

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

Summary Report of Roving Creel Surveys (2012 - 2013) and 2015 - 2019 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 (California Department of Water Resources [DWR] 2019). Pacific Gas and Electric Company (PG&E) manages Lower Bear water for hydroelectric uses (DWR 2019). A dam divides Upper Bear River Reservoir (Upper Bear) from Lower Bear. Upper Bear is much more remote 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 most of the fishing pressure.

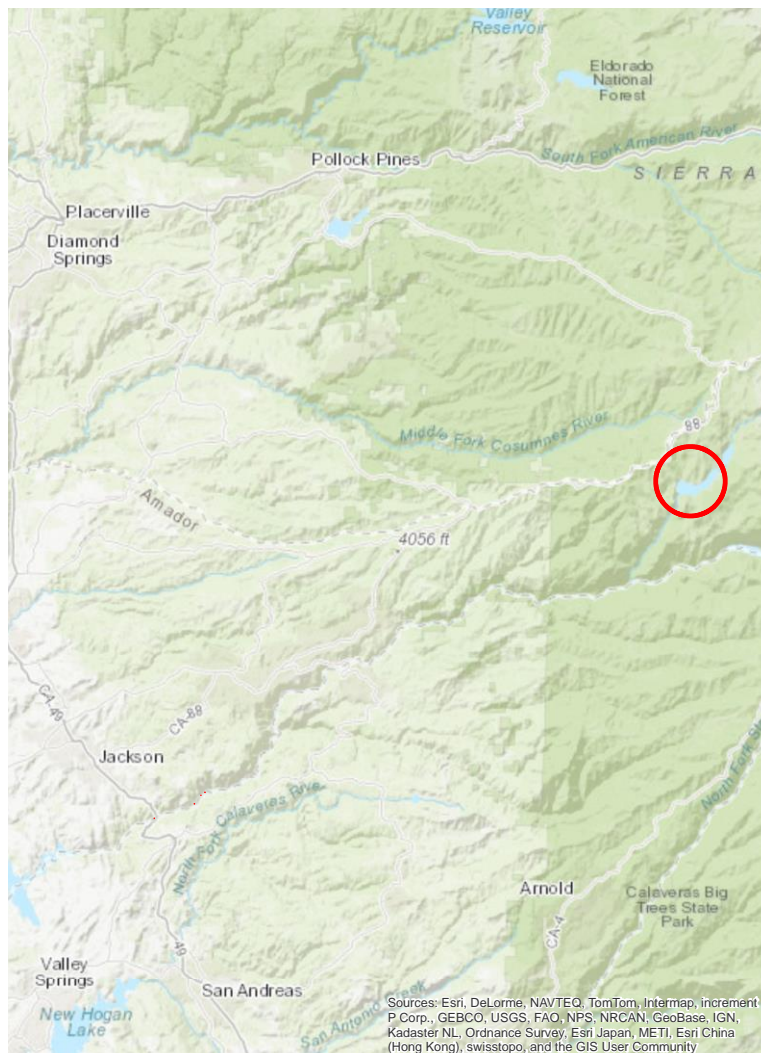


Figure 1. Lower Bear River Reservoir (Amador County).

There are two angler survey boxes (ASB) at Lower Bear. One is located at the main boat launch at the Bear River Lake Resort and the second is by the west side of the outlet dam (**Figure 2**).

