Lower Clark Fork River Tributary Sampling

Including: Fishway Exploitation Summary

Thompson Falls Field Station

2019

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Montana Fish, Wildlife and Parks

Thompson Falls, MT

October 2020

Contents

Thompson River

Fish in the mainstem Thompson River were sampled using an aluminum drift boat mounted with a rectifier (GPP; Smith-Root Inc., Vancouver, WA) and 5,000-watt generator. The hull of the boat served as the cathode and two fiberglass booms, each with four steel cable droppers, served as anodes. Output was standardized at one ampere of direct current.

Two runs were made to mark fish with each run focusing on a separate riverbank. All trout captured which were 150 mm or greater marked with an identifiable fin clip. Fish were identified to species, measured for total length and weight and released back within the sampling section. All mortalities were weighed and measured but were excluded from population estimation. Additionally, these are trout specific sampling events, but often other species are captured as bycatch. Information on these catches is included but abundance estimates are not calculated for non-target species. Two recapture runs were completed approximately 7-10 days after mark runs and all fish captured were visually examined for fin clips. The Chapman modification of Petersen's Mark-Recapture estimator was used to estimate population size (Pine et al. 2012).

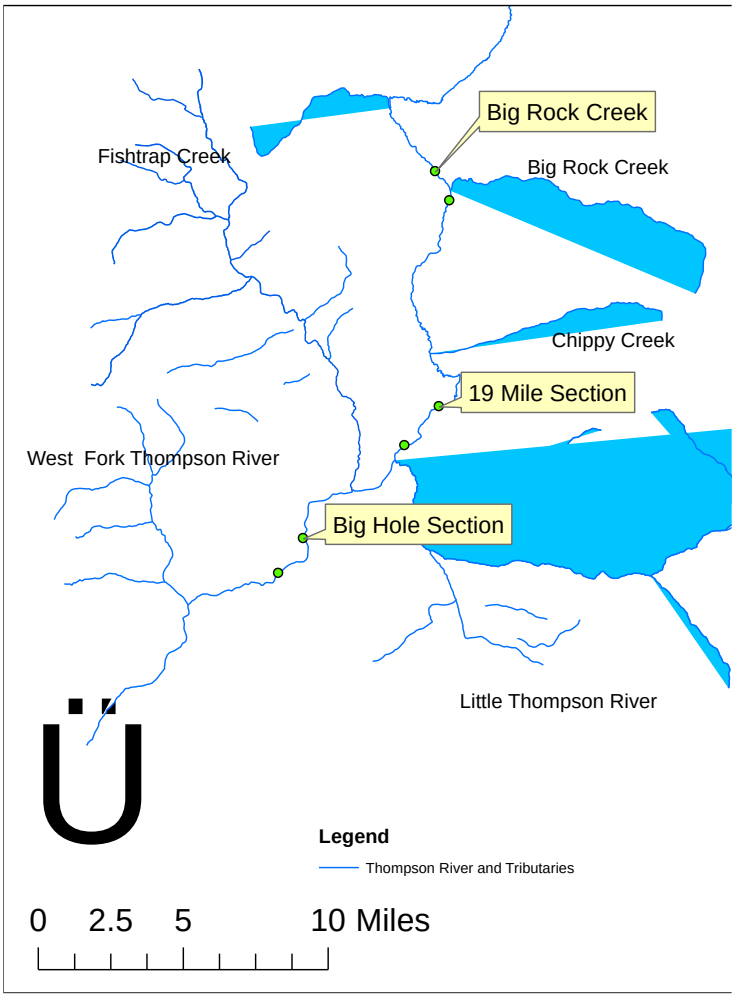

FIGURE 1. Map of the Thompson River with important tributaries and mainstem sampling sections.

In 2019 the Big Hole section and 19 Mile section at16 rkm and 30 rkm were sampled for abundance estimates and species composition from 6/3/2019-6/19/2019 when Thompson River flows were 866–421 cfs. Each section has been routinely sampled since 1998 (Big Hole) or 2003 (19 Mile) for similar abundance estimation. Population estimates collected at each site were calculated and divided by total section length for a standardized estimate of linear abundance per 1.6 kilometers (mile).

Results

In 2019 there were 325 fish sampled in the Big Hole section, the most abundant of which was Brown Trout *Salmo trutta* (LL; n = 167). Other fishes sampled included Rainbow Trout *Oncorhynchus mykiss* (RB, n = 128), Mountain Whitefish *Prosopium williamsoni* (MWF; n = 25), Bull Trout *Salvelinus confluentus* (BULL; n = 3), Longnose Sucker *Catostumus catostomus* (LNSU; n = 1), and Westslope Cutthroat Trout *Oncorhynchus clarki lewisi* (WCT; n = 1).

Sampling the 19 Mile section produced 226 total fish, a majority of which were LL (n = 196). Other fishes included RB (n = 28), Largescale sucker *Catostomus macrocheilus* (LSSU; n = 1), and WCT (n = 1).

For both sections the only species with enough captures and recaptures for reliable estimates were LL and RB. The LL abundances were estimated at 253 per mile (95% CI 172–391) in the Big Hole section and 227 per mile (95% CI 166–322) in the 19 Mile section. The RB abundances were estimated at 327 per mile (95% CI 162–715) in the Big Hole section and 40 per mile (95% CI 18–114) in the 19 Mile section.

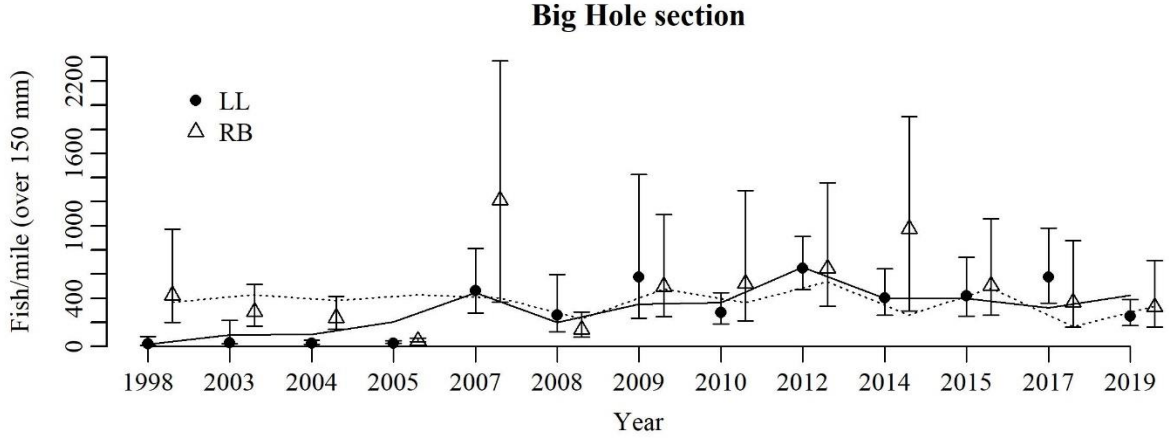

FIGURE 2. Abundance estimates in the Big Hole section from 1998 to 2019. The lines represent capture efficiency estimates for each species.

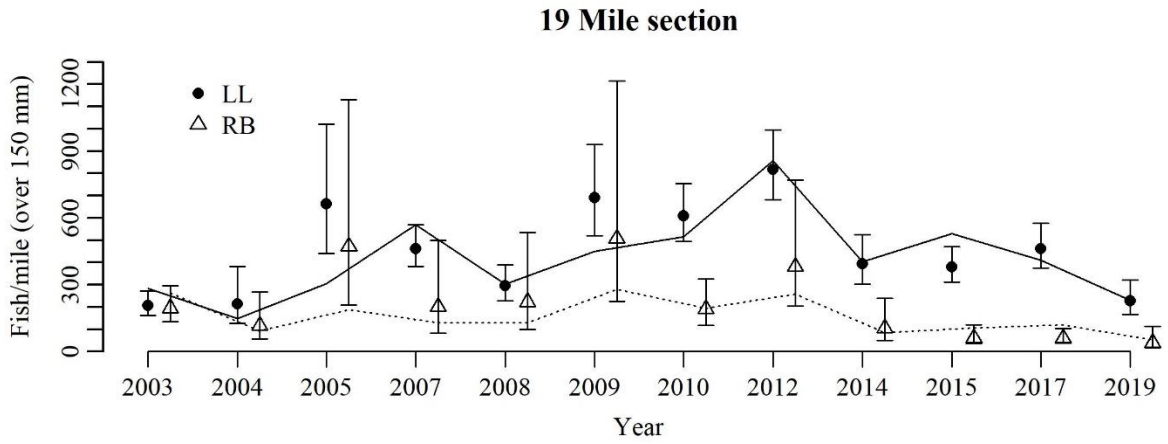

FIGURE 3. Abundance estimates in the 19 Mile section from 2003 to 2019. The lines represent capture efficiency estimates for each species.

Discussion

The two sites sampled in 2019 are showing similar trends per species and overall. Both sites have relatively low estimates for each species compared to previous estimates for the last decade. (Figure 1 and 2). A noticeable and continuing pattern is the reduction in RB in the 19 Mile section from 2010 to present. The RB estimates in this section of river have negatively diverged from the brown trout estimates and do not appear likely to recover. In 2020 there will be new, more liberal, fishing regulations on LL in the Thompson River which allow year-round fishing in upstream portions previously closed and harvest of LL. This change will potentially influence abundance and size structure of LL and should be monitored.

Temperature

Temperatures in the Thompson River at 12.2 rkm exceeded 15°C for 53 days in July and August with average monthly temperatures of 14.0°C and 14.1°C respectively above the West Fork Thompson River for 2019.

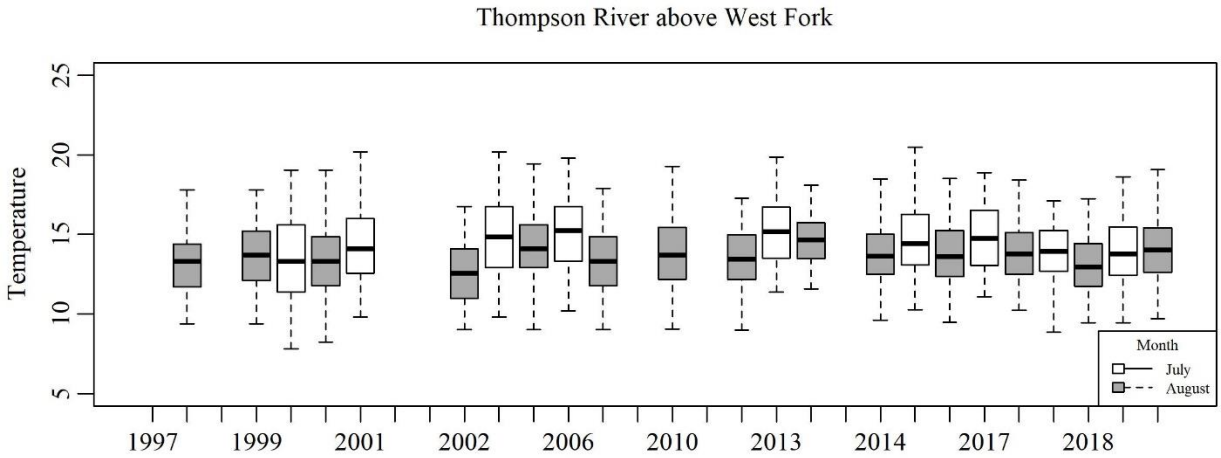

FIGURE 4. Long term temperatures from the Thompson River above the West Fork at 12.2 rkm.

Temperatures at the ACM bridge (1.5 rkm) exceeded 15°C for 49 days in July and August with monthly average temperatures of 13.9°C and 14.1°C respectively for 2019.

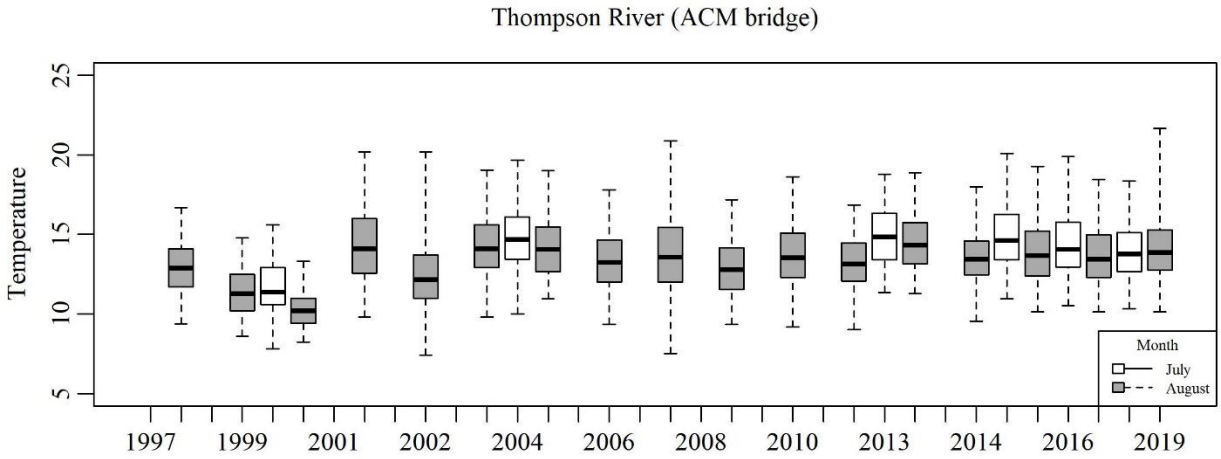

FIGURE 5. Long term temperatures from the Thompson River near the ACM bridge at 1.5 rkm.

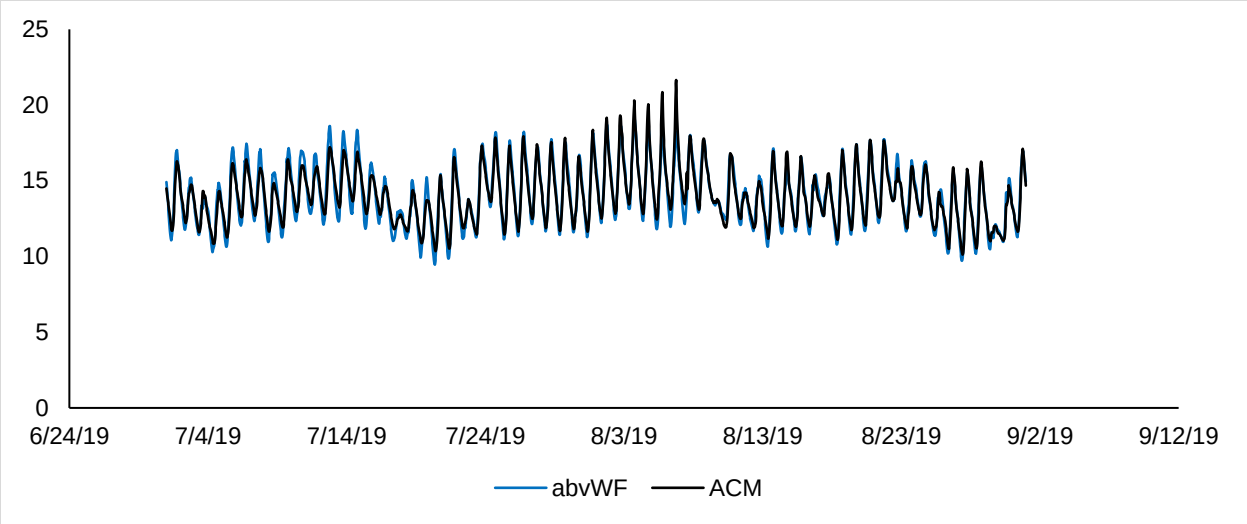

FIGURE 6. Unfiltered temperatures from the Thompson River in 2019 at both the ACM Bridge and above WF Thompson River (1.5 and 12.2 rkm).

