Montana Fish, Wildlife & Parks

Fisheries Division

Federal Aid Job Progress Report

Montana Statewide Fisheries Management

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Project Title: Montana Statewide Fisheries Management

Job Title: Bitterroot Drainage Fisheries Management

Purpose: This report summarizes fish sampling and fisheries related surveys conducted in waters of the Bitterroot basin during the 2021 and 2022 field seasons. Sampling was carried out as part of the fisheries management duties of the Bitterroot fisheries responsibility area located in administrative region 2.

Bitterroot Basin

Fisheries Sampling

2021 & 2022

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Acknowledgments

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PURPOSE

This report summarizes fish sampling and fisheries related surveys conducted in the Bitterroot River and other waters of the Bitterroot River drainage during the field seasons of 2021 and 2022. Sampling was carried out as part of the fisheries management duties of the Bitterroot fisheries responsibility area located in administrative region 2.

BACKGROUND

The Bitterroot River is a large Western Montana freestone stream originating at the confluence of its East and West Forks near Conner. From this location, the river flows in a northerly direction for over 80 miles through irrigated crop and pastureland before joining the Clark Fork River near the city of Missoula. There are five major diversions and numerous smaller canals that remove large amounts of water from the river during the irrigation season (Spoon 1987). In addition, many of the tributaries that originate on the Bitterroot National Forest (BNF) are diverted for irrigation during the summer months and contribute relatively little if any streamflow to the river during this time. Streamflow characteristics vary along the Bitterroot River, with the most critically dewatered reach being between Hamilton and Stevensville (Spoon 1987). To help lessen mainstem dewatering, Montana Fish, Wildlife & Parks (FWP) annually oversees the release of 15,000 acre-feet of water from Painted Rocks Reservoir on the West Fork of the Bitterroot River, and 3,000 acre-feet of water from Lake Como located near Darby. The most dewatered section of the river north of Hamilton is the target reach for the Painted Rocks instream flow water. In addition to dewatering, urbanization and development of the floodplain is also increasing in the Bitterroot Valley putting further pressures on the Bitterroot River (Javorsky 1994). These pressures come primarily in the form of bank stabilization and armoring, and woody riparian vegetation clearing.

The Bitterroot River is managed as a wild trout fishery, emphasizing natural reproduction of native and non-native trout. The Bitterroot drainage is currently home to ten native and nine non-native fish species. Native fish species include bull trout, westslope cutthroat trout, mountain whitefish, northern pike minnow, longnose sucker, largescale sucker, longnose dace, redside shiner, peamouth, and Columbia slimy sculpin. Non-native fish species inhabiting the drainage include rainbow trout, brown trout, brook trout, northern pike, largemouth bass, pumpkinseed, yellow perch, black bullhead, and brook stickleback. Dominant sportfish species vary by location in the drainage. Westslope cutthroat trout are abundant in many headwater tributaries and mountain lakes and are also common in the mainstem Bitterroot River above Hamilton. Rainbow trout, brown trout, and mountain whitefish are common throughout the entire length of the Bitterroot River as well as in the lower reaches of larger tributaries such as the East and West Forks. Brook trout are present in many smaller tributaries to the Bitterroot but are rare in the main river.

The Bitterroot River is an important sport fishery in western Montana. Annual pressure estimates from the statewide angler survey indicate that the Bitterroot River and its upper

forks routinely exceed 100,000 angler days per year. The most recent combined survey results from 2020 showed the highest pressure on record at nearly 167,000 angler days (FWP 2022). Due to increasing fishing pressure and observed declines in some fish species, harvest regulations became more restrictive in the Bitterroot River drainage beginning around 1990. Native westslope cutthroat trout, which were susceptible to high angling harvest prior to this time, were protected under catch-and-release regulations throughout the Bitterroot River and the upper forks. Rainbow trout harvest opportunity was also removed in the lower West Fork and East Fork around 2012 in response to declining populations possibly related to the impacts of whirling disease in the upper Bitterroot drainage. Catch-and-release sections for all trout were established in the upper and lower reaches of the Bitterroot River in 1992. While it appeared that rainbow trout numbers increased in the lower catch-and-release section between Stevensville and Florence as a result of the regulation, no apparent change was detected in the upper section near Darby, and it was eliminated around 2012. Currently, only one catch-and-release section for all trout species exists on the Bitterroot River. This section runs between the Florence Bridge FAS near Florence upstream to the Woodside Bridge FAS near Corvallis. This reach of the river appears to be recruitment limited and sees low flows and warm temperatures during periods of drought. In addition to being catch-and-release for all trout, this reach also limits tackle to artificial lures only. The remainder of the Bitterroot River is open to the use of bait.

Fish population monitoring in the Bitterroot River provides valuable information to inform management strategies to maximize angling opportunity while maintaining the quality of the fishery and protecting native species. Regular electrofishing population estimate data has been collected at a number of reaches beginning in the late 1980's. Study reaches were selected based on historical data, streamflow patterns and fishing regulation differences. Fish population estimates on the Bitterroot River have primarily been done in the fall (September and October) and focus only on trout. Prior to 2019, electrofishing estimates were completed at established sections every four to five years. Currently, sampling frequency has been increased to every other year. Due to the length of the study sections and the large number of fish required to calculate population estimates, other species of fish present in the river were not included. However, beginning in 2011 efforts were made to monitor a more diverse array of species using more basic sampling techniques. While this sampling does not result in a population estimate, it does provide a sense of relative abundance that allows us to monitor major changes in certain species. It is most beneficial for the more common species such as mountain whitefish, which are the most abundant fish in the river.

Tributaries to the Bitterroot River, many originating on the BNF, support widespread populations of native westslope cutthroat trout and bull trout. Westslope cutthroat trout are classified as a Species of Concern in Montana due to declining numbers, and bull trout are Federally listed as a Threatened Species under the Endangered Species Act. Due to the importance of these native fish species, monitoring has been conducted on many tributary streams to assess fishery health through time. Sections are located throughout the basin and are sampled on a rotating basis with a frequency typically between 1 and 5 years.

Lake Como is one of the most accessible flat water angling opportunities in the Bitterroot drainage. The lake is stocked annually with rainbow trout as well as westslope cutthroat trout. Kokanee were stocked frequently from 1997 to 2012 but are no longer due to poor performance. Due to severe annual drawdown for irrigation and instream flow, as well as the low productivity of the lake, fish density and growth continues to be low, and fishing is only fair. Annual sampling is done in Lake Como to assess basic survival and performance of stocked fish.

There are numerous mountain lakes in the Bitterroot Drainage. Many of these lakes support fish, with several supplemented by periodic plants of westslope cutthroat trout. As time allows, sporadic sampling is done to monitor fishery status in both stocked and unstocked lakes.

METHODS

Fish Sampling

Rivers:

Sampling on the Bitterroot mainstem and lower West Fork was done using a 14-foot drift boat electrofishing unit with two fixed booms. The system was powered by a 5,000-watt generator and current was controlled with a Smith-Root VVP-15B rectifying unit. Smooth direct current was used at all times. Crews consisted of two or three people, one rowing the boat and the other(s) standing in the bow capturing fish with a dip net. Typically, estimates were produced using three marking passes completed over approximately a one-week period and two recapture passes completed about one week later. Estimate sample sections varied by year and ranged in length from 2.9 to 5.0 miles. Figure 1 shows the general location of current monitoring sections on the Bitterroot River and the lower West Fork Bitterroot River. For all-species sampling conducted in the spring, a single electrofishing pass was made through the sections. These sections were shorter than estimate sections but were located within the same reach. Length of the 1-pass sections varied from 1.8 to 2.5 miles.

For smaller, shallower reaches (e.g., East Fork Bitterroot River and upper West Fork Bitterroot River) a small barge electrofishing unit or bank electrofishing setup was utilized. These systems were powered by a 4000-watt generator and current was controlled with a Smith-Root VVP-15B rectifying unit. Smooth direct current was used at all times. Crews consisted of four to five people, one controlling the barge or wire spool, one throwing and retrieving a mobile electrode, and two or three people dip netting fish and transporting them to holding pens (for bank electrofishing sections only). Estimates were made using one marking run and one recapture run completed approximately one week apart. Section lengths varied from 0.2 to 1.0 miles.

All fish captured during electrofishing efforts were identified to species, measured, weighed, given a small fin clip (if part of an estimate), examined for hook scars (obvious wounds or mouth trauma from being previously hooked by an angler) and other items of note, and then released. In each sample reach, multiple stops were made to process fish and make sure they were well distributed throughout the section.

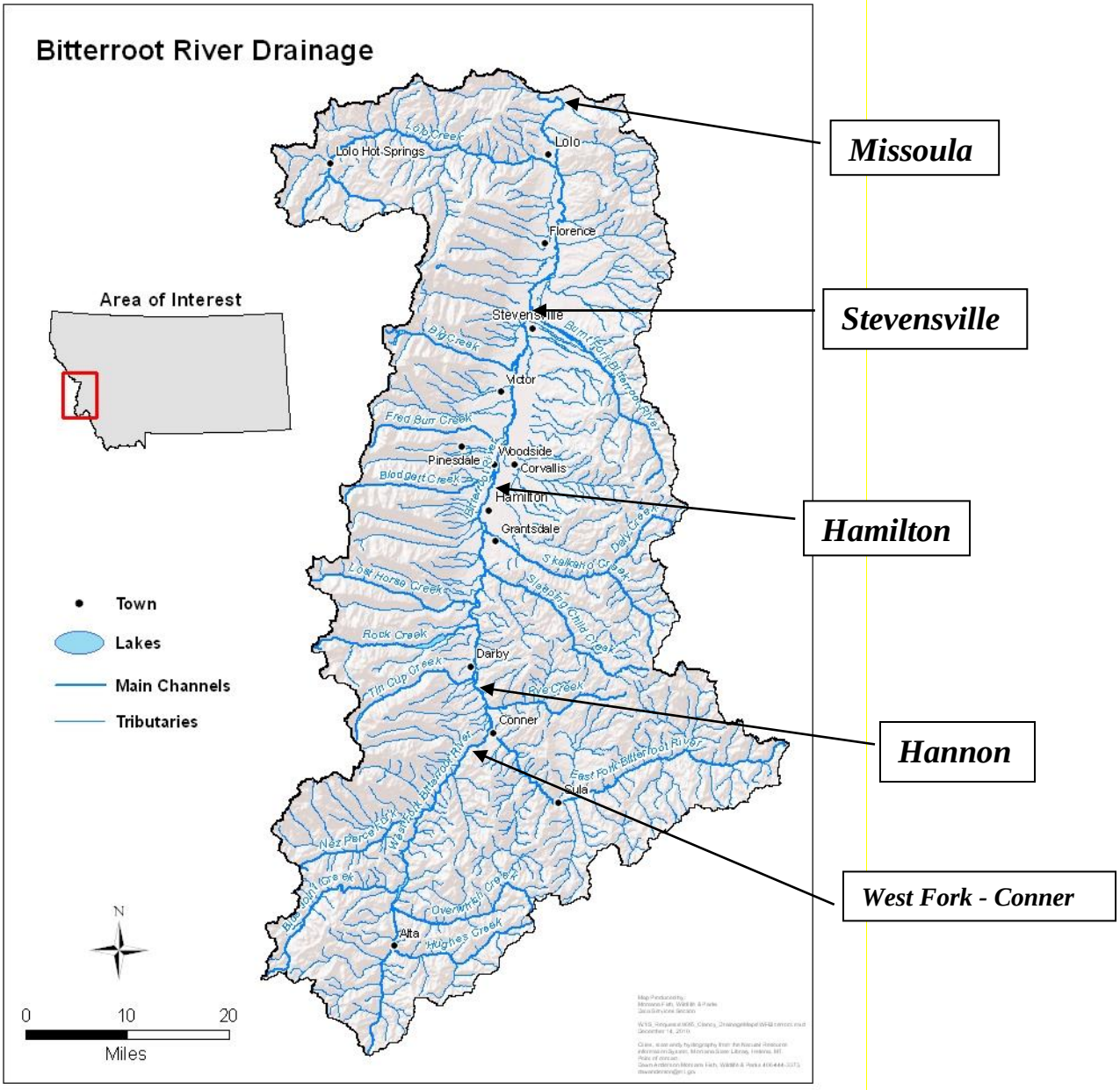

Figure1. Map of Bitterroot basin with Bitterroot River and lower West Fork Bitterroot River study sections labeled.

Tributaries:

Sampling at most long-term tributary sections was completed with a bank electrofishing setup. This consisted of a 4000-watt generator (placed at the midpoint of the section), a Smith-Root VVP-15B rectifying unit, and a 500-foot spool of coated wire connected to a mobile, throwable electrode. This setup required four to five people to sample effectively. In smaller streams, a backpack electrofishing unit (Smith-Root LR-24 and/or Coffelt Mark 10) was used to collect fish. Crew size was typically limited to two or three people in these instances. Mark and recapture population estimates were completed at many of the sample sites. Sampled reaches varied in length but were typically 500 to 1000 feet long. Estimates were generally made using one marking run and one recapture run completed approximately one week apart. All fish captured during tributary electrofishing efforts were identified to species, measured, weighed, given a small fin clip (if part of an estimate), examined for items of note, and then released near their capture location.

Lakes:

Monofilament gillnets (125 ft long by 6 ft deep, experimental design) and angling were utilized to sample fish in several lakes in the Bitterroot drainage in 2021 and 2022. At Lake Como, two floating gillnets were set at previously sampled locations on the east end of the lake in both years. The nets were set in mid-October out of a non-motorized boat. Nets were deployed in the afternoon and retrieved the following morning. For mountain lake assessments, angling was used to assess catch rates and size structure of fish present in each lake. A single angler fished from shore at various points around the perimeter of the lakes. All fishing was done at mid-day with a spinning rod using spinners, spoons, and/or a fly and bubble. All fish captured in these efforts were identified to species and measured for total length.

Data Summary

Rivers:

For estimate sections, the population estimate (standardized to the number of fish per mile), capture efficiency, the total number of fish handled during mark and recapture runs (not including recaptured fish), mean and range of fish lengths, and percent of species composition were all calculated. Population estimates were generated using a modified Peterson estimator (Bailey 1951). Estimates and capture efficiencies were only reported for trout greater than 175 mm (~7 in) in length due to low capture efficiency of smaller size classes. For single-pass sections, total number of fish handled, catch per mile, mean and range of fish lengths, and percent of species composition were calculated.

Tributaries:

Fish data was summarized for each sample location by species and included the number of fish captured (marking run or first pass only), catch per effort standardized to 1,000 feet of channel length, mean and range of fish lengths, and percent of species composition. Trout were the focus of these data summary efforts, but other species were included for some sections with more diverse fish communities. At sites where population estimates were made, an estimate value with a 95% confidence interval was reported. Population estimates were calculated using a modified Peterson estimator (Chapman 1951). Estimates were produced for fish 100 mm (~4 in) in total length and larger, and values were reported as the number of fish per 1,000 feet of channel length. Sample locations were identified and named according to the closest river mile using a GIS and a routed stream layer maintained by the US Forest Service.

Lakes:

Gillnet data was compiled for all nets and was summarized by species including the number of fish captured, mean and range of fish lengths, and the mean number of fish per net. Angling data was summarized by species and included the total number of fish caught and mean and range of fish lengths.

RESULTS & DISCUSSION

Bitterroot River Trout Populations

Bitterroot River

Population estimates were conducted on the Hamilton and Hannon sections in 2021 and the Stevensville section in 2022.

At the Hamilton section, rainbow trout dominated the trout community comprising 73% of the fish handled, followed by brown trout at 22%, and westslope cutthroat trout at 5% (Table 1). Rainbow trout density was below the long-term average for the section, but within the range of variability recorded in previous sample years (Figure 2). Brown trout numbers were close to the long-term average and have been relatively stable in the Hamilton section for the period of record (Figure 3). An estimate was obtained for westslope cutthroat trout in the Hamilton section in 2021, and similar to previous years (when an estimate was obtained) was less than 50 fish per mile (Figure 4). The proportion of trout (>175 mm) showing evidence of hook scars in the Hamilton section in 2021 was 8.5% for rainbow trout (includes rainbow x westslope cutthroat trout hybrids), 4.5% for brown trout, and 58.7% for westslope cutthroat trout. The rates for rainbow trout and

brown trout were slightly below long-term averages, while the rate for westslope cutthroat trout was a new record high for the species at this location (Figure 5).

Table 1. Electrofishing data collected on the Bitterroot River at the Hamilton Section during fall 2021. Population estimates and capture efficiencies are for trout greater than 175 mm (~7") in total length. Number following the population estimate (in parentheses) represents the 95 % confidence interval. Rainbow trout estimate includes any rainbow x westslope cutthroat trout hybrids.

Trout Species	Population Estimate (fish/mile)	Capture Efficiency (%)	Total Fish Handled	Mean Length (mm)	Length Range (mm)	Species Composition (%)
Bull	-	-	0	-	-	-
Cutthroat	30 (+/- 24)	15	46	346	220-444	5
Rainbow	442 (+/- 125)	16	675	252	65-536	73
Brown	125 (+/- 50)	19	206	315	90-560	22
Brook	-	-	0	-	-	-

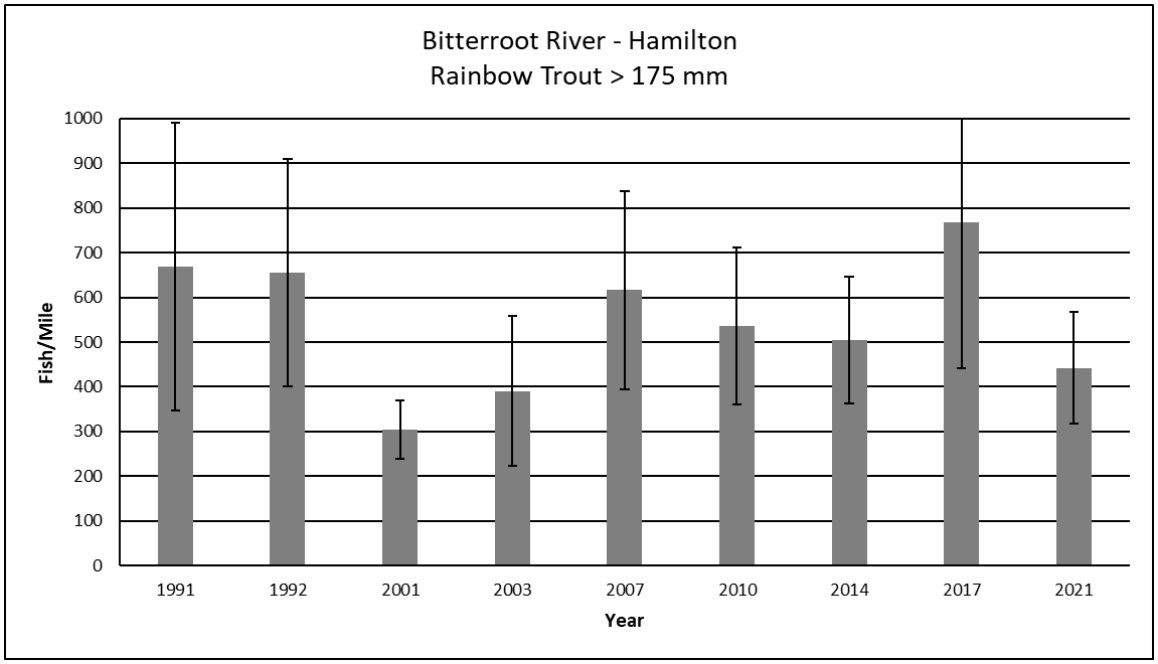

Figure 2. Population estimates for rainbow trout greater than 175 mm (~7") in total length in the Hamilton section for the period of record. Estimates include any rainbow x westslope cutthroat trout hybrids.

