



Watersheds Coalition of Ventura County IRWMP Proposition 50 Grant Proposal, Step 2 **Attachment 8: Scientific and Technical Merit**

Attachment 8 must be no more than 20 pages in length using a minimum 10-point type font. This attachment describes the scientific and technical merit of the Proposal and includes an assessment of the: 1) technical adequacy of the data and analysis used in developing each project contained in the Proposal and 2) feasibility of each project. In Attachment 8, applicants must submit the following items:

- *A discussion for each project in the proposal that lists and briefly describes the data and studies that have been collected and performed that support the projects' site location, feasibility, and technical methods. Include references to the page locations of the studies or reports that support the claims made in this discussion.*
- *Discussion of any project data gaps and references to work items in the Work Plan that would fill the data gaps.*

This Attachment includes a discussion of the technical adequacy of the data, feasibility, a reference list, and data gaps for each of the eleven projects in the Proposal. Three CDs with all reference material for Attachments 8 have been enclosed as CD-1; CD-2 and CD-3. A fourth CD with additional references supporting the economics analysis as referenced in Attachments 10 and 11 as well as documents for Attachment 1, 3, 9 and 14 is also attached. The CDs contain individual folders for each project labeled by project name and number. The references are labeled as follows: project no_ref#_report title. For references containing more than one file, a subfolder is included and labeled by report title. The individual files are then labeled by project no_ref#_filename.

Calleguas Creek Watershed

The Calleguas Creek Watershed is the most urbanized watershed in Ventura County and drains an area of approximately 343 square miles, predominantly in southern Ventura County. The Watershed includes Conejo Creek, Arroyo Santa Rosa, Arroyo Simi, Arroyo Las Posas, and Calleguas Creek, as well as Revolon Slough and Mugu Lagoon. The northern boundary of the watershed is formed by the Santa Susana Mountains, South Mountain, and Oak Ridge Mountains. The southern boundary is distinguished by the Simi Hills and Santa Monica Mountains. Presently, approximately 50 percent of the watershed is undeveloped open space, 25 percent is agricultural and the remaining 25 percent is in urban land use.

Similar to many areas throughout California, the Calleguas Creek Watershed is largely dependent on imported water sources, despite the availability of local groundwater. However, the Calleguas Creek Watershed has experienced salt accumulation in soils and groundwater supplies from historic and

ongoing point and non-point source (NPS) pollution from urbanization and agriculture. Most of the groundwater in the Watershed contains high levels of total dissolved solids (TDS), chloride, sulfate, and boron resulting from the use of high TDS groundwater supplies, fertilizer use in agricultural activities, and discharges from wastewater plants. Continued use of water from these basins for domestic and agricultural irrigation needs and the resulting recharge to the basin has concentrated salts. Salts and other impairments have resulted in development of numerous total maximum daily loads (TMDL) on Calleguas Creek. Accordingly, the projects in the Calleguas Creek Watershed collectively address water supply issues by allowing desalted brackish water and recycled water to be used, reducing salinity levels, and implementing numerous TMDLs.

Calleguas Regional Salinity Management Project (Brine Line), Hueneme Outfall Rehabilitation (C-1)

The Calleguas Regional Salinity Management Project, Hueneme Outfall Rehabilitation (Brine Line) consists of a pipeline to collect treated wastewater and brine concentrates from existing municipal wastewater treatment plants, future groundwater treatment facilities, and, potentially, industrial operations. The Brine Line will then convey the effluent/concentrates to other areas for beneficial reuse or ocean discharge. Operation of the Brine Line will provide a cost-effective means of brine management for the Calleguas Creek Watershed and increase the ability to utilize brackish groundwater for potable use. Furthermore, flow from the Brine Line will be beneficially reused for wetlands restoration, agricultural irrigation, and game preserves.

Proposed treatment methodologies for groundwater and wastewater, including reverse osmosis (RO)



**Watersheds Coalition of Ventura County IRWMP
Proposition 50 Grant Proposal, Step 2
Attachment 8: Scientific and Technical Merit**

and nanofiltration (NF), are proven, reliable, and commonly used in the industry. The technical basis for construction and operation of the Brine Line can be found in the reference list contained below.

The concept of a Brine Line was actually originally put forth by the Regional Water Quality Control Board (RWQCB) in the mid-1970s. Calleguas Municipal Water District (Calleguas MWD) further refined the concept in the 1999 "Regional Salinity Management Plan." Once the concept solidified, conceptual design for the alignment and sizing of the facility was developed in the 2000 "Regional Brineline Sizing and Alignment Study." Supporting engineering documents evaluating particular phases or aspects of the project have also been prepared, such as the "Alignment Corrosivity Assessment" and 2004 "Technical Memoranda, Oxnard Plain Brineline Phase 1C and Ocean Outfall Facility." Design plans and specifications have also been prepared for two phases of the Brine Line (Phases 1A and 1B).

