RECLAMATION

Managing Water in the West

Aquatic Pesticide Application Plan

Vegetation and Sediment Maintenance Program at Los Banos Detention Dam

EA-09-100

U.S. Department of the Interior
Bureau of Reclamation
Mid-Pacific Region
South-Central California Area Office
Fresno, California

December 2013

"I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations." [40 C.F.R. §122.22(d).]

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South-Central California Area Office

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List of Acronyms, Abbreviations and Definition of Terms

Adjuvants	compounds chosen by the discharger and added to aquatic pesticides during an application event to increase the effectiveness of the aquatic pesticides on target organisms (e.g. surfactants)
APAP	Aquatic Pesticide Application Plan
Application Area	the area to which aquatic pesticides are directly applied
Application Event	the time that introduction of the aquatic pesticide to the application area takes place. The application event is the time that the product is applied, not the length of time that it releases pesticide to the environment
California Department of Parks and Recreation	State Parks
cfs	cubic feet per second
Control Agency	permitted discharger to be authorized by General Permit No. CAG990005 (Reclamation)
CVRWQCB	Central Valley Regional Water Quality Control Board
CWA	Clean Water Act
DWR	Department of Water Resources
LBDD	Los Banos Detention Dam
MCL	Primary Maximum Contaminant Level
MUN	domestic or municipal supply
NPDES	National Pollutant Discharge Elimination System
Reclamation	Bureau of Reclamation
Section 5.3 Exception	Section 5.3 exception refers to a variance that dischargers may be granted, in accordance with section 5.3 of the *Policy for Implementation of Toxics Standards for Inland Surface Waters, Enclosed Bays, and Estuaries of California*. The variance allows dischargers to exceed water quality criteria for priority pollutants, as set by the California Toxics Rule
Treatment Area	the area that is treated by the aquatic pesticide to control weeds. It is the responsibility of the Control Agency to define the treatment area
Treatment Event	the period during which the aquatic application is actively killing or controlling weeds within the treatment area. It starts upon initiation of the application event and proceeds until the concentration of the aquatic pesticide is below that which can kill the target weed
USEPA	U.S. Environmental Protection Agency

Section 1 Introduction

1.1 Background

Los Banos Creek, an intermittent creek, begins in the Diablo Range in San Benito County. It then flows into western Merced County where it is dammed at the Los Banos Detention Dam (LBDD) (Figure 1-1). The dam was built by the Bureau of Reclamation (Reclamation) in 1966 to detain floodwater from Los Banos Creek in order to protect the San Luis Canal (Reclamation-owned portion of the California Aqueduct), the city of Los Banos, and the surrounding farmlands. It is an earthen dam with a height of 167 feet and a length of 1,370 feet, and has a 26,300 acre-foot capacity. Outflow passes through an outlet spillway into the creek with a maximum discharge of 8,600 cubic feet per second (cfs). See Figures 1-1 and 1-2 for location information and a photograph. The California Department of Parks and Recreation (State Parks) manages the Reclamation-owned, land at the Los Banos Creek Reservoir, as part of the San Luis Reservoir State Recreation Area.

The LBDD is a joint-use facility owned by Reclamation and operated and maintained by the Department of Water Resources (DWR). The reservoir level is typically maintained at or near the top of its active storage of 327.8 feet. Releases through the outlet works are made according to flood control criteria specified by the United States Army Corps of Engineers or through scheduled exercising of the flood gates. The dam has two discharge lines and a spillway that releases water into a basin at the toe of the dam. The outflow from the reservoir passes from the outlet works and/or the spillway into the existing Los Banos Creek channel. The water, both from behind the dam and within the Los Banos Creek, is then carried under the San Luis Canal by a six barrel culvert. The safe downstream channel capacity below the dam is 1,000 cfs.

Reclamation performs safety inspections on dams that fall under the jurisdiction of the Federal Dam Safety Program. Under the Dam Safety Program, Reclamation regularly monitors, examines and evaluates the performance of dams in its inventory to ensure facilities do not present unreasonable risks to the public, property, or the environment. Issues are evaluated in terms of loading conditions, structural response and the potential consequences of dam failure. When risks are determined to be unreasonable, corrective actions are formulated and implemented.

Both Reclamation and DWR's Division of Safety of Dams have completed numerous inspections of the LBDD and have classified it as high risk. The system is designed to flow water away from the dam, following its natural channel. Over time, cattails and tules have grown around this lower basin and the discharge path, preventing proper drainage and causing water to back up into the surrounding area. The dam also has a toe drain which is the primary source of warning if the dam is experiencing problems with holding water. With the heavy growth of vegetation and improper drainage, this valuable tool has been rendered useless.

On August 22, 2008 DWR's San Luis Field Division performed the LBDD Slide Gate exercise. After a small release from LBDD, water backed up on and across Canyon Road, the access road for Los Banos Reservoir. The water had dammed up on the road due to the overgrowth of reeds

and tules in the spillway channel (the vegetation holds pooled water). The water that was released ponded and caused two State Park visitors to sustain vehicle damage.

