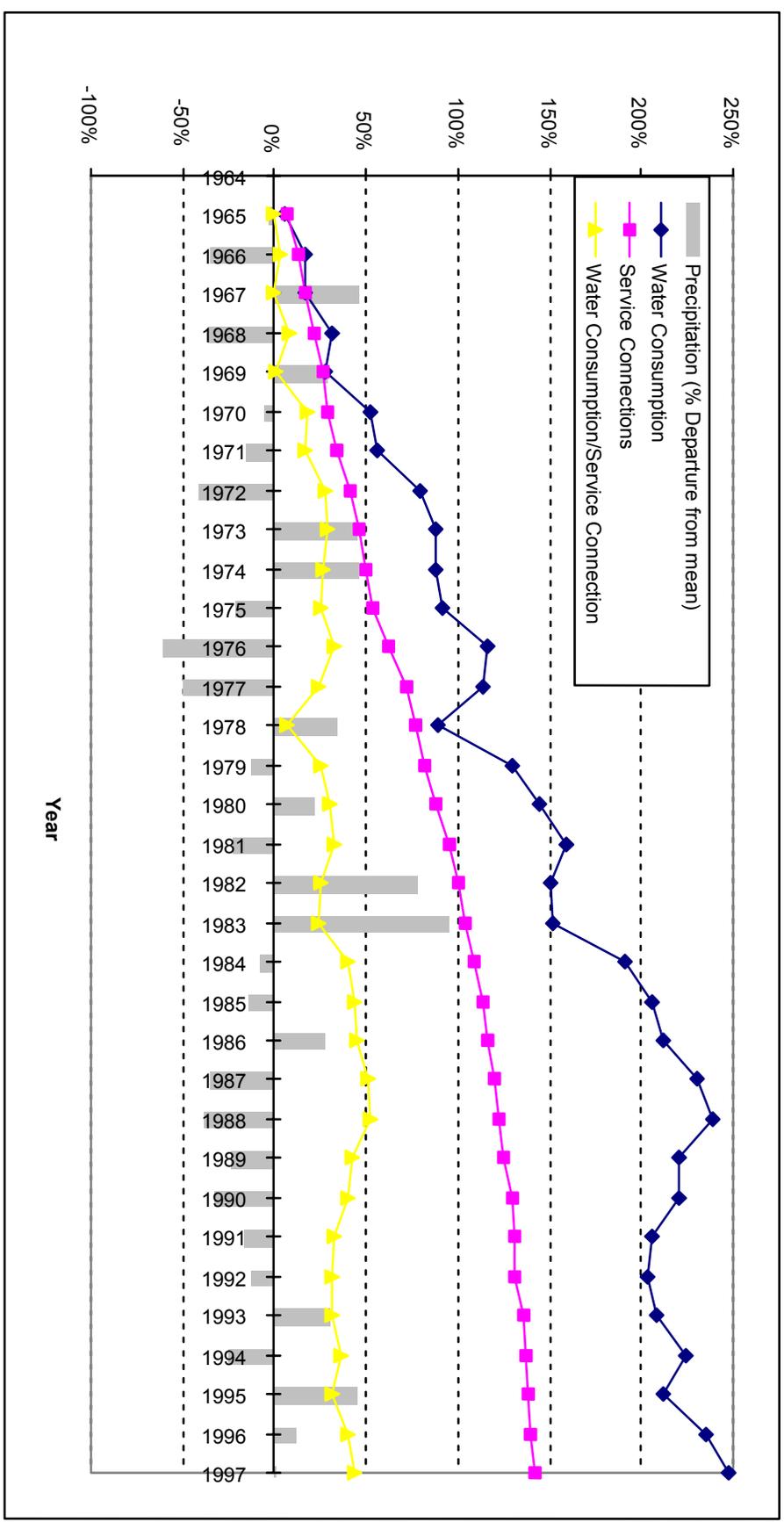
**Figure 2.** District Water Consumption 1965–1997

**Figure 3** shows the water consumption per service connection ranging from 0.23 acre feet in 1964 to 0.33 acre feet in 1997. This data follows a trend similar to water consumption for the same period.



**Figure 3.** District Water Consumption Per Service Connection 1964–1996

**Figure 4** on the following page provides a look at all three types of information on one graph. To consolidate this information into one graph, percent increases over time were used. Shaded areas at the bottom of the graph represent climate data from the region, showing above and below average precipitation.



Note: Source for precipitation data: Watsonville Wastewater Treatment Plant.

Figure 4. Percent Increase in Water Consumption, Number of Service Connections, and Water Consumption Per Service Connection 1964-1997

**Table 2** below shows per capita water consumption in various regions of California for 1990. This information is provided to show how water use in the District and county compare to other regions in California. The Central Coast region reports using 189 gallons per capita for all uses, and 113 gallons per capita for residential use. The Central Coast had the lowest daily gallons per capita for all uses, and one of the lowest for residential use. District customer use is well below the Central Coast regional estimate. Possible reasons for this low consumption for all uses in the District include, but are not limited to: smaller yards, fewer pools, more rainfall, and drought tolerant landscaping.

**Table 2.** 1990 Per Capita Water Consumption in California; Gallons per capita daily

Region	All Uses	Residential
Soquel Creek Water District	104	76
Santa Cruz (1990 was a mandatory water rationing year for SC)	114	62
Watsonville	130	77
Scotts Valley	170 (1995-96 data)	116 (1990 data)
Central Coast	189	113
South Coast	211	124
North Coast	263	84
South Lahontan	278	175
Sacramento River	301	166
Tulare Lake	301	202
San Joaquin	309	170
North Lahontan	421	194
Colorado River	579	342
Statewide Weighted Average*	232	134

\* Average of 1980–1987 data used as the 1990 normalized base

Source: Urban Water Use in California, Bulletin 166-4, August 1994, State Department of Water Resources, *except* Santa Cruz, Scotts Valley, Soquel Creek Water District (were calculated from their Urban Water Management Plans), and Watsonville, from Beach Road Water Main Project EIR, Aug. 1992.

**Table 3** shows the current per capita water consumption (1996–1997) to be 112.52 gallons per day. Calculations used to arrive at that number are given below the table.

**Table 3. Soquel Creek Water District Per Capita Water Consumption 1996–1997**

	<b>1996–1997</b>
Water Consumption (AFY)	5,188.41
Population *	41,161
Per Capita (Gal)/day	112.52
Per Capita (AFY)/year	.126
Number of Connections **	15,517
Water Consumption per Service Connection (AFY)	.334

\* AMBAG estimate for 1995 plus 1% average annual growth rate. Includes County of Santa Cruz census tracts 1211, 1216, 1217, 1219, 1220, 1221, 1222.

\*\* This is the number of 5/8" equivalent services within the District. Actual number of connections in the District is 13,205.

**Calculations:** Conversions from total water consumption to per capita and per service connection consumption.

100 cubic feet (Ccf) = 748 gallons

1 acre foot = 43,560 cubic feet

<b>Per Capita Gal/day</b>	
Acre Feet Yr x 43,560 = cubic feet	226,007,139.60
Cubic feet divided by 100 = Ccf	2,260,071.40
Ccf x 748 = gallons	1,690,533,404.00
Gallons divided by population = per capita gallon/yr	4,1071.24
Per capita gallon/yr divided by 365 = per capita gallon/day	112.52
<b>Per Capita (AFY)/day</b>	
Water Consumption (AFY) divided by population = per capita AFY/year	.13
<b>Water Consumption per Service Connection</b>	
Water Consumption (AFY) divided by Number of Service Connections = Water Consumption per Service Connection	.33

**Table 4** shows the water production and use analysis in the District for fiscal year 1996–97. Unaccounted water for the District was 5.32 percent in 1996–97. This figure represents the difference between the amount of water that was produced by the District (water demand) and the amount of water that was billed out (water consumption). This difference is due to fire hydrant and other public non-metered uses; distribution system operations such as flushing mains; system losses such as leaks; and other factors.

**Table 4.** District Water Production and Use Analysis; Fiscal Year 1996–1997

Water Demand (AFY) (a)	*5,480
Water Consumption (AFY) (b)	5,188
Unaccounted for Water (AFY)	292
% Unaccounted for Water (AFY)	5.32%

\* Estimated

(a) Water pumped and distributed

(b) Water sold

**Calculations:** Derivation of 5/8" equivalent services from number of regular services.

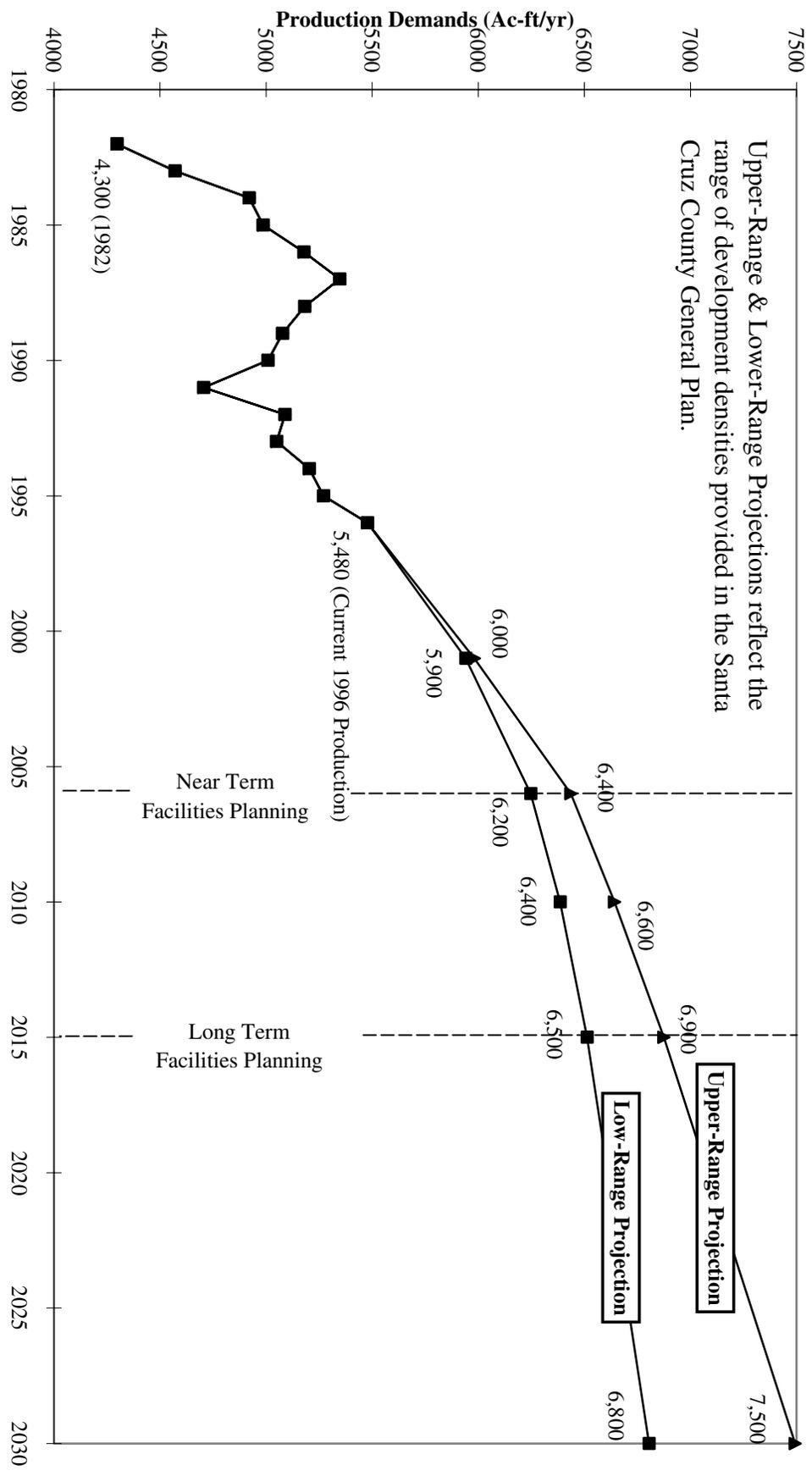
Number of Regular Services			13,205	
5/8" equivalent Services			15,517	
Size Inches	Meter		Number of Meters 6/30/97	Equivalent 5/8" Meters
	Design Capacity gpm*	Capacity Factor		
5/8 x 3/4	20	1.00	12,293	12,293
3/4	30	1.50	60	90
1	50	2.5	681	1,703
1-1/2	100	5.00	77	385
2	160	8.00	64	512
3	320	16.00	24	384
4	500	25.00	6	150
6	1000	50.00	0	0
			13,205	15,517

\* gallons per minute

**Figure 5** on the following page illustrates the water demand projections within the sphere of influence (SOI). These projections were developed by Montgomery Watson and assume all land uses will be built out according to the Santa Cruz County and City of Capitola general plans (refer back to pages 1–2 for complete description of methodology and assumptions). This graph shows a historical production rate of 4,300 acre feet in 1982. In 1996, the production is at 5,480 acre feet per year. During the early 1990s, there was a sharp decrease in production, most likely due to voluntary rationing during the drought.

Projections are made from current 1996 demands through the year 2030. The lower range projects water demand rising from 5,480 acre feet in 1996 to 6,800 acre feet in 2030. An additional 1,370 acre feet will be needed to meet this demand. The upper range projects an increase to 7,500 acre feet in 2030. An additional 2,058 acre feet will be needed to meet the upper range demand.

**Section 3**  
Statement of Future Water Demand Projections



**Figure 5**  
**Soquel Creek Water District**  
**Water Demand Projections Within Sphere of Influence**

Note: Methodology applied to District demands within SOI

## Section 3

# Statement of Future Water Demand Projections

**Table 5** shows the data from Figure 6 in table form. The additional water needed for each projection is followed by the annual percent increase. As such, an additional 464 acre feet of water is needed to meet the low-range projected demand of 5,900 acre feet in the year 2001. This is a 1.7 percent annual increase from 1996. Likewise, to meet the high-range projection of 6,000 acre feet in 2001, an additional 502 acre feet are needed. This represents a annual increase of 1.8 percent. It should be noted that these numbers are estimates based on today's conditions. However, changes in future land use may increase or decrease the estimated acre feet by 15 percent.

**Table 5. Soquel Creek Water District Projected Water Demands 2001–2030**

Year	Additional Water Needed to Meet Projected Demands*				Total Projected Water Demands (AFY)	
	Low		High		Low	High
	AFY	Annual % increase	AFY	Annual % increase		
<b>2001**</b>	464	1.7%	502	1.8%	5900	6000
<b>2006</b>	307	1.0%	456	1.5%	6200	6400
<b>2015</b>	300	.53%	500	.9%	6500	6900
<b>2030</b>	300	.3%	600	.6%	6800	7500
<b>Totals</b>	<b>1371</b>		<b>2058</b>			

\* Based on 1996 water demands of 5,480 AFY, planned County and City of Capitola land uses, and a portion of AMBAG's population growth rates for infill and redevelopment (see table 6).

