

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

Frog Lake, Winnemucca Lake, Round Top Lake, and Fourth of July Lake,
Alpine County

2018 and 2019 Angler Survey Box Analysis



Frog Lake



Round Top Lake



Winnemucca Lake



Fourth of July Lake

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Introduction

Environmental Setting

The Carson Pass Trail incorporates Frog, Winnemucca, Round Top, and Fourth of July Lakes in the Mokelumne Wilderness of the Sierra Nevada mountain range in Alpine County (Lockhart and Mussulman 2016). Three different watersheds are represented between the four lakes. Frog Lake is within the Carson River watershed. Winnemucca and Round Top Lakes are within the South Fork American River watershed, while Fourth of July Lake is within the Mokelumne River watershed. Much of the land surrounding the lakes on the Carson Pass trail is of montane and alpine habitat. Eldorado National Forest (ENF) manages the land in the Carson Pass trail area (Lockhart and Mussulman 2016; Chellman 2018). Due to the popularity of the Carson Pass Trail, ENF has placed restrictions on the Carson Pass Management Area to ensure opportunities for solitude, a primitive recreational experience, and to protect popular camping destinations from overcrowding and heavy impacts (ENF Website). The Carson Pass Trailhead is accessed off Highway 88 at the top of the Carson Pass.

Frog Lake

Frog Lake is a six-acre lake in Alpine County located at 38° 41' 16.06 N 119° 59' 10.03 W situated at 8,865 feet above mean sea level (**Figure 1**). The shoreline is a mix of rocks, sand, and conifer forest. The lake bottom appears to be primarily composed of mud and various-sized rock substrate. When Frog Lake spills, water flows into nearby Red Lake and the West Carson River. The lake receives water from rain and snowmelt runoff from the immediate area. California Department of Fish and Wildlife (CDFW) historically stocked Frog Lake with fingerling-size Brook Trout (*Salvelinus fontinalis*; BK), Rainbow Trout (*Oncorhynchus mykiss*; RT), and Lahontan Cutthroat Trout (*Oncorhynchus clarkii henshawi*; LCT) with the last recorded stocking of RT in 2018. Prior to stocking in 2018, the most recent stocking at Frog Lake had been an allotment of RT in 1999. CDFW currently manages Frog Lake as a “put and grow” fishery. Frog Lake is open all year for fishing and other recreational opportunities, but has limited access during the winter season when there is snow.

Winnemucca Lake

Winnemucca Lake is a 54-acre lake in Alpine County located at 38° 40' 11.56 N 119° 59' 36.46 W situated at 8,995 feet above mean sea level (**Figure 1**). The shoreline is a mix of rocks and conifer forest. The lake bottom appears to be primarily composed of mud and various-sized rock substrate. When Winnemucca Lake spills, water drains into nearby Woods Lake and the South Fork American River watershed. The lake receives water from rain and snowmelt runoff from the immediate area. CDFW historically stocked Winnemucca Lake with fingerling-size BK and RT with the last

recorded stocking of RT in 2000. CDFW currently manages Winnemucca Lake as a self-sustaining BK and RT fishery. Winnemucca Lake is open all year for fishing and other recreational opportunities, but has limited access during the winter season when there is snow.

Round Top Lake

Round Top Lake is a six-acre lake in Alpine County located at 38° 40' 01.84 N 120° 00' 44.46 W situated at 9,358 feet above mean sea level (**Figure 1**). The shoreline is a mix of rocks, willows, and conifer forest. The lake bottom appears to be primarily composed of mud and various-sized rock substrate. When Round Top Lake spills, water drains into nearby Woods Lake and the South Fork American River watershed. The lake receives water from rain and snowmelt runoff from the immediate area. CDFW historically stocked Round Top Lake with fingerling-size Golden Trout (*Oncorhynchus mykiss aguabonita*; GT), RT, and LCT, with the last recorded stocking of RT in 2018. Prior to stocking in 2018, the most recent stocking at Round Top Lake had been an allotment of LCT in 2006. CDFW currently manages Round Top Lake as a “put and grow” fishery. Round Top Lake is open all year for fishing and other recreational opportunities, but has limited access during the winter season when there is snow.

