

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

Red Lake, Alpine County

2011-2021 Angler Survey Box Analysis



Photo by B. Ewing

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Introduction

Red Lake is an 85-surface acre reservoir in Alpine County situated at 7,872 feet above mean sea level. Red Lake is located off Highway 88, one mile south of Carson Pass and 17 miles south of Lake Tahoe (**Figure 1**). Red Lake drains into Red Lake Creek, a five-mile creek that flows into the West Fork Carson River. Red Lake is open all year to the public with a five trout bag limit with a 10 in possession sport-fishing regulation.

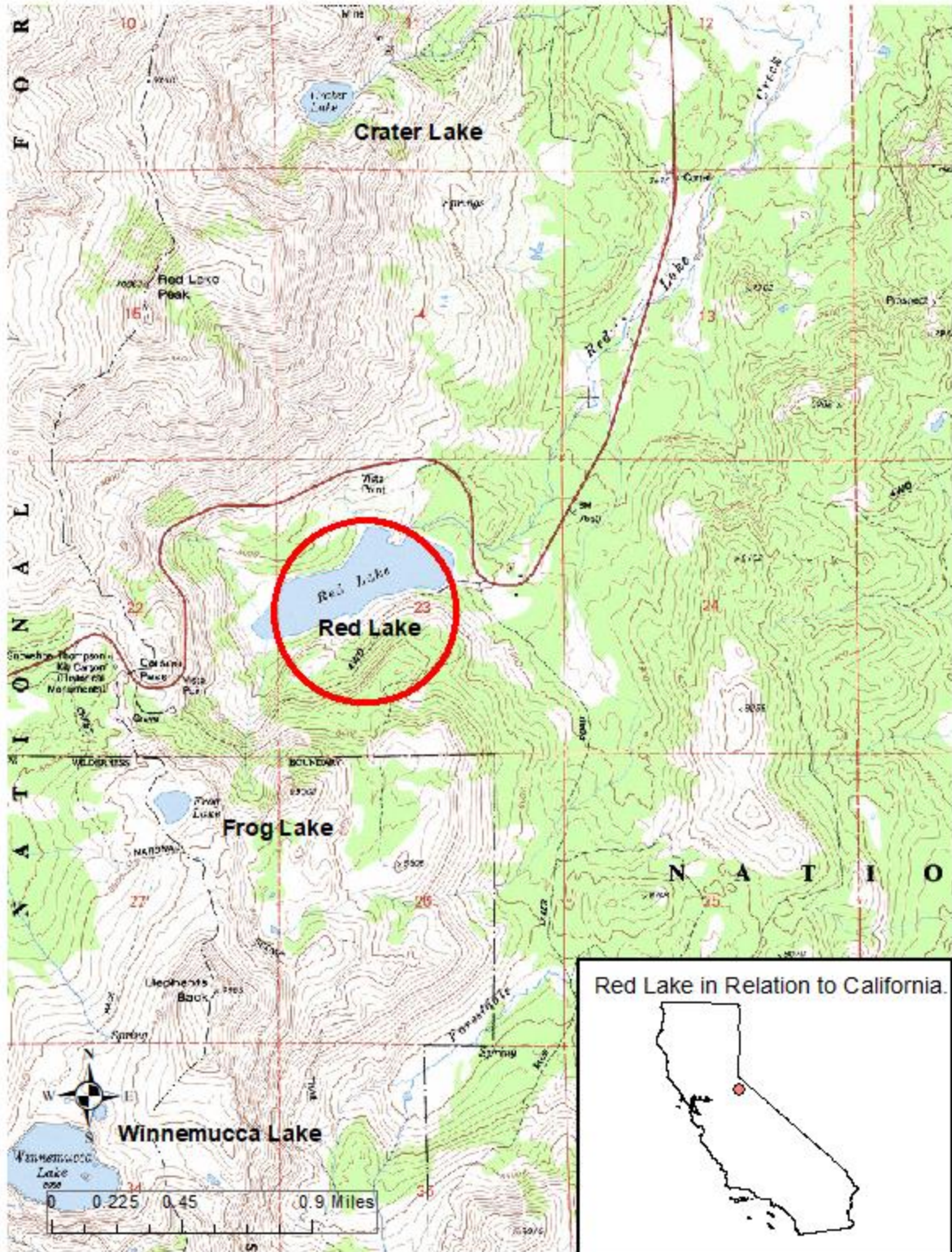


Figure 1. Red Lake, Alpine County.

