

Recommendations for the 2010 Santa Cruz Urban Water Management Plan

From: Ecological Landscaping Association, SC Desal Alternatives, Surfrider Foundation, Transition Santa Cruz, WILPF

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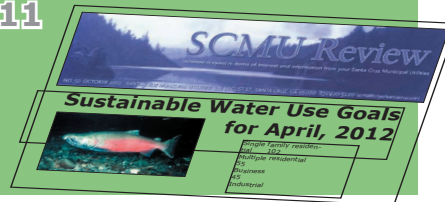
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Introduction: Conservation & Fish Habitat

Not all of the organizations who have co-authored this report have taken a position on the proposed desalination plant. The recommended measures in this report are meant to address our water challenges, whether or not a desalination plant is built. The necessity for these measures has become more evident with the recent release of information about the water flow needs of endangered coho salmon and threatened steelhead salmon.



Until the April 5, 2011 City Council study session on the Habitat Conservation Plan (HCP), some believed that “The City has plenty of water to satisfy current and future water demand in normal rainfall years. Our problem is a shortfall in drought years.” The HCP progress report revealed that **“Tier 3 flows** [defined as the minimal level of stream flow below which the City would pay \$250,000 per year as mitigation]...**are not currently possible in almost any hydrologic condition due to water supply limitations.**” This means there is not enough water in normal years to satisfy both current water demand and the water flow needs of native fish, let alone future growth in water demand. The report states, The Water Department’s report to Council on the HCP [see <http://www.cityofsantacruz.com/index.aspx?page=425>] did not include strategies other than desalination to allow reductions in stream water diversion for human use. We think that conservation strategies need to be considered for these reasons:

- **Desalination would not substantially increase stream flow in normal years in the short and medium term.** The HCP report indicates that desalination will not improve fish habitat in the “medium term” (defined in the report as from the time a desal plant is built until 2030) . If the desalination plant is built, it would only raise the number of years that the City can provide Tier 2 water flows to 90%, up from 88% without a desalination plant. Why no improvement for fish habitat in the medium term? The plan for plant operation has been for Santa Cruz to use the plant for six months only during drought years. Thus, stream flows in normal years would not benefit from desalination (aside from a greater use of Loch Lomond of unknown significance, since the City has not published relevant data on stream flows and reservoir use).
- **Desalination would not increase stream flows in drought years.** According to the HCP report, the City will use desalinated water in a drought year to supply customer needs, not increase bypass flows for fish. Even if a desal plant is expanded to Phase III capacity, in nearly half of all years the City would revert to Tier 2 or Tier 1 flows. “In the long-term (beyond the year 2030)...expansion of the water supply project [desal] to 4.5 mgd would allow for Tier 3 flows in 56% of years, but would still require fallback to Tier 2 often and Tier 1 occasionally.”
- **Reliance on desal to comply with the HCP would require plant expansion** The Water Department’s expectation for growth in water demand would require expansion of the desal plant to Phase II and Phase III before 2030. Such expansions would be necessary just to meet the legally required stream flow commitments. A water-neutral growth policy would remove this driver for plant expansion.

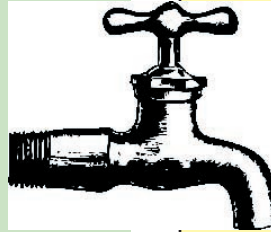
The development of desalination is far from certain. It is not clear that the project will be able to obtain a discharge permit for the Monterey Bay National Marine Sanctuary, or a permit from the Coastal Commission. A lawsuit or a ballot initiative could derail the project. These uncertainties will recur as the City seeks approval for expansion of the plant to Phase II and Phase III. In the event that the desalination plant or subsequent expansions to Phase III do not materialize, a failure to aggressively pursue the water demand reduction strategies recommended in this report may result in a water demand that is allowed to grow beyond the means of our natural water supply to sustain fish populations and planned population growth.

Enhancing Conservation & Public Education

-Sherry Lee Bryan, Ecology Action

Water utility customers are often interested in conservation practices, technologies, and efficiency retrofits, but whether there is a good or bad economy, most customers will not invest unless there is a strong incentive that creates a reasonable return on their investment. The lack of a public goods fee (as exists for energy utilities) for water conservation incentive and outreach programs creates a situation in which water utilities must find creative ways to carve out funds for conservation programming into their annual budgets, which are often strained by a number of other demands. Private and investor owned utilities regulated by the California Public Utilities Commission (CPUC) are allowed to charge a reasonable volumetric surcharge to fund conservation programs. California American Water Service Company operating on the Monterey Peninsula currently charges \$0.0191 per 10cf (74.8 gallons), collecting a total of \$2,674.678 for its 2011 conservation programs. If Santa Cruz Municipal Utilities was able to collect the same surcharge, it could raise an additional \$919,251 annually if it sold an average 3.6 billion gallons, more than doubling its' existing conservation budget. The water demand reduction incentives and actions listed below could be funded by a similar volumetric surcharge. Alternatively, they could be funded through a non-volumetric conservation fee added to the base rate, which has the advantage of remaining constant whether or not a drought and curtailment is in effect. Both funding strategies could be approved by customers through a yes or no vote.

- Offer low interest loans to residential and commercial customers for indoor and outdoor water efficiency improvement projects and alternative water supply systems. One example of such a loan program exists in Henderson Nevada (http://www.cityofhenderson.com/utility_services/programs.php) which assists Henderson residents of any income level who wish to replace their water-thirsty turf with water-efficient landscaping. The program offers a loan for up to \$5,000 at



- Sarah Damron, Surfrider Foundation

Evaluate savings potential of conservation measures

Develop conservation savings figures based on best educated guess for each demand management measure identified. In instances of retrofits, existing WaterTrack software used in toilet retrofit program could be co-opted for tracking other types of retrofits and gathering data to track effectiveness.

Expand water use audits

Instead of waiting for people to ask for an audit, announce neighborhood audit weeks to minimize costs. Serves dual purpose of saving water onsite and gathering more accurate data of water use.

To capture savings from the non-residential sector, many agencies provide **defined rebates for specific technologies**, including food steamers and ice machines.

Increasingly, water agencies have also developed **performance-based programs**, which provide incentives for nearly any technology that reduces water use. The financial incentive for these programs is based on the quantity of water saved, i.e., \$2.50 for every 1,000 gallons conserved. These programs are now available in a number of areas, including Las Vegas, San Francisco, Seattle, and Los Angeles.

Rates:

- A **new study of incentive-based rates** should be commissioned with the City's water-saving objectives in mind and applied to reap additional savings through the tiered rate system.
- Reevaluate** the application of across-the-board **Block 2 rates for non-residential customers**. Some type of incentive-based rate structure should be devised and applied to these customers as well, as appropriate.

Outdoor water use:

- Mandatory drip irrigation on all shrubs and trees where appropriate (Monterey Peninsula Water Management District ordinance for new development)

3% interest, amortized over a seven-year period.