Fourth of July Lake

Fourth of July Lake is a 15-acre lake in Alpine County located at 38° 38' 58.28 N 120° 01' 02.37 W situated at 8,172 feet above mean sea level (**Figure 1**). The shoreline is a mix of rocks, willows, and conifer forest. The lake bottom appears to be primarily composed of mud and various-sized rock substrate. When Fourth of July spills, water flows into Summit City Creek, eventually contributing to the Mokelumne River. The lake receives water from rain and snowmelt runoff from the immediate area. CDFW historically stocked Fourth of July Lake with fingerling-size BK, RT, LCT, and Kokanee Salmon (*Oncorhynchus nerka*; KS) with the last recorded stocking of KS in 1982. CDFW currently manages Fourth of July Lake as a self-sustaining BK and RT fishery. Fourth of July Lake is open all year for fishing and other recreational opportunities, but has limited access during the winter season when there is snow.

In 2018, CDFW installed an angler survey box (ASB) at the Carson Pass trailhead, located along the Pacific Crest Trail, to evaluate the aforementioned fisheries (**Figure 1**). Anglers voluntarily complete a survey sheet after their fishing trip, and deposit it in the box. CDFW uses these data to assess angler satisfaction, species composition/sizes, and general angler statistics at the identified lakes. This report covers data collected from Frog, Winnemucca, Round Top, and Fourth of July's ASB in 2018 and 2019.

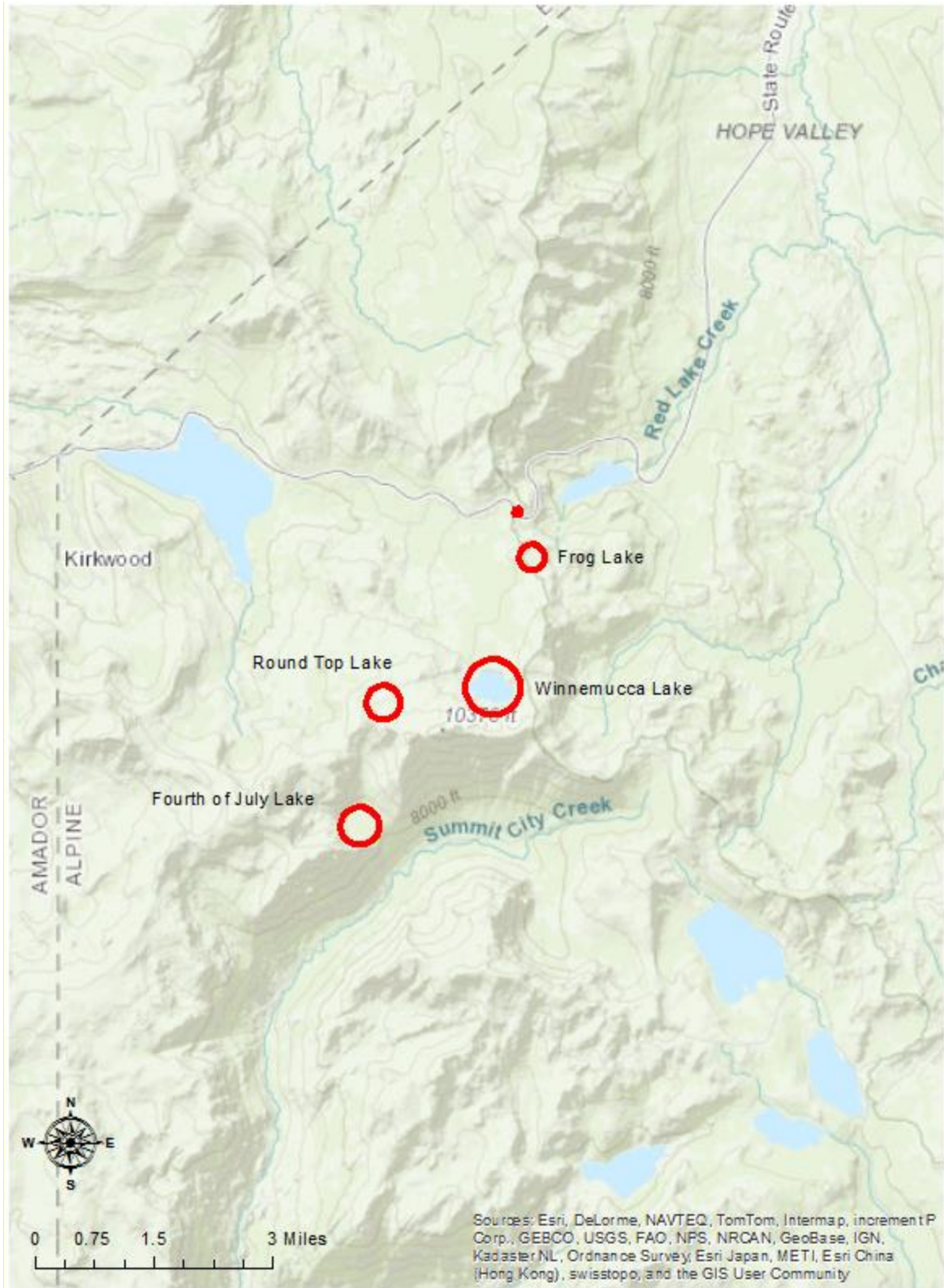


Figure 1. Frog Lake, Winnemucca Lake, Round Top Lake, and Fourth of July Lake (circled in red). Location of the Angler Survey Box is indicated by the red dot.

