

State of California  
Department of Fish and Wildlife

# Memorandum

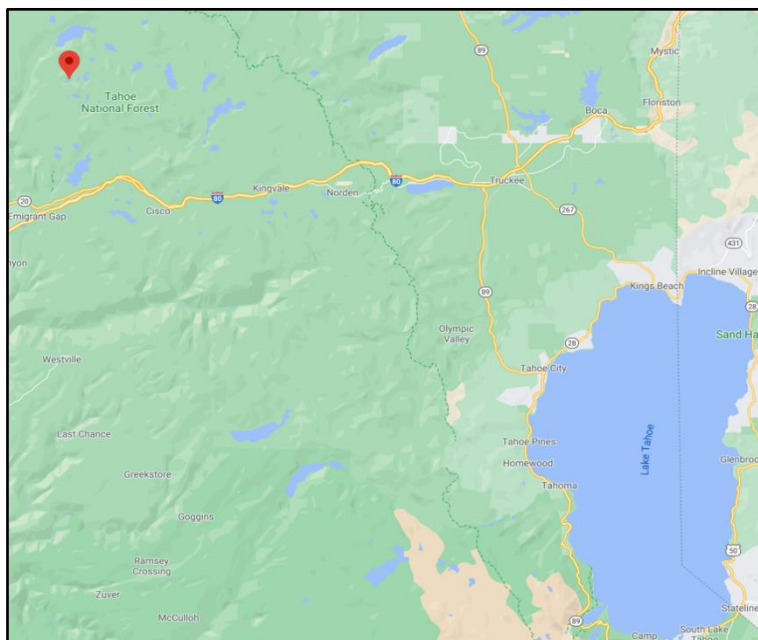
**Date:** March 8, 2023

**To:** Leslie Alber  
Senior Environmental Scientist; Supervisor  
Department of Fish and Wildlife  
North Central Region  
1701 Nimbus Road, Suite A  
Rancho Cordova, CA 95670

**Cc:** CDFW North Central Region Fish Files

**From:** Mitch Lockhart; Environmental Scientist, &  
Clyde "Cian" Hettrick; Scientific Aide  
Department of Fish and Wildlife  
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Rancho Cordova, CA 95670

**Subject:** Pre-Stocking Evaluation at Lower Lindsey Lake, Nevada County.



**Figure 1:** Map showing Lower Lindsey Lake (red pin) in relation to Lake Tahoe (Google Maps, retrieved on 9/11/20).

Lower Lindsey Lake (Lake ID: 12671), Nevada County, is a vehicle accessible destination found north of Yuba Gap at an elevation of 6,236 feet above sea level (**Figure 1**). The lake level is enhanced and controlled by an earthen dam owned and operated by Pacific Gas & Electric Company (PG&E) for hydropower generation as part of the Drum-Spaulding Hydroelectric Project (FERC# 2310). Lower Lindsey Lake has a surface area of 10.4 hectares and a maximum depth of at least 9.8 meters. The California Department of Fish and Wildlife (CDFW) has planted Lower Lindsey Lake with Rainbow Trout (*Oncorhynchus mykiss*;



**Figure 2:** Location (red star) of the gillnet set on Lower Lindsey Lake (Google Maps, retrieved 8/27/2020).

RT) since 1930. In 1932 CDFW began to plant Brown Trout (*Salmo trutta*; BN) and Brook Trout (*Salvelinus fontinalis*; BK) in the lake, in addition to RT. In 2001, CDFW discontinued the planting of BK and only planted BN and RT. In 2011, CDFW stopped planting BN at Lower Lindsey Lake. The most recent fish plant in Lower Lindsey Lake was 8,000 RT fingerlings in 2018 (Table 1).

To assess whether continued plants of RT are appropriate at Lower Lindsey Lake, three CDFW Scientific Aides surveyed the lake on

June 9, 2020, to determine the current status of fish and herpetofauna populations. The assessment included one gill net survey, a hook-and-line survey, and a visual encounter survey (VES).

Two Scientific Aides conducted a VES for a total of 47 minutes on the afternoon of June 9, 2020, to document the presence of diurnal herpetofauna, specifically the federally endangered Sierra Nevada Yellow-legged Frog (*Rana sierrae*; SNYLF). The surveyors encountered three adult Sierra Gartersnakes (*Thamnophis couchii*; THCO).