Reclamation prepared an Environmental Assessment and a Finding of no Significant Impact and circulated them for thirty days, from June 30, 2010 to July 30, 2010. No comments were received and the Finding of no Significant Impact was signed on February 7, 2011. Reclamation submitted a Notice of Intent and Aquatic Pesticide Application Plan (APAP) on August 8, 2012, to obtain coverage under the Statewide Aquatic Weed Control General Waste Discharge Requirements Water Quality Order 2004-0009-DWQ (NPDES No. CAG990005). On November 8, 2012, the Central Valley Regional Water Quality Control Board (CVRWQCB) issued a Notice of Applicability (2004-0009-DWQ-R5-0003). A restriction was included, limiting the application of herbicide to February 15-April 30. The first season, vegetation did not require treatment because very little growth was present. Then, the Aquatic Weed Control General Order expired on November 30, 2013. Reclamation never applied any herbicide, and will be submitting a report by the March 1 deadline to document this. There is still a need to apply herbicide in the near future, and therefore Reclamation has prepared this APAP to comply with the new General Permit (Order No. 2013-0002-DWQ, NPDES No. CAG990005).

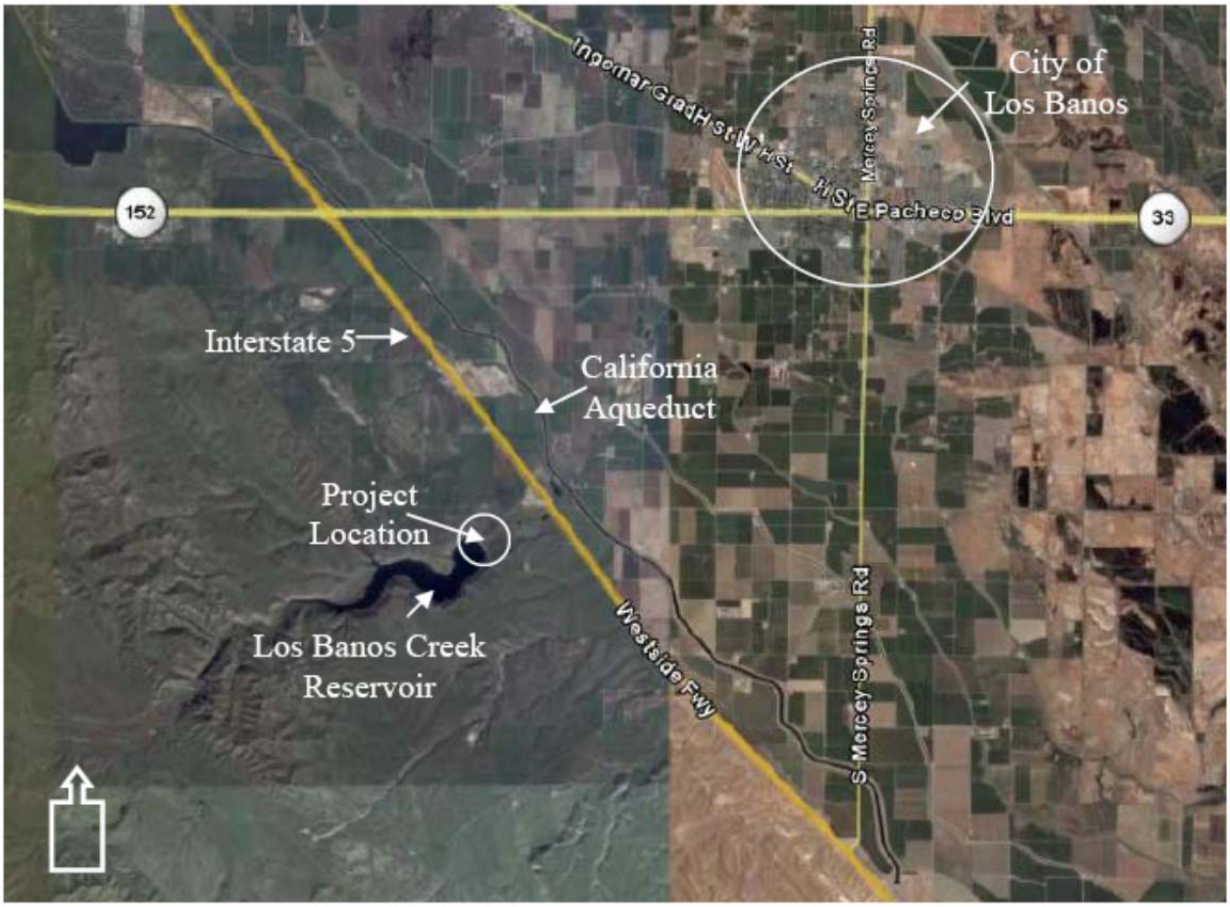

Figure 1-1. Los Banos Detention Dam and surrounding areas.

Figure 1-2. Photo of Los Banos Detention Dam and Reservoir, looking west.

Section 2 Description of the Water Proposed for Herbicide Application

Los Banos Creek, an intermittent creek, begins in the Diablo Range in San Benito County. Los Banos Creek is hydrologically connected to Mud Slough, which empties into the San Joaquin River. Los Banos Creek drains about 160 square miles of the Diablo Range. It then flows into western Merced County where it is dammed at LBDD, and passes under the San Luis Canal through a six-barrel culvert.

To maintain the LBDD system's functionality Reclamation and DWR propose to implement a 10-year program to remove accumulated vegetation and sediment at the LBDD. The maintenance program would be conducted by DWR's Civil Maintenance Branch of the San Luis Field Division Operations and Maintenance once every three to five years. Work would include the removal of vegetation and sediment from: the spillway of LBDD, the creek, and the Dam face (Figures 2-1 and 2-2) and herbicidal treatments as needed.

