State of California
Department of Fish and Wildlife

M e m o r a n d u m

Date: 11/6/2019

To: Sarah Mussulman
Sierra Fisheries Supervisor
Department of Fish and Wildlife
North Central Region

From: Mitch Lockhart
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Department of Fish and Wildlife
North Central Region

Subject: Resource Assessment at Elbert Lake, El Dorado County

Elbert Lake (Lake ID 14441), El Dorado County, is a small, off-trail lake within the Upper Truckee River (UTR) watershed in the Lake Tahoe Basin (Figure 1). It was planted with brook trout (*Salvelinus fontinalis*; BK) from 1934 to 1977 and rainbow trout (*Oncorhynchus mykiss*; RT) from 1977 to 2000 by California Department of Fish and Wildlife (CDFW). A gill net sample collected by CDFW in 2003 captured only BK.

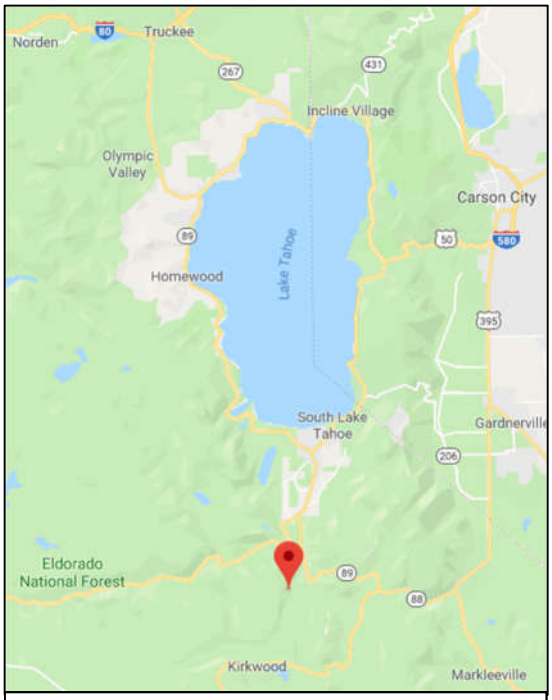

Figure 1:Map of the location of Elbert Lake, El Dorado Co. (Red Pin) in relation to Lake Tahoe (Google Maps, retrieved 10.16.19).

In 2008, the US Forest Service Lake Tahoe Basin Management Unit (LTBMU) began mechanical removal of non-native trout within the UTR to restore habitat for the Federally threatened Lahontan cutthroat trout (*Oncorhynchus clarkii henshawi*; LCT). Elbert Lake is located within the project area and must be evaluated for feasibility of fish removal.

On July 15, 2019 three CDFW Scientific Aids surveyed Elbert Lake, the tributaries, and fishery to

help inform mechanical non-native fish removal. A monofilament gill net was set at 8:05 pm and pulled on July 16, 2019 at 6:14 am for a total survey effort of 10 hours. Forty-five BK were captured (Figures 2 & 3).

On July 16, 2019 the Scientific Aids conducted a Visual Encounter Survey (VES) of Elbert Lake to search for diurnal, special status herpetofauna species. The VES began at 9:27 am under partly cloudy skies, light wind, and an air temperature of 18.5^{o} C. The VES concluded at 11:01 am for a total effort of 195 minutes. A single Sierra garter snake (*Thamnophis couchii*; THCO) was observed.

Figure 2: Photo of forty-five BK captured during a gill net survey at Elbert Lake, El Dorado Co., on July 15, 2019.

In addition, the inlet and outlet were surveyed for diurnal amphibians, fish, and fish barriers (Figure 4a). The inlet is a small, spring-fed system that flows down a steep slope and enters Elbert Lake through shallow, emergent vegetation (Figure 4b). The outlet flows east towards the UTR and may go dry or intermittent during dry seasons. Four fish barriers were observed between Elbert Lake the UTR (Figures 4-8).

