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## Summary Report



### **Diamond Lake Restoration Project Amphibian Study**

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Submitted to:

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## 1. BACKGROUND

### 1.1. PROJECT OVERVIEW

Turnstone Environmental Consultants Inc. (TECI) was contracted by the Oregon Department of Fish and Wildlife (ODFW) to monitor populations of two strategy species, the Western Toad (*Bufo boreas*) and the Cascade Frog (*Rana cascadae*).

On September 13<sup>th</sup> and 14<sup>th</sup> of 2006, ODFW treated Diamond Lake with the chemical rotenone to eradicate the Tui Chub population and help restore the trout population. Crews treated Diamond Lake and its edges as well as Silent Creek, Short creek, marsh pools and all small tributaries.

Tui Chub are an invasive species that had been used as live bait by fishermen, subsequently being introduced into the lake. The Tui Chub flourished in their new environment, growing to a population of 90 million and consequently out-competing trout for food and habitat.

Rotenone works by inhibiting fish from using oxygen needed for biological processes. The effects of low doses of rotenone on other birds, mammals and invertebrates are minimal but fish are sensitive to its effects because they are confined to the water ensuring a rapid absorption through their gills. For the same reason juvenile amphibians and tadpoles are at risk because they live primarily in the water and their skin is highly permeable and susceptible to toxins. The likelihood of mortality is high for juvenile amphibians living in water treated with rotenone.

Amphibians have been proposed as environmental indicator species partly because of their associations with late successional forests and due to the fact that they live in both aquatic and terrestrial habitats increasing their sensitivity to management activities (Sheridan and Olson 2003).

Western Toads are commonly found in wetland/marshes and small lakes. Adults are typically difficult to capture because they are nocturnal and tend to dig burrows or hide under downed wood during daylight hours. The Western Toad's breeding period is during February, March and April using the edges of small lakes and wetlands to lay their eggs. Their tadpoles complete their metamorphoses into toadlets during late summer and early fall.

Cascade Frogs are typically found in small lakes, wetlands/marshes and ponds that are associates with streams. Similar to the Western Toad, tadpoles of the Cascade frog metamorphose during late summer.

## 2. METHODS

Field surveys were conducted August 27<sup>th</sup> through August 30<sup>th</sup>. The time allotted to conduct field surveys was 40 hours. We were instructed in the contract's statement of work to conduct a single visual encounter survey on Short Creek, Silent Creek and Lake Creek and to conduct two visual-encounter surveys on Diamond Lake, Horse Lake and Teal Lake.



Effort was made to find a sampling method that would work within the time constraint of the contract. TECI biologists spoke with herpetology experts, Christopher Pearl and Doug Degross (USGS Corvallis Oregon), explaining the project's details and goals and discussed possible methodology. Given the timing and structure of the study it would not be possible to determine amphibian abundance at Diamond Lake. This task would require a much more intensive sampling protocol involving mark and recapture of each species encountered. It was decided that the most important issue was to cover as much area as possible while maintaining the ability to run repeat surveys on the selected lakes.

In an effort to increase rate of captures, surveys bordering cold water were conducted during the warmest times of day and surveys bordering warm water were conducted in the morning or late afternoon.

Measures were taken to minimize impact on amphibians found. Surveyors did not wear sunscreen or bug repellent while handling the animals and caution was used when replacing the animal to its original location (ie. Putting cover objects back in place first and then setting the animal beside it).

## **2.1. CREEK SURVEYS**

Previous surveys on Lake Creek, Silent Creek and Short Creek were conducted by ODFW biologists. Start and end points of the contracted stream surveys were placed at the same locations as the ODFW surveys in order to maintain consistency with the previous searches. Two surveyors were used to complete searches.

### **Lotic Methods**

- Record time of day and temperature of air and water at start of survey.
- One surveyor searched right bank and one surveyor searched left bank, starting at the wetted edge of the stream visually scanning the ground while slowly walking and turning over any encountered cover objects.
- Surveys were conducted starting at the downstream end of the outlet tributaries and upstream end of the inlet tributaries, moving toward the lake.
- All amphibians found were captured, measured and released in the location they were found. Type of habitat in which they were found was recorded as well as their proximity, in meters, to the wetted edge of the stream.
- Surveyors used stopwatches to time search effort, stopping the watch when capturing and measuring an amphibian.
- End of survey time and total search time for each surveyor was recorded.

## **2.2. LAKE SURVEYS**

The entire perimeter was searched on both Teal Lake and Horse Lake. Surveys on Diamond Lake targeted accessible areas, with habitat, that were not impeded by private homes/property, boat docks and campgrounds. Focus was placed on the aquatic edges where creeks entered or exited Diamond Lake as well as the aquatic edges associated with wetland areas or meadows.

### **Lentic Methods**

- Recorded time of day and temperature of air and water at the start of survey.



- One surveyor searched the littoral zone transect, walking along the shallow water habitat of the lakes and covering from the wetted edge out to a water depth of 1.25 meters (or to the limit of visibility). A dip net was used to facilitate the capture of amphibians in deeper water. The second surveyor searched the riparian zone, walking on the bank and covering from the wetted edge of the lakes out 3 meters, searching in grass and under cover objects.
- Surveyors made efforts to work at a similar speed throughout the surveys to avoid premature flushing of animals on either transect.
- All amphibians found were captured, measured and released in the location they were found. Type of habitat in which they were found was recorded as well as their proximity, in meters, to the wetted edge of the lake.
- Surveyors used stopwatches to time search effort, stopping the watch when capturing and measuring an amphibian.
- End of survey and total search time were recorded for each surveyor.

### 3. FINDINGS

The following tables are a summary of the numbers of amphibians captured, by species, for each area surveyed. The tables are arranged by the areas and habitat surveyed.

#### 3.1. CREEK DATA

**Table 1: Survey Summary: Diamond Lake Creeks**

Species	Lake Creek		Short Creek		Silent Creek	
	Captured	R.A.*	Captured	R.A.*	Captured	R.A.*
<i>Bufo boreas</i>	0	0	0	0	47	.16
<i>Rana cascadae</i>	0	0	6	.19	145	.51
<i>Pseudacris regilla</i>	0	0	2	.06	21	.07

\*R.A- Relative Abundance calculated for each species using total amphibians captured divided by total person minutes searched.

#### 3.2. LAKE DATA

**Table 2: Survey Summary: Teal Lake and Horse Lake**

Species	Teal Lake				Horse Lake			
	Survey1	Survey2	Total	R.A.*	Survey1	Survey2	Total	R.A.*
<i>Bufo boreas</i>	2	3	5	.024	11	14	25	.10
<i>Rana cascadae</i>	0	1	1	.005	6	4	10	.04
<i>Pseudacris regilla</i>	23	27	50	.242	17	4	21	.09
<i>Ambystoma gracile</i>	0	1	1	.005	4	2	6	.02

\*R.A- Relative Abundance calculated for each species using total amphibians captured divided by total person minutes searched.



**Table 3: Survey Summary: Diamond Lake Edges**

Species	Diamond Lake Edges							
	South Shore				Northwest Shore			
	Survey1	Survey2	Total	R.A.*	Survey1	Survey2	Total	R.A.*
<i>Bufo boreas</i>	7	28	35	.22	0	3	3	.006
<i>Rana cascadae</i>	1	3	4	.02	0	0	0	0
<i>Pseudacris regilla</i>	11	20	31	.19	12	17	29	.06

\*R.A- Relative Abundance calculated for each species using total amphibians captured divided by total person minutes searched.

**Table 4: Survey Summary: Diamond Lake Edges Adjacent to Creeks**

Species	Diamond Lake Edges							
	Short Creek Area				Rabbit Creek Area			
	Survey1	Survey2	Total	R.A.*	Survey1	Survey2	Total	R.A.*
<i>Bufo boreas</i>	1	0	1	.01	0	0	0	0
<i>Rana cascadae</i>	7	3	10	.08	0	0	0	0
<i>Pseudacris regilla</i>	4	3	7	.06	0	0	0	0

\*R.A- Relative Abundance calculated for each species using total amphibians captured divided by total person minutes searched.

**Table 5: Survey Summary: Diamond Lake Edges Adjacent to Creeks**

Species	Diamond Lake Edges							
	Porcupine Creek Area				Spruce Creek Area			
	Survey1	Survey2	Total	R.A.*	Survey1	Survey2	Total	R.A.*
<i>Bufo boreas</i>	0	0	0	0	0	0	0	0
<i>Rana cascadae</i>	0	0	0	0	0	0	0	0
<i>Pseudacris regilla</i>	0	0	0	0	0	0	0	0

\*R.A- Relative Abundance calculated for each species using total amphibians captured divided by total person minutes searched.



## 4. CONCLUSIONS

Due to the seasonal timing of the surveys, a majority of the amphibians encountered were juvenile. Because Western Toadlets remain active during daylight hours in late summer and early fall, we encountered them at several sites. However, adults Western Toads are active nocturnally so encounters during our surveys were scarce. Because of this, it is recommended that any future surveys are repeated within the same initial timeframe to assure comparable data

### **Diamond Lake Creeks:**

A single visual encounter survey was conducted at Lake Creek on August 27<sup>th</sup>, with a total of 242 person minutes searched. No amphibians were found along the banks or wetted edges.

A single visual encounter survey was conducted at Short Creek on August 30<sup>th</sup>, with a total of 30.93 person minutes searched. A total of 8 amphibians were captured during the survey; 6 Cascade Frogs and 2 Pacific Chorus Frogs.

A single visual encounter survey was conducted at Silent Creek on August 29<sup>th</sup>, with a total of 283.74 person minutes searched. A total of 213 amphibians were captured during the survey; 47 Western Toads, 145 Cascade Frogs and 21 Pacific Chorus Frogs.

### **Teal Lake and Horse Lake:**

Two visual encounter surveys were conducted at Teal Lake on August 28<sup>th</sup> and 30<sup>th</sup>, with a total of 206.78 person minutes searched. A total of 57 amphibians were captured during both surveys; 5 Western Toads, 1 Cascade Frog, 50 Pacific Chorus Frogs and 1 Northwestern Salamander.