\*\* The assumption was made that significant vacant lands within the District Urban Service Line (USL) would be built out by the year 2001.

Note: These projections do not include the Tan property which is outside of the District's SOI—(approximately 19 acre-feet per year.)

### Assumptions for each time period:

**Year 2001.** The development of currently vacant lands inside the Urban Service Line (USL) and development of remaining vacant land in the City of Capitola in accordance with General Plans.

**Year 2006.** The development of vacant lands outside the Urban Service Line (USL), but within the District's Sphere of Influence (SOI), in accordance with General Plans; and increased density / infill inside the USL.

**Year 2015.** Increased density / infill inside the District's Sphere of Influence (SOI). Portion of annual growth rates applied to 2006 water demands.

**Year 2030.** Increased density / infill inside the Soquel Creek Water District's Sphere of Influence (SOI). No population growth estimates available. Straight line projection, based on lowest growth rate, was used.

**Table 6** shows the Association of Monterey Bay Area Governments (AMBAG) census tract projections for annual population growth rates. A portion of growth rates were used to project water demands associated with increased density and in-fill.

**Table 6. Annual Population Growth Rates, AMBAG Census Tract Projections**

Years	Lower Range Growth Rate (a)	Upper Range Growth Rate (b)
2001–2006	0.9%	1.1%
2006–2010	0.55%	0.8%
2010–2015	0.4%	0.7%
2015–2030 (c)	0.3%	0.6%

- (a) Includes County of Santa Cruz census tracts 1216, 1217, 1219, 1221, 1222.
- (b) Includes County of Santa Cruz census tracts 1211, 1216, 1217, 1219, 1220, 1221, 1222. (Includes the faster growing region of Aptos Hills within the District SOI.)
- (c) No AMBAG data past year 2015. Growth rate is a straight line projection.

The water use factors for undeveloped lands are presented in **Table 7**. Each land use designation in the Santa Cruz County and City of Capitola General Plans was assigned a water use factor. These use factors were used to determine the projected water demands presented in Figure 5. These factors range from 700 gallons per day per dwelling unit in mountain residential areas to 150 gallons per day per dwelling unit in high density urban residences.

**Table 7. Soquel Creek Water District and City of Capitola Water Use Factors**

Land Use Classification	Water Use Factor *	Unit **
Residential		
Mountain Residential (1 du/10-40 ac)	700	gpd/du
Rural Residential (1du/2.5-20 ac)	700	gpd/du
Suburban Residential (1du/1-5 ac)	550	gpd/du
Urban Residential		
Very Low Density (1-4.3 du/ac)	550	gpd/du
Low Density (4.4-7.2 du/ac)	350	gpd/du
Medium Density (7.3-10.8 du/ac)	150	gpd/du
High Density (10.9-17.4 du/ac)	150	gpd/du
Non-Residential (City of Capitola only)***		
Commercial		
Retail	0.12	gpd/SF
Office	0.093	gpd/SF
Visitor Accommodations	68	gpd/room
Service Commercial and Light Industrial	0.051	gpd/SF
Parks and Open Space (Capitola Designation)	2.5	af/ac/yr

\* Water use factors were derived from a combination of District billing records, previous water use studies, and standard water use factors.

\*\* gpd = gallons per day  
af = acre feet; 1 af = 325,829 gallons  
du = dwelling unit  
SF = square feet  
af/ac/yr = acre feet per acre per year

\*\*\* No large non-residential vacant lots were found in the County General Plan for other areas within the Soquel Creek Water District.

Note: These water use factors will not be applied to uses outside the District without further analysis.

## Section 4

# Statement on Water Conservation Analysis

*Introduction and Sections 1-3 initially drafted by Laura Brown, Karen Johnson, and CONCUR. Introduced at Working Group Meeting No. 3 on March 19, 1998. Reviewed and revised at Working Group Meeting No. 4 on April 9, 1998. PAC Subcommittees drafted supplemental Sections 4 and 5. These were discussed at PAC Meeting No. 4 on May 21, 1998. The entire document was reviewed and provisionally ratified at PAC No. 5 on June 22, 1998. Further revisions were reviewed by the PAC on July 29, 1998. Final revised document presented to the PAC on November 4, 1998. Approved by the PAC on January 13, 1999.*

## Background

The historical water use within the Soquel Creek Water District is summarized below along with a description of past and current conservation efforts. Following this background information are the results of an analysis conducted by Montgomery Watson of potential conservation measures reflecting Soquel Creek Water District's (District) customer unique characteristics.

## Historical Water Use Within Soquel Creek Water District

The earlier chapter on Water Demand provided information about historical use within the District. It is, however, appropriate to again summarize important trends in water use by District customers in order to better ascertain the potential for demand reductions through conservation. The following facts are relevant to the analysis of conservation alternatives.

1. The District has a total of approximately 13,600 service connections—90% are domestic, 5% are commercial, 3.7% are multiple dwellings and the rest are miscellaneous other (Table 1).

The District does not have any agricultural customers.

**Table 1.** Soquel Creek Water District Water Connections by Meter Size. Source: Soquel Creek Water District 1997–98 Budget.

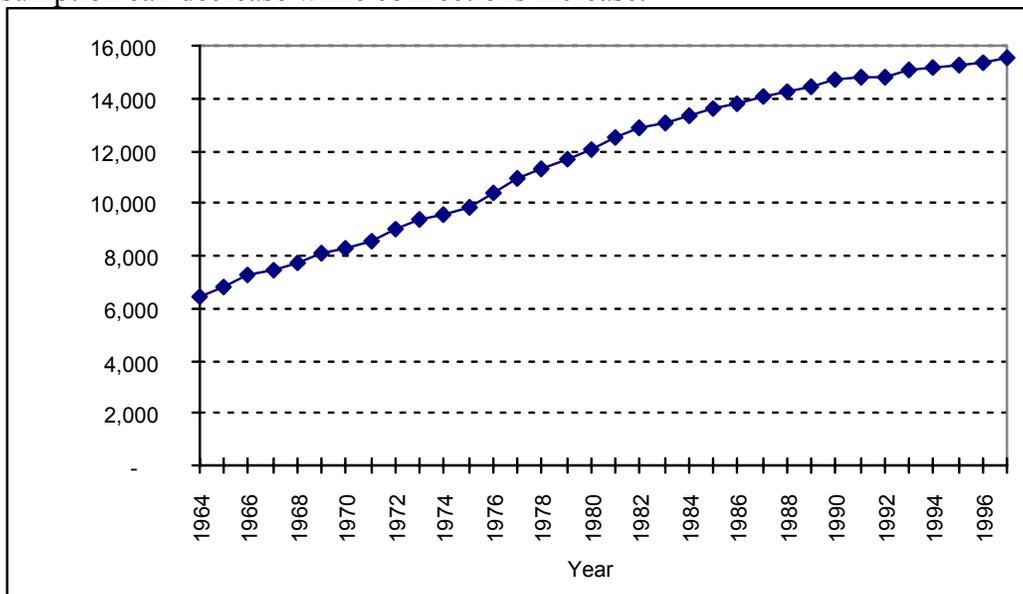
Meter Size	Domestic	Commercial	Multiple Residential	Other	Total
5/8"	12,010	438	182	52	12,682
3/4"	24	26	8	2	60
1"	247	178	235	21	681
1-1/2"		41	25	11	77
2"		20	34	10	64
3"		5	16	3	24
4"			2	4	6
	12,281	708	502	103	13,594

Table 2 expands on table 1, showing the percentage of connections in each category, along with the associated usage.

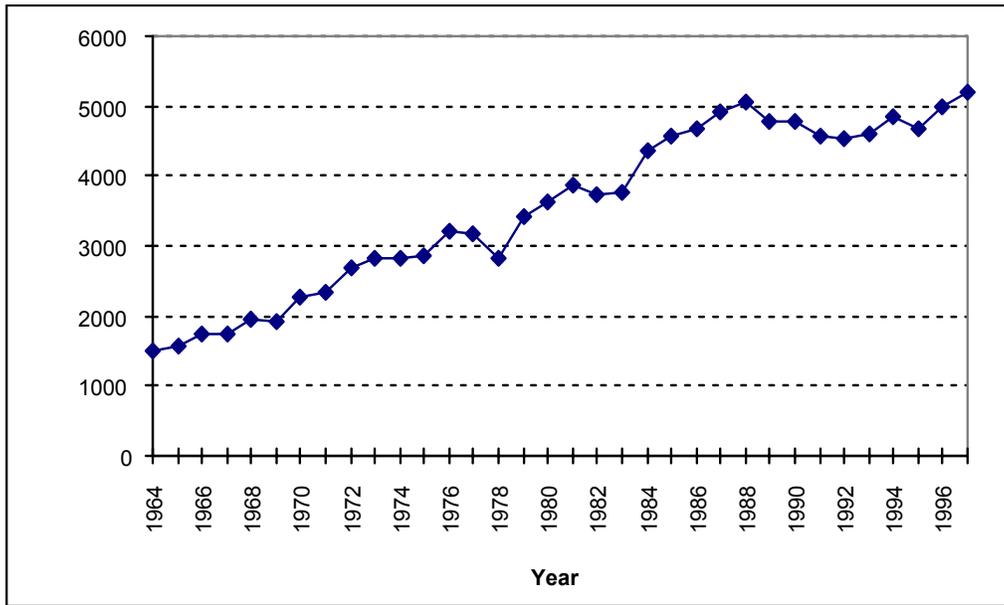
**Table 2.** Soquel Creek Water District Connections and Usage by Category (June 97-May 98).

	<b>Domestic</b>	<b>Commercial</b>	<b>Multiple Residential</b>	<b>Other</b>	<b>Total</b>
<b>Number of Connections</b>	12,281	708	502	103	13,594
<b>Percent of total # of Connections</b>	90%	5%	4%	1%	100%
<b>Annual (AFY) Percent usage</b>	3,368	636	828	414	5,246
<b>Percent of Total usage</b>	64%	12%	16%	8%	100%

- Water consumption initially peaked in 1987 and did not reach that figure again until 1996, even though there was a 6.5% increase in service connections (5/8" meter equivalents)—(Figures 1, 2 and 3). Although the reasons are unclear, it is interesting to note that consumption can decrease while connections increase.

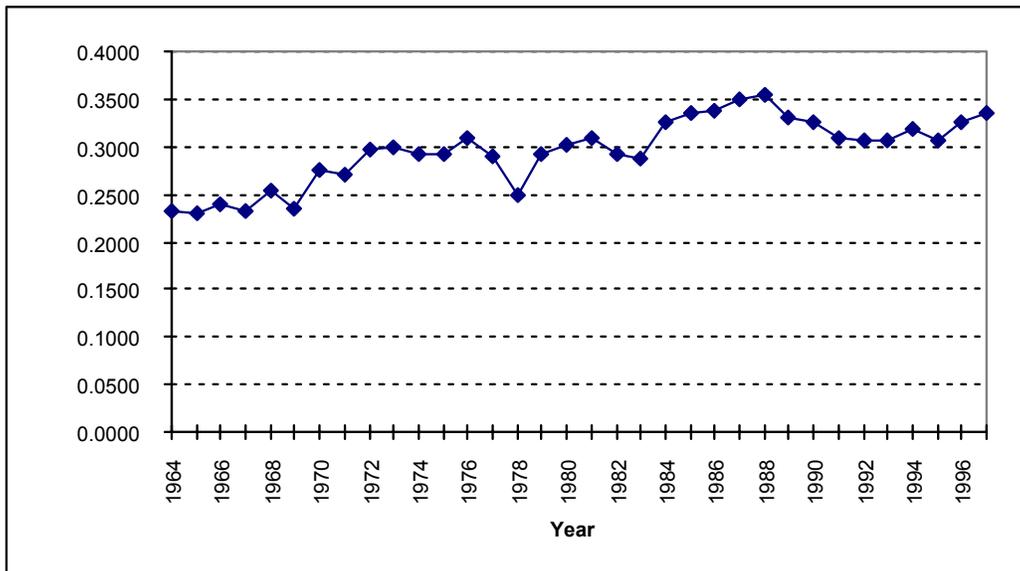


**Figure 1.** SCWD Regular Service Connections 1964–1997 (5/8" equivalent services)



**Figure 2.** SCWD Water Consumption 1965–1997

- The lowest sustainable trend in per service connection consumption within the District has been 0.3 acre feet per year (AFY). This level was maintained from 1990-1995 (Figure 3), although per connection use has risen substantially from 1964 to 1997.



**Figure 3.** SCWD Water Consumption Per Service Connection 1964–1996

Per capita water consumption for the District is currently about 112.5 gallons per day, using the AMBAG speculation of a population figure for the District of 41,161. According to data from the State Department of Water Resources, the District’s “all uses” consumption is only about 60% of the per capita use along the Central Coast which is the lowest in the State. This is probably the result of such factors as smaller yards, fewer swimming pools, more rainfall, cool and damper summer climate, drought tolerant landscaping and general conservation awareness (Table 3).

**Table 3. Soquel Creek Water District Per Capita Water Consumption 1996–1997**

	<b>1996–1997</b>
Water Consumption (AFY)	5,188.41
Population *	41,161
Per Capita (Gal)/day	112.52
Per Capita (AFY)/year	.126
Number of Connections **	15,517
Water Consumption per Service Connection (AFY)	.334

\* AMBAG estimate for 1995 plus 1% average annual growth rate.

\*\* This is the number of 5/8” equivalent services within the SCWD.

## Past and Current Conservation Efforts by the District

### MANDATORY APPROACHES

The District has adopted two resolutions which mandate water conservation. The first, adopted in 1979, establishes landscape design and irrigation water use policies for all new subdivisions and planned unit developments but not for existing residences. The second, adopted in 1981, prohibits certain wasteful uses of water and establishes the District’s authority to disconnect service for chronic violators.

The District has also adopted an Urban Water Management Plan, consistent with the Department of Water Resources guidelines (most recent update 1995). In addition to setting forth water use information and projections and conservation programs, the plan contains a water shortage contingency analysis and plan. The Water Shortage Contingency Plan (also known as the Drought Contingency Plan) establishes rationing and reduction goals for shortage levels between 0 and 50 percent (Table 4), penalties for excessive use, and a rationing allocation and appeals procedure; however, groundwater conditions that would constitute a shortage have not been defined. The plan also includes model resolutions and guidelines for the District to determine and legally declare a water shortage emergency which would invoke the provisions of the plan.

**Table 4.** Rationing Stages and Reduction Goals

Shortage	Stage	Demand Reduction Goal	Type of Program
up to 15%	Stage 1	15% Reduction	Voluntary
15%–30%	Stage 2	30% Reduction	Mandatory
30%–50%	Stage 3	50% Reduction	Mandatory

The District requires meters on all types of services. Customers are billed based on the quantity of water used. There is a single unit (100 cubic feet) price, which is one type of conservation pricing. This is a very effective, although not necessarily the most effective, mandatory conservation measure in that it directly associates cost with the amount of water used. It also provides the means for the District to identify and monitor high use customers. The District’s computer system registers increases in individual service consumption. If there is an extreme increase, a service representative is dispatched to make personal contact with the customer and investigate; substantial or notable increases generate a written notice to the customer alerting them to check for leaks. As the result of an aggressive replacement program in recent years, meters within the District are all now less than fifteen years old, the manufacturer’s warranty period. This effort improves the District’s confidence in the reliability and accuracy of its meters. The District also has a meter testing program for large capacity meters which, due to the high volumes of water, have a greater accuracy requirement.