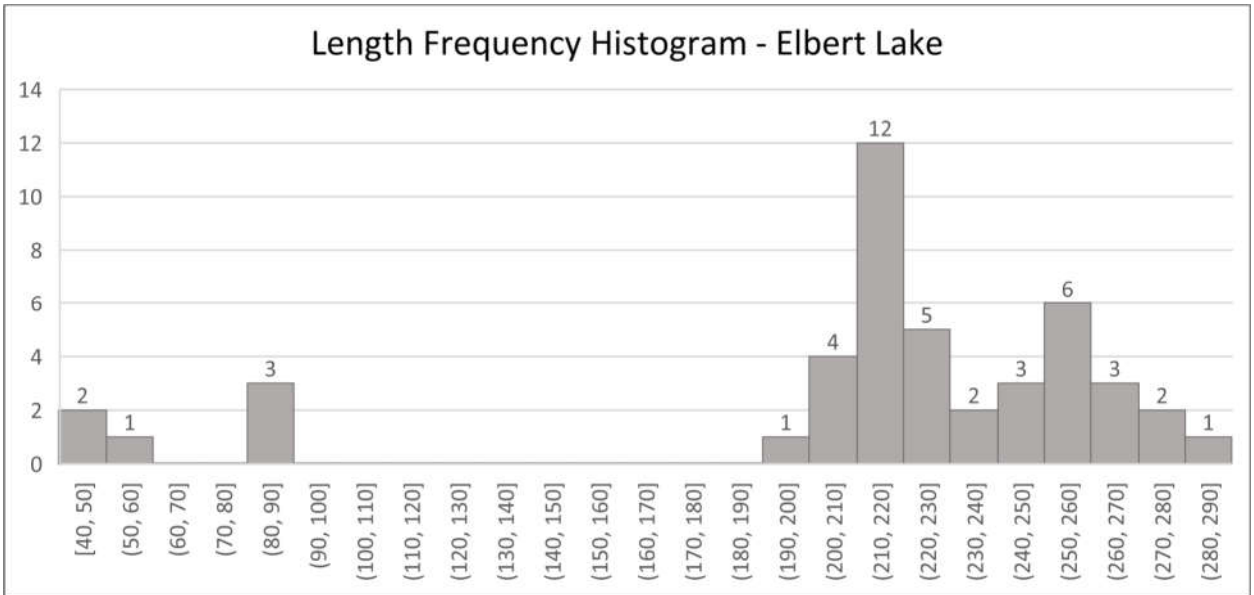

Figure 3: Length frequency histogram of BK captured during a gill net survey at Elbert Lake, El Dorado Co., on July 15, 2019. The x-axis displays 10mm (1 cm) bins of total length size classes. The y-axis displays the number of fish captured in each size class.

