

JUN 13, 2017



INFORMATION REPORT

DATE: May 3, 2017

TO: City Manager

DEPARTMENT: Water

SUBJECT: Perspectives on Information the Council has received from Mr. Jerry Paul
re: his Lochquifer Water Supply Alternative

APPROVED:  DATE: 6-1-17

Members of the Council have recently received emails and meeting requests from Mr. Jerry Paul related to his Lochquifer Water Supply Alternative. This Information Report has been prepared to provide the Council with the Water Department's perspective on Mr. Paul's proposal and to provide a broader context for information so that Councilmembers may consider whether or how they would like to proceed to respond to Mr. Paul.

Water supply has long been a topic of interest, and the subject of passion, in Santa Cruz. Interest, because of the community's commitment to conservation of both water and energy needed to solve our water supply problem; passion, because of the many creative minds in our community committed to solving our water supply problems. With that as a back drop, the Water Supply Advisory Committee created the "Our Water, Our Future" water supply convention at the very beginning of their process as a way to include the broad community in helping to address the problem. The WSAC was eager to see and hear the solutions that the community came up with – and there were many.

With close to one hundred solutions presented at the convention, there was a broad range of alternatives for the WSAC to consider. As was the case with some other project proponents, for example the quarry storage project developed by Mr. Joe-Ben Bevirt, or the off-stream storage options developed and pursued for many years by the late Mr. William Fieberling, Mr. Paul devoted much time and energy to developing his ideas for a regional water solution.

During the WSAC process there was a very public and very transparent process for evaluating and ultimately consolidating dozens of options with common elements or similar approaches so that they could be evaluated and considered further. WSAC members were actively involved in this effort. Many ideas did not progress in their original form or in their entirety, and yet still significantly influenced the direction the WSAC ultimately recommended.

Mr. Jerry Paul's Lochquifer idea is a great example of this in that the WSAC's preferred alternative includes the concept of capturing available winter flows and augmenting regional groundwater resources (through in lieu recharge and/or aquifer storage and recovery) to create both drought storage for Santa Cruz and sustainability of regional groundwater basins.

However, as discussed further in the attached table that responds to Mr. Paul's key elements of the Lochquifer proposal, his proposal is built on many "leaps of faith" assumptions. As the WSAC studied the various winter water harvest proposals, it recognized that, while very

promising, there were many unanswered questions and significant uncertainties that would require further analysis before a winter water harvest project could be pursued. In fact, the WSAC's recommendations were heavily influenced by the desire to provide the time needed to fully explore the feasibility of this option prior to making a final decision about how to address water supply reliability.

Despite the obvious influence that Mr. Paul's proposal had on the outcome of the WSAC process, he has never believed that his idea has received the consideration it deserves. As a result, both throughout the WSAC process and more or less continuously since the completion of that process, Mr. Paul has continued to advocate for further evaluation and consideration of his Lochquifer alternative.

While Mr. Paul's disappointment that his proposed alternative was not selected by the WSAC in its entirety is understandable, his recent accusations that the Water Department has inserted "poison pills" into the work to evaluate a winter flow harvest strategy are not. No one, least of all Water Department staff, denies the potential of the basic concept to contribute to or entirely solve the City's long standing water supply reliability problem and to potentially play a significant role in restoring depleted regional aquifers.

WSAC, Water Commissioners, and City staff, on the other hand strongly support the work plan and decision process developed by WSAC and approved by the Council to carefully, fully and transparently evaluate the winter flow harvest idea to consider its potential to become all or part of the solution. As recently as the Joint Water Commission and City Council meeting on March 14, 2017, Water Commissioners had the opportunity to raise with the Council any concerns they had about how the Water Department's efforts were proceeding. None of the Commissioners did so. At its most recent meeting on May 1, 2017, major findings from the winter flow harvest feasibility analysis work for both aquifer storage and recovery and in lieu recharge were presented and discussed.

The WSAC process created a strong, adaptable, community and Council supported road map for the work that needs to be done to identify the best water supply solution for Santa Cruz. While Mr. Paul's Lochquifer proposal is not being pursued as a specific, integrated approach, there is no question but that the concepts that underlie it are being actively researched and evaluated.

