



July 2010

# Water Supply Planning for City of Santa Cruz Water Department



## Recent History of Water Supply Planning Studies

The City of Santa Cruz has been actively pursuing a supplemental source of water supply since the mid 1960's, when it acquired several adjoining private water systems and initiated planning of a second surface water reservoir. The following is a brief chronology of water supply investigations conducted since the mid 1980's that have led up to the scwd<sup>2</sup> desalination project currently underway.

### 1985-1989

In June 1985, a Joint Powers Authority representing the water agencies and land use agencies in North Santa Cruz County prepared the North Santa Cruz County Water Master Plan (NSCCWMP). The project focused on regional opportunities to augment supply, but also proposed some City-only alternatives. The report made no specific recommendation but referred the following alternatives for additional study:

- Water conservation and leak control programs
- Development of interties between the water distribution systems of various agencies
- Zayante Creek Dam
- Development of additional ground-water supplies for Scotts Valley/ San Lorenzo Valley
- Various City of Santa Cruz capital improvement program elements (Baldwin Creek off stream storage reservoir, a pump station at Majors Creek diversion, and new ground-water wells)
- Glenwood Dam

Following the completion of the NSC-CWMP, the Santa Cruz City Council expressed its preference for groundwater

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### Frequently Asked Question:

## What will the future be like for City of Santa Cruz Water Department customers without a supplemental supply?

If the City were faced now with drought conditions similar to the 1976-77 time period, there would not be enough water to meet current demands and the City would be forced to ration water supplies to reduce demand by up to 45 percent. During the summer of 2009, the City was able to achieve a savings of approximately 15 percent by establishing designated dates and specified times for outdoor irrigation. A 45 percent curtailment would likely mean no outdoor irrigation, as well as restrictions on indoor water use. If curtailment levels were not met, public health and safety and our area's economic stability would be compromised.

## Fast Facts for City of Santa Cruz

Receive State/Imported Water: **No**

Source of Water      **95% surface water.** The City's sources of surface water include the San Lorenzo River, coastal streams (Laguna Creek, Reggiardo Creek, Liddell Spring and Majors Creek) and Loch Lomond Reservoir.

**5% groundwater.** The City obtains its groundwater from its Live Oak Wells.

Service Area            The City's Water Department service area includes the City itself, portions of unincorporated Santa Cruz County and a small portion of the City of Capitola.

Approximate Population Served: **95,000-100,000**

Approx. Percentage of Water Use by Customer Type

- 42% Single-Family Residential
- 24% Multi-Family Residential
- 27% Commercial, Industrial and Institutional
- 7% Dedicated Irrigation

Average Annual Water Production: **3.6 billion Gallons** (or 11,000 acre-feet)

Number of Miles of Pipeline: **Approximately 300 miles**

## Partial List of Water Management Studies

The Water Master Plan Study, completed in 1985 by EIP Associates and HEA

The Water Demand Investigation, completed in 1998 by Maddaus Water Management

The Water Conservation Plan, completed in 2000 by Gary Fiske & Associates

The Water Curtailment Study, completed in 2001 by Gary Fiske & Associates

The Alternative Water Supply Study, completed in 2002 by Carollo Engineers

The Integrated Water Plan, completed in 2003 by Gary Fiske & Associates

The Urban Water Management Plan, completed in 2006 by the City of Santa Cruz

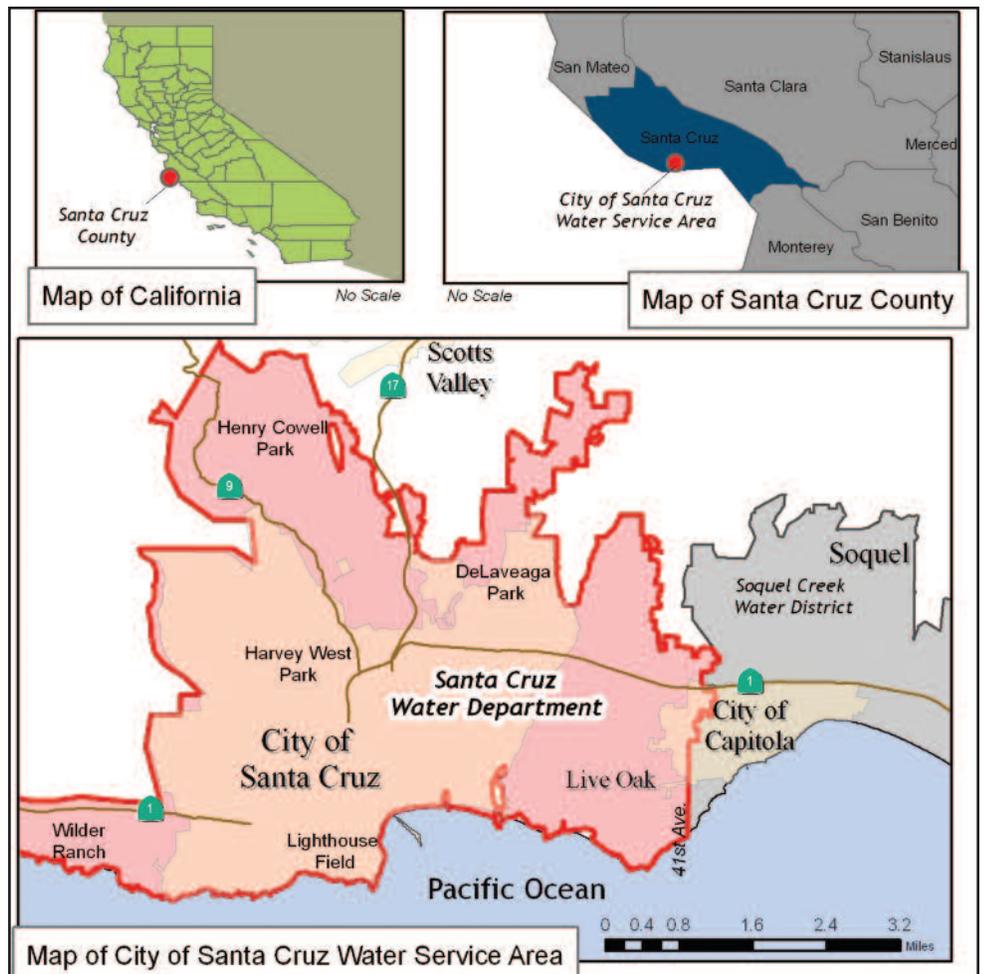
For a more complete list, visit [www.scwd2desal.org](http://www.scwd2desal.org)

