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, 2017

Prepared by:

UNITED WATER CONSERVATION DISTRICT

Environmental Planning and Conservation Department

Table of Contents

Executive Summary 1
1.0 Background 1
1.1 Arroyo Toad Protection Plan 1
1.2 Herpetological Monitoring Plan 2
2.0 Reporting Period 3
3.0 Activities Conducted during this Reporting Period 3
3.1 Arroyo Toad Protection Plan 3
3.2 Revised Monitoring Plan 3
4.0 Effectiveness of Aquatic Exotic Species Eradication Management Efforts 3
5.0 Assessment of Implementation and Effectiveness of the Revised Monitoring Plan 4
6.0 Recommendations for Changes to the Revised Monitoring Plan 4
7.0 Update Status of Access to Private Property 4
8.0 Updated Record of Consultation with Participating Agencies 4
9.0 Submittals to California Natural Diversity Database 5
Attachment A ..... A
Attachment B ..... B

Executive Summary
This annual report documents activities conducted between January 1 and December 31, 2017, 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 (Forest Service) 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 2017, 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 January and December following the methods outlined in the Revised Monitoring Plan. Exotic species management activities in the management area resulted in capture and removal of 63 adult and 162 juvenile bullfrogs (225 bullfrogs total), 147 bullfrog tadpoles; 60 African clawed frogs, 2 African clawed frog tadpoles; 59 bluegill sunfish, 165 largemouth bass, 8 prickly sculpin; and 1,020 red swamp crayfish. Despite high abundances of captured individuals and increased catch rates compared to those resulting from 2012 or 2013 efforts, removal efforts do not appear to be effective in significantly reducing targeted exotic species population sizes. 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.

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). 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 (Forest Service) 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 Forest Service land located within the Project boundary;

2. Any activities proposed to occur in the upcoming year that have the potential to impact arroyo toads or arroyo toad critical habitat on Forest Service 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), Forest Service, 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 the report to USFWS, CDFW, Forest Service, 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, 2017.

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 2017. 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 2017, 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 Forest Service land within the Project boundary;

    a. This requirement was incorporated from the Arroyo Toad Protection Plan. As described in Section 3.1, 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;

    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. Details of the methods implemented are contained in attachment A.

C. Reporting criteria.

    a. This report serves to satisfy the reporting requirements for 2017 activities associated with the Revised Monitoring Plan and the Arroyo Toad Protection Plan. Copies of the report will be provided to USFWS, CDFW, Forest Service, 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 January and December of 2017. The activities are described in the methods and results report presented in Attachment A.

2017 was wet compared to recent years, with significant rainfall events occurring in January and February. Initial water surface elevations (WSE) in the spillway channel pools at the beginning of the 2017 eradication were similar to 2016. In March, WSE in all ponds were elevated to the highest extent recorded since 2012. The elevated WSE resulted in an expansion of available habitat and increased habitat complexity for target species as compared to baseline conditions. Exotic species management activities in the treatment area resulted in capture and removal of 63 adult and 162 juvenile bullfrogs (225 bullfrogs total), 147 bullfrog tadpoles; 60 African clawed frogs, 2 African clawed frog tadpoles; 59 bluegill sunfish, 165 largemouth bass, 8 prickly sculpin; and 1,020 red swamp crayfish. Despite high abundance of captured individuals and increased catch rates compared to those resulting from 2012 or 2013 efforts, removal efforts do not appear to be effective in significantly reducing targeted exotic species population sizes.

5.0 Assessment of Implementation and Effectiveness of the Revised Monitoring Plan

Implementation efforts since initiation of the exotic aquatic species control treatments have yielded valuable lessons and resulted in refinement of methods associated with equipment and timing of activities. The modifications were, and will continue to be, implemented following an adaptive management strategy as outlined in the Revised Monitoring Plan.