**Table 1: Stocking history for Lower Lindsey Lake, Nevada County.**

Date	Species	Size	Number	Date	Species	Size	Number
2006	RT	Catchable	3,930	2010	RT	Fingerling	9,768
2006	RT	Fingerling	7,000	2010	BN	Catchable	2,660
2006	BN	Fingerling	23,990	2011	RT	Fingerling	8,000
2007	RT	Fingerling	7,000	2012	RT	Fingerling	8,000
2007	BN	Fingerling	22,638	2013	RT	Fingerling	8,000
2009	RT	Fingerling	8,000	2017	RT	Fingerling	8,000
2009	BN	Catchable	4,797	2018	RT	Fingerling	8,000



**Picture 1:** A photograph of BN and RT captured in a gill net at Lower Lindsey Lake (CDFW; 6/9/2020). One adult RT escaped the gill net and is not in the picture.

Two Scientific Aides performed a hook-and-line survey to assess if resident trout were catchable using lures. They fished from the dam and the north shore between 5:00 p.m.

and 6:45 p.m. on June 9<sup>th</sup>, 2020, for a total effort of 150 minutes. Fish were actively feeding on insects and forage fish during the survey period. However, the surveyors did not capture any fish during the survey.

The Scientific Aides set a sinking monofilament gill net on the evening of June 9, 2020, and pulled the following morning, for a total survey effort of 12.3 hours (**Figure 2**).

They captured five BN, two RT, one Brown Bullhead (*Ameiurus nebulosus*; BB), 18 Lahontan Redsides (*Richardsonius egregius*; LRS), 82 Golden Shiners (*Notemigonus crysoleucas*; GS), and a large number of Signal Crayfish (*Pacifastacus leniusculus*; SC). Surveyors weighed, measured, and sexed all captured trout (**Picture 1**, **Table 2**). One adult RT escaped the gill net and surveyors could not measure or photograph the fish.

CDFW planted Lower Lindsey Lake with RT and BN up until 2011, but only RT since (**Table 1**). Although the last RT plant in 2018 included 8,000 fingerlings, only three RT were captured during the gill net survey. These results may be representative of a low-density RT fishery at Lower Lindsey Lake and suggest that RT fingerlings do not survive and grow in large numbers. However, the large catch of minnows may have

**Table 2: Gill net data from Lower Lindsey Lake, Nevada County, June 9, 2020.**

Species	Length (mm)	Weight (g)	Sex	Egg Stage
RT	327	380	M	N/A
BN	315	420	M	N/A
BN	395	610	F	Early
BN	392	610	F	Early
BN	470	1100	F	Early & Late
BN	520	1490	F	Early & Late
RT	Large trout escaped			

skewed the results, diminishing the gill net's efficacy at capturing trout.

The fish survey results from the gill net and hook-and-line surveys are inconclusive. The results suggest that hatchery RT fingerlings can survive to adulthood and BN appear to be self-sustaining in Lower Lindsey Lake, however adult recruitment may be extremely low in both cases.

We recommend CDFW continue to plant triploid hatchery RT fingerlings at Lower Lindsey Lake and monitor for RT growth and angler catch rate. Future hook-and-line surveys should be more robust and cover more times of day and types of gear. Float tubes and trolling gear may be useful. Future gill net samples at Lower Lindsey Lake should be set offshore and with both ends of the net set in deep water to avoid littoral zones where schooling minnows aggregate. If future surveys demonstrate low survival and growth of fingerling RT, we recommend CDFW consider a 'put-and-take strategy' and plant catchable-sized hatchery RT during the summer months when recreational use is highest.