Methods

The survey asked anglers for information regarding lake fished, type of gear used, and the number of landed fish. This information was used to calculate catch per angler. Anglers were also asked the size and species of landed fish and whether they kept or released their catch. Lastly, anglers were 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 pertained to the level of satisfaction with their overall angling experience, and with the size and number of fish. Anglers were able to use the back of the survey form to include additional comments (**Appendix 1**).

Results

In 2019, 25 anglers responded to the survey, compared to 14 in 2018 (**Table 1**). In 2019, 69 fish were caught between the four lakes, compared to 28 in 2018. In 2019, the greatest number of fish were caught at Frog Lake (n = 36) compared to Fourth of July (n = 14) in 2018. In 2019, Fourth of July Lake had the highest catch per angler average (20.0) for a second consecutive year (3.5; 2018).

Table 1. Average catch statistics recorded from the 2018 and 2019 Angler Survey Box for Frog, Winnemucca, Round Top, and Fourth of July Lakes.

Lake	2018			2019		
	Fish Landed	Total Anglers	Catch per Angler	Fish Landed	Total Anglers	Catch per Angler
Frog	2	4	0.5	36	12	3.0
Winnemucca	12	5	2.4	13	11	1.2
Round Top	0	1	0.0	0	1	0.0
Fourth of July	14	4	3.5	20	1	20.0
Total	28	14		69	25	

Anglers used either bait, lures, or flies while fishing these four lakes (**Table 2**). In 2019, one fly angler that fished Fourth of July Lake had a 20.0 catch per angler and the highest catch per angler average of the four lakes. In 2019, five anglers at Frog Lake used multiple gear types and had the second highest catch rate per angler (3.8). In 2019, bait anglers at Winnemucca Lake had the highest catch per angler average (2.7) for any specific gear type for a second consecutive year (3.0; 2018) at that lake. In both 2018 and 2019, only one angler reported fishing at Round Top Lake, and in both years the reporting angler caught zero fish.

Table 2. The frequency of anglers that used each angling method and their corresponding catch rates from 2018 and 2019.

	Frog Lake		Winnemucca Lake		Round Top Lake		Fourth of July Lake	
	Number of Anglers	Catch per Angler	Number of Anglers	Catch per Angler	Number of Anglers	Catch per Angler	Number of Anglers	Catch per Angler
2018								
Bait	0	NA	2	3.0	1	0.0	0	NA
Lure	3	0.0	1	2.0	0	NA	0	NA
Fly	0	NA	1	2.0	0	NA	4	3.5
Not Recorded	1	2.0	1	2.0	0	NA	0	NA
Total	4		5		1		4	
2019								
Bait	1	3.0	3	2.7	0	NA	0	NA
Lure	6	2.33	2	0.5	1	0	0	NA
Fly	0	NA	1	0.0	0	NA	1	20.0
Multiple	5	3.8	5	0.8	0	NA	0	NA
Total	12		11		1		1	

In 2019, all of the landed fish ($n = 69$) measured at Frog, Winnemucca, and Fourth of July Lake were less than 16.0 inches (in.) in total length (**Figure 2**). In 2019, the RT modal length class at Frog Lake was 8.0 – 9.9 in. ($n = 12$), while one BK caught was in the 6.0 – 7.9 in. length class. The BK modal length class at Winnemucca Lake was 6.0 – 7.9 in. ($n = 9$). The modal length class for BK at Fourth of July Lake was the 10.0 – 11.9 in. length class ($n = 20$).