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 2016” (2016 Annual Report) was filed with FERC and submitted to all consulting federal and state agencies (Los Padres National Forest [LPNF], Angeles National Forest [ANF], USFWS, NMFS, and CDFW) on December 30, 2016. Consultation activities that occurred during 2017 were associated with the 2016 Annual Report. United consulted with representatives of LPNF on February 2, 2017. 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 2016 Annual Report. All consulting federal and state agencies were invited to participate in a conference call scheduled on February 23, 2017, to discuss the effectiveness of the aquatic exotic species management program performed during 2016. Consulting agencies did not show interest in accepting the invitation, and the conference call was cancelled. CDFW

responded to the submittal of the 2016 Annual Report by thanking United for the submittal, and stating that they had no questions or comments.

9.0 Submittals to California Natural Diversity Database

In December 2017, United submitted a table to the California Natural Diversity database describing observations of federally listed species made by United Water Conservation District (United) staff in the Santa Clara River Watershed during 2017. These observations were made incidentally while performing a variety of field-based tasks, including activities related to the exotic aquatic species control treatments. The table is presented in Attachment B.

Attachment A

2017 Exotic Species Eradication Management:
Methods and Results

2017 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 2017. The eradication management activities were conducted 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 2017, 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[1]. Because the pools are hydrologically isolated under most conditions, 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 exotic species that predate upon or compete with these native species 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 (2017) 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.

[1] In order to conduct an inspection of the Santa Felicia intake tower in October of 2015, an alternative water conveyance system was constructed to transport water between the Santa Felicia outlet works and the largest of the spillway channel pools. Water was piped from the outlet works and stored in the spillway channel pool, and then pumped back to the outlet works release pool to provide minimum required water releases during a period that the outlet works were out of service.

2017 Conditions

Methods

Physical Habitat and Water Quality Parameters

The eradication management treatment area was mapped using a GPS unit when activities were initiated in 2012 and updated with the addition of P4 in 2017 (Figure 1). During the 2017 management period, 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), and are presented in Table 1.

Turtles

Capture strategies for turtles included use of two types of floating traps throughout the year. Floating, unbaited basking traps (Pond King, Gainesville, TX) specifically designed for capturing turtles were deployed continuously from January to December and checked once per week following manufacturer recommendations. The Pond King traps were supplemented with PVC frame floating traps during the same period. Turtles can also be incidentally captured in large crayfish traps. When non-target species (e.g., native species such as western pond turtle and two-striped garter snake) were captured, they were released at the capture location. Western pond turtles were uniquely marked on two marginal scutes to facilitate identification and genetic samples were collected when possible. No target species (non-native turtles) were captured during 2017 activities. In the case that target species are captured, they are euthanized by freezing and submitted to the herpetology collection at the Los Angeles County Natural History Museum.

Frogs

Bullfrogs (*Rana catasbeiana*) and, to a lesser extent, African clawed frogs (*Xenopus laevis*) were captured using direct methods: frog gigs, a custom modified fishing pistol crossbow, and hand/dipnet. Crossbow and hand captures are made opportunistically while surveyors carry gigs, thus the effort of these methods is not tracked separately. 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 a small boat traversed the shoreline of the largest pool (P1), while the other teams walked the shorelines of P1D, P2U, P2D, and P3. Two to four biologists made a single pass of P4, when water was present, upon completion of P1-P3 surveys. 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 snout-vent length, SV), and individually frozen. Bullfrogs and African clawed frogs (primarily) were also captured in minnow/crayfish traps as discussed below.

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 96 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 cuttings of fish captured from the ponds or when fish were unavailable, chicken liver and gizzards. Traps were deployed for durations of approximately 96 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 targeting bullfrogs, fish, crayfish, and bullfrog tadpoles were implemented in February (4 days), March (4 days), April (4 days), May (4 days), June (4 days), July (4 days), August (4 days), and September (4 days) of 2017. Three to five biologists participated in each removal treatment. Passive capture methods were deployed for a total of 683 hours (experimental gill net), 23,166 hours (crayfish traps), and 43,800 hours (turtle traps). Active capture methods for bullfrog and clawed frog capture were employed for 153.71 hours (combination gig, fishing crossbow, and hand). The total hours of effort per treatment event and capture data are presented in Table 2.