Rescan LTM

### CDFW High Mountain Lakes - Amphibian and Reptile Visual Encounter Survey Data Sheet

Site ID: 12671	Date: 06/09/2020	SKY: <input checked="" type="radio"/> Clear <input type="radio"/> Partly Cloudy <input type="radio"/> Mostly Over-Cloudy <input type="radio"/> Rain <input type="radio"/> Snow <input type="radio"/> Smoke	WIND: Calm <input type="radio"/> Light <input checked="" type="radio"/> Moderate <input type="radio"/> Strong
Topo Name: (1:24,000) Lindsey Lake, lower	County: Nevada	Elevation: m ft	If not surveyed, provide reason: Private Property <input type="radio"/> Frozen <input type="radio"/> Not Found <input type="radio"/> No Access <input type="radio"/>
Surveyors: JTS CMH	Water Type: <input checked="" type="radio"/> Lake <input type="radio"/> Unmapped pond <input type="radio"/> Marsh/ meadow <input type="radio"/> Spring seep <input type="radio"/> Stream (Skip to "STREAMS" on pg. 2)		
Lake Name: (from map) Lindsey Lake, lower	East UTM: (0703263)	North UTM: (4365450)	UTM Zone: 10
Color: <input checked="" type="radio"/> Clear <input type="radio"/> Stained	Water (5 m from shore, Temp 10cm deep): 17.5 @ 1540 C or F	Air (1 m above water): 15.5 @ 1540 C or F	Seasonality: <input checked="" type="radio"/> Perennial <input type="radio"/> Ephemeral
Turbidity: <input checked="" type="radio"/> Clear <input type="radio"/> Cloudy			Currently Dry? <input type="radio"/> Yes <input checked="" type="radio"/> No
Survey START time: 1542	Survey END time: 1645	Total survey duration (min): 47	HERPS SEEN? <input checked="" type="radio"/> YES <input type="radio"/> NO
			FISH SEEN? <input checked="" type="radio"/> YES <input type="radio"/> NO

**\*FOR LAKES/PONDS/MEADOWS: ALSO SURVEY FIRST 200 m OF INLETS AND OUTLETS. RECORD DATA SEPARATELY IN THE "STREAMS" SECTION ON PG. 2**

HERP SPECIES	# adults	# subadults	# metamorphs	# larvae	# egg m.	# swabs	Survey Method
THCO	2						Visual Trapped Aural Hand Collected Amp Net Incidental
THsp.	1						Visual Trapped Aural Hand Collected Amp Net Incidental
							Visual Trapped Aural Hand Collected Amp Net Incidental
							Visual Trapped Aural Hand Collected Amp Net Incidental
							Visual Trapped Aural Hand Collected Amp Net Incidental
							Visual Trapped Aural Hand Collected Amp Net Incidental

**FISH SPECIES** (circle species seen, if known): BK (brook trout), BN (brown trout), CT (cutthroat trout), GT (golden trout), RT (rainbow trout) HYBRID (e.g., GT x RT), OTHER (e.g., minnows)

**Amphibians:** S. Long-toed Salamander (AMMA); Yosemite Toad (ANCA, fmlly BUC); Sierran Treefrog (HYSI, fmlly PSRE or HYRE); Sierra Nevada Yellow-legged Frog (RASI)

**Amph. less common in HML:** CA Toad (ANBO, fmlly BUBO); Bullfrog (RACT); Cascades Frog (RACA); CA Red-legged Frog (RADR); Sierra Newt (TASI, fmlly TATO)

**Reptiles:** Sierra Gartersnake (THCO); Mountain Gartersnake (THEL); Valley Gartersnake (THSI); Western Pond Turtle (EMMA, fmlly CLMA)

PHOTOS	Photo Number	Camera	Time	Date (yyyy-mm-dd)	UTM E	UTM N	Comments
Overview	CMH 1813	Phone	1813	2020-06-09	703357	4365403	
Herps	JTS P 1743	P	1743	2020-06-09			THsp.
Other							

<b>SITE SKETCH:</b> 	<b>NOTES:</b> Saw a blue-tailed skink Inlet #2 thick with alder
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**Figure 3: VES survey datasheet from Lower Lindsey Lake, Nevada County.**

Water: lower lindsey Date: 06/09/2020  
 Start: 1700 <sup>am</sup>pm Stop: 1800 <sup>am</sup>pm  
 No. Anglers: 1 Species Targeted: Trout

Fish No.	Species Caught	Total Length	Fin Clipped	Kept
1			Y N	Y N
2			Y N	Y N
3			Y N	Y N
4			Y N	Y N
5			Y N	Y N
6			Y N	Y N
7			Y N	Y N
8			Y N	Y N
9			Y N	Y N
10			Y N	Y N
11			Y N	Y N
12			Y N	Y N
13			Y N	Y N
14			Y N	Y N
15			Y N	Y N
16			Y N	Y N
17			Y N	Y N
18			Y N	Y N
19			Y N	Y N
20			Y N	Y N