In addition, several documents have been prepared evaluating the potential for reuse of Brine Line flows for wetlands and game preserves, such as the 2005 "Feasibility Evaluation of Delivery of Brineline Water to Ventura County Game Preserve." Finally, several documents have been prepared to support permit applications and comply with the California Environmental Quality Act (CEQA)/National Environmental Policy Act (NEPA) processes.

At this time, the data gaps include hydraulic, geotechnical, and marine climate information needs for the design of the Hueneme Outfall Rehabilitation. These information needs are being filled by the work items under Task 1, Preliminary Design. Once these data gaps are filled, preparation of plans and specifications under Task 2, Design, can be initiated.

The following documents have been prepared for, or support the feasibility and technical adequacy of, the Brine Line:

1. Kennedy/Jenks Consultants, "Regional Salinity Management Plan," 1999. Prepared for Calleguas MWD.
2. Kennedy/Jenks Consultants, "NPDES Permit Application Report, Regional Salinity

Management Program," October 2003. Prepared for Calleguas MWD.

3. Kennedy/Jenks Consultants, "NPDES Permit Application Report, Regional Salinity Management Program," (Hueneme Outfall) December 2005. Prepared for Calleguas MWD.
4. Kennedy/Jenks Consultants, "Feasibility Evaluation of Delivery of Brineline Water to Ventura County Game Preserve," June 2005. Prepared for Calleguas MWD.
5. Padre Associates, "Final Program Environmental Impact Report/ Environmental Assessment for the Calleguas Regional Salinity Management Project," August 2002. Prepared for Calleguas MWD.
6. Perliter & Ingalsbe, "Regional Brineline Sizing and Alignment Study," 2000. Prepared for Calleguas MWD.
7. Perliter & Ingalsbe, "Technical Memoranda, Oxnard Plain Brineline Phase 1C and Ocean Outfall Facility," June 2004. Prepared for Calleguas MWD.
8. M.J. Schiff and Associates, "Alignment Corrosivity Assessment," August 21, 2001. Prepared for Calleguas MWD.

Camarillo Groundwater Treatment Facility (C-3)

The Camarillo Groundwater Treatment Facility (Camarillo GWTF) will be a 4 million gallon per day (mgd) brackish groundwater treatment facility. RO treatment technology will be used to produce potable water from currently underutilized brackish groundwater. Brine waste, containing concentrated salts from the RO process, will be discharged to the Brine Line (C-1) and exported out of the Watershed.

The City of Camarillo has prepared several documents that identify the need for additional water supplies and evaluate various alternatives for meeting these needs. Once the use of membrane treatment to produce potable water from brackish groundwater was identified as the preferred approach, additional studies were prepared that



Watersheds Coalition of Ventura County IRWMP Proposition 50 Grant Proposal, Step 2 **Attachment 8: Scientific and Technical Merit**

describe the feasibility and technical adequacy of the Camarillo Groundwater Treatment Facility.

The feasibility of the overall project has been evaluated in several documents, containing progressively more detailed evaluation and analysis, most recently the "City of Camarillo Groundwater Treatment Facility Feasibility Study." The Feasibility Study concluded that the project was technically and economically feasible and provided recommendations for treatment processes, process flow, and facility layout. The Feasibility Study also identified several data gaps (p. 21), particularly with respect to the impact of iron and manganese on the proposed treatment processes. These data gaps will be filled by completing Task 1, Pilot Study.

The following documents have been prepared for, or support the feasibility and technical adequacy of, the Camarillo GWTF:

1. Black & Veatch, "City of Camarillo Groundwater Treatment Facility Feasibility Study," March 2005. Prepared for City of Camarillo.
2. Kennedy/Jenks Consultants, "Conceptual Membrane Treatment Facility for Wells A and B," May 2004. Prepared for City of Camarillo.
3. Kennedy/Jenks Consultants, "Water Production Alternatives Study, Final Draft Report," February 2003. Prepared for City of Camarillo.
4. Hopkins Groundwater Consultants Inc., "Preliminary Hydrogeological Study, City of Camarillo Water Production Alternatives Study," February 2002. Prepared for City of Camarillo.

VCWWD1 Recycled Water System, Phase II (C-7)

The Ventura County Waterworks District No. 1 (VCWWD1) Recycled Water System, Phase II (VCWWD1 Recycled Project) will consist of approximately 3,000 linear feet of recycled water pipeline to transport tertiary-treated effluent from the Moorpark Wastewater Treatment Plant (MWTP) to customers within VCWWD1. The project also

provides for the construction of a 1.5 million gallon welded steel aboveground storage tank.

