Quality Assurance Project Plan

For

Ventura River Watershed Protection Project (V-1): Upper San Antonio Creek Watershed Giant Reed Removal Project (SACGRRP)

Proposal Identification Number: 9604

May 2010

Ventura County Watershed Protection District (VCWPD)

QAPP Version No. 1.0

GROUP A ELEMENTS: PROJECT MANAGEMENT

1. TITLE AND APPROVAL SHEETS

APPROVAL SIGNATURES

COUNTY OF VENTURA/VENTURA COUNTY WATERSHED PROTECTION DISTRICT:

Title:	Name:	Signature:	Date*:
Project Director	Susan Hughes (County of Ventura)		
V-1 Component Project Manager	Zia Hosseinipour (VCWPD)		
SACGRRP Project Manager	Pam Lindsey (VCWPD)		
VCWPD Water Quality Section Manager	Arne Anselm (VCWPD)		
Stream Team Manager	Ben Pitterle (Santa Barbara Channel Keeper)		
SACGRRP QA Officer	Elizabeth Martinez (VCWPD)		

STATE WATER RESOURCES CONTROL BOARD:

Title:	Name:	Signature:	Date*:
Grant Manager	Danielle Siebal		
QA Officer	William Ray		

* This is a contractual document. The signature dates indicate the earliest date when the project can start.

This QAPP was prepared in accordance with the State Water Resources Control Board's Surface Water Ambient Monitoring Program's QAPP Template (Version 2.0, November 19, 2008)

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3. DISTRIBUTION LIST

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William Ray	State Water Resources Control Board	(916)341-5583	bray@waterboards.ca.gov
Susan Hughes	County of Ventura	(805)654-3836	susan.hughes@ventura.org
Zia Hosseinipour	Ventura County Watershed Protection District	(805) 654-2454	zia.hosseinipour@ventura.org
Pam Lindsey	Ventura County Watershed Protection District	(805)654-2036	pam.lindsey@ventura.org
Elizabeth Martinez	Ventura County Watershed Protection District	(805)658-4374	elizabeth.martinez@ventura.org
Arne Anselm	Ventura County Watershed Protection District	(805)654-3942	arne.anselm@ventura.org
Ben Pitterle	Santa Barbara Channelkeeper	(805)563-3377 x3	ben@sbck.org

4. PROJECT/TASK ORGANIZATION

4.1 Involved parties and roles.

The Ventura River Watershed Protection Project (V-1) is one component of State Water Board Grant Agreement No. 07-540-550-0. The Project Director for the Grant Agreement is Susan Hughes (County of Ventura) and the V-1 Project Manager is Zia Hosseinipour (VCWPD). Pam Lindsey is the Project Manager for the Upper San Antonio Creek Watershed Giant Reed Removal Project (SACGRRP) and is responsible for overseeing the design and implementation of the Project. The VCWPD Water Quality Section (WQS) and the Ventura River Stream Team (Stream Team) will conduct the sampling and monitoring efforts. The following laboratories shall conduct analyses of samples:

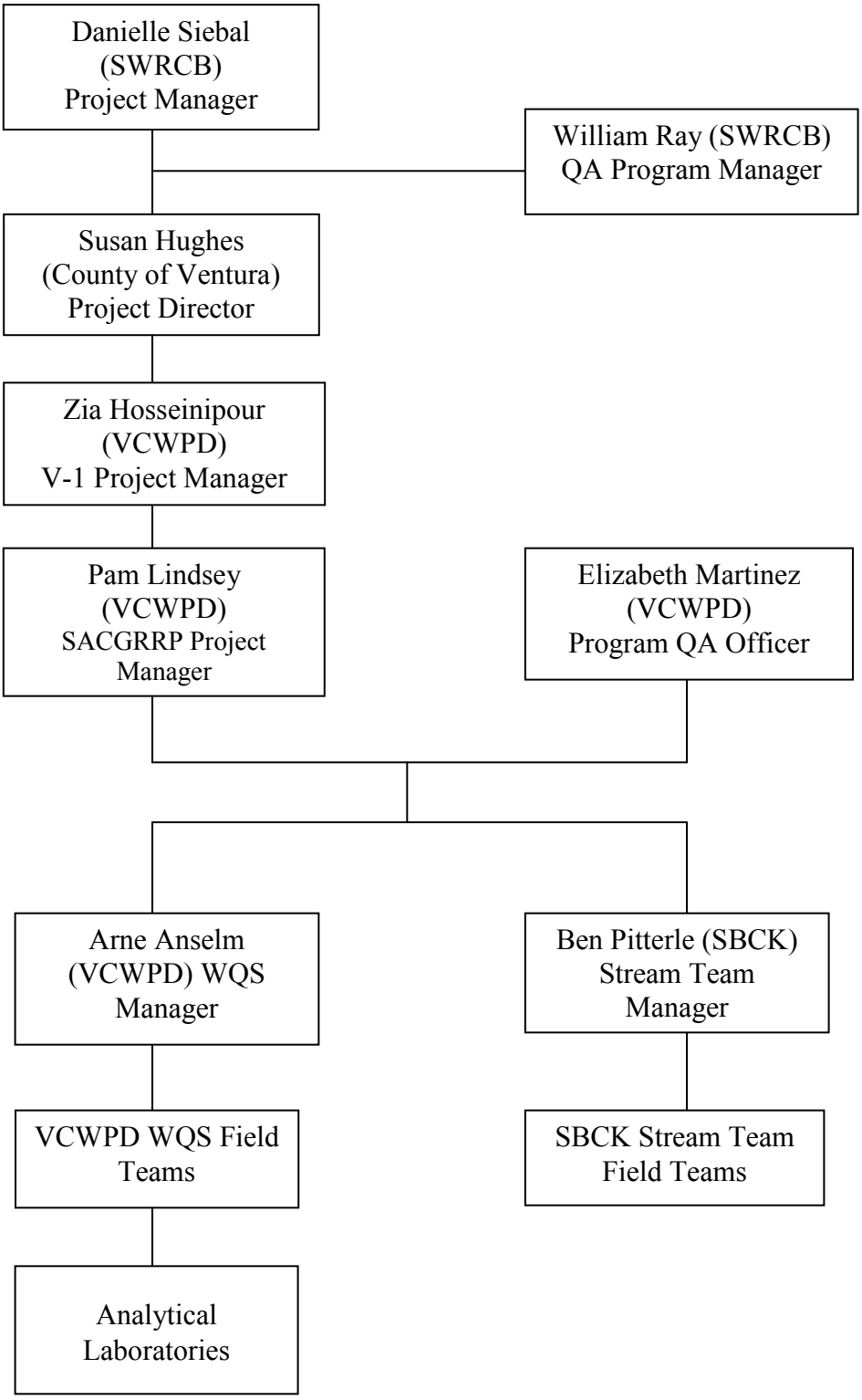
- Weck Laboratories, Inc. shall analyze VCWPD samples for glyphosate.
- The USGS Kansas Organic Geochemistry Research Laboratory shall analyze samples for glyphosate, glufosinate, and aminomethylphosphonic acid (AMPA).
- Fruit Growers Laboratory, Inc. (FGL Environmental, Inc.) shall analyze Stream Team samples for glyphosate.

The laboratories shall ensure that data conforms to their quality assurance standards and shall report information to WQS staff members, who will further evaluate the data and ensure that it is uploaded onto the VCWPD website (www.vcwatershed.org) and the California Environmental Data Exchange Network (CEDEN), the SWAMP Information Management System (IMS). WQS staff members are responsible for ensuring that data meets SWAMP requirements prior to uploading it to CEDEN. Elizabeth Martinez (VCWPD) is the Project's QA Officer and will provide quality assurance oversight and ensure that the quality assurance project plan criteria are met. The QA Officer is independent of data generation. The SACGRRP Project Manager, or their designee, is responsible for the update and maintenance of the QAPP, including any changes.

Table 1. Personnel Responsibilities.

Name	Organizational Affiliation	Title	Telephone Number
Susan Hughes	County of Ventura	Project Director	(805) 654-3836
Zia Hosseinipour	VCWPD	V-1 Component Manager	(805) 654-2454
Pam Lindsey	VCWPD	SACGRRP Project Manager	(805) 654-2036
Elizabeth Martinez	VCWPD	SACGRRP QA Officer	(805) 658-4374
Arne Anselm	VCWPD	Water Quality Section Manager	(805) 654-3942
Ben Pitterle	Santa Barbara Channelkeeper – Stream Team	Director of Watershed Programs	(805) 563-3377

Figure 1. V-1 Upper San Antonio Creek Watershed Giant Reed Removal Project Organizational Chart.



5. PROBLEM DEFINITION/BACKGROUND

5.1 Problem Statement

The objective of the Ventura River Watershed Protection Project is to address water supply, water quality, and habitat issues in the Ventura River Watershed. The goal of the Upper San Antonio Creek Watershed Giant Reed Removal Project (Project) is the removal of giant reed (*Arundo donax*) from the upper San Antonio Creek watershed where it occurs along those portions of upper San Antonio, McNell, Thacher, and Reeves Creeks that extend between the southwest boundary of Soule Park and private in-holdings within Los Padres National Forest, which is located northeast and east of Soule Park. San Antonio Creek is a tributary of the main branch of the Ventura River, and is part of the river's regional watershed. This Project complements the Matilija Dam Ecosystem Restoration Project's efforts to remove giant reed from the main stem of the Ventura River.