California Department of Fish and Wildlife (CDFW) has annually stocked Red Lake for recreational fishing annually since 1968. Historically, Red Lake was a Brook

Trout (*Salvelinus fontinalis*, BK) fishery. However, in 2011, CDFW shifted the fishery to native Lahontan Cutthroat Trout (*Oncorhynchus clarkii henshawi*, LCT). CDFW stocks Red Lake with sub-catchable LCT in addition to catchable broodstock LCT collected from Heenan Lake (**Appendix 1**). Along with LCT and BK, Red Lake currently supports populations of non-game fish, including Tahoe Sucker (*Catostomus tahoensis*), Mountain Sucker (*Catostomus platyrhynchus*), and Tui Chub (*Gila bicolor*).

To assess the fishery, CDFW installed two angler survey boxes (ASB) at Red Lake approximately 20 years ago (**Figure 2**). Anglers voluntarily complete a survey form after they complete their fishing trip, and deposit it in the box. CDFW uses this data to assess angler satisfaction, species composition, and general angler statistics at Red Lake. This report covers data collected from Red Lake’s ASBs from 2011–2021.

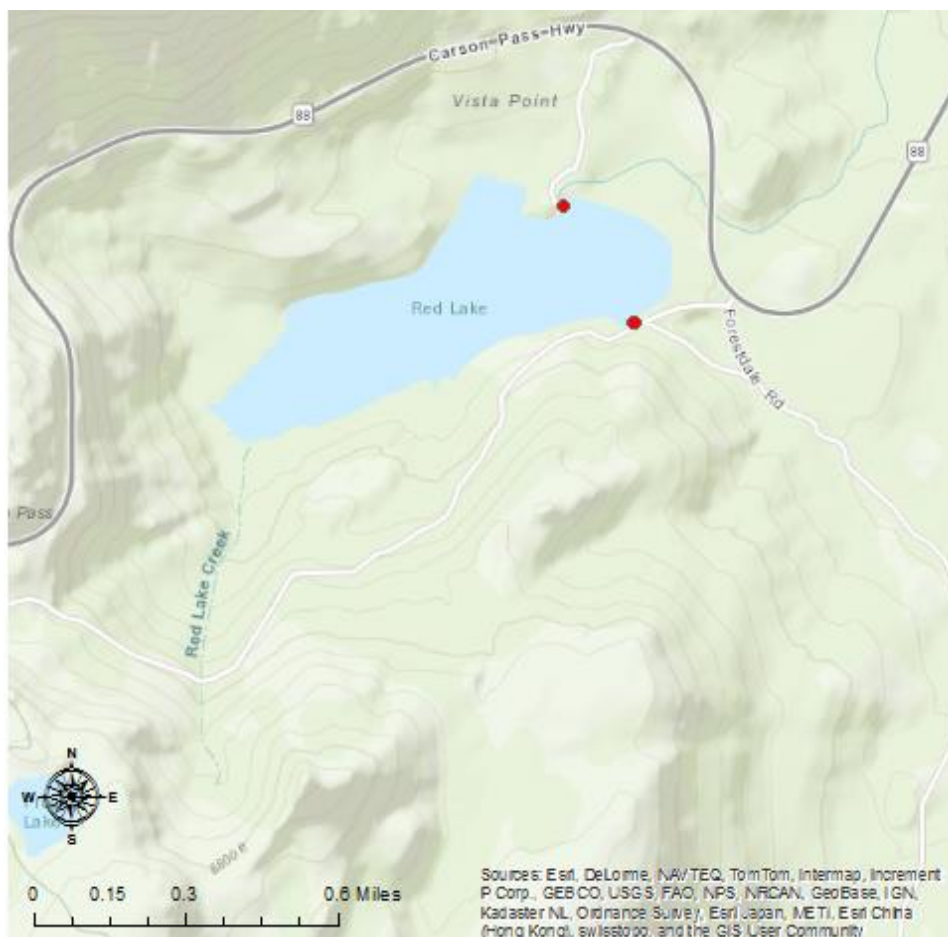


Figure 2. Red Lake Angler Survey Box (ASB) locations (Alpine County).

Methods

Participating anglers complete a voluntary survey form about their fishing experience. The survey asks anglers for information regarding hours fished, type of

gear and method used, and the number of landed fish. Anglers are also asked the size and species of fish landed and whether they kept or released their catch. Finally, anglers are asked three questions, and their answers were recorded on a scale of “-2 to +2”, with “+2” representing most satisfied and “-2” representing least satisfied. The questions pertain to satisfaction of overall angling experience, fish size, and number of fish caught. The back of the survey form is reserved for anglers who had any additional comments (**Appendix 2**).