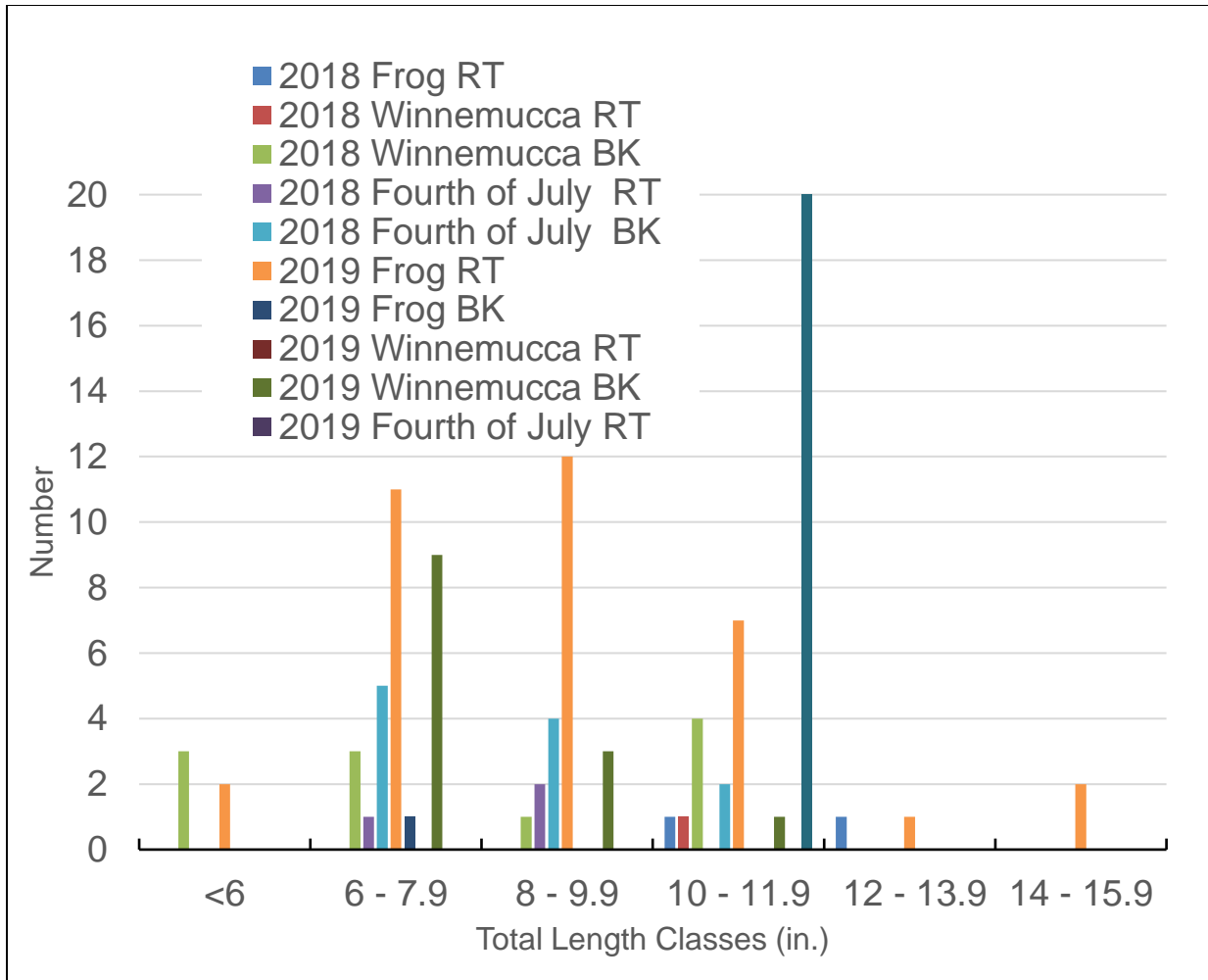


Figure 2. Frequency of fish in each length class that anglers reported landing at Frog, Winnemucca, and Fourth of July Lakes in 2018 and 2019.

Of all fish landed in 2019, 60 (87.0%) were released, similar to 2018, when 23; (82.1%) were released. In 2019, 5.7% of all RT were kept, compared to 66.7% in 2018. In 2019 20.6% of all BK were kept compared to 4.5% in 2018 (**Table 3**).

Table 3. Kept and released fish from Frog, Winnemucca, and Fourth of July Lakes in 2018 and 2019.