Results

Physical Habitat and Water Quality Parameters

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. 2017 was wet compared to recent years, with significant rainfall events occurring in January and February. Initial water surface elevations (WSE) in the spillway channel pools at the beginning of the 2017 eradication were similar to 2016. In March, WSE in all ponds were elevated to the highest extent recorded since 2012. A previously undocumented pond (P4, see figure 1) was surveyed during 2017. WSE declined throughout the spring months and by June, levels were approximately the same as WSE measured during 2014 and 2015 activities. P4 remained wetted until approximately mid to late May. The elevated WSE resulted in an expansion of available habitat and increased habitat complexity for target species as compared to baseline conditions. Several areas of suitable habitat in the downstream ponds (P2, P3) were inaccessible for the majority of the sampling period due to elevated water levels.

Water quality parameters were within acceptable levels for aquatic life during the survey period. Surface water temperature generally increased throughout the year and P1 had some degree of stratification throughout the monitoring season. Dissolved oxygen (DO) near the bottom of P1 reached near zero (mg/L) several times throughout the year. Several algal blooms occurred in P1 and P2 over the course of the summer. Water quality parameters measured in P1 during this reporting period are presented in Table 1.

Removal results

Frogs/Tadpoles

Treatment effort was increased in 2017 over prior years, with the addition of a sampling event in September. Within the treatment area, 63 adult and 162 juvenile bullfrogs (225 bullfrogs total) were captured and euthanized, along with 147 bullfrog tadpoles. Average adult bullfrog size was 164 ± 4 mm snout-vent length (Figure 2), with females (162 ± 5 mm) slightly smaller than males (166 ± 4 mm). The sex ratio was skewed towards females (0.45:1 M:F; two adult frogs were not sexed). Capture rates for adults were somewhat consistent throughout the season. The number of adults captured was not significantly reduced over the course of the removal efforts (Figure 3). In addition, adult bullfrogs were regularly captured in crayfish traps. Similar to 2012, 2014, and 2016 a spike in captures was observed in June, and recently metamorphosed juvenile frogs (metamorphs) were consistently captured throughout the remainder of the sampling period. Capture rate of juvenile frogs increased throughout the season, with record numbers captured in September (73 total). The majority of these juvenile bullfrogs were recent metamorphs (78% <50mm SV). Most bullfrogs were observed and captured in treatment area P1/P1D (74.6 hrs; 134 frogs), which has the largest amount of available habitat in the study area. The combined effort in P2/P3 was similar to P1, and the catch rate was approximately 48 percent less (73.6 hrs; 70 frogs)—in actuality, the active catch rate was lower, as eight of the frogs in P2/P3 were captured in passive traps (compared to one in P1). 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 per unit effort in P1 suggests that the population size in the lower pools was smaller than the population size in the larger pool. However, catch of bullfrog tadpoles was similar between the two areas, with 0.16 tadpoles per trap-day in P1 and 0.13 tadpoles per trap-day in P2 and P3. Catch of tadpoles was higher than recent years (147 total) and has been increasing since 2015, yet remains lower than baseline conditions.

Catch of African clawed frogs increased compared to 2016 but remained less than 2015. Similar to previous years, the majority (65%) of African clawed frogs were captured in P3. On several occasions up to 5 individual frogs were captured in a single trap. A possible explanation may be that during mating behavior the frogs act as attractants.

Turtles and snakes

No exotic turtles were captured during 2017 activities. No two-striped garter snakes were observed during 2017. Native western pond turtles (*Emys marmorata*) were captured 14 times during 2017 and represent nine individuals; of these captured turtles, four were unmarked and five were recaptures. One individual was captured four times and recorded moving from P1 to P2D and back again. This individual was sexed as a male, although during a previous capture (2015) it was determined to be a female. This revision results in zero female captures since 2012. Turtles were captured in all ponds but the majority of captures occurred in P2. An equal number of captures occurred in the floating turtle traps as in the large crayfish traps, and a single individual was captured by hand. A single turtle was found dead in a large crayfish trap (with one additional living turtle), all others were released back into the water adjacent to the traps or on the bank of the pool where they were captured. United collected genetic

samples from four pond turtles for submittal to USGS for analysis. A native species field survey form was submitted to the California Natural Diversity database describing the turtle observations in 2017.

