WATER RECLAMATION
SOLID WASTE MANAGEMENT

COUNTY SANITATION DISTRICTS
OF LOS ANGELES COUNTY

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STEPHEN R. MAGUIN
Chief Engineer and General Manager

November 9, 2010
File No. 26-02.01-55

Mr. Samuel Unger, Executive Officer
California Regional Water Quality Control Board,
Los Angeles Region
320 W. 4th Street, Suite 200
Los Angeles, CA 90013

Dear Mr. Samuel Unger:

Final Settlement Offer Request for Alleged Violations at the Saugus Water Reclamation Plant (NPDES Permit No. CA0054313, CI No. 2960) and Supplemental Environmental Project Workplan Submission

The Santa Clarita Valley Sanitation District of Los Angeles County (Sanitation District) sent a proposal to the California Regional Water Quality Control Board, Los Angeles Region (Regional Board) requesting to apply a portion of the assessed mandatory minimum penalty (MMP) liability for the Saugus Water Reclamation Plant (WRP) towards a supplement environmental project (SEP). Specifically, the Sanitation District proposed to fund the Upper Santa Clara River Watershed Area E Arundo Removal SEP, which is part of a larger project, the Upper Santa Clara River Watershed Arundo and Tamarisk Removal Project. The Regional Board notified the Sanitation District that the SEP proposal would be permitted and required submission of a SEP work plan. Therefore, attached please find the work plan for the Upper Santa Clara River Watershed Arundo and Tamarisk Removal Project, with a project schedule and budget specific to the Upper Santa Clara River Watershed Area E Arundo Removal SEP.

The Sanitation District is in agreement with the Regional Board's September 2009 assessment of $174,000 in total MMP liability for the Saugus WRP. However, the September 2009 assessment did not include two violations subject to MMPs that occurred on December 21, 2008 and January 14, 2009. These two violations were due to exceedances of the daily maximum chlorine residual concentration limit. The Sanitation District requests that the MMPs associated with the violations be included in the settlement offer, which will result in a total liability amount of $180,000. Additionally, the allowable SEP funding amount will increase to $97,500.

Lastly, the Sanitation District requests sixty (60) days to complete and return the required settlement documentation. A longer time period than thirty (30) days is necessary because the Sanitation District is a public agency and, as such, the documentation must be considered by the Sanitation District's Board of Directors. In order for all procedures to be followed regarding approval of any settlement agreement, sixty (60) days are necessary.

In conclusion, the Sanitation District is in agreement with a total liability of $180,000 for all past violations subject to MMPs, and would like to resolve this liability through payment of $82,500 in penalties and $97,500 to the enclosed SEP. Sanitation District staff would recommend that our Board of Directors approve this resolution of the MMP liability. Additionally, as requested above, sixty (60) days should be provided to complete any settlement documentation. Should you have any questions or require additional information regarding this request, please contact Shannon Grund at (562) 908-4288, extension 2843.

Very truly yours,

Stephen R. Maguin

Philip L. Friess
Department Head
Technical Services

PLF:SAG:lmb
Attachment

cc: Deb Smith, Paula Rasmussen, Hugh Marley, Kristie Kao, and Pansy Yuen (Los Angeles Regional Board)
Reed Sato, Mayumi Okamoto, and Taryn Stokell (State Water Board)

Attachment

UPPER SANTA CLARA RIVER WATERSHED ARUNDO/TAMARISK REMOVAL SUPPLEMENTAL ENVIRONMENTAL PROJECT

PROPOSAL/WORK PLAN REQUIREMENTS

- **Name of organization completing the SEP, contact person, and phone number.**

City of Santa Clarita, Primary Contact: Travis Lange, (661) 255-4337, Alternate Contact: Heather Merenda, (661) 284-1413.

- **Name and location of the project, including watershed (creek, river, bay) where it is located.**

Name: Upper Santa Clara River Watershed Arundo/Tamarisk Removal Plan (SCARP) Site Specific Project.

Location: The proposed project site is located in the City of Santa Clarita (herein referred to as "the City") within and along the banks of the Santa Clara River and the lowest reaches of two of its major tributaries, San Francisquito Creek and the South Fork. The 297-acre project site is located within the 500-year floodplain within the established boundaries of a conservation easement. The conservation easement boundary includes the riverbed, lower banks, and part of the upper bank of the main stem and south fork of the Santa Clara River and San Francisquito Creek. The project site is generally bounded by industrial parks and residential neighborhoods accessed by Newhall Road to the north, Town Center Drive to the south, and by Bouquet Canyon Road on the east. The project ends approximately 1,500 yards east of Interstate 5. See figure attached for Demonstration Project Boundary.

Watershed: Santa Clara River Watershed.

- **Describe the project and how it fits into one or more of the following SEP categories:**

1. **Pollution Prevention**
2. **Environmental Restoration**
3. **Environmental Auditing**
4. **Public Awareness/Education**
5. **Watershed Assessment**
6. **Watershed Management**
7. **Facilitation Services**
8. **Non-Point Source Program Implementation**

Project description:

Background:

The Santa Clara River is regarded as the largest natural river system in southern California. The Santa Clara River flows approximately 84 miles from its headwaters near Acton, in the San Gabriel Mountains, westward through Los Angeles and Ventura counties to its delta between the

cities of Ventura and Oxnard. The 45-mile-long portion of the Santa Clara River and its tributaries within Los Angeles County is referred to as the "Upper Santa Clara River watershed" while the portion in Ventura County is referred to as the "Lower Santa Clara River watershed."

The Upper Santa Clara River watershed, where the project is located, consists of approximately 680 square miles of mostly rugged topography and natural land. Urban development is concentrated in the City and its four communities (Canyon Country, Newhall, Saugus, and Valencia) and the Los Angeles County unincorporated communities of Stevenson Ranch, Castaic, West Ridge, and West Creek. There are also rural communities with some urbanization in Val Verde, Agua Dulce, and Acton. Surface flows are ephemeral in Reach 7 (between Bouquet Canyon Creek and Lang Gauging Station) and Reach 8 (above Lang Gauging Station) and are perennial for the majority of Reach 5 (from Blue Cut to The Old Road) and Reach 6 (from The Old Road to Bouquet Canyon Creek). The beneficial use designations for the Upper Santa Clara River include: IND, PROC, AGR, GWR, FRSH, REC1, REC2, WARM, WILD, BIOL, and WET.

Native habitats occupying the upland portions of the watershed include chaparral, coastal sage scrub, and oak woodlands. The floodplains of the Upper Santa Clara River and its tributaries support a mix of cover including open channel, a variety of native habitats, and developed areas. The most significant habitats are cottonwood woodlands, willow woodlands, and riparian scrub. Multiple threats to the health of the watershed exist. One threat is the establishment of invasive non-native plant species, particularly arundo (*Arundo donax*) and tamarisk (*Tamarix* spp.), which are out competing native plant species, degrading habitat, decreasing water availability, and causing both wildfire and flooding hazards. In addition, these invasive non-native plant species can also degrade water quality. For instance, stands of tamarisk cause the surface soil to become highly saline, preventing other native plant species from surviving. The increase in salinity can contribute to localized increase in chloride concentration of the surface water flows.

Project Overview:

The Upper Santa Clara River watershed Arundo/Tamarisk Removal Plan (SCARP) was developed in 2006. The goal of the SCARP is to facilitate future arundo or tamarisk removal projects of any size, by any agency, organization, or individual landowner, within the Santa Clara River in its upper watershed. Through obtaining regional permitting and outreach to landowners on the importance of removing non-native plants, SCARP has guided and facilitated the implementation of arundo, tamarisk, and other invasive plants (i.e., perennial pepperweed, castor bean) removal projects within the Upper Santa Clara River watershed of Los Angeles County. The Los Angeles Regional Water Quality Board (Regional Board) has funded this project in the past and we are asking for additional funds to remove arundo from additional areas that have not been previously abated. The Ventura County portion of the Santa Clara River has been trying to coordinate regional permitting. Recently, the Ventura County Agricultural Commissioners office has been working to coordinate the invasive plant efforts in the Santa Clara River. This project would help facilitate that coordination by keeping work moving so that when the Lower Santa Clara River watershed is ready with its permits, the upper reaches will have had significant work completed. This will make the Ventura County portion easier to coordinate and demonstrate success.

UPPER SANTA CLARA RIVER WATERSHED ARUNDO/TAMARISK REMOVAL SUPPLEMENTAL ENVIRONMENTAL PROJECT

The SCARP has been prepared to provide local landowners, municipalities, environmental groups, and other stakeholders with a broad menu of available techniques for removal of arundo and tamarisk and guidance in obtaining proper permits and approval for removal. The SCARP also provides Best Management Practices (BMP) needed to minimize impacts during removal projects. The proposed demonstration project site is a highly visible and accessible site, owned by the City of Santa Clarita. It includes arundo and tamarisk stands in need of removal, and would benefit from restorative plantings. SCARP BMPs will be utilized for removing arundo and tamarisk within the demonstration project site. If project goals are achieved at the completion of the demonstration project, then funding to expand the program to encompass more areas of the Upper and Lower Santa Clara River will be pursued by other stakeholders.

The Regional Board helped fund this project in the past. However, the SCARP project underestimated the amount of effort required for hand removal of arundo and tamarisk and the re-growth that occurs with these plants given that the Saugus Water Reclamation Plant produces a perennial source of nutrient rich water. Thus, areas that were removed had to be re-cut for two years and will likely need several more cuttings until the native plants out compete the arundo, using up more of the original budget than estimated. Also, some of the arundo has actually grown in the water itself, making it impossible to completely eradicate while complying with the California Department of Fish and Game permit conditions. Additional and expensive removal will need to be implemented in these areas.

The City is currently removing arundo from part of a 25-acre site in Area E shown on the area map attached. Only one third of the work needed for the first cut has been completed in this area. The work is slow due to the massive density of arundo that is mixed with old growth cottonwoods and willows. As a result of budget constraints, we anticipate that in 2010 we will only be able to remove about half of what is necessary to perform removal in this area. Area E has, in some areas, dead arundo understory of about three feet in depth. The City proposes these funds be utilized in 2012 for completing the abatement in Area E. There will also be willow planting using cuttings included in the areas to increase the competition against arundo. These funds will also be utilized to continue communication and coordination with the Ventura County Agricultural Commissioner's office and the Ventura County stakeholders on the Santa Clara River issue through the demonstration project.

How the Project Fits into the SEP Categories:

The proposed project is removing arundo in previously uncut parts of Area E of the Site Specific Implementation Plan area. This includes removal of arundo, tamarisk, and other incidental invasive species on a highly visible 297-acre reach (all City-owned property) of the Upper Santa Clara River and the lower reaches of two major tributaries just above the confluence of San Francisquito Creek and the South Fork of the Santa Clara River. One of the goals of the demonstration project is to stimulate interest and public support of river restoration projects. In addition, implementing the Site Specific Implementation Plan will accomplish the following goals:

- Improve habitat for wildlife, particularly for threatened and endangered species.
- Improve water quality and water flow within the project area.
- Provide a model project for the City of Santa Clarita's efforts to improve the ecology of the Upper Santa Clara River that will benefit the Lower Santa Clara River.
- Educate the local community about the problems caused by non-native, invasive species, particularly arundo and tamarisk.
- Monitor effectiveness and continuing treatment as needed for up to five years.

Environmental Restoration:

Both arundo and tamarisk consume large amounts of water, which negatively affects both in-stream and groundwater availability. Reduced water availability also adversely affects water-dependent plants and wildlife, and reduces the water available for beneficial urban and agricultural uses. Although native riparian plants have similar transpiration rates per unit of surface area to arundo and tamarisk, arundo and tamarisk have approximately two or more times greater leaf surface area. Therefore, they transpire more water than native plants. Water consumption by these species is so high that dense infestations can desiccate riparian areas (seeps, springs, rivers) in arid habitats.

In addition, arundo and tamarisk threaten native riparian habitats and the wildlife that depends upon these habitats by excluding native plants from water resources, growing space, and sunlight. Arundo often forms dense monocultures that exclude native vegetation by monopolizing water resources, shading, and altering flood regimes critical to the establishment of native riparian vegetation. The salt-laden leaf litter of tamarisk also prevents native plants from establishing under the trees. Both plants do not offer the same amount of shade as native vegetation. Both arundo and tamarisk reduce habitat quality and food supply for native wildlife, including insects and bird species. Insects and other grazers are not able to use arundo as a food source due to the noxious chemicals it contains and its defensive cellular structure. This is particularly important for federal and state listed species, such as least Bell's vireo, southwestern willow flycatcher, and yellow-billed cuckoo, which utilizes insects as a food source. Documented decreases in wildlife usage of riparian areas have occurred due to massive stands of arundo in watersheds affected by this infestation.

Pollution Prevention:

The demonstration project included a Quality Assurance Project Plan (QAPP) that will confirm that water quality will not be impaired by the removal. A biologist will be on-site to monitor activities. As discussed above, the invasive plants themselves contribute to water quality problems that can be prevented by their removal. Major Arundo infestations can cause an overall increase in water temperature by reducing shade in riparian areas. Increased water temperature can ultimately lead to a reduction of dissolved oxygen, making the water unsuitable for aquatic organisms. In addition, increased light exposure and temperature may encourage algal blooms, and consequently, increase pH levels and further reduce available habitat for aquatic organisms. Increased pH also facilitates the conversion of usable ammonia to a toxic byproduct, which degrades water quality. All of these changes can adversely affect wildlife, including rare and sensitive species.