2018 Species	Kept			Released			Total Percent	
	Lake			Lake			Kept	Released
	Frog	Winnemucca	Fourth of July	Frog	Winnemucca	Fourth of July		
RT	0	1	3	2	0	0	66.7%	33.3%
BK	0	1	0	0	10	11	4.5%	95.5%
Total	0	2	3	2	10	11		

2019 Species	Kept			Released			Total Percent	
	Lake			Lake			Kept	Released
	Frog	Winnemucca	Fourth of July	Frog	Winnemucca	Fourth of July		
RT	2	0	0	33	0	0	5.7%	94.3%
BK	0	7	0	1	6	20	20.6%	79.4%
Total	2	7	0	34	6	20		

In 2019, anglers had a positive average response to their overall fishing experience at Frog, Winnemucca, and Round Top Lakes for a second consecutive year with the highest value (2.00) at Round Top Lake (**Table 4**). The one angler who fished Fourth of July Lake in 2019 did not record their overall angling experience. Average satisfaction with size and number of fish were also positive for Frog and Winnemucca for a second consecutive year. Since no fish were reported caught from Round Top Lake, size and number satisfaction averages could not be calculated. The one angler who caught 20 BK at Fourth of July Lake in 2019 did not report any satisfaction values.

Table 4. Angler satisfaction response averages for Frog, Winnemucca, Round Top, and Fourth of July Lakes in 2018 and 2019. No average size of fish and number of fish were calculated for Round Top Lake due to no fish being caught in 2018. No satisfaction values were recorded for Fourth of July Lake in 2019.

2018			
Lake	Overall angling experience	Size of fish	Number of fish
Frog	2.00	1.00	1.00
Winnemucca	1.80	1.00	1.40
Round Top	1.00	NA	NA
Fourth of July	1.00	0.50	1.25

2019			
Lake	Overall angling experience	Size of fish	Number of fish
Frog	1.17	0.90	0.90
Winnemucca	0.91	1.20	1.00
Round Top	2.00	NA	NA
Fourth of July	NA	NA	NA

Discussion

The 2019 ASB results indicate anglers caught a various amount of fish per day, except at Round Top Lake where no fish were caught for a second consecutive year. CDFW conducted an angling survey in 2019 in which no fish were caught at Round Top Lake (Ewing 2019a). During the survey, CDFW noticed that a large part of the lake was very shallow, which may freeze solid during the winter, making overwintering for RT difficult. A gill net survey by CDFW in 2012 measured a depth of 2.1 meters in Round Top Lake at the ending spot of the 36 meter-long net (High Mountain Lakes [HML] Database). CDFW will likely reduce the RT allotment in 2020, given the reduced habitat and resources available for RT during the winter.

In 2019, the greatest number of fish were caught at Frog Lake ($n = 36$), while Fourth of July had the highest catch per angler value (20.0) for a second consecutive year. It is possible that the greatest number of fish were caught from Frog Lake due to large numbers of anglers who fished there in 2019 and the close proximity to the trailhead relative to the other three lakes. Fourth of July has not had a fish stocking since 1982, when KS were stocked. The last years RT and BK were stocked were 1979 and 1964, respectively. Between the BK and RT reported caught in 2018 and 2019 and an age and growth study by CDFW in 2018 (Ewing 2018) for BK in Fourth of July, it suggests that Fourth of July Lake has self-sustaining populations of RT and BK (HML Database). No recent observations of LCT or KS suggests these species are no longer present in Fourth of July Lake.

In 2019, Winnemucca Lake had the third highest number of trout caught ($n = 13$) and third highest catch per angler average. Winnemucca Lake was historically stocked with BK, LCT, and RT. The lake now appears to mainly have a self-sustaining BK population, however, RT are still present at a low density (Ewing 2019b). Frog and Round Top Lakes were recently added to the statewide stocking allotment, receiving aerial fingerling stockings in 2017 and 2018. Subsequently, the number of fish caught at Frog Lake increased from 2 in 2018 to 36 in 2019. This is an encouraging sign for Frog Lake's fishery. CDFW will likely maintain the same stocking allotment at Frog Lake due to the recent ASB results. As previously mentioned above, Round Top appears to have poor catch rates. CDFW will attempt to reduce the allotment in 2020 for reasons mentioned earlier and continue to monitor the fishery in order to increase angler success.

In 2019, anglers using flies had the highest catch per angler at all three lakes in which fish were caught. Fly angling was also the only identified gear used at Fourth of July Lake for a second consecutive year. In 2019, multiple gear anglers at Frog Lake had the second highest catch per angler value out of the four lakes. The hike to Frog Lake from the Carson Pass trailhead is approximately one mile. This hike may attract

anglers using the more passive, bait angling method, as well as the more active lure and fly method. In 2018, 79% of all fish caught from all four lakes were BK. However, in 2019, 51% of all fish caught were RT and 49% were BK. The large increase of stocked RT caught at Frog Lake in 2019 shifted the fish species composition from 2018. The large percentage of RT caught at Frog Lake also suggests a successful put and grow fishery. Future years' of ASB surveys will likely reflect a more accurate description of the RT fishery for both Frog and Round Top Lakes which will assist with management changes (i.e. adjusted allotments) (**Appendix 1**).