Results

In 2021, Red Lake had 20 respondents, which was well below the 2011–2021 average of 45 (range: 19–116) (**Table 1**). It was also the second lowest angler total in the 2011–2021 survey period. Cumulatively, 2021 anglers landed 32 fish and fished for 70.5 hours, which is also below the 11-year average of 119 fish landed and 149.0 hours fished. The catch per angler (1.60) and catch per hour (0.45) in 2021 decreased from the 11-year average of 2.76 and 0.86, respectively, as well as being the lowest values during this same period (**Table 1**).

Table 1. Collection of average effort and catch statistics recorded from the Angler Survey Box 2011–2021 at Red Lake.

Year	Respondents	Hours Fished	Fish Landed	Catch per Angler	Catch per Hour	Hours per Angler
2011	37	141.13	98	2.65	0.69	3.81
2012	51	159.75	166	3.25	1.04	3.13
2013	61	181.50	224	3.67	1.23	2.98
2014	41	132.00	136	3.32	1.03	3.22
2015	66	220.25	170	2.58	0.77	3.34
2016	116	423.50	211	1.82	0.50	3.65
2017	19	63.00	105	5.53	1.67	5.53
2018	21	68.50	39	1.86	0.57	3.26
2019	36	96.00	63	1.75	0.66	2.67
2020	30	83.00	70	2.33	0.84	2.77
2021	20	70.50	32	1.60	0.45	3.53
Average	45	149.01	119	2.76	0.86	3.44

Two anglers (10.0%) reported fishing with multiple methods, which resulted in the best success in terms of catch per angler (3.00) in 2021 (**Table 2**). Two anglers (10.0%) who did not report their method of fishing, recorded the second highest rate in terms of catch per angler (2.50) in 2021. Fourteen shore anglers (70.0%) reported a 1.43 catch per angler value and was also the most popular method of fishing for a sixth

consecutive year. One boat angler (5.0%) had a 1.00 catch per angler value. One float tube angler did not report catching any fish.

Table 2. Number of anglers and catch per angler based on angling method at Red Lake, 2016–2021. NA=Not Applicable

Method	2016		2017		2018	
	% Anglers	Catch/ Angler	% Anglers	Catch/ Angler	% Anglers	Catch/ Angler
Boat	4 (3.4%)	2.50	1 (5.3%)	4.00	1 (4.8%)	7.00
Float Tube	1 (1.0%)	0.00	NA	NA	3 (14.3%)	2.33
Shore/Wading	102 (87.9%)	1.81	14 (73.7%)	6.43	15 (71.4%)	1.53
Multiple	2 (1.7%)	0.00	1 (5.3%)	0.00	NA	NA
Not Recorded	7(6.0%)	2.29	3 (15.8%)	3.67	2 (9.5%)	1.00
Total	116		19		21	
Method	2019		2020		2021	
	% Anglers	Catch/ Angler	% Anglers	Catch/ Angler	% Anglers	Catch/ Angler
Boat	5 (13.9%)	2.60	7 (23.3%)	4.43	1 (5.0%)	1.00
Float Tube	1 (2.8%)	0.00	1 (3.3%)	1.00	1 (5.0%)	0.00
Shore/Wading	27 (75.0%)	1.70	19 (63.3%)	1.79	14 (70.0%)	1.43
Multiple	1 (2.8%)	2.00	NA	NA	2 (10.0%)	3.00
Not Recorded	2 (5.6%)	1.00	3 (10.0%)	1.33	2 (10.0%)	2.50
Total	36		30		20	

Anglers used bait, lures, and flies while fishing at Red Lake (**Table 3**). In 2021, eight anglers (40.0%) used lures to catch fish, which is the third straight year of the highest recorded angling method. Lure anglers also tied multiple-gear methods as the highest catch rate (2.00 catch per angler) in 2021 and third straight year of either the highest or tied for the highest catch per angler value. Multiple gear anglers also had a 2.00 catch per angler value, an increase from the previous three years. Bait anglers reported the second highest identified catch rate in 2021 (1.00 catch per angler) for a third consecutive year, but still a large decrease from 2017 (9.14 catch per angler). However, it was also the lowest catch per angler value in the last six years for bait anglers. In 2021, fly anglers had the lowest catch per angler value of 0.00. This is the third consecutive year fly anglers had the lowest catch per angler values. It is also the fifth time in the last six years, fly angling was the least used gear.