Giant reed is a non-native, highly invasive perennial plant that has become established in, and is spreading extensively throughout, riparian ecosystems in California. Giant reed consumes large quantities of water, displaces native vegetation and wildlife, disperses readily via channel flows that occur during heavy rains, and exacerbates flooding, erosion, and fire intensity. Once introduced, giant reed forms expansive rhizome systems that require human intervention to remove. Where castor bean (*Ricinus communis*) occurs in close proximity to those creek reaches targeted for giant reed removal, the VCWPD will remove this non-native plant species as well. Castor bean grows aggressively along stream banks and can rapidly displace native plant species and habitat.

5.2 Decisions or outcomes.

At both regional and local scales, the objectives of the proposed project are to:

- Restore biological habitat, including special-status species habitat;
- Reduce flood risks;
- Reduce fire risks;
- Improve water quality; and
- Enhance water supply reliability and groundwater recharge.

The removal of giant reed and castor bean involves a combination of hand held equipment and herbicide. All treatments will utilize a "cut and daub" method, which involves the cutting of all live giant reed material to a maximum of six inches above grade level using chain saws, loppers and power brush cutters. Within two minutes of cutting, a glyphosate-based herbicide that is approved for use near and in open water, such as Aquamaster®, will be painted onto the cambium layer of the freshly cut stalks with a cloth-covered wand or a sponge in a manner that maximizes the stalks' herbicide absorption. A non-toxic colorant, such as Blazon® will be added to the herbicide solution to identify treated plant material. All cut material will be removed and chipped.

To avoid potential adverse impacts, the project will avoid all standing and flowing water; prohibit herbicide applications within 24 hours prior to a predicted rain fall event, during, or within 24 hours following a rain event; and remove vegetation with hand held equipment. No project-related activities, with the exception of water quality sampling, shall be conducted during periods of surface flow in the creek reaches targeted for giant reed and castor bean removal.

Initial giant reed removal activities are expected to take eight weeks to complete, with re-treatments estimated to take ten working days and occur up to four times annually, depending on site-specific conditions. It is currently anticipated that re-treatments may continue through 2012.

Water quality and quantity monitoring will occur before, during, and after treatments when surface water is present and will include regular field measurements of dissolved oxygen, conductivity, specific conductance, salinity, temperature, pH, turbidity and stream flow; and laboratory analysis for glyphosate. Periodically during the term of the Project, samples will be analyzed for glyphosate, glufosinate, and AMPA utilizing a different analytical method.

5.3 Water quality or regulatory criteria.

The USEPA has promulgated a Primary Maximum Contamination Level (MCL) of 700 µg/L for glyphosate that is applicable for drinking water sources or water bodies with a MUN (municipal and domestic supply) beneficial use designation. This is the level of protection that the USEPA believes would not cause potential short-term or long-term health effects. The SWRCB has adopted the USEPA Primary MCL for its Aquatic Pesticides General Permit (Water Quality Order No. 2004-0009-DWQ). Therefore, as a protective measure, the threshold for glyphosate for this project is also set at 700 µg/L. Glyphosate analysis will be conducted using EPA Method 547 with a RL of 5.0 µg/L at Weck Laboratories, Inc. and 20 µg/L at FGL Environmental, Inc., which are California NELAP certified laboratories.

Aminomethylphosphonic acid (AMPA) is a breakdown product of glyphosate as the result of microbial metabolism. The laboratory method used to analyze for AMPA also measures glyphosate and glufosinate. Glufosinate is similar to glyphosate in its chemical structure and use. There are no aquatic regulatory thresholds for AMPA or glufosinate. Blazon® is a non-toxic colorant and has no aquatic regulatory thresholds.

6. PROJECT/TASK DESCRIPTION

6.1 Work statement and produced products.

Monitoring will be implemented to provide VCWPD with information on the effectiveness of water quality protection best management practices (BMPs) utilized during the Project. The monitoring program is designed specifically to monitor the short-term water quality trends within the Project area (Figure 2 and Figure 3). The monitoring program will measure water quality and quantity before, during, and after the initial treatment and subsequent re-treatments when surface water is present at the four sampling sites (Figure 2). Glyphosate and AMPA results are critical to this project. All other results are for informational purposes.

VCWPD will provide biannual and annual progress reports, including collected data, during the life of the project. At the end of the project, the VCWPD will produce a report with a listing and summary of the data collected. Water quality data obtained from the sampling will be used to test the efficacy of BMPs and determine whether additional BMPs are necessary.

SACGRRP monitoring will be implemented in conjunction with the more comprehensive Ventura River Watershed Monitoring Program conducted by the Ventura River Stream Team (Stream Team). VCWPS has not conducted water quality monitoring in the Project area; however, the Stream Team has over 9 years of baseline water quality data collected directly downstream of the Project area at Site 1 (VR10).

Figure 2. Project Area and Monitoring Sites

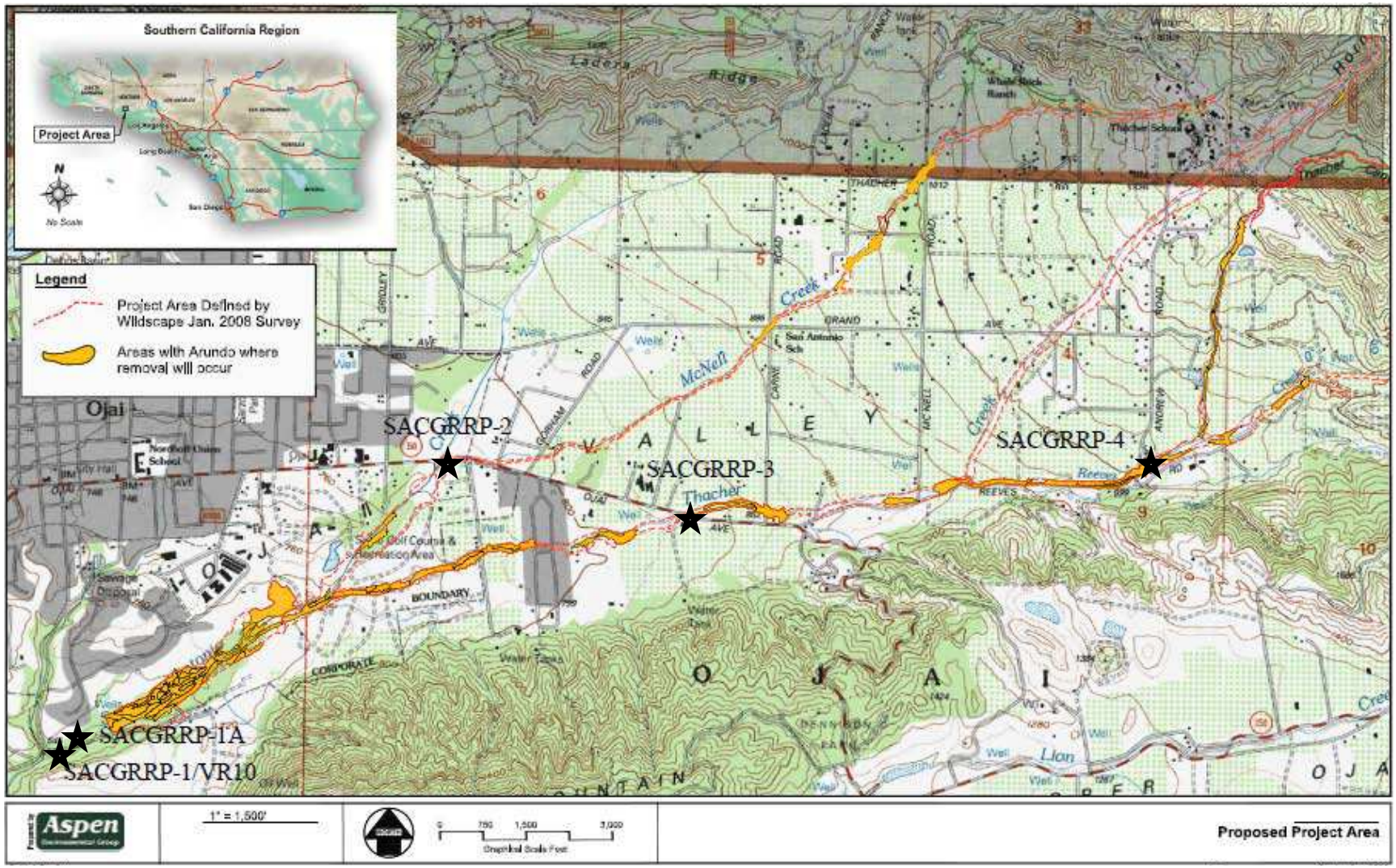
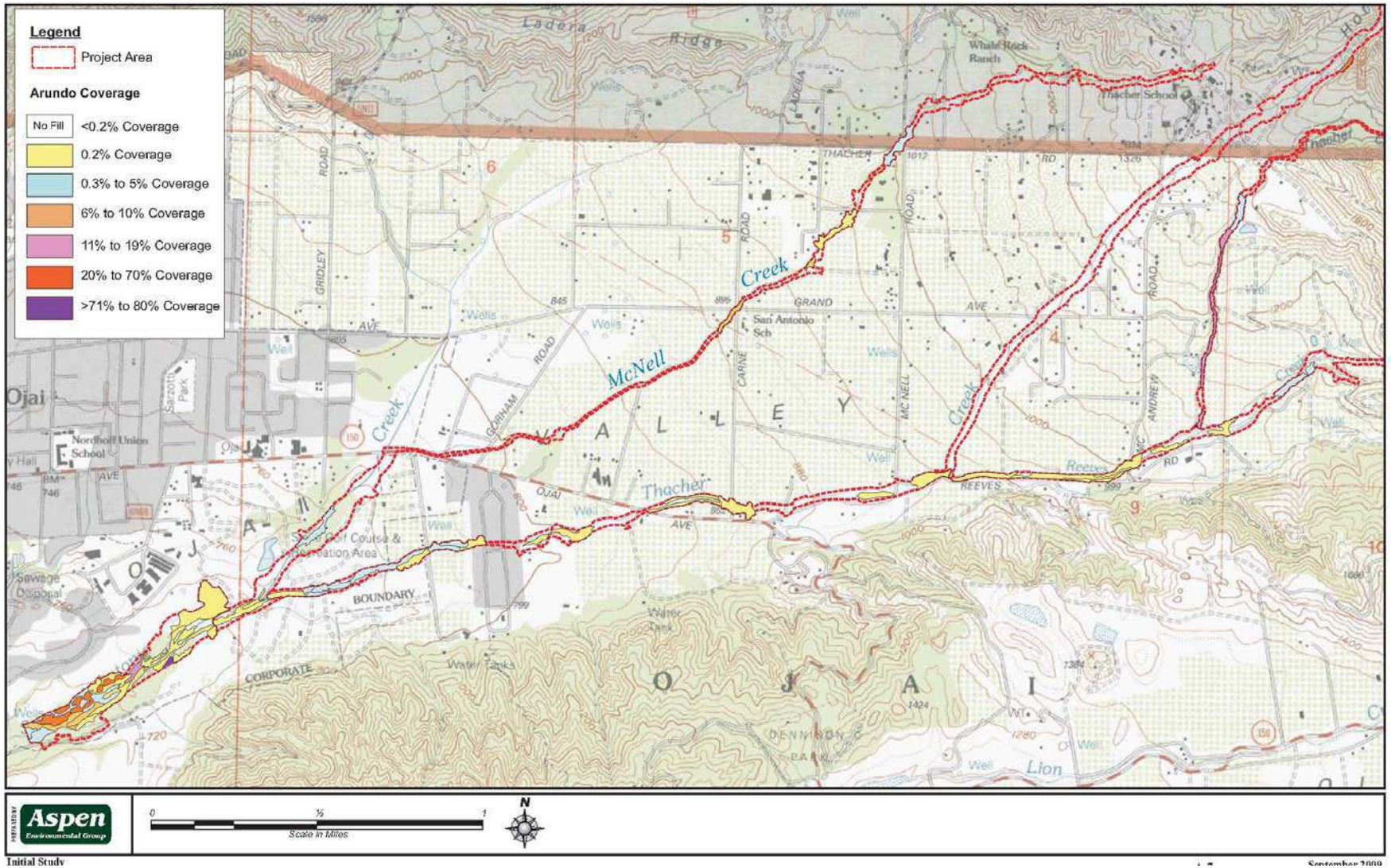