Tamarisk is tolerant of highly saline habitats and it concentrates salt in its leaves. Over time, as leaf litter accumulates under tamarisk plants, the surface soil can become highly saline, thereby impeding future colonization by many native plant species. Tamarisk also contributes salinity to surface waters. In addition to arundo and tamarisk, perennial pepperweed is a third significant threat to the watershed. Once established, it is very difficult to remove, and the monocultures it creates effectively displace native flora and fauna. Similar to tamarisk, perennial pepperweed also has the ability to concentrate salts near the ground surface. If these and other non-native plants are in the same area at the arundo and tamarisk, they are removed as time and budgets allow.

Public Awareness/Education:

Over the past five years, the City has provided tours, press releases, and other outreach activities to implement this program. Representatives from throughout the state have toured the sites during removal. City staff has worked to coordinate and support efforts throughout the watershed on invasive plants. As work on the Site Specific Implementation Plan project starts each year, private property owners and non-profits are invited to observe the operations. Specific types of invasive plants will be pointed out so property owners can identify them on their properties. In addition, specific question and answer periods will allow property owners to understand the operations. Information on native/non-invasive screening plants will also be provided.

Watershed Management:

Large stands of arundo and tamarisk may also obstruct flows and shunt floodwaters into areas that historically have not experienced water flow. This can exacerbate bank erosion problems and lead to an unnatural increase in the loss of adjacent public and private property that is often valuable farmland. Arundo provides less protection for steam banks from erosion, because its dense but shallow root masses are more easily undercut than deep-rooted native riparian vegetation. The presence of arundo in the River also restricts the River's ability to convey significant storm flows and consequently can result in flooding beyond the river bed. In addition to increasing flood magnitudes, arundo and tamarisk debris may accumulate downstream of the infestations, trapping sediments, and impeding natural water flow. The arundo debris can also create new establishments downstream and on the beach. The debris can quickly choke out native vegetation. In many cases, costly clean-up efforts or repairs are required.

Public Awareness/Education:

As part of the SCARP, the Site Specific Implementation Plan project would:

- Result in removal of noxious and invasive plants from a highly visible 297-acre area of the River that is located in the City of Santa Clarita;
- Act as a low-impact arundo and tamarisk removal demonstration or model project for interested agencies, landowners, and non-profits; and
- Stimulate public interest in, and support for, such future River restoration projects.

Watershed Assessment:

Project monitoring will be done to document and evaluate the success and costs of control and any re-vegetation efforts, and to allow a comparison of the methods employed. Areas where arundo and tamarisk are removed from the river bed will be re-vegetated consistent with Natural Resources Conservation Service standards of taking willow cuttings of existing trees and planting them, whereby natural succession and flooding will bring in appropriate native plant material. Areas where arundo and/or tamarisk are removed from the upper banks will be actively replanted. Monitoring information will be collected several times over a period of three to five years. Global positioning system (GPS) points from the original survey will be used to navigate to the treated arundo stands, and monitoring observations will be associated with the original stands by identification numbers. Repeated observations of site environmental quality and arundo health and infestation size will allow for evaluation of the success of the treatment. Photographs of the site and treated arundo will be taken from established photographed points for before-and-after comparisons. The project site will be monitored for arundo and tamarisk re-sprouts biannually for three to five years after the initial eradication work is completed by the selected contractor. Maintenance during the three to five years to remove arundo and tamarisk re-sprouts will be conducted as part of the project.

- **Describe how the project benefits water quality.**

Major arundo infestations can cause an overall increase in water temperature by reducing shade in riparian areas. Increased water temperature can ultimately lead to a reduction of dissolved oxygen, making the water unsuitable for aquatic organisms. In addition, increased light exposure and temperature may encourage algal blooms, and consequently, increase pH levels and severely reduce available habitat for aquatic organisms. Increased pH also facilitates the conversion of usable ammonia to a toxic byproduct, which degrades water quality. All of these changes can adversely affect wildlife, including rare and sensitive species.

Tamarisk is tolerant of highly saline habitats, and it concentrates salt in its leaves. Over time, as leaf litter accumulates under tamarisk plants, the surface soil can become highly saline, thereby impeding future colonization by many native plant species. Tamarisk also contributes salinity to surface waters. In addition to arundo and tamarisk, perennial pepperweed is a third significant threat to the watershed. Once established, it is very difficult to remove, and the monocultures it creates effectively displace native flora and fauna. Similar to tamarisk, perennial pepperweed also has the ability to concentrate salts near the ground surface.

As part of the overall SCARP program and as described previously, a QAPP was developed for the project, designed to measure and monitor the potential effects of the proposed project's eradication efforts on water quality. The QAPP was submitted to the Regional Board and was certified as being an acceptable program for measuring potential water quality effects. Field measurements were taken at two locations along the Santa Clara River, one upstream and one downstream of the proposed demonstration project site. Samples were taken to provide baseline water quality conditions for the project site to facilitate comparison with post-eradication water quality data. If funded, this project will include post-project monitoring to determine the nature

of water quality improvements.

- **Describe how the project benefits the public.**

Removing arundo and tamarisk from the River will increase the amount of groundwater available, reducing the need for imported water. It will also improve the quality of water in the Santa Clarita Valley. This project will prevent flooding, as arundo causes alterations in channel morphology that retain sediments and constrict flows. During the dry season, the arundo becomes straw like and much more flammable than native riparian vegetation, causing a fire hazard. Pursuant to local fire officials, various wildfires in the community have spread further than they would have without arundo infestation in the Santa Clara River. The public will benefit from reduced fire fuel loads, thereby reducing wildfire intensity and spread. In addition, the project will reduce bank erosion due to the diversion of water around established stands. Native habitats and the diversity of plants and animals will increase benefiting the public by improved quality of life.

- **Include documented support by one or more of the following:**

  1. **Other agencies**
  2. **Public groups**
  3. **Impacted persons**
  4. **Compliance with the California Environmental Quality Act**

In addition to the City, the stakeholders in the Ventura County Weed Management Areas have provided significant support. The Ventura County Resources Conservation District (VCRCD) led the process previously to develop the plans. It is a special district of the state whose mission is to provide assistance to rural and urban communities to conserve, protect, and restore natural resources. The VCRCD worked under a Memorandum of Understanding with the Antelope Valley Resource Conservation District to allow the VCRCD to work on this project even though the Santa Clarita Valley falls in the Antelope Valley Resource Conservation District. As a result of administrative changes, the Ventura County Agricultural Commissioner, in coordination with the Los Angeles County Agricultural Commissioner, will take over project administration from the VCRCD and work in close coordination with federal, state, and local regulatory agencies to support and expand the SCARP implementation. The City has an existing contract with Wildscape Restoration to perform the annual removal work and keep the project in compliance with all regulations and ordinances. Agencies include the Los Angeles Agricultural Commissioner's Office Weed Hazards and Pest Management Division. The Ventura County Weed Management Areas is a group of concerned public, non-profit, and private entities that support this project and its expansion watershed wide. Working with the Ventura County Agricultural Commissioner's Office and the Weed Management Areas may provide a future Supplemental Environmental Project application to expand the Site Specific Plan to a watershed wide annual removal effort for other fines in the Santa Clara River watershed. The overall goal would be to reduce arundo and tamarisk to less than five percent of the Santa Clara River watershed. Copies of letters of support are provided in Appendix A.

Impacted Persons:

Prior to the commencement of work on the Site-Specific Implementation Project in 2005, the VCRCD held four public hearings during evenings and weekends at Santa Clarita City Hall and the Agua Dulce Community Center. The purpose of these events was to explain the need for arundo and tamarisk removal, to promote the removal of invasive plants by property owners on their properties, to allow citizens to voice concerns, and to answer questions posed by attendees. In addition, postcards were mailed to all residents near the project area explaining the project and providing contact numbers for questions or complaints. The project will reduce the fire hazard for nearby residents and businesses over the long term.

Compliance with the California Environmental Quality Act:

The Project is currently in compliance with the California Environmental Quality Act (CEQA). The VCRCD filed a Notice of Exemption, Class 4, with the California State Clearinghouse prior to initiating the project in 2005. A programmatic Environmental Impact Report (EIR) that encompasses all activities in the SCARP project was prepared, circulated for comment, and approved. All current project activities fall under the SCARP programmatic EIR, which was finalized and approved in February 2006.

- **Key personnel involved with the project.**

Noreen Murano, Wildscape Restoration
Heather Lea Merenda, City of Santa Clarita
Travis Lange, City of Santa Clarita

- **Provide a description of the primary project activities.**

Demonstration Project Work Plan Overview:

In 2005, the City of Santa Clarita and the VCRCD, utilizing the California Conservation Corps, initiated removal of arundo on a small, but very dense, infestation at the upper reach of the project site, near the Saugus Water Reclamation Plant outfall at the Bouquet Canyon Road bridge. The Site-Specific Project was funded for that short period with the existing Proposition 13 funds that had allowed the programmatic Environmental Impact Report and the Long Term Implementation Plan to be completed. Since that time, the City of Santa Clarita has been working as much as possible through grant funds to continue the work. Area E, which was only partially abated in 2009 and 2010, would be funded for arundo removal in 2012.

Description of Plant Removal:

Eradication of arundo and tamarisk is typically scheduled between August and November (or until the first significant rain event is predicted) of each year. The locations of target plants have been mapped and included in the Site Specific Implementation Plan. The eradication efforts will start at the upstream end and work toward the downstream end of the project site. Two

eradication methods will be used, "Cut and Paint" and "Cut, Resprout, and Spray". Both methods involve the use of hand tools for cutting and the application of herbicides to kill the target species. "Cut and Paint" entails the use of a hand-held sponge painter or dauber to apply herbicide to the plant stems immediately after cutting. Since translocation ceases within minutes after cutting, a full strength herbicide solution will immediately be applied to the freshly cut stems of arundo or the trunks of tamarisk. "Cut, Resprout, and Spray" entails foliar application of herbicide one to two months after plants have been allowed to resprout from cut stem areas.

All herbicide applications will comply with recommendations by a licensed Pest Control Advisor and be performed under the supervision of a licensed Department of Pesticide Regulation or certified Qualified Applicator. Work crews will follow all safety measures outlined on herbicide packages and will follow all federal, state, and local regulations regarding herbicide use. Only herbicides approved for aquatic use by the California Department of Fish and Game will be used within the banks of rivers and tributaries. The particular removal method for each stand will be decided on a case-by-case basis. Factors that will affect the methodology decision include:

- Density of invasive plants
- Presence of native plant species
- Access to the stands
- Size of the stand, and
- Access to the staging area.

Both methods typically take three to five years to achieve complete eradication of target species and may require follow-up monitoring and treatment.

Work crews will use hand-held gas-powered chainsaws, weedwhips with brush-cutting blades, loppers, and/or similar hand equipment to cut standing arundo canes and tamarisk stems. (Dead arundo or tamarisk biomass that has been washed down the River by winter storms will be left in place.) Arundo stalks and tamarisk stems will be cut to within 12 inches of the substrate. Cut arundo stalks will be hauled out of the site on foot or by single-bed pick-up trucks, or similar rubber-tired vehicles to the project staging area, and chipped for beneficial reuse as mulch, or hauled away for disposal at an area landfill. Tamarisk biomass will be disposed of at a local landfill due to potential seed contamination and salinity within the leaves.

Best Management Practices for the project include:

- If herbicide accidentally comes into contact with desirable plants, affected portions will be trimmed off before moving to the next stand.
- If water becomes present, work will stop in that area until water is no longer flowing.
- No cut canes or stems will be left on site to prevent advantageous propagation.
- All cut material will be hauled off site and chipped small enough to preclude resprouting for reuse as beneficial mulch or disposed of after cutting.

- **Describe what the project hopes to achieve and a detailed plan for doing so.**

By implementing the Site Specific Implementation Plan Area E, the City hopes to achieve:

- Improved wildlife habitat
- Reduced wasteful water consumption by arundo and tamarisk
- Improved water quality
- Reduced hazards from the highly flammable nature of arundo
- Reduced flooding hazards

- **Include a monitoring plan or Quality Assurance Program Plan (if applicable).**

A Quality Assurance Program Plan has been completed, approved by the Regional Board, and implemented. The QAPP is included in Appendix B.

- **Describe the specific goals of the project, including numerical objectives where appropriate (i.e. number of participating students, student-hours, workshops held, acres restored). Would the project create any lasting programs, structures, or documents?**

The goal of the SCARP project is to coordinate removal of arundo and tamarisk from the Upper Santa Clara River watershed. The goal of the demonstration project is to demonstrate how to successfully remove arundo and tamarisk for landowners. The demonstration project is intended to create a lasting laboratory of invasive plant removal projects. The already developed Site Specific Plan, the Long Term Implementation Plan, along with the necessary CEQA documents (allowing for streamlined permitting of future projects) provide a sound foundation for long-term support for post-demonstration project efforts.