Table 3. The frequency of anglers that used each angling method and their corresponding catch rates from 2016–2021 at Red Lake.

Method	Catch per Angler (Total Anglers)					
	2016	2017	2018	2019	2020	2021
Bait	1.79 (61)	9.14 (7)	2.50 (4)	1.70 (10)	2.25 (8)	1.00 (4)
Lure	2.59 (27)	5.00 (5)	2.33 (6)	2.38 (13)	3.00 (11)	2.00 (8)
Fly	0.80 (5)	NA	3.00 (2)	0.33 (3)	1.67 (6)	0.00 (2)
Multiple	1.18 (22)	2.67 (6)	1.00 (8)	1.40 (10)	1.75 (4)	2.00 (6)
Not Recorded	2.00 (1)	0.00 (1)	1.00 (1)	NA	2.00 (1)	NA
Total	116	19	21	36	30	20

In 2021, anglers caught the fewest fish ($n = 32$) on record (**Table 1** and **Figure 3**). In 2011, 69% ($n = 68$) of trout landed were LCT, while only 29% ($n = 28$) were BK. In 2015, 64% of identifiable trout landed were LCT ($n = 113$), 8% were BK ($n = 14$), 24% percent were unidentifiable trout ($n = 43$), and 3% were unknown species ($n = 6$). In 2016, 84% of identifiable trout landed were LCT ($n = 177$), 8% were BK ($n = 16$), and 8% were a combination of unknown species/trout ($n = 18$). In 2017, 68% of identifiable trout landed were LCT ($n = 71$), 18% were unknown species ($n = 19$), 10% were Tui Chubs ($n = 11$), 3% were suckers ($n = 3$), and 1% were BK ($n = 1$). In 2018, 74% of fish landed were LCT ($n = 29$), 10% were unknown species ($n = 4$), 10% were BK ($n = 4$), and 5% were suckers ($n = 2$). In 2019, 62% of fish landed were LCT ($n = 39$), 37% were BK ($n = 23$), and 2% were BN ($n = 1$). In 2020, 53% of fish landed were LCT ($n = 37$), 46% were BK ($n = 32$), and 1% were Rainbow Trout (*Oncorhynchus mykiss*, RT) ($n = 1$) (Ewing 2021). In 2021, 38% of fish landed were LCT ($n = 12$), 31% were unknown species ($n = 10$), 28% were BK ($n = 9$), and 3% were RT ($n = 1$). It is the second consecutive year RT were reported caught at the Red Lake ASB.