Bear Creek

Bear Creek enters the Thompson River at approximate river kilometer (rkm) 35.0. Currently, a natural fish barrier exists in Bear Creek at 2.1 rkm and only Rocky Mountain tailed frogs (*Ascaphus montanus*) are present above the falls. Approximately 9.3 rkm of mainstem habitat exist upstream of the barrier. This stream may also have potential habitat available in the lower portions of some tributaries. The drainage size is 3,360 hectares, with the lower 4.8 rkm on Southern Pines (formerly Weyerhaeuser) land and the rest administered by the Lolo National Forest. Baseflow stream discharge at 0.1 rkm was 3.23 cfs in mid-August 2018. A temperature logger was deployed above the barrier falls at 3.5 rkm in 2019.

Bear Creek is a potential location for Westslope Cutthroat Trout (WCT) introduction given that it is naturally fishless, and neighboring streams, such as Chippy Creek, with genetically intact populations are facing threats of hybridization and non-native competition. There were no days recorded with temperatures exceeding 15°C. Average monthly July and August temperatures were 10.2°C and 10.9°C respectively.

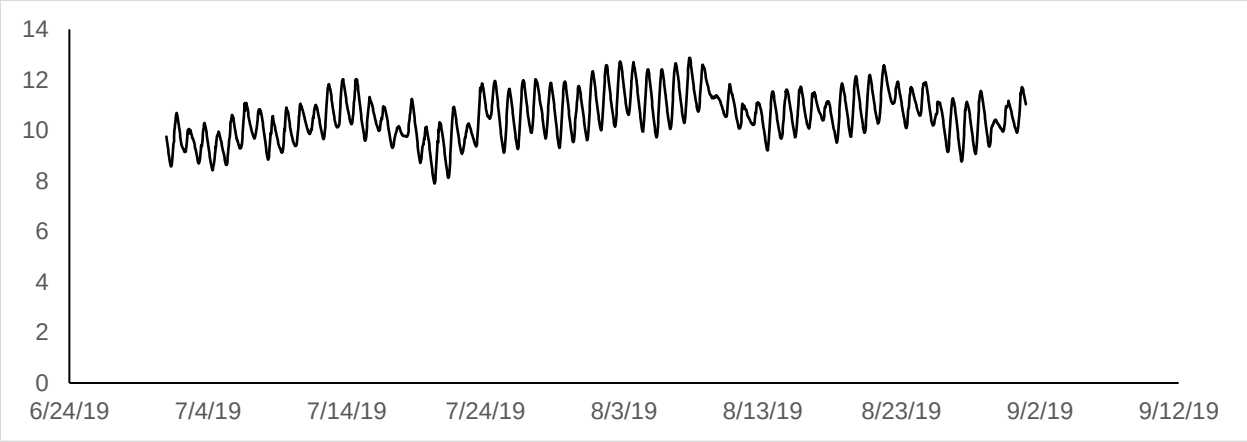

FIGURE 7. Unfiltered temperature profile of Bear Creek in 2019 at 3.5 rkm.

Beatrice Creek

Beatrice Creek is a tributary to Fishtrap Creek at 12.0 rkm. Beatrice Creek is considered a core tributary for BULL but recent electrofishing and redd surveys have indicated there are potentially decreasing numbers of BULL in Beatrice Creek. Multiple pass depletions moving downstream into a block net are used to estimate abundance in Beatrice Creek.

The two long term sites were sampled by multi-pass electrofishing, downstream into a block net in Beatrice Creek in 2019 with the site at 1.3 rkm having an estimated 2 Bull Trout (BULL) and 25 WCT (95% CI 9–41) over 75 mm per 100 m. The site at 3.4 rkm having an estimated 0 BULL and 36 WCT (95% CI 35–46) over 75 mm per 100 m. The trend data in Beatrice Creek is a little sparse, but the reduced numbers of BULL in 2019 is cause for concern and monitoring should continue. Redd numbers have varied from 0–4 in recent years in Beatrice Creek. This may be as simple as no recent spawning activity in Beatrice Creek.

FIGURE 8. Beatrice Creek sampling locations in 2019.

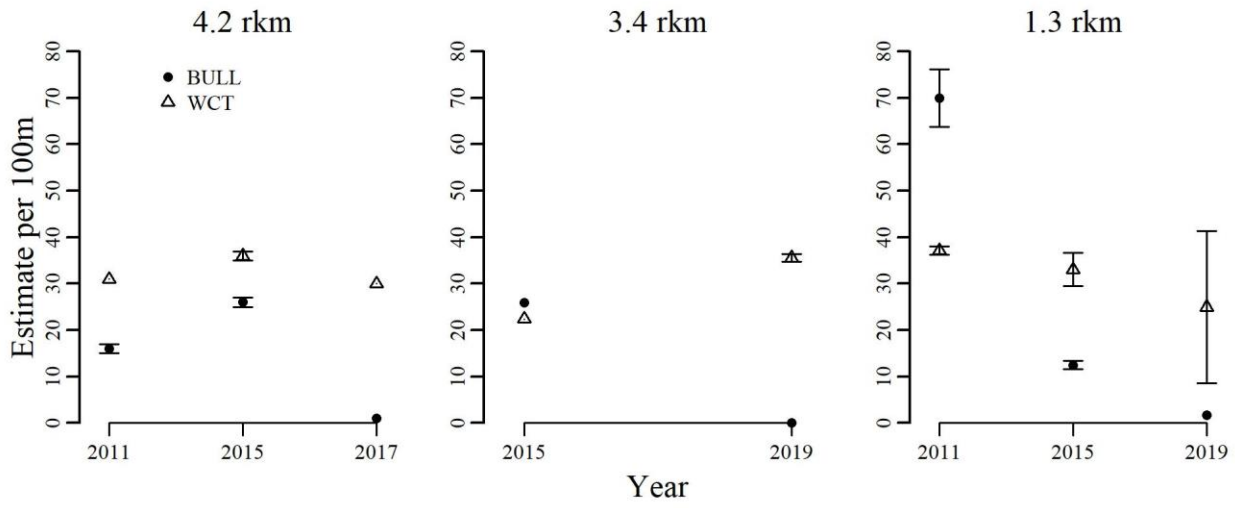

FIGURE 9. Long term depletion trends in Beatrice Creek at 1.3 rkm, 3.4 rkm, and 4.2 rkm.

Big Rock Creek

Big Rock Creek is a tributary stream to the Thompson River which enters the drainage approximately 52.4 rkm upstream from the Clark Fork River. Its drainage size is 8,650 hectares and land ownership are a mix of Southern Pines and US Forest Service. The stream is home to BULL and WCT. Low levels of Rainbow Trout hybridization were recently documented in multiple fish at 2.0 rkm, with six of fifteen fish tested showing hybrid alleles (Kriener and Terrazas 2018). Two brown trout were also sampled at 4.5 rkm in 2018 (Kreiner and Terrazas 2018). Big Rock Creek has a disjointed population of BULL that is of important conservation value. There are potential opportunities to sequester this population above a permanent barrier to reduce hybridization of WCT that remain in the upper drainage and reduce interactions with non-native fishes that may be deleterious to the native fishes that remain. Temperatures in Big Rock Creek at 5.2 rkm exceeded 15°C for 5 days, all at the beginning of August 2019. Average monthly July and August temperatures were 11.7°C and 12.3°C respectively.

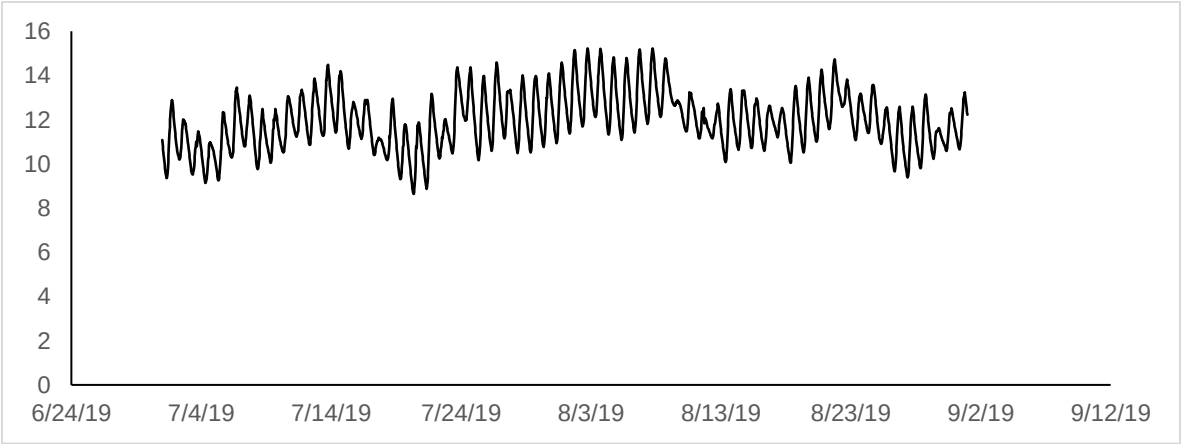

FIGURE 10. Unfiltered temperatures from Big Rock Creek in 2019 at 5.2 rkm.

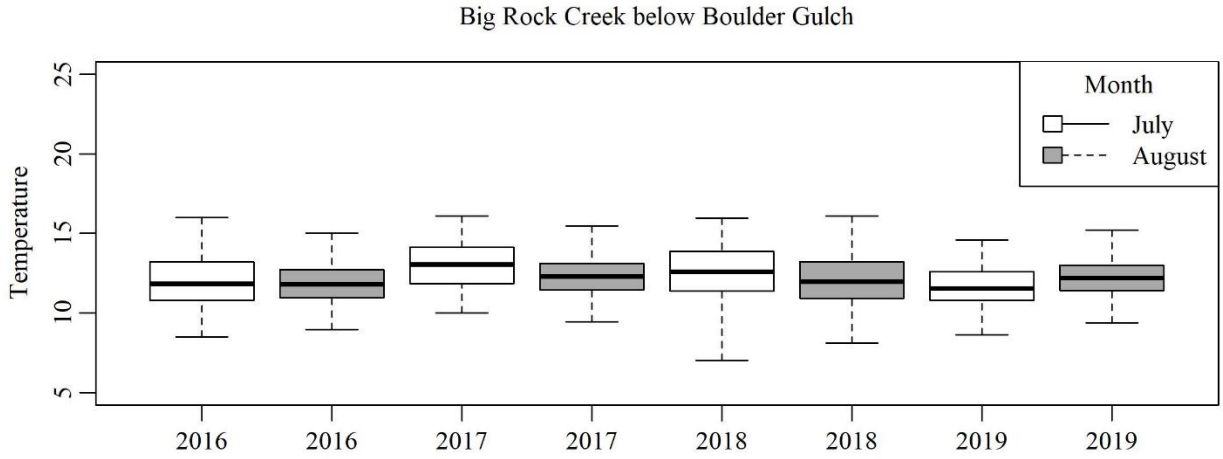

FIGURE 11. Long term temperature trend for Big Rock Creek below Boulder Gulch.

Chippy Creek

Chippy Creek is a tributary to upper Thompson River at 38.3 rkm. A series of bedrock slides at 4.0 rkm likely provide an impediment but not a barrier to upstream migration. Native and non-native trout exist above the barrier (Kreiner and Terrazas 2020).

Temperatures in Chippy Creek at the trail crossing at 3.9 rkm exceeded 15°C for 36 days in July and August of 2019, reaching a maximum of 17.0°C. Average monthly July and August temperatures were 12.3°C and 13.2°C respectively.

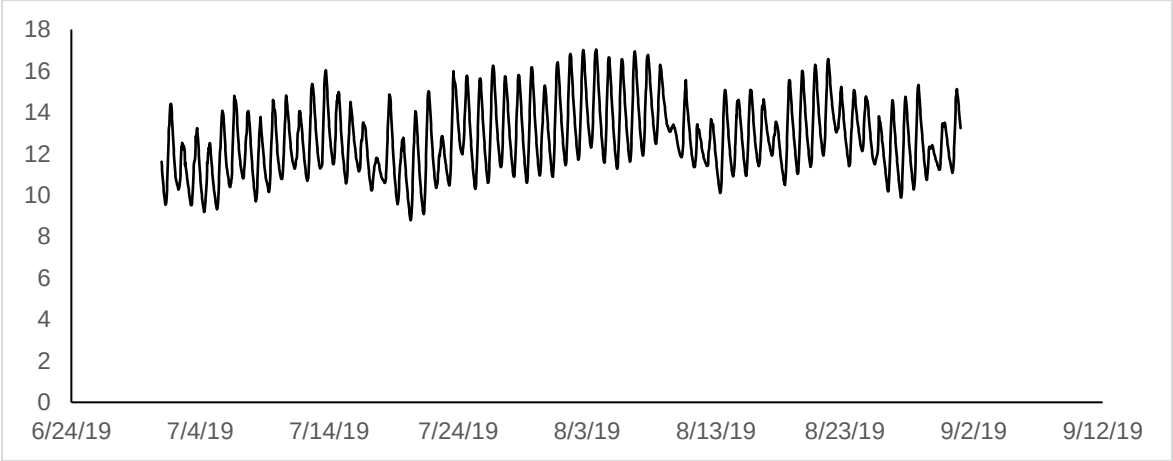

FIGURE 12. Unfiltered temperature profile for Chippy Creek in 2019 at 3.9 rkm.

Deerhorn Creek

Deerhorn Creek is a tributary to the Thompson River at 22 rkm. There has been relatively little sampling conducted in Deerhorn Creek compared to other Thompson River tributaries. Historical

genetic testing indicated low level RB introgression (1%) in 1990 (R. Leary, personal communication) but had expanded by 2003 in the lower reaches (11%) (Leary et al. 2006).

