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

Red Lake, Alpine County

2011-2022 Angler Survey Box Analysis

Photo by D. Kaffer

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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.

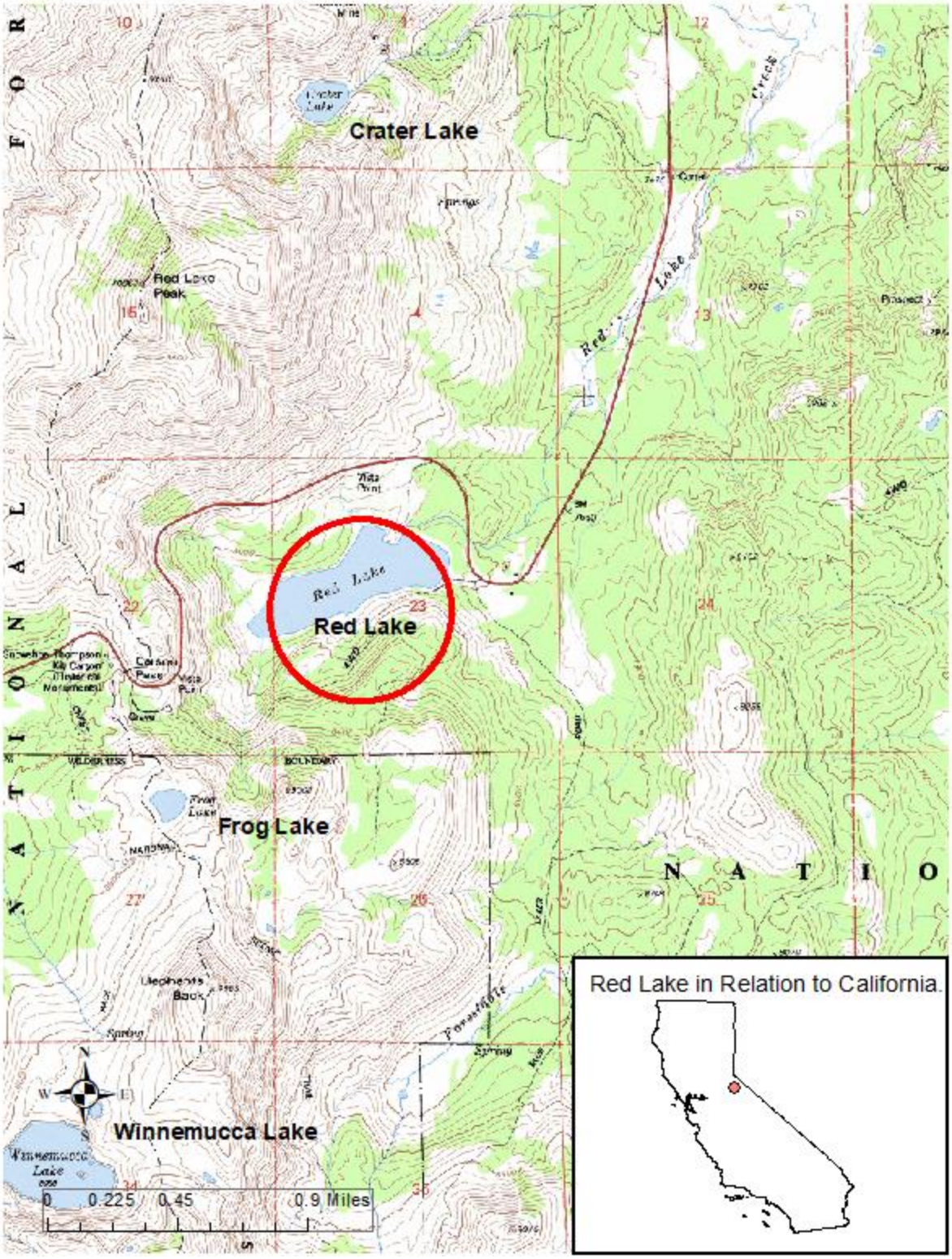

Figure 1. Red Lake, Alpine County.