The overall feasibility of delivering recycled water to this area was evaluated in the 1990 "Reclaimed Water Feasibility Study." The Feasibility Study (Section 5) showed that there is a large potential market for recycled water near the MWTP. Once the feasibility of the project was established, the concept was further refined in the "Supplemental Engineering Report for Proposed Reclaimed Water Distribution System and Storage Reservoir." Plans and specifications were subsequently partially prepared for the pipelines and the storage tank.

At this time, there are no known data gaps for the project. Project design, including preparation of plans and specifications, is 50 percent complete, with only final design, permitting, bidding and construction remaining to be completed.

The following documents have been prepared for, or support the feasibility and technical adequacy of, the VCWWD1 Recycled Project:

1. Plans and Specifications for the Reclaimed Water Storage Tank No. 1, Prepared for VCWWD1.
2. "Supplemental Engineering Report," April 2006, Prepared for VCWWD1.
3. Boyle Engineering, "Reclaimed Water Feasibility Study," 1990. Prepared for VCWWD1.

Calleguas Creek Watershed Arundo/Tamarisk Programmatic EIR/EA, Permits and Pilot Removal Project (C-10)

The removal of the invasive species of arundo and tamarisk will have habitat, water supply, and water quality benefits for the Calleguas Creek Watershed. The Calleguas Creek Watershed Arundo/Tamarisk Programmatic EIR/EA, Permits and Pilot Removal Project (Calleguas Arundo Removal Project) will perform a programmatic environmental review and permitting process for invasive plant removal projects within the Calleguas Creek Watershed, streamlining the process for removal of these



Watersheds Coalition of Ventura County IRWMP Proposition 50 Grant Proposal, Step 2 **Attachment 8: Scientific and Technical Merit**

species throughout the Watershed and implementing a pilot removal project.

The impacts caused by the establishment of non-native plant species, particularly arundo and tamarisk, are well-documented. Both arundo and tamarisk are listed as 'A-1' invaders (the most invasive and widespread wildland pest plants) by the California Invasive Plant Council and as noxious weeds by the California Department of Food and Agriculture (CDFA). The impacts of arundo and tamarisk on habitat quality, fire hazard levels, flooding and erosion potential, water supply, water quality, and stream geomorphology are thoroughly documented in the numerous studies and reports listed below.

The feasibility of removing arundo and tamarisk on a watershed basis has been evaluated and implemented in a number of locations. In particular, Ventura County Resource Conservation District (VCRCD) has modeled the Calleguas Creek Watershed effort after similar projects prepared by Sustainable Conservation and Circuit Rider Productions in several areas in northern and central California, including Morro Bay and Elkhorn Slough, as well as previous efforts in the Santa Clara River Watershed in Ventura County.

Although the need for and feasibility of arundo and tamarisk removal are well-documented, data gaps do exist. These data gaps, such as the specific location for the pilot project and more extensive and detailed arundo mapping, will be filled during the design, CEQA, and permitting processes (Tasks 1, 2, and 3).

The following documents detail the negative impacts of arundo and tamarisk and support the feasibility and technical adequacy of, the Calleguas Arundo Removal Project:

1. Bell, G. 1997. Ecology and management of *Arundo donax*, and approaches to riparian habitat restoration in Southern California. In Brock, J. H., Wade, M., Pysek, P., and Green, D. (Eds.): *Plant Invasions: Studies from North America and Europe*. Blackhuys Publishers, Leiden, The Netherlands, pp. 103-113.
2. California Exotic Pest Plant Council. 1999. *Exotic Pest Plants of Greatest Ecological Concern in California*. October
3. Carpenter, A.T. 1998. Element Stewardship Abstract for *Tamarix*." The Nature Conservancy.
4. Dudley, T. 2000. "*Arundo donax*." *Invasive Plants of California's Wildlands*. Bossard C.C., J.M. Randall, and M.C. Hoshovsky. University of California Press, Berkeley.
5. Hendrickson, D. and S. McGaugh 2005. *Arundo donax* (Carrizo Grande/Giant Cane) in Cuatro Cienegas. http://www.utexas.edu/tmm/sponsored_sites/dfc/cuatroc/organisms/non-native/arundo/Arundo.html
6. Herrera, A.M. and T.L. Dudley. 2003. "Reduction of riparian arthropod abundance and diversity as a consequence of giant reed (*Arundo donax*) invasion." *Biological Invasions* 5: 167-177
7. Hoshovsky, Marc. 1986. "Element Stewardship Abstract for *Arundo*." The Nature Conservancy.
8. Iverson, M.E. 1993. "The impact of *Arundo donax* on water resources. In: N. Jackson, P. Frandsen, and S. Duthoit (eds) *Proceedings of the Arundo donax workshop*, Ontario, California. California Exotic Pest Plant Council, Berkeley, CA. 19-25.
9. Lovich, J. 2000. "Tamarisk." *Invasive Plants of California's Wildlands*. Bossard C.C., J.M. Randall, and M.C. Hoshovsky. University of California Press, Berkeley.
10. Martin, Tunyalee "A Success Story: Tamarisk Control at Coachella Valley Preserve, Southern California." The Nature Conservancy. *Wildland Invasive Species Program*. Jan 2001.
11. McWilliams, John D. 2004. *Arundo donax*. In: *Fire Effects Information System*, [Online]. U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station, Fire Sciences Laboratory (Producer).