### **Voluntary Approaches**

The District maintains data on all detected leaks within the distribution system. Leaking water mains are routinely repaired by the District's field crew. A map is maintained showing all leaks in the system. The District appropriates funds each year to replace deteriorated mains. Areas prone to leaking are given high priority for replacement. Since 1969, 132 miles of water mains have been replaced. This is an ongoing program.

From 1980 to 1992, the District had a part-time Community Information Representative position whose primary focus was conservation education including: 1) a School Program (instructional materials, in-service workshops, educational fairs, District library of publications and special activities and projects) which also included adult education classes in water conservation, landscaping, and home plumbing; 2) a Community Information and Education Program which included brochures, bill inserts, film library, press releases, exhibits and distribution of water saving kits; 3) a Landscaping (Xeriscape) component which included demonstration gardens and video tapes for use by nurseries, landscape architects and contractors; and 4) Participation in numerous state, local community, and school committees relative to water awareness, conservation and education.

A study of the District's customer communication needs by the Argent Group completed in 1991 recommended that the District focus efforts on heightening community awareness of groundwater management and water quality issues. The District redirected funds that had gone exclusively toward conservation education to produce a direct mail quarterly newsletter. The newsletter regularly carries conservation articles.

In the 1996/97 budget, the District reestablished a conservation program with a funding appropriation of \$40,000, and actively participated in the State's Water Awareness Month activities for the first time in several years. The most notable program elements were the special conservation newsletter, featuring water savings tips, that was sent to all addresses within the District, and establishment of the ultra low flow toilet rebate program. The District provides a \$75 credit/rebate to customers who replace existing toilets. This program began in May of 1997 and is ongoing. As of the end of February 1998, 237 credits/rebates have been given.

The 1997/98 budget maintained conservation program funding at \$42,000. On September 13, 1997, the Board held a workshop to discuss the elements of the conservation program. At that time, they reviewed an opportunity to consolidate the District's communications and conservation program and establish a full-time Communications and Conservation Coordinator position. With the conversion to a new utility billing software system, the District's billing will change to a separate envelope format which will allow a newsletter to be included with the bill instead of mailed separately as done now. Savings from contracting out for newsletter production and the direct mailing costs were redirected to help fund the new position, providing a total communications/conservation budget of about \$80,000. In addition to greatly expanding the ability to implement conservation programs, the District will increase its direct communications with customers from the current quarterly newsletter to six issues per year. The

new bill format will also allow the District to enclose conservation pamphlets in the envelopes and print messages directly on the bill.

The District hired its first full-time Communications and Conservation Coordinator on May 4, 1998. The switch to the new bill format will begin in September 1998. The addition of the Communications/Conservation Coordinator position and desk top publishing equipment forms the cornerstone for implementing the types of focused conservation efforts identified by Montgomery Watson discussed below.

## **Water Conservation Analysis**

### **OBJECTIVES**

A water conservation program analysis was developed as part of the District's Integrated Resources Plan (IRP). There were two objectives for this analysis. One was to identify practical and cost effective conservation measures which the District could consider implementing on their own merits. The second objective was to develop a "supply" alternative for the IRP based on the potential water savings from an expanded conservation program. To meet both objectives, the District's current conservation efforts were reviewed and additional cost effective conservation measures were recommended. It was also necessary that potential water savings and costs of implementing the measure be quantifiable in order to meet the objectives.

### **METHODOLOGY FOR EXAMINING ALTERNATIVES**

**Background and Initial Analysis of Conservation Measures.** In 1991, the California Water Conservation Coalition prepared a Memorandum of Understanding Regarding Urban Water Conservation in California (MOU) which many water agencies, cities, federal and state agencies, environmental groups, and others signed. Through the MOU and the California Urban Water Conservation Council, 16 Best Management Practices (BMPs) for urban water conservation were developed. These 16 BMPs were used in this analysis as the primary basis for consideration of conservation measures, and are listed in Table 5, along with the status of the District's implementation of these measures. The BMPs suggest positive beginnings to new conservation measures. Additional water savings are possible and have been achieved in other locales.

**Table 5.** California Urban Water Conservation Council Best Management Practices and Status of Implementation by Soquel Creek Water District<sup>2</sup>

<b>MOU BMP</b>		<b>Target Group</b>	<b>Current Status</b>
1	Interior/Exterior Water Audits	Residential	N
2a	Enforce Ultra Low-Flush (ULF) Standards	Residential	C
2b	Support ULF Legislation	Residential	C
2c	Plumbing Retrofit	Residential	PI
3	Leak Detection and Repair	Water System	C
4	Metering	All	C
5	Large Landscape Water Audits	Commercial/ Industrial	N
6	Landscape Requirements	Residential (new)	C
7	Public Information	All	C
8	School Education	All—Primarily Residential	PI
9	Commercial/Industrial Water Conservation	Commercial/ Industrial	N
10	New Commercial/Industrial Water Use Review	Commercial/ Industrial	N
11	Conservation Pricing	All	C
12	Single-Family Landscape Conservation	Residential	N
13	Water Waste Prohibition	All	C
14	Water Conservation Coordinator	All	C
15	Financial Incentives	All	N
16	ULF Toilet Replacement	Residential	PI

C = currently implemented  
PI = partially implemented  
N = not implemented

<sup>2</sup> See Appendix A for descriptions of BMPs.

Ten variants of these BMPs were also considered as additional measures for examination. The 26 measures analyzed are presented in Table 6.

**Table 6.** Twenty-six Measures Considered: California Urban Water Conservation Council Best Management Practices plus ten additional variations<sup>3</sup>

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* 1	Residential Water Audits
2	Residential Irrigation Audits
3	Residential Plumbing Retrofit
4	System Water Audits, Leak Detection and Repair
5	Commodity Metering for Water Service
* 6	Large Landscape Water Audits
* 7	Commercial/Industrial/Public Incentives for Irrigation System Upgrades
8	Low-Water-Use Landscape Ordinance
9	Public Information
10	School Education
* 11	Commercial/Industrial Indoor Water Audits
* 12	Commercial/Industrial Outdoor Water Audits
13	New Commercial/Industrial Water Use Review
14	Conservation Pricing
15	Residential Landscape Ordinance
* 16	Residential Landscape and Irrigation System Incentives
17	Water Waste Prohibition
18	Water Conservation Coordinator
19	Financial Incentives
* 20	Residential Ultra-Low-Flush Toilet Replacement
* 21	Incentives for Commercial/Industrial Toilet/Shower Replacement
22	Pressure Reduction (Potential BMP)
23	Goal Billing
24	On-Site Gray Water Reuse (Potential BMP)
25	CIMIS (Weather Station) Controlled Landscape Irrigation
* 26	Irrigation Advisory Service

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\* Final Water conservation measures selected and evaluated for cost effectiveness

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<sup>3</sup> See Appendix B for a table describing the evaluation process.

Of these 26 BMPs, 17 measures were eliminated from detailed review either because 1) the District has already implemented these measures at some level; 2) insufficient quantitative data were available to provide support for the measures; or 3) the measures did not pass the initial screening criteria. The initial screening of conservation measures included, in addition to the criteria above, an adaptation of the methodology described in the American Water Works Association publication Water Conservation to evaluate non-monetary effects. This screening included consideration of the following:

**INITIAL SCREENING CRITERIA APPLIED TO THE 26 BEST MANAGEMENT PRACTICES IN TABLE 6**

- **Technical feasibility.**  
The water conservation measure must be a proven technology that has been implemented and shown to work in other parts of the country.
- **Environmental impacts.**  
The water conservation measure must not have significant unavoidable adverse impacts on the environment.
- **Implementation difficulty.**  
The measure must not impose undue hardships on either District or its customers, either due to financial, institutional, legal, or other constraints.
- **Customer acceptance.**  
The water conservation measure must be acceptable to customers in terms of implementing the measure and long term retention of the measure.

The nine remaining measures were evaluated in detail based on cost effectiveness. These are marked with an asterisk (\*) in Table 6. See Appendix B for a table of the excluded water conservation measures and the criteria used to evaluate them.

**Benefit-Cost Analysis.**<sup>4</sup> Nine measures were evaluated in detail based on cost effectiveness. A benefit-cost analysis provided the basis to determine if the savings produced are worth the cost or effort required to achieve the results. If the benefits from saving water exceed the costs to generate those benefits, then the conservation measure is cost effective.

The present value of benefits (including both avoided operation and maintenance costs of \$0.318 per thousand gallons, and avoided capital costs of \$0.692 per thousand gallons based on an off-stream diversion project) over the period through 2030 was compared to the present value of costs over the same period to determine the benefit-cost ratio (present value of benefits divided by the present value of costs). Where the benefit-cost ratio is greater than 1.0, the measure is considered economically effective. The off-stream diversion project was used for the comparison since it has the best defined costs at this time. Benefits from avoided capital costs will be less for an alternative with lower costs and higher for an alternative with higher costs.

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<sup>3</sup> Total benefits exclude environmental benefits and avoided environmental costs.

## EVALUATED WATER CONSERVATION MEASURES

At this time, nine BMPs have been evaluated for consideration as listed in Table 7. A description of each is provided in Appendix C.

**Table 7.** Evaluated Water Conservation Measures for the Soquel Creek Water District Conservation Program

Conservation Measure	Benefit- Cost Ratio	Water Savings (tgal*)	Water Saving (AFY**)
◆ Residential Water Audits	0.97	31,948	98
◆ Large Landscape Audit Program	1.13	5,603	17
◆ Commercial/Industrial/Public Irrigation Incentives	1.16	3,558	11
◆ Residential Landscape Incentives	1.22	38,262	117
◆ Residential Toilet Rebate Program	1.73	54,750	168
◆ Commercial/Industrial/Public Toilet Rebate Program	2.05	53,748	165
◆ Irrigation Advisory Service	1.56	<u>16,618</u>	<u>51</u>
		<b>204,487 tgal</b>	<b>628 AFY</b>
◆ <sup>5</sup> Commercial/Industrial/Public Indoor Audits	0.72	3,882	12
◆ Commercial/Industrial/Public Outdoor Audits	0.71	4,649	14
		<b>213,018 tgal</b>	<b>653 afy</b>

\* tgal = thousand gallons

Water savings usually develop slowly, reaching full maturity after full market penetration has been achieved. Normally this occurs five to ten years after the start of the program. To estimate the total water savings associated with the measures, historic District consumption data were analyzed to estimate the amount of indoor versus outdoor consumption for each of the customer classes. A determination was also made of the per unit water savings from each measure.

The water savings to the District from seven recommended measures at the top of **Table 7** amount to about 628 acre-feet per year (AFY) by the year 2030. The total 2030 savings represents about nine percent of the total consumption projected for that year. This level of savings is consistent over the program years beginning about seven years after implementation of all conservation measures. (Water savings of 620 AFY were estimated for the year 2015.) The annual costs for the recommended program average about \$224,000 over the first ten years. This compares with an off-stream diversion project producing approximately 1400 AFY from the first year of project completion at an estimated cost of \$1.9 million per year over a 10 year period.<sup>6</sup>

<sup>4</sup> These two items were not selected for the recommended Conservation program based on Benefit Cost ratio for the comparison project.

<sup>5</sup> This was the estimate used for the cost benefit analysis based on a 7% interest rate for debt service.

## **Current Policies Related to Land Use and Water Conservation**

### **PAC RECOMMENDATIONS TO SOQUEL CREEK WATER DISTRICT**

The Public Advisory Committee (PAC) agrees that precious water resources within the Soquel Creek Water District (the District) should be carefully managed and conserved to sustain present uses and provide for a reasonable level of future water use. The PAC also agrees that every resident and business should conserve water.

The PAC further agrees that although general land use and building permit authority lies with the County and City of Capitola, land use decisions made by the County and the City are based, in part, upon the Water District's stated ability to service additional customers. The PAC recommends that the District's ability to serve should be clearly communicated to the County and City so they can make balanced decisions regarding growth.

Below are references to the legislative and legal framework within which the Water District and County operate. Within this framework there are policy tools available to the County of Santa Cruz to assist water districts in balancing water resource management duties with growth in population and development.

### **Legal Framework by Jurisdiction**

#### **State of California**

California is a state that recognizes the limitations of its natural resources. Article 10 Section 2 of the Constitution of the State of California provides that:

"because of conditions prevailing in this State the general welfare requires that the water resources of the state be put to beneficial use to the fullest extent of which they are capable, and that the waste or unreasonable use or unreasonable method of use of water be prevented, and that the conservation of such waters is to be exercised with a view to the reasonable and beneficial use thereof in the interest of the people and for the public welfare."

The history of California law also supports personal property rights and adjudicated water rights. "However, all water within the state is the property of the people of the state and subject to government regulation." (Miller and Starr, California Real Estate, p. 533 and also Article 10 Section 5 of the California Constitution)

#### **Soquel Creek Water District**

Soquel Creek Water District is a County Water District established under Sections 30000 et seq. of the California Water Code. The powers and duties of the District are limited to furnishing sufficient water in the District for any present or future beneficial use (sec. 31020); storing and conserving water and appropriating and acquiring water rights, including protection, conservation and replenishment of groundwater (sec. 31021).

State law also gives the District the power to restrict the use of District water during any emergency, but only during the period of the emergency which will be further discussed below (sec. 31026). The District is obligated to protect the common water supply, but land use regulation is not a function of the District.

*Soquel Creek Water District 1995-2015 Drought Contingency Plan*

The Drought Contingency Plan establishes goals, priorities and triggers for three levels of supply shortage. Stage 1, up to 15% (minimum) triggers a voluntary program of conservation. Stage 2, 15 to 30% (severe) triggers a mandatory rationing program. It establishes annual allotments for all connections and refuses requests for building permits or meters installed for new accounts which had not already received permits before the water shortage emergency declaration. Stage 3 - 30 to 50% (critical) further limits annual allotments for all connections and continues the refusal of requests for building permits or meters installed for new accounts which had not already received permits before the water shortage emergency declaration. The declaration of a water emergency requires a public hearing.

**The City of Capitola**

The City's water supply is furnished primarily through Soquel Creek Water District with a small portion of the City (primarily that area on the far west side by 41st Avenue) being serviced by the City of Santa Cruz Water District. The Conservation Element of the City's General Plan contains a Local Coastal Program which examines the natural resources evident in the Capitola community. Below are some of these program policies relevant to water resources.

Policy 4: It shall be the policy of the City to cooperate with other agencies in the County and/or region for master planning delivery and allocation of available Public Services consistent with the Coastal Act, Sec. 32054 and 32055.

