

State of California
Department of Fish and Wildlife

Memorandum

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Subject: Independence Lake LCT Hybridization Genetic Sampling Effort

Summary

From the dates of June 24, 2019 to June 27, 2019, a team of Scientific Aids led by CDFW Environmental Scientists Mitch Lockhart, John Hanson, and Isaac Chellman, went to Independence Lake, CA (**Figure 1**), to capture as many Lahontan Cutthroat Trout (LCT; *Oncorhynchus clarkii henshawi*) as possible, to gather fin clips for genetic analysis. The crew set and checked Fyke Traps and angled from shore and boat. The tissue samples will be analyzed to establish whether this historically native population of LCT has been hybridized with non-native Rainbow Trout.

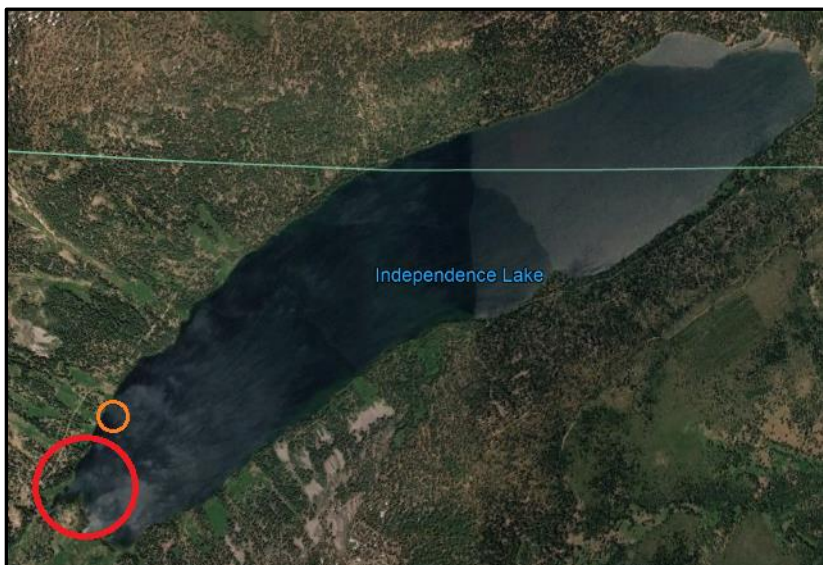


Figure 1. Aerial imagery of Independence Lake. The red circle depicts where Fyke Trap #'s 1-6 were set on June 24, 2019. The orange circle indicates where Trap #1 was reset on June 27, 2019.

On June 24, 2019, we arrived at Independence Lake and set six Fyke traps. The traps were set within the most significant inlet of the lake, Independence Creek, (**Figure 2**) at 17:15 with the intent of blocking as much of the channel as possible. The team then fished for four hours, catching seven LCT.