- **Describe what measures, if any, you would take to offset or overcome any impediments affecting project implementation.**

Events of significant precipitation may deposit uprooted arundo and tamarisk biomass from upstream areas onto and within the restored property. Early disposal of debris and prompt removal of resprouts and/or herbicide application will be crucial in preventing establishment of the flood-deposited arundo and tamarisk biomass. If a wildfire burned through the River bottom on the City owned property, the County Fire Department and California Department of Fish and Game would be consulted on appropriate measures.

The project is predicated on not working in the River once the rainy season has begun. While the rainy season is traditionally defined as beginning in October, the demonstration project and the associated permitting will allow work until the first major rain event of the year when surface flows appear. The Best Management Practices discussed in the Site Specific Plan, the Long Term Implementation Plan, as well as California Department of Fish and Game and National Pollutant

Discharge Elimination System Permit requirements, dictate actions and application of herbicides near surface water.

- **Describe the criteria that will be used to assess project success.**

When monitoring of the site demonstrates virtual 95 percent removal of all arundo and tamarisk from the 297 acres, the Site Specific Implementation Plan will be deemed successful.

- **Identify a company or organization retained to audit the project.**

As part of the City's annual audit by the independent auditing firm, Moreland and Associates, the City will audit implementation of the Supplemental Environmental Project funds.

- **Describe plans to continue and/or maintain the project beyond the SEP-funded period. Identify potential funding sources for maintenance/continuation activities. For restoration projects, describe the monitoring plan, who will implement the plan, and length of time the plan will be in place.**

The entire SCARP program, documents, and efforts are designed to continue invasive plant removal in the Upper Santa Clara River watershed until there is significant abatement. The Trustee Council, a group that administers federally imposed oil spill fines on Mobil and Exxon to fund projects in the Santa Clara River watershed, has committed to funding arundo removal as one of its primary objectives. There has been a $1,000,000 endowment established that produces roughly $30,000 a year that is to be spent in the Santa Clara River for invasive plant removal maintenance. The Ventura County Agricultural Commissioner's office will be working to use these funds on a watershed basis to support removal projects like those in the City of Santa Clarita.

- **Include a statement which states that after successful completion of the SEP, any funds left over must be turned over to the State Cleanup and Abatement Account.**

It is understood that after successful completion of the Site Specific Plan, any funds left over must be turned over to the State Cleanup and Abatement Account.

- **Reporting procedures (Quarterly Progress Reports, Final Report)**

The City will provide quarterly progress reports, as well as a final report, to the Regional Board, on the activities undertaken with this demonstration project. At a minimum, the reports should include a list of all activity on the SEP for each reporting period, an accounting of funds expended, and the proposed work for the following quarter. Reports are due no later than the first of the second month following the end of each reporting period in accordance with the schedule shown below. Until such time as expenditure of SEP funds has commenced, the City may submit

only the report due on the first day of August. The City shall submit progress reports on the SEP until the demonstration project is completed and the SEP contribution is fully expended or otherwise approved by the Regional Board Executive Officer.

Reporting Period	Report Due Date
January - March	May 1
April - June	August 1
July - September	November 1
October - December	February 1

UPPER SANTA CLARA RIVER WATERSHED ARUNDO/TAMARISK REMOVAL SUPPLEMENTAL ENVIRONMENTAL PROJECT

WORK PLAN REQUIREMENTS SPECIFIC TO AREA E ARUNDO REMOVAL SUPPLEMENTAL ENVIRONMENTAL PROJECT

- **Name of organization proposing the SEP, contact person, and phone number.**

County Sanitation Districts of Los Angeles County (Public Agency), Primary Contact: Shannon Grund, (562) 908-4288 x2843

- **Project description for Area E Arundo Removal**

The Area E Arundo Removal fits into the SEP category for environmental restoration and watershed management. The proposed project is removing invasive plant species in previously uncut parts of Area E of the Site Specific Implementation Plan areas. Specifically, this includes removal of arundo, tamarisk, and other incidental invasive species on a highly visible 297-acre reach (all City-owned property) of the Upper Santa Clara River and the lower reaches of two major tributaries just above the confluence of San Francisquito Creek and the South Fork of the Santa Clara River. The arundo removal will improve habitat for wildlife, particularly for threatened and endangered species and improve water quality and water flow within the project area.

- **Provide a timetable for project implementation, including any project milestones.**

Below is a proposed schedule of tasks to complete removal on Area E. The proposed schedule may be modified depending on available funding resources and based on circumstances outside the City's control, such as weather impacts or unfavorable site conditions. The agency proposing the Area E Arundo Removal is ultimately responsible for meeting milestones below. Assuming the funding occurs before June 2012:

August 2012 –	Begin circulation of new annual removal contract with Wildscape Restoration.
August 2012-September 2011 –	Once contract signed, begin permit notifications and site-removal plan.
September 2012 –	Prepare field crews and subcontractors, provide training on Best Management Practices.
September 2012-November 2011 –	Complete Area E abatement
2012-2013 –	Monitor small-scale invasive vegetation removal, if necessary.

- **Include a detailed budget for the project. Any additional funding would go towards additional laborers.**

See attached budget specific for Area E Arundo Removal project.

Upper Santa Clara River Watershed Area E Arundo Removal SEP Budget

	A	B	C	D	E
1	60	PERSONNEL #	RATE PER HOUR OR UNIT	TOTAL HOURS	TOTAL
2	**Task 1**	**Project Initiation and Coordination**			
3	Principal	1	$175.00	4	$700.00
4	Senior Project Manager	1	$160.00	8	$1,280.00
5	Senior Associate	1	$125.00	8	$1,000.00
6	Administrative Staff	1	$65.00	2	$130.00
7	**SubTotal**				**$3,110.00**
8					
9	***Expenses***				
10	Administrative Expenses				$0.00
11	Mileage (miles)		$0.55	200	$110.00
12	***SubTotal***				**$110.00**
13					
14	**Task 1 Total**				**$3,220.00**
15					
16	**Task 2a**	**Coordination with Regulatory Agencies**			
17	Principal	1	$175.00	2	$350.00
18	Senior Project Manager	1	$160.00	6	$960.00
19	Senior Associate	1	$125.00	8	$1,000.00
20	Administrative Staff	1	$65.00	3	$195.00
21	**SubTotal**				**$2,005.00**
22					
23	***Expenses***				
24	Administrative Expenses				$100.00
25	Permit Fees (estimated)				$1,000.00
26	***SubTotal***				**$1,100.00**
27					
28	**Task 2a Subtotal**				**$3,105.00**
29					
30	**Task 2b**	**Post-Construction Report**			
31	Principal	1	$175.00	2	$350.00
32	Senior Project Manager	1	$160.00	8	$1,280.00
33	Senior Associate	1	$125.00	10	$1,250.00
34	Administrative Staff	1	$65.00	4	$260.00
35	**SubTotal**				**$3,140.00**
36					
37	***Expenses***				
38	Administrative Expenses				$100.00
39	***SubTotal***				**$100.00**
40					
41	**Task 2b Subtotal**				**$3,240.00**
42					
43	**Task 2 Total**				**$6,345.00**
44					
45	**Task 3**	**Pre-Construction Surveys**			
46	Principal	1	$175.00	2	$350.00
47	Senior Project Manager	1	$160.00	6	$960.00
48	Senior Associate	1	$125.00	6	$750.00
49	Administrative Staff	1	$65.00	2	$130.00
50	**SubTotal**				**$2,190.00**
51					
52	***Expenses***				
53	Mileage (miles)		$0.55	100	$100.00
54	***SubTotal***				**$100.00**
55					
56	***Subcontractor***				
57	Biological Monitor	1	$92.00	16	$1,472.00
58	Mileage (miles)	1	$0.55	400	$220.00
59	***SubTotal***				**$1,692.00**
60					
61	**Task 3 Total**				**$3,982.00**
62					
63	**Task 4**	**Pre-Construction Meeting and Personnel Education**			
64	Principal	1	$175.00	2	$350.00
65	Senior Project Manager	1	$160.00	4	$640.00
66	Senior Associate	1	$125.00	6	$750.00
67	Administrative Staff	1	$65.00	2	$130.00
68	SubTotal				$1,870.00

Upper Santa Clara River Watershed Area E Arundo Removal SEP Budget

	A	B	C	D	E
1	60	PERSONNEL #	RATE PER HOUR OR UNIT	TOTAL HOURS	TOTAL
69					
70	***Expenses***				
71	Administrative Expenses				$100.00
72	Mileage (miles)	1	$0.55	100	$55.00
73	***SubTotal***				**$155.00**
74					
75	**Subcontractor**				
76	Biological Monitor	1	$92.00	8	$736.00
77	Mileage (miles)	1	$0.55	200	$110.00
78	***SubTotal***				**$886.00**
79					
80	**Task 4 Total**				**$2,911.00**
81					
82	**Task 5**	**Biological Monitor**			
83	Principal	1	$175.00	3	$525.00
84	Senior Project Manager	1	$160.00	9	$1,440.00
85	Senior Associate	1	$125.00	10	$1,250.00
86	Administrative Staff	1	$65.00	4	$260.00
87	**SubTotal**				**$3,475.00**
88					
89	***Expenses***				
90	Mileage (miles)		$0.55	600	$330.00
91	***SubTotal***				**$400.00**
92					
93	**Subcontractor**				
94	Biological Monitor	1	$92.00	120	$11,040.00
95	Mileage (miles)		$0.55	3,000	$1,650.00
96	***Subtotal***				**$12,690.00**
97					
98	**Task 5 Total**				**$16,565.00**
99					
100	**Task 6**	**Cut and Plant & Biomass Removal**			
101	Principal	1	$175.00	2	$350.00
102	Senior Project Manager	1	$160.00	6	$960.00
103	Administrative Staff	1	$65.00	4	$260.00
104	**SubTotal**				**$1,570.00**
105					
106	**Subcontractor**				
107	Foreman	1	$44.85	120	$5,382.00
108	Laborers	5	$34.50	120	$20,700.00
109	Tool Truck	1	$24.15	120	$2,898.00
110	Tractor (manned), 13 of 15 days	1	$115.00	104	$11,960.00
111	Chipper	1	$57.50	120	$6,900.00
112	***Subtotal***				**$47,840.00**
113					
114	***Subcontractor-Self Dump***				
115	Dumptruck per hour	1	$40.25	120	$4,830.00
116	Dump charge per ton (2 tons per load, daily dumps)	2	$30.00	15	$900.00
117	***Subtotal***				**$5,730.00**
118					
119	**Expenses**				
120	Aquamaster	8	$184.00	1	$1,472.00
121	Blazon dye indicator	4	$62.00	1	$248.00
122	***SubTotal***				**$1,720.00**
123					
124	**Willow Planting in Cut Areas**				
125	Laborer	5	$34.50	44	$7,590.00
126					
127	**Task 6 Total**				**$64,450.00**
128					
129	**Task 1**				**$3,220.00**
130	**Task 2**				**$6,345.00**
131	**Task 3**				**$3,982.00**
132	**Task 4**				**$2,911.00**
133	**Task 5**				**$16,565.00**
134	**Task 6**				**$64,450.00**
135					
136	**GRAND TOTAL**				**$97,473.00**

Upper Santa Clara River Watershed Arundo and Tamarisk Removal Project (SCARP)

Site-Specific Implementation Project (SSIP) Area

Prepared by Wildscape Restoration, November 2008

0 500 1,000 2,000 Feet

Appendix A

RESOURCE
CONSERVATION

October 28, 2010

Mr. Sam Unger, Executive Officer
Regional Water Quality Control Board
320 West Fourth Street, Suite 200
Los Angeles, CA 90013

Dear Mr. Unger:

We are writing in support of the City of Santa Clarita's application for support for their Upper Santa Clara River Watershed Arundo/Tamarisk Removal Plan (SCARP) Site Specific Project through Supplemental Environmental Program funds.

As the lead agency for the Ventura County Weed Management Area we support the efforts of the City to remove arundo and tamarisk from City owned river property will improve the habitat and beneficial uses of the Santa Clara River.

The RCD supports removing and managing invasive weeds and educating the public on this problem. The City of Santa Clarita project helps to support that mission.

Thank you for your consideration of the City of Santa Clarita's application for support.

Sincerely,

Marty Melvin
Executive Officer
805.216.3583 Cell
805.386.4489 Ext 108 office

University of California Cooperative Extension, Los Angeles County
Division of Agriculture and Natural Resources

From the campus to the community

4-H Youth Development
Farm Advisor
Gardening & Horticulture
Natural Resources
Nutrition, Family & Consumer Science

Mr. Sam Unger, Executive Officer
Regional Water Quality Control Board
320 West Fourth Street, Suite 200
Los Angeles, CA 90013

Dear Mr. Unger:

I am writing this letter in support of the City of Santa Clarita's application for funding for their Upper Santa Clara River Watershed Arundo/Tamarisk Removal Plan (SCARP) Site Specific Project through the Supplemental Environmental Program.

On behalf of UC Cooperative Extension and the Los Angeles and Ventura County Weed Management Areas, I chair the Santa Clara River Invasive Weeds Task Force. This is a group that is working together to restore the Santa Clara River by managing invasive weeds in the watershed. The City's efforts to remove arundo and tamarisk from City owned river property will improve the habitat and beneficial uses of the Santa Clara River. Our organization supports removing and managing invasive weeds and educating the public on this problem. The City of Santa Clarita project helps to support that mission.