(A) The City shall participate in a County-wide watershed task force.

Policy 15: The City should coordinate with Santa Cruz County and AMBAG to investigate and implement sound watershed management methods for the lands within Capitola to:

- (a) maintain adequate stream flow for fish and wildlife and riparian vegetation,
- (b) control contaminated urban run off, and
- (c) encourage water conservation.

Policy 19: The City shall encourage energy and water conservation by supporting public education programs and shall require low water use fixtures in new developments, as well as encouraging energy conservation techniques in site development and construction.

With these policies and its Soquel Creek Lagoon Management and Enhancement Plan, the City of Capitola supports the regulations of the California Department of Fish and Game and the California Water Code. In addition, Capitola has participated in the Soquel Creek adjudication of water rights.

## **County of Santa Cruz**

The County of Santa Cruz, as specified by the Government Code and in consultation with water purveyors, is required to consider water supply as a major factor in the preparation of the County General Plan. Following are some of the Government Code Sections that detail the County's and the water purveyors' responsibility with regard to planning for future development based on the availability of adequate water supplies. The next update to the County's General Plan, due in 2004 (approximately), will be subject to these requirements. Relevant policies from the current General Plan are also outlined. Full citations are provided in **Appendix E**.

### Relevant Sections of the Government Code

65302. (d) A conservation element for the conservation, development, and utilization of natural resources including water and its hydraulic force, forests, soils, rivers and other waters, harbors, fisheries, wildlife, minerals, and other natural resources. That portion of the conservation element including waters shall be developed in coordination with any countywide water agency and with all district and city agencies which have developed, served, controlled or conserved water for any purpose for the county or city for which the plan is prepared. Coordination shall include the discussion and evaluation of any water supply and demand information described in Section 65352.5, if that information has been submitted by the water agency to the city or county...
- 65352.5. (a) The Legislature finds and declares that it is vital that there be close coordination and consultation between California's water supply agencies and California's land use approval agencies to ensure that proper water supply planning occurs in order to accommodate projects that will result in increased demands on water supplies.
- (b) It is, therefore, the intent of the Legislature to provide a standardized process for determining the adequacy of existing and planned future water supplies to meet existing and planned future demands on these water supplies.
- (c) Upon receiving, pursuant to Section 65352, notification of a city's or a county's proposed action to adopt or substantially amend a general plan, a public water system, as defined in Section 116275 of the Health and Safety Code with, 3,000 or more service connections, shall provide the planning agency with the following information, as is appropriate and relevant:
- (1) The current version of its urban water management plan, adopted pursuant to Part 2.6 (commencing with Section 10610) of Division 6 of the Water Code.
  - (2) The current version of its capital improvement program or plan, as reported pursuant to Section 31144.73 of the Water Code.
  - (3) A description of the source or sources of the total water supply currently available to the water supplier by water right or contract, taking into account historical data concerning wet, normal, and dry runoff years.
  - (4) A description of the quantity of surface water that was purveyed by the water supplier in each of the previous five years.
  - (5) A description of the quantity of groundwater that was purveyed by the water supplier in each of the previous five years.

(6) A description of all proposed additional sources of water supplies for the water supplier, including the estimated dates by which these additional sources should be available and the quantities of additional water supplies that are being proposed.

(7) A description of the total number of customers currently served by the water supplier, as identified by the following categories and by the amount of water served to each category:

- |                         |                        |
|-------------------------|------------------------|
| (A) Agricultural users. | (C) Industrial users.  |
| (B) Commercial users.   | (D) Residential users. |

(8) Quantification of the expected reduction in total water demand, identified by each customer category set forth in paragraph (7), associated with future implementation of water use reduction measures identified in the water supplier's urban water management plan.

(9) Any additional information that is relevant to determining the adequacy of existing and planned future water supplies to meet existing and planned future demands on these water supplies.

(Added by Stats. 1993, Ch. 1195; Amended by Stats. 1996, Ch. 1023. Effective September 29, 1996.)

#### Relevant Policies in the County General Plan

The current General Plan, last updated in 1994, contains a number of policies and programs which tie the development of land to the ability of service providers, including water districts, to serve the type and density of development proposed.

##### 2.1.9 Urban and Rural Growth Rates

(LCP) Maintain growth rates for Urban and Rural portions of the County (as defined by the Urban Services Line). Encourage residential development to locate within existing urban areas where adequate levels of public services exist. Discourage new development and divisions of land in urban and rural areas, where such public services are not available and where the impact on environmental resources cannot be mitigated.

##### 7.18.1 Linking Growth to Water Supplies

(LCP) Coordinate with all water purveyors and water management agencies to ensure that land use and growth management decisions are linked directly to the availability of adequate, sustainable public and private water supplies.

##### 7.18.2 Written Commitments Confirming Water Service Required for Permits

(LCP) Concurrent with project application, require a written commitment from the water purveyor that verifies the capability of the system to serve the proposed development. Projects shall not be approved in areas that do not have a proven, adequate water supply. A written commitment is a letter from the purveyor guaranteeing that the required level of service for the project will be available prior to the issuance of building permits, or in the case of a subdivision, prior to filing the Final Map or Parcel Map. The County decision

making body shall not approve any development project unless it determines that such project has adequate water supply available.

**Objective 5.8a Groundwater Protection**

To protect the quantity and quality of the County's groundwater resources through an integrated program of land use regulation and runoff management in groundwater recharge areas, careful water quality monitoring and management of extractions consistent with long-term sustainable water supply yields.

**Objective 5.8b Overdrafted Groundwater Basins**

To act directly and coordinate and work with relevant water purveyors and agencies to eliminate long-term groundwater overdraft in all water basins where overdraft has been documented.

**Objective 5.6 Maintaining Adequate Streamflows**

To protect and restore in-stream flows to ensure a full range of beneficial uses including recreation, fish and wildlife habitat and visual amenities as part of an ecosystem-based approach to watershed management.

Measure J

The County's Growth Management Initiative (Measure J) was passed by the voters of the unincorporated area of the County in 1978. Its stated purpose is to preserve agricultural land, to distinguish urban and rural areas, to protect natural resources and to assure urban area protection through the provision of adequate services. The measure provides for an annual growth rate to be determined by the Board of Supervisors and has historically been one percent. However, the one percent is an average growth rate for the entire county. The measure does not provide for a breakdown via planning area or water aquifer. The one percent figure must be balanced with several state mandates, such as the County's housing requirements as set by the state (Santa Cruz County General Plan).

Measure C

Measure C promotes several environmental goals and was passed by the voters of the unincorporated area of the County in 1990. It addresses a wide variety of subjects such as offshore oil drilling renewable energy, forest protection, and recycling. The portion on growth and development states as follows:

Because pressures for rapidly accelerating growth and development exist within the State of California, and particularly affect desirable coastal areas like Santa Cruz County, it shall be the policy of Santa Cruz County government to use its powers and resources to ensure that the future growth and development of Santa Cruz County does not surpass the natural carrying capacity of the Santa Cruz County environment, and that such growth and development does not lead to the

*overdraft of any water source, the creation of unacceptable levels of air pollution, or the loss of prime agricultural land (Santa Cruz County General Plan)*

#### County Chapter 7.70.120 – Soquel Creek Water District Service Area Restrictions

In the 1980s, at the request of the Soquel Creek Water District, the County Board of Supervisors passed this ordinance in response to the potential for seawater intrusion into the Purisima Formation. The ordinance recognizes the need for careful monitoring and management of the groundwater basin and that the District is empowered to carry out monitoring and management efforts. The ordinance generally prohibits construction of new private wells within the District's boundaries and within a specified distance of a District water distribution line. It requires development on parcels meeting these criteria to be served by the District, if possible.

#### **Declaration of a Water Emergency by a Local Agency**

Various agencies including the Water District and the County of Santa Cruz are empowered to declare natural resource emergencies under circumstances outlined by the agencies. Additional land-use regulation by agencies such as the County may be activated by a Water District declaration of a water emergency.

#### **Recommendations of the PAC to the Soquel Creek Water District**

It is the overall recommendation of the PAC, as customers of the District and residents of the County of Santa Cruz and City of Capitola that the District take steps to clearly communicate with the County and City regarding the District's estimated current and projected ability to adequately supply water for new development. Improved communication among the District, the County, and the City of Capitola will enable planning for future growth which reflects the District's ability to serve that growth. This improved communication will also contribute to the broader goal to achieve regional-level coordination for water resource management.

Specifically, the PAC recommends the following step to be taken by the District:

12. An annual report should be submitted by the Water District to the County Planning Department, County Board of Supervisors, and City of Capitola. If the Water District has entered any of the three shortage levels outlined in Appendix V of the Soquel Creek Water District 1995-2015 Drought Contingency Plan, the annual report should include a request to the County to review its growth limits.
  
13. Set criteria that clearly define the groundwater conditions that constitute a shortage emergency and invoke the provisions of the *Soquel Creek Water District 1995-2015 Drought Contingency Plan* with the following modifications:
  - C. First Level: Conservation Emergency.**  
Triggers include up to 15 percent supply shortage, or overdrafting and threat to future water supply/quality.

The District shall hold a public hearing regarding the water supply shortage, shall take action to reduce water use and shall consider the following potential actions:

- h) Conditional or limited will-serve letters to customers;
- i) Moratorium on new water hookups;
- j) Request the County to place a moratorium on new wells within the aquifer;
- k) Request the County to monitor and meter all wells within the groundwater basin;
- l) Voluntary use reductions outlined in table 5 and in Appendix V of the *Soquel Creek Water District 1995-2015 Drought Contingency Plan*;
- m) Mandatory use reductions outlined in Table 5 and in Appendix V of the *Soquel Creek Water District 1995-2015 Drought Contingency Plan*;
- n) Particularly in short-term emergency situations, take other appropriate actions to reduce water use.

**D. Second Level: Supply Emergency**

Triggers include a more than 15 percent supply shortage, and threat to current and future water supply/quality, and evidence of salt water intrusion.

The District shall hold a public hearing regarding the water supply shortage and shall take the following actions:

- e) Moratorium on new water hookups;
- f) Request the County to declare a moratorium on new well drilling;
- g) Mandatory use reductions outlined in Table 5 and in Appendix V of the *Soquel Creek Water District 1995-2015 Drought Contingency Plan*;
- h) Particularly in short-term emergency situations, take other appropriate actions to reduce water use.

*Legal case history requires that these steps be supported by sound data.*

- 14. Initiate discussions with other agencies with water use jurisdiction within the aquifers used by the District to establish similar water emergency and conservation measures.
- 15. Encourage regional solutions to water supply/quality problems by forming alliances with other water management agencies.
- 16. Work with the County of Santa Cruz to quantify non-district pumping within the aquifers.
- 17. Support a county-wide water resources monitoring and management program.
- 7. Request that the County and City of Capitola, in their future land use planning decisions, not exceed the projected water demands through 2030 (which are based on the current General Plans) by not increasing densities, expanding urban services lines or other land use changes that would result in overall increased water demand within the Soquel/Aptos groundwater basin.

## **Water Conservation Measures Beyond The Best Management Practices (BMPs)**

### **PAC RECOMMENDATIONS TO SOQUEL CREEK WATER DISTRICT**

The following suggested measures expand upon the conservation Best Management Practices, (BMP), add additional technologies, suggest collaborations or partnerships between the District and other organizations as well as model ordinances which could produce water savings. An additional economic analysis is also presented. Although not comprehensive, additional measures and the economic analysis include:

#### **BMP Modifications and Additions**

1. Pricing methods including multi-tier, “Fair Use Management” or “fee-bates” reward those who conserve and charge those who use substantially above average amounts of water at a greater per unit cost. Some of these methods have been implemented by Cal Am in Monterey County with a 5-tier system and by the City of Santa Cruz with a 3-tier plan. Establishment of any of these pricing methods should be accompanied by an appeal process allowing the District to hear special cases such as unavoidable high water use to care for sick or elderly residents.
2. Reducing water system loss is an option which the District can carry out without assistance from outside the District. The District can develop a priority list of projects to achieve 6% and 5% system loss with anticipated costs associated with each level of reduction. Including active sonic leak detection for all water lines and connections can be an effective option, (as well as send a signal to the public that the district is taking all available opportunities to prevent water loss).
3. Appliance rebate programs can produce tangible water savings. Expanding programs in their scope, moving up the implementation timelines, and increasing rebates to achieve fuller utilization can make the savings greater. Three options to increase savings include:
  - 3.1. A new rebate program for front-load laundry washers could save both water and energy. Montgomery Watson suggests this savings could be 4.5 gallons per person per day. A special rebate program would be instituted for laundromats or laundry facilities in multi-family complexes.
  - 3.2. Accelerate and increase the participation in the Low-Flow Toilet Rebate Program through the mandatory replacement at time of transfer or remodel (exceeding 50% of existing square footage) for all residences and commercial facilities.
  - 3.3. Provide low-flow showerheads with shutoff valves and hose shutoffs without cost during water audits.

4. Drought tolerant landscaping can help address the approximately 50% increase in water consumption during the summer months.
  - 4.1. Irrigation rebates are an option and could be combined with reasonable mandatory replacement or installation at time of transfer or remodel (exceeding 50% of existing square footage) for all residences and commercial facilities.
  - 4.2. Drought tolerant landscaping or drought tolerant lawn replacement rebates and technical assistance in selecting plant or lawn variety would encourage and accelerate water savings as well as provide the District with data on participation.
5. Mandatory reduction remains an option. Cal Am has identified the top 20% of users as the best place to look for water savings as did Irvine Ranch. Costs to the district might be reasonable. Allowances would be made for special needs such as large families and customers would have one year to make reductions.
6. Savings can be encouraged when people know their usage or become aware of changes such as leaks in their particular residential unit. The District could provide incentives/rebates for apartment or condominium submeter installation or require installation without cost to the District. Two areas to focus upon include:
  - 6.1. Mandatory installation of submeters for apartments or condominiums within 3 years.
  - 6.2. Mandatory installation of submeters for mobile homes within 5 years with cost protections for residents.
7. Develop pressure reduction options for individual residences and commercial customers as well as for neighborhoods or subdivisions. Two possible target areas include:
  - 7.1. Individual residences particularly in areas of high system pressure.
  - 7.2. Mandatory pressure reduction on new developments over a pre-determined number of units or square feet.

### **New Options**

1. Model education programs represent an investment in future water savings. Some options include:
  - 1.1. Establish and/or expand existing education programs to reach private well users outside the District but within shared aquifers to increase their conservation.
  - 1.2. Establish a partnership with the Life Lab program to have children grow and study drought tolerant plants at school and then plant them at home.

Establish and/or support existing educational or nursery programs for drought tolerant plants. Use a nonprofit partnership program such as the Homeless Garden Project for growing or installing plants. Provide incentives for verified replacement of "traditional" landscaping or provide free plants to customers along with conservation information.

