

State of California
The Resources Agency
Department of Fish and Wildlife

East Fork Carson River
2022 Angler Survey Box Analysis



Photo Credit L. Weirach

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Introduction

During the 2022 fishing season, the California Department of Fish and Wildlife (CDFW) conducted an angler survey box (ASB) evaluation on the East Fork Carson River (EFCR) in Alpine County. The EFCR is an east-slope draining river originating in the Carson-Iceberg Wilderness in California, then flowing northward into Nevada. CDFW manages the EFCR as both a “put and take” trout water and a California Fish and Game Commission designated Wild Trout Water. The designated Wild Trout Water on the EFCR is located upstream from the confluence with Wolf Creek, excluding tributaries.

Wild Trout waters are defined as waters: (1) open to public angling; (2) able to support, with appropriate angling regulations, wild trout populations of sufficient magnitude to provide satisfactory trout catches in terms of number or size of fish; and (3) domestic strains of catchable-size trout shall not be planted but suitable hatchery-produced wild or semi-wild strains may be planted in designated waters, but only if necessary to supplement natural reproduction (CDFW website). This report pertains to the recently designated “put and take” fishery from Hangman’s Bridge to the Nevada State Line. “Put and take” trout waters are defined as lakes or streams which receive heavy fishing pressure and are unable to support self-sustaining trout populations. These waters are commonly referred to as catchable fisheries and provide the public with the opportunity to harvest their catch. Prior to April 2021, the section between Hangman’s Bridge and the Nevada State Line was a Wild Trout Water (**Figure 1**).

CDFW raises catchable-size Rainbow Trout (RT) (*Oncorhynchus mykiss*) at CDFW’s American River Hatchery, which are then stocked upstream of Hangman’s Bridge of the EFCR. Lahontan Cutthroat Trout (LCT) (*Oncorhynchus clarkii henshawi*) broodstock from Heenan Lake are also stocked in the same location. Historically, LCT and Mountain Whitefish (MWF) (*Prosopium williamsoni*), were the native game fish found in the EFCR. Due to previous CDFW stocking events, Brook Trout (BK) (*Salvelinus fontinalis*), and Brown Trout (BN) (*Salmo trutta*), can also be found in the EFCR.

For the 2022 EFCR ASB survey and prior years, CDFW staff gathered data from anglers to determine angling method, catch per angler, catch per hour, species, lengths of fish caught, and angler satisfaction values. This information, combined with historical data, will assist the CDFW with future management decisions.

Methods

Participating anglers complete a voluntary survey form about their fishing. The survey asks anglers for information regarding hours fished and the number of landed

fish. Anglers are also asked the size and species of the 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 in total length (inches), and number of fish caught. The back of the survey form was reserved for anglers who had any additional comments (**Appendix 1**). Due to the regulations being changed on the last Saturday in April 2021, CDFW is including angler data collected from January 1 – April 23, 2021 along with the 2020 calendar year.

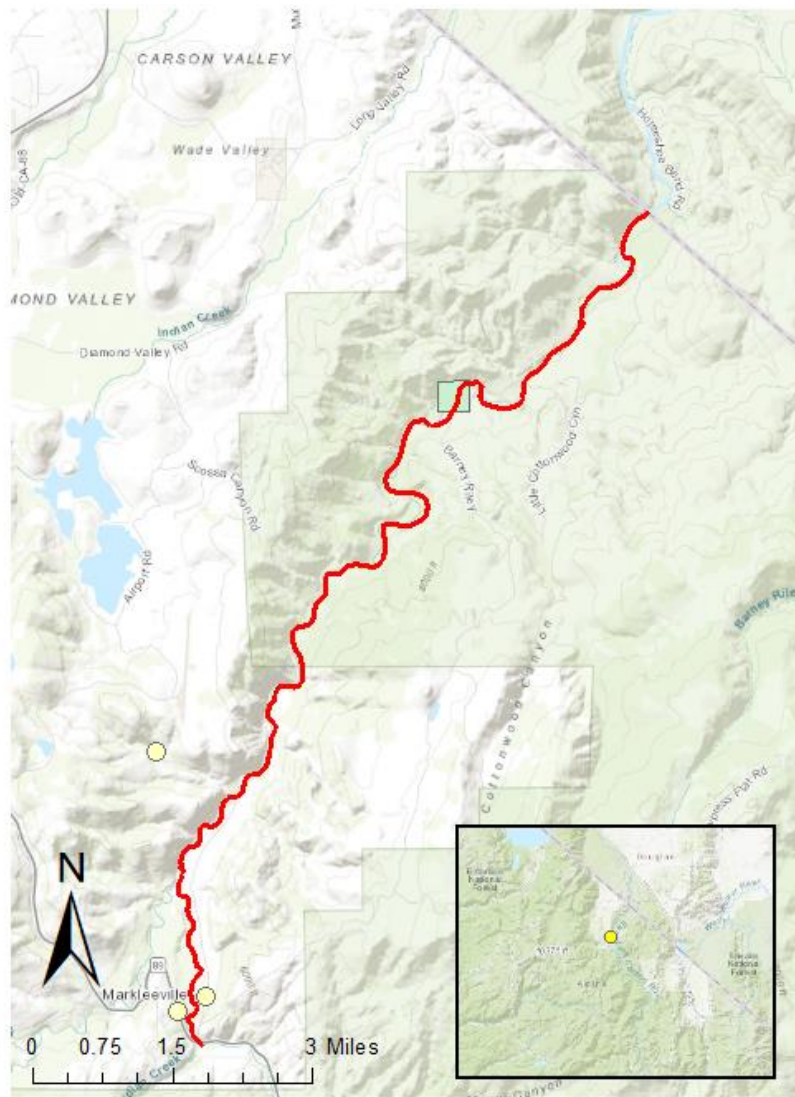


Figure 1. East Fork Carson River from Hangman’s Bridge to Nevada State Line (red line) Alpine County. Location of Angler Survey Boxes are indicated by the pale-yellow dots in the main map. The EFCR is also indicated by the yellow dot in the smaller data frame in relation to the California/Nevada State line as well as Lake Tahoe.