Two visual encounter surveys were conducted at Horse Lake on August 28<sup>th</sup> and 30<sup>th</sup>, with a total of 242.25 person minutes searched. A total of 62 amphibians were captured during both surveys; 25 Western Toads, 10 Cascade Frogs, 21 Pacific Chorus Frogs and 6 Northwestern Salamanders.

### **Diamond Lake Edges:**

Two visual encounter surveys were conducted at the Southern shore of Diamond Lake on August 28<sup>th</sup> and 29<sup>th</sup>, with a total of 322.02 person minutes searched. A total of 70 amphibians were captured during both surveys; 35 Western Toads, 4 Cascade Frogs and 31 Pacific Chorus Frogs.



Two visual encounter surveys were conducted at the Northwest shore of Diamond Lake on August 27<sup>th</sup> and 30<sup>th</sup>, with a total of 501 person minutes searched. A total of 32 amphibians were captured during both surveys; 3 Western Toads and 29 Pacific Chorus Frogs.

**Diamond Lake Edges Adjacent to Creeks:**

Two visual encounter surveys were conducted at the Short Creek adjacent edges of Diamond Lake on August 29<sup>th</sup> and 30<sup>th</sup>, with a total of 123.06 person minutes searched. A total of 18 amphibians were captured during both surveys; 1 Western Toad, 10 Cascade Frogs and 7 Pacific Chorus Frogs.

Two visual encounter surveys were conducted at the Rabbit Creek adjacent edges of Diamond Lake on August 29<sup>th</sup> and 30<sup>th</sup>, with a total of 47.4 person minutes searched. No amphibians were captured.

Two visual encounter surveys were conducted at the Porcupine Creek adjacent edges of Diamond Lake on August 29<sup>th</sup> and 30<sup>th</sup>, with a total of 57.78 person minutes searched. No amphibians were captured.

Two visual encounter surveys were conducted at the Spruce Creek adjacent edges of Diamond Lake on August 29<sup>th</sup> and 30<sup>th</sup>, with a total of 34.34 person minutes searched. No amphibians were captured.



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## APPENDIX A: PHOTOS OF SURVEY AREAS



**Photo 1: Teal Lake**



**Photo 2: Horse Lake**



**Photo 3: Short Creek**



**Photo 4: Silent Creek**





**Photo 5: Southern Shore of Diamond Lake**



**Photo 6: Southern Shore of Diamond Lake**



### APPENDIX B: SURVEY DATA

<b>Temperature- Air:</b> 84		<b>H2O:</b> 41	<b>Start of Survey:</b> 1320		<b>End of Survey:</b> 1355	
<b>Surveyor:</b> Justin Miles			<b>Effort time (minutes):</b> 14.8			
<b>Surveyor:</b> Kris Fausti			<b>Effort time (minutes):</b> 16.13			
<b>Date</b>	<b>Site</b>	<b>Common Name</b>	<b>Species Code</b>	<b>Snout-vent length (mm)</b>	<b>Habitat</b>	<b>Distance from wetted edge (meters)</b>
8/30/2007	Short Creek	Cascade Frog	RACA	31	in tall grass	1
8/30/2007	Short Creek	Cascade Frog	RACA	29	under log	0.2
8/30/2007	Short Creek	Cascade Frog	RACA	30	in grass	0.5
8/30/2007	Short Creek	Pacific Chorus Frog	PSRE	24	on soil	0.1
8/30/2007	Short Creek	Cascade Frog	RACA	27	on floating veg. in water	NA
8/30/2007	Short Creek	Cascade Frog	RACA	45	on floating veg. in water	NA
8/30/2007	Short Creek	Cascade Frog	RACA	40	on mossy log/over water	NA
8/30/2007	Short Creek	Pacific Chorus Frog	PSRE	22	on grass	0.3

<b>Temperature (Farenheit)- Air:</b> 68		<b>H2O:</b> 69	<b>Start of Survey:</b> 1400			
<b>Surveyor:</b> Justin Miles		<b>Effort time (minutes):</b> 125			<b>End of Survey:</b> 1640	
<b>Surveyor:</b> Kris Fausti		<b>Effort time (minutes):</b> 117				
<b>Date</b>	<b>Site</b>	<b>Common Name</b>	<b>Species Code</b>	<b>Snout-vent length (mm)</b>	<b>Habitat</b>	<b>Distance from wetted edge (meters)</b>
8/27/2007	Lake Creek	None found	None found			



<b>Temperature- Air:</b> 82		<b>H2O:</b> 40			<b>Start of Survey:</b> 1037	<b>End of Survey:</b> 1350
<b>Surveyor:</b> Justin Miles				<b>Effort time (minutes):</b> 138.97		
<b>Surveyor:</b> Kris Fausti				<b>Effort time (minutes):</b> 144.77		
<b>Date</b>	<b>Site</b>	<b>Common Name</b>	<b>Species Code</b>	<b>Snout-vent length (mm)</b>	<b>Habitat</b>	<b>Distance from wetted edge (meters)</b>
8/29/2007	Silent Creek	Pacific Chorus Frog	PSRE	24	grass/moss	log over water (0.3m from bank)
8/29/2007	Silent Creek	Pacific Chorus Frog	PSRE	19	grass	0.1
8/29/2007	Silent Creek	Cascade Frog	RACA	missed	grass	0.1
8/29/2007	Silent Creek	Cascade Frog	RACA	25	grass	0.1
8/29/2007	Silent Creek	Cascade Frog	RACA	19	grass	0.1
8/29/2007	Silent Creek	Cascade Frog	RACA	28	grass	0.1
8/29/2007	Silent Creek	Cascade Frog	RACA	24	moss	wetted edge
8/29/2007	Silent Creek	Cascade Frog	RACA	27	moss	wetted edge
8/29/2007	Silent Creek	Cascade Frog	RACA	29	moss	wetted edge
8/29/2007	Silent Creek	Cascade Frog	RACA	34	floating vegetation	wetted edge
8/29/2007	Silent Creek	Cascade Frog	RACA	24	floating vegetation	wetted edge
8/29/2007	Silent Creek	Cascade Frog	RACA	missed	log	log over water (0.1m from bank)
8/29/2007	Silent Creek	Cascade Frog	RACA	26	muddy sparse grass	0.1
8/29/2007	Silent Creek	Cascade Frog	RACA	27	muddy sparse grass	0.1
8/29/2007	Silent Creek	Cascade Frog	RACA	29	muddy sparse grass	0.1
8/29/2007	Silent Creek	Cascade Frog	RACA	29	muddy sparse grass	wetted edge
8/29/2007	Silent Creek	Cascade Frog	RACA	missed	muddy sparse grass	wetted edge
8/29/2007	Silent Creek	Cascade Frog	RACA	missed	muddy sparse grass	wetted edge
8/29/2007	Silent Creek	Cascade Frog	RACA	28	mud	wetted edge
8/29/2007	Silent Creek	Cascade Frog	RACA	28	grass	grass over water (0.1m)
8/29/2007	Silent Creek	Cascade Frog	RACA	25	moss/grass	wetted edge
8/29/2007	Silent Creek	Cascade Frog	RACA	27	moss/grass	wetted edge



8/29/2007	Silent Creek	Cascade Frog	RACA	25	moss/grass	wetted edge
8/29/2007	Silent Creek	Pacific Chorus Frog	PSRE	19	mat of insects	(insect) mat over water(0.1m)
8/29/2007	Silent Creek	Cascade Frog	RACA	27	moss/vegetation	0.1
8/29/2007	Silent Creek	Cascade Frog	RACA	25	moss/vegetation	0.1
8/29/2007	Silent Creek	Cascade Frog	RACA	24	mossy log	log over water (0.2m from bank)
8/29/2007	Silent Creek	Cascade Frog	RACA	missed	log	log over water (0.1m from bank)
8/29/2007	Silent Creek	Cascade Frog	RACA	29	mud	wetted edge
8/29/2007	Silent Creek	Cascade Frog	RACA	missed	mud	wetted edge
8/29/2007	Silent Creek	Western Toad	BUBO	25	moss	0.1
8/29/2007	Silent Creek	Cascade Frog	RACA	33	moss log	0.1
8/29/2007	Silent Creek	Cascade Frog	RACA	24	mud	0.1
8/29/2007	Silent Creek	Cascade Frog	RACA	25	muddy sparse grass	wetted edge
8/29/2007	Silent Creek	Cascade Frog	RACA	26	muddy sparse grass	wetted edge
8/29/2007	Silent Creek	Cascade Frog	RACA	26	muddy sparse grass	wetted edge
8/29/2007	Silent Creek	Cascade Frog	RACA	24	mud	wetted edge
8/29/2007	Silent Creek	Cascade Frog	RACA	24	mud	wetted edge
8/29/2007	Silent Creek	Cascade Frog	RACA	24	mud	wetted edge
8/29/2007	Silent Creek	Cascade Frog	RACA	25	mud	wetted edge
8/29/2007	Silent Creek	Cascade Frog	RACA	37	mossy log	0.1
8/29/2007	Silent Creek	Cascade Frog	RACA	missed	mossy log	log over water (0.1m from bank)
8/29/2007	Silent Creek	Cascade Frog	RACA	missed	moss in water	wetted edge
8/29/2007	Silent Creek	Cascade Frog	RACA	28	mossy bank	0.1
8/29/2007	Silent Creek	Cascade Frog	RACA	37	mossy bank	0.1
8/29/2007	Silent Creek	Cascade Frog	RACA	24	mossy bank	0.1
8/29/2007	Silent Creek	Cascade Frog	RACA	missed	mossy bank	0.1
8/29/2007	Silent Creek	Cascade Frog	RACA	missed	mossy bank	0.1
8/29/2007	Silent Creek	Cascade Frog	RACA	24	mossy bank/grass	0.1