- Provide a significant cost-share/rebate (\$1-\$2/ft²) for removing non-functional turf and/or retrofitting spray irrigation systems to low-volume systems at multi-family and commercial facilities, targeting the highest water users in the district. These properties are often the highest outdoor water users. Conversion of 1,000 square feet of non-functional, cool season turf to drought tolerant landscaping may conserve 36.48 HCF (27,286 gallons)/year.¹ If funding allows, consider extending this rebate program to Single Family Residences. Engage local landscape contractors and certified Green Gardeners to promote the rebate program to their clients.
- Provide a significant cost-share/rebate of \$100, or a voucher program through local garden centers for a 3-way valve & starter kit, to incentivize residential laundry graywater systems that are in compliance with CPC Chapter 16A. A laundry to landscape graywater system has a low materials cost (\$100-\$300) and provides between 2,500-8,000 gallons annually of decentralized drought insurance for non-drought tolerant plantings (fruit trees, privacy hedges, etc.) in residential landscapes.
- In conjunction with a low interest loan or rebate program, apply and enforce the water use efficiency provisions of the updated California Model Water Efficient Landscape Ordinance to all existing multi-family and commercial properties with dedicated irrigation accounts, regardless of landscape size. The cost of this conservation measure must include enforcement of the ordinance and outreach to supply technical assistance to ensure a contractor has completed the efficiency retrofit.
- In cooperation with the County of Santa Cruz Building and Environmental Health departments, develop an economical and streamlined permitting process for stormwater catchment for toilet flushing and landscape irrigation in multi-family, public, and commercial buildings. Permitted by Chapter 6 of the CPC and UPC, up to the discretion of the AHJ (Authority Having Jurisdiction).

–Alternatively, assign **all** new development, including single-family residential, a fixed annual water use budget based on the size of the landscaped area.

Rebates:

–Based on the success and demand offset by the high-efficiency clothes washer rebate program and the remaining opportunity for the program (since 3,420 appliances had been rebated at the time of the 2005 UWMP), the City should plan to put more effort into promoting the rebate or requiring the retrofit.

–It is unclear how “saturated” the commercial and industrial rebate market is for the rebates that have been offered (i.e. LightWash, Smart Rinse, toilet rebates). If the market for these programs is less than 90% saturated, these programs should continue and more resources should be directed toward further saturation.

–Create rebate for turf removal. The Monterey Peninsula Water Management District has an ordinance could be used as a template. While the quantity of water saved by turf replacement depends largely on local climate conditions, replacing turf with more water-efficient landscapes could reduce outdoor water use significantly. Cash for Grass programs are available in Monterey, Los Angeles, Roseville, and many other California cities.

–Offer dual flush toilet converter kits at no cost to customer

Water Waste Prohibitions: Hire a Code Enforcement Officer to proactively identify water wasters and enforce City water waste ordinances. Alternatively, the Water Conservation Manager and/or staff could assume this role. This would more effectively squash water wasting and could generate funds for the City that could be reinvested in water conservation efforts.

Plumbing fixture retrofit ordinance:

–Extend the Retrofit Upon Sale Ordinance provisions to rental units upon vacancy, offering free installation of water efficient fixtures paid for by the proposed water demand offset program (see Water-Neutral Development article).

–Standards for all low-flow retrofits should be reevaluated and updated annually or as-needed to adjust the standards to the current lowest-flow standard.

ABSOLUTELY KEY CHANGE: Despite our greatest efforts, no water is actually “saved” unless a policy is set forth that retain these savings and do not pass them along to allow new growth. The concept of a water-neutral (or water-negative) growth policy would meet this objective without restricting growth.

- Provide customers with manual shower shut-off valves with shower aerators so that a behavior change element is incorporated into an efficiency retrofit. Danco 89171 Shut-Off Shower Valve, Chrome is available on Amazon for \$10.84.
- Use utility websites to assist customers in calculating a water budget for their home and/or business and with checking real time water use data to enable them to check their meters often and compare the readings to water budgets.
- Devote at least one page in quarterly customer newsletters to highlight conservation successes, providing positive reinforcement and acknowledgement to customers who stay within water budgets with innovative solutions.
- As a fall-back strategy to the Sustainable Water Use Commitment (see “Beyond Curtailment” section on page) continue the best management practices in the landscape water use curtailment policy developed for moderate drought years to extend to every year.

Although the City and District are among the lowest in per capita water use in the state, invigoration of existing California Urban Water Conservation Council best management practices could contribute to additional water savings to meet a portion of the 2.5 million/gallon day supply goal. These include:

- Achievement of complete saturation of the toilet replacement market for customers that have not participated in the high efficiency toilet replacements rebate or demand offset program, focusing outreach efforts on absentee landlords and property management companies.
- Consistent enforcement of existing or new water waste prohibition ordinances, including doubling rates for customers that do not make a good faith effort to repair broken irrigation systems or keep water on site.
- Increase rates in blocks 3-5 to more strongly discourage inefficient landscape irrigation systems and water waste. Continue to protect low or fixed income water users with low rates for essential water needs in blocks 1 and 2.
- Develop water budgets for dedicated irrigation accounts with conservation rate structures that penalize water waste, exempting public schools. Irrigation accounts can be matched to contractor participants of the CLCA water management program for assistance in keeping sites on budget and making necessary efficiency retrofits.

Prioritizing Reservoir Use for Drought Protection

Recommendations:

1. **To enhance drought protection, adopt a new goal for end-of-dry-season reservoir level, (probably near 80%).**
2. **In order to achieve high reservoir levels and reduction in stream diversion, establish the water consumption levels of 2009 and 2010 as goals for the near term, and initiate a campaign to attain or exceed the Climate Action Plan goal of 10% reduction from 2010 levels by 2020.¹**

Loch Lomond Reservoir is the City's water "savings account". There is a balance to be struck when using this savings account between short term and long term use, that is, between summer use in normal years and saving for drought years. When Santa Cruz residents conserve water in the dry season of the year, there is more water stored in case of a dry winter. A good example was 2009, a dry year. On account of our conservation efforts, Loch Lomond was 90% full at the end of the dry season, on October 1. That's an ideal level for the lake in case of a second dry winter, because a minimum of winter rainfall would refill the lake.