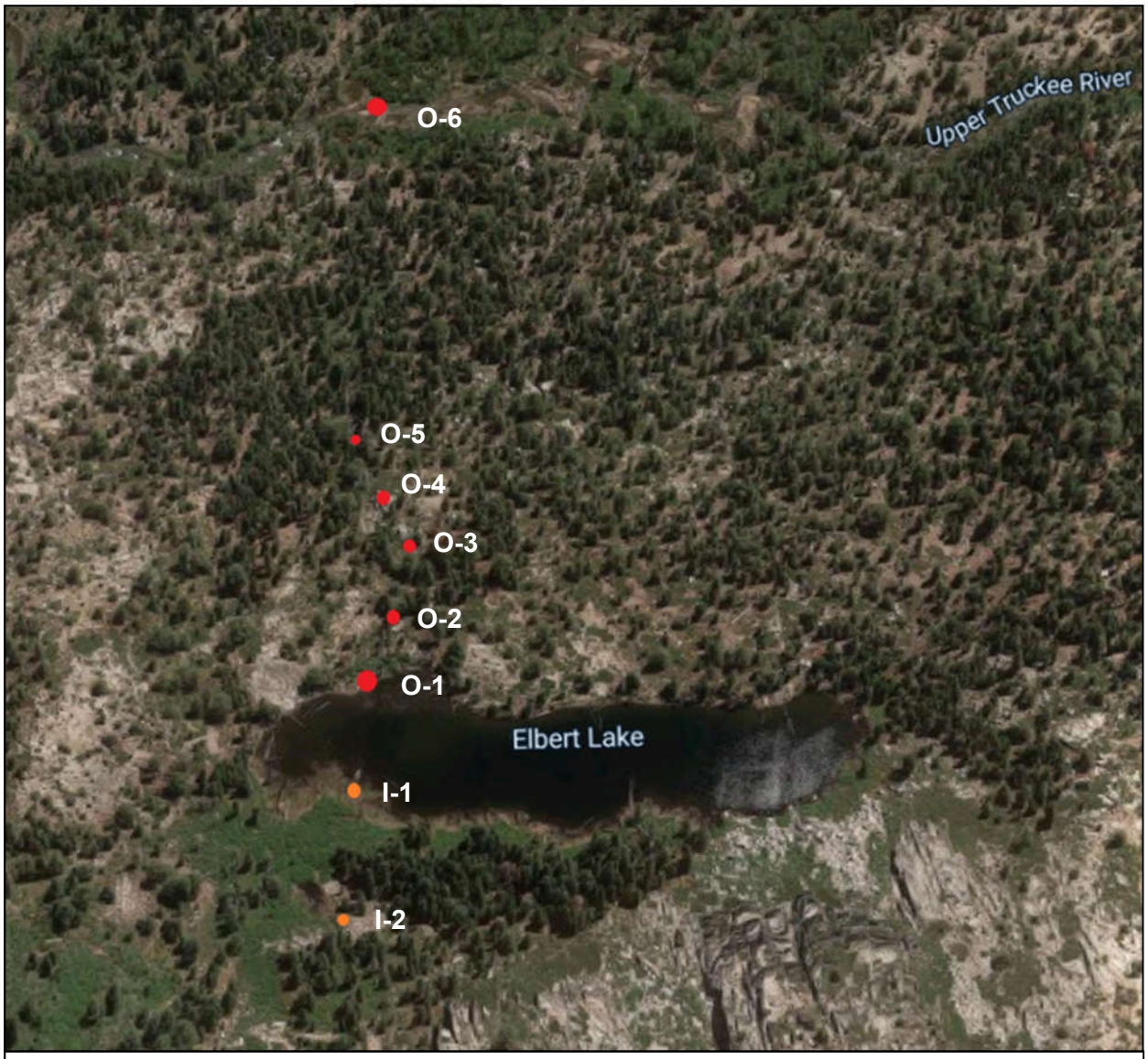

Figure 4: Satellite image of Elbert Lake, El Dorado Co. The orange points represent locations of inlet photographs I-1 and I-2. The red points represent the locations of outlet photographs O-1 to O-6. Photographs were collected by a CDFW Scientific Aid during a VES conducted on July 16, 2019.

These data suggest that mechanical removal of BK at Elbert Lake is feasible. Suitable low flow barriers exist on the inlet and outlet diminishing the likelihood the BK population within Elbert Lake can access suitable spawning habitat. This conclusion is additionally supported by the length frequency histogram (Figure 3) which clearly demonstrates a large segregation between adult fish and young-of-year. Juvenile size classes are missing from the sample. This suggests the BK population is limited by spawning habitat availability and is not successfully spawning every year. This is especially relevant, considering 2016, 2017, and 2018 were average or above average water years. The inlet mouth may present challenges to mechanical fish removal and the lake should be assessed during late-summer or fall, when the lake level is lower to determine if the marsh area around the inlet mouth is drier and easier to work within.