There were two sites in Deerhorn Creek sampled in 2019, one at 2.1 rkm and another at 3.7 rkm with one-pass downstream into a block net. There were 3 WCT and 3 BULL sampled at the lower site, and 26 WCT sampled at the upper site. Twenty-three WCT samples were submitted for hybridization analysis (three from the lower and 20 from the upper site), and all appear to be pure WCT (Kovach et al. 2020). This is good information for the upper site but given the low sample size from the lower site (3) there are still unknowns. Sampling at the lower site was difficult and fish may have been missed. This is the first documented occurrence of Bull Trout in Deerhorn Creek. All fish appeared to be the same age (age-1; 96–106 mm total length) and would have potentially been from one spawning pair in 2017.

TABLE 1. Sampling summary from two sites in Deerhorn Creek in 2019.

RKM	Section Length	Survey Type	Spp.	Total Captured	Total (≥75 mm)	Min Length (mm)	Mean Length (mm)	Max Length (mm)
2.1	100	Single	BULL	3	3	96	100.3	106
			WCT	3	3	87	107.7	127
3.7	100	Single	WCT	26	26	78	104.2	144

FIGURE 13. Deerhorn Creek sampling sites in 2019.

Dry Creek

Dry Creek is a tributary of Prospect Creek at approximately 0.9 rkm. There is a large cascade and intermittent section from 2.0 rkm to approximately 6.0 rkm.

Four forks of Dry Creek were sampled moving upstream with no block net until 10 fish were sampled (40 total) in 2019 to collect fin clips for genetic analysis. Sites near the trailhead at WF Dry Creek, Knox Creek, and Gold Rush Creek were all sampled. The EF Dry Creek samples were taken near the Gold Rush Creek trailhead. Ten fish were collected, and samples were submitted for genetic analysis which revealed all 40 fish appear to be genetically pure WCT with high genetic diversity (Kovach et al. 2020). These results suggest this is one intermixing population above an intermittent barrier and that intermittency within the drainage has likely prevented hybridization from occurring. We estimate there are 8 rkm of perennial stream in the WF and Joan Creek portions of the drainage with 11.25 rkm of perennial stream in the EF, Knox, and Gold Rush tributaries making a conservative estimate of over 19 rkm of perennial stream above the intermittent section. There are also many beaver complexes in this drainage, but we still have high diversity, and evidence of intermixing.

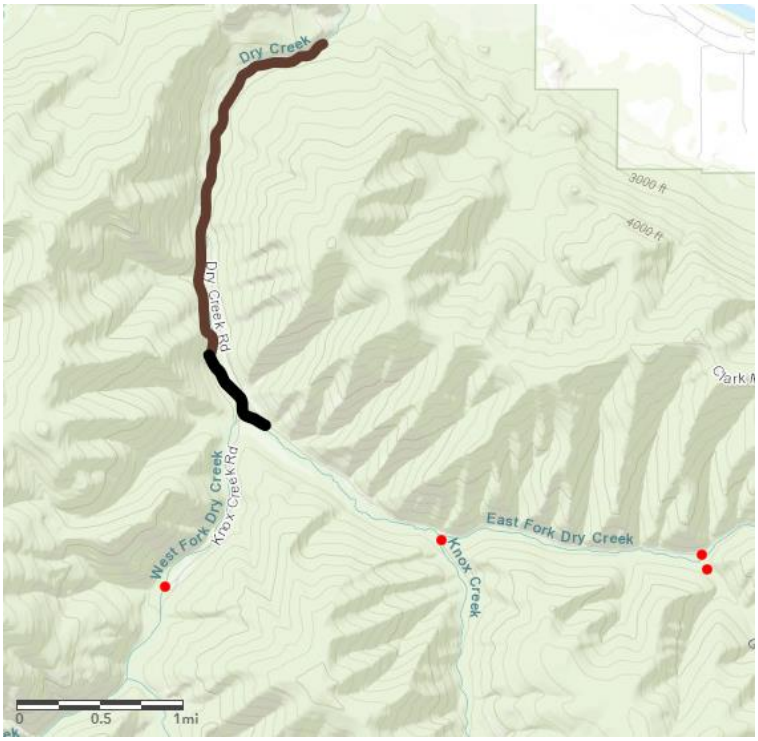

FIGURE 14. Map of dry creek showing genetics sampling locations for 2019 (red dots) and intermittent section (black line).

Fishtrap Creek

The Fishtrap Creek drainage is the primary spawning and rearing habitat for migratory BULL in the Thompson River drainage. It has been regularly sampled over the past twenty years and has been described extensively in other reports (Kreiner and Tholl 2014, Glaid 2017). Sampling has included electrofishing in the mainstem Fishtrap Creek and tributaries, redd counts, a 2015 graduate study, and ongoing outmigration studies (Kreiner and Terrazas 2018; Kreiner and Terrazas 2020). Extended redd surveys in lower Fishtrap Creek conducted between 2015 and 2017 revealed Bull Trout spawning in the lower river, downstream of all previously existing

electrofishing surveys. Although spawning in the lower river was thought to occur primarily during low-water years and was exacerbated by barriers such as beaver dams and intermittency, redds were documented in both low- and high-water years (e.g. 2015 and 2018). Because of the unknown species composition in the lower river and warmer water temperatures, it was desired to conduct electrofishing surveys to determine success of lower Fishtrap Creek spawning activity. Temperature loggers were deployed at the bridge below the confluence with Beatrice Creek (rkm 11.3), and near the mouth (rkm 0.2).

In 2019 multiple sites were sampled using multiple passes moving downstream into a block net. The Fishtrap Creek site at 10.9 rkm, also called Sinking Log – Bounding Cougar, had an estimated 8 WCT (95% CI 7–8) and 3 BULL (95% CI 1–6) over 75 mm per 100 m in 2019. The site at 16.6 rkm, also called Mickelson's Hole, had an estimated 11 BULL (95 % CI 11-12) and 9 WCT (95% CI 8–9) over 75 mm per 100 m in 2019.

In 2019 we replicated a site above Jungle Creek at 2.7 rkm that was sampled in 2018 to monitor species composition in the lower watershed. This sampling was conducted with a single pass downstream into a block net.

TABLE 2. Sampling summary from 2.7 rkm site in Fishtrap Creek in 2019.

RKM	Section Length	Survey Type	Spp.	Total Captured	Total (≥75 mm)	Min Length (mm)	Mean Length (mm)	Max Length (mm)
2.7	271	Single	BULL	10	10	82	122.6	181
			EB	51	32	58	97.3	195
			LL	12	5	67	82.3	151
			MWF	1	1	80	80	80
			RB	36	36	87	138.6	255
			WCT	5	5	102	121.6	132

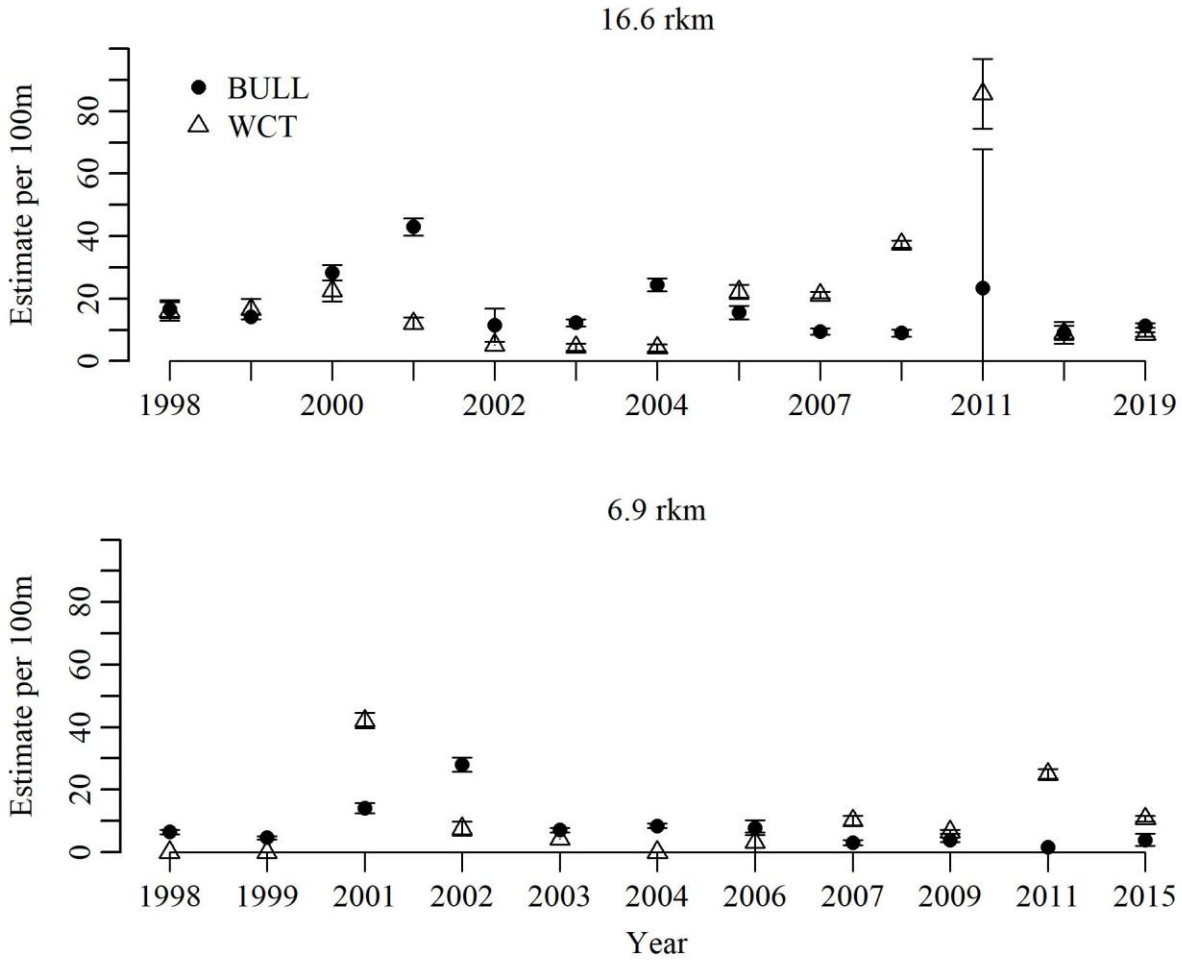

FIGURE 15. Long term depletion trends in Fishtrap Creek at 6.9 rkm and 16.6 rkm sites.

Fishtrap Creek below Beatrice Creek at 11.3 rkm did not exceed 15°C in 2019. Average July and August temperatures were 9.6°C and 9.9°C respectively.

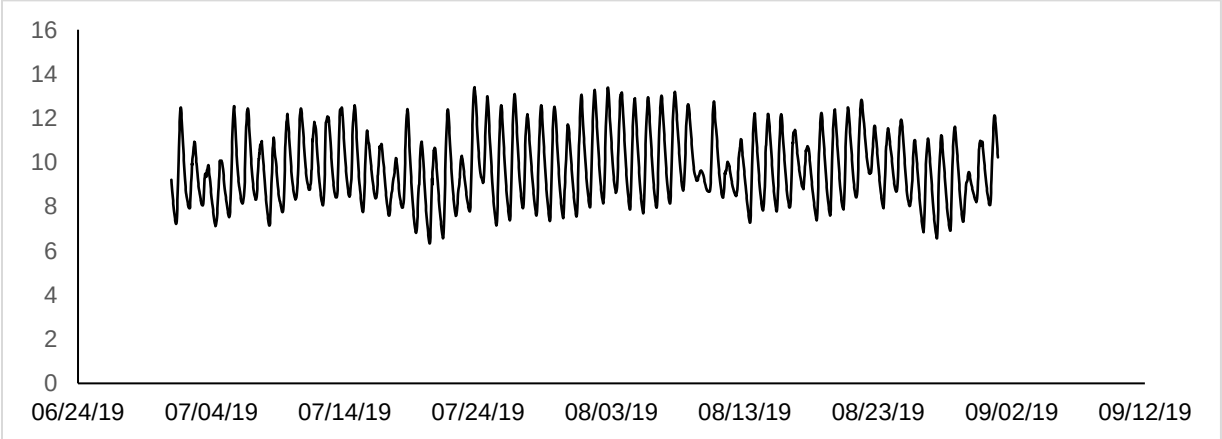

FIGURE 16. Unfiltered temperature profile for Fishtrap Creek below Beatrice Creek in 2019 at 11.3 rkm.

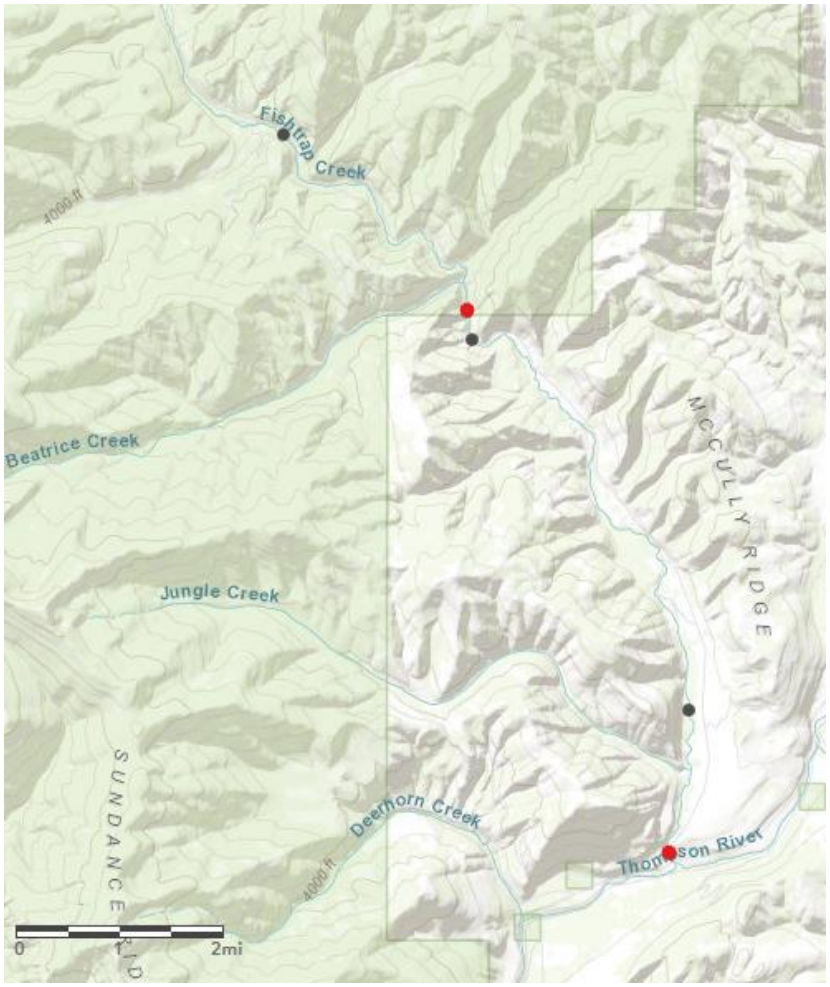

FIGURE 17. Sampling (black dots) and thermograph (red dots) locations in Fishtrap Creek in 2019.