8/29/2007	Silent Creek	Cascade Frog	RACA	26	mossy bank/grass	0.1
8/29/2007	Silent Creek	Cascade Frog	RACA	missed	mossy bank/grass	0.1
8/29/2007	Silent Creek	Cascade Frog	RACA	missed	mossy bank/grass	0.1
8/29/2007	Silent Creek	Cascade Frog	RACA	27	moss/grass	0.1
8/29/2007	Silent Creek	Cascade Frog	RACA	missed	moss/grass	0.1
8/29/2007	Silent Creek	Cascade Frog	RACA	missed	moss/grass	0.1
8/29/2007	Silent Creek	Cascade Frog	RACA	25	moss/grass	0.1
8/29/2007	Silent Creek	Cascade Frog	RACA	25	moss/grass	0.1
8/29/2007	Silent Creek	Cascade Frog	RACA	28	moss/grass	0.1
8/29/2007	Silent Creek	Cascade Frog	RACA	23	moss/grass	0.1
8/29/2007	Silent Creek	Cascade Frog	RACA	missed	moss/grass	0.1
8/29/2007	Silent Creek	Cascade Frog	RACA	missed	moss/grass	0.1
8/29/2007	Silent Creek	Western Toad	BUBO	25	moss/grass	0.1
8/29/2007	Silent Creek	Western Toad	BUBO	25	moss/grass	0.1
8/29/2007	Silent Creek	Cascade Frog	RACA	27	moss/grass	wetted edge
8/29/2007	Silent Creek	Cascade Frog	RACA	25	moss/grass	wetted edge
8/29/2007	Silent Creek	Pacific Chorus Frog	PSRE	21	moss	0.1
8/29/2007	Silent Creek	Cascade Frog	RACA	27	moss/grass (seep)	0.2
8/29/2007	Silent Creek	Cascade Frog	RACA	29	moss/grass (seep)	0.2
8/29/2007	Silent Creek	Cascade Frog	RACA	missed	grass	wetted edge
8/29/2007	Silent Creek	Cascade Frog	RACA	missed	grass	wetted edge
8/29/2007	Silent Creek	Cascade Frog	RACA	25	floating moss	over water (0.1m from bank)
8/29/2007	Silent Creek	Cascade Frog	RACA	25	floating moss	over water (0.1m from bank)
8/29/2007	Silent Creek	Cascade Frog	RACA	27	floating moss	over water (0.1m from bank)
8/29/2007	Silent Creek	Western Toad	BUBO	22	grass (seep)	wetted edge
8/29/2007	Silent Creek	Cascade Frog	RACA	24	moss/grass	wetted edge
8/29/2007	Silent Creek	Cascade Frog	RACA	28	moss/grass	wetted edge



8/29/2007	Silent Creek	Pacific Chorus Frog	PSRE	20	moss/grass	0.1
8/29/2007	Silent Creek	Cascade Frog	RACA	24	floating moss	over water (0.1m from bank)
8/29/2007	Silent Creek	Cascade Frog	RACA	24	floating moss	over water (0.1m from bank)
8/29/2007	Silent Creek	Western Toad	BUBO	27	log	log over water (0.1m from bank)
8/29/2007	Silent Creek	Western Toad	BUBO	24	grass	0.2
8/29/2007	Silent Creek	Cascade Frog	RACA	27	grass in water	in water (0.1m)
8/29/2007	Silent Creek	Western Toad	BUBO	22	moss	0.1
8/29/2007	Silent Creek	Cascade Frog	RACA	missed	grass in water	in water (0.1m)
8/29/2007	Silent Creek	Cascade Frog	RACA	missed	grass in water	in water (0.1m)
8/29/2007	Silent Creek	Western Toad	BUBO	28	grass in water	in water (0.1m)
8/29/2007	Silent Creek	Pacific Chorus Frog	PSRE	missed	grass	0.1
8/29/2007	Silent Creek	Cascade Frog	RACA	29	grass/moss in water	in water (0.1m)
8/29/2007	Silent Creek	Cascade Frog	RACA	31	grass/moss in water	in water (0.1m)
8/29/2007	Silent Creek	Cascade Frog	RACA	28	grass/moss in water	in water (0.1m)
8/29/2007	Silent Creek	Western Toad	BUBO	26	water?	in water?
8/29/2007	Silent Creek	Western Toad	BUBO	25	water?	in water?
8/29/2007	Silent Creek	Cascade Frog	RACA	33	grass/moss (island)	0.2
8/29/2007	Silent Creek	Cascade Frog	RACA	32	grass/moss (island)	0.5
8/29/2007	Silent Creek	Pacific Chorus Frog	PSRE	20	moss	0.1
8/29/2007	Silent Creek	Western Toad	BUBO	25	moss	0.1
8/29/2007	Silent Creek	Cascade Frog	RACA	27	grass	0.1
8/29/2007	Silent Creek	Western Toad	BUBO	22	floating vegetation	over water (0.7m from bank)
8/29/2007	Silent Creek	Pacific Chorus Frog	PSRE	19	in grass	1
8/29/2007	Silent Creek	Pacific Chorus Frog	PSRE	22	in grass	1.5
8/29/2007	Silent Creek	Pacific Chorus Frog	PSRE	20	in grass	0.5
8/29/2007	Silent Creek	Cascade Frog	RACA	31	in grass	0.5
8/29/2007	Silent Creek	Cascade Frog	RACA	26	in grass	0.5



	Creek					
8/29/2007	Silent Creek	Cascade Frog	RACA	30	in grass	0.5
8/29/2007	Silent Creek	Cascade Frog	RACA	25	in grass	0.5
8/29/2007	Silent Creek	Cascade Frog	RACA	26	in 0.02m water/on silt	NA
8/29/2007	Silent Creek	Cascade Frog	RACA	24	under cut bank/on silt	0.2
8/29/2007	Silent Creek	Cascade Frog	RACA	25	in grass	0.3
8/29/2007	Silent Creek	Cascade Frog	RACA	26	on gravel	wetted edge
8/29/2007	Silent Creek	Cascade Frog	RACA	26	on gravel	wetted edge
8/29/2007	Silent Creek	Cascade Frog	RACA	25	on gravel	wetted edge
8/29/2007	Silent Creek	Cascade Frog	RACA	27	on gravel	wetted edge
8/29/2007	Silent Creek	Cascade Frog	RACA	30	on gravel	wetted edge
8/29/2007	Silent Creek	Cascade Frog	RACA	25	under grass/on silt	0.2
8/29/2007	Silent Creek	Pacific Chorus Frog	PSRE	19	undercut bank	0.1
8/29/2007	Silent Creek	Pacific Chorus Frog	PSRE	19	undercut bank	0.1
8/29/2007	Silent Creek	Cascade Frog	RACA	25	undercut bank	0.1
8/29/2007	Silent Creek	Cascade Frog	RACA	26	undercut bank	0.1
8/29/2007	Silent Creek	Pacific Chorus Frog	PSRE	24	in grass	1
8/29/2007	Silent Creek	Cascade Frog	RACA	27	on moss	0.4
8/29/2007	Silent Creek	Western Toad	BUBO	24	on moss	0.2
8/29/2007	Silent Creek	Western Toad	BUBO	23	on moss	0.2
8/29/2007	Silent Creek	Cascade Frog	RACA	22	on moss	0.3
8/29/2007	Silent Creek	Cascade Frog	RACA	24	on moss	0.5
8/29/2007	Silent Creek	Pacific Chorus Frog	PSRE	21	under grass/ on moss	0.2
8/29/2007	Silent Creek	Western Toad	BUBO	22	under grass/on moss	0.2
8/29/2007	Silent Creek	Western Toad	BUBO	22	under grass/on moss	0.2
8/29/2007	Silent Creek	Western Toad	BUBO	23	under grass/on moss	0.2
8/29/2007	Silent Creek	Western Toad	BUBO	25	under grass/on moss	0.1



8/29/2007	Silent Creek	Pacific Chorus Frog	PSRE	22	under grass/on moss	0.5
8/29/2007	Silent Creek	Cascade Frog	RACA	24	in grass	0.1
8/29/2007	Silent Creek	Cascade Frog	RACA	26	in grass	0.1
8/29/2007	Silent Creek	Western Toad	BUBO	23	under grass/on moss	wetted edge
8/29/2007	Silent Creek	Western Toad	BUBO	23	under grass/on moss	wetted edge
8/29/2007	Silent Creek	Western Toad	BUBO	26	in grass	0.3
8/29/2007	Silent Creek	Western Toad	BUBO	22	in grass	0.1
8/29/2007	Silent Creek	Western Toad	BUBO	23	on gravel	wetted edge
8/29/2007	Silent Creek	Cascade Frog	RACA	25	in grass	0.2
8/29/2007	Silent Creek	Cascade Frog	RACA	24	under grass/on moss	0.1
8/29/2007	Silent Creek	Cascade Frog	RACA	25	under grass/on moss	0.1
8/29/2007	Silent Creek	Cascade Frog	RACA	25	under grass/on moss	0.1
8/29/2007	Silent Creek	Cascade Frog	RACA	23	under grass/on moss	0.1
8/29/2007	Silent Creek	Cascade Frog	RACA	26	under grass/on moss	0.1
8/29/2007	Silent Creek	Cascade Frog	RACA	28	under grass/on moss	0.1
8/29/2007	Silent Creek	Western Toad	BUBO	22	under grass/on moss	0.4
8/29/2007	Silent Creek	Western Toad	BUBO	23	under grass/on moss	0.5
8/29/2007	Silent Creek	Western Toad	BUBO	22	under grass/on moss	0.2
8/29/2007	Silent Creek	Cascade Frog	RACA	25	under grass/on moss	0.1
8/29/2007	Silent Creek	Cascade Frog	RACA	24	under grass/on moss	0.1
8/29/2007	Silent Creek	Cascade Frog	RACA	25	under grass/on moss	0.3
8/29/2007	Silent Creek	Cascade Frog	RACA	26	under grass/on moss	0.2
8/29/2007	Silent Creek	Pacific Chorus Frog	PSRE	21	under grass/on moss	0.4
8/29/2007	Silent Creek	Pacific Chorus Frog	PSRE	22	under grass/on moss	0.5
8/29/2007	Silent Creek	Pacific Chorus Frog	PSRE	20	under grass/on moss	1
8/29/2007	Silent Creek	Western Toad	BUBO	23	on grass	0.2
8/29/2007	Silent Creek	Western Toad	BUBO	23	on grass	0.5