Figure 5: Photographs of inlet features of Elbert Lake, El Dorado Co. Photograph I-1 (left) was taken looking upstream at the inlet mouth where the inlet flows into Elbert Lake. The inlet mouth is characterized by shallow water and emergent vegetation. Photograph I-2 (right) was taken on the inlet looking upstream at the first fish barrier closest to Elbert Lake. The barrier is characterized by over-steepened cascades with boulder and large cobble substrate.

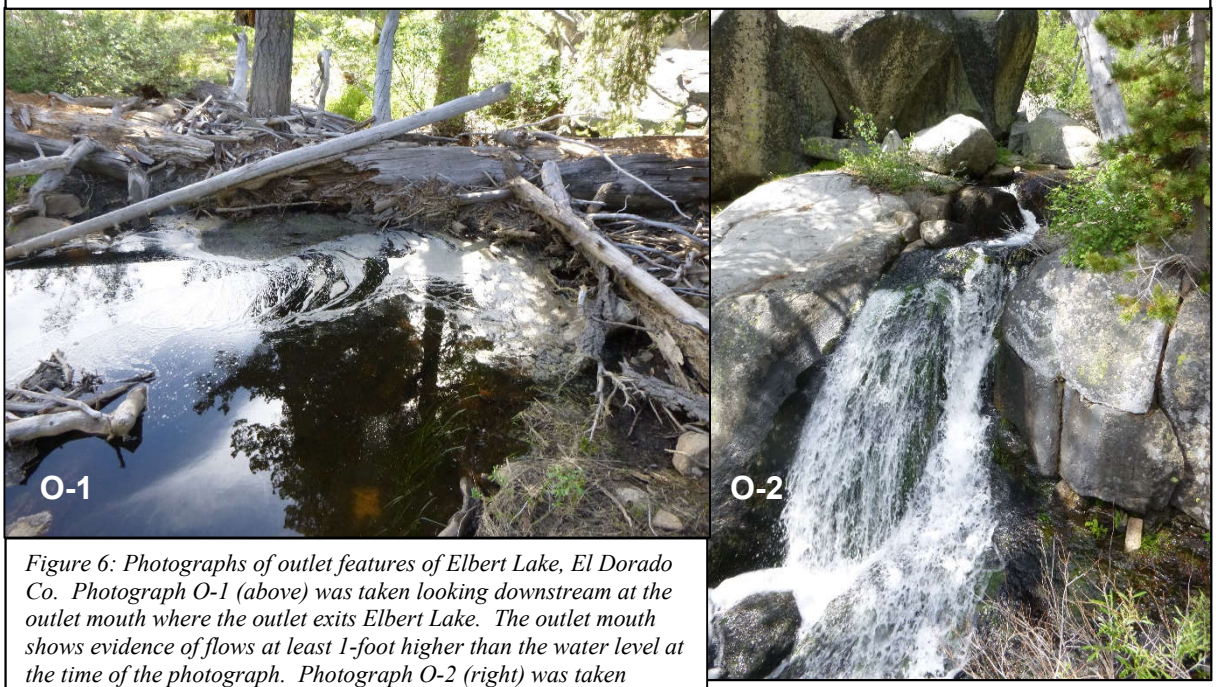

Figure 6: Photographs of outlet features of Elbert Lake, El Dorado Co. Photograph O-1 (above) was taken looking downstream at the outlet mouth where the outlet exits Elbert Lake. The outlet mouth shows evidence of flows at least 1-foot higher than the water level at the time of the photograph. Photograph O-2 (right) was taken looking upstream at a fish movement impediment characterized by a 2-foot drop onto a boulder with no jump pool. This feature may not be a barrier at high flow.