Watersheds Coalition of Ventura County IRWMP Proposition 50 Grant Proposal, Step 2 **Attachment 8: Scientific and Technical Merit**

Available:
<http://www.fs.fed.us/database/feis/> [2006, April 28].

12. Muzika, Rose-Marie and Swearingen, Jil M. "Saltcedar" (On-line)The National Park Service website:
<http://www.nps.gov/plants/alien/fact/tama1.htm>
13. A. Sala, S.D. Smith, D.A. Devitt. "Water Use by *Tamarix Ramosissima* and Associated Phreatophytes in a Mojave Desert Floodplain". *Journal of Applied Ecology*, Vol. 6(3), 888-898pp., 1996
14. Santa Ana Watershed Protection Authority (SAWPA). Arundo Removal Protocol.
15. Swift, Curtis "Cooperative Extension: Saltcedar (Tamarix) Physiology- A Primer", Colorado State University.
16. Ventura County Resource Conservation District (VCRCD). 2005. Initial Study and Negative Declaration for the Calleguas Creek Permit Program. Somis, CA.
17. VCRCD. 2006a. Upper Santa Clara River Watershed Arundo/Tamarisk Removal Plan. Somis, CA
18. VCRCD. 2006b. Environmental Impact Report for the Upper Santa Clara River Watershed Arundo/Tamarisk Removal Plan. Somis, CA
19. Zouhar, Kris 2003. *Tamarix* spp. In: Fire Effects Information System, [Online]. U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station, Fire Sciences Laboratory (Producer). Available: <http://www.fs.fed.us/database/feis/> [2006, April 28].

Simi Valley Tapo Canyon Water Treatment Plant (C-11)

The Simi Valley Tapo Canyon Water Treatment Plant (TCWTP) will be a 1.0 mgd brackish groundwater treatment plant, utilizing the NF process, to produce potable water.

A Preliminary Design Report for the TCWTP was prepared in March 1999, and included an evaluation of the technical and economic feasibility of the project. The Preliminary Design Report also evaluated potential treatment technologies, and recommended the NF process. Since that time, plans and specifications were prepared based on the Preliminary Design Report.

At this time, there are no known data gaps for the project. Project design, including preparation of plans and specifications, is largely complete, with only final design, permitting, bidding and construction remaining to be completed.

The following documents have been prepared for, or support the feasibility and technical adequacy of, the TCWTP:

1. RBF Consulting, "Plans and Specifications for the Tapo Canyon Groundwater Treatment Facility." Prepared for VCWWD No. 8/City of Simi Valley.
2. Robert Bein, William Frost, and Associates "Preliminary Design Report for the Replacement Tapo Canyon Water Treatment Plant," March 1999. Prepared for VCWWD No. 8/City of Simi Valley.

Santa Clara River Watershed

The Santa Clara River is the largest river system in Southern California remaining in a relatively natural state. Originating in the San Gabriel Mountains of Los Angeles County, the River flows west approximately 84 miles through Ventura County before reaching the Pacific Ocean between the Cities of San Buenaventura and Oxnard. The Santa Clara River and tributary system has an area of about 1,634 square miles with approximately 60 percent of the Watershed located in Ventura County and 40 percent in Los Angeles County.

The Santa Clara River Watershed is partially dependent on imported water from Calleguas MWD, and heavily dependent on local groundwater sources. The Santa Clara River Watershed is facing a number of challenges with respect to NPS groundwater pollution from septic systems and



**Watersheds Coalition of Ventura County IRWMP
Proposition 50 Grant Proposal, Step 2
Attachment 8: Scientific and Technical Merit**

issues associated with a variety of TMDLs, either adopted or in development.

El Rio Forebay Groundwater Contaminant Elimination Project, Phase 7 (SC-1)

The El Rio Forebay Groundwater Contaminant Elimination Project (El Rio GCEP) will construct sewer systems to enable existing septic systems in the unincorporated communities of El Rio, Strickland, Saticoy, and a portion of the City of Oxnard to be removed. The existing septic systems degrade water quality by discharging pathogens, ammonia, nitrates, nitrites, and organic nitrogen to groundwater that is used for drinking water. The overall feasibility and technical adequacy of the El Rio GCEP has been addressed in several documents prepared for the Ventura County Water and Sanitation Department, as well as documents prepared for and by the RWQCB.