alternatives and directed staff to investigate the feasibility of developing 815 million gallons of groundwater suggested in the NSCCWMP. At the same time, the City relinquished its water rights to Zayante Creek and abandoned the reservoir project. The consulting firm of Luhdorff & Scalmanini was hired in 1987 to investigate three areas for possible groundwater development potential. The conclusion of this groundwater investigation was that there were not 815 million gallons of groundwater available to the City. There was only limited potential for small wells located in either the Harvey West Park area or in the vicinity of Thurber Lane.

### 1989-1997

After the Luhdorff & Scalmanini groundwater work demonstrated that groundwater alone was not a viable future source of supply, the City contracted with Leedshill-Herkenhoff to prepare a Water Master Plan, which included the preparation of water demand projections and an evaluation of other water supply alternatives to meet the future demands. Alternatives examined in this study included the following:

- Upgrade existing supply system – North Coast treated water main, revised operating rules, increased maintenance, and additional pumps at Felton Booster Station
- Increase capacity of Felton Diversion
- North Coast pump stations (Majors Creek)
- Parallel pipeline from San Lorenzo River to Graham Hill Water Treatment Plant
- Additional groundwater wells from Purisima aquifer (Thurber Lane vicinity)
- Additional groundwater wells from San Lorenzo River alluvium (Harvey West vicinity)
- Wastewater reclamation
- Enlarge Loch Lomond
- Scotts Valley Water District intertie, Soquel Creek Water District intertie
- Various reservoir projects, including



Zayante Dam, Bald Mountain School Dam, Baldwin Creek Dam, Glenwood Dam, Jamison Dam, Bear Creek Dam, and Waterman Gap Reservoir

The City then hired the engineering firm Camp, Dresser & McKee to build on the 1989 Water Master Plan, to evaluate potential water supply projects further, and to develop a recommended project for environmental review and preliminary design. A total of nine water supply projects, including several new alternatives, were formulated and compared. The project with the highest rating was a "No Reservoir" project involving both new groundwater wells near Thurber Lane and a Brackish Groundwater Wells project along the north coast.

In 1995, Carollo Engineers was hired to perform all necessary work to design the Brackish Wells Project. Prior to gathering any field data, however, this project encountered considerable resistance from area residents and the City Council elected to abandon the effort.

### 1997-Present

In 1997, the City initiated a new effort using a broader based approach known as Integrated Water Planning to consider all practical options for decreasing demand and increasing supply. As part of this effort, a series of detailed background studies were undertaken, including the following:

- Water Demand Investigation (1998)
- Water Conservation Plan (2000)
- Water Curtailment Study (2001)
- Alternative Water Supply Study (2000)
- Evaluation of Regional Water Supply Alternatives (2002)

An Integrated Water Plan (IWP) was then developed over a two-year period (Gary Fiske & Associates, 2003). It used the results of these background studies to develop and evaluate a set of water resource strategies to meet two fundamental goals:

1. Reduce near-term drought shortages, and
2. Provide a reliable supply that meets long-term needs while ensuring protection of public health and safety.