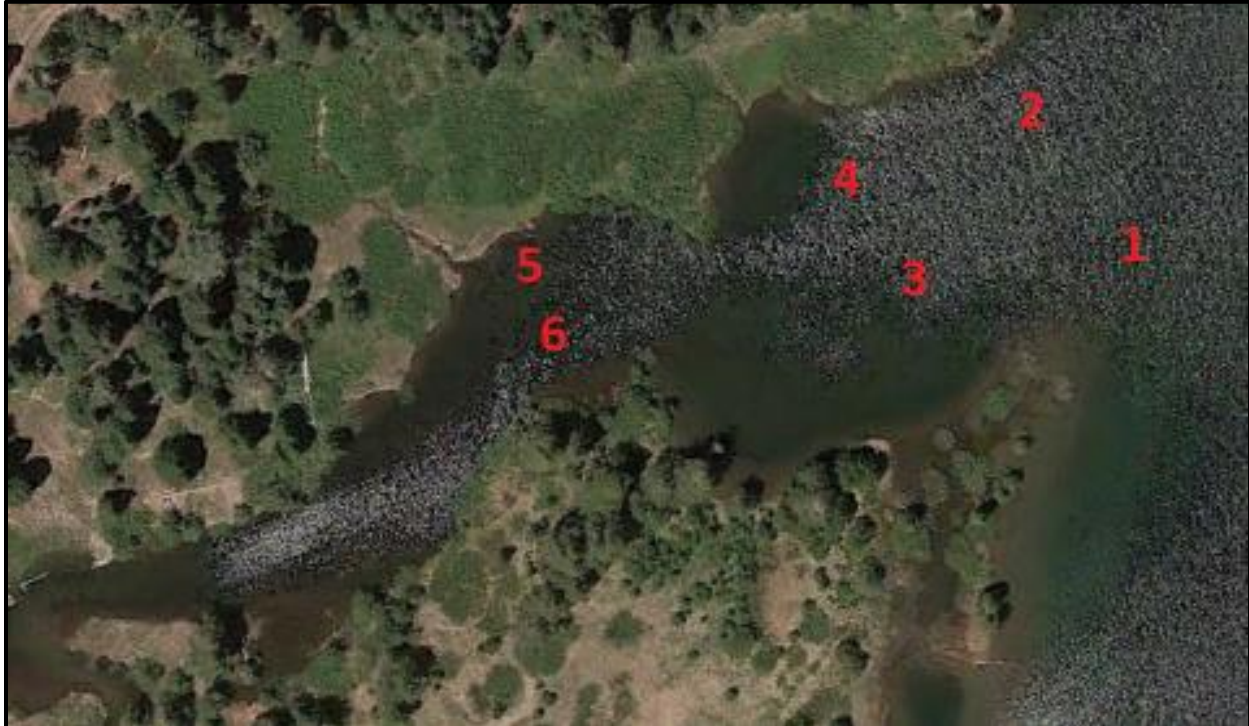


Figure 2. Map of six Fyke Trap locations within the confluence of Independence Creek with Independence Lake. Traps #1, #2, #3, and #4 had one wing, while Traps #5 and #6 were set with two wings.

On June 25, 2019, we checked the traps at 08:45 and then again at 15:00. One LCT was captured in the Fyke traps. The seven hours between checks were spent hook and line angling, which yielded 11 LCT.

On June 26, 2019, we checked the Fyke traps at 10:30. No LCT were captured. We then fished for six hours, catching eight LCT. We could not check the traps in the evening and had to end angling early due to severe wind and lake conditions.

On June 27, 2019, we checked and pulled the Fyke traps at 08:30. No LCT were captured. We fished for three hours and caught three LCT. We then left the project site.

Over the four days of sampling, the Fyke nets captured a total of 124 Suckers (*Catostomidae* spp.; SKR), 54 Whitefish (*Prosopium williamsoni*; WF), 39 Tui Chub (*Siphateles bicolor*, TC), 33 Lahontan Redsides (*Richardsonius egregius*; LRS), three Paiute Scuplin (*Cottus beldingii*; PS), and one LCT (**Table 1**). A total of 29 LCT were captured via hook and line angling (**Table 2**). The four days of sampling yielded LCT

captured of a wide range of size classes (**Figure 3**) and from a variety of locations and habitat types.

Table 1. Fyke Trap Catch Data at Independence Lake from June 24 to June 27, 2019.

