

State of California  
California Department of Fish and Wildlife  
North Central Region

Summary Report of Roving Creel Surveys (2012 - 2013) and 2015 - 2018 Angler  
Survey Box Analysis at Lower Bear River Reservoir, Amador County



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## Introduction

Lower Bear River Reservoir (Lower Bear) is located in Amador County and situated in the Eldorado National Forest. Lower Bear is off Highway 88 (Carson Pass) and is approximately 40 miles northeast of Jackson (Figure 1). Lower Bear covers an area of 710 surface acres with approximately nine miles of shoreline, has a storage capacity of 48,750 acre-feet of water, and is 5,824 feet above mean sea level (Ca. Dept. of Water Resources (DWR) 2012). Water levels at Lower Bear are managed by the Pacific Gas and Electric Company (PG&E) for hydroelectric uses (DWR 2018). A dam divides Upper Bear River Reservoir (Upper Bear) and Lower Bear. Upper Bear is much more isolated and access requires a significant hike, boat ride from Lower Bear, or access through an adjacent Boy Scout camp. The easier access results in Lower Bear receiving the majority of the fishing pressure.

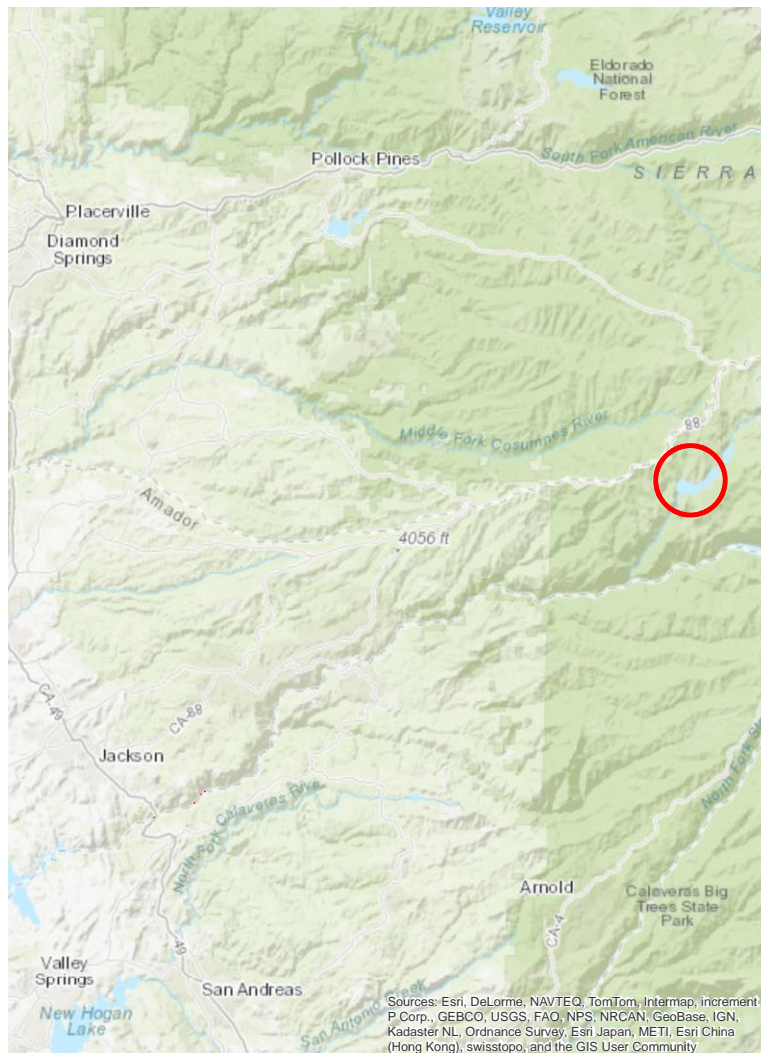


Figure 1. Lower Bear River Reservoir (Amador County).

There are two angler survey boxes (ASB) at Lower Bear. One is located at the main boat launch at the Bear River Lake Resort while the second is by the west side of the outlet dam (Figure 2). Campgrounds and cabins are located around the reservoir, which makes Lower Bear ideal for multi-day usage.

