



July 2010

Water Supply Planning for Soquel Creek Water District



Past, Present and Future: Managing Water Supply & Demand

Early History: Late 1950's to mid 1980's

In 1961, after the devastating flood of 1955, Soquel Creek County Water District (changed to Soquel Creek Water District in 1983) was formed with the primary mission of flood control and to sell water from a proposed Army Corps of Engineers' dam and reservoir project that was to be built on Soquel Creek. The dam received strong community opposition and was never constructed, and the District began to focus on the existing groundwater supply as it moved toward acquiring small local water systems such as the Monterey Bay Water Company.

In the mid 1960's, the District operated six separate groundwater systems stretching from Capitola to La Selva Beach, but little was known at that time about the groundwater basin underlying the District's service area. With development occurring in this mid-county area, the District and the City of Santa Cruz contracted with the United States

Geological Survey (USGS) to prepare a comprehensive geophysical report of the groundwater basin so they could gain an understanding of the hydrogeology of the Soquel-Aptos area.

In 1967, the USGS report, written by John J. Hickey, described the Soquel-Aptos basin as two separate aquifer systems: the Purisima Formation and the Aromas Red Sands. Hickey's report concluded that (1) up to 7,700 acre-feet per year (afy) of water could be extracted from the aquifer systems; and (2) there was no evidence of saltwater intrusion in the wells along the coast.

Assuming responsibility for managing and protecting the groundwater resources and knowing that developing new water supplies takes many years, the District commissioned an environmental impact study on the feasibility of building a dam on the west branch of Soquel Creek (also known as the Glenwood Reservoir) in

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Frequently Asked Question:

What could the future be like for Soquel Creek Water District customers without a supplemental supply?

The sustainable yield of the groundwater basin, based on more current analysis, is indicating that the District's water shortage could be 15-40 percent of current demand. Without a supplemental water supply, the District's only option would be to further reduce customer demands with increased conservation and mandatory water rationing.

Direct impacts for the District's customers and businesses with increased conservation and rationing include:

- Year-round restrictions on outdoor water use and limitations on indoor water use.
- Increased water rates to meet fixed production and service costs which are not lessened by reduced water sales.

If rationing levels are not met, seawater intrusion would eventually occur which could significantly impact public health and safety, the mid-county's economic stability, and the quality of life for our customers.

Fast Facts for Soquel Creek Water District

Receive State/Imported Water: No	
Source of Water	100% groundwater. The District obtains its groundwater from 16 production wells located in the Soquel-Aptos Basin.
Service Area	The District's service area includes Soquel, most of the City of Capitola, Aptos, Rio Del Mar, Seascape and La Selva Beach.
Approximate Population Served: 50,000	
Approx. Percentage of Water Use by Customer Type	<ul style="list-style-type: none"> • 62% Single-Family Residential • 16% Multi-Family Residential • 18% Commercial, Industrial and Institutional • 4% Dedicated Irrigation
Average Annual Water Production (2005-2009): 4,815 acre-feet (or 1.57 billion gallons)	
Number of Miles of Pipeline: Approximately 130 miles	

Partial List of Water Management Studies

- Draft Integrated Resources Plan (draft IRP), 1999
- Evaluation of Regional Supply Alternatives, 2002
- Groundwater Assessment of Alternative Conjunctive Use Scenarios; Hydrogeologic Conceptual Model, 2004
- The Soquel Creek Water District Urban Water Management Plan Update, 2005
- Soquel Creek Water District Integrated Resources Plan (IRP), update of 1999 draft IRP, 2006
- Groundwater Management Plan – 2007 for Soquel-Aptos Area, 2007