Date	Time	Trap#	SKR	WF	TC	LRS	PS	LCT	Total (#)	Effort (hrs)	CPUE
24-Jun	1715	2	0	4	0	0	0	0	4	8	0.50
24-Jun	1720	4	0	0	0	0	0	0	0	8	0.00
25-Jun	845	1	0	0	0	0	0	0	0	15	0.00
25-Jun	850	2	14	0	3	0	0	0	17	15	1.13
25-Jun	855	3	1	5	1	1	0	0	8	15	0.53
25-Jun	900	4	1	1	2	0	0	1	5	15	0.33
25-Jun	905	5	0	4	8	6	0	0	18	15	1.20
25-Jun	910	6	0	11	1	0	0	0	12	15	0.80
25-Jun	1500	1	0	1	0	0	0	0	1	8	0.13
25-Jun	1509	2	0	0	0	0	0	0	0	8	0.00
25-Jun	1512	3	0	0	0	0	0	0	0	8	0.00
25-Jun	1515	4	0	0	0	0	0	0	0	8	0.00
25-Jun	1521	5	0	1	0	0	0	0	1	8	0.13
25-Jun	1526	6	0	11	0	0	0	0	11	8	1.38
26-Jun	1028	1	47	1	14	6	0	0	68	19.5	3.49
26-Jun	1037	2	4	0	1	0	1	0	6	19.5	0.31
26-Jun	1052	3	3	1	1	2	0	0	7	19.5	0.36
26-Jun	1058	4	2	0	1	1	0	0	4	19.5	0.21
26-Jun	1113	5	0	0	0	0	0	0	0	19.5	0.00
26-Jun	1108	6	0	3	1	3	0	0	7	19.5	0.36
27-Jun	830	1	50	3	3	0	0	0	56	21	2.67
27-Jun	746	2	0	0	0	1	0	0	1	21	0.05
27-Jun	754	3	1	1	0	0	1	0	3	21	0.14
27-Jun	801	4	0	0	0	5	1	0	6	21	0.29
27-Jun	815	5	1	2	2	4	0	0	9	21	0.43
27-Jun	811	6	0	5	1	4	0	0	10	21	0.48
Total (#)			124	54	39	33	3	1	254	397	

Methods

Fyke Traps: A Fyke trap consists of three parts: one or more wings, a box net, and a hoop net. For this sampling effort Trap #1, #2, #3, and #4 were deployed with one wing, while Trap #5 and #6 had two wings (**Figure 2**). The wings are three feet in height with floats tied to the upper portion and lead weights attached to the bottom of the wing. The ends of the wing are held in place using either a weight or boat anchor and marked with a surface float.

Table 2. Table of Hook and Line LCT catch and CPUE at Independence Lake.

Date	LCT Catch	Effort (hrs)	CPUE
24-Jun	7	4	1.8
25-Jun	11	7	1.6
26-Jun	8	6	1.3
27-Jun	3	3	1.0