Thank you for your time and consideration,

Sincerely,

Dr. Sabrina Drill
Natural Resources Advisor, UCCE
Chair, Santa Clara River Invasive Weeds Task Force

4800 E. Cesar E. Chavez Avenue, Los Angeles, CA 90022
Tel: (323) 260-2267 • Fax: (323) 260-5208 • http://celosangeles.ucdavis.edu

USDA United States Department of Agriculture | Forest Service | Santa Clara/Mojave Rivers Ranger District | 28245 Ave Crocker, Suite 220
Santa Clarita, CA 91355
661-296-9710 Voice
626-447-8992 TTY

Date: November 1, 2010

Mr Sam Unger, Executive Officer
Regional Water Quality Control Board
320 West Fourth Street, Suite 200
Los Angeles, CA 90013

Dear Mr. Unger:

The Angeles National Forest and the City of Santa Clarita are members of the newly formed Santa Clara River Invasive Weeds Task Force. This is a group that is working together to restore the Santa Clara River by managing invasive weeds in the watershed.

The City has been working to remove arundo and tamarisk from City owned river property to improve the habitat and beneficial uses of the Santa Clara River. The US Forest Service is currently working on the NEPA (National Environmental Policy Act) documentation to provide for invasive species management on the Angeles National Forest in the watershed. We support the City's efforts to remove and manage invasive weeds and to educate the public on this serious environmental problem. The City of Santa Clarita's proposed project helps to support the mission of the Task Force and contributes to the work being done by all partners involved.

Thank you for your consideration.

Sincerely,

/s/ *Wilburn Blount*

WILBURN BLOUNT
District Ranger

Central Ventura County Fire Safe Council, Inc.
A California Non-Profit Public Benefit Corporation
2977 Sexton Canyon
Ventura, CA 93003

November 5, 2010

Mr Sam Unger, Executive Officer

Regional Water Quality Control Board

320 West Fourth Street, Suite 200

Los Angeles, CA 90013

Dear Mr. Unger:

The City of Santa Clarita is a member of the newly formed Santa Clara River Invasive Weeds Task Force. This is a group that is working together to restore the Santa Clara River by managing invasive weeds in the watershed. The City has been working to remove Arundo and Tamarisk from City owned river property to improve the habitat and beneficial uses of the Santa Clara River. Arundo Donax as well as other invasive weeds, creates fuel hazards that endanger the citizens of Ventura and Los Angeles counties. Our organization supports removing and managing invasive weeds and educating the public on this problem. The City of Santa Clarita project helps to support that mission.

Thank you for your time and consideration.

Sincerely,

Richard Atmore
President

The mission of the Central Ventura County Fire Safe Council is to reduce the threat of wildfire to farms, ranches, urban neighborhoods and infrastructure, through an aggressive program of action, education and collaboration.

Appendix B

1. Title and Approval Pages

VENTURA COUNTY RESOURCE CONSERVATION DISTRICT QUALITY ASSURANCE PROJECT PLAN AND WATER QUALITY MONITORING PLAN

Upper Santa Clara River Watershed Arundo and Tamarisk Removal Project

Final

PREPARED FOR:
Ventura County Resource Conservation District

PREPARED BY:
AMEC Earth & Environmental, Inc.

Refer correspondence to:
Noreen Cabanting
Ventura County Resource Conservation District
P.O. Box 147
Somis, CA 93066
noreen.cabanting@vcrcd.org
(805) 386-4685

Approval Signatures

Grant Organization:

Organization: Ventura County Resource Conservation District
Title: Project Director
Name: Patricia Oliver
Signature: Patricia Oliver Date: July 12, 2005

Organization: Ventura County Resource Conservation District
Title: Project Manager and QA Officer
Name: Noreen Cabanting
Signature: Noreen Cabanting Date: JULY 12, 2005

Organization: AMEC Earth & Environmental, Inc.
Title: Project Manager
Name: ~~Manjunath Venkat~~ DANIEL GIRA
Signature: Date: 6/27/05

State Water Resources Control Board:

Organization: Los Angeles Regional Water Quality Control Board
Title: Contract Manager
Name: Elizabeth Erickson
Signature: Date: May 14, 05

Organization: Los Angeles Regional Water Quality Control Board
Title: QA Officer
Name: Jau Ren Chen
Signature: Jau Ren Chen Date: June 6, 2005

2. Table of Contents

APPENDICES

TABLES AND FIGURES

3. Distribution List

Contract and Project Managers, Task Leaders, and Technical Advisors will receive copies of this Quality Assurance Project Plan (QAPP), and any approved revisions of this plan. Once approved, this QAPP will be available to any interested party by requesting a copy from the Ventura County Resource Conservation District (VCRCD). The distribution list is shown in the following table.

Table 3.1 Distribution List

Name	Organizational Affiliation	Title	Contact Information	No. of Copies
Elizabeth Erickson	LARWQCB	Contract Manager	213.576.6683	ORIGINAL
Jau Ren Chen	LARWQCB	QA Officer	213.576.6656	1
Patricia Oliver	VCRCD	Project Director	805.386.4685	1
Noreen Cabanting	VCRCD	Project Manager	805.386.4685	1
Manjunath Venkat	AMEC	Project Manager	805.962.0992 x232	1
Howard Bailey	Nautilus	Senior Scientist	858.587.7007	1
Gary Goodwin	PCL	CFO	805.532-0012	1

4. Project Organization

4.1 Involved Parties and Roles

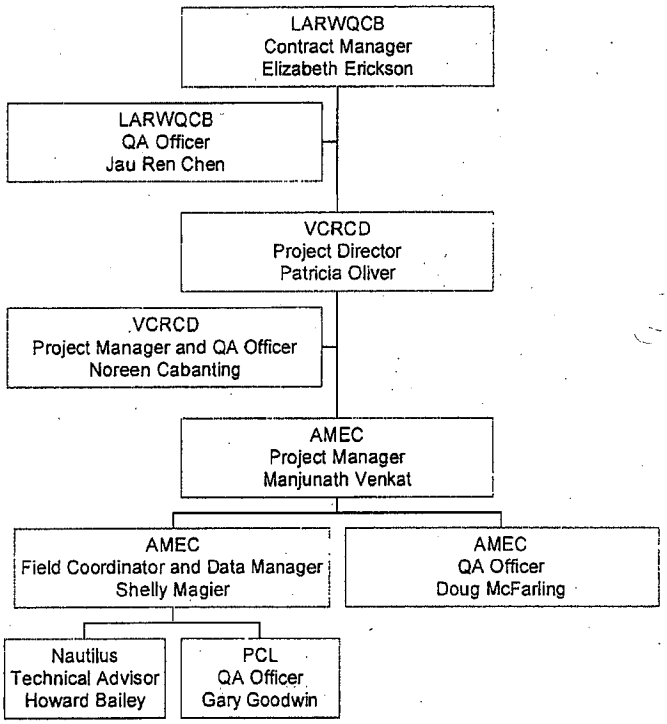
The VCRCD is a district of the California state government that specializes in providing assistance to both rural and urban communities to conserve, protect, and restore natural resources. As the lead agency, the VCRCD has contracted AMEC Earth & Environmental, Inc. (AMEC) to conduct baseline monitoring and site-specific monitoring for this project. AMEC is a multi-disciplinary environmental consulting firm with specialized staff to handle issues that relate specifically to aquatic resources. AMEC will be assisted as necessary by Nautilus Environmental, LLC (Nautilus), who will be provide technical review and services throughout the course of the project. Nautilus specializes in aquatic resources, including fish and invertebrate surveys, aquatic toxicology, limnological analyses, and water quality studies. Pat-Chem, Inc. (PCL) will be conducting the laboratory analyses. PCL is a State Certified Environmental Laboratory specializing in a wide range of hazardous and non-hazardous testing to industrial, consulting and governmental clients. Please see Appendix 4 for proof of certification. General organization of the project management team is shown in Figure 4.1.

Patricia Oliver is the VCRCD's Project Director. Ms. Oliver will provide oversight for the entire project. Noreen Cabanting is the VCRCD's Project Manager. She will be responsible for management of AMEC throughout the course of the project. Manjunath Venkat is AMEC's Project Manager. Mr. Venkat and Shelly Magier will coordinate all aspects of the monitoring task of the project including the organization of field staff, scheduling of sampling days, and coordination of PCL relative to data analysis and management of subconsulting services.

Nautilus will act as a technical resource to VCRCD and AMEC staff and management. Dr. Howard Bailey will be the primary contact, and will provide technical input and support as requested by AMEC.

PCL will be the contract laboratory for all analyses not conducted in the field. PCL will analyze submitted samples in accordance with all method and quality assurance requirements found in this QAPP.

Figure 4.1 Organizational Chart



4.2 Quality Assurance Officer Role

Noreen Cabanting is the VCRCD's Quality Assurance Officer. She will establish the quality assurance and quality control procedures detailed in this QAPP as part of the sampling, field analysis, and in-house analysis procedures. Ms. Cabanting will also work with the Technical Advisor, Howard Bailey by communicating all quality assurance and quality control issues as they relate to this QAPP.

Noreen Cabanting will also review and assess all procedures in comparison to QAPP requirements. Ms. Cabanting may stop all actions, including those conducted by PCL if there are significant deviations from required practices or if there is evidence of a systematic failure.

4.3 Persons Responsible for QAPP Update and Maintenance

Changes and updates to this QAPP may be made after a review of the evidence for change by the VCRCD's Project Manager and Quality Assurance Officer, and with the concurrence of both the State Board's Contract Manager and Quality Assurance Officer. VCRCD's Project Manager will be responsible for making the changes, submitting drafts for review, preparing a final copy, and submitting the final for signature.

5. Background

5.1 Problem Statement

The primary threat to the remaining riparian habitat of coastal southern California is the continued expansion of invasive non-native plant species, such as giant reed (*Arundo donax,* hereafter referred to as Arundo), and salt cedar (*Tamarix* spp., hereafter referred to as Tamarisk). The upper Santa Clara River watershed[1] consists of the Los Angeles County portion in Southern California's largest relatively natural watershed. The headwaters of the mainstem are located near Acton in the San Gabriel Mountains and passes through large portions of the Angeles National Forest in Los Angeles County. The Upper Santa Clara River watershed consists of approximately 680 square miles of mostly rugged topography and natural land with some mixed developed areas.

The Upper Santa Clara River is a large ephemeral stream that comprises the headwaters of the Santa Clara River system. At certain times of the year, the river may have continuous surface flow to the Pacific Ocean from natural watershed drainage. Incidental flows are supplied from discharge of two wastewater treatment facilities in Saugus and Valencia and imported water runoff in the middle reach from Santa Clarita to the Los Angeles-Ventura county line. The Santa Clara River is the major recharge source for all groundwater basins within the watershed.

The morphology of the river changes along its course. It originates as a typical mountain stream with a relatively narrow channel incised into hard bedrock. The river has a straight to meandering channel pattern, and characteristic channel bedforms represented by a sequence of bars, riffles, and pools. As the river exits the confinement of the mountains, it has a typical braided stream geomorphology characterized by the frequently shifting network of channels and intervening bars, and a broad floodplain area.

Arundo has the capability to spread rapidly, forming large contiguous root masses covering several acres, effectively crowding out native riparian vegetation. This results in lower biodiversity of plant life, thereby reducing or eliminating crucial habitat for birds, fish, and other wildlife that use riparian corridors. In addition, dense stands of Arundo utilize a large volume of water, thus decreasing water available to the stream or river. Arundo also increases fire hazards because of its tendency to burn rapidly and at extremely high temperatures.

[1] For the purpose of this document the upper Santa Clara River hydrologic area is referred to as the "upper Santa Clara River watershed."

Tamarisk is an aggressive, woody invasive plant species that is relatively long-lived and can tolerate a wide range of environmental conditions. It can displace native woody species, such as cottonwood and willow, which occupy similar habitats, especially when hydrology, salinity, temperature, and substrate texture have been altered by human activities.

5.2 Decisions or Outcomes

The general goals of this monitoring effort are to:

- Establish baseline water quality conditions in different reaches of the Santa Clara River, and;
- Evaluate the effects of Arundo and Tamarisk removal on water quality at a specific location on the Santa Clara River.

The baseline data will be used by the VCRCD as an initial assessment of baseline water quality in the upper Santa Clara River watershed. These data will be used as a baseline for the site-specific removal effort evaluating the effects of Arundo and Tamarisk removal in the upper Santa Clara River watershed. The data will be made available to the public for purposes of watershed education, and to regulatory and resource management agencies to supplement their existing data collection efforts (e.g., for use by the Regional and State Boards in Section 305(b) reporting).

5.3 Water Quality or Regulatory Criteria

As a requirement of the Costa-Machado Water Act of 2000 (Proposition 13) grant program, the VCRCD is required to prepare and maintain a QAPP if water quality or other environmental measurements are undertaken. In addition, the QAPP must follow the SWRCB's Surface Water Ambient Monitoring Program's Quality Assurance Project Plan and data reporting requirements as specified in Water Code Section 13192 established by AB 982.