8/29/2007	Silent Creek	Western Toad	BUBO	25	on grass	0.2
8/29/2007	Silent Creek	Western Toad	BUBO	24	on grass	0.2
8/29/2007	Silent Creek	Western Toad	BUBO	23	on moss	0.2
8/29/2007	Silent Creek	Western Toad	BUBO	23	on moss	0.4
8/29/2007	Silent Creek	Pacific Chorus Frog	PSRE	19	on moss	1
8/29/2007	Silent Creek	Pacific Chorus Frog	PSRE	20	on moss	0.2
8/29/2007	Silent Creek	Pacific Chorus Frog	PSRE	20	on moss	0.3
8/29/2007	Silent Creek	Cascade Frog	RACA	25	on moss	0.1
8/29/2007	Silent Creek	Cascade Frog	RACA	23	on moss	0.1
8/29/2007	Silent Creek	Cascade Frog	RACA	26	on moss	wetted edge
8/29/2007	Silent Creek	Cascade Frog	RACA	25	on moss	wetted edge
8/29/2007	Silent Creek	Cascade Frog	RACA	25	on moss	0.1
8/29/2007	Silent Creek	Cascade Frog	RACA	22	on moss	0.1
8/29/2007	Silent Creek	Western Toad	BUBO	26	on moss	0.1
8/29/2007	Silent Creek	Western Toad	BUBO	23	on moss	0.4
8/29/2007	Silent Creek	Cascade Frog	RACA	24	on moss	wetted edge
8/29/2007	Silent Creek	Cascade Frog	RACA	26	on log in water	NA
8/29/2007	Silent Creek	Cascade Frog	RACA	25	on log in water	NA
8/29/2007	Silent Creek	Cascade Frog	RACA	23	on log in water	NA
8/29/2007	Silent Creek	Cascade Frog	RACA	28	on log in water	NA
8/29/2007	Silent Creek	Cascade Frog	RACA	28	on log in water	NA
8/29/2007	Silent Creek	Cascade Frog	RACA	25	on log in water	NA
8/29/2007	Silent Creek	Western Toad	BUBO	24	on grass	0.1
8/29/2007	Silent Creek	Western Toad	BUBO	24	on grass	0.1
8/29/2007	Silent Creek	Western Toad	BUBO	24	on grass	0.1
8/29/2007	Silent Creek	Western Toad	BUBO	24	on grass	0.1
8/29/2007	Silent Creek	Cascade Frog	RACA	30	under grass/ on moss	0.5



8/29/2007	Silent Creek	Cascade Frog	RACA	30	under grass/ on moss	0.2
8/29/2007	Silent Creek	Cascade Frog	RACA	30	under grass/ on moss	0.5
8/29/2007	Silent Creek	Cascade Frog	RACA	30	under grass/ on moss	0.5
8/29/2007	Silent Creek	Cascade Frog	RACA	30	under grass/ on moss	0.5
8/29/2007	Silent Creek	Cascade Frog	RACA	30	under grass/ on moss	0.5
8/29/2007	Silent Creek	Cascade Frog	RACA	30	under grass/ on moss	1
8/29/2007	Silent Creek	Cascade Frog	RACA	30	under grass/ on moss	0.2
8/29/2007	Silent Creek	Cascade Frog	RACA	30	under grass/ on moss	0.3
8/29/2007	Silent Creek	Cascade Frog	RACA	30	under grass/ on moss	0.5
8/29/2007	Silent Creek	Western Toad	BUBO	26	under grass/ on moss	1
8/29/2007	Silent Creek	Western Toad	BUBO	24	under grass/ on moss	1
8/29/2007	Silent Creek	Western Toad	BUBO	26	under grass/ on moss	1
8/29/2007	Silent Creek	Western Toad	BUBO	23	under grass/ on moss	1
8/29/2007	Silent Creek	Cascade Frog	RACA	30	under grass/ on moss	1
8/29/2007	Silent Creek	Western Toad	BUBO	27	on moss	0.6
8/29/2007	Silent Creek	Cascade Frog	RACA	33	in 0.05M water	NA
8/29/2007	Silent Creek	Cascade Frog	RACA	30	on grass	0.5
8/29/2007	Silent Creek	Cascade Frog	RACA	25	on grass	0.2
8/29/2007	Silent Creek	Cascade Frog	RACA	35	on silt	0.2
8/29/2007	Silent Creek	Cascade Frog	RACA	26	on silt	0.5
8/29/2007	Silent Creek	Cascade Frog	RACA	29	on silt	0.4
8/29/2007	Silent Creek	Cascade Frog	RACA	26	on grass	0.6
8/29/2007	Silent Creek	Cascade Frog	RACA	25	on grass	0.5
8/29/2007	Silent Creek	Cascade Frog	RACA	31	on silt	0.4
8/29/2007	Silent Creek	Cascade Frog	RACA	25	on silt	0.5
8/29/2007	Silent Creek	Cascade Frog	RACA	23	on silt	1
8/29/2007	Silent Creek	Western Toad	BUBO	31	on silt	1
8/29/2007	Silent	Western Toad	BUBO	29	on silt	1.5





<b>Temperature (Fahrenheit)- Air:</b> 84		<b>H2O:</b> 70	<b>Start of Survey:</b> 1525		<b>End of Survey:</b> 1617	
<b>Bank Surveyor:</b> Justin Miles		<b>Effort time (minutes):</b> 7.0				
<b>Aquatic Edge Surveyor:</b> Kris Fausti		<b>Effort time (minutes):</b> 7.0				
<b>Date</b>	<b>Site</b>	<b>Common Name</b>	<b>Species Code</b>	<b>Snout-vent length (mm)</b>	<b>Habitat</b>	<b>Distance from wetted edge (meters)</b>
8/30/2007	Spruce Creek	None found	None found			

<b>Temperature (Fahrenheit)- Air:</b> 80		<b>H2O:</b> 70	<b>Start of Survey:</b> 1730		<b>End of Survey:</b> 1840	
<b>Bank Surveyor:</b> Justin Miles		<b>Effort time (minutes):</b> 14.72				
<b>Aquatic Edge Surveyor:</b> Kris Fausti		<b>Effort time (minutes):</b> 14.72				
<b>Date</b>	<b>Site</b>	<b>Common Name</b>	<b>Species Code</b>	<b>Snout-vent length (mm)</b>	<b>Habitat</b>	<b>Distance from wetted edge (meters)</b>
8/29/2007	Porcupine Creek	None found	None found			
<b>Temperature (Fahrenheit)- Air:</b> 84		<b>H2O:</b> 70	<b>Start of Survey:</b> 1525		<b>End of Survey:</b> 1617	
<b>Bank Surveyor:</b> Justin Miles		<b>Effort time (minutes):</b> 14.17				
<b>Aquatic Edge Surveyor:</b> Kris Fausti		<b>Effort time (minutes):</b> 14.17				
<b>Date</b>	<b>Site</b>	<b>Common Name</b>	<b>Species Code</b>	<b>Snout-vent length (mm)</b>	<b>Habitat</b>	<b>Distance from wetted edge (meters)</b>
8/30/2007	Porcupine Creek	None found	None found			



<b>Temperature (Fahrenheit)- Air:</b> 78		<b>H2O:</b> 70	<b>Start of Survey:</b> 1900		<b>End of Survey:</b> 1947	
<b>Bank Surveyor:</b> Justin Miles		<b>Effort time (minutes):</b> 32.5				
<b>Aquatic Edge Surveyor:</b> Kris Fausti		<b>Effort time (minutes):</b> 32.5				
<b>Date</b>	<b>Site</b>	<b>Common Name</b>	<b>Species Code</b>	<b>Snout-vent length (mm)</b>	<b>Habitat</b>	<b>Distance from wetted edge (meters)</b>
8/29/2007	Diamond Lake at Short Creek	Pacific Chorus Frog	PSRE	20	on grass	0.3
8/29/2007	Diamond Lake at Short Creek	Pacific Chorus Frog	PSRE	22	on duff	1.2
8/29/2007	Diamond Lake at Short Creek	Pacific Chorus Frog	PSRE	24	on duff	0.4
8/29/2007	Diamond Lake at Short Creek	Pacific Chorus Frog	PSRE	25	in grass	0.2
8/29/2007	Diamond Lake at Short Creek	Cascade Frog	RACA	40	in tall grass	wetted edge
8/29/2007	Diamond Lake at Short Creek	Cascade Frog	RACA	30	in tall grass	wetted edge
8/29/2007	Diamond Lake at Short Creek	Cascade Frog	RACA	30	in tall vegetation	0.3
8/29/2007	Diamond Lake at Short Creek	Western Toad	BUBO	20	on mud and grass	1.2
8/29/2007	Diamond Lake at Short Creek	Cascade Frog	RACA	32	in tall grass/on mud	0.2
8/29/2007	Diamond Lake at Short Creek	Cascade Frog	RACA	33	in tall grass/on mud	0.1
8/29/2007	Diamond Lake at Short Creek	Cascade Frog	RACA	missed	in grass/on mud	1.3
8/29/2007	Diamond Lake at Short Creek	Cascade Frog	RACA	36	in grass/on mud	0.5



<b>Temperature (Fahrenheit)- Air:</b> 84		<b>H2O:</b> 70		<b>Start of Survey:</b> 1400		<b>End of Survey:</b> 1441
<b>Bank Surveyor:</b> Justin Miles		<b>Effort time (minutes):</b> 28.83				
<b>Aquatic Edge Surveyor:</b> Kris Fausti		<b>Effort time (minutes):</b> 29.23				
<b>Date</b>	<b>Site</b>	<b>Common Name</b>	<b>Species Code</b>	<b>Snout-vent length (mm)</b>	<b>Habitat</b>	<b>Distance from wetted edge (meters)</b>
8/30/2007	Diamond Lake at Short Creek	Cascade Frog	RACA	33	on grass	0.2
8/30/2007	Diamond Lake at Short Creek	Cascade Frog	RACA	37	in mud	1.1
8/30/2007	Diamond Lake at Short Creek	Cascade Frog	RACA	33	in grass	0.1
8/30/2007	Diamond Lake at Short Creek	Pacific Chorus Frog	PSRE	20	in grass	0.4
8/30/2007	Diamond Lake at Short Creek	Pacific Chorus Frog	PSRE	21	in grass	1.5
8/30/2007	Diamond Lake at Short Creek	Pacific Chorus Frog	PSRE	22	on leaf	0.7