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 (*Salvenlinus 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 2011–2022.

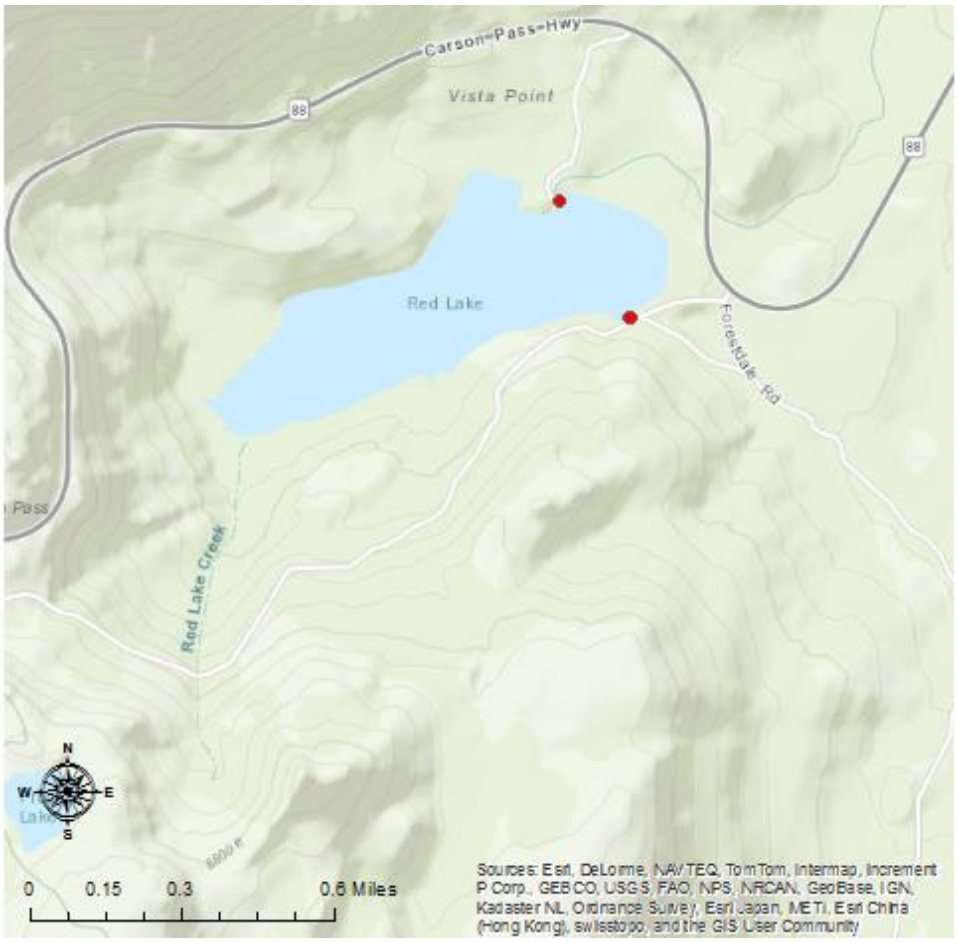

Figure 2. Red Lake Angler Survey Box (ASB) locations (Alpine County).

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 2022, Red Lake had 24 respondents, which was well below the 2011–2022 average of 44 (range: 19–116) (**Table 1**). It was also the fourth lowest angler total in the 2011–2022 survey period. Cumulatively, 2022 anglers landed 28 fish and fished for 82.5 hours, which is also below the 12-year average of 112 fish landed and 143.5 hours fished. The catch per angler (1.17) and catch per hour (0.34) in 2022 decreased from the 12-year average of 2.63 and 0.82, 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 2011−2022 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
2022	24	82.50	28	1.17	0.34	3.44
Average	44	143.47	112	2.63	0.82	3.44

Three anglers (12.5%) reported fishing from a float tube, which resulted in the best success in terms of catch per angler (3.33) in 2022 (**Table 2**). Eight boat anglers (33.3%) recorded the second highest rate in terms of catch per angler (1.50) in 2022.