Figure 3. Giant Reed Percent Coverage and Distribution



6.2 Constituents to be monitored and measurement techniques.

Four monitoring sites will be established in the project area (Figure 2). Monitoring will include field measurements of dissolved oxygen, conductivity, specific conductance, salinity, temperature, pH, turbidity, and stream flow conducted using calibrated portable meters. Samples will be collected and sent to a California NELAP approved laboratory for glyphosate (EPA method 547) analysis. Periodically, samples will be collected and sent to the USGS research laboratory for aminomethylphosphonic acid (AMPA) analysis (USGS method LCGY), which also includes glyphosate and glufosinate.

Field measurements conducted by the Stream Team are covered under the Santa Barbara Channelkeeper's *Ventura River Watershed Monitoring Program QAPP (2004)* and are not included in the SACGRRP QAPP.

6.3 Project schedule.

Routine and random grab sampling will provide consistent and targeted data throughout the treatment periods. Baseline samples will be collected at the four monitoring sites prior to the beginning of the treatment program, if water is present. The VCWPD will collect samples for glyphosate and AMPA at Site 1 and samples for glyphosate at Sites 2-4 during the last week of April 2010, prior to the beginning of the Project. The Stream Team will collect a sample for glyphosate at Site 1 (VR10) on the first Saturday of March 2010 and the first Saturday of May 2010. Field measurements will also be taken at the time of sample collection. Additional pre-treatment data are available for Site 1 (VR10) from the Stream Team's existing water quality monitoring program. The data collected during this sampling period, in conjunction with the data already collected by the Stream Team, will form the baseline water quality data.

The during-treatment sampling period consists of the initial treatment period and the re-treatment periods. The initial treatment period includes the cut and daub work along the entire project area and is anticipated to begin in May 2010. The re-treatment periods target isolated patches of re-sprouts and will occur approximately quarterly throughout the two year monitoring period. The intensity of the re-treatments will be substantially less than the initial treatment.

Routine sampling at designated sites will occur during and after the initial treatment and each subsequent re-treatment if surface water is present at the sampling site. The Stream Team will sample for glyphosate at Site 1 (VR10) on the first Saturday of each month in which treatment has occurred, and the first Saturday of the month following the completion of a treatment, The VCWPD will sample for glyphosate at Sites 1-4 within five days of the first Saturday of each month in which the Stream Team is scheduled to sample, if water is present. The VCWPD will sample for AMPA at Site 1 before treatment begins and after all re-treatments are completed each year.

Storm event monitoring will occur each year as soon as possible after rain begins for one 0.5" or greater predicted rain event that results in flow in the treatment areas. Sites 1-4 will be targeted for sampling, with an additional sample taken in Soule Park where most of the treatment work will occur due to the high density of giant reed cover. Soule Park site selection will depend on flow and access. Sites 1-4 and Soule Park will be sampled for glyphosate, and Site 1 will also be sampled for AMPA.

Monitoring results will be posted online on the VCWPD website www.vcwatershed.org within one month of receiving the results from the laboratory. Biannual and annual progress reports, including collected data, will be produced each December and June, respectively, for the life of the project beginning with the December 2010 biannual report. At the completion of the project, VCWPD staff will produce a final report with a listing and summary of the data collected.

Table 2. Project Schedule and Timeline.

Activity	Date (Month, Year)		Deliverable	Deliverable Due Date
	Anticipated Date of Initiation	Anticipated Date of Completion		
Baseline monitoring	March 2010	May 2010	None	N/A
Enter data online	April 2010	May 2012	Monitoring data	N/A
Routine monitoring - initial treatment	June 2010	September 2010	None	N/A
Routine monitoring – 1st re-treatment	September 2010	October 2010	None	N/A
Routine monitoring – 2nd re-treatment	October 2010	November 2010	None	N/A
Produce biannual monitoring report	November 2010	December 2010	Biannual Report	N/A
Storm event monitoring	October 2010	April 2011	None	N/A
Routine monitoring – 3rd re-treatment	March 2011	May 2011	None	N/A
Produce annual monitoring report	May 2011	June 2011	Annual Report	N/A
Routine monitoring – 4th re-treatment	June 2011	August 2011	None	N/A
Routine monitoring – 5th re-treatment	September 2011	October 2011	None	N/A
Produce biannual monitoring report	November 2011	December 2011	Biannual Report	N/A
Storm event monitoring	October 2011	April 2012	None	N/A
Upload data to CEDEN	July 2010	May 2012	Monitoring data	
Produce final monitoring report	May 2012	June 2012	Final Report	N/A

Table 3. Sampling Schedule

Monitoring Month	SACGRRP-1	SACGRRP-2-4	Soule Park
May 2010	Glyphosate + AMPA	Glyphosate	N/A
June 2010	Glyphosate	Glyphosate	N/A
July 2010	Glyphosate	Glyphosate	N/A
August 2010	Glyphosate	Glyphosate	N/A
September 2010	Glyphosate	Glyphosate	N/A
October 2010	Glyphosate	Glyphosate	N/A
November 2010	Glyphosate	Glyphosate	N/A
Rain Storm for 2010-11	Glyphosate + AMPA	Glyphosate	Glyphosate
March 2011	Glyphosate	Glyphosate	N/A
April 2011	Glyphosate	Glyphosate	N/A
May 2011	Glyphosate	Glyphosate	N/A
July 2011	Glyphosate	Glyphosate	N/A
August 2011	Glyphosate	Glyphosate	N/A
September 2011	Glyphosate	Glyphosate	N/A
October 2011	Glyphosate	Glyphosate	N/A
Rain Storm for 2011-12	Glyphosate + AMPA	Glyphosate	Glyphosate

6.4 Geographical setting.

The upper San Antonio Creek watershed is located within the Ojai Valley of Ventura County, California. The Ojai Valley is approximately 12 miles north (inland) of the City of Ventura, and is accessed via State Highways 33 and 150. At a local scale, the project area includes those portions of upper San Antonio, McNell, Thacher, and Reeves Creeks that extend between the southwest boundary of Soule Park and private in-holdings within Los Padres National Forest, which is located northeast and east of Soule Park. Although some segments of these creeks traverse through the jurisdictional boundaries of the City of Ojai (Ojai), no creek reaches targeted for giant reed removal would occur within Ojai's city limits. Similarly, some segments of McNell and Thacher Creeks are located north of the Los Padres National Forest boundary, however, proposed removal activities along these creek reaches would occur on private lands that fall under the jurisdiction of Ventura County. A total of 212 acres are targeted for giant reed removal.

