

Monitoring of the California Red-legged Frog, *Rana aurora draytonii*, within Properties of the Los Baños Wildlife Area Complex, 2007



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Abstract

The California red-legged frog, *Rana aurora draytonii*, is a federally Threatened species and is considered a Species of Special Concern in the state of California. Factors such as habitat destruction, commercial harvest, pollution, and predation by non-native species may all have contributed to its decline. The California Department of Fish & Game has been conducting surveys for this species on the San Luis Reservoir and Upper Cottonwood Creek Wildlife Areas since 2001. Between March and September of 2007, we performed frog surveys on these properties at a total of 17 sites. We also conducted a one-time survey at three sites on Lower Cottonwood Creek Wildlife Area. Our monitoring consisted primarily of daytime visual surveys, and we were able to confirm frog presence and breeding activity at several sites on Upper Cottonwood Creek Wildlife Area. Habitat quality and frog health were key factors in our monitoring efforts and further study will give us important insight on the future management of these wildlife areas.

Keywords: California red-legged frog, *Rana aurora draytonii*, visual survey, grazing, wildlife area

Introduction

The California red-legged frog, *Rana aurora draytonii*, is federally listed as Threatened (U.S. Fish and Wildlife Service 2002), and is also considered a Species of Special Concern in the state of California (Jennings and Hayes 1994). California red-legged frogs (CRF) have been extirpated from approximately 70% of their historic range (U.S. Fish and Wildlife Service 2002). One factor that may have contributed to the frog's decline was extensive market harvesting during the late 1800's for frog legs (Jennings and Hayes 1985). When CRF numbers began to decline, bullfrogs (*Rana catesbeiana*) were introduced in order to sustain market demand but preyed upon CRF, thus lowering their numbers further (Jennings and Hayes 1994). Invasive species such as bullfrogs may also threaten natives by out-competing for shared resources (Keisecker et al. 2001). CRF habitat in the San Joaquin Valley has also undergone drastic changes due to the development of agriculture and urbanization. A great deal of habitat has been eliminated through agricultural reclamation efforts, with many locations having been drained and levied off. Flood control projects have disturbed a great deal of ephemeral pool systems as well. Some areas that were once seasonally wet, have now been converted into permanent waterways and ponds. These ponds are not ideal CRF habitat because water levels can often fluctuate in order to support the irrigation and drainage needs of farmlands. Permanent water also supports bullfrogs, which can out compete (and prey upon) CRF.

Though CRF have been extirpated from the Central Valley, they do persist in the Coast Range, Sierras, and disjunct populations can be found in the Transverse Range and south (U.S. Fish & Wildlife Service 2002). Since 2001, biologists from the Los Baños Wildlife Area Complex have been monitoring CRF populations on the Upper Cottonwood Creek Wildlife Area (UCCWA) and San Luis Reservoir Wildlife Area (SLRWA). These properties are located in the eastern foothills of the Coast Range and feature man-made stock ponds, springs, and ephemeral pools and drainages. The purpose of our surveys was to monitor CRF populations and assess any possible threats to its survival. We hope that long-term monitoring of CRF and their habitat could provide important insight for the management of this species. Prior to 2006, only opportunistic monitoring was completed when Department personnel were available. However, a new strategy has been adopted to monitor CRF populations on these Department-owned lands during regular intervals by use of a standardized protocol. Cattle grazing contracts at some study sites have also played an important role in controlling non-native grasses and in fire prevention. Continued monitoring of the health of CRF populations is a priority for the Department, as well as studying the effects that cattle presence may have on this species. This year we were also able to incorporate a one-time survey at three sites on Lower Cottonwood Creek Wildlife Area (LCCWA). This property has limited aquatic habitat, but is in close proximity to lands that support CRF, and restoration projects such as improvement of riparian corridors and enhancement of natural springs may take place in the future. Though this property is not known to harbor CRF, we had the personnel available to conduct a single survey of each pond in early spring in order to make sure no frogs were present in the event that restoration work might be disruptive.

Study Area

The Lower Cottonwood Creek, Upper Cottonwood Creek, and San Luis Reservoir Wildlife Areas are located approximately 15+ miles west of the town of Los Baños along Highway 152 (Figure 1). All three properties are a part of the California Department of Fish and Game's Los Baños Wildlife Area Complex. Vegetation associations for these areas are generally described as California annual grassland and both SLRWA and UCCWA also include blue oak habitat series (Sawyer and Keeler-Wolf 1995). The climate consists of

hot, dry summers, and relatively short and cool winters. Average rainfall is 28 cm per year (California Department of Fish and Game unpublished data 1970-2006).



