Monitoring of the California Red-legged Frog, *Rana aurora draytonii*, within Properties of the Los Baños Wildlife Area Complex, 2006

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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 February and October of 2006, we performed frog surveys on these properties at a total of 21 sites. Our monitoring consisted of daytime visual surveys, where we were able to confirm frog presence at both wildlife areas, and breeding activity at several sites on one property. 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.

Study Area

The Upper Cottonwood Creek and San Luis Reservoir Wildlife Areas are located approximately 18 miles west of the town of Los Baños along Highway 152 (Figure 1). Both 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 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).

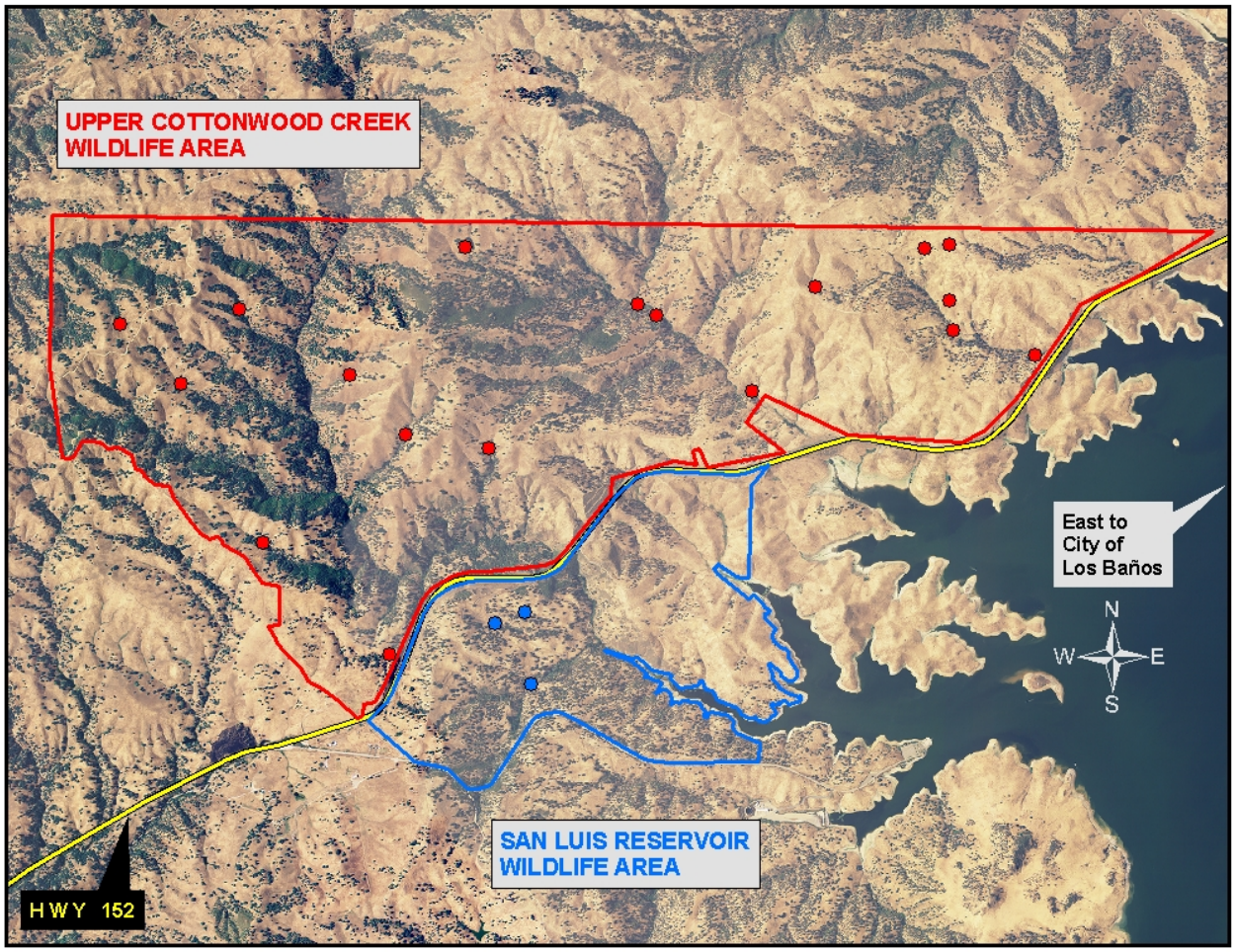

Figure 1. 2006 survey sites for California red-legged frogs at San Luis Reservoir and Upper Cottonwood Creek Wildlife Areas.