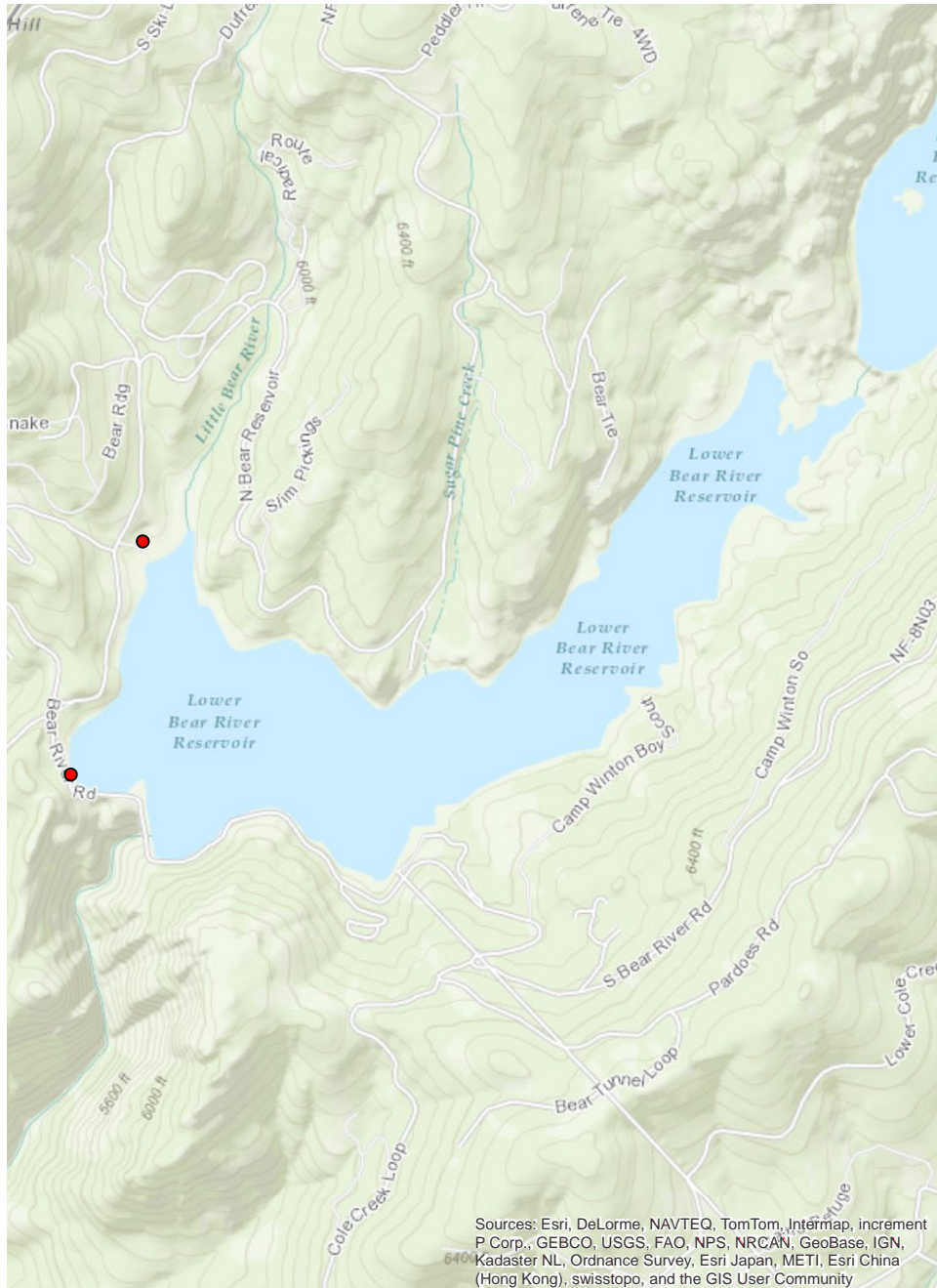


Figure 2. Lower Bear River Reservoir ASB locations (Amador County).