<b>Temperature (Fahrenheit)- Air:</b> 85		<b>H2O:</b> 72				<b>Start of Survey:</b> 1530
<b>Bank Surveyor:</b> Justin Miles		<b>Effort time (minutes):</b> 69.38				<b>End of Survey:</b> 1730
<b>Aquatic Edge Surveyor:</b> Kris Fausti		<b>Effort time (minutes):</b> 89.00				
<b>Date</b>	<b>Site</b>	<b>Common Name</b>	<b>Species Code</b>	<b>Snout-vent length (mm)</b>	<b>Habitat</b>	<b>Distance from wetted edge (meters)</b>
8/28/2007	Diamond Lake (South Shore)	Pacific Chorus Frog	PSRE	24	on dry grass	2
8/28/2007	Diamond Lake (South Shore)	Western Toad	BUBO	22	on dry grass	2
8/28/2007	Diamond Lake (South Shore)	Western Toad	BUBO	22	at base of root wad	3.5
8/28/2007	Diamond Lake (South Shore)	Pacific Chorus Frog	PSRE	20	under grass	3
8/28/2007	Diamond Lake (South Shore)	Pacific Chorus Frog	PSRE	24	under grass	3
8/28/2007	Diamond Lake (South Shore)	Cascade Frog	RACA	29	in puddle of root bowl	2
8/28/2007	Diamond Lake (South Shore)	Western Toad	BUBO	24	on sand	0.5



8/28/2007	Diamond Lake (South Shore)	Pacific Chorus Frog	PSRE	20	in grass	0.5
8/28/2007	Diamond Lake (South Shore)	Pacific Chorus Frog	PSRE	19	in grass/on duff	3
8/28/2007	Diamond Lake (South Shore)	Pacific Chorus Frog	PSRE	24	in grass/on duff	3
8/28/2007	Diamond Lake (South Shore)	Pacific Chorus Frog	PSRE	21	in grass/on duff	3
8/28/2007	Diamond Lake (South Shore)	Pacific Chorus Frog	PSRE	25	in grass/on duff	3
8/28/2007	Diamond Lake (South Shore)	Pacific Chorus Frog	PSRE	24	in grass/on duff	3
8/28/2007	Diamond Lake (South Shore)	Pacific Chorus Frog	PSRE	22	in grass/on duff	3
8/28/2007	Diamond Lake (South Shore)	Western Toad	BUBO	24	in grass/on duff	1.5
8/28/2007	Diamond Lake (South Shore)	Western Toad	BUBO	25	in grass	0.1
8/28/2007	Diamond Lake (South Shore)	Western Toad	BUBO	31	on sand/under grass	1
8/28/2007	Diamond Lake (South Shore)	Western Toad	BUBO	28	on sand	wetted edge
8/28/2007	Diamond Lake (South Shore)	Pacific Chorus Frog	PSRE	21	in 3ft high grass	2.5

<b>Temperature (Farenheit)- Air:</b> 85		<b>H20:</b> 72	<b>Start of Survey:</b> 1420		<b>End of Survey:</b> 1653	
<b>Bank Surveyor:</b> Justin Miles		<b>Effort time (minutes):</b> 87.42				
<b>Aquatic Edge Surveyor:</b> Kris Fausti		<b>Effort time (minutes):</b> 76.22				
<b>Date</b>	<b>Site</b>	<b>Common Name</b>	<b>Species Code</b>	<b>Snout-vent length (mm)</b>	<b>Habitat</b>	<b>Distance from wetted edge (meters)</b>
8/29/2007	Diamond Lake (South Shore)	Pacific Chorus Frog	PSRE	20	1' grass	1.5
8/29/2007	Diamond Lake (South Shore)	Western Toad	BUBO	27	1' grass	0.5
8/29/2007	Diamond Lake (South Shore)	Western Toad	BUBO	29	1' grass	0.5
8/29/2007	Diamond Lake (South Shore)	Pacific Chorus Frog	PSRE	22	flattened grass	1
8/29/2007	Diamond Lake (South Shore)	Pacific Chorus Frog	PSRE	22	flattened grass	1.5



8/29/2007	Diamond Lake (South Shore)	Pacific Chorus Frog	PSRE	24	grass	0.5
8/29/2007	Diamond Lake (South Shore)	Pacific Chorus Frog	PSRE	20	grass	1.1
8/29/2007	Diamond Lake (South Shore)	Pacific Chorus Frog	PSRE	22	grass/grass	1
8/29/2007	Diamond Lake (South Shore)	Western Toad	BUBO	25	sand	0.2
8/29/2007	Diamond Lake (South Shore)	Western Toad	BUBO	26	sand	0.2
8/29/2007	Diamond Lake (South Shore)	Western Toad	BUBO	25	sand	0.3
8/29/2007	Diamond Lake (South Shore)	Western Toad	BUBO	23	sand	0.3
8/29/2007	Diamond Lake (South Shore)	Pacific Chorus Frog	PSRE	23	grass	2.5
8/29/2007	Diamond Lake (South Shore)	Western Toad	BUBO	28	sand	0.1
8/29/2007	Diamond Lake (South Shore)	Pacific Chorus Frog	PSRE	21	2' grass	2.5
8/29/2007	Diamond Lake (South Shore)	Cascade Frog	RACA	29	root bowl (puddled water)	2
8/29/2007	Diamond Lake (South Shore)	Western Toad	BUBO	19	root bowl (puddled water)	2
8/29/2007	Diamond Lake (South Shore)	Pacific Chorus Frog	PSRE	20	grass/duff	2.5
8/29/2007	Diamond Lake (South Shore)	Pacific Chorus Frog	PSRE	23	grass/duff	2.5
8/29/2007	Diamond Lake (South Shore)	Pacific Chorus Frog	PSRE	21	grass/duff	2.5
8/29/2007	Diamond Lake (South Shore)	Pacific Chorus Frog	PSRE	21	grass/duff	2.5
8/29/2007	Diamond Lake (South Shore)	Pacific Chorus Frog	PSRE	24	grass/duff	2.5
8/29/2007	Diamond Lake (South Shore)	Pacific Chorus Frog	PSRE	18	grass/duff	2.5
8/29/2007	Diamond Lake (South Shore)	Pacific Chorus Frog	PSRE	22	grass/duff	2.5
8/29/2007	Diamond Lake (South Shore)	Western Toad	BUBO	17	grass/duff	2.5
8/29/2007	Diamond Lake (South Shore)	Western Toad	BUBO	19	grass/sand	2.5
8/29/2007	Diamond Lake (South Shore)	Pacific Chorus Frog	PSRE	17	3' grass	3
8/29/2007	Diamond Lake (South Shore)	Pacific Chorus Frog	PSRE	missed	3' grass	3
8/29/2007	Diamond Lake (South Shore)	Western Toad	BUBO	26	grass	0.4



8/29/2007	Diamond Lake (South Shore)	Western Toad	BUBO	25	grass	2.5
8/29/2007	Diamond Lake (South Shore)	Pacific Chorus Frog	PSRE	21	duff	1
8/29/2007	Diamond Lake (South Shore)	Western Toad	BUBO	20	duff	1
8/29/2007	Diamond Lake (South Shore)	Cascade Frog	RACA	29	log	over water in "canal" (0.7m from bank) 2.5m from lake
8/29/2007	Diamond Lake (South Shore)	Western Toad	BUBO	22	sand	1.5
8/29/2007	Diamond Lake (South Shore)	Pacific Chorus Frog	PSRE	21	grass	3.5
8/29/2007	Diamond Lake (South Shore)	Western Toad	BUBO	23	in grass	0.75
8/29/2007	Diamond Lake (South Shore)	Western Toad	BUBO	34	in grass	0.75
8/29/2007	Diamond Lake (South Shore)	Western Toad	BUBO	26	in grass	0.75
8/29/2007	Diamond Lake (South Shore)	Western Toad	BUBO	25	in grass	0.75
8/29/2007	Diamond Lake (South Shore)	Western Toad	BUBO	24	in grass	1.5
8/29/2007	Diamond Lake (South Shore)	Western Toad	BUBO	26	in grass	2.5
8/29/2007	Diamond Lake (South Shore)	Cascade Frog	RACA	30	in grass	0.1
8/29/2007	Diamond Lake (South Shore)	Western Toad	BUBO	27	in grass	0.2
8/29/2007	Diamond Lake (South Shore)	Western Toad	BUBO	26	in grass	0.3
8/29/2007	Diamond Lake (South Shore)	Western Toad	BUBO	30	on sand	0.1
8/29/2007	Diamond Lake (South Shore)	Western Toad	BUBO	22	on sand in 0.01M water	NA
8/29/2007	Diamond Lake (South Shore)	Western Toad	BUBO	29	on sand	0.7
8/29/2007	Diamond Lake (South Shore)	Pacific Chorus Frog	PSRE	22	under grass/on sand	0.5
8/29/2007	Diamond Lake (South Shore)	Western Toad	BUBO	22	on sand	0.3
8/29/2007	Diamond Lake (South Shore)	Western Toad	BUBO	26	on sand in 0.02M water	NA
8/29/2007	Diamond Lake (South Shore)	Western Toad	BUBO	23	on grass	0.1



<b>Temperature (Fahrenheit)- Air: 81</b>		<b>H2O: 75</b>		<b>Start of Survey: 1110</b>		<b>End of Survey: 1308</b>
<b>Bank Surveyor: Justin Miles</b>		<b>Effort time (minutes): 73.00</b>				
<b>Aquatic Edge Surveyor: Kris Fausti</b>		<b>Effort time (minutes): 83.00</b>				
<b>Date</b>	<b>Site</b>	<b>Common name</b>	<b>Species Code</b>	<b>Snout-vent length (mm)</b>	<b>Habitat</b>	<b>Distance from wetted edge (meters)</b>
8/28/2007	Horse Lake	Pacific Chorus Frog	PSRE	20	in grass	4
8/28/2007	Horse Lake	Pacific Chorus Frog	PSRE	19	in grass	4
8/28/2007	Horse Lake	Western Frog	BUBO	21	on silt	0.3
8/28/2007	Horse Lake	Western Frog	BUBO	22	on silt	0.3
8/28/2007	Horse Lake	Pacific Chorus Frog	PSRE	24	in low grass	3
8/28/2007	Horse Lake	Pacific Chorus Frog	PSRE	20	on edge of water	wetted edge
8/28/2007	Horse Lake	Pacific Chorus Frog	PSRE	21	in low grass	2
8/28/2007	Horse Lake	Western Frog	BUBO	22	in low grass	2
8/28/2007	Horse Lake	Northwestern Salamander	AMGR	57/105	in water, 0.3M deep	2
8/28/2007	Horse Lake	Pacific Chorus Frog	PSRE	22	in tall grass	3
8/28/2007	Horse Lake	Pacific Chorus Frog	PSRE	22	in low grass	3
8/28/2007	Horse Lake	Pacific Chorus Frog	PSRE	23	in low grass	3
8/28/2007	Horse Lake	Northwestern Salamander	AMGR	31/58	in water, 0.1M deep	2
8/28/2007	Horse Lake	Western Frog	BUBO	22	on waters edge, 0.02 deep	NA
8/28/2007	Horse Lake	Cascade Frog	RACA	48	on waters edge	wetted edge
8/28/2007	Horse Lake	Northwestern Salamander	AMGR			
8/28/2007	Horse Lake	Northwestern Salamander	AMGR			
8/28/2007	Horse Lake	Western Frog	BUBO	20	in grass	1.5
8/28/2007	Horse Lake	Cascade Frog	RACA	21	in grass	0.7
8/28/2007	Horse Lake	Western Frog	BUBO	23		wetted edge
8/28/2007	Horse Lake	Pacific Chorus Frog	PSRE	21		NA
8/28/2007	Horse Lake	Cascade Frog	RACA	29		
8/28/2007	Horse Lake	Cascade Frog	RACA			