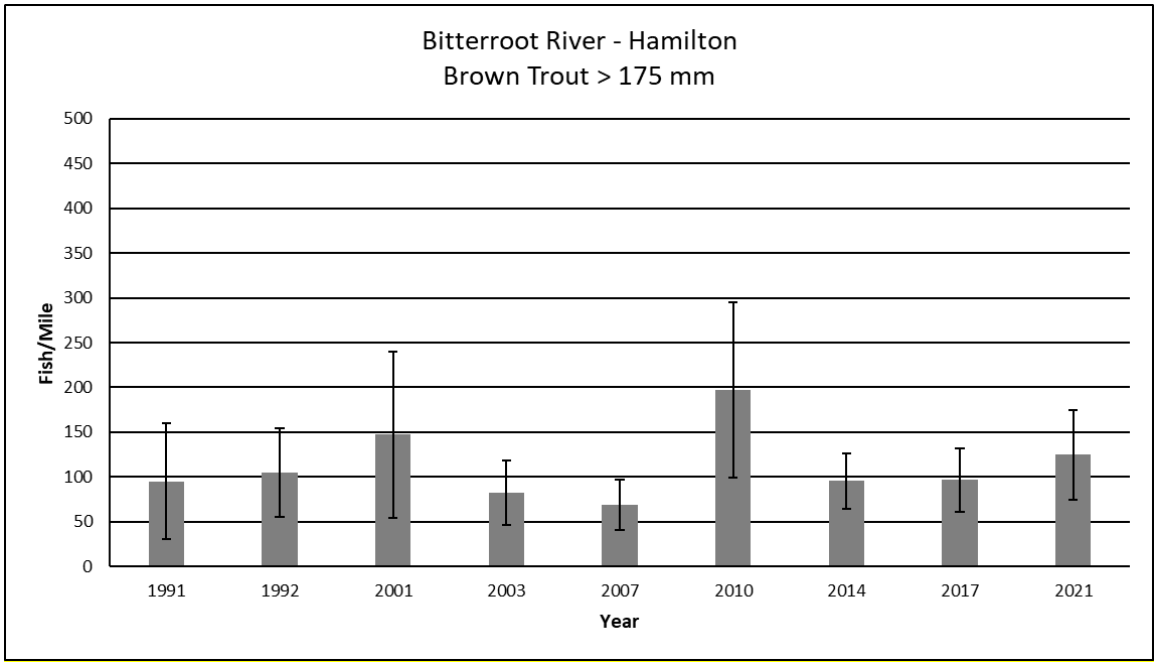

Figure 3. Population estimates for brown trout greater than 175 mm (~7") in total length in the Hamilton section for the period of record.

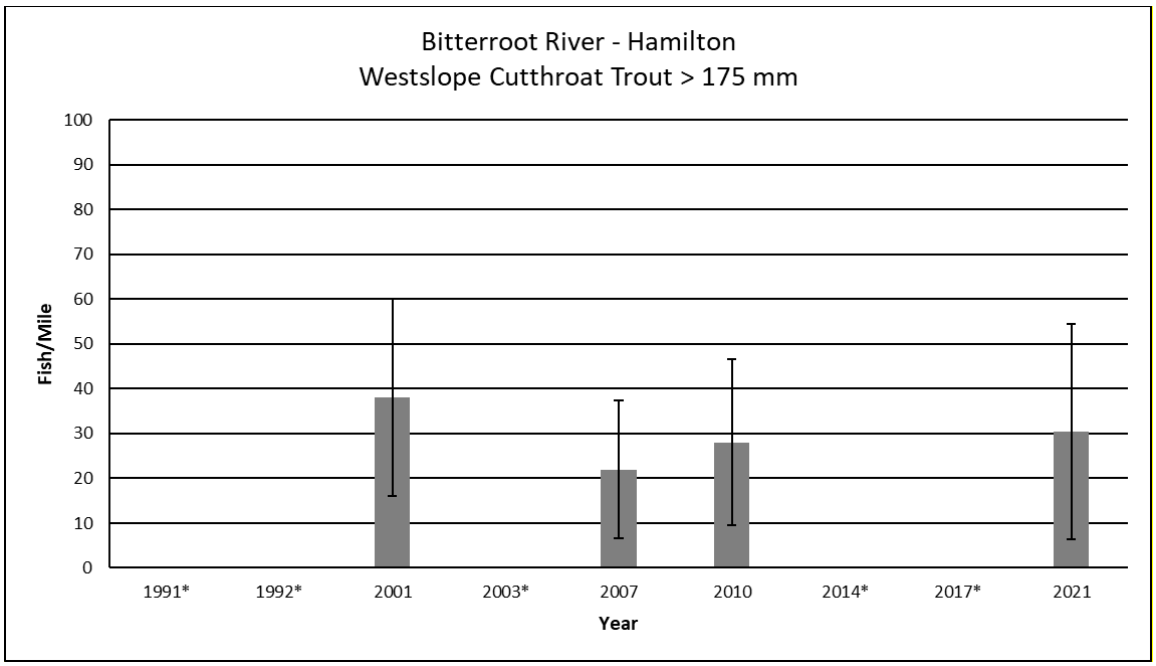

Figure 4. Population estimates for westslope cutthroat trout greater than 175 mm (~7") in total length in the Hamilton section for the period of record. Asterisk following year denotes estimate not reported due to poor capture efficiency.

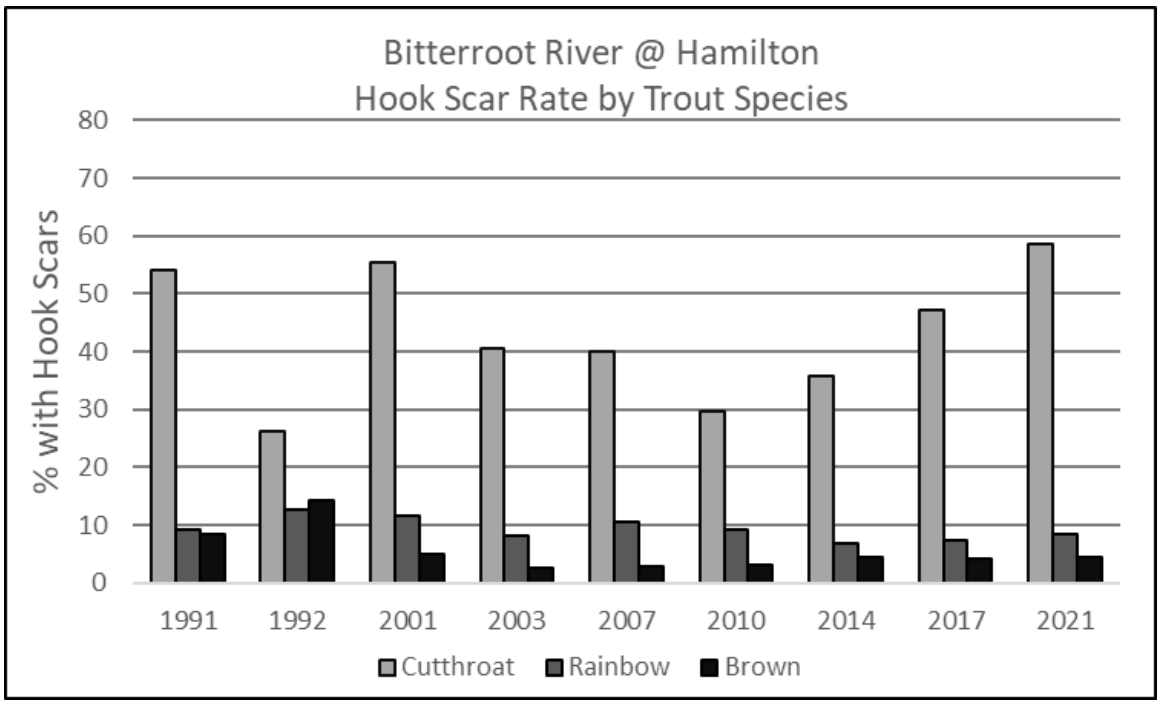

Figure 5. Hook scar rates for trout (>175 mm) in the Bitterroot River at the Hamilton section for the period of record. Rainbow trout value includes rainbow x westslope cutthroat trout hybrids.

At the Hannon section, westslope cutthroat trout, rainbow trout, and brown trout occurred in similar proportions (Table 2). Westslope cutthroat trout and rainbow trout population numbers were near long-term averages for the site, but while rainbow trout densities have remained stable over the last decade, westslope cutthroat trout numbers have shown a decline (Figures 6 and 7). Brown trout density at Hannon was stable since the mid-2000s, but the estimate obtained in 2021 suggested numbers have declined (Figure 8). The proportion of trout (>175 mm) showing evidence of hook scars in the Hannon section in 2021 was 16.6% for rainbow trout (includes rainbow x westslope cutthroat trout hybrids), 4.8% for brown trout, and 50.8% for westslope cutthroat trout. The rate for brown trout was near the long-term average, while the rates for westslope cutthroat trout and rainbow trout were both slightly above average (Figure 9).

Table 2. Electrofishing data collected on the Bitterroot River at the Hannon Section during fall 2021. Population estimates and capture efficiencies are for trout greater than 175 mm (~7") in total length. Number following the population estimate (in parentheses) represents the 95 % confidence interval. Rainbow trout estimate includes rainbow x westslope cutthroat trout hybrids.

Trout Species	Population Estimate (fish/mile)	Capture Efficiency (%)	Total Fish Handled	Mean Length (mm)	Length Range (mm)	Species Composition (%)
Bull	-	-	2	350	195-505	<1
Cutthroat	267 (+/- 92)	19	332	282	120-435	30
Rainbow	374 (+/- 167)	11	426	232	62-472	38
Brown	212 (+/- 66)	22	354	259	81-516	32
Brook	-	-	7	237	175-280	<1

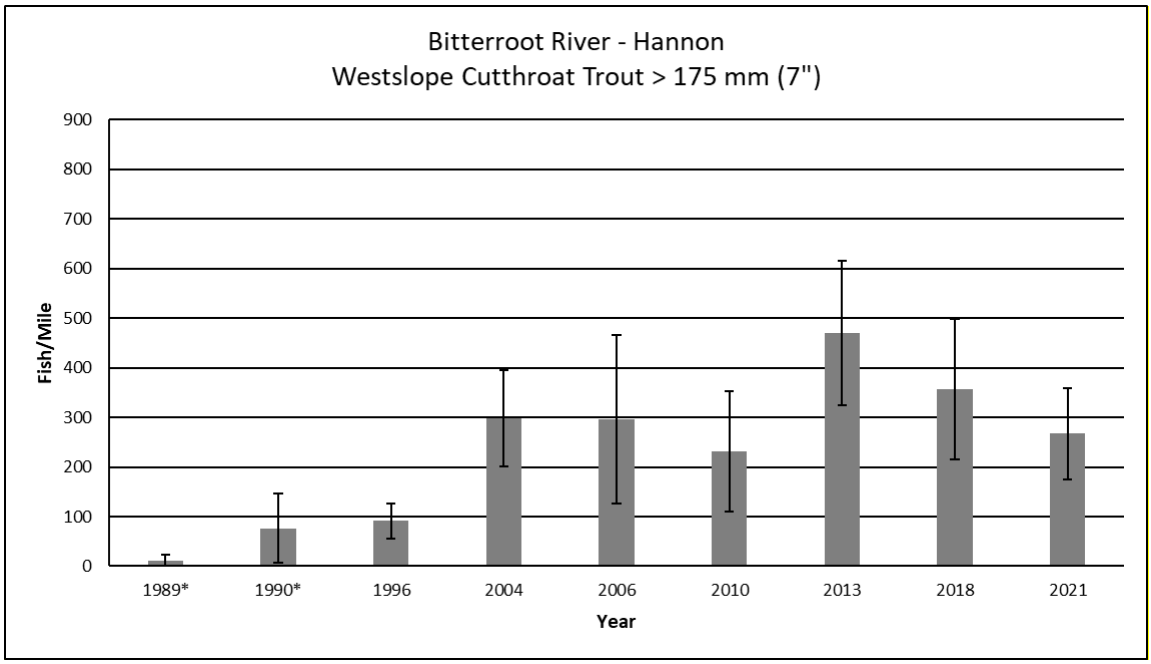

Figure 6. Population estimates for westslope cutthroat trout greater than 175 mm (~7") in total length in the Hannon section for the period of record. Asterisk following year denotes estimate may be impacted by low recaptures.

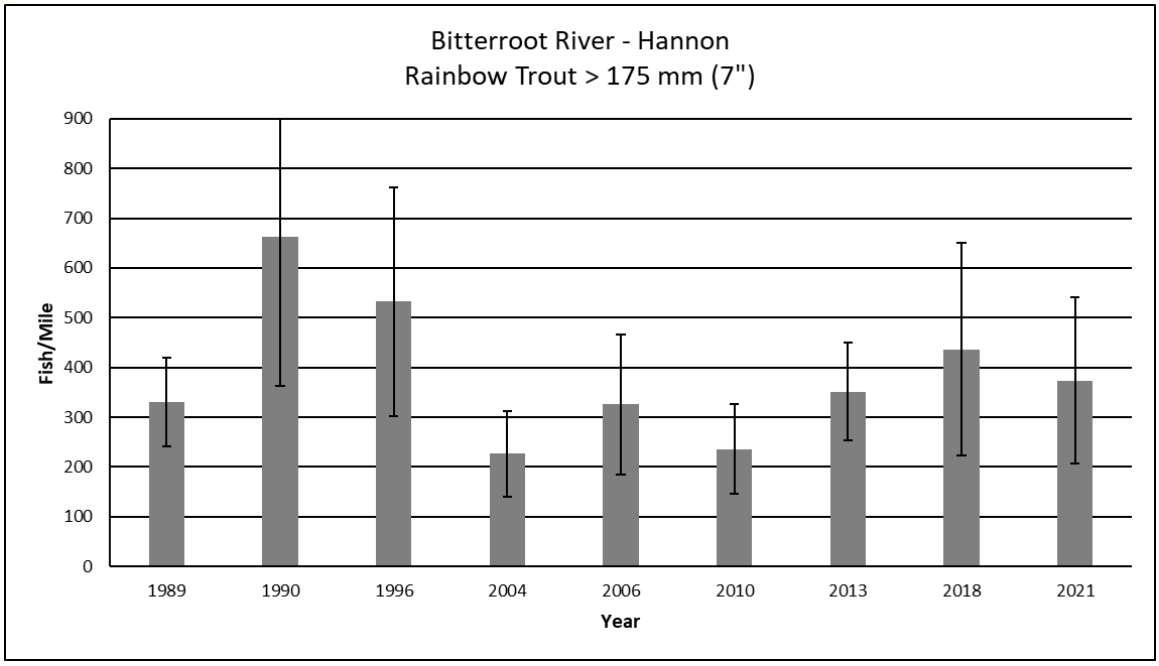

Figure 7. Population estimates for rainbow trout greater than 175 mm (~7") in total length in the Hannon section for the period of record. Estimates include any rainbow x westslope cutthroat trout hybrids.

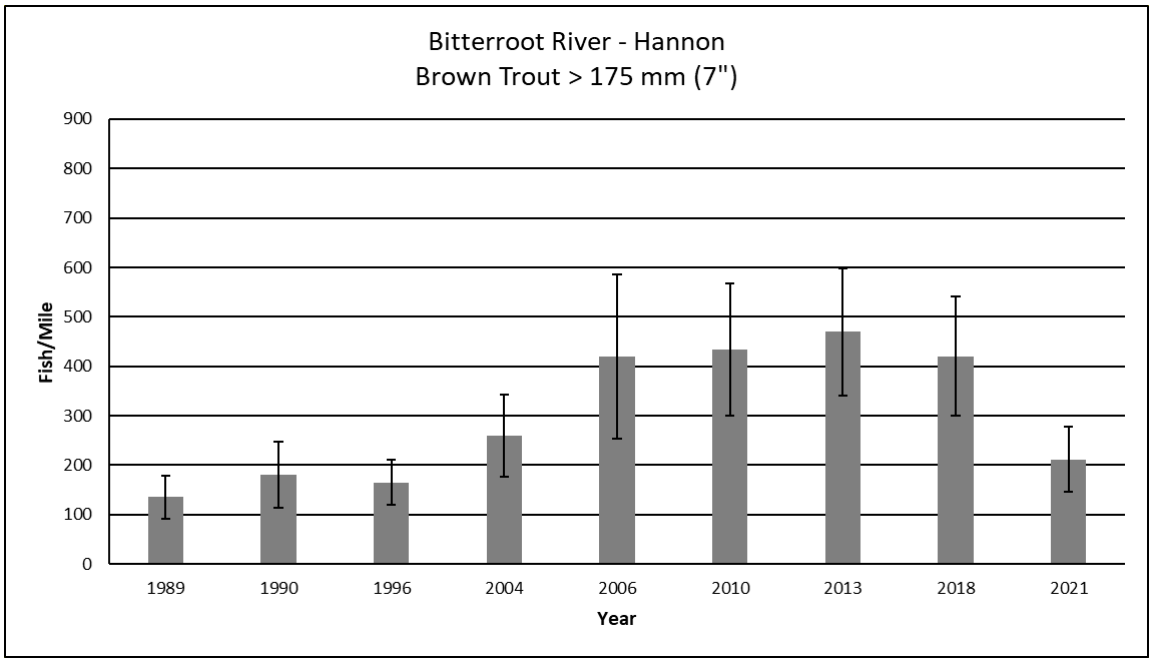

Figure 8. Population estimates for brown trout greater than 175 mm (~7") in total length in the Hannon section for the period of record.

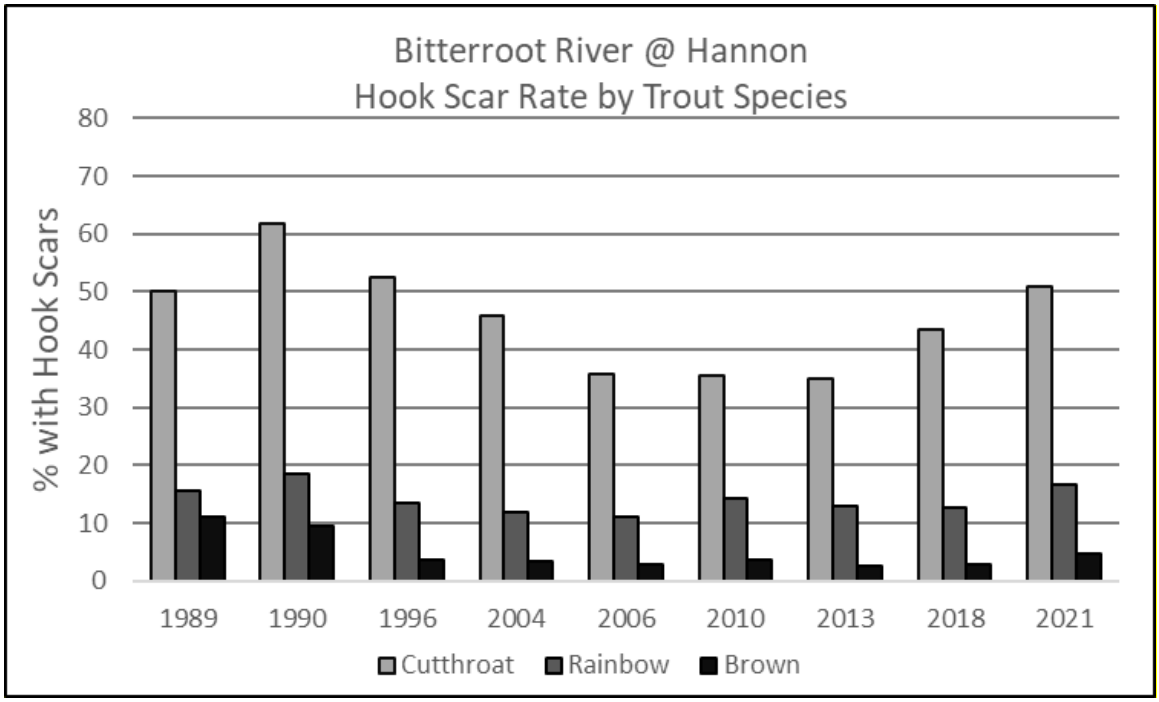

Figure 9. Hook scar rates for trout (>175 mm) in the Bitterroot River at the Hannon section for the period of record. Rainbow trout value includes rainbow x westslope cutthroat trout hybrids.

At the Stevensville section, rainbow trout dominated the trout community comprising 74% of the fish handled, followed by brown trout at 25%, and westslope cutthroat trout at 1% (Table 3). Rainbow trout density was approximately half of the long-term average

for the section and was the lowest estimate ever recorded (Figure 10). Brown trout numbers were also below the long-term average for the section, but only slightly and were within the range of previously recorded values (Figure 11). Brown trout density has been low and relatively stable in the Stevensville section since the mid-1990s (Figure 11). No estimate was obtained for westslope cutthroat trout due to insufficient numbers of fish. The proportion of trout (>175 mm) showing evidence of hook scars in the Stevensville section in 2022 was 14.9% for rainbow trout and 8.1% for brown trout. The rates for both species were slightly higher than the long-term average and were similar to values observed in 2020 (Figure 12).

Table 3. Electrofishing data collected on the Bitterroot River at the Stevensville Section during fall 2022. Population estimates and capture efficiencies are for trout greater than or equal to 175 mm (~7") in total length. Number following the population estimate (in parentheses) represents the 95 % confidence interval. Rainbow Trout estimate includes any rainbow x westslope cutthroat trout hybrids.