Figure 1. Survey sites for California red-legged frogs at Lower Cottonwood Creek, Upper Cottonwood Creek, and San Luis Reservoir Wildlife Areas, 2007.

LCCWA (869 ha) is located within Merced County and is along the eastern most edge of the Coast Range. Two large bodies of water, the San Luis Reservoir and the O'Neill Forebay lie to the west and east of the wildlife area respectively. Riparian habitat on this property is limited to a single corridor which runs along an ephemeral stream. The elevation at LCCWA ranges from approximately 90-390 m.

UCCWA (1708.5 ha) lies primarily within Merced County, with a small portion also extending into eastern Santa Clara County. This property, as well as LCCWA, is owned and managed by the California Department of Fish and Game. Elevation ranges from approximately 200 m near the reservoir to 610 m along the northern ridges. UCCWA

harbors a number of springs, ponds, and ephemeral streams. There are several streams on the property that feature pooled water for part of the year. Aside from natural ponds, there are also man-made stock ponds, which provide additional frog habitat and were created by the previous landowner as well as Department personnel.

SLRWA (365 ha) is located in western Merced County along the south side of Highway 152, and is adjacent to the San Luis Reservoir. This wildlife area is owned by the U. S. Bureau of Reclamation and is managed by the California Department of Fish and Game. Elevation ranges from approximately 183 m to 460 m. This property is relatively small and harbors only a few ponds and ephemeral streams.

Methods

We conducted visual surveys based primarily on the techniques as described in Part B of the Revised Guidance on Site Assessments and Field Surveys for the California Red-legged Frog (U.S. Fish & Wildlife Service 2005). These guidelines were developed as an optimal method for detecting CRF at designated project sites, which once in development, could pose threats to CRF or their habitat. However, because our surveys are used to monitor sites with protected habitat, we modified some portions of their protocol as necessary. The following list includes other modifications incorporated into our protocol:

- Surveys begin during late winter or early spring, as soon as property access is feasible.
- Each site is surveyed approximately once per month (weather permitting) through no later than October.
- Surveying may cease prior to October if: a) survey sites become dry, b) heavy winter rains begin to re-fill the survey sites, or c) CRF life stages recorded are indicative of breeding; further surveys at these sites are not required (but are optional) for the remainder of the season.
- Dip-netting or other disturbance of CRF and/or aquatic habitat is avoided unless necessary for identification purposes.

Our surveys are comprised of two parts, including an initial survey and a perimeter search, and are usually conducted by one to two surveyors. During the initial survey, we stop at a vantage point and scan the pond and surrounding habitat with binoculars and

listen for frog calls. Though our surveys focus on CRF, we record and tally the life stages of all identifiable herpetofauna (reptiles and amphibians). After our initial survey, we slowly approach the pond, paying careful attention to any fleeing animals, and begin to walk the perimeter. Though we follow standard guidelines for disinfecting footwear and dip nets to prevent the possibility of spreading of any diseases or agents which may harm CRF populations, care is also taken in minimizing our contact with mud or water unless necessary. The perimeter search is treated as a separate survey so while walking, we stop and scan the water and banks, and again record and tally all herpetofauna life stages (including any animals which may have already been tallied during our initial survey).

Prior to leaving the site, we also record information such as weather conditions, air and water temperature, and we make note on our data sheet (Appendix A) of any other incidentally observed animals or unique environmental conditions (e.g. recent fire, pollution, habitat destruction, etc.). Finally, we take a minimum of two photographs for each survey site from pre-determined photo points. These points have been marked with a global positioning system (GPS) and surveyors navigate to them while in the field. Therefore, photographs taken each time a site is surveyed may be easily compared for any habitat changes. Due to the remote nature of many of our monitoring sites, and the presence of cougars at UCCWA and SLRWA, we usually perform daytime surveys only. However, optimal driving conditions this season permitted us to conduct two night surveys during the breeding season at one of the properties. Though photos are not taken from photo points, these surveys are conducted in a similar fashion as daytime surveys. However, we use handheld spotlights (held at eye level to best detect frog eye-shine) in combination with binoculars during the perimeter search.