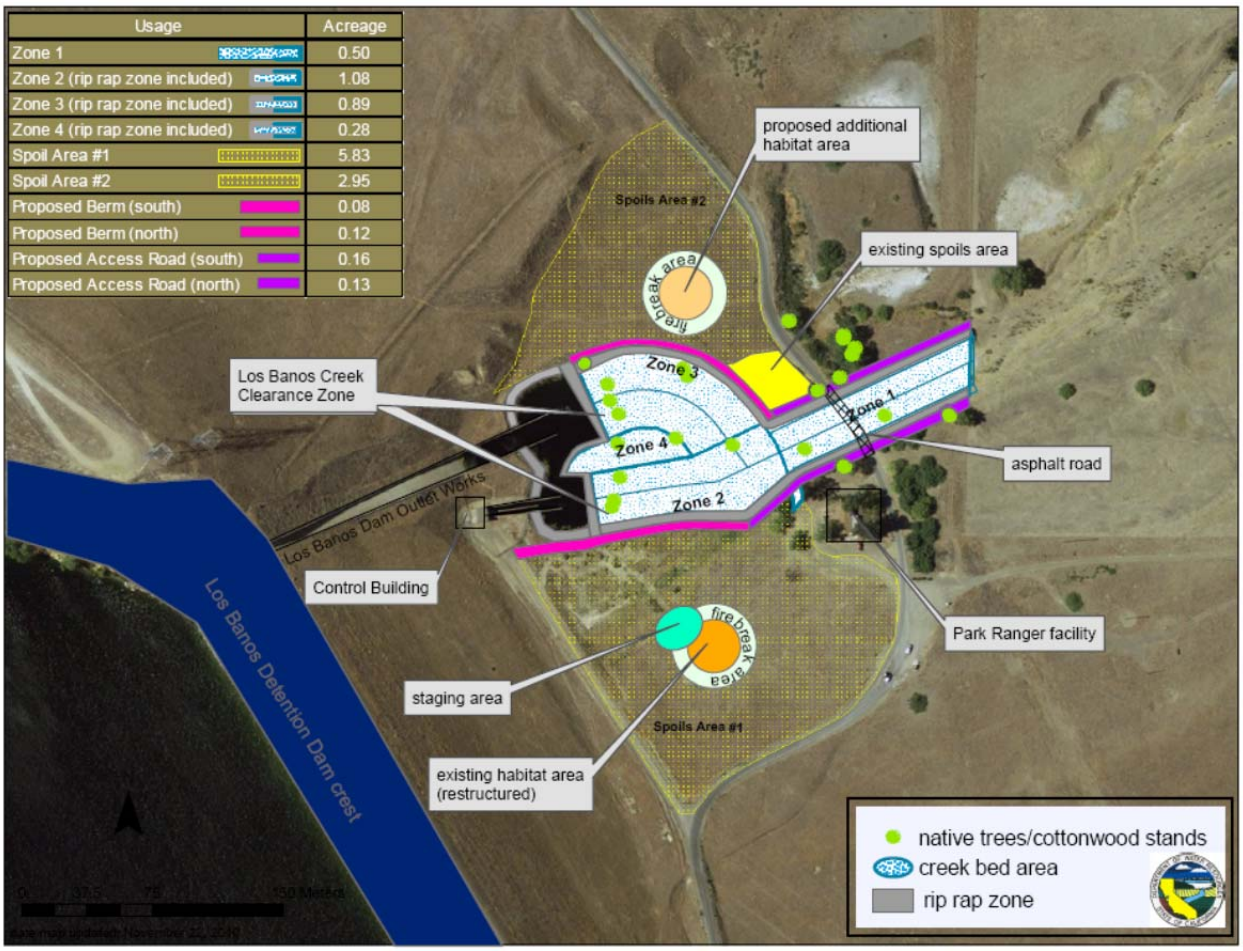

Figure 2-1. Project layout (zones 1-4).