SLRWA (365 ha) is located in western Merced County along the south side of HWY 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. At SLRWA, we surveyed for CRF at a total of three sites.

UCCWA (1708.5 ha) is north of Highway 152 and lies primarily within Merced County, with a small portion also extending into eastern Santa Clara County. This property is both 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. At UCCWA, we surveyed for CRF at a total of 18 sites.

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. Due to the remote nature of many of our monitoring sites and the presence of cougars at UCCWA and SLRWA, we performed daytime surveys only. 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.

We enter all of our raw data into an Access database, and report all CRF findings to the California Natural Diversity Database (CNDDB). 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 CNDDB. 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 late February through mid-October, and were able to confirm CRF presence at both properties. During 2006, we completed a combined total of 87 surveys. 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.

At SLRWA, we surveyed a total of three sites and observed a single adult frog at Lost Pond (Table 1). 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. In 2006, we found that the firebreak had completely washed out and that the pond no longer holds much water (Figure 2). During previous years of surveying, no other site on the property has yielded CRF observations.

Table 1. California red-legged frog presence found during surveys at San Luis Reservoir Wildlife Area, 2006. Sites surveyed through October or until ponds became dry. (y = frog presence; -- = survey conducted, no frog presence.)

Survey Sites	*Month Surveyed*				
	Feb	**Apr**	**Jun**	**Aug**	**Oct**
Guitar Pick Pond	--	--	--	--	
Lizard Pond	--	--	--	--	
Lost Pond	--	y	--	--	--

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 February of 2006.

This year we surveyed a total of 18 sites at UCCWA, including two newly located ponds. A grazing contract was in effect on this property between January and March of 2006. 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 2). During one survey at Muddy Reservoir, we did observe a number of dead CRF tadpoles (nearly fully developed) floating along the edge of the pond. However, none of the animals we observed or collected appeared diseased or deformed in any way.

Table 2. California red-legged frog presence found during surveys at Upper Cottonwood Creek Wildlife Area, 2006. Sites surveyed approximately once per month unless ponds became dry or breeding was confirmed. (y = frog presence; b = life stage(s) confirm breeding; -- = survey conducted, no frog presence.)

Survey Sites	*Month Surveyed*							
	Feb	**Mar**	**Apr**	**May**	**Jun**	**Aug**	**Sep**	**Oct**
Alfredo Sink	--		--	--		y		--
Barefoot Pond	--		--	y		--		
Big Bully Gully		--		--				
Bucket Pool	--		--		--	--		
County-line Pond	--		--	--		--	--	
Deer Reservoir	y		--	--		b		
Fin Dome Pond		--		--[a]				
Imaginary Pond	--		--		--	--		
Justin Pond	y		--	y		--		
Lower East Pond	--		--		--	--		--
Muddy Reservoir		y		y[a]		b		
O'Connell Stock Pond		--		y[a]		y	y	
Plunge Pool	--		--	y		y		y
Red-legged Frog Pond	--		--	--		y		y
Scissor-kick Pond	--		--		--	--		
Secret Pond	--		--	b				
Upper East Pond	--		--			--		--
Wittle Pond	--		--		--	--		

[a] = site surveyed twice within the same month

Discussion

From our monitoring efforts in 2006, we found that CRF are present at both wildlife areas, and are utilizing UCCWA 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.

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 observed only one frog here during 2006. This particular firebreak has not been maintained for some time and at 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. 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.

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 did find deceased CRF at Muddy Reservoir, which is a large, deep pond that has often been used for breeding. All of the dead animals observed were developing tadpoles with fully formed hind legs and were of similar size. Due to a previous bout of hot weather however, it may be possible that edge water temperatures simply became too high and could have depleted oxygen levels. The water temperature recorded at the pond's edge that day was 21.5° C (70.7° F), though ambient temperatures had been higher during the previous week. None of the dead CRF appeared to have any asymmetry to their limbs or bodies, nor did we observe many dying individuals (most were already dead). We also recorded many live tadpoles, metamorphs, and adult frogs on the same survey, which all appeared to be healthy. Because this site has also been used frequently for breeding, the site should continue to be monitored and serves as an excellent training pond for new personnel to hone their identification skills.