We enter all of our raw data into an Access database, and report all CRF findings to the California Natural Diversity Database (CNDDDB). Surveyors carry a GPS in the field and record coordinates for any incidental sightings of CRF or other listed species, which we also report to the CNDDDB. We use GIS (geographic information system) software to create and manage the coordinates of our survey sites, photo points, and significant incidental species observed while on the wildlife areas.

Results

We conducted surveys at SLRWA and UCCWA from early March through late-September, but only completed one survey during May due to staffing problems and high winds. Because of very low precipitation during winter, many sites dried early this year. During March, we also conducted surveys at LCCWA. During the 2007 season, we completed a combined total of 58 surveys and were able to confirm CRF presence and breeding activity at UCCWA. While conducting our monitoring, we did not observe amphibians (of any species) that appeared to have obvious signs of disease or malformations. In addition to CRF, all other incidental wildlife observed during our surveying efforts were recorded and are provided in Appendix B.

There are three known ponds at LCCWA, and though CRF surveys have not been performed in the past, prior unrelated dip-netting efforts on the property failed to yield this species. Aeromatic Pond is the only site which is spring-fed and usually holds some water even during drought conditions. Because of possible plans to do silt removal at that spring, we decided to survey all three ponds on LCCWA during March, before any restoration work was to take place. We did not observe CRF during our surveys and restoration work has not begun to date.

At SLRWA, we surveyed a total of three sites, two of which dried by early spring. The remaining site, Lost Pond, held only a small amount of water until July. This pond was formed by a firebreak, which crosses and dams a small, ephemeral stream flowing directly to the San Luis Reservoir. Though this site normally holds water later in the season than the remaining two ponds, it was noted during 2005 that the firebreak began to erode due to a heavy winter with high precipitation. By 2006, we found that the firebreak had completely washed out and that the pond no longer held much water. During our 2007 surveys, conditions remained the same at Lost Pond, and we observed that thick vegetation has increased (Figure 2). During previous years of surveying, no other site on the property has yielded CRF observations. This year, we did not observe any CRF at SLRWA.



Figure 2. Lost Pond at San Luis Reservoir Wildlife Area prior to firebreak washout (at left) during May of 2005, and post washout (at right) during June of 2007.

This season, we surveyed a total of 14 sites at UCCWA. A grazing contract was in effect on this property between January 1st and March 1st of 2007. During past years cattle were sometimes placed on the property via one location and would congregate at select stock ponds. However, this year we observed that cattle were more effectively spread across the property, resulting in less disturbance of CRF habitat. We observed CRF at nine of our survey sites and were able to confirm breeding at three of those locations (Table 1). Although we monitored Imaginary Pond in previous years, it was dry upon our first visit in March so we were unable to conduct any surveys at that site during 2007. After completing one survey at Lower East Pond, we no longer visited due to an already heavy infestation of Red Swamp Crayfish, *Procambarus clarkii*. Upper East Pond developed a thick algal bloom and few signs of animal use were observed during our August survey, so we did not re-visit it during September.

Table 1. California red-legged frog presence found during surveys at Upper Cottonwood Creek Wildlife Area, 2007. Sites surveyed approximately once per month unless ponds became dry or breeding was confirmed; we opted to continue surveys at Muddy Reservoir and Secret Pond for training of new personnel. (y = frog presence; b = life stage(s) confirm breeding; -- = survey conducted, no frog presence.)

Survey Sites	Month Surveyed					
	Mar	Apr	Jun	Jul	Aug	Sep
Alfredo Sink	--	--	--		y ^a	y
Barefoot Pond	--	--				
County-line Pond	y ^b	--	--			
Deer Reservoir	--	--	--	--	b	
Fin Dome Pond	y ^a					
Justin Pond	--	--				
Lower East Pond	--					
Muddy Reservoir	b ^b		--		b	
O'Connell Stock Pond		y ^a				
Plunge Pool	--	--	y	y	--	--
Red-legged Frog Pond	--	--	y	y	y	y
Scissor-kick Pond	--	--				
Secret Pond	--	--	y		b ^a	b
Upper East Pond	--	--	--		--	

^a = site surveyed twice within the same month

^b = presence found during night survey only

Discussion

From our monitoring efforts in 2007, we found that CRF are present at UCCWA, and are also utilizing this wildlife area for breeding. Although the frogs we observed did not appear unhealthy, we will continue to follow standardized disinfection procedures in order to minimize the spread of any potential diseases. We also feel that continued monitoring at regular intervals every season, as well as photographing sites from set locations during each survey, will allow us to better identify trends in both the use and health of CRF habitat. By trying to conduct surveys on a monthly basis, we will be better able to monitor changes in habitat, both seasonally and from year to year.