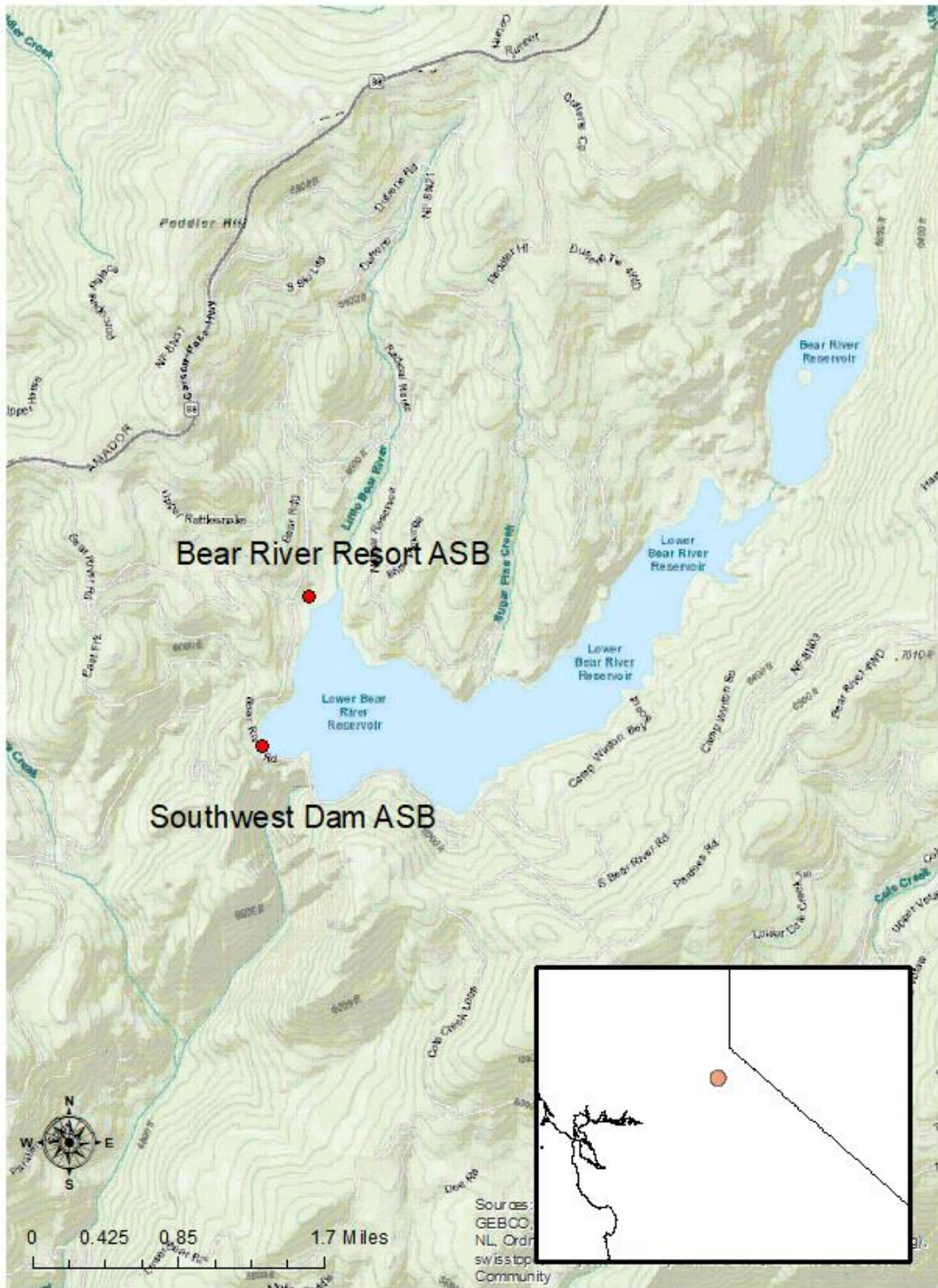


Figure 2. Lower Bear River Reservoir ASB locations. One ASB is located at Bear River Resort while the second ASB is located by the dam (Amador County).

Campgrounds and cabins are located around the reservoir, which makes Lower Bear ideal for multi-day usage. In addition to fishing, the area surrounding Lower Bear supports recreational activities including hiking, hunting, boating, all-terrain vehicle trails, 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). California Department of Fish and Wildlife (CDFW), PG&E, and the Bear River Lake Resort regularly stock Lower Bear with trout ranging in size from fingerling (2.5 to 5 inches [in.]) to trophy (> 18 in.).