Invasive Fish

During 2017 activities, a single largemouth bass was captured in P2 and all other fish were captured in P1. A total of 28 fish (largemouth bass and bluegill) were captured in the experimental gill net. The minnow/crayfish traps captured 133 largemouth bass, 44 bluegill sunfish, and 8 prickly sculpin. The majority of fish captured in traps were young of the year (YOY), with the exception of prickly sculpin. Hook and line fishing was performed when time was available and resulted in the capture of 4 largemouth bass and 13 bluegill sunfish. Hook and line fishing was substantially less effective than in previous years. Capture rates were slightly lower than 2016 and all treatment methods for capturing exotic fish species appear to be ineffective as a large number of fish are still observed in the study area. The presence of YOY bass indicates successful reproduction during 2017 and the largest bass since 2013 (518mm Total Length) was captured in the gill net.

Crayfish

A total of 1,020 red swamp crayfish (*Procambarus clarkii*) were captured in crayfish traps. Trapping was more efficient than 2016, in terms of catch per unit effort. Trapping effort has increased slightly throughout the years, however 2014 and 2015 remain the most efficient trapping years. Trapping was most efficient in P3, similar to previous years. Based on data from 2012-2015, relatively few crayfish entered the wire mesh "walk-in" traps compared to the cloth minnow traps.

Bycatch

Native species bycatch increased during 2017 activities. A total of six muskrats (*Ondatra zibethicus*) were found dead in both large and small minnow traps in P1, P2, and P3. One bufflehead (*Bucephala albeola*) was caught and drowned in the gill net. One Virginia rail (*Rallus limicola*) was found alive in a large minnow trap and released.

Discussion

The total number of bullfrogs captured in 2017 exceeded the numbers captured in recent years. A similar amount of adult frogs were captured in 2017 as in the initial effort in 2012. The catch per unit effort (active methods) of adult frogs in 2017 is lower than the 2012 baseline condition (0.4 frogs/hr and 1.47 frogs/hr, respectively). However, catch per unit effort of total frogs in 2017 and 2012 is more similar (1.45 frogs/hr and 1.69 frogs/hr, respectively). In 2017, 72% of captured frogs were juveniles, indicating successful reproduction in the past two years.

The number of adult bullfrogs captured has gradually rebounded each year since 2012 and a population of adults likely remains in the ponds. Several adult bullfrogs that were not successfully captured were observed or heard calling during removal efforts. Total effort was higher in 2017 and may have contributed to the increased number of bullfrogs captured (9 adults and 73 juveniles were captured in September, a month not previously sampled). There is evidence that bullfrog reproduction in the past two years has been more successful than in previous years. Bullfrog tadpoles may take several months

to three years to metamorphose, so it is unclear if the juvenile frogs captured in 2017 are a result of reproduction during that year. In addition, overland dispersal from areas outside the treatment area may provide a source for recolonization of these ponds.

Native western toad (*Anaxyrus boreas*) abundance was greater than observed during previous years. Native species observations have not been systematically recorded throughout the years. However, some records of incidental observations exist and an increased effort was made to record incidental observations during 2017. A total of 165 observations of adult western toads were recorded (potential for multiple counts of the same individuals). Forty adult western toad observations were recorded on March 1, primarily in P3 and wetted areas just downstream. Two pairs of western toads were observed in amplexus. Signs of successful western toad reproduction was observed in all ponds (P1, P2, P3, and P4), as egg clutches, tadpoles, and recent metamorphs. P4 was particularly productive and numerous recent metamorphs were observed. However, it is unknown how many tadpoles desiccated when P4 went dry. One western toad was found alive in a minnow trap and released.