In addition to fishing, the area surrounding Lower Bear supports recreational activities including hiking, hunting, boat and all-terrain vehicle rentals, kayaking, canoeing, and swimming. Depending on road conditions, Lower Bear also provides terrain for snowmobiling,

cross-country skiing, and ice fishing in the winter. Lower Bear is a well-known trout fishery, containing Brown Trout (*Salmo trutta*) (BN), Rainbow Trout (*Oncorhynchus mykiss*) (RT), and Lake Trout (*Salvelinus namaycush*) (LT). Lower Bear is regularly stocked by California Department of Fish and Wildlife (CDFW), PG&E, and the Bear River Lake Resort, with trout ranging in size from fingerling (2.5 to 5 inches) to trophy (> 18 inches).

## Methods

Anglers were asked to fill out a voluntary survey form about their fishing experience at Lower Bear. The survey asks anglers for information regarding hours fished, fishing method, type of gear used, the number, and species of landed fish. Anglers were also asked the size of the fish landed and whether they kept or released their catch. Lastly, anglers were asked three questions pertaining to satisfaction with their overall angling experience, size, and number of fish. Answers were recorded on a scale of -2 to +2, with “+2” representing most satisfied and “-2” representing least satisfied. The back of the survey form included space for anglers to provide any additional comments. The 2012 and 2013 data used for comparison in this report was gathered using the roving creel survey (RCS) technique (Hickey 2013 and Richardson 2014). The 2015 – 2017 data were collected via ASB.

## Results

In 2018, the number of fish reported caught was more than any other previous ASB survey (Table 1). In 2018, 23 anglers responded to the ASB compared to 13 in 2017, 35 in 2016, and only five in 2015 (Ewing 2018). The six-year survey respondent average, including anglers who responded to the 2012 and 2013 roving creel surveys, was 176 (Hickey 2013 and Richardson 2014) (Table 1). Cumulatively, these anglers landed an average of 152 fish annually and averaged 478.1 hours of fishing. Average catch per hour for the six-year average was 0.56. The catch per angler increased from a pre-2018 average of 1.59 to a record high of 5.43 in 2018. The catch per hour also increased from a pre-2018 average of 0.38 to 1.46 in 2018.

Table 1. Collection of average effort and catch statistics recorded from the roving creel surveys in 2012 - 2013 and the 2015 - 2018 angler survey box at Lower Bear River Reservoir, Amador County.

<u>Year</u>	<u>Respondents</u>	<u>Hours Fished</u>	<u>Fish Landed</u>	<u>Catch per Hour</u>	<u>Catch per Angler</u>
2012	447	1176.2	247	0.21	0.55
2013	533	1433.5	408	0.28	0.77
2015	5	25.0	4	0.16	0.80
2016	35	146.0	83	0.57	2.37
2017	13	68.0	45	0.66	3.46
2018*	23	20.0	125	1.46	5.43
Average	176	478.1	152	0.56	2.23

\*In 2018, the majority of ASB sheets did not have an area for the angler to record their time spent fishing, thus the number of hours in 2018 is lower than expected. However, the catch per hour may be an accurate representation of the 2018 season.

In 2018, for the first time in the six years of surveys, there was a tie for the gear method that caught the greatest number of fish. Bait anglers and lure anglers both caught 44 fish each (Table 2). In 2017, lure anglers caught the greatest number of fish (n = 33). In 2012 and 2016, bait anglers caught the greatest number of fish (2012, n = 180; 2016, n = 50). In 2013 and 2015 multiple gear types caught the greatest number of fish (2013, n = 189; 2015, n = 4) (Table 2).

Table 2. The number of fish landed by the type of gear used from 2012 -2013 (creel method) and 2015 - 2018 (Angler Survey Box method).

