

**State of California
Department of Fish and Wildlife**

M e m o r a n d u m

Date: 9/30/2019

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 Big Bear Lake, Plumas County

Big Bear Lake (Lake ID: 12247), Plumas County, is an easily accessible day-use lake located within the popular Lakes Basin Recreation Area (Figure 1). It was last surveyed in 2013 and brook trout (*Salvelinus fontinalis*; BK) and speckled dace (*Rhinichthys osculus*; SD) were found to be present (Mussulman 2015).

On September 24, 2019 at 7:46 pm, two California Department of Fish and Wildlife (CDFW) Scientific Aids set a gill net along the northern reaches of the lake. The purpose of the survey is to determine the species and relative densities of fish present in the lake. The gill net was pulled the following morning, September 25, 2019, at 7:15 am for a total effort of 11.5 hours. The catch consisted of four BK and two DC (Figure 2, Table 1).

The Scientific Aids then performed a Visual Encounter Survey (VES) of the entire lake. The purpose of the VES is to determine if special status herpetofauna species are present at Big Bear Lake. The survey began at 9:19 am during clear skies, light wind, an air temperature of 15 degrees C, and a water temperature of 14 degrees C. The survey continued until 10:05 am for a total survey effort of 88 minutes. Both the inlet and outlet were dry. One Sierra garter snake (*Thamnophis couchii*; THCO) was observed during the survey.

Big Bear Lake was last planted with BK in 1992. The continued presence of BK suggests the population is self-sustaining and survived the extreme drought from 2014 to 2016. However, BK densities are very low and natural reproduction may not be successful annually. Therefore, the BK are probably not sufficiently abundant to provide a fishery, and the population may be



Figure 1: Big Bear Lake, Plumas County, represented by the red pin, situated north west of Lake Tahoe and south west of Graeagle, CA (retrieved from Google Maps, Oct 2019).

susceptible to future extirpation. Fish were in good condition indicating ample food supply. Both sexes were present, but the two females exhibited early egg stage in late September. This suggests spawn timing may be much later at Big Bear Lake than other high elevations BK populations in the Sierra Nevada. Alternatively, late egg development may be due to above average snowpack and late ice-out of 2019. Regardless, this could result in spawning interference if female BK consistently produce eggs late in the year.

The data are not adequate to determine if BK are sufficiently abundant to provide a fishery. It should be noted that movement of fish by entities other than

CDFW could also account for the presence of BK at Big Bear Lake. Recruitment of BK into Big Bear Lake could also be immigration from Silver Lake, Cub Lake, Little Bear Lake, and Round Lake during seasonal drainage.

Additionally, 7,000 fingerling rainbow trout (*Oncorhynchus mykiss*; RT) were air planted in 2018. The absence of these fish in the gill net survey may indicate low winter survival of fish in the lake.

Alternatively, the lake could be considered for native species management. The tributaries dry up in late summer, and therefore limit BK distribution and in-stream fall spawning. Gill net surveys indicate the BK population is very small and would be easy to eradicate. However, Big Bear Lake is downstream of four fish-bearing waters, Silver Lake, Cub Lake, Little Bear Lake, and Round Lake, which would have to be included in a native species management schema. It is not within the scope of this report to analyze management of those waters.



Figure 2: Photograph of BK catch from a gill net survey at Big Bear Lake, Plumas Co, on September 25, 2019. Two fish on the left are males, while the two fish on the right are females.

Table 1: Total length, weight, sex, and egg stage of fish captured during a gill net survey at Big Bear Lake, Plumas County, on September 25, 2019.

Species	Length (mm)	Weight (g)	Sex (M/F)	Egg Stage
BK	362	480	M	-
BK	330	355	M	-
BK	300	298	F	E
BK	309	280	F	E
DC	77	-	-	-
DC	79	-	-	-

Literature Cited

Mussulman, S. Fisheries monitoring in Plumas County - Big Bear Lake (12247).. CDFW; 11/10/2015. [Cited 2019 November 6]. Available from: <http://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=111313>

GILLNET SURVEY DATA SHEET
 Date 09/24-25/19 Water Big Bear Lake (12247) Sampler(s) C. Hettrick L. Mitchell
 SET TIME 09/24 1946 PULL TIME 9/25 0715 WATER TEMP _____
 Latitude WS 0699732 Longitude 4398924

Species	BK		Sex	Egg	DC		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	362	480	M	-	77					
2	320	355	M	-	79					
3	300	298	F	E						
4	309	280	F	E						
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Figure 3: Data sheet with gill net data from a survey conducted Sept. 24, 2019, at Big Bear Lake, Plumas County.