Non-native turtles have not been captured since September 2015, despite continuous trapping. It is possible that only native turtles remain in the project area. United will consult with the resource agencies on reducing or discontinuing the effort involved in turtle trapping until the next spill event from Lake Piru occurs.

Presence of largemouth bass, bluegill sunfish, and high numbers of juvenile bass in P1 indicated evidence of successful fish production. For the second year in a row, no green sunfish were captured during the 2017 activities. Capture rates in the gill net were similar to previous years with medium-size fish (150-300mm total length) caught most frequently. Capture rates by hook and line were lower than previous years and limited primarily to medium-size fish. Conversely, capture of small size class bluegill in traps increased during the same period. Only a single fish was captured in the downstream ponds, which is likely a result of these ponds (P2 and P3) drying out nearly completely in the late summer of 2016, after removal efforts had ceased.

Despite high abundances of captured individuals and increased catch rates compared to those resulting from 2012 or 2013 efforts, trapping, netting, and manual capture appear to be below the amount required to significantly reduce population sizes. Funnel style traps had higher catch rates and captured a larger variety of taxa and were more effective than walk-in traps, which will be phased out in future years. The expanded treatment window employed in 2017 (February and September) may be modified for 2018, and shifted later in the year (March through October). Early season efforts have not been efficient and flexible late season efforts may be appropriate for 2018 (i.e. continue efforts into October if September catch rates are high).

Figure 1 - Aquatic exotic eradication management treatment area.

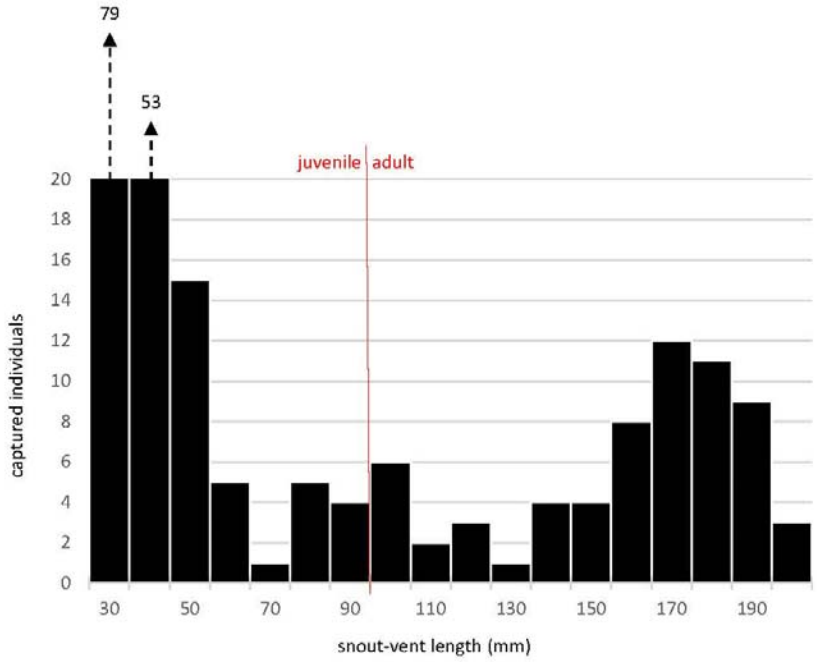

Figure 2 – Size distribution of captured bullfrogs in 2017.