Trout Species	Population Estimate (fish/mile)	Capture Efficiency (%)	Total Fish Handled	Mean Length (mm)	Length Range (mm)	Species Composition (%)
Bull	-	-	0	-	-	-
Cutthroat	n/a	-	4	355	246-396	1
Rainbow	163 (+/- 47)	26	285	322	104-541	74
Brown	56 (+/- 30)	24	97	323	100-595	25
Brook	-	-	0	-	-	-

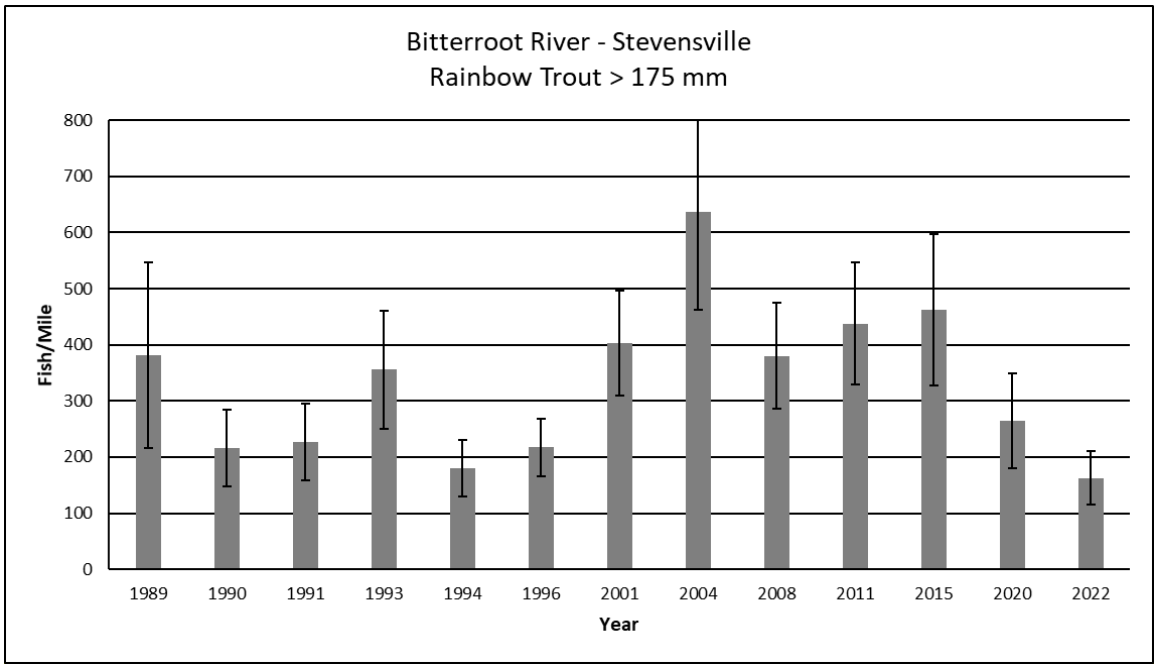

Figure 10. Population estimates for rainbow trout greater than 175 mm (~7") in total length in the Stevensville section for the period of record. Estimates include any rainbow x westslope cutthroat hybrids.

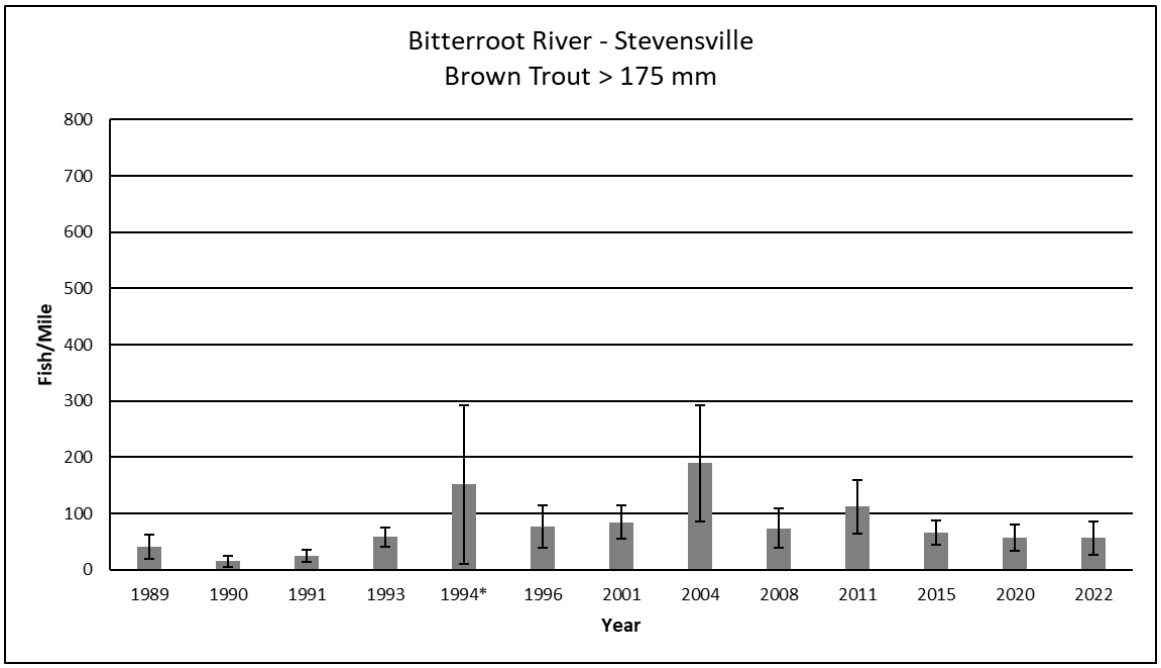

Figure 11. Population estimates for brown trout greater than 175 mm (~7") in total length in the Stevensville section for the period of record.

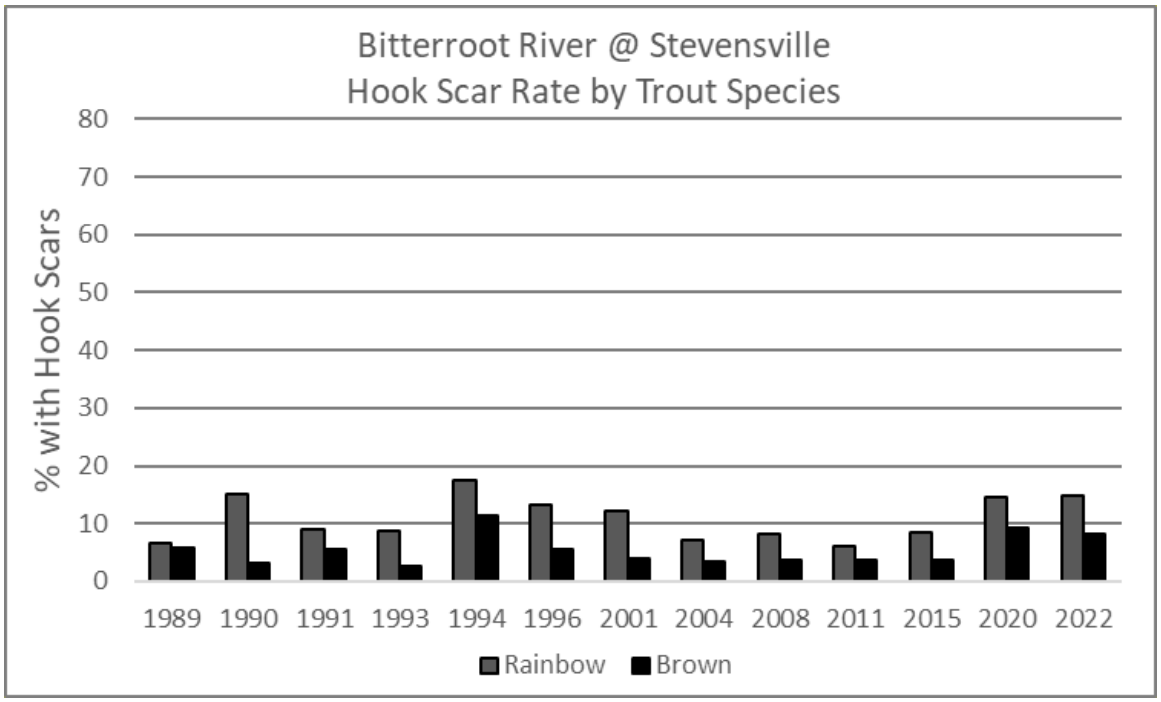

Figure 12. Hook scar rates for trout (>175 mm) in the Bitterroot River at the Stevensville section for the period of record. Rainbow trout value includes rainbow x westslope cutthroat trout hybrids.

In general, trout population monitoring on the Bitterroot River in 2021 and 2022 indicated that trout population numbers are stable to declining depending on species and river location. Reduced trout populations throughout the mainstem Bitterroot River are likely related to recent drought conditions and relatively poor flow years. Summer angling restrictions (often called "hoot owl" closures, which restrict angling from 2 p.m to midnight when in effect) were placed on the entirety of the Bitterroot River for a portion of the summer in both 2021 and 2022 due to elevated water temperatures and low flows. Mean August flow in both 2021 and 2022 at the USGS gauge station at Bell Crossing was below the long-term average (414 cfs from 1989-2020). Additionally, since 2015, mean August flow at Bell Crossing has been below average on six out of eight years (Figure 13). This has likely resulted in poor spawning and recruitment success throughout this time period, ultimately leading to the reduction in catchable fish numbers in the Bitterroot River.

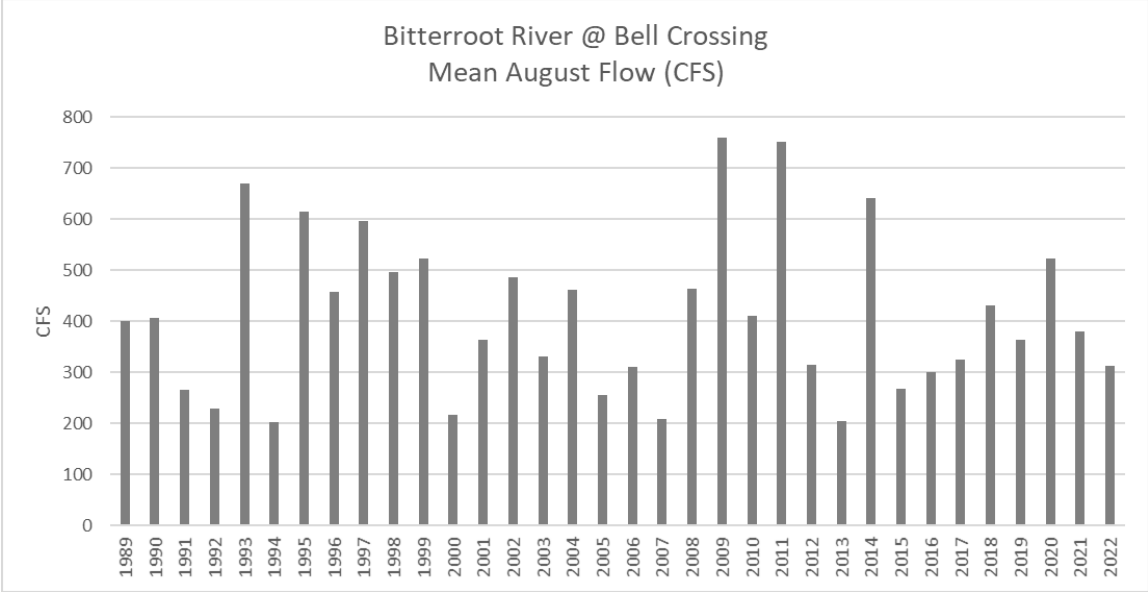

Figure 13. Mean August flow in the Bitterroot River at Bell Crossing near Victor, MT for the period of record. Flow data was obtained from USGS gauge station 12350250. The mean August flow from 1989-2020 is 414 cfs.

In addition to drought impacts, angler pressure has also risen to record levels in recent years on the Bitterroot River (Figure 14). The most recent pressure estimate from 2020 was over 140,000 angler days. It is unknown if current pressure levels are having a measurable impact on trout populations. In general hook scar rates observed for rainbow trout and brown trout are close to long-term averages and it appears unlikely that pressure or harvest is having an effect on the population dynamics of these species. However, westslope cutthroat trout, which are more susceptible to being caught by anglers, have seen increased hook scar rates over the last decade (Figures 5 and 9). While harvest of westslope cutthroat trout is not allowed in the Bitterroot River and the upper Forks, further investigation into the impact of catch-and-release mortality appears warranted given recently observed trends (increasing angler pressure and hook scar rates, decreasing westslope cutthroat trout populations in the upper Bitterroot). Catch-and-release related

mortality has generally been assumed to be around 5% based on the current body of scientific literature (Schill and Scarpella 1997). However, little work has focused on westslope cutthroat trout that are caught repeatedly over a short amount of time and/or when conditions are stressful (warm water temperatures).

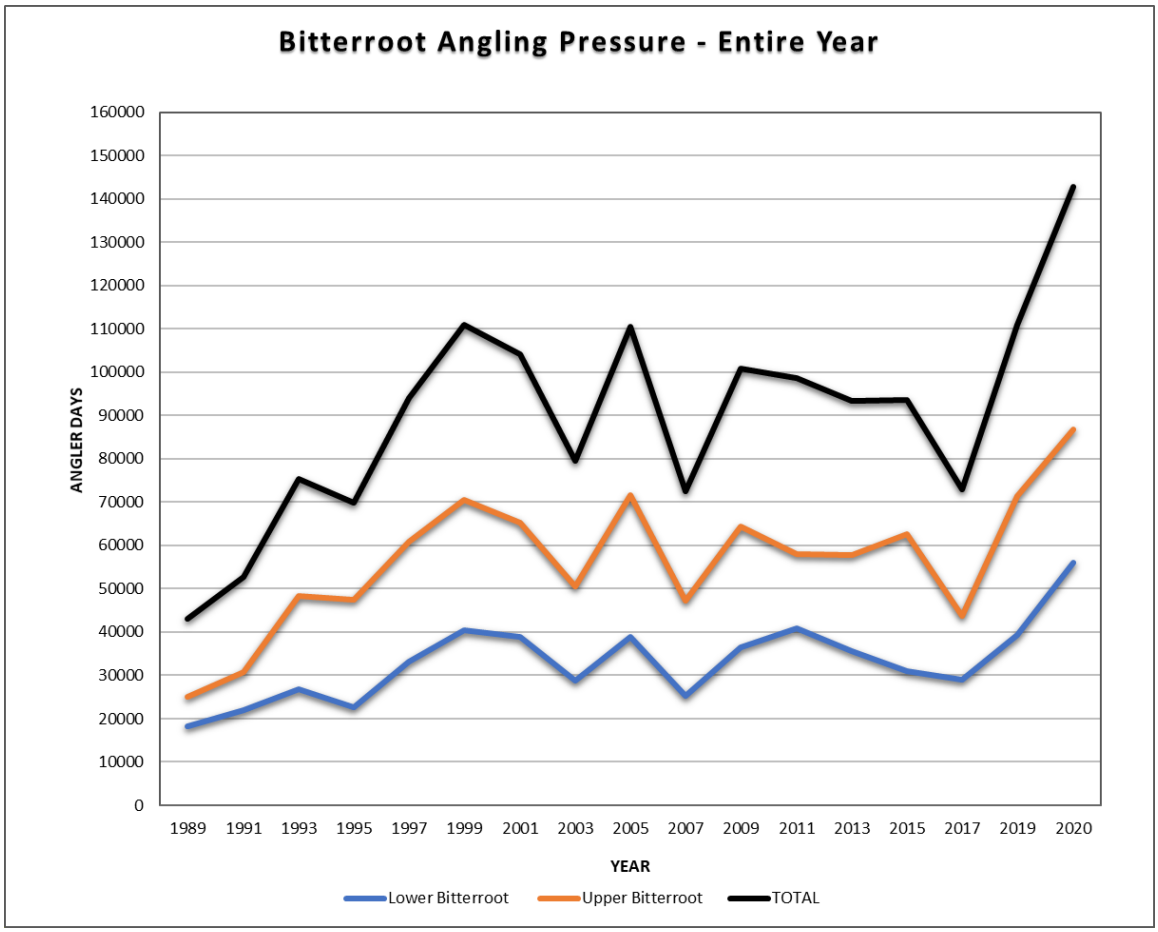

Figure 14. Bitterroot River angler days for the period of record. Data from FWP angler survey.

West Fork Bitterroot River

Population estimates were completed at two sections on the West Fork Bitterroot River during the sample period. The reaches sampled included the new Bonnie Blue section located downstream of Painted Rocks Reservoir in 2021, and the Conner long-term site in 2022. The Bonnie Blue section was first sampled in 2020 to expand our knowledge of species composition and abundance in this reach of the river.

At the Bonnie Blue section in 2021, rainbow trout and brown trout comprised much of the trout community, with rainbow trout being most common (Table 4). Westslope cutthroat trout, brook trout, and bull trout were also present in the reach but in fewer numbers (Table 4). Unfortunately, no estimates were generated in 2020 due to poor

sampling conditions and reduced capture efficiency. Because of this, no population trend data currently exists for this section. Continued sampling should be done to build a base-line data set.

Table 4. Electrofishing data collected on the West Fork Bitterroot River at the Bonnie Blue Section during fall 2021. Population estimates and capture efficiencies are for trout greater than 175 mm (~7") in total length. Number following the population estimate (in parentheses) represents the 95% confidence interval. Rainbow trout numbers includes rainbow x westslope cutthroat trout hybrids. Brook trout numbers include brook x bull trout hybrids.

Trout Species	Population Estimate (fish/mile)	Capture Efficiency (%)	Total Fish Handled	Mean Length (mm)	Length Range (mm)	Species Composition (%)
Bull	-	-	5	202	170-225	1
Cutthroat	121 (+/- 64)	23	67	269	110-475	12
Rainbow	290 (+/- 91)	24	268	207	52-567	49
Brown	332 (+/- 110)	24	192	251	67-548	35
Brook	-	-	19	180	80-247	3

At the Conner section in 2022, westslope cutthroat trout were the most abundant fish sampled, followed closely by rainbow trout and then brown trout (Table 5). Bull trout and brook trout were also collected in the reach but were rare (Table 5). Westslope cutthroat trout densities in the Conner section have generally increased since the early 1990s when catch-and-release restrictions where instituted for the species (Figure 14). However, the estimate obtained in 2022 showed that population numbers had declined to slightly below the long-term average. Rainbow trout numbers were also below the long-term average and were the lowest ever recorded in the section (Figure 15). However, the 2022 estimate for rainbow trout was only slightly lower than previous estimates for the species collected over the last two decades (Figure 15). Brown trout density in the lower West Fork was also down and was similar to numbers observed in the late 1980s and early 1990s (Figure 16). Bull trout presence has been trending down in the Conner section since it was first sampled in 1986 (Figure 17). The proportion of trout (>175 mm) showing evidence of hook scars in the Conner section in 2022 was 4.9% for brown trout, 27.1% for rainbow trout (includes rainbow x westslope cutthroat trout hybrids), and 67.9% for westslope cutthroat trout. The rate for brown trout was slightly above the long-term average, whereas the rates for rainbow trout and westslope cutthroat trout were considerably more and were the highest ever recorded for both species (Figure 18).

Table 5. Electrofishing data collected on the West Fork Bitterroot River at the Conner Section during fall 2022. Population estimates and capture efficiencies are for trout greater than 175 mm (~7") in total length. Number following the population estimate (in parentheses) represents the 95% confidence interval. Rainbow trout estimate includes rainbow x westslope cutthroat trout hybrids. Brook trout numbers include any brook x bull trout hybrids.

Trout Species	Population Estimate (fish/mile)	Capture Efficiency (%)	Total Fish Handled	Mean Length (mm)	Length Range (mm)	Species Composition (%)
Bull	n/a	-	2	251	208-294	<1
Cutthroat	204 (+/- 68)	27	228	300	141-449	47
Rainbow	172 (+/- 90)	19	171	267	100-481	35
Brown	52 (+/- 29)	23	85	253	81-470	17
Brook	n/a	-	2	240	184-295	<1

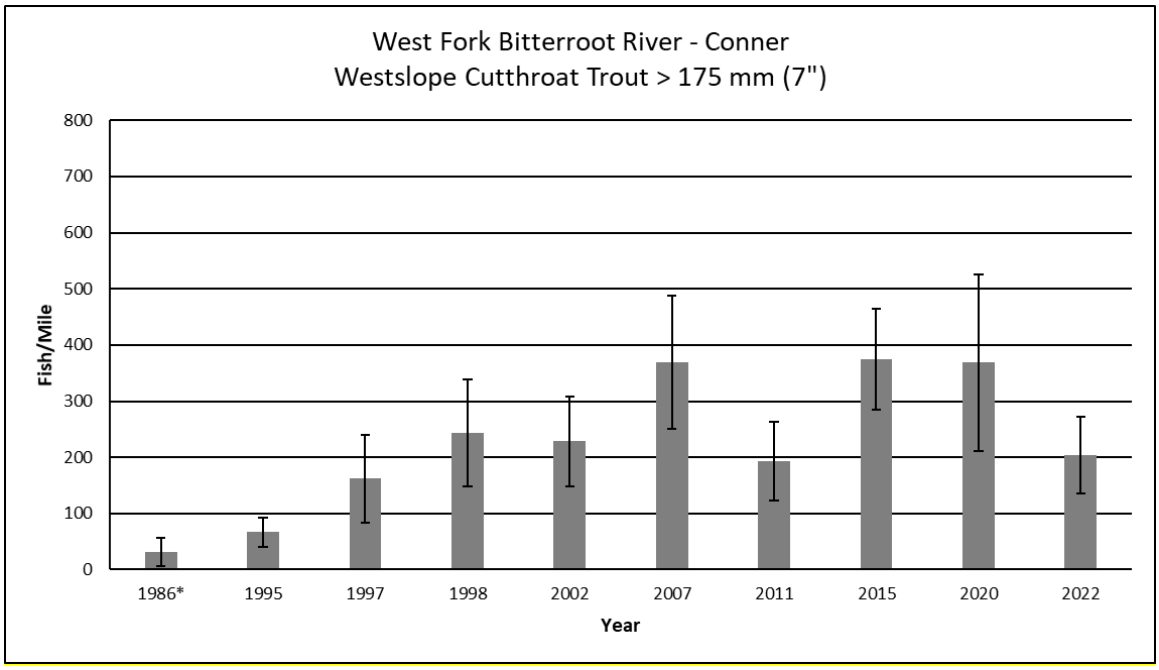

Figure 14. Population estimates for westslope cutthroat trout greater than 175 mm (~7") in total length in the Conner section for the period of record.