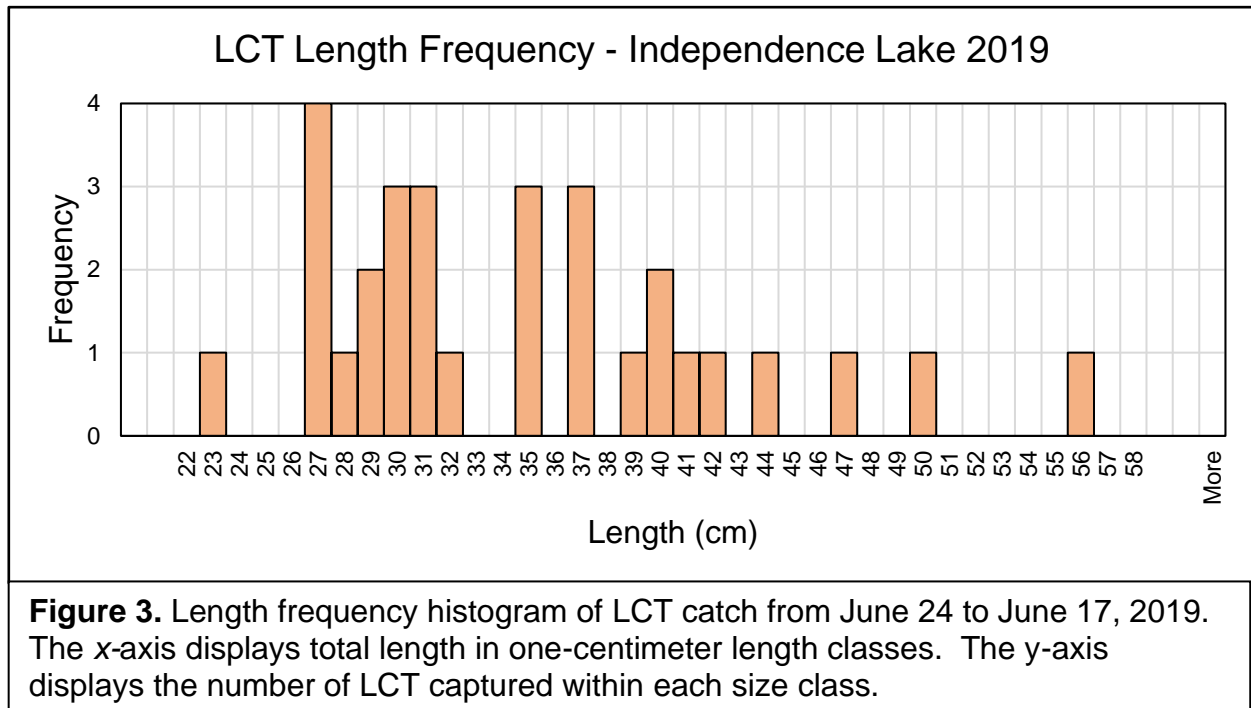


Figure 3. Length frequency histogram of LCT catch from June 24 to June 17, 2019. The x-axis displays total length in one-centimeter length classes. The y-axis displays the number of LCT captured within each size class.

The traps with one wing were set perpendicular to the shore with the end of the wing attached to a root or sturdy bush. Once the wing was attached to the bush the boat was reversed away from shore as the wing, the box trap, and the hoop nets were fed off the bow. With the entire trap deployed, the box was anchored in the middle of the river channel with a boat anchor.

The traps with two wings were positioned facing the river mouth. One wing was anchored to a root or study bush near the bank with the other wing placed towards the center of the channel.

To check the nets the hoop net and box trap are pulled onto the bow of the boat to facilitate transfer of the catch from the net to the live well. After the net is empty, the trap is reset in the same position.

After resetting each trap, the boat was maneuvered out of the river channel to open water to permit easier sorting of the catch. All fish captured were identified to species and counted. LCT were worked up on shore (see below).

Hook and Line Sampling: LCT were captured via hook and line from shore and from boat using lures and spin casting gear. The shore effort was focused around the cove north-northeast of the inlet mouth. Angling from the boat was focused on the cove for the first two days but was then widened to include wind drifting along the shore of the lake. Drifting allowed for a larger sampling area and exposure to a wider variety of fish.

The highest catch-rate lure and coloration was a Kastmaster™ with a fire tiger pattern. The pattern slightly mimics a Rainbow Trout on one side and is solid gold on the other. Aside from the fire tiger pattern the lure that landed the largest fish was mostly gold with a tinge of red to mimic the coloration of LRS.

LCT Processing: Captured LCT were weighed to the nearest gram (g) and total length was recorded to the nearest millimeter (mm). The adipose fin was clipped and stored in a paper envelope to be submitted as a tissue voucher to the genetics laboratory. Lastly, a PIT tag was inserted near the dorsal fin on the left side of the fish. All data were recorded on data sheets and directly recorded on the caudal fin envelope.

Discussion

Over the four days of sampling, the efficiency of checking and setting Fyke traps increased drastically. We realized that the Fyke traps were proficient at sampling Mountain Whitefish, Suckers, Tui Chub, and Lahontan Redsides, but were not efficient at capturing LCT. The six traps were set for 400 hours of cumulative fishing effort and caught a single LCT. Angling was more effective, yielding 29 LCT over 20 hours of effort.

Based on our sampling efforts, the Fyke traps were inferior to hook and line angling, and the time spent checking and setting the nets would have been better spent angling. One possible reason the Fyke traps were ineffective is that the length of the wings on the Fyke traps were not long enough to block the entire stream channel.

In addition, the wind was a limiting factor due to the flat bottom and low draft of the boat we used. We could not check the Fyke traps on June 26, 2019 and had to end hook and line angling early due to severe wind and fear of flooding the boat. A larger boat may have been able to navigate the conditions, however the road leading to Independence Lake precludes larger watercrafts from accessing the lake.