One of the new sites surveyed at UCCWA this year was Big Bully Gully. It is located in a remote location and gets its water supply from a spring-fed drainage. Upon our first

visit to the pond, we noticed a similar situation to that of Lost Pond at SLRWA, where the firebreak creating a berm at the lower end of the pond had washed out (Figure 3). However, the washout appears to have taken place years prior and this pond was completely dry by early May. In addition, no CRF were observed within the pond or along the drainage above. Because the drainage is spring-fed and often holds water even after the pond is dry, this site might be an excellent candidate for some type of restoration work as well. However, we feel no further surveying is necessary unless this pond is restored, and instead plan to focus our efforts on more optimal locations for the time being.

Figure 3. Upper Cottonwood Creek Wildlife Area berm erosion at Big Bully Gully while viewing pond from east side (at left) and from southwestern side (at right), 2006.

Another 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. This year ranchers were instructed to spread the cattle more evenly across the property and did an effective job. However, we surveyed County-line Pond a total of five times in 2006 and again, found no CRF present. Though we cannot conclude if the lack of frogs here is a natural occurrence or is actually due to the heavy trampling that took place prior to the 2005 surveys, we do 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 and troughs at UCCWA and Lower Cottonwood Creek Wildlife Area (LCCWA). 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.

Because of the remote nature of most of our sites, and poor road conditions during breeding season, night surveying for CRF is usually not a possibility. However, if conditions permit, we recommend that the Department conduct 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 would be 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 LPRWA is relatively easy even during the winter months.

Overall, continued monitoring at SLRWA and UCCWA should take place, and by continuing to follow 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.

Acknowledgements

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APPENDIX A. California Red-legged Frog Survey Data Form.

*Survey Personnel:*_____ *Date:*_____*Time:*_____

Study Area		Air Temp @ Pond	°C / °F
Pond / Site		Water Temp	°C / °F
		Weather Code	

 # Photos Taken
Photo Point 1
Photo Point 2

INITIAL ANIMAL COUNT

Spp. Code	*Lifestage*	*Tally*	*Notes*

PERIMETER COUNT

Spp. Code	*Lifestage*	*Tally*	*Notes*

Weather Codes: 1= Sunny and Clear; 2=Less than 50% cloud cover; 3=Greater than 50% cloud cover; 4=Rain

NOTES / COMMENTS

APPENDIX B. Non-target wildlife species observed at California red-legged frog survey sites on San Luis Reservoir Wildlife Area (SLRWA) and Upper Cottonwood Creek Wildlife Area (UCCWA), 2006. Because of the presence of both 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.)

SPECIES OBSERVED*	SLRWA			UCCWA																
	Lizard Pond	Lost Pond	Guitar Pick Pond	Alfredo Sink	Barefoot Pond	Big Bully Gully	Bucket Pool	County-line Pond	Deer Reservoir	Fin Dome Pond	Imaginary 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
AVIFAUNA																					
American Kestrel *Falco sparverius*																		1			
Black Phoebe *Sayornis nigricans*			1	1					1		1		1						1	1	
Brewer's Blackbird *Euphagus cyanocephalus*					1															1	
Bufflehead *Bucephala albeola*														1							
California Quail *Callipepla californica*									1											1	
Common Raven *Corvus corax*														1							
Ferruginous Hawk *Buteo regalis*						1															
Golden Eagle *Aquila chrysaetos*							1												1		
Great Blue Heron *Ardea herodias*								1													

APPENDIX B continued. (Observation types: 1 = visual; 2 = visual with signs of breeding; 3 = auditory; 4 = tracks.)

SPECIES OBSERVED*	SLRWA			UCCWA																
	Lizard Pond	Lost Pond	Guitar Pick Pond	Alfredo Sink	Barefoot Pond	Big Bully Gully	Bucket Pool	County-line Pond	Deer Reservoir	Fin Dome Pond	Imaginary 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
AVIFAUNA continued…																					
Great Egret *Ardea alba*								1												1	
Hummingbird (unknown species)																1					
Killdeer *Charadrius vociferous*					1						1										
Mallard *Anas platyrhynchos*				1			1		1											1	
Mourning Doves *Zenaida macroura*	1			1	1									1				1		1	
Oak Titmouse *Baeolophus inornatus*			1																		
Red-tailed Hawk *Buteo jamaicensis*											1		1		1					1	1
Red-winged Blackbird *Agelaius phoeniceus*								1	1				1	1							
Rock Wren *Salpinctes obsoletus*																1					
Tricolored Blackbird *Agelaius tricolor*													1								

APPENDIX B continued. (Observation types: 1 = visual; 2 = visual with signs of breeding; 3 = auditory; 4 = tracks.)