2. Start a gray water task force to include representatives of the County, Cities, a nonprofit organization, and the business community. Include the publishing of technical assistance materials, providing audits, and the development of a contractor education and/or certification program. Work in partnership with the County's Environmental Health Department to ensure protection of public health.
3. Begin a summer water conservation institute in conjunction with UCSC, Cabrillo, and vocational training programs to provide assistance with retrofits and landscaping conversion.
4. Declare a groundwater emergency consistent with the provisions of Stage 1 of the District's Drought Contingency Plan (up to 15% shortage), with its associated conservation measures.
  - 4.1. Revise the District's Drought Contingency Plan by adding the following measure to Stage 1 – "Issue conditional will serve letters and clearly communicate to all applicants about the District's projected supply shortage and the necessity of resolution in order to approve additional connections."
5. Establish a reward system for low water use which might include one or more of the following options:
  - 5.1. Provide a financial incentive to those who use substantially less water.
  - 5.2. Consider establishing a market based conservation program such as would be suggested by the "Fair Use Management" approach. Shares representing a certain quantity of water would be allocated to each customer according to type of use, with a portion of unused shares available for sale to those willing to pay the market price, thus addressing the finite nature of the resource at any given time.
  - 5.3. Use rewards such as tokens or coupons that can be exchanged for drought tolerant plants or car washes at facilities that use recycled water for use below a certain level or for each unit of water not used within a certain allotment.
6. Establish, as quickly as possible, a water conservation committee with District, private, and governmental participation and a budget to carry out projects.
7. Investigate a County-wide assessment to support water monitoring throughout the County of Santa Cruz, to include private wells.

## **Model Ordinances**

The District could achieve, expand, or secure savings through the joint preparation or modification of existing water conservation ordinances. Examples include:

1. Expand the drought tolerant landscaping requirements with County and City of Capitola input and explore the possibility of working with the other water agencies and the Santa Cruz City Mayor's Select Committee to create uniform water conservation legislation throughout the County.
2. Issue conditional hookup permits limiting water use per the Scotts Valley program.

## **Additional Economic Analysis**

The BMPs as applied by the Montgomery Watson (MW) Conservation report represent a valuable starting point for a district wide conservation program. They depend upon a cost/benefit analysis to select desirable options. The cost of water (avoided costs) was determined to be \$1.01 per thousand gallons (tgal) or approximately \$325 per acre foot (AF) and has an overriding impact on the conclusions and conservation measures selected. (The 30 year analysis period of the comparison project and interest rate chosen are also critical in the \$325 selected for comparison.) Should pricing of a comparison project be increased or a different project be selected the number of water conservation measures, the type of measures, and the corresponding water savings would expand considerably. Additionally, increased savings are possible within the threshold established of avoided costs of \$325 per acre foot by both widely used conservation measures and those used in model programs. New initiatives and collaborations between the District and the county or nonprofit organizations may also yield favorable cost/benefit ratios.

With regard to the cost comparison, alternative economics might be applied. For example, the preliminary estimates for the water diversion project, is approximately \$1,900,000 annually for debt service and operating costs for a yield of approximately 1,400 acre feet. This represents an approximate cost of \$1,357 per acre foot or three times greater than the \$325 used in the original MW analysis. These numbers are subject to revision. Additionally, with conservation measures, no capacity is paid for in advance of need. This difference represents even greater opportunities for cost effective conservation and the implementation of other supply options.

Advantages of the expanded BMPs and water conservation measures described in this section include the following:

- There is a known timeline for implementation of many of these measures;
- These measures have the potential to reduce the projected water demand;
- These measures are more or less isolated from weather considerations;
- These water conservation measures largely avoid environmental costs.

## APPENDIX A

### Best Management Practices from the Memorandum of Understanding Regarding Urban Water Conservation in California

#### **BMP 1 INTERIOR AND EXTERIOR WATER AUDITS AND INCENTIVE PROGRAMS FOR SINGLE FAMILY RESIDENTIAL, MULTI FAMILY RESIDENTIAL, AND GOVERNMENTAL/INSTITUTIONAL CUSTOMERS.**

Implementation methods shall be at least as effective as identifying the top 20% of water users in each sector, directly contacting them (e.g. by mail and/or telephone) and offering the service on a repeating cycle; providing incentives sufficient to achieve customer implementation (e.g. free showerheads, hose end sprinkler timers, adjustment to higher water use bills if customers implement conservation measures, etc.). This could be a cooperative program among organizations that would benefit from its implementation.

#### **BMP 2 PLUMBING NEW AND RETROFIT**

- a. ENFORCEMENT OF WATER CONSERVING PLUMBING FIXTURE STANDARDS CONSTRUCTION BEGINNING JANUARY 1, 1992.**
- b. SUPPORT OF STATE AND FEDERAL LEGISLATION PROHIBITING SALE OF TOILETS USING MORE THAN 1.6 GALLONS PER FLUSH.**
- c. PLUMBING RETROFIT**

Implementation methods shall be at least as effective as delivering retrofit kits including higher quality low-flow showerheads to pre-1980 homes that do not have them and toilet displacement devices or other devices to reduce flush volume for each home that does not already have ULF toilets; offering to install the devices; and following up at least three times.

#### **BMP 3 DISTRIBUTION SYSTEM WATER AUDITS, LEAK DETECTION AND REPAIR**

Implementation methods shall be at least as effective as at least once every three years completing a water audit of the water supplier's distribution system using methodology such as that described in the American Water Works Association's "Manual of Water Supply Practices: Water Audits and Leak Detection" advising customers whenever it appears possible that leaks exist on the customers' side of the meter; and performing distribution system leak detection and repair whenever the audit reveals that is cost effective.

#### **BMP 4 METERING WITH COMMODITY RATES FOR ALL NEW CONNECTIONS AND RETROFIT OF EXISTING CONNECTIONS**

Implementation methods shall be requiring meters for all new connections and billing by volume of use; and establishing a program for retrofitting any existing unmetered connections and billing by volume of use; for example, through a requirement that all connections be retrofitted at or within six months of resale of the property or retrofitted by neighborhood.

**BMP 5 LARGE LANDSCAPE WATER AUDITS AND INCENTIVES**

Implementation methods shall be at least as effective as identifying all irrigators of large (at least 3 acres) landscapes (e.g. golf courses, green belts, common areas, family housing landscapes, cemeteries, schools, business parks, cemeteries, parks and publicly owned landscapes on or adjacent to road right-of-way); contacting them directly (by mail and/or telephone); offering landscape audits using methodology such as that described in the "Landscape Water Management Handbook" prepared for the California Department of Water Resources; and cost effective incentives sufficient to achieve customer implementation; providing follow-up audits at least once every five years; and providing multilingual training and information necessary for implementation.

**BMP 6 LANDSCAPE WATER CONSERVATION REQUIREMENTS FOR NEW AND EXISTING COMMERCIAL, INDUSTRIAL, INSTITUTIONAL, GOVERNMENTAL AND MULTI FAMILY DEVELOPMENTS**

Implementation methods shall be enacting and implementing landscape water conservation ordinances, or if the supplier does not have the authority to enact ordinances, cooperating with cities, counties and the green industry in the service area to develop and implement landscape water conservation ordinances pursuant to the "Water Conservation in Landscaping Act" (California Government Code 65590 et seq.). The ordinance shall be at least as effective as the Model Water Efficient Landscape Ordinance developed by the Department of Water Resources.

**BMP 7 PUBLIC INFORMATION**

Implementation methods shall be at least as effective as ongoing programs promoting water conservation and conservation related benefits including providing speakers to community groups and the media; using paid and public service advertising; using bill inserts; providing information on customers' bills showing use in gallons per day for the last billing period compared to the same period the year before; providing public information to promote other water conservation practices; and coordinating with other governmental agencies, industry groups and public interest groups.

**BMP 8 SCHOOL EDUCATION**

Implementation methods shall be at least as effective as ongoing programs promoting water conservation and conservation related benefits including working with the school districts in the water supplier's service area to provide educational materials and instructional assistance

**BMP 9 COMMERCIAL AND INDUSTRIAL WATER CONSERVATION**

Implementation shall be at least as effective as identifying and contacting the top 10% of the industrial and commercial customers directly (by mail and/or telephone); offering audits and incentives sufficient to achieve customer implementation; and providing follow-up audits at least once every five years, if necessary.

**BMP 10 NEW COMMERCIAL ,INDUSTRIAL AND INSTITUTIONAL WATER USE REVIEW**

Implementation methods shall be at least as effective as assuring the review of proposed water uses for new commercial and industrial water service and making recommendations for improved water use efficiency before completion of the building permit process.

**BMP 11 CONSERVATION PRICING. WATER SERVICE - SEWER SERVICE**

Implementation methods shall be at least as effective as eliminating nonconserving pricing and adopting conserving pricing. For signatories supplying both water and sewer service, this BMP applies to pricing of both water and sewer service. Signatories that supply water but not sewer service shall make good faith efforts to work with sewer agencies so that those sewer agencies adopt conservation pricing for sewer service.

Nonconserving pricing provides not incentives to customers to reduce use. Such pricing is characterized by one or more of the following components:

- a. Rates in which the unit price decreases as the quantity used increases (declining block rates);
- b. Rates that involve charging customers a fixed amount per billing cycle regardless of the quantity used;
- c. Pricing in which the typical bill is determined by high fixed charges and low commodity charges.

Conservation pricing provides incentives to customers to reduce average or peak use, or both. Such pricing includes:

- a. Rates designed to recover the cost of providing service; and
- b. Billing for water and sewer service based on metered water use.

Conservation pricing is also characterized by one or more of the following components:

- c. Rates in which the unit rate is constant regardless of the quantity used (uniform rates) or increases as the quantity used increases (increasing block rates);
- d. Seasonal rates or excess-use surcharges to reduce peak demands during summer months;
- e. Rates based upon the long-run marginal cost or the cost of adding the next unit of capacity to the system;
- f. Lifeline rates.

**BMP 12 LANDSCAPE WATER CONSERVATION FOR NEW AND EXISTING SINGLE FAMILY HOMES**

Implementation methods shall be at least as effective as providing guidelines, information and incentives for installation of more efficient landscapes and water saving practices (e.g. encouraging local nurseries to promote sales and use of low water using plants, providing landscape water conservation materials in new home owner packets and water bills, sponsoring demonstration gardens); and enacting and implementing landscape water conservation ordinances or, if the suppliers does not have the authority to enact ordinances, cooperating with cities, counties, and the green industry in the service area to develop and implement landscape water conservation ordinances pursuant to the "Water Conservation in Landscaping Act" (California Government Code 65590 et seq. ). The ordinance shall be at least as effective as the Model Water Efficient Landscape Ordinance being developed by the Department of Water Resources.

**BMP 13 WATER WASTE PROHIBITION**

Implementation methods shall be enacting and enforcing measures prohibiting gutter flooding, sales of automatic (self-regenerating) water softeners, single pass cooling systems in new connections, non-recirculating systems in all new conveyor car wash and commercial laundry systems and nonrecycling decorative water fountains.

Modification (1995): Signatories shall also support efforts to develop state law regarding exchange-type water softeners that would: 1. Allow the sale of only more efficient, demand-initiated regenerating (DIR) models; 2. develop minimum appliance efficiency standards that (a) increase the regeneration efficiency standard to at least 3,350 grains of hardness removed per pound of common salt used; and (b) implement an identified maximum number of gallons discharged per gallon of soft water produced; 3. Allow local agencies, including municipalities and special districts, to set more stringent standards and/or ban on-site regeneration of water softeners if it is demonstrated and found by the agency governing board that there is an adverse effect on the reclaimed water or groundwater supply.

Signatories shall also include water softener checks in home water audit programs and include information about DIR and exchange-type softeners in their educational efforts to encourage replacement of less efficient timer models.

**BMP 14 WATER CONSERVATION COORDINATOR**

Implementation methods shall be at least as effective as designating a water conservation coordinator responsible for preparing the conservation plan, managing its implementation, and evaluating the results. For very small water suppliers, this might be a part-time responsibility. For larger suppliers, this would be a full-time responsibility with additional staff as appropriate. This work should be coordinated with suppliers' operations and planning staff.

**BMP 15 FINANCIAL INCENTIVES**

Implementation methods should be at least as effective as:

- a. Offering financial incentives to facilitate implementation of conservation programs. Initial recommendations for such incentives will be developed by the Council within two years of initial signing of the MOU, including incentives to improve the efficiency of landscape water use; and
- b. Financial incentives offered by wholesale water suppliers to their customers to achieve conservation.

**BMP 16 ULTRA LOW FLUSH TOILET REPLACEMENT**

Water suppliers agree to implement programs for replacement of existing high-water-using toilets with ultra-low-flush toilets (1.6 gallons or less) in residential, commercial, and industrial buildings. Such programs will be at least as effective as offering rebates of up to \$100 for each replacement that would not have occurred without the rebate, or requiring replacement at the time of resale, or requiring replacement at the time of change of service. This level of implementation will be reviewed by the Council after development of assumptions included in the following two paragraphs using the economic principles included in paragraphs 3 and 4 of Exhibit 3.

**APPENDIX B**

**TABLE DESCRIBING EVALUATION PROCESS OF EXCLUDED WATER CONSERVATION MEASURES**

Conservation Measure	Already Implemented	Insufficient Data to Evaluate	Technical Feasibility	Environmental Impacts	Implementation Difficulty	Customer Acceptance	Better Measure Available	Included in Other Measures
Residential Irrigation Audits							X	X
Residential Plumbing Retrofit							X	X
System Water Audits, Leak Detection and Repair	X							
Commodity Metering for Water Service	X							
Low-Water-Use Landscape Ordinance	X	X						
Public Information	X	X						
School Education	X	X						
New Commercial/Industrial Water Use Review		X						X
Conservation Pricing	X							
Residential Landscape Ordinance		X			X		X	
Water Waste Prohibition	X	X						
Water Conservation Coordinator		X						X
Financial Incentives		X						X
Pressure Reduction (Potential BMP)		X			X		X	
Goal Billing		X			X			
On-Site Gray Water Reuse (Potential BMP)					X		X	
CIMIS (Weather Station) Controlled Landscape Irrigation		X			X			

## APPENDIX C

### Description of Nine Water Conservation Measures Evaluated Using Benefit Cost Analysis

**Residential Water Audits.** This measure targets existing residents in an effort to reduce indoor and outdoor water use, especially during peak use periods. The top 20 percent of single-family and multifamily home water users (on a gallons per account per day basis) are offered a free audit that includes indoor water conservation measures and development of an irrigation schedule. Indoor water savings are realized from installation of low-flow shower heads and leak repairs. The audit needs to be repeated every five years to maintain savings.

**Large Landscape Water Audits and Incentives.** Audits to increase the irrigation efficiency of landscapes containing more than three acres of turf would be conducted according to methods developed by the California Department of Water Resources. Aimed at reducing peak use, the objective of this measure is to give landscape managers the information necessary for them to perform timely equipment maintenance and to apply accurate irrigation amounts throughout the year based on customized irrigation schedules.