Two anglers (8.3%) who did not record their fishing method had a 0.50 catch per angler value. Eleven shore anglers (45.8%) reported a 0.45 catch per angler value and was also the most popular method of fishing for a sixth consecutive year.

Table 2. Number of anglers and catch per angler based on angling method at Red Lake, 2017 - 2022. NA=Not Applicable

	2017		2018		2019	
Method	Number of Anglers (%)	Catch per Angler	Number of Anglers (%)	Catch per Angler	Number of Anglers (%)	Catch per Angler
Boat	1 (5.3%)	4.00	1 (4.8%)	7.00	5 (13.9%)	2.60
Float tube	NA	NA	3 (14.3%)	2.33	1 (2.8%)	0.00
Shore/Wading	14 (73.7%)	6.43	15 (71.4%)	1.53	27 (75.0%)	1.70
Multiple	1 (5.3%)	0.00	NA	NA	1 (2.8%)	2.00
Not recorded	3 (15.8%)	3.67	2 (9.5%)	1.00	2 (5.6%)	1.00
Total	19		21		36	
	2020		2021		2022	
Method	Number of Anglers (%)	Catch per Angler	Number of Anglers (%)	Catch per Angler	Number of Anglers (%)	Catch per Angler
Boat	7 (23.3%)	4.43	1 (5.0%)	1.00	8 (33.3%)	1.50
Float tube	1 (3.3%)	1.00	1 (5.0%)	0.00	3 (12.5%)	3.33
Shore/Wading	19 (63.3%)	1.79	14 (70.0%)	1.43	11 (45.8%)	0.45
Multiple	NA	NA	2 (10.0%)	3.00	NA	NA
Not recorded	3 (10.0%)	1.33	2 (10.0%)	2.50	2 (8.3%)	0.50
Total	30		20		24	

Anglers used bait, lures, and flies while fishing at Red Lake (**Table 3**). In 2022, fly anglers had the highest catch per angler value of 2.50. This is the second time in the last six years that fly anglers had the highest catch per angler values. In 2022, eleven anglers (45.8%) used lures to catch fish, which is the fourth straight year of the highest recorded angling method. Lure anglers also had the second highest catch rate (1.64 catch per angler) in 2022 for the second time in six years. Bait anglers reported the third highest identified catch rate in 2022 (0.50 catch per angler) for a second consecutive year, but still a large decrease from 2017 (9.14 catch per angler). It was also the lowest catch per angler value in the last six years for bait anglers. One angler who reported using multiple gear reported zero fish caught, which is the first time in six years no fish have been caught using multiple gear types.

Table 3. The frequency of anglers that used each angling method and their corresponding catch rates from 2017 - 2022.

Catch per Angler (Total Anglers)						
Method	**2017**	**2018**	**2019**	**2020**	**2021**	**2022**
Bait	9.14 (7)	2.50 (4)	1.70 (10)	2.25 (8)	1.00 (4)	0.50 (10)
Lure	5.00 (5)	2.33 (6)	2.38 (13)	3.00 (11)	2.00 (8)	1.64 (11)
Fly	NA	3.00 (2)	0.33 (3)	1.67 (6)	0.00 (2)	2.50 (2)
Multiple	2.67 (6)	1.00 (8)	1.40 (10)	1.75 (4)	2.00 (6)	0.00 (1)
Not recorded	0.00 (1)	1.00 (1)	NA	2.00 (1)	NA	NA
Total	**19**	**21**	**36**	**30**	**20**	**24**

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). In 2022, anglers caught the fewest fish (n = 28) on record (**Table 1** and **Figure 3**). In 2022, 86% of fish landed were LCT (n = 24), 11% were Mountain Whitefish (*Prosopium williamsoni*, MWF) (n = 3), and 4% were unknown fish (n = 1). It is the first year MWF were reported caught at the Red Lake ASB.