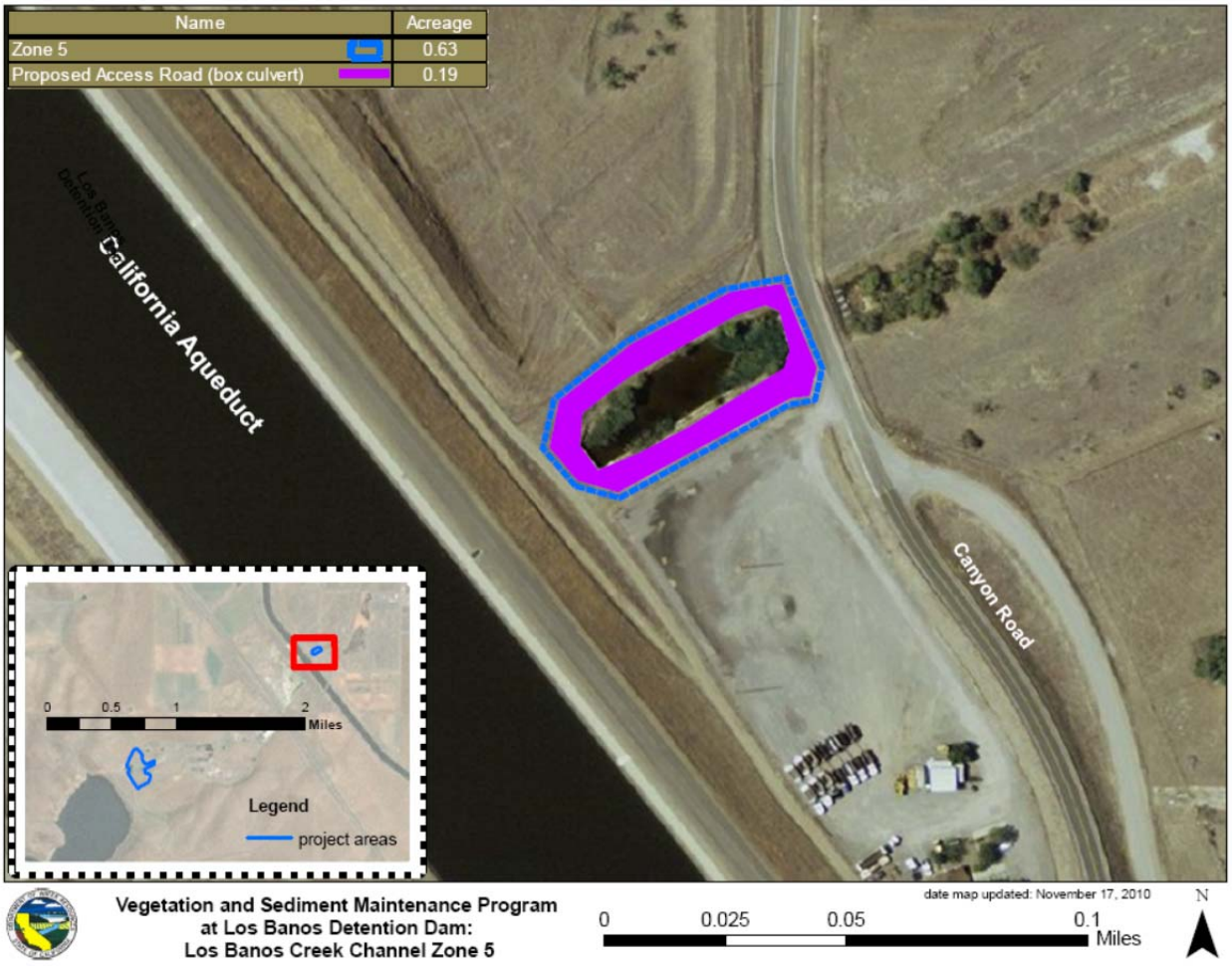

Figure 2-2. Project layout (zone 5).

Section 3 Description of the Treatment Area in the Water System

Herbicide would be applied to the channel downstream of the spillway and outlet works. Channel clearance would encompass an area of 3.38 acres (the treatment area). See Figures 2-1 and 2-2.

Section 4 Description of Weeds Being Controlled and Why

4.1 Broadleaf Cattails

The primary vegetation to be controlled is broadleaf cattails (*Typha latifolia*), which are clogging the area downstream from the dam, interfering with water flow and impeding the ability to monitor the dam for leaks. Broadleaf cattails are native to the area. Broadleaf cattail is an aquatic or semiaquatic emergent perennial. Broadleaf cattail plants are typically three to 10 feet tall, reedlike, and form large clones. They can be highly productive (Yeo 1964). Broadleaf cattail may spread via vegetative growth. Rhizome growth is important to broadleaf cattail regeneration. Rhizome dispersal may occur when portions of a clone are separated by wind, water, etc. (Apfelbaum 1985).

4.2 Mulefat

A less abundant species to be controlled is mulefat (*Baccharis salicifolia*). Mulefat is a perennial shrub that is native to California and occurs along streambanks. Individual plants may reach up to 12 feet in height and superficially resemble willows (but are in the Asteraceae [sunflower family]). The species will reproduce vegetatively by suckering and can form dense thickets. Mulefat may be important forage for some wildlife, such as deer and some butterflies.

4.3 Tamarisk

Another species to be controlled which is less abundant than cattails is tamarisk (saltceder) (*Tamarix* spp.). The exact species growing at LBDD has not been identified, but all *Tamarix* spp. are not native to the area and are invasive. Tamarisk are deciduous shrubs or shrub-like trees with numerous large basal branches, reaching 13 to 26 feet in height, but usually less than 20 feet. Tamarisk has a deep, extensive root system that extends to the water table, and is also capable of extracting water from unsaturated soil layers. Tamarisk can reproduce sexually (seeds dispersed by air and water) but will also reproduce vegetatively via rhizomes. *Tamarix* spp. will remove large amounts of water from their root zone (Hoddenbach 1987) and they concentrate salt in the upper soil layer. Where non-native, tamarisk invasions disrupt aquatic systems and in most cases, reduce the quality of riparian habitat for wildlife (Anderson and Ohmart 1977). The extensive root systems can contribute to flooding (Rush 1994).

Section 5 Herbicide Description

5.1 Type of Aquatic Pesticide Used

AquaMaster™ is an aqueous solution containing 53.8% glyphosate in its isopropylamine salt form (approximately four pounds acid per gallon) and contains no inert ingredients other than water. The primary decomposition product of glyphosate is aminomethylphosphonic acid, and the commercial product contains an impurity, 2, 4-nitrosoglyphosate.