Current City policy is to take no action to curtail water use over the summer if the lake is predicted to remain above 64% capacity at the end of the dry season. "No shortage is indicated as long as the lake is forecast to remain above 1.8 billion gallons (64% capacity) through the end of September." – Water Shortage Contingency Plan (2009)

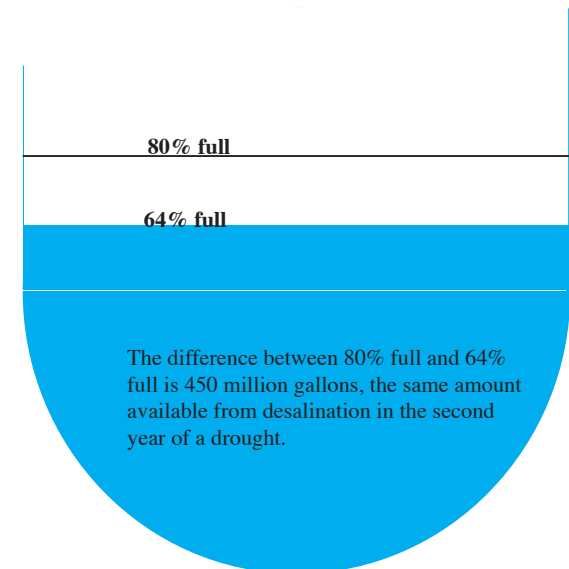
We have learned from the example of the 1976-77 drought that allowing the lake capacity to dip this low during a normal year is taking a risk. On October 1, 1975, the lake was at 60% capacity. The following two winters were critically dry, resulting in a lake level at the beginning of the dry season, April 1, 1977, of only 34% capacity.

We recommend that the City raise its goal for lake capacity at the end of

the dry season in all normal and mildly dry years. Consider the difference between a goal of 80% full and 64% full: 450 million gallons. That amount of water that would then be available in the event of a second dry year. (Compare to desal output in a dry year, 456 million gallons).

How will the City accomplish this higher reservoir level, especially given the new constraints on stream water diversion in the Habitat Conservation Plan? The first action would be for the City Council to set a goal that water demand and production not exceed the levels of water production that we experienced in 2009 and 2010, 3.1 billion gallons. A second goal would be to move towards lower consumption targets over time, specifically meeting the City's Climate Action goal of a 10% reduction in per capita water use from 2010 levels by 2020.

Making our water consumption of the last two years "the new normal" stands in contrast to the recent *Water Supply Assessment*² that lists the new normal year demand as ranging from 3.52 billion to 4 billion gallons. In essence this document considers the last two years to be an aberration, and expects water demand to rebound. This is not an unreasonable expectation based on the history of water consumption gradually rising



in years following a drought, with public perception that the need for conservation has ended. However, the fish habitat issue has made it clear that there is a perennial need for conservation. The call to action for an additional minimum 10% reduction in per capita water use through conservation has not been vigorously communicated to the public.

In order to achieve water demand levels of 3.1 billion gallons in 2009, residents were restricted to landscape irrigation two days per week. Hand watering, drip and soaker hoses were exempted from restrictions. In 2010, a foggy summer contributed to reduced landscape irrigation. And water conservation practices carried over from the drought year, as normally happens. The task is to make these practices the norm through the recommendations in this document.

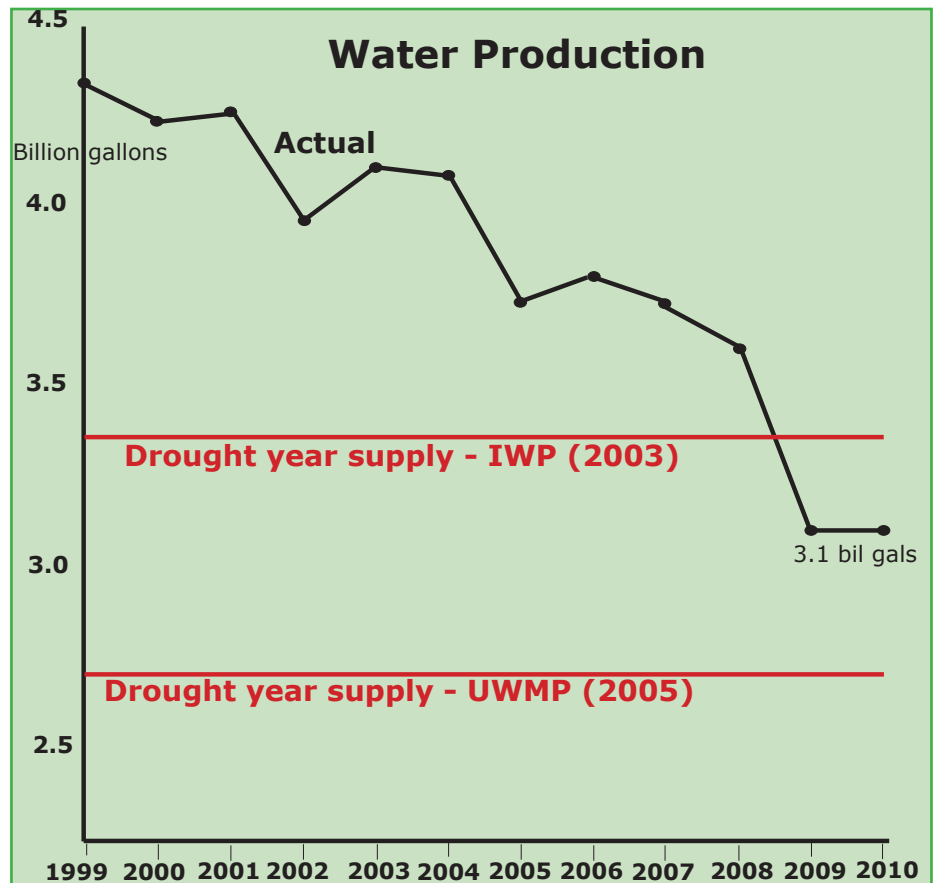
Combined with a water-neutral development policy (see next section), a 10% reduction from 2010 levels would mean total system production of 2.8 billion gallons in 2020. That contrasts with the *Water Supply Assessment* projection for increased demand in 2020, ranging from 3.85 billion to 4.33 billion gallons. This savings of 1 to 1.5 billion gallons would provide a significant improvement in fish habitat as well as allow higher reservoir levels.

The article on page 9 discusses preventing water demand from growing, without which a strategy of optimizing reservoir levels for drought protection will not be viable in the future.

(Footnotes)

¹According to City Climate Action Coordinator, Ross Clark, the base year for the 10% per capita reduction goal is 2010.

² Erler & Kalinowsky, *Water Supply Assessment (2011)* Table 2, Projected Water Demand



The red lines show the estimated supply in a worst case drought year. The lower estimate, from the Urban Water Management Plan (2005), assumes that lake levels are drawn down to 64% in normal years. This would happen on a routine basis if growth in water demand is allowed to rise. Under this policy, growth in water demand would continue until the entire annual water rights limit of reservoir water is consumed, 1,042 million gallons. *Only 200 million gallons of reservoir water would be available when we need it the most---during the second year of a critical 2-year drought.*

There is still time to prevent growth in water demand from depleting our drought security. Our current ten-year (2000-2009) average use of Loch Lomond water is 584 million gallons, well under the water rights limit. The City could enact a water-neutral development policy before consumption of lake water rises further. (See next section)

Optimizing Use of Existing Resources

By James Bentley, retired Water Production Superintendent, City of Santa Cruz

Recommendation: The City should fully analyze the value of optimizing the use of existing resources, i.e. the North Coast and the San Lorenzo River sources, an alternative recommended for further study by Carollo Engineers in the *Water Supply Alternatives Study* (2000), but subsequently rejected from the *Integrated Water Plan* (2003).