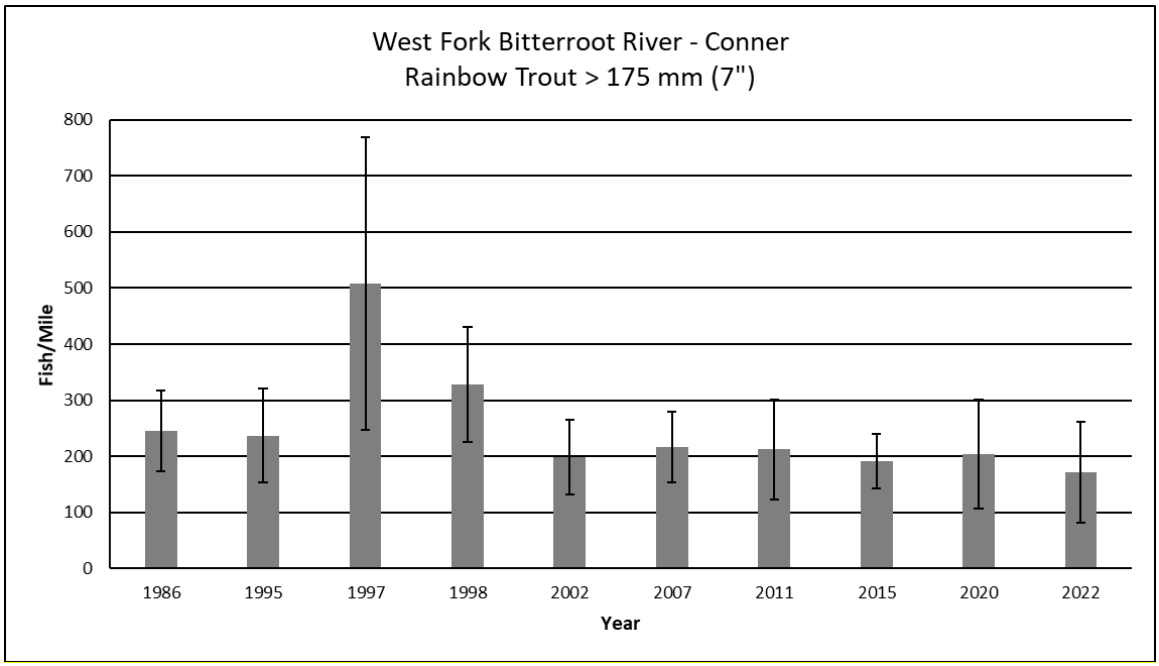

Figure 15. Population estimates for rainbow trout greater than 175 mm (~7") in total length in the Conner section for the period of record. Estimates include rainbow x westslope cutthroat trout hybrids.

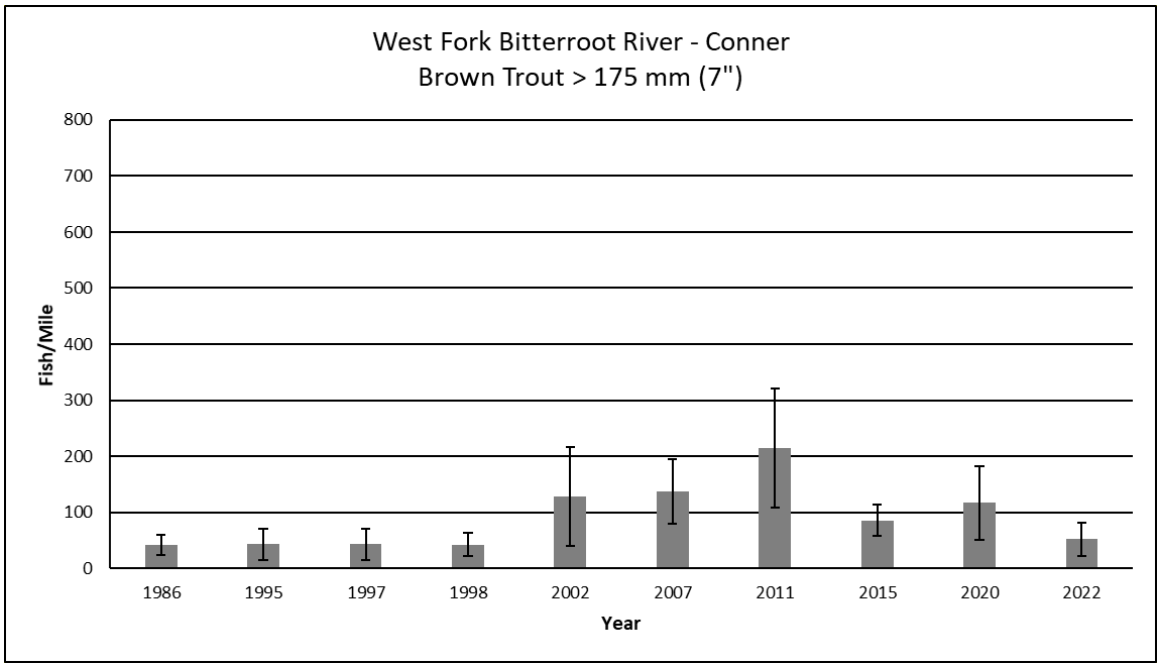

Figure 16. Population estimates for brown trout greater than 175 mm (~7") in total length in the Conner section for the period of record.

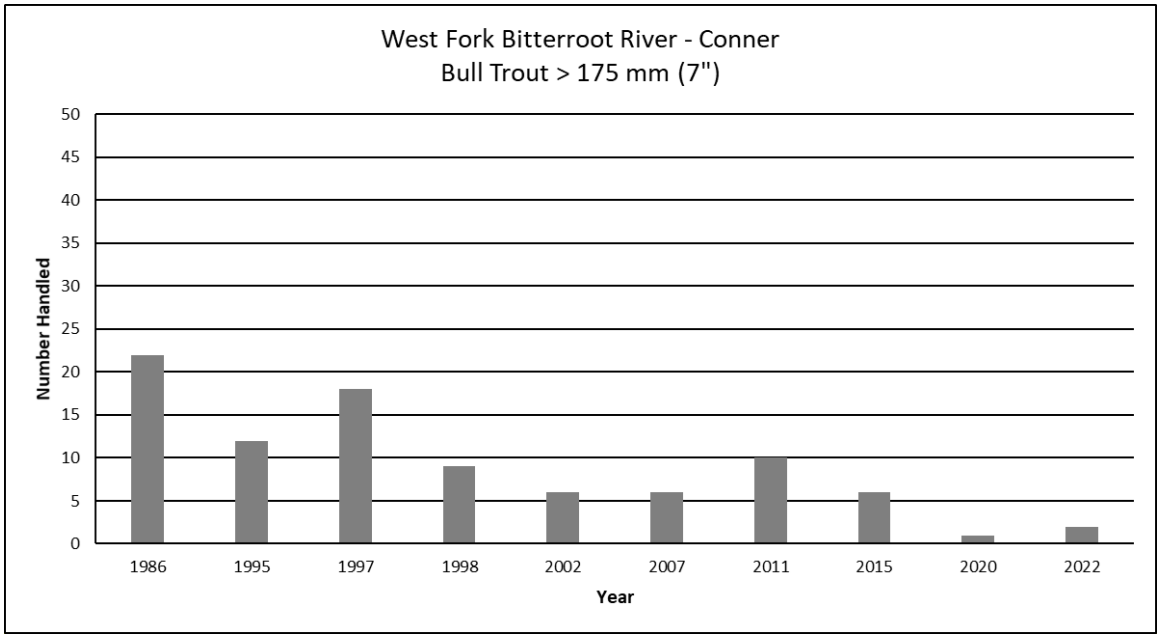

Figure 17. Number of bull trout greater than 175 mm (~7") in total length handled in the Conner section for the period of record.

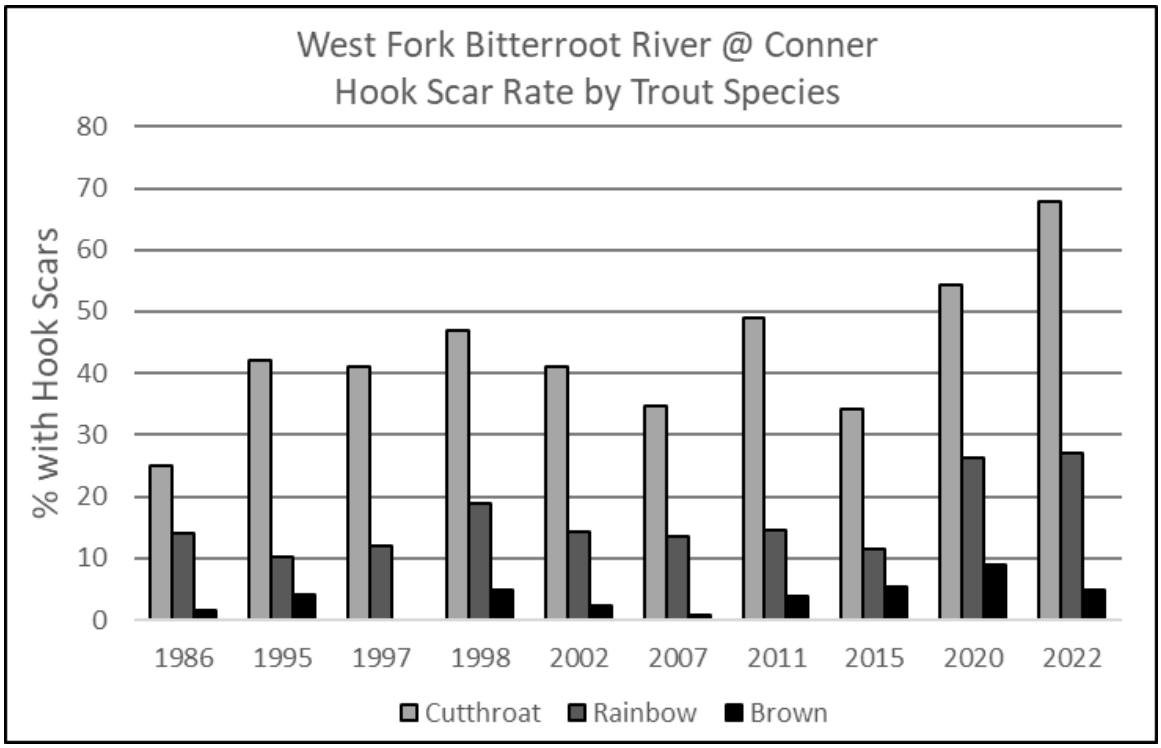

Figure 18. Hook scar rates for trout (>175 mm) in the West Fork Bitterroot River at the Conner section for the period of record. Rainbow trout value includes rainbow x westslope cutthroat trout hybrids.

The cause(s) for declines in trout numbers in the lower West Fork at the Conner section are not completely understood but are likely related to ongoing drought conditions in the region. Similar to what was discussed above for the Bitterroot River, poor flow conditions and elevated summer stream temperatures have likely impacted spawning, recruitment, and overall fish survival over the last several years. While angler harvest is allowed for brown trout in the Conner section, there is no evidence to suggest that this is having a measurable effect on the brown trout population in the reach. First, catch rates for brown trout are low as indicated by low hook scar rates throughout the drainage for this species; and second, limited creel surveys in the West Fork as well more detailed surveys on nearby rivers such as the Blackfoot River and Rock Creek suggest that most anglers are fly fishing and practicing catch-and-release (Liermann 2022, Uthe 2022). Current harvest rates are extremely low and do not appear to have an impact on fish population levels in the region. Westslope cutthroat trout and rainbow trout are both protected by a catch-and-release regulations in the West Fork, and harvest is not a concern for these species. However, similar to the Bitterroot River, the West Fork is currently experiencing angler pressure at unprecedented levels. It is unknown if current pressure levels are having an impact on trout populations, despite the fact that most of the angling is catch-and-release. Increasing hook scar rates and declining populations observed for westslope cutthroat trout in particular suggest that further investigation into the impact of catch-and-release related mortality appears warranted. Catch-and-release related mortality has generally been assumed to be around 5% based on the current body of scientific literature (Schill and Scarpella 1997). However, little work has focused on westslope cutthroat trout that are caught repeatedly over a short amount of time and/or when conditions are stressful (warm water temperatures).

East Fork Bitterroot River

Population estimates were completed at three sections on the East Fork Bitterroot River during the sample period. Sections sampled included the Trinity section (RM 2.5) in 2021, and the Maynard (RM 12.0) and Wilderness Trailhead sections (RM 31.4) in 2022.

At the Trinity section (RM 2.5) in 2021, rainbow trout comprised over half of the fish handled followed by brown trout, which made up almost 40% of the trout community (Table 6). Other species, including westslope cutthroat trout, made up less than 10% of the fish sampled (Table 6). Rainbow trout densities in the Trinity section were slightly above average and have showed an increasing trend over the last decade (Figure 19). Whirling disease likely continues to impact rainbow trout numbers in the lower East Fork as densities are still below peak values observed in 2000, which was close to when the disease was first detected. Brown trout density was slightly below the long-term average but was similar to recent estimates collected within the last decade (Figure 20). No estimate was made for westslope cutthroat trout due to an insufficient number of fish handled. However, the total number sampled was similar to previous years (Figure 21).

Table 6. Electrofishing data collected on the East Fork Bitterroot River at the Trinity Section during fall 2021. Population estimates and capture efficiencies are for trout greater than 175 mm (~7") in total length. Number following the population estimate (in parentheses) represents the 95 % confidence interval. Rainbow trout estimate includes rainbow x westslope cutthroat trout hybrids

Trout Species	Population Estimate (fish/mile)	Capture Efficiency (%)	Total Fish Handled	Mean Length (mm)	Length Range (mm)	Species Composition (%)
Bull	-	-	0	-	-	-
Cutthroat	-	-	36	294	140-415	8
Rainbow	318 (+/- 113)	29	231	189	71-455	53
Brown	207 (+/- 49)	43	169	215	74-556	39
Brook	-	-	2	228	205-251	<1

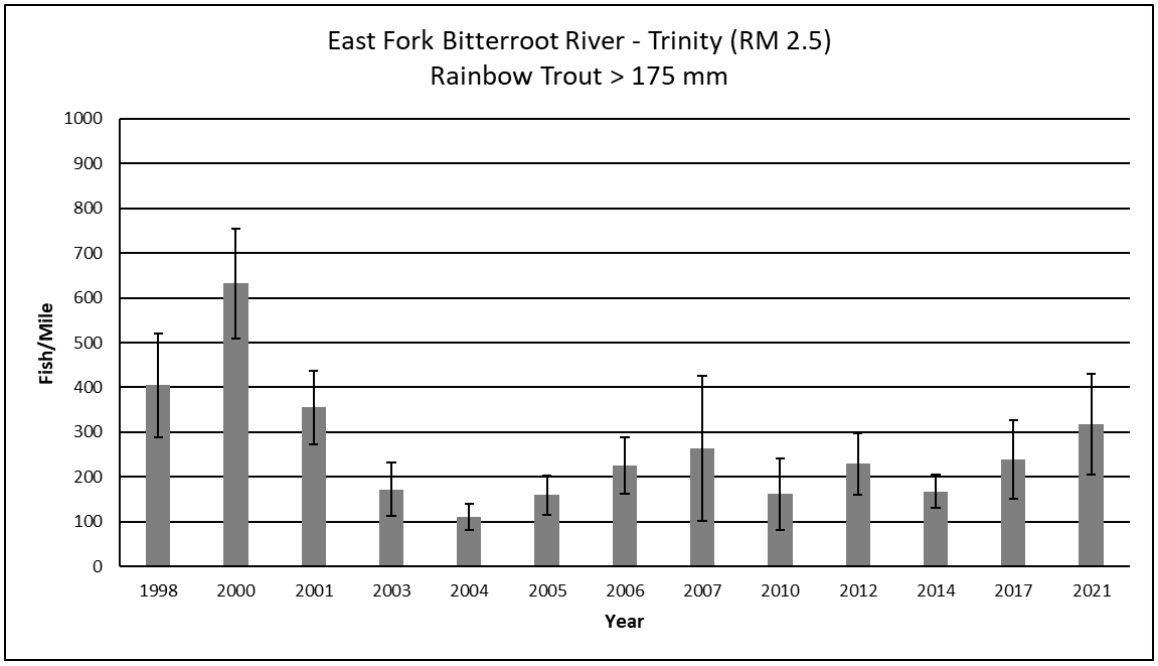

Figure 19. Population estimates for rainbow trout greater than 175 mm (~7") in total length in the Trinity section for the period of record. Estimates include rainbow x westslope cutthroat trout hybrids.

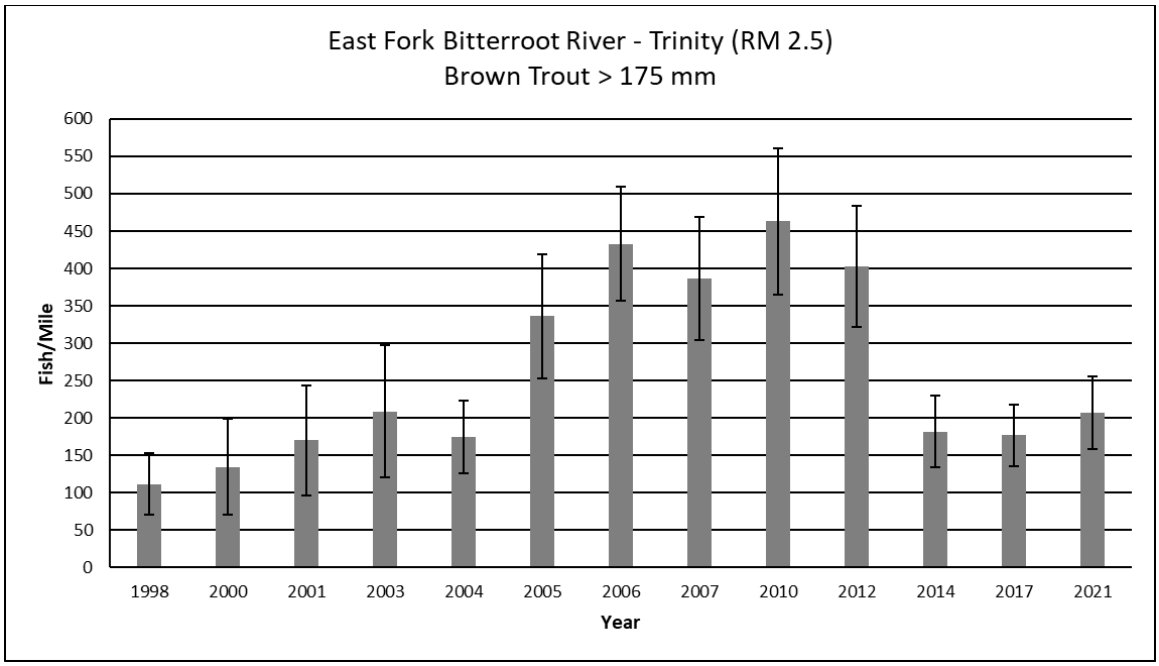

Figure 20. Population estimates for Brown Trout greater than 175 mm (~7") in total length in the Trinity section for the period of record.