Though no CRF have ever been observed at LCCWA, it is in close proximity to lands which do support frog populations. This property has relatively little aquatic habitat, and the remainder consists almost entirely of annual grassland. Managers of the wildlife area have

discussed restoration plans to benefit wildlife by increasing the available water and riparian habitat. It is possible that this type of restoration work could draw in nearby CRF, which makes this property an excellent candidate for future frog surveys. Grazing regimes are also utilized at LCCWA, and thus add to the importance of regular CRF monitoring to determine if frogs are present and to see if cattle need to be provided with additional sources of water. We recommend this property be fully incorporated into the Department's regular frog monitoring activities. We also suggest that photographs be taken prior to, during, and after restoration work so that changes in habitat can be documented.

In past years, surveying efforts at SLRWA have often yielded CRF adults at Lost Pond, which appeared to use it as an over-summering site and for feeding habitat. We have yet to observe CRF at any other site on this property. Since the firebreak that helped to create this aquatic habitat has washed out, Lost Pond no longer holds any significant amount of water and we did not observe frogs here during 2007. This particular firebreak has not been maintained for some time and at a minimum, repairing that section in order to re-dam Lost Pond could be very beneficial for continuing to have CRF present on this wildlife area (Figure 3). In addition, the installation of some form of culvert here may help to prevent future washouts during heavy winter rains. We also recommend that all three sites at SLRWA continue to be monitored for CRF presence.



Figure 3. San Luis Reservoir Wildlife Area firebreak at Lost pond during early stages of erosion (at left, 2005) and after completely washed out with pond no longer dammed (at right, 2006).

Based on the results of our monitoring at UCCWA, we feel that continued surveying on this property is important and also have several site-specific recommendations. This

year we were able to conduct two night surveys, which both proved successful in locating CRF. Because of the low precipitation this winter, we were still able to drive to a few sites following significant rains during the breeding season. The first was done at County-line Pond, a site which once was used for breeding but did not yield any frog observations in 2006. We found two adult frogs during that night survey, and did not observe CRF during any of our 2007 daytime surveys of this site. The second night survey, conducted at Muddy Reservoir, yielded both adult frogs as well as a few egg masses (Figure 4).



Figure 4. California red-legged frog adult (at left) and egg mass (at right) observed during a night survey at Muddy Reservoir on Upper Cottonwood Creek Wildlife Area, March 2007.

One site that we no longer plan to survey is Lower East Pond. Though CRF have been observed here a few times during past years, this pond is heavily infested with Red Swamp Crayfish (*Procambarus clarkii*). When the San Luis Reservoir is full, it floods onto UCCWA via a culvert that runs underneath Highway 152 and is located next to Lower East Pond. The crayfish then make their way into the pond and are a highly aggressive and invasive species that are known to predate on amphibians (Fidalgo et al. 2001, Gamradt and Kats 1996, Gamradt et al. 1997, Gil-Sánchez and Alba-Tercedor 2002). No frogs have been observed at this site for a few years and moderate numbers of crayfish are consistently found. Though we no longer recommend surveying this site, we do stress the importance of recording crayfish presence at other ponds and along drainages, as they may pose a serious threat to the health of CRF populations.

One of the Department's goals has been to watch the interaction between cattle grazing on UCCWA and the effect it has on CRF and their habitat. Cattle are not only an important tool in keeping non-native grasses in check and reducing fire hazard amongst grasslands, but it has also been suggested that grazing may be an effective tool in the management of CRF habitat. Grazing can reduce the buildup of emergent vegetation and algae along the pond edges, which may benefit tadpole development (Scott and Rathbun 2002). However, too much trampling by cattle can cause an excessive amount of silt, which could potentially harm eggs or tadpoles. During 2005, Department personnel were only able to conduct a few CRF surveys at UCCWA, but found no frogs at a site which often contained many and was known from previous years as a breeding pond. It was also noted that prior to those 2005 surveys, when cattle were placed on the property, they were all deposited near this site (County-line Pond) and trampled it heavily. Since 2006, ranchers have been instructed to spread the cattle more evenly across the property and now do an effective job. Our only observation of CRF at County-line Pond this year was two adults seen during our night survey in March, and we did not witness breeding calls or locate any egg masses. We cannot conclude if the lack of frogs here is a natural occurrence, is due to the heavy trampling that took place prior to the 2005 surveys, or is simply due to this year's drought conditions. We do however recommend fencing off a portion of the pond as well as some of the upland habitat (important for adult frogs) in order to see if frogs might return to this site.