The need to remove septic systems from the area has been thoroughly documented by the RWQCB for more than 30 years. In 1975, the Regional Water Pollution Control Board (a precursor to the RWQCB) noted that El Rio is one of several communities where septic systems result in problems (Water Quality Control Plan Report for the Santa Clara River Basin [4A], adopted on March 20, 1975, as referenced in RWQCB Resolution No. 99-13, p.3). In 1994, the RWQCB stated that it discouraged the prolonged use of septic systems, and further stated that septic systems were not acceptable in areas that could lead to contamination of either surface or groundwater (Basin Plan, adopted on June 13, 1994, as referenced in RWQCB Resolution No. 99-13, p.3). Furthermore, a Ventura County Grand Jury investigated nitrate contamination in the groundwater underlying the Oxnard Forebay (used interchangeably with the El Rio Forebay), and their report stated that septic systems in the Forebay “violate water quality objectives, impair present and future beneficial uses, and unreasonably degrade the quality of the waters of the state.” (as referenced in RWQCB Resolution No. 99-13, p.4).

The Forebay’s importance for groundwater recharge, the contribution of septic systems to the degradation of groundwater quality, and the need for the project have also been documented by the RWQCB in Resolution No. 99-13, as follows:

- “The Oxnard Forebay (Forebay) is an important recharge area for valuable resources of groundwater in aquifers underlying the Oxnard Plain Forebay. Existing beneficial uses of ground water underlying the Oxnard Forebay include: Municipal and Domestic supply, Commercial and Industrial supply, and Agricultural supply.” (p. 3)
- “The findings of the investigation are detailed as follows:
 - A. The communities discharge septic systems effluent to groundwater, which is also their source of drinking water.
 - B. Septic system effluent contains nitrogen and pathogens well in excess of water quality objectives; the communities’ drinking water also contains nitrate and pathogens at times in excess of water quality objectives.
 - C. In the early 1990’s some local water supplies were taken off line by State Health Officials because nitrate in the water supply exceeded the maximum contaminant level of 45 mg/L. After this period, some local purveyors abandoned their water supply in favor of purchasing imported water.
 - D. State Health officials require existing water purveyors to disinfect their water supplies to kill pathogens. Data indicate that coliform is still found in water supplies, indicating disinfection does not always work.
 - E. Groundwater depth varies in communities and can range from 20 feet below ground surface to 90 feet below ground surface.
 - F. The soils underlying these communities are coarse and well drained and not suitable to attenuate the high volume of septic system discharges



**Watersheds Coalition of Ventura County IRWMP
Proposition 50 Grant Proposal, Step 2
Attachment 8: Scientific and Technical Merit**

(between 750,000 and 1,500,000 gallons of septic discharge per day)" (p. 4)

The feasibility of the overall project to address the issues raised by the RWQCB was evaluated in the "County of Ventura, Project Feasibility Report, El Rio Area Sewer Collection and Disposal System," which determined to which areas sewer service could be feasibly provided, and discussed the basics of how the system will operate (p.i).

The benefits of the project were corroborated by the "El Rio Groundwater Elimination Project, Project Assessment Evaluation Plan" (p.1) and an internal County Technical Memorandum, which indicated that approximately 164 lbs of pollutants per household septic system, per year, are discharged to the groundwater in the Forebay. A conventional sewer system will facilitate the abandonment of approximately 1,400 residential and 200 commercial/industrial septic systems, and eliminate these systems as a source of groundwater pollution. Phase 7 of the El Rio GCEP is expected to eliminate 202 of the septic systems in the Forebay.

At this time, there are no known data gaps for the project. Other phases of the project, which are similar in nature and design, have been successfully implemented. Project design, including preparation of plans and specifications, is largely complete, with only limited permitting, bidding and construction remaining to be completed.

The following documents have been prepared for, or support the feasibility and technical adequacy of, the El Rio GCEP:

1. State of California, California Regional Water Quality Control Board, Los Angeles Region, "Amendment to the Water Quality Control Plan for the Los Angeles Region to Incorporate a Septic System Prohibition in the Oxnard Forebay (Resolution No. 99-13)"
2. Phase 7 Plans and Specifications, Technical Specifications Draft, County of Ventura, April 2006.
3. Technical Memorandum, From: David Panaro, To: Reddy Pakala, Subject: Nitrate

Loading To Groundwater from Individual Septic Disposal Systems, May 31, 2006.

4. Project Feasibility Report, Penfield & Smith, April 2001.
5. Notice of Determination, Mitigated Negative Declaration, April 2001.
6. U.S. Environmental Protection Agency Environmental Assessment, April 2003.
7. U.S. Environmental Protection Agency, Finding of No Significant Impact, April 2006.

Oxnard Forebay Groundwater Contaminant Elimination Project, College Park Phase (SC-2)

Similar to the El Rio GCEP (SC-1), the Oxnard Forebay Groundwater Contaminant Elimination Project, College Park Phase (Oxnard GCEP) will construct sewer systems to enable existing septic systems in College Park to be removed. The importance, need, benefits, overall feasibility and technical adequacy of the Oxnard GCEP have been addressed in the same RWQCB documents, as described above. In addition, the City of Oxnard's 2002 "Wastewater Collection System Master Plan" incorporates facilities necessary to convey the additional wastewater from both the El Rio GCEP (SC-1) and Oxnard GCEP.