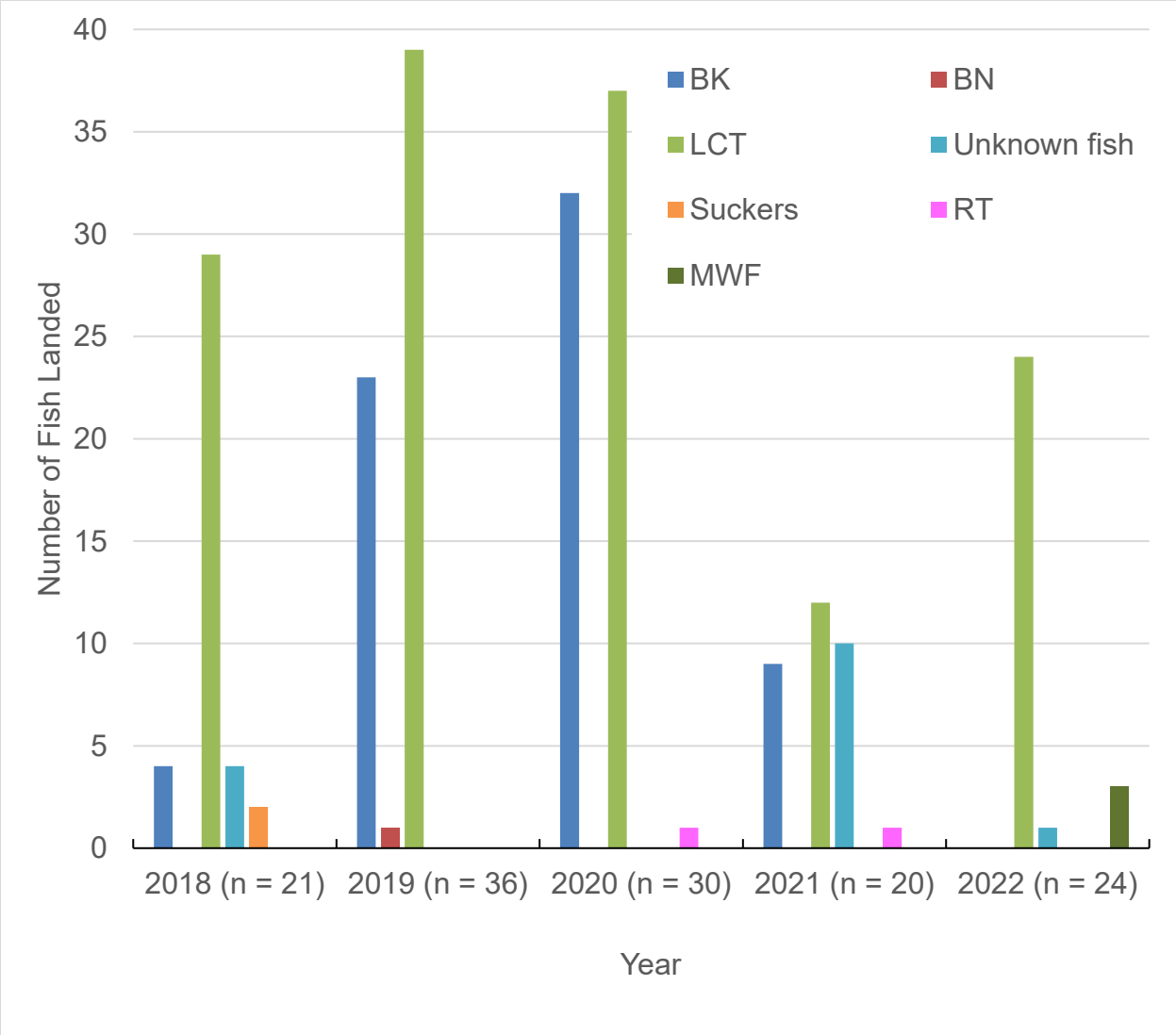

Figure 3. Number of each species of fish caught annually from Red Lake, 2018-2022 with number of anglers in parenthesis.

The number of landed salmonids that measured < 10 inches (in.) in total length was 3.3% (n = 2) in 2020, 0.0% in 2021, and 11.1% in 2022 (**Figure 4**). The number of landed salmonids that measured between 12 and 20 inches was 83% in 2020, 100% in 2021, and 74% in 2022. In 2020, 13% of the total catch (n = 8) were greater than 20 inches compared to 0% in 2021. In 2022, the number of fish greater than 20 in. increased up to 11%.