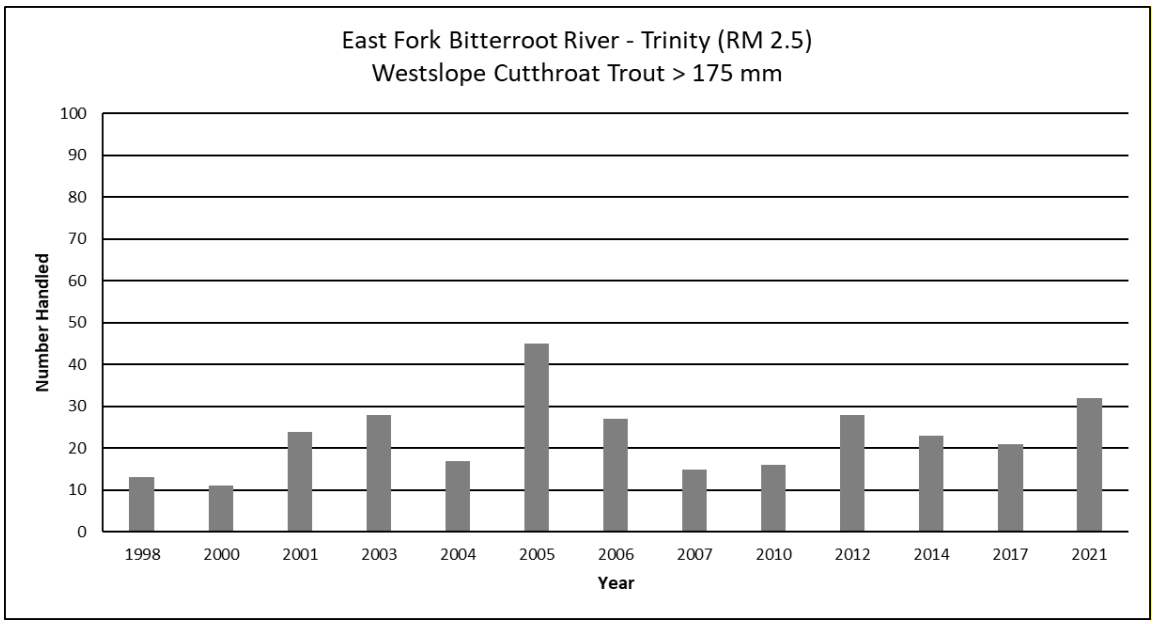

Figure 21. Number of westslope cutthroat trout greater than 175 mm (~7") in total length handled in the Trinity section for the period of record.

At the Maynard section (RM 12.0) in 2022, rainbow trout comprised most of the fish handled followed by brown trout (Table 7). Westslope cutthroat trout and bull trout were also present in the reach in low numbers (Table 7). Rainbow trout density was near the recent average (Figure 22). Whirling disease likely continues to impact rainbow trout numbers in the lower East Fork as densities are still below peak values observed in the

early 2000s, which was approximately when the disease was detected. Brown trout density was slightly below the long-term average but within the range of variability observed in the last decade (Figure 23). No estimate was made for westslope cutthroat or bull trout due to insufficient numbers of fish handled. However, the total number of westslope cutthroat trout sampled was down from recent years (Figure 24), and low numbers of bull trout has been the norm for this section (Figure 25).

Table 7. Electrofishing data collected on the East Fork Bitterroot River at the Maynard Section during fall 2022. Population estimates and capture efficiencies are for trout greater than 175 mm (~7") in total length. Number following the population estimate (in parentheses) represents the 95% confidence interval. Rainbow trout estimate includes any rainbow x westslope cutthroat trout hybrids

Trout Species	Population Estimate (fish/mile)	Capture Efficiency (%)	Total Fish Handled	Mean Length (mm)	Length Range (mm)	Species Composition (%)
Bull	n/a	-	1	199	-	<1
Cutthroat	n/a	-	9	330	185-397	2
Rainbow	399 (+/- 155)	29	244	184	74-415	66
Brown	233 (+/- 86)	35	114	196	94-405	31
Brook	-	-	0	-	-	-

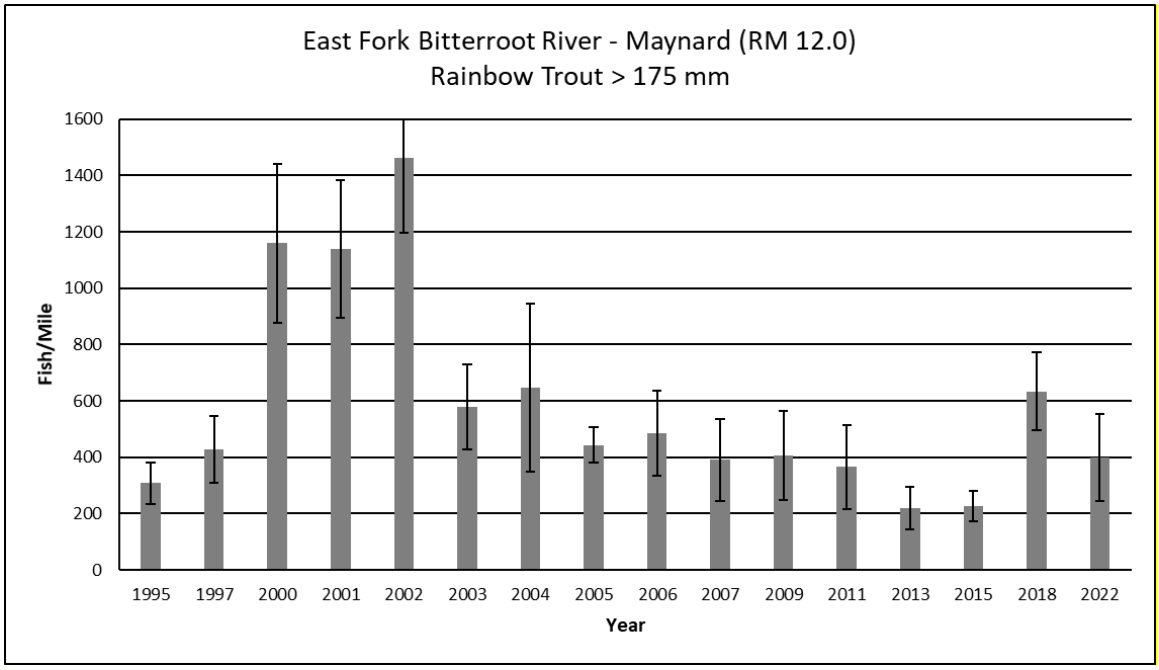

Figure 22. Population estimates for rainbow trout greater than 175 mm (~7") in total length in the Maynard section for the period of record. Estimates include rainbow x westslope cutthroat trout hybrids.

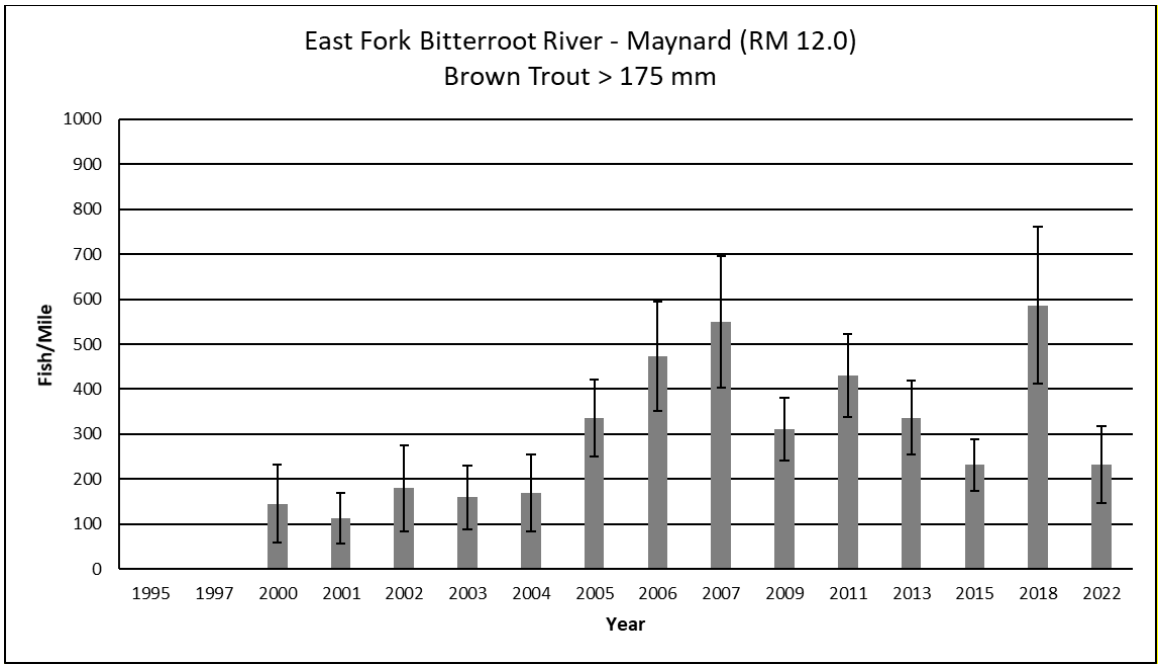

Figure 23. Population estimates for brown trout greater than 175 mm (~7") in total length in the Maynard section for the period of record.

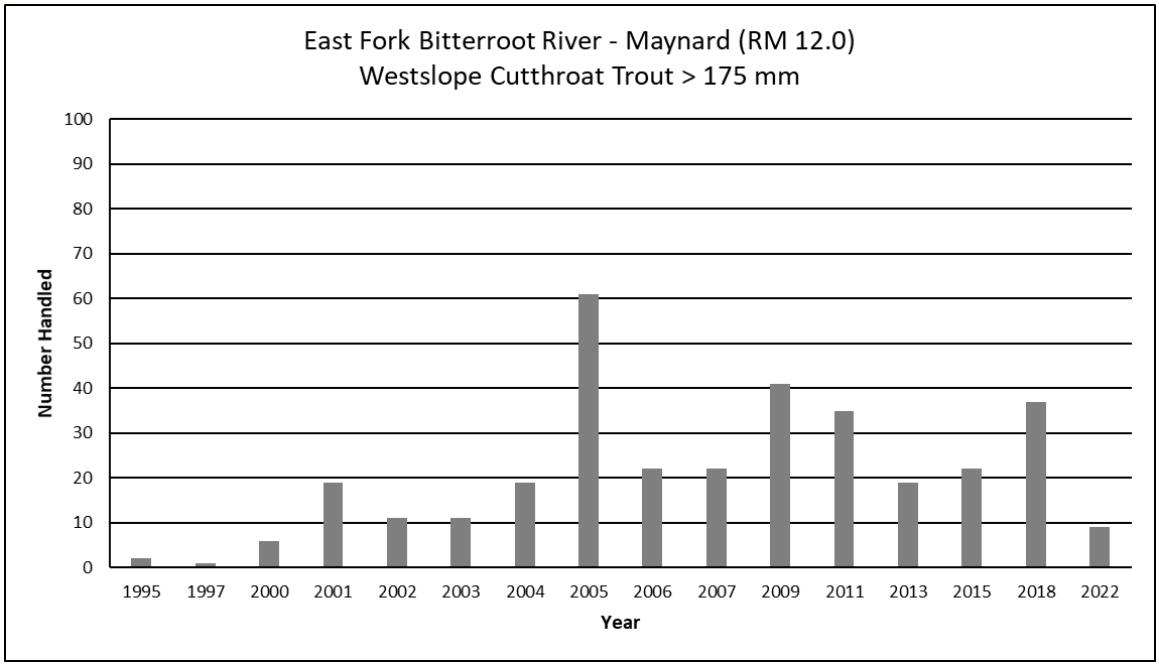

Figure 24. Number of westslope cutthroat trout greater than 175 mm (~7") in total length handled in the Maynard section for the period of record.

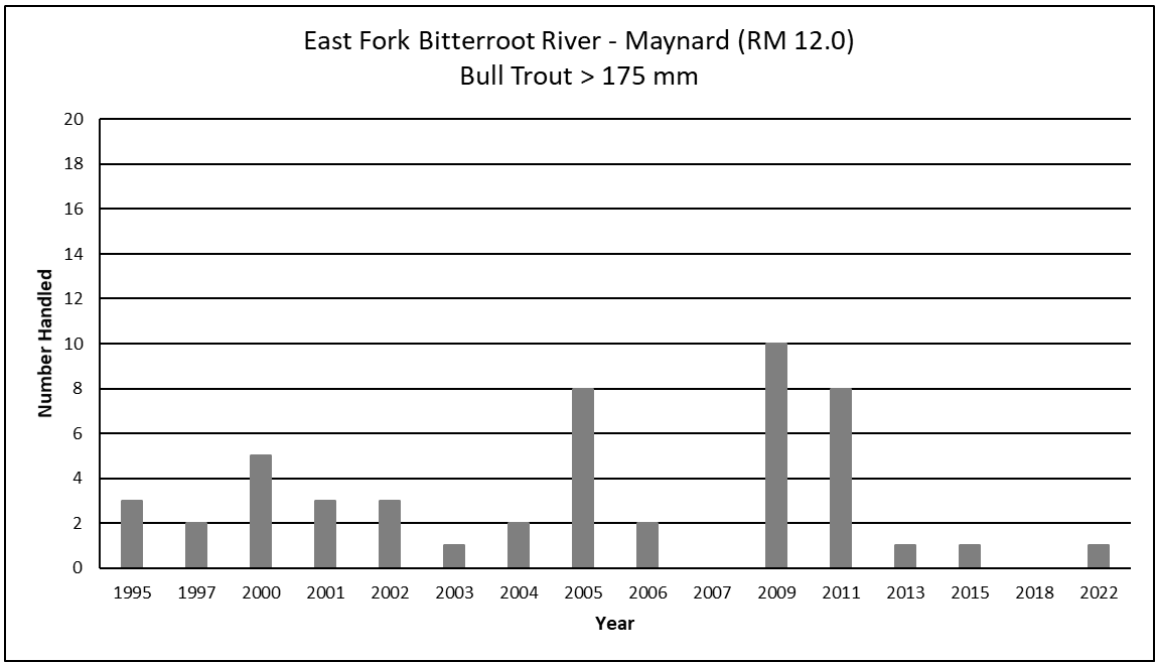

Figure 25. Number of bull trout greater than 175 mm (~7") in total length handled in the Maynard section for the period of record.

At the Wilderness Trailhead section (RM 31.4) in 2022, westslope cutthroat trout comprised over 90% of the trout community at the site, with bull trout making up much of the remainder (Table 8). Brown trout were also detected in the reach in low numbers. The population estimate for westslope cutthroat trout was slightly above the long-term average for the site (Figure 26). No estimate was obtained for bull trout due to an insufficient number of fish handled. However, the number of bull trout observed was slightly below average, although the species has never been overly common in the reach throughout the period of record (Figure 27).

Table 8. Electrofishing data collected on the East Fork Bitterroot River at the Wilderness Trailhead Section during fall 2022. Population estimates and capture efficiencies are for trout greater than 175 mm (~7") in total length. Number following the population estimate (in parentheses) represents the 95% confidence interval.

Trout Species	Population Estimate (fish/mile)	Capture Efficiency (%)	Total Fish Handled	Mean Length (mm)	Length Range (mm)	Species Composition (%)
Bull	n/a	-	11	148	107-177	7
Cutthroat	327 (+/- 94)	52	153	162	46-338	91
Rainbow	-	-	0	-	-	-
Brown	n/a	-	4	173	121-223	2
Brook	-	-	0	-	-	-

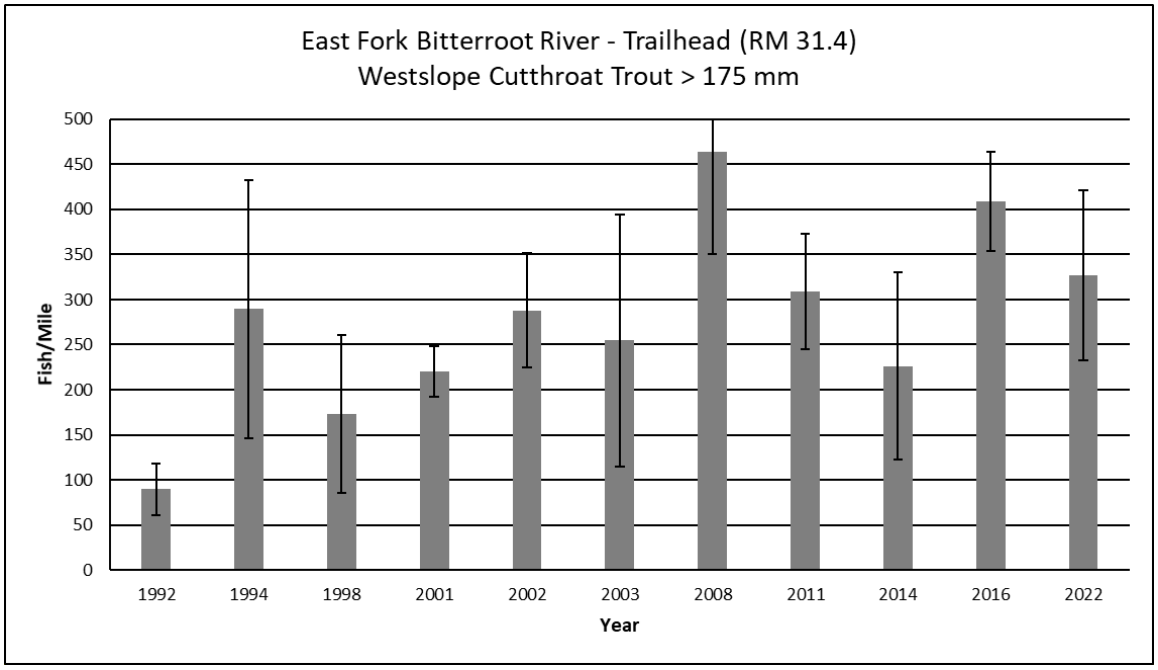

Figure 26. Population estimates for westslope cutthroat trout greater than 175 mm (~7") in total length in the Wilderness Trailhead section for the period of record.

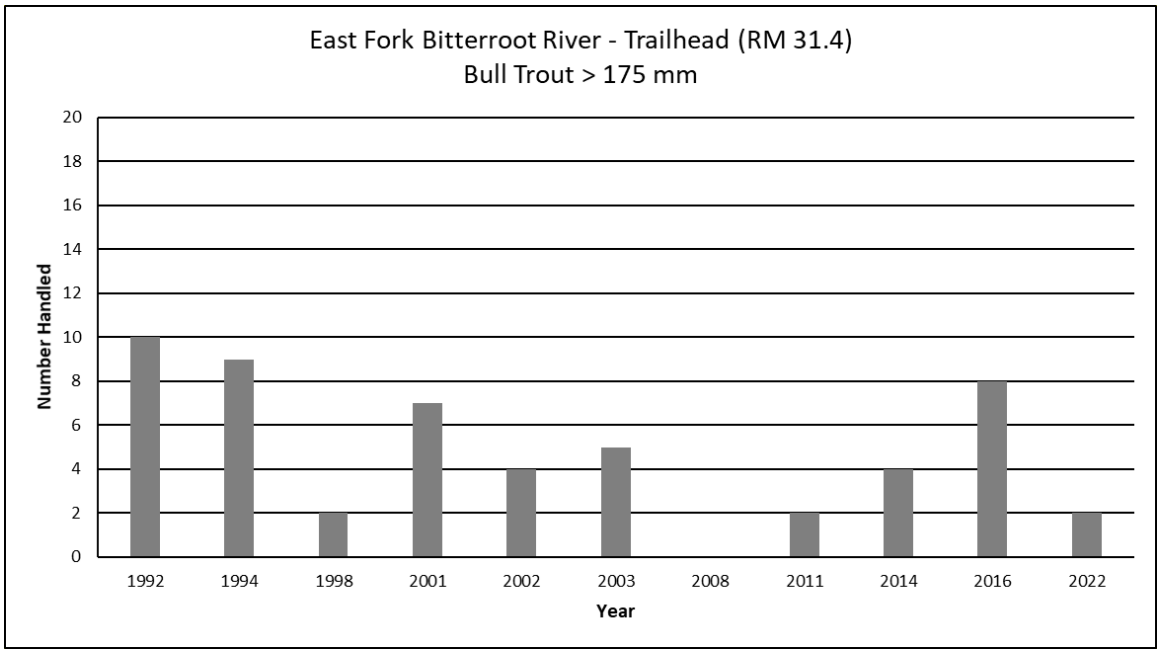

Figure 27. Number of bull trout greater than 175 mm (~7") in total length handled in the Wilderness Trailhead section for the period of record.

Bitterroot River Multi-Species Single-Pass Sampling

During spring of 2021, all established Bitterroot River single-pass sections were sampled. These included the Missoula, Stevensville, Hamilton, and Hannon sections. Mountain whitefish were the most common fish captured at all sites, comprising between 66% and 89% of the total catch (Table 9). The number of whitefish captured in 2021 was the highest recorded in the Missoula and Hamilton sections but was below record highs observed at the Stevensville and Hannon sections in 2020 (Figures 28, 29, 30, and 31).

Table 9. Electrofishing data collected at the Missoula, Stevensville, Hamilton, and Hannon single-pass sections in the spring of 2021. Small bodied species (redside shiner, longnose dace, and slimy sculpin) are not included due to the inherently poor capture efficiency of these fish with a boat electrofisher. Species abbreviations are as follows: MWF = Mountain Whitefish, RB = Rainbow Trout, LL = Brown Trout, WCT = Westslope Cutthroat Trout, BULL = Bull Trout, EB = Brook Trout, LNSU = Longnose Sucker, LSSU = Largescale Sucker, NPMN = Northern Pikeminnow, NP = Northern Pike. Rainbow trout numbers include rainbow x westslope cutthroat trout hybrids.