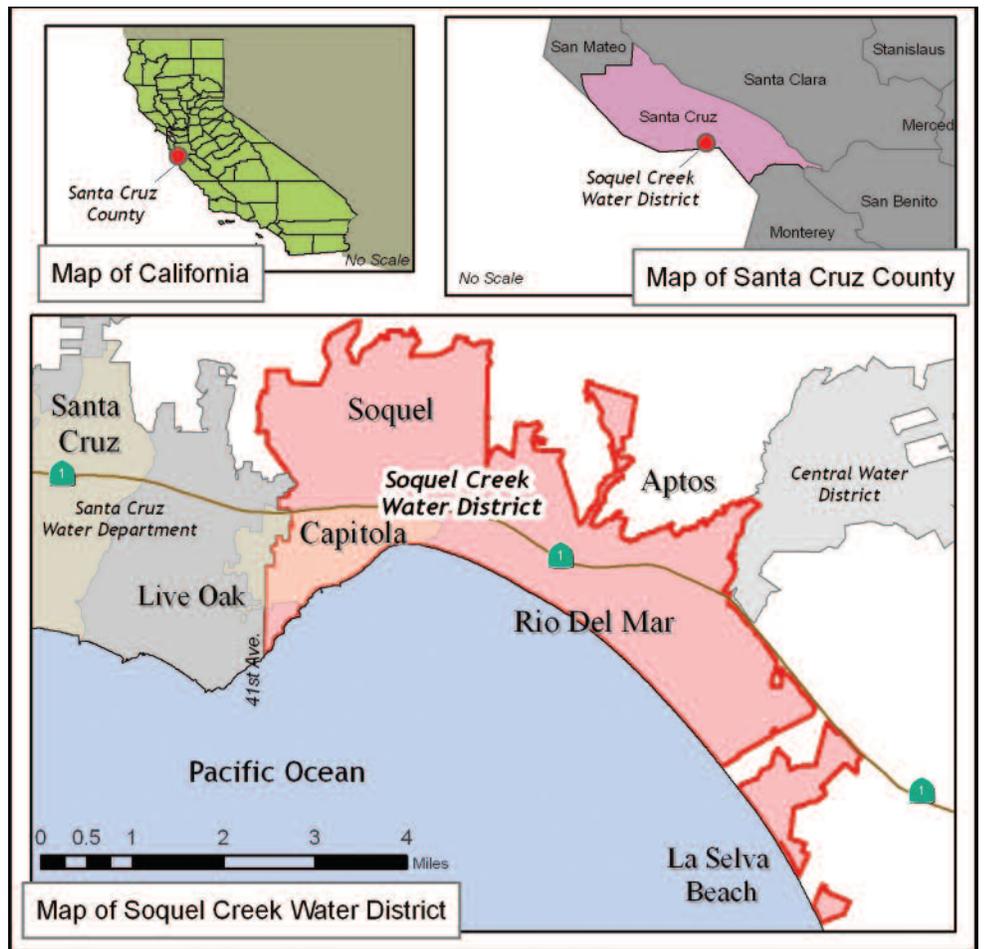
For a more complete list, visit www.scwd2desal.org

1973. The report also suggested increasing water conservation and monitoring the aquifers. To further develop these components, the District hired James M. Montgomery who prepared a 10-year plan for water system development. This 1976 report recommended that, in order to meet future growth projections, the District should (1) build the Glenwood Reservoir with an annual yield of 4,800 afy; and (2) investigate the feasibility of a diversion structure downstream on Soquel Creek for an additional 2,000 afy.

The drought of 1976-1977 severely impacted the District's neighboring water purveyor, the City of Santa Cruz, since their primary water supply was, and still is, surface water. Drought does not have an immediate impact on coastal groundwater levels since the basin has a delayed-reaction due to the aquifers' natural ability to store water and the years it takes for precipitation to percolate into deep aquifer layers from where groundwater is extracted; however, the District engaged in water conservation efforts similar to the City's during this time. Customer usage dropped by 20 percent from 1975 to 1978.

In November 1977, the drought was deemed over when winter rains returned. This good news was shortly followed by bad news: new USGS findings by Ken Muir ("Seawater Intrusion and Groundwater Yield of the Soquel-Aptos Area, USGS Water Resources Investigation of 1979") concluded that Hickey's sustainable yield of the basin should be lowered from 7,700 afy to 4,000 afy.

After numerous contentious public meetings, the District declared a water emergency in late 1979 and passed Ordinance 80-1, which implemented a moratorium on any new connections to the District's system. This moratorium stopped new construction in the District and led the Board to get an independent opinion on the state of the basin. In August 1981, Luhdorff and Scalmanini Consulting Engineers presented their findings, which identified flaws in the Muir report and concluded that (1) neither aquifer was in overdraft within the District's service area; and (2) there



was no seawater intrusion occurring at the coastal wells. The report also suggested the construction of an extensive monitoring program to better gauge the pumping effects on the aquifers. Consequently, one of the first early warning systems for detecting signs of advancing seawater intrusion in California was undertaken by the District. In October 1981, the moratorium was lifted.