Results

In 2022, the EFCR ASB had 74 respondents, which was well below the 1993–2022 average of 187 (range: 18–517) (**Table 1**). It was also the fourth lowest angler total in the 1993–2022 survey period. Cumulatively, 2022 anglers landed 325 fish and fished for 314 hours, which is also below the 26–year average of 724 fish landed and 790 hours fished. However, the catch per angler (4.39) and catch per hour (1.04) in 2022 were above the cumulative average of 3.76 and 0.91, respectively, over the 26–year period (**Table 1**).

Table 1. Collection of average effort and catch statistics recorded from the ASB 1993 - 2000, 2003 - 2011, and 2013 - 2022 on the East Carson River below Hangman's Bridge.

Year	Respondents	Hours Fished	Fish Landed	Catch per Angler	Catch per Hour
1993	107	452.5	417	3.90	0.92
1994	249	935.0	504	2.02	0.54
1995	116	512.0	370	3.19	0.72
1996	517	2278.5	1828	3.54	0.80
1997	472	2141.0	1650	3.50	0.77
1998	234	970.0	853	3.65	0.88
1999	340	1540.0	1318	3.88	0.86
2000	466	1856.8	2288	4.91	1.23
2003	181	734.0	636	3.51	0.87
2004	151	606.5	521	3.45	0.86
2005	176	711.5	645	3.66	0.91
2006	149	609.3	561	3.77	0.92
2007	196	818.5	1100	5.61	1.34
2008	226	1008.0	1291	5.71	1.28
2009	240	1099.0	1246	5.19	1.13
2010	163	749.5	498	3.06	0.66
2011	132	551.5	384	2.91	0.70
2014	18	50.0	27	1.50	0.54
2015	63	209.5	194	3.08	0.93
2016	86	348.6	291	3.38	0.83
2017	106	379.2	255	2.41	0.67
2018	155	655.3	698	4.50	1.07
2019	89	360.5	407	4.57	1.13
2020 - 4/23/2021	132	568.75	390	2.95	0.69
4/24/2021 - 12/31/2021	23	93.0	126	5.48	1.35
2022	74	314.0	325	4.39	1.04
Average	187	790.5	724	3.76	0.91

The species composition has not varied much over the survey years, including 2022, in which RT made up almost 92% of the fish species collected (**Figure 2**).

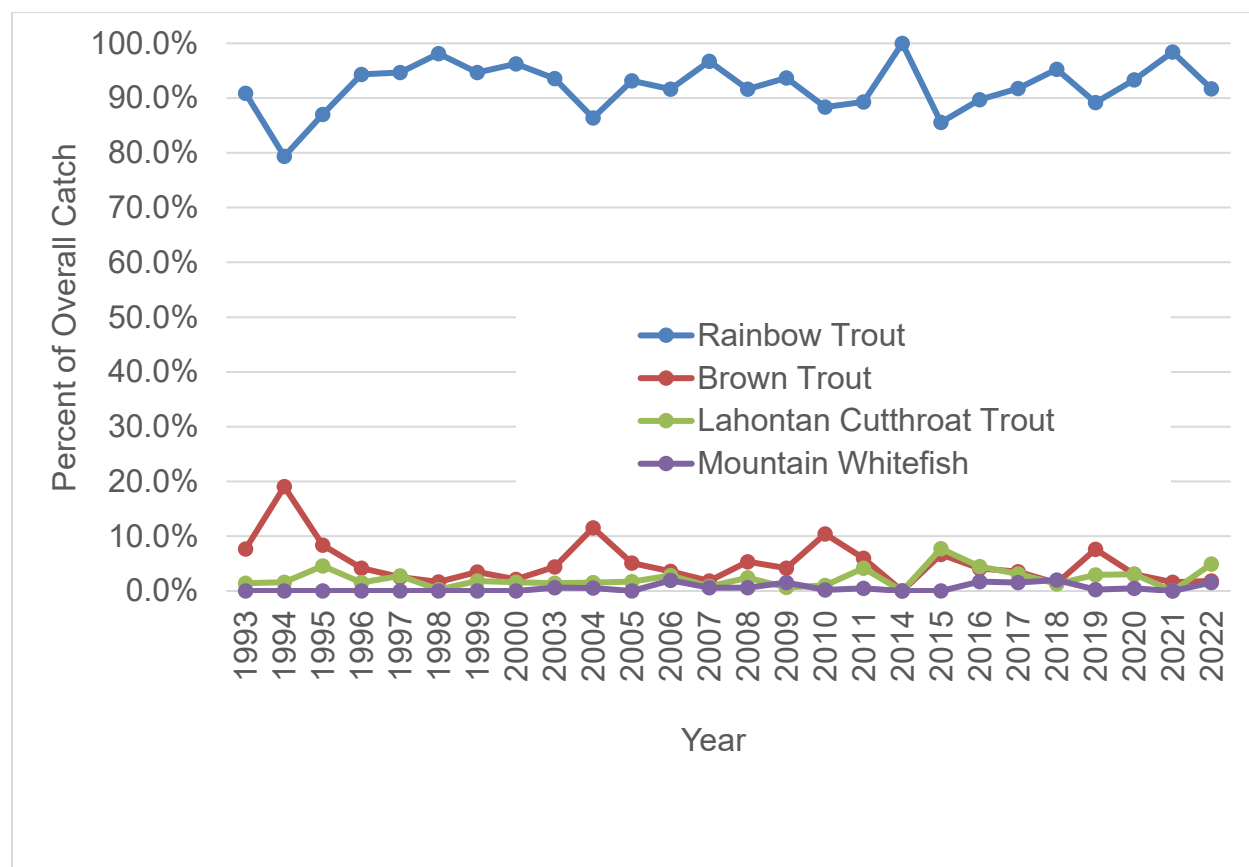


Figure 2. Fish species composition of reported fish species caught in the East Fork Carson River from 1993–2022.