Angling method	2012	2013	2015	2016	2017	2018
Bait	180	160	0	50	7	44
Lure	14	53	0	12	33	44
Fly	4	6	0	6	0	8
Multiple	49	189	4	5	0	29
Not recorded	NA	NA	NA	10	5	NA
Total	247	408	4	83	45	125

In 2018, Forty-three RT were caught in the 10.0 – 11.9 inch length class, which was also the length class with the greatest number for a second consecutive year (Figure 3). In comparison, 31 RT caught in 2016 were in the 6.0 – 7.9 inch length class, which was the length class with the greatest number. Seven of the nine LT caught in 2018 were in the 10.0 – 11.9 inch length class. All five BK caught in 2018 were in the 8.0 – 9.9 in. length class. The one BN caught was in the 8.0 – 9.9 length class. The 2012 – 2013, and 2015 – 2016 length classes of fish caught at Lower Bear can be found in the 2013 and 2016 survey studies (Richardson 2014; Ewing 2018).

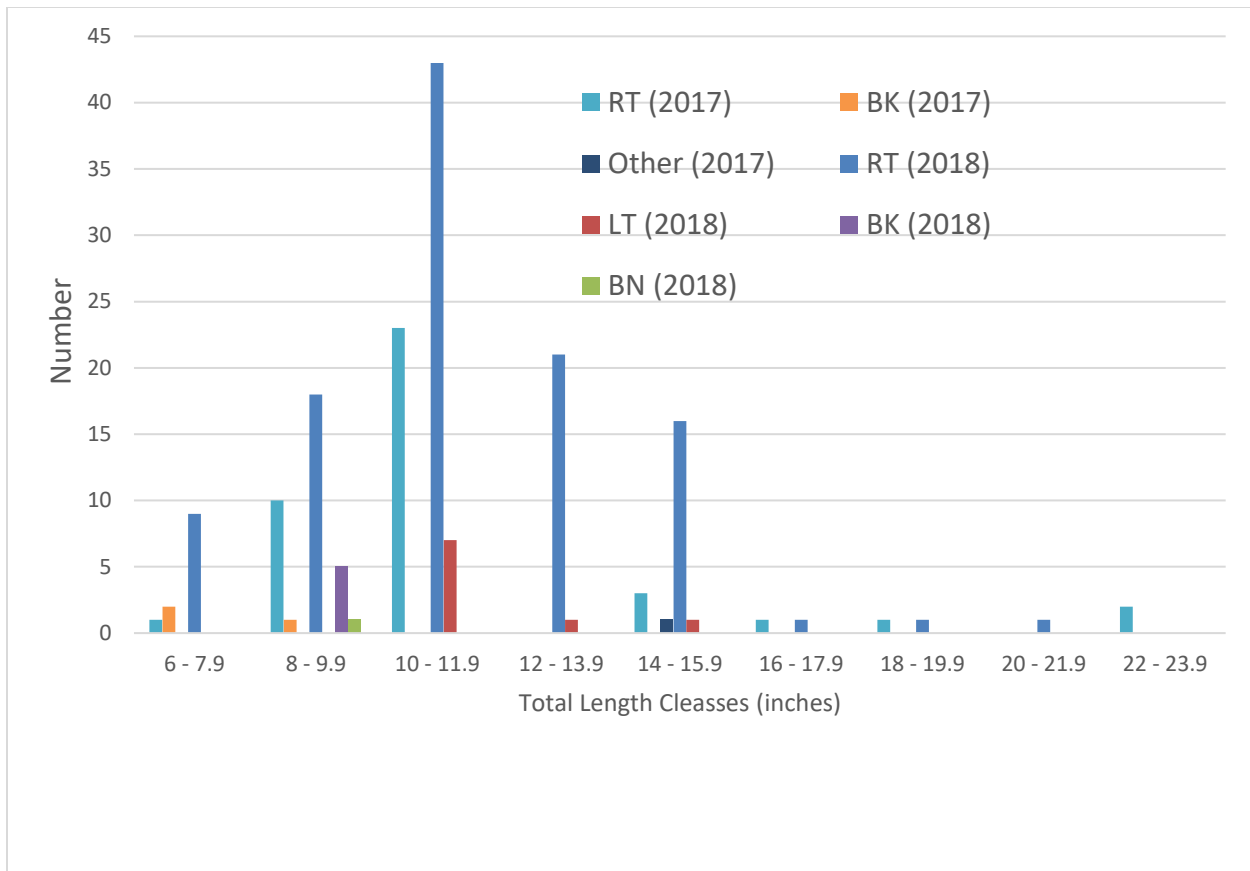


Figure 3. Frequency of measured fish in each size class that anglers reported landing at Lower Bear River Reservoir (2017 – 2018).

