State of California Department of Fish and Wildlife

## Memorandum

Date: August 19, 2020

- To: Sarah Mussulman 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: Jacob Stout; Scientific Aide, and Mitch Lockhart; Environmental Scientist Department of Fish and Wildlife 1701 Nimbus Road, Suite A Rancho Cordova, CA 95670

## Subject: Resource Assessment at Sterling Lake, Nevada County

Sterling Lake (Lake ID 13165), Nevada County, is located northwest of Truckee, CA, in the Tahoe National Forest (TNF) (Figures 1, 2 & 3). Sterling Lake is a reservoir impounded by a 32-foot-tall dam operated by PG&E as part of the Drum-Spaulding Hydroelectric Project (FERC Project No. 2310). The outlet from the dam flows into Fordyce Lake and eventually into the South Yuba River.



**Figure 1:** Overview photograph of Sterling Lake, Nevada County, CA taken from the southeast side of the lake on June 22, 2020 (CDFW).

Sterling Lake is accessed from Interstate 80 via Rattlesnake Road. TNF operates Sterling Lake Campground and provides several campsites with tables, fire pits and a bathroom. The northeast side of the lake is managed by Bear Yuba Land Trust and offers primitive camp sites and trails. Sterling Lake is also home to Camp Robert L. Cole, a Boy Scout Camp on the southwest side of the lake that has been in operation since 1954.

California Department of Fish and Wildlife (CDFW) planted Rainbow Trout (*Oncorhynchus mykiss*; RT) at Sterling Lake regularly from 1930 through 2001. Brook Trout (*Salvelinus fontinalis;* BK) were planted occasionally by CDFW between 1941 and 1979. Brown Trout (*Salmo trutta*; BN) were planted briefly from 1930 through 1936.

A CDFW gill net survey in 2001 captured Brook Trout, two Rainbow Trout, and many Lahontan Redsides (*Richardsonius egregius*; LRS). A 2013 survey captured a single Brook Trout and many Lahontan Redsides. These results suggest Lahontan Redsides will persist in the lake indefinitely; Rainbow Trout are not self-sustaining and are no longer present

in the fishery; while Brook Trout are persisting at low densities, although the population may be in decline.

CDFW halted fish plants in 2001 because of Sterling Lake's proximity to the Mossy Pond Sierra Nevada Yellow-legged Frog (*Rana sierrae*; SNYLF) population. Although Sterling Lake is not hydrologically connected to SNYLF-containing waters, the nearest SNYLF location is only 700 meters distant (**Figure 3**).

The Aquatic Biodiversity Management



**Figure 2:** Map of Sterling Lake, Nevada County, (Red Pin) in relation to Lake Tahoe and Truckee, CA (Google Maps, retrieved 7.1.2020).



**Figure 3:** Aerial photo of Sterling Lake, Fordyce Lake, Mossy Pond, and the surrounding area looking south.

Plan for the South Yuba River Management Unit (Mussulman & Lockhart 2014) recommends Sterling Lake be managed as a stocked fishery. The lake receives considerable recreational use and angling pressure, and active plants may be necessary to support a fishery. However, CDFW has not implemented this management direction, to date.

To determine the current status of the fishery at Sterling Lake, three CDFW Scientific Aids surveyed Sterling Lake on June 22, 2020. Two monofilament gill nets were set on opposite sides of the lake to sample the fishery. The net set on the southeast side of the lake was set at 9:25 PM on June 22, 2020, and was pulled the following morning on September 23, 2020, at 7:40 AM for a total survey effort of approximately 10 hours. The gill net catch included 17 Brook Trout and 176 Lahontan Redside minnows (**Figure 4**, **Table 1**).

The net set on the northwest side of the lake was set at 8:50 PM on June 22, 2020, and was pulled the following morning on June 23, 2020 at 8:45 AM for a total survey effort of approximately 10 hours. The gill net catch included 18 Brook Trout (*Salvelinus fontinalis*, BK) and 452 Lahontan Redside minnows (*Richardsonius egregious*; LRS) (**Figure 5, Table 2**).

**Figure 6** displays the length distribution of all Brook Trout (n=35) caught in Sterling Lake. The average total length was 342 mm (13.5 inches) with most individuals being between 340 mm (13.4 inches) and 379 mm (14.9 inches). Brook Trout were healthy and in good condition with an average condition factor of 0.994.