Each of the four sampling sites was chosen to be representative of the watershed in which treatment is occurring. Site 1 is located downstream of the treatment area, southwest of Soule Park and above the confluence of San Antonio Creek and Stewart/Fox Canyon (Pirie Creek) and will contain flow contributions from the upstream tributaries, when flowing. Sites 2 and 3 are representative of sites within the project boundaries, and are located on the tributaries that are most likely to have flow. Site 4 is located downstream of one of the most abundant populations of giant reed being targeted in this project.

6.5 Constraints.

All sampling is constrained by the need for surface water to be present for the collection of samples. Random grab samples cannot be taken during the treatment periods as treatment cannot occur if surface water is present. Grab samples will be collected as soon as possible after water begins to flow at the sampling sites. Grab samples will also be taken immediately following a spill where water is present and periodically afterwards to track chemical dissipation.

7. QUALITY OBJECTIVES AND CRITERIA FOR MEASUREMENT DATA

Measurement data quality objectives and criteria for the Stream Team field measurements and laboratory samples can be found in the Santa Barbara Channelkeeper's *Ventura River Watershed Monitoring Program QAPP (2004)*.

Data quality indicators for monitoring data collected by the WQS for this project will consist of the following:

- Field Measurements – "Electronic Specs" Accuracy, Resolution, Completeness
- Laboratory Analyses – Accuracy, Precision, Recovery, Completeness

Accuracy is a measure of how closely the analytical result or field measurement represents the true quantity found in the sample, precision is a measure of how repeatable a result is, recovery is a measurement of the laboratory's ability to measure a known added quantity of an analyte, and completeness is a measure of the percentage of sample results that are collected and analyzed and determined to be valid.

Field Measurements: the meters used by the WQS are designed to meet the measurement quality objectives listed in Table 4. Accuracy will be determined by measuring one or more selected performance testing samples or standard solutions from sources other than those used for calibration (dissolved oxygen, pH, conductivity, and turbidity). Resolution is the smallest interval measurable by a scientific instrument and is determined according to the manufacturer. The program will use the resolution limits specified in Table 4.

Laboratory Analysis: accuracy will be determined by measuring recoveries using matrix spikes, laboratory control spikes, and/or reference materials. Method blanks will be utilized to check for contamination. Precision will be calculated using relative percent differences (RPD) obtained through duplicate analysis of samples, such as laboratory control spike duplicates and matrix spike duplicates. The reporting limits for this Project are the limits set by the laboratory and reflect the method sensitivity targeted for this Project (Table 5).

The quality of the data will be checked against the measurement quality objectives (MQOs) for each of the data quality indicators (DQIs) listed below (Table 4 and Table 5). Analyses that meet the requirements listed in Table 4 and Table 5 may be uploaded into the SWAMP Information Management System. Data that do not meet the listed DQIs may still be used by the Program provided the analysis meets the MQOs set by the laboratory, but will be flagged to allow for future identification. MQOs ensure that a measurement represents the characteristics of a sample.

Table 4. Measurement Quality Objectives for Field Data.

	"Electronic Specs" Accuracy	Resolution	Completeness
YSI Model 85			
Dissolved oxygen	± 0.5 mg/L or 10%	0.1 mg/L	90%
Conductivity	± 2 µS/cm	1 µS/cm	90%
Temperature	± 0.5°C	± 0.1°C	90%
Beckman 255			
pH	± 0.2 pH units	± 0.1 pH units	90%
Temperature	± 0.5°C	± 0.1°C	90%
Hach 2100P			
Turbidity	the greater of ± 1 NTU or 10%	0.10 NTU	90%
Flow Measurements			
Velocity	0.05 ft/s	0.01 ft/s	90%
Depth	0.10 ft	0.10 ft	90%

Table 5. Measurement Quality Objectives for Laboratory Data.

ANALYTE (LABORATORY)	Accuracy	Precision	Recovery	Target RLs		Completeness
Glyphosate (FGL)	50-150%	25%	50-150%	20.0	ug/l	90%
Glyphosate (Weck)	50-150%	25%	50-150%	5.0	ug/l	90%
AMPA (USGS)	50-150%	25%	50-150%	0.02	ug/l	90%
Glyphosate (USGS)	50-150%	25%	50-150%	0.02	ug/l	90%
Glufosinate (USGS)	50-150%	25%	50-150%	0.02	ug/l	90%

8. Special Training Needs/Certification

No certifications are required for sampling personnel. Training is provided on the job and will be conducted by experienced VCWPD or Stream Team staff, as needed. External training may be conducted by other agencies, laboratories or consultants, as needed. FGL Environmental, Inc. and Weck Laboratories, Inc. are California ELAP and NELAP certified laboratories and their certifications are available at the laboratories and on their websites. The USGS Kansas Organic Geochemistry Research Laboratory specializes in USGS-approved methods.

9. Documents And Records

VCWPD will collect records for sample collection, field measurements, and laboratory analyses. Each visit to the monitoring location will be recorded on a copy of the field sheet template (Figure 4). Information that will be recorded includes site name, date and time of visit, personnel, field measurements, observations, comments, and sampling times. VCWPD field sheets will be scanned and stored electronically by VCWPD. Stream Team field sheets will be stored and maintained by the Stream Team. Sampling information will be recorded on chain of custody forms and will include the monitoring station name, date and time of sample collection, sampling personnel, number of sample bottles, and analyses requested (Figure 5, Figure 6, and Figure 7).

The chemistry analytical results will be reported to VCWPD by the laboratories and will include sample ID, date and time of collection, date sample received, date of analysis, analytical method and, where applicable, date of sample preparation, method detection limit and reporting limit. Relevant QA/QC data shall also be provided with results, including results of any blanks, duplicates, spikes, and reference materials. VCWPD staff members will evaluate water quality data on a monthly basis and will post the laboratory results online at the VCWPD website, www.vcwatershed.org, within one month of receiving the results from the laboratory. Water quality data will be periodically uploaded to CEDEN (California Environmental Data Exchange Network). Water quality data will be stored by VCWPD for a period of at least 20 years from the date of sampling. Laboratories retain records for a period of at least five years, after which time copies of the data will be available through written reports and CEDEN.

The Project Manager or their designee shall ensure that this QAPP and any additional documents pertaining to the V-1 Upper San Antonio Creek Watershed Giant Reed Removal Project are distributed to all individuals listed in Element 3 of this document. The QAPP will be kept in hard copy form by VCWPD, and will be stored electronically on the VCWPD network drives. Updates to the QAPP will be clearly labeled with the date of completion so as to be kept distinct from previous versions.

Data gathered over the term of the Project will be included in the biannual, annual, and final reports, which will be kept on hand at VCWPD for 20 years from the date of generation.

Figure 4. VCWPD Field Data Sheet

Upper San Antonio Creek Watershed Giant Reed Removal Project
VCWPD Field Data Sheet

Date: _____ Site ID: _____ Location: _____
Time: _____ Sampled By: _____

Weather Conditions

□ Clear
□ Partly Cloudy
□ Overcast
□ Showers
□ Rain
□ Other

Photos: □ Upstream & Downstream photos taken
Wind condition: _____
Air Temperature: _____ °C / °F at _____ am / pm
Comments: _____

Type of Flow	Flow	Water Clarity	Water Color	Odors	Floatables
□ None	□ Not Taken	□ Clear	□ Clear	□ None	□ None
□ Intermittent	□ Taken	□ Cloudy	□ Red	□ Rotten eggs	□ Sheen
□ Trickle	_____ cfs	□ Milky	□ Brown	□ Sewage	□ Oily sheen
□ Steady	□ est.	□ Muddy	□ Yellow	□ Chlorine	□ Garbage
□ Heavy		□ Other	□ Green	□ Musty	□ Sewage
□ Flooding			□ Gray	□ Ammonia	□ Leaves
□ Puddling			□ Other	□ Other	□ Other

Biological Floatables

Algae: (Color/% Coverage in Stream)
□ Suspended _____
□ On Substrate _____

Foam:
(Color/Height/Consistency/% Coverage)

Trash/Debris (General Area=GA; Stream Banks or Water=BW)

GA: □ None □ Light □ Moderate □ High
BW: □ None □ Light □ Moderate □ High

	GA	BW
% Organics	_____	_____
% Recyclables	_____	_____
% Plastics	_____	_____
# Large Items	_____	_____
# Pieces:	_____	_____

Chemistry **Site Elevation:** (calibrate YSI meter) _____ feet

	1	2	3	Average	
Dissolved Oxygen	_____	_____	_____	_____	%
Dissolved Oxygen	_____	_____	_____	_____	mg/L
Conductivity	_____	_____	_____	_____	µS / mS
Spec. Conductance	_____	_____	_____	_____	µS / mS
Salinity	_____	_____	_____	_____	ppt / ppm
Water Temp.	_____	_____	_____	_____	°C
pH	_____	_____	_____	_____	[H+]
Turbidity	_____	_____	_____	_____	NTU

Laboratory Samples	Sample Time	Sample Bottle (unpreserved)
□ Glyphosate (Weck)	_____ am / pm	2 x 40 ml amber glass VOA, TFE lid
□ AMPA/Glyphosate/Glufosinate	_____ am / pm	2 x 125 ml amber glass, TFE lid, fill to shoulder
□ Glyphosate (FGL)	_____ am / pm	1 x 125 ml amber glass, TFE lid

GROUP B: DATA GENERATION AND ACQUISITION

10. SAMPLING PROCESS DESIGN

Sample collection points and justifications for site selection are described in the Monitoring Plan. In brief, sample points were evaluated based on the following criteria: safe access, landowner permission to cross private property where applicable, being representative of the project area, previous historical data, and likelihood of flow. Sites are on Caltrans right-of-ways and private property and permission from landowners has been obtained for the duration of the project and so should remain accessible to VCWPD staff and Stream Team members. Should sites become inaccessible, alternate locations will be found that meet the same criteria for site selection. Three sites were selected within the project area and one site was selected downstream of the project area. The creeks in the majority of the project area are dry most of the year. The three sites within the project area were determined to be low enough in the watershed that they will have the greatest probability for flow while also including potential runoff from upstream treatment areas. The sites are shown in Figure 2.