At this time, there are no known data gaps for the project. Other phases of the project, which are similar in nature and design, have been successfully implemented. Project design, including preparation of plans and specifications, is largely complete, with only limited permitting, bidding and construction remaining to be completed.

The following documents have been prepared for, or support the feasibility and technical adequacy of, the Oxnard GCEP:

1. Regional Water Quality Control Board – Los Angeles Region, "Proposed Amendment to the Water Quality Control Plan for the Los Angeles Region For A Prohibition of Septic System Discharges in the Oxnard Forebay," July 29, 1999.



Watersheds Coalition of Ventura County IRWMP Proposition 50 Grant Proposal, Step 2 **Attachment 8: Scientific and Technical Merit**

2. Kennedy/Jenks Consultants, "Recycled Water Backbone System Study," October, 2005, Prepared for the City of Oxnard Water Division.
3. Brown and Caldwell, "City of Oxnard Wastewater Collection System Master Plan," August 2002. Prepared for the City of Oxnard Wastewater Division.
4. United Water Conservation District "Surface and Groundwater Conditions Report – 2000," September 2001. Prepared by United Water Conservation District, Groundwater Resources Department.

Fillmore Integrated Water Recycling and Wetlands Project, Phase II-A (SC-3)

The overall Fillmore Integrated Water Recycling and Wetlands Project involves construction of a wastewater treatment plant to produce Title 22 unrestricted reuse recycled water, a water softening plant, recycled water distribution system, and wetlands percolation areas. The phase of the project for which funding is being sought is the construction of a recycled water distribution system to serve existing users throughout the City of Fillmore, called Phase II-A, or the Fillmore Recycled Project.

The City has performed extensive study of the feasibility of the recycled water system, as a component of the Fillmore Integrated Water Recycling and Wetlands Project. The April 2005 "Report of Waste Discharge" described the City's waste discharge requirements and proposed this approach, the Fillmore Integrated Water Recycling and Wetlands Project, to achieve them.

The costs, feasibility, and individual components of the project were further developed in the "Water Recycling Plant Project Report," "Water Treatment Alternatives Report," and "Effluent Disposal Project Report." The layout and components of the recycled water distribution system were refined in the "Technical Memorandum, WRP Offsite Infrastructure Concept Design-Phase 1."

At this time, there are no known data gaps for the project. Adequate information is available to perform design, including preparation of plans and

specifications. Once design is completed, bidding, award, and construction can follow.

The following documents have been prepared for, or support the feasibility and technical adequacy of, the Fillmore Recycled Project:

1. P&D Environmental. "Environmental Impact Report for the Fillmore Water Recycling Plant," March 2005. Prepared for the City of Fillmore.
2. Boyle Engineering Corporation, "City of Fillmore Sewer Master Plan," August 2005. Prepared for the City of Fillmore.
3. Boyle Engineering Corporation, "Water Treatment Alternatives Report," July 2005. Prepared for the City of Fillmore.
4. Boyle Engineering Corporation, "Water Recycling Plant Project Report," June 2005. Prepared for the City of Fillmore.
5. Boyle Engineering Corporation, "Effluent Disposal Project Report," October 2005. Prepared for the City of Fillmore.
6. Boyle Engineering Corporation, "Report of Waste Discharge," April 2005. Prepared for the City of Fillmore.
7. Boyle Engineering Corporation, "Technical Memorandum, WRP Offsite Infrastructure Concept Design-Phase 1," June 2005.

Ventura River Watershed

The Ventura River Watershed has an area of approximately 225 square miles. Originating in the Los Padres National Forest, the River generally flows in a southerly direction to the Pacific Ocean, exiting at an estuary located at the mouth of the Ventura River. The Ventura River is a perennial, but intermittent, stream. The Ventura River Watershed is the wettest watershed in Ventura County, with an average rainfall of 16 inches near the river mouth to 40 inches at the headwaters. It is not unusual to get 24 inches of rain in a 24-hour period in the Watershed.



**Watersheds Coalition of Ventura County IRWMP
Proposition 50 Grant Proposal, Step 2
*Attachment 8: Scientific and Technical Merit***

An effort is underway to remove 60-year-old Matilija Dam located on Matilija Creek, approximately 16 miles upstream of the Pacific Ocean. The dam was intended to provide a local water supply while offering flood protection for downstream communities. The build-up of sediment behind the dam has undermined both of those original functions. Sediment will continue to accumulate behind the dam, until what little is left of the Matilija Reservoir disappears altogether, eliminating any water storage capabilities. The initial storage capacity of the reservoir was 7,018 acre-feet, but today it holds less than 500 acre-feet of water.