Of the 10 alternatives considered by the *Water Supply Alternatives Study*, “optimization of existing sources” stands alone as the only recommended alternative that provides benefit without requiring development of a new source of supply. Carollo (2000) concluded, “Based on our preliminary analysis of water rights and other factors related to implementation there are no apparent limiting constraints or “fatal flaws” associated with this alternative.”

This alternative fulfills a principle articulated by the Integrated Water Plan which states: “The City’s objective is to maximize use of its existing resources before considering new supplies”.

It is extremely important to recognize that the water supply shortage is not only about drought years. The April 5, 2011 report to City Council on the Habitat Conservation Plan concluded that “***Tier 3 flows...are not currently possible in almost any hydrologic condition due to water supply limitations.***” ***This means that even in normal and wet years the City exceeds sustainable use of its water sources. Moreover, unless the City adopts a water-neutral development policy, normal year shortfalls will increase with growth in water demand.***

Carollo’s study concluded that optimization of existing sources would:

- Provide 600 MG/Y on average during a two-year drought if their five upgrade scenarios were implemented. Providing pretreatment and pumping improvements for the coast and river would account for 55% of this gain.
- Provide 200 MG/Y on average during average precipitation years if all scenarios were implemented.

Based on projected demand determined by the *Integrated Water Plan* (2003), this water supply gain would fall short of meeting build out demand conditions. However, those conditions have changed. Year 2010 conditions are 31% lower than projected in the IWP¹, greatly increasing the value of supply gained from source optimization and emphasizing the need to reevaluate this option. Even with the severe projections of the 2000 study, Carollo still concluded:

- Modifications to the City’s infrastructure can increase the overall supply in both average and non-drought years.
- The potential supply during a drought is sufficient to help offset some of the projected shortfall.
- The infrastructure improvement would improve the overall system operation and reliability in both non-drought and drought years.
- There are no apparent limiting constraints associated with this alternative.

This alternative needs to be fully vetted, as were the other alternatives in the IWP. Not only does it promise to provide additional supply, but several of the recommended infrastructure improvements, such as replacement of the North Coast Main, need to be done anyway, so these costs should not be counted against the alternative when compared to desalination.



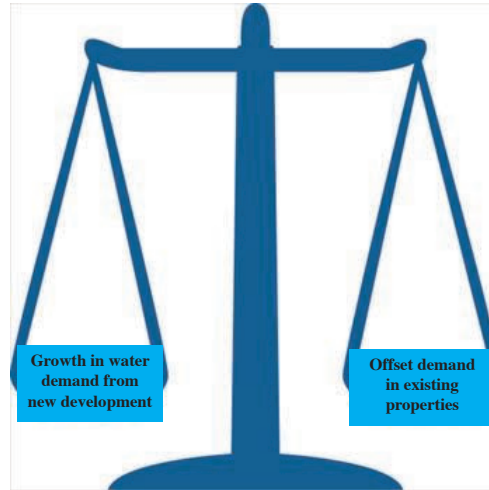
Creeks along the North Coast supply Santa Cruz with a third of its water supply, carried by gravity through pipes over 60 years old. In 2003 the City estimated losses due to leaks in the pipeline to be 15%. At that time the schedule for completion of pipeline replacement was 2021. Acceleration of this replacement is part of the “optimizing existing resources” alternative.

¹IWP demand projection for 2010 (less 300 mil gals due to conservation) = 4.5 bil gals. Actual 2010 production = 3.1 bil gals.

Water Neutral Development Policy

Recommendation: The City should adopt a water-neutral growth policy, requiring new development to fund retrofits in existing properties that fully offset new water demand created by development. Baseline for net zero growth should be 2010 water consumption.

The Water Department's presentation to the City Council on April 5, 2011 made it clear that even in normal rainfall years there is insufficient water to provide for customers needs as well as the water flow needs of native fish. "Tier 3 flows...are not currently possible in almost any hydrologic condition due to water supply limitations." If the City would adopt a water-neutral growth policy, it would prevent this overdraft of streams from getting worse.



A water-neutral growth policy means offsetting the water demand created by new growth with conservation retrofits in existing development. The Soquel Creek Water District has had a water-neutral development policy since 2003. Builders need to offset 120% of new water demand by paying a fee that funds free installation of water efficient toilets in existing buildings. When the potential of toilet retrofits is exhausted, there is a great deal of untapped potential in replacement of washing machines, water-hungry landscapes, installation of rainwater and graywater systems, etc.

If the City adopts a water-neutral growth policy, it will join not only Soquel Creek Water District, but other County jurisdictions. The County of Santa Cruz is drafting a water-neutral development ordinance, requiring development fees to completely offset new demand by funding retrofits in existing development. Santa Cruz County LAFCO has also adopted a water-neutral development policy:

Standard 4.1.1a. In cases where the basin is overdrafted or existing services are not sustainable, a boundary change proposal may be approved if there will be a net decrease in impacts on water resources.

We recommend that the City follow the lead of these jurisdictions and establish a water neutral growth policy.

How Santa Cruz's Conservation Program Differs from a Water-Neutral Development Policy

In response to advocacy of water-neutral development policy, City Water Department officials have claimed that the City's current conservation program is as effective as the Soquel Creek District program in offsetting growth in demand. While it is true that water demand dropped dramatically and unexpectedly over the last ten years, it would be a mistake to claim that the City has a water-neutral development policy.

The true test of a water neutral development policy is that it results in zero growth in water demand. No such result was expected from the City's *Water Conservation Plan*, adopted in 2000.¹

The Water Department continues to expect growth to outstrip conservation. The recently released *Water Supply Assessment* (2011) reveals a policy of allowing growth in water demand to continue to rise. (See chart on next page.)