Grab samples will be collected before, during, and after the initial treatment and re-treatments when flow occurs in the creeks. Field measurements will be taken at the same time and location as the grab samples. It is anticipated that there will be four treatment events each year. The Stream Team will collect samples to be analyzed for glyphosate at Site 1 (VR10) during their monthly routine monitoring event when treatment occurs. The WQS will collect samples to be analyzed for glyphosate from Sites 1-4 within 5 days of the first Saturday of designated treatment months, , and samples for AMPA, glyphosate, and glufosinate at Site 1 before treatment begins and during one 0.5" or greater storm each treatment year for the term of the project.

Samples destined for laboratories within Ventura County will be delivered to the applicable laboratories as soon as possible after collection, and within the holding times specified in Table 6. Samples destined for laboratories outside of Ventura County but within California will be picked up by Courier and delivered to the laboratory within the holding times specified in Table 6 (no later than 7 days from sample collection). Samples being shipped out of state will be shipped via an overnight express service in coolers with wet ice on the day of collection. Sampling dates and times are to be determined and depend on treatment schedules and flow conditions.

Laboratory results are considered to be critical, with a particular emphasis on glyphosate and AMPA, and field measurement data is considered to be informational.

Sources of variability and bias include the quantity and intensity of surface flow, the duration of rain events, the predictability of rainfall and runoff, and differences in sampling and analytical staff. The variability of rain quantity and duration are based on the weather and cannot be strictly controlled. Differences will be minimized through the use of routine monitoring sites and the training and emphasis on SOPs for sample collectors.

11. SAMPLING METHODS

Clean sampling techniques will be utilized in sample collection to minimize contamination. Staff will wear clean, powder-free nitrile gloves when handling samples. Sampling protocols are described in the Upper San Antonio Creek Watershed Water Quality Monitoring Plan. Grab samples will be as close to mid depth and mid flow as can be safely achieved and will be collected in pre-cleaned and pre-preserved bottles supplied by the laboratories. The type and size of the bottle and any required preservatives will be appropriate for the constituents to be analyzed (Table 6). Samples will be stored in coolers with cube ice until they are received and processed by the laboratory. VCWPD staff and Stream Team members will coordinate with the laboratories to ensure samples are processed within holding times. Field

measurements will be taken at the same time and location as the grab samples and will be measured using field equipment that has been calibrated according to the manufacturer's specifications.

It is the combined responsibility of all VCWPD field staff and Stream Team members to ensure that sampling performance requirements are met and any problems are rectified as soon as possible. The VCWPD field staff will contact the VCWPD QA Officer with any questions or concerns about procedures based on site-specific conditions. Problems on site will be recorded on the appropriate field sheet.

12. SAMPLE HANDLING AND CUSTODY

Sample bottles will be labeled with site name, collection date and time, laboratory, required analysis and sampler initials prior to collection. Glass sample bottles will be wrapped with bubble wrap when feasible. Samples will be stored in coolers with cube ice until received by the laboratory. Sampling times and locations will be noted on the field sheet.

The chain-of-custody (COC) shall include event name, sample site ID, date and time of sampling, number of bottles, requested analyses, sampler name(s), and relevant comments. Sample COCs are included in Figure 5, Figure 6, and Figure 7. COCs shall travel with the samples until logged in at the laboratory. The laboratory shall verify that samples match those noted on the COC. Any discrepancies or problems shall be documented during the login procedure and be reported to the laboratory Project Manager, who will notify VCWPD staff.

Samples destined for laboratories within Ventura County will be delivered to the applicable laboratories as soon as possible after collection, and within the holding times specified in Table 6. Samples destined for laboratories outside of Ventura County will either be picked up by Courier and delivered to the laboratory within the holding times specified in Table 6 (no later than 7 days from sample collection), or they will be shipped overnight in coolers with wet ice on the day of collection. Dates and times of sampling are to be determined and depend on treatment schedules and flow conditions.

Samples will be kept by the laboratory for 30 days after analyses are completed and a report has been issued. After this, the laboratory will properly dispose of the samples.

Table 6. Sample Container, Handling, and Custody (Per Site)

Analytical Parameter	Grab/ Comp.	# Bottles	Bottle Volume	Bottle type	Preservation (chemical, temperature)	Maximum Holding Time: Preparation/ analysis
Glyphosate (FGL)	G	1	125ml	Amber glass-TFE septa cap	< 4°C, ($Na_2S_2O_3$, if chlorinated)	14 days
Glyphosate (Weck)	G	1	40ml	Amber glass VOA - TFE septa cap	< 4°C, ($Na_2S_2O_3$, if chlorinated)	14 days
AMPA Glyphosate Glufosinate (USGS)	G	1	125 ml	Amber glass-TFE septa cap	< 4°C	3 days/ 6 days

Figure 5. Chain of Custody - VCWPD_Weck Labs, Inc

Figure 6. Chain of Custody - Stream Team_FGL Environmental, Inc.

Figure 7. Chain of Custody - VCWPD_USGS

13. ANALYTICAL METHODS

Stream Team analytical methods are described in the VRWMP QAPP (SBCK).

VCWPD equipment used in the field will include a pH meter (Beckman 255 pH/mV/temp ISE meter or similar), a multi-parameter meter for salinity, conductivity, specific conductance, dissolved oxygen, and temperature (YSI 85 or similar), and a turbidity meter (Hach 2100P or similar). VCWPD field staff will troubleshoot any field equipment failures as soon as possible after error discovery. VCWPD will send out any malfunctioning equipment that cannot be repaired in the field for repair by the manufacturer or other qualified entity. Field measurement equipment will be calibrated prior to use per the manufacturer's recommendations. VCWPD field personnel are responsible for corrective action and appropriate documentation when field equipment errors occur.

Laboratory equipment to be used in this project is included in each laboratory's QA manual and/or SOPs which are available at the laboratories. Laboratory equipment receives regular maintenance and calibration, and external repair companies are utilized if issues cannot be resolved through troubleshooting in-house. Laboratory equipment issues will be handled by the laboratories per their QA Manuals and SOPs. Laboratory personnel are responsible for corrective action and appropriate documentation when laboratory equipment errors occur.

Chemistry samples will be retained by the laboratory for 30 days after the analyses are completed and the report has been issued, after which time they will be disposed of according to laboratory SOPs.

Table 7 (below) lists field equipment methods and ranges. Table 8(below) lists laboratory analytical methods, reporting limits and estimated turnaround times. The action level for glyphosate for this project is set at 700 µg/L, the maximum contaminant level (MCL) for drinking water.

Table 7. Field Analytical Methods.

VCWPD		
FIELD MEASUREMENTS	**Method**	**Range**
Dissolved Oxygen (%)	Probe - combination	0 to 200% Air Sat.
Dissolved Oxygen (mg/L)	Probe - combination	0 to 20 mg/L
Temperature (°C)	Probe - combination	-5° to +65°C
Conductivity (µs)	Probe - combination	0 to 200 mS/cm
Salinity (ppt)	Calculation - by combination probe	0 to 80 ppt
pH	Probe - combination	0-16 pH
Temperature (°C)	Probe - combination	-5° to 105°C (23° to 221°F)
Turbidity (NTU)	Two-detector optical system meter	0 to 1000 NTU

Table 8. Laboratory Analytical Methods

WECK LABORATORIES, INC.				
ANALYTE	**RL**	**RL Units**	**Analytical Method/SOP**	**ETT**
Glyphosate	5.0	ug/l	EPA 547	10 workdays

FGL Environmental, INC.				
ANALYTE	**RL**	**RL Units**	**Analytical Method/SOP**	**ETT**
Glyphosate	20.0	ug/l	EPA 547	10 workdays

USGS KANSAS ORGANIC GEOCHEMISTRY RESEARCH LABORATORY				
ANALYTE	**RL**	**Units**	**Analytical Method/SOP**	**ETT**
AMPA	0.02	ug/l	LCGY	4-6 weeks
Glyphosate	0.02	ug/l	LCGY	4-6 weeks
Glufosinate	0.02	ug/l	LCGY	4-6 weeks

* ETT: Estimated Turnaround Time

14. QUALITY CONTROL

Field Measurements:

On the day prior or day of sampling, the measurement devices for pH, dissolved oxygen, conductivity, and salinity will be calibrated and then checked against a standard whose source is different than that selected for calibration. Dissolved oxygen will be checked against water that has been aerated with an air stone to saturation point (60 minutes). The measured values will be compared to the "electronic specifications" accuracy criteria established in Element 7. If the difference between the measured value and the true value is greater than those listed in Element 7, the meter will be recalibrated and the process will be repeated.