8/28/2007	Horse Lake	Pacific Chorus Frog	PSRE	22	on grass/under wood	3
8/28/2007	Horse Lake	Western Frog	BUBO	20		
8/28/2007	Horse Lake	Western Frog	BUBO	98	in water/ resting against log	
8/28/2007	Horse Lake	Cascade Frog	RACA	25	on wetted edge	
8/28/2007	Horse Lake	Pacific Chorus Frog	PSRE	18	in grass	3.5
8/28/2007	Horse Lake	Pacific Chorus Frog	PSRE	18	in grass	3.5
8/28/2007	Horse Lake	Pacific Chorus Frog	PSRE	17	in grass	1
8/28/2007	Horse Lake	Pacific Chorus Frog	PSRE	21	in grass	3.5
8/28/2007	Horse Lake	Pacific Chorus Frog	PSRE	23	in grass	2
8/28/2007	Horse Lake	Pacific Chorus Frog	PSRE	21	in grass	2
8/28/2007	Horse Lake	Pacific Chorus Frog	PSRE	22	in grass	2
8/28/2007	Horse Lake	Western Frog	BUBO	19	in grass	3
8/28/2007	Horse Lake	Western Frog	BUBO	15	in grass	2
8/28/2007	Horse Lake	Western Frog	BUBO	16	in grass	2
8/28/2007	Horse Lake	Cascade Frog	RACA	24	in grass	1

<b>Temperature (Fahrenheit)- Air: 80</b>		<b>H2O: 72</b>		<b>Start of Survey: 1000</b>		<b>End of Survey: 1115</b>	
<b>Bank Surveyor: Justin Miles</b>		<b>Effort time (minutes): 44.83</b>					
<b>Aquatic Edge Surveyor: Kris Fausti</b>		<b>Effort time (minutes): 41.42</b>					
<b>Date</b>	<b>Site</b>	<b>Common Name</b>	<b>Species Code</b>	<b>Snout-vent length (mm)</b>	<b>Habitat</b>	<b>Distance from wetted edge (meters)</b>	
8/30/2007	Horse Lake	Pacific Chorus Frog	PSRE	17	grass	2.5	
8/30/2007	Horse Lake	Western Toad	BUBO	19	grass	2	
8/30/2007	Horse Lake	Western Toad	BUBO	18	grass	1.5	
8/30/2007	Horse Lake	Pacific Chorus Frog	PSRE	17	grass/grass	3	
8/30/2007	Horse Lake	Western Toad	BUBO	19	grass/grass	3	
8/30/2007	Horse Lake	Western Toad	BUBO	14	mud/grass	2	
8/30/2007	Horse Lake	Western Toad	BUBO	16	grass/grass	1.5	
8/30/2007	Horse Lake	Western Toad	BUBO	15	grass/grass	1.5	
8/30/2007	Horse Lake	Western Toad	BUBO	18	grass/duff	3	
8/30/2007	Horse Lake	Pacific Chorus Frog	PSRE	19	grass/duff	2.5	
8/30/2007	Horse Lake	Pacific Chorus Frog	PSRE	17	in 0.05m water	NA	
8/30/2007	Horse Lake	Western Toad	BUBO	17	on grass	1	
8/30/2007	Horse Lake	Western Toad	BUBO	18	on silt	0.2	
8/30/2007	Horse Lake	Cascade Frog	RACA	26	in grass	1	
8/30/2007	Horse Lake	Western Toad	BUBO	19	in grass/on silt	0.5	



8/30/2007	Horse Lake	Western Toad	BUBO	16	on silt	0.3
8/30/2007	Horse Lake	Cascade Frog	RACA	21	on silt	0.3
8/30/2007	Horse Lake	Western Toad	BUBO	19	under grass/on silt	0.4
8/30/2007	Horse Lake	Western Toad	BUBO	22	on silt	0.2
8/30/2007	Horse Lake	Western Toad	BUBO	14	on silt	0.1
8/30/2007	Horse Lake	Cascade Frog	RACA	29	on silt	0.3
8/30/2007	Horse Lake	Northwestern Salamander	AMGR	missed	buried under silt in 0.1m water	NA
8/30/2007	Horse Lake	Northwestern Salamander	AMGR	missed	buried under silt in 0.1m water	NA
8/30/2007	Horse Lake	Cascade Frog	RACA	20	on silt	0.2

<b>Temperature (Fahrenheit)- Air:</b>		<b>H2O:</b>	<b>Start of Survey:</b> 1330		<b>End of Survey:</b> 1456	
<b>Bank Surveyor:</b> Justin Miles		<b>Effort time (minutes):</b> 48.38				
<b>Aquatic Edge Surveyor:</b> Kris Fausti		<b>Effort time (minutes):</b> 62.67				
<b>Date</b>	<b>Site</b>	<b>Common Name</b>	<b>Species Code</b>	<b>Snout-vent length (mm)</b>	<b>Habitat</b>	<b>Distance from wetted edge (meters)</b>
8/28/2007	Teal Lake	Pacific Chorus Frog	PSRE	21	on wetted edge	
8/28/2007	Teal Lake	Pacific Chorus Frog	PSRE	22	on wetted edge	
8/28/2007	Teal Lake	Pacific Chorus Frog	PSRE	22	in grass	3
8/28/2007	Teal Lake	Pacific Chorus Frog	PSRE	21	on mud	2.5
8/28/2007	Teal Lake	Pacific Chorus Frog	PSRE	24	in grass	1.5
8/28/2007	Teal Lake	Pacific Chorus Frog	PSRE	20	on edge of water	wetted edge
8/28/2007	Teal Lake	Western Frog	BUBO	82	in water, 0.15 M deep, resting on log	NA
8/28/2007	Teal Lake	Pacific Chorus Frog	PSRE	18	on edge of water	wetted edge
8/28/2007	Teal Lake	Pacific Chorus Frog	PSRE	21	on edge of water	wetted edge
8/28/2007	Teal Lake	Pacific Chorus Frog	PSRE	20	on edge of water	wetted edge
8/28/2007	Teal Lake	Pacific Chorus Frog	PSRE	20	on bank	0.2
8/28/2007	Teal Lake	Pacific Chorus	PSRE	18	on mud	3.5



		Frog				
8/28/2007	Teal Lake	Pacific Chorus Frog	PSRE	19	on mud	4
8/28/2007	Teal Lake	Pacific Chorus Frog	PSRE	21	in sticks on mud	2
8/28/2007	Teal Lake	Pacific Chorus Frog	PSRE	22	on mud	5
8/28/2007	Teal Lake	Western Frog	BUBO		in mud/under log	3
8/28/2007	Teal Lake	Pacific Chorus Frog	PSRE	19	on mud	2
8/28/2007	Teal Lake	Pacific Chorus Frog	PSRE	23	on mud	2
8/28/2007	Teal Lake	Pacific Chorus Frog	PSRE	19	on mud	2
8/28/2007	Teal Lake	Pacific Chorus Frog	PSRE	18	on mud and sparce grass	1
8/28/2007	Teal Lake	Pacific Chorus Frog	PSRE		on mud and sparce grass	1.5
8/28/2007	Teal Lake	Pacific Chorus Frog	PSRE	19	in thick grass	4
8/28/2007	Teal Lake	Pacific Chorus Frog	PSRE	20	in duff and sparse grass	3
8/28/2007	Teal Lake	Pacific Chorus Frog	PSRE	19	on grass	3
8/28/2007	Teal Lake	Pacific Chorus Frog	PSRE	17	on dead grass	4

<b>Temperature (Farenheit)- Air: 83</b>		<b>H2O: 75</b>	<b>Start of Survey: 1145</b>		<b>End of Survey: 1300</b>	
<b>Bank Surveyor: Justin Miles</b>		<b>Effort time (minutes): 46.30</b>				
<b>Aquatic Edge Surveyor: Kris Fausti</b>		<b>Effort time (minutes): 49.43</b>				
<b>Date</b>	<b>Site</b>	<b>Common Name</b>	<b>Species Code</b>	<b>Snout-vent length (mm)</b>	<b>Habitat</b>	<b>Distance from wetted edge (meters)</b>
8/30/2007	Teal Lake	Pacific Chorus Frog	PSRE	19	soil sparse grass	3
8/30/2007	Teal Lake	Western Toad	BUBO	23	soil sparse grass	4
8/30/2007	Teal Lake	Pacific Chorus Frog	PSRE	18	soil sparse grass	3.2
8/30/2007	Teal Lake	Pacific Chorus Frog	PSRE	17	soil sparse grass	2.8
8/30/2007	Teal Lake	Pacific Chorus Frog	PSRE	19	mud	1.5
8/30/2007	Teal Lake	Pacific Chorus Frog	PSRE	19	mud	1.7
8/30/2007	Teal Lake	Pacific Chorus Frog	PSRE	19	soil/grass	2.5