Henry Creek

Henry Creek is a tributary to the Clark Fork River between the towns of Plains and Paradise, near 156.3 rkm. Henry Creek has approximately 10.8 rkm of mainstem habitat, primarily comprised of WCT which are suspected to be pure. The only documented sampling in this drainage was from 2002 when 35 WCT were sampled in a 90 m section near 5.6 rkm. There were 27 genetics samples submitted for hybridization analysis from this sampling and all were pure WCT (Kovach et al. 2020).

Henry Creek was sampled using single passes upstream without a block net at 5.6 rkm and 7.9 rkm with 29 and 33 WCT sampled at each location respectively. Of the total, 22 genetics samples were collected and submitted for hybridization analysis, 10 from the lower site and 12 from the upper site. The analysis revealed pure WCT at both locations with one likely polymorphic SNP in the population (Kovach et al. 2020).

TABLE 3. Sampling summary from two sites in Henry Creek in 2019.

RKM	Section Length	Survey Type	Spp.	Total Captured	Total (≥75 mm)	Min Length (mm)	Mean Length (mm)	Max Length (mm)
5.6	100	Single	WCT	29	26	70	123.4	188
7.9	100	Single	WCT	46	42	60	105.8	200

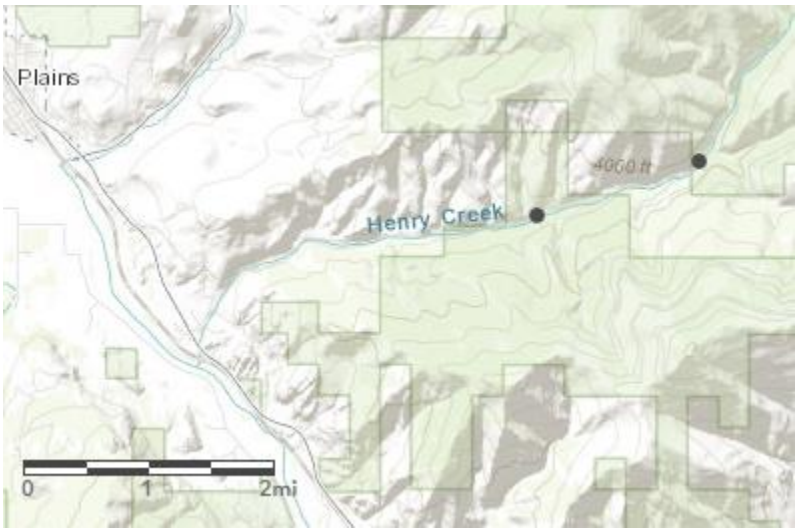

FIGURE 18. Sampling locations in Henry Creek in 2019.

Jungle Creek

Jungle Creek is a tributary to Fishtrap Creek at 1.6 rkm. Jungle Creek is considered a core tributary for BULL but recent electrofishing and redd surveys have indicated there are relatively few and potentially decreasing numbers of BULL in Jungle Creek. Multiple pass depletions moving downstream into a block net are used to estimate abundance in Jungle Creek.

At the lower site on Jungle Creek (1.9 rkm) there were 21 WCT (95% CI 20–22) and one BULL over 75 mm per 100 m in 2019. At the upper site (6.4 rkm) there were an estimated 5 BULL (95% CI 5–5) and 10 WCT (95% CI 10–10) over 75 mm per 100 m in 2019.

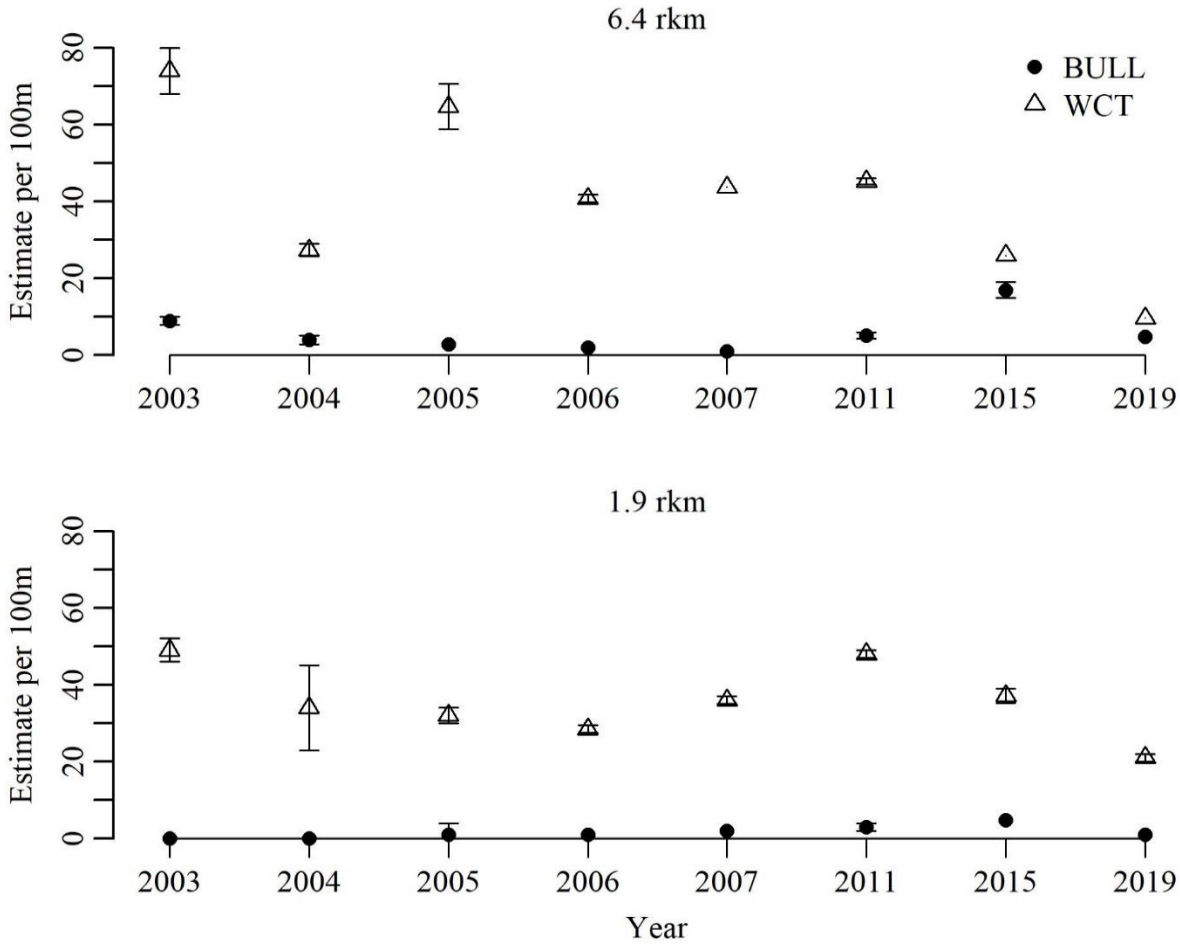

FIGURE 19. Long term depletion estimates from Jungle Creek from 1.9 rkm and 6.4 rkm.

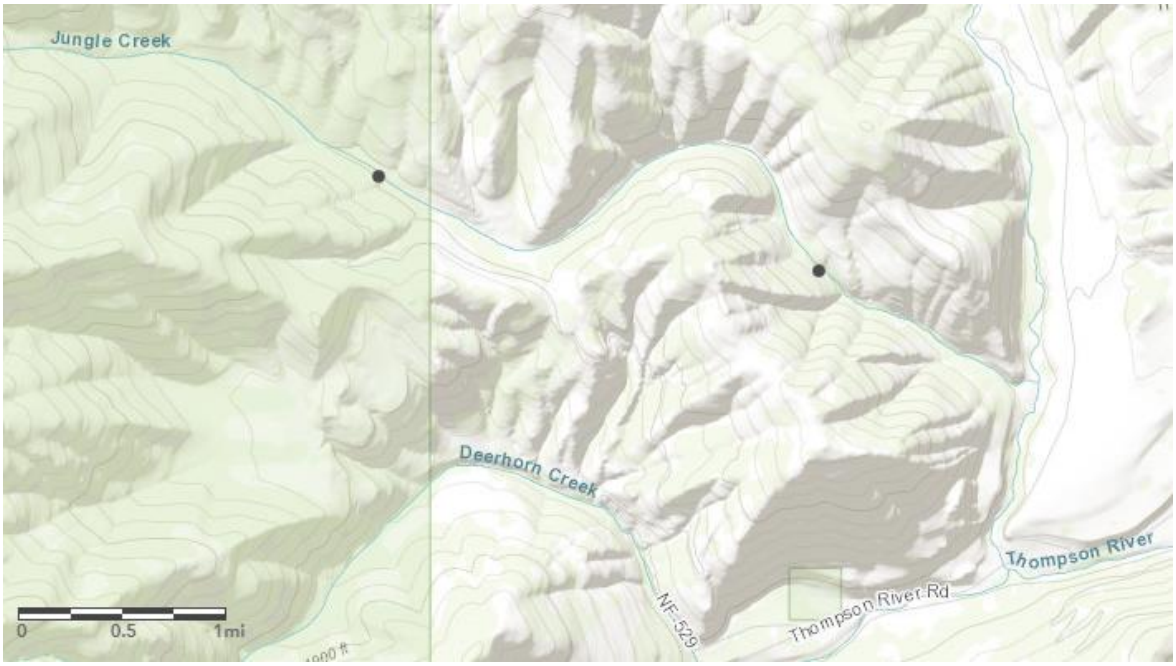

FIGURE 20. Map of sampling locations in Jungle Creek in 2019.

Little Rock Creek

Little Rock Creek is a tributary to the Little Thompson River at rkm 2.3. The stream was sampled extensively in 2016 and 2017 (Kreiner and Terrazas 2018). Species composition follows a consistent general trend of EB in the lower creek to a dominant WCT assemblage in the upper creek. The transition point appears to be a permanent diversion structure at approximately rkm 4.2. Below this diversion, the stream is over-grazed, de-watered and temperatures are elevated. The only genetics samples obtained from this drainage were from a 2007 sampling by Plum Creek in the lower watershed. This sampling indicated 20 pure WCT were sampled, but the location data appear to be off considering our species composition data (Leary et al. 2008).

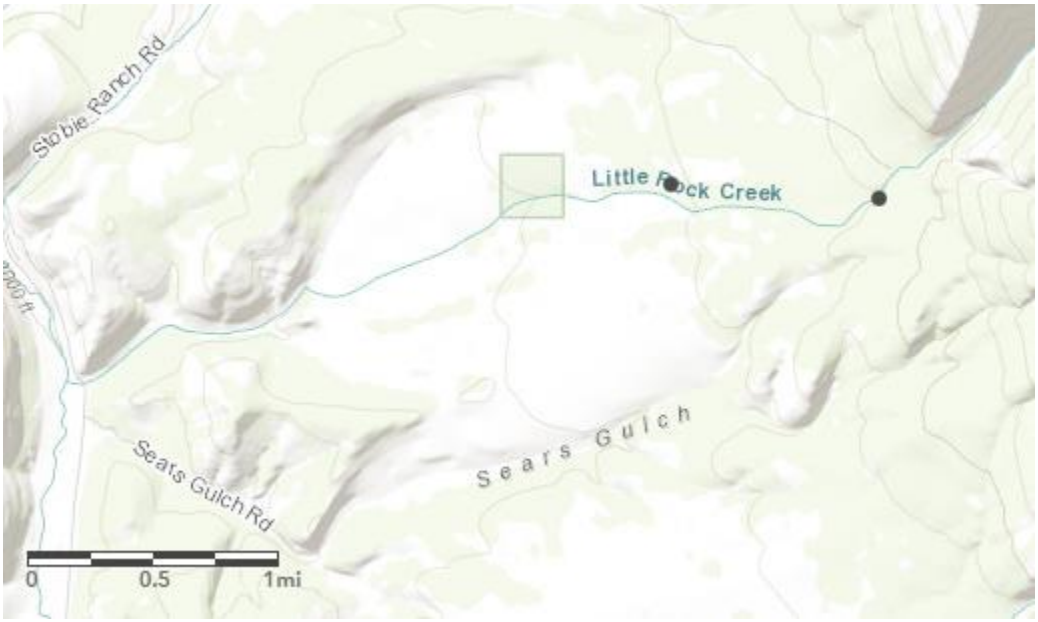

FIGURE 21. Sampling locations in Little Rock Creek in 2019. The thermograph was deployed at the lower site.

Little Rock Creek was sampled at 4.3 rkm and 5.8 rkm in 2019. The lower site terminates at the permanent diversion to Marten Creek and had 27 WCT and 12 EB. The known distribution of EB was less than 0.5 rkm upstream of this site from sampling in 2017. The upper site had 56 WCT. Genetic testing from 2007 indicated pure WCT in the lower portions of Little Rock Creek. With the detection of a single phenotypic RB in the system at 1.6 rkm (Kreiner and Terrazas 2020) the conservation of this population through diversion and fish screens should be a priority in coming years.

TABLE 4. Sampling summary from two sites in Little Rock Creek in 2019.

RKM	Section Length	Survey Type	Spp.	Total Captured	Total (≥75 mm)	Min Length (mm)	Mean Length (mm)	Max Length (mm)
4.3	100	Single	EB	12	4	60	83.3	144
			WCT	27	27	83	125.1	189
5.8	100	Single	WCT	56	47	60	108.3	185

Temperatures in Little Rock Creek above the permanent diversion at 4.3 rkm did not exceed 15°C in 2019. Average monthly July and August temperatures were 10.9°C and 11.8°C respectively.

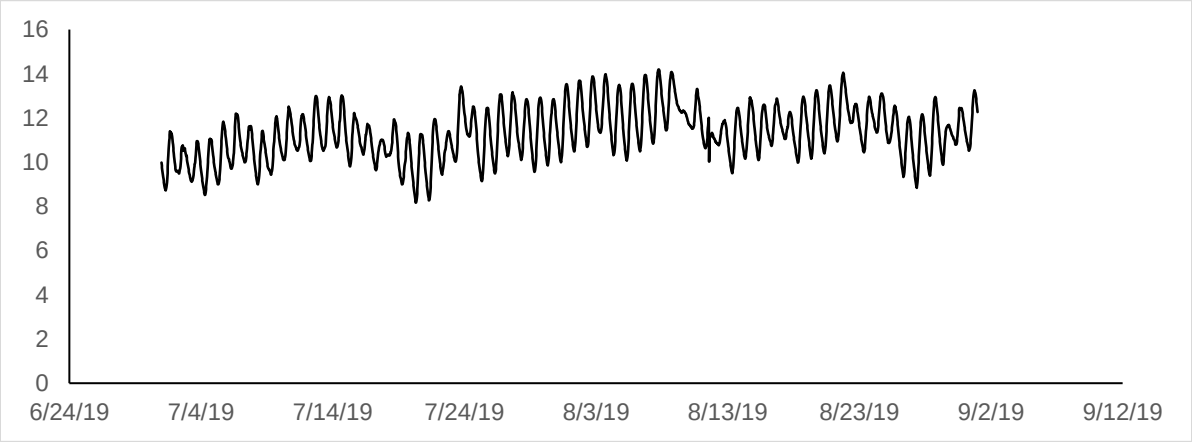

FIGURE 22. Unfiltered temperature profile for Little Rock Creek in 2019 at 4.3 rkm.