Glyphosate inhibits an enzyme needed to synthesize an intermediate product in the biosynthesis of the aromatic amino acids, essential for protein synthesis and to produce many secondary plant products such as growth promoters, growth inhibitors, phenolics, and lignin. Animals do not synthesize these aromatic amino acids and glyphosate therefore has low toxicity to these potential non-target receptors (Schuette 1998). AquaMaster™ has an extremely low toxicity to aquatic organisms on an acute basis (see Appendix B). Because glyphosate adheres strongly to particles, it does not readily leach to waters (Sprankle *et al.* 1975), and potential movement of glyphosate to groundwater is unlikely.

The U.S. Environmental Protection Agency's (USEPA's) Hazardous Waste Identification Rule (40 CFR 261) identifies compounds that are recognized as having a low, medium or high potential for bioaccumulation. For bioaccumulation in aquatic systems, rankings were determined using bioaccumulation factors in fish, which are indicated in laboratory tests as having low octanol-water partitioning coefficient (or log K_{ow})) values for organic compounds. Bioaccumulation potential is defined in Table 5.1:

Table 5-1. Bioaccumulation potential of chemicals**.**

Bioaccumulation potential	**Bioaccumulation Factor**	**(BAF) log K_{ow}**
High	BAF ≥ 10,000	log $K_{ow} \geq 4.0$
Medium	10,000 > BAF ≥ 100	$4.0 >$ log $K_{ow} \geq 2.0$
Low	BAF < 100	log $K_{ow} < 2.0$

All reported bioaccumulation factor values for glyphosate in aquatic organisms are well below 100 (Ebasco 1993; Wang *et al.* 1994) and therefore are considered low.

Trumbo (2002) studied the environmental fate and aquatic toxicity of Rodeo® (same active ingredient as AquaMaster™) in three locations, including a riverine area. This study measured glyphosate, aminomethylphosphonic acid (glyphosate's primary metabolite), nonylphenol ethoxylate, and nonylphenol at treated sites one hour, two days, and eight days after application, and tested for toxicity using 96-hour toxicity tests with the fish species fathead minnow (*Pimephales promelas*). It was found that concentrations of the tested constituents at the river site (with moving water) was below detectible levels for all tests, and that there was no significant mortality of test fishes.

5.2 Application Method

Glyphosate solution would be applied as a spray to plant foliage for control of cattails, mulefat, and tamarisk. Spray mixtures would be administered from trucks (ground broadcast equipment).

DWR would use a pesticide applicator that is licensed by the California Department of Pesticide Regulation (DPR) and in possession of a Qualified Applicator Certificate. All pesticide application would be performed or directed by this person.

5.3 Adjuvant Used

No adjuvants would be used.

Section 6 Factors Influencing the Decision to use Herbicide for Weed Control

The area downstream from the LBDD developed a heavy growth of aquatic vegetation. This was increasing flooding in the creek and interfering with access to the recreation areas at the reservoir. It was also making it difficult to monitor the dam for leaks. In compliance with Sections 401 and 404 of the CWA, as well as other applicable environmental laws, the vegetation and sediment was cleaned out and additional service roads were constructed to make future maintenance easier. Application of selected herbicides is a critical part of Reclamation's Integrated Pest Management Program. Now that the initial heavy growth of vegetation was cleared out, DWR (on Reclamation's behalf) wishes to use glyphosate to control new growth of emergent vegetation, before it reaches the density and height that it had previously attained. AquaMaster™ is suitable for controlling the above-water portion of this vegetation, and is of low toxicity to non-target organisms.

Section 7 Gates or Control Structures

This is not applicable. The treatment area does not have any gates or control structures.

Section 8 Section 5.3 Exception

This is also not applicable. Neither Reclamation nor DWR has sought or been granted a section 5.3 exception.

Section 9 Monitoring and Reporting Plan

Reclamation has prepared this Monitoring and Reporting Plan in accordance with requirements set forth in Water Quality Order No. 2013-0002-DWQ, General Permit No. CAG990005.

The USEPA has promulgated a Primary MCL of 0.7 mg/L (700 µg/L) for glyphosate that is applicable for drinking water sources or water bodies with an MUN designation. The General Permit requires compliance with USEPA Primary MCLs for discharges to water bodies with MUN designation. Therefore, the receiving water limitation for discharge of glyphosate to water bodies with MUN designation is 0.7 mg/L. As Los Banos Creek is hydrologically connected with the San Joaquin River, Reclamation and DWR would adhere to the 0.7 mg/L limit.

During every application the following monitoring provisions, required by General Permit No. CAG990005, would be met:

- All laboratory analyses shall be conducted at a laboratory certified for such analyses by the California Department of Health Services. All analyses shall be conducted in accordance with the latest edition of "Guidelines Establishing Test Procedures for Analysis of Pollutants" promulgated by the USEPA (40 CFR 136). Hardness shall be determined by the calculation[1] or titration method.

- Samples shall be collected using sampling procedures to minimize loss of monitored constituents during sample collection and analysis and maintain sample integrity.

- If DWR monitors any constituent required to be monitored under this General Permit more frequently than specified, the monitoring results shall be submitted to the Central Valley Regional Water Quality Control Board (CVRWQCB).