The project was overseen by a committee consisting of City Council members and Water Commission members, which held public meetings on a regular basis and several public workshops throughout the planning process. Water resources strategies evaluated in the IWP included:

- Selected upgrades to the North Coast system, the Coast Pump Station and treatment upgrades
- Additional groundwater in Live Oak
- Seawater desalination
- Reclamation/Coast groundwater exchange
- Various levels of use curtailment

The seawater desalination and reclamation resource strategies were evaluated both on a City-only basis and on a regional basis in conjunction with Soquel Creek Water District. A program environmental impact report (PEIR) was then prepared on the plan and circulated for public review and comment. On November 8, 2005, the City Council certified the PEIR and unanimously adopted the IWP as the City's long-term water resource strategy. The adopted plan includes the following three components:

1. Reduce average demand through water conservation in all years;
2. Curtailment of water use by up to 15 percent in times of drought; and
3. Additional water supply in the form of a 2.5 mgd seawater desalination facility that would be expandable in 1.0 mgd increments up to 4.5 mgd, if needed, in future years.

After the Soquel Creek Water District had completed a similar review process (Integrated Resources Plan, 2006) to the City's IWP, it also concluded that a supplemental water supply was necessary to meet the needs of their service area, as well as protect their groundwater resources from seawater intrusion. Since



*The City of Santa Cruz primarily receives surface water from the San Lorenzo River (shown above), coastal streams and Loch Lomond Reservoir.*

desalination was also identified in their Integrated Resources Plan (IRP) as the best alternative for a supplemental supply, both agencies have joined together (as scwd<sup>2</sup>) to better meet the water needs of our communities and more fully evaluate this alternative supply. A joint Integrated Water Plan (IWP) was developed that consists of four components:

1. Conservation – Continue to reduce customer demand for water and increase water use efficiency to obtain the greatest public benefit from available water supplies.
2. Rationing – Further reduce water use, by up to 15%, through temporary water restrictions during times of drought.
3. Supplemental Supply – Evaluate construction of a desalination plant to meet additional water needs.
4. Recycled Water – Use recycled water where feasible.

Regarding the supplemental supply component of the IWP, scwd<sup>2</sup> is in the evaluation stage and has completed several studies and a desalination pilot plant program. Numerous engineering and environmental studies (desalination plant intake, brine dilution, energy minimization and entrainment) are in process at this time, in parallel with the development of an environmental impact report (EIR) and an environmental review process as required by the California Environmental Quality Act (CEQA). It is anticipated that the EIR will be completed in the summer of 2012 and the public will have several opportunities to participate and provide comments.

## Challenges Impacting Water Availability

### Water Supply Shortage during Drought Conditions:

Based on current water needs, the City could experience a 45% shortfall in water supply during a drought event similar to the one experienced in 1976-77.

### Endangered Species Preservation and Habitat Conservation:

Since Santa Cruz is predominantly reliant on surface water, future water availability is subject to change due to regulatory requirements in place to protect fish and their habitat.

### Water Rights:

The City has two water rights applications pending that could potentially affect reservoir operations and reduce the amount of water that is allowed to be pumped from Felton Diversion to Loch Lomond Reservoir.

### Groundwater Overdraft:

There is the potential for seawater intrusion to jeopardize the future availability of existing groundwater supplies.

# Evaluation of Supplemental Supply Options

The City of Santa Cruz 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 City or the Soquel Creek Water District over the last twenty years.

The City has conducted exhaustive evaluations of water supply options and potential new water sources through its Integrated Water Plan (IWP, 2003). Below is a chart summarizing the main supply projects the City has considered over the years and their respective limitations:

Project to Increase Supply*	Project Limitations
Construct New Dam (Zayante, Bald Mtn. School, Baldwin Creek)	Insufficient supply, geologically poor site, or City Council unwilling.
Construct Brackish Groundwater System (from San Lorenzo River)	Water rights conflict, strong community opposition.
Use Recycled Water for Irrigation	Would require a new dedicated distribution system that would be prohibitively expensive compared with the small volume of water produced, and in times of drought, agencies need potable water, not irrigation water.
Construction of New Groundwater Wells	City's evaluation of new wells in Santa Margarita Aquifer at Live Oak found inadequate source volume.
Construct Reclamation Plant to Meet North Coast Irrigation Needs in Exchange for Access to Groundwater	Possible depletion of aquifer resulting in seawater intrusion, potential water quality issues from upslope landfill, State park opposition.
Conservation/Curtailment without a New Supply	Conservation, curtailment or a combination of the two would not guarantee adequate water savings (i.e., these measures are highly dependent upon human behavior), and more than 15% curtailment could negatively impact the economy and public health and safety.
Enlarge Loch Lomond Reservoir	Structural upgrades may require demolition of existing dam; cannot have system out of service for the length of time such construction would require; potential for regulatory agencies to increase fish release requirements that would leave the City with no additional water for drought periods or perhaps even less.

\*For additional information on these projects and others, refer to the City's Integrated Water Plan (Gary Fiske & Associates, 2003)

The City's IWP and the Soquel Creek Water District's Integrated Resources Plan both 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 since 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.



*The City of Santa Cruz and Soquel Creek Water District formed the scwd<sup>2</sup> 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 must respond to changing conditions and long-term projections. The Urban Water Plan updates due in June 2011 will re-evaluate supply and demand projections for both the City and the District using recent data and studies.

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



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