The greatest number of fish caught from Fourth of July, Frog, and Winnemucca Lakes were in the 10.0 - 11.9 in. length class, indicating growth from the fingerling-size stockings. Similar to 2018, the majority of BK caught in 2019 were under 10.0 in., which may explain why anglers released 95.5% of their catch in 2018 and 79.4% in 2019. In 2018, approximately 67% of RT caught were kept, but decreased to 5.7% in 2019. It is possible that anglers released so many RT because most were under 10.0 in. and anglers may have wanted an RT in a greater length class. Winnemucca and Fourth of July Lakes are self-sustaining fisheries, with no supplemental stockings, and only effective if post-release mortality rates are low (Muoneke and Childress 1994; Noble and Jones 1999; Bartholomew and Bohnsack 2005). All fish caught in 2018, and 97% of fish caught in 2019, were less than 14.0 inches. This may suggest a stunted population in the self-sustaining Winnemucca and Fourth of July Lakes and that Frog and Round Top Lakes may need more time for stocked fish to grow. The trout may be limited in their growth due to population density and biomass in Winnemucca and Fourth of July Lakes, which vary with landscape variables such as surficial geology, catchment area, and land use (Blann 2000, 2004; Nerbonne and Vondracek 2001; Zimmerman et al. 2003). It appears that anglers are catching larger-sized trout from Frog Lake. The fingerling-sized stocked fish are able to overwinter at Frog Lake and grow to nice, catchable-sized fish.

The primary objective when managing recreational fisheries is often to improve the quality of fishing or optimize human benefit (Pollock et al. 1994; Weithman 1999). In 2019, anglers were satisfied with their overall fishing experience. Anglers were also satisfied with the size and number of fish they caught at all the lakes surveyed, except Round Top, which had no fish caught for a second consecutive year. The probability of an increase in angler satisfaction rating was positively related to the mean length and number of fish caught (McCormick and Porter 2014). Future ASB data will continue to help inform trends in angler satisfaction related to the size and number of landed trout. Angler trip satisfaction can be influenced by factors other than fishing success (McCormick and Porter 2014). The size and number of trout caught at Frog, Winnemucca, and Fourth of July Lakes may have played a large role in the positive overall fishing experience value reported by anglers. It is also possible that the overall

fishing experience success of some anglers may have been due less to the fishing itself, and more due to outside factors, such as weather, fishing access, lack of crowds, and scenery.

It is possible many anglers are not aware of the recent stocking additions along the Carson Pass Trail, however the number of respondents for Frog Lake and Winnemucca Lake more than doubled from 2018 to 2019. Having more respondents in 2019 provided CDFW with a better representation of the fishery than the number collected in the inaugural year. Ideally, the more respondents, the more feedback it provides CDFW on angler success at the fisheries. It is essential CDFW maintain the trend of increasing angler participation in the ASB survey. The goal of increasing angler participation may be accomplished by personal communication around Alpine County. Anglers are likely getting reacquainted with the fisheries and ASB program, especially considering the recent stockings of Frog Lake and Round Top Lake and since 2018 was the first year of an ASB at the Carson Pass.

Recommendations

- When possible, CDFW should continue to encourage anglers to fill out the ASB forms.
- Collect a minimum of five years' worth of ASB data to look at fishery trends over time. Data will help CDFW gather a more accurate information on the Carson Pass Trail fishery.
- Continue to stock Frog and Round Top Lake for the next five years, at least.
- Reduce the allotment at Round Top Lake.

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Appendix 1.

The California Department of Fish and Wildlife is conducting an evaluation of the fisheries at Frog, Winnemucca, Round Top, and Fourth of July Lakes. We request your help in this evaluation by providing the following information in this survey. Please use this form for one day's fishing at the specific lake by one angler only.

Circle the Lake fished at:

Frog Winnemucca Round Top Fourth of July

Date Fished: _____
mm/dd/yyyy

Primary gear type used (check one):
 Lure Bait Fly

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

Size	Rainbow trout		Brook trout	
	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"				
20-21.9"				
22"-23.9"				
24"-25.9"				
>26"				

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

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

Please use the back of this form for any additional comments. Thank you for helping us manage and protect California's fisheries.