The number of landed RT in 2022 was 298, which is a 56% decrease from the 1993 – 2022 average of 677 RT (**Figure 3**).

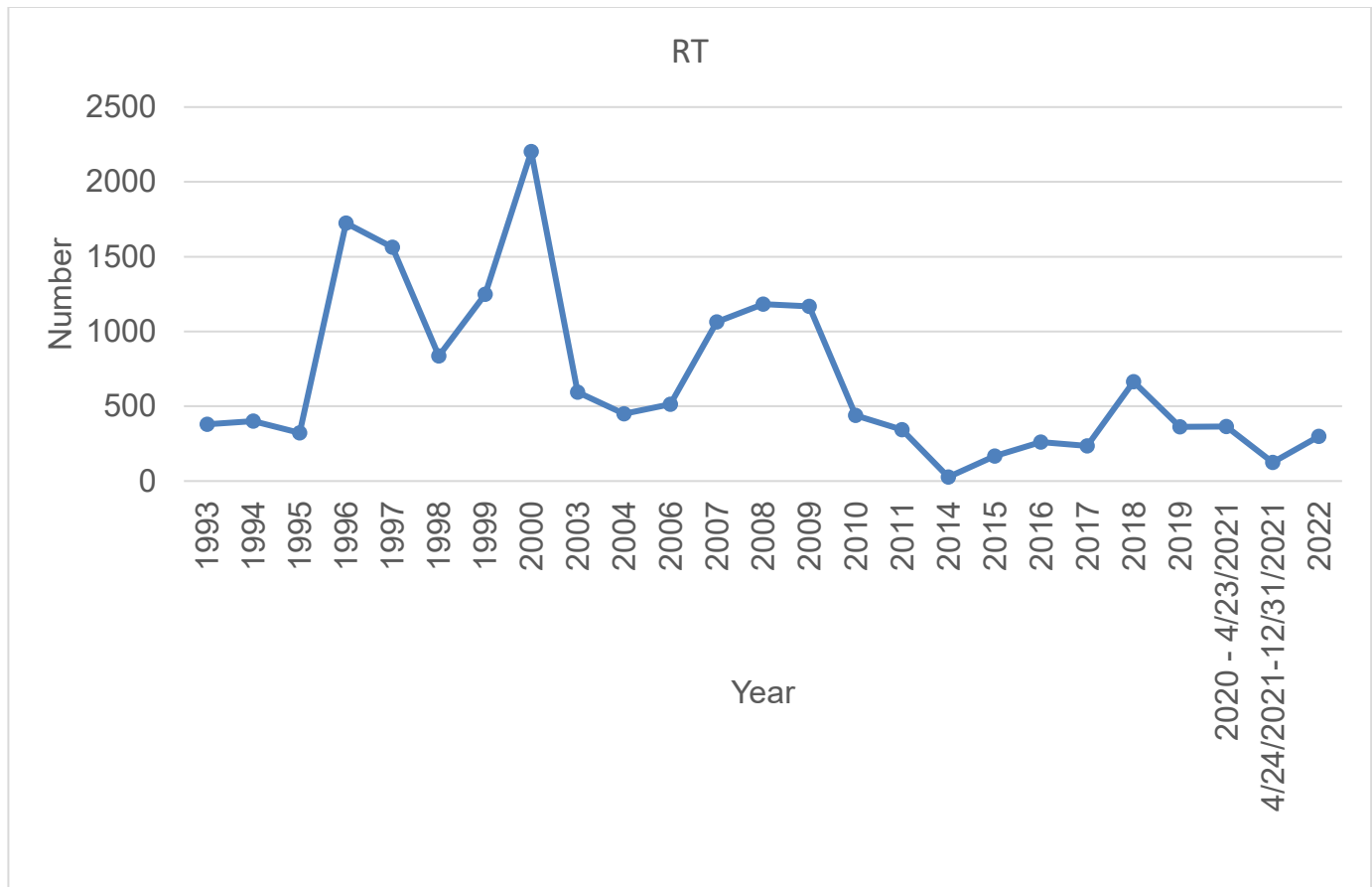


Figure 3. The number of RT reported caught in the East Fork Carson River from Hangman's Bridge to the Nevada State Line from 1993–2000, 2003–2011, and 2014–2022.

The modal length class for RT in 2022 was 6.0–7.9 inch (in.) (**Figure 4**). This is the first time in the last nine sample seasons that this range was the modal length class.