¹ The Plan established a goal of 280 million gallons of water conserved annually by 2010. At that time, the projection for increase in water demand was 392 million gallons by 2010, or a net increase after conservation of 112 million gallons. Source: *Integrated Water Plan*, Table II-2

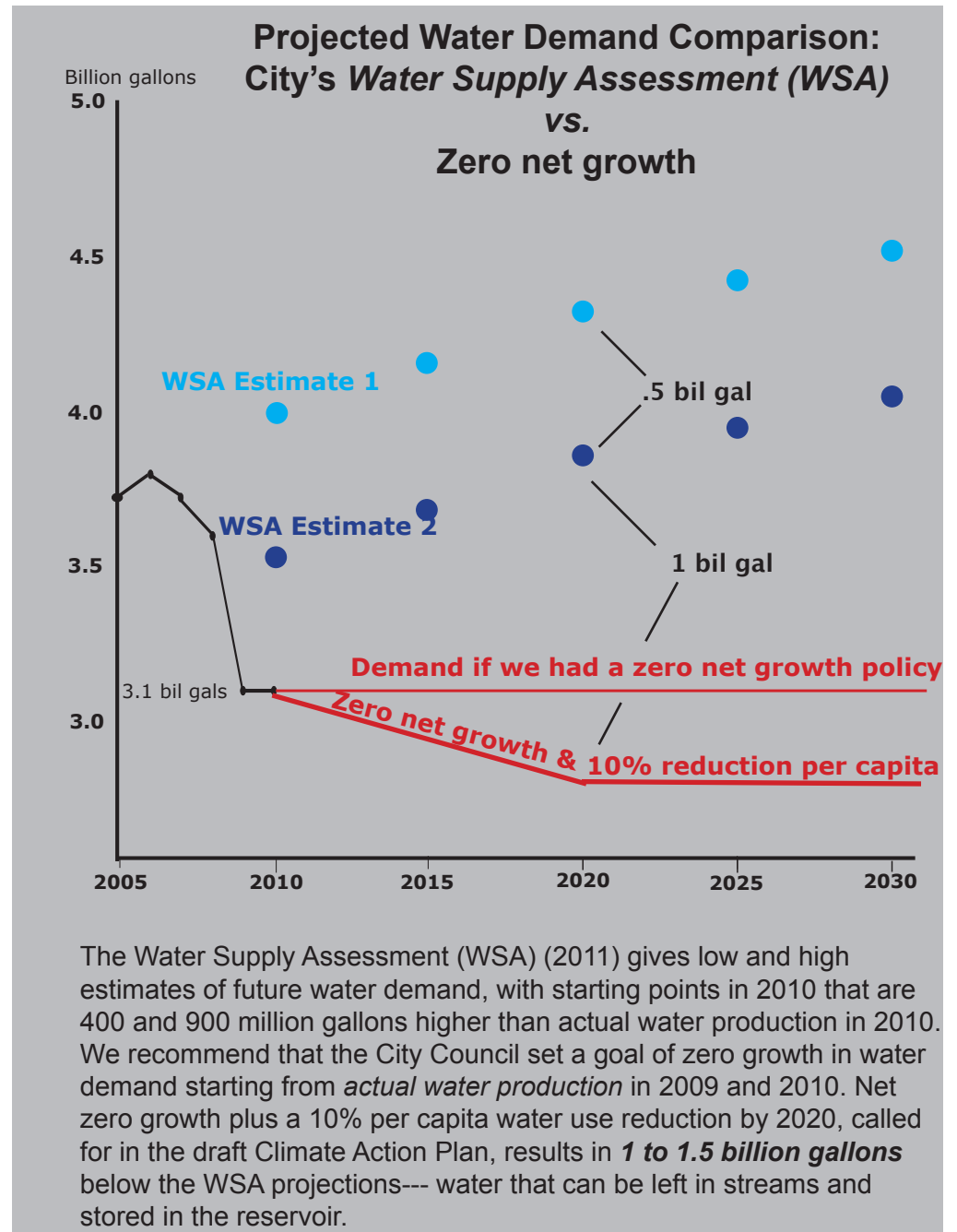
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How Santa Cruz's Conservation Program Differs from a Water-Neutral Development Policy

A Water-Neutral Policy finances conservation offsets through charges on new development. Santa Cruz finances its conservation programs mostly through water rates on existing customers. In the last three years, the portion of the City's water conservation budget financed through new water hook-up fees was \$149,000, or less than 30% of the total. That's a de facto 21% offset program, compared to Soquel Creek's program that charges developers to offset 120% of expected new demand.

To be effective, Santa Cruz would need to emulate the practice of Soquel Creek District, which estimates the new demand created by each new project. "You can't control what you don't measure" is a principle of engineering.

Soquel Creek District itemizes fees for new water hook-ups. For a typical new 3-bedroom home, the charge is \$6264 for "Water Demand Offset", \$5800 for "System Expansion", and \$5400 for "Buy-In" to the existing system. In contrast, Santa Cruz charges \$6530 for "System Development Charges". In fiscal year 2009, the System Development Fund paid out 15 times as much on capital improvements (including desal studies) as on conservation.



Beyond Curtailment: A Proposal for a Community Water-Use Commitment

“Conservation should be distinguished from curtailment, which means mandatory reductions in water use.”

- American Public Works Association

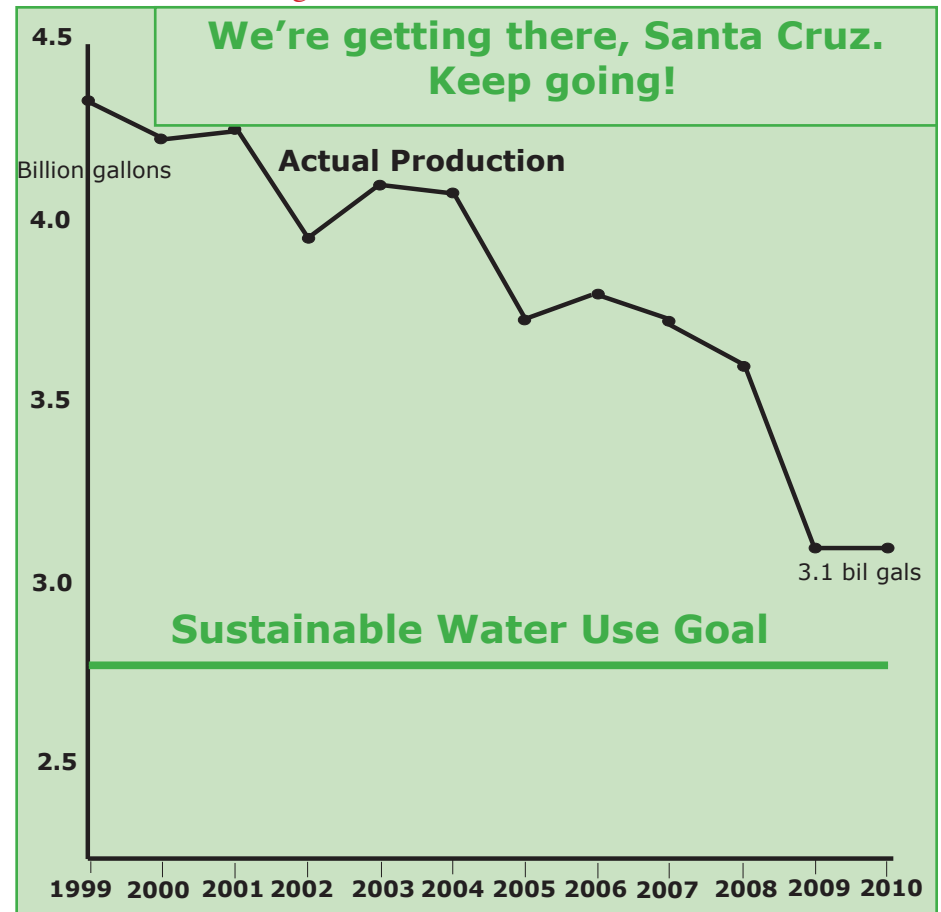
*“In the end, we will conserve only what we love;
We will love only what we understand”.*