Section	Species	Total Fish Handled / Catch per Mile	Mean Length (mm)	Length Range (mm)	Species Composition (%)
Missoula	MWF	431 / 172	262	110-474	66
	RB	63 / 25	341	98-490	10
	LL	13 / 5	300	109-578	2
	WCT	7 / 3	363	236-420	1
	LSSU	124 / 50	490	97-600	19
	NPMN	11 / 4	430	372-510	2
	NP	1 / <1	830	n/a	<1
Stevensville	MWF	577 / 289	276	89-436	88
	RB	28 / 14	316	74-490	4
	LL	18 / 9	419	166-596	3
	WCT	1 / <1	292	n/a	<1
	LSSU	18 / 9	441	104-604	3
	NPMN	11 / 6	388	367-425	2
Hamilton	MWF	737 / 388	289	100-407	89
	RB	13 / 7	334	143-456	2
	LL	15 / 8	412	237-520	2
	WCT	6 / 3	322	236-397	1
	LNSU	2 / 1	415	400-430	<1
	LSSU	34 / 18	492	402-585	4
	NPMN	17 / 9	437	367-511	2
Hannon	MWF	296 / 164	317	93-510	74
	RB	30 / 17	327	127-444	7.5
	LL	24 / 13	264	97-446	6
	WCT	35 / 19	335	121-445	9
	LSSU	14 / 8	473	407-544	3.5

During spring of 2022 three of the established sections were sampled. These included the Stevensville, Hamilton, and Hannon sections. Mountain whitefish were again the most common fish captured at all sites, comprising between 66% and 88% of the total catch (Table 10). The number of whitefish collected in 2022 was below the long-term averages for all three sites (Figures 29, 30, and 31). Other species sampled in 2021 and 2022 showed no clear population trends. This is likely due to low numbers of individuals handled.

Table 10. Electrofishing data collected at the Stevensville, Hamilton, and Hannon single-pass sections in the spring of 2022. Small bodied species (redside shiner, longnose dace, and slimy sculpin) are not included due to the inherently poor capture efficiency of these fish with a boat electrofisher. Species abbreviations are as follows: MWF = Mountain Whitefish, RB = Rainbow Trout, LL = Brown Trout, WCT = Westslope Cutthroat Trout, BULL = Bull Trout, EB = Brook Trout, LNSU = Longnose Sucker, LSSU = Largescale Sucker, and NPMN = Northern Pikeminnow. Rainbow trout numbers include rainbow x westslope cutthroat trout hybrids.

Section	Species	Total Fish Handled / Catch per Mile	Mean Length (mm)	Length Range (mm)	Species Composition (%)
Stevensville	MWF	398 / 199	281	96-425	85
	RB	41 / 21	329	115-471	9
	LL	15 / 8	415	273-575	3
	LNSU	1 / <1	495	n/a	<1
	LSSU	7 / 4	504	480-580	1
	NPMN	6 / 3	405	140-526	1
Hamilton	MWF	337 / 177	300	90-382	88
	RB	9 / 5	294	105-427	2
	LL	11 / 6	286	117-481	3
	LNSU	1 / <1	445	n/a	<1
	LSSU	20 / 11	506	329-600	5
	NPMN	5 / 3	424	390-450	1
Hannon	MWF	247 / 137	315	83-415	66
	RB	19 / 11	324	92-555	5
	LL	25 / 14	273	93-450	7
	WCT	26 / 14	361	145-420	7
	EB	1 / <1	122	n/a	<1
	LSSU	57 / 32	488	416-580	15

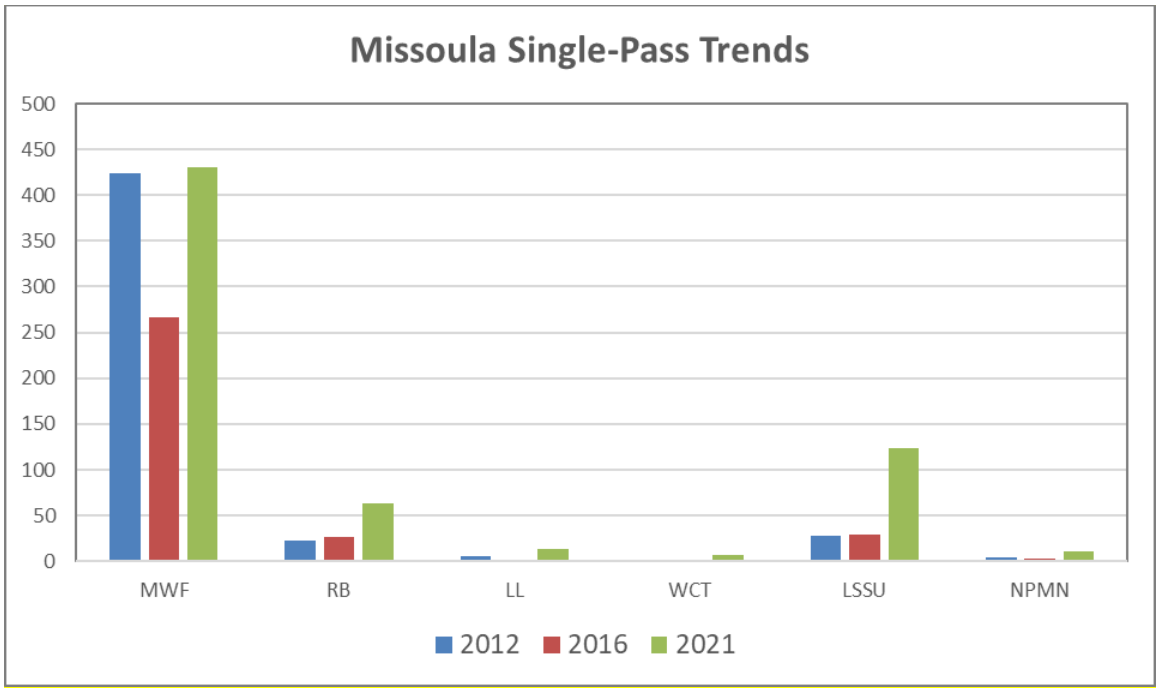

Figure 28. Number of fish handled for specific species in the Missoula single-pass section for the period of record. Species abbreviations are as follows: MWF = Mountain Whitefish, RB = Rainbow Trout, LL = Brown Trout, WCT = Westslope Cutthroat Trout, LSSU = Largescale Sucker, and NPMN = Northern Pikeminnow. Rainbow trout numbers include any rainbow x westslope cutthroat trout hybrids.

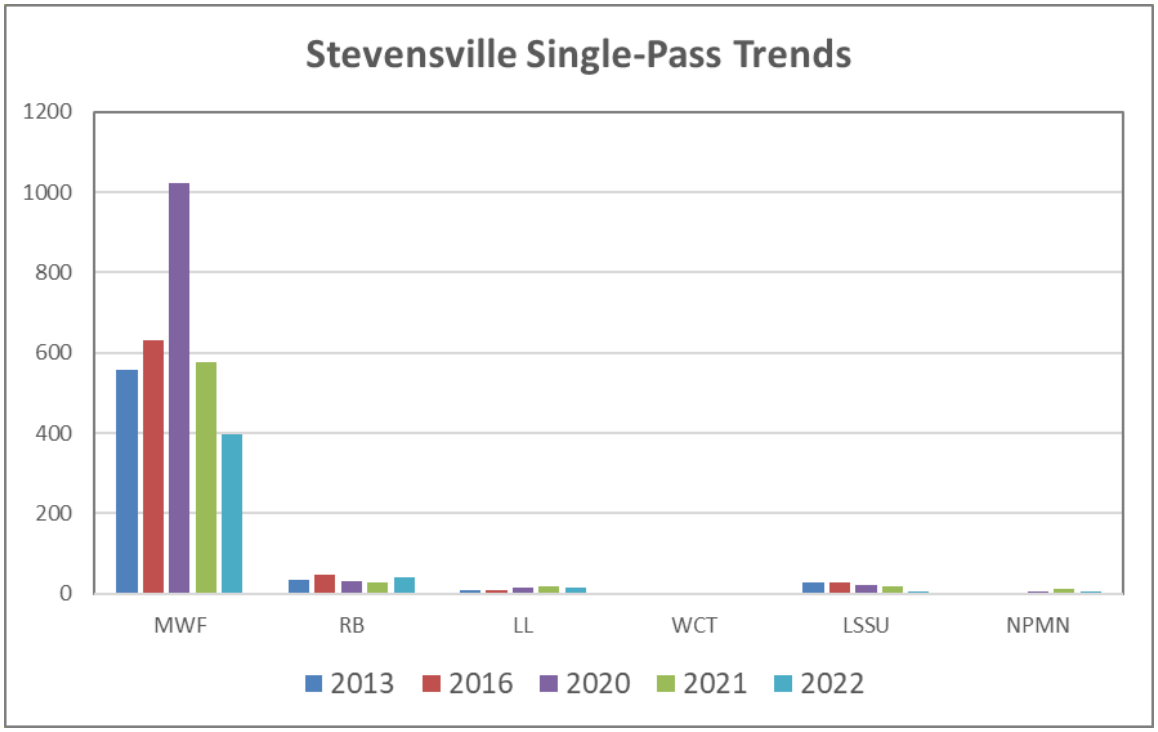

Figure 29. Number of fish handled for specific species in the Stevensville single-pass section for the period of record. Species abbreviations are as follows: MWF = Mountain Whitefish, RB = Rainbow Trout, LL = Brown Trout, WCT = Westslope Cutthroat Trout, LSSU = Largescale Sucker, and NPMN = Northern Pikeminnow. Rainbow trout numbers include any rainbow x westslope cutthroat trout hybrids.

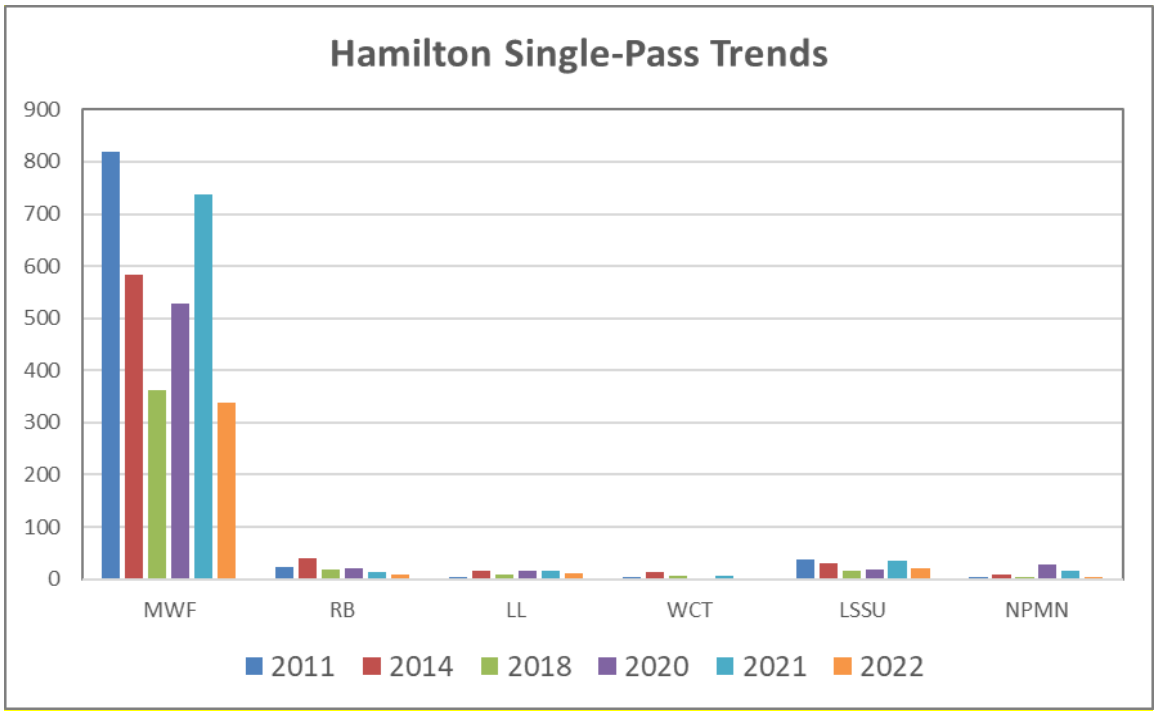

Figure 30. Number of fish handled for specific species in the Hamilton single-pass section for the period of record. Species abbreviations are as follows: MWF = Mountain Whitefish, RB = Rainbow Trout, LL = Brown Trout, WCT = Westslope Cutthroat Trout, LSSU = Largescale Sucker, and NPMN = Northern Pikeminnow. Rainbow trout numbers include any rainbow x westslope cutthroat trout hybrids.

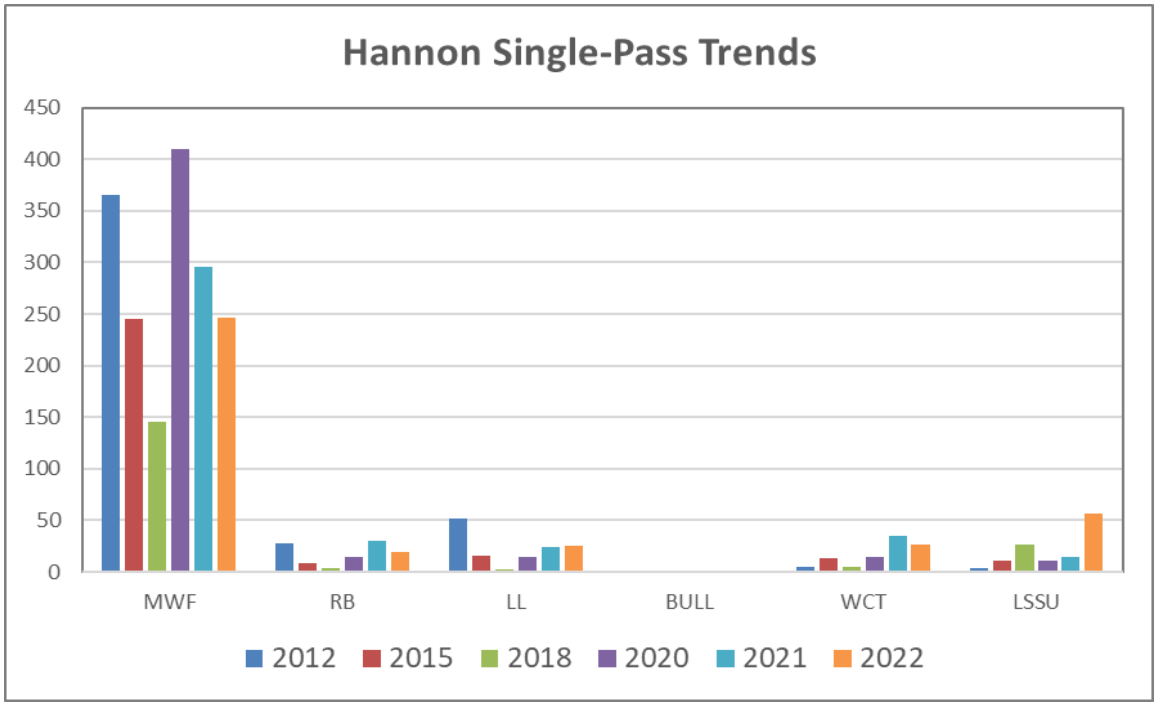

Figure 31. Number of fish handled for specific species in the Hannon single-pass section for the period of record. Species abbreviations are as follows: MWF = Mountain Whitefish, RB = Rainbow Trout, LL = Brown Trout, BULL = Bull Trout, WCT = Westslope Cutthroat Trout, and LSSU = Largescale Sucker. Rainbow trout numbers include any rainbow x westslope cutthroat trout hybrids.

Tributary Fish Sampling

Threemile Creek Drainage

Threemile Creek

Fish surveys were completed in upper Threemile Creek during the summer of 2021 and 2022. The established estimate section near the downstream boundary of the Threemile Wildlife Management Area at Forest Service River Mile (FSRM) 12.3 was sampled in both years. An additional one-pass survey was completed in 2021 near FSRM 15.5 to assess species composition at this location in the drainage.

At FSRM 12.3, westslope cutthroat trout dominated the trout community, with brook trout also present, but in lower densities (Table 11). The population estimate for westslope cutthroat trout over 100 mm in length in 2021was 184 per 1000 ft (95% confidence interval: +/- 42), and for 2022 it was 169 per 1000 ft (95% confidence interval: +/- 63). The estimate for brook trout in 2021 was 52 per 1000 ft (95% confidence interval: +/- 20), and for 2022 it was 54 per 1000 ft (95% confidence interval: +/- 21). Only three years of sampling are available for this site and caution should be taken making inference about data patterns. However, the limited trend data suggests that native westslope cutthroat trout may be slowly declining (Figure 32) in density while non-native brook trout are gradually increasing in number (Figure 33). Further sampling is important to monitor this trend.

Table 11. Electrofishing data collected in Three Mile Creek at the FSRM 12.3 section in 2021 and 2022. Data presented is from the marking run. Species abbreviations are as follows: WCT = Westslope Cutthroat Trout and EB = Brook Trout.

Year	Species	Number of Fish Captured	Fish per 1000 ft (CPUE)	Mean Length (mm)	Length Range (mm)	Species Composition (%)
2021	WCT	70	117	127	51-219	76
	EB	22	37	123	70-189	24
2022	WCT	63	105	120	61-217	66
	EB	33	55	112	75-201	34

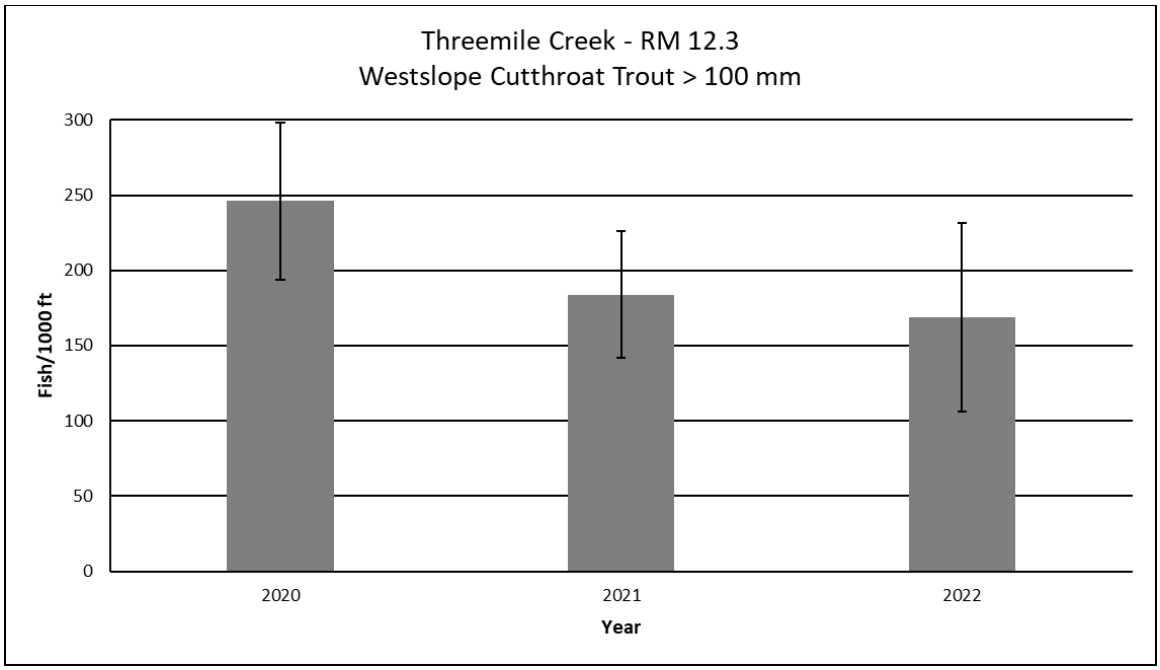

Figure 32. Population estimates for westslope cutthroat trout greater than 100 mm (~4") in total length in Threemile Creek at the FSRM 12.3 section for the period of record.