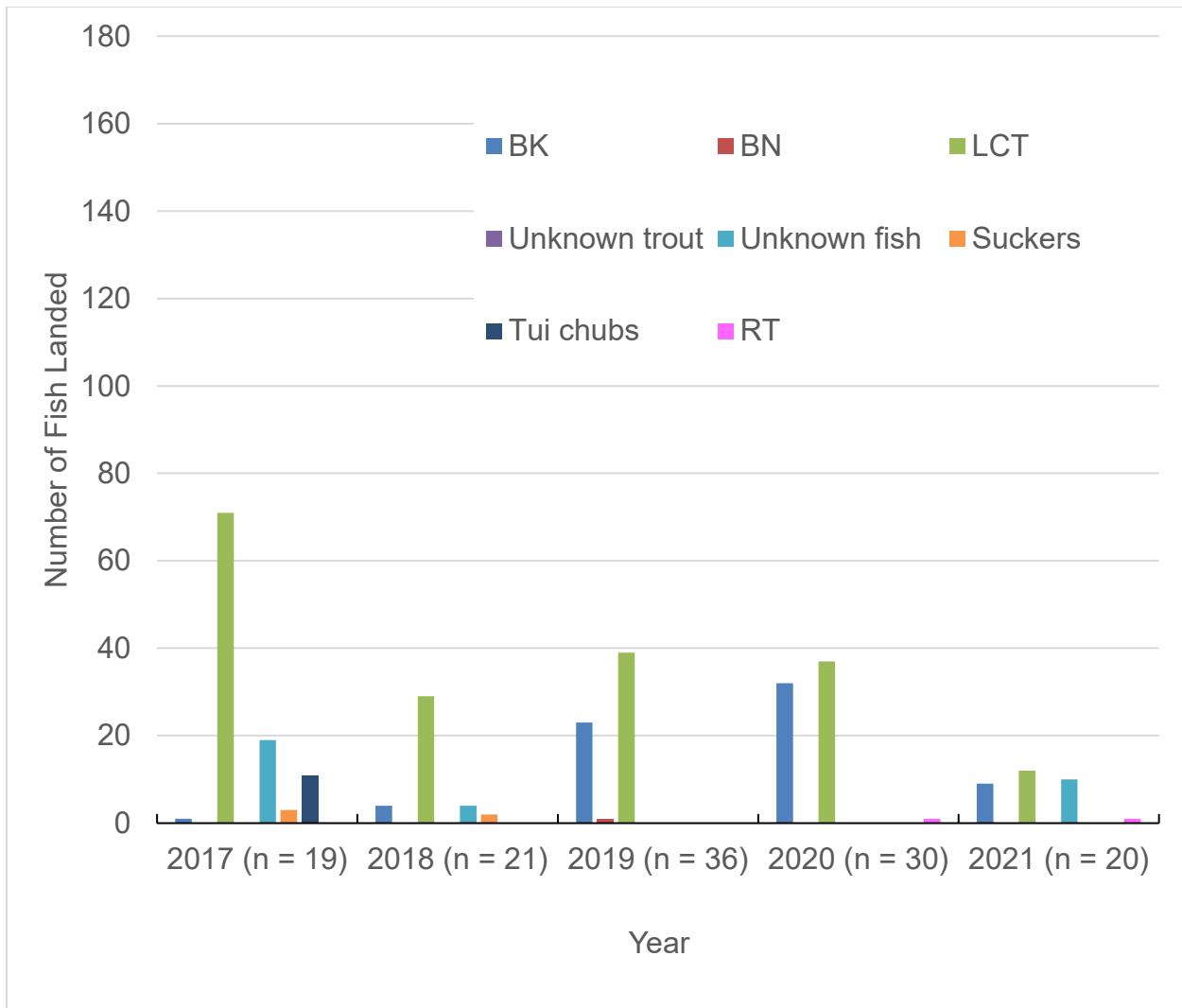


Figure 3. Number of each species of fish caught annually from Red Lake, 2017-2021 with number of anglers in parenthesis.

The number of landed trout that measured < 10 inches (in.) in total length was 38% (n = 24) in 2019, 3.3% (n = 2) in 2020, and 0.0% in 2021 (**Figure 4**). The number of landed trout that measured between 12 and 20 inches was 40% (n = 25) in 2019, 83% in 2020, and 100% in 2021. In 2019, 16% of the total catch (n = 10) were greater than 20 inches and compared to 13% of the total catch (n = 8) in 2020. Unfortunately, in 2021, the number of fish greater than 20 in. dropped back to 0%.