SPECIES OBSERVED*	SLRWA			UCCWA																	
	Lizard Pond	Lost Pond	Guitar Pick Pond	Alfredo Sink	Barefoot Pond	Big Bully Gully	Bucket Pool	County-line Pond	Deer Reservoir	Fin Dome Pond	Imaginary 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
AVIFAUNA continued…																					
Turkey Vulture *Cathartes aura*														1	1						1
Western Bluebird *Sialia mexicana*															1					1	
Western Meadowlark *Sturnella neglecta*																		1			
Western Scrub-jay *Aphelocoma californica*									1											1	
White-crowned Sparrow *Zonotrichia leucophrys*				1																	
Wild Turkey *Meleagris gallopavo*				3				3						1							
Woodpecker (unknown species)															3						
Yellow-rumped Warbler *Dendroica coronata*											1							1			
HERPETOFAUNA																					
California Toad *Bufo boreas halophilus*														2							
Coast Range Newt *Taricha torosa torosa*	2	2	2	2	2			2	2	1	1	2		2	2	2		2	2	2	

APPENDIX B continued. (Observation types: 1 = visual; 2 = visual with signs of breeding; 3 = auditory; 4 = tracks.)

SPECIES OBSERVED*	SLRWA			UCCWA																	
	Lizard Pond	Lost Pond	Guitar Pick Pond	Alfredo Sink	Barefoot Pond	Big Bully Gully	Bucket Pool	County-line Pond	Deer Reservoir	Fin Dome Pond	Imaginary 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
HERPETOFAUNA continued…																					
Pacific Treefrog *Hyla regilla*	2	1	2	2	2	3	2	2	2	2	2	2	3	2	2	3	3	2	1	2	2
Pacific Gopher Snake *Pituophis catenifer c.*									1												
Santa Cruz Garter Snake *Thamnophis atratus a.*	1	1	1	2	1			1	1	1	1	1		2	2		1	1	1	1	
Skilton's Skink *Eumeces skiltonianus s.*				1																	
Valley Garter Snake *Thamnophis sirtalis fitchi*														1							
Western Fence Lizard *Sceloporus occidentalis*		1		1	1		1								1		1	1			
Western Pond Turtle *Clemmys marmorata*				1																	
Yellow-bellied Racer *Coluber constrictor mormon*									1												
MAMMALS																					
Bobcat *Lynx rufus*															4						4
California Ground Squirrel *Spermophilus beecheyi*					1																

APPENDIX B continued. (Observation types: 1 = visual; 2 = visual with signs of breeding; 3 = auditory; 4 = tracks.)

SPECIES OBSERVED*	SLRWA			UCCWA																
	Lizard Pond	Lost Pond	Guitar Pick Pond	Alfredo Sink	Barefoot Pond	Big Bully Gully	Bucket Pool	County-line Pond	Deer Reservoir	Fin Dome Pond	Imaginary 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
MAMMALS continued…																					
California Vole *Microtus californicus*	1											1									
Canine (unknown species)	4			4	4	4				4		4			4			4	4	1	4
Common Raccoon *Procyon lotor*	4		4		4									4					4	4	
Coyote *Canis latrans*																1					
Desert Cottontail *Sylvilagus aquaticus*													1								
Dusky-footed Woodrat *Neotoma fuscipes*		1																			
Feline (unknown species)						4													4		
Feral Pig *Sus scrofa*	1			4				4													
Mountain Lion *Felis concolor*												4									
Mule Deer *Odocoileus hemionus*	4	1	4	4	4	4		4	4	1				4	4			4	4	4	

APPENDIX B continued. (Observation types: 1 = visual; 2 = visual with signs of breeding; 3 = auditory; 4 = tracks.)

SPECIES OBSERVED*	SLRWA			UCCWA																	
	Lizard Pond	Lost Pond	Guitar Pick Pond	Alfredo Sink	Barefoot Pond	Big Bully Gully	Bucket Pool	County-line Pond	Deer Reservoir	Fin Dome Pond	Imaginary 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
MAMMALS continued…																					
Striped Skunk *Mephitis mephitis*																					4
Tule Elk *Cervus elaphus nannodes*	1																				

*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.