Methods

Anglers voluntarily filled out a 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; Richardson 2014). The 2015 – 2019 data were collected via ASB.

Results

In 2019, the number of fish reported caught ($n = 48$) was less than 2018 ($n = 125$) (**Table 1**). In 2019, 10 anglers responded to the ASB compared to 23 in 2018, 13 in 2017, 35 in 2016, and only five in 2015 (Ewing 2016, 2017, 2018, 2019). The two-year roving-creel survey respondent average was 490. The five-year ASB survey respondent average was 17 (**Table 1**). Creel-surveyed anglers landed an average of 328 fish annually and averaged 1304.9 hours of fishing. ASB-surveyed anglers landed an average of 61 fish annually and averaged 56.2 hours of fishing. Average catch per hour for the seven-year average was 0.62. The catch per hour also increased from a pre-2019 average of 0.56 to 1.00 in 2019. The catch per angler increased from a pre-2019 average of 2.23 to 4.80 in 2019. However, this is a decrease from a record high of 5.43 in 2018.

Table 1. Collection of average effort and catch statistics recorded from the roving creel surveys in 2012 - 2013 and the 2015 - 2019 angler survey box (ASB) 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
2019*	10	22.0	48	1.00	4.80
Overall Average	152	413.0	137	0.62	2.60
ASB only	17	56.2	61	0.77	3.37
Creel only	490	1304.9	328	0.25	0.66

*In 2018 and 2019, a portion of ASB sheets did not have an area for the angler to record their time spent fishing, thus the number of hours in 2018 and 2019 is lower than expected. However, the catch per hour may still be an accurate representation of the 2018 and 2019 season.

Similar to 2017, in 2019, lure anglers caught the greatest number of fish (n = 25) (**Table 2**). In 2018, both lure and bait anglers caught the greatest number of fish (n = 44), each. 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 - 2019 (Angler Survey Box method).

<u>Angling Method</u>	<u>2012</u>	<u>2013</u>	<u>2015</u>	<u>2016</u>	<u>2017</u>	<u>2018</u>	<u>2019</u>
Bait	180	160	0	50	7	44	21
Lure	14	53	0	12	33	44	25
Fly	4	6	0	6	0	8	NA
Multiple	49	189	4	5	0	29	2
Not recorded	NA	NA	NA	10	5	NA	NA
Total	247	408	4	83	45	125	48

In 2019, 23 RT caught were in the 12.0 – 13.9 in. length-class. In 2018 and 2017 the 10.0 – 11.9 in. length-class had the greatest numbers (**Figure 3**). In comparison, 31 RT caught in 2016 were in the 6.0 – 7.9 in. length-class, which was the length class with the greatest number. The one BN caught in 2019 was in the 24.0 – 25.9 in. length-class (**Figure 4**). No LT or Brook Trout (*Salvelinus fontinalis*) (BK) were caught in 2019. The 2012 – 2013, and 2015 – 2016 length-classes of fish caught at Lower Bear can be

found in the 2013 and 2016 survey studies (Hickey 2013; Richardson 2014; Ewing 2016 and 2017).