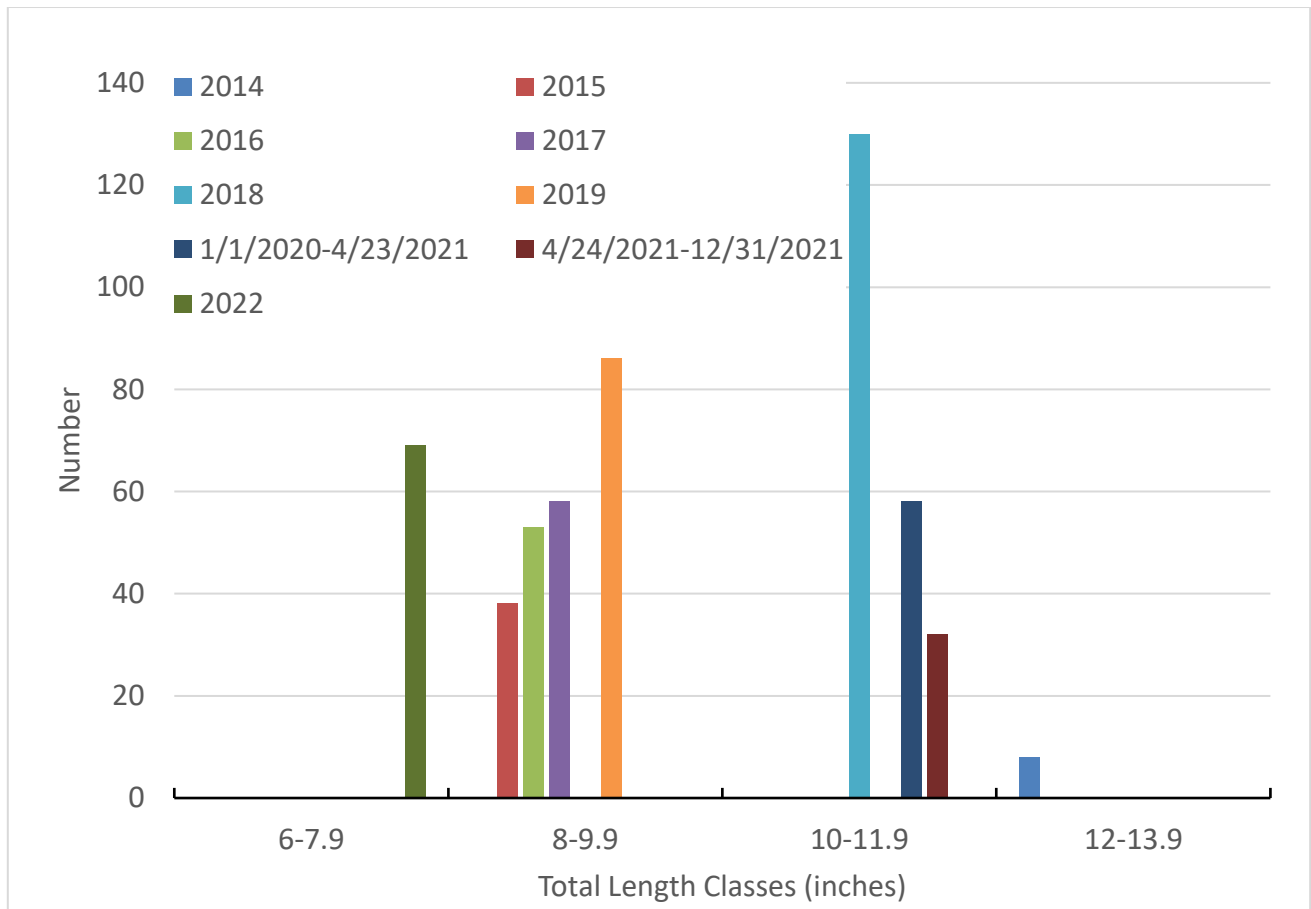


Figure 4. Modal length classes for Rainbow Trout caught in the East Fork Carson River from 2014–2022.

The number of landed BN in 2022 was six, which is an 82% decrease from the 1993 – 2022 average of 33 (**Figure 5**).

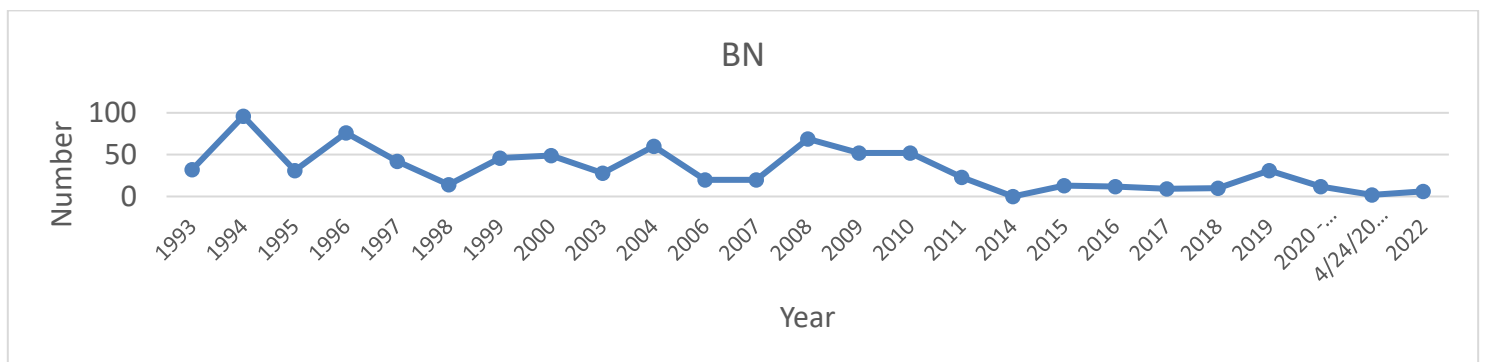


Figure 5. The number of BN reported caught in the East Fork Carson River from Hangman's Bridge to Nevada State Line from 1993–2000, 2003–2011, and 2014–2022.

The modal length class for BN in 2022 was the 8.0–8.9 in. length class (**Figure 6**). In 2015, 2016, and the 2020/early 2021 year, at least one of the modal classes were also in the 8.0–8.9 in. class and in 2019, the modal length class was also in the 8.0–8.9 in. length class.