The Ventura River Watershed is entirely dependent on local surface water and groundwater sources, although several agencies hold unused State Water Project entitlements. The Ventura River Watershed is facing a number of challenges with respect to adequate water supply and issues associated with a variety of TMDLs to be developed. Habitat loss and flooding are also important concerns for the Watershed.

Ventura River Watershed Protection Project (V-1)

The Ventura River Watershed Protection Project (V-1) will develop a comprehensive, integrated plan to facilitate the implementation of an arundo removal/water supply reliability project, and both a groundwater and surface water quality monitoring program.

The arundo removal/water supply reliability project will substantially reduce the abundance and distribution of invasive plants which consume large quantities of water, displace native vegetation and wildlife, disperse readily during floods, and exacerbate flooding, erosion, and fire intensity. The benefits of arundo removal and the relevant references for those benefits have already been described for the Calleguas Arundo Removal Project (C-10). Those same references are relevant to the Ventura River Watershed Protection Project.

The groundwater and surface water quality monitoring program will assess current water quality impairments, potential pollutant sources, and evaluate the success of the arundo removal/water supply reliability project.

Previous efforts within the Ventura River Watershed have identified the following problems and issues:

(1) surface water quality deterioration; (2) mechanical impairments; and (3) degraded habitat resources. However, at this time, sizable data gaps and unknowns still exist. Most significantly, it is unclear how past and current land use practices have impacted the hydrology, water quality, habitat and floodplain resources throughout the Watershed. The Ventura River Watershed Protection Project will address these fundamental gaps in knowledge and modeling and implement specific water quality, water supply, and habitat restoration projects. In order to move towards these goals, information needs will be addressed under Task 1, Data Gap Analysis.

The feasibility of the Ventura River Watershed Protection Project is proven by similar successful projects in other Ventura County Watersheds, such as the Santa Clara River Enhancement and Management Plan (SCREMP) and the Calleguas Creek Watershed Management Plan (CCWMP). These projects illustrate the significant work that is accomplished by bringing stakeholders together to discuss, plan, model, identify priorities, and implement restorative projects that have multiple and integrated benefits.

The Ventura River Watershed Protection Project will capitalize on the proven effective methods utilized in the CCWMP, such as the implementation of the Hydrologic Simulation Program Fortran model (HSPF). This modeling tool will simulate the continuous, dynamic event and/or the steady-state behavior of processes in the Ventura River Watershed. The HSPF model is unusual in its ability to represent the hydrologic regimes of a wide variety of streams and rivers with reasonable accuracy. Thus, the potential applications and uses of the model are comparatively large and include: flood mapping, urban drainage studies, river basin planning, studies of sedimentation and water erosion problems and in-stream water quality planning. The validity of the HSPF model is well established, and it is used by the U.S. EPA for simulation of watershed hydrology and water quality for both conventional and toxic organic pollutants.

In addition, the following key documents have been prepared for, or support the feasibility and technical



Watersheds Coalition of Ventura County IRWMP Proposition 50 Grant Proposal, Step 2 **Attachment 8: Scientific and Technical Merit**

adequacy of, the Ventura River Watershed Protection Project:

1. California Regional Water Quality Control Board – Los Angeles Region, “State of the Watershed – Report on Surface Water Quality of the Ventura River Watershed,” 2002.
2. United States Army Corps of Engineers, “Matilija Dam Ecosystem Restoration Feasibility Study,” 2004. Prepared for the Ventura County Watershed Protection District.
3. ENTRIX, Inc., “Draft Ventura River Habitat Conservation Plan,” 2005. Prepared for the Ventura County Watershed Protection District.
4. ENTRIX, Inc. and Woodward Clyde Consultants, “Ventura River Steelhead Restoration and Recovery Plan,” 1997. Prepared for Casitas Municipal Water District, City of San Buenaventura, Ventura County Flood Control District, Ventura County Transportation Department, Ventura County Solid Waste Management Department, Ojai Valley Sanitary District, Ventura River County Water District, Ojai Basin Ground Water Management Agency, Meiners Oaks County Water District, and Southern California Water Company.
5. Casitas Municipal Water District, “Sanitary Survey Update 2006.”

San Antonio Spreading Grounds Rehabilitation (V-2)

The San Antonio Spreading Grounds Rehabilitation will rehabilitate abandoned diversion works and spreading basins adjacent to San Antonio Creek to increase groundwater recharge into the Ojai Valley Groundwater Basin and improve fish passage past the point of the current damaged diversion structure and low-flow, concrete road crossings. A “clustered” depth-discrete monitoring (DDM) well will also be constructed near the spreading grounds to permit monitoring of the effectiveness of the spreading grounds.