Other Recommendations

One project underway right now is the development of spring boxes at Lower and Upper Cottonwood Creek Wildlife Areas. Natural springs are developed in order to provide drinking troughs that can be utilized by both wildlife and cattle (Figure 5). Especially as troughs overflow and create marsh-like habitat, these might be additional sites worth surveying for CRF in the future. Currently, plans also exist to develop LCCWA in order to expand both the limited riparian habitat and available summer water, and should be incorporated into our CRF monitoring efforts. During past, unrelated dip-netting surveys, no CRF were ever found at LCCWA. Because this wildlife area may be undergoing restoration to provide more aquatic habitat, and because this property is also grazed, it is

an excellent opportunity for us to begin regular monitoring in order to see if it might one day sustain CRF populations.



Figure 5. A box created around a natural spring (at left) with underground piping, which feeds a drinking trough several meters away (at right). Upper Cottonwood Creek Wildlife Area, 2007.

Because of the remote nature of most of our sites, and poor road conditions during the breeding season, night surveying for CRF is usually not a possibility. However, if conditions permit, we recommend continued night-surveying of County-line Pond at UCCWA. This pond is located along a dirt road and would not require surveyors to walk to the interior of the property. Surveying this pond at night could reveal if frogs are still trying to breed here but are no longer successful. Another site, which would be a good candidate for night surveys is Little Panoche Reservoir Wildlife Area (LPRWA). During other herpetofauna work in 2005 and prior to that, CRF have been confirmed at this property. However, because of thick cattail habitat, visual surveys are extremely difficult here. Listening for frog calls at night during the CRF breeding season might be an easy way to confirm its presence at this property. In addition, access to aquatic habitat at LPRWA is relatively easy even during the winter months.

Monitoring at SLRWA, as well as at Lower and Upper Cottonwood Creek Wildlife Areas should continue to take place regularly. By following the same protocol, we can more easily see changes in both CRF habitat and its use. In addition, these survey sites and ponds are used by many different forms of wildlife, thus continued monitoring will allow

the Department to better manage these lands in the future for a number of species, as well as for public use.

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APPENDIX B. Non-target wildlife species observed at California red-legged frog survey sites on Lower Cottonwood Creek Wildlife Area (LCCWA), Upper Cottonwood Creek Wildlife Area (UCCWA), and San Luis Reservoir Wildlife Area (SLRWA), 2007. Because of the presence of feral cats and hunting dogs, additional rows have been added for canine and feline tracks since they cannot always be identified to species. (Observation types: 1 = visual; 2 = visual with signs of breeding; 3 = auditory; 4 = tracks, 5 = visual observation while en route to site.)

SPECIES OBSERVED*	LCCWA			UCCWA													SLRWA					
	Aeromatic Pond	Lower Aeromatic Pond	San Luis Pond	Alfredo Sink	Barefoot Pond	County-line Pond	Deer Reservoir	Fin Dome Pond	Justin Pond	Lower East Pond	Muddy Reservoir	O'Connell Stock Pond	Plunge Pool	Red-legged Frog Pond	Scissor-kick Pond	Secret Pond	Upper East Pond	Wittle Pond	Lizard Pond	Lost Pond	Guitar Pick Pond	
AVIFAUNA																						
Acorn Woodpecker <i>Melanerpes formicivorus</i>																3						
American Coot <i>Fulica americana</i>							1															
American Goldfinch <i>Carduelis tristis</i>							1									1	1					
Ash-throated Flycatcher <i>Myiarchus cinerascens</i>																	1					
Bewick's Wren <i>Thryomates bewickii</i>														1								
Black Phoebe <i>Sayornis nigricans</i>						1	1							1		1						
Brewer's Blackbird <i>Euphagus cyanocephalus</i>											1		1				1					
Brown-headed Cowbird <i>Molothrus ater</i>																	1					
Bushtit <i>Psaltriparus minimus</i>				1										1								

APPENDIX B continued. (Observation types: 1 = visual; 2 = visual with signs of breeding; 3 = auditory; 4 = tracks, 5 = visual observation while en route to site.)