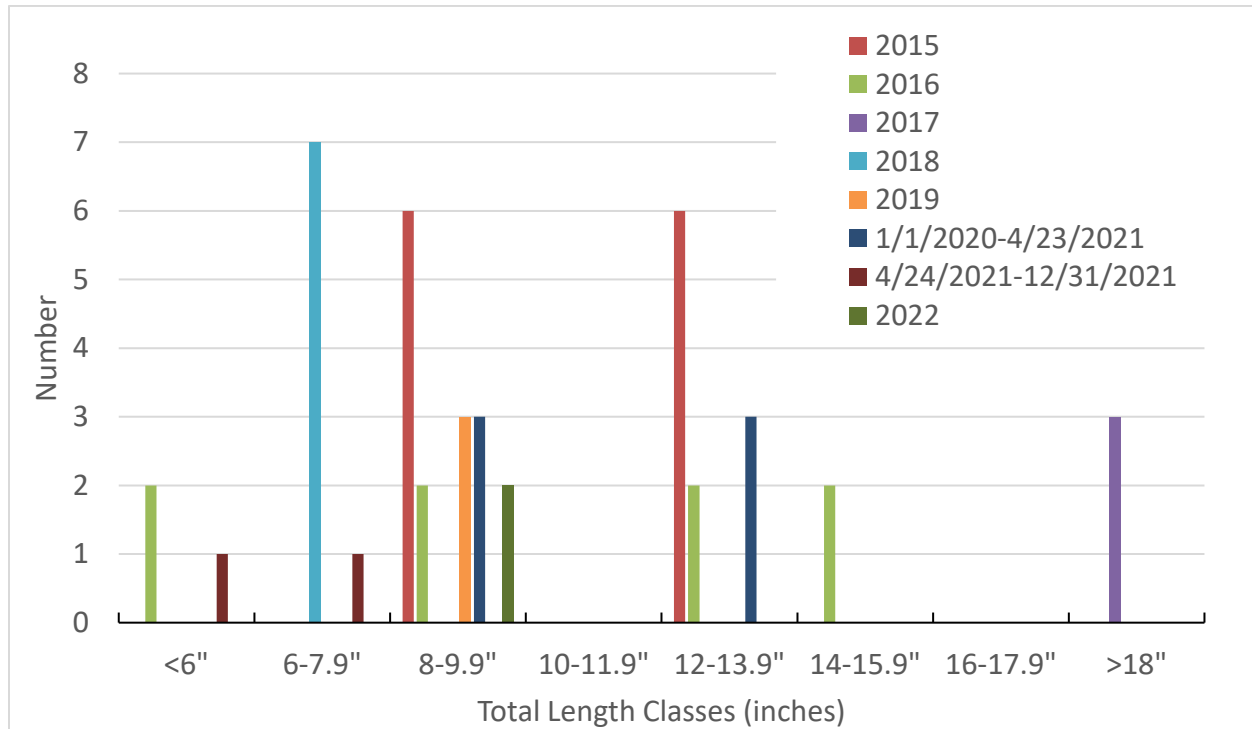


Figure 6. Modal length classes for Brown Trout caught in the East Fork Carson River from 2015–2022.

Sixteen LCT were landed in 2022, which is a 14% increase from the 1993 – 2022 average of 14 (**Figure 7**).