Little Thompson River

The Little Thompson River is a tributary stream to the Thompson River with a confluence 28 km upstream from the Clark Fork River. It has a drainage area of approximately 310 km^2. Bull Trout are currently absent from the Little Thompson River, but populations of apparently aboriginal Westslope Cutthroat Trout persist in several of the tributaries. The drainage has many non-native trout (primarily Brook Trout) which are distributed throughout the mainstem and many of the tributaries. There are two diversion canals which direct water from the headwaters of Alder Creek and McGinnis Creek through a trans basin exchange to the Confederated Salish and Kootenai Tribal land. Each ditch has a large water right (~60 cfs) which is unlikely to be fully utilized in most years. This usually results in the complete capture of each creek during the period of diversion.

Temperatures in the Little Thompson River at the ACM bridge crossing exceeded 15°C for 72 days in July and August of 2019. The average monthly July and August temperatures were 14.9°C and 15°C respectively. This drainage is temperature and sediment impaired, needs additional riparian protection from timber harvest and livestock grazing, and could be much cooler if these habitat features were in place (Lower Clark Fork Watershed Group 2018).

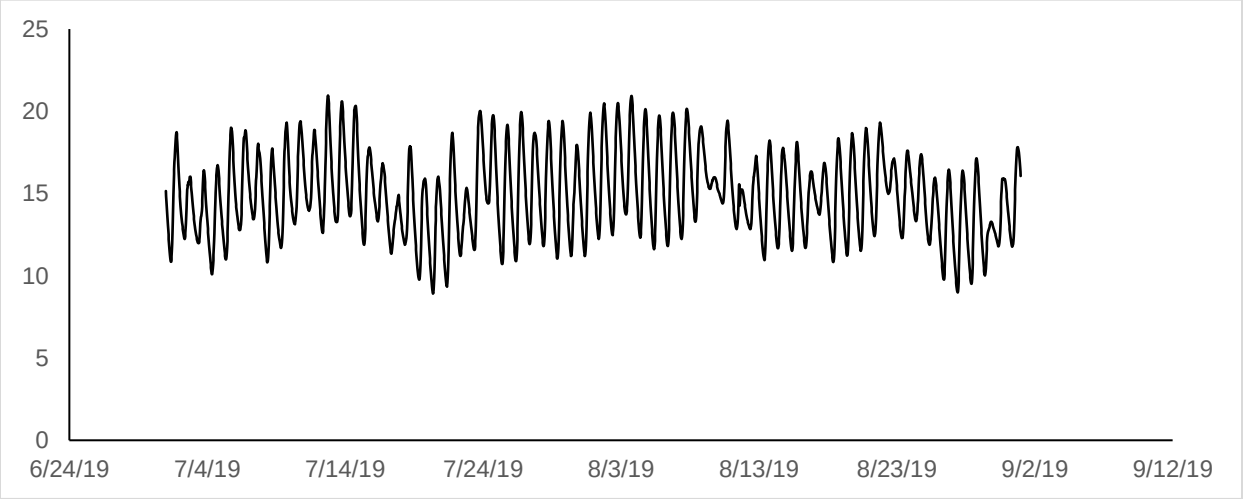

FIGURE 23. Unfiltered temperature profile for the Little Thompson River near the mouth for 2019 at 0.1 rkm.

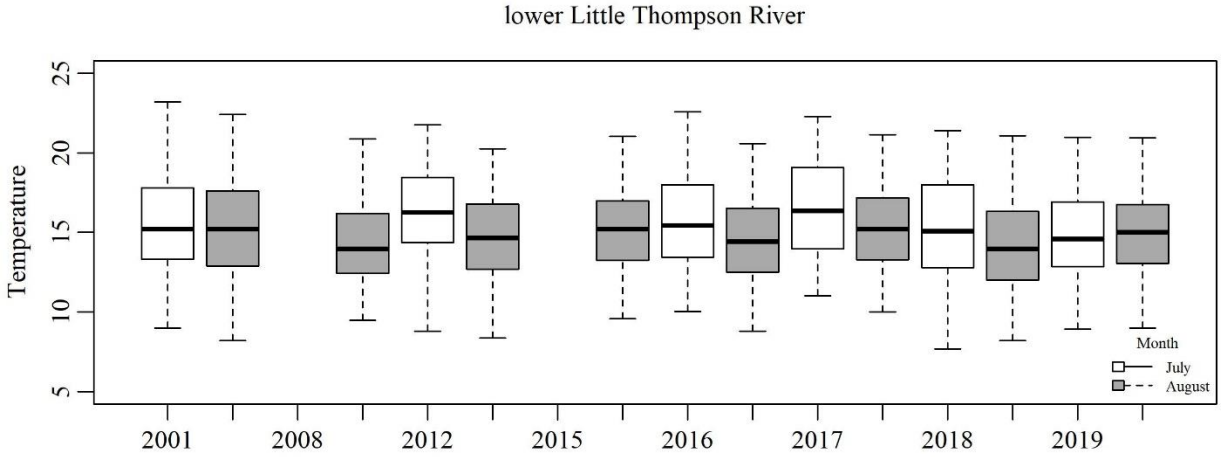

FIGURE 24. Long term temperatures in the Little Thompson River.

Loneman Creek

Loneman Creek is a tributary to Mudd Creek in the Little Thompson River drainage. Most of the creek flows through Southern Pines property and is grazed heavily under the jointly managed Thompson River Cooperative grazing allotment (Southern Pines, Montana Department of Natural Resources Conservation (DNRC), United States Forest Service). Westslope Cutthroat Trout are the primary salmonids present, although a few Brook Trout have recently been captured. Sculpins and tailed frogs are also present. Previous temperature monitoring revealed elevated stream temperatures compared to a similar sized nearby stream with riparian fencing (Partridge Creek; Kreiner and Terrazas 2018). This prompted Fish Wildlife and Parks, Weyerhauser, and the Lower Clark Fork Watershed Group to initiate a riparian fencing project which was completed in 2018. Electrofishing and temperature data will continue to be collected in Loneman Creek to monitor the effect of the fencing on the stream.

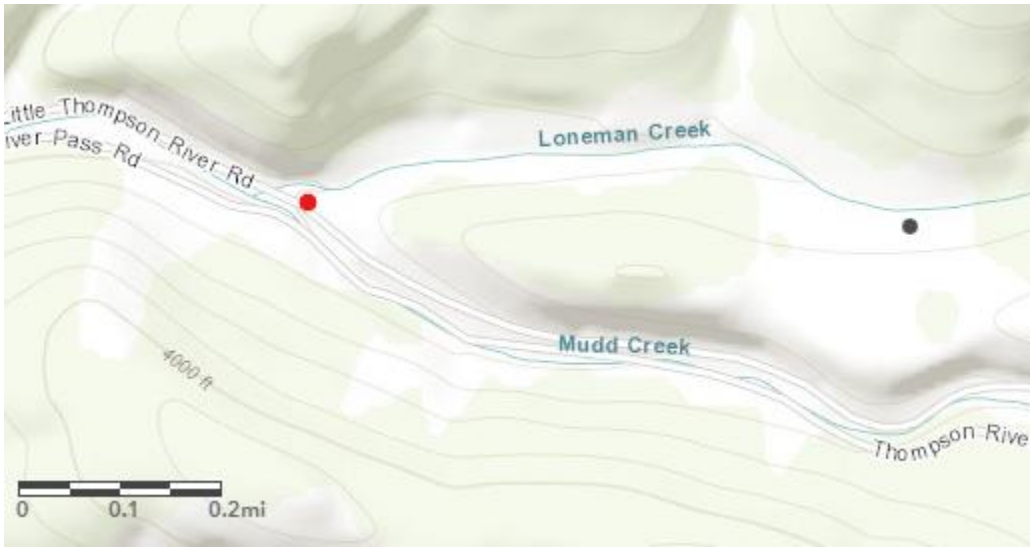

FIGURE 25. Sampling (black dot) and thermograph (red dot) locations in Loneman Creek in 2019.

The upper site of Loneman Creek (1.1 rkm) had 8 WCT and 2 EB in 2019 sampling. This is more fish total (3) and more WCT (2) than 2018 sampling collected.

TABLE 5. Sampling summary for one site in Loneman Creek in 2019.

RKM	Section Length	Survey Type	Spp.	Total Captured	Total (≥75 mm)	Min Length (mm)	Mean Length (mm)	Max Length (mm)
1.1	100	Single	EB	2	0	63	67.5	70
1.1	100	Single	WCT	8	5	39	100.4	167

Temperatures in Loneman Creek at 0.1rkm did not exceed 15°C in 2019 at the lower road culvert. The average July and August temperatures were 11.5°C and 11.8°C as compared to 12.3°C and 11.6°C in 2018. A riparian fencing project was completed in 2018 and even though 2018 was a seemingly better water year than 2019 (based on snowpack, runoff) there is a noticeable decrease in daily temperature variability in 2019 which will be monitored over the coming years to evaluate the benefit of fencing.

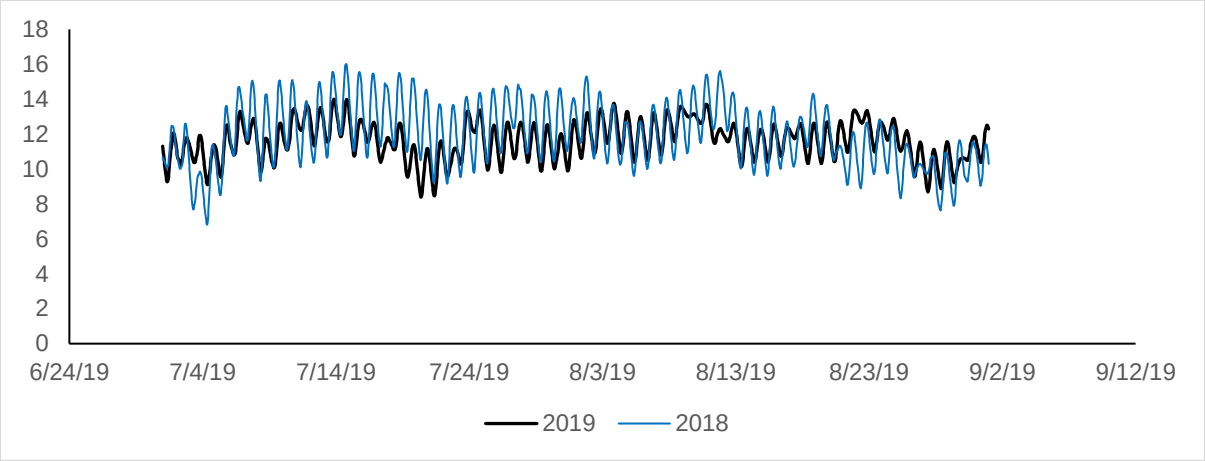

FIGURE 26. Unfiltered temperature profiles comparing 2018 and 2019 temperatures in Loneman Creek at 0.1 rkm.

Munson Creek

Munson Creek is a tributary to the Clark Fork River at 125.9 rkm. Sampling and genetic testing from 2008 revealed hybridized WCT×RB in the lower portions of Munson Creek, below a permanent diversion structure (Leary et al. 2009). Admixture was variable but at times high and was present in all 30 samples (Leary et al. 2009).

Munson Creek was sampled at 1.9 rkm above a permanent diversion structure. There were 11 WCT sampled and all were submitted for hybridization analysis which revealed genetically pure WCT with low diversity (Kovach et al. 2020). This may be a good location for mixing fish from other genetically pure populations to avoid inbreeding.

TABLE 6. Sampling summary for one site in Munson Creek in 2019.

RKM	Section Length	Survey Type	Spp.	Total Captured	Total (≥75 mm)	Min Length (mm)	Mean Length (mm)	Max Length (mm)
1.9	100	Single	WCT	11	11	123	163	230

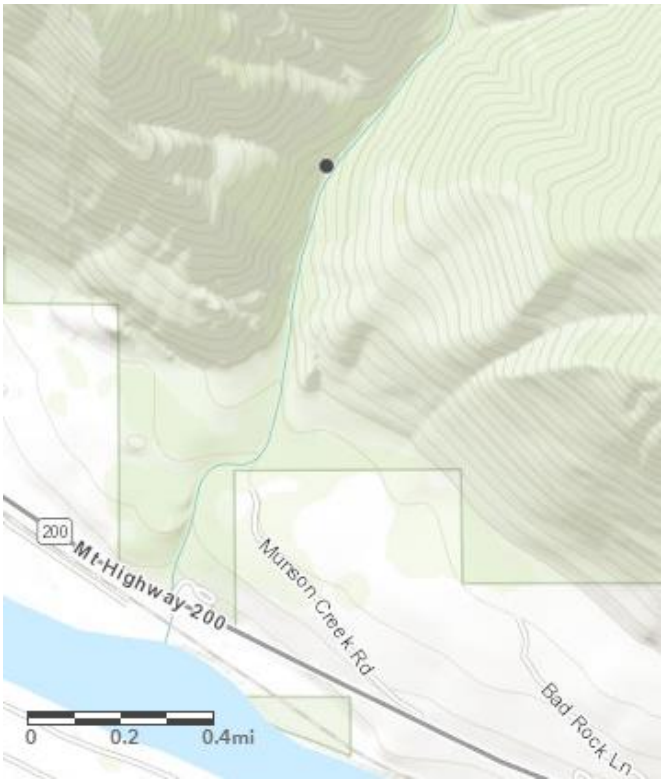

FIGURE 27. Sampling location in Munson Creek in 2019.

Murr Creek

Murr Creek is a tributary to the Thompson River at 65.8 rkm. Historic and contemporary surveys indicate Brook Trout are widespread in the North Fork of Murr Creek. Murr Creek proper appears to be fishless above an apparent barrier just upstream of the confluence with NF Murr Creek at 4.3 rkm which may be suitable for translocation of WCT (Figure 19).

NF Murr Creek and tributaries were spot sampled to determine the upstream distribution of fish. A tributary to NF Murr Creek upstream of the confluence with Murr Creek can be considered to have fish to the upstream extent of water (the upper reaches are seasonally intermittent) and the fish are present downstream in NF Murr Creek from near 10.6 rkm (N47.99226, W-114.85221).

The thermograph in Murr Creek was located just upstream of the forest service boundary and above the apparent barrier at 2.6 rkm. Temperatures did not exceed 15°C in Murr Creek in 2019. Average monthly July and August temperatures were 10.5°C and 11.3°C respectively.

