

"Managing California's Groundwater: Issues and Challenges – Ventura County"

Presented by Lynn E. Maulhardt, President of the United Water Conservation
District Board of Directors and Chairman of Fox Canyon Groundwater
Management Agency

To The Honorable Chair and Members,
Senate Natural Resources & Water Committee

March 18, 2014

The people of Ventura County have for decades shown the ability to plan and pull together strategies and policies that are designed to protect the local groundwater resources in an effort to be self-sustainable and provide for a thriving economy. The discussion below describes the many successes we have had but also points out the challenges ahead that require a change to our current business practices.

First, we have the governance structure in place to make the necessary and difficult policy decisions. Second, we have the agencies that can construct and operate the physical solutions that are needed. Third, our community has shown, over a long period of time, that they recognize there are new challenges and are ready and willing to take on (and fund) the required solutions. Fourth, these solutions will take immense lead time and coordination amongst the stakeholders, regulatory agencies and other interested parties that have different needs and financial resources.

This is how Ventura County has dealt with challenges over the past years. In the short-term we will have to make serious changes as to how we manage and utilize our limited water resources while at the same time keeping stakeholders economically sound since it is these people who will be required to pay for the final long-term solutions. The people of Ventura County know what they have to do and are ready and willing, once again, to take the necessary steps. We invite everyone from the State who is interested in seeing our water resource operations to come to Ventura County and talk to local water representatives and see our infrastructure in operation firsthand, to see that we have been actively dealing with our water resource shortfall, and recognize there is still much more to do.

Historical Information

1920 – 1940

Effective groundwater management in Ventura County is nothing new, in fact it goes back as far as the 1920's when it became evident that agricultural irrigation needs exceeded natural replenishment and seawater intrusion along the coastal Oxnard Plain. The Santa Clara River Water Conservation District (SCRWCD) was created in 1927 to assist nature in its replenishment of groundwater aquifers by diverting surface water off the Santa Clara River and into geologically beneficial areas where connectivity to the upper and lower aquifer systems was ideal for percolation recharge. In wet years, the SCRWCD efforts led to artesian conditions along the coast and the fight against seawater intrusion was on.

1940 – 1960

After World War II it was clear the population of Ventura County was growing and starting to outpace the water supply that was being generated by systems created by SCRWCD that were meant to keep up with agricultural needs. New water management strategies were needed to provide the growing population with a sustainable and reliable water supply and meet the necessary water quality needs. It was clear agricultural parcels could not fund

these strategies alone. In 1950 the SCRWCD was changed to the United Water Conservation District (UWCD) that would develop and construct facilities needed for both municipal & industrial (M&I) growing needs and would assist in keeping agriculture economically viable. UWCD was first funded 100% by property tax revenues but, since 1978 and the passage of Proposition 13, is now funded primarily by Water Code authorized groundwater pump charges and approximately \$2 million per year from property taxes.

The people of Ventura County voted to build Santa Felicia Dam (that would capture watershed run-off and create 100,000 acre-feet of water storage that would be known as Lake Piru) and construct two (2) separate pipelines that would provide water for both M&I and agricultural needs. Both pipelines (the Pleasant Valley Pipeline and the Oxnard Hueneme Pipeline) were designed to provide conjunctive use of the water resources (using both surface water and groundwater beneficially) in an effort to abate seawater intrusion. And, in the case of the Oxnard Hueneme Pipeline, eliminate the escalating nitrate levels from agricultural fields that were becoming a serious health and safety issue for this potable water system. All three of these infrastructures were constructed and put into operation circa 1955. Lake Piru provided the storage needed to allow for conservation releases that would provide groundwater recharge and surface water deliveries at the end of the summer months when southern California receives almost no measureable precipitation.