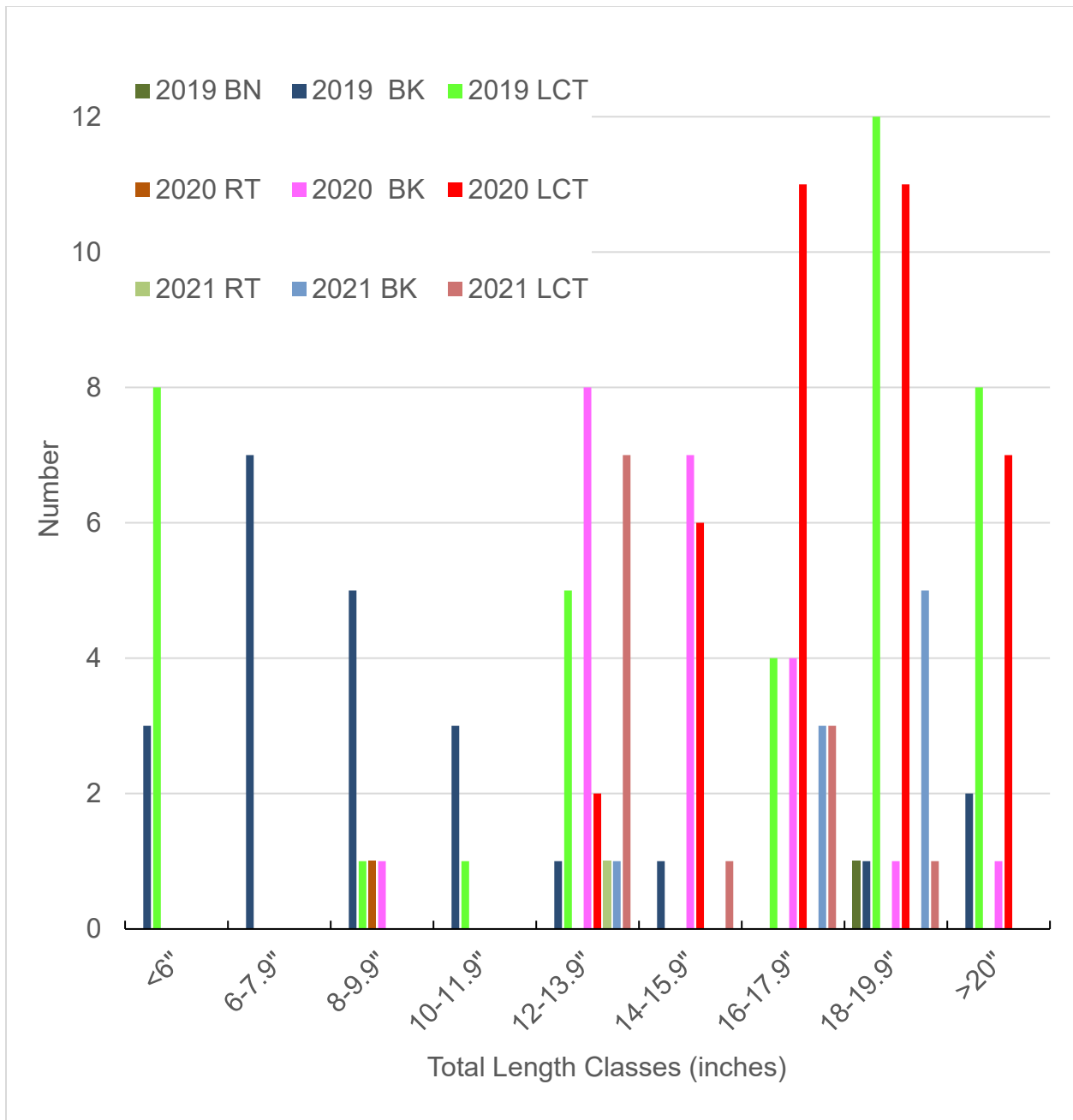


Figure 4. Frequency of identified trout in each size class that anglers reported landing at Red Lake, 2019–2021.

In 2017, anglers kept all BK and released 37% of LCT. Anglers released 11% of unknown fish, 100% of suckers, but kept all Tui Chubs in 2017 (**Table 4**). In 2018, anglers released 75% of BK, 83% of LCT, all unknown fish, and kept all suckers. In 2019, anglers released 83% of BK, 59% of LCT, and the one BN that was caught. In 2020, anglers released 84% of BK and 70% of LCT. The one RT caught in 2020 was kept. In 2021, anglers released 89% of BK, 25% of LCT and 100% of RT. Twenty percent of unknown fish caught in 2021 were released.

Table 4. Table 4. Kept and released fish in Red Lake from 2017–2021.

Year	Species	Kept	Released	Total Caught	Total Catch (%)	Released (%)
2017	BK	1	0	1	1.0	0.0
	LCT	45	26	71	67.6	36.6
	Unknown Fish	17	2	19	18.1	10.5
	Suckers	0	3	3	2.9	100.0
	Tui Chub	11	0	11	10.5	0.0
	Total	74	31	105		
2018	BK	1	3	4	10.3	75.0
	LCT	5	24	29	74.4	82.8
	Unknown Fish	0	4	4	10.3	100.0
	Suckers	2	0	2	5.1	0.0
	Total	8	31	39		
2019	BK	4	19	23	36.5	82.6
	LCT	16	23	39	61.9	59.0
	BN	0	1	1	1.6	100.0
	Total	20	43	63		
2020	BK	5	27	32	45.7	84.4
	LCT	11	26	37	52.9	70.3
	RT	1	0	1	1.4	0.0
	Total	17	53	70		
2021	BK	1	8	9	28.1	88.9
	LCT	9	3	12	37.5	25.0
	RT	0	1	1	3.1	100.0
	Unknown Fish	8	2	10	31.3	20.0
	Total	18	14	32		

In 2021, anglers reported being satisfied with their overall angling experience (**Table 5**). Anglers have reported a positive average angling experience in all 11 years, indicating that the fishery has consistently provided a satisfactory experience. Anglers were satisfied with the size of trout for the seventh consecutive year. The 1.31 “size” value in 2021 was identical to 2020 and tied for highest value on record. Anglers were satisfied with the number of fish caught for the ninth consecutive year. The 1.38 “number” value in 2021 was the highest value on record.