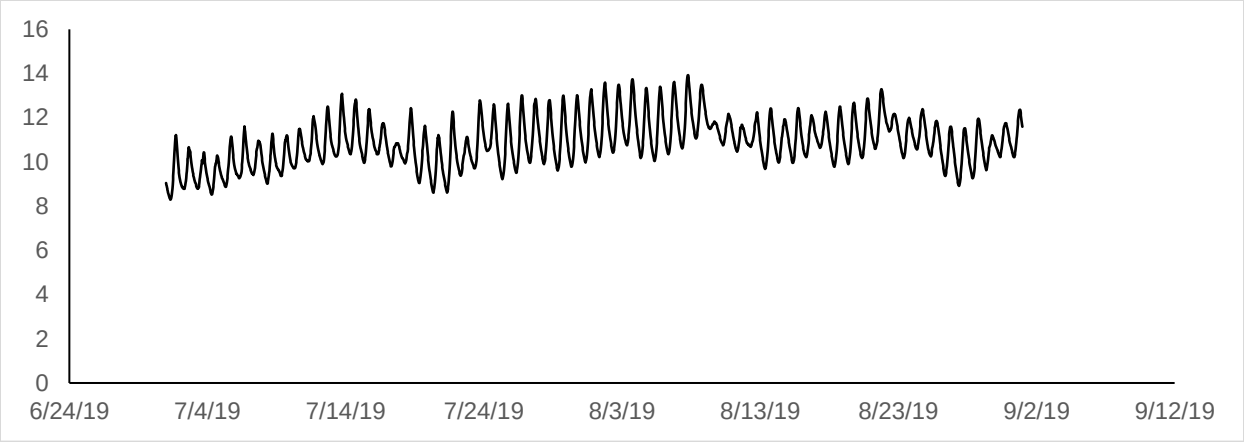

FIGURE 28. Unfiltered temperature profile for Murr Creek upstream of the barrier falls in 2019 at 2.6 rkm.

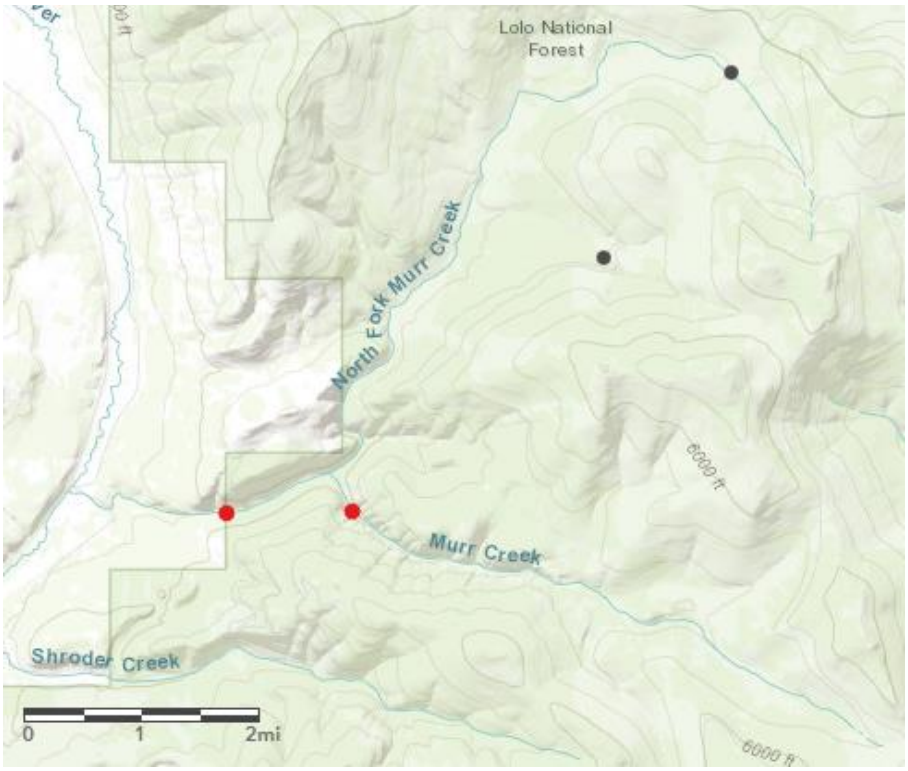

FIGURE 29. Map of Murr Creek showing the 2 fish barriers (red dots) and the upstream distribution of fish (black dots) for NF Murr and an unnamed tributary. The upper barrier had no fish above it (second red dot).

Partridge Creek

Partridge Creek is a tributary to Mudd Creek at 2.4 rkm and both are in the Little Thompson River drainage. Sampling in recent years has indicated that only WCT reside in Partridge Creek, or if there are any non-natives they are at very low abundance (Kreiner and Terrazas 2018; 2020).

Partridge Creek was sampled at 1.1 rkm and 2.2 rkm in 2019. The lower site had 6 WCT and the upper site 2 WCT in this native species bastion of the Little Thompson River.

TABLE 7. Sampling summary for two sites in Partridge Creek in 2019.

RKM	Section Length	Survey Type	Spp.	Total Captured	Total (≥75 mm)	Min Length (mm)	Mean Length (mm)	Max Length (mm)	W_r
1.1	100	Single	WCT	6	5	42	103.3	157	
2.2	100	Single	WCT	2	2	90	102.5	115	

Temperatures in Partridge Creek did not exceed 15°C in 2019 at the lower road culvert (0.1 rkm). Average monthly July and August temperatures were 10°C and 10.5°C respectively.

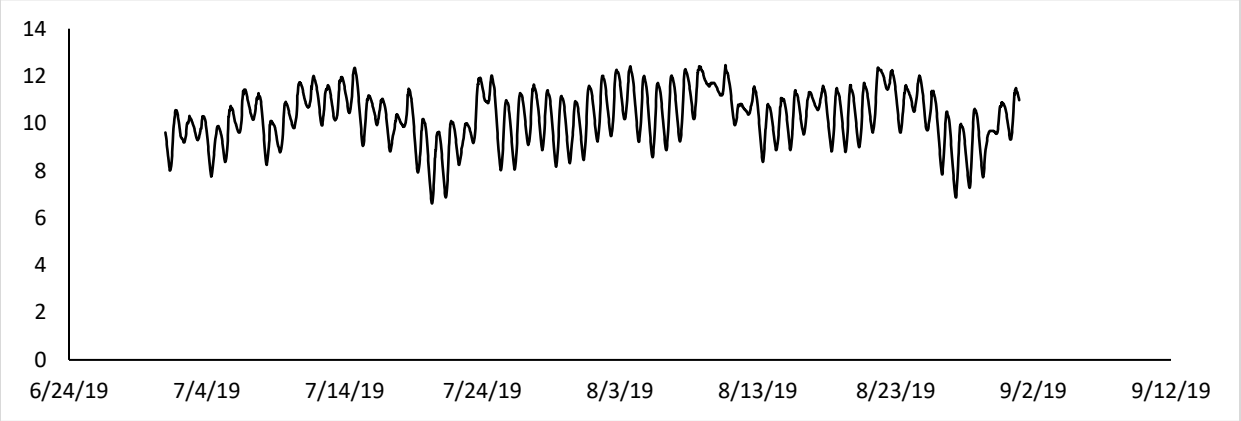

FIGURE 30. Unfiltered temperature profile for Partridge Creek in 2019 at 0.1 rkm.

FIGURE 31. Sampling (black dots) and thermograph (red dot) locations for Partridge Creek in 2019.

Semem Creek

Semem Creek is a tributary to the Thompson River at 38.9 rkm. To our knowledge 2019 was the first time Semem Creek was sampled.

Semem Creek was sampled 7/26/2019 at two sites using spot shocking to look for fish presence and species composition. The creek was dry where road 5587 crossed upstream of the upper site (N 47.82709, W -114.96623) and there was no water 200 m downstream of this site. The upper site had all Westslope Cutthroat Trout and they presumably occur to the extent of upstream water which is a relatively short distance above this site. A tributary came in just below the upper site which looked to be spring fed and crosses the access road at (N 47.82700, W -114.96583). The lower site (N 47.83430, W -114.96613) was mixed Westslope Cutthroat Trout and Brook Trout at a ratio of about 1:3 natives to nonnatives.

TABLE 8. Sampling summary for two sites in Semem Creek in 2019.

RKM	Section Length	Survey Type	Spp.	Total Captured	Total (≥75 mm)	Min Length (mm)	Mean Length (mm)	Max Length (mm)
4.98		Spot	WCT	2	2	97	100	103
			EB	5	4	42	86	138
5.6		Spot	WCT	6	6	79	108	161

Temperatures in Semem Creek at the county road culvert at 0.2 rkm during July and August exceeded 15°C for 21 days in 2019. Average monthly July and August temperatures where 12.4°C and 13°C respectively.

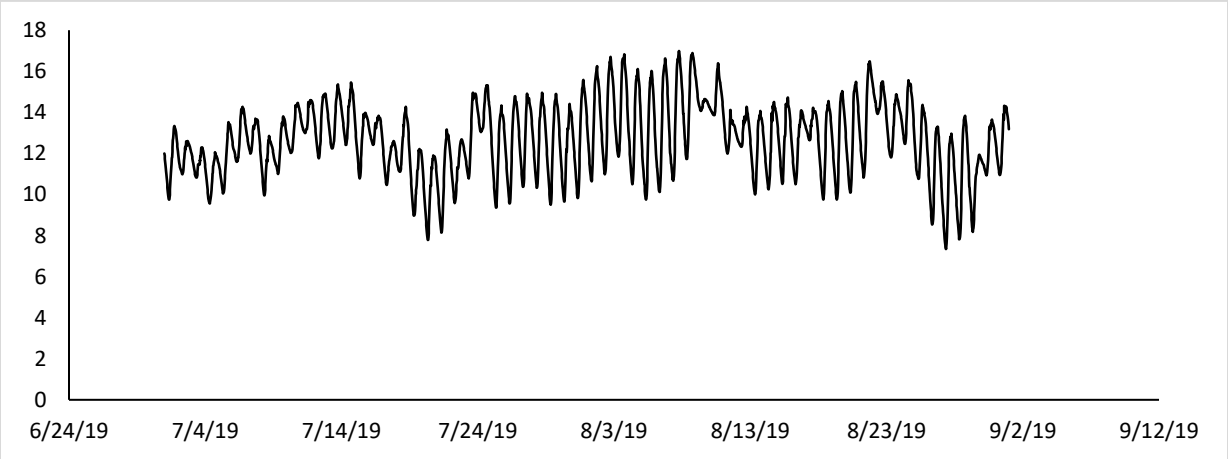

FIGURE 32. Unfiltered temperature profile for Semem Creek in 2019 at 0.2 rkm

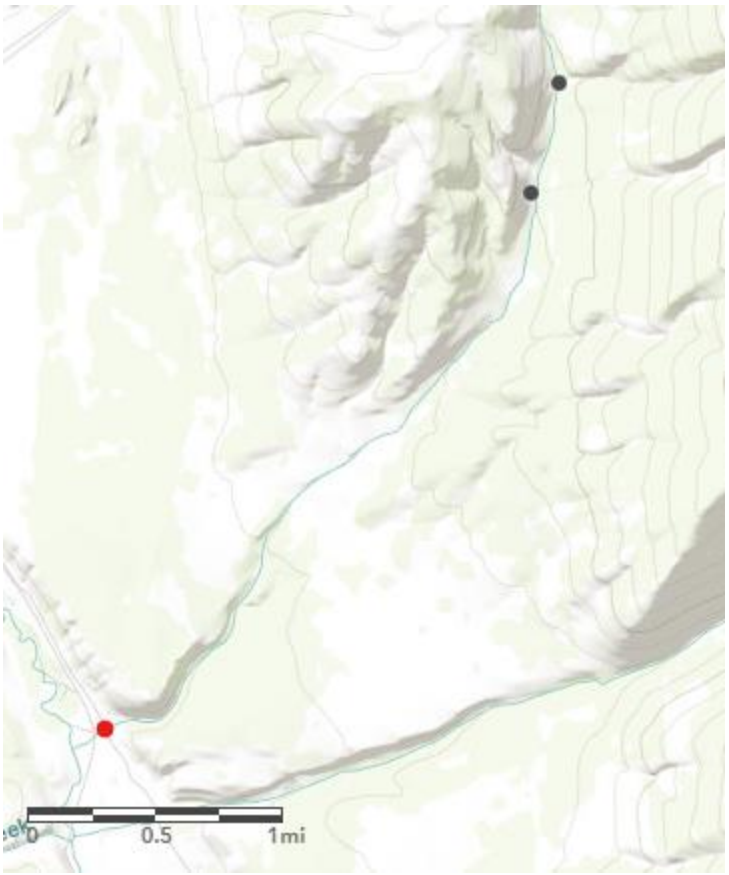

FIGURE 33. Map of sampling locations (black dots) and thermograph (red dot) in Semem Creek in 2019. Above the upstream site the creek is intermittent.

Shroder Creek

Shroder Creek is a tributary to the Thompson River at 63.2 rkm. A historic electrofishing survey were conducted at 0.5 rkm indicated that there were primarily non-native salmonids present (LL, EB; FWP unpublished data). Weyerhauser timber company has some records of snorkel surveys indicating there were salmonids present higher in the drainage (B. Sugden, personal communication). No other records corroborate this, but contemporary electrofishing records corroborate the mixed species composition low in the drainage.

There were five sites surveyed in 2019 at 0.31, 1.1, 2.7, 3.9, and 5.3 rkm. The sites at 0.31 and 5.3 rkm were sampled downstream into a block net and the other sites were spot shocked to look for fish presence. The stream sections varied from 30–100 m with a total of 310 m of stream sampled. No fish were sampled above 1.1 rkm in 2019. Future efforts will concentrate on finding the location of an apparent barrier in the lower drainage and confirming the absence of fish in this stream above such a location. If this location can be confirmed Shroder Creek may be a suitable location for WCT establishment.

TABLE 9. Sampling summary for five sites in Shroder Creek in 2019.

RKM	Section Length	Survey Type	Spp.	Total Captured	Total (≥75 mm)	Min Length (mm)	Mean Length (mm)	Max Length (mm)	W_r
0.31	100	Single	EB	36	27	51	102	212	
			LL	11	11	79	126	222	
			RB	1	1	123		123	
1.1	30	Spot	none						
2.7	30	Spot	none						
3.9	40	Spot	none						
5.3	100	Single	none						

Shroder Creek did not exceed 15°C at the mouth in 2019. Average monthly July and August temperatures were 10°C and 10.7°C respectively.