6. Project/Task Description

6.1 General Overview of Monitoring

This project contains two components: a general baseline monitoring program and a site-specific monitoring program. The baseline component is designed to provide an indication of background concentrations of selected constituents at five locations in the upper Santa Clara River hydrologic unit. Samples will be collected at one time and used to make comparisons across reaches within this hydrologic unit, as well as to provide an indication of baseline conditions as the Arundo and Tamarisk removal project and associated monitoring efforts proceed over time. The site-specific data will be used to identify potential water quality impacts associated with a demonstration Arundo and Tamarisk removal project. This component will involve sampling at locations upstream and downstream of the project site. Samples will be taken at both sites before the removal activities are initiated and after they have been completed.

6.2 Monitoring Parameters

Table 6.1 summarizes the physical, chemical, and biological parameters to be measured, and whether the parameters will be measured on-site by the monitoring group, or sampled for later analysis by a professional laboratory. These parameters were selected based on guidance provided by VCRCD, and are intended to provide a limited characterization of parameters of concern to overall water quality in the Santa Clara River, as well as parameters potentially affected by Arundo and Tamarisk removal operations.

Table 6.1 Summary of Monitoring Parameters

Parameter	Type of Monitoring[1]
Flow	USGS gauge[2]
Temperature	F
Dissolved Oxygen	F
pH	F
Salinity	F
Conductivity	F
Total Dissolved Solids (TDS)	L
Total Suspended Solids (TSS)	L
Turbidity	L
Ammonia	L
Nitrite	L
Nitrate	L
Total and Dissolved Phosphorus	L
Total and Dissolved Organic Carbon	L
Biochemical Oxygen Demand (BOD)	L
Glyphosate	L
Fecal Coliform	L
Total Coliform	L

[1] F = Field analysis, L = Sample collected and submitted to analytical laboratory.
[2] http://waterdata.usgs.gov/ca/nwis/current/?type=flow (Santa Clara River stations: Lang, CA, #11107745; Saugus, CA, #1110800; Piru, CA, 11109000)

Chemical, physical, and bacteriological parameters will be measured using the methods shown in Table 7.1. Real-time flow data will be downloaded from the USGS website noted in Table 6.1. Samples may be sent to any certified laboratory capable of performing these analyses. All analysis shall comply with all requirements of the QAPP.

6.3 Project Timetable

Table 6.2 identifies the schedule of major activities associated with this project. Monthly reports summarizing the progress on this task will be provided.

Table 6.2 Project Schedule

Activity	Anticipated Date of Initiation	Anticipated Date of Completion
Overall Project	8/04	12/05
Baseline Sample Collection in Santa Clara River	Winter '04/'05	
Site-Specific Sample Collection in Santa Clara River	Winter '04/'05 and Winter '05/'06	
Baseline Data Summary Report	3/05	4/05
Site-Specific Data Summary Report	3/06	4/06

6.4 Monitoring Locations

Monitoring locations are shown in Appendix 1.

6.5 Resource and Time Constraints

The Santa Clara River watershed is a characteristically flashy system. During the dry season, March to November, the streambed is dry in most reaches in the upper watershed. During the wet season, November to March, the watershed is subject to infrequent storms that typically cause a rapid, yet short-term increase in water volume and velocity in the channel. Sampling will have to occur during wet weather shortly after storms to facilitate sample collection. As a result, monitors need to be wary of the hazardous conditions and will most likely be limited to sampling from bridges that cross the River in order to remain out of the channel that may be filled with swift moving water. In addition, the narrow sampling window will require that monitors are prepared to mobilize at a moments notice.

7. Data Quality Objectives and Criteria

This section identifies how accurate, precise, complete, comparable, sensitive, and representative the water quality measurements will be. These data quality objectives were derived by reviewing the QAPPs and performance of citizen monitoring organizations (e.g., Chesapeake Bay, Texas Watch, Coyote Creek Riparian Station, Southern California Citizen Monitoring Steering Committee, Heal the Bay Malibu Stream Team); by considering the specifications of the instruments and methods that will be employed, and by considering the utility of the data. For purposes of this QAPP, data quality is considered adequate for the determination of general water quality conditions, with a potential application of the data for Section 305(b) reporting purposes.

Data quality objectives are summarized in Table 7.1. Whenever possible, the methods with the greatest sensitivity and lowest detection limit will be used as the primary method. Methods with lesser sensitivity and higher detection limits will be used only as back-up methods in cases where the primary methods are not available or functioning properly for a particular sampling event. All data will be collected during current monitoring periods and no previously collected information will be utilized.

Table 7.1 Data Quality Objectives for Water Quality Parameters

Parameter	Method/ Range	Units	Detection Limit	Sensitivity*	Precision	Accuracy	Recovery	Complete-ness (%)
Temperature	Thermometer (-5 to 50)	°C	-5	0.5°C	± 0.5°C	± 0.5°C	NA	100
Temperature	Thermistor (0 to 50)	°C	-5	0.5°C	± 0.5°C	± 0.5°C	NA	100
Dissolved oxygen	Membrane/galvanic cell	mg/l	0.1	0.1	± 5%	± 5%	NA	100
Dissolved oxygen	EPA 360.1	mg/l	0.2l	0.2 mg/l	± 10%	± 10%	NA	100
pH	Glass electrode	pH units	0.1	0.1	± 10%	± 10%	NA	100
pH	EPA 150.1	pH units	2.0	0.1 unit	± 0.2 units	± 0.2 units	NA	100
Conductivity	Alternating four-electrode	µS/cm	1	1	± 10%	± 10%	NA	100
Conductivity	EPA 120.1	µS/cm	10	10 µS/cm	± 10%	± 10%	NA	100
Salinity	Conductivity conversion	%	1	1	± 10%	± 10%	NA	100
Salinity	SM 2520	%	1	1	± 10%	± 10%	NA	100
Turbidity	EPA 180.1	NTUs	0.1	0.1	± 10%	± 10%	NA	100
Total Dissolved Solids (TDS)	EPA 160.1	mg/l	5	5	± 10%	± 10%	Matrix spike at 80-120% or control at limits ± 3std based on actual lab data	100
Total Suspended Solids (TSS)	EPA 160.2	mg/l	5	5	± 10%	± 10%	Matrix spike at 80-120% or control at limits ± 3std based on actual lab data	100
Ammonia Nitrogen	EPA 350.2	mg/l	0.05	0.01	±0.2 (<2.0) ±10% (>2)	±0.2 (<2.0) ±10% (>2)	Matrix spike at 80-120% or control at limits ± 3std based on actual lab data	100
Nitrate N	EPA 353.2	mg/l	0.05	0.01	±0.2 (<2.0) ±10% (>2)	±0.2 (<2.0) ±10% (>2)	Matrix spike at 80-120% or control at limits ± 3std based on actual lab data	100
Nitrite N	EPA 353.2	mg/l	1.0	1.0	± 1.0	± 1.0	Matrix spike at 80-120% or control at limits ± 3std based on actual lab data	100
Phosphorus (Dissolved)	EPA 365.2	mg/l	0.03	0.03	± 10%	± 10%	Matrix spike at 80-120% or control at limits ± 3std based on actual lab data	100

Parameter	Method/ Range	Units	Detection Limit	Sensitivity*	Precision	Accuracy	Recovery	Complete-ness (%)
Phosphorus (Total)	EPA 365.2	mg/l	0.03	0.03	± 10%	± 10%	Matrix spike at 80-120% or control at limits ± 3std based on actual lab data	100
Biochemical Oxygen Demand (BOD)	EPA 405.1	mg/l	5	5	± 10%	± 10%	Matrix spike at 80-120% or control at limits ± 3std based on actual lab data	100
Dissolved Organic Carbon (DOC)	EPA 415.1	mg/l	0.7	0.7	± 10%	± 10%	Matrix spike at 80-120% or control at limits ± 3std based on actual lab data	100
Total Organic Carbon (TOC)	EPA 415.1	mg/l	0.7	0.7	± 10%	± 10%	Matrix spike at 80-120% or control at limits ± 3std based on actual lab data	100
Glyphosate	EPA 547	mg/l	1	1	± 10%	± 10%	Matrix spike 50 – 150% or control limits at ± 3 std based on actual lab data	100
Total Coliform Bacteria	SM9221B	MPN/ 100ml	10	10	Laboratory positive negative cultures – proper positive or negative response.	R_{log} within 3.27*mean R_{log}	NA	100
Fecal Coliform	SM9221E	MPN/ 100ml	10	10	Laboratory positive negative cultures – proper positive or negative response.	R_{log} within 3.27*mean R_{log}	NA	100

NA: not applicable
TBD: to be determined
* Note: Some test kits vary in sensitivity over the range of detection. The specific range of readings is noted in parentheses.

7.1 Accuracy

Accuracy describes how close the measurement is to its true value, and is determined by comparing a known concentration against its measured value. The accuracy of chemical measurements will be checked by performing tests on standards during calibration of field instruments, and as part of the quality control program of the certified laboratory responsible for analytical determinations. Accuracy will be recorded in an equipment log, or on field or laboratory datasheets, as appropriate.

7.2 Comparability

Comparability is the degree to which data can be compared directly to similar studies, and results from the use of similar sampling procedures and data quality objectives. This program will use sampling teams comprised of trained professionals following established protocols. In addition, a certified analytical laboratory will conduct analyses not performed in the field. Consequently, data generated in this study should be comparable to other studies conducted with a similar level of rigor.

7.3 Precision

The precision objectives apply to duplicate and split samples taken as part of periodic in-field QC checks, or as part of the certified analytical laboratory's QA/QC program, and describe how well repeated measurements agree. See Section 14.1 for more information on the frequency and number of duplicates and split samples that will be required for this program.

7.4 Representativeness

Representativeness describes how relevant the data are to actual environmental conditions. Bias can occur if:

- Samples are taken in a stream reach that does not describe the area of interest (e.g., a headwaters sample should not be taken downstream of a point source),
- Samples are taken in an unusual habitat type (e.g., a stagnant backwater instead of in the flowing portion of the creek), or
- Samples are not analyzed or processed appropriately, which cause conditions in the sample to change (e.g., water chemistry measurements are not taken immediately).

Representativeness will be ensured by rigorous site-selection procedures, by following established analytical and sampling methods, and by adhering to the program approach established in this document.

7.5 Method Detection Limit and Sensitivity

The Method Detection Limit is the lowest possible concentration the instrument or equipment can detect. This is important to record because it is not possible to determine that a pollutant was not present, only that it could not be detected.

Sensitivity is the ability of the instrument to distinguish one concentration from the next. Detection limits and sensitivities are noted in Table 7.1.

7.6 Completeness

Completeness is the fraction of planned data that must be collected in order to fulfill the objectives of the project. Given the limited scope of this project (i.e., baseline and site-specific monitoring), it is expected that 100 percent of all measurements will be taken. This accounts for adverse weather conditions, safety concerns, and equipment problems. All measurements will

be evaluated for validity by verifying that the sampling methods were appropriate and data quality objectives were met.

8. Special Training/Certification

No specialized training or certification is required for this project. The project staff involved in monitoring is fully trained and familiar with the appropriate field sampling protocols. Project staff will further consult with the analytical laboratory to ensure that the samples are collected and handled according to the specifications of the laboratory's protocols. No additional training is necessary at this time.

9. Documentation and Records

All field results will be recorded at the time of completion using field datasheets (see Appendix 2). Datasheets will be reviewed for outliers and omissions before leaving the sample site. Datasheets will be signed after review by the field coordinator. Samples will be sent to PCL. Upon completion of their internal QA/QC procedures, PCL will provide their datasheets to AMEC.

All datasheets, completed data quality control forms, and maintenance logs will be kept at AMEC's Santa Barbara office until project completion. Upon completion of this project, hard copies of all datasheets and logs and electronic files will be provided to VCRCD by AMEC, where they will be archived for at least 3 years from the time they were generated. Hard copies and electronic files of all data, will be maintained at the VCRCD by the Project Manager. Electronic data will be backed up on CDs.

Copies of this QAPP will be distributed to all parties involved with the project, including field collectors and the laboratory analyst by AMEC's Data Manager. Any future amended QAPPs will be held and distributed in the same fashion. All originals of these first and subsequent amended QAPPs will be held at VCRCD.

A final data report package will compile and summarize all data, including the datasheets, chain of custody forms, completed data quality control forms, and maintenance logs. This report will be submitted to the LARWQCB Contract Manager.

10. Sampling Process Design

Sampling is designed to address two objectives: provide an indication of baseline conditions across the Santa Clara River hydrologic area; and to identify any short-term impacts on water quality associated with *Arundo* removal activities occurring at specific locations. Baseline monitoring of selected parameters will occur at one time intervals at five sites distributed across the Upper Santa Clara River watershed hydrologic area (Appendix 1, Figure 1). In the context of this study, the 'baseline data' will be based on one sampling event and, therefore, will not provide a complete characterization of temporal variability associated with baseline conditions. Site-specific monitoring is designed to provide an indication of water quality before and after completion of removal activities associated with specific sites (Appendix 1, Figure 2).

Therefore, it will provide a measure of any short-term impacts to water quality associated with project activities. Sampling will occur at two sites, the first site is located downstream of the removal operation at a point where any impact should be completely mixed in the water column, but upstream of any other discharge or disturbance. The second location is sited upstream of the removal area so that any impacts to water quality caused by the removal activities can be compared with the upstream reference condition.

Current sampling design does not include any long-term monitoring component. Based on initial reconnaissance of the sites, it is not anticipated that the sites will remain accessible throughout the course of the study. In the event that a site becomes inaccessible to the sampling team, an alternative site will be identified in accordance with the overall project objectives.