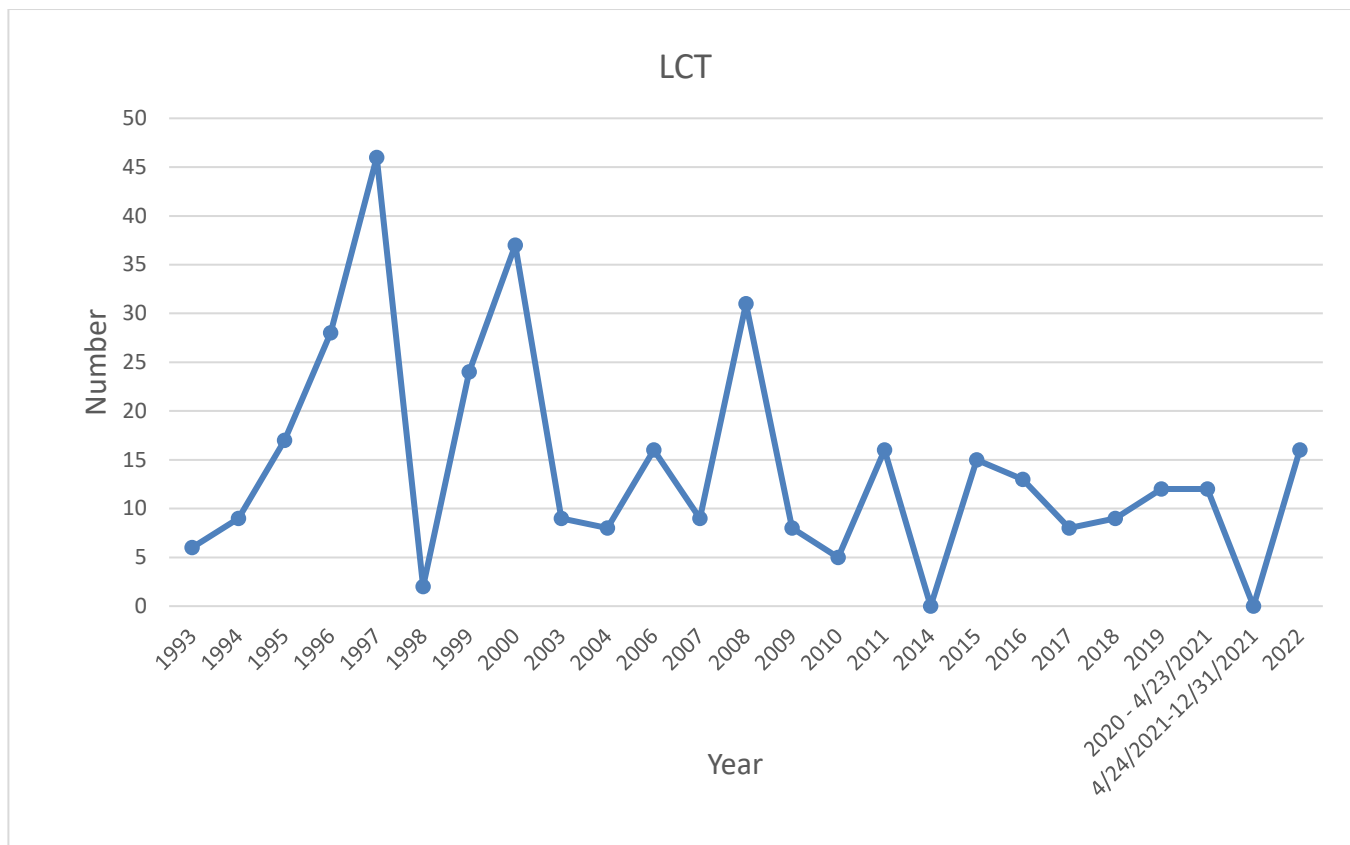


Figure 7. The number of LCT reported caught in the East Fork Carson River from Hangman's Bridge to the Nevada State Line from 1993–2000, 2003–2011, and 2014–2022.

The modal length class for LCT in 2022 was the >18.0 in. length class (**Figure 8**). In 2015, 2019, and 2020/early 2021 years, the modal classes were also in the >18.0 in. length class. The LCT in this size class caught were likely Heenan Lake broodstock that were stocked by CDFW.

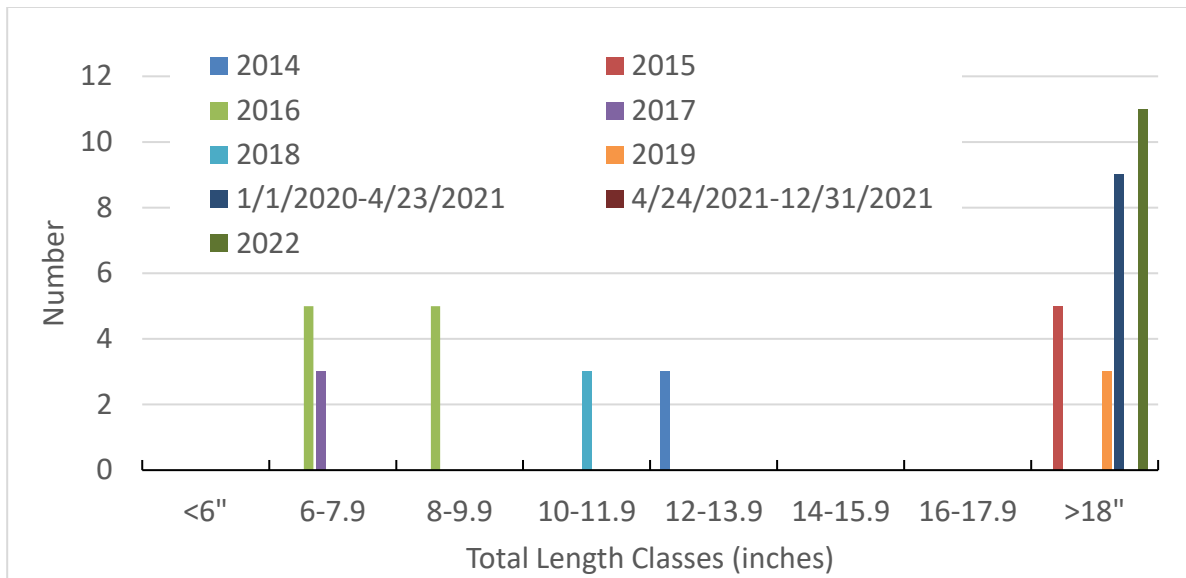


Figure 8. The number of LCT reported caught in the East Fork Carson River for each modal size class from 2014–2022.

The number of landed MWF in 2022 was five, which is consistent with the 1993 – 2022 average of five (**Figure 9**).