AMPHIBIAN AND REPTILE SURVEY DATA SHEET - 2017

Site ID: 12247	Date: 9/25/19	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: <input checked="" type="radio"/> Calm <input type="radio"/> Light <input type="radio"/> Moderate <input type="radio"/> Strong					
Topo Name: (1:24,000)	County: Plumas County	Elevation: m ft	If not surveyed, provide reason: <input type="radio"/> Private Property <input type="radio"/> Frozen <input type="radio"/> Not Found <input type="radio"/> No Access					
Surveyors: L. Mitchell, C. Hettrick	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" below)	North UTM:	UTM Zone:					
Lake Name: (from map) Big Bear Lake	East UTM:	Water Temp (1.5 m from shore): 14 @ 0918 ^{Or} F	Air Temp (1.5 m above water): 15 @ 0915 ^{Or} F					
Color: <input checked="" type="radio"/> Clear <input type="radio"/> Stained	Turbidity: <input checked="" type="radio"/> Clear <input type="radio"/> Cloudy	Survey Start time: 0919	Survey End time: 1005					
Survey duration (min): 88	HERPS SEEN? <input checked="" type="radio"/> YES <input type="radio"/> NO	FISH SEEN? <input checked="" type="radio"/> YES <input type="radio"/> NO	Site condition notes:					
*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						<input checked="" type="radio"/> Visual Trapped <input type="radio"/> Aural Hand Collected <input type="radio"/> Amp Net Incidental	
Calling? <input checked="" type="radio"/> Y <input type="radio"/> N								
Calling? <input type="radio"/> Y <input type="radio"/> N								
Calling? <input type="radio"/> Y <input type="radio"/> N								
Calling? <input type="radio"/> Y <input type="radio"/> N								
STREAM								
Inlet <input checked="" type="radio"/> Outlet (circle one) # 1	Stream Type: <input type="radio"/> Perennial <input type="radio"/> Ephemeral	Stream Currently Dry? <input checked="" type="radio"/> Y <input type="radio"/> N	Intermittent? <input type="radio"/> Y <input type="radio"/> N	Start E UTM: 0700095	N UTM: 4396164	End E UTM:	N UTM:	
Start Time: 1000	End Time: 1000	Duration (min):	Water Temp:	Air Temp:	Color: <input type="radio"/> Clear <input type="radio"/> Stained <input type="radio"/> NA	Turbidity: <input type="radio"/> Clear <input type="radio"/> Cloudy <input type="radio"/> NA	Herps Present? <input checked="" type="radio"/> YES <input type="radio"/> NO	
Inlet <input type="radio"/> Outlet (circle one) #	Stream Type: <input type="radio"/> Perennial <input type="radio"/> Ephemeral	Stream Currently Dry? <input type="radio"/> Y <input type="radio"/> N	Intermittent? <input type="radio"/> Y <input type="radio"/> N	Start E UTM:	N UTM:	End E UTM:	N UTM:	
Start Time:	End Time:	Duration (min):	Water Temp:	Air Temp:	Color: <input type="radio"/> Clear <input type="radio"/> Stained <input type="radio"/> NA	Turbidity: <input type="radio"/> Clear <input type="radio"/> Cloudy <input type="radio"/> NA	Herps Present? <input type="radio"/> YES <input type="radio"/> NO	
Inlet <input type="radio"/> Outlet (circle one) #	Stream Type: <input type="radio"/> Perennial <input type="radio"/> Ephemeral	Stream Currently Dry? <input type="radio"/> Y <input type="radio"/> N	Intermittent? <input type="radio"/> Y <input type="radio"/> N	Start E UTM:	N UTM:	End E UTM:	N UTM:	
Start Time:	End Time:	Duration (min):	Water Temp:	Air Temp:	Color: <input type="radio"/> Clear <input type="radio"/> Stained <input type="radio"/> NA	Turbidity: <input type="radio"/> Clear <input type="radio"/> Cloudy <input type="radio"/> NA	Herps Present? <input type="radio"/> YES <input type="radio"/> NO	
Inlet <input type="radio"/> Outlet (circle one) #	Stream Type: <input type="radio"/> Perennial <input type="radio"/> Ephemeral	Stream Currently Dry? <input type="radio"/> Y <input type="radio"/> N	Intermittent? <input type="radio"/> Y <input type="radio"/> N	Start E UTM:	N UTM:	End E UTM:	N UTM:	
Start Time:	End Time:	Duration (min):	Water Temp:	Air Temp:	Color: <input type="radio"/> Clear <input type="radio"/> Stained <input type="radio"/> NA	Turbidity: <input type="radio"/> Clear <input type="radio"/> Cloudy <input type="radio"/> NA	Herps Present? <input type="radio"/> YES <input type="radio"/> NO	
Species	In/Outlet #	# adults	# subadults	# metamorphs	larvae	# egg m.	# swabs	Survey Method
	(circle one) #							
Calling? <input type="radio"/> Y <input type="radio"/> N	IN							<input type="radio"/> Visual Trapped <input type="radio"/> Aural Hand Collected <input type="radio"/> Amp Net Incidental
Calling? <input type="radio"/> Y <input type="radio"/> N	OUT							
Calling? <input type="radio"/> Y <input type="radio"/> N	IN							<input type="radio"/> Visual Trapped <input type="radio"/> Aural Hand Collected <input type="radio"/> Amp Net Incidental
Calling? <input type="radio"/> Y <input type="radio"/> N	OUT							
Calling? <input type="radio"/> Y <input type="radio"/> N	IN							<input type="radio"/> Visual Trapped <input type="radio"/> Aural Hand Collected <input type="radio"/> Amp Net Incidental
Calling? <input type="radio"/> Y <input type="radio"/> N	OUT							
Calling? <input type="radio"/> Y <input type="radio"/> N	IN							<input type="radio"/> Visual Trapped <input type="radio"/> Aural Hand Collected <input type="radio"/> Amp Net Incidental
Calling? <input type="radio"/> Y <input type="radio"/> N	OUT							