Table 5. Angler satisfaction response averages for the Red Lake fishery from 2011–2021.

Year	Overall Angling Experience	Size of Fish	Number of Fish
2011	0.28	-0.33	-0.14
2012	0.34	-0.42	-0.15
2013	0.73	-0.16	0.49
2014	0.54	-0.16	0.38
2015	0.50	0.52	0.50
2016	0.08	0.43	0.10
2017	1.06	0.87	0.93
2018	0.53	0.75	0.42
2019	0.64	1.06	0.82
2020	0.78	1.31	0.88
2021	0.84	1.31	1.38
Average	0.57	0.47	0.51

Discussion

Red Lake anglers have averaged almost three fish caught per day in the last 11 years. Overall catch in 2021 was the lowest in 11 years of surveys. Catch per hour and catch per angler values also experienced record lows. It is possible the lower overall catch per angler and catch per hour were a function of the poor air quality due to the Tamarack and Caldor Fires that burned nearby for much of the summer. The fires closed the El Dorado and Humboldt-Toiyabe forests, which closed legal access to fishing Red Lake and likely decreased angler usage.

Although CDFW stocked the same amount of LCT brood stock in 2021 as they did from 2018–2020, anglers reported landing no LCT \geq 20.0 in. LCT in 2021, which is a decrease from eight in 2019 and seven in 2020. Local CDFW game warden Erick Elliott (Pers. Comm.), has observed or spoken with/contacted many anglers from the central valley, driving up to Red Lake for the opportunity to catch large trout in past years (Pers. Comm.); however he has seen a decline in the number of anglers over the years. This decline may be attributed to the local fires and gas prices and led to the decrease in angler usage and number of fish caught.

In 2021, two anglers fished using multiple methods, both indicating using a boat/kayak for at least some of the time. These anglers also had the greatest catch per angler value for the first time in the last six years. It is not known the proportion of methods used. It is possible these anglers, when using a boat/kayak were able to reach areas of the lake where fish were congregating compared to the dam area, which is

where most anglers fish. Unfortunately for those anglers fishing the dam (east side of lake), this area gets high angler pressure which may cause the fish to move to areas of the lake where shore anglers were not willing to hike. Additionally, the west side of the lake, although harder to access, provides seasonal tributaries which contribute cooler water, and likely hold more fish over the summer season.

2021 was the second time in the last six years that the greatest number of fish caught were in the 12.0 in. – 13.9 in. size class (2016; n = 62). Most fish in this size class were LCT, which were likely the result of previous years' sub-catchable stockings. However, one of the fish caught in this size class was a BK, which have not been stocked since 2010. In 2018 and 2019, Red Lake spilled into Red Lake Creek. It is possible that during these years the BK migrated up into Red Lake and grew into the larger-size classes seen. It is likely the one RT reported in 2021 was a recent Red Lake Creek migrant and not part of an established RT population in Red Lake. However, it is the second consecutive year a RT was reported caught. Further surveys may clarify the significance of the recent RT catches.

Before 2013, anglers were unsatisfied with the number of trout they were catching. For nine consecutive years, anglers have been satisfied with the number of trout caught. It is possible that the decrease in fish stockings over the years has decreased competition for food, increased LCT and now BK survivability and growth rates in Red Lake. This likely contributed to LCT and BK in Red Lake attaining larger sizes, not previously available to anglers. The large number of angler-released fish (44%) may also contribute to larger size fish. During the last seven years, anglers have been satisfied with the size of trout caught. It is often difficult for a fishery to satisfy both high catch rates and large size of fish caught, but these ideals were achieved at Red Lake from 2015–2021.

Unlike 2018–2020, when anglers released most trout caught, 2021 anglers kept most fish caught. In 2021, 100% of the fish caught were between 12 and 20 in. Additionally, 2021 had the highest “size” and “number” satisfaction values on record. It is possible anglers were satisfied enough with the sizes and numbers of fish being caught that harvesting the majority caught would have the bonus of providing a meal.