1960-1990

While these new facilities were great steps to take, the overdraft and seawater intrusion problems still existed, although at a lower level. In the 1960's the Ventura County Watershed Protection District signed an agreement with the Department of Water Resources (DWR) to obtain a 20,000 acre-foot allocation of the State Water Project. It was felt that this 20,000 acre-feet would be the offset needed to balance out the overdraft. Unfortunately, due to a 50%-60% delivery reliability of the SWP, the extreme costs for necessary infrastructure to deliver the water from the nearest reach of the SWP system, and a later complication resulting from Endangered Species Act (ESA) protection for the Arroyo Toad, the direct delivery of the SWP allocation ultimately amounted to 5,000 acre-feet or less per year.

In the late 1970's and early 1980's it became abundantly clear that there existed groundwater overdraft of approximately 25,000 – 30,000 acre-feet per year, and seawater intrusion into the aquifers was manifested by the overdraft. Much more needed to be done. The State threatened to take over groundwater management unless Ventura County resolved the problem. Ventura County voted to retain local control and began taking the next steps needed to overcome the overdraft problem. The State gave Ventura County the opportunity to solve its problem locally and set 2010 as the deadline for achieving balanced groundwater management.

The County and State jointly created the Fox Canyon Groundwater Management Agency (FCGMA) in 1982 to regulate groundwater pumping, in particular to protect the lower aquifer system – Fox Canyon Aquifer – that was believed to have a 100-year supply available but was not easily recharged. The FCGMA is fully funded by a minimal legislatively approved groundwater extraction charge.

At the same time UWCD planned and constructed (1990) a permanent diversion structure (Vern Freeman Diversion Dam) in the Santa Clara River (with the help of, and permits from the State) and the Pumping Trough Pipeline, now the third pipeline infrastructure in place to provide conjunctive use capabilities to reduce groundwater pumping near the coast by providing in-lieu surface water deliveries off the Santa Clara River. These new facilities, along with a groundwater management governance system, quickly paid off during the end of

the drought in the late 1980's/early 1990's and we were able to be proactive when the "Miracle March" rains came just in the nick of time.

The most populated city in Ventura County – Oxnard – was annexed into Metropolitan Water District of Southern California (MWD) and began receiving approximately one-half of its water needs from MWD via Calleguas Metropolitan Water District. Calleguas used this water not only to supplement their water needs that exceeded its now FCGMA groundwater extraction allocation, but to also provide a supply for blending for water quality purposes. We felt that the pieces for successful and sustainable groundwater management were now in place.

1990 – Current

Up to this point in time the FCGMA and UWCD relied on a USGS Regional Groundwater Study and Model to determine the size and scope of our groundwater issues. In early 1990 UWCD began building the most technically sound and qualified Groundwater Department of its time to not only actively monitor groundwater measurements throughout its boundaries and create regular reporting for decision makers but to provide technical and credible expertise for the local policy makers (for both UWCD and FCGMA) to rely upon. Our Groundwater Department was given a clear objective – don't tell the local policy makers what they want to hear but what they must hear, and know to protect the local groundwater resources.

At the time (based on the USGS study) the safe yield of the area covered by the FCGMA (and UWCD for the most part) was thought to be 120,000 – 130,000 acre-feet per year. The FCGMA mandated a 25% reduction in pumping after setting historical groundwater allocations based on 1985 – 1989 pumping levels (approximately 160,000 acre-feet per year). The reduction was fully implemented in 2008 after a phase-in period to minimize negative cutback impacts that resulted in a pumping allocation of approximately 120,000 – 130,000 acre-feet. Although pumping has been reduced within the FCGMA boundary as a result of the mandated cutbacks, the latest technical information developed by UWCD's Groundwater staff now shows that the USGS study was wrong and the safe yield for the area is actually closer to 100,000 acre-feet. With all that has been done to date a 20,000 – 30,000 acre-foot shortfall exists and seawater intrusion continues.

