Native Salmonid Abundance and Tributary Habitat Restoration Monitoring

Annual Project Update – 2023

Montana Tributary Habitat Acquisition and

Recreational Fishery Enhancement Program

Appendix B

September 2024

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Introduction

This is an annual update of work completed as part of the Montana Tributary Habitat Acquisition and Recreational Fishery Enhancement Program, Appendix B of the Clark Fork Settlement Agreement. This update focuses on native salmonid population monitoring conducted in 2023 in tributaries to the lower Clark Fork River in Montana. Fish population estimates were conducted at long-term monitoring sites in the following streams: Prospect Creek, Cooper Gulch, Graves Creek, Swamp Creek, and East Fork Blue Creek. Westslope Cutthroat Trout *Oncorhynchus lewisi* genetic monitoring was conducted in Napolean Gulch, Dry Creek, Hamilton Gulch, Berray Creek, North Fork Bull River, Middle Fork Bull River and East Fork Blue Creek. Additional sampling occurred in intermittent portions of Prospect Creek and East Fork Bull River to salvage native salmonids stranded in ephemeral pools. Trend information by species for long-term electrofishing monitoring sites, yearly thermograph data, mean yearly Bull Trout *Salvelinus confluentus* growth by drainage, and summaries of fish detections on the Prospect Creek, Graves Creek, Vermilion River, Bull River, and East Fork Bull River passive integrated transponder (PIT) tag arrays can be found in appendices A through D respectively.

Methods

In 2023, backpack electrofishing units were used at depletion sections of stream that were 86–113 m in length. All depletion sections were sampled from the upstream-most point in the section to a block net at the bottom of the site. Bull Trout were scanned for a PIT tag and a 12 mm long full duplex PIT tag was implanted in the dorsal sinus of all unmarked fish ≥100 mm. If a PIT tag was present the identification number was recorded.

Multi-pass population estimates for fish greater than or equal to 75 mm were conducted in Montana Fish, Wildlife and Parks (FWP) internal Fisheries Information System (FIS) using K-pass removal equations (Ogle 2010) derived for Zippin (1958) and modified by Carle and Strub (1978). Prior to 2017, these population estimates were conducted by hand (in Excel) and it appears there are slight differences, in most instances, for both the estimates and their associated confidence intervals. Historical data for all the sites sampled in 2023 were recalculated using FIS and are now up to date (Appendix A). Efforts are being made to redo all population estimates using FWP's FIS.

Linear abundance for this report is defined as the population estimate (based on multiple passes, typically 2 or 3) standardized to a 100 m section of stream. Salmonid biomass ($g/100m^2$) was estimated using the population estimate, mean fish weight at each sampling location and the area of stream that was sampled based on the section length and six wetted widths [(population estimate * mean weight) / (reach length * mean reach width) * 100)]. Density ($fish/100m^2$) was estimated using the population estimate and the area of stream that was sampled [(population estimate * 100) / (reach length * mean reach width)].

Fish tissue samples were collected from Westslope Cutthroat Trout in select streams for genetic analysis. Genetic samples were analyzed for purposes of describing the presence and extent of

non-native genetic admixture from Rainbow Trout *Oncorhynchus mykiss* and/or Yellowstone Cutthroat Trout *Oncorhynchus virginalis bouvieri*. A targeted genomic approach was used to genotype all fish with >2,300 species diagnostic markers (combination of Westslope, Rainbow and Yellowstone diagnostic markers). In each stream, tissue samples were collected across the spatial extent of the population. Continued regular genetic analysis is crucial to inform conservation and management of Westslope Cutthroat Trout populations into the future.

Thermographs were deployed in most important native salmonid tributaries with data collected from July 1 through September 30. Stream temperature was recorded every 30 minutes over the entirety of the study period. Mean and maximum daily temperatures are displayed for each stream in Appendix B. For more detailed information on stream temperature sampling locations, methodologies, and analysis refer to: Horn and Tholl 2011; Kreiner and Tholl 2014; or Blakney and Tholl 2019a.

An overview of the long-term trends in stream salmonid abundance and biomass for monitoring sites sampled in 2023 is provided in Appendix A. Table A-1 provides the slope of the line (and direction of the trend), coefficient of determination, and *p*-value from linear regression of time (year) versus linear abundance and biomass for long-term sample sites, and is organized by stream, site, and species. In most instances, time was a poor covariate with abundance and biomass, as these metrics are likely influenced by environmental variables that were not quantified. Given the available data, a significant trend was noted when the *p*-value from the linear regression was less than or equal to 0.05. If the significance level is less than or equal to 0.05, it can be said that the relationship between time and the dependent variable (abundance or biomass) is different from zero. The direction and magnitude of this trend is expressed as the slope. A positive value would suggest the species to be increasing, while a negative value would imply a declining trend. If the *p*-value is greater than 0.05, that relationship is not different from zero (there is no relationship), regardless of the coefficient of determination (r^2) value.

Significance levels at or below 0.05 coupled with moderate or higher coefficient of determination values ($r^2 > 0.30$ in ecological studies) would suggest that the described relationship has a high probability of not occurring by chance alone and that some portion of the variation within the data (r^2 value) can be attributed to changes in fish species' abundance or biomass over time. A specific site was included in this analysis if it had been sampled three or more times. The majority of species-specific metrics at a given site (abundance and biomass) did not change over time and thus species at those sites can be considered stable (Table A-1). For these streams and sites with fewer sampling events it is likely that more regular sampling would be needed to detect changes to the fish community, therefore it is not surprising that many of these sites did not show statistically significant trends. Trends that appear at sites with a relatively low number of sampling events should also be interpreted with caution.

Results and Discussion

Prospect Creek

The Prospect Creek drainage is mainly occupied by non-native salmonids in the lower portions, while the upper drainage and its major tributaries are occupied solely by native fish species. This dichotomy is likely facilitated by the geology of the area where large unconsolidated substrate was deposited by Glacial Lake Missoula and underlies portions of the stream causing the mainstem and portions of its tributaries to go dry during low flow periods each year (Sando and Blasch 2015; M. Lawlor, U.S. Geological Survey, unpublished data). Two lengthy, naturally intermittent sections of stream occur on the mainstem of Prospect Creek. The lower dry reach begins just upstream of Brush Gulch and extends approximately 4.0 km upstream to above the Daisy Creek confluence. A short perennial section of stream occurs from an area between Daisy Creek and Therriault Gulch to just upstream of the Crow Creek confluence. Above where Crow Creek enters, Prospect Creek again becomes ephemeral for about 6.8 km.

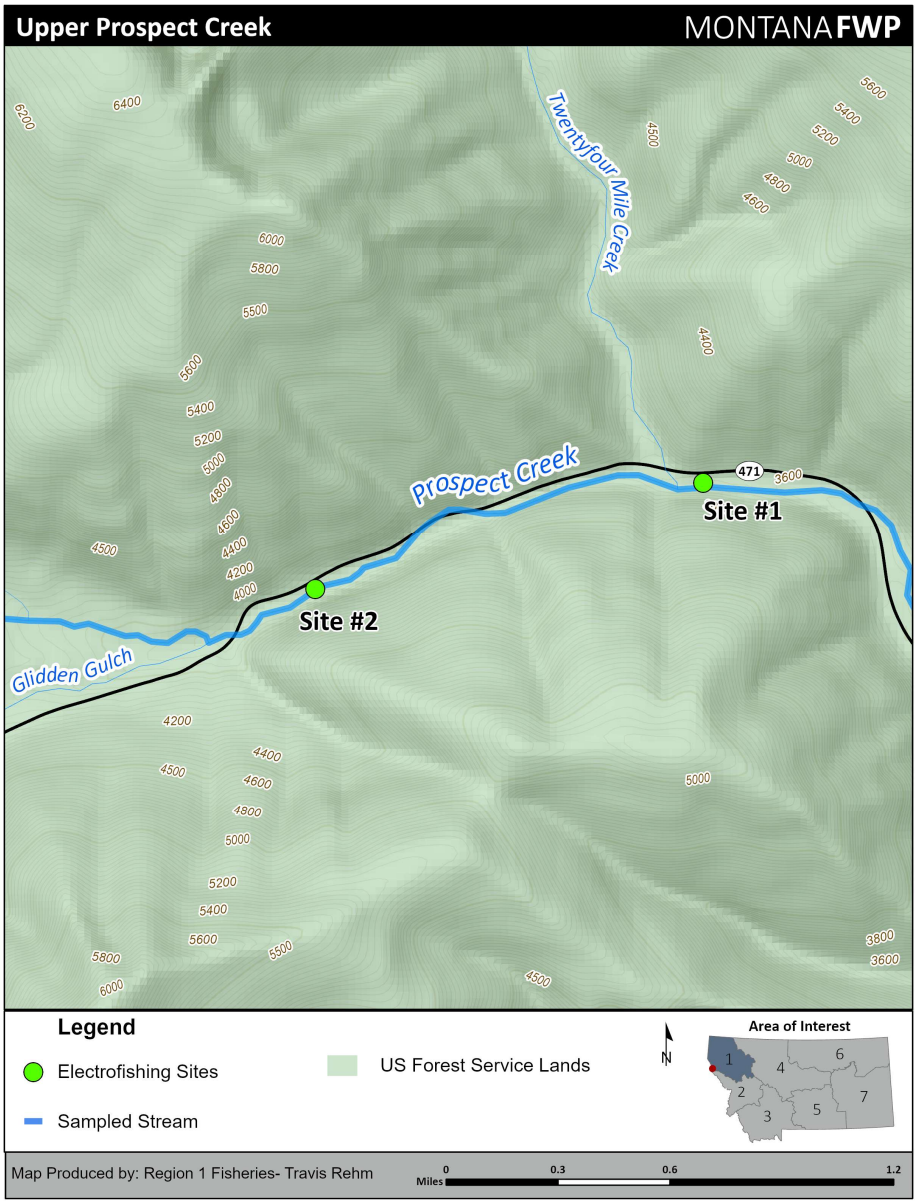

Figure 1 Prospect Creek electrofishing sites sampled in 2023.

A small-scale habitat project was completed in 2020 when nine large woody debris structures were created by selectively felling large conifer trees to facilitate spawning gravel deposition in upper Prospect Creek (Brissette et al. 2024). Notably, project associated gravel patches were documented being used by Bull Trout with two redds being observed in 2022 and one in 2023 by FWP staff.

Encroachment by non-native salmonids that dominate the lower perennial reach of Prospect Creek is a serious threat to the upper watershed which is an important native fish refugia in the lower Clark Fork River drainage. Genetic analyses from putative Westslope Cutthroat Trout in Crow Creek (2009 and 2017) and Therriault Gulch (2023) has noted low rates Rainbow Trout hybridization in the drainage (Kovach et al. 2019; Kovach 2023). It is likely that the perennial reach of Prospect Creek near Crow Creek facilitates the persistence of colonizing Rainbow Trout and hybrids that have caused the relatively low levels of hybridization that had occurred over the last two decades. Rainbow Trout that originate in lower Prospect Creek and the Clark Fork River may ultimately be influencing hybridization observed in the vicinity of Crow Creek (Moran and Storaasli 2013; Blakney and Tholl 2019). Genetic analyses from putative Westslope Cutthroat Trout in Cooper Gulch (2009 and 2017) and the upper mainstem of Propsect Creek (2007 and 2020) have found a non-hybridized population of Westslope Cutthroat Trout (Kovach et al. 2019; Kovach et al. 2021).

Two long-term monitoring sites were sampled in Upper Prospect Creek in 2023 (Figure 1). Site 1 and Site 2 are the upper most sampling sites in Prospect Creek and have both been sampled 16 times since 1999. Site 1 is located just downstream of the Twenty-four Mile Creek confluence at River Kilometer (Rkm) 30. Site 2 is located approximately 1 km below the confluence of upper Prospect Creek and Glidden Gulch at Rkm 31.9. Site 2 is located within the upper end of the 2020 large woody debris addition project.

Bull Trout were captured at both sites sampled in upper Prospect Creek in 2023. Mean Bull Trout abundance at Site 1 was 21.1 fish/100 meters from 1999–2020 (n = 15), compared to 6.3 fish/100 m in 2023 (Table 1; Figure 2). This marks a significant decrease in Bull Trout abundance and biomass over time (linear regression, $r^2 = 0.33$, $p = 0.02$; linear regression, $r^2 = 0.43$, $p = 0.01$; Appendix A). At Site 2 mean abundance from 1999–2020 (n = 15) was 22.5 fish/100 m, compared to 16.4 fish/100 m in 2023 (Table 1; Figure 3). This marks a significant decrease in Bull Trout biomass over time (linear regression, $r^2 = 0.33$, $p = 0.02$; Appendix A). Bull Trout abundances were notably lower in 2023 than historic means and have shown significant declines since 1999. Upper Prospect Creek still represents a stronghold for Bull Trout in the Lower Clark Fork drainage, despite these declines and the observation of few redds since 2013 (Moran 2024).

Abundances of Westslope Cutthroat Trout were near or above long-term means, and the population appears stable in upper Prospect Creek. At Site 1 mean abundance from 1999–2020 (n = 15) was 34.2 fish/100 m, compared to 41.4 fish/100 m in 2023 (Table 1; Figure 2). At Site 2

mean abundance from 1999–2020 (n = 15) was 44.9 fish/100 m, compared to 43.6 fish/100 m in 2023 (Table 1; Figure 3).

Table 1. Standardized linear abundance (#/100m), density (#/100m^2) and biomass (g/100m^2) estimates (fish≥75mm) for Bull (BULL) and Westslope Cutthroat Trout (WCT) in Prospect Creek in 2023.

Site # (Rkm)	Section Length (m)	Spp.	Length Range (mm)	Estimate per 100 m	95% C.I.	Estimate per 100 m^2	95% C.I.	g/100 m^2	95% C.I.
1	111	BULL	91–224	6.3	6.3–7.1	0.9	0.9–1.7	39.1	39.1–39.9
(30.0)		WCT	58–268	41.4	40.5–44.6	5.8	5.7–9.0	210.1	205.6–213.3
2	110	BULL	88–225	16.4	16.4–17.4	3.2	3.2–4.2	86.6	86.6–87.7
(31.9)		WCT	71–211	43.6	43.6–45.5	8.6	8.6–10.5	342.2	342.2–344.1

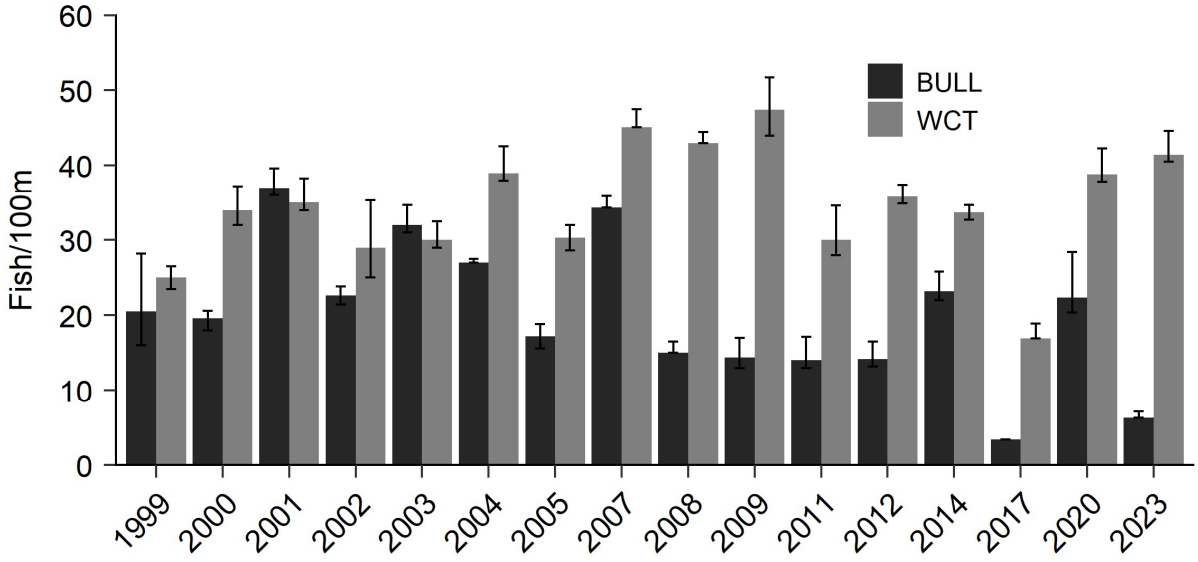

Figure 2. Linear abundance estimates (fish/100 m) with 95% confidence intervals for Bull Trout (BULL) and Westslope Cutthroat Trout (WCT) at Site 1 in upper Prospect Creek.

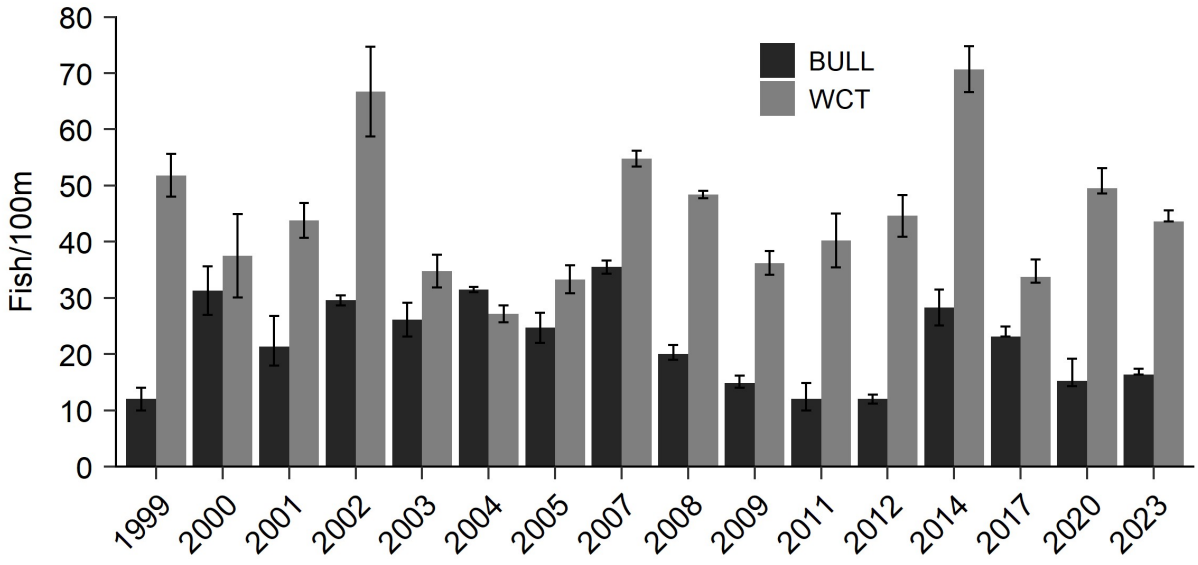

Figure 3. Linear abundance estimates (fish/100 m) with 95% confidence intervals for Bull Trout (BULL) and Westslope Cutthroat Trout (WCT) at Site 2 in upper Prospect Creek.

Cooper Gulch

Cooper Gulch is a headwater tributary to Prospect Creek. The fish community is entirely native, with Westslope Cutthroat Trout and Bull Trout being the only fish species present. Most of the portion of the stream occupied by Bull Trout runs between a Northwestern Energy powerline corridor and a USFS road. Both of these features impact the stream as the channel has been armored and riparian forests have been removed in multiple locations. Deleterious effects along Cooper Gulch include loss of vegetation, changes to vegetative communities, bank instability, increased width/depth ratios, increased sediment supply, reduced stream shading, and simplified habitats.

The Bull Trout population in Cooper Gulch is small and it has been estimated that 10 to 40 adult fish reside in the stream at any one time (Al-Chokhachy and Ebinger 2012). Perennial habitat in Cooper Gulch occupied by the species during baseflow conditions is about 4 km of stream. Genetic analyses and the movement of PIT tagged fish during high water periods (Oldenburg et al. 2015; DeHaan and Bernall 2017; Adams et al. 2017) suggest Cooper Gulch is part of a unique, mainly stream-resident Bull Trout metapopulation in the upper Prospect Creek watershed. Data from long-term monitoring sites also demonstrates that Cooper Gulch has among the highest abundance, density, and biomass of non-hybridized Westslope Cutthroat Trout in the lower Clark Fork drainage in Montana (Blakney and Tholl 2019a; Kovach et al. 2019). Several habitat related projects have been carried out in Cooper Gulch over the past

decade. These projects include culvert replacements (2007 and 2011), LWD addition (2009), and bank stabilization using brush bundles (2012) (Blakney and Tholl 2019a; Horn 2011).

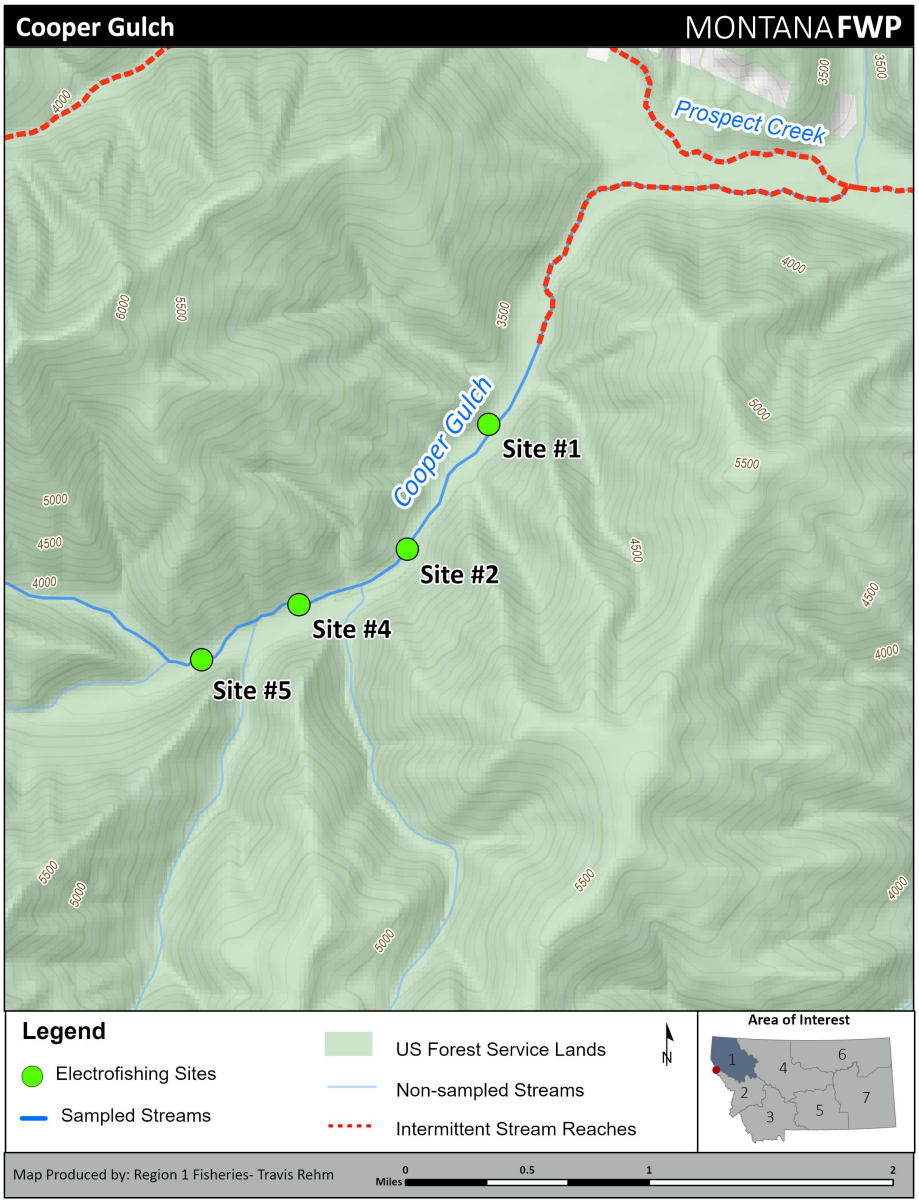

Figure 4. Cooper Gulch electrofishing sites sampled in 2023.

Four sites were sampled in the Cooper Gulch in 2023 (Figure 4), including two long-term electrofishing sites (Sites 1 and 2) that have been sampled 8 times since 2009. Site 1 is located within the 2009 LWD treatment reach at Rkm 3.5 in a section where the power lines parallel and then cross the stream. Site 2 is located in an undisturbed section of stream, away from the road and powerline corridor, at Rkm 4.5. Site 2 is considered the control reach for assessing the 2009 LWD project, as this section is dominated by old-growth riparian conifers, with LWD and pool habitat being comparably more abundant. The remaining two sites (Sites 4 and 5) have been sampled 4 and 3 times respectively, since 2016. Site 4 is located between Spokane Creek and Chipmunk Creek, above a short intermittent section, at Rkm 5.4. Site 5 is located upstream of Chipmunk Creek and downstream of the Summit Creek-Cooper Gulch confluence, at Rkm 6.0.

Bull Trout were captured at all four sites sampled in Copper Gulch in 2023. Mean Bull Trout abundance at Site 1 was 13.2 fish/100 meters from 2009–2020 (n = 7), identical abundance was

observed in 2023 (Table 2; Figure 5). At Site 2 mean abundance from 2009–2020 (n = 8) was 11.7 fish/100 m, compared to 18.8 fish/100 m in 2023 (Table 2; Figure 6). Mean Bull Trout abundance at Site 4 was 15.2 fish/100 meters from 2016–2020 (n = 3), compared to 7.3 fish/100 m in 2023 (Table 2; Figure 7). At Site 5 mean abundance from 2016–2020 (n = 2) was 4.6 fish/100 m, compared to 4.7 fish/100 m in 2023 (Table 2; Figure 8). Bull Trout abundances continues to show a stable population within Cooper Gulch.

Westslope Cutthroat abundances were all recorded below long-term means. However, populations have rebounded from record lows recorded in 2020. Despite reduced abundance of the Westslope Cutthroat population in Cooper Gulch appears to be stable. Mean Westslope Cutthroat Trout abundance at Site 1 was 102.4 fish/100 meters from 2009–2020 (n = 7), compared to 72.6 fish/100 m in 2023 (Table 2; Figure 5). At Site 2 mean abundance from 2009–2020 (n = 8) was 90.7 fish/100 m, compared to 74.3 fish/100 m in 2023 (Table 2; Figure 6). Mean Westslope Cutthroat Trout abundance at Site 4 was 140.3 fish/100 meters from 2016–2020 (n = 3), compared to 85.4 fish/100 m in 2023 (Table 2; Figure 7). At Site 5 mean abundance from 2016–2020 (n = 2) was 96.4 fish/100 m, compared to 91.6 fish/100 m in 2023 (Table 2; Figure 8).

Table 2. Standardized linear abundance (#/100m), density (#/100m^2) and biomass (g/100m^2) estimates (fish≥75mm) for Bull (BULL) and Westslope Cutthroat Trout (WCT) in Cooper Gulch in 2023.

Site # (Rkm)	Section Length (m)	Spp.	Length Range (mm)	Estimate per 100 m	95% C.I.	Estimate per 100 m^2	95% C.I.	g/100 m^2	95% C.I.
1	106	BULL	46–186	13.2	13.2–13.8	2.5	2.5–3.1	76.2	76.2–76.8
(3.5)		WCT	66–289	72.6	71.7–75.8	14.0	13.8–17.1	614.7	606.7–617.8
2	101	BULL	45–225	18.8	18.8–20.4	3.3	3.3–4.8	85.8	85.8–87.4
(4.1)		WCT	56–265	74.3	71.3–80.1	13.0	12.5–18.9	573.2	550.3–579.1
4	96	BULL	137–225	7.3	7.3–9.2	1.3	1.3–3.2	86.2	86.2–88.0
(5.4)		WCT	60–241	85.4	81.3–92.0	15.5	14.8–22.1	528.0	502.3–534.6
5	107	BULL	140–279	4.7	4.7–5.7	1.2	1.2–2.3	163.6	163.6–164.6
(6.0)		WCT	57–210	91.6	86.9–99.0	24.1	22.9–31.5	650.8	617.6–658.2

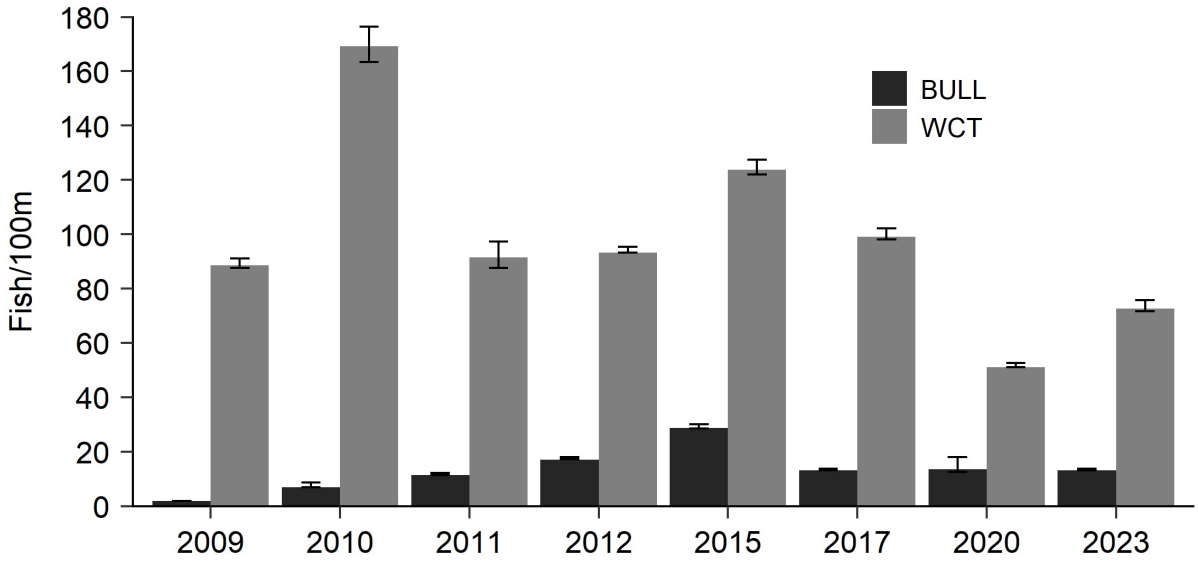

Figure 5. Linear abundance estimates (fish/100 m) with 95% confidence intervals for Bull Trout (BULL) and Westslope Cutthroat Trout (WCT) at Site 1 in Cooper Gulch.

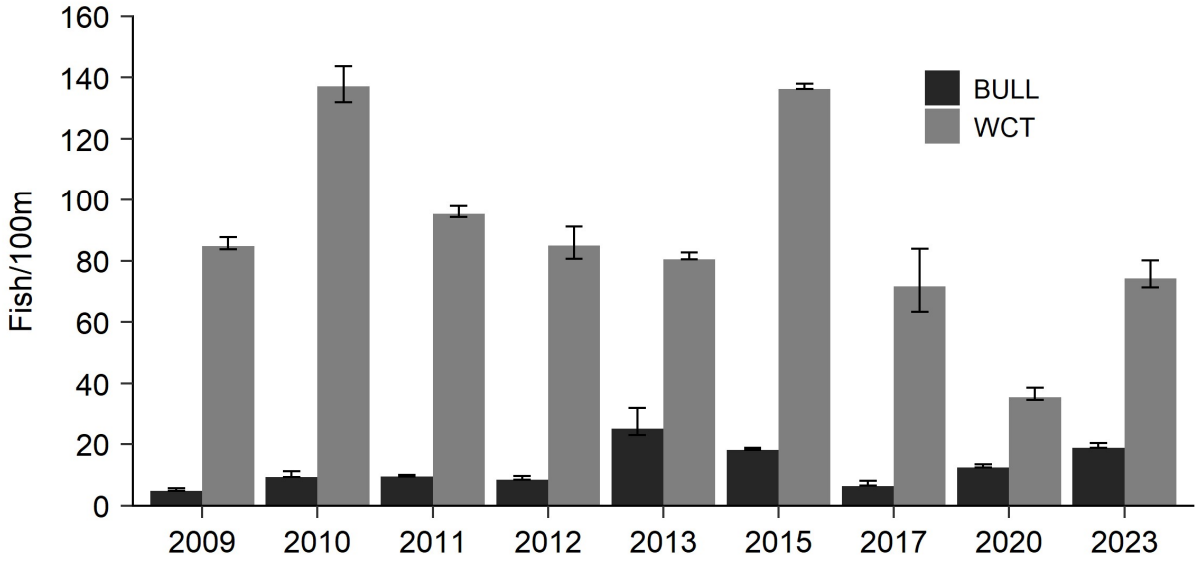

Figure 6. Linear abundance estimates (fish/100 m) with 95% confidence intervals for Bull Trout (BULL) and Westslope Cutthroat Trout (WCT) at Site 2 in Cooper Gulch.

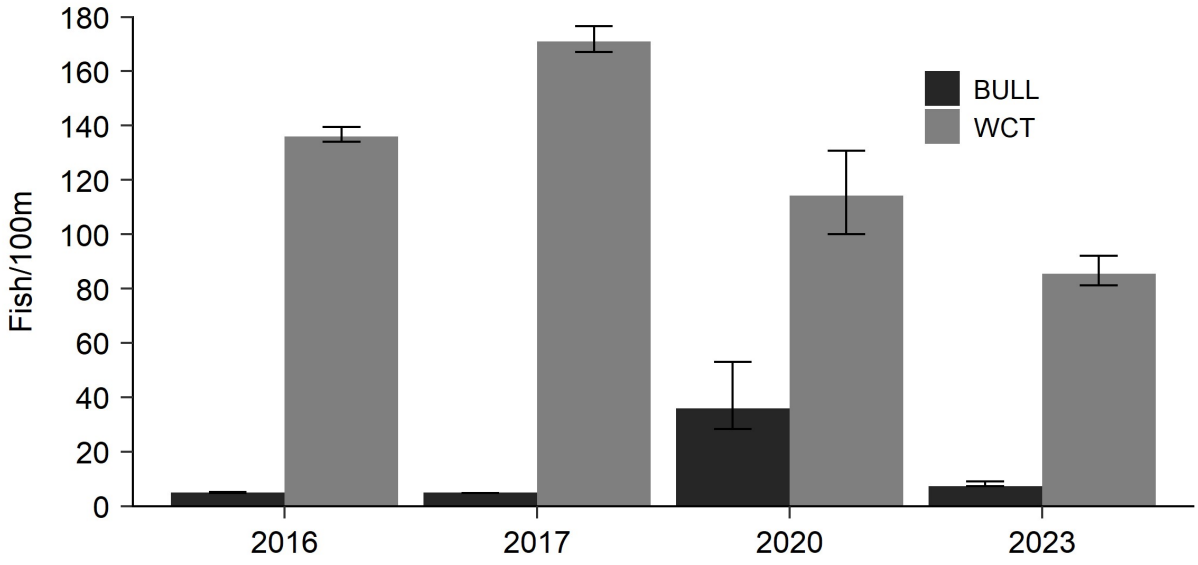

Figure 7. Linear abundance estimates (fish/100 m) with 95% confidence intervals for Bull Trout (BULL) and Westslope Cutthroat Trout (WCT) at Site 4 in Cooper Gulch.

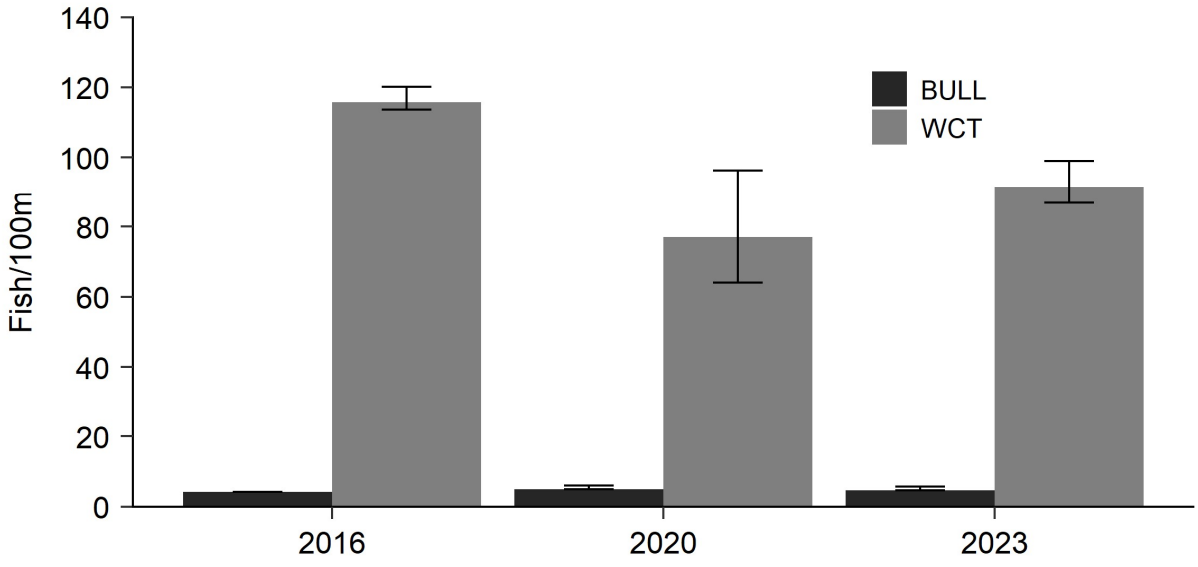

Figure 8. Linear abundance estimates (fish/100 m) with 95% confidence intervals for Bull Trout (BULL) and Westslope Cutthroat Trout (WCT) at Site 5 in Cooper Gulch.

Graves Creek

Graves Creek is a tributary to Noxon Reservoir, draining ~74 km^2 of the western edge of the Cabinet Mountains. The watershed is functionally separated by a large waterfall at approximate Rkm 5.6. Migratory Bull Trout have access to lower Graves Creek below the falls, while only Westslope Cutthroat Trout and low abundances of Brook Trout *Salvelinus fontinalis* exist above the falls. Other salmonids species that occur at low densities in lower Graves Creek include Brown Trout *Salmo trutta*, Rainbow Trout, *Oncorhynchus* hybrids, and Mountain Whitefish *Prosopium williamsoni*. Recent increases in non-native fish have been observed in lower Graves Creek (Rehm and Tholl 2023). Human impacts in the watershed consist of timber harvest, roads, and development, with many of the impairments occurring below the falls. About half of the land bordering stream in the lower drainage is privately owned. A stream restoration project on lower Graves Creek occurred in the summer of 2009 which included the addition of large woody debris jams and stabilization of an eroding bank near Rkm 1.0 (Horn 2011). A second small-scale habitat project was completed in 2019 where four large woody debris structures were completed to facilitate spawning gravel deposition in lower Graves Creek (Trout Unlimited et al. 2022). In 2021, a large wildfire burned at high

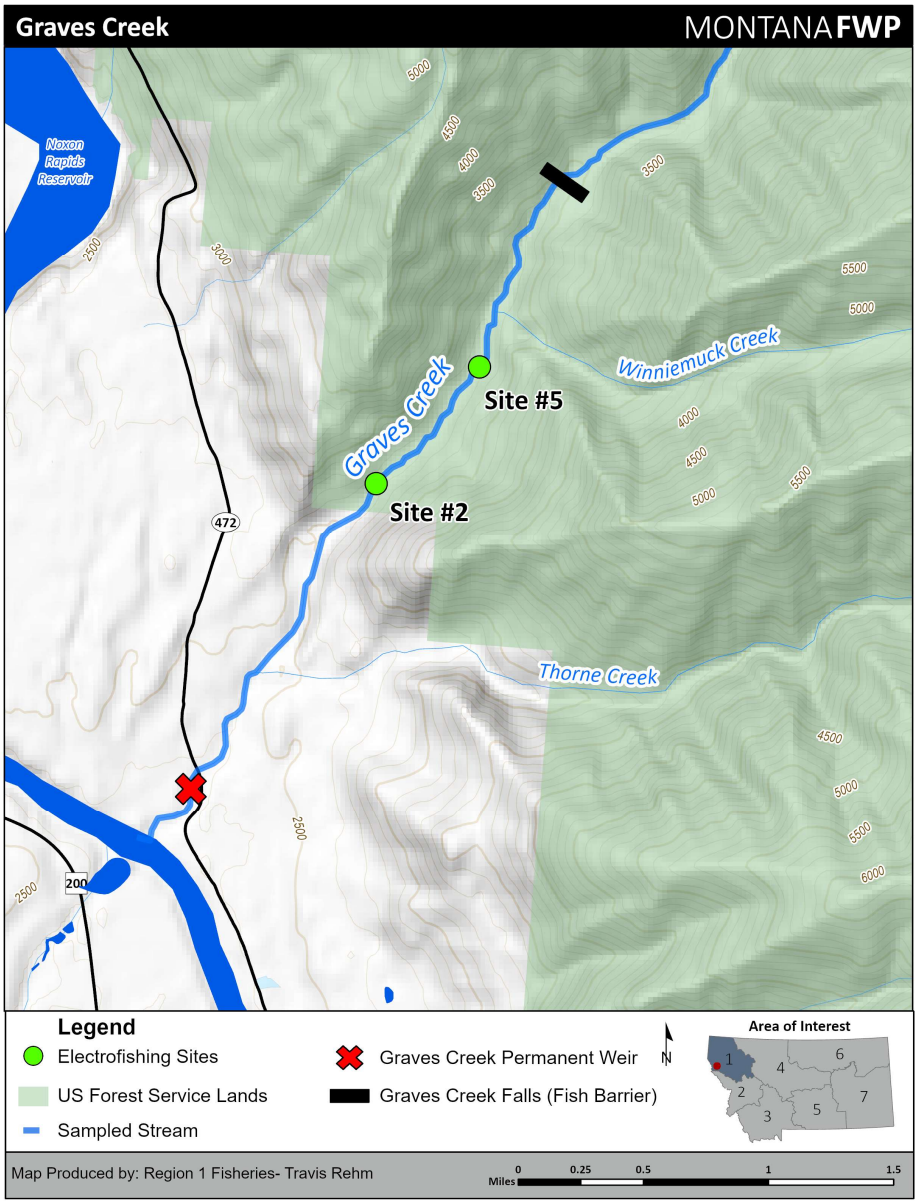

Figure 9. Graves Creek electrofishing sites sampled in 2023.

severity across most of the upper Graves Creek watershed. This wildfire increased stream temperature and likely productivity within Graves Creek.

Two monitoring sites were sampled in lower Graves Creek in 2023 (Figure 9). Site 2 sampled 12 times since 2003, is located just above Winniemuck Creek downstream of the falls at Rkm 4.3. Site 5 sampled 2 times since 2022 is located a couple hundred meters on to Forest Service ownership at Rkm 3. These two sites were selected to be monitored in 2023 as lower Graves Creek is a perspective donor population for Bull Trout translocation efforts. Graves Creek above the falls is currently being evaluated under the *Fish Passage/Native Salmonid Restoration Plan (Appendix C), Graves Creek Bull Trout Translocation Project* as a perspective location for Bull Trout translocation. A permanent weir is located in the lower portion of Graves Creek just downstream of the Blueslide Road bridge. The weir is operated to capture out-migrating juvenile Bull Trout that are subsequently driven to and released in the Clark Fork River below Cabinet Gorge Dam (Oldenburg 2018). PIT tag arrays are located above and below the weir to monitor movements of both juvenile and adult fish.

Bull Trout were captured at both sites sampled in Graves Creek in 2023. At Site 2 mean abundance from 2003–2022 (n = 12) was 31.8 fish/100 m, compared to 34.9 fish/100 m in 2023 (Table 3; Figure 10). At Site 5 abundance in 2022 was 17.8 fish/100 m, compared to 15 fish/100 m in 2023 (Table 3; Figure 11). Bull Trout abundance continues to be relatively high throughout the drainage compared to the species abundance encountered in other lower Clark Fork River tributaries. These stable to increasing abundances are likely due to Bull Trout passage efforts by both the *Fish Passage/Native Salmonid Restoration Plan (Appendix C), Upstream Fish Passage Program* and *Tributary Trapping and Downstream Juvenile Bull Trout Transport Program.* This stable Bull Trout abundance within Graves Creek has also been observed during annual redd surveys. Nine redds where observed in 2023 which is near the long-term 2001-2022 average of 10.3 (Moran 2024).

Abundances of Westslope Cutthroat Trout were lower than in recent years, however populations appear stable in Graves Creek. At Site 2 mean abundance from 2003–2022 (n = 12) was 27.4 fish/100 m, compared to 17.9 fish/100 m in 2023 (Table 3; Figure 10). At Site 5 abundance in 2022 was 44.9 fish/100 m, compared to 10.6 fish/100 m in 2023 (Table 3; Figure 11).

Table 3. Standardized linear abundance (#/100m), density (#/100m^2) and biomass (g/100m^2) estimates (fish≥75mm) for Bull (BULL), Brook (EB) and Westslope Cutthroat Trout (WCT) in Graves Creek in 2023.

Site # (Rkm)	Section Length (m)	Spp.	Length Range (mm)	Estimate per 100 m	95% C.I.	Estimate per 100 m^2	95% C.I.	g/100 m^2	95% C.I.
2	106	BULL	60–194	34.9	34.0–38.6	4.5	4.4–8.1	62.7	61.0–66.3
(4.2)		EB	138–138	0.9	0.9–0.9	0.1	0.1–0.1	5.4	5.4–5.4
		WCT	95–303	17.9	17.9–18.9	2.3	2.3–3.3	186.1	186.1–187.1
5	113	BULL	61–205	15.0	15.0–15.6	2.5	2.5–3.1	61.2	61.2–61.7
(3.0)		EB	122–122	0.9	0.9–0.9	0.1	0.1–0.1	2.7	2.7–2.7
		WCT	46–290	10.6	10.6–11.9	1.8	1.8–3.1	108.0	108.0–109.3

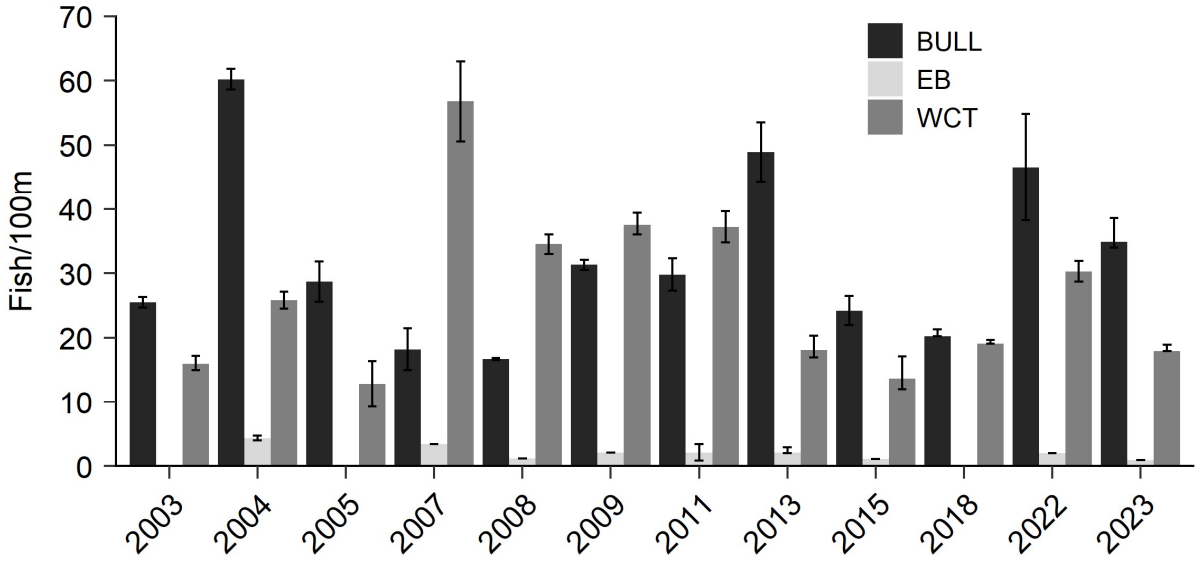

Figure 10. Linear abundance estimates (fish/100 m) with 95% confidence intervals for Bull Trout (BULL), Westslope Cutthroat Trout (WCT), and Brook Trout (EB) at Site 2 in Graves Creek.

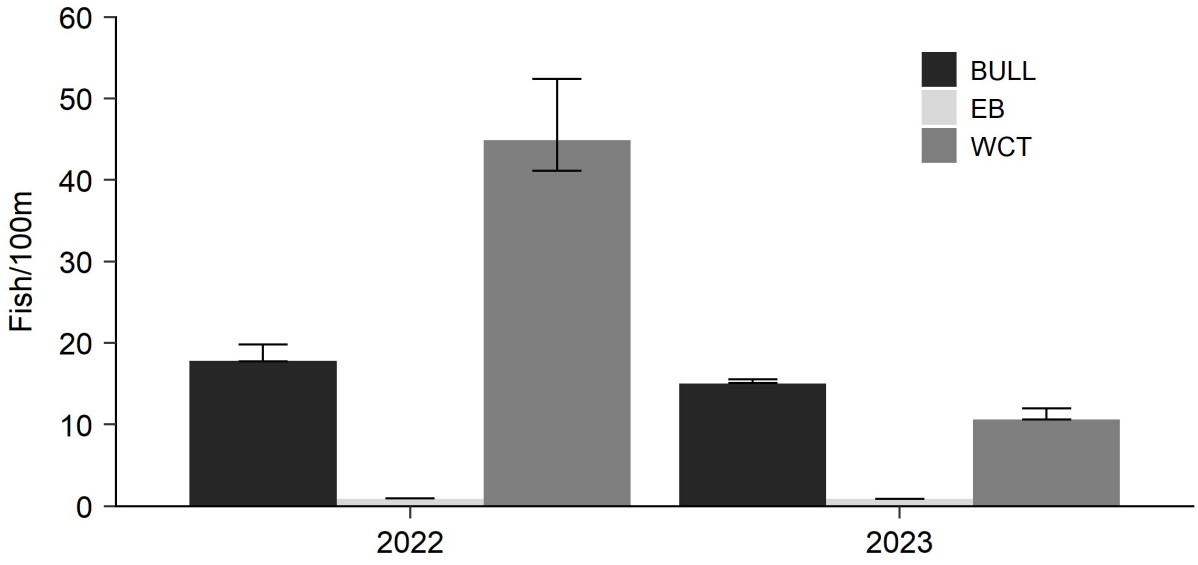

Figure 11. Linear abundance estimates (fish/100 m) with 95% confidence intervals for Bull Trout (BULL), Westslope Cutthroat Trout (WCT), and Brook Trout (EB) at Site 5 in Graves Creek.

Swamp Creek

Swamp Creek is a tributary to Noxon Reservoir which enters approximately 6 km above Noxon Rapids dam. Its headwaters lie in the Cabinet Mountains Wilderness above Wanless Lake. After leaving Wanless Lake, the stream plunges approximately 300 m in elevation to Buck Lake, a shallow, mud-bottomed pond, where the mainstem Swamp Creek begins. As a result of Buck Lake and four other cirque lakes that occur in the upper basin stream temperatures in the upper reaches of Swamp Creek are among the highest in the drainage (Neesvig 2014). The large surface area of these lakes coupled with shallow maximum depths, facilitates the warmer than expected temperature regime in upper Swamp Creek. Maximum temperatures in this portion of the drainage have been found to exceed above 15°C, a threshold that typically limits Bull Trout distribution (Rieman and McIntyre 1993). Stream temperature cools substantially near Sites 5 and 6 (Neesvig 2014), where past sampling has consistently found Bull Trout, albeit at relatively low abundance (Moran 2007; Kreiner and Tholl 2014; Blakney and Tholl 2019b). The uppermost distribution of Bull Trout in the drainage was noted in 2012, when a lone Bull Trout (presumably a resident adult, 269 mm) was captured below Buck Lake at Site 8. Swamp Creek has an intermittent stretch near the trailhead at approximate Rkm 10, downstream of Site 4 (Moran 2007). The perennial reach below Site 4 down to the mouth is comprised mainly of non-native salmonids (Moran 2007; Kreiner and Tholl 2014) and has various anthropogenic impacts that degrade stream habitat quality (Neesvig 2014). At approximate Rkm 8.5, a large ditch draws water from an already losing reach of the creek for irrigation purposes. A study by the USFS found that during low water this ditch may draw as much as 49% of the Swamp Creek flow

(compared with 26% expected loss from natural conditions) and may contribute to a greater than 3°C increase in the water temperatures of lower Swamp Creek (Neesvig 2014). The lower end of the creek has been heavily affected by human development and cattle grazing.

Figure 12. Swamp Creek electrofishing sites sampled in 2023.

Four sites were sampled in the roadless portion of Swamp Creek in 2023 (Figure 12). Site 4, 5 and 6 have been sampled four times since 2006. Site 4 is located near the mouth of Goat Creek at Rkm 11.9. Site 5 is located at the Cabinet Mountain Wilderness boundary at Rkm 15.7. Site 6 is located 2.4 km above the wilderness boundary at Rkm 18.2. Site 8 was sampled for the second time since 2012. Site 8 is located 1 km downstream of Buck Lake. These sites were chosen as long-term monitoring sites because Bull Trout were believed to be most abundant in this portion of the drainage (Moran 2007; Kreiner and Tholl 2014).

No Bull Trout were captured at any site sampled in Swamp Creek in 2023 (Table 4). Site 6 has seen significant decrease in Bull Trout abundance over time (linear regression, $r^2 = 0.92$, $p = 0.04$; Appendix A). Bull Trout still presumably occupy Swamp Creek at low densities as the *Fish Passage/Native Salmonid Restoration Plan (Appendix C), Upstream Fish Passage Program* has

captured and transported at least one Bull Trout (n=9) from below Cabinet Gorge Dam to Swamp Creek every year over the last decade, excluding two years (Avista, unpublished data). Additionally, at least one Bull Trout redd (n=12) have been observed each year over that same time period during annual surveys in Swamp Creek (Moran 2024). However, their recent absence during sampling of long-term monitoring sites is concerning.

Populations of Westslope Cutthroat Trout appear stable in Swamp Creek, with abundance increasing in the upstream sites (Table 4). At Site 4 mean abundance from 2006–2017 (n = 3) was 113.8 fish/100 m, compared to 108 fish/100 m in 2023 (Table 4; Figure 13). At Site 5 mean abundance from 2006–2017 (n = 3) was 89.2 fish/100 m, compared to 109.9 fish/100 m in 2023 (Table 4; Figure 14). At Site 6 mean abundance from 2006–2017 (n = 3) was 94.3 fish/100 m, compared to 148 fish/100 m in 2023 (Table 4; Figure 15). At Site 8 mean abundance in 2012 was 166.7 fish/100 m, compared to 162 fish/100 m in 2023 (Table 4; Figure 16). Brook Trout continue to be detected at low densities at the three lower most sites and were most abundant at Site 6 (Table 4; Figure 13-16).

Table 4. Standardized linear abundance (#/100m), density (#/100m^2) and biomass (g/100m^2) estimates (fish≥75mm) for Brook (EB) and Westslope Cutthroat Trout (WCT) in Swamp Creek in 2023.

Site # (Rkm)	Section Length (m)	Spp.	Length Range (mm)	Estimate per 100 m	95% C.I.	Estimate per 100 m^2	95% C.I.	g/100 m^2	95% C.I.
4	100	EB	65–105	3.0	3.0–4.5	0.4	0.4–1.9	3.5	3.5–5.0
(11.9)		WCT	80–262	108.0	105.0–113.1	15.9	15.4–21.0	397.1	386.0–402.1
5	101	EB	155–155	1.0	1.0–1.0	0.3	0.3–0.3	7.9	7.9–7.9
(15.7)		WCT	62–232	105.9	105.9–112.0	27.2	28.2–33.2	679.1	679.1–685.2
6	100	EB	131–190	7.0	7.0–7.0	1.2	1.2–1.2	44.2	44.2–44.2
(18.2)		WCT	65–207	148.0	142.0–155.9	26.0	24.9–33.9	649.1	622.8–657.0
8	100	WCT	68–213	162.0	158.0–168.0	46.3	45.1–52.3	1064.6	1038.3–1070.6
(20.5)									

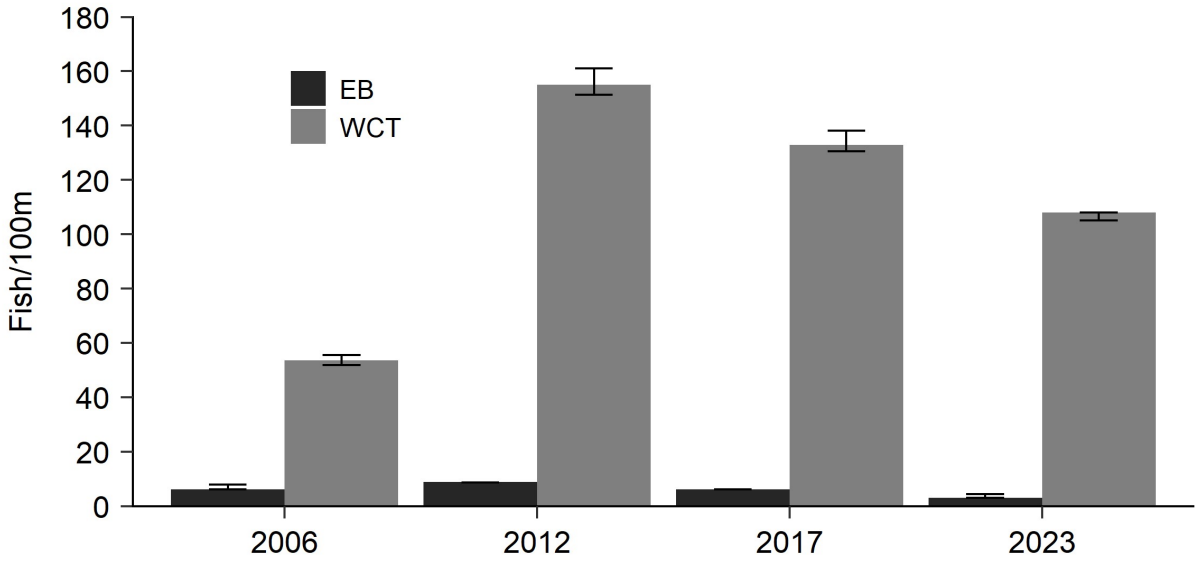

Figure 13. Linear abundance estimates (fish/100 m) with 95% confidence intervals for Westslope Cutthroat Trout (WCT) and Brook Trout (EB) at Site 4 in Swamp Creek.

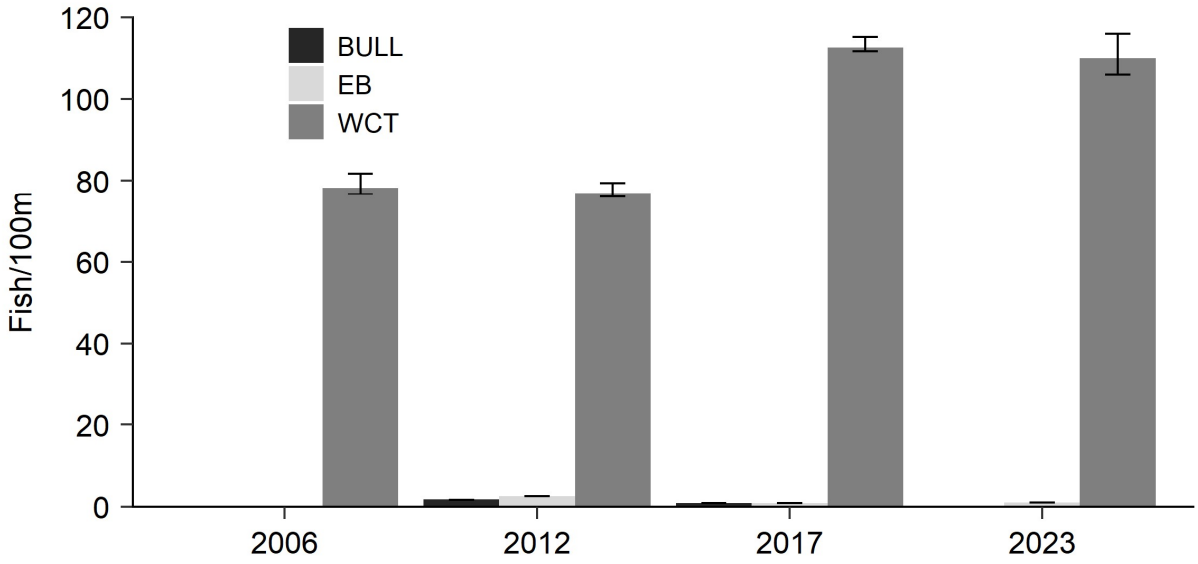

Figure 14. Linear abundance estimates (fish/100 m) with 95% confidence intervals for Bull Trout (BULL), Westslope Cutthroat Trout (WCT), and Brook Trout (EB) at Site 5 in Swamp Creek.

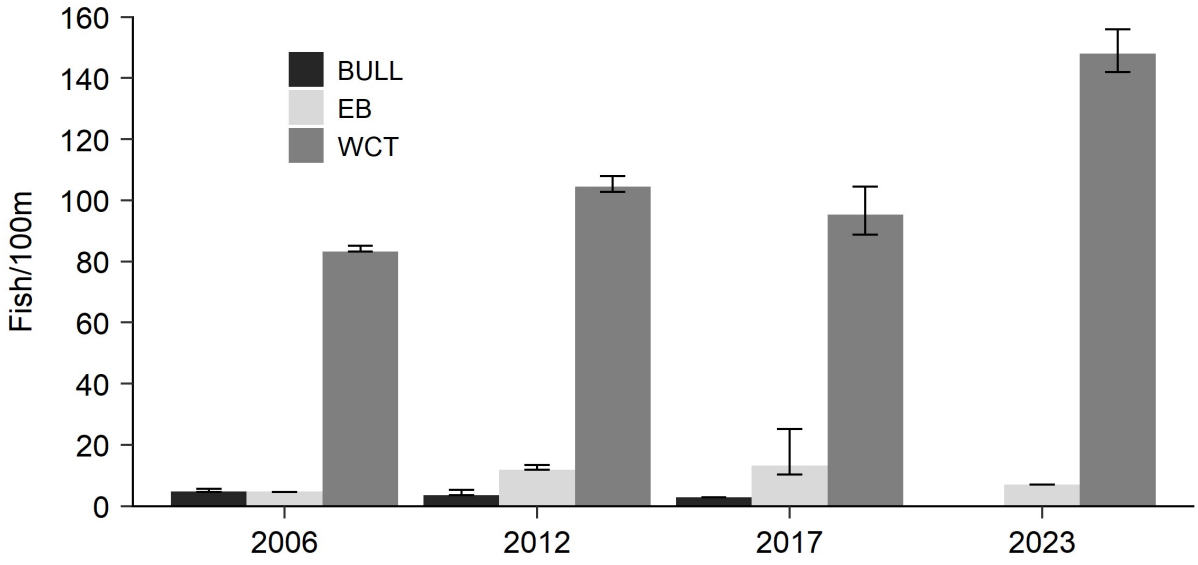

Figure 15. Linear abundance estimates (fish/100 m) with 95% confidence intervals for Bull Trout (BULL), Westslope Cutthroat Trout (WCT), and Brook Trout (EB) at Site 6 in Swamp Creek.

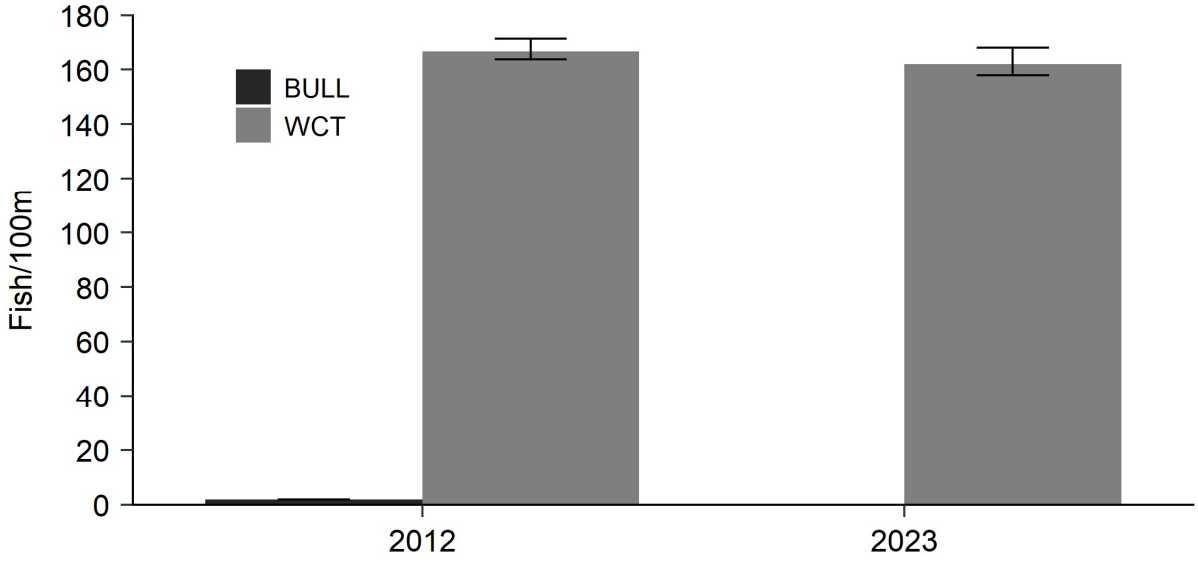

Figure 16. Linear abundance estimates (fish/100 m) with 95% confidence intervals for Bull Trout (BULL) and Westslope Cutthroat Trout (WCT) at Site 8 in Swamp Creek.

East Fork Blue Creek

Blue Creek enters Cabinet Gorge Reservoir from the north approximately 1.6 km east of the Idaho border. The entire drainage is ~78 km^2, with its two main forks (east and west) meeting in Blue Creek Bay of the reservoir. The fish community of both forks is almost entirely Westslope Cutthroat Trout. Fish can move freely between the reservoir and West Fork Blue Creek, which has its headwaters in Idaho. Human impacts are minimal in West Fork Blue Creek. The main disturbance was caused by a November 2006 rain-on-snow flood that scoured and moved the stream channel. The 2006 flood did not disturb East Fork Blue Creek to any significant degree, though human impacts are more prevalent. Timber harvest on private and public lands, roads, mining remnants, and stream fords are the major impacts in this fork (RDG 2008). Also, a pair of hanging culverts, were thought to block upstream fish migration, isolating the East Fork Blue Creek Westslope Cutthroat Trout. However, recent detection of Rainbow Trout ancestry in fish above the culverts indicates that this barrier could only be partial. Unpermitted stocking of Rainbow Trout in a private pond in the drainage could have also facilitated the hybridization. It should also be noted

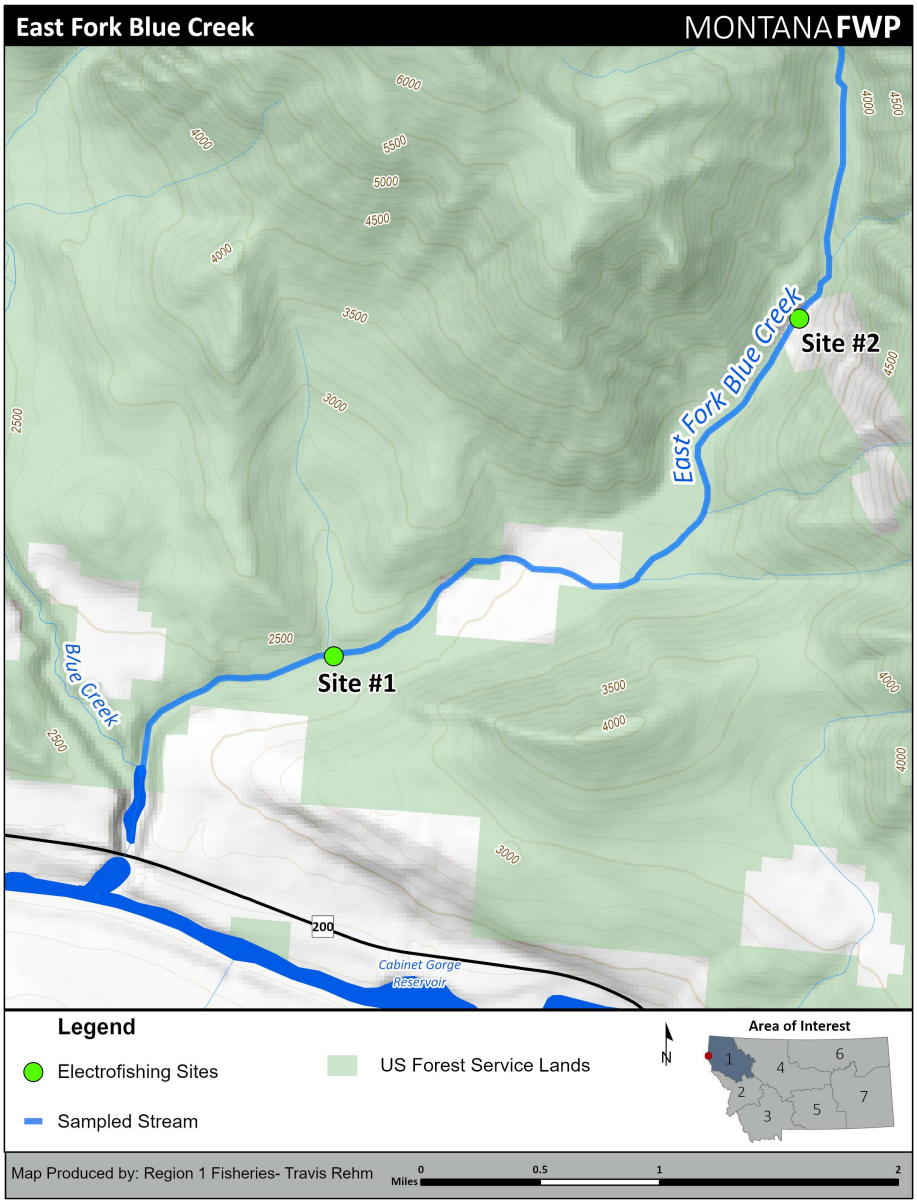

Figure 17. East Fork Blue Creek electrofishing sites sampled in 2023.

that East Fork Blue Creek goes dry for about two kilometers starting just below site 2.

Two long-term monitoring sites were sampled in East Fork Blue Creek in 2023 (Figure 17). Site 1 and 2 have been sampled 5 and 6 times since 2007, respectively. Site 1 is located 150 m upstream of two perched culverts that act as a presumed fish barrier at Rkm 1.7. In the summer of 2010, a major restoration/mine clean-up occurred in the upper part of East Fork Blue Creek. As part of the cleanup, several road-associated sediment inputs were repaired, and five instream structures were installed within East Fork Blue Creek (Horn 2011). Site 2 is approximately 100 m downstream of these structures, at Rkm 6.3.

Abundances of Westslope Cutthroat Trout appear stable in Blue Creek. At Site 1 mean abundance from 2007–2011 (n = 5) was 59.2 fish/100 m, compared to 66.3 fish/100 m in 2023 (Table 5; Figure 18). At Site 2 mean abundance from 2007–2014 (n = 6) was 95.7 fish/100 m, compared to 56 fish/100 m in 2023 (Table 5; Figure 19).

Table 5. Standardized linear abundance (#/100m), density (#/100m^2) and biomass (g/100m^2) estimates (fish≥75mm) for Westslope Cutthroat Trout (WCT) in East Fork Blue Creek in 2023.

Site # (Rkm)	Section Length (m)	Spp.	Length Range (mm)	Estimate per 100 m	95% C.I.	Estimate per 100 m^2	95% C.I.	g/100 m^2	95% C.I.
1 (1.7)	86	WCT	52–184	66.3	64.0–71.7	13.3	12.8-18.6	225.3	217.4–230.7
2 (6.3)	101	WCT	55–211	56.4	55.4–59.5	10.6	10.5-13.7	255.6	251.1–258.6

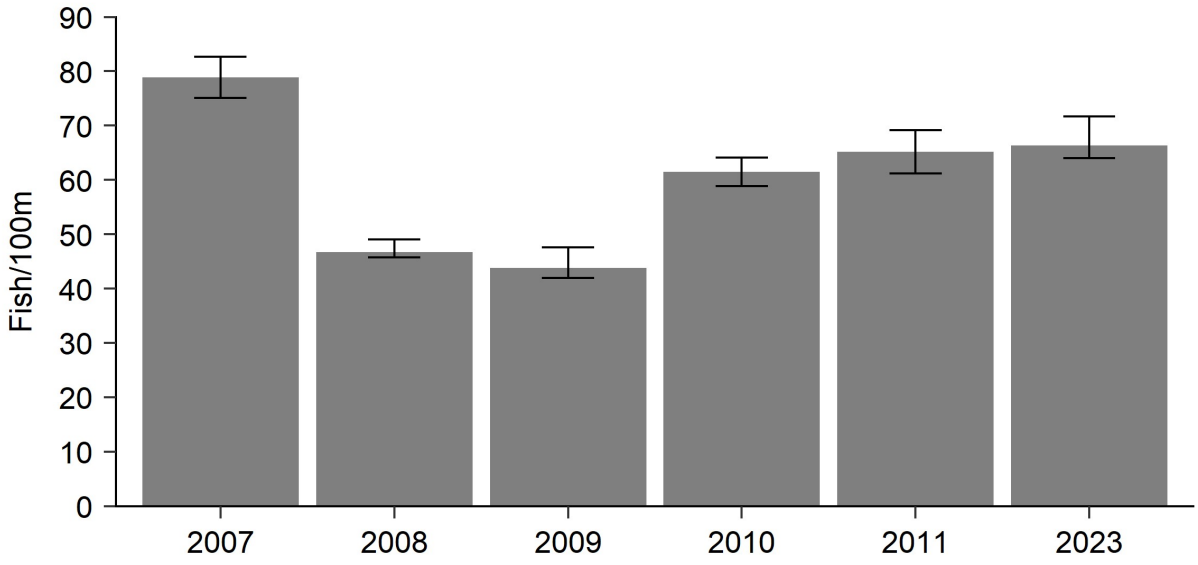

Figure 18. Linear abundance estimates (fish/100 m) with 95% confidence intervals for Westslope Cutthroat Trout (WCT) at Site 1 in East Fork Blue Creek.

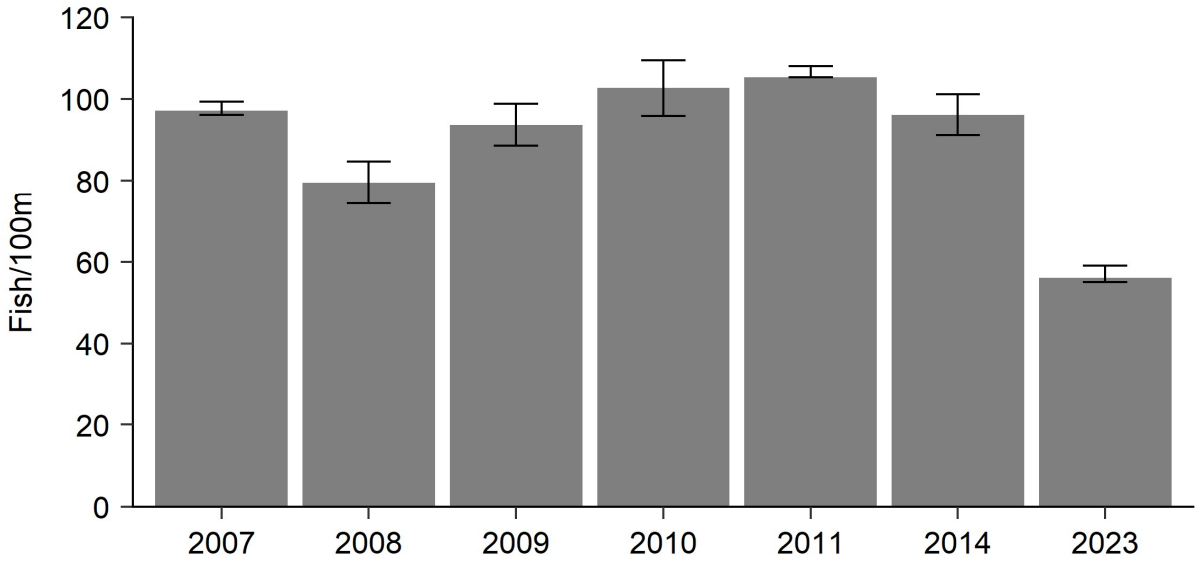

Figure 19. Linear abundance estimates (fish/100 m) with 95% confidence intervals for Westslope Cutthroat Trout (WCT) at Site 2 in East Fork Blue Creek.

Prospect Creek Fish Salvage

In 2012, the U.S. Geological Survey and FWP while working on a stream intermittency study, encountered Bull Trout in stranded pools in an ephemeral section of Prospect Creek just upstream of its confluence with Crow Creek (R. Kreiner, FWP, personal observation). Bull Trout and putative Westslope Cutthroat Trout were salvaged from these pools and moved downstream to the lower perennial portion of Prospect Creek. The next year, fish were left in these pools based on discussions with the U.S Fish and Wildlife Service. Fish rescue efforts resumed in 2014 and through 2016. During those efforts 37 of the 41 Bull Trout captured were transported to the lower Clark Fork River in Idaho, below Cabinet Gorge Dam. The four other fish that were too small to be PIT tagged or transported, were released near Brush Gulch (Eric Oldenburg, Avista, personal communication; Oldenburg et al. 2015). Bull Trout captured in ephemeral portions of Prospect Creek in 2017–2022 were moved into Crow Creek (n = 197) (Rehm et al. 2023).

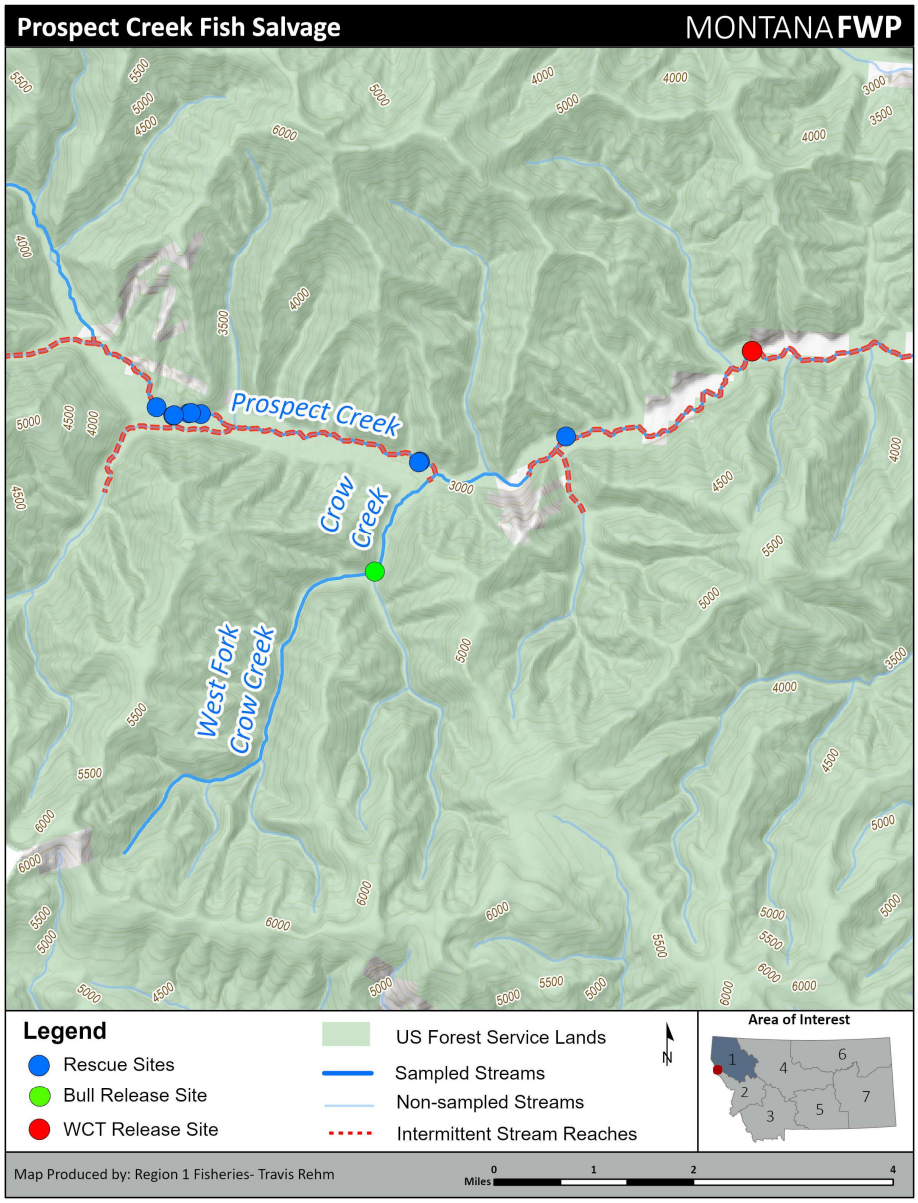

Figure 20. Prospect Creek fish rescue and release sites 2023.

In 2023, efforts to capture Bull Trout in stranded pools in the mainstem of Prospect Creek occurred over six days in July (7/11, 7/13, 7/17, 7/19, and 7/24) and August (8/7). Due to low flow conditions in 2023 salvage dates were

significantly earlier than in past years. Observations indicate timing and extent of intermittency is quite variable where some stream reaches dry up in a matter of hours, while in other areas the stream and associated ephemeral pools may take days or weeks to go completely dry. A total of 17 Bull Trout were rescued from isolated pools ranging 52–240 mm in length and were relocated to Crow Creek (Figure 20). Sixteen Bull Trout were PIT tagged (≥100 mm), and a single Bull Trout was released untagged (<100 mm). The mean length of Bull Trout captured in ephemeral pools was 183 mm with 8 fish ≥ 200 mm. There was one Bull Trout measuring 52 mm in length and 8 Bull Trout 142–183 mm. Based on length at time of capture fish ranged from an estimated age-0 to age-4+ (Zymonas 2006). Genetics were collected from all Bull Trout rescued from Prospect Creek and released into Crow Creek.

Sixty-five Bull Trout ≥ 200 mm in length have been rescued from the intermittent sections of Prospect Creek since 2012. Of these 65 fish, 53 Bull Trout have been released into Crow Creek 2017–2023. Resident Bull Trout ≥200 mm in length are likely age-4 or older and should be at or near sexual maturity (Rieman and McIntyre 1993; Zymonas 2006). Annual supplementation with fish from stranded pools could increase Bull Trout production in Crow Creek. Because of the low densities of Bull Trout in the drainage, even a few more large fish in Crow Creek could benefit the population. One redd in 2018, two redds in 2019 and one redd in 2022 were observed in Crow Creek, while only two redds were found in the drainage 2003–2017. However, no redds were observed in 2020, 2021 and 2023 (Moran 2024).

Beginning in 2023, efforts began to determine if Bull Trout rescued from pools in ephemeral sections of Prospect Creek are producing offspring in Crow Creek and what percentage of Bull Trout are emigrating out of the creek after salvaging efforts. This work is being completed under another Clark Fork Settlement Agreement project the *Montana Tributary Habitat Acquisition and Recreational Fishery Enhancement Program (Appendix B)*, *Prospect Creek Bull Trout Salvage Evaluation*. Initial detections in 2023 from PIT tag arrays placed in Crow Creek show multiple years (2021-2023) of salvaged Bull Trout occupying Crow Creek (FWP, unpublished data).

Westslope Cutthroat Trout were also salvaged from ephemeral pools in portions of Prospect Creek. A total of 92 Westslope Cutthroat Trout were rescued and released in the lower perennial reach of Prospect Creek just downstream of Brush Gulch (Rkm 13.0) in 2023. Fish ranged from 72–384 mm in length with an average length of 189 mm. All Westslope Cutthroat Trout ≥100 mm received PIT tags and 21 fish rescued in 2023 were later detected on the Prospect Creek PIT tag array located downstream at Rkm 0.7. Six Westslope Cutthroat Trout rescued in 2022 were also detected on the Prospect Creek PIT array in 2023 (Appendix D-1). One Westslope Cutthroat Trout originally tagged in 2022 salvaging efforts was recaptured and rescued again in 2023. A single Westslope Cutthroat Trout originally tagged during salvaging efforts in 2020 was detected on a PIT tag array below Cabinet Gorge Dam, Idaho. One Bull Trout tagged during salvaging

efforts in 2022 and released in Crow Creek was also detected on the Prospect Creek PIT tag array presumably out-migrating in the spring (Appendix D-1).

East Fork Bull River Fish Salvage

In 2022, Avista personnel while working under *Fish Passage/Native Salmonid Restoration Plan (Appendix C), Tributary Trapping and Downstream Juvenile Bull Trout Transport Program* encountered Bull Trout in stranded pools in an ephemeral side channel of East Fork Bull River near Rkm 6.6. Bull Trout were captured in these pools in 2022 and transported to the lower Clark Fork River in Idaho, below Cabinet Gorge Dam. During 2023 salvaging efforts in the ephemeral side channel occurred much earlier due to low flow conditions and all fish were relocated into the adjacent mainstem of East Fork Bull River.

In 2023, efforts to capture Bull Trout in stranded pools occurred over two days in August (8/8 and 8/10). A total of 14 Bull Trout were rescued from isolated pools ranging 111–152 mm in length with an average length of 130 mm. All Bull Trout capture received a PIT tag prior to release. Westslope Cutthroat Trout were also salvaged from ephemeral pools in portions of East Fork Bull River. A total of 43 Westslope Cutthroat Trout were rescued ranged from 62–160 mm in length with an average length of 189 mm. All fish were relocated to the directly adjacent mainstream of the East Fork Bull River.

Westslope Cutthroat Trout Genetic Monitoring

Napolean Gulch
Genetic samples (n = 27) from putative Westslope Cutthroat Trout were collected from one reach of Napolean Gulch in 2023 at Rkm 0.6. A natural bedrock chute at Rkm 0.8 was observed that is approximately 69 m in length and at a slope of ≥ 20º. Sampling occurred above this barrier and no fish were observed and waters above this natural barrier are presumably fishless. Fish were only found to occupy approximately 0.1 km of habitat in Napolean Gulch, from this barrier downstream to an ephemeral section of stream that enters the Bull River. No definitive Rainbow Trout or Yellowstone Cutthroat Trout ancestry was detected. All individuals in the sample appear to be non-hybridized Westslope Cutthroat Trout (Kovach 2024). These results are consistent with a past sample from Napolean Gulch in 1992, suggesting Rainbow Trout from the Bull River have yet to invade Napolean Gulch (Kovach 2024).

Dry Creek
Genetic samples (n = 29) from putative Westslope Cutthroat Trout were collected from two reaches of Dry Creek (Bull River drainage) in 2023 at Rkm 3.5 and 4.3. No definitive Rainbow Trout or Yellowstone Cutthroat Trout ancestry was detected. All individuals in the sample

appear to be non-hybridized Westslope Cutthroat Trout (Kovach 2024). These results are consistent with a past sample from Dry Creek in 1992, suggesting Rainbow Trout from the Bull River have yet to invade Dry Creek (Kovach 2024).

Hamilton Gulch

Genetic samples (n = 29) from putative Westslope Cutthroat Trout were collected from two reaches of Hamilton Gulch in 2023 at Rkm 1.1 and 2.1. No definitive Rainbow Trout or Yellowstone Cutthroat Trout ancestry was detected. All individuals in the sample appear to be non-hybridized Westslope Cutthroat Trout (Kovach 2024). These results are consistent with a past sample from Hamilton Gulch in 1992, suggesting Rainbow Trout from the Bull River have yet to invade Hamilton Gulch (Kovach 2024).

Berray Creek

Genetic samples (n = 28) from putative Westslope Cutthroat Trout were collected from three reaches of Berray Creek in 2023 at Rkm 1.1, 2.3, and 2.7. No definitive Rainbow Trout or Yellowstone Cutthroat Trout ancestry was detected. All individuals in the sample appear to be non-hybridized Westslope Cutthroat Trout (Kovach 2024). These results are consistent with a past sample from Berray Creek in 1992, suggesting Rainbow Trout from the Bull River have yet to invade Berray Creek (Kovach 2024).

Middle Fork Bull River

Genetic samples (n = 28) from putative Westslope Cutthroat Trout were collected from three reaches of the Middle Fork Bull River in 2023 at Rkm 1, 2.4, and 3.1. No definitive Rainbow Trout or Yellowstone Cutthroat Trout ancestry was detected. All individuals in the sample appear to be non-hybridized Westslope Cutthroat Trout (Kovach 2024). These results are consistent with a past samples from the Middle Fork Bull River in 1992, 2007, and 2014, suggesting Rainbow Trout from the Bull River have yet to invade the Middle Fork Bull River (Ardren et al. 2008; DeHann et al. 2016; Kovach 2024).

North Fork Bull River

Genetic samples (n = 28) from putative Westslope Cutthroat Trout were collected from three reaches of the North Fork Bull River in 2023 at Rkm 0.5, 2.2, and 3.2. Definitive evidence of Yellowstone Cutthroat Trout ancestry was detected in 4 fish, with ancestry less than 1% in all four hybrids. Hybrids were detected in all 3 reaches. The remaining fish in the sample appeared to be non-hybridized Westslope Cutthroat Trout (Kovach 2024). While Yellowstone Cutthroat ancestry is present, it is found at a trivial level. These results are consistent with a past samples from the North Fork Bull River in 1992, 2007, and 2014 (Ardren et al. 2008; DeHann et al. 2016; Kovach 2024).

The presence of Yellowstone Cutthroat Trout ancestry in fish from North Fork Bull River is almost certainly due to downstream gene flow from Yellowstone Cutthroat Trout historically stocked and hybrids currently residing in Snowshoe Lake (Kovach 2024; Blakney et al. *In Prep*). Based on recent work done under the *Montana Tributary Habitat Acquisition and Recreational Fishery Enhancement Program (Appendix B), Mountain Lake Fisheries Monitoring Project*, genetic swamping of Westslope-Yellowstone Cutthroat Trout hybrids was initiated in Snowshoe Lake. This is performed by stocking high densities of non-hybridized Westslope Cutthroat Trout to reduce the prevalence of hybrid fish in headwater lakes that threaten populations downstream.

East Fork Blue Creek

Genetic samples (n = 29) from putative WCT were collected from two reaches of East Fork Blue Creek in 2023 at Rkm 1.7 and 6.3. All samples were collected above a pair of hanging culverts that were historically thought to block upstream fish migration. Definitive evidence of Rainbow Trout ancestry was detected in 5 fish, with ancestry ranging from 0-3% (Kovach 2024). Hybrids were detected in both reaches. Hybridization appears to be currently limited to subset of the population and appears to be relatively recent. However, recent results suggest that hybridization appears to be increasing in the stream. These results are consistent with a past samples from the East Fork Blue Creek in 1993, 2002, 2007, 2010, and 2014 (Ardren et al. 2008; DeHann et al. 2016; Kovach 2024).

Table 6. Summary of hybridization results. The Max RBT and YCT columns denote the maximum individual Rainbow Trout and Yellowstone Cutthroat Trout ancestry observed.

Sample	Year	N	#Hybrids	#WCT	Max RBT	Max YCT
Napolean Gulch	2023	27	0	27	0	0
Dry Creek	2023	28	0	28	0	0
Hamilton Gulch	2023	28	0	28	0	0
Berray Creek	2023	28	0	28	0	0
Middle Fork Bull River	2023	28	0	28	0	0
North Fork Bull River	2023	28	4	24	0	0.9
East Fork Blue Creek	2023	29	5	24	3.1	0

PIT Tag Array Detection Summary

Prospect Creek Array

A PIT tag array was installed in lower Prospect Creek (Rkm 0.7) in August of 2018 and was a cost-share between the Avista and Northwestern Energy mitigation programs (Biomark 2018c). In 2023, 42 fish were detected on the array including Bull Trout, Rainbow Trout, *Oncorhynchus* hybrid, and Westslope Cutthroat Trout (Appendix D-1). Of the three Bull Trout that were detected, one was initially tagged during salvaging efforts in the ephemeral reaches of Prospect

Creek and relocated in Crow Creek in 2022. This fish appears to have out-migrated into Noxon Reservoir in April. The remaining two Bull Trout were adults transported upstream from below Cabinet Gorge Dam under the *Fish Passage/Native Salmonid Restoration Plan (Appendix C), Upstream Fish Passage Program*. One of the transported Bull Trout was a West Fork Thompson River upstream transport in 2022. The other Bull Trout was transported to the South Fork Jocko River in 2021. This fish made apparent spawning movements up Prospect Creek in 2022 and 2023. Both upstream transport fish likely overwintered in Noxon Reservoir and failed to ascend the Thompson Falls Fish Ladder.

Twenty-seven Westslope Cutthroat Trout were detected on the Prospect Creek array in 2023. All those fish came from salvaging efforts in the ephemeral reaches of Prospect Creek (2022–2023). The remaining fish detected on the array included one *Oncorhynchus* hybrid and eleven Rainbow Trout. All the Rainbow Trout and the *Oncorhynchus* hybrid were initially tagged at the Thompson Falls Fish Ladder.

Graves Creek Array

The current Graves Creek PIT array was installed in 2015 at Rkm 0.6. In 2023, 109 fish were detected on the array including Bull Trout, Brown Trout, Rainbow Trout, *Oncorhynchus* hybrid, and Westslope Cutthroat Trout (Appendix D-1). Forty-nine Bull Trout were detected on the array in 2023. One of these fish were tagged in Graves Creek as part of the *Fish Passage/Native Salmonid Restoration Plan (Appendix C), Bull Trout Emigration Study* as a juvenile in 2020. Twenty additional Bull Trout were tagged during electrofishing efforts in Graves Creek from 2022 and 2023 as part of the *Montana Tributary Habitat Acquisition and Recreational Fishery Enhancement Program (Appendix B), Habitat Restoration Monitoring and Native Salmonid Abundance Monitoring Plan*. Eight of those fish tagged electrofishing were later caught in the permanent weir on Graves Creek and subsequently transported downstream below Cabinet Gorge Dam as part of the *Fish Passage/Native Salmonid Restoration Plan (Appendix C), Tributary Trapping and Downstream Juvenile Bull Trout Transport Program*. Twenty-six Bull Trout detected were adults transported upstream from below Cabinet Gorge Dam to the Graves Creek under the *Fish Passage/Native Salmonid Restoration Plan (Appendix C), Upstream Fish Passage Program* from 2020-2023. Twenty-five of these fish were also transported downstream from Graves Creek to below Cabinet Gorge Dam as juveniles under the *Fish Passage/Native Salmonid Restoration Plan (Appendix C), Tributary Trapping and Downstream Juvenile Bull Trout Transport Program*. The remaining two Bull Trout were tagged at the permanent weir site in Graves Creek in 2022 and 2023.

Twenty-five Westslope Cutthroat Trout were detected on the Graves Creek array in 2023. All of those fish were tagged at the permanent weir site in Graves Creek in 2023. The remaining fish detected on the array included 26 Brown Trout, 8 Rainbow Trout, and an *Oncorhynchus* hybrid. Three Brown Trout and the *Oncorhynchus* hybrid were initially tagged at the Thompson Falls

Fish Ladder in 2022 and 2020, respectively. Three Brown Trout were tagged in the Clark Fork River in 2022 as part of a Thompson Falls Fish Ladder efficiency study with one returning from the prior year. The remaining 20 Brown Trout were all tagged at the permanent weir site in Graves Creek in 2023.

Vermilion River Array

In the summer of 2019, a PIT tag array was installed on the lower Vermilion River at Rkm 2.8. (Biomark 2019). In 2023, nine fish were detected on the array including six Bull Trout, two Brown Trout, and one Westslope Cutthroat Trout (Appendix D-1). One of the Bull Trout was initially tagged as a juvenile in the Vermilion River under the *Fish Passage/Native Salmonid Restoration Plan (Appendix C), Tributary Trapping and Downstream Juvenile Bull Trout Transport Program* in 2023. Four Bull Trout were adults transported upstream from below Cabinet Gorge Dam to the Vermilion River under the *Fish Passage/Native Salmonid Restoration Plan (Appendix C), Upstream Fish Passage Program*. Three of the upstream transports were also transported downstream from the Vermilion River to below Cabinet Gorge Dam as juveniles under the *Fish Passage/Native Salmonid Restoration Plan (Appendix C), Tributary Trapping and Downstream Juvenile Bull Trout Transport Program* in 2019 and 2020. These three juvenile Bull Trout were captured during fall electrofishing efforts. The fourth upstream transport fish was transported in 2020. This fish has likely overwintered in Noxon Reservoir and has made apparent spawning movements in the Vermilion River in 2020, 2021 2022, and 2023. The sixth Bull Trout detected was originally tagged in Graves Creek as part of long-term monitoring effort under the *Montana Tributary Habitat Acquisition and Recreational Fishery Enhancement Program (Appendix B), Habitat Restoration Monitoring and Native Salmonid Abundance Monitoring Plan.* This fish was likely seeking a thermal refuge after entering the Noxon Reservoir during the middle of July.

One Westslope Cutthroat Trout initially tagged in Graves Creek in 2023 was detected on the array. Both Brown Trout were initially tagged at the Thompson Falls Fish Ladder. One of those fish was also detected on the array in 2022.

Bull River Array

In August of 2018, a PIT tag array was installed on the lower Bull River at Rkm 4.5 (Biomark 2018a). In 2023, 124 fish were detected on the array including Bull Trout, Brook Trout, Brown Trout, Mountain Whitefish, Rainbow Trout, *Oncorhynchus* hybrids and Westslope Cutthroat Trout (Appendix D-1). Five Bull Trout were detected on the array in 2023. Two of these Bull Trout were tagged in the East Fork Bull River as part of long-term monitoring efforts under the *Montana Tributary Habitat Acquisition and Recreational Fishery Enhancement Program (Appendix B), Habitat Restoration Monitoring and Native Salmonid Abundance Monitoring Plan* in 2022. Two more Bull Trout were tagged in the Bull River and East Fork Bull River as part of sampling efforts for the *Fish Passage/Native Salmonid Restoration Plan (Appendix C), Westslope Cutthroat Trout Transport Evaluation* in 2022 and 2023. The final Bull Trout was

tagged in the East Fork Bull River as a juvenile under the *Fish Passage/Native Salmonid Restoration Plan (Appendix C), Tributary Trapping and Downstream Juvenile Bull Trout Transport Program* sampling in 2022.

Thirty-seven Westslope Cutthroat Trout were detected on the Bull River array in 2023. Thirty-two of those fish came from tags associated with the *Fish Passage/Native Salmonid Restoration Plan (Appendix C), Westslope Cutthroat Trout Transport Evaluation* tagged in 2022 and 2023. Twenty-one of those Westslope Cutthroat appeared to have out-migrated during the winter, either during the months of January or December. Based on length at time of capture those fish ranged from an estimated age 2-4. The remaining five Westslope Cutthroat Trout were transported upstream from below Cabinet Gorge Dam to Cabinet Gorge Reservoir under the *Fish Passage/Native Salmonid Restoration Plan (Appendix C), Upstream Fish Passage Program*. Four of those fish were transported upstream in 2023 and a single fish transported upstream in 2022. The 2022 transport likely overwintered in Cabinet Gorge Reservoir.

Sixty-five Brown Trout, nine Brook Trout, four Rainbow Trout, and three *Oncorhynchus* hybrids were detected on the Bull River array in 2023. Forty-one Brown Trout, two Rainbow Trout, and three *Oncorhynchus* hybrids came from tags associated with the *Fish Passage/Native Salmonid Restoration Plan (Appendix C), Westslope Cutthroat Trout Transport Evaluation* all tagged in 2022 and 2023. Thirteen of those Brown Trout and a *Oncorhynchus* hybrid had also been detected on the array in 2022. One Rainbow Trout and one Brown Trout were initially tagged at the Thompson Falls Fish Ladder in 2023. The same Rainbow Trout was detected on the East Fork Bull River and circular PIT arrays below Noxon Rapids Dam and below Cabinet Gorge Dam. The remaining twenty-three Brown Trout, nine Brook Trout, and one Rainbow Trout were fish tagged during East Fork Bull River weir exclusion efforts as part of the *Fish Passage/Native Salmonid Restoration Plan (Appendix C), Tributary Trapping and Downstream Juvenile Bull Trout Transport Program.* A single Mountain Whitefish was also detected for the fifth consecutive year on the Bull River Array that was tagging in 2019 at the East Fork Bull River screw trap associated with *Fish Passage/Native Salmonid Restoration Plan (Appendix C), Tributary Trapping and Downstream Juvenile Bull Trout Transport Program.*

East Fork Bull River Array

In September of 2018, a PIT tag array was installed on East Fork Bull River at Rkm 0.2 (Biomark 2018b). In 2023, 37 fish were detected on the array including Bull Trout, Brown Trout, Mountain Whitefish, *Oncorhynchus* hybrids and Westslope Cutthroat Trout (Appendix D-1). Six Bull Trout were detected on the array in 2023. One Bull Trout was tagged in the East Fork Bull River as part of sampling efforts for the *Fish Passage/Native Salmonid Restoration Plan (Appendix C), Westslope Cutthroat Trout Transport Evaluation*. Two Bull Trout were tagged as part of long-term monitoring under the *Montana Tributary Habitat Acquisition and Recreational Fishery Enhancement Program (Appendix B), Habitat Restoration Monitoring and Native Salmonid Abundance Monitoring Plan.* Two Bull Trout were tagged and released in the East

Fork Bull River as part of the *Fish Passage/Native Salmonid Restoration Plan (Appendix C), Tributary Trapping and Downstream Juvenile Bull Trout Transport Program*. The remaining Bull Trout detected was transported upstream as an adult from below Cabinet Gorge Dam to the East Fork Bull River under the *Fish Passage/Native Salmonid Restoration Plan (Appendix C), Upstream Fish Passage Program* in 2023. All Bull Trout were also detected on the Bull River Array, excluding the Bull Trout transported upstream from below Cabinet Gorge Dam.

Eight Westslope Cutthroat Trout were detected on the East Fork Bull River array in 2023. Three were tagged in the East Fork Bull River as part of the *Fish Passage/Native Salmonid Restoration Plan (Appendix C), Tributary Trapping and Downstream Juvenile Bull Trout Transport Program* in 2021 and 2023. Two were tagged in the Bull River and three in the East Fork Bull River as part of sampling efforts for the *Fish Passage/Native Salmonid Restoration Plan (Appendix C), Westslope Cutthroat Trout Transport Evaluation*. One of the Westslope Cutthroat Trout initially tagged in the Bull River above the twelve-mile bridge appears to have made a spawning migration into the East Fork Bull River. Two Westslope Cutthroat Trout were also detected on the Bull River Array.

Nineteen Brown Trout, one Rainbow Trout, and two *Oncorhynchus* hybrids were detected on the East Fork Bull River array in 2023. Eleven Brown Trout, and both Oncorhynchus hybrids came from tags associated with the *Fish Passage/Native Salmonid Restoration Plan (Appendix C), Westslope Cutthroat Trout Transport Evaluation* all tagged in 2023. One Rainbow Trout tagged at the Thompson Falls Fish Ladder was detected on the East Fork Bull River Array. This fish was also detected on the Bull River Array and circular PIT arrays below both Noxon Rapids and Cabinet Gorge Dams. The remaining eight Brown Trout were tagged during East Fork Bull River weir exclusion efforts as part of the *Fish Passage/Native Salmonid Restoration Plan (Appendix C), Tributary Trapping and Downstream Juvenile Bull Trout Transport Program.* A single Mountain Whitefish was detected that was tagged in 2019 at the East Fork Bull River screw trap associated with *Fish Passage/Native Salmonid Restoration Plan (Appendix C), Tributary Trapping and Downstream Juvenile Bull Trout Transport Program*. This fish was also detected on the Bull River Array.

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Appendix A. Long-term abundance (fish/100 m) and biomass (grams/100 m^2) trends for stream reaches sampled in 2023.

Table A-1. Coefficient of determination (r^2), slope and *P*-value from linear regression analyses of abundance (fish/100m) and biomass (g/100m2) over time organized by sites and species for long-term monitoring sites in lower Clark Fork tributaries sampled in 2023. Bold text signifies significant relationships. Sampling Period (Period) and sample size (n) indicate how many times a site was sampled within year period. Species abbreviations include Bull Trout (BULL), Brook Trout (EB), and Westslope Cutthroat Trout (WCT).

				Abundance			Biomass		
Stream	**Site (Rkm)**	**Period (n)**	**Species**	r^2	**Slope**	***P*-value**	r^2	**Slope**	***P*-value**
Prospect	1 (30.0)	1999- 2023 (16)	BULL	0.33	-0.74	**0.02**	0.43	-3.11	**0.01**
Prospect	1 (30.0)	1999- 2023 (16)	WCT	0.02	0.15	0.6	0.17	-2.62	0.13
Prospect	2 (31.9)	1999- 2023 (16)	BULL	0.12	-0.38	0.18	0.33	-8.47	**0.02**
Prospect	2 (31.9)	1999- 2023 (16)	WCT	0.00	0.11	0.81	0.02	1.24	0.65
Cooper	1 (3.5)	2009-2023 (8)	BULL	0.12	0.54	0.4	0.05	3.01	0.63
Cooper	1 (3.5)	2009-2023 (8)	WCT	0.31	-3.9	0.15	0.14	-19.06	0.40
Cooper	2 (4.1)	2009-2023 (8)	BULL	0.15	0.55	0.3	0.02	1.84	0.75
Cooper	2 (4.1)	2009-2023 (8)	WCT	0.27	-3.5	0.15	0.01	-2.46	0.83
Cooper	4 (5.4)	2016-2023 (4)	BULL	0.08	1.36	0.72	0.39	-5.31	0.38
Cooper	4 (5.4)	2016-2023 (4)	WCT	0.74	-9.79	0.14	0.75	-61.38	0.13
Cooper	5 (6.0)	2016-2023 (3)	BULL	0.42	0.07	0.55	<0.01	-0.95	0.96
Cooper	5 (6.0)	2016-2023 (3)	WCT	0.46	-3.79	0.52	0.40	-17.39	0.56
Graves	2 (4.2)	2003-2023 (12)	BULL	0.01	0.18	0.78	0.16	-1.71	0.19
Graves	2 (4.2)	2003-2023 (12)	EB	0.04	-0.04	0.56	0.01	-0.10	0.73
Graves	2 (4.2)	2003-2023 (12)	WCT	0.03	-0.35	0.57	<0.01	0.94	0.85
Swamp	4 (11.9)	2006-2023 (4)	EB	0.42	-0.21	0.35	0.24	-1.64	0.51
Swamp	4 (11.9)	2006-2023 (4)	WCT	0.19	2.6	0.57	0.02	0.87	0.85
Swamp	5 (15.7)	2006-2023 (4)	BULL	0.01	-0.01	0.88	0.01	-0.19	0.89
Swamp	5 (15.7)	2006-2023 (4)	EB	0.04	0.1	0.81	0.12	0.27	0.66
Swamp	5 (15.7)	2006-2023 (4)	WCT	0.72	2.28	0.15	0.48	13.53	0.30
Swamp	6 (18.2)	2006-2023 (4)	BULL	0.92	-0.27	**0.04**	0.76	-9.99	0.13
Swamp	6 (18.2)	2006-2023 (4)	EB	0.07	0.15	0.73	0.05	1.20	0.77
Swamp	6 (18.2)	2006-2023 (4)	WCT	0.74	3.36	0.14	0.02	-3.05	0.87
EF Blue	1 (1.7)	2007-2023 (6)	WCT	0.03	0.08	0.73	0.02	-2.48	0.77
EF Blue	2 (6.3)	2007-2023 (6)	WCT	0.52	-0.02	0.07	0.43	-23.51	0.11

Appendix B. Stream Temperature Monitoring Data 2023

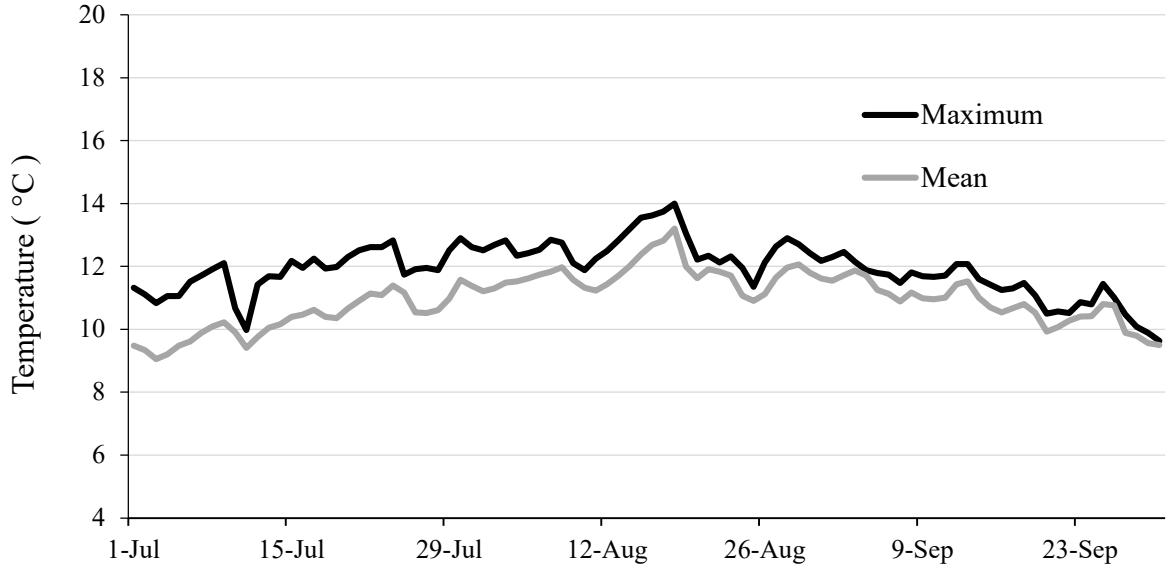

Figure B-1. Maximum and mean daily water temperatures in East Fork Blue Creek (Rkm 0.3), 2023.

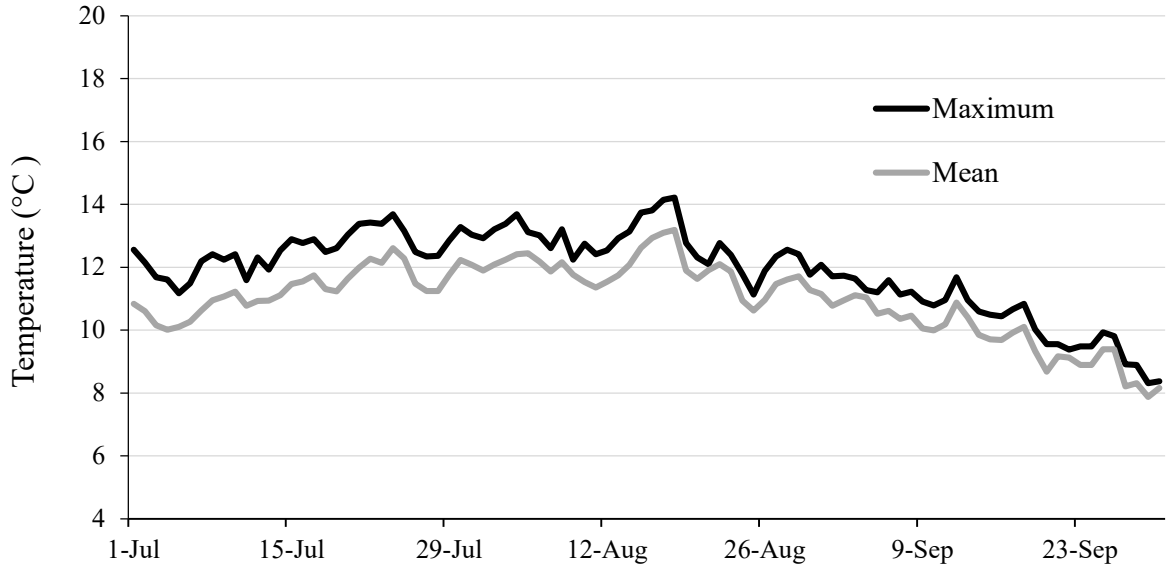

Figure B-2. Maximum daily water temperatures in upper Prospect Creek (Rkm 29.3), 2023.

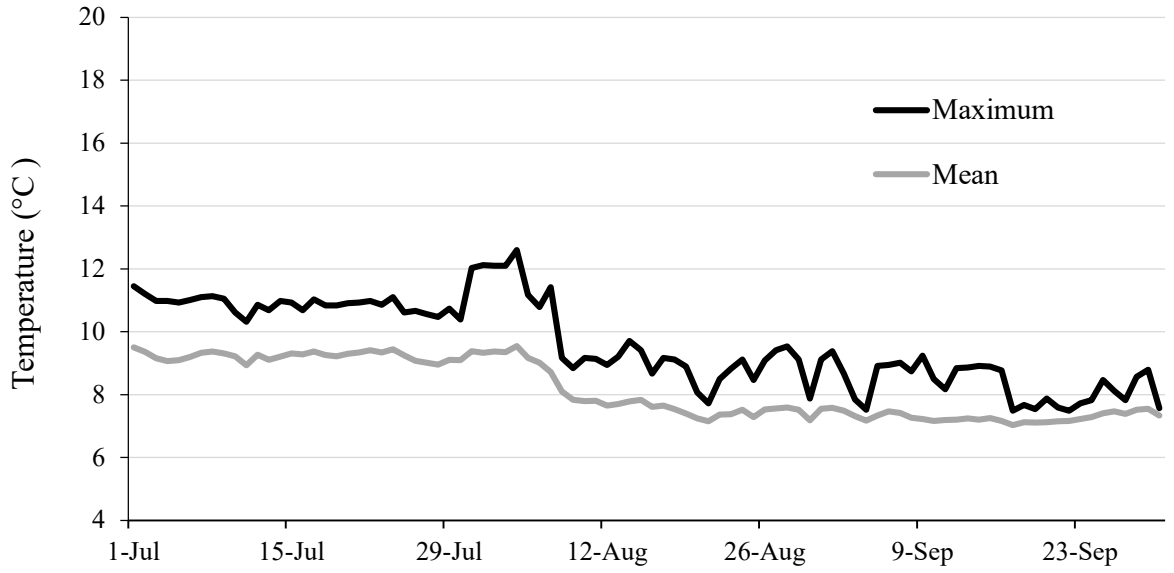

Figure B-3. Maximum and mean daily water temperatures in Prospect Creek below Crow Creek (Rkm 19.5), 2023.

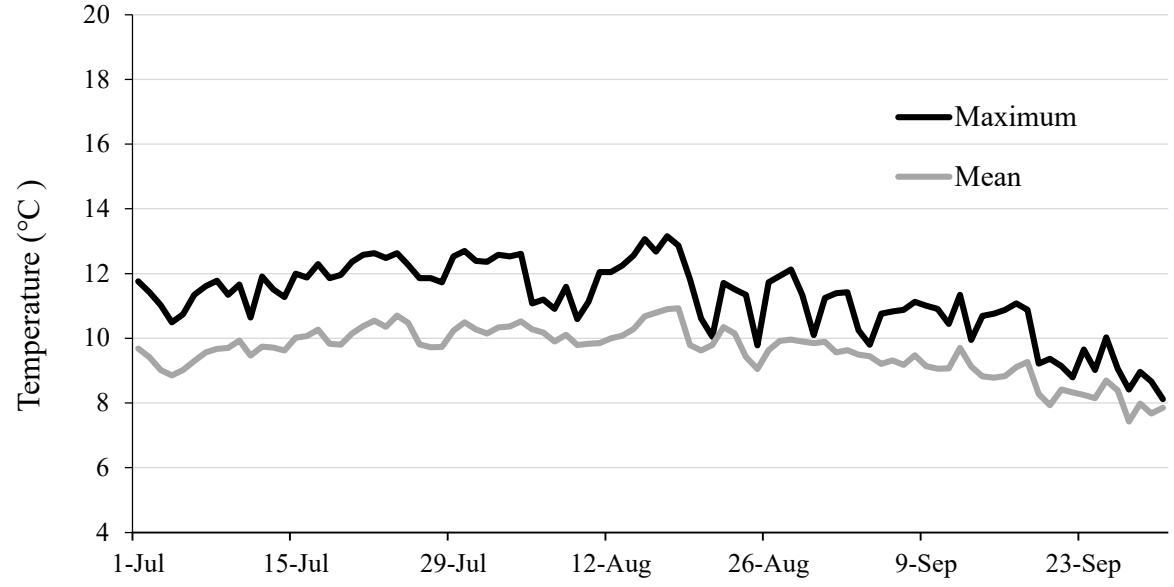

Figure B-4. Maximum and mean daily water temperatures in Cooper Gulch above long-term monitoring Site 1 (Rkm 3.7), 2023.

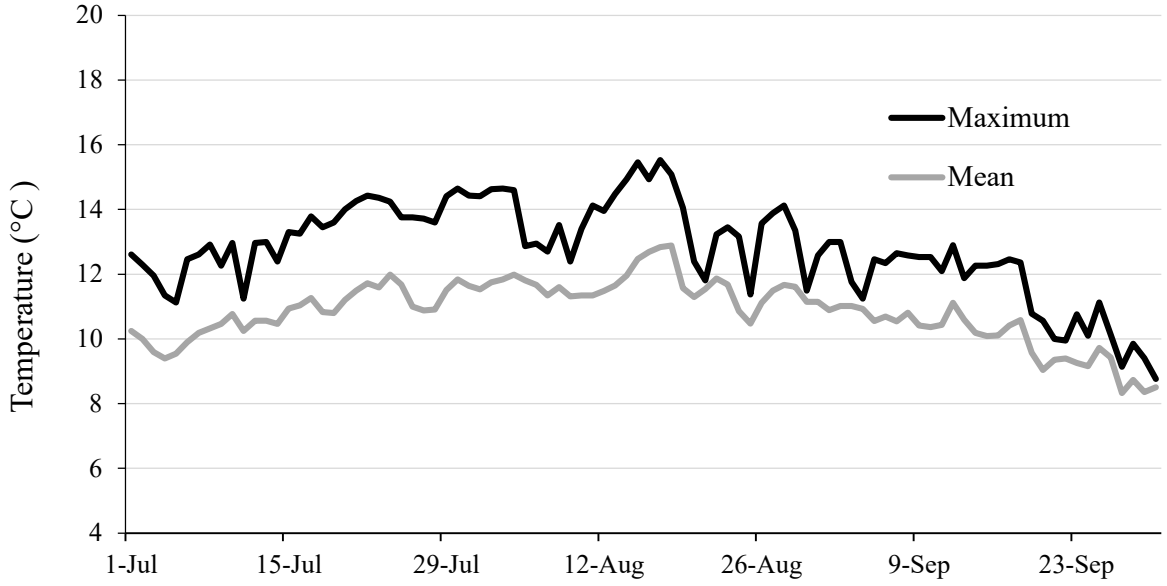

Figure B-5. Maximum and mean daily water temperatures in Cooper Gulch below Chipmunk Creek (Rkm 5.5), 2023.

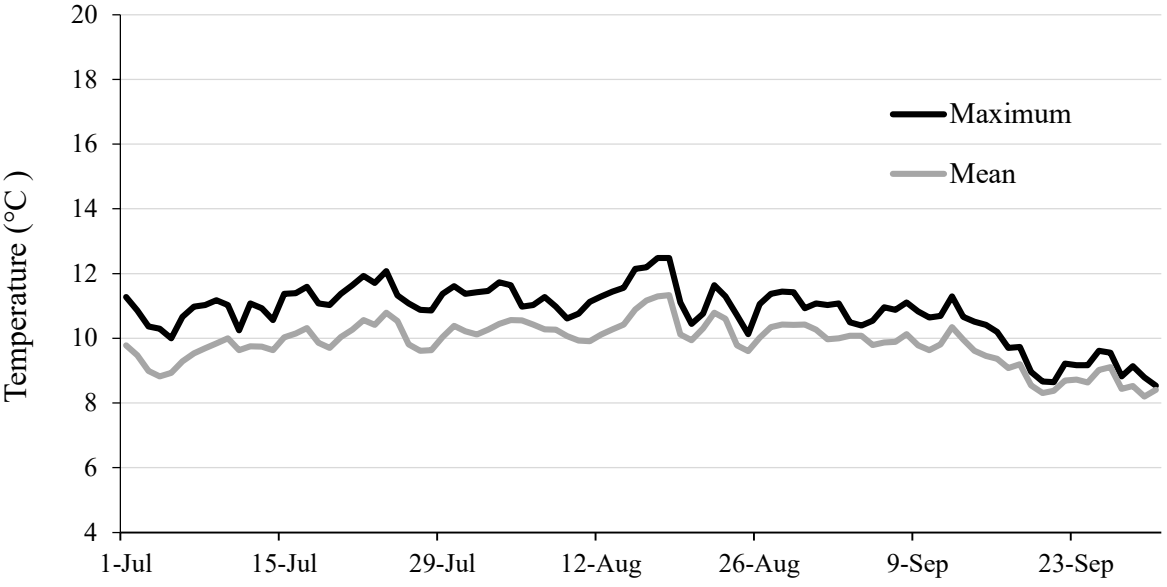

Figure B-6. Maximum and mean daily water temperatures in Crow Creek restoration reach (Rkm 1.8), 2023.

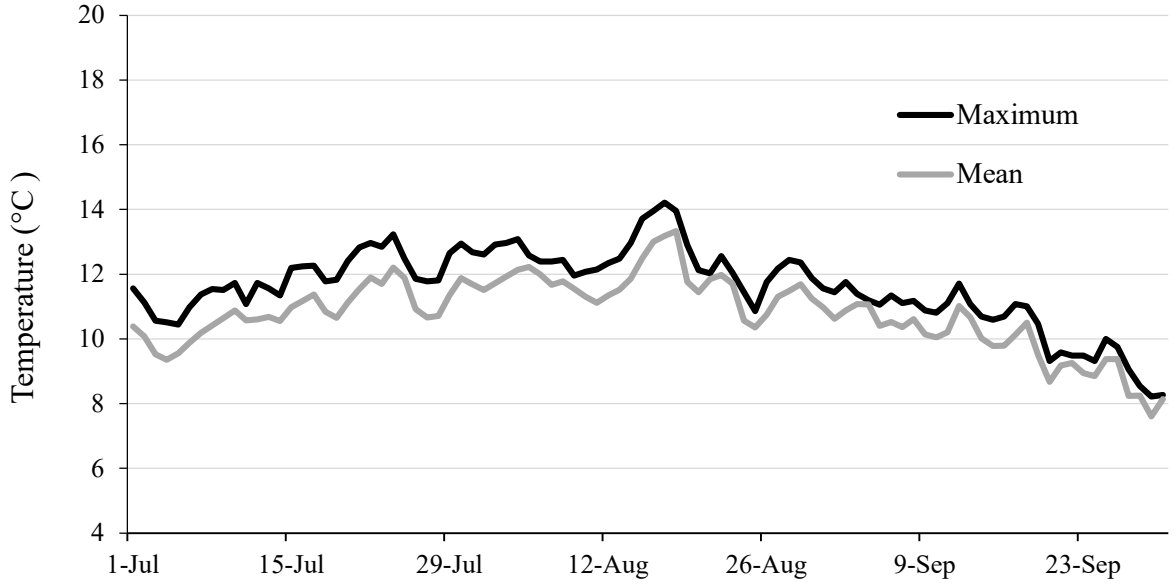

Figure B-7. Maximum and mean daily water temperatures in West Fork Crow Creek (Rkm 0.6), 2023.

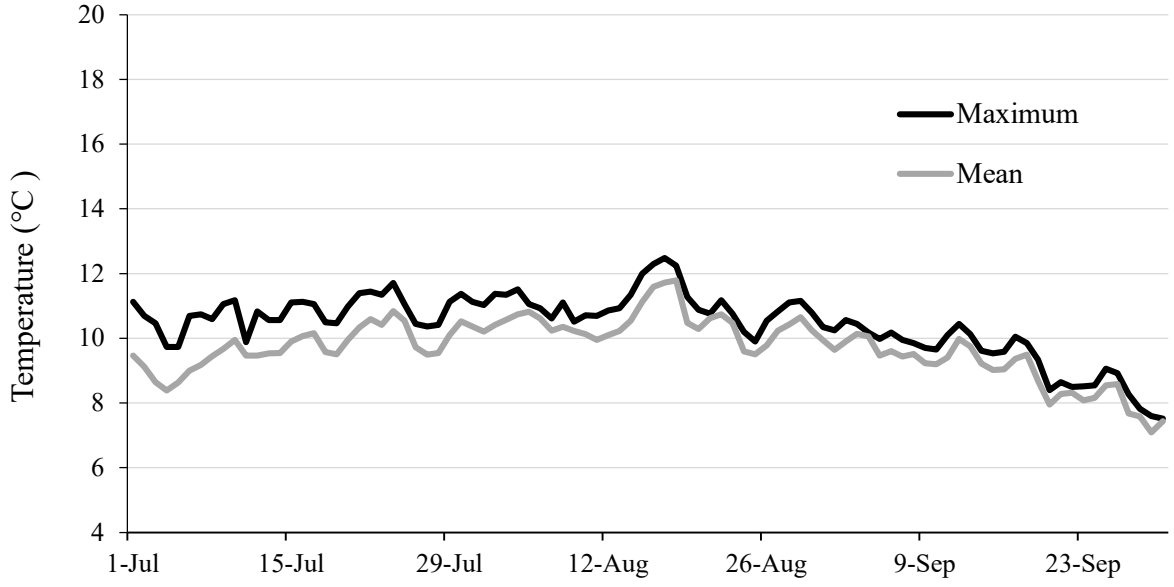

Figure B-8. Maximum and mean daily water temperatures in East Fork Crow Creek (Rkm 2), 2023.

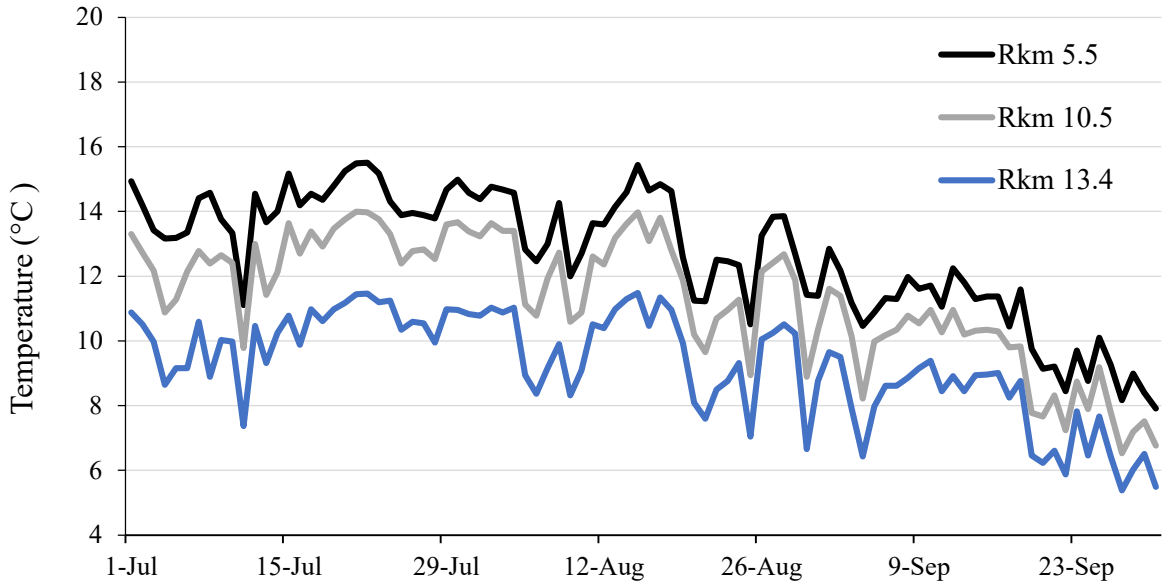

Figure B-9. Maximum daily water temperatures in Graves Creek above the falls (Rkm 5.5), upstream of second bridge (Rkm 10.5), and at Lawn Lake Trailhead (Rkm 13.4), 2023.

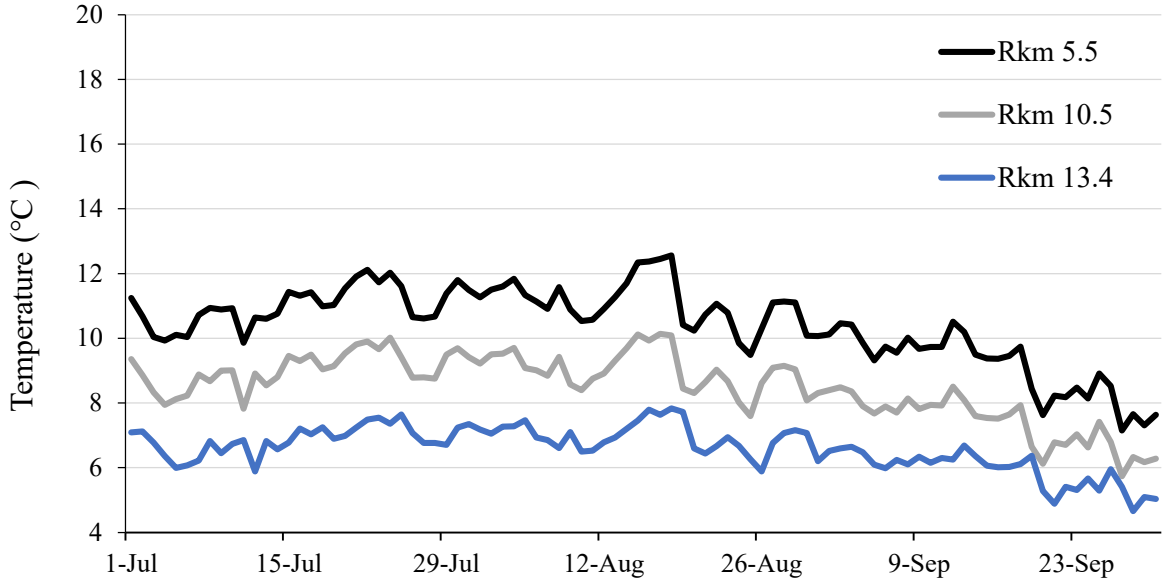

Figure B-10. Mean daily water temperatures in Graves Creek above the falls (Rkm 5.5), upstream of second bridge (Rkm 10.5), and at Lawn Lake Trailhead (Rkm 13.4), 2023.

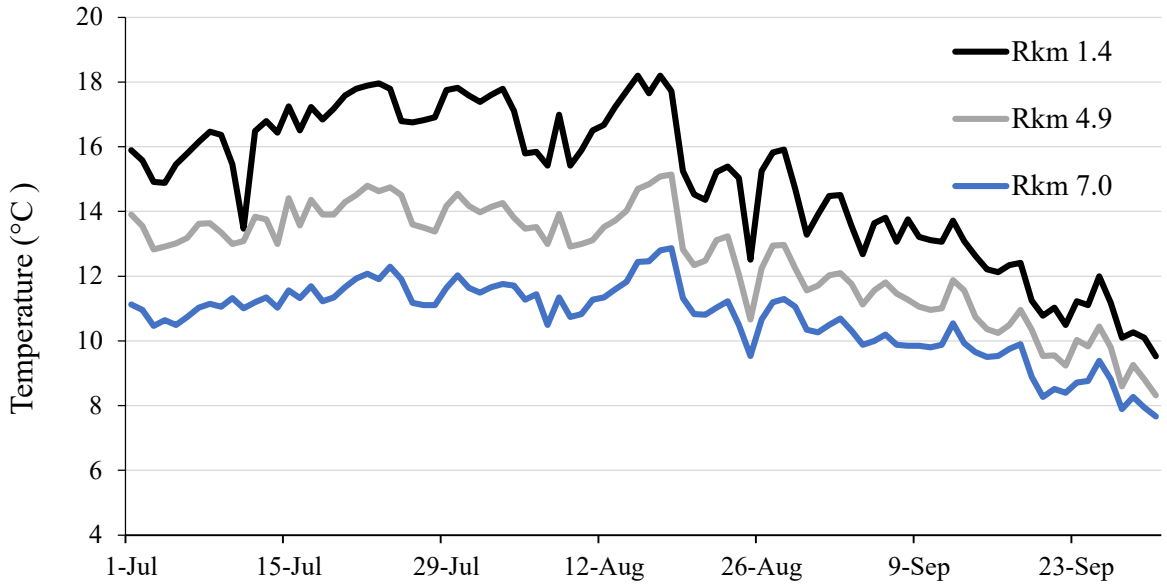

Figure B-11. Maximum daily water temperatures in Lower West Fork Trout Creek (Rkm 1.4), above Robins Run (Rkm 4.9), and below the South Branch (Rkm 7.0), 2023.

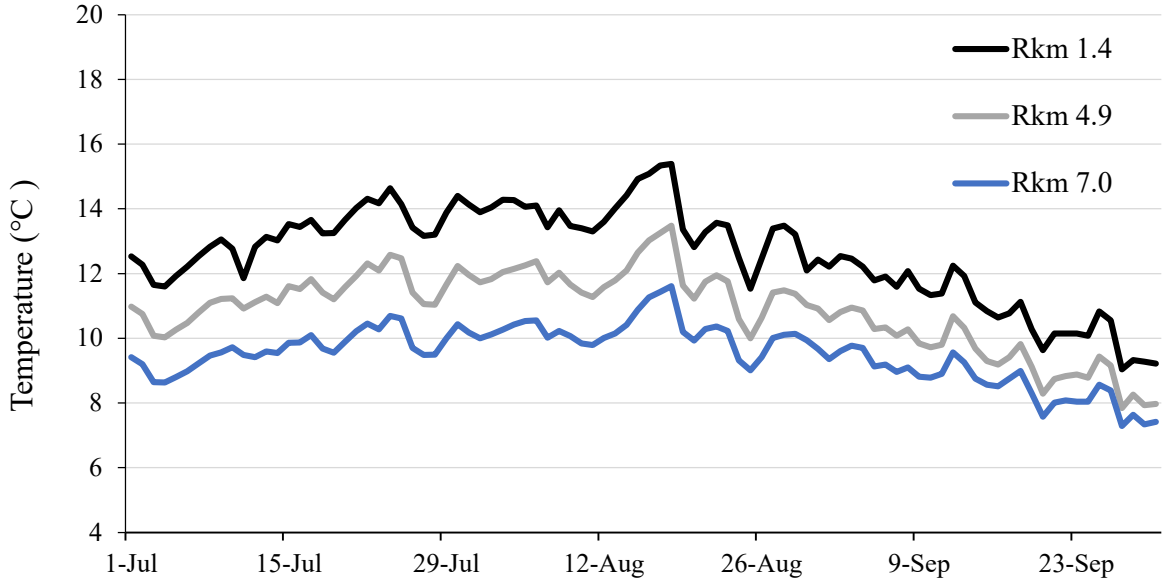

Figure B-12. Mean daily water temperatures in Lower West Fork Trout Creek (Rkm 1.4), above Robins Run (Rkm 4.9), and below the South Branch (Rkm 7.0), 2023.

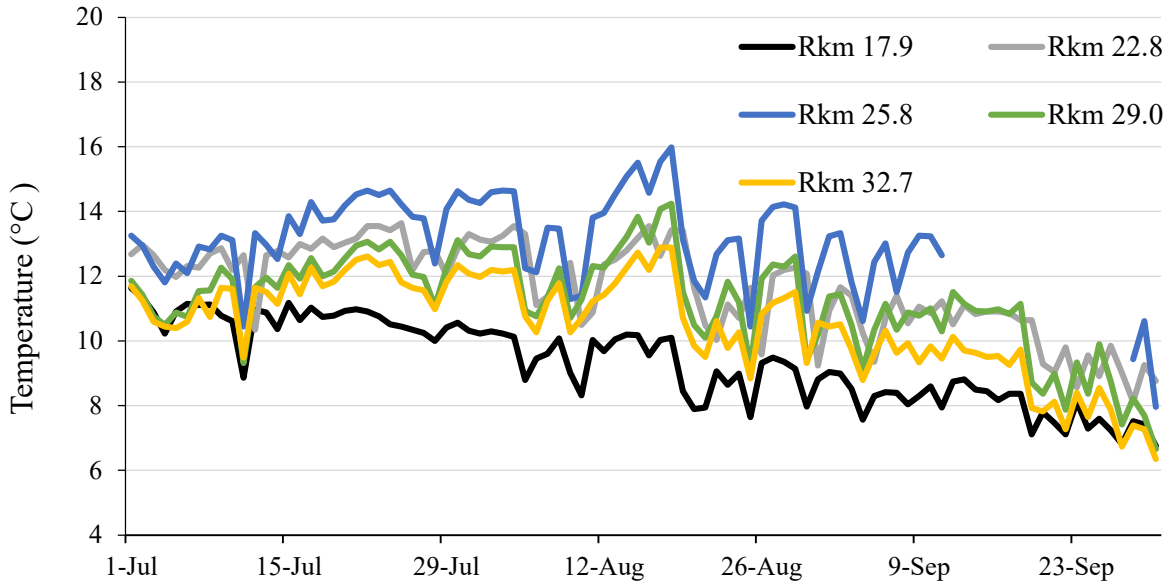

Figure B-13. Maximum daily water temperatures in Vermilion River above Chapel Slide (Rkm 17.9), below Willow Creek (Rkm 22.8), Below Charred Creek (Rkm 25.8), below Miller Creek (Rkm 29), and at Control Creek (Rkm 32.7), 2023.

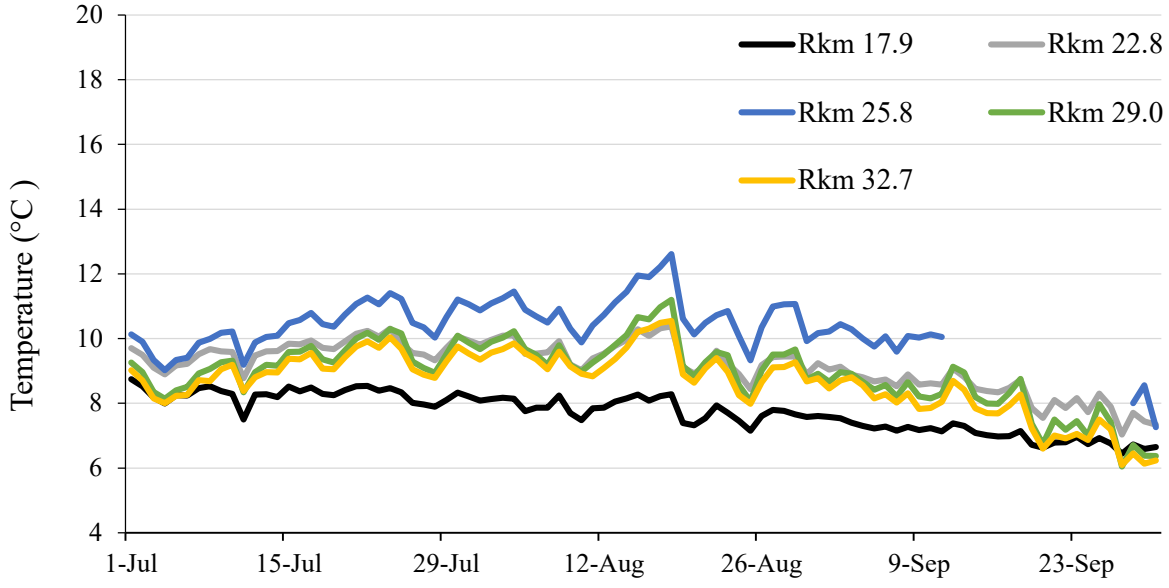

Figure B-14. Mean daily water temperatures in Vermilion River above Chapel Slide (Rkm 17.9), below Willow Creek (Rkm 22.8), Below Charred Creek (Rkm 25.8), below Miller Creek (Rkm 29), and at Control Creek (Rkm 32.7), 2023.

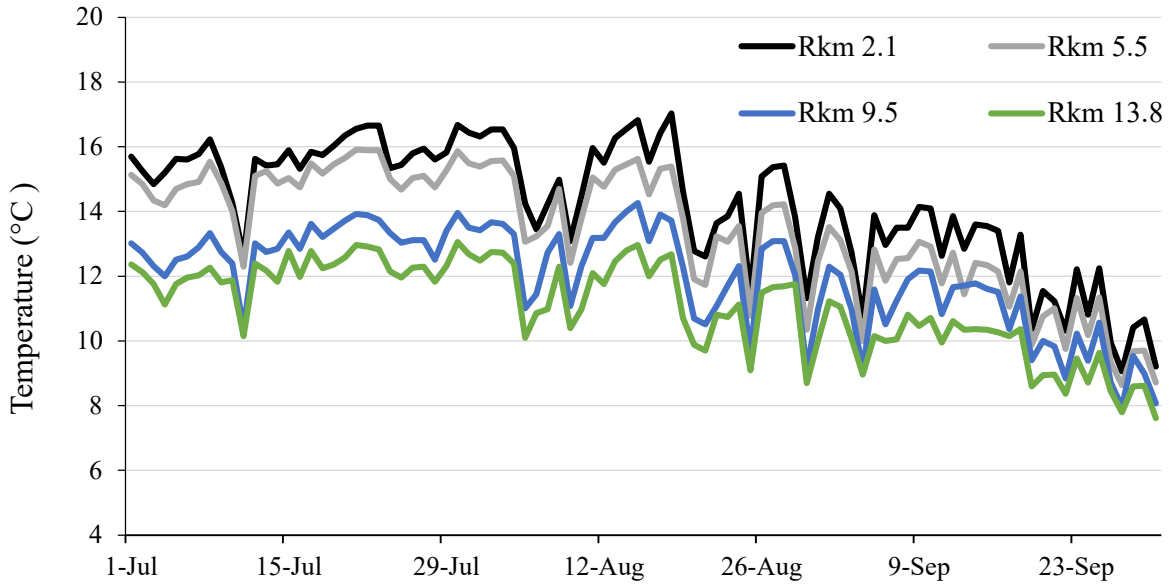

Figure B-15. Maximum daily water temperatures in the Vermilion River below Grouse Creek (Rkm 13.8), below Cataract Creek (Rkm 9.5), Below Canyon Creek and Roe Gulch (Rkm 5.5), and near mouth (Rkm 2.1), 2023.

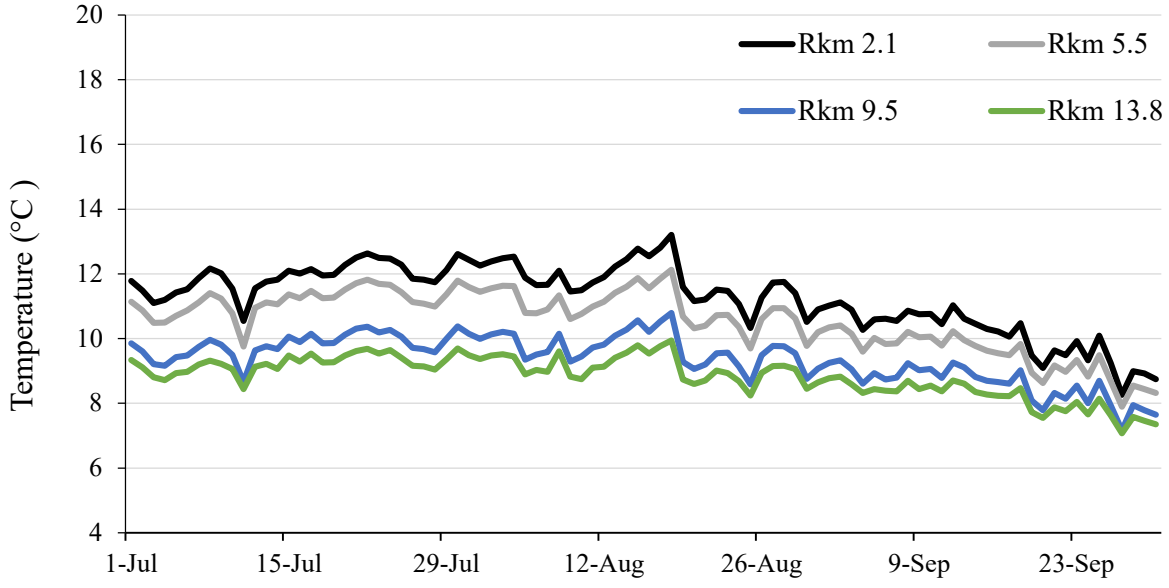

Figure B-16. Mean daily water temperatures in the Vermilion River below Grouse Creek (Rkm 13.8), below Cataract Creek (Rkm 9.5), Below Canyon Creek and Roe Gulch (Rkm 5.5), and near mouth (Rkm 2.1), 2023.

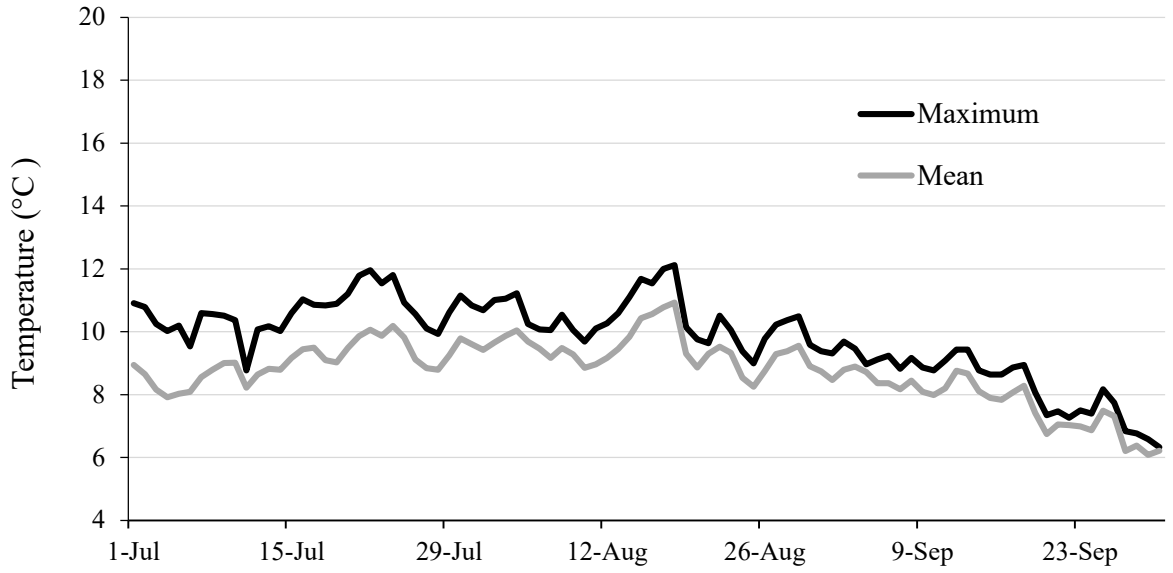

Figure B-17. Maximum and mean daily water temperatures in Happy Gulch (Rkm 0), 2023.

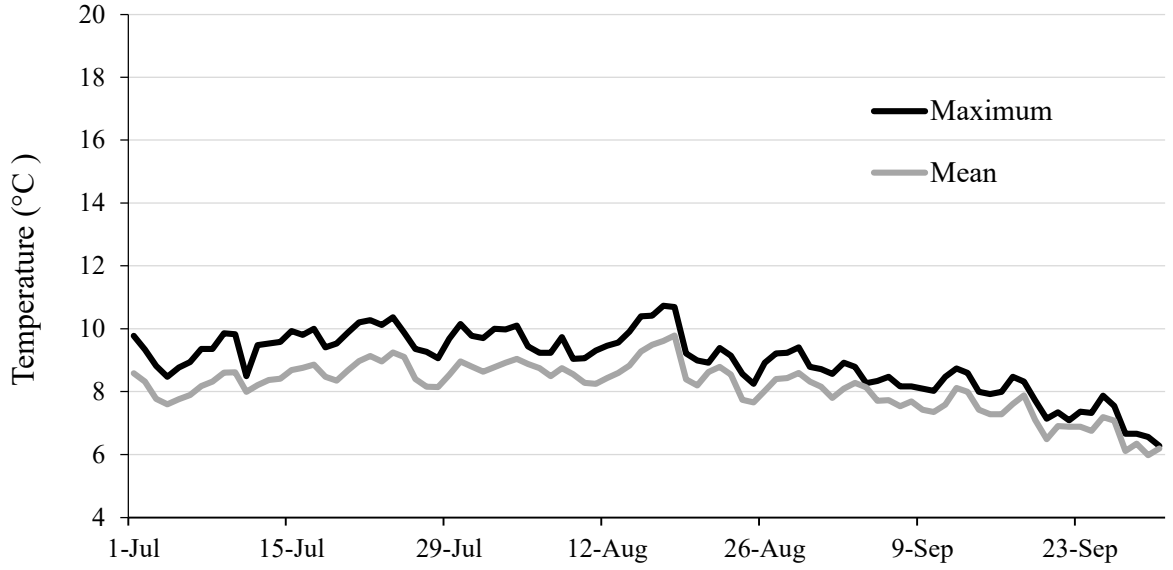

Figure B-18. Maximum and mean daily water temperatures in Miller Creek (Rkm 0.3), 2023.

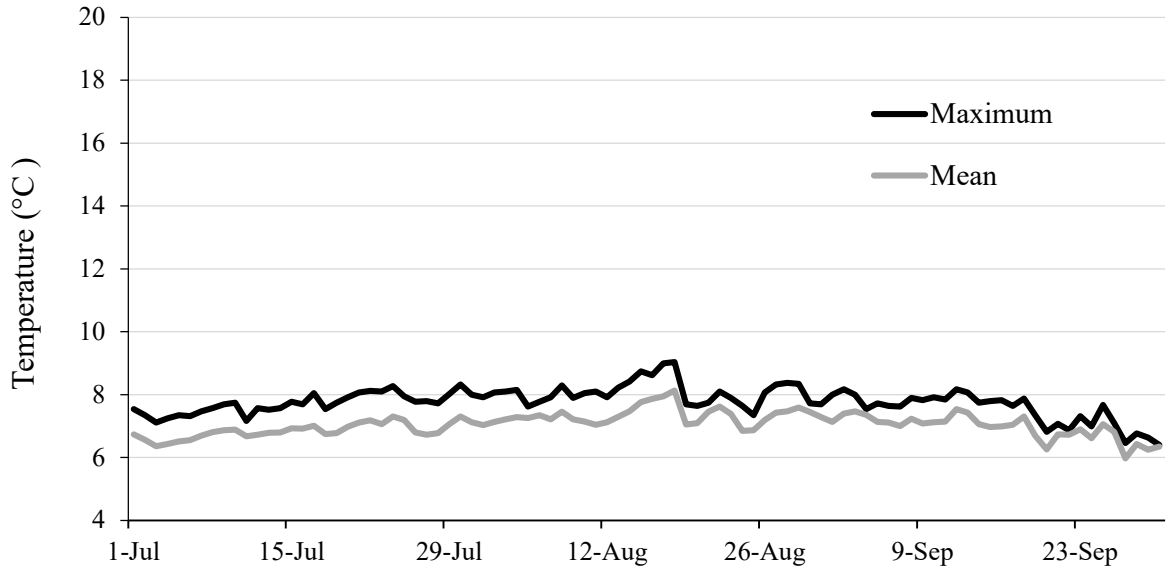

Figure B-19. Maximum and mean daily water temperatures in Sims Creek (Rkm 0), 2023.

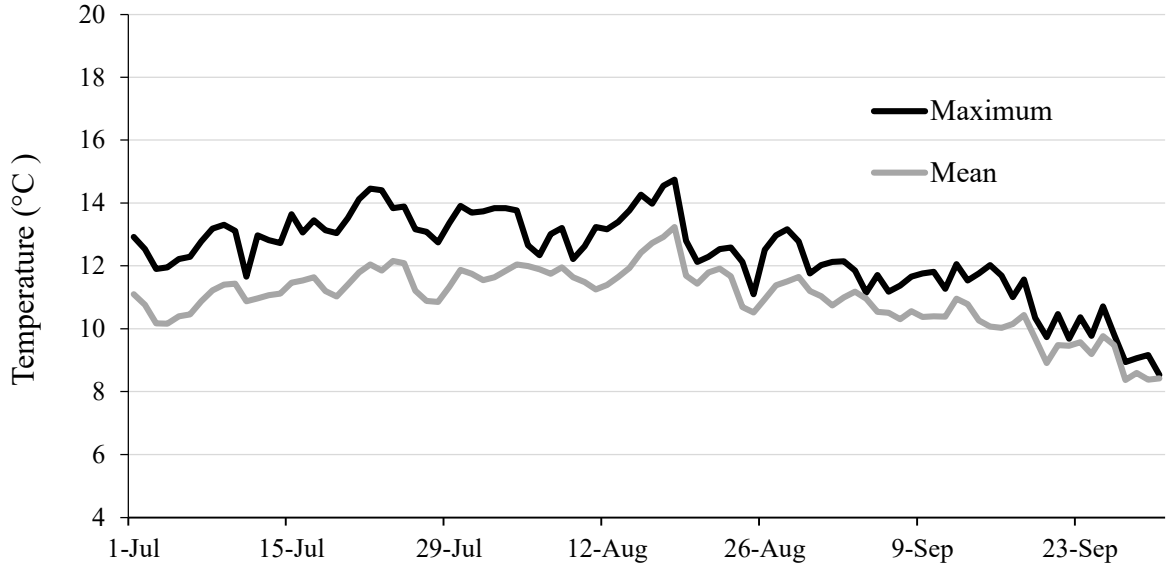

Figure B-20. Maximum and mean daily water temperatures in Canyon Creek (Rkm 0.8), 2023.

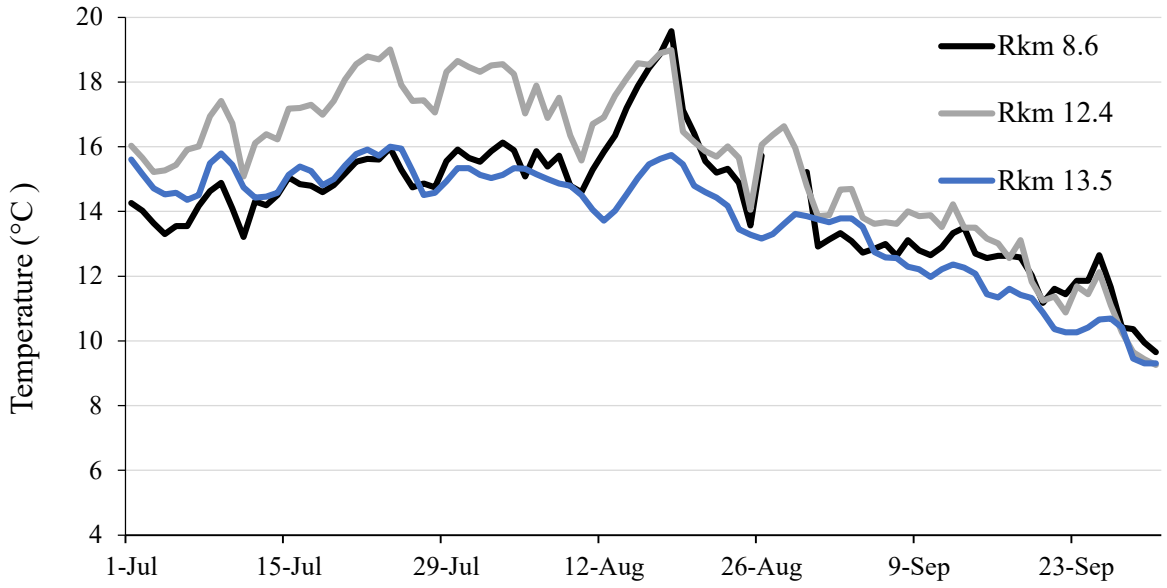

Figure B-21. Maximum daily water temperatures in Rock Creek above the West Fork of Rock Creek (Rkm 8.6), above trailhead (Rkm 12.4), and below upper cascade (13.5) 2023.

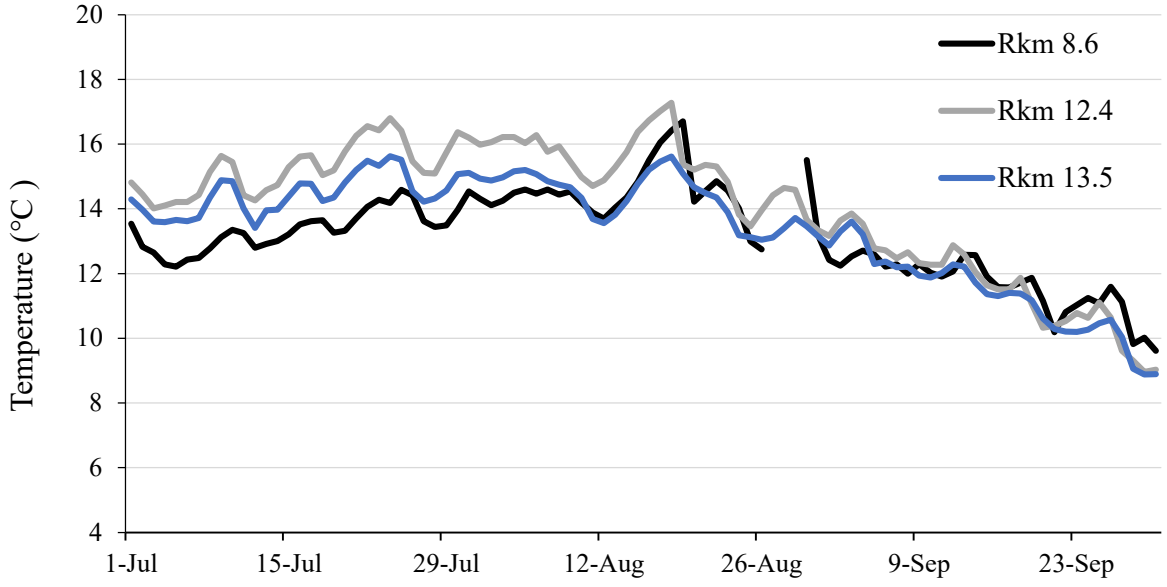

Figure B-22. Mean daily water temperatures in Rock Creek above the West Fork of Rock Creek (Rkm 8.6), above trailhead (Rkm 12.4), and below upper cascade (13.5) 2023.

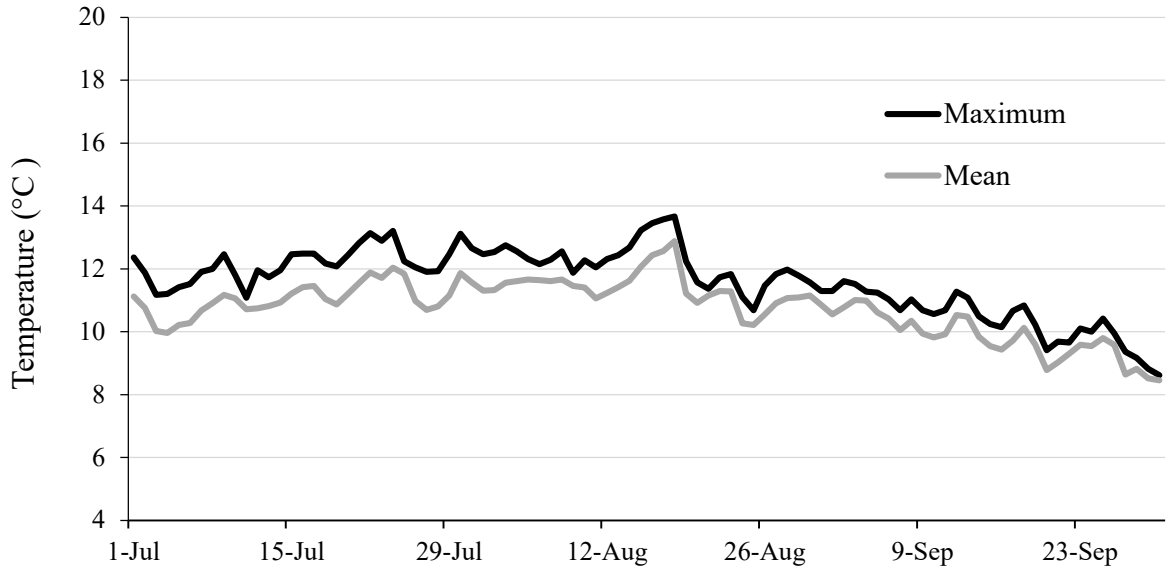

Figure B-23. Maximum and mean daily water temperatures in South Fork Bull River (Rkm 0.03), 2023.

Appendix C. Mean Yearly Growth Rates for Recaptured Bull Trout

Table C-1. Data summary of calculated mean yearly growth rates for recaptured Bull Trout in streams and tributaries in the Lower Clark Fork drainage. Initial and recapture data ranges 2001–2023.

Stream	Mean Yearly Growth (mm)	Mean Yearly Growth (g)	Number of Fish
Cooper Gulch	39.9	70.7	17
Crow Creek	47.5	65.0	2
East Fork Bull River	50.8	58.3	78
Fishtrap Creek	55.5	32.0	2
Graves Creek	48.8	37.8	93
Jungle	34.0	25.5	2
Lower Prospect	74.6	150.8	3
Rock Creek	34.3	21.2	18
South Fork Bull River	56.5	48.0	1
Upper Prospect	35.1	27.7	70
Vermilion River	63.5	98.3	30
West Fork Thompson	29.5	28.0	26
West Fork Trout Creek	40.8	50.3	3

Appendix D. Fish Detected on Lower Clark Fork River PIT Tag Arrays

Table D-1. PIT tag number, species, length and weight at initial tagging; initial tagging location, project associated with initial tagging, river kilometer (Rkm) and date; and range of date detections on PIT tag arrays in lower Prospect Creek, Graves Creek, Vermilion River, Bull River, and East Fork Bull River in 2023. Species abbreviations include Bull Trout (BULL), Brook Trout (EB), Brown Trout (LL), Mountain Whitefish (MWF), *Oncorhynchus* hybrids (RBxWCT), Rainbow Trout (RB), and Westslope Cutthroat Trout (WCT).

Array	PIT Tag No.	Species	Length (mm)	Weight (g)	Tagging location	Initial tagging	Rkm	Date tagged	Date Detected
Prospect	982126050371142	BULL	618	2272	Below Cabinet Gorge	Upstream Transport	0	6/16/2022	7/17- 9/14
Prospect	982126050371177	BULL	655	2446	Below Cabinet Gorge	Upstream Transport	0	9/13/2021	4/17
Prospect	989001040632232	BULL	147	28	Prospect Creek	Salvage	20.3	8/9/2022	4/9
Prospect	989001030300688	RB	537	1578	Thompson Fall Dam	Ladder	105.5	3/30/2020	9/5
Prospect	989001033212330	RB	318	326	Thompson Fall Dam	Ladder	105.5	6/26/2023	4/4-4/25, 5/19
Prospect	989001033212429	RB	514	1352	Thompson Fall Dam	Ladder	105.5	3/28/2023	4/2, 4/10
Prospect	989001033211949	RB	390	550	Thompson Fall Dam	Ladder	105.5	4/29/2021	3/17, 4/19, 12/23-12/27
Prospect	989001033212651	RB	385	606	Thompson Fall Dam	Ladder	105.5	5/5/2022	7/17-9/14
Prospect	989001033212663	RB	414	676	Thompson Fall Dam	Ladder	105.5	5/5/2022	4/3, 4/13
Prospect	989001033212631	RB	350	420	Thompson Fall Dam	Ladder	105.5	5/9/2022	4/10
Prospect	989001033212657	RB	465	966	Thompson Fall Dam	Ladder	105.5	5/4/2022	4/11-4/12, 5/7
Prospect	989001033211846	RB	269	188	Thompson Fall Dam	Ladder	105.5	5/10/2021	4/16
Prospect	989001033212915	RB	456	908	Thompson Fall Dam	Ladder	105.5	9/24/2020	4/28, 5/15

Array	PIT Tag No.	Species	Length (mm)	Weight (g)	Tagging location	Initial tagging	Rkm	Date tagged	Date Detected
Prospect	989001033212722	RB	342	398	Thompson Fall Dam	Ladder	105.5	10/27/2021	4/29, 5/17
Prospect	989001033211891	RBxWCT	424	714	Thompson Fall Dam	Ladder	105.5	4/20/2021	5/21, 8/8
Prospect	989001040870570	WCT	204	103	Prospect Creek	Salvage	20.3	7/13/2023	8/4, 8/5
Prospect	989001030300779	WCT	265	192	Prospect Creek	Salvage	20.3	8/3/2022	3/13-3/14
Prospect	989001040870170	WCT	165	43	Prospect Creek	Salvage	20.3	8/23/2022	6/3
Prospect	989001040870680	WCT	232	126	Prospect Creek	Salvage	20.3	7/24/2023	9/24
Prospect	989001040870611	WCT	282	248	Prospect Creek	Salvage	20.3	7/13/2023	9/25
Prospect	989001040870608	WCT	219	117	Prospect Creek	Salvage	20.3	7/13/2023	11/2
Prospect	989001040632187	WCT	201	90	Prospect Creek	Salvage	20.3	8/9/2022	4/30
Prospect	989001033210391	WCT	175	57	Prospect Creek	Salvage	20.3	7/29/2022	6/6
Prospect	989001040870138	WCT	150	33	Prospect Creek	Salvage	20.3	8/23/2022	6/11
Prospect	989001030300794	WCT	231	127	Prospect Creek	Salvage	20.3	8/3/2022	6/15
Prospect	989001040870562	WCT	195	83	Prospect Creek	Salvage	20.3	7/13/2023	7/17
Prospect	989001040870598	WCT	230	134	Prospect Creek	Salvage	20.3	7/17/2023	7/18
Prospect	989001040870658	WCT	182	57	Prospect Creek	Salvage	20.3	7/19/2023	7/20
Prospect	989001040632115	WCT	202	85	Prospect Creek	Salvage	20.3	7/17/2023	7/21
Prospect	989001040870726	WCT	204	86	Prospect Creek	Salvage	20.3	7/19/2023	7/22
Prospect	989001040870612	WCT	279	256	Prospect Creek	Salvage	20.3	7/13/2023	7/26
Prospect	989001040870707	WCT	182	55	Prospect Creek	Salvage	20.3	7/19/2023	7/29

Array	PIT Tag No.	Species	Length (mm)	Weight (g)	Tagging location	Initial tagging	Rkm	Date tagged	Date Detected
Prospect	989001040870644	WCT	188	60	Prospect Creek	Salvage	20.3	7/19/2023	7/29
Prospect	989001040870625	WCT	235	145	Prospect Creek	Salvage	20.3	7/17/2023	7/29
Prospect	989001040870673	WCT	195	63	Prospect Creek	Salvage	20.3	7/24/2023	7/30
Prospect	989001040870656	WCT	209	96	Prospect Creek	Salvage	20.3	7/19/2023	7/30
Prospect	989001040870536	WCT	227	136	Prospect Creek	Salvage	20.3	7/13/2023	8/4
Prospect	989001040870684	WCT	145	27	Prospect Creek	Salvage	20.3	7/19/2023	11/26
Prospect	989001040870584	WCT	226	150	Prospect Creek	Salvage	20.3	7/13/2023	12/5
Prospect	989001040870659	WCT	153	35	Prospect Creek	Salvage	20.3	7/19/2023	12/10
Prospect	989001040870676	WCT	174	48	Prospect Creek	Salvage	20.3	7/19/2023	12/13
Prospect	989001040870626	WCT	213	95	Prospect Creek	Salvage	20.3	7/17/2023	12/28
Graves Creek	982126050371253	BULL	189	52	Graves Creek	Permanent Weir	0.5	9/10/2014	5/11, 9/17-10/2
Graves Creek	989001030151069	BULL	175	45	Graves Creek	Permanent Weir	0.7	4/21/2020	10/9
Graves Creek	989001026316963	BULL	174	40	Graves Creek	Permanent Weir	0.7	10/29/2019	6/30, 7/15
Graves Creek	989001026316426	BULL	144	23	Graves Creek	Permanent Weir	0.7	10/22/2018	10/10
Graves Creek	989001026316834	BULL	190	57	Graves Creek	Permanent Weir	0.7	10/19/2019	10/18
Graves Creek	989001026316906	BULL	179	40	Graves Creek	Permanent Weir	0.7	10/23/2019	10/9-10/10
Graves Creek	989001030151079	BULL	148	25	Graves Creek	Permanent Weir	0.7	4/22/2020	6/30
Graves Creek	989001033211247	BULL	114	12	Graves Creek	Emigration study	2.1	7/21/2020	8/20-8/22
Graves Creek	989001033409316	BULL	168	33	Graves Creek	Permanent Weir	0.7	10/3/2020	10/25
Graves Creek	989001026316320	BULL	235	98	Graves Creek	Permanent Weir	0.7	9/26/2019	10/10, 10/14

Array	PIT Tag No.	Species	Length (mm)	Weight (g)	Tagging location	Initial tagging	Rkm	Date tagged	Date Detected
Graves Creek	989001030151130	BULL	139	22	Graves Creek	Permanent Weir	0.7	4/30/2020	10/10
Graves Creek	989001026316280	BULL	141	20	Graves Creek	Permanent Weir	0.7	9/27/2019	10/10
Graves Creek	982126057418063	BULL	127	18	Graves Creek	Permanent Weir	0.7	4/27/2016	10/14
Graves Creek	989001033409751	BULL	178	44	Graves Creek	Permanent Weir	0.7	5/23/2021	10/19
Graves Creek	989001026316947	BULL	142	22	Graves Creek	Permanent Weir	0.7	10/26/2019	10/9-10/10
Graves Creek	989001033409280	BULL	187	48	Graves Creek	Permanent Weir	0.7	10/14/2020	11/2
Graves Creek	989001033409581	BULL	154	26	Graves Creek	Permanent Weir	0.7	11/5/2020	10/10, 10/17
Graves Creek	989001026317518	BULL	113	11	Graves Creek	Site #5	3	7/23/2018	10/10
Graves Creek	989001033409636	BULL	174	39	Graves Creek	Permanent Weir	0.7	11/2/2020	10/13
Graves Creek	989001026316815	BULL	173	38	Graves Creek	Permanent Weir	0.7	10/17/2019	10/24
Graves Creek	989001026317074	BULL	125	15	Graves Creek	Permanent Weir	0.7	11/2/2019	10/12
Graves Creek	989001026316790	BULL	137	20	Graves Creek	Permanent Weir	0.7	10/18/2019	11/3
Graves Creek	989001026316676	BULL	164	34	Graves Creek	Permanent Weir	0.7	10/14/2019	10/23
Graves Creek	989001030151237	BULL	168	35	Graves Creek	Permanent Weir	0.7	9/6/2020	10/31
Graves Creek	989001030151102	BULL	135	19	Graves Creek	Permanent Weir	0.7	11/24/2019	10/24
Graves Creek	982126057418126	BULL	581	1678	Below Cabinet Gorge	Cabinet Gorge Fish Ladder	0	10/8/2023	11/5
Graves Creek	989001026316905	BULL	165	36	Graves Creek	Permanent Weir	0.7	10/22/2019	11/2-11/9
Graves Creek	989001033210753	BULL	196	58	Graves Creek	Permanent Weir	0.7	9/8/2022	1/6-1/22
Graves Creek	989001042385682	BULL	213	72	Graves Creek	Permanent Weir	0.7	10/13/2023	10/13
Graves Creek	989001040632204	BULL	126	18	Graves Creek	Site #5	2.7	8/18/2022	6/28-6/30
Graves Creek	989001040632265	BULL	120	15	Graves Creek	Site #2	4	8/9/2022	11/16
Graves Creek	989001040632275	BULL	132	21	Graves Creek	Site #2	4	8/9/2022	9/14-9/21

Array	PIT Tag No.	Species	Length (mm)	Weight (g)	Tagging location	Initial tagging	Rkm	Date tagged	Date Detected
Graves Creek	989001040632282	BULL	193	64	Graves Creek	Site #2	4	8/9/2022	6/4
Graves Creek	989001040632283	BULL	137	23	Graves Creek	Site #2	4	8/9/2022	11/7-11/23
Graves Creek	989001040632302	BULL	125	16	Graves Creek	Site #2	4	8/9/2022	7/16
Graves Creek	989001040632304	BULL	120	14	Graves Creek	Site #5	2.7	8/18/2022	10/8
Graves Creek	989001040632307	BULL	120	15	Graves Creek	Site #6	3	8/19/2022	10/10
Graves Creek	989001040632309	BULL	129	18	Graves Creek	Site #2	4	8/9/2022	8/13
Graves Creek	989001040632310	BULL	125	17	Graves Creek	Site #2	4	8/9/2022	9/3
Graves Creek	989001040632318	BULL	132	20	Graves Creek	Site #2	4	8/9/2022	12/10
Graves Creek	989001040632322	BULL	126	17	Graves Creek	Site #2	4	8/9/2022	10/5
Graves Creek	989001040632331	BULL	134	20	Graves Creek	Site #2	4	8/9/2022	8/31, 9/1
Graves Creek	989001040632342	BULL	185	82	Graves Creek	Site #5	2.7	8/18/2022	1/22
Graves Creek	989001040632344	BULL	127	18	Graves Creek	Site #2	4	8/9/2022	11/11
Graves Creek	989001040870819	BULL	205	66	Graves Creek	Site #5	3	8/31/2023	9/1
Graves Creek	989001040870789	BULL	146	27	Graves Creek	Site #5	3	8/31/2023	9/2-9/3
Graves Creek	989001040870816	BULL	205	65	Graves Creek	Site #5	3	8/31/2023	9/8, 10/10
Graves Creek	989001040870754	BULL	194	56	Graves Creek	Site #5	3	8/31/2023	9/13
Graves Creek	989001040870728	BULL	181	48	Graves Creek	Site #2	4	8/30/2023	10/11
Graves Creek	989001033212627	LL	347	374	Clark Fork River	Thompson River Confluence	100.2	9/29/2022	11/9-11/12
Graves Creek	989001033212809	LL	430	736	Clark Fork River	Thompson River Confluence	100.2	3/24/2022	10/15, 10/18

Array	PIT Tag No.	Species	Length (mm)	Weight (g)	Tagging location	Initial tagging	Rkm	Date tagged	Date Detected
Graves Creek	989001033212849	LL	400	588	Clark Fork River	Thompson River Confluence	100.2	3/24/2022	1/16, 1/24, 11/29-12/13
Graves Creek	989001033212608	LL	444	824	Thompson Fall Dam	Ladder	105.5	9/26/2022	1/11, 1/13, 11/7-11/19
Graves Creek	989001042386101	LL	240	118	Graves Creek	Permanent Weir	0.7	4/10/2023	4/10, 6/4-6/6, 6/30-7/1
Graves Creek	989001042386114	LL	100	11	Graves Creek	Permanent Weir	0.7	4/10/2023	4/10
Graves Creek	989001042386124	LL	165	44	Graves Creek	Permanent Weir	0.7	4/11/2023	4/11
Graves Creek	989001042386125	LL	102	9	Graves Creek	Permanent Weir	0.7	4/12/2023	4/12
Graves Creek	989001042386142	LL	203	70	Graves Creek	Permanent Weir	0.7	4/18/2023	4/18
Graves Creek	989001042386148	LL	170	42	Graves Creek	Permanent Weir	0.7	4/24/2023	4/24
Graves Creek	989001042386105	LL	102	10	Graves Creek	Permanent Weir	0.7	5/27/2023	5/27
Graves Creek	989001042386072	LL	105	10	Graves Creek	Permanent Weir	0.7	4/27/2023	4/27
Graves Creek	989001042386150	LL	167	42	Graves Creek	Permanent Weir	0.7	4/27/2023	4/27
Graves Creek	989001042386062	LL	184	64	Graves Creek	Permanent Weir	0.7	6/5/2023	6/5-6/30
Graves Creek	989001042386122	LL	134	23	Graves Creek	Permanent Weir	0.7	5/21/2023	6/14-6/28, 7/1-7/12
Graves Creek	989001042386094	LL	146	31	Graves Creek	Permanent Weir	0.7	6/20/2023	6/20
Graves Creek	989001042386132	LL	204	82	Graves Creek	Permanent Weir	0.7	6/23/2023	6/23-7/11
Graves Creek	989001042386095	LL	373	529	Graves Creek	Permanent Weir	0.7	9/9/2023	9/9
Graves Creek	989001042386079	LL	315	292	Graves Creek	Permanent Weir	0.7	9/11/2023	9/11

Array	PIT Tag No.	Species	Length (mm)	Weight (g)	Tagging location	Initial tagging	Rkm	Date tagged	Date Detected
Graves Creek	989001042386083	LL	179	55	Graves Creek	Permanent Weir	0.7	9/12/2023	9/12
Graves Creek	989001042385777	LL	193	72	Graves Creek	Permanent Weir	0.7	11/3/2023	11/3
Graves Creek	989001042385685	LL	295	220	Graves Creek	Permanent Weir	0.7	10/18/2023	10/18
Graves Creek	989001042385815	LL	475	949	Graves Creek	Permanent Weir	0.7	11/12/2023	11/12, 12/6, 12/15,
Graves Creek	989001033212689	LL	413	696	Thompson Fall Dam	Ladder	105.5	9/12/2022	4/27, 8/22
Graves Creek	989001033212578	LL	475	918	Thompson Fall Dam	Ladder	105.5	10/5/2022	12/7, 12/10
Graves Creek	989001042386149	LL	212	91	Graves Creek	Permanent Weir	0.7	4/24/2023	4/24
Graves Creek	989001042386141	RB	143	26	Graves Creek	Permanent Weir	0.7	4/10/2023	4/10
Graves Creek	989001042386088	RB	180	49	Graves Creek	Permanent Weir	0.7	4/11/2023	4/11
Graves Creek	989001042386115	RB	162	38	Graves Creek	Permanent Weir	0.7	4/11/2023	4/11
Graves Creek	989001042386061	RB	151	28	Graves Creek	Permanent Weir	0.7	4/11/2023	4/11
Graves Creek	989001030300838	RB	347	436	Thompson Fall Dam	Ladder	105.5	7/20/2020	4/28, 6/14-6/15
Graves Creek	989001042386064	RB	146	26	Graves Creek	Permanent Weir	0.7	5/12/2023	5/12, 5/18
Graves Creek	989001042386128	RB	209	80	Graves Creek	Permanent Weir	0.7	4/27/2023	4/27
Graves Creek	989001042386096	RB	202	85	Graves Creek	Permanent Weir	0.7	6/20/2023	6/20-8/7
Graves Creek	989001042385722	RBxWCT	310	260	Graves Creek	Permanent Weir	0.7	10/10/2023	10/11-10/13
Graves Creek	989001042386093	WCT	112	11	Graves Creek	Permanent Weir	0.7	4/13/2023	4/13
Graves Creek	989001042386080	WCT	165	42	Graves Creek	Permanent Weir	0.7	6/16/2023	6/16

Array	PIT Tag No.	Species	Length (mm)	Weight (g)	Tagging location	Initial tagging	Rkm	Date tagged	Date Detected
Graves Creek	989001042386059	WCT	211	94	Graves Creek	Permanent Weir	0.7	6/16/2023	6/16
Graves Creek	989001042386121	WCT	235	190	Graves Creek	Permanent Weir	0.7	6/17/2023	6/17
Graves Creek	989001042386126	WCT	315	294	Graves Creek	Permanent Weir	0.7	6/22/2023	6/22
Graves Creek	989001042386107	WCT	197	69	Graves Creek	Permanent Weir	0.7	6/23/2023	6/23
Graves Creek	989001042386075	WCT	166	37	Graves Creek	Permanent Weir	0.7	6/23/2023	6/23
Graves Creek	989001042386113	WCT	209	72	Graves Creek	Permanent Weir	0.7	6/23/2023	6/23
Graves Creek	989001042386112	WCT	210	84	Graves Creek	Permanent Weir	0.7	6/23/2023	6/23
Graves Creek	989001042386136	WCT	179	52	Graves Creek	Permanent Weir	0.7	6/23/2023	6/23
Graves Creek	989001042386106	WCT	190	61	Graves Creek	Permanent Weir	0.7	6/23/2023	6/23
Graves Creek	989001042386153	WCT	189	60	Graves Creek	Permanent Weir	0.7	6/23/2023	6/23
Graves Creek	989001042386066	WCT	198	70	Graves Creek	Permanent Weir	0.7	6/24/2023	6/24
Graves Creek	989001042386099	WCT	134	28	Graves Creek	Permanent Weir	0.7	6/24/2023	6/24-7/1
Graves Creek	989001042386134	WCT	188	64	Graves Creek	Permanent Weir	0.7	6/24/2023	6/24
Graves Creek	989001042386143	WCT	158	33	Graves Creek	Permanent Weir	0.7	6/24/2023	6/24
Graves Creek	989001042386058	WCT	187	61	Graves Creek	Permanent Weir	0.7	6/24/2023	6/24
Graves Creek	989001042386065	WCT	206	77	Graves Creek	Permanent Weir	0.7	6/24/2023	6/24
Graves Creek	989001042386104	WCT	178	45	Graves Creek	Permanent Weir	0.7	6/24/2023	6/24
Graves Creek	989001042386060	WCT	190	69	Graves Creek	Permanent Weir	0.7	6/24/2023	6/24
Graves Creek	989001042386108	WCT	171	47	Graves Creek	Permanent Weir	0.7	6/24/2023	6/24

Array	PIT Tag No.	Species	Length (mm)	Weight (g)	Tagging location	Initial tagging	Rkm	Date tagged	Date Detected
Graves Creek	989001042386119	WCT	195	70	Graves Creek	Permanent Weir	0.7	6/24/2023	6/24
Graves Creek	989001042386063	WCT	175	53	Graves Creek	Permanent Weir	0.7	6/24/2023	6/24
Graves Creek	989001042386089	WCT	188	60	Graves Creek	Permanent Weir	0.7	6/24/2023	6/24
Graves Creek	989001042386147	WCT	188	55	Graves Creek	Permanent Weir	0.7	6/24/2023	6/24
Vermilion	982126050371121	BULL	638	2420	Below Cabinet Gorge	Upstream Transport	0	9/21/2020	6/3, 6/12, 7/8, 10/1
Vermilion	989001026317336	BULL	141	21	Vermilion River	Downstream Transport	8.2	10/21/2019	10/17
Vermilion	989001033409467	BULL	234	116	Vermilion River	Downstream Transport	6.3	11/3/2020	10/20
Vermilion	989001033409027	BULL	212	72	Vermilion River	Downstream Transport	6.3	10/23/2020	10/12
Vermilion	989001042385356	BULL	252	135	Vermilion River	Downstream Program	4.9	10/23/2023	11/28
Vermilion	989001040632302	BULL	125	16	Graves Creek	Site #2	4	9/9/2022	7/17
Vermilion	989001007069746	LL	458	900	Thompson Fall Dam	Ladder	106	10/29/2018	11/8-11/13
Vermilion	989001033212400	LL	558	1856	Thompson Fall Dam	Ladder	106	10/13/2022	10/19-11/27
Vermilion	989001042386099	WCT	134	28	Graves Creek	Weir	0.7	6/24/2023	7/2-7/6
Bull River	989001033211197	BULL	117	12	East Fork Bull River	Downstream Program	6	10/20/2022	11/7
Bull River	989001033210463	BULL	267	152	Bull River	WCT Evaluation	9.6	7/13/2022	3/10
Bull River	989001033210416	BULL	133	21	East Fork Bull River	Site #2	5.5	7/25/2022	6/8
Bull River	989001033210465	BULL	136	22	East Fork Bull River	Site #3	7	7/28/2022	5/12
Bull River	989001040870823	BULL	191	60	East Fork Bull River	WCT Evaluation	0.2	8/28/2023	11/27
Bull River	989001042385341	EB	192	61	East Fork Bull River	Bull River Exclusion	0.7	10/20/2022	1/29

Array	PIT Tag No.	Species	Length (mm)	Weight (g)	Tagging location	Initial tagging	Rkm	Date tagged	Date Detected
Bull River	989001042385942	EB	128	17	East Fork Bull River	Bull River Exclusion	0.7	10/31/2022	9/26
Bull River	989001042385290	EB	107	9	East Fork Bull River	Bull River Exclusion	0.7	11/9/2022	3/20
Bull River	989001030300046	EB	124	19	East Fork Bull River	Bull River Exclusion	0.7	9/27/2022	5/24-5/25
Bull River	989001042385277	EB	127	20	East Fork Bull River	Bull River Exclusion	0.7	6/20/2023	6/20-6/21
Bull River	989001042385877	EB	161	22	East Fork Bull River	Bull River Exclusion	0.7	10/22/2022	7/7
Bull River	989001042385333	EB	165	45	East Fork Bull River	Bull River Exclusion	0.7	6/18/2023	6/18-6/22
Bull River	989001042385271	EB	117	9	East Fork Bull River	Bull River Exclusion	0.7	5/9/2023	6/30
Bull River	989001042385309	EB	149	29	East Fork Bull River	Bull River Exclusion	0.7	10/1/2023	10/3-10/4
Bull River	989001042385284	LL	102	11	East Fork Bull River	Bull River Exclusion	0.7	6/30/2023	6/30
Bull River	989001030151083	LL	107	11	East Fork Bull River	Bull River Exclusion	0.6	4/15/2019	9/19
Bull River	989001040185364	LL	225	103	East Fork Bull River	Bull River Exclusion	0.7	9/17/2021	1/31, 4/9, 10/17
Bull River	989001040185495	LL	422	723	East Fork Bull River	Bull River Exclusion	0.7	10/27/2021	10/17-12/7
Bull River	989001033409644	LL	238	117	East Fork Bull River	Bull River Exclusion	0.7	5/5/2022	2/3, 3/7
Bull River	989001042385863	LL	120	15	East Fork Bull River	Bull River Exclusion	0.7	10/29/2022	3/12
Bull River	989001042385292	LL	420	692	East Fork Bull River	Bull River Exclusion	0.7	11/2/2022	12/1
Bull River	989001042385307	LL	127	20	East Fork Bull River	Bull River Exclusion	0.7	5/30/2023	5/30-6/1
Bull River	989001042385288	LL	134	22	East Fork Bull River	Bull River Exclusion	0.7	5/13/2023	5/13
Bull River	989001042385357	LL	112	15	East Fork Bull River	Bull River Exclusion	0.7	5/19/2023	5/19
Bull River	989001042385353	LL	153	37	East Fork Bull River	Bull River Exclusion	0.7	6/11/2023	6/12-6/20, 7/4

Array	PIT Tag No.	Species	Length (mm)	Weight (g)	Tagging location	Initial tagging	Rkm	Date tagged	Date Detected
Bull River	989001042385319	LL	105	13	East Fork Bull River	Bull River Exclusion	0.7	6/30/2023	6/30
Bull River	989001042385327	LL	167	37	East Fork Bull River	Bull River Exclusion	0.7	9/15/2023	9/15
Bull River	989001042385740	LL	430	830	East Fork Bull River	Bull River Exclusion	0.7	10/17/2023	10/17- 10/24
Bull River	989001042385738	LL	175	49	East Fork Bull River	Bull River Exclusion	0.7	10/17/2023	10/17
Bull River	989001042385689	LL	174	43	East Fork Bull River	Bull River Exclusion	0.7	10/17/2023	10/17
Bull River	989001042385745	LL	435	774	East Fork Bull River	Bull River Exclusion	0.7	10/17/2023	10/17-10/22
Bull River	989001042385850	LL	408	639	East Fork Bull River	Bull River Exclusion	0.7	10/23/2023	10/23-11/5
Bull River	989001042385763	LL	426	846	East Fork Bull River	Bull River Exclusion	0.7	10/23/2023	10/23-11/3
Bull River	989001042385793	LL	408	683	East Fork Bull River	Bull River Exclusion	0.7	10/25/2023	10/25, 11/5, 11/9
Bull River	989001042385797	LL	150	27	East Fork Bull River	Bull River Exclusion	0.7	11/5/2023	11/5
Bull River	989001042385518	LL	111	11	East Fork Bull River	Bull River Exclusion	0.7	11/6/2023	11/7
Bull River	989001042385531	LL	372	465	East Fork Bull River	Bull River Exclusion	0.7	11/8/2023	11/8, 11/13
Bull River	989001033210529	LL	406	582	Bull River	WCT Evaluation	9.6	5/4/2022	1/1-1/30, 4/2-6/25
Bull River	989001033210289	LL	489	1285	Bull River	WCT Evaluation	9.6	7/5/2022	4/14-4/18, 11/16-12/5
Bull River	989001033210349	LL	418	861	Bull River	WCT Evaluation	9.6	7/5/2022	5/15-7/9, 11/2
Bull River	989001033210438	LL	300	342	Bull River	WCT Evaluation	9.6	7/13/2022	1/1-12/30
Bull River	989001033210415	LL	450	1118	Bull River	WCT Evaluation	9.6	7/13/2022	4/11-4/12, 11/14

Array	PIT Tag No.	Species	Length (mm)	Weight (g)	Tagging location	Initial tagging	Rkm	Date tagged	Date Detected
Bull River	989001033210365	LL	356	444	Bull River	WCT Evaluation	9.6	7/13/2022	4/11-4/12, 6/18, 11/28
Bull River	989001033210290	LL	352	495	Bull River	WCT Evaluation	9.6	7/5/2022	7/18, 9/9
Bull River	989001033210410	LL	397	710	Bull River	WCT Evaluation	9.6	7/13/2022	11/15-11/21
Bull River	989001033210336	LL	321	-	Bull River	WCT Evaluation	2.5	7/8/2022	5/1
Bull River	989001033210279	LL	231	-	Bull River	WCT Evaluation	2.5	7/8/2022	1/1, 1/3
Bull River	989001033210440	LL	555	1766	Bull River	WCT Evaluation	9.6	7/13/2022	10/11-10/27
Bull River	989001033210348	LL	437	992	Bull River	WCT Evaluation	9.6	7/5/2022	6/8, 10/6
Bull River	989001040870329	LL	300	-	Bull River	WCT Evaluation	17	9/21/2022	2/2, 4/27
Bull River	989001040632242	LL	290	-	Bull River	WCT Evaluation	2	8/8/2022	2/3
Bull River	989001033210557	LL	348	602	Bull River	WCT Evaluation	9.6	7/5/2022	2/14, 4/13, 11/15
Bull River	989001033210307	LL	562	1719	Bull River	WCT Evaluation	9.6	7/13/2022	2/28
Bull River	989001033210499	LL	356	490	Bull River	WCT Evaluation	9.6	5/4/2022	3/7, 4/10
Bull River	989001033210403	LL	531	502	Bull River	WCT Evaluation	9.6	7/13/2022	3/14
Bull River	989001040632135	LL	411	792	Bull River	WCT Evaluation	9.6	6/8/2023	7/3
Bull River	989001040632083	LL	440	942	Bull River	WCT Evaluation	9.6	6/8/2023	6/8-6/23, 11/12-11/17
Bull River	989001040632054	LL	434	844	Bull River	WCT Evaluation	9.6	6/8/2023	6/8, 11/11
Bull River	989001040632082	LL	230	116	Bull River	WCT Evaluation	9.6	6/8/2023	6/8-6/24

Array	PIT Tag No.	Species	Length (mm)	Weight (g)	Tagging location	Initial tagging	Rkm	Date tagged	Date Detected
Bull River	989001040632053	LL	352	482	Bull River	WCT Evaluation	9.6	6/8/2023	6/9, 8/3, 11/25, 12/6
Bull River	989001040632088	LL	223	110	Bull River	WCT Evaluation	9.6	6/8/2023	6/21
Bull River	989001040632117	LL	250	152	Bull River	WCT Evaluation	9.6	6/8/2023	6/8, 8/10-8/31, 9/18, 9/23
Bull River	989001040632060	LL	470	1130	Bull River	WCT Evaluation	9.6	6/8/2023	6/8
Bull River	989001040632130	LL	307	282	Bull River	WCT Evaluation	9.6	6/8/2023	6/8-7/1
Bull River	989001040632063	LL	213	100	Bull River	WCT Evaluation	9.6	6/8/2023	6/9, 6/19, 7/16
Bull River	989001040632086	LL	406	694	Bull River	WCT Evaluation	9.6	6/8/2023	6/10, 12/9-12/31
Bull River	989001040870890	LL	437	-	Bull River	WCT Evaluation	22	9/26/2023	10/11, 10/24, 10/26-10/27
Bull River	989001040870309	LL	383	-	Bull River	WCT Evaluation	2	8/29/2022	11/4-11/5, 11/13
Bull River	989001033210355	LL	401	685	Bull River	WCT Evaluation	9.6	7/5/2022	11/20
Bull River	989001040870875	LL	382	-	Bull River	WCT Evaluation	19	9/23/2023	11/8-12/10
Bull River	989001040870682	LL	427	-	Bull River	WCT Evaluation	17	8/1/2023	10/19, 10/23
Bull River	989001040632097	LL	462	1080	Bull River	WCT Evaluation	9.6	6/8/2023	11/7, 11/10
Bull River	989001040632108	LL	480	1183	Bull River	WCT Evaluation	9.6	6/8/2023	11/12-11/14
Bull River	989001033212610	LL	496	1076	Thompson Fall Dam	Ladder	105.5	9/26/2022	11/13, 11/19

Array	PIT Tag No.	Species	Length (mm)	Weight (g)	Tagging location	Initial tagging	Rkm	Date tagged	Date Detected
Bull River	989001033210561	LL	456	1195	Bull River	WCT Evaluation	9.6	7/5/2022	11/19
Bull River	989001033210278	LL	365	531	Bull River	WCT Evaluation	9.6	7/5/2022	11/20
Bull River	989001033210295	LL	340	-	Bull River	WCT Evaluation	30	7/7/2022	11/23
Bull River	989001040632112	LL	402	625	Bull River	WCT Evaluation	9.6	6/8/2023	12/6
Bull River	989001040870849	LL	257	-	Bull River	WCT Evaluation	22	9/26/2023	12/31
Bull River	989001026316569	MWF	395	542	East Fork Bull River	Screw Trap	0.7	6/23/2019	4/16, 12/6
Bull River	989001033211797	RB	363	443	Thompson Fall Dam	Ladder	105.5	8/23/2021	4/25, 4/30
Bull River	989001042385342	RB	119	10.3	East Fork Bull River	Screw Trap	0.7	6/10/2023	6/10-6/12
Bull River	989001040632138	RB	204	90	Bull River	WCT Evaluation	9.6	6/8/2023	6/8, 6/15
Bull River	989001040870847	RB	264	-	Bull River	WCT Evaluation	17	9/28/2023	12/27
Bull River	989001040632181	RBxWCT	310	-	Bull River	WCT Evaluation	2	8/8/2022	1/26-2/5, 9/21, 9/27, 11/11
Bull River	989001040870241	RBxWCT	298	-	Bull River	WCT Evaluation	2	8/29/2022	5/16-7/7
Bull River	989001033210309	RBxWCT	461	916	Bull River	WCT Evaluation	9.6	7/5/2022	5/22, 10/29
Bull River	982126050371139	WCT	361	552	Below Cabinet Gorge	Upstream Transport	0	5/3/2022	5/11
Bull River	982126050371144	WCT	575	1554	Below Cabinet Gorge	Upstream Transport	0	4/24/2023	4/28-5/2
Bull River	982126050371168	WCT	466	908	Below Cabinet Gorge	Upstream Transport	0	4/24/2023	4/29
Bull River	982126050371129	WCT	406	684	Below Cabinet Gorge	Upstream Transport	0	5/9/2023	5/18-5/21
Bull River	982126057418101	WCT	445	858	Below Cabinet Gorge	Upstream Transport	0	6/5/2023	6/8

Array	PIT Tag No.	Species	Length (mm)	Weight (g)	Tagging location	Initial tagging	Rkm	Date tagged	Date Detected
Bull River	989001033210483	WCT	340	-	Bull River	WCT Evaluation	22	5/27/2022	6/12
Bull River	989001040632201	WCT	232	-	Bull River	WCT Evaluation	2	8/8/2022	4/29
Bull River	989001040870512	WCT	308	-	Bull River	WCT Evaluation	19	9/12/2022	1/15, 1/21
Bull River	989001040870464	WCT	259	-	Bull River	WCT Evaluation	17	9/6/2022	1/3
Bull River	989001040870466	WCT	232	-	Bull River	WCT Evaluation	17	9/6/2022	1/4
Bull River	989001040870349	WCT	258	-	Bull River	WCT Evaluation	17	9/19/2022	1/4, 6/23
Bull River	989001033210328	WCT	243	-	Bull River	WCT Evaluation	27.4	7/11/2022	1/6
Bull River	989001033210488	WCT	193	56	Bull River	WCT Evaluation	33.3	4/29/2022	1/6
Bull River	989001040870358	WCT	312	-	Bull River	WCT Evaluation	17	9/19/2022	1/6
Bull River	989001040870385	WCT	303	-	Bull River	WCT Evaluation	22	9/27/2022	1/11
Bull River	989001040870379	WCT	206	-	Bull River	WCT Evaluation	22	9/27/2022	1/17
Bull River	989001040870450	WCT	224	-	Bull River	WCT Evaluation	17	9/6/2022	2/4, 3/20
Bull River	989001033210549	WCT	162	36	Bull River	WCT Evaluation	33.3	4/29/2022	2/11, 5/10
Bull River	989001033210441	WCT	201	-	Bull River	WCT Evaluation	33.3	8/2/2022	3/4
Bull River	989001040870230	WCT	111	12	Bull River	WCT Evaluation	36.5	8/30/2022	6/22
Bull River	989001040870285	WCT	106	11	Bull River	WCT Evaluation	36.7	8/31/2022	7/23
Bull River	989001040870574	WCT	197	-	Bull River	WCT Evaluation	27.4	7/7/2023	7/27
Bull River	989001040870786	WCT	278	230	East Fork Bull River	WCT Evaluation	0.7	8/28/2023	8/31
Bull River	989001040870559	WCT	160	-	Bull River	WCT Evaluation	27.4	7/7/2023	8/5

Array	PIT Tag No.	Species	Length (mm)	Weight (g)	Tagging location	Initial tagging	Rkm	Date tagged	Date Detected
Bull River	989001040870448	WCT	145	30	Bull River	WCT Evaluation	38.1	9/1/2022	7/1
Bull River	989001040870882	WCT	282	-	Bull River	WCT Evaluation	2	9/15/2023	12/3, 12/5
Bull River	989001040870859	WCT	220	-	Bull River	WCT Evaluation	17	9/28/2023	12/22, 12/24
Bull River	989001040870858	WCT	206	-	Bull River	WCT Evaluation	17	9/20/2023	12/23
Bull River	989001040870927	WCT	212	-	Bull River	WCT Evaluation	17	9/28/2023	12/23
Bull River	989001040870910	WCT	225	-	Bull River	WCT Evaluation	17	9/28/2023	12/26
Bull River	989001040870522	WCT	105	10	Bull River	WCT Evaluation	38.1	9/1/2022	12/26
Bull River	989001040870891	WCT	238	-	Bull River	WCT Evaluation	19	9/25/2023	12/27
Bull River	989001040870867	WCT	209	-	Bull River	WCT Evaluation	33.3	9/18/2023	12/27-12/29
Bull River	989001040870874	WCT	220	-	Bull River	WCT Evaluation	17	9/20/2023	12/27
Bull River	989001040870926	WCT	224	-	Bull River	WCT Evaluation	17	9/28/2023	12/29
Bull River	989001040870630	WCT	205	76	Bull River	WCT Evaluation	38.5	8/3/2023	12/30
Bull River	989001040870321	WCT	100	9	Bull River	WCT Evaluation	36.5	8/30/2022	12/31
EFBR	989001033408943	BULL	205	634	East Fork Bull River	Downstream Transport	0.7	10/18/2020	7/8, 7/23
EFBR	989001033409450	BULL	112	12	East Fork Bull River	Downstream Program	5.5	10/19/2021	5/13
EFBR	989001033211197	BULL	117	12	East Fork Bull River	Downstream Program	6	10/20/2022	11/5
EFBR	989001033210416	BULL	133	21	East Fork Bull River	Site #2	5.5	7/25/2022	6/5
EFBR	989001033210465	BULL	136	22	East Fork Bull River	Site #3	7	7/28/2022	5/10

Array	PIT Tag No.	Species	Length (mm)	Weight (g)	Tagging location	Initial tagging	Rkm	Date tagged	Date Detected
EFBR	989001040870823	BULL	191	60	East Fork Bull River	WCT Evaluation	0.2	8/28/2023	11/5
EFBR	989001026316569	MWF	395	542	East Fork Bull River	Screw Trap	0.7	6/23/2019	5/3, 6/1
EFBR	989001026316384	LL	363	500	East Fork Bull River	Bull River Exclusion	0.7	10/17/2018	11/4, 11/15
EFBR	989001030151083	LL	107	11	East Fork Bull River	Screw Trap	0.7	4/15/2019	1/2-1/12, 9/14-9/28, 10/17
EFBR	989001026317138	LL	490	1231	East Fork Bull River	Bull River Exclusion	0.7	11/17/2019	11/6-11/8
EFBR	989001030151200	LL	176	46	East Fork Bull River	Bull River Exclusion	0.7	9/15/2020	2/21, 6/7, 6/9, 10/23-11/4
EFBR	989001033409543	LL	515	1332	East Fork Bull River	Bull River Exclusion	0.7	11/12/2020	11/6, 11/9
EFBR	989001033409829	LL	441	660	East Fork Bull River	Bull River Exclusion	0.7	11/21/2020	11/4, 11/19
EFBR	989001040185364	LL	225	103	East Fork Bull River	Bull River Exclusion	0.7	9/17/2021	11/5
EFBR	989001042385740	LL	430	830	East Fork Bull River	Bull River Exclusion	0.7	10/17/2023	10/22, 11/3, 11/9
EFBR	989001033210556	LL	360	-	Bull River	WCT Evaluation	33.3	4/29/2022	1/2, 11/5, 12/5
EFBR	989001033210338	LL	473	1336	Bull River	WCT Evaluation	9.6	7/13/2022	1/1-1/2, 11/11
EFBR	989001040632060	LL	470	1130	Bull River	WCT Evaluation	9.6	6/8/2023	11/5, 11/19
EFBR	989001040870894	LL	414	-	Bull River	WCT Evaluation	17	9/20/2023	10/16
EFBR	989001040870898	LL	441	-	Bull River	WCT Evaluation	30	9/29/2023	11/5, 11/11, 11/14

Array	PIT Tag No.	Species	Length (mm)	Weight (g)	Tagging location	Initial tagging	Rkm	Date tagged	Date Detected
EFBR	989001040632068	LL	412	892	Bull River	WCT Evaluation	9.6	6/8/2023	11/5
EFBR	989001040870373	LL	353	-	Bull River	WCT Evaluation	17	9/21/2022	11/5
EFBR	989001033210355	LL	401	685	Bull River	WCT Evaluation	9.6	7/5/2022	11/5
EFBR	989001033210371	LL	530	1413	Bull River	WCT Evaluation	9.6	7/13/2022	11/14
EFBR	989001040632131	LL	410	853	Bull River	WCT Evaluation	9.6	6/8/2023	11/16
EFBR	989001040632102	LL	402	629	Bull River	WCT Evaluation	9.6	6/8/2023	12/5, 12/12
EFBR	989001033211797	RB	363	443	Thompson Fall Dam	Ladder	105.5	8/23/2021	4/27
EFBR	989001033210309	RBxWCT	461	916	Bull River	WCT Evaluation	9.6	7/5/2022	5/26
EFBR	989001040632100	RBxWCT	183	59	Bull River	WCT Evaluation	9.6	6/8/2023	7/22
EFBR	989001040185356	WCT	302	243	East Fork Bull River	Weir	0.7	9/19/2021	4/27, 7/13
EFBR	989001042385310	WCT	104	10	East Fork Bull River	Screw Trap	0.7	5/26/2023	7/18
EFBR	989001042385305	WCT	276	184	East Fork Bull River	Weir	0.7	9/7/2023	9/27, 9/29
EFBR	989001040870294	WCT	425	-	Bull River	WCT Evaluation	30	8/26/2022	5/25
EFBR	989001040870786	WCT	278	230	East Fork Bull River	WCT Evaluation	0.7	8/28/2023	8/30
EFBR	989001040870752	WCT	130	17	East Fork Bull River	WCT Evaluation	0.7	8/28/2023	9/3-9/4
EFBR	989001040870792	WCT	170	47	East Fork Bull River	WCT Evaluation	0.7	8/28/2023	9/7-12/8
EFBR	989001040870321	WCT	100	9	Bull River	WCT Evaluation	36.5	8/30/2022	12/22, 12/24