- DWR shall retain records of all monitoring information including all calibration and maintenance records, copies of all reports required by the General Permit, and records of all data used to complete the application for the General Permit. Records shall be maintained for a minimum of three years from the date of the sampling, measurement, or report. This period may be extended during the course of any unresolved litigation regarding this discharge or when requested by the CVRWQCB Executive Officer.

- The pesticide applicator would maintain a log for each aquatic pesticide application. The log would contain:
    1. Date of application
    2. Exact location (by place name/river mile, and GPS coordinates)
    3. Time of application
    4. Type of pesticide applied, concentration, and application rate (the dosage and quantity) of each pesticide applied at each application site
    5. Time application started and stopped
    6. Water temperature, flow rate or level of water body
    7. Surface area and/or volume of the application area
    8. Visual monitoring assessment of water conditions
    9. Name/s of individual/s applying pesticide
    10. Signed certification that applicator followed the APAP

- For each application at each site, the applicator would create a map of the site area with a convenient scale. The map would show the following (see application diagrams attached):
    1. Application area
    2. Treatment area
    3. Untreated areas immediately adjacent to the treated water (applies if the entire water body is not treated)
    4. Proximity of any municipal water intakes

[1] Hardness, mg equivalent $CaCO_3$ mg/L = 2.497[Ca, mg/L] + 4.118[Mg, mg/L]

5. The water body receiving the treatment

- All Municipal water intakes (MUN's) would be identified by GPS mapping and provided to the applicator for planning treatments with municipal restrictions.

- All monitoring instruments and devices that are used by DWR to fulfill the prescribed monitoring program shall be properly maintained and calibrated as necessary to ensure their continued accuracy.

All water samples would be labeled with matching unique identification numbering to the corresponding Reclamation water quality data sheet. The data sheet would include the following information:

- Date
- Sample identification number
- Time of sampling
- Exact location of collection site (by GPS coordinates, name, and river mile)
- Notation of site on a detailed map with correlating sample number
- Type of water flow (backwater, lake, irrigation drain, river mainstem)
- Type of sample (background, event, post-event)
- Type of site (Indicate whether it is a representative site)
- Name of water body sampled
- Type of testing required (name/s of pesticide/s)
- Name/s of individual/s collecting samples

In conducting the receiving water sampling, a log shall be kept of the receiving water conditions throughout the reach bounded by the treatment area. Attention shall be given to the presence or absence of:

- Floating or suspended matter;
- Discoloration;
- Bottom deposits;
- Aquatic life;
- Visible films, sheens, or coatings;
- Fungi, slimes, or objectionable growths; and
- Potential nuisance conditions.

Notes on receiving water conditions shall be summarized in the monitoring report.

Field personnel are responsible for the following:

- Maintaining a logbook detailing an accurate record of sample collection activities
- All records would be written using a waterproof permanent marker pen
- Ensuring that entries are clear and legible
- Dating and initialing daily entries
- Noting errors or changes using a single line to cross out the entry and date and initialing changes
- Completing a chain of custody form accurately and legibly (Reclamation Chain of Custody Record 7-2518[8-93])

- Water samples are to be placed in a cooler and maintained in a chilled condition (4ºC, pH 5-9) until express mailing to the designated laboratory. Chain of custody must be preserved with documentation accompanying the samples to the laboratory. Samples must be received by the laboratory within 24 hours after collection.

The first application event would be sampled per year for physical and chemical sample types if there is more than one application event in a given year[2]. Visual sampling would occur for all application events. A minimum of three Background representative site water samples would each be collected at approximately the center of the "horseshoe area," the center of the area downstream (east) of Canyon Road, and the culvert area, shown in Figure 2-1. A minimum of three representative site Application Event water samples and a minimum of three representative site Post-Event water samples would each be collected at the same three locations.

Water samples would be collected in accordance with *Department of Interior, Bureau of Reclamation Quality Assurance Guidance for Environmental Management,* (USDOI-BOR, August 2003) and incorporate the appropriate procedures for water sampling found in the USEPA's *Water Sample Collection Technique in Monitoring and Assessing Water Quality*.

Water samples would be collected at three feet below the surface, or mid-depth if the water body is less than six feet deep.

A Background sample would be collected from each representative site to be applied. Samples would be at the scheduled application event area within no more than 24 hours before treatment begins. Once herbicide application is completed in the defined application area a Treatment Event water sample would be collected adjacent to the treatment area from each designated representative site. The samples would be collected within one hour after herbicide application. Within seven days after completing the pesticide application Post-Event water samples would be collected from within and adjacent to the treatment area from each designated representative site. A more detailed schedule is not possible at this time, due to the need to obtain permit coverage first, to avoid heavy rainfall, and ensure the availability of necessary staff to conduct the work.

All laboratory analyses shall be conducted at a laboratory certified for such analyses by the California Department of Public Health in accordance with California Water Code section 13176. Laboratories that perform sample analyses shall be identified in all monitoring reports. Reclamation shall institute a Quality Assurance-Quality Control Program for onsite field measurements. A manual containing the steps followed in this program must be kept in the laboratory and shall be available for inspection by the State Water Resources Control Board and the appropriate CVRWQCB staff. The Quality Assurance-Quality Control Program would conform to USEPA guidelines or to procedures approved by the State Water Resources Control Board and the CVRWQCB.