The drought and moratorium heightened the importance of water planning, and in 1982, the County's water agencies embarked on a regional approach. The North Santa Cruz County Water Master Plan (NSCCWP) was initiated to look at interagency cooperation for new sources of water. One of the findings again concluded that the District pursue a dam on the upper section of Soquel Creek.

In 1983, the District purchased the Glenwood Reservoir Site and made a formal application for the water rights on the west branch of Soquel Creek; but given the Luhdorff & Scalmanini findings, developing a supplemental water supply

was no longer urgent. The District did proceed with the extensive groundwater monitoring system and began measuring water levels and quality near the coastline to identify conditions that warn of seawater intrusion.

Late 1980's – Mid 1990's

From the late 1980's to the mid 1990's, the District focused away from developing a supplemental supply and prioritized operational improvements of new groundwater wells, storage tanks, and distribution pipelines.

Following the drought of the late 1980's, coastal groundwater levels began declining and there was general agreement among hydrogeologic experts that the basin was being over-pumped.

Late 1990's – Present

In July 1997, a Public Advisory Committee (PAC) was formed to make recommendations regarding the current and future water demand and supply for the District. The PAC was comprised of more than 20 individuals representing a

broad spectrum of stakeholders in the area, including homeowners, environmental groups, business, governmental agencies and private well owners. The PAC regularly met over an 18-month period and produced a Draft Integrated Resource Plan (Draft IRP) in 1999 for the District Board to consider.

The Draft IRP concluded that (1) the District's aquifers were in overdraft and that water conservation should be maximized; and (2) a supplemental water supply would also be needed to stabilize existing coastal groundwater levels and meet projected water demand to build-out based upon adopted Santa Cruz County and City of Capitola General Plans. The PAC identified a number of supplemental supply options and developed a short list of potentially viable options for further evaluation. The Glenwood Reservoir was no longer considered a viable project because of environmental impact, public perception and significant permitting issues. In 2006, the IRP was revised to reflect updated information that included revisions to the demand projections and conservation savings, and the results of further evaluating the various supplemental supply options. The adopted IRP is a multi-faceted plan with the following components:

Demand management: Continue and increase conservation efforts and evaluate site-specific recycled water for irrigation use;

Groundwater management: Limit groundwater pumping to no more than 4,800 afy and continue monitoring of coastal groundwater levels and water quality, redistribute ground-water pumping inland, support groundwater recharge protection and enhancement projects and policies; and

Supplemental supply: Develop a regional seawater desalination facility with the City, or, as alternatives, reconsider a modified Soquel Creek diversion project or the potential for a local-only desalination facility.

Since acceptance of the 2006 IRP, the

District has been working on all of the above mentioned components. Below is a brief status:

Demand Management

- The conservation program continues to expand and now includes a host of rebate incentives, a free home and business water survey program, and a strong educational outreach component. As a result of these efforts, per capita water use is among the lowest in the State.

- A report on satellite reclamation facilities was completed in June 2009 and concluded that site-specific recycled water is technically feasible but is neither a cost-effective nor sufficient water supply alternative at this time for the District.

Groundwater Management

- The District has been pumping at or below the recommended 4,800 afy for several years; however, groundwater levels are not improving. New studies suggest that the sustainable yield of the basin is less than 4,800 afy and may be closer to 2,500-4,300 afy. The District will be re-evaluating the sustainable yield after the USGS has completed its groundwater model for the Pajaro Valley Water Management Agency, which extends into the portion of the Aromas aquifer utilized by the District.

Redistribute Groundwater Pumping

- The District is completing environmental review for up to four new wells and the conversion of one irrigation well to municipal use. All of these well sites are inland of Highway 1 and in the Purisima aquifer. These new wells would enable the District to redistribute pumping away from the vulnerable coastal region and better manage drawdown of groundwater levels.