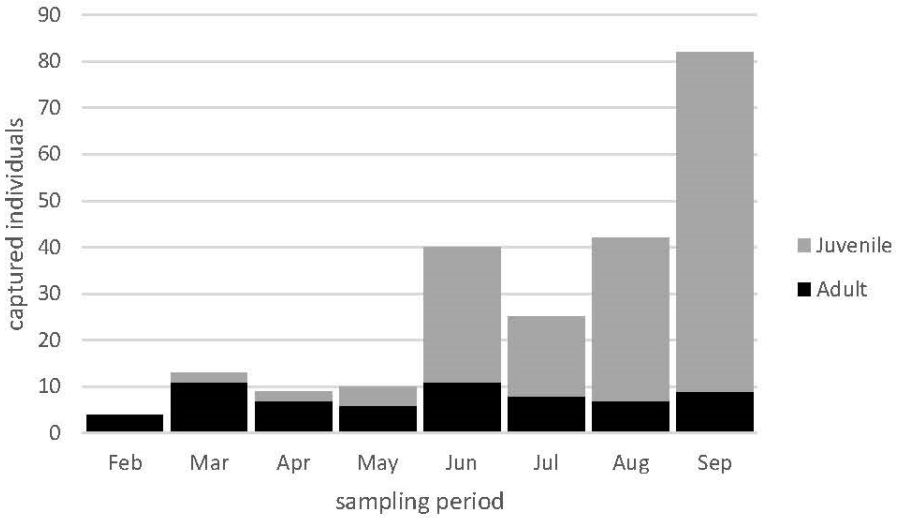

Figure 3 – Catch of adult and juvenile bullfrogs in 2017 by sampling period.

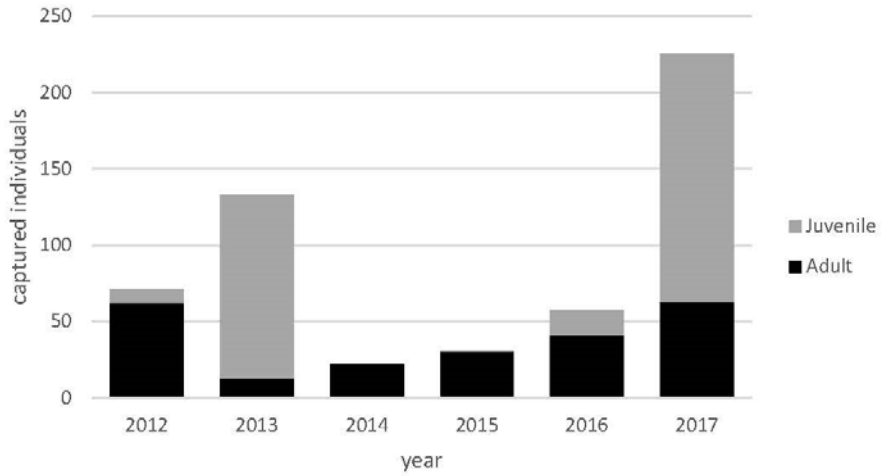

Figure 4 – Catch of adult and juvenile bullfrogs by year, 2012 to 2017.

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

2017 Sampling Period	**Depth (ft)**		**Temp (°C)**		**DO (mg/L)**		**pH**		**Cond (mS/cm)**		**Turbidity (ntu)**	
	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min
February	17	0	14.6	11.9	8.4	0.05	7.45	6.83	1.398	0.791	11.2	0
March	20	0	20.1	15.4	12.78	3.98	7.54	6.81	1.499	0.892	6230.9	0.3
April	18	0	22.2	18.2	10.65	3.34	7.82	6.91	1.501	0.914	6.6	0.2
May	16	0	24	18.8	8.85	0.06	7.67	6.8	1.44	0.925	49	0.2
June	14	0	27.9	21.9	7.78	0.35	8.22	0.14	1.234	1.014	4.7	0
July	13	0	27.2	24.5	8.09	0.83	8.19	7.43	1.367	1.097	4.2	0
August	12	0	27.96	22.25	8.71	0.12	8.16	6.86	1.87	1.317	-	-
September	10	0	23.96	20.34	12.28	3.85	8.23	7.6	8.23	7.6	122	74

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
January 17	Trap (turtle)	3,720.0															
February 17	Gig	15.2			4												
February 17	Net	47.5															
February 17	Trap	1,551.7	2														
February 17	Trap (turtle)	3,360.0															
February 17	Gig	7.8															
February 17	Hook & line	0.0															
February 17	Net	44.5															
February 17	Trap	1,368.6															
March 17	Trap (turtle)	3,720.0															
March 17	Gig	21.3			8				1								
March 17	Net	86.9					1		2								
March 17	Trap	2,903.1	6		2	1			1		25						2