- Baba Dioum, Senegalese ecologist

Recommendations

1. Using 2010 as the base year, adopt the draft Climate Action Plan goal of 10% per capita reduction by 2020. Partner with non-profit and community groups to launch a Community Commitment Campaign to achieve sustainable levels for fish habitat and enhance reservoir storage for drought protection. Support long-term shifts in water use culture.
2. Utilize utility website and billing statements to provide customers with information about water budget vs. actual water use, with a section on how the City is doing as a whole to meet the sustainable water use goal.
3. Change City financial incentives and building code to reflect a recognition that certain technologies reinforce a cultural shift, e.g. rainwater catchment, composting toilets, graywater irrigation.
4. Engage community groups in formulating the agenda for public surveys.

The word *mandatory* implies coercion. While sometimes necessary to protect the safety of the community resources, we believe coercion is best avoided unless other options are exhausted. It is more sustainable that people save water because they understand the need to do so. In this section we propose a *Community Water Use Commitment*, a strategy for immediate implementation to bring Santa Cruz water use in alignment with sustainable



levels for fish habitat as well as high reservoir levels. We also recommend a longer-term campaign to shift cultural norms regarding water consumption.

Doug McKenzie-Mohr is a Canadian social psychologist who applies research from the social sciences to challenges such as the need to reduce water consumption. He has written *Fostering Sustainable Behavior, An Introduction to Community-Based Social Marketing*, in which he writes, “Numerous studies document that education alone often has little or no effect upon sustainable behavior.” McKenzie-Mohr advises that public education needs to be supplemented by removing obstacles to participation. He recommends that water policy

water conservation and water saving appliances, however these positive attitudes are not consistently translated into actual behaviour. The main barriers to adoption of water conservation behaviours identified in the study are: the perception of inconvenience and impracticality, as well as costs associated with purchasing water saving appliances.... It appears that attitudes are translated into action where it is easy to do so; where water conservation does not inconvenience people. For example, people are happy to run the washing machine only when it is full, but reusing water from the washing machine, the shower, sinks, and bath is much less common.”¹

To address these barriers, the study recommends that water agencies “develop incentives which will reduce the financial burden” and demonstrate to water customers “how the use of water efficient appliances can be integrated into everyday life without substantial sacrifice in convenience.” That might include, for example, offering workshops in laundry to landscape irrigation, coupled with \$100 rebate toward a laundry to landscape installation or do-it-yourself kit available at participating irrigation supply or garden centers.

A Community Commitment Campaign

Doug McKenzie-Mohr notes that one of the most effective tools for fostering sustainable behavior is seeking a citizen commitment.

The following proposal for a campaign draws from his advice on how commitments can be made most effective.

1. **Information:** In early spring the Water Department would estimate what monthly water consumption targets would result in Tier 3 stream flows for fish habitat² as well as an end-of-dry-season capacity at Loch Lomond of 80%.³ Monthly

consumption targets would be established for different water customer groups, e.g. single-family residences, businesses, golf courses, etc.

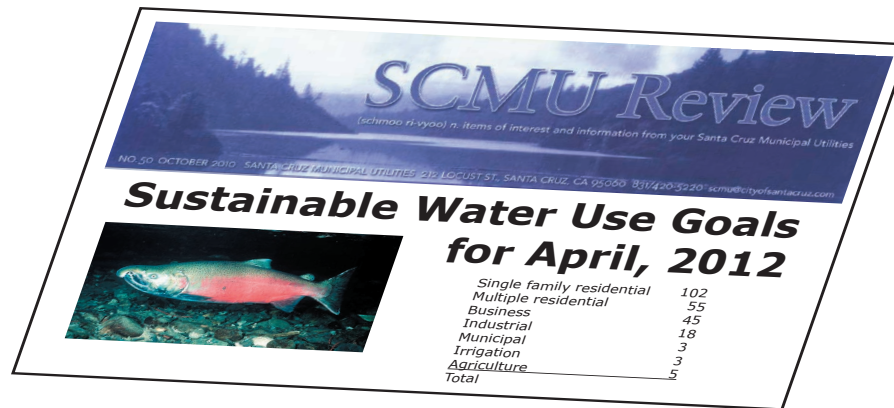
2. **Request Commitment:** Leaders in city government, business, and civil society organizations would invite water customers to make a commitment to reach these consumption targets.
3. **Forms of Commitment:** According to McKenzie-Mohr, the most effective commitments are
 - made in writing (There could be a check-box on the water bill.)
 - made as part of groups (The Water Department could contract with a non-profit organization for a community organizer to solicit commitments from church groups, civic organizations, and neighborhoods.)
 - made publicly (Ads in newspapers could recognize outstanding participation by blocks or neighborhoods)
 - made with active involvement of the person. (The statement of

commitment should include options for how the person intends to meet the commitment.)

4. Remove obstacles to commitment

The Water Department or contract agency conducts research on what stands in the way of customers being able to make a commitment or fulfill their commitment. Steps are taken to respond to the research results.

5. **Feedback that is timely and that connects customers with progress toward drought security and healthy fish habitat** Monthly bills can be adapted to include a congratulatory message when people are meeting their targets and offer support when targets are not met. The bill and City website should contain a progress report for each customer the whole community. (See our recommendation for additional changes to the monthly bill in the



The City could use the USGS online stream gauge for the San Lorenzo River to offer online reports on stream flow targets. Customers could see reports comparing stream flow with City water consumption.

6. Events to celebrate achievements and connect people to the watershed The City could sponsor an end of summer picnic at Loch Lomond that celebrates the City's preparedness for drought. Other events that could build watershed awareness include naturalist-led walks along the San Lorenzo River and North Coast streams, and a San Lorenzo River Festival with workshops that focus on care for the watershed.



The City could sponsor an end-of-summer picnic at Loch Lomond that celebrates the City's preparedness for drought.

Reinforcing a Shift in Community Norms

Zoe Sofoulis is an Australian sociologist who has conducted research on people's attitudes regarding water use. Her research indicates that major barriers to water conservation behavior are the cultural conventions about water use.⁴ Those conventions include norms regarding what type of plants belong in a landscape, or how often people "need" to shower.

Droughts in 1976-77 and 89-91 shifted community norms regarding water use. It makes sense for policy makers to put resources into reinforcing those cultural shifts. The following are norms that have already shifted for some people in the community and could form the basis for a campaign for a broad acceptance of new norms. The City should partner with community groups and non-profits to conduct community organizing to reinforce shifts in cultural norms.