Some of the challenges we must contend with, while understanding it is our responsibility to solve our overdraft and seawater intrusion issues:

- The reliability and cost of the State Water Project water may not fully resolve our shortfall.
- Ventura County agricultural production provides \$2 billion to the local economy and represents the 10th largest agricultural industry in the country. At the same time, land costs are astronomical and rely on high cash/high water use crops to make ends meet. Most farmers have implemented the most cost effective conservation measures for water use available but crops must have a certain amount of water to be productive. The other challenge related to these high value crops is the cropping pattern. In the early days one to two crops per year were grown. Now, because of land costs and other mandates, farmers must turn three to four crops per year to meet their financial needs.
- The groundwater allocation system established by the FCGMA has not produced the intended results and must be addressed. This will likely create hardship and financial difficulties until additional water supplies can be developed (Please see discussion below).

- The Endangered Species Act (ESA) has not only impacted the SWP deliveries from the Delta but has resulted in two jeopardy biological opinions for UWCD (Santa Felicia Dam and the Vern Freeman Diversion). In order to address these ESA issues (get take permits) will result in loss of water that would otherwise be available for groundwater storage and surface water delivery. We accept these challenges before us, and fully dedicate efforts that are necessary to protect the southern California Steelhead and other threatened species that may be impacted by our water resource operations.
- Costs! Like so many others local infrastructure needs to be attended to and the costs are high. For example, between the ESA, infrastructure improvement necessities, federal/state and legal mandates UWCD alone is looking at \$200 million – \$300 million of projects over the next 3 – 7 years. UWCD has an annual operating budget of \$18 – \$20 million and none of the new projects result in any new water supply. In fact they result in less water in some cases to comply with the ESA. It is clear that new water supply costs will be substantial.
- The City of Oxnard has built a state-of-the art advanced recycled water system, known as the Groundwater Recovery Enhancement and Treatment (GREAT) program after 10 plus years of planning and construction. The use of this recycled water is highly regulated, complex and the per-unit cost is high. Currently this system is not operational yet, but acceptable agreements for use and costs can be developed. The GREAT program has the potential to produce up to 28,000 acre-feet of highly treated water in the future (currently only 7,000 acre-feet would be available once the system is put on-line). It will take in the magnitude of tens of millions of dollars to build out the system. The water available from the GREAT Program for groundwater recharge will be determined after the City's needs are met.
- Propositions 218, 26, and 13 have created very complex legal problems that have resulted in financial uncertainty that make it difficult, if not impossible, for UWCD to move forward with funding for necessary water supply and environmental projects.

Future Opportunities

Besides the above mentioned City of Oxnard GREAT Program, other area cities (i.e. Ventura, Simi Valley, Camarillo, Moorpark, Thousand Oaks, Santa Paula, and Fillmore) are working collectively and individually to try and solve their water challenges by developing their own recycled water programs. Local cities, water agencies and stakeholders are looking into brackish water desalter systems to take advantage of available but poor quality groundwater supplies. Calleguas Municipal Water District has invested over \$200 million to date to construct a Salinity Management Pipeline to help deal with brine disposal and UWCD is looking at capturing good quality water from offshore aquifer systems. All of these projects will take years to implement and we believe the local community is ready to fund these efforts.

Short-term measures are being discussed to carry the area through the current water resource shortfall until long-term measures are agreed upon and implemented. This is a brief history of Ventura County groundwater management. We are confident in our ability to work together with our local constituents to solve problems when they are presented to us. We steadfastly work to manage, protect, conserve and enhance the region's water supply. Through careful monitoring and management, we will continue to maintain the water resources of the Santa Clara River, its tributaries and associated aquifers, in an environmentally balanced manner.