Any modifications made to the location of sampling sites will be noted in this QAPP. The following criteria were considered when selecting sampling locations:

- safe access;
- samples can be taken in the main river current or where homogeneous mixing of water occurs;
- samples are representative of the part of the water body of interest;
- the locations complement or supplements historical data; and
- the locations provide information of specific interest to the study objectives.

Table 6.2 provides details of the project activity schedule. Samples will be collected one time at each of five sites for the baseline monitoring program. Samples at two sampling locations will be collected once before and once after removal activities are conducted at specific removal site. Samples will be of "water," and collected as subsurface "grab" samples. Specific parameters to be monitored are included in Table 6.1, and are expected to provide information appropriate to the project's objectives. Samples will be sent to PCL immediately after the sampling event is complete in order to meet sample holding time requirements. Note that additional parameters could be incorporated into the sampling program in response to modifications to the program's objectives, or to address specific issues that arise over time. In the event that additional parameters are included in the study, the QAPP will be modified to reflect the change.

All of the parameters identified in the sampling plan have been selected based on their relevance to the objectives of the study. Consequently, until they can be reviewed in the context of the overall study results, each parameter is considered "critical" in terms of achieving the project's objectives.

Natural variability could impact the parameters measured on a spatial and temporal basis. This could be of particular concern in the 'baseline' portion of study in which monitoring is planned for only one discreet sampling period. Thus, the baseline data could reflect potential bias associated with random variation in the parameter(s) being measured. However, the design reflects limitations in the resources committed to the sampling effort and, therefore, we will rely on best professional judgment in terms of identifying values that might not reflect average baseline conditions. The design of the site-specific monitoring program will be less impacted by

spatial and temporal variability since sites will be located upstream and downstream of potential impact areas, sampling will occur at approximately the same time, and comparisons will be relative with respect to upstream and downstream locations.

11. Sampling Methods

Project staff will conduct sampling as appropriate, depending upon the site, safety requirements, and any analytical concerns. All sampling, including both measurements taken in the field, and samples collected for analysis by PCL, will be consistent with SOPs as defined by the SWAMP in Appendices D and E. Any deviations from these procedures will be noted and reviewed by AMEC's QA officer, Doug McFarling. Refer to Section 14 for additional information pertaining to SOPs for sample collection.

Parameters measured in the field will generally involve use of probes held below the water's surface. In some cases, it may be more appropriate to collect a subsurface water sample and measure the parameter immediately in the sampling or transfer container using the probe.

Water samples for chemical analysis may be collected by Van Dorn Samplers, Niskin Bottles, extension pole-type sampling devices, and hand-held plastic or glass containers. Sampling protocols are available for each of these methods and will be reviewed prior to sampling. In cases where glass bottles are required for sample storage, plastic samplers would be satisfactory as long as the holding time in the sampling device is minimal before transfer to the glass sample bottle.

Sampling devices and sample bottles (that are not pre-sterilized and do not contain preservatives/fixing agents) will be rinsed three times with sample water prior to collecting each sample. Sterile bottles, whirl-paks, and sample bottles which contain preservatives/fixing agents (e.g., acids) will not be rinsed with sample water prior to collecting the sample. In these cases, a sampling device will be used to collect the sample prior to transferring it into the sample container. Care will be taken not to disturb the water while wading. If it is necessary to wade into the water, the sample collector will stand downstream of the sample, taking the sample upstream. If the collector disturbs sediment when wading, the collector will wait until the effect of disturbance is no longer apparent before taking the sample. All samples will be taken in a well-mixed area, at least one inch below the surface.

For parameters measured by the analytical laboratory, split samples will be submitted following each sampling event. For split samples, sufficient volume will be collected, composited, and split between two sample containers prior to submission to PCL. As with the regular samples, any necessary preservatives will be added to each sample container prior to submittal to PCL.

Temperature, dissolved oxygen, pH, conductivity, and salinity will be measured using a Horiba U-10 Water Quality Checker. All remaining parameters will be analyzed by PCL.

Table 11.1 describes the sampling equipment, sample-holding container, sample preservation method, and maximum holding time for each parameter.

Table 11.1 Sampling Method Requirements

Parameter	Sample Bottle	Preferred/Maximum Holding Times
Temperature	Sample directly	Immediately
Dissolved oxygen	500 ml plastic bottle or sample directly	Immediately/store cool at 4°C for up to 1 day
pH	250 ml plastic bottle or sample directly	Immediately/as soon as possible after sampling
Conductivity	100 ml plastic bottle or sample directly	Immediately/store at STP for up to 28 days
Salinity	100 ml plastic bottle or sample directly	Immediately/store cool at 4°C for up to 28 days
Turbidity	250 ml plastic bottle or sample directly	Immediately/store cool at 4°C for up to 2 days
Total dissolved solids	500 ml plastic bottle or sample directly	Immediately/store cool at 4°C for up to 7 days
Total suspended solids	500 ml plastic bottle or sample directly	Immediately/store cool at 4°C for up to 7 days
Ammonia N	500 ml plastic bottle	Immediately/add H2SO4 to pH <2, store cool at 4°C for up to 28 days
Nitrate N	500 ml plastic bottle	Immediately/store cool at 4°C for up to 2 days
Nitrite N	500 ml plastic bottle	Immediately/store cool at 4°C for up to 2 days
Phosphorus (Diss)	500 ml plastic bottle	Immediately/store cool at 4°C for up to 2 days
Phosphorus (Total)	500 ml plastic bottle	Immediately/store cool at 4°C for up to 2 days
Total Organic Carbon	250 ml Amber	Immediately/add H2SO4 to pH <2, store cool at 4°C for up to 28 days
Biochemical Oxygen Demand	1L plastic bottle	Up to 2 days
Dissolved Organic Carbon	Acid and d.i. water rinsed glass sampling bottle, teflon liner in lid	Up to 48 hours
Pesticides and other synthetic organic compounds (Glyphosate)	120 ml Amber	Store cool at 4°C for up to 14 days
Total Coliform & Fecal Coliform Bacteria	100 ml Bacti	Dechlorinate, store cool at 4°C for up to 6 hours

12. Sample Handling and Custody Procedures

12.1 Sample Handling

Identification information for each sample will be recorded on the field data sheets (see Appendix 2) when the sample is collected. Samples will be labeled with the waterbody name, sample location, sample number, date and time of collection, sampler's name, and preservative added (if any). Please refer to Table 11.1 for maximum holding times allowed from sample collection to extraction and/or analysis for each sample type. Samples will be transported on ice in a cooler that will keep the samples at 4°C as prescribed by the sampling method requirements. Samples will be stored at 4°C in the lab until time of analysis.

No special handling or custody procedures are needed. The chain of custody form is used as a shipping record.

Samples may be disposed of when analysis completed and all analytical quality assurance/quality control procedures are reviewed and accepted,

12.2 Custody Procedures

The parameters measured in the field do not require specific custody procedures because, in most cases, they will be measured immediately by the same person who performs the sampling. In certain circumstances (e.g., driving rain or extreme cold), samples will be taken directly to a nearby sheltered location for immediate analysis. Samples requiring chemical preservation will be fixed prior to transport.

When samples are transferred from the monitoring team to professional analytical laboratory, a Chain of Custody form (Appendix 3) will be used. This form identifies the waterbody name, sample location, sample number, date and time of collection, sampler's name, and method used to preserve sample (if any). It also indicates the date and time of transfer, and the name and signature of the sampler and the sample recipient.

It is the responsibility of the field coordinator to ensure that all sample labels and Chain of Custody forms are filled out correctly.

12.3 Disposal

Given that chemicals will not be used in the field, it is not anticipated that the monitoring team will need to implement specialized procedures for disposal of potential contaminants. The analytical laboratory will be responsible for disposal of reagents and other chemicals used to process samples they receive, as well as any unused sample remaining after analyses are completed.

13. Analytical Methods Requirements

Water chemistry parameters will be measured using appropriate protocols described by ASTM, APHA, or USEPA, as stated in the SWAMP, in order to obtain data of known quality. Table 13.1 identifies all field and laboratory SWAMP approved protocols that will be used to analyze each parameter. With the exception of the *in situ* measurements taken using the Horiba U-10 sampling unit, no additional *in situ* direct measurements will be included. As a result, fouling and long term maintenance of data recorders does not apply to this program. All equipment and instrumentation utilized by PCL is included in the cited EPA guidelines. Method performance criteria are identified in Table 7.1 and are consistent with EPA guidelines. PCL is accredited by the State of California Department of Health Services through the environmental laboratory accreditation program. Under this program, PCL has identified procedures to follow when failures occur, identified the individual responsible for corrective action and appropriate documentation. Sample disposal procedures will occur follow the lab's accredited procedures. AMEC will receive preliminary results from PCL within 14 days of sample submittal. AMEC will receive final results within 30 days of sample submittal. Only standard methods that are consistent with Appendix C of the SWAMP will be utilized for sample analysis. As a result, method validation and information, and SOPs for nonstandard methods and PBMS are not applicable to this QAPP.

Table 13.1 Analytical Methods for Water Quality Parameters

Parameter	Method	Reference
Temperature	Thermometric	TBD
Temperature	Thermistor (0 to 50°C)	Ashtead
Dissolved Oxygen	Membrane/ galvanic cell	Ashtead
pH	Glass electrode	Ashtead
Conductivity	Alternating four-electrode	Ashtead
Salinity	Conductivity conversion	Ashtead
Turbidity	180.1	EPA
Total dissolved solids	160.1	EPA
Total suspended solids	160.2	EPA
Ammonia N	350.2	EPA
Nitrate N	353.2	EPA
Nitrite N	353.2	EPA
Phosphorus (Dissolved)	365.2	EPA
Phosphorus (Total)	365.2	EPA
Total Organic Carbon	415.1	EPA
Biochemical Oxygen Demand	405.1	EPA
Dissolved Organic Carbon	415.1	EPA
Glyphosate	547	EPA
Total Coliform and Fecal Coliform Bacteria	SM 9221E; SM 9221B	Standard Methods

14. Quality Control Requirements

Quality control samples will be taken to ensure valid data are collected. Depending on the parameter, quality control samples will consist of blanks, replicate samples, and split samples. The monitoring events for this project will be approximately 1 year apart. Therefore, to ensure that sampling is being conducted correctly, sampling, and analytical techniques will be reviewed with monitors prior to each event.

14.1 Blanks, Replicates, Split Samples, and Standardization

14.1.1 Field/Laboratory Blanks

For all water quality analyses submitted to the certified analytical laboratory, field blanks will be analyzed every sampling trip.

Instructions for Field Blanks: Distilled water is taken into the field and handled just like a sample. It will be poured into the sample container and then submitted for analysis. When reagents are used to fix or otherwise stabilize a sample for a particular test method, then the reagents are added to the distilled water at the time of sampling. Field blanks are recorded on the field datasheet.

14.1.2 Field Confirmations

If a second method or instrument for measuring temperature, dissolved oxygen, and pH is available in the field, monitors will perform measurements with both instruments/methods on a split sample at least once daily. Examples of this sort of redundant measurement would be:

- for temperature, the use of an electronic thermometer (e.g., built into dissolved oxygen meters) and an armored thermometer;
- for dissolved oxygen or pH, the use of two different meters and probes.

This procedure will validate the backup capability if one of the measurement alternatives fails. The results of both measurements will be recorded along with the procedure used on the field datasheet. If the two results are inconsistent, or control limits are exceeded, then the field coordinator will so note on the datasheet, and re-evaluate the calibration and maintenance logs for the instruments/methods in question. Any related issues regarding data validity will be brought to the attention of the data manager.

14.1.3 Replicate Samples

Replicate samples are two or more samples collected at the same time and place. When there are only two replicates then these are referred to as duplicates. For this study, duplicate field samples will be taken during every sampling event. Duplicate samples will be collected as soon as possible after the initial sample has been collected, and will be subjected to identical handling and analysis.

14.1.4 Split Samples

For parameters measured by the analytical laboratory, split samples will be submitted following each sampling exercise. Analysis of split samples provides an indication of analytical precision. For split samples, sufficient volume will be collected, composited, and split between two sample containers prior to submission to the analytical laboratory. As with the regular samples, any necessary preservatives will be added to each sample container prior to submittal to the laboratory.

14.1.5 Standardization of Instruments and Procedures

Prior to use in the field, temperature measurements will be standardized by comparing the thermometers and probes to a NIST-certified or calibrated-thermometer in ice water and ambient temperature water. All meters (i.e., pH, conductivity, and oxygen) will be evaluated using the appropriate standards. All instruments will be properly calibrated prior to standardization and use in the field.

Table 14.1 summarizes the quality control regimen.

Table 14.1 Summary of Quality Control Requirements

Parameter	Blank	Duplicate Sample	Split Sample to lab
Water quality			
Temperature	None	Daily	None
Dissolved oxygen	None	Daily	None
pH	None	Daily	None
Conductivity	None	Daily	None
salinity	None	Daily	None
turbidity	Each event	Each event	Each event
Ammonia	Each event	Each event	Each event
Nitrate	Each event	Each event	Each event
Nitrite	Each event	Each event	Each event
Phosphorus (Dissolved)	Each event	Each event	Each event
Phosphorus (Total)	Each event	Each event	Each event
Total Organic Carbon	Each event	Each event	Each event
Biochemical Oxygen Demand	Each event	Each event	Each event
Dissolved Organic Carbon	Each event	Each event	Each event
Glyphosate	Each event	Each event	Each event
Biological Parameters			
Total Coliform and Fecal Coliform Bacteria	Each event	Each event	Each event

Due to the relatively small size of the dataset, data quality review will be limited to statistically evaluations such precision, bias, outliers and missing data. Refer to Sections 22 and 23 for more detail.