**Figure 4:** Brook Trout catch (n=17) from the southeast gill net.



**Figure 5**: Brook Trout catch (n=18) from the northwest gill net.

Brook Trout have not been planted in Sterling Lake since 1979 yet persist through natural reproduction despite substantial angling pressure. Yearling fish are not present in the gill net. This may be a result of the large Lahontan Redside catch overwhelming the portions of the gill net suitable to capturing yearlings. The absence of yearling fish could also indicate limited spawning success and/or recruitment to adult life stages. Young of year (YOY) are not represented in the gill net data because the size of mesh is too large to capture YOY. However, Brook Trout YOY were seen and captured by hand net (**Figure 7**). These observations illustrate successful Brook Trout spawning in Sterling Lake.

The Scientific Aids also conducted a Visual Encounter Survey (VES) of the entire lake on June 22, 2020, searching for diurnal herpetofauna. The VES began at 12:16 PM under clear skies, light wind, and an air temperature of 21° C. The survey continued

**Table 1:** Total length, weight, sex, egg stage, and condition factor (K) of fishcaptured in the southeast gill net at Sterling Lake, Nevada Co., on June 22,2020.

	Species	Length (mm)	Weight (g)	Sex (F/M)	Egg Stage	Condition Factor (K)
	BK	308	320	F	EARLY	1.095
	ВК	341	476	F	EARLY	1.200
	ВК	374	481	М		0.919
	ВК	376	498	М		0.937
	ВК	390	574	F	EARLY	0.968
	ВК	376	488	F	EARLY	0.918
	ВК	375	545	М		1.033
	ВК	416	595	М		0.826
	ВК	281	232	М		1.046
	BK	272	259	F	EARLY	1.287
	BK	304	390	F	EARLY	1.388
	BK	316	322	F	EARLY	1.020
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	BK	319	329	F	LATE	1.014
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	BK	346	354	F	LATE	0.855
	BK	334	351	F	EARLY	0.942
	ВК	343	360	F	EARLY	0.892
	ВК	364	421	М		0.873
verage		343	411			1.013

until 14:49 PM for a total survey effort of 201 minutes. During this time one adult Mountain Garter Snake (*Thamnophis elegans elegans*) (**Figure 8**) was seen along the northern shore at 14:25 PM. In the evening two California Toads (*Anaxyrus boreas halophilus*) (**Figure 9**) and four actively calling Sierran Treefrogs (*Pseudacris sierra*) were observed along the southern shore.

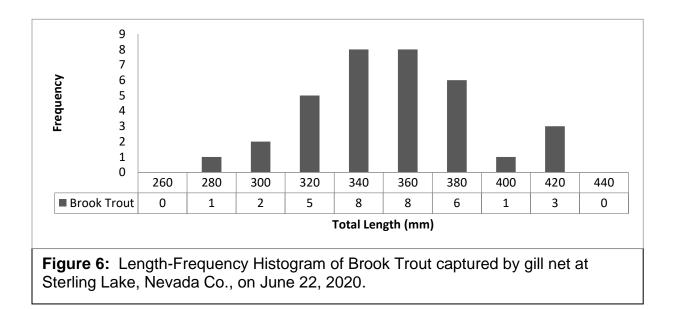
The results of the June 22, 2020, survey reinforce the results of previous surveys at Sterling Lake. Brook Trout persist in the absence of stocking, up to 17 inches total length, and are present in greater densities then CDFW recorded in the



**Figure 7:** Brook Trout Young of Year (YOY) captured in Sterling Lake on June 22, 2020.

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	Species	Length (mm)	Weight (g)	Sex (F/M)	Egg Stage	Condition Factor (K)
	BK	340	360	Μ		0.916
	ВК	329	362	Μ		1.012
	ВК	336	381	F	EARLY	1.004
	ВК	348	486	Μ		1.153
	ВК	371	479	Μ		0.938
	ВК	341	392	Μ		0.989
	ВК	332	370	Μ		1.011
	ВК	338	400	F	EARLY	1.036
	ВК	342	382	F	EARLY	0.955
	BK	327	359	F	EARLY	1.027
	BK	404	539	Μ		0.817
	BK	278	215	F	EARLY & LATE	1.001
	BK	355	450	F	EARLY	1.006
	ВК	292	271	F	EARLY	1.088
	ВК	309	295	F	EARLY	1.000
	ВК	417	612	Μ		0.844
	ВК	355	369	F	EARLY	0.825
	ВК	324	324	Μ		0.953
age		341	391			0.977

**Table 2:** Total length, weight, sex, egg stage, and condition factor (K) of fish captured in the northwest gill net at Sterling Lake, Nevada Co., on June 22, 2020.



earlier two surveys, despite substantial angling pressure. Adult fish are healthy and of good body condition and large numbers of Lahontan Redside forage are present. YOY were observed during the survey indicating successful spawning. However, the absence of small Brook Trout (< 200 mm total length), the large size of adults, and the variability of Brook Trout density across multiple surveys suggests that spawning success and/or adult recruitment is limited.