All field measurements will be made in triplicate except for flow when measured with a flow meter, which will be taken once. Each result will be recorded along with the average of the three results, the difference between the largest and smallest result, and the percent difference between the largest and smallest result. The difference or percent difference, as appropriate, will be compared against the Precision criteria established in Element 7.

The percent difference will be calculated as follows:

$$\text{Percent difference} = 100 \times (\text{largest} - \text{smallest}) \div \text{average}.$$

Laboratory Analyses:

Laboratory quality control samples are performed according to the procedures specified in the laboratory QA manual, SOPs, and the analytical methods. Laboratory analyses will include blanks, laboratory control samples (LCS), matrix spikes (MS), matrix spike duplicates (MSD), and the calculation of relative percent differences (RPD). Laboratory control sample duplicates are performed if there is insufficient sample for MS/MSD analysis. The method for calculating recovery and RPD are included in the QA manual. Field blanks are not required for glyphosate analysis, however, laboratory method blanks are essential. Method specific quality controls are shown in the tables below.

Table 9. Laboratory QC

EPA Method 547: Glyphosate		
Laboratory QC	**Frequency/Number**	**Acceptance Limits**
Method Blank	Per 20 samples or per analytical batch, whichever is more frequent	<RL for target analyte
LCS	Per 20 samples or per analytical batch, whichever is more frequent	50-150% recovery
MS	Per 20 samples or per analytical batch, whichever is more frequent	50-150% recovery
MSD	Per 20 samples or per analytical batch, whichever is more frequent	50-150% recovery
RPD	Per 20 samples or per analytical batch, whichever is more frequent	RPD<25%

USGS Method LCGY: AMPA, Glyphosate, Glufosinate		
Laboratory QC	**Frequency/Number**	**Acceptance Limits**
Method Blank	Per 10 samples or per analytical batch, whichever is more frequent	<RL for target analyte
LCS	Per 10 samples or per analytical batch, whichever is more frequent	50-150% recovery
MS	Per 10 samples or per analytical batch, whichever is more frequent	50-150% recovery
MSD	Per 10 samples or per analytical batch, whichever is more frequent	50-150% recovery
RPD	Per 10 samples or per analytical batch, whichever is more frequent	RPD<25%

Corrective actions

Blanks: If a blank shows a detectable amount of target analyte the source of the contamination will be investigated and measures taken to correct, minimize, or eliminate the problem, and the affected samples shall be reprocessed in a subsequent preparation batch, except when sample results are below the detection limit or LOD. If insufficient sample volume remains for reprocessing, the results shall be reported with appropriate data qualifiers.

MS/MSD: if a MS/MSD exceeds the recovery and/or RPD limits, the laboratory control sample (LCS) will be checked for recovery and RPD. If the LCS exceeds the limits, the laboratory will investigate the source and correct, minimize, or eliminate the problem. If the LCS is within the acceptance limits, an attempt will be made to correct the matrix problem. Data will be qualified as needed.

RPD calculations are used to determine precision. Recovery calculations are used to determine accuracy. The equations used to determine RPD and recovery are given below.

Figure 8. RPD and Recovery Calculations

The following equations are used in the calculation of recovery and RPD:

From duplicate sample:

$$RPD = \frac{S_a - S_b}{((S_a + S_b) \div 2)} x100\%$$

Where: S_a = First sub-sample analyzed
S_b = Second sub-sample analyzed

From MS/MSD analysis:

$$RPD = \frac{R_a - R_b}{((R_a + R_b) \div 2)} x100\%$$

Where: R_a = Amount of analyte found in Matrix Spike.
R_b = Amount of analyte found in Matrix Spike Duplicate

Recovery of matrix spikes:

$$\text{Recovery} = \frac{SSR - SR}{CA} x100\%$$

Where: SSR = Results of spiked sample
SR = Results of sample (unspiked)
CA = Concentration of spike added

Surrogate recoveries:

$$\%\ \text{Recovery} = \frac{ConcentrationFound}{ConcentrationAdded} x100\%$$

Where: Concentration found = Result obtained after analysis
Concentration added = Amount of surrogate spiked

15. INSTRUMENT/EQUIPMENT TESTING, INSPECTION, AND MAINTENANCE

Field measurement equipment will be checked for operation by VCWPD staff in accordance with the manufacturer's specifications prior to use and any problems will be rectified. Inspections will include battery level, membrane and electrode integrity (if applicable), and cleanliness. Field equipment will be cleaned with tap water and rinsed with distilled water prior to storage, as appropriate. Field equipment will be calibrated prior to each event and calibration details will be noted in the equipment calibration log book. Routinely required spare parts are kept on hand, and non-routine replacement items are ordered as needed.

Laboratories will provide grab sample collection bottles and will ensure that the bottles are clean and contain the appropriate preservative prior to delivery to VCWPD.

Laboratory equipment will be inspected, tested, and maintained by the contract laboratories according to the procedures documented in their Quality Assurance Manuals. The laboratory QA manuals are available for review at each laboratory.

16. INSTRUMENT/EQUIPMENT CALIBRATION AND FREQUENCY

Field measurement equipment will be calibrated on the day prior to or on the day of the sampling event, as described in the operation manuals for each instrument. The pH meter will be calibrated using standard buffer solutions and the DO multiple probe meter will be calibrated using the saturated oxygen chamber method at the sample site or a site of similar elevation, so that elevation can be incorporated in the calibration. These calibrations will be performed by VCWPD water quality staff and recorded in the calibration log book. In the event that calibration results do not meet specifications, staff will attempt to recalibrate. If the calibration is still not successful staff will try again with new solutions or perform any relevant maintenance. If the equipment continues to malfunction it shall be sent to the manufacturer or other qualified entity for repair.

Laboratory analytical equipment will be calibrated according to the procedures and frequencies documented in each laboratory's Quality Assurance Manual. Laboratory QA manuals are available for review at the laboratories.

17. INSPECTION/ACCEPTANCE OF SUPPLIES AND CONSUMABLES

Gloves, sample containers, and other consumable equipment will be inspected upon purchase/delivery by VCWPD water quality staff. Coolers and ice quantities will be checked prior to each event to determine adequate supply. Any signs of damage, breakage, or contamination will result in the responsible party being notified and the item being sent back or disposed of, as applicable and a replacement item will be obtained.

Laboratory inspection protocols are documented in each laboratory's QA manual, which is available for review at the laboratory.

18. NON-DIRECT MEASUREMENTS (EXISTING DATA)

The selection of sample sites utilized maps of giant reed percent coverage and distribution that were created for the Initial Study component of the SACGRRP. The Stream Team has collected over ten years of data at the SACGRRP-1 (VR10) site which may be useful if any changes are noticed in the water quality during monitoring. Data generated in the Matilija Dam Giant Reed Removal Project (MDGRRP) may be used for comparison purposes as the projects are similar, however the MDGRRP represents a different section of the watershed, and the analyses were conducted at a laboratory with a higher reporting limit than two of the three laboratories utilized in this Project, so any comparisons are purely informational. All data will be reviewed against the data quality objectives stated in Element 7 and only data meeting all of the criteria will be used in this project.

19. DATA MANAGEMENT

Field data will be recorded on field sheets which will be scanned and stored digitally on the VCWPD network drive. Information from the field sheets will be hand entered into an Excel spreadsheet, and compiled in the biannual, annual, and final reports which will be submitted to the SWRCB Project Manager and stored on the VCWPD network drive.

Laboratory data will undergo QA procedures at the laboratory as described in their QA manual and SOPs. The data will be delivered to VCWPD water quality staff as a hard copy report and/or in PDF format. VCWPD staff members will inspect the data for errors and completeness once the report is

received from the laboratory. Summary tables can be generated from the spreadsheet for inclusion in the biannual, annual, and final reports, and for manual entry into the SWAMP IMS (CEDEN) by WQS staff. Information relevant to the Project will be retained by VCWPD for **twenty years** from date of generation.

GROUP C: ASSESSMENT AND OVERSIGHT

20. ASSESSMENTS & RESPONSE ACTIONS

Field sampling crews will assess the performance of sampling procedures and equipment before, during, and after each sampling event and will perform corrective actions as necessary. Field staff members are subject to ongoing peer review and any corrective action deemed necessary will be undertaken by the Surface Water Quality Manager. Weck Laboratories, Inc. and FGL Environmental, Inc. will participate in proficiency testing at least two times per year to meet the requirements of their NELAP certification. The laboratory QA Officers are responsible for ensuring compliance with the proficiency testing requirements and for reporting any necessary corrective action to the laboratory manager. Any issues will be resolved by laboratory staff and any affected results will be flagged by the laboratory for VCWPD staff review. All significant corrective actions are to be documented and reported to the affected parties. VCWPD staff members have the authority to issue a stop-work order if it is determined that the quality of the data is impaired.

