

RECEIVED

OCT 21 2016

ATTACHMENT E – NOTICE OF INTENT

DIVISION OF WATER QUALITY

ORDER WQ 2016-XXXX-DWQ
GENERAL PERMIT CAG 990006

STATEWIDE NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM PERMIT
FOR RESIDUAL PESTICIDE DISCHARGES TO WATERS OF THE UNITED STATES
FROM AQUATIC ANIMAL INVASIVE SPECIES CONTROL APPLICATIONS

I. NOTICE OF INTENT STATUS (see Instructions)

WDID# 456AP00004

Mark only one item: A. <input checked="" type="checkbox"/> New Applicator	B. <input type="checkbox"/> Change of Information: WDID# _____
C. <input type="checkbox"/> Change of ownership or responsibility: WDID# _____	

II. DISCHARGER INFORMATION

A. Name <u>United Water Conservation District</u>			
B. Mailing Address <u>106 N. 8th Street</u>			
C. City <u>Santa Paula</u>	D. County <u>Ventura</u>	E. State <u>CA</u>	F. Zip <u>93060</u>
G. Contact Person <u>Linda Purpus</u>	H. Email Address <u>lindap@unitedwater.org</u>	I. Title <u>Env. Scientist</u>	J. Phone <u>805-317-8987</u>

III. BILLING ADDRESS (Enter Information only if different from Section II above)

A. Name			
B. Billing Address			
C. City	D. County	E. State	F. Zip
G. Email address	H. Title	I. Phone	

IV. RECEIVING WATER INFORMATION

A. Biological pesticide and residual chemical pesticide discharge to (check all that apply):

1. Canals, ditches, or other constructed conveyance facilities owned and controlled by Discharger.
Name of the conveyance system: Santa Felicia Dam infrastructure

2. Canals, ditches, or other constructed conveyance facilities owned and controlled by an entity other than the Discharger.
Owner's name: _____
Name of the conveyance system: _____

3. Directly to river, lake, creek, stream, bay, ocean, etc.
Name of water body: Lake Piru; Lower Piru Creek; Spillway Channel Pool

B. Regional Water Quality Control Board(s) where application areas are located
(REGION 1, 2, 3, 4, 5, 6, 7, 8, or 9): Region 4
(List all regions where pesticide application is proposed.) see APAP Figure 2

A map showing the locations of A1-A3 in each Regional Water Board shall be included.

V. PESTICIDE APPLICATION INFORMATION

A. Target Organisms	<u>Quagga Mussels</u>
B. Pesticides Used: List name, active ingredients and, if known, degradation by-products.	<u>Earth Tec QZ; Copper</u>
C. Period of Application: Start Date <u>Upon Execution of permit</u> End Date <u>December 31, 2018</u>	<u>(Multiple applications not continuous)</u>
D. Types of Adjuvants Added by the Discharger:	<u>None</u>

VI. AQUATIC PESTICIDES APPLICATION PLAN

A. Has an Aquatic Pesticides Application Plan (APAP*) been prepared?"	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
B. If not, when will it be prepared? _____	
* A copy of the APAP shall be included with the NOI.	
C. Is the applicator familiar with its contents?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <u>Qualified applicator will be contracted in the future and will be familiar w/ the APAP</u>

VII. NOTIFICATION

Have potentially affected public and governmental agencies been notified?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
If yes, a copy of the notifications shall be attached to the NOI.	<u>Informal Request for Consultation in process.</u>

VIII. FEE

Have you included payment of the filing fee (for first-time enrollees only) with this submittal?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A
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IX. CERTIFICATION

"I certify under penalty of law that this document and all attachments were prepared under my direction and supervision in accordance with a system designed to ensure 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 or imprisonment. Additionally, I certify that the provisions of this Order, including developing and implementing a monitoring program, will be complied with."

Printed Name: MAURICIO E GUARDADO JR

Signature: [Signature] Date: 10/20/16

Title: GENERAL MANAGER

X. FOR STATE WATER BOARD USE ONLY

WDID:	Date NOI Received:	Date NOI Processed:
Case Handler's Initial:	Fee Amount Received: \$	Check #:

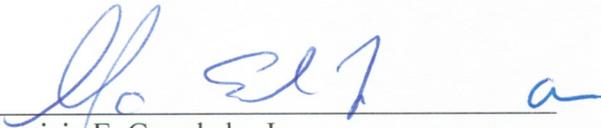
Aquatic Pesticide Application Plan

OCTOBER 2016

**UNITED WATER CONSERVATION DISTRICT
106 N. 8TH STREET
SANTA PAULA, CALIFORNIA 93060**

CERTIFICATION

"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(c)).

A handwritten signature in blue ink, appearing to read "M. Guardado, Jr.", written over a horizontal line.

Mauricio E. Guardado, Jr.
General Manager; United Water Conservation District

INTRODUCTION

United Water Conservation District (United) owns and operates Lake Piru, a water resource reservoir, located in Ventura County, California (Figure 1). Quagga mussels (*Dreissena rostriformis bugensis*) were discovered in Lake Piru in December of 2013. As a result of water releases from the Lake Piru reservoir, quagga mussels have also infested Santa Felicia Dam infrastructure, the spillway channel pool, and the upper reach of lower Piru Creek. United is seeking authorization to use a copper-based molluscicide to treat, and potentially eradicate quagga mussels from Lake Piru, the associated Santa Felicia Dam infrastructure, the spillway channel pool, and lower Piru Creek.

United is applying for coverage under a National Pollutant Discharge Elimination System (NPDES) permit for biological pesticides and residual chemical pesticide discharges to waters of the United States from aquatic animal invasive species control applications (General Permit CAG 990006). Coverage under the NPDES permit is requested for a range of discharges. United proposes to conduct flow-through pilot studies using the molluscicide that will result in discharge of residual concentrations of copper-based molluscicide to either Lake Piru, the spillway channel pool, or lower Piru Creek. United may conduct isolated “spot” treatments either in the lake, within the Santa Felicia Dam infrastructure, the spillway channel pool, or in lower Piru Creek. Depending on assessment results, United may use the copper-based molluscicide in a broad-scale treatment strategy designed to eradicate quagga mussels from Lake Piru, Santa Felicia Dam infrastructure, the spillway channel pool, and lower Piru Creek.

This Aquatic Pesticide Application Plan (Plan) has been prepared to comply with NPDES permit requirements and is submitted in conjunction with a Notice of Intent (NOI) and application for coverage under the NPDES permit. This Plan contains the following elements.