The findings of the June 22, 2020, survey at Sterling Lake support reinstating fingerling plants of Rainbow Trout as recommended in



**Figure 8**: Mountain Garter Snake (*Thamnophis elegans elegans*) found along the northern shore of Sterling Lake on June 22, 2020.

the South Yuba Management Plan. Sterling Lake has sufficient forage and available habitat to support active management as a sports fishery to support the angling pressure and recreational use. Fingerlings should be planted annually for three years followed by monitoring surveys to monitor survivorship and growth. Monitoring surveys should include gill net, visual, and hook-and-line elements.

The proximity of Sterling Lake to a SNYLF population at the Mossy Pond complex requires consideration. Fingerling Rainbow Trout should not be planted by plane, as they have in the past, but delivered by truck and hand planted. This will minimize or eliminate the chance of fish being planted in the wrong waterbody. There is some concern that planting fish at Sterling Lake will supply a source of fish for illegal plants of



**Figure 9:** Three adult California Toads (*Anaxyrus boreas halophilus*) observed along the south shore of Sterling Lake, Nevada Co. the evening of June 22, 2020. The toad pictured in the center is sloughing old brown skin revealing fresh green skin beneath.

fish to neighboring fishless waters or SNYLF-occupied habitat. However, the June 22, 2020, survey demonstrates that fish have persisted in Sterling Lake despite halting fish plants, as a result that risk has been present with or without planting and should not be the sole reason that fish plants are not reinstated.

## Citations

Mussulman, S. and M. Lockhart. Aquatic biodiversity management plan for the South Yuba River Management Unit. California Department of Fish and Wildlife; 6/9/2014. [Cited 2020 July 6]. Available from: http://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=85427

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**Figure 10:** Data sheet with gill net data from a survey conducted June 22, 2020, at Sterling Lake, Nevada County.

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**Figure 11:** Data sheet with gill net data from a survey conducted June 22, 2020, at Sterling Lake, Nevada County.

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nphibians: S. Long-toed Salamander (AMMA); Yosemite Toad (ANCA, fimily BUCA); Sierran Treefrog (HYSI, fimily PSRE or HYRE); Sierra Nevada Yellow-legged   nph. less common in HML: CA Toad (ANBO, fimily BUBO); Builfrog (RACT); Cascades Frog (RACA); CA Red-legged Frog (RADR); Sierra Newt (TASI, fimily TA publies: Sierra Gartersnake (THCO); Mountain Gartersnake (THEL); Valley Gartersnake (THSI); Western Pond Turtle (EMMA, fimily CLMA)   PHOTOS Photo Number Camera Time Date (www.mmm.dd) UTM E UTM N Comments   Overview 1317 LTM-P 1319 2020-304-72 0716757 H358938 SE peak fac:vg NW   Herps JTSP2138 P 21%8 ANJBO 2   Uther 1415 LTM-P 1145 P34634 43591227 UNID   Other 1415 LTM-P p34934 43591227 UNID Frovit far/ in Gill /	dental
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INSP2/UM   P   244   MIBO   2     UTSP2/UG   P   2146   PSRE   PSRE     Other   1415   LTM-P   H15   PTHTSH   0716734   4359227   UNID   Trovt PArl in Gill l	
ITSP2/UM   P   2044   MUBO   2     UTSP2/UG   P   2146   PSRE   PSRE     Other   1415   LTM-P   H15   p   454   4359227   UNID   Trove PAr/ in Gill /	
Jtsp2i46   P   2146   PSRE     Other   1415   LTM-P   H15   p   141544   4359227   UNID Trove Park in Gill /	
Other 1415 LTM-P 1415 p711234 0716234 4359227 UNID Trout Parl in Gill 1	
Other in the second sec	
	101
	164
SITE SKETCH: (utility) (utility) NOTES: Inlet 1 start/End Pilb (1226, 1230)	·
Tules 2 Stuit/ End Di26(1354, 1407)	
Inlet & Start/End Pics (1430, 1436)	- 19
Inverz: mouth deep bft channel. UNID Large Carp-line fish. Had Carp/Sucker sci	165
and bottom firs are white - Init 2 not fl	owing.
- S WATD Front Yoy.	
Twilet 3: Dry at mouth, becomes wet. No. Seen until Water touches lake,	FISH
I TAA	
Averyiew many schools of Lahoman Forsides.	
water stained w/ pollen along banks.	
PLEASE Return to: Isaac Chellman, California Department of Fish and Wildlife, (916) 358-4038; 1701 Nimbus Rd., Rancho Cordova, CA 95670	