Simple changes to the monthly water bill to improve feedback.

With these changes water customers can more accurately track their use.

1. Change the billing unit from CCF (hundred cubic feet) to gallons
2. Don't round off when reporting water consumed. (Water customers are often confused by higher consumption one month and significantly lower consumption in the preceding or succeeding one. This is a result of rounding up to the nearest CCF in one month and rounding down to the nearest CCF in the next)

| Old Norm | New Norm |
|---|---|
| Lawns are the norm for a front (and back) yard landscape | Small lawns are good places for children to play. A drought tolerant landscape is preferable for yards in this climate. |
| Green manicured lawns make a house look desirable, prosperous, etc. | It's appropriate to our climate to let lawns go brown in summer or to plant a drought tolerant native grass lawn. |
| Storm water should be directed to the street. | Redirecting downspouts into rain gardens and swales to slow, spread, and sink stormwater into the ground reduces polluted urban run-off that is harmful animals and fish in my watershed and the Bay. |
| Laundry waste water is unsanitary. | Laundry to landscape irrigation is safe, legal and saves water. |
| Flush the toilet after each use | "If it's yellow, let it mellow. If it's brown, flush it down." |
| Composting toilets are disgusting. | Composting toilets are a sanitary and aesthetically acceptable alternative to using drinking water to flush and sending waste miles away for expensive treatment. |
| I have a right to shower for as long as I want. | Shutting off water while lathering up can offer satisfying showers while saving water for fish. |



Laundry to landscape water is safe and legal.

Reducing Demand Hardening

Water agencies sometimes make the argument that our community is already doing so much conservation, we can't really call on people to do much more on a regular basis. A related argument is that conservation limits our ability to cut back during a drought because there's not much left to cut back. This reduction in our ability to conserve is called "demand hardening".

While it makes sense in theory that the capacity for water conservation should decline when the low-hanging fruit of conservation are picked, in actual practice, demand hardening has been counteracted by other factors. The City's consultant, Gary Fiske, wrote a review of the research literature on demand hardening in the *Water Curtailment Study (2001)*. He writes, "Evidence of demand hardening is largely anecdotal. If anything, the literature suggests that demand hardening is largely a hypothetical issue." Fiske goes on to say, "Survey research suggests that those making investments in long-term conservation also have the highest likelihood to reducing their demands during shortages."

What are the factors that counteract demand hardening? Zoe Sofoulis' research led her to conclude that people's "motivation for saving water often linked to a renewed connection with water, a sense of co-responsibility to ensuring future water supply and complying with new social norms (such as four minute showers), or a deeper cultural connection with water."

Sofoulis noticed that citizens who become water gatherers rather than just water consumers develop a stronger cultural connection to water. Australians are ahead of Santa Cruzans in saving rainwater. According to a recent survey, 34% Australians have a water tank.⁵ Just as the technologies of the flush toilet, shower, and garden tap have revolutionized water consumption habits, our choice of technologies such as rainwater catchment can reinforce a transformation in attitudes about water consumption.

This information suggests that an evaluation of effective water conservation strategies should avoid a narrow focus on gallons saved. Catching rainwater doesn't appear to save much municipal water in our climate, since there is insufficient rain in the dry season to refill a storage tank. However, the social benefit of catching rainwater is far greater than the amount of municipal water that is not used. Catching rainwater transforms the person from a passive consumer whose only responsibility is to pay the water bill, to someone with a sense of "co-responsibility to ensuring future water supply." Looked at this way, an effective tool that the City employs to counteract demand hardening may be its provision of subsidized rain barrels.

From the perspective of changing attitudes towards water consumption, the City would also benefit from legalizing and encouraging composting toilets. Again, from the limited point of view of water saved, the results may not be significant for many years. But from the point of view of helping to shift cultural norms, the example of a few people using composting toilets should not be underestimated. For new buildings there should be robust incentives to install composting toilets, especially in buildings where a custodial staff can

perform the proper maintenance. With sufficient to overcome initial investment barriers, schools may be interested in the educational value of familiarizing their students with composting toilets.

Research needed regarding desal's impact on demand hardening

An Australian study recommends that future research "explore community opinion regarding the role of restrictions once centralized augmentation projects (such as desalination plants) are in place"⁶. We recommend that this question be researched in Santa Cruz as well. There is reason to believe that when customers are paying larger water bills for desalination, they may be less willing to curtail their use during drought. A report from the Australian government says that estimates of future demand hardening must "take into account social and psychological considerations and water usage, for example, the level of trust between a water utility and their customers...".⁷ The perception that the desalination project is being pushed forward without adequate consideration of alternatives could diminish public trust in the Water Department.

(Footnotes)

¹ Dolnicar, S. & Hurlimann, A. (2010). Australians' Water Conservation Behaviours and Attitudes. Australian Journal of Water Resources, 14 (1), 43-53.

² "Tier 3 flows are designed to provide 80% of optimum habitat conditions in most areas during all but critically dry water years." – City Council Agenda Report, Habitat Conservation Plan Update, March 28, 2011

³ See section "Prioritizing Reservoir Use for Drought Protection"

⁴ Sofoulis, Zoë(2005) 'Big Water, Everyday Water: A Sociotechnical Perspective', Continuum, 19: 4, 445 —463

⁵ Dolnicar, S. & Hurlimann, A. (2010). Australians' Water Conservation Behaviours and Attitudes. Australian Journal of Water Resources, 14 (1), 43-53.

⁶ Ibid, Dolnicar & Hurliman

⁷ Office of Water, New South Wales *Climate change and its impacts on water supply and demand in Sydney*

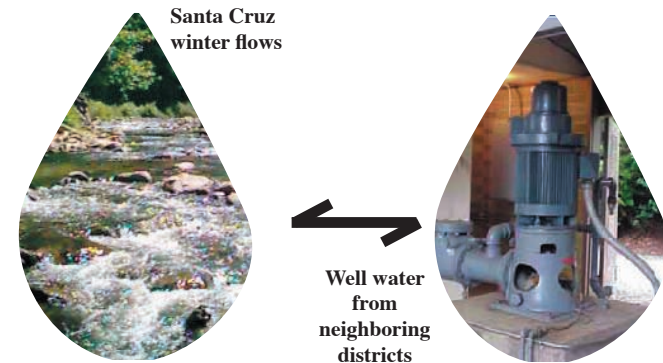
Water Exchanges With Neighboring Districts

Recommendations:

1. The City and neighboring water districts should initiate an application for water rights transfers.
2. The City should include in the Capital Improvement Program funding for pipeline interconnects with neighboring districts.