8/30/2007	Teal Lake	Pacific Chorus Frog	PSRE	19	soil/grass	2.5
8/30/2007	Teal Lake	Pacific Chorus Frog	PSRE	19	soil	2
8/30/2007	Teal Lake	Pacific Chorus Frog	PSRE	missed	soil	2
8/30/2007	Teal Lake	Pacific Chorus Frog	PSRE	18	grass	2.5
8/30/2007	Teal Lake	Pacific Chorus Frog	PSRE	17	grass	2.5
8/30/2007	Teal Lake	Pacific Chorus Frog	PSRE	19	on silt	0.7
8/30/2007	Teal Lake	Pacific Chorus Frog	PSRE	20	under sparse grass/on soil	2
8/30/2007	Teal Lake	Pacific Chorus Frog	PSRE	15	under sparse grass/on mud	3.5
8/30/2007	Teal Lake	Pacific Chorus Frog	PSRE	17	on mud	2.5
8/30/2007	Teal Lake	Pacific Chorus Frog	PSRE	19	under wood/on silt	0.2
8/30/2007	Teal Lake	Pacific Chorus Frog	PSRE	20	on mud	1
8/30/2007	Teal Lake	Cascade Frog	RACA	27	on algae	0
8/30/2007	Teal Lake	Northwestern Salamander	AMGR	41/75	in water/mort.	NA
8/30/2007	Teal Lake	Pacific Chorus Frog	PSRE	20	in grass	1.2
8/30/2007	Teal Lake	Pacific Chorus Frog	PSRE	25	in sparse grass/on mud	1
8/30/2007	Teal Lake	Pacific Chorus Frog	PSRE	20	on log over water	NA
8/30/2007	Teal Lake	Pacific Chorus Frog	PSRE	18	on mud	2
8/30/2007	Teal Lake	Western Toad	BUBO	92	buried in mud/under log	4
8/30/2007	Teal Lake	Pacific Chorus Frog	PSRE	15	on silt	0.4
8/30/2007	Teal Lake	Pacific Chorus Frog	PSRE	21	in grass/on mud	3.5
8/30/2007	Teal Lake	Pacific Chorus Frog	PSRE	17	on soil	2.5
8/30/2007	Teal Lake	Pacific Chorus Frog	PSRE	21	on silt	0.3
8/30/2007	Teal Lake	Pacific Chorus Frog	PSRE	18	on silt	0.5
8/30/2007	Teal Lake	Pacific Chorus Frog	PSRE	23	on silt	0.2
8/30/2007	Teal Lake	Western Toad	BUBO	25	on silt	1



<b>Temperature (Fahrenheit)- Air:</b> 68		<b>H2O:</b> 71	<b>Start of Survey:</b> 1700		<b>End of Survey:</b> 1912	
<b>Bank Surveyor:</b> Justin Miles		<b>Effort time (minutes):</b> 140				
<b>Aquatic Edge Surveyor:</b> Kris Fausti		<b>Effort time (minutes):</b> 132				
<b>Date</b>	<b>Site</b>	<b>Common Name</b>	<b>Species Code</b>	<b>Snout-vent length (mm)</b>	<b>Habitat</b>	<b>Distance from wetted edge (meters)</b>
8/27/2007	Diamond Lake (NW Shore)	Pacific Chorus Frog	PSRE	20	In grass	2
8/27/2002	Diamond Lake (NW Shore)	Pacific Chorus Frog	PSRE	18	In grass	1.5
8/27/1997	Diamond Lake (NW Shore)	Pacific Chorus Frog	PSRE	20	In grass	0.5
8/27/1992	Diamond Lake (NW Shore)	Pacific Chorus Frog	PSRE	20	In grass	1
8/27/1987	Diamond Lake (NW Shore)	Pacific Chorus Frog	PSRE	19	In grass	3
8/27/1982	Diamond Lake (NW Shore)	Pacific Chorus Frog	PSRE	21	In grass	2.5
8/27/1977	Diamond Lake (NW Shore)	Pacific Chorus Frog	PSRE	20	In grass	1
8/27/1972	Diamond Lake (NW Shore)	Pacific Chorus Frog	PSRE	18	In grass	0.75
8/27/1967	Diamond Lake (NW Shore)	Pacific Chorus Frog	PSRE	21	In grass	1
8/27/1962	Diamond Lake (NW Shore)	Pacific Chorus Frog	PSRE	20	In grass	2
8/27/1957	Diamond Lake (NW Shore)	Pacific Chorus Frog	PSRE	18	In grass	4
8/27/1952	Diamond Lake (NW Shore)	Pacific Chorus Frog	PSRE	19	In grass	2

<b>Temperature (Fahrenheit)- Air:</b> 80		<b>H2O:</b> 72	<b>Start of Survey:</b> 1649		<b>End of Survey:</b> 1858	
<b>Bank Surveyor:</b> Justin Miles		<b>Effort time (minutes):</b> 109				
<b>Aquatic Edge Surveyor:</b> Kris Fausti		<b>Effort time (minutes):</b> 120				
<b>Date</b>	<b>Site</b>	<b>Common Name</b>	<b>Species Code</b>	<b>Snout-vent length (mm)</b>	<b>Habitat</b>	<b>Distance from wetted edge (meters)</b>
8/30/2007	Diamond Lake (NW Shore)	Pacific Chorus Frog	PSRE	20	In tall grass	1
8/30/2007	Diamond Lake (NW Shore)	Pacific Chorus Frog	PSRE	23	In tall grass	0.5



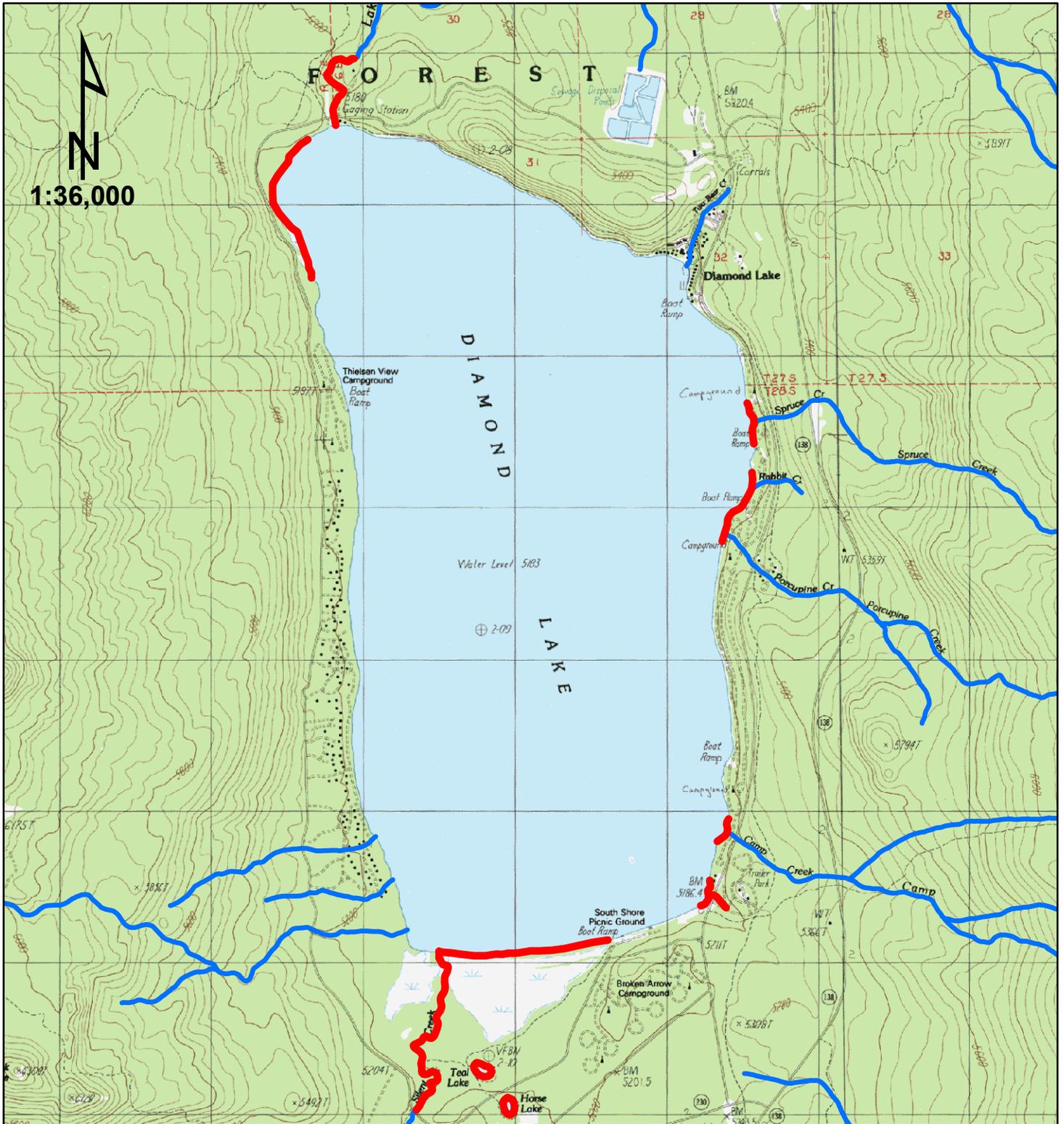
8/30/2007	Diamond Lake (NW Shore)	Pacific Chorus Frog	PSRE	20	In tall grass	0.2
8/30/2007	Diamond Lake (NW Shore)	Pacific Chorus Frog	PSRE	20	In tall grass	0.1
8/30/2007	Diamond Lake (NW Shore)	Pacific Chorus Frog	PSRE	18	In tall grass	3
8/30/2007	Diamond Lake (NW Shore)	Western Toad	BUBO	22	on a log in marsh	5
8/30/2007	Diamond Lake (NW Shore)	Pacific Chorus Frog	PSRE	19	on a log in marsh	4.5
8/30/2007	Diamond Lake (NW Shore)	Pacific Chorus Frog	PSRE	18	in crack of log	5.5
8/30/2007	Diamond Lake (NW Shore)	Pacific Chorus Frog	PSRE	20	in crack of log	5
8/30/2007	Diamond Lake (NW Shore)	Pacific Chorus Frog	PSRE	18	in crack of log	5
8/30/2007	Diamond Lake (NW Shore)	Western Toad	BUBO	20	on log	5
8/30/2007	Diamond Lake (NW Shore)	Pacific Chorus Frog	PSRE	17	in crack of log	5
8/30/2007	Diamond Lake (NW Shore)	Western Toad	BUBO	25	in crack of log	15
8/30/2007	Diamond Lake (NW Shore)	Pacific Chorus Frog	PSRE	21	in crack of log	15
8/30/2007	Diamond Lake (NW Shore)	Pacific Chorus Frog	PSRE	20	in crack of log	15
8/30/2007	Diamond Lake (NW Shore)	Pacific Chorus Frog	PSRE	18	in crack of log	15
8/30/2007	Diamond Lake (NW Shore)	Pacific Chorus Frog	PSRE	17	in crack of log	15
8/30/2007	Diamond Lake (NW Shore)	Pacific Chorus Frog	PSRE	23	in crack of log	15
8/30/2007	Diamond Lake (NW Shore)	Pacific Chorus Frog	PSRE	20	in crack of log	15
8/30/2007	Diamond Lake (NW Shore)	Pacific Chorus Frog	PSRE	22	in crack of log	15