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
April 17	Trap (turtle)	3,600.0															
April 17	Trap	2,872.0	9			3				4	135				1		2
April 17	Net	85.8															
April 17	Gig	18.8			8												
April 17	Hook & line	0.0					3										
May 17	Gig	16.8			9												
May 17	Hook & line	0.0					4		2								
May 17	Net	90.5							3								
May 17	Trap	2,695.8	7			11	2		48	4	126				3		
May 17	Trap (turtle)	3,720.0													1		
June 17	Hook & line	0.0					4		1								
June 17	Crossbow	0.0			3												
June 17	Gig	18.8			14	1											
June 17	Net	64.6							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
June 17	Trap	2,855.0	2			47			24		133				2		
June 17	Trap (turtle)	3,600.0													5		
June 17	Hand	0.0	1		23	1									1		
July 17	Crossbow	0.0			1												
July 17	Gig	18.3	1		6	1											
July 17	Hand	0.0			16	2											
July 17	Hook & line	0.0					1		1								
July 17	Net	87.7					1		5		1						
July 17	Trap	2,947.3	9	1	2	65	4		34		204						2
July 17	Trap (turtle)	3,720.0															
August 17	Hand	0.0			33	2	1		1								
August 17	Trap (turtle)	3,720.0															
August 17	Trap	2,975.6	19		4	7	13		23		139						
August 17	Hook & line	0.0															

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
August 17	Gig	13.6	1		3												
August 17	Crossbow	4.6			3												
August 17	Net	89.0							10								
September 17	Crossbow	0.0			1												
September 17	Gig	18.4			7												
September 17	Hand	0.0			72												
September 17	Hook & line	0.0															
September 17	Net	86.8							3								
September 17	Trap	2,997.1	3	1	1	6	25		3		257						
September 17	Trap (turtle)	3,600.0															
October 17	Trap (turtle)	3,720.0															
November 17	Trap (turtle)	3,600.0															
December 17	Trap (turtle)	3,720.0															
	Totals	67,803.03	60	2	220	147	59		165	8	1020				13		6

Taxa key			
Amphibian/ Reptile	Fish	Crustacean	Mammal

Attachment B

Completed California Native Species Field Survey Form

Table 3 - CNDDB Submittal for Turtles Captured During 2017

Date	Loc	Sex	Length	Width	Thickness	Scute Mark 1	Scute Mark 2	Genetic sample	Genetic sample date	Comments
4/21/2017	P4	M	134.04	105.05	42.9	M10	M30	Y	4/21/2017	Dent out of right shoulder, algae on shell
4/26/2017	P1D	M	146.92	112.24		M8	M40	N		Caught in BKRND trap in P1D-previously caught in 2015, Turtle very lethargic and tail was fully entended and believe to be a male although previous catch determined to be a female
5/23/2017	P2D	M	162.07	122.28	45.52	M8	M30			Chunck taken out of M400, M100, M800, caught in P2D trap
5/26/2017	P1	M	139.1	116.95	47.1	M30	M40			Caught in BKRND05 P1R -- subsequently died
5/26/2017	P3	M	109.34	87.35	37.03	M7	M1600			Chunk taken out of M40-M50, caught in P3 BKRND06, bite marks on ventral side
5/26/2017	P1	M	152.6	124.5	46.19	M8	M800	Y	5/26/2017	Chunk taken out of M50-M10, Caught in BKRND05 P1R, seemed to be decreased but some movement, Left on shore in case alive, lots of bite marks
6/9/2017	P2D	M	147.76	115	45.6	M9	M20	Y	6/9/2017	
6/22/2017	P2D	M				M10	M20	N		
6/22/2017	P1	M				M8	M40	N		
6/26/2017	P2D	M	147.81	114.6	50.8	M8	M40	N		
6/27/2017	P1	M				M8	M40	N		Caught by hand
6/28/2017	P2U	M	114.77	92.79	38.31	M7	M1600	N		caught in BKRD10
6/29/2017	P2D	M	146.83	111.94	45.36	M8	M60	Y	6/29/2017	
6/29/2017	P2U	M	141.13	111.03	44.34	M9	M20	N		

