State of California Department of Fish and Wildlife

Memorandum

Date: 11/6/2019

- To: Sarah Mussulman Sierra Fisheries Supervisor Department of Fish and Wildlife North Central Region
- From: Mitch Lockhart Environmental Scientist 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.

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

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	Fish Bar 1	Pic 95	Cian	0757765, 42	6100
	Fish Bar Z	Pic 96	Cian	0757806,429	6084
	Fish Bar	P:C 94/100	Cian	0757837,412	96103
	Fish Bar	Piz 101-103	Cian	0757876,429	6128
	SPAWM Gravel	Pic LOH	Ciun	07 58110, 4296	
NOTE	s: ght 48 Ble in 1 emble flooded 1	overnight gill meuolow. Bea	net. No ver pres	its and west	ern edges of poud rees, dams,
(eg De 1)1	emble flooded 1 al THSI SNOW 05 0757782.429 0758098.42961	6061. 2) C75	7981,42	Shallows OU A 6142.3) 07 58	1 let Waypoints 2071, 429642. 20. Trout unknown Sp.
(CS Dea 1)1 4) Amphib Amphiles	EMBLE Flood.Ed 1 CA THSI SUNK US 0757782,429 3758098,42961 ans. S. Long-toed Salamander (AMM ess common in HML: CA Toad (AMI : Sierra Gartesnake (THCO); Mounta E Return to: Isaac Chelliman, Califi E Return to: Isaac Chelliman, Califi	Mellolow . Isen c found in nor 6061. 2) 075 (24. Flat P0015 MA); Yosemile Toad (ANCA 1 BO, fmly BUBO); Builting (R) ain Gartersnake (THEL); Valle	Thern 9 7981, 42 Just bef mily BUCA; Sier ACT); Cascades F y Gartersnake (TP nd Wildlife, (916)	Shallows. (1) 9 6142.3) 0758 ore upper Trucked an Treating (HYSI, fmly PSRE or rog (RACA): CA Red-legged Fing 18); Western Pond Turtle (EMMA.	HET WOLYPOINTS 2071, 429642. 20 - Trout Unknown SP. HYRE: Sierra Nevada Yellow-legged Frog (RA (RADR: Sierra Nevat (TASI, triniy TATO) triniy CLMA)

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