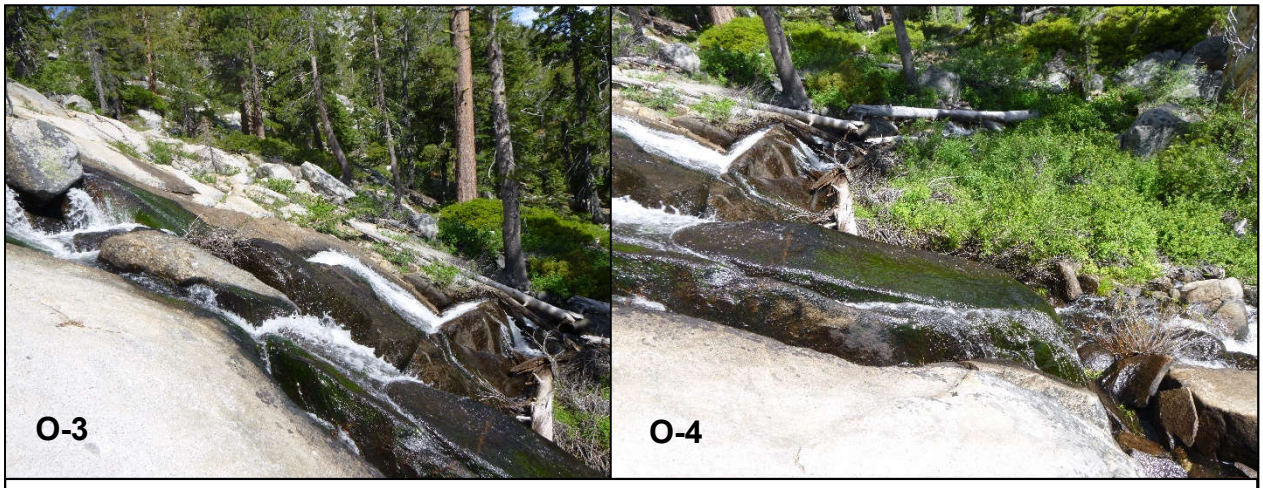

Figure 7: Photographs of outlet features of Elbert Lake, El Dorado Co. Photograph O-3 (left) and O-4 (right) were taken looking roughly west at the most prominent outlet barrier. The barrier is characterized by a 6-meter bedrock slide. There are few to no rest pools or jump pools. The barrier ends (O-4) at a small drop onto boulders with no jump pool. This feature is likely a barrier during high and low flows.

Figure 8: Photograph of outlet features of Elbert Lake, El Dorado Co. Photograph O-5 (left) was taken looking upstream at a fish movement impediment. This feature is characterized by boulder dominated step pool habitat. It is unclear if this feature is a barrier at high flow. However, it is worth noting that young-of-year trout (spp.) were observed in the creek downstream of this feature. Photograph O-6 (right) was taken looking roughly north of the confluence of Elbert Lake outlet and the Upper Truckee River. The confluence is characterized by low-gradient slope and dominated by gravel and cobble substrate.

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LENGTH-WEIGHT DATA SHEET

Date 7.16.19
Sampler LM, CMH, PF
Sampling Method Gill Net

Water Elbert's Lake (14441)
Area El Dorado County
Other Set: 2005 (7.15.19), Pull: 0614 (7.16.19)

	Species	BK		Sex	Egg						
		Length TL (mm)	Weight (gm)	~~Length TL (mm)~~	~~Weight (gm)~~	Length TL (mm)	Weight (gm)	Length TL (mm)	Weight (gm)	Length TL (mm)	Weight (gm)
1		260	155	M	–						
2		255	140	F	E						
3		255	150	F	E						
4		220	117	M	–						
5		270	125	M	–						
6		220	115	M	–						
7		90	75	F	E						
8		260	125	F	E, L						
9		230	135	F	E						
10		90	65	F	E						
11		220	110	M	–						
12		250	130	F	E						
13		275	185	M	–						
14		220	115	M	–						
15		220	110	F	E						
16		240	140	F	E						
17		230	115	F	E						
18		220	110	F	E						
19		210	95	M	–						
20		60	36	F	E						
21		225	85	M	–						
22		215	85	M	–						
23		270	115	M	–						
24		260	220	F	E, L						
25		275	225	M	–						
26		290	220	M	–						
27		250	150	F	E						
28		220	165	M	–						
29		210	110	M	–						
30		220	110	M	–						
31		210	90	F	E						
32		265	155	M	–						
33		255	142	M	–						
34		205	102	F	E, L						
35		245	120	F	E						
36		220	117	F	E, L						
37		230	135	M	–						
38		240	150	M	–						
39		220	125	F	E						
40		220	105	M	–						
41		200	87	F	E						
42		50	30	F	E						
43		90	75	F	E						
44		40	25	F	E						
45		225	120	M	–						
46											
47											
48											
49											
50											