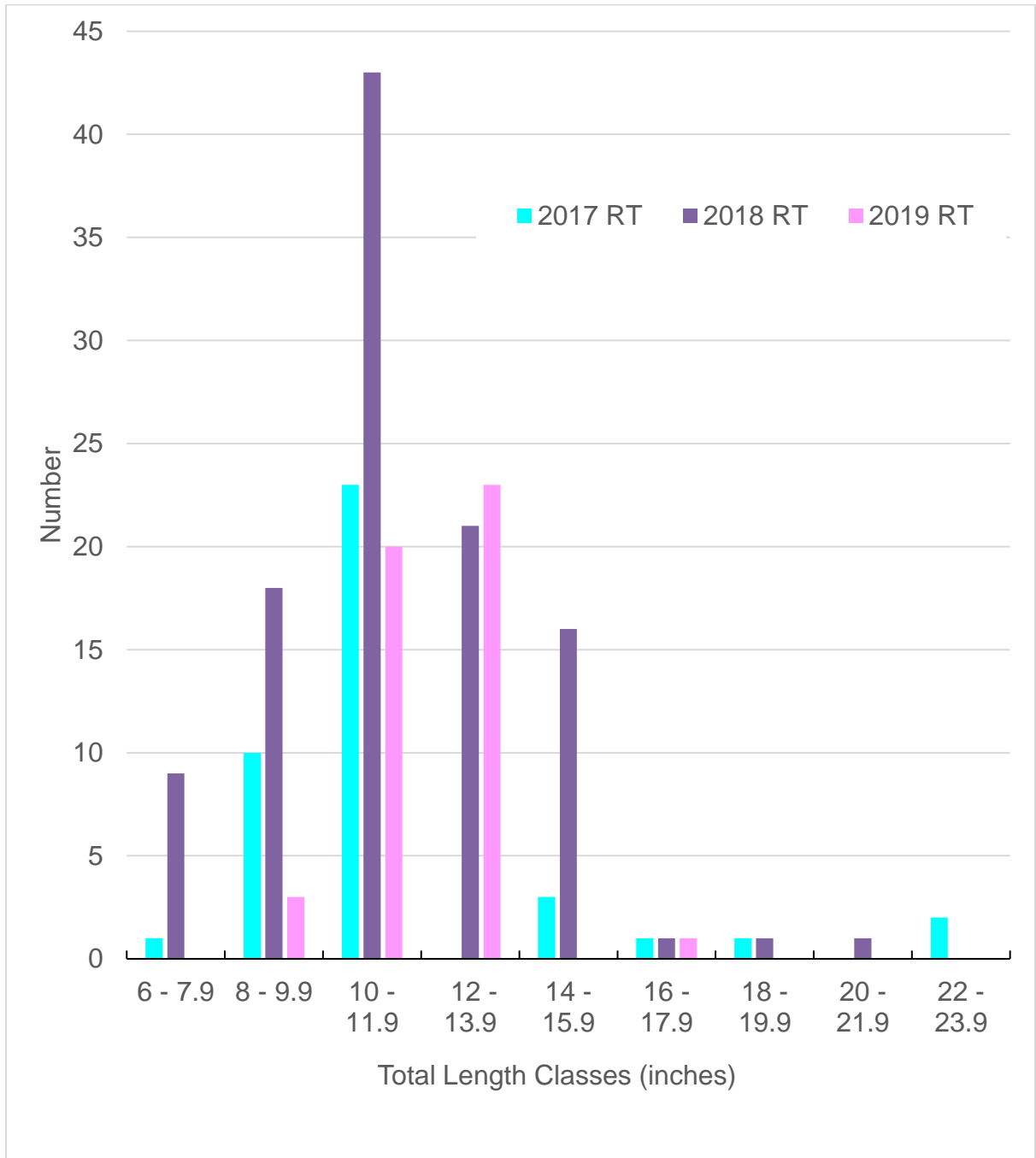


Figure 3. Frequency of measured RT in each length-class that anglers reported landing at Lower Bear River Reservoir (2017 – 2019).