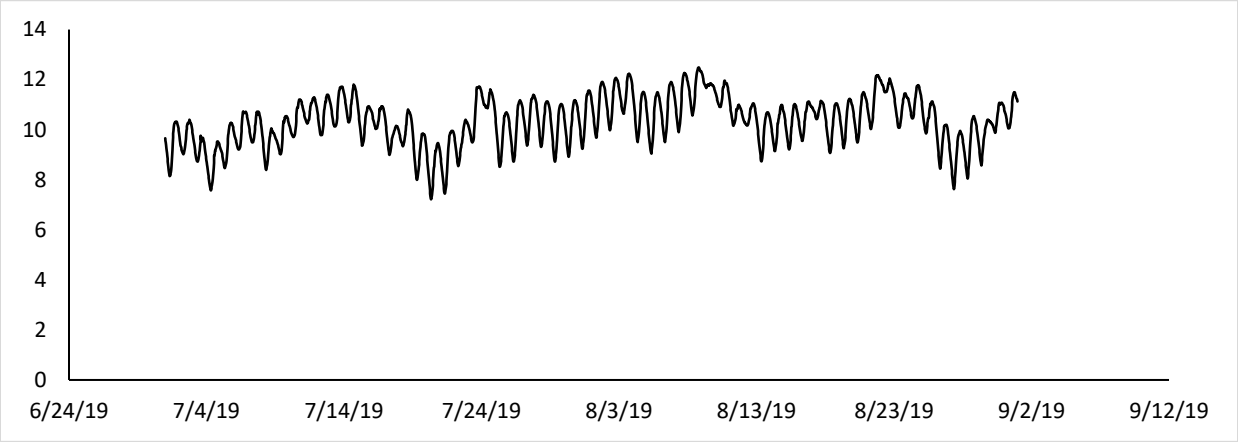

FIGURE 34. Temperature profile for Schroder Creek in 2019 at 0.0 rkm.

FIGURE 35. Sampling locations (black dots) and thermograph (red dot) in Shroder Creek in 2019. The four upstream locations had no fish.

Weeksville Creek

Weeksville Creek is a tributary to the Clark Fork River at 136.5 rkm. Historic and contemporary electrofishing surveys indicate WCT are the primary species upstream of the confluence with Spring Creek (FWP, unpublished data). There have been Brook Trout sampled in the drainage below Spring Creek (4.0 rkm). Historic genetic surveys indicate WCT hybrids at 3.4 rkm but pure WCT at 6.0 rkm (Leary 1994).

Sampling upstream without a block net at 7.4 rkm and 12.2 rkm yielded 15 WCT and 23 WCT respectively. There were 25 samples submitted for hybridization analysis (13 upper; 12 lower) which revealed one polymorphic allele in the upper sample, but likely still indicates pure WCT (Kovach et al. 2020). The sample from upper Weeksville Creek appears to have much lower diversity than the fish from the lower section. There was a large intermittent section below the site at 7.4 rkm and the mouth of Spring Creek (4.0 rkm) and Teepee Creeks (6.6 rkm) were also already dry on 7/9/2019. The dry section on Spring Creek was considerable, extending upstream of the trailhead. The dry section at the mouth of Teepee Creek was also at least several hundred yards. There are potentially pure WCT in perennial sections of Spring and Teepee Creeks which should be explored. Also, Buffalo Bill Creek has historic records of sampling at rm 1.9 but no fish at rm 2.2. The upper distribution of fish and hybridization status could be evaluated for the Weeksville Creek and Buffalo Bill Creek complexes.

TABLE 10. Sampling summary for two sites in Weeksville Creek in 2019.

RKM	Section Length	Survey Type	Spp.	Total Captured	Total (≥75 mm)	Min Length (mm)	Mean Length (mm)	Max Length (mm)
7.4	100	Single	WCT	15	14	61	123.5	159
12.1	100	Single	WCT	23	23	83	121.8	191

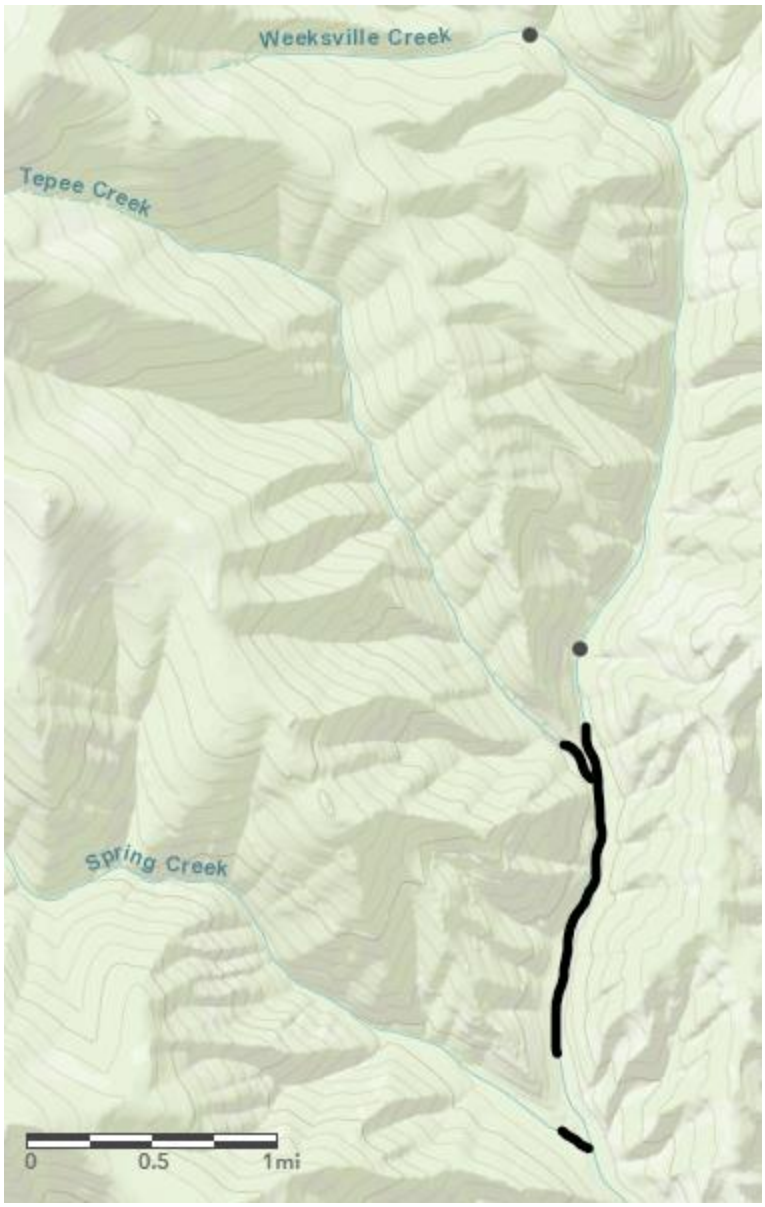

FIGURE 36. Map of Weeksville Creek sampling locations (black dots, 7.4 and 12.1 rkm) and intermittent stream segments (black line, 5-6.6 rkm) documented in 2019.

West Fork Fishtrap Creek

West Fork Fishtrap Creek is a tributary to Fishtrap Creek at 17.0 rkm. West Fork Fishtrap Creek is considered a core tributary for BULL with recent electrofishing and redd surveys indicating considerable productivity in this system. Multiple pass depletions moving downstream into a block net are generally used to estimate abundance in West Fork Fishtrap Creek.

Three Sites were sampled in WF Fishtrap Creek in 2019 at 1.1 rkm, 5 rkm, and 8.9 rkm. The sites are alternatively named: Big Pondo, Upper Bridge, and Donk Land. At 1.1 rkm there were an estimated 2 BULL (95% CI 0–3) and 52 WCT (95% CI 44–59) over 75 mm per 100 m. At 5.0

rkm there were an estimated 19 BULL (95% CI 16–23) and 59 WCT (95% CI 56–61) over 75 mm per 100 m. At 8.9 rkm there were 28 WCT and 21 BULL sampled in a one pass effort.

TABLE 11. Sampling summary for 8.9 rkm site in West Fork Fishtrap Creek in 2019.

RKM	Section Length	Survey Type	Spp.	Total Captured	Total (≥75 mm)	Min Length (mm)	Mean Length (mm)	Max Length (mm)
8.9	100	Single	BULL	21	21	83	120.6	182
			WCT	28	22	52	126.4	203

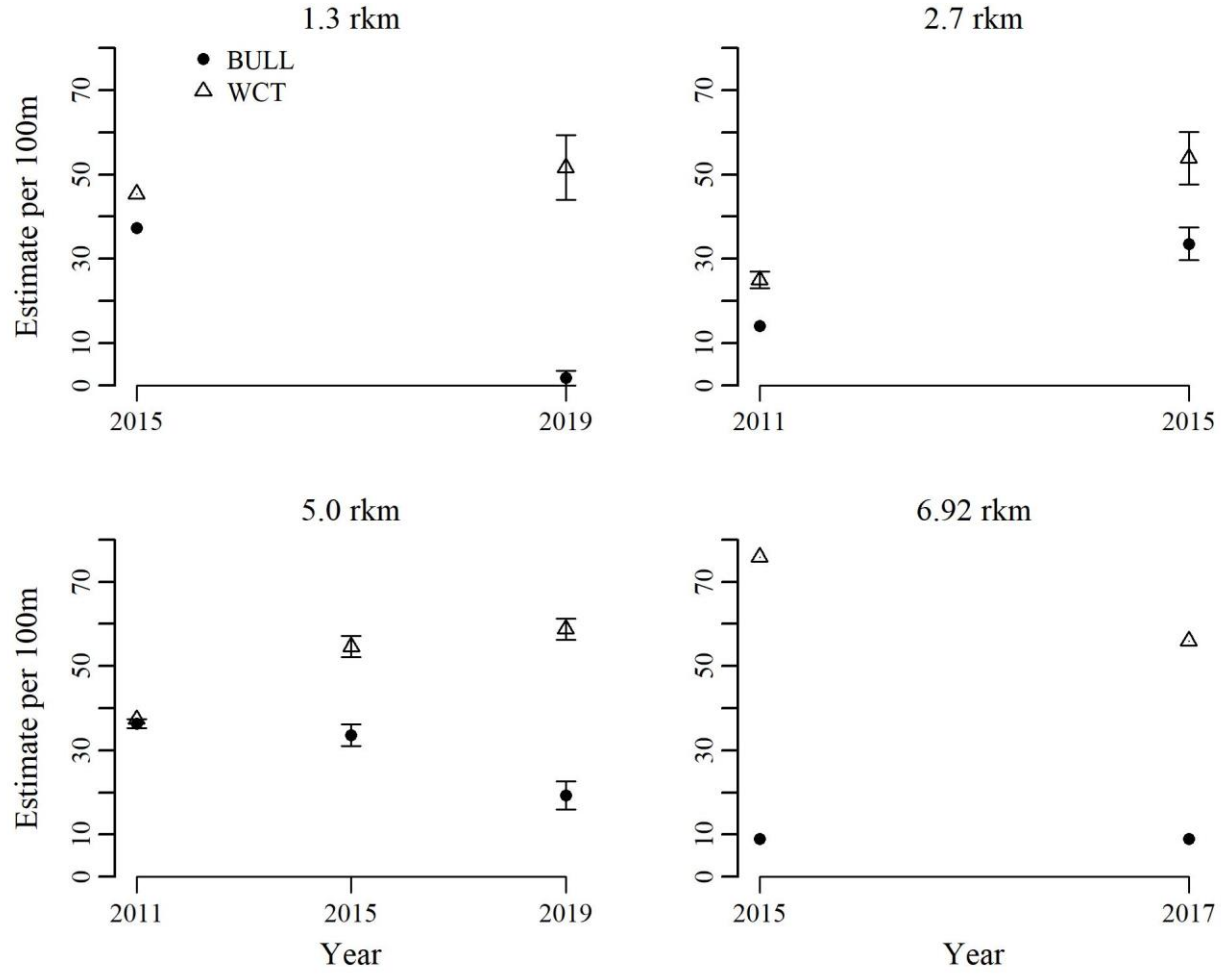

FIGURE 37. Long term depletion trends in WF Fishtrap Creek for sites at 1.3, 2.7, 5, and 6.92 rkm.

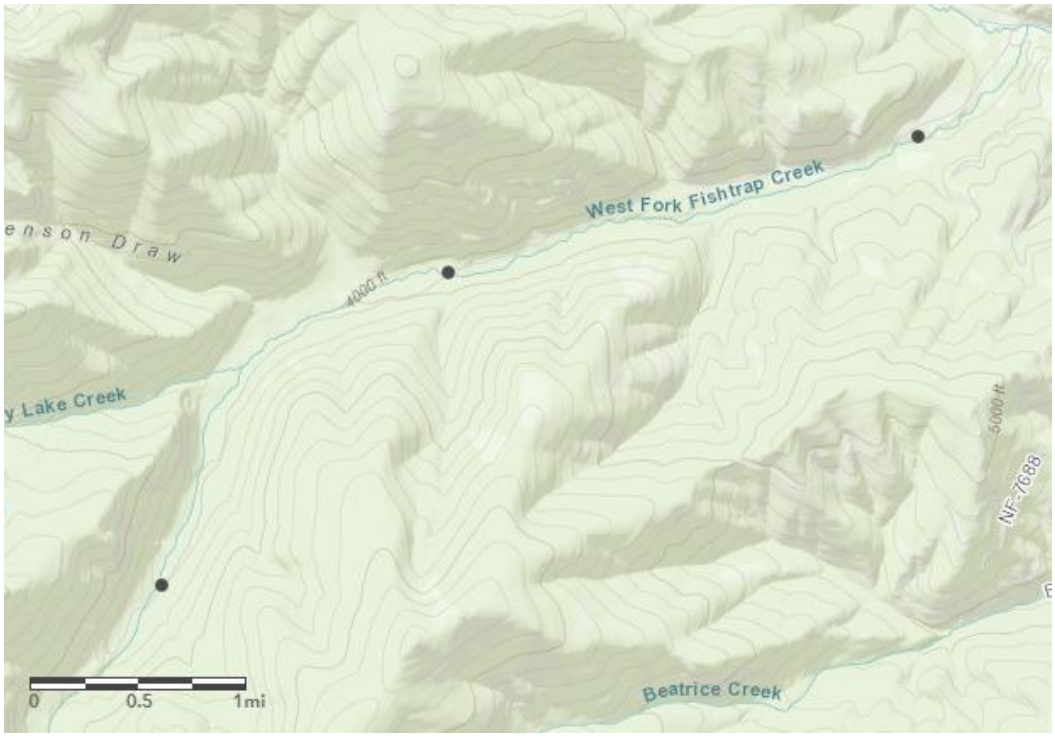

FIGURE 38. Sampling locations in West Fork Fishtrap Creek in 2019.