Figure 9: Data sheet with gill net data from a survey conducted July 16, 2019, at Elbert Lake, El Dorado County

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AMPHIBIAN AND REPTILE SURVEY DATA SHEET - 2017

Site ID: 14441	Date: 7/16/19	SKY: Clear (Partly Cloudy) Mostly Cloudy Over-cast Rain Snow Smoke	WIND: Calm (Light) Moderate Strong		
Topo Name: (1:24,000)	County: El Dorado	Elevation: m ft	If not surveyed, provide reason:	Private Property	Frozen / Not Found / No Access
Surveyors: Luc Mitchell, Cian Hettrick, Parisa Farman	Water Type: (Lake) Unmapped pond	Marsh/ meadow	Spring seep	Stream (Skip to "STREAMS" below)	
Lake Name: (from map) Elbert's Lake	East UTM:	North UTM:	UTM Zone:		
Color: (Clear) Stained; Turbidity: (Clear) Cloudy	Water (.5 m from shore, Temp 10cm deep): 14 @ 0934 (Cor) F	Air (1 m above water) Temp: 18.5 @ 0931 (Cor) F	Site condition notes:		
Survey START time: 0927	Survey END time: 1101	Total survey duration (min): 195	HERPS SEEN? (YES) NO	FISH SEEN? (YES) NO	

*FOR LAKES/PONDS/MEADOWS: ALSO SURVEY FIRST 200 m OF ALL INLETS AND OUTLETS. RECORD DATA SEPARATELY IN THE "STREAMS" SECTION BELOW.

Species	# adults	# subadults	# metamorphs	# larvae	# egg m.	#swabs	Survey Method
THCO		(1)					(Visual) Trapped; Aural Hand Collected; Amp Net Incidental
Calling? Y N							
							Visual Trapped; Aural Hand Collected; Amp Net Incidental
Calling? Y N							
							Visual Trapped; Aural Hand Collected; Amp Net Incidental
Calling? Y N							
							Visual Trapped; Aural Hand Collected; Amp Net Incidental
Calling? Y N							

STREAM

(Inlet) Outlet (circle one) #___	Stream Type: Perennial Ephemeral	Stream Currently Dry? Y N	Intermittent? Y N	
Start 105 E UTM: 0757640 N UTM: 4296107	End 105 E UTM: 0757545 N UTM: 4296122		Color: Clear Stained NA; Turbidity: Clear Cloudy NA	
Start Time: 1005	End Time: 1023	Duration (min): 10	Water Temp:	Air Temp:	Herps Present? YES (NO)
Inlet (Outlet) (circle one) #___	Stream Type: Perennial Ephemeral	Stream Currently Dry? Y N	Intermittent? Y N		
Start 105 E UTM: 0757716 N UTM: 4296095	End 105 E UTM: 0758110 N UTM: 4296120		Color: Clear Stained NA; Turbidity: Clear Cloudy NA		
Start Time: 0939	End Time: 1048	Duration (min): 67	Water Temp:	Air Temp:	Herps Present? YES (NO)
Inlet Outlet (circle one) #___	Stream Type: Perennial Ephemeral	Stream Currently Dry? Y N	Intermittent? Y N		
Start E UTM: N UTM:	End E UTM: N UTM:		Color: Clear Stained NA; Turbidity: Clear Cloudy NA		
Start Time:	End Time:	Duration (min):	Water Temp:	Air Temp:	Herps Present? YES NO
Inlet Outlet (circle one) #___	Stream Type: Perennial Ephemeral	Stream Currently Dry? Y N	Intermittent? Y N		
Start E UTM: N UTM:	End E UTM: N UTM:		Color: Clear Stained NA; Turbidity: Clear Cloudy NA		
Start Time:	End Time:	Duration (min):	Water Temp:	Air Temp:	Herps Present? YES NO