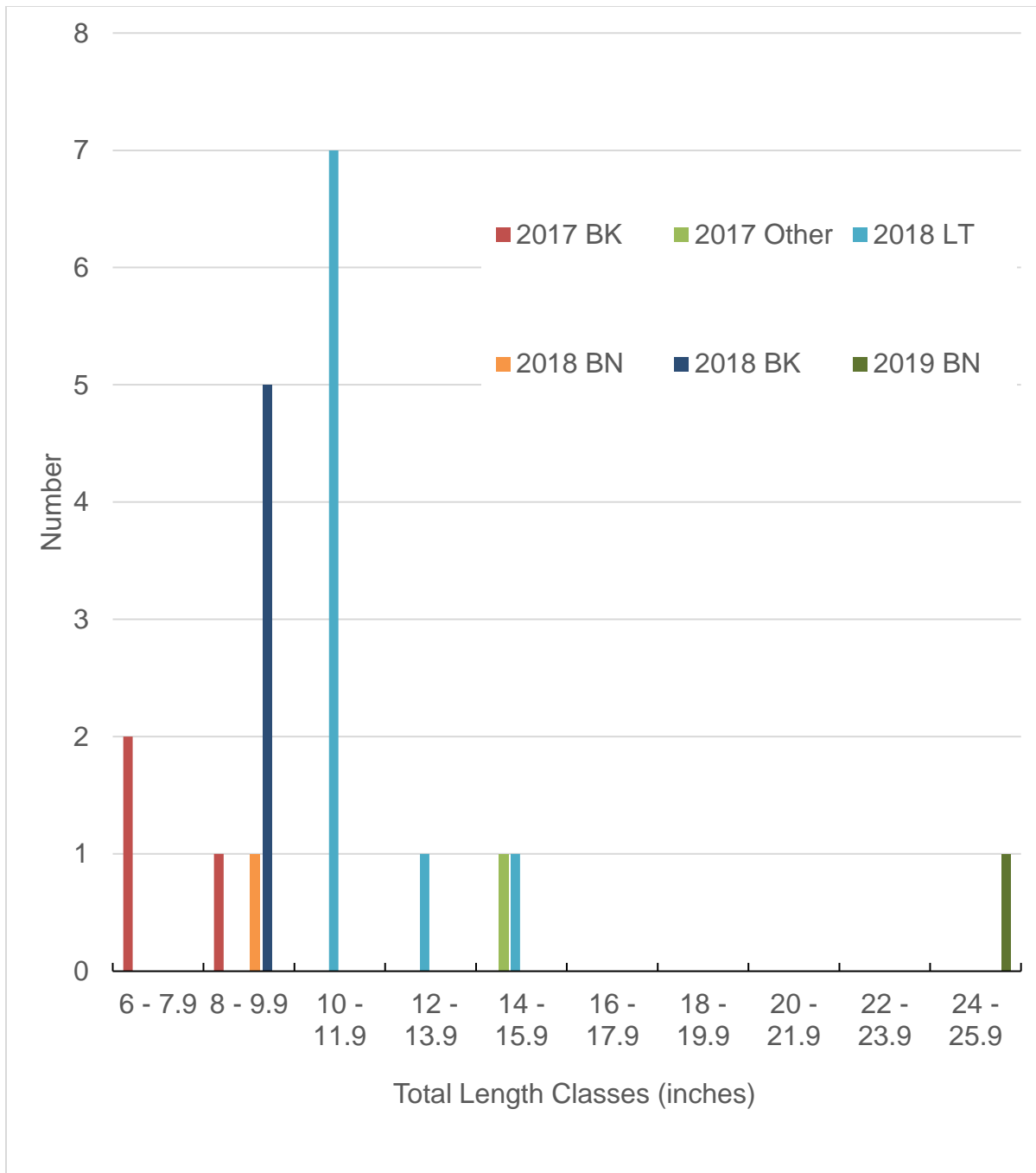


Figure 4. Frequency of measured LT, BK, BN, and Other in each length class that anglers reported landing at Lower Bear River Reservoir (2017 – 2019).

Five anglers (50.0%) reported fishing from a boat/kayak, which resulted in the best success in terms of catch per angler (5.20) in 2019 (**Table 3**). Boat/kayak fishing methods were also tied for most popular method of fishing with Not Recorded fishing in 2019 (n = 5). In 2019, anglers who did not record their method of angling had a 4.40 catch per angler value. In 2019, no anglers reported fishing from shore or from a float tube.