Until John Ricker delivered his report to the Board of Soquel Creek Water District on May 17, 2011, it wasn't known how much excess water could be delivered from Santa Cruz to Scotts Valley and Soquel Creek Water District during an average rainfall winter. Ricker is the County Water Resources Director, and Board members were all ears as he reported the results of his state-funded study on the potential of water transfers. The number everyone was waiting to hear turns out to be 800 acre-feet.¹ That's the average amount of water from the San Lorenzo River that can be sent to neighboring districts from December through March under Santa Cruz's existing water rights, and still allow a minimum of 25 cubic feet per second to bypass the City's water diversion at Ocean St. Extension. The bypass is needed for fish migration. If Scotts Valley or Soquel Creek District could purchase that water from Santa Cruz, they could cut back on pumping out of the aquifers, allowing the overdrafted aquifers to recharge. 800 acre feet of water is two-thirds of what the entire Soquel Creek Water District consumes during that four month period.

Two big questions need to be answered. Would Soquel Creek agree to send water back to Santa Cruz during a drought? Director Bruce Daniels voiced support for sending water to Santa Cruz², pointing out that the Soquel Creek District would receive water in more years than it would transfer water back to Santa Cruz. According to the chart in Ricker's report, in most winters there is sufficient flow in the river for Santa Cruz to export water to neighboring



districts. Even in the dry winter of 2009, for example, over 600 acre feet was available. The number of drought years in which Santa Cruz would benefit from importing water could average one in nine, according to the City's IWP.³

The second question is would the fisheries agencies (National Marine Fisheries Service, State Department of Fish and Game) agree to the water exchange? Without their endorsement, the water rights changes needed could probably not be secured.

One strategy for winning fisheries agency support would be to design an agreement whereby Soquel Creek District or Scotts Valley District, or both, send water back to Santa Cruz during a drought, a portion of which is tied to increased dry season bypass flows in the river and North Coast streams. This would be an improvement over Santa Cruz's current Habitat Conservation Plan proposal, in which little or no increased bypass flows are planned for drought years—even with a desal plant online. (see Introduction)

Some have argued that an obstacle to implementing water exchanges appears to be the long time it takes for water rights revisions to be approved by the state. There are ways to expedite approval. According to John Ricker, "There

appear to be other expedient options to request approval of a short term transfer of San Lorenzo River water while pursuing approval of a long term water transfer or water rights amendment. We are continuing discussions with State Division of Water Rights staff regarding the best ways to proceed.”⁴ According to the State Water Resources Control Board, water transfers for the purpose of benefitting fish habitat are encouraged.⁵

To win fisheries agency support, the City should include the water exchange strategy in their current negotiations with the fisheries agencies to create a Habitat Conservation Plan. As of April the City had not discussed water exchanges in that setting, according to the National Marine Fisheries Service. The City recently declined a County Board of Supervisors request to include John Ricker in the Habitat Conservation Plan negotiations. The Supervisors made the request for the very purpose of ensuring that water exchanges would be discussed.

A further goal of this water transfer proposal is for Santa Cruz and neighboring districts to investigate the feasibility of treating water that is turbid (muddy). Current City practice is to use Loch Lomond water in the days or weeks of the winter in which the river is too turbid to use. The technology to treat turbid water is available and we recommend that the City’s planned \$25 million upgrade to the Graham Hill Treatment Plant the Water Department include a cost-benefit analysis of turbid water treatment.

(Footnotes)

¹ For a copy of Ricker’s report, <http://desalalternatives.org/wp-content/uploads/2011/05/Conjunctive-Use.pdf>

² Soquel Creek Water District Board Meeting May 17 minutes

³ According to Table II-4 of the Integrated Water Plan, the expected frequency of droughts requiring 10-20% curtailment is 6 in 59 years. In addition, there is a 1 in 59 year expectation of a worst-case drought requiring more than 30% curtailment. *Water Shortage Contingency Plan* (2009) p2-6

⁴ email communication to SqCrWD.

⁵ *A Guide To Water Transfers*, Division of Water Rights, State Water Resources Control Board. Another possible water rights solution is for Santa Cruz to use the pre-1914 water rights of N. Coast streams. According to this publication: “Holders of pre-1914 rights can change the purpose of use, place of use or points of diversion without the need of notifying the SWRCB. (Water Code [section 1706](#))”.

Summary of Recommendations

I. Enhancing Conservation and Public Education

1. Extend the Retrofit Upon Sale Ordinance provisions to rental units upon vacancy, offering free installation of water efficient fixtures paid for by the proposed water demand offset program.
2. Evaluate the savings potential of each conservation measure.
3. Expand and promote water use audits.
4. Develop performance-based programs that reward results, allowing the customer latitude in how to meet the water savings.
5. Offer free dual flush converter kits.
6. Offer low interest loans to residential and commercial customers for indoor and outdoor water efficiency improvement projects
7. Apply the water use efficiency provisions of the updated California Water Efficient Landscape Ordinance to all existing multi-family and commercial properties with dedicated irrigation accounts. Employ metering, mandatory drip systems and price-incentivized water budgets.
8. Provide a significant cost-share for removing non-functional turf and retrofitting spray irrigation systems to low-volume systems at multi-family and commercial facilities
9. Develop low-cost and streamlined permit processes for stormwater reuse for toilet flushing and irrigation system in single family, multi-family, public and commercial buildings.
10. Provide a significant cost-share or subsidy to fund residential laundry graywater systems
11. Provide manual shower shut-off valves
12. As a fallback strategy, continue the landscape water use curtailment policy developed for moderate drought years to extend to every year
13. Provide a disincentive for inefficient irrigation systems and water waste by increasing rates for blocks 3-5. Evaluate incentive pricing for non-residential customers.
14. Enforce water waste ordinance.

II. Campaign for a Water Use Commitment

1. Using 2010 as the base year, adopt the draft Climate Action Plan goal of 10% per capita reduction by 2020. Partner with non-profit and community groups to launch a Community Commitment

Campaign to achieve sustainable levels for fish habitat and enhance reservoir storage for drought protection. Support long-term shifts in water use culture.

2. Utilize utility website and billing statements to provide customers with information about water budget vs. actual water use, with a section on how the City is doing as a whole to meet the sustainable water use goal.
3. Change City financial incentives and building code to support technologies that reinforce shifts in cultural norms, e.g. rainwater catchment, composting toilets, graywater irrigation.
4. Engage community groups in formulating the agenda for public surveys.

III. Reservoir policy

1. To enhance drought protection, adopt a new goal for end-of-dry-season reservoir level, (probably near 80%).

IV. Water-Neutral Development Policy

1. The City should adopt a water-neutral development policy, requiring new development to fund retrofits in existing development that fully offset new demand created by development. Baseline for net water neutrality shall be 2010 actual consumption.

V. Water Exchanges With Neighboring Districts

1. The City and neighboring water districts should initiate an application for water rights transfers.
2. The City should include in the Capital Improvement Program funding for pipeline interconnects with neighboring districts.

The recommendations in this report would result in reducing water demand 1 to 1.5 billion gallons by 2020. This would greatly enhance fish habitat and drought security.