**Commercial/Industrial/Public Incentives for Irrigation System Upgrades.** This program offers a customized rebate for any device or technique that can be shown to reduce irrigation water use by more than 1,000 hundred cubic feet (CCF)/year per application and reliably provide those savings for at least five years. This measure recognizes the increasing number of methods for improving irrigation efficiency and is designed to support any viable concept. The burden of proof for savings and durability of those savings rests with the applicant, however, and acceptance of the proof, for the purpose of setting the rebate level, is at the discretion of the District.

**Commercial/Industrial/Public Indoor Water Audits.** This alternative measure targets the top 10 percent of commercial, industrial, and public (government, institutional) water users. This measure meets part of the provisions of BMPs 1 and 9. Building owners would be contacted and offered a free interior audit together with incentives sufficient to achieve customer implementation of audit findings. An interior audit would be conducted by District staff or a consultant. The auditor would perform an on-site interior audit and produce a customized report that describes fixture inspections and retrofit possibilities, leak tests, cooling tower operation, process water improvement, and recycling opportunities for each site. Audits would be repeated every five years to maintain or improve the conservation level.

**Commercial/Industrial/Public Outdoor Water Audits.** This measure seeks to reduce peak demand by conserving irrigation water. This measure addresses sites with less than three acres of turf. Existing commercial and industrial building owners, whose buildings have high summer water use, would be offered an irrigation system audit to improve water use efficiency of the existing sprinkler system. One of the key areas of this audit is establishing the correct watering

rate. Watering schedules and yearly conservation reminders would be sent to the targeted businesses/industries, and an offer would be made to repeat the audit after five years.

**Residential Water Efficient Landscape and Irrigation System Incentives.** This program offers incentives to single- and multifamily customers for the installation of water-efficient landscaping and irrigation systems. Rebates would apply to (1) new landscaping with 20 percent turf or less, (2) re-landscaping involving the removal of turf, and (3) installation of an efficient irrigation system on landscaping with 20 percent of turf or less. To qualify, customers must have drip irrigation on plant material, timers or controllers, and soil and rain sensors.

**Ultra Low-Flush Toilet Replacement.** The District would continue and enhance its current toilet replacement program offering rebates to customers who replace their high water-use toilets with 1.6 gallons per flush (gpf) models. Approximately 25 percent of all toilets would be replaced (approximately 5,000 toilets in total) with rebates over a ten-year period. Implementation of this measure would create increased savings in the short term because the low-flow fixtures are installed sooner than the natural replacement rate. The natural replacement covers toilets voluntarily replaced in conjunction with bathroom remodeling. Over the long run, no total increase in savings would occur, however, since the federal Energy Policy Act mandates that only 1.6 gpf toilets can be sold. Eventually all toilets will be replaced with 1.6 gpf models.

**Incentives for Commercial/Industrial/Public Toilet Shower Replacement.** Cash rebates would be offered to encourage replacement of existing toilets and urinal valves in the Commercial/Industrial/Public sectors that use more than 1.6 (toilets) and 1.0 (urinals) gallons per flush. Low-flow shower heads could be replaced for all Commercial/Industrial/Public customers that have significant numbers of shower heads (like schools).

**Irrigation Advisory Service.** This alternative measure would offer all irrigators advice on when and how much to water. The advice would be based on the calculated irrigation water needed for turf grass, based upon evapotranspiration (ET) information from a series of local weather stations. ET information could be published daily in the local newspaper. Depending on weather variability within the service area, more than one recommended water schedule may need to be published.

## APPENDIX D

### Alternative Pricing Structures

#### Alternate Pricing Structures

A conservation-oriented rate structure is implemented to encourage efficient water use and discourage waste by ensuring that customer bills communicate the full cost of providing water services including the cost of new supplies. Customers who conserve will be rewarded for their efforts by lower bills than they would otherwise have to pay. Customers may choose to consume more water than their neighbors, but the customers with high usage will have to assume the responsibility for paying the costs they impose on the water system.

Some types of alternate rate structures:

- 1) Uniform Volume Rate - Same unit price (dollars per gallon or cubic feet) applies to all water use. Uniform rates are relatively simple, easy for customers to understand, and involve low administrative costs.
- 2) Seasonal Rates - Seasonal pricing recognizes that use during peak periods drives system capacity decisions. Seasonal rate structures can have up to three demand periods, peak, mid peak, and off peak. Customers pay more based on seasonal water demands.
- 3) Inclining Block or Tiered Rate - In an increasing block rate structure, the applicable unit price increases with higher-use blocks or tiers. The conceptual basis for the increasing-block rate as a conservation rate form is the belief that unit capacity costs associated with system expansion will increase with more costly supply sources. The price effect on the customer is that price per unit is based on the tiered block rate which the unit of water falls in.

A variation of tiered block rates is called the “ratchet” approach where all usage, not just falling within one block, is charged at the rate applicable to the highest block of consumption reached by the customer. This approach provides a stronger incentive to conserve because reductions in consumption that drop total usage into a lower rate block will result in a reduction in the total cost of all water used by the customer.

#### Impact

Statistical studies suggest that water usage, especially in the short-term, is not substantially affected by changes in price. Economists label demand as “price inelastic” when changes in price induce relatively small changes in consumption. Therefore, the issue is not whether prices affect use, but rather how much prices affect use (The response is usually dependent on the magnitude of the increase and the level of rates).

Water demand is relatively unresponsive to price for the following reasons:

- 1) Potable water has no close substitutes to which customers can switch; water for other purposes has limited substitutes.
- 2) Water utility bills generally amount to a relatively small proportion of a household's total expenditures.
- 3) Water prices historically have been sufficiently low to undermine any incentive consumers might have to monitor and alter water use in response to water changes.

## **APPENDIX E**

### **State Legislation and General Plan Policies Related to Water Resources Management**

#### **State Legislation Affecting General Plans**

The County of Santa Cruz, as specified by the Government Code and in consultation with water purveyors, is required to consider water supply as a major factor in the preparation of the County General Plan. The following Government Code Sections detail the County's and the water purveyors' responsibility with regard to planning for future development based on the availability of adequate water supplies. The next update to the County's General Plan, due in 2004 (approx.), will be subject to these requirements.

65302. (d) A conservation element for the conservation, development, and utilization of natural resources including water and its hydraulic force, forests, soils, rivers and other waters, harbors, fisheries, wildlife, minerals, and other natural resources. That portion of the conservation element including waters shall be developed in coordination with any countywide water agency and with all district and city agencies which have developed, served, controlled or conserved water for any purpose for the county or city for which the plan is prepared. Coordination shall include the discussion and evaluation of any water supply and demand information described in Section 65352.5, if that information has been submitted by the water agency to the city or county...

65302.2. Upon the adoption, or revision, of a city or county's general plan, on or after January 1, 1996, the city or county shall utilize as a source document any urban water management plan submitted to the city or county by a water agency. (Added by Stats. 1995, Ch. 881.)

65352. (a) Prior to action by a legislative body to adopt or substantially amend a general plan, the planning agency shall refer the proposed action to all of the following entities:...

(6) Any public water system, as defined in Section 116275 of the Health and Safety Code, with 3,000 or more service connections, that serves water to customers within the area covered by the proposal. The public water system shall have at least 45 days to comment on the proposed plan, in accordance with subdivision (b), and to provide the planning agency with the information set forth in Section 65352.5.

65352.5. (a) The Legislature finds and declares that it is vital that there be close coordination and consultation between California's water supply agencies and California's land use approval agencies to ensure that proper water supply planning occurs in order to accommodate projects that will result in increased demands on water supplies.

(b) It is, therefore, the intent of the Legislature to provide a standardized process for determining the adequacy of existing and planned future water supplies to meet existing and planned future demands on these water supplies.

(c) Upon receiving, pursuant to Section 65352, notification of a city's or a county's proposed action to adopt or substantially amend a general plan, a public water system, as defined in Section 116275 of the Health and Safety Code with, 3,000 or more service connections, shall provide the planning agency with the following information, as is appropriate and relevant:

(1) The current version of its urban water management plan, adopted pursuant to Part 2.6 (commencing with Section 10610) of Division 6 of the Water Code.

(2) The current version of its capital improvement program or plan, as reported pursuant to Section 31144.73 or the Water Code.

(3) A description of the source or sources of the total water supply currently available to the water supplier by water right or contract, taking into account historical data concerning wet, normal, and dry runoff years.

(4) A description of the quantity of surface water that was purveyed by the water supplier in each of the previous five years.

(5) A description of the quantity of groundwater that was purveyed by the water supplier in each of the previous five years.

(6) A description of all proposed additional sources of water supplies for the water supplier, including the estimated dates by which these additional sources should be available and the quantities of additional water supplies that are being proposed.

(7) A description of the total number of customers currently served by the water supplier, as identified by the following categories and by the amount of water served to each category:

(A) Agricultural users.

(B) Commercial users.

(C) Industrial users.

(D) Residential users.

(8) Quantification of the expected reduction in total water demand, identified by each customer category set forth in paragraph (7), associated with future implementation of water use reduction measures identified in the water supplier's urban water management plan.

(9) Any additional information that is relevant to determining the adequacy of existing and planned future water supplies to meet existing and planned future demands on these water supplies.

(Added by Stats. 1993, Ch. 1195; Amended by Stats. 1996, Ch. 1023. Effective September 29, 1996.)

As indicated by the legislation presented above, the state places a high priority on the provision of adequate water supplies to meet the future needs of each community. The requirement that new General Plans and General Plan updates reflect the availability of domestic water to meet the needs for a community's growth places the responsibility on local governments and water purveyors.

## **County General Plan Policies and Programs**

The current General Plan, last updated in 1994, contains a number of policies and programs which tie the development of land to the ability of service providers, including water districts, to serve the type and density of development proposed. These policies are as follows:

### **Policies**

#### **2.1.4 Siting of New Development**

(Local Coastal Program, LCP) Locate new residential, commercial, industrial development, within, next to, or in close proximity to existing developed areas with adequate public services and where it will not have significant adverse effects, either individually or cumulatively, on environmental and natural resources, including coastal resources.

#### **2.1.6 Public Services Adequacy**

(LCP) Consider the adequacy of public service capacity (including without limitation sewer, water, roads), public school capacity, terrain, access, pattern of existing land use in the neighborhood, unique circumstances of public value, location with respect to regional or community shopping and other community facilities; access to transportation facilities including transit, rail, bicycle and pedestrian facilities; and parcel size in the surrounding area in determining the specific density to be permitted for individual projects within each residential density range, as appropriate.

#### **2.1.9 Urban and Rural Growth Rates**

(LCP) Maintain growth rates for Urban and Rural portions of the County (as defined by the Urban Services Line). Encourage residential development to locate within existing urban areas where adequate levels of public services exist. Discourage new development and divisions of land in urban and rural areas, where such public services are not available and where the impact on environmental resources cannot be mitigated.

#### **Objective 2.2 Public Facilities Guidelines**

(LCP) To achieve patterns of development compatible with the availability of required public facilities and services.

#### **2.2 Program**

a. Manage the allocation of building permit approvals in areas where an adequate water supply for domestic use and for fire protection cannot be made available, as indicated by, or at the request of, a water district or fire district (Responsibility: Planning Department, Planning Commission, Board of Supervisors, Water Districts, Fire Districts).

#### **Objective 7.18a Domestic Water Service**

(LCP) To ensure a dependable supply of high quality domestic water to meet the needs of communities that obtain water service from municipal water systems, County water districts and small water systems.

**Objective 7.18b Water Supply Limitations**

(LCP) To ensure that the level of development permitted is supportable within the limits of the County's available water supplies and within the constraints of community-wide goals for environmental quality.

**Objective 7.18c Water Conservation**

(LCP) To maximize the County's water conservation potential through a coordinated program with water purveyors and water management agencies involving public education, financial incentives to conserve, voluntary and mandatory conservation measures, retrofit programs, runoff management and water waste regulations and enforcement.

**Policies**

**7.18.1 Linking Growth to Water Supplies**

(LCP) Coordinate with all water purveyors and water management agencies to ensure that land use and growth management decisions are linked directly to the availability of adequate, sustainable public and private water supplies.

**7.18.2 Written Commitments Confirming Water Service Required for Permits**

(LCP) Concurrent with project application, require a written commitment from the water purveyor that verifies the capability of the system to serve the proposed development. Projects shall not be approved in areas that do not have a proven, adequate water supply. A written commitment is a letter from the purveyor guaranteeing that the required level of service for the project will be available prior to the issuance of building permits, or in the case of a subdivision, prior to filing the Final Map or Parcel Map. The County decision making body shall not approve any development project unless it determines that such project has adequate water supply available.

**7.18.3 Impacts of New Development on Water Purveyors**

(LCP) Review all new development proposals to assess impacts on municipal water systems, County water districts, or small water systems. Require that either adequate service is available or that the proposed development provide for mitigation of its impacts as a condition of project approval.

**Programs to Implement Policies in the General Plan**

**7.18 Programs**

(LCP) c. Continue to monitor the adequacy of available water supplies to support projected development and review and amend the County General Plan and LCP Land Use Plan periodically to ensure available water supply to serve projected levels of development

without adverse impacts to groundwater resources or streams. (Responsibility: Planning Department, Planning Commission, PVWMA, Board of Supervisors, Water Purveyors)

d. Participate in the development of surface and groundwater management programs to ensure the availability of an adequate quantity and quality of domestic water supplies for urban and suburban areas. (Responsibility: Planning Department, Water Purveyors, PVWMA, Public Works)

(LCP) i. Evaluate the impacts of allowing additional wells in aquifers where overdraft is occurring. Develop criteria to regulate new well development, if necessary. (Responsibility: Environmental Health, Board of Supervisors, Water Management Agencies, Water Purveyors, PVWMA, Flood Control and Water Conservation District)

(LCP) j. Review and evaluate proposals by water agencies to develop supplemental sources of water supply (such as waste water reclamation, water conservation, north coast groundwater, or surface water development) to reverse overdraft, seawater intrusion and other basin problems where ever they are occurring. The development and use of these sources must be consistent with General Plan and LCP Land Use Plan resource protection and development policies. (Responsibility: Water Purveyors, Board of Supervisors, Flood Control, PVWMA)

(LCP) k. Continue to monitor seawater intrusion in the Pajaro Valley, Soquel area and along the North Coast. (Responsibility: PVWMA, Water Purveyors, Flood Control)

(LCP) n. Cooperate with state and federal agencies in addressing groundwater basin overdraft problems and seek any available state or federal assistance to support local groundwater management programs. (Responsibility: Water Purveyors, Flood Control, PVWMA, Board of Supervisors)

o. Coordinate monitoring efforts with water purveyors to provide comprehensive information on the quantity and quality of surface and ground water resources. (Responsibility: Water Purveyors, Flood Control, PVWMA)

(LCP) p. Provide public education regarding the need for groundwater resource management. (Responsibility: Water Purveyors, PVWMA)

r. Assist the water purveyors to develop additional water supplies with sufficient capacity to serve General Plan and LCP Land Use Plan buildout population without creating overdraft of groundwater basins. (Responsibility: Water Purveyors, Public Works, Planning Department)

The policies and programs listed above clearly indicate that the County also considers water supply a critical factor in the development of land.