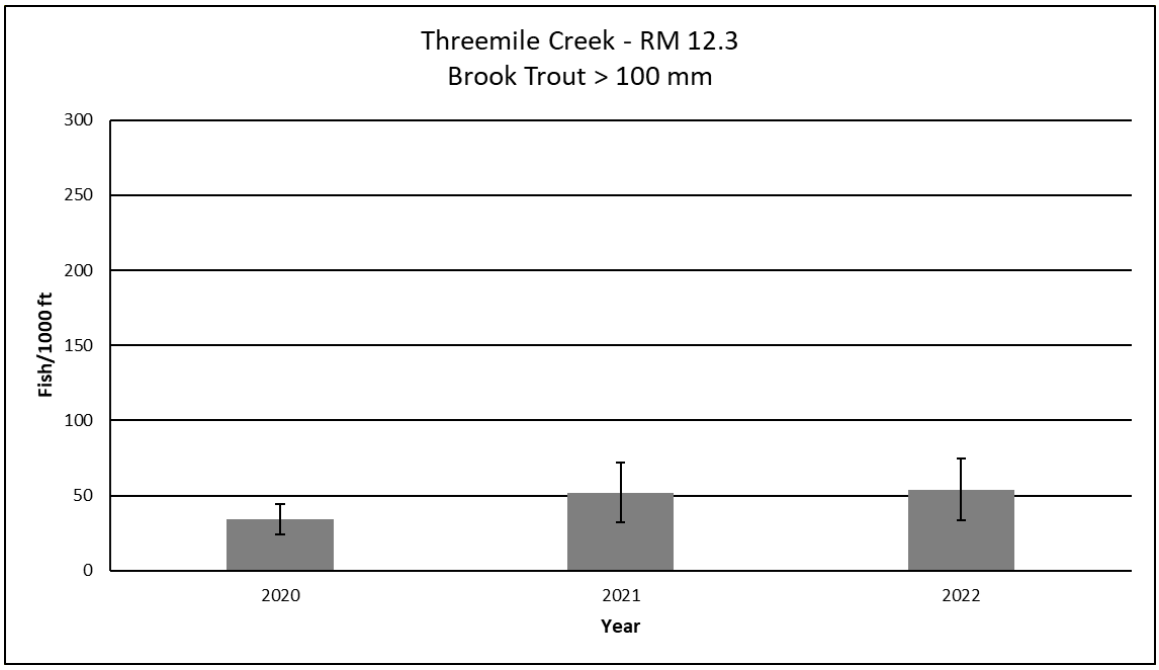

Figure 33. Population estimates for brook trout greater than 100 mm (~4") in total length in Threemile Creek at the FSRM 12.3 section for the period of record.

At FSRM 15.5, only westslope cutthroat trout were observed in the short sample reach (Table 12). However, sampling conducted one mile below this location in 2020 showed low densities of brook trout present. Based on recent and past sampling in the upper extent of Three Mile Creek, it appears that brook trout are expanding their distribution. Continued monitoring should be done to further define and monitor this situation.

Table 12. Electrofishing data collected in Three Mile Creek at FSRM 15.5 in 2021. Data presented is from the marking run. Species abbreviations are as follows: WCT = Westslope Cutthroat Trout and EB = Brook Trout.

Section	Species	Number of Fish Captured	Fish per 1000 ft (CPUE)	Mean Length (mm)	Length Range (mm)	Species Composition (%)
FSRM 15.5	WCT	39	195	119	77-182	100

Wheelbarrow Creek

Electrofishing was completed at two sites on Wheelbarrow Creek during the summer of 2022. The sampling was related to the identification of a partial culvert barrier located near FSRM 3.2 on private land. Sampling was completed immediately below and above the culvert, which was perched approximately 8-10 inches. Westslope cutthroat trout were the only fish observed at both locations. Table 13 contains a summary of the electrofishing results. Genetic samples collected from fish in 2019 suggest that the Wheelbarrow Creek westslope cutthroat trout population is non-hybridized (Kovach et al 2020).

Table 13. Electrofishing data collected below and above culvert crossing on Wheelbarrow Creek in 2022. Species abbreviations are as follows: WCT = Westslope Cutthroat Trout.

Section	Species	Number of Fish Captured	Fish per 1000 ft (CPUE)	Mean Length (mm)	Length Range (mm)	Species Composition (%)
FSRM 3.2 Below Crossing	WCT	27	270	114	33-185	100
FSRM 3.2 Above Crossing	WCT	21	135	83	42-151	100

North Burnt Fork

Several single-pass, presence-absence surveys were completed in North Burnt Fork during the summer of 2021. Two sites were located near the confluence with the Bitterroot River on the Lee Metcalf National Wildlife Refuge, while an additional site was located on private land approximately 0.5 miles upstream of the Bitterroot Irrigation District's (BRID) diversion structure for the Big Ditch located near FSRM 7.4. This structure appears to function as an upstream fish barrier under most conditions. While there is a bypass channel located immediately south of the main diversion, it is uncertain whether fish can pass upstream through it successfully. Table 14 contains a summary of the electrofishing results obtained in 2021. At the sites located within the Lee Metcalf National Wildlife Refuge, non-game fish species including suckers (largescale and longnose sp.) and northern pikeminnow dominated the fish assemblage. The trout community was comprised primarily of low densities of brown trout, with several being relatively large adults (Table 14). Further upstream above the BRID Big Ditch crossing, the fish community in North Burnt Fork was dominated by brook trout, which made up over half of the fish sampled (Table 14). Westslope cutthroat trout were also relatively common at the site as were Columbia slimy sculpin. No brown trout were found at this sample location despite being common immediately below the Big Ditch crossing.

Table 14. Electrofishing data collected at three sections of North Burnt Fork in 2021. Species abbreviations are as follows: WCT = Westslope Cutthroat Trout, EB = Brook Trout, LL = Brown Trout, RB = Rainbow Trout, MWF = Mountain Whitefish, LS SU = Largescale Sucker, LN SU = Longnose Sucker, LN DC = Longnose Dace, N PMN = Northern Pikeminnow, RS SH = Redside Shiner, and SL COT = Slimy Sculpin.

Section	Species	Number of Fish Captured	Fish per 1000 ft (CPUE)	Mean Length (mm)	Length Range (mm)	Species Composition (%)
FSRM 0.1	LL	9	18	292	57-500	7
	RB	1	2	155	n/a	1
	LS SU	91	182	131	52-237	66
	LN SU	13	26	253	157-315	9
	LN DC	1	2	66	n/a	1
	N PMN	16	32	157	65-320	12
	RS SH	6	12	34	32-35	4
FSRM 0.6	LL	7	10	339	61-520	14
	MWF	1	1	304	n/a	2
	LS SU	13	19	108	67-149	25
	N PMN	19	27	122	83-183	37
	RS SH	11	16	60	42-76	22
FSRM 7.9	WCT	31	86	190	105-287	34
	EB	48	133	148	64-246	53
	SL COT	12	33	80	60-91	13

Skalkaho Creek

During the summers of 2021 and 2022, a population estimate was conducted on Skalkaho Creek at the long-term site located near FSRM 16.8. This reference site has typically been sampled annually since 1989. Table 15 contains a summary of fish captured during the marking runs in each year. Westslope cutthroat trout comprised the bulk of the fish community, with bull trout (including one brook trout x bull trout hybrid in 2021) being much less common. Brown trout were also observed in both years in the survey reach but were present in very low densities. The population estimate for westslope cutthroat trout over 100 mm in length in 2021 was 143 per 1000 ft (95% confidence interval: +/- 19), and in 2022 was 124 per 1000 ft (95% confidence interval: +/- 16). These values were near the long-term average for the site, and within the range of variability (Figure 34). Population estimates for bull trout in 2021 and 2022 were both affected by poor capture efficiency and were likely of marginal quality. The 2021 estimate for bull trout greater than 100 mm was 29 per 1000 ft (95% confidence interval: +/- 20), and in 2022 was 74 per 1000 ft (95% confidence interval: +/- 50). Although 2022 indicated some slight improvement, bull trout density has generally been declining over the last decade in this section of Skalkaho Creek (Figure 35).

Table 15. Electrofishing data collected at one section of Skalkaho Creek at FSRM 16.8 in 2021 and 2022. Data presented is from the marking run. Species abbreviations are as follows: WCT = Westslope Cutthroat Trout, BULL = Bull Trout, EBxBULL = Brook Trout x Bull Trout hybrid, and LL = Brown Trout.

Year	Species	Number of Fish Captured	Fish per 1000 ft (CPUE)	Mean Length (mm)	Length Range (mm)	Species Composition (%)
2021	WCT	88	88	225	66-340	88
	BULL	10	10	187	79-282	10
	EBxBULL	1	1	245	n/a	1
	LL	1	1	201	n/a	1
2022	WCT	75	75	209	81-311	79
	BULL	17	17	167	84-300	18
	LL	3	3	96	94-101	3

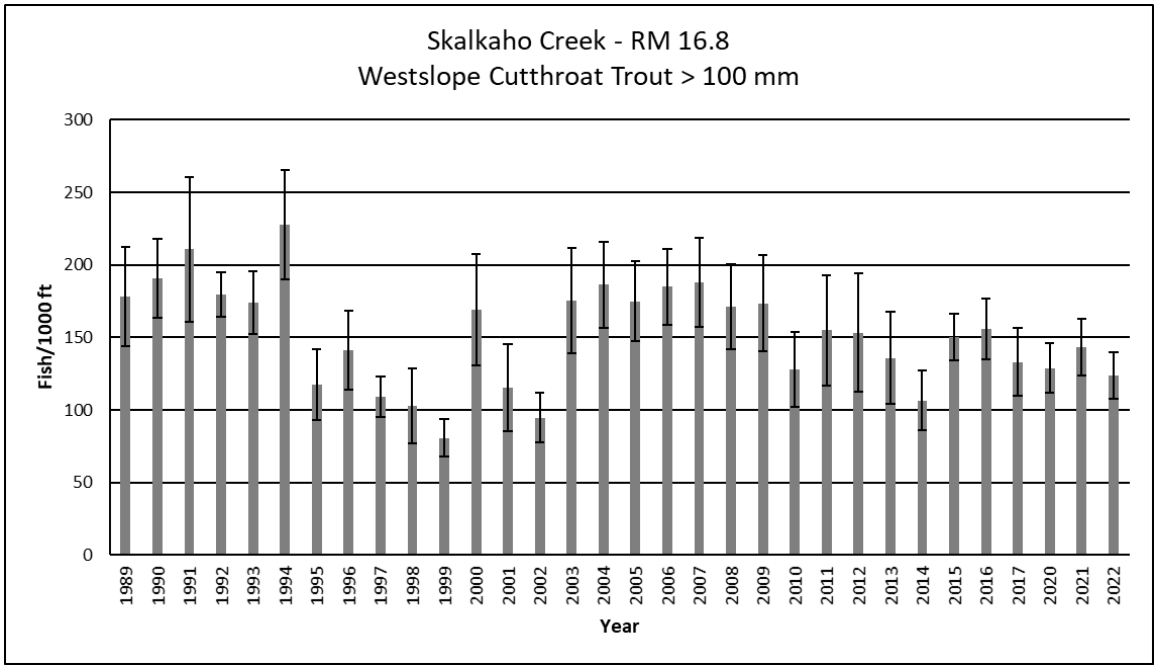

Figure 34. Population estimates for westslope cutthroat trout greater than 100 mm (~4") in total length in Skalkaho Creek at the FSRM 16.8 section for the period of record.

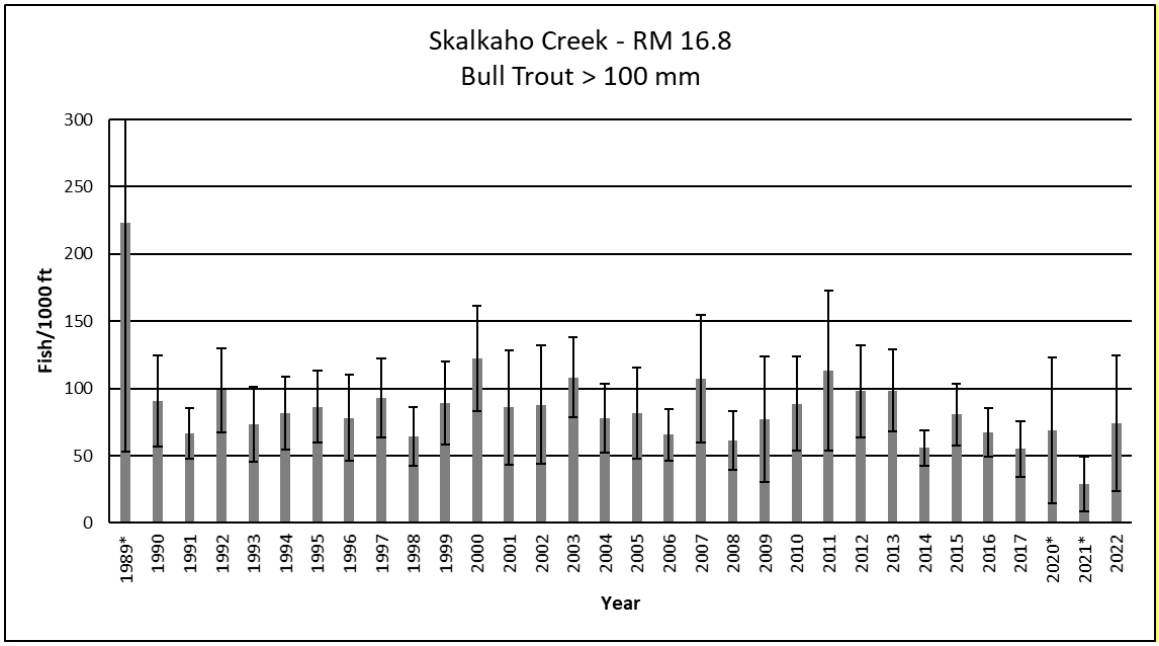

Figure 35. Population estimates for bull trout greater than 100 mm (~4") in total length in Skalkaho Creek at the FSRM 16.8 section for the period of record. Asterisk following year denotes estimate includes less than 3 recaptures.

Sleeping Child Creek

During the summer of 2021 and 2022, a population estimate was conducted on Sleeping Child Creek at the long-term site located near FSRM 10.2. This reference site has typically been sampled on an annual basis since 1985. Additionally, two single-pass surveys were also completed lower in the drainage at FSRM 4.5 and FSRM 6.7. The purpose of these surveys was to look for the presence of Columbia slimy sculpin. This species was present in most historical surveys at the FSRM 10.2 section but had not been observed in recent years. Unfortunately, no Columbia slimy sculpin were observed in any of the surveys completed in Sleeping Child Creek in 2021 or 2022.

At the FSRM 10.2 section in both 2021 and 2022, brown trout comprised a little over half of trout handled in the reach with westslope cutthroat trout also being fairly common (Table 16). Bull trout were observed in both years but were rare. Brown trout were first detected at the FSRM 10.2 section in 1997 but did not become established until approximately 2006. The 2021 population estimate for brown trout over 100 mm in length was 99 per 1000 ft (95% confidence interval: +/- 16), and in 2022 it was 190 per 1000 ft (95% confidence interval: +/- 45). While both of these values are above the long-term average from when brown trout became established in the section (2006), the 2022 estimate was the second highest ever recorded in the reach (Figure 36). For westslope cutthroat trout, the 2021 estimate for fish over 100 mm in length was 81 per 1000 ft (95% confidence interval: +/- 20), and in 2022 it was 93 per 1000 ft (95% confidence interval: +/- 18). These values were below the long-term average but were improved over recent years (Figure 37). No estimates were made for bull trout given the low number present in the sample reach in both years. An evaluation of the total number captured through time showed that the 2021 and 2022 values were below the long-term average (Figure 38).

Table 16. Electrofishing data collected at the FSRM 10.2 section of Sleeping Child Creek in 2021 and 2022. Data presented is from the marking run. Species abbreviations are as follows: WCT = Westslope Cutthroat Trout, BULL = Bull Trout, and LL = Brown Trout.

Year	Species	Number of Fish Captured	Fish per 1000 ft (CPUE)	Mean Length (mm)	Length Range (mm)	Species Composition (%)
2021	WCT	54	54	147	80-260	46
	BULL	1	1	143	n/a	1
	LL	62	62	199	52-283	53
2022	WCT	51	51	161	88-270	40
	BULL	3	3	167	162-172	2
	LL	73	73	165	90-290	58

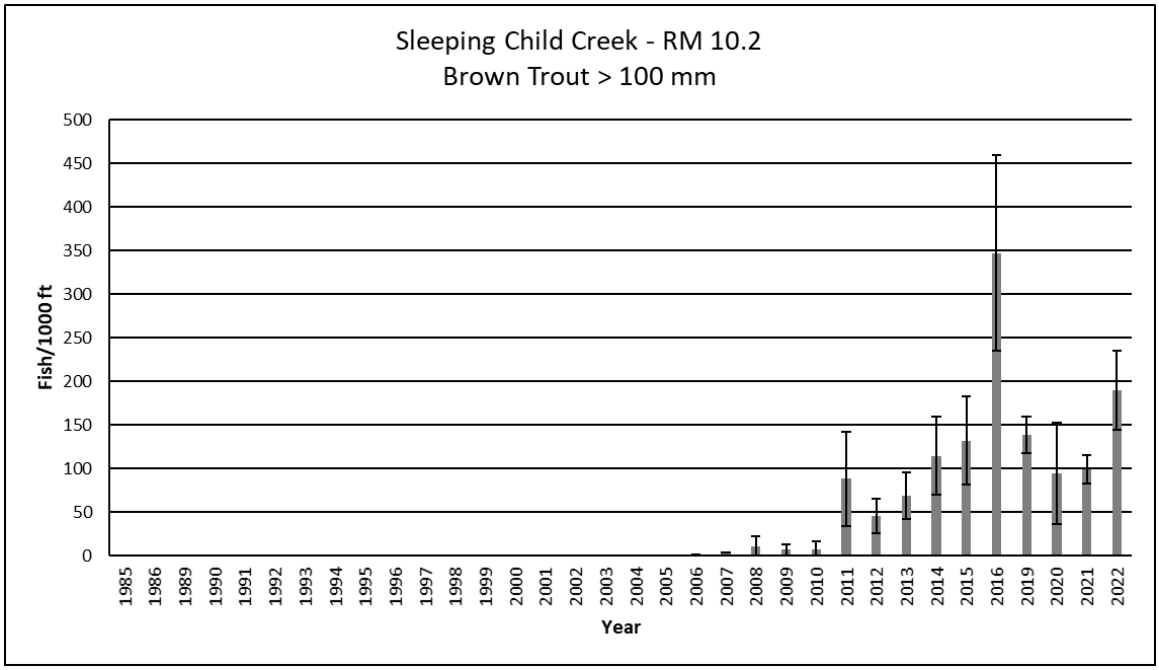

Figure 36. Population estimates for brown trout greater than 100 mm (~4") in total length in Sleeping Child Creek at the FSRM 10.2 section for the period of record.

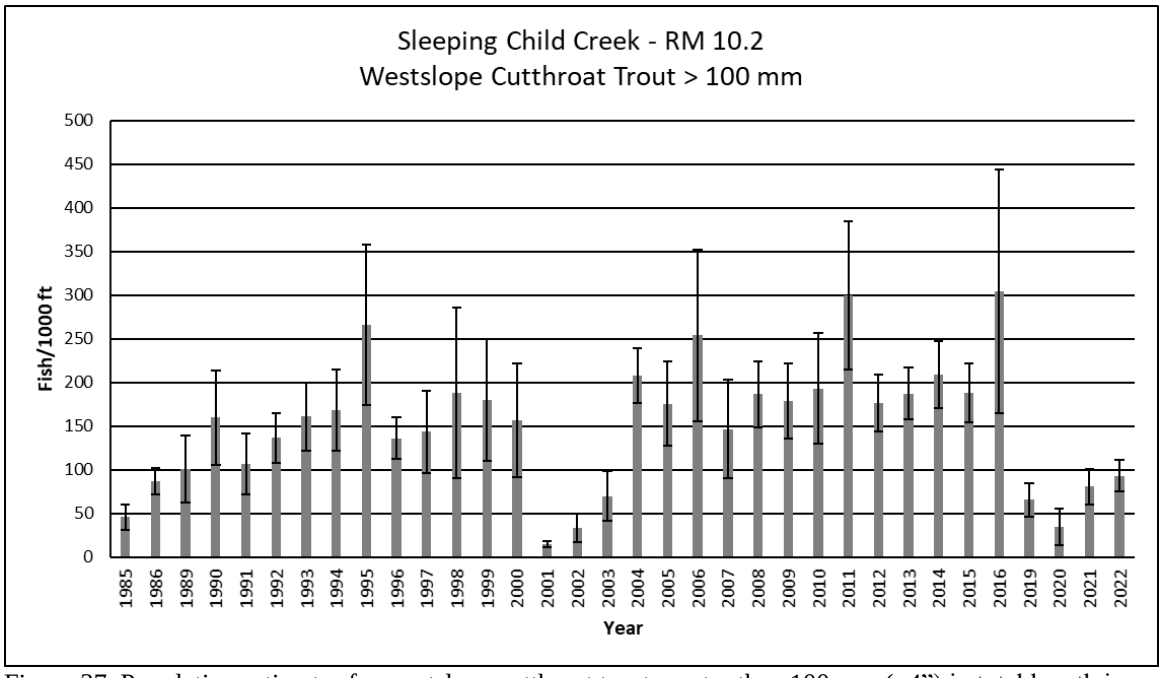

Figure 37. Population estimates for westslope cutthroat trout greater than 100 mm (~4") in total length in Sleeping Child Creek at the FSRM 10.2 section for the period of record.