Unlike creel surveys, ASB surveys have shown more LCT caught than BK. Historically, Red Lake was a BK fishery, but CDFW has not stocked BK into Red Lake since 2010. Red Lake has and continues to receive both sub-catchable LCT (when available) and Heenan Lake LCT broodstock. The continued stockings of LCT and discontinuation of BK stocking may explain the majority of fish caught being LCT. However, in 2021, 41% (n=9) of identified fish caught were BK, 37% (n=22) in 2020, and 37% (n=23) in 2019, all more than the 2016–2018 combined total of BK caught of 21. It is possible the last three winters' precipitation enhanced the spawning

opportunities for BK, not present before a five-year drought (2012–2016). It is also possible increased outflows gave BK in Red Lake Creek more incentive and/or opportunity to migrate into the lake. Given the large sizes of BK caught in 2021, fish were likely able to take advantage of a larger forage base in Red Lake when compared with Red Lake Creek.

The overall fishing experience for anglers has been positive at Red Lake every year surveyed. This is consistent with a roving creel survey conducted by CDFW in 2014 (Onanian 2014). Anglers are likely satisfied because they are catching a satisfying number of big fish. Several studies have shown that angler satisfaction is positively related to fishing success (Hicks et al. 1983; Graefe and Fedler 1986; McMichael and Kaya 1991; Spencer 1993; Mostegl 2007; Hunt et al. 2012).

The number of respondents in the 2021 survey was the second lowest on record and a decrease from the average. However, forest closures related to the wildfires and algae blooms may have deterred some anglers from fishing Red Lake. Ideally, the more respondents, the more feedback it provides CDFW regarding angler satisfaction. Angler feedback is useful for making more informed management decisions at popular recreational fisheries. Overall, it appears anglers who responded to the ASB in 2021 had a satisfactory time at Red Lake.

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Appendix 1.

Table 6. Stocking history at Red Lake since 2011.

Date	Species	Weight (lbs.)	Number	Size
7/18/2011	LCT	201	3015	Sub-catchable
5/18/2012	LCT	378	189	Super-catchable
5/22/2012	LCT	322	161	Super-catchable
6/4/2012	LCT	785	6672	Sub-catchable
6/5/2012	LCT	1,532	13328	Sub-catchable
5/13/2013	LCT	460	5014	Sub-catchable
5/21/2013	LCT	360	180	Super-catchable
5/22/2013	LCT	304	152	Super-catchable
5/29/2014	LCT	218	109	Super-catchable
6/5/2014	LCT	218	109	Super-catchable
6/23/2014	LCT	100	1600	Sub-catchable
5/19/2015	LCT	300	150	Super-catchable
5/20/2016	LCT	375	150	Super-catchable
5/31/2016	LCT	150	1005	Sub-catchable
6/4/2017	LCT	290	145	Super-catchable
6/6/2017	LCT	430	215	Super-catchable
6/13/2017	LCT	125	1000	Sub-catchable
5/24/2018	LCT	720	360	Super-catchable
6/15/2018	LCT	134.14	1100	Sub-catchable
5/31/2019	LCT	524	262	Super-catchable
6/5/2019	LCT	138.79	569	Sub-catchable
6/5/2019	LCT	40.78	369	Sub-catchable
6/5/2019	LCT	196	98	Super-catchable
5/27/2020	LCT	762.5	305	Super-catchable
6/3/2020	LCT	137.5	55	Super-catchable
6/11/2020	LCT	68	1008	Sub-catchable
5/25/2021	LCT	720	356	Super-catchable

Appendix 2.

Red Lake

The California Department of Fish and Wildlife is conducting an evaluation of the trout fishery on Red Lake. We request your help in this evaluation by providing the following information in this survey. Please use this form for **one** day's fishing on Red Lake by **one** angler only.

Date Fished: _____ # Hours Fished: _____
mm/dd/yyyy

Primary gear type used (check one):

- Bait Lure Fly

Primary method or location fished (check one):

- Shore or Wading Float Tube Boat

Enter the total number of fish caught by species and size class:

Size	brook trout		Lahontan cutthroat trout		Other:	
	Kept	Released	Kept	Released	Kept	Released
Less than 6"						
6"-7.9"						
8"-9.9"						
10"-11.9"						
12"-13.9"						
14"-15.9"						
16"-17.9"						
18"-19.9"						
20" and greater						

Please indicate your level of satisfaction with the following statements regarding your fishing experience today:

	Least satisfied		Neutral	Most satisfied	
Overall angling experience today:	-2	-1	0	+1	+2
Size of fish:	-2	-1	0	+1	+2
Number of fish:	-2	-1	0	+1	+2

Please use the back of this form for any additional comments. Thank you for taking the time to fill out this form.