Supplemental Supply Project

- After an extensive evaluation of the recommended alternatives identified in the 2006 IRP, a collaborative seawater desalination facility with the City of Santa Cruz appears to be the most viable overall solution to provide a sufficient, reliable and flexible water supply to supplement our threatened groundwater supply. The two agencies have joined together and formed scwd² to further evaluate a 2.5 million gallon per day facility that would be used by the District to significantly reduce pumping in vulnerable areas and enable groundwater levels to recover to elevations protective against seawater intrusion. scwd² recently launched preparation of an environmental impact report (EIR) under the provisions of the California Environmental Quality Act (CEQA).

Challenges Impacting Water Availability

Water Supply Shortage:

The groundwater basin that supplies the District and other local pumpers is overdrafted and coastal water levels are too low to protect against seawater intrusion.

Seawater Intrusion:

Contamination of seawater into the freshwater aquifers will make the groundwater unusable. A freshwater barrier is needed to keep seawater intrusion from occurring.

Climate Change:

There is potential for more intense storms with greater runoff and less percolation into the aquifers, more frequent/intense droughts, and rising sea levels that could induce seawater intrusion.

Water Quality:

Naturally occurring hexavalent chromium (also called chromium 6) is generally present throughout the Aromas Red Sands aquifer. The State is expected to establish a drinking water standard for this contaminant which could require the addition of expensive treatment facilities in the future.

Evaluation of Supplemental Supply Options

The Soquel Creek Water District is often asked the following two questions:

- “What other projects have you considered instead of desalination?”
- “Why is desalination the best option?”

A joint desalination facility is not a “quick solution” or a “silver bullet project” to solve our existing water shortages, but rather it was identified as the best apparent solution after extensive consideration of over thirty different projects

that have been evaluated by either the District or the City of Santa Cruz over the last twenty years.

Soquel Creek Water District has conducted exhaustive evaluations of water supply options and potential new water sources over the years and most recently through its Integrated Resources Plan (IRP, 2006). Below is a chart summarizing some supply projects the District has considered and their respective limitations:

The District’s IRP and the City of Santa Cruz’s Integrated Water Plan (2003) independently concluded that a desalination plant would ensure that both agencies could provide a reliable water supply that meets long-term needs while ensuring protection of public health and safety. A desalination plant has become a viable option because the plant can be used by both agencies, technological advancements have greatly reduced operating and energy costs, there are minimal environmental impacts compared to other alternatives, and it is not dependent upon rainfall.

Project to Increase Supply*	Project Limitations
On-Stream Dam (Glenwood Reservoir)	Environmental and protected species impacts and permitting restrictions.
Off-Stream Diversion (from Soquel Creek)	Issues related to requirements for fish passage, limited stream flows and storage ability, unreliable yield and permitting.
Recycled Water for Irrigation	Would require a new dedicated distribution system that would be prohibitively expensive compared with the small volume of water produced; small satellite reclamation facilities would have limited benefit at a very high cost.
Import Water from State Water Project (with Pajaro Valley Water Management Agency (PVWMA))	Proposed PVWMA project has not progressed since 2006; export of water from the Pajaro Valley prohibited by voter initiative.
Recharge Enhancement with Precipitation	Local geology makes opportunities for surface recharge or injection very limited; thus this would not be a sufficient source of supply.
Surface Water from City of Santa Cruz	Surplus water from City sources is limited and unreliable (little or no surplus in below-average rainfall years); water quality issues during high flows due to turbidity; issues with permitting and reopening water rights; does not address City’s drought shortage.
Conservation/Curtailment without New Supply	Conservation, curtailment or a combination of the two would not guarantee adequate water savings (i.e., they are highly dependent upon human behavior). More than 15% curtailment could negatively impact the economy and public health and safety.

*For additional information on these projects and others, refer to the District’s Integrated Resources Plan (ESA, 2006).



The City of Santa Cruz and Soquel Creek Water District formed the scwd² Task Force to oversee evaluation of desalination as a supplemental water supply.

Both agencies will continue to evaluate desalination and conduct studies related to energy, environmental impacts, and water quality in preparation of the project level Environmental Impact Report (EIR) that is currently being conducted.

Our water history shows that water supply planning is an adaptive process that responds to changing conditions and long-term projections. The Urban Water Plan update due in June 2011 will re-evaluate supply and demand projections for both the District and the City using recent data and studies.

Historical photo provided by SC Resource Conservation District (Watershed Cruzin', 2005)



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