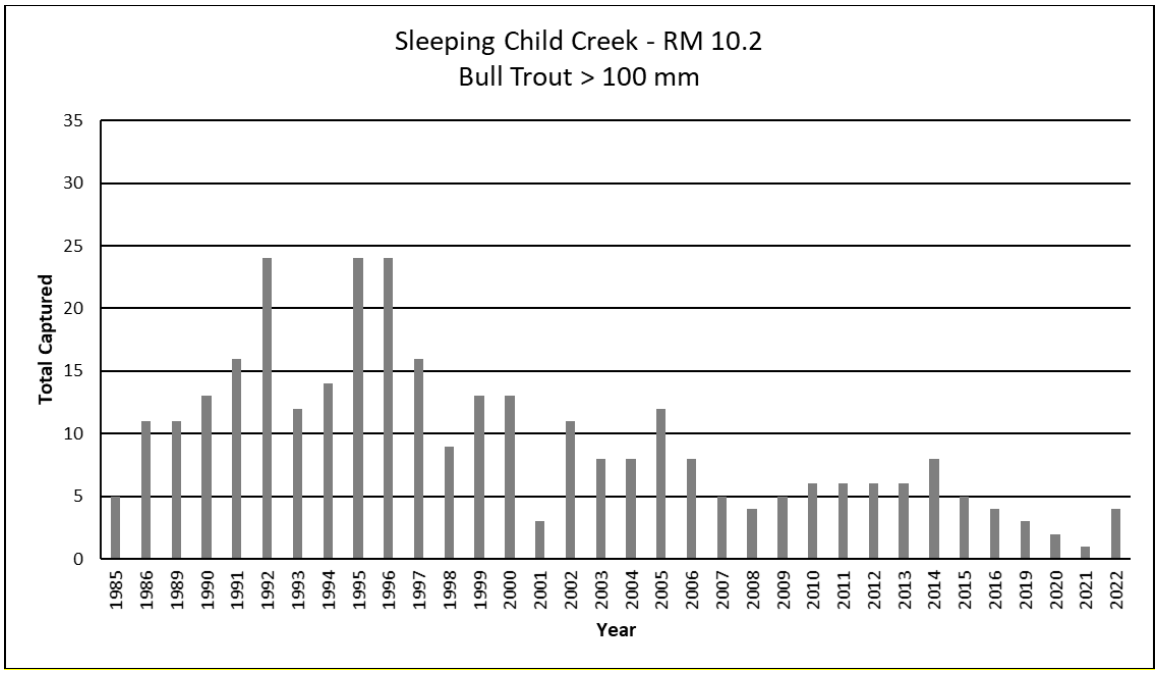

Figure 38. Number of bull trout greater than 100 mm (~4") in total length handled in the Sleeping Child Creek FSRM 10.2 section for the period of record.

East Fork Bitterroot River Drainage

Martin Creek

Two population estimates were completed in Martin Creek during the summer of 2022. The surveys were conducted at established sections located near FSRM 1.3 and FSRM 7.5. Table 17 contains a summary of fish collected during the marking runs at each site. Westslope cutthroat trout comprised most of the fish in both sections, with bull trout also present, but in low numbers.

At FSRM 1.3, the estimate for westslope cutthroat trout over 100 mm in length was 251 per 1000 ft (95% confidence interval: +/- 60). This value was a little above the long-term average and was one of the highest estimates ever recorded (Figure 39). No estimate was made for bull trout given the low number present. An evaluation of the total number captured through time shows that the 2022 value was the lowest ever recorded in this section of Martin Creek (Figure 40).

Table 17. Electrofishing data collected at two sections of Martin Creek in 2022. Data presented is from the marking run. Species abbreviations are as follows: WCT = Westslope Cutthroat Trout and BULL = Bull Trout.

Section	Species	Number of Fish Captured	Fish per 1000 ft (CPUE)	Mean Length (mm)	Length Range (mm)	Species Composition (%)
FSRM 1.3	WCT	172	172	147	72-270	99
	BULL	1	1	196	-	1
FSRM 7.5	WCT	102	102	153	81-217	86
	BULL	17	17	142	100-204	14

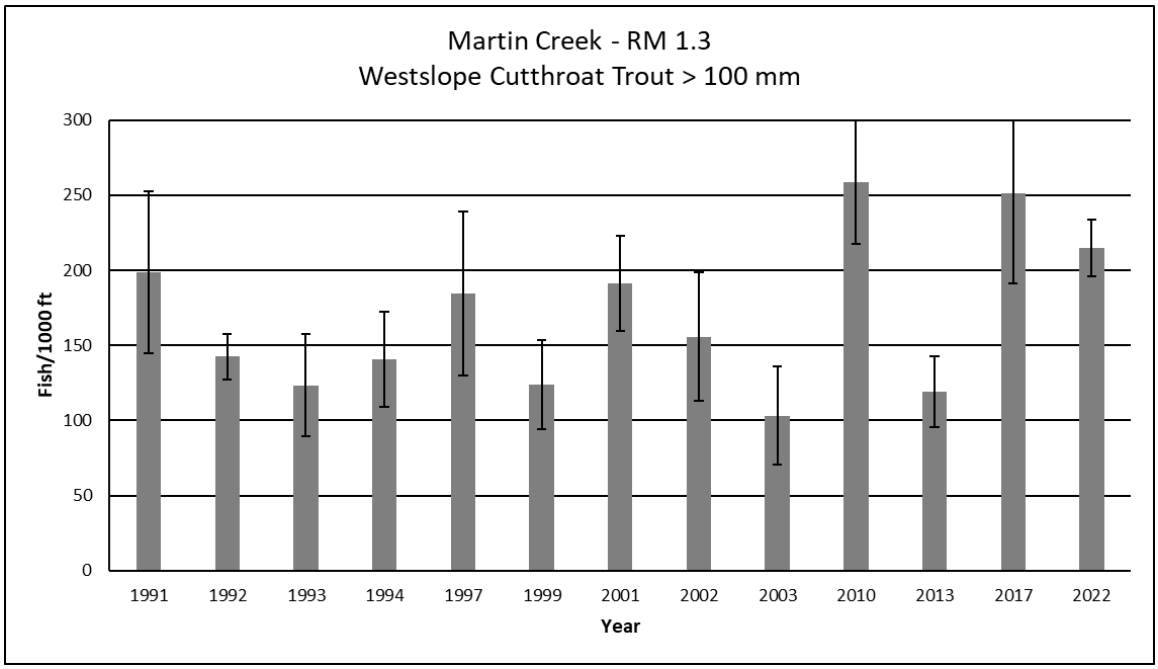

Figure 39. Population estimates for westslope cutthroat trout greater than 100 mm (~4") in total length in Martin Creek at the FSRM 1.3 section for the period of record.

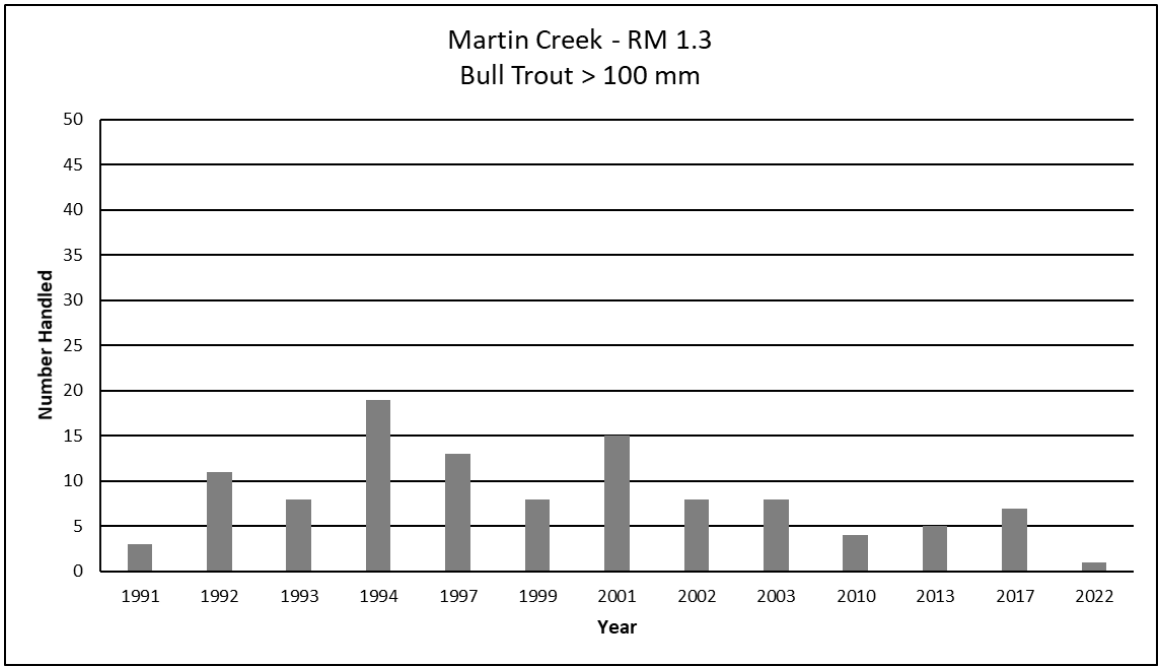

Figure 40. Number of bull trout greater than 100 mm (~4") in total length handled in the Martin Creek FSRM 1.3 section for the period of record.

At FSRM 7.5, the estimate for westslope cutthroat trout over 100 mm in length was 188 per 1000 ft (95% confidence interval: +/- 35). This value was slightly below the long-term average but was within the range of variability observed at the site over the period of record (Figure 41). The estimate for bull trout was 44 per 1000 ft (95% confidence interval: +/- 27). It has been uncommon to obtain a bull trout estimate at the FSRM 7.5 section throughout the period of record, so there are relatively few years to compare to. However, an evaluation of the total number handled through time shows that the 2022 value was one of the higher numbers ever recorded in this section of Martin Creek (Figure 42).

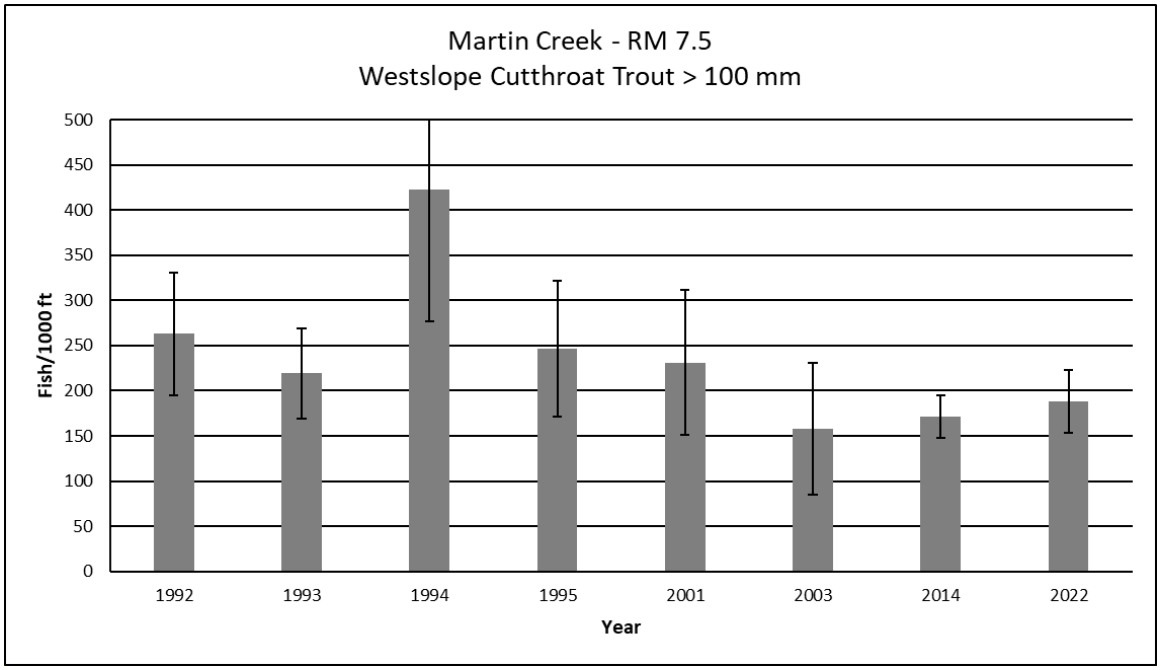

Figure 41. Population estimates for westslope cutthroat trout greater than 100 mm (~4") in total length in Martin Creek at the FSRM 7.5 section for the period of record.

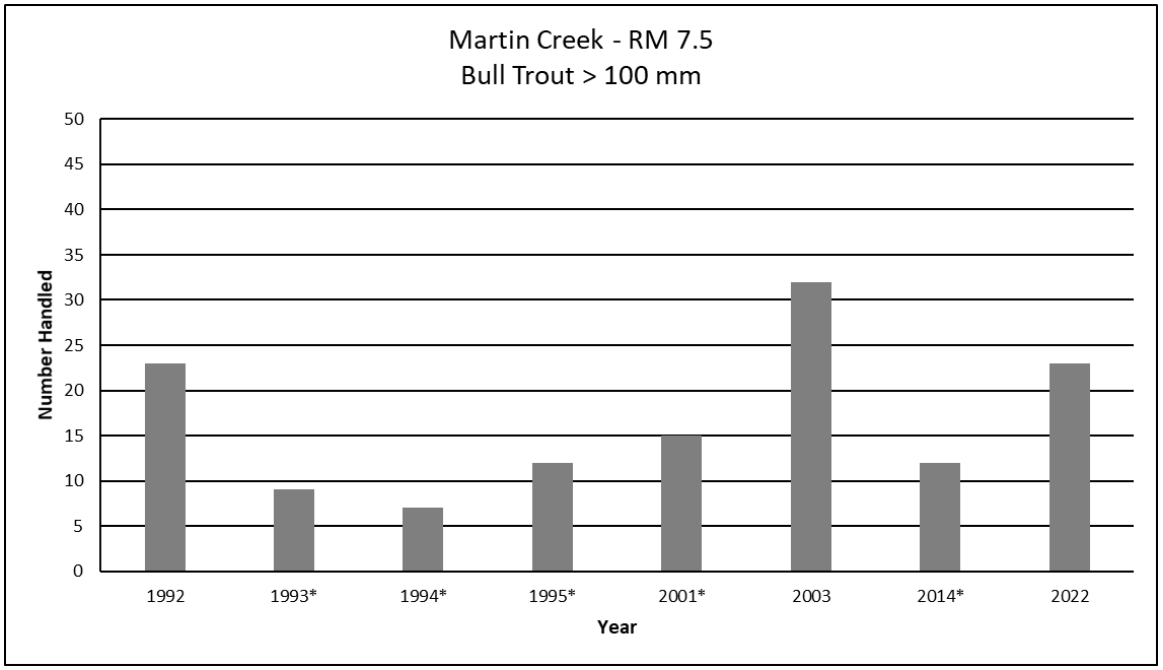

Figure 42. Number of bull trout greater than 100 mm (~4") in total length handled in the Martin Creek FSRM 7.5 section for the period of record.

Lake Fish Sampling

Lake Como

Gillnet surveys were conducted in Lake Como in both 2021 and 2022. Two floating experimental gillnets were set at established locations on the east end of the lake. Table 18 contains a summary of the catch from both years. In general, rainbow trout numbers showed a slight improvement in 2022, while cutthroat trout densities showed a slight decline (Figure 43). Currently, approximately 12,500 rainbow trout and 4,000 westslope cutthroat trout are stocked annually. Kokanee densities have remained relatively stable over the last several years despite no recent stocking (Figure 43). Kokanee were stocked regularly in Lake Como from 1997 to 2002 and then again from 2007 to 2012. Monitoring during this time showed that stocked kokanee had relatively poor growth and performance, typically not attaining lengths over 250 mm (~10 in) (Clancy 2013, Clancy 2003). Kokanee appear to be self-sustaining at this time and despite relatively low densities, remain small. Low fish densities and small average fish size are likely a result of large annual drawdown and the naturally low productivity of the water in Lake Como.

Table 18. Gillnet data collected at Lake Como in 2021 and 2022. Only the most common gamefish species are displayed. Species abbreviations are as follows: WCT = westslope cutthroat trout, YCT = Yellowstone cutthroat trout, RB = rainbow trout, and KOK = kokanee.

Year	Species	Number Captured	Mean Length (mm)	Length Range (mm)	Mean Fish per Net
2021	WCT	12	284	215-352	6
	YCT	4	260	205-306	2
	RB	8	294	205-502	4
	KOK	8	225	203-249	4
2022	WCT	3	207	191-238	1.5
	YCT	0	-	-	-
	RB	17	252	179-545	8.5
	KOK	10	219	211-226	5

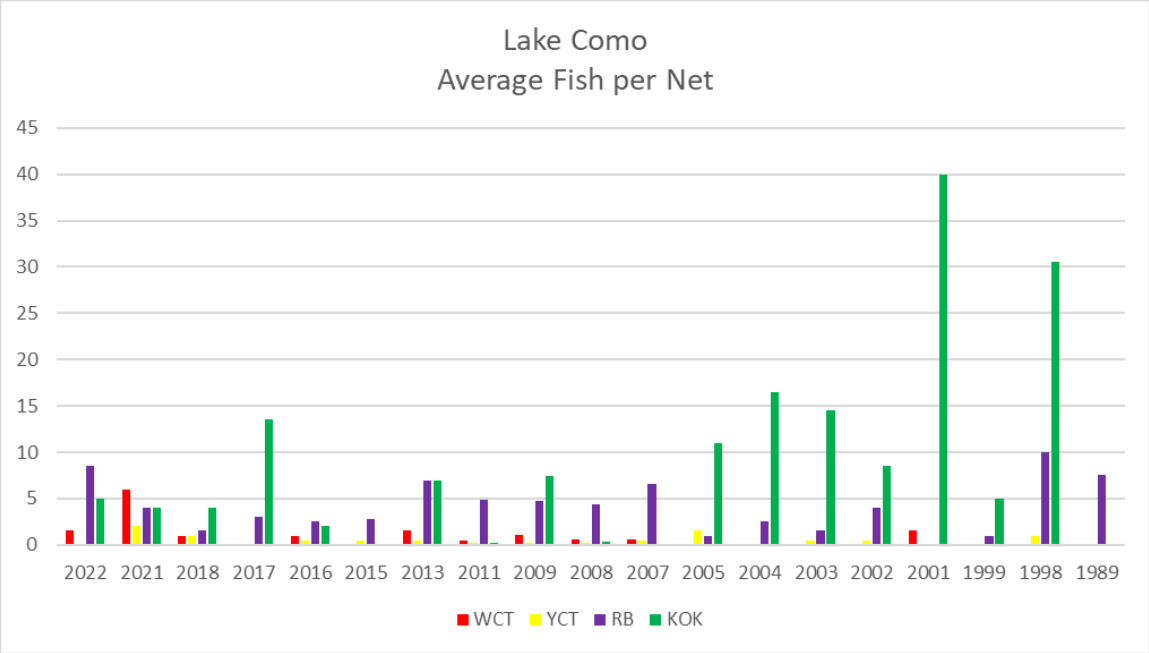

Figure 43. Average number of fish per net by species in Lake Como for the period of record. Only the most common gamefish species are displayed. Species abbreviations are as follows: WCT = westslope cutthroat trout, YCT = Yellowstone cutthroat trout, RB = rainbow trout, and KOK = kokanee.

Bailey Lake

Bailey Lake is a 11-acre hike-to lake located in the upper Lost Horse Creek drainage. The lake has been regularly stocked with westslope cutthroat trout since 1988. The current stocking plan is for 750, 50 mm (2 in) fish every four years. Past stocking frequency was more frequent, typically every two or three years. The last plant was completed in 2019.

A 2-hour angling survey was conducted on July 20, 2022, to assess catch rate and fish size structure. The entire perimeter of the lake was traversed on foot during the survey. Catch rate was good for fish up to 305 mm (~12 in). A total of 14 westslope cutthroat trout were caught and measured, with an additional 14 fish hooked but not landed. Measured fish had an average length of 267 mm (range: 243-305 mm). Given the abundance of smaller fish in the lake, stocking rates may be adjusted to try and increase average size without severely impacting catch rates.

Gleason Lake

Gleason Lake is a 14-acre hike-to lake located in the upper Willow Creek drainage. The lake is managed for irrigation storage and has a dam and control valve on the west end. The lake has received infrequent stocking since 1947 and was last planted with westslope cutthroat trout in 2004.

A 1-hour angling survey was conducted on July 27, 2022, to assess fish presence, catch rate, and size structure. The entire perimeter of the lake was traversed during the survey. Catch rate was low for westslope cutthroat trout but redside shiner were extremely common. A total of two westslope cutthroat trout were caught and measured, while approximately 10 redside shiner were caught or snagged while angling. Numerous redside shiner followed and bit at the lure at every cast but most were too small to be hooked. The two westslope cutthroat trout that were caught had total lengths of 165 mm and 305 mm. Given the lack of recent stocking and the presence of different age classes, the westslope cutthroat trout population in Gleason Lake appears to be self-sustaining. A small inlet stream was observed on the north side of the lake that appears to provide adequate spawning habitat. However, due to the large number of redside shiner in the lake, interspecific competition for food is likely high and limits westslope cutthroat trout recruitment.

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