The feasibility of the project is proven by its successful operation from 1949 to 1985. However, no written records were kept of the surface flow diversions from San Antonio Creek. According to estimates contained in hydrogeologic investigation of the Basin performed in 1990, 15 to 20 acre-feet per day were diverted to the ponds for an average of 30 days per year. Other estimates of 25 acre-feet per day have been suggested. According to Staal, Gardner & Dunn Inc., in an average year, this will yield approximately 500 acre-feet of recharge to the basin. The amount of recharge in any given year could vary appreciably, depending upon the quantity, intensity, and duration of rainfall received in the area. If surface flow occurred during a short period of time, only part of the runoff could be diverted for recharge.

Following the Ojai fire in 1985, the VCWPD was concerned that heavy rains could trigger a debris flow downstream and damage properties adjacent to San Antonio Creek. The VCWPD constructed a debris basin in the vicinity of the recharge ponds and unknowingly filled the ponds with excavated soil. In the process, most of the ponds were buried in silt and clay.

Data gaps do exist. While the prior long-standing and successful operation of the spreading grounds demonstrates that there is technical merit for rehabilitation of the spreading grounds, there is a lack of historical records documenting the quantity of augmented Basin yield that may result from the rehabilitated spreading grounds. To answer this question, VCWPD and Golden State Water Company commissioned the hydrology firm, D.B. Stephens and Associates, to perform a hydrologic study of San Antonio Creek and the potential rehabilitated spreading grounds, which was completed in June 2006. This study determined: (a) the annual flows within San Antonio Creek (average and variable), (b) the quantity of water that must remain in the creek system for riparian habitat, (c) the quantity of water that could be diverted to the proposed spreading grounds, and (d) the amount of potential infiltration and augmentation of the Ojai Basin's yield that will result from this project.

Because this study was completed prior to the anticipated grant agreement date of May 1, 2007, it is not included in the Work Plan. However, the



Watersheds Coalition of Ventura County IRWMP Proposition 50 Grant Proposal, Step 2 **Attachment 8: Scientific and Technical Merit**

results of the study will also provide information necessary to complete the CEQA documentation for the project (Task 3), and to support the application for the necessary diversion permit from the State Water Resources Control Board (Task 4), both of which are included in the Work Plan.

The following documents have been prepared for, or support the feasibility and technical adequacy of, the San Antonio Spreading Grounds Rehabilitation:

1. Staal, Gardner & Dunn, Inc., "Ojai Groundwater Basin Section 602 and 603 Study Tasks," December 1992.
2. Jordan Leigh Kear, "Hydrogeology of the Ojai Groundwater Basin: Storativity and Confinement, Ventura County, California," December 2005. (This document also contains an extensive reference list for groundwater issues in the Ojai Basin.)
3. D.B. Stephens and Associates. "Hydrology Study of San Antonio Creek," June 2006.

Senior Canyon Mutual Water Company Automation Upgrades Project (V-6)

The Senior Canyon Mutual Water Company Automation Upgrades Project (Senior Canyon Upgrades) is a critical component of Casitas Municipal Water District's Water Conservation Program. The project will provide a cost-effective means of water supply management for the Senior Canyon area and increase the ability to utilize previously wasted groundwater for potable use by implementing equipment and automation upgrades to better manage water supplies and deliver better quality water to customers.

The need for additional water supplies was identified in the 2004 "Water Supply and Use Status Report," identifying a 360 AF/yr deficit during dry years (p. 9). The 2005 Urban Water Management Plan (UWMP) presented potential approaches that will generate more water supplies or better use existing resources, including the Senior Canyon Upgrades (p. 10). The need for system upgrades was also identified in the California Department of Health Services' inspection report for the Senior Canyon Mutual Water Company System. The equipment

required for the upgrade was documented in an internal memorandum from the Treatment Plant Manager to the Conservation Manager.

The project will result in the conservation of at least 42 AFY of water ordinarily lost to seepage, evaporation, and downstream releases due to lack of storage capacity, water quality issues, and untimely response to flow changes due to the manual operating system. The lack of instrumentation and controls makes it difficult to prevent distribution storage tanks from overflowing or from identifying leaks within the system. An automated system will allow for immediate management of the water system enabling personnel to respond more quickly to operational failures in treatment and water supply losses.

At this time, there are no known data gaps for the project. Adequate information is available to perform design, including preparation of plans and specifications. Once design is completed, bidding, award, and construction can follow.

The following documents have been prepared for, or support the feasibility and technical adequacy of, the Senior Canyon Upgrades:

1. Casitas Municipal Water District, "Water Supply and Use Status Report," December 7, 2004.
2. Casitas Municipal Water District, "2005 Urban Water Management Plan."
3. Internal Casitas Municipal Water District Memorandum from Treatment Plant Manager to Conservation Manager, Re: Sr. Canyon Equipment List for Grant, May 22, 2006.
4. California Department of Health Services, "Notice of Violation," September, 2003.