Species	In/Outlet #	# adults	#subadults	#metamorphs	larvae	# egg m.	#swabs	Survey Method
	(circle one) # IN							Visual Trapped; Aural Hand Collected; Amp Net Incidental
Calling? Y N	OUT							
	(circle one) # IN							Visual Trapped; Aural Hand Collected; Amp Net Incidental
Calling? Y N	OUT							
	(circle one) # IN							Visual Trapped; Aural Hand Collected; Amp Net Incidental
Calling? Y N	OUT							
	(circle one) # IN							Visual Trapped; Aural Hand Collected; Amp Net Incidental
Calling? Y N	OUT							

Amphibians: S. Long-toed Salamander (**AMMA**); Yosemite Toad (**ANCA**, frmly BUCA); Sierran Treefrog (**HYSI**, frmly PSRE or HYRE); Sierra Nevada Yellow-legged Frog (**RASI**)
Amph. less common in HML: CA Toad (**ANBO**, frmly BUBO); Bullfrog (**RACT**); Cascades Frog (**RACA**); CA Red-legged Frog (**RADR**); Sierra Newt (**TASI**, frmly TATO)
Reptiles: Sierra Gartersnake (**THCO**); Mountain Gartersnake (**THEL**); Valley Gartersnake (**THSI**); Western Pond Turtle (**EMMA**, frmly CLMA)

PLEASE Return to: Isaac Chellman, California Department of Fish and Wildlife, (916) 358-4038; 1701 Nimbus Rd., Rancho Cordova, CA 95670

Field review____ Copied____ Entered____ Proofed____ Herp Data Sheet, pg. 1 of 2

PHOTOS	Photo Number	Camera	Time	Date (yyyy-mmm-dd)	UTM E	UTM N	Comments

Figure 10: VES data sheet from a survey conducted July 16, 2019, at Elbert Lake, El Dorado County

Overview							
Herps							
Other	overview			Elberts Lake Overview. 7.15			From SW Peak facing NE
	Fish Bar 1			Pic 95	Cian	0757755, 4296100	
	Fish Bar 2			Pic 96	Cian	0757806, 4296084	
	Fish Bar			Pic 99/100	Cian	0757837, 4296103	
	Fish Bar			Pic 101-103	Cian	0757876, 4296128	
	Spawn gravel			Pic 104	Cian	0758110, 4296120	

SITE SKETCH:

NOTES:
Caught 48 Bk in overnight gillnet. North and western edges of pond resemble flooded meadow. Beaver presence in fallen trees, dams. Dead THSI snake found in northern shallows. Outlet waypoints 1) 105 0757782, 4296061. 2) 0757981, 4296142. 3) 0758071, 4296142. 4) 0758098, 4296124. Flat pools just before upper Truckee. Trout unknown sp.

Amphibians: S. Long-toed Salamander (**AMMA**); Yosemite Toad (**ANCA**, frmly BUCA); Sierran Treefrog (**HYSI**, frmly PSRE or HYRE); Sierra Nevada Yellow-legged Frog (**RASI**)
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Field review_____ Copied_____ Entered_____ Proofed_____

Herp Data Sheet, pg. 2 of 2

Figure 10, Con't: VES data sheet from a survey conducted July 16, 2019, at Elbert Lake, El Dorado County