## **County Ordinances to Implement Policies and Programs of the General Plan**

In order to implement the policies and programs noted above, the County has enacted a number of ordinances that tie the approval of building permits and discretionary permits to the availability of water (and other services). These ordinances require that all persons submit “will serve” letters from water districts certifying the ability of the water district to serve the proposed development. The ordinances are as follows:

Section 12.01.050(b) - BUILDING PERMIT APPLICATIONS (required submittals)

9. Letters from cities and special districts (other than those administered by the Department of Public Works) providing service to new projects certifying their ability to provide domestic water service and sewer service, and meet the fire protection requirements including Sections 12.01.060(d), (e) and (f).

Section 13.10.324.1 - PUBLIC FACILITY REQUIREMENTS FOR RESIDENTIAL DISTRICTS

(b) All requirements of the local sanitation district and water district shall be met. Letters indicating adequate sewer and water service to the project shall be submitted with the project application. Within the Coastal Zone, adequate system capacity shall be reserved for priority coastal uses as per Section 17.02.070.

Sections 13.10.334(b) and 13.10.344(b) contain identical language as above except that they apply to commercial and industrial projects, respectively.

Section 14.01.206 - FORM AND CONTENT OF TENTATIVE MAPS (required submittals)

(l) Submit a letter from a responsible person for a source of water supply, certifying as to the availability of water and its ability to serve the subdivision, or submit a letter from the Environmental Health Services of the County Health Department, certifying as to the ability of the subdivision to meet the requirements of Part IV of the Design Criteria Manual.

Section 14.01.402 - COMPLIANCE WITH GENERAL PLAN - AREA PLAN - ZONING and

Section 14.01.403 - DENIAL OF APPROVAL - FINDINGS (land divisions) require conformance with all requirements of the County General Plan and the Zoning Ordinance, including the requirements for adequate water supply, as certified by the appropriate water district.

Section 18.10.230 - FINDINGS REQUIRED (development permits) requires that findings be made that the development project is consistent with the County General Plan and all Zoning Ordinance provisions.

The County is responsible for the review of all development and subdivision applications, and is the sole jurisdiction charged with approving new development in the unincorporated areas, whether through issuance of building permits or through approval of development and subdivision applications. This review and approval process, however, is dependent on the information provided by the various utility providers, including the water districts.

## Section 5

# Determination of Water Needs

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### Background

Based on the results of the technical analyses presented in previous sections, it was determined that the District needs to augment its groundwater supply with a supplemental source. The range of the District's water supply needs was determined based on the following components.

- Water demand projections
- Existing groundwater production
- Groundwater model results on basin sustainable yield
- Recommended conservation program

As previously discussed, water demand projections and a recommended conservation program were developed technically and then modified and agreed upon by the PAC. The groundwater model results were originally reviewed by the Technical Advisory Committee (TAC), which was established for this purpose. TAC members included representatives from the District, State Department of Water Resources, U.S. Geological Survey, Santa Cruz County, UC Santa Cruz, and a private consultant. The TAC worked with model developers over the course of a year. The preliminary groundwater model results were agreed to by the TAC and also presented to the PAC as discussed below.

### Water Demand Projections

The Statement on Future Water Demand in Soquel Creek Water District (See Section 3) was ratified by the PAC on December 9, 1997. It was based on the Water Demand Projection Update (See Appendix D). Using 1996 as existing conditions, the demand projections were developed to year 2030 (projected year for area buildout). High-end and low-end future demands were estimated using the land use-based approach and the parcel-based approach for development, respectively. The high-end projections assume that new development will occur at the density range allowed according to the County of Santa Cruz General Plan. The low-end projections assume that development will occur at lower densities based on parcel size. Both ranges of demands reflect allowable densities in the County General Plan land use element.

The 1996 District groundwater production was approximately 5,480 afy. High-end and low-end future demands were estimated for 2001, 2006, 2015, and 2030. At year 2030, the high-end demand projection is 7,500 afy and the low-end demand projection is 6,800 afy.

## Groundwater Model Results

The Soquel-Aptos Integrated Groundwater and Surface Water Model (IGSM) was developed and used to simulate basin baseline conditions and develop the basin sustainable yield for the Purisima formation. The preliminary model findings were reviewed by the PAC on March 10, 1999. For the model analysis, pumping of District production wells was reduced until the model showed sufficient recovery in coastal monitoring wells to effectively re-establish positive (above sea level) conditions. The remaining pumping provided an estimate of the sustainable yield of the aquifer. Assuming that pumping changes are limited to the District wells only, the analysis indicated that 1996 aquifer pumping levels in the Purisima formation need to be reduced by approximately 610 afy in selected production wells to alleviate the undesirable conditions of depressed and declining coastal monitoring well water levels.

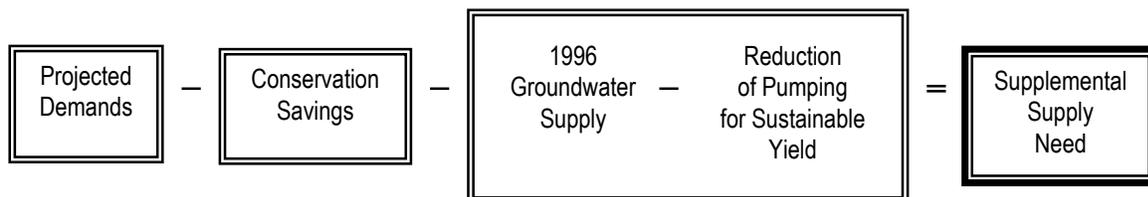
The preliminary groundwater model analysis focused only on the Purisima formation. About one-third of District pumping is currently from the adjacent Aromas formation. Analysis of the sustainable yield of the Aromas formation may be conducted by the District after an update of the Pajaro IGSM has been completed. The 610 afy reduction in pumping required is only for District wells within the Purisima formation. Depending on the outcome of the sustainable yield of the Aromas formation, additional pumping reduction (for District wells within the Aromas formation) may be required.

## Water Conservation Savings

The PAC's recommended conservation measures (see Section 4) are projected to result in estimated water savings for the District of about 650 afy by the year 2030. The technical studies indicate that the PAC's recommended conservation program may achieve these savings, but it will take some time. The full 650 afy savings would occur gradually over time as the District implements various measures, with full savings by year 2030.

## Resulting Range of Supply Need

The resulting range of supplemental water supply need is shown in **Figure 5.1**. The year 2030 need was determined based on the difference between projected demands, conservation savings, and the sustainable yield of the Purisima aquifer.



Using the upper and lower range year 2030 demand projections, the District's need is determined as follows.

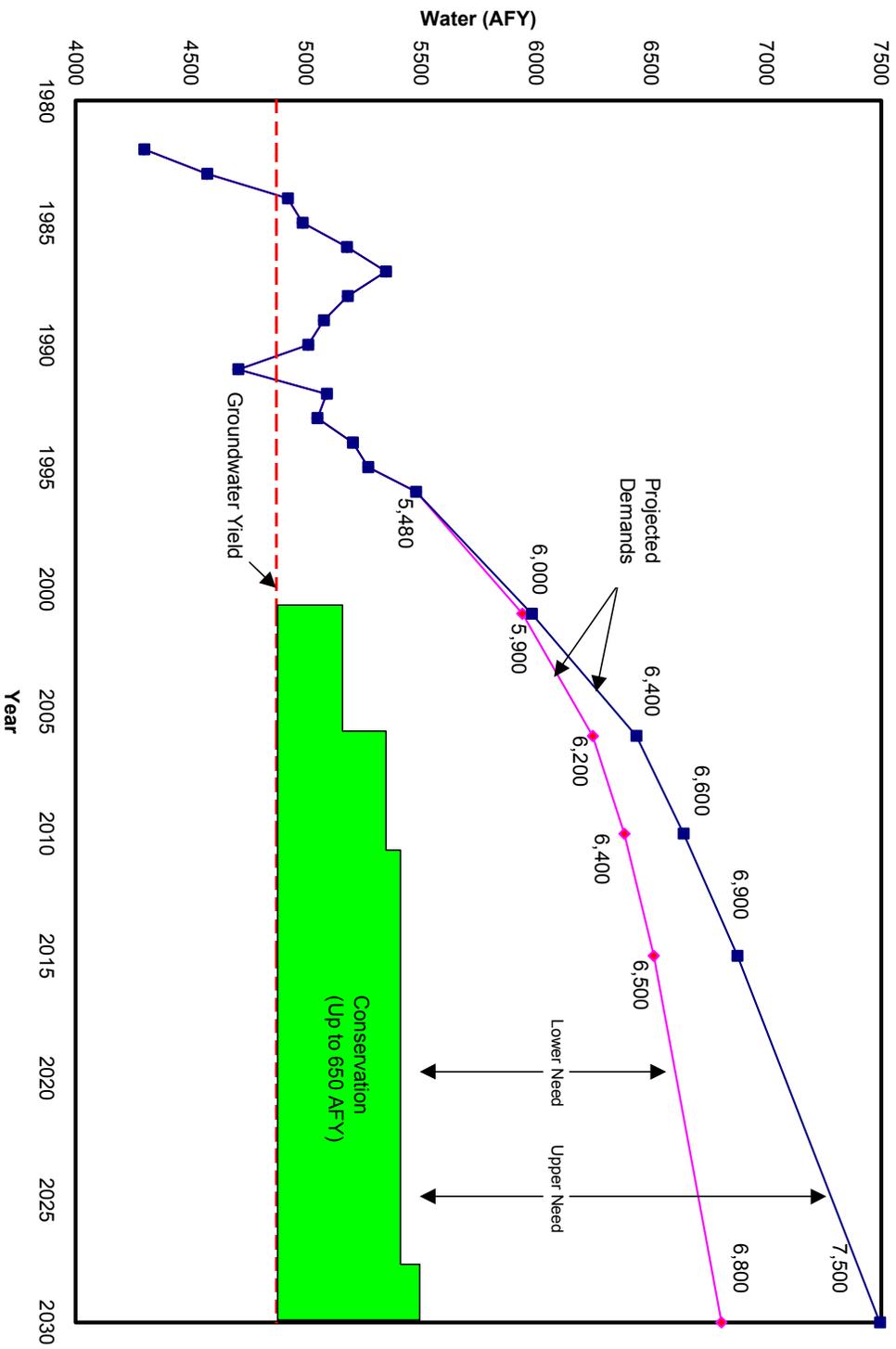
Upper Range of Need:

$$\begin{array}{r}
 \boxed{7,500 \text{ AFY}} - \boxed{650 \text{ AFY}} - \boxed{5,480 \text{ AFY} - 610 \text{ AFY}} = \boxed{1,980 \text{ AFY}} \\
 \text{Lower Range of Need}
 \end{array}$$
  

$$\boxed{6,800 \text{ AFY}} - \boxed{650 \text{ AFY}} - \boxed{5,480 \text{ AFY} - 610 \text{ AFY}} = \boxed{1,280 \text{ AFY}}$$

Therefore, the District needs to augment its current water supply by approximately 1,200 to 2,000 afy to provide adequate supply to its customers and eliminate undesirable impacts in the Purisima aquifer. This is in addition to the aggressive conservation program recommended.

# Section 5 Determination of Water Needs



## Section 6

# Water Supply Evaluation and Recommendations

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## Background

As discussed in Section 5, the year 2030 supplemental water supply need is 1,200 afy to 2,000 afy. To meet this future need, the PAC agreed to a list of the supply options. These were investigated as potential supplemental supplies to augment the District's current groundwater supply. The PAC narrowed the list to three supply options, which were then more fully developed and evaluated using evaluation criteria. Based on the evaluation of the three supply options, the PAC came up with a recommended strategy that best reflects the needs of the District.

## Initial Supply Options

The PAC agreed to an initial list of supply options to be considered. These options are briefly described here.

**Desalination.** The desalination process would treat seawater to meet potable water quality standards. The process would involve using beach wells or an ocean intake for collecting seawater. The seawater would then be transported to the desalination plant where it would undergo treatment such as reverse osmosis. The treated water would be delivered directly to the distribution system. The concentrated brine resulting from treatment would be discharged through wells or an outfall where the brine could be blended with treated wastewater to reduce the salinity.

**Off-Stream Diversion.** The proposed off-stream diversion project would divert water from Soquel Creek during periods of high flow (winter runoff period and wet years). The project would require the construction and operation of a raw water intake to divert surface water from Soquel Creek to an off-stream raw water reservoir. The settled water would then be delivered to a water treatment plant. After treatment, the potable water could be conveyed to the distribution system or used to recharge the aquifer for storage and later withdrawal.

**Recycled Water.** The recycled water supply option would involve conveying treated wastewater from the City of Santa Cruz (City) to the District to be used for landscape irrigation. The City's wastewater treatment plant (WWTP) currently provides secondary treatment with disinfection. To comply with Title 22 of the California Code of Regulations, the wastewater effluent would need to be treated through a tertiary process. The major project facilities include the addition of a tertiary treatment process at the WWTP, pump stations, a pipeline to transport recycled water from the City WWTP to the District, and a separate non-potable distribution system. Other uses for recycled water including potable indirect reuse (drinking water use) and injecting it into the aquifer as a coastal barrier to seawater intrusion were also questioned and discussed. New wells would have to be drilled for coastal barrier option.

**Reservoir at Olympia Quarry.** The Olympia Quarry near Felton is currently operated by RMC Lonestar for mining. However, the owner of the quarry is interested in requesting that Santa Cruz County amend the Use Permit to allow deeper mining for the next 8 to 10 years. In return, the quarry could be available for use as storage to the City of Santa Cruz after the mining is complete. This option would pose several constraints for the District. First, the quarry is not available for another 10 years. Second, the storage that the quarry could provide is insufficient to meet the City of Santa Cruz's future demand projections. Therefore, there is no surplus water supply and storage available for the District. Third, to pursue this option as a District only project would require the construction of a tremendously long pipeline given the distance between the District service area and the quarry.

**Additional Conservation.** The PAC was asked by a member of the public to consider investigating further conservation measures beyond those recommended in the PAC approved conservation document. No other conservation measures beyond those already addressed were identified.

**Recharge Enhancement with Precipitation.** This option would involve recharging the groundwater aquifer with precipitation through natural percolation. Storm water runoff would be captured and diverted to recharge basins where the water infiltrates into the aquifer. For this option to be feasible, there would need to be large flat areas of Purisima formation outcrop since the Purisima is a confined aquifer. Based on existing Santa Cruz County hydrogeologic information (Bruce Laclergue, April 21, 1999), the areas designated effective for surface recharge are very limited and this is not a feasible option.