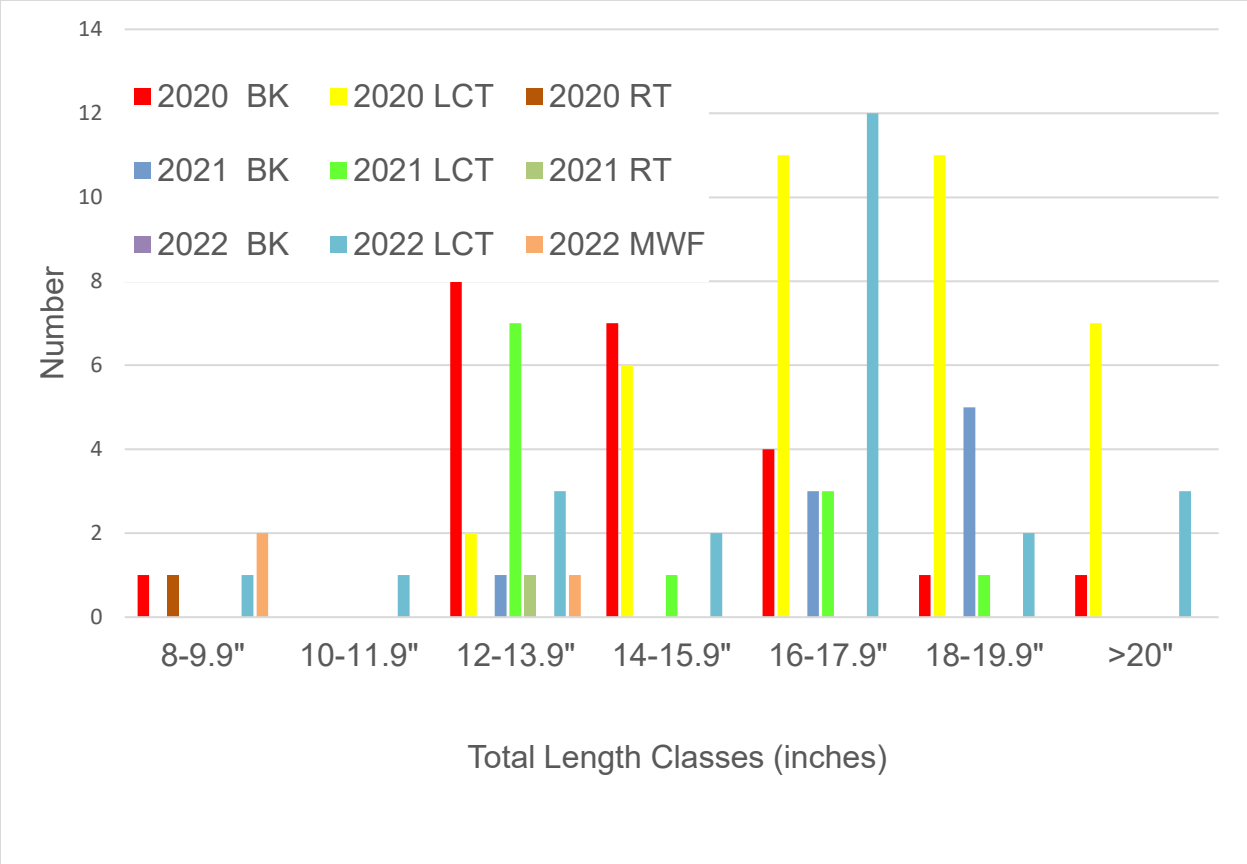

Figure 4. Frequency of identified salmonids in each size class that anglers reported landing at Red Lake, 2020–2022.

In 2018, anglers released 75% of BK, 83% of LCT, all unknown fish, and kept all suckers (**Table 4**). 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. In 2022, anglers released 54% of LCT and 100% of MWF. Zero percent of unknown fish caught in 2022 were released.