Table 3 Continued - Other CNDDB Submittals (non-project related)

time	ComName	Species	Count	Lat	Long	Datum	Notes
4/28/2017	slender mariposa lily	Calochortus clavatus var. gracilis	1	34.46706809	-118.7616677	NAD83 CASPV	population
4/28/2017	slender mariposa lily	Calochortus clavatus var. gracilis	1	34.46051309	-118.7565267	NAD83 CASPV	population
4/28/2017	slender mariposa lily	Calochortus clavatus var. gracilis	1	34.4591731	-118.7606997	NAD83 CASPV	population
4/28/2017	slender mariposa lily	Calochortus clavatus var. gracilis	1	34.4558651	-118.7614747	NAD83 CASPV	population
4/27/2017	two-striped garter snake	Thamnophis hammondii	1	34.52762616	-118.75699	NAD83 CASPV	
3/17/2017	two-striped garter snake	Thamnophis hammondii	1	34.52974845	-118.7570958	NAD83 CASPV	
9/12/2017	coast horned lizard	Phrynosoma blainvilli	1	34.39440892	-118.799061	NAD83 CASPV	
11/11/2017	two-striped garter snake	Thamnophis hammondii	1	34.566365	-118.841495	WGS84	
11/12/2017	two-striped garter snake	Thamnophis hammondii	1	34.549354	-118.802754	WGS84	
10/11/2017	pond turtle	Emys marmorata	1	34.585483	-118.777534	WGS84	found dead
10/11/2017	pond turtle	Emys marmorata	1	34.581875	-118.776791	WGS84	
10/10/2017	two-striped garter snake	Thamnophis hammondii	1	34.614441	-118.782737	WGS84	
4/4/2017	least Bell's vireo	Vireo bellii pusillus	1	34.23611214	-119.1966517	NAD83 CASPV	calling
4/4/2017	least Bell's vireo	Vireo bellii pusillus	1	34.24430814	-119.1882607	NAD83 CASPV	calling
4/4/2017	least Bell's vireo	Vireo bellii pusillus	1	34.24760414	-119.1815837	NAD83 CASPV	calling
4/4/2017	least Bell's vireo	Vireo bellii pusillus	1	34.26521514	-119.1637257	NAD83 CASPV	calling
4/4/2017	least Bell's vireo	Vireo bellii pusillus	1	34.26661714	-119.1599537	NAD83 CASPV	calling
4/4/2017	least Bell's vireo	Vireo bellii pusillus	1	34.29340213	-119.1237067	NAD83 CASPV	calling
5/12/2017	least Bell's vireo	Vireo bellii pusillus	1	34.53039869	-118.7569619	NAD83 CASPV	heard again June 9th
4/13/2017	least Bell's vireo	Vireo bellii pusillus	1	34.35387439	-119.0188491	NAD83 CASPV	calling
2017/04	least Bell's vireo	Vireo bellii pusillus	1	34.45896822	-118.7515503	NAD83 CASPV	repeatedly heard during spring 2017
2017/04	least Bell's vireo	Vireo bellii pusillus	1	34.4581015	-118.755233	NAD83 CASPV	repeatedly heard during spring 2017
5/18/2017	least Bell's vireo	Vireo bellii pusillus	1	34.40344543	-118.7875259	NAD83 CASPV	calling
5/31/2017	California condor	Gymnogyps californianus	10	34.48130564	-118.7640428	NAD83 CASPV	soaring
2017/04	least Bell's vireo	Vireo bellii pusillus	1	34.45700142	-118.7547952	NAD83 CASPV	repeatedly heard during spring 2017