Submitted by:



Rosemary Menard
Water Director

Attachments:

Table Providing City of Santa Cruz Water Department Response to Mr. Jerry Paul's Lochquifer Proposal

<p>Key Points From Mr. Jerry Paul's The Lochquifer Proposal (see attached 1 page flyer)</p>	<p>City of Santa Cruz Water Department Response</p>
<p>1. Santa Cruz's Loch Lomond Reservoir isn't being used much now, because it is being kept very full, as insurance against future drought. The Lochquifer Alternative frees up the Loch by shifting the drought insurance storage job to the local aquifers, which have many times more storage space than the Loch does, because they have been overdrawn by wells for decades.</p>	<p>Although the way Loch Lomond has been used has evolved over time, its current role is as a drought reserve that is conservatively managed to reduce the risk of serious water supply shortages for Santa Cruz customers. The economic, public health and safety implications of a serious shortage necessitate this approach, at least until additional storage or a supplemental water supply project have been developed.</p> <p>A significant goal of the WSAC Recommendations is to create additional storage or access to other supplemental supplies that will protect water customers from this risk.</p> <p>Once additional storage or supplemental supply has been developed, there will be more flexibility in the way that Loch Lomond. However, until additional storage or supplemental supply is developed, it is too risky for Santa Cruz customers for us to manager their only drinking water reservoir less conservatively.</p>
<p>2. The freed-up Loch would be used to hold massive amounts of new water harvested from the San Lorenzo River in the rainy season, when the flow is often so high that fish tend to avoid it.</p>	<p>As noted above, operating Loch Lomond to capture and direct available winter flows is a possibility that can be explored once doing so does not put Santa Cruz water customers at risk of water shortages.</p> <p>Mr. Paul's comments about fishery issues are incorrect. The anadromous fish species of concern in the San Lorenzo River are the endangered coho salmon and the threatened steelhead trout. The rainy season is critical for the survival of these species. It is during this time that these species migrate from the ocean to fresh water, spawn, incubate eggs, and after rearing in fresh water over the dry season, migrate back to the ocean. The optimum water level required for these threatened and endangered species during the rainy season is high. In very wet years, meeting them is not generally a challenge, but in more normal, dry, and critically dry years, meeting wet season flows for these species require reducing diversions from all of the City's surface water sources.</p>

<p>3. Water from the Loch would be treated to a high potable standard as it is presently (at the existing Graham Hill Water Treatment Plant), and distributed, not just to the City but also to the Soquel Creek Water District and other places--and not just in the winter, but throughout the entire year.</p>	<p>This statement makes the following assumptions:</p> <ul style="list-style-type: none"> • First, that all water needed to achieve the Lochquiver project could be <u>adequately</u> treated at the existing Graham Hill Water Treatment Plant facility, and that no additional investment in treatment processes is needed, and • Second, that water rights are adequate and available to allow for providing water to Soquel and Scotts Valley all year round. <p>Both of these assumptions are stated as “facts” by Mr. Paul. As facts, they incorrect or, at the very least, not black and white as portrayed.</p> <p>For example, water rights can be a limiting factor in changing the way existing facilities operate as well as expanding where water may be served. In general, Mr. Paul’s approach assumes that any/all water rights issues can be resolved through acquisition of new water rights or alteration to existing rights. While some possibilities for change exist in this area, it should be noted that the San Lorenzo River is fully appropriated and not open for any additional water rights from June 1 through November 1. This specific constraint could effectively limit the City’s ability to deliver water to other agencies during this period as is proposed by Mr. Paul.</p> <p>Similarly with water treatment, it is likely that some additional treatment process improvements will be needed to meet regulatory requirements should winter flow harvest be pursued. The cost to produced and delivered for in lieu, for example, would be higher than what it is now due to it adding an amortized cost of capital to current O&M costs.</p>
<p>4. Recipients of this potable water would shut down their wells, so when Mother Nature puts water into the aquifers every year, her water stays there and the aquifers recharge.</p>	<p>The concept of in lieu recharge is as Mr. Paul describes here. Natural recharge and reduced or eliminated pumping of wells to provide water service would contribute to increased groundwater levels in locally depleted aquifers.</p> <p>Mr. Paul’s three year timeframe for full recovery (see blue highlighted area of the Lochquiver Proposal), however, may be very optimistic. Groundwater modeling work planned for the groundwater sustainability efforts in the Santa Cruz Mid-County and Santa Margarita Groundwater basins and as part of the Department’s evaluation of the potential benefits and costs of aquifer storage and recovery, will certainly improve our ability to assess recovery timelines under different alternative approaches.</p>