SPECIES OBSERVED*	LCCWA			UCCWA														SLRWA				
	Aeromatic Pond	Lower Aeromatic Pond	San Luis Pond	Alfredo Sink	Barefoot Pond	County-line Pond	Deer Reservoir	Fin Dome Pond	Justin Pond	Lower East Pond	Muddy Reservoir	O'Connell Stock Pond	Plunge Pool	Red-legged Frog Pond	Scissor-kick Pond	Secret Pond	Upper East Pond	Wittle Pond	Lizard Pond	Lost Pond	Guitar Pick Pond	
AVIFAUNA continued...																						
California Quail <i>Callipepla californica</i>																1					1	
Golden Eagle <i>Aquila chrysaetos</i>												1										
Greater Roadrunner <i>Geococcyx californianus</i>														5								
Greater Yellowlegs <i>Tringa melanoleuca</i>																	1					
House Finch <i>Carpodacus mexicanus</i>				1												1	1					
Hummingbird (unknown species)				1																		
Killdeer <i>Charadrius vociferous</i>			1									1										
Lawrence's Goldfinch <i>Carduelis lawrencei</i>											1			1		1						
Lesser Goldfinch <i>Carduelis psaltria</i>				1			1									1						
Mallard <i>Anas platyrhynchos</i>		1	1				1										1					

APPENDIX B continued. (Observation types: 1 = visual; 2 = visual with signs of breeding; 3 = auditory; 4 = tracks, 5 = visual observation while en route to site.)

SPECIES OBSERVED*	LCCWA			UCCWA															SLRWA			
	Aeromatic Pond	Lower Aeromatic Pond	San Luis Pond	Alfredo Sink	Barefoot Pond	County-line Pond	Deer Reservoir	Fin Dome Pond	Justin Pond	Lower East Pond	Muddy Reservoir	O'Connell Stock Pond	Plunge Pool	Red-legged Frog Pond	Scissor-kick Pond	Secret Pond	Upper East Pond	Wittle Pond	Lizard Pond	Lost Pond	Guitar Pick Pond	
AVIFAUNA continued...																						
Mourning Dove <i>Zenaida macroura</i>						1	1				1		1			1	1					
Oak Titmouse <i>Baeolophus inornatus</i>				1		1	1									1						
Oregon Junco <i>Junco hyemalis oregonus</i>				1																		
Phainopepla <i>Phainopepla nitens</i>													1				1					
Prairie Falcon <i>Falco mexicanus</i>				1																		
Red-shafted Flicker <i>Colaptes auratus cafer</i>											1					1						
Red-tailed Hawk <i>Buteo jamaicensis</i>				1		1						2	1		1	1	1					
Red-winged Blackbird <i>Agelaius phoeniceus</i>			1				1															
Rufous-crowned Sparrow <i>Aimophila ruficeps</i>							1															
Savannah Sparrow <i>Passerculus sandwichensis</i>				1																		

APPENDIX B continued. (Observation types: 1 = visual; 2 = visual with signs of breeding; 3 = auditory; 4 = tracks, 5 = visual observation while en route to site.)

SPECIES OBSERVED*	LCCWA			UCCWA														SLRWA				
	Aeromatic Pond	Lower Aeromatic Pond	San Luis Pond	Alfredo Sink	Barefoot Pond	County-line Pond	Deer Reservoir	Fin Dome Pond	Justin Pond	Lower East Pond	Muddy Reservoir	O'Connell Stock Pond	Plunge Pool	Red-legged Frog Pond	Scissor-kick Pond	Secret Pond	Upper East Pond	Wittle Pond	Lizard Pond	Lost Pond	Guitar Pick Pond	
AVIFAUNA continued...																						
Tree Swallow <i>Tachycineta bicolor</i>				1							1					1						
Turkey Vulture <i>Cathartes aura</i>				1	1			1	1		1					1				1		
Violet-green Swallow <i>Tachycineta thalassina</i>						1					1											
Western Bluebird <i>Sialia mexicana</i>				1												1						
Western Kingbird <i>Tyrannus verticalis</i>				1		1										1						
Western Scrub-jay <i>Aphelocoma californica</i>				1			1				1		1	1		1	1					
White-breasted Nuthatch <i>Sitta carolinensis</i>						1																
Wild Turkey <i>Meleagris gallopavo</i>																3						

APPENDIX B continued. (Observation types: 1 = visual; 2 = visual with signs of breeding; 3 = auditory; 4 = tracks, 5 = visual observation while en route to site.)