Table 3. Number of anglers and catch per angler based on angling method at Lower Bear River Reservoir, 2017 - 2019.

Method	2017		2018		2019	
	Number of Anglers (%)	Catch per Angler	Number of Anglers (%)	Catch per Angler	Number of Anglers (%)	Catch per Angler
Not Recorded	1 (7.7%)	5.00	3 (13.0%)	3.67	5 (50.0%)	4.40
Boat	4 (30.8%)	4.25	6 (26.1%)	11.00	5 (50.0%)	5.20
Shore/Wading	8 (61.5%)	2.88	13 (56.5%)	3.08	0 (0.0%)	NA
Float Tube	0 (0.0%)	NA	1 (4.3%)	8.00	0 (0.0%)	NA

In 2019, anglers reported being satisfied with their overall angling experience, size of the fish, and the number of fish caught (**Table 4**). This is the third consecutive year where all three satisfaction questions had a positive average response. Satisfaction with Size and Number also reached record high values in 2019.

Table 4. Angler Satisfaction Response Averages for the Lower Bear River Reservoir Angler Survey Box, 2015 -2019 (Based on -2 to 2 Rating Scale).

Year	Overall Angling Experience	Size of the Fish	Number of Fish
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
2019	1.00	1.71	1.57

Discussion

The 2019 Lower Bear ASB results indicate anglers had the second highest catch per angler rate compared to previous years. Although overall catch and catch per hour in 2019 was lower than 2018, the values were still higher than pre-2018 years. This increase may be the result of the larger allotment of catchable-size RT stocked in 2018 and 2019 compared to 2015 - 2017. However, the number of anglers who responded in 2019 was the lowest in four years, which may indicate decreased usage. Ideally, the more respondents, the more feedback the ASBs provide CDFW on angler success at the fishery. Since CDFW surveyed hundreds of people each year with the roving creel and only 86 in five years with the ASB, the roving creel may have captured a more diverse group of fishing experiences. However, using the ASB is less costly than creel surveys and able to collect information 24 hours a day, seven days a week.

The 12.0 – 13.9 in. length-class had more RT than any other length class in 2019 for the first time in four years. These fish may have been the 2017 and 2018 10.0 – 11.9 in. length-class and the 2016, 6.0 – 7.9 in. length-class, which had more RT than any

other in their respective years. 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 12 in. RT compared to six in.

Anglers were satisfied with both the number and size of fish they caught for a fourth 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 2019 for anglers was positive for the third consecutive year. It is likely the overall angling experience was positive from 2017 - 2019 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.

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 in. 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 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 (> 18 in.) length-classes. However, only one trophy-size BN was caught in 2019 compared to two trophy-size RT and nine catchable-size LT caught 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 and 2019. 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 six BN have been reported caught in seven years of surveys. Prior to the 2019 stocking of BN, the most recent stocking of BN was 15,000 fingerlings in 2012. This 2012 stocking 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 2019 survey method was the fifth consecutive season of the ASB at Lower Bear. However, the low number of respondents in 2019 did not provide a robust dataset for CDFW to analyze. The 2019 survey year will be the last for at least a few years due to five years of surveys performed and informative data collected.

Recommendations

- Switch to stocking trophy-size RT.
- Switch to stocking catchable-size BN
- Keep stocking allotment weight the same for RT

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Appendix 1. Stocking history at Lower Bear River Reservoir from 2015 - 2019.

Date	Species	Weight (lbs.)	Number	Agency
10/2/2019	RT	800	1,760	CDFW
10/2/2019	RT	20	6	CDFW
8/1/2019	RT	302.8	55,715	CDFW
8/1/2019	RT	12.76	4,287	CDFW
6/27/2019	RT	3,000	6,300	CDFW
6/12/2019	RT	1,500	3,000	PG & E
5/28/2019	RT	1000	1,500	CDFW
5/28/2019	BN	150	30,000	CDFW
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