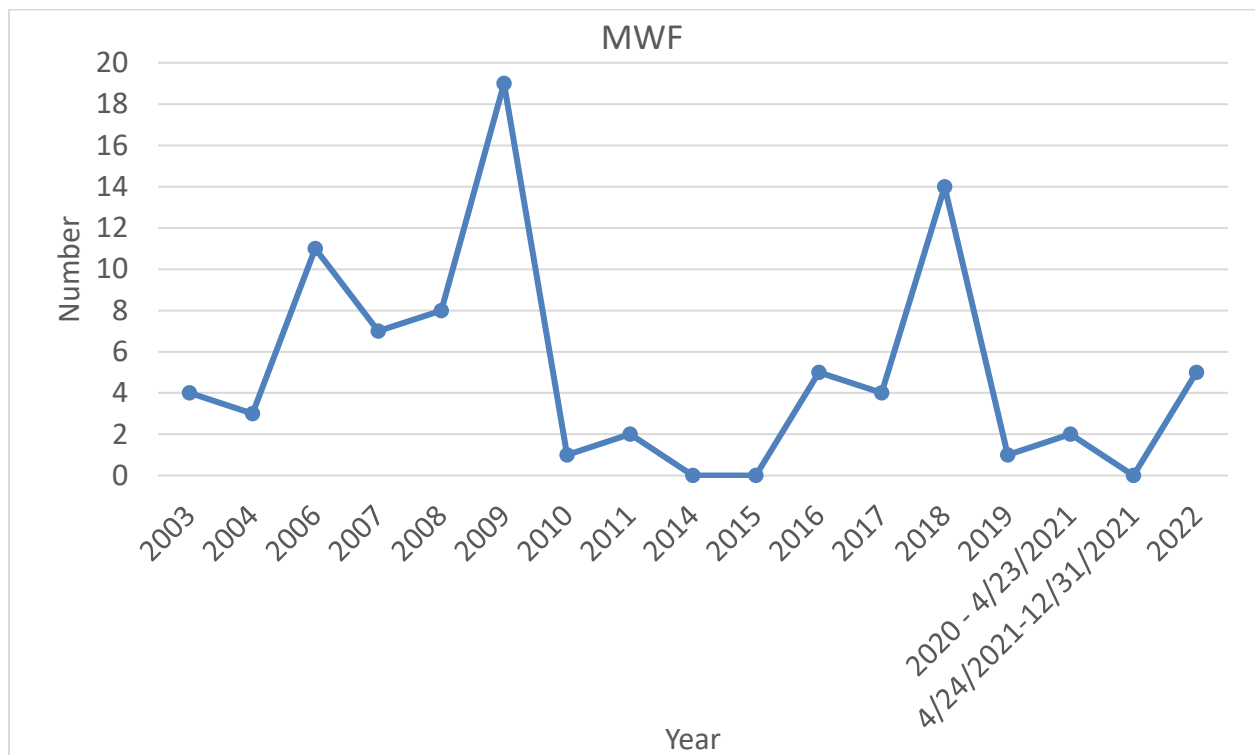


Figure 9. The number of MWF reported caught in the East Fork Carson River from Hangman's Bridge to the Nevada State Line from 2003–2011, and 2014–2022.

The modal length class for MWF in 2022 was the 14.0-15.9 in. length class (**Figure 10**). In 2016, the modal class was also in the 14.0-15.9 length class.

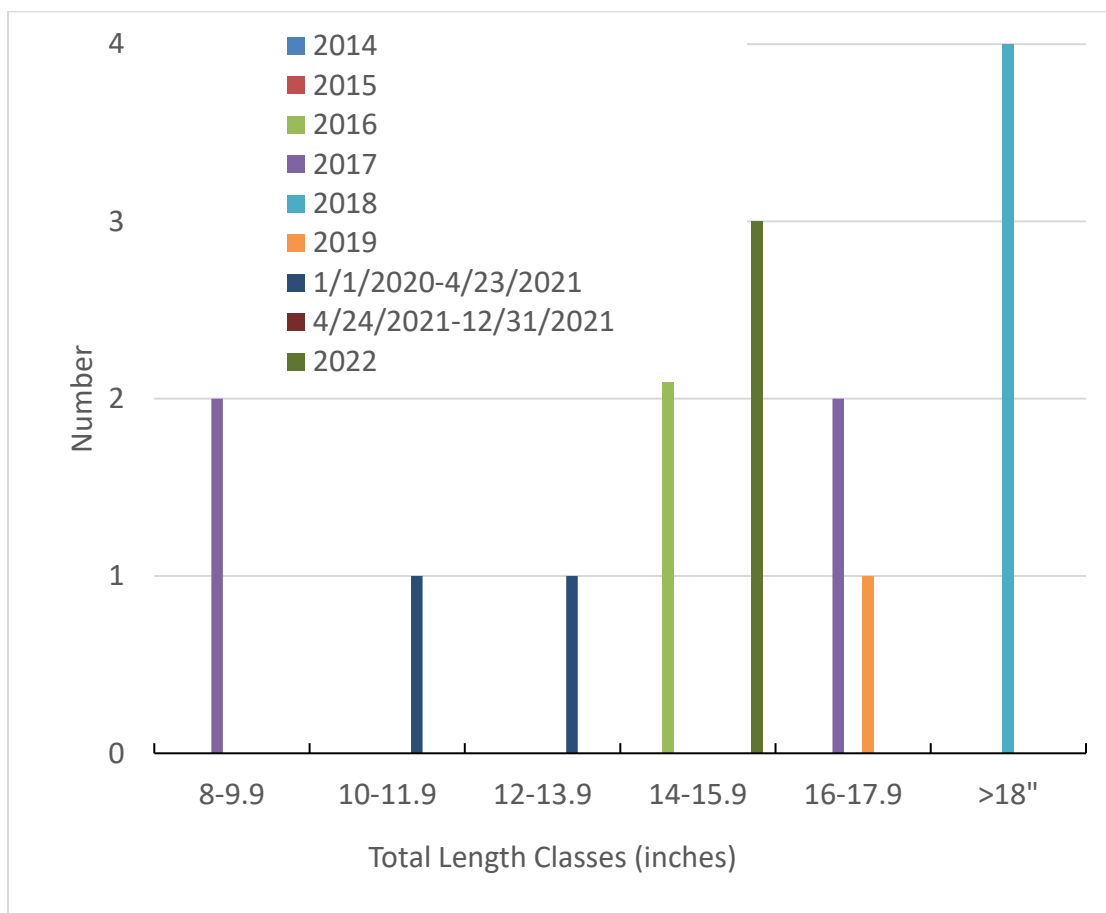


Figure 10. The number of MWF reported caught in the East Fork Carson River for each modal size class from 2014–2022. No MWF were reported caught in 2014 and 2015.