<p>5. Water from Loch Lomond would also be piped mostly downhill by gravity to do "dry times surface spreading" of water into the aquifers under the Scotts Valley-Felton-Lompico area. Major new water treatment facilities probably will not be required.</p>	<p>Mr. Paul's statement that "dry times surface spreading" would contribute to aquifer restoration in the Scotts Valley, Felton, Lompico areas is a blanket statement that makes a lot of assumptions, some of which will not be borne out by reality. The map appended to this table has been developed by UCSC Professor Andy Fisher to show the favorable locations in Santa Cruz County for managed aquifer recharge. The picture in the Scotts Valley, Felton, Lompico area is certainly not black and white.</p> <p>That said, Mr. Paul's statement that "major new treatment facilities would probably not be required" is correct as recharge through surface spreading does not require treatment to potable standards prior to spreading. However, Mr. Paul doesn't include the likelihood that transmission pipelines and groundwater extraction wells would be required to deliver and recover water to aquifer recharge sites.</p>
<p>6. In critically dry years very little water would be taken from the river; instead the aforementioned wells would be robustly re-activated to provide potable water to the entire region.</p>	<p>A key to Mr. Paul's proposal, particularly to his cost analysis, is the relatively minor investment that he claims is required in new infrastructure.</p> <p>In this statement, Mr. Paul indicates that during dry times when surface water isn't available, existing wells would be used to access stored groundwater. <u>What Mr. Paul apparently hasn't taken into account is that during these conditions, all existing wells, most of which belong to Scotts Valley or Soquel Creek, would be being used to serve existing customers in Scotts Valley and Soquel Creek water districts.</u> These wells were originally designed to meet the needs of existing customers and may not have the needed capacity to meet the needs of both local customers as well as provide water to Santa Cruz in the volume needed.</p> <p>Santa Cruz's unrestricted daily peak season demand during a drought will likely be in the range of 9 to 10 mgd. The availability of surface water resources during critically dry years is very limited. With about 1.5 mgd of groundwater capacity in the Beltz well system and 1 – 1.5 mgd from the existing intertie between Soquel and Santa Cruz, the Department will need to have ready access to both the Loch Lomond reservoir (the fuller the better) as well as to groundwater resources stored in local aquifers in Scotts Valley and it the Santa Cruz Mid County Groundwater basins. This means the daily quantity needed to meet unrestricted peak season demand is likely in the range of 6 to 7 million gallons per day.</p> <p>Santa Cruz doesn't have wells or transmission infrastructure in the Scotts Valley area nor does it have any additional transmission pipelines in place to bring water from Soquel to Santa Cruz.</p> <p>The point of this information is that Mr. Paul's cost projection for his proposal does not</p>