**Figure 12:** VES data sheet from a survey conducted June 22, 2020, at Sterling Lake, Nevada County.

						1			(N)	Intermitte	ent? (Y)	N
Inlet Outlet (sircle one) #		Stream Type:	Perer	1-	Ephemeral	Stream Curre			Color:	Clea		NA
TM E: 0716084	UTM N:	4358916			0716041				Turbidity:	Clea		NA
tart Time: 1226	End Time:	1230	Duration	n (min):	Water Te	np: —	Air Tamp:	1	*BARRIE	RS (fill ou	it info belo	v).
ish present?	Barrier 1	) Photo	o #'s:		UTM.E:			UTM N:				
(Y) N		~		1.5	Description:			1	÷			
ierps present?	Barrier 2	) Photo	#'s:	20 a 75	UTM E:			UTM N:				
Y (N)			1	1	Description:			1				
Spawning evidence?	Barrier 3	) Photo	o#'s:		UTM E:			UTM N:				
pawning / Redds / Fry / None				/	Description:	1.			(N)	Intermitte	ent? (Y)	N
Inlet Outlet (circle one) #	2	Stream Type:	Perer	1	(Ephemeral)	Stream Curre		١	Color:	Clea		NA
Start JTM E: 0716774	UTM NI	4359161	6		0716843	UTM N:	135919	Z	Turbidity:	Clea		NA
Start Time: 1345	End Time:			n (min):		mp:	Air Temp:	-	*BARRIE	RS (fill ou	it info belo	N)*
					UTME: 0716	-			43591	12	- 19 - 19 - 19	-12-
ish present?	Barrier 1	) Photo	o#'s: 14	0L	Description: SE		B. 10 F				0 0 4 4	18.9
<u>Y</u> N	Dearlag 2	N Dhat	- #las		UTM E:		- 1- 1	UTM N:			an a	an article
Herps present?	Barrier 2	2) Photo	J#S.		Description:			15.000				- 11
	Damies 2	06-1	# .		UTM E:			UTM N:			la se estestes i	**************************************
Spawning evidence?	Barrier 3	S) Photo	J#3.		Description:			1		to a set		en. i
Spawning / Redds (Fry) None	and the second se	01	Perer	nial	(Ephemeral)	Stream Curre	ntly Dry?	Y	(N)	Intermitte	ent? Y	N
Inlet Outlet (circle one) #	3	Stream Type:	Perer		· · · · · · · · · · · · · · · · · · ·				Color:	Clea	Stained	NA
Start JTM E: 0716809	UTM N:	435935	59	UTM E	0716882	UTM N:	135930	Z	Turbidity:	Clea	Charlenness Strender on the party	NA
Start Time: 1430	End Time:	1436	Duration			mp: —	Air Temp:	:		Contraction of the local division of the loc	it info below	v)*
Fish present?	Barrier 1		o #'s:		UTM E: 0716	831		UTM N:	43593	74	No. 19 March 19	
Y N		,	o#'s: ]44	43	Description: 50	usonal Bo	artier.	6ft	drop	C.	Ϋ́.	100
Herps present?	Barrier 2			and the second second	UTM E:	a the second	4.6%	UTM N:			Second p. 1	
Y N		,			Description:	· ·		$= \frac{1}{2} \frac{2}{2} \frac{2}{3} \frac{1}{3} \frac{3}{3} $			N.	11
Spawning evidence?	Barrier 3	) Photr	o #'s:	e	UTM E:		14 14 14 14 14 14 14 14 14 14 14 14 14 1	UTM N:		1. L.		
Spawning / Redds / Fry None					Description:		5, 8					
Inlet Outlet (circle one)	1	Stream Type:	Perer	nnial	Ephemeral	Stream Curre	ntly Dry?	Y	N		ent? (Y	) N
Start		6		End	1				Color:	Clea	~	NA
UTM E: 0716033	UTM N:	43594'	36	UTM E	0715894				Turbidity:	Clear		NA
Start Time: 1302	End Time:	1320	Duration	n (min):	Vater Te	mp: 13.5	Air Temp:	1	*BARRIE	<b>45 (fill ou</b>	it info below	v)
Fink	Barrier 1				UTM E:			UTM N:	1			
Fish present?		AJTI .	1323	•	Description: V	ony steep	, inte	rm Her	it, man	y bou	lders	
Fish present? Y		UISI					and the second	UTM N:			223 8	1
Y N Herps present?	Barrier 2		o #'s:		UTM E:							
YN	Barrier 2		o #'s:		UTM E: Description:			1				
Y N Herps present? Y N	Barrier 2 Barrier 3	2) Photo			UTM E: Description: UTM E:		i i i	UTM N:			· · · ·	
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**Figure 12, Con't:** VES data sheet from a survey conducted June 22, 2020, at Sterling Lake, Nevada County.