In 2022, anglers released 100% of fish caught, similar to 2021 when anglers released 99.2% of fish caught, even though the new regulations allow harvest.

In 2022, anglers reported being satisfied with their overall angling experience (0.81) (**Table 2**). Anglers have reported a positive average angling experience in all nine years, indicating that the fishery provides a satisfactory experience. Anglers were satisfied with the size of fish caught for the sixth consecutive year. The 0.90 size value in 2022 was third highest value in nine years. Anglers were satisfied with the number of fish caught for the fifth consecutive year. The 0.80 number of fish value in 2022 was the second highest reported in the last nine years.

Table 2. Angler satisfaction response averages for the East Carson River fishery from 2014 through 2022.

Year	Overall Angling Experience	Size of the Fish	Number of Fish
2014	0.35	-0.40	-0.47
2015	0.52	0.14	-0.24
2016	0.36	-0.04	-0.18
2017	0.63	0.33	-0.02
2018	0.74	0.65	0.23
2019	0.96	0.52	0.26
2020 - 4/23/21	1.14	0.94	0.75
4/24/2021 - 12/31/2021	1.19	1.19	1.19
2022	0.81	0.90	0.80
	0.74	0.47	0.26

Discussion

East Fork Carson River anglers have averaged almost four fish caught per day in the last 26 survey years. Overall catch (n = 325) in 2022 was an increase from the April 24, 2021-December 31 2021 survey period, but well below the 26-year average of 724. Although overall catch was down from previous years, catch per hour and catch per angler values were above their respective 26-year averages. Catch per hour in 2022 was 1.04 fish/hr., while the catch per angler was 4.39. It is possible the higher overall catch per angler and catch per hour compared to the 26-year averages were a function of the large number of fish stocked compared to anglers fishing.

In 2022, the greatest number of fish caught were in the 6.0 in. – 7.9 in. size class. A portion of the RT caught in this size class were likely wild. Sixteen LCT were reported caught compared to zero in the April 24, 2021-December 31, 2021 survey period. This is positive since CDFW stocked 700 Heenan Lake broodstock above Hangman's Bridge in 2022, with 11 > 18 in. caught. These LCT were likely the broodstock stocked from Heenan Lake. In 2020, anglers caught nine LCT broodstock. The large increase in LCT caught from the previous survey season was likely due the large increase of stocked LCT broodstock compared to 2021, when only 226 were stocked.

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). The overall fishing experience for anglers in the last nine years was positive on the EFCR. This is consistent with a roving creel survey conducted by CDFW in 2013 (Onanian 2014). Anglers are likely satisfied because they are catching a satisfying

number and size of 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).

For five consecutive years, anglers have been satisfied with the number of trout caught. It is possible the relatively high number of hatchery and wild trout available relative to the number of anglers has increased the number of fish caught. During the last six years, anglers have been satisfied with the size of trout caught. The large number of angler-released fish may also contribute to larger-sized fish caught which include Heenan Lake Broodstock LCT as well as trophy-sized RT stocked by Alpine County. It is often difficult for a fishery to satisfy both high catch rates and large size of fish caught, but these ideals were achieved on the EFCR from 2017–2022.

Similar to before the regulation change that allowed anglers to harvest trout caught, anglers released 100% of trout caught in 2022, similar to 2021 when anglers released 99.3% of trout caught. In recent years, fishing clubs and many outdoor writers have promoted the idea of catch and release fishing. Anglers are encouraged to release fish they catch, even though the fish may be large enough to keep under the prevailing fishing regulations (Clark Jr. 1983). Additionally, catch and release fishing can allow an increased number of anglers to benefit from a fishing experience (Wallmo and Gentner 2008). It is also possible anglers released fish greater than 14 inches (legal take size) in hopes to catch even larger trout.

More RT were reported caught than any other species. The EFCR has and continues to receive both catchable-sized RT (when available) from CDFW and Alpine County as well as Heenan Lake LCT broodstock from CDFW. Historically, CDFW also stocked sub-catchable or fingerling-size LCT into the EFCR, but since 1993, these LCT have never ended up making a proportionally large contribution to the number of total trout caught. One of the main reasons for this may be due to competition with RT. Seiler and Keeley (2009) cite introduced RT as having a great impact on native cutthroat trout through hybridization and competition. The continued stockings of LCT broodstock will occur, but due to the lack of sub-catchable and fingerling-size LCT holding over and being reported caught, CDFW will continue to keep these sized-fish from future allotments.

Historically, angling success on the EFCR between Hangman's Bridge and Nevada is heavily reliant on the wild trout population in that section. To a lesser extent, it is also affected by CDFW and Alpine County stocking that occurs above Hangman's Bridge. Recruitment in the section below Hangman's Bridge is thought to be high, with large numbers of fish less than 14 inches. However, the section immediately below Hangman's Bridge likely receives some of the larger hatchery fish that are stocked upstream. The change in regulations was put in place in hopes of protecting many of

the wild trout, but allowing harvest of hatchery fish, which likely are 14 inches and greater.

The number of respondents in the 2022 survey ($n = 73$) was well below the average of 187. The decline in respondents mirrors the continued decline in overall purchasing of state fishing licenses. 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, especially given the recent regulation changes. Overall, it appears anglers who responded to the ASB in 2022 had and continue to have a satisfactory time fishing the EFCR.

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Appendix 1.

East Fork Carson River

The California Department of Fish and Wildlife is conducting an evaluation of the fishery on the East Fork Carson River downstream from Hangman's Bridge. 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 the East Fork Carson River by **one** angler only.

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

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

Size	rainbow trout		brown trout		cutthroat trout		mountain whitefish	
	Kept	Released	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" 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 helping us manage and protect California's wild trout resources.