Table 4. Kept and released fish in Red Lake from 2018−2022.

Year	Species	Kept	Released	Total Caught	Total Catch (%)	Released (%)
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**		
2022	LCT	11	13	24	85.7	54.2
	MWF	2	1	3	10.7	100.0
	Unknown fish	1	0	1	3.5	0.0
	Total	**14**	**14**	**28**		

In 2022, anglers reported being satisfied with their overall angling experience (**Table 5**). Anglers have reported a positive average angling experience in all 12 years, indicating that the fishery has consistently provided a satisfactory experience. Anglers were satisfied with the size of trout for the eighth consecutive year. The 1.43 “size” value in 2022 was the highest value on record. Anglers were satisfied with the number of fish caught for the tenth consecutive year. The 0.79 “number” value in 2022 was the fifth highest value on record and above the 0.53 average.

Table 1. Angler satisfaction response averages for the Red Lake fishery from 2011−2022.

Year	Overall Angling Experience	Size of the 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
2022	0.95	1.43	0.79
Average	0.61	0.55	0.53

Discussion

Red Lake anglers have averaged over two and a half fish caught per day in the last 12 years. Overall catch in 2022 was the lowest in 12 years of surveys. Catch per hour and catch per angler values also experienced record lows. It is possible that the lack of any sub-catchable LCT stockings in 2021 and 2022 contributed to the low catch values.

Although CDFW stocked the same amount of LCT brood stock in 2022 as they did from 2018−2021, anglers reported landing only three LCT ≥ 20.0 in. in 2022, which is a decrease from eight in 2019 and seven in 2020, but an increase from zero in 2021. In prior years, many of the LCT broodstock would immediately leave the lake via the spillway, into Red Lake Creek. Once in Red Lake Creek, they were easier targets for anglers and snagging techniques. The last few years CDFW has installed a weir prior to broodstock stockings. This likely has decreased the access for anglers to catch these larger fish and gives the fish a better chance of survival after being stocked.

In 2022, three anglers fished using a float tube and had the greatest catch per angler value for the first time in the last six years. It is possible these anglers 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.

2022 was the second time in the last six years that the greatest number of fish caught were in the 16.0 in. – 17.9 in. size class (2020; n = 15). All fish in this size class were LCT, which were likely the result of previous years' sub-catchable or brood stock stockings.

MWF were reported caught for the first time in seven years. In recent years, Red Lake spilled into Red Lake Creek. It is possible that during these years the MWF migrated up into Red Lake. No RT were reported caught in 2022 and 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. Further surveys may clarify the significance of the recent RT and MWF catches.

Before 2013, anglers were unsatisfied with the number of fish they were catching. For 10 consecutive years, anglers have been satisfied with the number of trout caught. It is possible that anglers in 2022 were simply satisfied in fishing in a beautiful setting, with no wildfires, and post-COVID era since the 2022 catch per angler and catch per hour values were the lowest on record.

For the eighth straight year, anglers were satisfied with the size of fish they were catching. It is possible that the decrease in fish stockings the last two years has decreased competition for food, increased LCT survivability and growth rates in Red Lake. This likely contributed to LCT in Red Lake attaining larger sizes, not previously available to anglers. The large number of angler-released fish (50%) may also contribute to larger size fish. 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 2015–2022.

Similar to 2018−2020, in 2022, anglers released most fish caught. 2022 had the lowest catch per angler and catch per hour values on record. It is possible anglers may have wanted to catch more fish before harvesting any.

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. No BK were reported caught in 2022, which is odd since in 2021, 41% (n=9) of identified fish caught were BK, 37% (n=22) in 2020, and 37% (n=23) in 2019. It is possible the below average angler count combined with the low catch rates contributed to the reduction of BK collected.

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 2022 survey was below the average, but an increase from 2021. In 2021, 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 2022 had a satisfactory time at Red Lake.

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Appendix 1.

Table 2. 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	63	1008	Sub-catchable
5/25/2021	LCT	720	356	Super-catchable
5/20/2022	LCT	274	137	Super-catchable
5/27/2022	LCT	448	224	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.