Six anglers (26.1%) reported fishing from a boat/kayak, which resulted in the best success in terms of catch per angler (11.0) in 2018 (Table 3). Shore fishing was the most popular method of fishing in 2018 (n = 13) for a second consecutive year and had a 3.08 catch per angler value. Three anglers (13.0%) who did not report their fishing method in 2018 had a 3.67 catch per angler value. One float tube angler had an 8.0 catch per angler value. Overall, all angling methods in 2018 had an increase in catch per angler values compared to 2017.

Table 3. Number of anglers and catch per angler based on angling method at Lower Bear River Reservoir, 2017 and 2018.

Method	2017		2018	
	Number of Anglers (%)	Catch per Angler	Number of Anglers (%)	Catch per Angler
Not Recorded	1 (7.7 %)	5.00	3 (13.0%)	3.67
Boat/Kayak	4 (30.8 %)	4.25	6 (26.1 %)	11.00
Shore/Wading	8 (61.5 %)	2.88	13 (56.5 %)	3.08
Float Tube	0 (0.0 %)	NA	1 (4.3%)	8.00

In 2018, anglers reported being satisfied with their overall angling experience, size of the fish, and the number of fish caught (Table 4). This is the second consecutive year where all three satisfaction questions had a positive average response. All three satisfaction questions also reached record high values in 2018.

Table 4. Angler Satisfaction Response Averages for the Lower Bear River Reservoir Angler Survey Box, 2015 - 2018 (Based on -2 to 2 Rating Scale).

<u>Year</u>	<u>Overall Angling Experience</u>	<u>Size of the Fish</u>	<u>Number of Fish</u>
2015	-0.75	0.00	-0.67
2016	-0.72	0.10	0.50
2017	0.36	0.60	1.20
2018	1.45	1.21	1.39

## Discussion

The 2018 Lower Bear ASB results indicate anglers had the highest catch per angler rate compared to any prior years. Overall catch in 2018 and CPUE was the highest for any ASB surveyed year. This increase may be the result of the larger allotment of catchable-size RT stocked in 2018 compared to 2015 - 2017. It is also possible that the low number of responses to the ASB survey disproportionately represented the more successful anglers. Since CDFW surveyed hundreds of people each year with the roving creel and only 76 in four years with the ASB, the roving creel may have captured a more diverse group of fishing experiences. However, the number of anglers who responded in 2018 increased from 2017, which may indicate increased usage.

The 10.0 – 11.9 inch length size class had more RT than any other length class in 2018 for a second consecutive year. These fish may have been the 2016, 6.0 – 7.9 inch length size class, which had more RT than any other that year. This may correspond to why anglers were more satisfied with the “size” compared to any previous year since it is likely anglers would prefer catching 10 inch RT compared to 6 inch. Anglers were satisfied with the number of fish they caught for a third straight year. Both the size and number satisfaction numbers have trended up every year since 2015, which suggests a fishery that is improving for anglers.

The overall fishing experience in 2018 for anglers was positive for the second consecutive year. It is likely the overall angling experience was positive in 2017 and 2018 because the number of fish and size satisfaction values had record high values for their years. The “satisfaction” trend may also be related to the “pounds stocked/year” trend.

The number of respondents in the 2018 survey was up from 2015 and 2017, but lower than the number of respondents in the 2016 survey. It is possible the large number of wildfires in California and poor air quality in 2018, deterred anglers from fishing Lower Bear. Ideally, the more respondents, the more feedback the ASBs provide CDFW on angler success at the fishery. It is essential CDFW maintain the trend of increasing angler participation in the ASB survey, partly because these surveys provide information on complete fishing trips. In addition, CDFW

staff should continue to inform anglers of the ASB locations at Lower Bear and emphasize how helpful their responses and participation in the survey are.