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

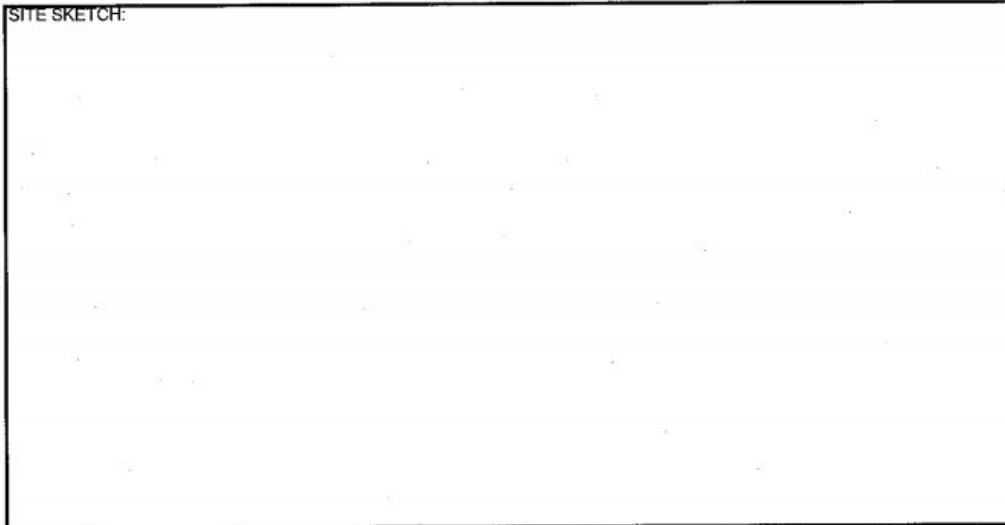
PLEASE Return to: Isaac Chellman, California Department of Fish and Wildlife, (916) 358-4036; 1701 Nimbus Rd., Rancho Cordova, CA 95670

Field review	Copied	Entered	Proofed	Herp Data Sheet, pg. 1 of 2
PHOTOS	Photo Number	Camera	Time	Date (yyyy-mm-dd)
	UTM E	UTM N	Comments	

Figure 4: Data sheet with VES data from a survey conducted Sept. 25, 2019, at Big Bear Lake, Plumas County.

Overview						
Herps	0934	Cran	9/25			THCO in bush
Other	1000	LVL	9/25	700095,4326169		outlet blocked
	0922	Cran	9/25	105699643,4395885		Dry Inlet

SITE SKETCH:



NOTES:

outlet is dry. Flow would potentially be blocked by fallen trees/logs. Brook trout present in Gill net.

Amphibians: S. Long-toed Salamander (AMMA); Yosemite Toad (ANCA, family BUCA); Sierran Treefrog (HYSI, family PSRE or HYRE); Sierra Nevada Yellow-legged Frog (RASI)
 Amph. less common in HML: CA Toad (ANBO, family BUBO); Bullfrog (RACT); Cascades Frog (RACA); CA Red-legged Frog (RADR); Sierra Newt (TASI, family TATO)
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 PLEASE Return to: Isaac Chelman, 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. 2 of 2

Figure 4, Con't: Data sheet with VES data from a survey conducted Sept. 25, 2019, at Big Bear Lake, Plumas County.