15. Instrument/Equipment Testing, Inspection and Maintenance

The Horiba U-10 Water Quality Checker, which is functionally equivalent to similar YSI models, will be used to collect measurements in the field. The supplier, Ashtead Technology Rentals, maintains the Horiba U-10. Before each use, the instrument will be checked to ensure that it is clean and in good working order. Spare parts, or a replacement of a deficient meter will be available from Ashtead within 24 hours of the request . A maintenance and calibration log will be maintained by the field coordinator. This log details the dates of instrument inspection and routine maintenance, calibrations performed in the laboratory, battery replacement, the dates reagents and standards are replaced, and any problems noted with instruments or reagents. This section applies to instruments used to measure selected parameters in the field; PCL is responsible for the remaining analyses and is responsible for maintenance, standardization, and calibration of their instruments according to the requirements of their certification. PCL's State approved SOPs and QA/QC procedures indicate how deficiencies should be resolved, re-inspections performed and effectiveness of corrective actions are determined and documented.

15.1 Temperature

Before each use, thermometers will be checked for breaks in the column. If a break is observed, the alcohol thermometer will be placed in nearly boiling water so that the alcohol expands into the expansion chamber, and the alcohol forms a continuous column. Following this procedure, accuracy will be verified by comparing with a calibrated or certified thermometer. Temperature probes will also be checked against calibrated thermometers.

15.2 Dissolved oxygen

Membranes and solutions will be replaced according to manufacturer's specifications, but no less frequently than quarterly. Membranes should be checked for bubbles after replacement. Before each use, dissolved oxygen meters will be checked to see if they are clean, in good working order, and calibrated according to the manufacturer's specifications.

15.3 Conductivity and pH

Before each use, conductivity and pH meters will be checked to see if they are clean and in good working order. Conductivity and pH meters will be calibrated before each use, according to the manufacturer's specifications. Conductivity standards and pH buffers are replaced at least annually. Conductivity and pH standards will be stored with the caps firmly in place, in a dry area away from extreme heat. Solutions used for calibration will be discarded following their use.

16. Instrument Calibration/Standardization and Frequency

The Horiba U-10 Water Quality Checker is calibrated by the supplier, Ashtead Technology Rentals. Photocopies of the calibration and standardization records will be maintained in the project file. Calibration will be re-checked by field personnel prior to use. The instrument will be calibrated and reagents checked against standards according to the following schedule. Standards will be purchased from a chemical supply company or prepared by a professional laboratory. Calibration records will be kept in the maintenance log where they can be easily accessed by the field coordinator and technical advisor. All calibration and standardization deficiencies will be recorded on field datasheets and will be resolved in the field. *In situ* monitoring using the Horiba U-10 Water Quality Checker will not be permitted if calibration and standardization is not successful. Calibration of in situ equipment will be checked at the beginning and end of the sampling event. Any changes in calibration during the course of the sampling event will be recorded on the field data sheet. In addition, samples will be collected for DO, pH, conductivity, and salinity. In the event that the *in situ* equipment loses its calibration, these back-up samples will be analyzed by PCL immediately following the sampling event. The frequency of calibration is described in Table 16.1.

Table 16.1 Instrument Calibration and Frequency

Equipment Type	Calibration Frequency	Standard or Calibration Instrument Used
Temperature meter or thermometer	Each event	NIST calibrated or certified thermometer
Dissolved oxygen meter	Every sampling day	At a minimum, water saturated air, according to manufacturer's instructions.
pH meter	Every sampling day	pH 7.0 buffer and one other standard (4 or 10)
Conductivity meter	Every sampling day	Conductivity standard and distilled water
Salinity meter	Every sampling day	Salinity standard and distilled water

17. Inspection/Acceptance Requirements

Upon receipt, buffer solutions, standards, and reagents will be inspected by the field coordinator for leaks or broken seals, and to compare the age of each reagent to the manufacturer's recommended shelf-life. Reagents and standards will be replaced before they exceed the manufacturer's recommended shelf life. Reagent replacement dates will be noted in the maintenance log. All sampling equipment will be inspected for broken or missing parts, and will be tested to ensure proper operation.

All consumables used for *in situ* measurements will be supplied by Ashtead Technology Rentals or a chemical supply company. All consumables used for samples analyzed by the lab will be supplied by PCL.

18. Non-Direct Measurements

Flow data is the only non-direct measurement included in this sampling program. These data should be obtained from the following USGS website and are subject to the agency's QA/QC procedures: http://waterdata.usgs.gov/ca/nwis/current/?type=flow, for the following stations: Lang, CA, #11107745; Saugus, CA, #11108000; Piru, CA, 11109000. AMEC and the VCRCD have no way of independently verifying the data. As a result, limitations of validity and operating conditions cannot be determined by AMEC or the VCRCD.

This real-time flow data will be used as a reliable and efficient source of flow data for the Upper Santa Clara River hydrologic area. This data is preferable to flow data measured in the highly braided and wide channeled areas where our monitoring sites are located.

This information is readily available off the internet. As a result, no additional resources or support facilities are necessary.

19. Data Management

Data will be maintained as established in Section 9 of this document. Field datasheets will be checked and signed in the field by the field coordinator. The field coordinator will identify any results where holding times have been exceeded, sample identification information is incorrect, samples were inappropriately handled, or calibration information is missing or inadequate.

Where possible, missing or incorrect information will be added in the field; otherwise, such data will be marked as unacceptable by the field coordinator and will not be entered into the electronic spreadsheet.

The results from the analytical laboratory will be reviewed by the data manager, who will verify sample identification information, review the Chain of Custody forms, and identify possible questionable values. These data will also be reviewed by the technical advisor.

The data manager will review the field sheets and enter the data deemed acceptable by the field coordinator and the technical advisor. Upon entering the data the data manager will sign and archive the field datasheets. Data will be entered into an MS Excel spreadsheet. Following initial data entry the data manager will review electronic data, compare it to the original datasheets, and correct entry errors. After performing data checks, and ensuring that data quality objectives have been met, data analysis will be performed.

20. Assessment and Response Actions

All reviews will be made by the AMEC QA officer assisted by as necessary by the technical advisor and may include the VCRCD QA officer. AMEC will conduct reviews of sampling procedures on an annual schedule that will coincide with the development of the two reports identified in section 21. Reviews will consist of comparing observed practices against those found in AMEC's sampling SOPs. Results from PCL will be inspected immediately upon receipt to identify any outliers based on expected values, and variability associated with duplicate and split samples. Potential analytical errors associated with the analytical laboratory will be brought to their immediate attention, so that their calculations and procedures can be reviewed in a timely manner. If necessary, remaining sample or extract may be re-analyzed to confirm the initial result. Regardless, any corrective actions will be noted appropriately in the project log.

If an audit discovers any discrepancy, AMEC's QA officer, along with the technical advisor as necessary, will discuss the observed discrepancy with the appropriate person responsible for the activity (see organization chart). The discussion will begin with whether the information collected is accurate, what were the cause(s) leading to the deviation, how the deviation might impact data quality, and what corrective actions might be considered.

The AMEC QA officer has the power to halt all sampling and analytical work by both AMEC and PCL if the deviation(s) noted are considered detrimental to data quality.

21. Reports to Management

The scope of this project requires that two reports and associated raw data will be submitted to the VCRCD. The first report will summarize data collected for the baseline water quality study. The second report will summarize data collected for the study evaluating the potential effects on water quality associated with removal of Arundo and Tamarisk. Each report will describe the objectives of the study, and the methods used to obtain and analyze the data. In addition, the monitoring results and associated data analysis will be described, including comparisons to water quality objectives, comparisons across reaches and any effects associated with the Arundo and Tamarisk removal activities. Finally, any deviations from the QAPP will be noted,

along with an assessment of their potential impact on the study and the corrective actions taken. It is the responsibility of the field coordinator and technical advisor to write these reports. Both reports will be submitted to the VCRCD.

22. Data Review, Validation and Verification

Data generated by project activities will be reviewed against the data quality objectives and the quality assurance/quality control practices. As part of standard field protocols, any sample readings out of the expected range will be reported to the field coordinator. A second sample will be taken as soon as possible to verify the condition. If the data appear to be invalid, they will be so noted (flagged) on the datasheet, and immediate actions taken to trace the sources of error, and to correct those problems.

Results from PCL will be inspected immediately upon receipt to identify any outliers based on expected values, and variability associated with duplicate and split samples. PCL will be notified of our concern and requested to evaluate their procedures. If necessary, they will be requested to repeat the analysis on any remaining un-used sample.

Datasheets will be reviewed after each sampling event by the Data Manager and Technical Advisor to determine if the data meet the QAPP objectives. They will identify outliers, spurious results, or omissions to the field coordinator. They will also evaluate compliance with the DQOs. Data generated by project activities will be reviewed against the data quality objectives cited in Section 7 and the quality assurance/quality control practices cited in Sections 14, 15, 16, and 17. Data will be separated into three categories: data meeting all data quality objectives, data meeting failing precision or recovery criteria, and data failing to meet accuracy criteria. Data meeting all data quality objectives, but with failures of quality assurance/quality control practices will be set aside until the impact of the failure on data quality is determined. Once determined, the data will be moved into either the first category or the last category.

Data falling in the first category is considered usable by the project. Data falling in the last category is considered not usable. Data falling in the second category will have all aspects assessed. If sufficient evidence is found supporting data quality for use in this project, the data will be moved to the first category, but will be flagged with a "J" as per EPA specifications.

The Data Manager and Technical Advisor will suggest corrective action that will be implemented by the field coordinator. As noted below, problems with data quality and corrective action will be noted in the final reports.

23. Verification and Validation Methods

All data records will be reviewed by AMEC's QA officer, with assistance from the technical advisor as necessary, and compared to DQOs as defined in Table 7.1. Data that exceed the criteria will be qualified or rejected depending on the nature of the exceedance. Due to the relatively small size of the data set verification and validation procedures will be completed manually. Please see Appendix 6 for the verification and validation checklist that will accompany each dataset generated from the two scheduled sampling events. The project

manager and technical advisor will review reports. All checks by PCL will be reviewed by AMEC or the VCRCD, noting any issues.

Reconciliation and correction will be done by a committee composed of the technical advisor, field coordinator, data manager, and project manager; and PCL. Any corrections require a unanimous agreement that the correction is appropriate.

No data validation software will be used.

24. Reconciliation with User Requirements

The project requires a sufficient numbers of data points, as represented by the completeness data quality objective, in order to determine the effects of Arundo and Tamarisk removal. A failure to achieve the numbers of data points cited could mean an inability to provide this assessment.

Due to the lack of replicates quantifying uncertainty is not applicable to the sampling program as defined in this QAPP.

Data collected as part of this study should be reported to data users with the caveat that without additional samples, the data should be considered to represent conditions at the time of sampling. The baseline data consists of data collected during one sampling event. As a result, the data will not provide a complete characterization of temporal variability associated with baseline conditions.

Data collected as part of this study will provide information regarding surface water quality of the Santa Clara River, and the short-term effects of *Arundo* removal activities on water quality. Thus, in addition to further increasing the existing database for an important regional watershed, the ubiquitous distribution of *Arundo* in watersheds in southern California suggests that these data will have significance for planning additional future projects and assessing their potential impacts. All data will be submitted to the SWRCB for incorporation into the SWAMP database. All data will be submitted to the SWRCB to be incorporated into the SWAMP database.