United Water Conservation District
Short List of Pending Projects

Project	Project Description	Compliance Order	Cost
<p>Freeman Diversion Fish Passage Modification</p>	<p>Since 1997, when the Southern California steelhead trout was listed as a federally endangered species, UWCD has been working with the National Marine Fisheries Service (NMFS) with respect to providing adequate fish passage at the District's Freeman Diversion Dam on the Santa Clara River. Following recommendations of an independent panel of experts who studied the facility, UWCD is now in the design phase for major modification of the dam to allow for better passage of steelhead. This design is being conducted in conjunction with development of operating criteria for the dam under a Habitat Conservation Plan.</p>	<p>The project is necessary to comply with requirements of the NMFS with respect to the federal Endangered Species Act. Since diversions from the Santa Clara River constitutes "take" of endangered steelhead trout as defined by the Act, it is necessary for UWCD to acquire a "take permit" for continued operation of the Freeman Diversion. The District is currently in the process of developing an HCP pursuant to Section 10 of the Endangered Species Act; the HCP will set forth operating criteria for UWCD facilities and establish acceptable "take."</p>	<p>Actual project cost will be dependent upon the final decision with respect to necessary modifications. The current recommendation by NMFS calls for a rock ramp to be constructed along the entire 1,200-foot face of the Freeman Diversion Dam, the cost for which has been estimated as high as \$60 million.</p>
<p>Ferro-Rose Recharge Project</p>	<p>After years of effort United was in December 2009 able to acquire two large properties which were formally used for gravel mining. Because of the previous excavation on the properties, their proximity to existing UWCD facilities and the Santa Clara River, and their expected ability to quickly recharge groundwater, the 230-acre Ferro Property and the 118-acre Rose Property will greatly enhance the District's groundwater recharge capability. The properties will be particularly valuable during and immediately after storm events. During these periods, when flows in the Santa Clara River are greatest, the river water is too turbid to be accepted in the District's current spreading grounds. However, the nature of the abandoned gravel pits of the Ferro and the Rose will allow for spreading of river water during those periods, thereby greatly increasing the river water that is available to UWCD for replenishing groundwater supplies. To utilize these two properties pipeline infrastructure will need to be built to deliver water to them.</p>	<p>The project is needed not to comply with any requirement of a regulatory agency. However, by enhancing UWCD's ability to recharge groundwater during high-flow events it will offset water lost from the need to provide more for fish flows.</p>	<p>The current estimate of the construction cost of the project is \$10-\$15 million.</p>

Project	Project Description	Compliance Order	Cost
<p>Freeman Diversion Facing Rehabilitation Project</p>	<p>The District's Freeman Diversion Dam was constructed in 1991. It spans the 1,200-foot width of the bed of the Santa Clara River, and it is 60 feet high to bedrock with the top 25 feet of its face exposed. The dam is UWCD's primary facility for spreading surface water to replenish local groundwater supplies and to provide irrigation water to local agriculture in lieu of groundwater pumping which would further exacerbate existing overdraft. The diversion's spillway face was originally constructed with a two-foot thick roller-compacted concrete sacrificial overbuild. Flood flows over the dam's 20 years of operation have eroded this overbuild. Additionally, cracks which have formed in the original concrete construction, and, while not an immediate threat to the structural integrity, these cracks have allowed high sulfate groundwater more area to attack the concrete. Third, the bank protection near the flushing channel has failed twice during large storms over the project's life. Finally, the dam's desilting basin is full of accumulated silt. Consequently, the Facing Rehabilitation Project would consist of four necessary aspects: re-facing of the dam's spillway, grouting of cracks in the diversion structure, reconfiguring of the bank protection near the dam's flushing channel, and dredging of the desilting basin.</p>	<p>This project is not currently associated with a compliance order or other regulatory requirement; however, it could conceivably be rolled in with construction of modifications to the Freeman necessary to comply with fish passage requirements for endangered steelhead trout.</p>	<p>Total project cost is currently estimated to be \$20 million.</p>
<p>Santa Felicia Dam Probable Maximum Flood (PMF)</p>	<p>A National Weather Service model has indicated that the largest possible storm in the Piru Creek watershed would cause Santa Felicia Dam to be overtopped. This model has been a subject of dispute between UWCD and the FERC and DSOD. Together with DWR, UWCD funded an independent, site-specific study which challenged the NWS findings. UWCD is now in the process of evaluating a suite of possible alternatives for presentation to the regulatory agencies to address the issue. These alternatives include various options for raising the height of the dam and modifying the dam's spillway.</p>	<p>The project is being undertaken to comply with dam safety requirements of the Federal Energy Regulatory Commission and California Division of Safety of Dams.</p>	<p>It is virtually certain that some modification to Santa Felicia Dam will be required by FERC and DSOD. The cost will depend upon a final decision on projects. The options currently are estimated to range from \$15 to \$100 million.</p>