Reclamation staff would collect water quality samples. All but glyphosate would be measured in the field, and Reclamation would utilize a contractor to conduct lab tests for glyphosate (125 ml amber glass container, preservative $Na_2S_2O_3$, holding time = 14 days). Records shall be kept of the dates of analysis, names of the individuals conducting the analyses, and the analytical methods used. All costs for any work associated with this project are cost-shared between

[2] There would only be one environmental setting (i.e. non-flowing water, not non-flowing and flowing water).

Reclamation and DWR. Table 9-1 shows the type of samples to be collected. For the physical and chemical samples, the horseshoe area refers to Zones 2-4 and "downstream of Canyon Road" refers to Zone 1 in Figure 2-1. The culvert area is even further downstream (Zone 5) and is shown in Figure 2-2.

Table 9-1. Sample types, methods, and frequencies**.**

Sample Type	Constituent/Parameter	Units	Sample Method	Minimum Sampling Frequency	Sample Type Requirement	Required Analytical Test Method
Visual	Site description (backwater, lake, river mainstem, irrigation drain, etc.) Appearance of water (sheen, color, clarity, etc.) Weather conditions (fog, rain, wind, etc.)	Not applicable	Visual observation	All applications at entire site	Background, Event, and Post-Event Monitoring	Not Applicable
Physical	Temperature[3] pH[3] Turbidity[4] Electrical conductivity/salinity[3] @ 25°C	°F Number NTU µmhos/cm	Grab[5]	Background, Event, and Post-Event Monitoring	Background, Event, and Post-Event Monitoring	As described in 40 C.F.R. 136
Chemical	Glyphosate Dissolved Oxygen[3]	µg/L mg/L	Grab[4]	One application event per year at the three sample sites (horseshoe area, downstream of Canyon Road, and culvert area)	Background, Event, and Post-Event Monitoring	As described in 40 C.F.R. 136

The pesticide applicator and monitoring personnel would provide a copy of all water sampling documentation and field logs to appropriate Reclamation staff, who would maintain copies of all documentation. Reclamation would prepare annual reports that provide details regarding pesticide application activities and associated monitoring performed from January 1 to December 31 for each application year. The annual report would contain an executive summary discussing compliance or violation of the General Permit and the effectiveness of the APAP, as well as a summary of monitoring data, including the identification of water quality improvements or degradation as a result of the aquatic pesticide application. These reports would be submitted annually to the CVRWQCB by March 1 following each application year. Reclamation would

[3] Field Testing
[4] Field or Laboratory Testing
[5] Samples shall be collected at three feet below the surface, or mid-depth if water body is less than six feet deep

provide an oral report of any noncompliance, including any unexpected or unintended effect of an algaecide or aquatic herbicide use that may endanger health or the environment, within 24 hours to the State Water Resources Control Board and the CVRWQCB from the time that we become aware of the circumstances. The 24 hour report would be followed up by a written report within five days of the time that Reclamation becomes aware of the non-compliance. These reports would follow the protocols and requirements as stated in Attachment C of the General Permit.

Section 10 Prevention of Sample Contamination

The staff responsible for sample collection would be trained be trained at the beginning of the season in proper collection methods and procedures to avoid sample contamination. The sample collection equipment would be labeled and kept separately from the equipment being used to apply herbicide. Properly labeled and documented samples would be placed in a cooler, along with the chain of custody form, to ensure integrity of the samples from the time they're collected until they're delivered to the laboratory for analysis.

Section 11 Description of BMPs to be Implemented

All herbicides shall be applied by or under the direct supervision of trained, certified or licensed applicators and in accordance with the product label. A monitoring program shall be implemented as part of the NPDES permit. Reclamation and DWR shall use adaptive management strategies to refine herbicide application methods to increase control effectiveness and reduce impacts.

11.1 Spill Prevention and Containment

On-site mixing and filling operations shall be confined to upland areas appropriately bermed or otherwise protected to minimize spread or dispersion of spilled herbicide into surface waters.

11.2 Appropriate Application Rate

Consistent with the label, herbicide shall be applied directly to the targeted emergent vegetation, to minimize the potential application of herbicide on the water surface. In accordance with the label directions for application via ground broadcast equipment (see Appendix A), a 4.5-6 pints/acre rate for cattails, a 3-7.5 pints/acre rate for mulefat, and a 6-7.5 pints/acre (partial control) rate for tamarisk would be used.

11.3 Staff and Herbicide Applicator Education

Prior to each treatment event, Reclamation will ensure that the APAP (with the herbicide label), the NPDES permit, and the NOA are provided to and reviewed by the staff and pesticide applicator involved in the herbicide applications.

11.4 Planning and Coordination with Nearby Water Users

Reclamation has been and will continue to inform and coordinate with State Parks and with the Central California Irrigation District. State Parks does not take municipal water from the reservoir, but on occasion, anglers have been known to fish below the dam, although they have only been seen using the areas upstream from the treatment area, where the water is deeper and more vegetation remains (and where therefore the fish habitat is better). The Central California Irrigation District is proposing a project to divert water from Los Banos Creek downstream from the treatment area, pursuant to theirpre-1914 riparian right. All of the downstream users are within the district boundaries of the proponent for that project. Reclamation is the lead Federal agency for the project, which requires multiple approvals from Reclamation. We have informed the project proponent of our plan to apply herbicide, and will coordinate with them on particular applications. We will utilize the Public Notice Requirements as specified in the NPDES permit:

Every calendar year, at least 15 days prior to the first application of algaecide or aquatic herbicide, the Discharger shall notify potentially affected public agencies. The Discharger shall post the notification on its website if available (we have a website for posting information on this project). The notification shall include the following information:

1. A statement of the discharger's intent to apply algaecide or aquatic herbicide(s);
2. Name of algaecide and aquatic herbicide(s);
3. Purpose of use;
4. General time period and locations of expected use;
5. Any water use restrictions or precautions during treatment; and
6. A phone number that interested persons may call to obtain additional information from the Discharger.