**Imported Supply.** This option would involve a water transfer or purchase from a federal water contractor or a water rights holder. The District would first need to identify a willing seller and negotiate a water supply quantity and purchase price with the seller. Then the negotiated water quantity would need to be stored and conveyed to the District through pipeline and other facilities. The imported raw water would be treated before delivering directly into the distribution system or recharging the aquifer.

**On-Stream Reservoir.** The on-stream reservoir option would involve building a dam on Soquel Creek. The proposed Glenwood Project is located on the West Fork of Soquel Creek in the Glenwood Basin. A transmission pipeline would convey the stored water from the reservoir to a treatment plant. After treatment, the potable water could be delivered directly into the distribution system or used to recharge the aquifer.

To further define what is required for the implementation of each supply option as well as to compare the options, project facilities were identified. Descriptions of major potential project facilities for each of the above options are presented in **Tables 6.1 to 6.3**.

## Supply Options Used In Evaluation Process

After discussing potential project locations, major facilities required, and the feasibility of each supply option, the PAC narrowed the list of supply options to be further evaluated. The PAC voted on the carrying the following three projects forward for evaluation.

- Desalination
- Off-stream diversion
- Recycled water (irrigation or non-potable use)

The PAC voted to retain both the ocean intake (seawater) and beach well intake (brackish water) desalination option for comparative evaluation. However, it was recognized that there would be numerous implementation obstacles and constraints with desalination. For the recycled water option, the PAC agreed to eliminate aquifer injection and coastal barrier usage from further consideration because it was recognized that there would be many obstacles to overcome in having to drill new wells. However, the option of using recycled water for non-potable irrigation by large users within the District boundary should be carried forward for evaluation as a long-term alternative.

The PAC voted not to further evaluate the following options at this point in time.

- Imported supply
- On-stream reservoir

The PAC further recommended that the District cooperate with Pajaro Valley Water Management Agency in evaluating potential benefits to the District (reduction of current pumping in the Aromas formation) from an imported supply to the Pajaro area. It may be possible for the District to assist with such a project. The PAC also recommended that the District not preclude the on-stream reservoir option as a possible long-term future safeguard if needs arise.

The PAC voted to eliminate the following options from further comparative evaluation.

- Reservoir at Olympia Quarry
- Additional conservation
- Recharge enhancement with precipitation

## Evaluation Criteria

The remaining three supply options (desalination, off-stream diversion, and recycled water for irrigation) from the previous screening process were further analyzed through an evaluation process using evaluation criteria agreed to by the PAC. These criteria are provided below.

**Economic Feasibility** – The alternative is cost effective for both capital and O&M costs.

**Availability of Supply** – The alternative has the quantity available to either meet the projected need directly and/or can be used to recharge the basin to meet the need.

**Reliability of Supply** – The alternative provides supply source reliability seasonally and under various hydrologic year types.

**Environmental Quality** – The alternative provides environmental enhancement and/or minimizes potential environmental impacts, assuming feasible mitigations are incorporated into the alternative.

**Implementation Risk and Uncertainty** – The alternative ensures minimal risk of implementation delays due to regulatory restrictions and requirements, and/or other non-District control or influence.

**Water Quality** – Potable alternatives must be treatable, can be blended with groundwater, and has low variability in quality. Non-potable alternative must meet applicable standards for the intended use.

**Operational Flexibility** – The alternative provides ease of operational implementation and flexibility to operate water treatment and distribution system (e.g. minimal treatment complexity and ease of integration with existing supply and facilities).

**Flexibility to Meet Future Needs** – The alternative provides flexibility to meet near term and long term supply needs, and/or can be expanded in the future to accommodate a higher level of demand than projected or a regional project.

**Public Safety** – The alternative poses minimal threat to public safety in the event of a disaster (e.g. earthquake).

## **Evaluation Process**

The water supply options of desalination, off-stream diversion, and recycled water (non-potable use) were evaluated by the PAC. Evaluating each option by the same set of criteria allowed an objective comparison of the options. The information developed for each supply option is presented in **Figures 6.1 to 6.3**. Based on the evaluation of the three supply options, the PAC came up with a strategy that best reflects the needs of the District.

## **Public Advisory Committee Recommended Strategy**

Based on the Water Needs Assessment, the PAC recommends the following supplemental supply options for the District's consideration.

2. **Off-Stream Diversion Option.** Pursue the Off-Stream Diversion Project to offset winter demands and inject water into the aquifer contingent upon the following:
  - 1.1. Determine that there is capacity within the aquifer to absorb the amount of water available for injection without losing water to the ocean. Determine the aquifer response when water is injected/recharged to evaluate the overall benefit to groundwater levels along the coast. Use an independent peer review, Technical Advisory Committee or consultant to verify findings.
  - 1.2. Work with California Department of Fish and Game and other interested entities to understand their issues related to fisheries protection and other stream resources.
  - 3.3. Analyze the environmental impacts, especially related to the biological health of the stream system, and mitigate accordingly.

If the above studies demonstrate to the District Board that the project is feasible and impacts can be addressed, then proceed with the project in the following manner:

- 3.4. Working with the appropriate agencies, identify possible stream enhancement activities, such as riparian and streambed restoration, erosion control, fish habitat and other environmental enhancement projects.
  - 3.5. Obtain all necessary environmental and other permits and approvals.
  - 3.6. Develop a stream-flow monitoring program that includes baseflow and other types of monitoring as identified by the permitting agencies.
  - 3.7. Develop an interactive Public Information Program regarding all aspects of the project.
  - 3.8. Utilize an open participation process with the neighborhood surrounding the project in developing the facilities design. Pay particular attention to ways of minimizing visual, noise, and other potential impacts to surrounding areas.
4. **Desalination Option.** Consider participating in the development of a regional desalination supply, if, in the future, the District's Board determines it is necessary. If the District pursues this option, consideration should be given to working with the City of Santa Cruz to locate the plant site proximate to the existing ocean outfall or working with other water agencies that may pursue a desalination project. Track the most up-to-date technologies for more cost-effective treatment options.
5. **Recycled Water Option.**
    - 3.4 Consider participating in the development of a recycled water supply for non-potable applications (such as irrigation), if, in the future, the City of Santa Cruz or another agency implements this supply option.
    - 3.5 Identify and encourage the installation of dual water systems in existing and new developments with large turf areas (e.g., playing fields, golf courses) and other major non-potable water uses (e.g., industrial users) for future applications of recycled water.

- 3.6 Request that the County and Cities consider dual water system installations for new developments of major non-potable water users by non-District customers (e.g., Cabrillo College, County parks, major industrial projects, etc.).

## Additional Recommendations

1. **Baseflow of Soquel Creek.** The District should continue to work with other agencies and private interests to protect and enhance the baseflow of Soquel Creek. Efforts should include: monitoring groundwater levels along Soquel Creek; developing a watershed management plan; cooperatively working with others to evaluate the adjudication of the Creek; and consideration of a Watermaster.
2. **Imported Supply.** The District should work with the County and the Pajaro Valley Water Management Agency (PVWMA) to evaluate and maximize the potential indirect increase in the amount of water available in the District's portion of the Aromas Red Sands Aquifer. This increase could result from the importation of water, other supply projects to the Pajaro Valley, or a decrease of pumping in the Pajaro Basin.
  - 1.1 Use the updated PVWMA groundwater model to evaluate the effect of groundwater pumping in the Pajaro area (particularly Corralitos) on water levels, gradients, and yields in the Aromas formation in the southern part of the District.
  - 1.2 Evaluate the potential impact on water levels and yields within the District that could result from importation of water and in-lieu recharge in the Pajaro Basin, particularly in the Corralitos area.
  - 1.4 If there are indirect benefits to the District, work with PVWMA to consider changes in the Pajaro Basin Management Plan to maximize benefits to the District in return for District support in proportion to those benefits.
3. **On-Stream Reservoir.** Retain this option for the distant future should the need for an additional project arise.
  - 2.1 Work with the State Water Resources Control Board and Scotts Valley Water District to retain a modified application for a water rights permit on the West Branch of Soquel Creek to not preclude a possible reservoir project at the Glenwood site.
  - 2.5 Seek County support for this application.
  - 2.6 Do not sell land holdings in the Glenwood area.

Request that the County retain this option as a possible future regional project in the General Plan.

### Ground Rules

*Ratified by the Public Advisory Committee on October 22, 1997. Revised and agreed to February 23, 1998 and November 4, 1998.*

### Representation and Participation

1. Members of the Public Advisory Committee (PAC) have been recruited based on their ability to represent the views of an interest group within the community, commit personal time to take part in the process and work collaboratively with other PAC members, facilitators and District Staff.
2. The personal integrity and values of each member will be respected by other members. This includes the avoidance of personal attacks and stereotyping. The motivations and intentions of members will not be criticized.
3. Commitments will not be made lightly and will be kept. Delay will not be employed as a tactic to avoid an undesired result.
4. Disagreements will be regarded as problems to be solved rather than as battles to be won.
5. Every member will check back with their respective organization or constituency and will be responsible for keeping them aware of ongoing Public Advisory Committee (PAC) decision-making processes and timelines. Significant comments and questions expressed by the peers, senior staff and/ or governing boards of the members will be communicated back to the PAC at its next regular meeting.
6. Every member is responsible for communicating their position on issues under consideration. It is incumbent upon each member to state the interests of the organization or group they represent. Voicing these interests is essential to enable meaningful dialogue and full consideration of issues by the PAC. If a PAC member does not regularly attend PAC meetings or communicate their view point on an issue, it is assumed that they agree with decisions, and recommendations made by the PAC. If a member's interest is conveyed to another member, staff or one of the facilitators outside of a meeting, the source of that comment will be clearly conveyed to the PAC.
7. If a member cannot make a scheduled PAC meeting, that person can designate an alternate to attend and represent him or her. If an alternate is not designated, the PAC member should, whenever possible, communicate his or her comments orally or in writing directly to the facilitators. PAC members can also contact the facilitators between meetings at any time to discuss their concerns and needs related to this dialogue.

### Development of Multiple Options for Issues Under Discussion

1. To encourage brainstorming and creative thinking, and in order to promote the achievement of mutual gains in these discussions, members commit to examining multiple options for all issues under discussion by the PAC.
2. As part of this process of developing multiple options, members are encouraged to put forward tentative proposals for consideration, which may later be withdrawn.
3. Preconceived conclusions on issues under discussion by the PAC should be avoided to facilitate an objective result.

## Information Sharing and Joint Fact-Finding

1. Members are asked to provide pertinent information for items under discussion at all facilitated sessions and joint fact-finding meetings. This means that members have an obligation to share any specific information, including possible or pending decisions within or by the organizations they represent, as well as information in the form of reports, memos and studies which may affect the deliberations of the members.
2. Claims of privileged or confidential information will not be advanced lightly.
3. Tentative or sensitive information will be treated as such.
4. The PAC, with the assistance of the facilitators, may select members to serve on smaller working groups to address specific topics or issues being considered by the PAC. Working groups will present their work to the PAC for its consideration and agreement.

## Consensus and Agreement on Written Products

1. The goal of this process is to have PAC members make decisions by consensus. In this context, consensus is defined as when the parties are in full agreement, and when not in full agreement, are in substantial agreement, with no member willing to stand in the way of a decision or an agreement. Straw votes may be taken from time to time to gauge the level of agreement on specific issues.

If after a comprehensive discussion, full or substantial agreement is not reached, then a vote of PAC members can be taken. PAC members can vote “yes” (agreement), “neutral” (perhaps not optimal, but comfortable with the decision) or “no” (meaning active opposition to a particular decision). If any three PAC members (representing different organizations) register a “no” vote then the proposal is not advanced as an agreed upon PAC position. Instead, it moves forward with a clear delineation of majority and minority viewpoints as reflected in the meeting notes. It is understood by PAC members that this voting procedure is to be used sparingly and only when it is apparent that no more discussion or analysis will lead to consensus. So-called “veto” votes should not be taken lightly or used to delay or damage the process.

2. Members shall work toward agreement of a series of individual agreements, which shall be the collaborative work products of the PAC process.
3. PAC member comments on written documents under consideration, such as the Mission Statement and Ground Rules, are to be made on the actual documents, so they can be easily understood and integrated into the revised text of a written agreement. Comments made via separate memos, letters, phone calls and faxes will not be accepted. It is understood that the PAC’s primary goal for written products is to agree on substantive policies, principles and recommendations, not to debate the detailed wording of every part of all PAC documents.
4. As PAC members discuss and make decisions on these issues, the facilitators and drafting subcommittees will assist PAC members by drafting language that reflects the emerging consensus. Draft statements that are prepared in this manner will then be circulated for review by all PAC members. The facilitators and drafting subcommittees will then integrate

comments into a revised statement, which in turn will be presented to the next meeting of the PAC for agreement.

### **Media Contact and Observers**

1. If approached by the media, members of the PAC and their alternates will be careful to present only their own views and not those of other members on the PAC. Members are encouraged to suggest that media representatives contact other PAC members who may have different points of view.
2. While the PAC is studying, discussing or evaluating issues, members will not initiate media contact or make public statements except as mutually agreed. No statements prejudging outcomes will be made. Such statements can hamper creative discussion and the group's ability to modify draft proposals.
3. Observers, including representatives of the media, are welcome to attend PAC meetings, and are requested to identify themselves to the PAC or the facilitators prior to the start of each meeting. Staff will provide a copy of these ground rules to observers.
4. If it so desires, the PAC may form a media subcommittee, representative of all interests serving on the PAC to jointly draft periodic press releases to accurately convey the proceedings of the PAC to the media. These press releases will then be coordinated and released by the facilitators.

### **Timetable and Work Products**

1. The PAC is committed to participating in this process for at least eight facilitated sessions and possible sub-group meetings as needed.
2. The facilitators will prepare meeting agendas and some written agreements based on discussions and results of PAC and joint fact-finding meetings.
3. The PAC is committed to cooperatively participating in a facilitated process to examine and reach agreement on water demand, water supply and the future water needs of Soquel Creek Water District in a manner that:
  - utilizes existing information developed by District staff, consultants, other governmental agencies and individuals;
  - identifies areas where additional information is needed;
  - establishes a common base of information.

### **PAC members will endeavor to accomplish the following specific goals:**

1. Understand and decide whether a water quality and water supply problem is imminent in the District;
2. Develop a common assessment of long term water needs and water demand management alternatives for the area served Soquel Creek Water District;
3. Consider water use and management issues throughout the watersheds and groundwater basins that are utilized by the District;

4. Decide whether a supplemental water supply is needed;
5. Develop criteria including environmental, social and economic elements to evaluate all water supply alternatives equally and include evaluation of conservation as an alternative;
6. Use the evaluation criteria to make recommendations for water supply to meet projected demands.

**PAC members are committed to completing and ratifying a report or detailed memorandum, which will document the substantive findings and agreements arrived at during the Public Advisory Committee process, including:**

1. Mission Statement;
2. Ground rules for operation of the Public Advisory Committee;
3. A logical sequence of issues in the form of a Table of Contents;
4. A summary of technical information reviewed;
5. Conclusions and recommendations;
6. Strategies to implement the proposed recommendations.