SPECIES OBSERVED*	LCCWA			UCCWA															SLRWA			
	Aeromatic Pond	Lower Aeromatic Pond	San Luis Pond	Alfredo Sink	Barefoot Pond	County-line Pond	Deer Reservoir	Fin Dome Pond	Justin Pond	Lower East Pond	Muddy Reservoir	O'Connell Stock Pond	Plunge Pool	Red-legged Frog Pond	Scissor-kick Pond	Secret Pond	Upper East Pond	Wittle Pond	Lizard Pond	Lost Pond	Guitar Pick Pond	
AVIFAUNA continued...																						
Woodpecker (unknown species)				3																3		
HERPETOFAUNA																						
California Toad <i>Bufo boreas halophilus</i>			5																			
California Alligator Lizard <i>Elgaria multicarinata m.</i>																1						
Coast Range Newt <i>Taricha torosa torosa</i>				2		2	2				2	1	1			2	2				2	
Northern Pacific Rattlesnake <i>Crotalus viridis oregonus</i>							1														1	
Pacific Treefrog <i>Hyla regilla</i>	1		2	2	2	1	2	2	2		2	2	2	1		2	2					2
Ring-necked Snake <i>Diadophis punctatus</i>				1																		
Santa Cruz Garter Snake <i>Thamnophis atratus a.</i>				1	1	1	1	1	1		1	2	1	1	1	1	1				1	
Skilton's Skink <i>Eumeces skiltonianus s.</i>														1		1						

APPENDIX B continued. (Observation types: 1 = visual; 2 = visual with signs of breeding; 3 = auditory; 4 = tracks, 5 = visual observation while en route to site.)

SPECIES OBSERVED*	LCCWA			UCCWA															SLRWA			
	Aeromatic Pond	Lower Aeromatic Pond	San Luis Pond	Alfredo Sink	Barefoot Pond	County-line Pond	Deer Reservoir	Fin Dome Pond	Justin Pond	Lower East Pond	Muddy Reservoir	O'Connell Stock Pond	Plunge Pool	Red-legged Frog Pond	Scissor-kick Pond	Secret Pond	Upper East Pond	Wittle Pond	Lizard Pond	Lost Pond	Guitar Pick Pond	
HERPETOFAUNA cont...																						
Valley Garter Snake <i>Thamnophis sirtalis fitchi</i>							1															
Western Fence Lizard <i>Sceloporus occidentalis</i>				1			1		1			1	1			1						
Yellow-bellied Racer <i>Coluber constrictor mormon</i>				1							1											
MAMMALS																						
Badger <i>Taxidea taxus</i>																	1					
Canine (unknown species)			4	4	4			4	4							4	4		4			
Common Raccoon <i>Procyon lotor</i>					4							4					4					
Coyote <i>Canis latrans</i>						3																
Desert Cottontail <i>Sylvilagus aquaticus</i>							1							1								
Feline (unknown species)								4														

APPENDIX B continued. (Observation types: 1 = visual; 2 = visual with signs of breeding; 3 = auditory; 4 = tracks, 5 = visual observation while en route to site.)

SPECIES OBSERVED*	LCCWA			UCCWA														SLRWA				
	Aeromatic Pond	Lower Aeromatic Pond	San Luis Pond	Alfredo Sink	Barefoot Pond	County-line Pond	Deer Reservoir	Fin Dome Pond	Justin Pond	Lower East Pond	Muddy Reservoir	O'Connell Stock Pond	Plunge Pool	Red-legged Frog Pond	Scissor-kick Pond	Secret Pond	Upper East Pond	Wittle Pond	Lizard Pond	Lost Pond	Guitar Pick Pond	
Mammals cont...																						
Mule Deer <i>Odocoileus hemionus</i>				4	1	4	4	4	4		4	4		4		1	4					
Skunk <i>Mephitis</i> spp								4														

*Species keyed using Sibley's Field Guide to Birds of Western North America, 2003; Stebbins' Western Reptiles and Amphibians Third Ed., 2003; & Jameson and Peeters' Mammals of California, 2004.