1. Description of receiving water bodies proposed for application of copper-based molluscicide
2. Factors influencing the decision to use copper-based molluscicide for control of quagga mussels
3. Molluscicide active ingredient, degradation byproducts, adjuvants or surfactants, and method of application
4. Description of all application areas
5. Other control methods used and their limitations
6. How much product is needed and how was this amount determined
7. Representative monitoring locations and justification for selection of locations
8. Discussion regarding gates or control structures and inspection schedules to ensure they are not leaking
9. Exception under State Implementation Policy section 5.3
10. Description of monitoring and reporting program
11. Description of procedures to prevent sample contamination from persons, equipment, and vehicles

12. Evaluation of feasibility of alternatives to pesticide application that could reduce potential water quality impacts
13. Description of BMPs
 - a. Measures to prevent spills
 - b. Measures to ensure that only a minimum and consistent amount is used
 - c. Plan to educate staff and pesticide applicator on potential adverse effects to waters of the U.S. from pesticide application
 - d. Description of specific BMPs for copper-based molluscicide
 - e. Description of specific BMPs for each environmental setting
14. Identification of the problem
15. Examination of alternatives with respect to impact on water quality, impact on non-target organisms, pesticide resistance, feasibility, and cost effectiveness
 - a. No action
 - b. Prevention
 - c. Mechanical or physical methods
 - d. Cultural methods
 - e. Biological control agents
 - f. Pesticides
16. Examination of alternatives to use the least intrusive method of pesticide application
17. Correct use of pesticide
18. Notice posted on website and at recreation facility

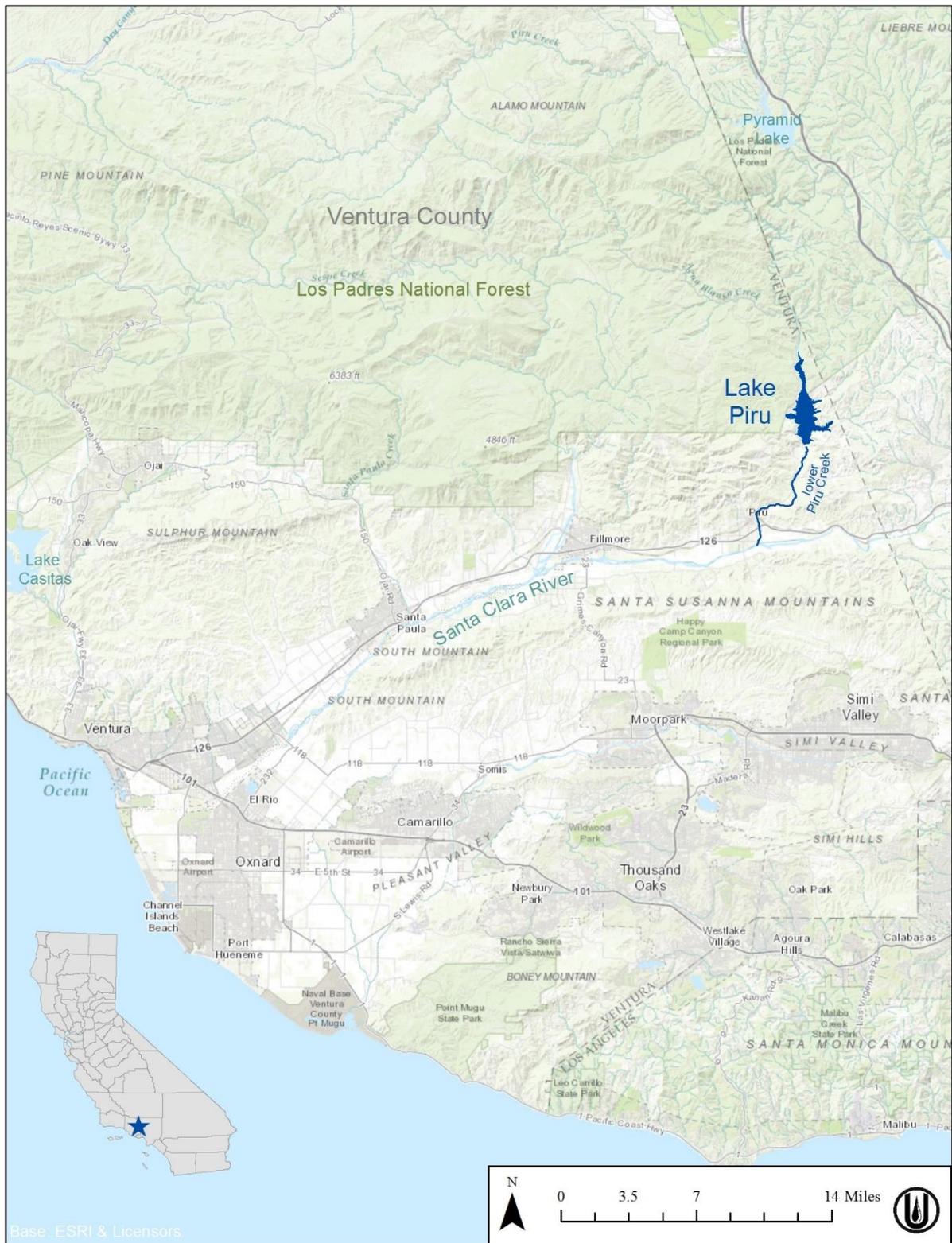


Figure 1 - Location map

1.0 DESCRIPTION OF RECEIVING WATERBODIES

United proposes to apply copper-based molluscicide to Lake Piru, the Santa Felicia Dam infrastructure, the spillway channel pool, and lower Piru Creek (Figure 2). Lake Piru was created in 1955 by construction of the Santa Felicia Dam and is located along the lower reaches of Piru Creek. Lake Piru is a water resource reservoir that is strategically managed to protect, conserve and enhance the water resources of the Santa Clara River Valley, its tributaries, and associated aquifers. The lake also provides recreational opportunities and is equipped with a campground, launch ramps, marina docks, and swim beach. Water from Lake Piru is conveyed through the Santa Felicia Dam infrastructure, and released to lower Piru Creek, which is a tributary to the Santa Clara River. The Santa Felicia Dam is located approximately 6.2 miles upstream of the confluence with the Santa Clara River. Infrastructure at the dam includes an intake structure, a conveyance system, a hydropower plant, and outlet works equipped with multiple ports and valves (considered critical energy infrastructure, and therefore not described in more detail in this document).

The water impounded by the dam forms Lake Piru, which had an original maximum capacity of 101,225 acre-feet (AF) upon completion of construction. Based on an analysis performed in 2015, the maximum capacity is reduced to an estimated 81,986 AF as a result of sediment deposition. Water releases from Santa Felicia Dam are intended to meet United's water resource management goals and satisfy requirements of United's license issued by the Federal Energy Regulatory Commission (FERC) and the associated biological opinion issued by National Marine Fisheries Service for endangered southern California steelhead (*Oncorhynchus mykiss*). Lower Piru Creek is designated critical habitat for southern California steelhead. Minimum required water releases are prescribed in the Santa Felicia Water Release Plan and comprised of three components: (1) habitat water releases; (2) migration water releases; and (3) alternative operations water releases (United 2012). Minimum required habitat water releases range between 7 and 20 cubic feet per second (cfs) and are based on cumulative rainfall. Minimum required migration releases are 200 cfs and are triggered by certain Santa Clara River flow criteria intended to provide steelhead migration opportunities. Under alternative operations, minimum required water releases are 5 cfs to allow for periodic dam safety activities, maintenance, and repairs.

Water management strategies generally include retaining and storing water in Lake Piru during the winter and spring months when downstream groundwater basins are at their fullest level. When water stored in the lake is sufficient, conservation releases from Santa Felicia Dam are typically conducted in the fall of each year. Water releases during these conservation events generally range between 200 and 400 cfs and are designed to maximize the amount of water that reaches United's Freeman Diversion structure which is located on the Santa Clara River approximately 40 miles downstream of the Piru Creek confluence.

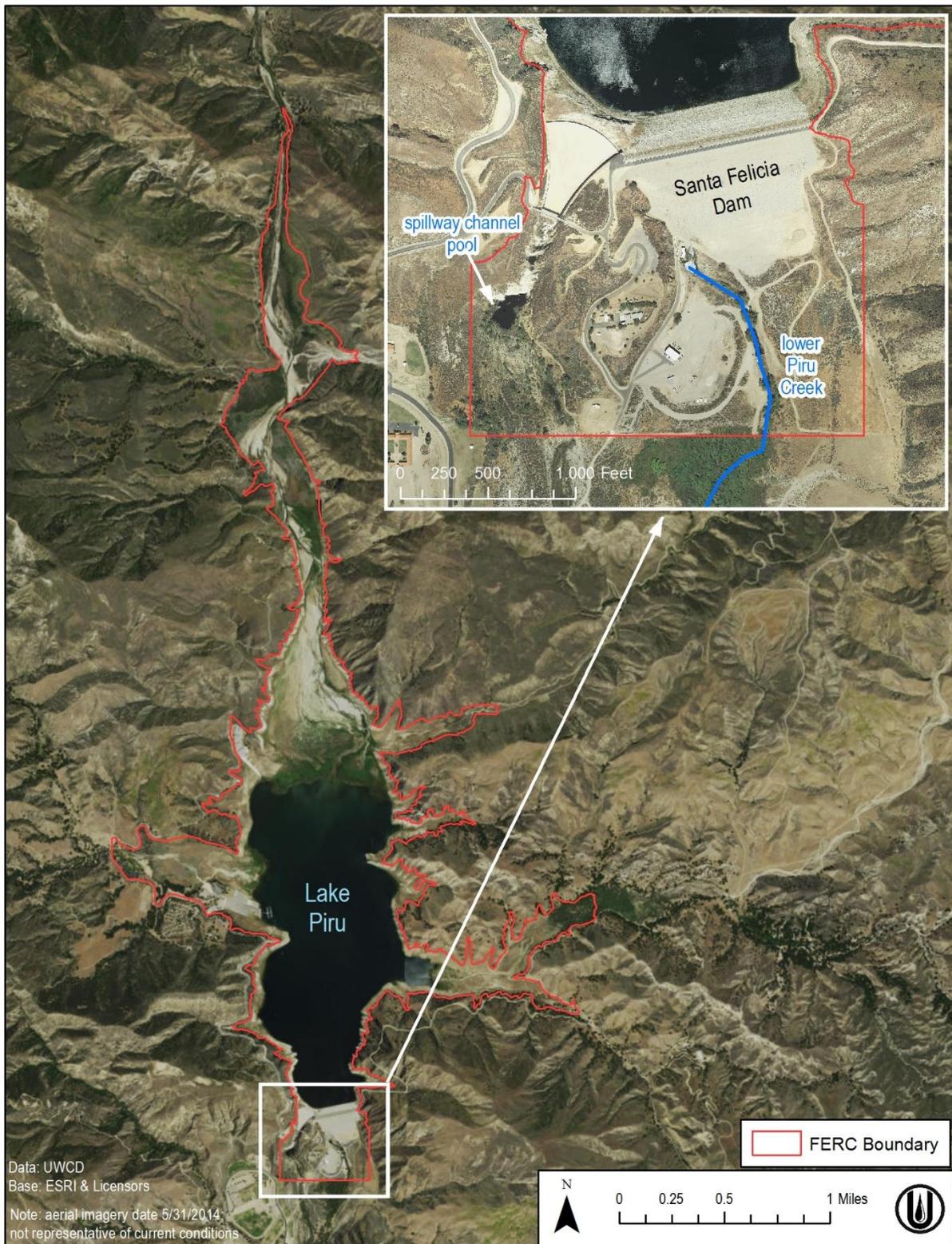


Figure 2 - Map showing Lake Piru, Santa Felicia Dam, the spillway channel pool, and lower Piru Creek

2.0 FACTORS INFLUENCING THE DECISION TO USE COPPER-BASED MOLLUSCICIDE FOR CONTROL OF QUAGGA MUSSELS

Following the discovery of quagga mussels in Lake Piru in December of 2013, United expended considerable effort exploring control treatment options. United conducted literary research, consulted with state and federal regulatory agencies, academia, staff from agencies that have experience working on invasive mussel issues, and suppliers of molluscicide products. Priority was placed in identifying a molluscicide agent that would be effective (with the goal of achieving eradication), with the least environmental consequences. To date, the only documented molluscicidal agents that have high potential for successful eradication of mussels on a whole waterbody scale have been potash or copper-based products. The efficacy of any selected product is dependent on water chemistry, temperature, and species of mussel. United has determined that the water chemistry at Lake Piru is not favorable for use of potash products. United is designing a pilot study to test the efficacy of copper-based molluscicide (initially EarthTec QZ®, but other compounds may be tested as well) using both water and quagga mussels from Lake Piru. One purpose of the study will be to determine the lowest effective dosage. The pilot study will use a flow-through system that will draw water from the lake and result in a discharge of residual copper to either the lake, the spillway channel pool, or lower Piru Creek, depending on the location selected for the study.

Coverage under the NPDES permit is required prior to conducting the pilot study. Once a pilot study has been completed, depending upon results, United may select to use the copper-based molluscicide to conduct isolated “spot” treatments either in the lake, within the Santa Felicia Dam infrastructure, the spillway channel pool, or in lower Piru Creek, or in a broad-scale treatment strategy designed to eradicate quagga mussels from Lake Piru, Santa Felicia Dam infrastructure, the spillway channel pool, and lower Piru Creek.

3.0 MOLLUSCICIDE ACTIVE INGREDIENT, DEGRADATION BYPRODUCTS, ADJUVANTS OR SURFACTANTS, AND METHOD OF APPLICATION

United is requesting authorization to use a copper-based molluscicide. There are many copper-based products available on the market. United intends to perform a pilot test using EarthTec QZ®. The active ingredient in EarthTec QZ® is copper in the cupric ion form (a biologically active form of copper). EarthTec QZ® does not have any degradation byproducts, and no adjuvants or surfactants are used in the application. Depending on the results of the pilot study, United may decide to test another copper-based molluscicide, and therefore is seeking authorization for a copper-based molluscicide rather than a particular formulation.

EarthTec QZ™ is a liquid formulation that is miscible in water and has ionic diffusion properties that cause it to readily disperse throughout the water column. Application methods will vary depending on the scale of project. For a pilot study, product will be injected into a flow-through system using a metering pump. Isolated “spot” treatments and broad-scale treatment applications would likely be conducted by boat, but some applications may be conducted from shore or marina docks. An isolated treatment of the Santa Felicia Dam infrastructure could be achieved by injecting a hose into the intake structure and allowing the product to transport through the

conveyance system. A full scale treatment of the lake would likely be conducted by boat. If the lake is not accessible by boat, and the product label allows, a helicopter may be used. The molluscicide will be applied near the water surface and allowed to disperse or, where means exist, delivered via hose to the depths, sites, and surfaces of worst infestations. When applying to large areas, the product will be dispensed along a route with gaps preferably no greater than 20 feet, starting near one shore and moving outward in bands.

4.0 DESCRIPTION OF ALL APPLICATION AREAS

The first proposed application will be a flow-through pilot study conducted either on the shore, a dock, or barge. Residual copper from the pilot study will either be discharged to Lake Piru, the spillway channel, or the release channel in lower Piru Creek below the Santa Felicia Dam outlet works. The release channel in lower Piru Creek is the preferred location due to security, available space, electricity and water supply. Lower Piru Creek is designated critical habitat for southern California steelhead and therefore, United will consult with NMFS prior to any application to the creek.

Following the pilot study, depending upon results, United may select to use the copper-based molluscicide to conduct isolated “spot” treatments either in the lake, within the Santa Felicia Dam infrastructure, the spillway channel, or in lower Piru Creek, or in a broad-scale treatment strategy designed to eradicate quagga mussels from Lake Piru, Santa Felicia Dam infrastructure, the spillway channel pool, and lower Piru Creek.

5.0 OTHER CONTROL METHODS USED AND THEIR LIMITATIONS

The following control methods have been implemented at Lake Piru.

- Mechanical scraping at select hot-spot locations and key infrastructure.
- Oxygen deprivation via tarping at select hot-spot locations.
- Desiccation as provided by fluctuating lake levels.

All of these methods were implemented as measures to control populations and protect infrastructure. These methods are only effective at reducing populations within treatment areas and not capable of achieving eradication.

6.0 HOW MUCH PRODUCT IS NEEDED AND HOW WAS THIS AMOUNT DETERMINED

The efficacy of any molluscicide is dependent on water chemistry, temperature, and species of mussel. United is designing a pilot study to test the efficacy of copper-based molluscicide (initially EarthTec QZ®, but other compounds may be tested as well) using both water and quagga mussels from Lake Piru. One purpose of the study will be to determine the lowest effective dosage. All applications will comply with Environmental Protection Agency (EPA) and California Department of Pesticide Regulation (CDPR) registration instructions and concentration restrictions.

7.0 REPRESENTATIVE MONITORING LOCATIONS AND JUSTIFICATION FOR SELECTION OF LOCATIONS.

Representative monitoring locations and justification for selection of the monitoring locations are included in the Monitoring and Reporting Program MRP presented in Attachment A.

8.0 DISCUSSION REGARDING GATES OR CONTROL STRUCTURES AND INSPECTION SCHEDULES TO ENSURE THEY ARE NOT LEAKING (IF APPLICABLE).

There are two transport mechanisms for water to flow out of Lake Piru; the Santa Felicia Dam outlet works and the spillway channel. The outlet works contain several valves, used to adjust water releases from the lake. The valves are exercised and inspected at regular intervals in accordance with FERC and California Department of Safety of Dams (DSOD) protocol. There are no gates at the facility. Lake Piru does not provide flood control and United does not control spill events. The spillway is constructed at an elevation of 1,055 feet (ft) mean sea level (msl), and once water surface elevation in the lake reaches the spillway elevation, water will spill over the spillway, through the spillway channel, into lower Piru Creek. Spill conditions occur as a result of winter storms, and molluscicide application will not be implemented under these conditions.

9.0 EXCEPTION UNDER STATE IMPLEMENTATION POLICY SECTION 5.3

United is not requesting an exception under the State Implementation Policy (SIP) section 5.3 for discharges resulting from conducting the pilot study. Residual copper concentrations resulting from the pilot study are expected to be insignificant and in compliance with receiving water limitations defined in the California Toxics Rule. One of the purposes of the pilot study is to determine the lowest concentration dosage for effective treatment of quagga mussels. Once this has been determined, United will make decisions regarding further use of the copper-based molluscicide to achieve control and eradication goals. Prior to using the copper-based molluscicide for additional treatments, United will assess whether concentrations identified for effective treatment will comply with California Toxics Rule criteria. If required, United will submit an application for exception under SIP section 5.3 prior to application of the copper-based molluscicide in concentrations that would exceed receiving water limitations.

10.0 DESCRIPTION OF MONITORING AND REPORTING PROGRAM

The complete MRP is presented in Attachment A.

11.0 DESCRIPTION OF PROCEDURES TO PREVENT SAMPLE CONTAMINATION FROM PERSONS, EQUIPMENT, AND VEHICLES

The field monitoring technician will employ sampling techniques to prevent contamination, such as sterile handling of the container and lid; keeping containers sealed until ready for use; and

sealing containers immediately after they are filled. Once samples are obtained they will be placed on ice or blue ice in a designated ice chest, chain-of-custody forms will be filled out, and both will be delivered to a state-certified laboratory within 72 hours.

12.0 EVALUATION OF FEASIBILITY OF ALTERNATIVES TO PESTICIDE APPLICATION THAT COULD REDUCE POTENTIAL IMPACT ON WATER QUALITY, NON-TARGET ORGANISMS, PESTICIDE RESISTANCE, FEASIBILITY, AND COST EFFECTIVENESS

12.1 No action

Avoidance of any type of control treatment would result in an increased infestation level of quagga mussels in Lake Piru, Santa Felicia Dam infrastructure, the spillway channel pool, and lower Piru Creek. Quagga mussels are an invasive species and a threat to infrastructure and environmental ecosystems. They can infest a wide range of aquatic habitats and clog water intake structures, such as pipelines and screens, interfering with water based infrastructure for hydroplants, water treatment facilities, and water diversions. Recreation-based industries and activities are also affected by the mussels colonizing docks, breakwalls, buoys, boats and beaches. For boaters, attached mussels increase drag, clog engines causing overheating and can affect steerage.

A population of quagga mussels can filter the water volume of a lake several times a day exerting considerable influence over particle concentrations, including phytoplankton, zooplankton, and nutrients, in the water column. As a result, mussels can restructure the dominant energy and nutrient pathways in freshwater ecosystems with a depletion of nutrients, energy, and biomass in the pelagic-profundal pathway and a promotion of nutrients, energy, and biomass in the benthic-littoral pathway (Higgins 2014). These dramatic changes to energy and nutrient cycling have the potential to trigger trophic cascades throughout the food web of the freshwater ecosystem as well as associated upland species that depend on freshwater systems, such as piscivorous birds.

12.2 Prevention

United has implemented measures to prevent infestation of quagga mussels in Lake Piru since approximately 2007. Early prevention measures included vessel inspections and public education campaigns. Since discovery of quagga mussels in the lake in 2013, the measures have been enhanced in an effort to prevent additional infestations of other invasive species and prevent the spread of quagga mussels from Lake Piru to other water bodies.

12.3 Mechanical or Physical Methods

United has implemented the following mechanical and physical methods to control infestations in the Lake Piru: 1) Mechanical scraping at select hot-spot locations and key infrastructure, 2) Oxygen deprivation via tarping at select hot-spot locations, and 3) Desiccation as provided by

fluctuating lake levels. These methods have a limited effect in controlling infestations at treatment areas, and are not sufficient to achieve the eventual eradication goal.

United considered the feasibility of draining water from Lake Piru to the lowest level possible to promote desiccation of quagga mussels. This would be challenging because there are areas of the lake bottom that are located at lower elevations than the intake structure (i.e., water would not “drain” from the lake through the conveyance system to the outlet works below a certain elevation), and multiple low level water inputs (e.g., tributary flow, subsurface flow, springs). Under this alternative, quagga mussels have the potential to survive in wetted or mud-like micro-environments for a significant duration and there is no guarantee that all areas would dry prior to a rain event and restoration of water inputs. Surviving mussels could re-populate the lake once water inputs are restored. For the reasons listed, this alternative was deemed infeasible.

The current plan to implement a copper-based molluscicide will include a strategy to draw down water levels prior to treatment. This will reduce the treatment area and amount of molluscicide needed as well as provide for desiccation of mussels exposed on the shoreline.

12.4 Cultural Methods

United will continue to implement public education campaigns to prevent additional infestations of quagga mussels and other invasive species, and prevent the spread of quagga mussels from Lake Piru to other water bodies.

12.5 Biological Control Agents

United considered the use of a biological molluscicide (Zequanox) for treatment, however the product is very expensive and not sufficiently effective to achieve eradication. Any viable mussels remaining after a treatment have the potential to re-populate the lake, and associated structures/features.

12.6 Molluscicides

United has determined that the most feasible option for spot treatments and eradication treatments is use of a chemical molluscicide. The copper-based product United is considering is a formulation that keeps the copper in its cupric ion form in solution until it is taken up into biological tissues. The copper is expected to bioaccumulate in living organisms (mostly the quagga mussels and algae) and will enter the food web and be transported from organism to organism resulting in most of the copper being sequestered in biological tissues and less in the surrounding water and sediment. Copper is an essential trace nutrient that is required in small amounts by living organisms for metabolism and the functioning of more than 30 enzymes. It is also needed for the formation of hemoglobin and hemocyanin, the oxygen-transporting pigments in the blood of vertebrates and shellfish respectively. Higher copper concentrations can be toxic, however quagga mussels are more sensitive to the cupric ion than vertebrate animals, allowing the potential for a lethal dose for quagga mussels with minimal or no impacts to non-target

organisms. While copper does bioaccumulate in living organisms (e.g. shellfish, algae, etc.), it is not thought to biomagnify up the food chain.

13.0 IDENTIFICATION OF THE PROBLEM

Quagga mussels were first detected in Lake Piru in December 2013. Subsequent monitoring indicates that Lake Piru is infested with quagga mussels throughout the reservoir and that the mussel population continues to expand. The initial infestation was generally confined to hard substrate areas (e.g., rock walls, docks) during the first year but mussels are now present and dense on many soft substrates (e.g., mud and silt) habitats within the lake. In the shallow northern portion of the lake, the mussel population is generally less dense (with some exceptions, e.g., rock outcrops and marina docks) than the deeper southern portion of the lake where greater than 90% of the lake bottom is covered with mussels. Mussels are most dense in habitats below 15 ft or on shaded infrastructure (i.e., bottom of docks).

United performs mechanical removal on infrastructure (e.g., docks and water intake infrastructure) to manage the impacts of the infestation. Early efforts removed up to 3,500 pounds of mussels from the lake infrastructure per treatment; subsequent, more frequent removal efforts (4-5 times per year) have resulted in decreased mussel density and biomass on infrastructure, potentially as a result of timing mechanical removals prior to mussels reaching reproductive size. Surveys in typically inaccessible areas of Santa Felicia Dam infrastructure (e.g., intake tower, portions of the conveyance system, and outlet works) have been performed and indicate that mussels are present and dense throughout the structures. No control treatments have been conducted inside the Santa Felicia Dam infrastructure to date.

In lower Piru Creek, quagga mussels are currently present between the Santa Felicia Dam outlet works and the boundary of United's property, approximately 0.25 miles downstream of the dam. Mussels are most dense at the water release point and generally decline in abundance downstream. United does not have authorization to access private property located downstream of United's property. Private property owners in this downstream reach have collected samples for analysis and no detections have been identified to date. United owns an additional parcel of property downstream in the vicinity of the confluence of Piru Creek and the Santa Clara River. Surveys on United's property in the lower portion of lower Piru Creek, approximately 0.25 miles upstream of the confluence of lower Piru Creek and the Santa Clara River have not detected adult or larval quagga mussels.

15.0 DESCRIPTION OF BEST MANAGEMENT PRACTICES

United intends to contract with a qualified applicator certified/licensed by the California Department of Pesticide Regulation (CDPR). All applications will be conducted under the supervision of the certified/licensed applicator. Molluscicide applications will be made following registration label instructions and guidelines, employing safe and effective practices. Prior to execution of a contract, the certified/licensed applicator will provide a scope of work that will include development of a written project plan that details the application dosage, targeted concentration for treatment, registration label and receiving water limitation criteria. In addition,

the project plan will outline best management practices (BMPs) to be implemented during application activities.

15.1 Measures to prevent spills.

All applications will be conducted under the supervision of the certified/licensed applicator following safe handling and storage practices. Spill containment procedures will be reviewed with all participants involved in conducting the application activities prior to initiation of application activities, and spill containment equipment will be readily accessible in areas of application activities.

15.2 Measures to ensure that only a minimum and consistent amount is used.

All applications of copper-based molluscicide will be measured implementing industry standard equipment to ensure that dosages do not exceed registration label concentrations. Metered pumps will be used for the flow-through pilot study. The meters will be calibrated prior to performance of study activities. As discussed above, one of the purposes of the pilot study is to identify the lowest effective dosage. Following the pilot study, United may select to use the copper-based molluscicide to conduct isolated “spot” treatments either in the lake, within the Santa Felicia Dam infrastructure, the spillway channel pool, or in lower Piru Creek, or in a broad-scale treatment strategy designed to eradicate quagga mussels from Lake Piru, Santa Felicia Dam infrastructure, the spillway channel pool, and lower Piru Creek. United will use recent bathymetry data (2015) to quantify the volume of water for each treatment event in the lake and spillway channel pool (based on water surface elevation at the time of application), and has information available regarding volume of water within Santa Felicia Dam infrastructure, and flow meters at the outlet works to determine volumes of water entering the creek.

15.3 Plan to educate staff and pesticide applicator on potential adverse effects to waters of the U.S. from pesticide application.

All applications will be conducted under the supervision of the certified/licensed applicator that will be knowledgeable of the potential adverse effects to waters of the U.S. from pesticide applications. Prior to application activities, the applicator will provide a pre-project briefing to instruct all participants involved in conducting the application activities. The briefing will include a description of application activities, discussion of precautions to be employed including personal protection equipment, expectation for response to accidental spill events, and any other measures considered appropriate for safe and effective application.

15.4 Description of specific BMPs for copper-based molluscicide.

The qualified applicator will consult the registration label of the selected copper-based molluscicide and incorporate any BMPs specific to the product into the project plan.

15.5 Description of specific BMPs for each environmental setting.

The qualified applicator will consult the registration label of the selected copper-based molluscicide and incorporate any BMPs specific to each environmental setting for the selected product into the project plan. Other BMPs will be identified (and included in the project plan) following safe and effective practices for pilot study applications (conducted on land),

applications made from shore to the lake or spillway channel pool, applications made from boat to the lake or spillway channel pool, applications to Santa Felicia Dam infrastructure, and applications to lower Piru Creek.

16.0 EXAMINATION OF ALTERNATIVES TO USE THE LEAST INTRUSIVE METHOD OF PESTICIDE APPLICATION

The initial application activity proposed under this NPDES permit request is for use of a molluscicide for conducting a pilot study. The pilot study will not result in an intrusive application process. Prior to larger scale applications, United will contract with a qualified applicator to refine plans for future treatments. United will seek to contract a certified/licensed applicator that is experienced in pesticide/molluscicide applications and can provide guidance on developing application strategies that will maximize the potential to achieve eradication goals and minimize environmental impacts.

17.0 CORRECT USE OF MOLLUSCICIDE

All applications will be conducted under the supervision of the certified/licensed applicator that will be knowledgeable and trained in the regulatory requirements, and use (proper storage, handling, and application) of molluscicide products.

18.0 PUBLIC NOTICE

United will consult with all appropriate state and federal agencies prior to application of the molluscicide to Lake Piru, Santa Felicia infrastructure, or lower Piru Creek. United will develop a notification that will include a statement of intent to apply molluscicide, the name of the molluscicide, purpose for use, time period and location of expected use, water use restrictions or precautions required during application, and contact information where interested parties can obtain additional information. The notification of intent will be posted on United's website (<http://www.unitedwater.org/resource-conservation-3/santa-felicia-dam>) and at appropriate locations within the Lake Piru Recreation Area.

REFERENCES

Higgins, S.N. 2014. Meta-analysis of dreissenid effects on freshwater ecosystems. Pages 484-494 in T.F. Nalepa and D.W. Schloesser. 2014. Quagga and Zebra Mussels. CRC Press, Boca Raton, Florida.

United. 2012. Santa Felicia Water Release Plan.

http://www.unitedwater.org/images/stories/Resource-Conservation/Santa-FeliciaDam/FERC/water_release_plan/Final_Santa_Felicia_Water_Release_Plan_June_2012.pdf

Attachment A Monitoring and Reporting Program

Introduction

This Monitoring and Reporting Program (MRP) will ensure compliance with the NPDES aquatic animal invasive species control applications of copper based molluscicides. The goals of the procedures and specifications outlined in this program are to provide references, standardized procedures, and quality specifications for sampling in Lake Piru, the spillway channel pool, and in lower Piru Creek during and following the discharge (effluent from pilot studies) or applications (quagga mussel control or eradication treatment) of copper. In order to do this, the MRP identifies sampling locations, number of samples, and field procedures to be used. The MRP details QA (Quality Assurance)/QC (Quality Control) procedures and specifications, and establishes methods for reviewing and documenting compliance with field procedures.

This MRP is designed to address two key questions:

- Does the residual chemical pesticide from discharge or applications cause an exceedance of receiving water limitations?
- Does the chemical pesticide, including active ingredients, inert ingredients, and degradation by-products, in any combination cause or contribute to an exceedance of the “no toxics in toxic amounts” narrative toxicity objective?

This MRP contains the following elements:

- I. General Monitoring Provisions
- II. Monitoring Locations and Sample Types
 - A. Monitoring Locations
 - B. Sample Types
- III. Receiving Water Monitoring Requirements – Surface Water
 - A. Monitoring Plan Design
 - B. Monitoring Log
- IV. Reporting Requirements
 - A. General Monitoring and Reporting Requirements
 - B. Annual Reports
 - C. Reporting Protocols

I. General Monitoring Provisions

- A. Samples taken as required herein shall be representative of the nature of the monitored discharge. All samples shall be taken at the anticipated monitoring locations (Figure 1) specified within this MRP. The sample locations and frequencies were selected in order to provide data that are representative of conditions throughout the lake, in the spillway channel pool, and along lower Piru Creek and to represent average conditions found in the lake,

spillway, and lower Piru Creek during and following discharge of copper-based molluscicide for pilot studies or application of copper-based molluscicide for quagga mussel infrastructure/spot treatment or treatment for attempted eradication.

- B. All laboratory analyses shall be conducted at a laboratory certified for such analyses by the California Water Resources Control Board (State Water Board). Laboratories that perform sample analyses shall be identified in all monitoring reports. A manual containing the steps followed in this program must be kept in the laboratory and shall be available for inspection by State Water Board and Los Angeles Regional Water Quality Control Board (Regional Water Board) staff. The QA/QC Program must conform to U.S. Environmental Protection Agency (USEPA) guidelines or to procedures approved by the State Water Board and the appropriate Regional Water Board.
- C. 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 C.F.R. part 126). Any procedures to prevent the contamination of samples as described by the Aquatic Pesticide Application Plan (APAP) shall be implemented.
- D. Records of monitoring information shall include the following:
 - 1. The date, exact place, and time of sampling or measurements;
 - 2. The individuals who performed the sampling or measurements;
 - 3. The dates that analyses were performed;
 - 4. The individuals who performed the analyses;
 - 5. The analytical techniques or methods used; and
 - 6. The results of such analyses.
- E. United shall properly maintain and calibrate all monitoring instruments and devices to fulfill the prescribed monitoring program to ensure their accuracy.
- F. United shall report all monitoring results, including noncompliance, at intervals and in a manner specified in this MRP.
- G. Laboratories that conduct the analyses shall be certified by State Water Board, in accordance with the provision of California Water Code section 13176.

II. Monitoring Locations and Sample Types

A. Monitoring Locations

United has established monitoring locations (Figure 1) to demonstrate compliance with the Receiving Water Limitations, registration label specifications, and requirements of the National Pollutant Discharge Elimination System (NPDES) permit for biological pesticides and residual chemical pesticide discharges to waters of the United States from aquatic animal invasive species control applications (General Permit CAG 990006). The number and location of samples were selected to answer the two key questions. United will use representative monitoring locations to

characterize water quality in treatment locations (Lake Piru, the spillway channel pool, and lower Piru Creek). Justification for the selection of these monitoring locations as representative is based on the idea that the locations are similar in factors that may be affected by the applications.

B. Sample Types

1. *Background Monitoring*. Background samples shall be collected in the discharge/application area or target area within 24-hours before application.
2. *Event Monitoring*. Event monitoring samples shall be collected in the target area or downstream of the discharge/application area after the discharge/application event but shall not exceed 24 hours after the discharge/application event.
3. *Post-Event Monitoring*. Post-event samples shall be collected within the discharge/application area within one week after project completion.

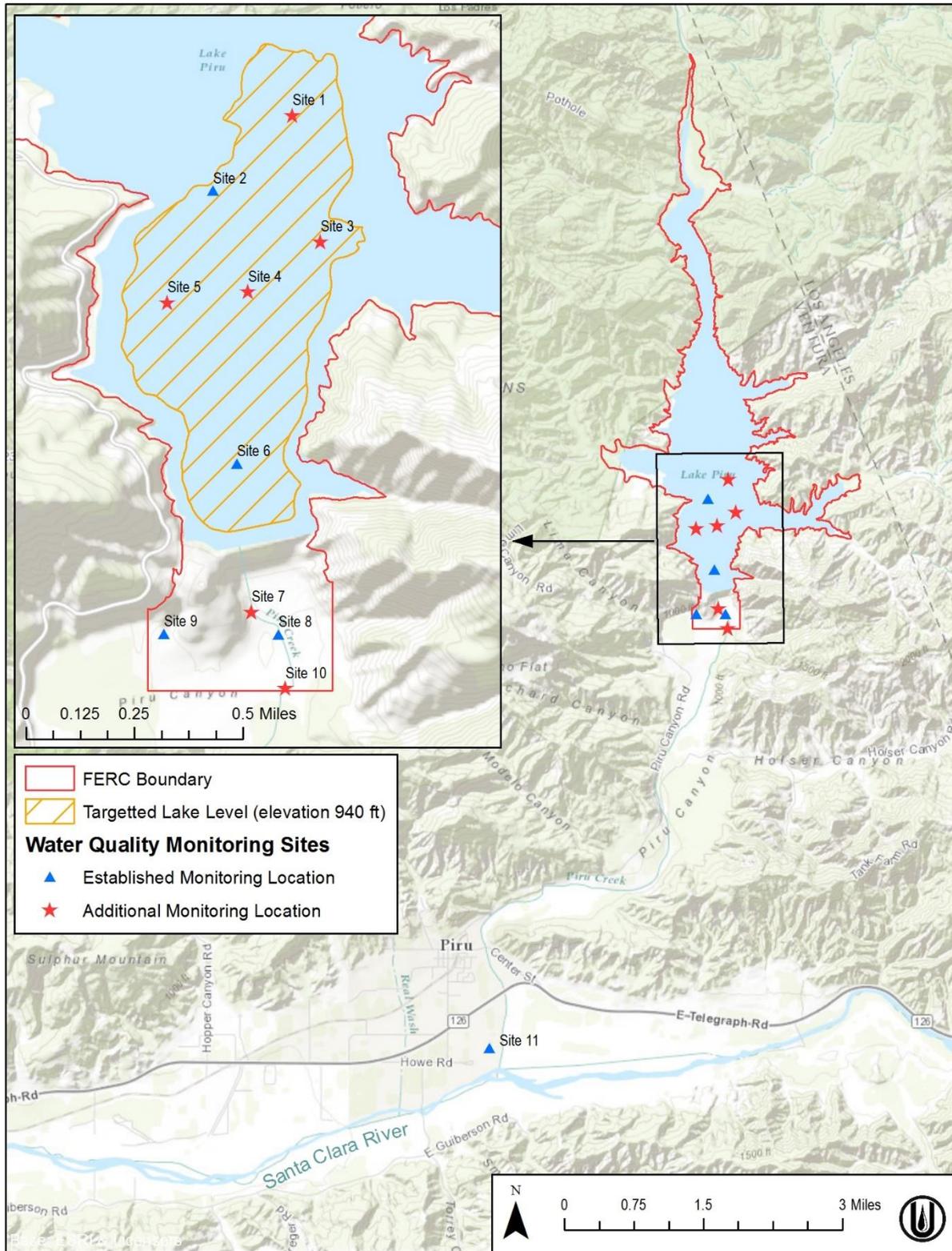


Figure 1 – Monitoring site locations

III. Receiving Water Monitoring Requirements-Surface Water

A. Monitoring Plan Design

1. Section 1.0 of the APAP provides a detailed description of the geographic and hydrographic features of the area. In summary, Lake Piru is an 81,986 acre-feet capacity reservoir that receives water from middle Piru Creek. Lake Piru also occasionally receives state water deliveries from Pyramid Lake via middle Piru Creek. United is in the preliminary planning stage of developing an eradication plan. Currently, the eradication plan is targeting a treatment to occur in 2017 at a lake level elevation of 940 ft at which point the lake would contain approximately 2,000 acre-feet. Lake water passes through the Santa Felicia Dam and is released through the outlet works into the lower Piru Creek release pool, and then the water travels down lower Piru Creek to the Santa Clara River. Water can also be transported from the lake over the spillway when the lake is full. If the lake spills, the water goes into the spillway channel which eventually joins lower Piru Creek if flows are high enough to connect it, otherwise it forms a perennial pond below the spillway.

The copper-based molluscicide considered in this MRP will be used for three different purposes:

- a. Pilot study testing using flow-through bioboxes positioned adjacent to the lake, or adjacent to the release pool of the outlet works below Santa Felicia Dam.
- b. Infrastructure or “spot” treatments which involve specific targeting of infrastructure or hot-spots of infestation and is not aimed at eradication.
- c. Eradication efforts that involve coordinated treatment of the lake, Santa Felicia Dam infrastructure, spillway channel pool, and lower Piru Creek aimed at eradication of quagga mussels from Lake Piru, Santa Felicia Dam infrastructure, the spillway channel, and lower Piru Creek.

The discharge/application points and the pathways of residue flows differ for the pilot study, infrastructure/spot treatments, and eradication efforts. Pilot study effluent would be discharged into Lake Piru, the spillway pool, or into lower Piru Creek depending on consultation with U.S. Fish & Wildlife Service and National Marine Fisheries Service regarding compliance with the Endangered Species Act. Infrastructure/spot treatments would be restricted to the area being treated and the surrounding areas where the agent would diffuse through the water column and flow downstream to lower Piru Creek and may eventually reach the main stem of the Santa Clara River. An eradication project would involve full treatment of the lake, Santa Felicia Dam infrastructure, spillway channel pool, and lower Piru Creek.

2. One or more pilot studies will be used to test the efficacy of the agent in killing quagga mussels in a cost-effective manner with minimum environmental impacts (i.e. lowest effective dose). The pilot study will help determine the concentration of the molluscicide to

be used for quagga mussel treatments and/or potential eradication. Application will proceed according to the pest control recommendation from a qualified applicator certified/licensed by the California Department of Pesticide Regulation (CDPR). Application concentration will not exceed registration label instructions. To ensure accuracy, GIS and GPS technology will be utilized for calculating treatment areas, and to track the actual application process.

3. The copper agent United intends to use is formulated to maintain the copper in its cupric ion form in solution until it is readily taken up into biological tissues. The copper should bioaccumulate in living organisms (mostly the quagga mussels and algae) and will enter the food web and be transported from organism to organism resulting in most of the copper being sequestered in biological tissues and less in the surrounding water and sediment. Copper is an essential trace nutrient that is required in small amounts by living organisms for metabolism and the functioning of more than 30 enzymes. It is also needed for the formation of hemoglobin and hemocyanin, the oxygen-transporting proteins in the blood of vertebrates and shellfish respectively. Higher copper concentrations can be toxic, however quagga mussels are more sensitive to the cupric ion than vertebrate animals, allowing the potential for a lethal dose for quagga mussels with minimal or no impacts to nontarget vertebrate organisms. While copper does bioaccumulate in living organisms (e.g. shellfish, algae, etc.), it is not thought to biomagnify up the food chain.
4. Lake Piru is a water resource reservoir that is strategically managed to protect, conserve and enhance the water resources of the Santa Clara River Valley, its tributaries, and associated aquifers. The lake also provides contact and non-contact recreational activities and is equipped with a campground, launch ramps, marina docks, and swim beach.
5. Manufacturers of registered pesticides provide information about the action of cumulative and indirect effects, and of other sources of impact to the USEPA, and it is considered when formulating the Pest Control Recommendation.
6. Eradication efforts may lead to impacts in the form of temporary suspension of United's contact and some non-contact recreational activities at Lake Piru depending on the agent selected for use, the dose used, temperature at the time of treatment, and the label requirements.
7. The product registration label does not indicate water quality impacts from applications conducted in accordance with label instructions and guidelines.
8. United has established 11 sampling sites (Figure 1). Sampling sites 1-6 will be used for the pilot study if it occurs adjacent to Lake Piru; sampling sites 7-11 will be used for the pilot study if it occurs adjacent to lower Piru Creek; sampling sites 1-6 will be used for spot treatment of the floating docks; sampling sites 6 and 8-11 will be used for treatment of the Santa Felicia Dam infrastructure; all sampling areas will be used for any eradication attempt.

All discharge/application events would include background monitoring within 24 hours prior to the initiation of the discharge or application. During pilot study events, monitoring would occur once a week for two weeks, and then once every two weeks if copper levels are below

the limits of detection in the first two weeks. During infrastructure/spot treatments and attempted eradication events, monitoring would occur every 24 hours during the treatment. Post-event monitoring would be conducted within one week after the completion of any of the projects (i.e. pilot study, infrastructure/spot treatment, or attempted eradication). The required constituents/parameters that will be monitored are included in Table 1.

Table 1 - Monitoring Requirements

Sample Type	Constituent/Parameter	Units	Sample Method	Sample Type Requirement	Required Analytical Test Method
Visual	Monitoring area description (lake, spillway, or creek)	Not applicable	Visual Observation	Background, Event, and Post-Event Monitoring	Not applicable
	Appearance of waterway (sheen, color, clarity, etc.)				
	Weather conditions (fog, rain, wind, etc.)				
Physical	Temperature	°F	Grab or In Situ Probe		40 C.F.R. part 136
	pH	Number			
	Turbidity	NTU			
	Electrical Conductivity @ 25°C	µmhos/cm			
Chemical	Copper	µg/L	Grab	EPA Analytical Method 200.7 or 200.8	

B. Monitoring Log

United shall keep a log of the receiving water conditions throughout the treatment and monitoring area when conducting receiving water sampling. Attention shall be given to the presence or absence of:

1. floating or suspended matter,
2. discoloration,
3. bottom deposits,
4. aquatic life,
5. visible films, sheens, or coatings,
6. fungi, slimes, or objectionable growths, and
7. potential nuisance conditions.

IV. Reporting Requirements

A. General monitoring and reporting requirements:

1. United shall inform the Aquatic Animal Invasive Species and Weed Control Permit Issuance department of the State Water Board (Russell.Norman@waterboards.ca.gov; [916] 341-5775) and the Regional Water Board 24 hours or the earliest feasible time before the start of each discharge/application event.
2. United shall comply with all Standard Provisions of the NPDES General Permit CAG 990006 related to monitoring, reporting, and recordkeeping.
3. Upon written request of the State Water Board or the Regional Water Board, United shall submit a summary monitoring report.
4. United shall report to the State Water Board and the Regional Water Board any toxic chemical or pesticide release data it reports to the State Emergency Response Commission within 15 days of reporting the data to the Commission pursuant to section 313 of the “Emergency Planning and Community Right to Know Act” of 1986. (42 U.S.C. § 11001 et seq.)
5. The State Water Board Deputy Director of the Division of Water Quality (Deputy Director) or his/her designee may adjust monitoring frequencies to a less frequent basis if United makes a request and provides justification that includes statistical trends of monitoring data submitted.
6. The Deputy Director or his/her designee may add further monitoring and reporting requirements to the MRP.

B. Annual Reports

1. United shall include the following information in the annual report:
 - a. An executive summary discussing compliance or violation of NPDES General Permit CAG 990006 and the effectiveness of the APAP to reduce or prevent the discharge of pollutants associated with pesticide applications;
 - b. A summary of monitoring data, including the identification of water quality improvements or degradation, and recommendations for improvements to the APAP (including proposed best management practices (BMPs)) and monitoring program based on the monitoring results. All receiving water monitoring data shall be compared to applicable water quality standards;
 - c. Identification of BMPs currently in use and a discussion of their effectiveness in meeting the requirements in this order;
 - d. A discussion of BMP modifications addressing violations of this Order;
 - e. A map showing the location of each application area and the target area;
 - f. Types and amounts of pesticides used at each application event during each application;

- g. Information on surface area and/or volume of application and target areas and any other information used to calculate dosage, concentration, and quantity of each pesticide used;
 - h. Sampling results shall indicate the name of the sampling agency or organization, detailed sampling location information (including latitude and longitude or township/range/section if available), detailed map or description of each sampling area (i.e., address, cross roads, etc.), collection date, name of constituent/parameter and its concentration detected, minimum levels, method detection limits for each constituent analysis, name or description of water body samples, and a comparison with applicable water quality standards, description of analytical quality assurance/quality control plan. Sampling results shall be tabulated so that they are readily discernible;
 - i. Recommendations to improve the monitoring program, BMPs, and APAP to ascertain compliance with NPDES General Permit CAG 990006; and
 - j. Pesticide Application Log.
2. United shall include in the annual report any updated information regarding specific monitoring locations from its APAP.
 3. At any time during the term of NPDES General Permit CAG 990006, the State Water Board or the Regional Water Board may notify United of the requirement to electronically submit Self-Monitoring Reports (SMRs) using the State Water Board’s California Integrated Water Quality System (CIWQS) Program website (<http://www.waterboards.ca.gov/ciwq/index/html>). Until such notification is given, United shall submit hard copy SMRs. The CIWQS website will provide additional directions for SMR submittal in the event there will be service interruption for electronic submittal.
 4. United shall report the results for all monitoring specified in this MRP in the SMR. United shall submit annual SMRs including the results of all required monitoring using EPA Analytical Methods 200.7 or 200.8. If United monitors copper more frequently than required by this Order, the results of this monitoring shall be included in the calculations and reporting of the data submitted in the SMRs.
 5. United shall submit monitoring reports to the Deputy Director or his/her designee in accordance with the schedule in Table 2.

Table 2 - Reporting Schedule

Reporting Frequency	Reporting Period	Annual Report Due
Annual	January 1 through December 31	March 1

C. Reporting Protocols

United shall report with each sample result the applicable reported Minimum Level and the current Method Detection Limit (MDL), as determined by the analytical method.

United shall report the results of analytical determinations for the presence of chemical constituents in a sample using the following reporting protocols:

1. For chemical analyses, sample results greater than or equal to the reported Minimum Level shall be reported as measured by the laboratory (i.e. the measured chemical concentration in the sample).
2. For chemical analyses performed in the laboratory, sample results less than the Reporting Limit, but greater than or equal to the laboratory's MDL, shall be reported as "Detected, but Not Quantified" or DNQ. The estimated chemical concentration of the sample shall also be reported.
3. For chemical analyses performed in the laboratory, the laboratory shall write the estimated chemical concentration next to DNQ as well as the words "Estimated Concentration" (may be shortened to "Est. Conc."). The laboratory may, if such information is available, include numerical estimates of the data quality for the reported result. Numerical estimates of data quality may be percent accuracy (plus a percentage of the reported value), numerical ranges (low to high), or any other means considered appropriate by the laboratory.
4. Sample results less than the laboratory's MDL shall be reported as "<" followed by the MDL.
5. United shall instruct its laboratories to establish calibration standards so that the ML value (or its equivalent if there is differential treatment of samples relative to calibration standards) is the lowest calibration standard. At no time is United to use analytical data derived from extrapolation beyond the lowest point of the calibration curve.
6. Multiple Sample Data: If two or more sample results are available, United shall compute the arithmetic mean unless the data set contains one or more reported determinations of DNQ or "Not Detected" (ND). In those cases, United shall compute the median in place of the arithmetic mean in accordance with the following procedure:
 - a. The data set shall be ranked from low to high, ranking the reported ND determinations lowest, DNQ determinations next, followed by quantified values (if any). The order of the individual ND or DNQ determinations is unimportant.
 - b. The median value of the data set shall be determined. If the data set has an odd number of data points, then the median is the middle value. If the data set has an even number of data points, then the median is the average of the two values around the middle unless one or both of the points are ND or DNQ, in which case the median value shall be the lower of the two data points where DNQ is lower than a value and ND is lower than DNQ.

7. United shall submit the annual report in accordance with the following requirements:
 - a. United shall arrange all reported data in a tabular format. The data shall be summarized to clearly illustrate whether the facility is operating in compliance with effluent and receiving water limitations. United is not required to duplicate the submittal of data that is entered in a tabular format within CIWQS. When electronic submittal of data is required and CIWQS does not provide for entry into a tabular format within the system, United shall electronically submit the data in a tabular format as an attachment.
 - b. United shall attach a cover letter to the annual report. The information contained in the cover letter shall clearly identify violations of the permit; discuss corrective actions taken or planned; and the proposed time schedule for corrective actions. Identified violations must include a description of the requirement that was violated and a description of the violation.
 - c. United must submit an annual report to the State Water Board, signed and certified as required by the Standard Provisions of NPDES General Permit CAG 990006.