Species Codes:  
 Kokanee = KOK, Chinook Salmon = CHIN, Lake Trout = LT, Rainbow Trout = RT,  
 Brown Trout = BN, Brook Trout = BK, Lahontan Cutthroat Trout = LCT, Golden Trout = GT,  
 Mountain Whitefish = MWF

**Figure 4:** Angler 1 hook and line survey data sheet from Lower Lindsey Lake, Nevada County.

# FISH SURVEYING

Trout: rainbow trout (RT), golden trout (GT), cutthroat trout (CT), brown trout (BN), brook trout (BK), hybrids (GT x RT, CT x RT)										DATE: 6/9/2020	
Site Name (if available): Lindsey Lake, Lower					Survey Crew: JTS					Net depth (m):	
SITE ID: 12671		Fish Survey Method: (circle one) gill net <input type="radio"/> hook and line <input checked="" type="radio"/> e-fish <input type="radio"/>			Net Location (UTM NAD 83) E: N:			Fish captured? (circle one) Y (insert data below) <input checked="" type="radio"/> N <input type="radio"/>			
Gill Net near-inlet <input type="checkbox"/> near-outlet <input type="checkbox"/> other <input type="checkbox"/>		General location (circle one):		Net Set Date:		Net set time (hhmm):		Net Pull Date:		Net pull time (hhmm):	
Electrofishing (inlet or outlet #)		Location:		Start coord. (downstream) E N		End coord. (upstream) E N		Start (hhmm): 1658		End (hhmm): 1845	
E-fisher Settings (if needed):				Volts:		Hz:		Duty Cycle:		Pulse:	
Other:											
Fish #	Species	Tot. Lgth (mm)	Weight (g)	Sex	Egg Stage (F only) Early Ripe Late			Otoliths?	Comments		
1									several fish were actively feeding @ surface. Some were hitting insects and some were pushing baitfish against the surface. No luck on lures though. Tried spinners, rapalas and jerkbaits.		
2											
3											
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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 \_\_\_\_\_

Data Sheet 2, pg. 1 of 2

**Figure 5:** Angler 2 hook and line survey data sheet from Lower Lindsey Lake, Nevada County.

## FISH SURVEYING

Trout: rainbow trout (RT), golden trout (GT), cutthroat trout (CT), brown trout (BN), brook trout (BK), hybrids (GT x RT, CT x RT)										DATE: 6/15/2020
Site Name (if available): Lower Lindsey Lake					Survey Crew: LTM, LMA, JTS					Net depth (m): 5.2
SITE ID: 12671		Fish Survey Method: (circle one) gill net hook and line e-fish			Net Location (UTM NAD 83) E: 0703040 N: 4365088			Fish captured? (circle one) Y (insert data below) N		
Gill Net near inlet near outlet		General location (circle one) other			Net Set Date: 6/9/2020		Net set time (hh:mm): 1936		Net Pull Date: 6/10/2020	
Electrofishing		Location: (inlet or outlet #)			Start coord. (downstream) E N		End coord. (upstream) E N		Net pull time (hh:mm): 0648	
E-fisher Settings (if needed):					Volts: —	Hz: —	Duty Cycle: —	Pulse: —	Other: —	
Fish #	Species	Tot. Lgth (mm)	Weight (g)	Sex	Egg Stage (F only)			Otoliths?	Comments	
					Early	Ripe	Late			
1	RT	327	380	M						
2	BN	315	420	M						
3	BN	395	610	F	✓					
4	BN	392	610	F	✓					
5	BN	470	1100	F	✓		✓			
6	BN	520	1490	F	✓		✓			
7	BB								1 Brown Bullhead Catfish	
8	GS								62 Golden Shiner	
9	LRS								18 Redside	
10	RT								1 large rainbow escaped	
11										
12										
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Field review	Copied	Entered	Proofed
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Data Sheet 2, pg. 1 of 2

Figure 6: Gillnet datasheet from Lower Lindsey Lake, Nevada County.