21. REPORTS TO MANAGEMENT

Biannual, annual and final water quality monitoring reports will be prepared by VCWPD field staff and will include Project QA status reports and data results. Reports will be posted on the website www.vcwatershed.org and submitted to the VCWPD V-1 Project Manager for submittal to the SWRCB Project Manager according to Table 10 below:

Table 10. Reporting Schedule

Type of Report	Projected Delivery Dates(s)	Person(s) Responsible for Report Preparation	Report Recipients
QAPP	June 2010	VCWPD staff	See Element 3
Bi-annual	December 2010	VCWPD staff	SWRCB Project Manager VCWPD V-1 Project Manager VCWPD SACGRRP Manager VCWPD SACGRRP QA Officer
Annual	June 2011	VCWPD staff	SWRCB Project Manager VCWPD V-1 Project Manager VCWPD SACGRRP Manager VCWPD SACGRRP QA Officer
Bi-annual	December 2011	VCWPD staff	SWRCB Project Manager VCWPD V-1 Project Manager VCWPD SACGRRP Manager VCWPD SACGRRP QA Officer
Final	June 2012	VCWPD staff	SWRCB Project Manager VCWPD V-1 Project Manager VCWPD SACGRRP Manager VCWPD SACGRRP QA Officer

GROUP D: DATA VALIDATION AND USABILITY

22. DATA REVIEW, VERIFICATION, AND VALIDATION REQUIREMENTS

Analytical data generated by each laboratory will be reviewed, verified, and validated according to the procedures stated in the laboratory's QA manual. The laboratory QA manual contains a detailed explanation of the laboratory's QA procedures. Data for the Project will be reviewed by laboratory staff prior to being sent to VCWPD. Data will be further reviewed by VCWPD staff upon receipt from the laboratory. Field data will be reviewed by VCWPD field staff during data collection and will be further reviewed during and after entry into the summary spreadsheet.

Data for the Project must meet the SWAMP data quality objectives listed in Element 7. Data that meet all criteria will be accepted. Data that do not meet any of the criteria will be rejected. Data that meet some of the criteria will undergo further evaluation prior to being accepted or rejected. Data that do not meet precision or recovery criteria will be further evaluated to determine the level of impact the data failure will have on the data quality. The data will be flagged or excluded, depending on the reason and extent to which it is outside of the data quality objectives criteria.

23. VERIFICATION AND VALIDATION METHODS

Data will be verified at all stages of the collection process including sample collection, receipt, preparation, analysis, and report generation. Data will be checked for multiple factors including adherence to the SOPs, transcription errors, dilution factors, conversion factors, and units of measurement. SOPs are available at the laboratories for all laboratory analytical procedures. VCWPD field staff members are responsible for reviewing and verifying the data that they generate. Additional verification will be performed by different staff members as the data is transcribed, entered into the spreadsheets, and reported. Any discrepancies that are found will be brought to the attention of the responsible staff member, who will correct the error if possible, and write an explanation for the discrepancy if it cannot be rectified.

Weck Laboratories, Inc. data validation includes internal equipment checks (where applicable) and an in-house sequential review process (of at least three tiers) which includes a 100% review by the analyst, followed by a review by a technically qualified person such as a supervisor or another chemist, and an overall administrative review of the complete data package by the Project Manager. If a discrepancy is noted in any stage of the reviewing process, the package is returned to the primary analyst for corrective action. Any data that does not meet data quality objectives will be flagged with an explanation in the report. USGS laboratory data validation occurs after the laboratory checks that all QA/QC requirements listed in the analytical method and the laboratory's QA Manual have been met.

24. RECONCILIATION WITH USER REQUIREMENTS

This Project is designed to monitor the BMP practices being utilized in the removal of giant reed from the upper San Antonio Creek watershed. The laboratory information produced will be used to determine if procedures are being followed to prevent the introduction of glyphosate into the waters of the upper San Antonio, McNell, Thacher, and Reeves Creeks. It is hypothesized that treatment processes should have little to no observed effect on the chemistry of water in the treatment area. Any detection of glyphosate will result in an investigation to attempt to determine the source and make necessary BMP adjustments to prevent future incidents. Data that meets the QA requirements in this document (Elements 7, 11, and 14) will be considered to meet the user's requirements.

Field measurements are collected for informational purposes but are not considered critical.

Data will be stored by VCWPD and any uncertainties regarding data quality will be flagged during data entry to ensure that data users will be aware of any limitations. Microsoft Excel tables and/or graphs will be generated as needed. Data will be available for uploading into the SWAMP Information Management System at the completion of the Project after it has been reviewed by the Project's QA Officer.

SWAMP-EPA-QAPP Review Checklist

SWAMP elements numbers	Element	Element Name and Review Aspect	A Acceptable	U Unacceptable	NI Not Included	NA Not Applicable	Page # (Section #)	Comments (and notes)
A		**PROJECT MANAGEMENT**						
A1	1	**Title and Approval Sheet (s)**						Items A1.1 through A1.8 can be presented on one or two sheets
A1.1	1	Contains project title	A				1	
A1.2	1	Indicates revision number, if applicable	A				1	
A1.3	1	Indicates organization's name	A				1	
A1.4	1	Includes signature of organization's project manager	A				2	
A1.5	1	Includes signature block for organization's project manager	A				2	
A1.6	1	Includes signature block for organization's quality assurance officer	A				2	
A1.7	1	Includes signature block for contract manager	A				2	
A1.8	1	Includes signature block for Water Board quality assurance officer	A				2	
A2.	2	**Table of Contents**						
A2.1	2	Lists QA Project Plan information sections	A				3	
A2.2	2	Includes document control information	A					
A2.3	2	Provides lists of tables and figures	A				4	
A2.4	2	Provides contents of each appendix	A				4	
A2.5	2	Lists all attached standard operating procedures (with names, not just numbers)				NA	4	
A3.	3	**Distribution List**						
A3.1	3	Includes all individuals who are to receive a copy of the quality assurance project plan, and identifies their organization	A				5	
A4.	4	**Project/Task Organization**						
A4.1	4	Identifies key individuals involved in all major aspects of the project, including contractors	A				6	
A4.2	4	Discusses their responsibilities	A				6	
A4.3	4	Confirms that the project QA officer position is independent of data generation	A				6	
A4.4	4	Identifies individual responsible for maintaining the official, approved quality assurance project plan	A				6	
A4.5	4	Includes organizational chart that shows lines of authority and reporting responsibilities	A				7	

SWAMP elements numbers	Element	Element Name and Review Aspect	A Acceptable	U Unacceptable	NI Not Included	NA Not Applicable	Page # (Section #)	Comments (and notes)
A4.6	4	Clearly identifies who is part of the project team, and who is related to the project in an advisory role (but is not responsible for delivery of any product)	A				6	
A5.	5	**Problem Definition/Background**						
A5.1	5	States decisions to be made, actions to be taken, or outcomes expected from the information to be obtained	A				8	
A5.2	5	Clearly explains the reason (site background or historical context) for initiating this project	A				8	
A5.3	5	Identifies regulatory information, applicable criteria, or action limits necessary to the project	A				9	
A6.	6	**Project/Task Description**						
A6.1	6	Summarizes work to be performed (e.g., measurements to be made, data files to be obtained)	A				9	
A6.2	6	Provides a work schedule, indicating critical project points (e.g., start and completion dates for activities such as sampling, analysis, data reviews, assessments)	A				12-14	
A6.3	6	Details geographical locations to be studied, including maps where possible	A				10-11,14	
A6.4	6	Describes resource and time constraints, if applicable	A				14	
A7.	7	**Quality Objectives and Criteria**						
A7.1	7	Identifies measurement quality objectives that meet or exceed those mandated by SWAMP	A				15-16	
A7.2	7	Identifies project action limits for all parameters of interest	A				15-16,23	
A7.3	7	Identifies acceptance criteria for all previously collected information				NA	X	
A7.4	7	Discusses precision	A				15	
A7.5	7	Addresses bias	A				15	
A7.6	7	Discusses representativeness and how it will be assessed and controlled	A				15	
A7.7	7	Identifies the need for completeness	A				15	
A8.	8	**Special Training/Certifications**						
A8.1	8	Identifies any specialized training or certifications required of project personnel	A				16	
A8.2	8	Discusses how this training will be provided	A				16	

SWAMP elements numbers	Element	Element Name and Review Aspect	A Acceptable	U Unacceptable	NI Not Included	NA Not Applicable	Page # (Section #)	Comments (and notes)
A8.3	8	Identifies individual(s) responsible for ensuring sufficient training and certification	A				16	
A8.4	8	Identifies where training and certification information is documented	A				16	
A9.	9	**Documentation and Records**						
A9.1	9	Identifies report format and summarizes all data report package information	A				16	
A9.2	9	Lists all other project documents, records, and electronic files that will be produced	A				16	
A9.3	9	Identifies where project information should be kept and for how long	A				16	
A9.4	9	Discusses backup plans for records stored electronically	A				16	
A9.5	9	States how the individuals identified in Element A3 will receive the most current copy of the approved quality assurance project plan, and identifies the individual(s) responsible for this	A				16	
B	10	**DATA GENERATION AND ACQUISITION**						
B01.	10	**Sampling Process Design (Sampling Design and Logistics)**						
B01.1	10	Provides the design information, or a reference to a specific document that contains it, with sufficient detail to assess data against project objectives	A				18	
B01.2	10	Describes and justifies design strategy, indicating the size of the area and time period to be represented by a sample	A				18	
B01.3	10	Details the type and total number of samples, matrices, and runs expected and needed	A				18	
B01.4	10	Indicates where samples should be taken and how sites will be identified	A				18	
B01.5	10	Discusses what to do if sampling sites become inaccessible	A				18	
B01.6	10	Identifies project activity schedules (e.g., sampling events, shipping times)	A				18	
B01.7	10	Specifies what information is critical and what is for informational purposes only	A				18	
B01.8	10	Identifies sources of natural variability and how this variability should be reconciled with project information	A				18	
B01.9	10	Identifies potential sources of bias or misrepresentation, and how their contribution can be minimized	A				18	
B02.	11	**Sampling (sample collection) Methods**						Field measurements are discussed in element 13
B02.1	11	Identifies all sampling standard operating procedures by number, date, and regulatory citation, indicating sampling options or modifications to be taken. Non-SWAMP standard operating procedures should be attached	A				18	