11.5 Fish Kill Prevention Methods

As explained previously, glyphosate has low toxicity to fish. Additionally, the area to be treated and the area downstream from the LBDD, up to the point that Los Banos Creek crosses the California Aqueduct, only contains flowing water either during or shortly after rainfall events, or when DWR makes flood control releases. These releases are made only during the rainy season when the reservoir contains enough water to require them. The creek bed is usually completely dry downstream from Reclamation-owned land. The initial vegetation and sediment removal also reduced ponding of water in the treatment area and for a distance downstream. As a result of the low levels of water in this area, fish are not common. All of the required monitoring will be conducted, and if any adverse toxic effects on fish are observed, DWR will take steps to remedy the effects, and Reclamation will report the adverse incident as required by the NPDES permit.

An "adverse or toxic effect" includes any impact that occurs within waters of the United States on non-target organisms as a result of algaecide or aquatic herbicide residue discharge. Examples of these effects may include:

- Distressed or dead juvenile and small fishes
- Washed up or floating fish
- Fish swimming abnormally or erratically

- Fish lying lethargically at water surface or in shallow water
- Fish that are listless or nonresponsive to disturbance
- Stunting, wilting, or desiccation of non-target submerged or emergent aquatic plants
- Other dead or visibly distressed non-target aquatic organisms (amphibians, turtles, invertebrates, etc.)

Section 12 Examination of Alternatives

Department of Interior directives and guidance require Reclamation to implement IPM principles for controlling troublesome and invasive species.

12.1 No Action

The No Action alternative is not viable because the target vegetation would grow back to its previous state, trap sediment, and again cause flooding and interfere with dam monitoring.

12.2 Prevention

Two of the three target plant species are native. Tamarisk are non-native, and spread easily by wind-blown seed. These trees occur upstream in places along the shoreline of Los Banos Reservoir. The General Plan for the San Luis Reservoir State Recreation Area (of which Los Banos Reservoir is a part), call for the following two measures as part of the effort to manage invasive exotic species (State Parks and Reclamation 2013):

- Identify invasive and exotic species in the Plan Area and prepare a vegetation management statement to manage and remove these species over time.
- Avoid planting non-native species. Use locally native species that are defined as indigenous to the Plan Area or closely surrounding areas where possible.

Reclamation, DWR, and State Parks also consider the potential spread of tamarisk when proposing any new actions. This helps to limit the source of the tamarisk in the treatment area, but has not been sufficient to completely prevent colonization. The other two species are native and provide valuable cover and food for some wildlife species and are allowed to grow where they naturally occur upstream and don't interfere with any required operations or maintenance.

12.3 Mechanical or Physical Methods

The project has received all other environmental clearances, and initial work (excluding herbicide use) was conducted in summer of 2011. An excavator was used to remove aquatic vegetation. However, this method is more labor intensive, destructive to land, and expensive. Mechanical removal can cause bank erosion. Therefore, since the initial vegetation removal has been conducted at the beginning of the program, from here on out, herbicides would be used to control cattails, mulefat, and tamarisk.

Manual labor is time intensive and costly. Workforce availability could be a problem. Removal by hand may result in some degree of increased turbidity.

12.4 Cultural Methods

Only the tamarisk are non-native and are not known to be spread by park visitors. They likely spread primarily by wind-blown seed. Therefore, there is a low potential for a public education program to prevent or reduce the spread of tamarisk at the site.

12.5 Biological Control Agents

Tamarisk leaf beetles (*Diorhabda elongata*) were initially introduced from Fukang, China into the western United States by U.S. Department of Agriculture in 2001 as a biological control for tamarisk. The beetles and their larvae will defoliate an entire tree before moving onto another. This method does not result in a cost savings over herbicide use when used for maintenance following initial removal by another method (Tamarisk Coalition 2008). The Willow Flycatcher is listed as endangered under the California Endangered Species Act, and the Southwestern Willow Flycatcher is listed as endangered under the Federal Endangered Species Act. The Willow Flycatcher is one of the few native species that will utilize tamarisk to some extent, although none have been documented at the Los Banos Reservoir. There is a risk that if tamarisk beetles were introduced, they could spread to other areas that are within the current range of the Willow Flycatcher, and cause a loss of habitat. This method would do nothing to control the other two target species, as tamarisk beetles are not known to use any other hosts besides tamarisk.

12.6 Aquatic Herbicides

AquaMaster™ has a very low toxicity to non-target organisms, and is specifically intended for non-submerged aquatic vegetation. As the level of infestation of the target plants is low (due to the initial mechanical removal), the cost for ongoing treatment with herbicide is low (Tamarisk Coalition 2003). Unlike tamarisk beetles, the effect of glyphosate use is localized and short-term. Herbicide would be applied only when the water is not flowing, would be applied directly to minimize the amount of herbicide entering the water, and would be applied according to the rates specified on the label.

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