APPENDIX 1

MONITORING LOCATION TABLE AND MAPS

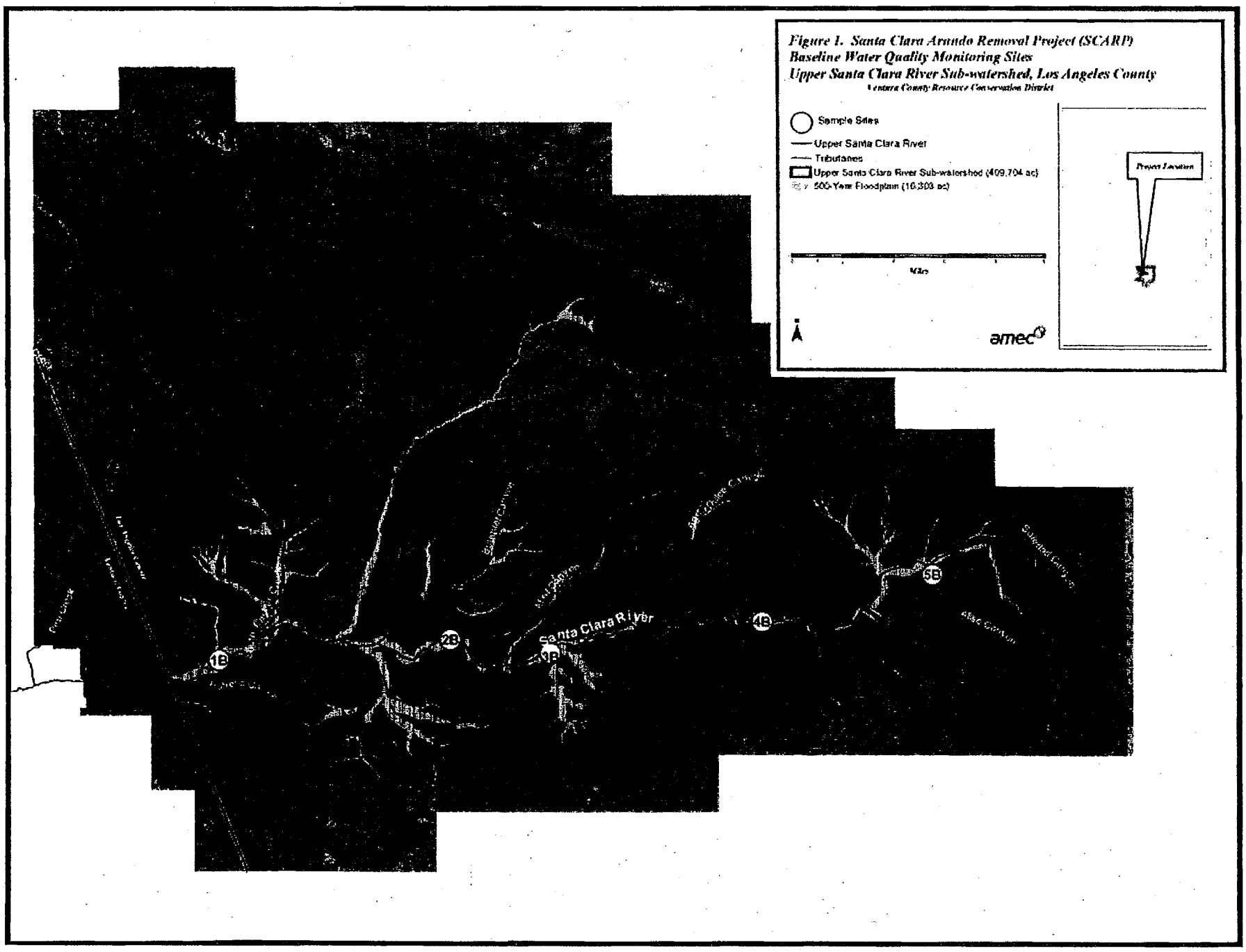


Figure 1. Santa Clara Arundo Removal Project (SCARP)
Baseline Water Quality Monitoring Sites
Upper Santa Clara River Sub-watershed, Los Angeles County
Ventura County Resource Conservation District
Sample Sites
Upper Santa Clara River
Tributaries
Upper Santa Clara River Sub-watershed (409,704 ac)
500-Year Floodplain (16,303 ac)
Miles
Project Location
amec
Santa Clara River
1B
2B
3B
4B
5B

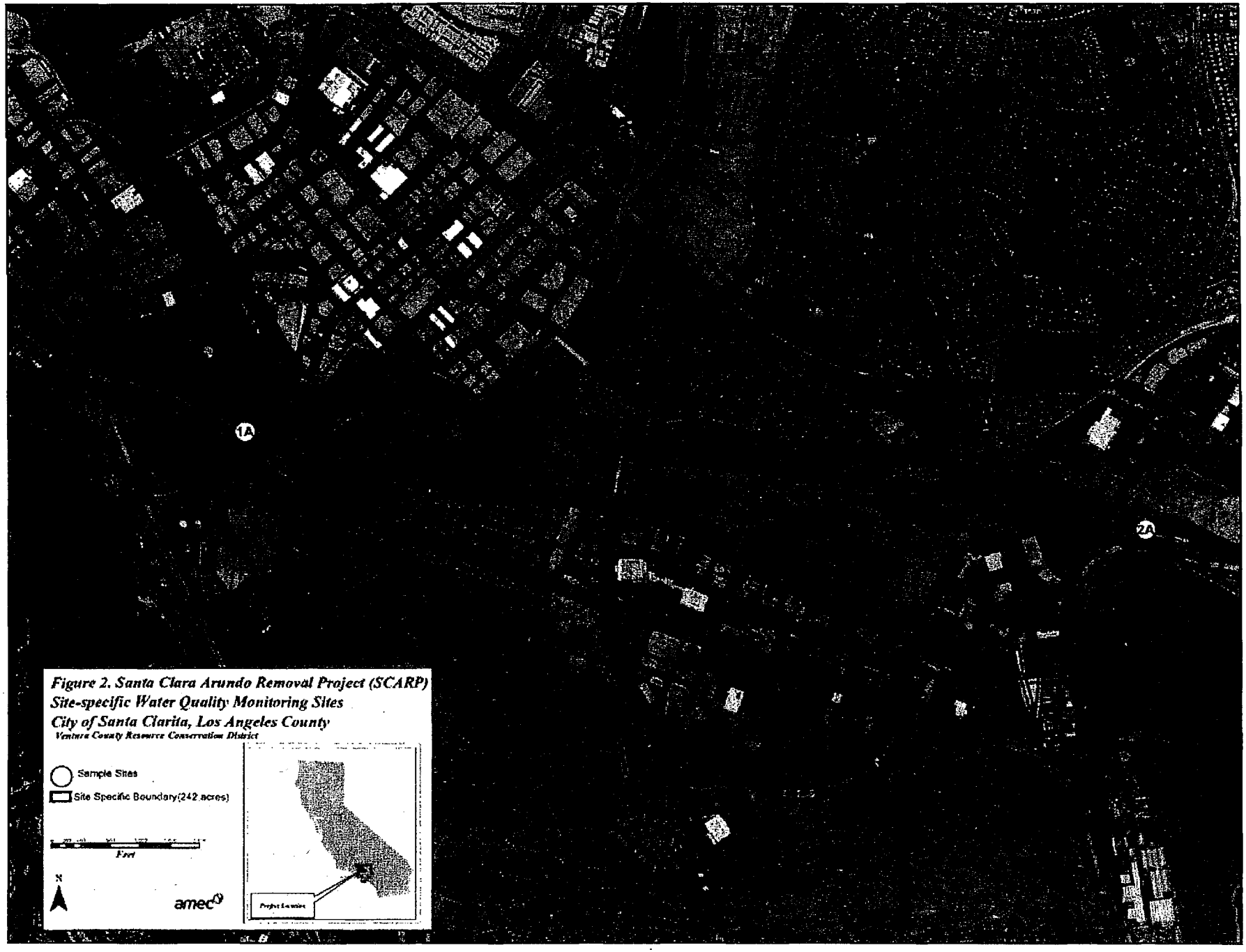


Figure 2. Santa Clara Arundo Removal Project (SCARP)
Site-specific Water Quality Monitoring Sites
City of Santa Clarita, Los Angeles County
Ventura County Resource Conservation District

Table 1. Baseline and Site Specific Water Quality Monitoring Locations

	Sampling Location	Status	Position		Sampling Location Description
			Easting	Northing	
Site Specific Monitoring Locations	1A	Digitized (GPS)	6388791.04079	1978336.9468	Site specific. Park in last lot of housing development. Follow the trail towards the River. Follow trail until it meets the larger channel.
	2A	Digitized (GPS)	6399247.3787	1976684.1249	Site specific. Access issues need to be resolved before finalizing this point.
Baseline Monitoring Locations	1B	SWAMP site	6363869.8462	1973951.8571	Suitable access to this sampling location needs to be verified.
	2B	Digitized (GPS)	6412661.3856	1978547.9445	Sampling point located at the end of Honby Road. Going East on Soledad Canyon Rd. turn left onto Honby. Go to end of Honby. Park next to Rio Vista School. Look for dirt trail leading to River.
	3B	Digitized (GPS)	6412671.1788	1978565.4646	Going East on Soledad Canyon, make a right at Sand Canyon. Go over bridge that crosses the Santa Clara River. Make a right on Lost Canyon Road. Cross bridge and park across from Pinecrest school.
	4B	Digitized (GPS)	6477844.9168	1982139.5869	Sampling point is located at Robins' Nest Campground. Going East on Soledad, make a left into driveway after sign. This location is past the Acton Conservation Camp (right side).
	5B	Digitized (GPS)	6519425.7824	1992251.9533	Going East on Soledad. Make a right on Aliso Canyon. The sampling site is just across from, and south of El Dorado Drive. Make sure to sample south (upstream) of the LADPW discharge point.

APPENDIX 2

WATER QUALITY MONITORING DATA SHEETS

Water Quality Monitoring Data Sheet
Field Measurements

Santa Clara Arundo Removal Project

Monitoring Event Information

Date (M/D/Yr): _____

Time (Begin/End): _____

Field Monitors: _____

_____

Site Information

Site #: _____

GPS Coordinates

Latitude: _____

Longitude: _____

Water Quality Measurements

	1	2	Taken by:	Recorded by:
Water Temperature (C°):				
Dissolved Oxygen (mg/l):				
pH:				
Salinity (%):				
Conductivity (µS/cm):				

Observations/Notes: _____

_____

_____

_____

_____

_____

_____

_____

Water Quality Monitoring Data Sheet
Lab Samples

Santa Clara Arundo Removal Project

Monitoring Event Information	Site Information
Date (M/D/Yr): _____	Site #: _____
Time (Begin/End): _____	GPS Coordinates
Field Monitors: _____	Latitude: _____
_____	Longitude: _____

Samples Collected for PCL

	Sample ID	Duplicate	Split	Taken by:
Turbidity:				
Ammonia:				
Nitrate N:				
Nitrite N:				
Phosphorus (Dissolved):				
Phosphorus (Total):				
Biochemical Oxygen Demand (BOD):				
Dissolved Organic Carbon (DOC):				
Total Organic Carbon (TOC):				
Glyphosate:				
Total Coliform:				

Verified by: _____

Please make all notes on the back of this form.

APPENDIX 3

CHAIN OF CUSTODY FORM

Pat-Chem Laboratories
11990 Discovery Court
Moorpark, CA 93021

CHAIN OF CUSTODY RECORD

Phone (805) 532-0012
Fax (805) 532-0016

Sample I.D.#: _____

Customer Name	P.O.#	Project Location
Address	Phone #	Sampled by
City, State, Zip	Report Attention	

Lab #	Date Sampled	Time Sampled	Comp or Grab	Type **see below	SAMPLE DESCRIPTION	No. Rec.	Required Tests	Preservatives	Bottle Type

Signature	Print Name	Company	Date	Time
Relinquished by				
Received by				
Relinquished by				
Received by				
Relinquished by				
Received by				

pH: _____

Temperature: _____

Initial Flow: _____

Final Flow: _____

** Type: AQ = aqueous NA = Nonaqueous SL = Sludge
SO = Soil PE = Petroleum OT = Other

Note: Samples are discarded 30 days after results are reported, unless other arrangements are made. Hazardous samples will be returned to client, or disposed at the CLIENTS expense.

Composite Sampler Setup Date: ___ / ___ / ___ Composite Sampler Setup Time: ___ : ___

APPENDIX 4

STATE OF CALIFORNIA
DEPARTMENT OF HEALTH SERVICES
ENVIRONMENTAL LABORATORY CERTIFICATION

STATE OF CALIFORNIA
DEPARTMENT OF HEALTH SERVICES
ENVIRONMENTAL LABORATORY ACCREDITATION PROGRAM

ENVIRONMENTAL LABORATORY CERTIFICATION

Is hereby granted to

PAT-CHEM LABORATORIES

MOORPARK

11990 DISCOVERY COURT

MOORPARK, CA 93021

Scope of certification is limited to the
"List of Approved Fields of Testing and Analytes"
which accompanies this Certificate.

Continued certification status depends on successful completion of site visit, proficiency testing studies, and payment of applicable fees.

This Certificate is granted in accordance with provisions of Section 100825, et seq. of the Health and Safety Code.

Certificate No: **1531**
Expiration Date: **05/31/2005**
Effective Date: **05/01/2003**

George C. Kulasingam

Berkeley, California
subject to forfeiture or revocation.

George C. Kulasingam, Ph.D.
Program Chief
Environmental Laboratory Accreditation Program

APPENDIX 5

STANDARD OPERATING PROCEDURES

Sampling Method Using the Horiba U-10 Water Quality Checker

During conditions of low flow, the U-10 cannot be fully submerged in the stream. In this situation, rotate the probe such that the appropriate sensors are submerged when taking readings.

A. Turn on the Horiba U-10.
B. Make measurements in the following order:
1) pH and temperature
2) Conductivity and salinity
3) Turbidity
4) Dissolved Oxygen
C. Record measurements on field data sheets

APPENDIX 6

DATA VERIFICATION AND VALIDATION CHECKLIST

Data Verification and Validation Checklist

Sampling event date _____

Verification and validation tasks should be checked off as they are completed. Please place your initials on the line next to the box you have checked.

- ☐ _____ Field verification by field coordinator
- ☐ _____ Field verification reviewed by data manager
- ☐ _____ Field data entered into spreadsheet
- ☐ _____ Laboratory data reviewed by data manager
- ☐ _____ Laboratory data entered into spreadsheet
- ☐ _____ Data entries checked against data recorded on field sheets
- ☐ _____ Data contained in the Water Quality Monitoring Report checked for consistency with data in spreadsheet