Project	Project Description	Compliance Order	Cost
<p>Santa Felicia Dam Intake Tower</p>	<p>UWCD's Santa Felicia Dam, which holds back Lake Piru, was constructed in 1955, and over the past 55 years the reservoir has gradually lost approximately 15,000 acre-feet of its original 100,000 acre-foot storage capacity due to sediment accumulation. Much of the sediment has accumulated near the dam itself and has gradually buried more of the intake tower which allows water conservation releases from the reservoir. A survey in late 2009 showed that the lake bottom is only now eight feet from the intake screen, and it is estimated that at the current rate sediment will reach the intake by 2020. Also, a recent study determined that the intake structure and penstock, which is used to move water through the dam, are seismically unstable. Consequently, the intake tower must be rebuilt to raise the level of intake in order to continue to utilize the lake for water conservation purposes.</p> <p>To address a large local seawater intrusion problem and to enhance local water supplies, UWCD is currently conducting a feasibility study for a desalination facility. The project would pump brackish groundwater from areas of seawater intrusion (thus avoiding environmental problems associated with intakes of other desalination projects), treat the water with reverse osmosis, and then deliver the water to adjacent water supply systems. The brackish waste from the desalination process would be delivered to the existing (and permitted) local Salinity Management Pipeline operated by Calleguas Municipal Water District.</p>	<p>All operations of and modifications to Santa Felicia Dam are subject to oversight and review by FERC and California Division of Safety of Dams; however, this project is not the subject of a compliance order.</p>	<p>Estimated cost for design work and construction for a 4-5 year project is \$15-\$40 million, depending upon what construction approach is deemed necessary.</p>
<p>Brackish Water Desalination Project</p>	<p>The District operates a small hydroelectric plant at its Santa Felicia Dam to generate energy during releases from 85,000-acre foot Lake Piru. The plant contains two hydroelectric units: a larger unit with a maximum output capacity of 1,216 kW and the smaller unit with maximum output capacity of 238 kW. Both units are currently in need of repair, and other financial strains on UWCD have prevented it from moving forward with these. Additionally, modifications would provide for generating electricity over a much greater range of operating conditions than in the past.</p>	<p>Project is not currently subject of a compliance order but could be eligible for funds which help to enhance a drinking water and irrigation supply. It would help to address a serious seawater intrusion issue which is under the review of the State Water Resources Control Board.</p>	<p>The current feasibility study, due to be completed by the end of 2014, will give more much more cost detail than is currently known; however, a final project will certainly cost tens of millions of dollars.</p>
<p>Santa Felicia Dam Hydroelectric Plant Rehabilitation</p>	<p>Repair of the hydroelectric facilities is not subject to direct regulatory requirements, although it has been an issue of some concern with FERC, due to UWCD's license for operation of Santa Felicia Dam. However, flow from the dam to accommodate endangered steelhead trout must be maintained at the level of inflow to the lake, which generally is at least 5 cfs. This year-round flow represents an opportunity to consistently be generating clean energy which is not being realized.</p>	<p>The current cost estimate for repairs to both hydroelectric units is estimated to be \$500,000.</p>	<p>The current cost estimate for repairs to both hydroelectric units is estimated to be \$500,000.</p>