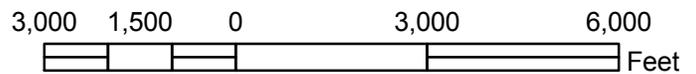
## APPENDIX C: MAPS OF SURVEY AREAS



# Diamond Lake Restoration Project Amphibian Study



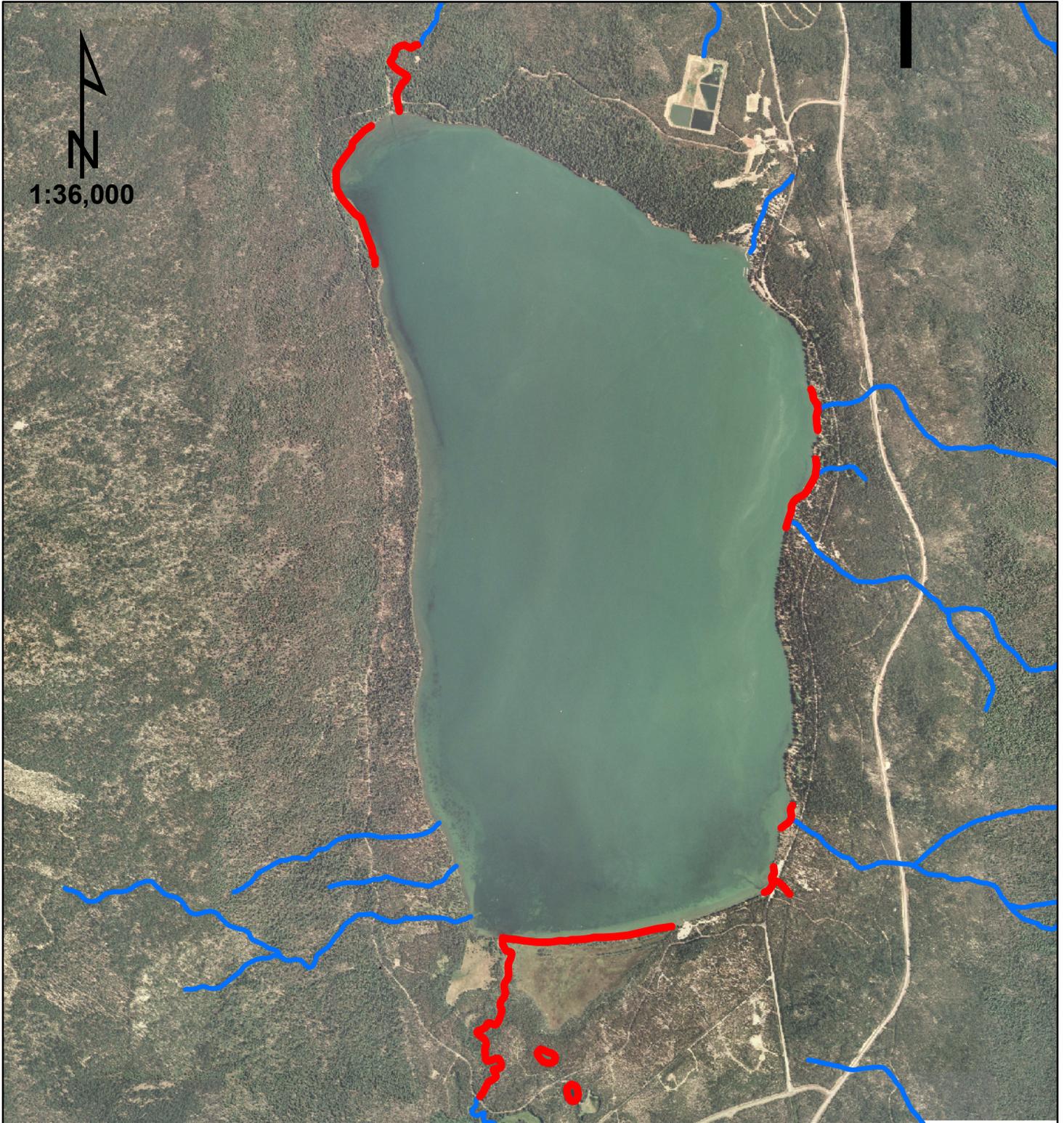
North Arrow  
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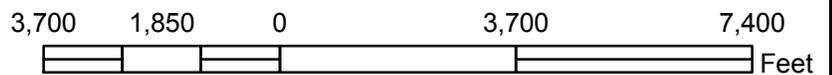
**Legend**  
**— Amphibian Survey Areas**



# Diamond Lake Restoration Project Amphibian Study



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## Legend

 Amphibian Survey Areas



# Diamond Lake Restoration Project Amphibian Study

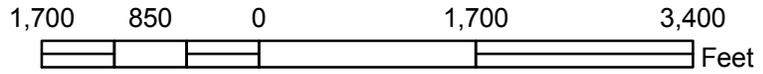


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Water Level 5183

## Eastern Shore Area



**Legend**

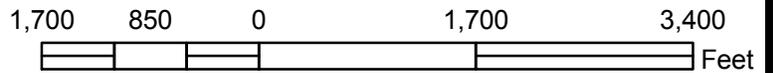
 **Amphibian Survey Areas**



# Diamond Lake Restoration Project Amphibian Study



## Northern Shore Area

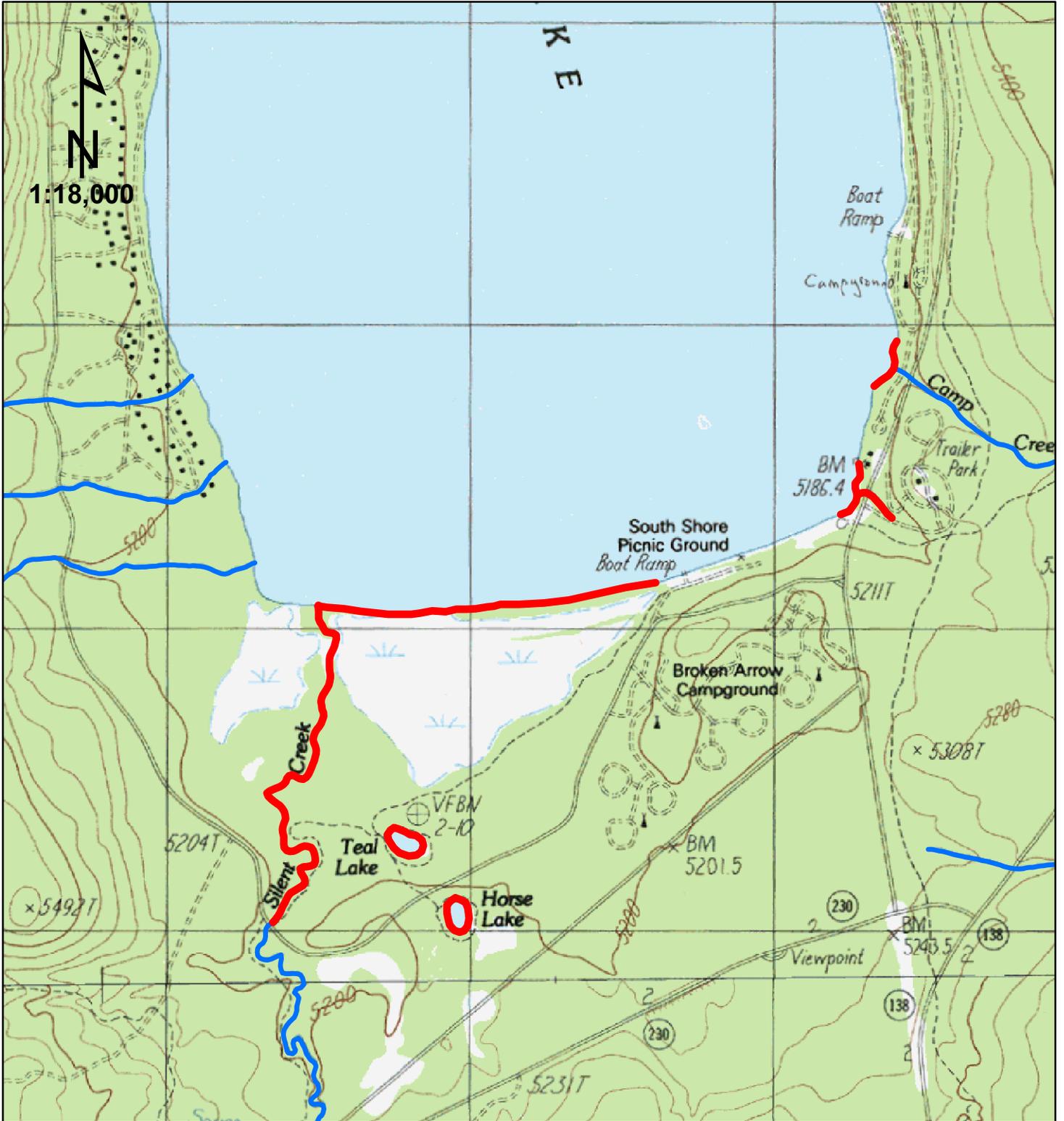


### Legend

 Amphibian Survey Areas



# Diamond Lake Restoration Project Amphibian Study



## Southern Shore Area

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 Amphibian Survey Areas