SWAMP elements numbers	Element	Element Name and Review Aspect	A Acceptable	U Unacceptable	NI Not Included	NA Not Applicable	Page # (Section #)	Comments (and notes)
B02.2	11	If bioassessment sampling, implements the standard operating procedure *Collecting Benthic Macroinvertebrate Samples and Associated Physical and Chemical Data for Ambient Bioassessments in California*				NA	NA	
B02.3	11	Indicates how each kind of matrix and each sample type should be collected	A				19	
B02.4	11	Indicates how samples are to be homogenized, composited, split, or filtered				NA	NA	
B02.5	11	Indicates what sample containers and sample volumes should be used	A				19	
B02.6	11	Identifies whether samples should be preserved, and indicates methods that should be followed	A				19	
B02.7	11	Describes how sampling equipment and samplers should be cleaned and decontaminated, including the disposal of byproducts				NA	NA	
B02.8	11	Identifies any equipment and support facilities needed	A				19	
B02.9	11	Addresses actions to be taken when problems occur, identifying individual(s) responsible for corrective action and how this should be documented	A				19	
B03.	12	**Sample Handling and Custody**						
B03.1	12	For each parameter, states maximum holding times allowed from sample collection to preparation and analysis	A				19	
B03.2	12	Identifies how samples should be physically handled, transported, received, and stored in the laboratory or office (including temperature upon receipt)	A				19	
B03.3	12	Indicates how sample handling and custody information should be documented, identifying individual(s) responsible	A				19	
B03.4	12	Identifies chain-of-custody procedures and includes form to track custody	A				19-22	
B04.	13	**Analytical Methods and Field Measurements**						
B04.01	13	Identifies all standard operating procedures that should be followed by number, date, and regulatory citation, indicating options or modifications; standard operating procedures should be attached or referenced	A				23	
B04.02	13	Lists all the instruments and kits that will be used in the field and describes their measurement principle (e.g., nephelometric or transparency) and major attributes (e.g., automatic temperature compensation, range and resolution)	A				23	
B04.03	13	If *in situ* monitoring, indicates how instruments should be deployed and operated to avoid fouling and ensure maintenance of proper data				NA	NA	
B04.04	13	If continuous monitoring, indicates how instruments should store and maintain raw data				NA	NA	

SWAMP elements numbers	Element	Element Name and Review Aspect	A Acceptable	U Unacceptable	NI Not Included	NA Not Applicable	Page # (Section #)	Comments (and notes)
B04.05	13	Identifies all laboratory standard operating procedures that should be followed by number, date, and regulatory citation, indicating options or modifications to be taken (e.g., such as sub-sampling and extraction procedures)	A				23	
B04.06	13	Identifies equipment or instrumentation needed for laboratory analyses	A				23	
B04.07	13	Specifies any specific method performance criteria	A				23	
B04.08	13	Provides target analytical reporting limits (RLs) or method detection limits (MDLs)	A				23	
B04.09	13	Identifies procedures to follow when failures occur, identifying individual(s) responsible for corrective action and associated documentation	A				23	
B04.10	13	Identifies sample disposal procedures	A				23	
B04.11	13	Specifies laboratory turnaround times needed	A				23	
B04.12	13	Provides documentation for the use of non-standard methods	A				23	
B05.	14	**Quality Control**						
B05.1	14	For each parameter, identifies quality control activities (e.g., blanks, spikes, duplicates) that meet those mandated by SWAMP	A				24-25	
B05.2	14	Details what should be done when control limits are exceeded, and how corrective actions will be assessed and documented	A				24-25	
B05.3	14	Identifies procedures and formulas for calculating quality control results (e.g., precision, bias)	A				24-26	
B06.	15	**Instrument/Equipment Testing, Inspection, and Maintenance**						
B06.1	15	Identifies field and laboratory equipment needing periodic maintenance, and the associated schedule	A				26	
B06.2	15	Identifies testing criteria; this information is instrument-specific and may be included in the standard operating procedure for each instrument	A				26	
B06.3	15	Notes availability and location of spare parts	A				26	
B06.4	15	Indicates procedures in place for inspecting equipment before usage (this information is instrument-specific and may be already included in the standard operating procedure for each Instrument)	A				26	
B06.5	15	Identifies individual(s) responsible for testing, inspection, and maintenance	A				26	
B06.6	15	Indicates how deficiencies should be resolved, and how corrective actions should be assessed and documented	A				26	
B07.	16	**Instrument/Equipment Calibration and Frequency**						

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B07.1	16	Identifies equipment, tools, and instruments that should be calibrated, and the frequency for this calibration	A				27	
B07.2	16	Describes how calibrations should be performed and documented, indicating test criteria and standards or certified equipment (this information is instrument-specific and may be already included in the standard operating procedure for each Instrument)	A				27	
B07.3	16	Identifies how deficiencies should be resolved and documented	A				27	
B08.	17	**Inspection/Acceptance for supplies and Consumables**						
B08.1	17	Identifies critical field and laboratory supplies and consumables; noting supply source, acceptance criteria, and procedures for tracking, storing, and retrieving these materials	A				27	
B08.2	17	Identifies the individual(s) responsible for this	A				27	
B09	18	**Non-direct Measurements**						
B09.1	18	Identifies data sources (e.g., computer databases, literature files, models) that should be assessed and used	A				27	
B09.2	18	Describes the intended use of this information and the rationale for their selection	A				27	
B09.3	18	Indicates the acceptance criteria for these data sources or models	A				27	
B09.4	18	Identifies key resources and support facilities needed	A			NA	NA	
B09.5	18	Describes how limits to validity and operating conditions should be determined (e.g., internal checks, beta testing)	A			NA	NA	
B10.	19	**Data Management**						
B10.01	19	Describes the data management scheme from field to final use and storage	A				27	
B10.02	19	Verifies that all continuous monitoring raw data will be kept in the original sonde file (and stored on a PC); Endpoints (e.g., averages) can be calculated after downloading and trimming records				NA	NA	
B10.03	19	Describes the filing and document control system, or cites documentation such as standard operating procedures	A				27	
B10.04	19	Identifies data handling equipment and procedures that should be used to process, compile, analyze, and transmit data reliably and accurately	A				27	
B10.05	19	Describes how field and laboratory data will be formatted and entered into SWAMP's Information Management System	A				27	
B10.06	19	Identifies individual(s) responsible for each step and task	A				28	

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B10.09	19	Describes procedures to demonstrate the acceptability of hardware and software configurations				NA	NA	
B10.10	19	Attaches checklists and forms that should be used (or refers to standard operating procedures)				NA	NA	
C	20	**ASSESSMENT AND OVERSIGHT**						
C1.	20	**Assessments and Response Actions**						
C1.1	20	Lists the number, frequency, and type of assessment activities that should be conducted, including approximate dates	A				28	
C1.2	20	Identifies individual(s) responsible for conducting assessments; including their authority to issue stop work orders	A				28	
C1.3	20	Describes how and to whom assessment information should be reported	A				28	
C1.4	20	Identifies how corrective actions should be addressed and by whom, and how they should be verified and documented	A				28	
C2.	21	**Reports to Management**						
C2.1	21	Identifies what project quality assurance reports are needed and how frequently	A				28	
C2.2	21	Identifies who should write and receive these reports	A				28	
D	22	**DATA VALIDATION AND USABILITY**						
D1.	22	**Data Review, Verification, and Validation**						
D1.1	22	Describes SWAMP criteria that should be used for accepting, rejecting, or qualifying project data (or refers to element 7)	A				29	
D2	23	**Verification and Validation Methods**						
D2.1	23	Describes processes for data verification and validation, including standard operating procedures and data validation software	A				29	
D2.2	23	Identifies who is responsible for verifying and validating different components of project information (e.g., chain-of-custody forms, receipt logs, calibration information)	A				29	
D2.3	23	Describes the issue resolution process, and individual(s) responsible for conveying results to data users	A				29	
D2.4	23	Attaches checklists, forms, and calculations (including electronic formulae if using spreadsheets)	A			NA	NA	
D3.	24	**Reconciliation with User Requirements**						
D3.1	24	Describes procedures used to evaluate the uncertainty of the validated data (or refers to previous elements)	A				29	

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D3.2	24	Describes how limitations on data use should be reported to the data users	A				30	
D3.3	24	Identifies how the data will be used in the context of the various SWAMP components, including the SWAMP Information Management System	A				30	
x1		Project Name: Ventura River Watershed Protection Project (V-1): Upper San Antonio Creek Watershed Giant Reed Removal Project						
x2		Reviewer Name: Kelly Hahs						
		Review Contact Email: kelly.hahs@ventura.org						
x3		Review Date: 05-27-2010						