<p>7. Implementation mainly involves 4 projects: widen two existing pipelines, install a fish-friendly filtering well ("Ranney collector"), and coordinate a joint application for extended water rights for all in the region (rather than letting so much water just flow out to sea). Small additional pipelines would implement the dry-times surface spreading.</p>	<p>includes any money for new infrastructure, especially the additional extraction wells and interties, that Santa Cruz will need to meet its water demand during droughts.</p> <p>As noted previously, Mr. Paul's statements about infrastructure required to achieve the outcome he proposes are based on many highly simplified assumptions, many of which have a grain of truth embedded in them.</p> <p>For example, his statements about Ranney collectors, a form of river bank filtration, being the obvious answer to the problems of dealing with more turbid winter water is true <u>if Ranney Collectors or other similar systems actually work here</u>. Local hydrogeology may not support this particular strategy.</p> <p><u>Additional water rights might be available and obtainable, but not for the dry season, when all local surface water resources are fully appropriated.</u></p> <p>Small additional pipelines might be adequate to implement surface spreading, <u>but putting water in the ground also likely requires wells to get it back out of the groundwater when it is needed.</u></p> <p>Mr. Paul's proposal is built on many of these kinds of "leaps of faith" assumptions. The WSAC studied the various winter water harvest proposals, and recognized that, while very promising, there were many unanswered questions and significant uncertainties that require further analysis before a winter water harvest project should be pursued.</p>
<p>8. The \$100 Million Dollar Letter: Soquel Creek Water District can save about \$100M by abandoning their small but expensive, energy-squandering sewage-recycling scheme, and instead, offering to pay Santa Cruz to build Lochquifer, which would supply about 2.4 times more water at about 1/5th the cost. Santa Cruz will get a huge new water source at absolutely no cost.</p>	<p>It may very well be the case that some kind of regional project involving using available surface water flows for in lieu and/or aquifer storage and recovery would be a less expensive option for the Soquel Creek Water District Board to pursue. However it is <u>very unlikely for all the reasons described earlier in this response</u> that a project that would achieve the water supply objectives of both the Soquel Creek Water District and those of the City of Santa Cruz customers could be implemented for the \$27 million price tag that Mr. Paul insists is the case.</p>

Suitability for Managed Aquifer Recharge based on Surface Conditions

Collaboration between UCSC, RCD-SCC, regional agencies: preliminary analysis for stormwater collection



R. Harmon, S. Beganskas, E. Teo, A. Fisher, S. Lozano

Data from USDA, NOAA, USGS, etc.

Remarkable Regional Water Supply Solution

- Santa Cruz Gets Huge New 2.1 Billion Gallon Water Supply for Free
- Soquel Creek Water District Families and Businesses Save \$100M (\$12,000 per family) From Being Added to Their Water Bills
- Scotts Valley, San Lorenzo Valley, Mt. Hermon and Others Get a Very Low-cost Aquifer Refill and Save \$ on Pumping
- The Entire Region Becomes Drought-Proof Within 3 Years
- Fish Habitats Get Big, Highly Flexible Supply of Cool, Clean, Deep Water When and Where They Need It
- No Finance Charges Necessary; Huge Economic Benefits to the Region

The Lochquiver Alternative

How can these remarkable claims be made? Mostly by using existing facilities intelligently.

1. Santa Cruz's Loch Lomond Reservoir isn't being used much now, because it is being kept very full, as insurance against future drought. The Lochquiver Alternative frees up the Loch by shifting the drought insurance storage job to the local aquifers, which have many times more storage space than the Loch does, because they have been overdrawn by wells for decades.
2. The freed-up Loch would be used to hold massive amounts of new water harvested from the San Lorenzo River in the rainy season, when the flow is often so high that fish tend to avoid it.
3. Water from the Loch would be treated to a high potable standard as it is presently (at the existing Graham Hill Water Treatment Plant), and distributed, not just to the City but also to the Soquel Creek Water District and other places--and not just in the winter, but throughout the entire year.
4. Recipients of this potable water would shut down their wells, so when Mother Nature puts water into the aquifers every year, her water stays there and the aquifers recharge.
5. Water from Loch Lomond would also be piped mostly downhill by gravity to do "dry times surface spreading" of water into the aquifers under the Scotts Valley-Felton-Lompico area. Major new water treatment facilities probably will not be required.
6. In critically dry years very little water would be taken from the river; instead the aforementioned wells would be robustly re-activated to provide potable water to the entire region.
7. Implementation mainly involves 4 projects: widen two existing pipelines, install a fish-friendly filtering well ("Ranney collector"), and coordinate a joint application for extended water rights for all in the region (rather than letting so much water just flow out to sea). Small additional pipelines would implement the dry-times surface spreading.
8. The \$100 Million Dollar Letter: Soquel Creek Water District can save about \$100M by abandoning their small but expensive, energy-squandering sewage-recycling scheme, and instead, offering to pay Santa Cruz to build Lochquiver, which would supply about 2.4 times more water at about 1/5th the cost. Santa Cruz will get a huge new water source at absolutely no cost.

For details and how to support the Lochquiver effort, visit Water For Santa Cruz County: