Combined Annual Report

Revised Lower Piru Creek Herpetological Monitoring Plan
and
Arroyo Toad Protection Plan

Santa Felicia Project FERC P-2153

Reporting Period: January 1 through December 31, 2014

Prepared by:

UNITED WATER CONSERVATION DISTRICT

Environmental Planning and Conservation Department

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Executive Summary
This annual report documents activities conducted between January 1 and December 31, 2014, in accordance with the "Arroyo Toad Protection Plan" and the "Revised Lower Piru Creek Herpetological Monitoring Plan" (Revised Monitoring Plan). United Water Conservation District (United) did not conduct any activities under the Arroyo Toad Protection Plan because United did not undertake any activities on U.S. Forest Service (USFS) land within the Santa Felicia Project boundary during the reporting period. United did not have permission to access private land in lower Piru Creek during 2014, and therefore implemented the "No Access Plan" section of the Revised Monitoring Plan. Aquatic exotic species management activities were implemented in pools below the Santa Felicia spillway between April and December following the methods outlined in the Revised Monitoring Plan. The removal efforts continue to be most effective at reducing the abundance of bullfrogs in the treatment area. Capture efficiencies for other target species were low, but higher than previous years. Capture counts for each species are included in the methods and results report presented in Attachment A. Eradication management methods were refined throughout the reporting period, and will continue to be refined as appropriate, following the adaptive management strategy outlined in the Revised Monitoring Plan, to improve the effectiveness of future eradication management activities.

1.0 Background

United Water Conservation District (United) owns and operates the Santa Felicia Project (Project) on Piru Creek in Ventura County, California. The Federal Energy Regulatory Commission (FERC) issued a new license (License) to United for the operations of the Project on September 12, 2008 (FERC Project No. 2153-012). Articles 401 and 404 of the License required United to file an *arroyo toad protection plan* and *herpetological monitoring plan* (respectively). The following background information pertains to each plan.

1.1 Arroyo Toad Protection Plan

In compliance with Article 401 of the License, United filed with FERC the "Arroyo Toad Protection Plan" on October 8, 2009. FERC issued an order approving the plan on January 5, 2011. The plan describes procedures to minimize and mitigate for effects to arroyo toads and arroyo toad critical habitat resulting from any project United undertakes on U.S. Forest Service (USFS) land located within the Project boundary. As required in article 404 of the License, the content of the Arroyo Toad Protection Plan was incorporated into the herpetological monitoring plan (discussed below), and therefore, the annual reporting requirements are being addressed in combination with annual reporting requirements for the herpetological monitoring plan.

The Arroyo Toad Protection Plan requires United to produce an annual report that discusses the following:

1. Any activities conducted by United during the reporting period that had the potential to impact arroyo toads or arroyo toad critical habitat on USFS land located within the Project boundary;

2. Any proposed activities proposed to occur in the upcoming year that have the potential to impact arroyo toads or arroyo toad critical habitat on USFS land located within the Project boundary;

3. Assessment of implementation and effectiveness of the plan;

4. Recommendations for changes to the plan;

5. Updated record of consultation with participating agencies;

6. Submittal of documented information for all sensitive species observed during implementation of the plan to the California Natural Diversity Database.

The Arroyo Toad Protection Plan requires United to provide a copy of the annual report to U.S. Fish and Wildlife Service (USFWS), California Department of Fish and Wildlife (CDFW), USFS, and FERC. No deadline for completing the annual report was established in the plan or in FERC's order approving the plan. Given the integration of the Arroyo Toad Protection Plan with the Revised Monitoring Plan, United intends to complete all required monitoring for both plans by the same date, December 31, annually.

1.2 Herpetological Monitoring Plan

In compliance with article 404 of the License, United filed with FERC a "Lower Piru Creek Herpetological Monitoring Plan" on October 8, 2009. FERC issued an order approving the plan on January 19, 2011. The October 2009 plan outlined activities that required access to private property. In December of 2011, and supplemented in May of 2012, United was denied access to private property comprising the majority of lower Piru Creek. In a meeting on January 6, 2012 United consulted with USFWS, CDFW, and National Marine Fisheries Service (NMFS) to develop a strategy for addressing the access issue. The "Revised Lower Piru Creek Herpetological Monitoring Plan" (Revised Monitoring Plan) dated May of 2012 incorporates the approach developed in consultation with the resource agencies, termed the "No Access Plan." United filed the Revised Monitoring Plan on June 6, 2012, and FERC issued an order approving the Revised Monitoring Plan on August 9, 2012.

For the reporting period covered in this annual report, United did not have permission to access private property and so implemented the "No Access Plan" portion of the Revised Monitoring Plan. The Revised Monitoring Plan, under this no access situation, requires that the annual report discusses the following.

1. Effectiveness of aquatic exotic species eradication management efforts.

2. Assessment of implementation and effectiveness of the Revised Monitoring Plan.

3. Recommendations for changes to the Revised Monitoring Plan.

4. Update status of access to private property.

5. Updated record of consultation with participating agencies.

6. Submittal of documented information for all sensitive species observed during implementation of the Revised Monitoring Plan to the California Natural Diversity Database.

The Revised Monitoring Plan requires United to complete an annual report by December 31 of each year and provide a copy of it to USFWS, CDFW, USFS, NMFS, and FERC.

2.0 Reporting Period

This document serves as the annual report for activities conducted for the Arroyo Toad Protection Plan and Revised Monitoring Plan between January 1 and December 31, 2014.

3.0 Activities Conducted during this Reporting Period

3.1 Arroyo Toad Protection Plan

United did not conduct any activities on USFS land within the Project boundary during 2014. Because of this, United did not implement any activities under the Arroyo Toad Protection Plan. Therefore, no additional information is included in this report associated with the Arroyo Toad Protection Plan.

3.2 Revised Monitoring Plan

During 2014, United did not have access to private property on lower Piru Creek. Therefore, the "No Access Plan" described in section 3.0 of the Revised Monitoring Plan was implemented. The "No Access Plan" requires that United implement the following activities:

A. Provisions for mitigation and minimization measures for protecting arroyo toads and arroyo toad critical habitat to be implemented in the event that United conducts operations on USFS land within the Project boundary;

    a. This requirement was incorporated from the Arroyo Toad Protection Plan. As described in section 1.1, United did not undertake any activities under the Arroyo Toad Protection Plan. Therefore, United did not implement any provisions for arroyo toad protection under the Revised Monitoring Plan.

B. Aquatic exotic species management; and,

    a. United undertook the required management activities for aquatic exotic species. As required under the "No Access Plan," these activities took place in the pools located below the Santa Felicia spillway (treatment area). United implemented tasks 1 and 2 as described in the Revised Monitoring Plan. Task 3 is focused on addressing the effects of United's fall conservation release. Due to dry conditions, a conservation release did not occur during 2014. Additional details of the methods implemented are contained in attachment A.

C. Reporting criteria.

    a. This report serves to satisfy the reporting requirements for 2014 activities associated with the Revised Monitoring Plan and the Arroyo Toad Protection Plan. Copies of the report will be provided to USFWS, CDFW, USFS, NMFS, and FERC. As required, within three months following submittal of this annual report, United will host a meeting to discuss the effectiveness of the aquatic exotic species management program and any operational mitigation or minimization measures performed during the year. All consulting federal and state agencies will be invited to attend.

4.0 Effectiveness of Aquatic Exotic Species Eradication Management Efforts

The Revised Monitoring Plan identifies the American bullfrog (*Rana catesbeiana),* African clawed frog (*Xenopus laevis),* red swamp crayfish (*Procambarus clarkii*), and invasive fishes as targets for management actions. In addition to focusing on these targets, United also implemented removal activities for exotic turtles. Exotic turtles are known to occur in the treatment area and, similar to the other target species, can have detrimental effects on native species. Eradication activities were implemented between April and December of 2014. The activities are described in the methods and results report presented in Attachment A.

Similar to aquatic exotic species eradication efforts in prior years, the 2014 eradication effort was most effective at reducing the abundance of adult bullfrogs in the treatment area, but was less effective with other taxa. The number of adult frogs present in the treatment area is substantially reduced compared to prior years. No juvenile frogs or signs of successful reproduction (i.e., eggs or tadpoles) were observed during the 2014 activities. Data collected during implementation of eradication management activities suggest that concentrating the primary removal effort in the early breeding season successfully reduced or eliminated reproduction during 2014. Early season efforts will continue in 2015.

Fish production was high in 2014, with clear evidence of successful reproduction by largemouth bass, green sunfish, and bluegill sunfish. Capture rates were much higher in 2014 compared to prior efforts, but many of the fish captured were young of the year. Capture efficiencies for other taxa remain low, despite high abundances of most exotic taxa and increased catch rates compared to those resulting from 2012 or 2013 efforts. United intends to increase and/or modify trapping efforts during 2015, incorporate additional styles of traps, and will consult with resource agencies to determine if habitat level management efforts are warranted.

5.0 Assessment of Implementation and Effectiveness of the Revised Monitoring Plan

Eradication activities for targeted exotic aquatic species during 2014 produced results that are within an acceptable range. Monitoring data indicate that eradication efforts continue to be most effective at reducing the abundance of adult bullfrogs in the treatment area, but less effective with other taxa. Implementation efforts yielded valuable lessons and resulted in refinement of methods associated with equipment and timing of activities. The modifications were implemented following an adaptive management strategy as outlined in the Revised Monitoring Plan, and therefore do not warrant amending the Revised Monitoring Plan. As stated above, United intends to increase and/or modify trapping efforts during 2015, incorporating additional styles of traps, and will consult with resource agencies to determine if habitat level management efforts are warranted.

6.0 Recommendations for Changes to the Revised Monitoring Plan

United will continue to refine removal and monitoring techniques as appropriate following the adaptive management strategy outlined in the Revised Monitoring Plan. United has not identified any elements of the Revised Monitoring Plan that require amendment at this time.

7.0 Update Status of Access to Private Property

As of this filing date, United has not received permission to access private property located on lower Piru Creek and the access situation remains the same.

8.0 Updated Record of Consultation with Participating Agencies

The last annual report "Combined Annual Report for the Revised Lower Piru Creek Herpetological Monitoring Plan and Arroyo Toad Protection Plan 2013" (2013 Annual Report) was filed with FERC and submitted to all consulting federal and state agencies (LPNF, Angeles National Forest (ANF), USFWS, NMFS, and CDFW) on December 31, 2013. Most of the consultation activities that occurred during 2014 were associated with the 2013 Annual Report. United consulted with representatives of the Los Padres National Forest (LPNF) on January 30, 2014. During the consultation United presented a status report for implementation activities associated with conditions of section 4(e) of the License, which included discussion of activities addressed in the 2013 Annual Report. All agencies were invited to participate in a conference call scheduled to occur on February 27, 2014, to discuss the effectiveness of the aquatic exotic species management program and operational mitigation or minimization measures performed during 2013. The conference call was cancelled due to lack of interest from consulting agencies.

9.0 Submittals to California Natural Diversity Database

United submitted native species field survey forms to the California Natural Diversity database describing two incidents of western pond turtles being captured in partially submerged inverted-funnel style crayfish traps during aquatic exotic species eradication activities. The first capture occurred on May 8, 2014 and the second on July 30, 2014. Both turtles were released on the bank of the pool where they were captured. One two-striped garter snake was captured in a crayfish trap on July 30, 2014, but was dead on arrival. The completed forms are included in Attachment B.

Attachment A

2014 Exotic Species Eradication Management:
Methods and Results

2014 Aquatic Exotic Species Eradication Management; Methods and Results

Introduction

This report details aquatic exotic species eradication management activities performed by United Water Conservation District (United) during the year 2014. The eradication management activities were in accordance with the "Revised Lower Piru Creek Herpetological Monitoring Plan" (May 2012) which was developed to satisfy requirements of article 404 of the license issued to United by the Federal Energy Regulatory Commission (FERC) for operations of the Santa Felicia Project (FERC Project No. 2153-012). The revised plan describes alternative activities to be implemented based on United's ability to access private property located downstream of the Santa Felicia Dam. During 2014, United did not have permission to access private property below the dam, and therefore, eradication management activities were conducted following protocols outlined in the revised plan for the "no access" condition.

The eradication management activities were conducted in three pools located in the Santa Felicia Dam spillway channel, in Ventura County, California. The pools are not hydrologically connected to Lake Piru or lower Piru Creek except under spill conditions. Because the pools are hydrologically isolated, the opportunities for aquatic exotic species to enter or leave the pools are limited to species that can travel overland. Removing exotic species from the pools is expected to have a biological benefit until the next spill occurs. The pools have the potential to provide suitable habitat for the California red-legged frog, among other important native species. Removing the exotics that predate upon or compete with these natives may create an opportunity for them to colonize the pools.

The conditions documented during the initial aquatic exotic species removal and monitoring effort in 2012 are considered representative of baseline conditions with respect to exotic species densities and population dynamics within the eradication management treatment area. Observations made during this reporting period (2014) and subsequent periods will be compared to baseline conditions to evaluate the effectiveness of the exotic removal techniques and activities. Methods were refined throughout the reporting period, and will continue to be refined, as appropriate, in an iterative effort to improve the effectiveness of future eradication management activities.

2014 Conditions

Water surface elevations in the three spillway channel pools within the eradication management treatment area fluctuated seasonally during the reporting period based on atmospheric temperature and rainfall patterns. 2014 was a dry year, and minimum measured water surface elevations (WSEs) in the spillway channel pools were more than two feet lower that those measured during 2012 activities and approximately the same as WSEs measured during 2013 activities. This decrease in WSE resulted in a reduction of available habitat for target species as compared to baseline conditions. The pools surveyed were primarily inhabited with largemouth bass (*Micropterus salmoides*), green sunfish

(*Lepomis cyanellus*), bluegill (*Lepomis macrochirus*), bullfrogs (*Rana catesbeiana*) and red swamp crawfish (*Procambarus clarki*). Adult largemouth bass were present in two of the pools (P1 and P2D, Figure 1), and juvenile largemouth bass were present in P1 and P2. African clawed frog (*Xenopus laevis*) adults were only observed in downstream pools (P2D and P3, Figure 1). Native western pond turtles (*Emys marmorata*) and non-native turtles were also observed in the treatment area.

Methods

Physical Habitat and Water Quality Parameters

Each pool was mapped using a GPS unit in 2012 (Figure 1). Total area was quantified for each pool using Manifold GIS (v8.0.28). Water quality data were only collected in the largest pool (P1, Figure 1) where the removal effort was focused due to greater habitat area. Water quality parameters were collected at three sites within P1 (furthest upstream, middle pool and shallow shelf).

Bullfrogs

Bullfrogs (*Rana catasbeiana*) were captured using direct methods: frog gigs, a custom modified fishing pistol crossbow, and hand/dipnet. Beginning 20 to 40 minutes after sunset, two or three teams (composed of one to three biologists each) surveyed the treatment area using high powered headlamps (Black Diamond Icon 200 lumen). A two-person team in an inflatable boat traversed the shoreline of the largest pool (P1), while the other teams walked the shorelines of P1D, P2U, P2D, and P3. Bullfrogs were sighted using eye-shine, approached as closely as possible to maximize capture probability while limiting detection by the frog, and then gigged, shot with a customized pistol crossbow with retrievable arrows, or captured by hand/dipnet. Captured frogs were euthanized in an anesthetic overdose of buffered MS-222 (3-5 g/L), measured and sexed (over 100 mm SV), individually frozen, and submitted to the herpetology collection at the Los Angeles County Natural History Museum.

Turtles

Capture strategies for turtles included use of two types of floating traps throughout the year. During April, a pvc frame floating trap (also used in 2013) was deployed for approximately 48-72 hours per sampling period. The traps were checked once per day. At the low turtle densities found in the ponds, the pvc frame traps are ineffective at capturing turtles and so were replaced with floating, unbaited basking traps (Pond King, Gainesville, TX) specifically designed for capturing turtles. The Pond King turtle traps were deployed continuously from May to December and checked once per week following manufacturer recommendations. When non-target species (e.g., native species such as western pond turtle and two-striped garter snake) are captured, they are released at the capture location. Turtles were also incidentally captured in large crayfish traps. Target species were euthanized by freezing and submitted to the herpetology collection at the Los Angeles County Natural History Museum.

Fish

Non-native fish were captured using an experimental gill net (150 feet long, with six panels of different mesh size), hook and line, or minnow traps. The gill net and minnow traps were deployed for durations of approximately 48-72 hours and checked once per day. The gill net was deployed across the largest

pond (P1). Hook and line fishing and dipnetting occurred when time was available and by technicians of varying skill, therefore, fishing effort using this technique was not assessed or quantified.

Crayfish/Bullfrog Tadpoles

Crayfish and bullfrog tadpoles were captured in minnow/crayfish traps baited with chicken liver and gizzards or cuttings of fish captured from the ponds. Traps were deployed for durations of approximately 48-72 hours and checked once per day. Traps were placed in shallow water near the edge of pools P1, P2, and P3. Several models of traps were used: square wire "walk-in" traps, fine mesh collapsible minnow traps (funnel style), and medium mesh collapsible crayfish traps (funnel style).

Removal effort

Removal treatments were implemented in April (3 days), May (3 days), June (4 days), July (5 days), November (4 days), and December (4 days) of 2014. Two to five biologists participated in each removal treatment. Passive capture methods were deployed for a total of 406 hours (experimental gill net), 13,013 hours (crayfish traps), and 14,268 hours (turtle traps). Active capture methods for bullfrog and clawed frog capture were employed for 0.17 hours (fishing crossbow), 43.65 hours (frog gigs), 0.88 hours (seine). The total hours of effort per treatment event and capture data are presented in Table 2.

Results

Physical Habitat and Water Quality Parameters

Water quality parameters were within acceptable levels for aquatic life during the survey period. Surface water temperature increased, dissolved oxygen decreased, and P1 became stratified in June and July of 2014. Several algal blooms occurred in P1 over the course of the summer. The total surface area for each pool in April was approximately 3,148 m^2 for P1, 854 m^2 for P2 and 108 m^2 for P3. By the end of the sampling season, P1 had decreased by approximately 30 percent, and P3, P2U, and P2D had decreased by approximately 20 percent. P0, typically a small puddle (1 m^2) between P1 and P2, was dry during all monitoring events in 2014. Water quality parameters measured in P1 during this reporting period are presented in Table 1.

Removal results

Bullfrogs/Tadpoles

Within the treatment area, 22 adult bullfrogs were captured and euthanized, but no bullfrog tadpoles were observed or captured. All bullfrogs were larger than 150 mm snout-vent (SV) length. Average bullfrog size was 181 ± 4 mm snout-vent length (Figure 2), with females (157 ± 46 mm) slightly larger than males (140 ± 37 mm). The sex ratio was skewed towards males (1.3:1 M:F; one frog was not sexed). Capture rates for adults were consistently low throughout the season compared to baseline conditions, and the number of adults captured was reduced over the course of the removal efforts (Figure 3). Similar to 2012, we observed a spike in captures in June, however, it was not the result the emergence of recently metamorphosed juvenile frogs (no juvenile frogs were captured in 2014). Most bullfrogs were observed and captured in treatment area P1/P1D (26.2 hrs; 14 frogs), which has the largest amount of available habitat in the study area. The combined effort in P2/P3 was less than P1, and the catch rate was approximately 15 percent less (17.6 hrs; 8 frogs). Although eradication efforts were

logistically more difficult to implement in the smaller pools (P2/P3) than in the larger pool (P1), the difference in catch rates is greater than would be expected if it were only due to logistical differences in sampling activities. The substantially greater catch rate in P1 suggests that the population size in the lower pools was smaller than the population size in the larger pool.

Turtles and snakes

One turtle was captured in a turtle trap. Two native western pond turtles (*Emys marmorata*) were captured in a large crayfish trap in treatment area P2. The first capture occurred on May 8, 2014 and the second on July 30, 2014. Both turtles were released on the bank of the pool where they were captured. It is possible that the same turtle was captured twice. In future efforts United will mark captured turtles following USGS protocols. A native species field survey form was submitted to the California Natural Diversity database describing the two incidents. One exotic turtle (red-eared slider) was captured in P1 on May 29, 2014. One two-striped garter snake was captured in a crayfish trap in P3, but was dead on arrival.

Invasive Fish

Fish were only captured in the two larger pools (P1, P2). No fish were observed in P3. A total of 38 fish (largemouth bass, green sunfish, and bluegill; Table 2) were captured in the experimental gill net (which was a substantial increase compared to previous years). The minnow/crayfish traps captured 88 young-of-the-year (YOY) largemouth bass, 38 bluegill sunfish, and 6 green sunfish. Hook and line fishing was performed when time was available and resulted in the capture of 53 largemouth bass (mostly YOY), 37 bluegill sunfish, and 1 green sunfish. In spite of higher capture rates than were experienced during prior years, all treatment methods for capturing exotic fish species appeared to be ineffective, and a large number of fish are still observed in the study area. Largemouth bass of at least one life stage (P2U only had young bass) were observed in all pools with fish. The presence of YOY bass indicates successful reproduction during 2014.

Crayfish

A total of 1,296 red swamp crayfish (Procambarus clarkia) were captured in crayfish traps. Trapping was more efficient than 2012 and 2013. The increased efficiency is attributed to placement of bait in heavy mesh bags to prevent crayfish from eating the bait without entering the trap and the use of local fish as bait. Trapping effort was increased in 2014, with both more days of trapping and more traps. Relatively few crayfish entered the wire mesh “walk-in” traps compared to the cloth minnow traps. In spite of the increased efficiency in trapping efforts, and large number of crayfish are still observed in the study area.

Discussion

Similar to aquatic exotic species eradication efforts in prior years, the 2014 eradication effort was most effective at reducing the abundance of adult bullfrogs in the treatment area, but was less effective with other taxa. Substantially fewer frogs were captured in 2014 than in either 2012 or 2013. The number of adult frogs present in the treatment area was reduced substantially compared to prior years and no juvenile frogs or tadpoles were observed. No signs of successful reproduction (i.e., eggs or young tadpoles) were observed during the 2014 activities. Several adult bullfrogs were heard calling during the

removal effort but not all were successfully captured. The continued presence of adult frogs partially may be a result of frogs that have dispersed overland from upstream or downstream areas. Data collected during implementation of eradication management activities suggest that concentrating the primary removal effort in the early breeding season successfully reduced or eliminated reproduction during 2014. We will continue our early season efforts in 2015.

Fish production was high in 2014, with clear evidence of successful reproduction by largemouth bass, green sunfish, and bluegill sunfish. Capture rates, both in the gill net and hook and line, were much higher in 2014 compared to prior efforts, but many of the fish captured were YOY. P1 has higher fish diversity, with all species observed, while P2 has very high densities of largemouth bass but few sunfish. No fish were observed in P3, but nearly all the red swamp crayfish and African clawed frogs observed in 2014 were captured in this very small habitat (potentially due to minimal fish predation).

It was not clear why capture efficiencies for other taxa were low. Despite high abundances of most exotic taxa and increased catch rates compared to those resulting from 2012 or 2013 efforts, trapping, netting, and manual capture remained below the amount required to significantly reduce population sizes. Funnel style traps captured a larger variety of taxa and were more effective than walk-in traps. In 2015, we will increase or modify trapping efforts (e.g., minnow traps, and gill nets), potentially using additional styles of turtle and crayfish traps. For fish, we may increase the level of effort or attempt other capture techniques, including purse seines, trammel nets, and trot lines.

Population trends for bullfrogs continue to decline, but a small population of adults remains in the ponds. Overland dispersal from ponds outside the treatment area may result in additional recolonization of these ponds. We estimate that bullfrog reproductive output is currently negligible, given the lack of juveniles and tadpoles. Overall, during this reporting period, the exotic removal effort showed a decrease in catches over time, with only one frog captured in the final sampling event of the season, and within each month of sampling, subsequent evenings often resulted in lower catch rates.

With the exception of turtles, all of the target species are subject to strong density dependent population growth (Adams and Pearl 2007)—meaning that removing adults relaxes predation on juveniles, which can lead to exponential population growth. Permanent or at least long-lasting eradication may require habitat level controls in addition to direct control (e.g., gigging and trapping). United will submit this methods and results report to consulting resource agencies and invite resource agencies to participate in a consultation meeting, which will be scheduled to occur within three months following submittal of the report, to discuss the effectiveness of the aquatic exotic species management program and determine strategies for future aquatic exotic species management efforts.

References

Adams, M. J., and C. A. Pearl. 2007. Problems and opportunities managing invasive Bullfrogs: is there any hope? Pages 679–693 *in* F. Gheradi, editor. Biological invaders in inland waters: Profiles, distribution, and threats. Springer, Dordrecht.

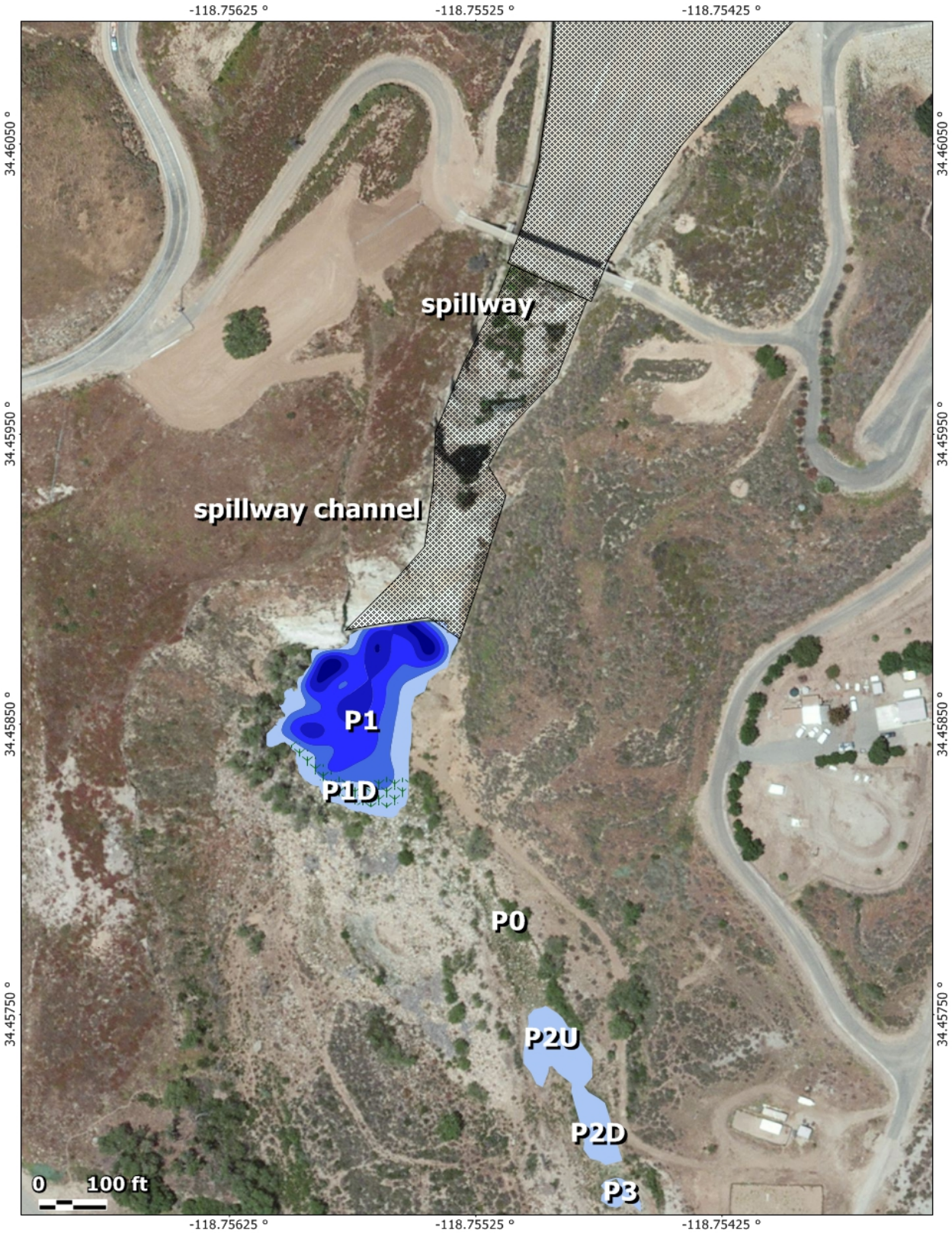

Figure 1 - Aquatic exotic eradication management treatment area

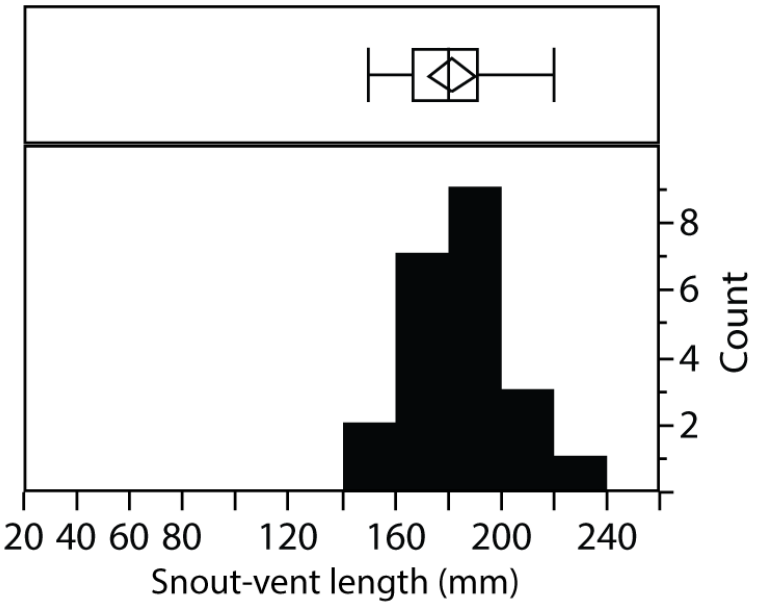

Figure 2 - Size distribution of captured bullfrogs

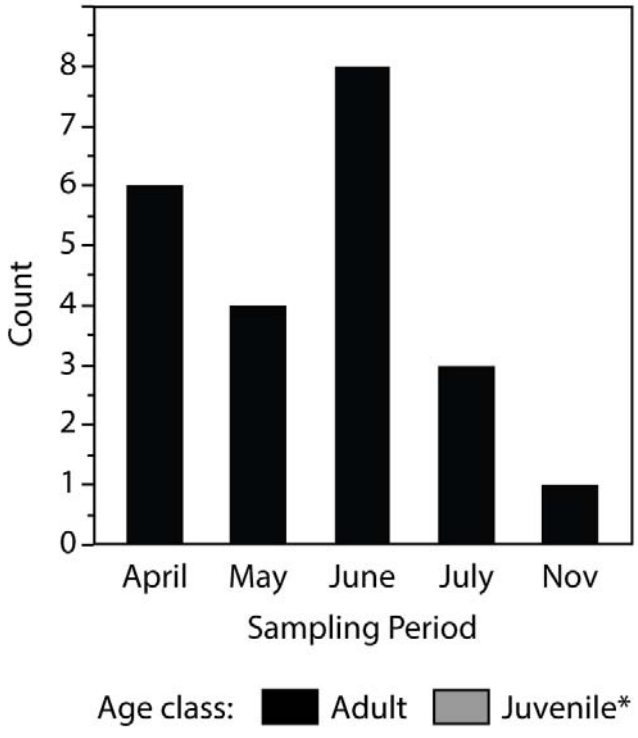

Figure 3 - Age class of captured bullfrogs. *No juveniles were captured in 2014.

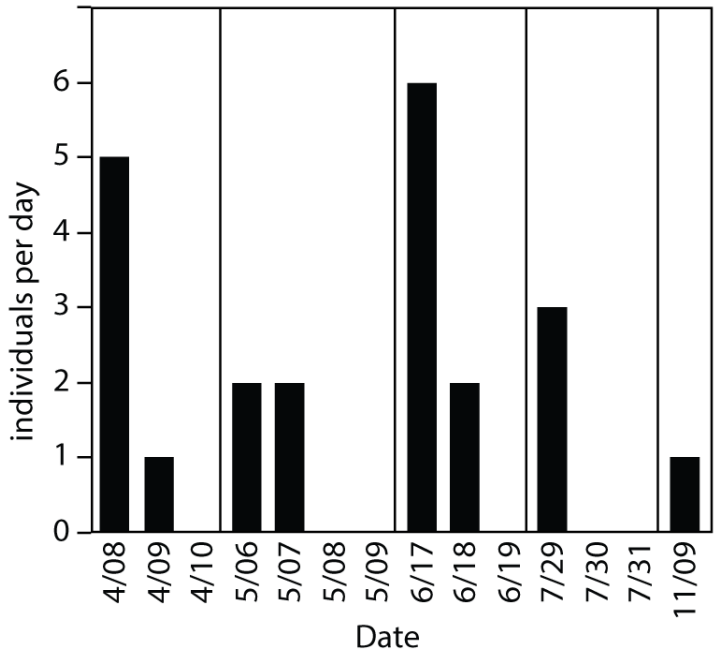

Figure 4 - Number of bullfrogs captured on each eradication treatment event day

Table 1 - Physical characteristics and water quality parameters for P1.

Sampling Period	Depth (ft)		Temp (°C)		DO (mg/L)		pH		Cond (mS/cm)		Turbidity (ntu)	
	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max
April	1	16	17.1	20.0	5.98	9.46	7.79	7.92	1.69	1.70	0.0	810.0
May	0	16	19.6	20.7	12.62	20.41	7.80	7.89	1.73	1.73	0.0	12.8
June	0	14	19.8	25.7	0.21	7.90	7.37	8.40	1.85	1.86	3.7	16.0
July	0	10	20.8	27.5	0.22	11.61	7.41	8.72	1.84	1.93	5.0	89.0
November	0	13	15.6	16.6	9.60	10.52	8.14	8.32	2.18	2.20	4.8	77.6

Table 2. Exotics removal effort and catch

Sampling period	Method	Total Hours*	Exotic species										Native species				
			African clawed frog	African clawed frog tadpole	Bullfrog	Bullfrog tadpole	Bluegill sunfish	Green sunfish	Largemouth bass	Prickly sculpin	Red swamp crayfish	Red-eared slider	Tree frog	Tree frog tadpole	Southwestern pond turtle	Two-striped garter snake	Muskrat
April 14	Net	46.9							2								
April 14	Trap	848.4	3								13						
April 14	Gig	16.2			6												
May 14	Crossbow	0.2			1												
May 14	Gig	5.2			3												
May 14	Hook & line	0.0					10										
May 14	Net	66.1					1		5								
May 14	Seine	0.9	9	112							47						
May 14	Trap	1,806.8	4				9		44		79				1		
May 14	Trap (Turtle)	1,622.9										1					
June 14	Trap (Turtle)	1,944.3															
June 14	Gig	10.8			8						2						
June 14	Hook & line	0.0					27	1	1								

Taxa key			
Amphibian/ Reptile	Fish	Crustacean	Mammal

Sampling period	Method	Total Hours*	Exotic species									Native species				
			African clawed frog	African clawed frog tadpole	Bullfrog	Bullfrog tadpole	Bluegill sunfish	Green sunfish	Largemouth bass	Prickly sculpin	Red swamp crayfish	Red-eared slider	Tree frog	Tree frog tadpole	Southwestern pond turtle	Two-striped garter snake	Muskrat
June 14	Net	86.3						2	10								
June 14	Trap	2,253.4	13				11	1	11		255						
July 14	Hook & line	0.0							38								
July 14	Net	110.6					5		6								
July 14	Trap	2,887.5	8				17	5	30		295				1	1	
July 14	Trap (Turtle)	1,411.8															
July 14	Gig	11.5			3												
August 14	Hook & line	0.0							9								
August 14	Trap (Turtle)	2,186.0															
September 14	Trap (Turtle)	1,629.9															
October 14	Hook & line	0.0							2								
October 14	Trap (Turtle)	2,591.4															
November 14	Trap	2,659.0	3		1		1		3		323						
November 14	Trap (Turtle)	1,514.3															

Taxa key			
Amphibian/ Reptile	Fish	Crustacean	Mammal

Sampling period	Method	Total Hours*	Exotic species										Native species				
			African clawed frog	African clawed frog tadpole	Bullfrog	Bullfrog tadpole	Bluegill sunfish	Green sunfish	Largemouth bass	Prickly sculpin	Red swamp crayfish	Red-eared slider	Tree frog	Tree frog tadpole	Southwestern pond turtle	Two-striped garter snake	Muskrat
December 14	Trap (Turtle)	1,367.5															
December 14	Net	168.0					1	1									
December 14	Trap	2,558.7	3					1			282						
	Totals	27,804.60	43	112	22		82	11	161		1296	1			2	1	

Taxa key			
Amphibian/ Reptile	Fish	Crustacean	Mammal

Attachment B

Completed California Native Species Field Survey Forms

Mail to:
California Natural Diversity Database
Department of Fish and Game
1807 13th Street, Suite 202
Sacramento, CA 95811
Fax: (916) 324-0475 email: CNDDB@dfg.ca.gov

Date of Field Work (mm/dd/yyyy): 05/08/2014

For Office Use Only
Source Code _____ Quad Code _____
Elm Code _____ Occ. No. _____
EO Index No. _____ Map Index No. _____

Reset

California Native Species Field Survey Form

Send Form

Scientific Name: *Emys marmorata*

Common Name: Western Pond turtle

Species Found? ☑ Yes ☐ No _____ If not, why?

Total No. Individuals _____ Subsequent Visit? ☐ yes ☐ no

Is this an existing NDDB occurrence? _____ ☐ no ☐ unk.
Yes, Occ. #

Collection? If yes: _____ Number _____ Museum / Herbarium

Reporter: Michael Booth
Address: UWCD 106 N 8th St, Santa Paula, Ca 93060
E-mail Address: mikeb@unitedwater.org
Phone: (805) 317-8988

Plant Information

Phenology: _____% vegetative _____% flowering _____% fruiting

Animal Information

2 # adults _____ # juveniles _____ # larvae _____ # egg masses _____ # unknown

☐ wintering ☐ breeding ☐ nesting ☐ rookery ☐ burrow site ☑ other

***Location Description* (please attach map AND/OR fill out your choice of coordinates, below)**

Small pond below Piru Lake spillway, indicated with a star on the attached map.

County: Ventura Landowner / Mgr.: United Water Conservation District
Quad Name: Piru Elevation: _____
T____ R____ Sec ____, ____ ¼ of _____¼, Meridian: H☐ M☐ S☐ Source of Coordinates (GPS, topo. map & type): _____
T____ R____ Sec ____, ____ ¼ of _____¼, Meridian: H☐ M☐ S☐ GPS Make & Model Trimble GeoExplorer XP
DATUM: **NAD27** ☑ **NAD83** ☐ **WGS84** ☐ Horizontal Accuracy 3 m meters/feet
Coordinate System: UTM Zone 10 ☐ UTM Zone 11 ☐ ***OR*** Geographic (Latitude & Longitude) ☑
Coordinates: 118 45.237 W 34 27.426 N

Habitat Description (plants & animals) *plant communities, dominants, associates, substrates/soils, aspects/slope:*
Animal Behavior *(Describe observed behavior, such as territoriality, foraging, singing, calling, copulating, perching, roosting, etc., especially for avifauna):*
Shallow (1-2 m deep) pool surrounded by bullrush and small willows. Turtles were captured in a partially submerged inverted-funnel style crayfish trap baited with fish. Turtles were released on the pond bank next to the pond. One turtles was captured on 05/08/2014 and one on 07/30/2014.

Please fill out separate form for other rare taxa seen at this site.

Site Information Overall site/occurrence quality/viability (site + population): ☑ Excellent ☐ Good ☐ Fair ☐ Poor
Immediate AND surrounding land use: relatively undisturbed overflow channel, no current human use.
Visible disturbances:
Threats: Numerous largemouth bass present
Comments:

Determination: *(check one or more, and fill in blanks)*
☑ Keyed (cite reference): Stebbins. Western Reptiles and Amphibians 3rd edition
☐ Compared with specimen housed at: _____
☐ Compared with photo / drawing in: _____
☐ By another person (name): _____
☐ Other: _____

Photographs: *(check one or more)* Slide Print Digital
Plant / animal ☐ ☐ ☐
Habitat ☐ ☐ ☐
Diagnostic feature ☐ ☐ ☐
May we obtain duplicates at our expense? yes ☐ no ☐

DFG/BDB/1747 Rev. 6/16/09

-118.75625 °
-118.75525 °
-118.75425 °
34.46050 °
34.45950 °
34.45850 °
34.45750 °

spillway
spillway channel
P1
P1D
P0
P2
P3
0 100 ft

Mail to:
California Natural Diversity Database
Department of Fish and Game
1807 13th Street, Suite 202
Sacramento, CA 95811
Fax: (916) 324-0475 email: CNDDB@dfg.ca.gov

Date of Field Work (mm/dd/yyyy): 07/30/2014

For Office Use Only
Source Code _____ Quad Code _____
Elm Code _____ Occ. No. _____
EO Index No. _____ Map Index No. _____

Reset

California Native Species Field Survey Form

Send Form

Scientific Name: *Thamnophis hammondii*

Common Name: Two-striped garter snake

Species Found? ☑ Yes ☐ No _____ If not, why?

Total No. Individuals _____ Subsequent Visit? ☐ yes ☐ no

Is this an existing NDDB occurrence? _____ ☐ no ☐ unk.
Yes, Occ. #

Collection? If yes: _____ Number _____ Museum / Herbarium

Reporter: Michael Booth
Address: UWCD 106 N 8th St, Santa Paula, Ca 93060
E-mail Address: mikeb@unitedwater.org
Phone: (805) 317-8988

Plant Information

Phenology: _____% vegetative _____% flowering _____% fruiting

Animal Information

1 # adults _____ # juveniles _____ # larvae _____ # egg masses _____ # unknown

☐ wintering ☐ breeding ☐ nesting ☐ rookery ☐ burrow site ☑ other

Location Description ***(please attach map AND/OR fill out your choice of coordinates, below)***

Small pond below Piru Lake spillway, indicated with a star on the attached map.

County: Ventura Landowner / Mgr.: United Water Conservation District
Quad Name: Piru Elevation: _____
T____ R____ Sec ____, ____ ¼ of _____¼, Meridian: H☐ M☐ S☐ Source of Coordinates (GPS, topo. map & type): _____
T____ R____ Sec ____, ____ ¼ of _____¼, Meridian: H☐ M☐ S☐ GPS Make & Model Trimble GeoExplorer XP
DATUM: **NAD27** ☑ **NAD83** ☐ **WGS84** ☐ Horizontal Accuracy 3 m meters/feet
Coordinate System: UTM Zone 10 ☐ UTM Zone 11 ☐ ***OR*** Geographic (Latitude & Longitude) ☑
Coordinates: 118 45.237 W 34 27.426 N

Habitat Description (plants & animals) *plant communities, dominants, associates, substrates/soils, aspects/slope:*
Animal Behavior *(Describe observed behavior, such as territoriality, foraging, singing, calling, copulating, perching, roosting, etc., especially for avifauna):*
Shallow (1-2 m deep) pool surrounded by bullrush and small willows. Snake was captured in a submerged inverted-funnel style crayfish trap baited with fish. Snake was dead upon capture on 07/30/2014 and was partially eaten by crayfish.

Please fill out separate form for other rare taxa seen at this site.

Site Information Overall site/occurrence quality/viability (site + population): ☑ Excellent ☐ Good ☐ Fair ☐ Poor
Immediate AND surrounding land use: relatively undisturbed overflow channel, no current human use.
Visible disturbances:
Threats: Numerous largemouth bass and crayfish present
Comments:

Determination: *(check one or more, and fill in blanks)*
☑ Keyed (cite reference): Stebbins. Western Reptiles and Amphibians 3rd edition
☐ Compared with specimen housed at: _____
☐ Compared with photo / drawing in: _____
☐ By another person (name): _____
☐ Other: _____

Photographs: *(check one or more)* Slide Print Digital
Plant / animal ☐ ☐ ☐
Habitat ☐ ☐ ☐
Diagnostic feature ☐ ☐ ☐

May we obtain duplicates at our expense? yes ☐ no ☐

-118.75625 °
-118.75525 °
-118.75425 °
34.46050 °
34.45950 °
34.45850 °
34.45750 °

spillway
spillway channel
P1
P1D
P0
P2
P3
0 100 ft