CDFW, PG&E, and the Bear River Lake Resort stock RT at Lower Bear (Appendix 1). The sizes of fish stocked included fingerling, sub-catchable, catchable, and trophy-size fish. Fingerling and sub-catchable trout are stocked under a put and grow management strategy, while catchable and trophy-size trout are stocked under a put and take management strategy. CDFW is implementing a put and grow strategy with the sub-catchable RT, but it is not known how many of these fish grow to catchable size. Losee and Phillips (2017) found that RT in the 14 - 15 inch length-class were, on average, 12.5 times more likely to be caught by sport anglers than those in the smallest individual length-class (8 – 9 inch). Anglers may not be catching as many hatchery RT as they could due to the presence of large, predatory BN and LT in Lower Bear. CDFW is transitioning over to a trophy-trout fishery (1 lb. and larger stocked RT) in the coming years in order to help survivability of RT stocked in Lower Bear. The number of pounds stocked will likely stay the same.

Lower Bear has a history of growing large RT, LT, and BN in the trophy-size length classes. Two trophy-size RT and nine catchable-size LT were recorded in 2018. The decrease in trophy-size RT caught may be due to the absence of trophy-size RT stocked by Bear River Resort in 2018. Gathering information on the trophy-sized component of fish populations can be challenging due to their rarity and their use of habitats unsuitable to traditional sampling techniques (Bayley and Austen 2002). Lower Bear has a lot of boulder and bedrock structure with a steep gradient along its shoreline. This allows shore anglers access to deep water for fishing. Being able to fish this deeper water from shore means boat anglers are not the only ones able to fish greater depths.

Only five BN have been reported caught in six years' of surveys. The last stocking of 15,000 fingerling-size BN in 2012 does not appear to be successful from the data collected. It is also possible that the smaller percentage of BN in Lower Bear are trophy-size and eating many of the RT resulting in fewer RT in the larger size classes. Wiley et al. (1993) noted that larger trout are better able to avoid predators. This same hypothesis could be also happening in Lower Bear.

It was easier to identify any overlying trends since the 2018 survey method was the fourth consecutive season of the ASB at Lower Bear. The 2019 survey year will be the fifth year of the ASB at Lower Bear and will likely be its last due to five years of surveys performed.

### **Recommendations**

- Continue to survey Lower Bear using ASB procedures to gather year-to-year comparisons.
- Switch to stocking trophy-size RT.
- Educate the public and anglers about ASBs and their locations at Lower Bear.



## References

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Appendix 1. Stocking history at Lower Bear River Reservoir in 2015 - 2018.

Date	Species	Weight (lbs.)	Number	Agency
9/11/2018	RT	800	960	CDFW
8/2/2018	RT	1,000	2,100	CDFW
6/4/2018	RT	2,000	3,600	CDFW
5/21/2018	RT	1,500	3,000	PG & E
5/1/2018	RT	2,000	3,600	CDFW
2017	RT	1,000		Bear River Lake Resort
7/31/2017	RT	1,000	2,900	CDFW
6/26/2017	RT	1,000	2,700	CDFW
5/22/2017	RT	1,500	6,300	CDFW
5/17/2017	RT	1,500	3,000	PG & E
5/27/2016	RT	350	525	CDFW
5/27/2016	RT	200	600	CDFW
5/27/2016	RT	450	1,530	CDFW
7/18/2016	RT	510.5	2,195	CDFW
5/18/2016	RT	1,500	3,000	PG & E
2016	RT	1,000		Bear River Lake Resort
2015	RT	1,500	3,000	PG & E
2015	RT	1,000	2,000	Bear River Lake Resort
6/30/2015	RT	1,070	50,076	CDFW
6/22/2015	RT	1,800	4,680	CDFW
5/4/2015	RT	500	850	CDFW
5/4/2015	RT	1,500	2,700	CDFW