West Fork Thompson River

West Fork Thompson River (WFTR) is an important native salmonid stream in the Thompson River drainage. It has been regularly sampled for the past twenty years and has been described extensively in other reports. Sampling has included mainstem electrofishing, Bull Trout redd counts, a 2014-15 graduate study, and ongoing outmigration studies (Kreiner and Terrazas 2018). Since at least 2011, a bedrock slide and debris jam located at rkm 7.7 appears to have blocked migratory Bull Trout from spawning above this location. Although resident Bull Trout have been observed spawning above this slide, Bull Trout abundance has decreased in the uppermost monitoring section of WFTR (just below slide.) In 2019 two sites were sampled to estimate native trout abundance at 3.5 and 7.5 rkm. The WFTR generally had cool, stable temperatures all year, with mean daily temperatures rarely exceeding 10°C (Kreiner and Terrazas 2018).

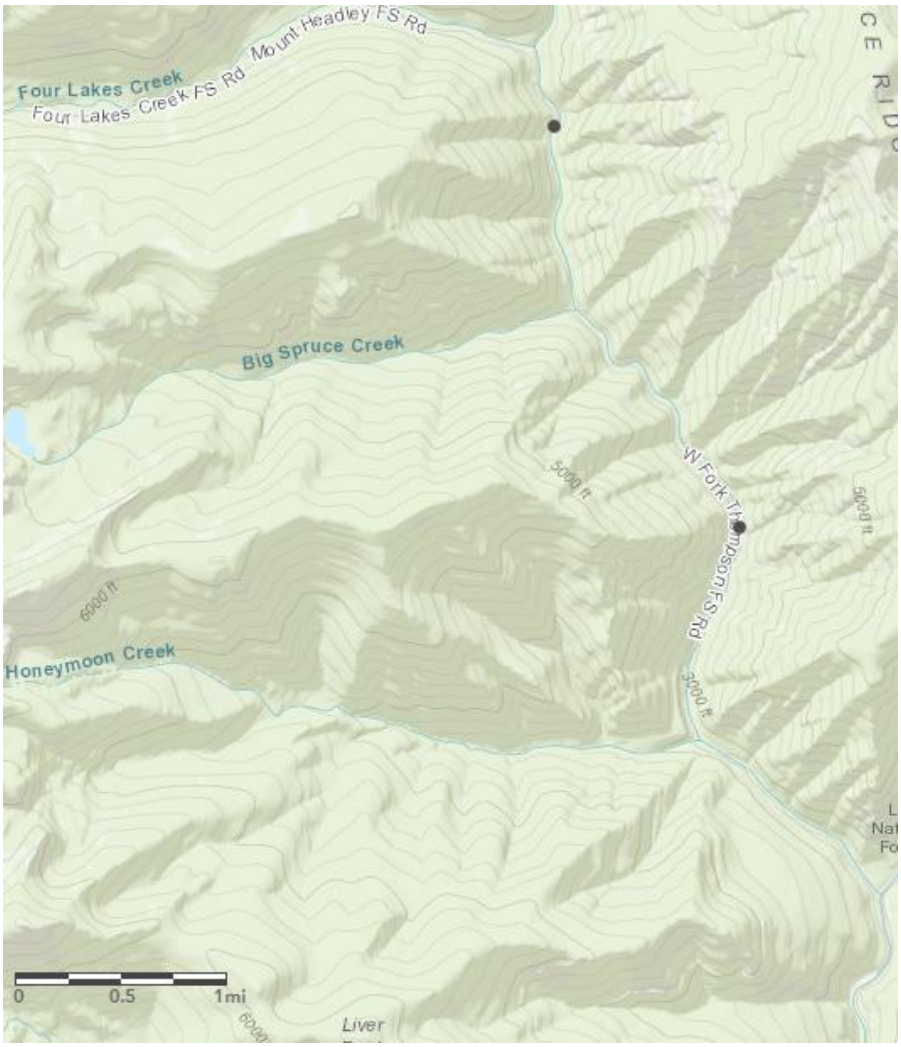

FIGURE 39. Map of the two sampling sites in WFTR in 2019.

TABLE 12. Sampling summary for 3.5 rkm site in WFTR in 2019.

RKM	Section Length	Survey Type	Spp.	Total Captured	Total (≥75 mm)	Min Length (mm)	Mean Length (mm)	Max Length (mm)
3.5	115	Multiple	BULL	8	8	111	143	205
			WCT	63	7	62	110	225
			RB	4	4	199	233	276

There were an estimated 7 BULL (95% CI 6–8) and 49 WCT (95% CI 47–50) over 75 mm per 100 m at the lower site (3.5 rkm). There were an estimated 34 WCT (95% CI 33–35) and 28 BULL (95% CI 24–32) over 75 mm per 100m at the upper site (7.4 rkm).

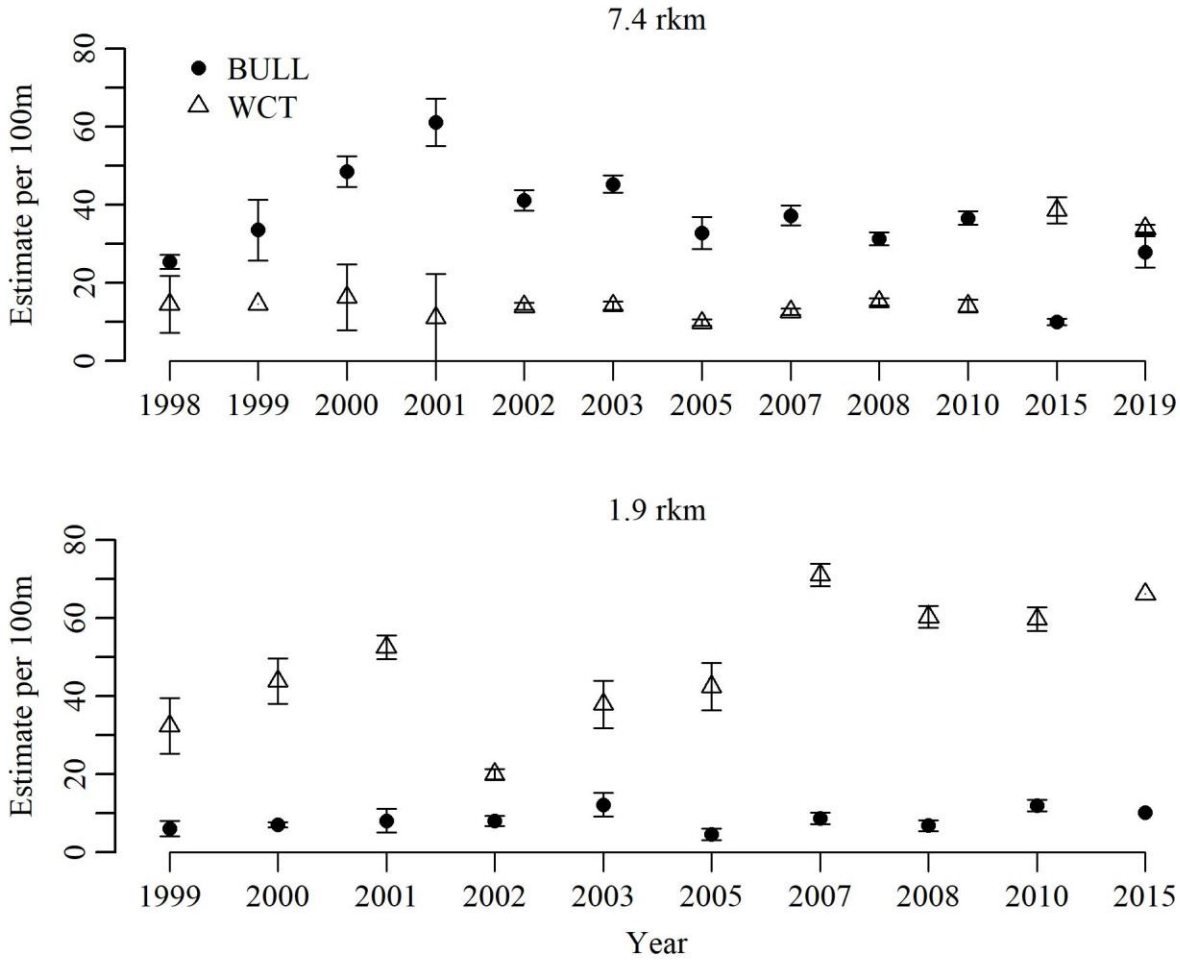

FIGURE 40. Long term depletion trends in WF Thompson River at the long-term sites (1.9 and 7.4 rkm).

Fish Ladder Exploitation Summary

In fall 2017 Montana Fish, Wildlife & Parks and NorthWestern Energy started secondary tagging all salmonids passed over the fishway at Thompson Falls Dam with a T-bar tag (Floy). Each tag had a unique identifier and a phone number for anglers to call and report catches and harvest. From these angler reports we can estimate exploitation after accounting for tag loss and angler reporting bias. Tag loss was estimated over this portion of the study period (September 2017–October 2019) by recaptured fish at the fishway. Fish that were recaptured with a passive integrated transponder, which had also been tagged with a T-bar which had since gone missing were considered tag loss. Angler reporting bias was assumed to be similar to Idaho anglers (Meyer et al. 2012) and was also factored into exploitation estimates. Course scale movement was also documented through angler return information.

Results

During the study period 473 fish were deployed with T-bar tags, and 506 fish were observed in total, making for 33 recaptures. We tagged 26, 188, and 259 fish respectively in 2017, 2018, and 2019. We had five recaptures within the same year (all in 2018), 27 recaptures within one year, and one recapture within two years. Of the 33 recaptures only five had lost their original T-bar tag giving us a tag loss estimate of 0.15. Of the tag loss fish, four were recaptured after one year and one was recaptured after two years. We could calculate that as tag loss over one year is 0.148, and over two years is 1.0, but with the simplicity of the dataset we are assuming a 0.15 overall loss rate. From October 2017 to October 2019 there were 16 tagged fish reported as being caught, 9 were harvested and 7 released. If Montana anglers are similar to Idaho anglers, which we believe is a safe assumption, then we likely only received reports of approximately 50% of the tagged fish which were caught due to angler reporting bias. If this was the case, then correcting for tag loss and reporting bias would yield an estimate of approximately 21 fish in total being harvested for an exploitation (μ) estimate of 4.4%, and a total angler catch of 37 fish which corresponds to 7.8% of the fish tagged in the study. No fish were observed with a T-bar tag that did not have a PIT tag.

Another interesting result is the locations of tag returns. Fish were caught upstream as far as the mouth of Rattlesnake Creek in Missoula, and near Sloan Bridge by Ronan. The fish caught in Missoula was angled 16 days after passage at the ladder and 240 rkm upstream. Multiple fish were caught between Missoula and Paradise in the Clark Fork River. A fish was caught in the St. Regis River, and another up the Thompson River in the Little Thompson River. As expected, a number of fish were caught in the vicinity of Thompson Falls, including at the mouth of the Thompson River and Prospect Creek. The fish caught furthest downstream was in Vermilion Bay on Noxon Reservoir.

Table 13. Mark and recapture data for t-bar tagged fish passing the Thompson Falls Upstream Passage Facility for 2017–2019 including date recaptured, general location, harvest or release, and river kilometers (rkm) traveled from initial tagging location.

Date	Species	Recapture Location	Harvest	Tagging	Date	rkm
10/12/2017	RB	Sloan Bridge	y	Ladder	9/20/2017	132.6
6/1/2018	WCT	St. Regis River (2 rmi)	n	Ladder	4/23/2018	104
10/1/2018	LL	mouth Petty Creek	n	Ladder		180
4/20/2019	LL	Vermillion Bay	y	Ladder	8/10/2018	36.7
4/16/2019	RB	mouth Rattlesnake Creek	n	Ladder	4/3/2019	241
5/22/2019	RB	mouth Prospect Creek	y	Ladder	4/22/2018	0.6
7/27/2019	WCT	Clark Fork @ Siegel Creek	n	Ladder	4/8/2019	67
8/1/2019	RB	Clark Fork @ Siegel Creek	n	Ladder	7/3/2019	67
8/5/2019	RB	mouth Prospect Creek	y	Ladder	5/10/2019	0.6
8/7/2019	RB	mouth Thompson River	n	Ladder		9.8
8/7/2019	RB	mouth Thompson River	y	Ladder	4/22/2019	9.8
8/8/2019	RB	mouth Thompson River	y	Ladder		9.8
8/10/2019	LL	Little Thompson River	y	Ladder	4/16/2019	37.8
9/2/2019	LL	Thompson River	y	Ladder	7/8/2019	21
9/13/2019	RB	mouth Prospect Creek	y	Ladder	10/27/2018	0.6
10/10/2019	RB	St. Regis @ RR trestle	n	Ladder	2019	101.5

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Appendix 1. Thermograph locations for tributary sampling in 2019.

Stream Name	Location	Latitude	Longitude
Thompson River	Gaging Station	47.58756	-115.23299
Thompson River	Above West Fork	47.65517	-115.16595
WF Thompson River	Lower	47.65382	-115.17865
Fishtrap Creek	Below Jungle	47.71421	-115.05933
Fishtrap Creek	Below Beatrice	47.78991	-115.10140
Little Thompson	@ ACM bridge	47.72949	-115.02859
Little Rock Creek	Above Diversion	47.72879	-114.95877
Big Rock Creek	Below Boulder Gulch	47.87438	-114.95064
Partridge Creek	Lower	47.65559	-114.94250
Loneman Creek	Lower	47.64343	-114.95131
Chippy Creek	Near Trailhead	47.79403	-114.95578
Bear Creek	Above Falls	47.77248	-114.95476
Murr Creek	Above Falls	47.93828	-114.94226
Semem Creek	Above culvert	47.78986	-115.00533
Shroder Creek	Mouth	47.92365	-114.99544

Appendix 2. Tributary sampling locations for 2019.

Sampling Sites	Location	Latitude	Longitude
Beatrice Creek	1.3 rkm	47.78964	-115.1176
Beatrice Creek	3.4 rkm	47.77835	-115.1395
Deerhorn Creek	2.1 rkm	47.71860	-115.10637
Deerhorn Creek	3.7 rkm	47.71593	-115.1235
EF Dry Creek	5.15 rkm	47.52337	-115.3115
Fishtrap Creek	2.7 rkm	47.73438	-115.0554
Fishtrap Creek	10.9 rkm	47.78603	-115.1005
Fishtrap Creek	16.6 rkm	47.81476	-115.1398
Gold Rush Creek	0.06 rkm	47.52205	-115.3108
Henry Creek	5.6 rkm	47.44520	-114.79354
Henry Creek	7.9 rkm	47.45160	-114.76585
Jungle Creek	1.9 rkm	47.73378	-115.0779
Jungle Creek	6.4 rkm	47.74041	-115.1236
Knox Creek	0.08 rkm	47.52460	-115.34509
Little Rock Creek	4.3 rkm	47.72886	-114.9589
Little Rock Creek	5.8 rkm	47.72802	-114.9409
Loneman Creek	1.1 rkm	47.64308	-114.9384
Munson Creek	1.9 rkm	47.56669	-115.114
NF Murr	9.5 rkm	47.99436	-114.8596
NF Murr	10.6 rkm	47.99226	-114.8521
NF Murr	11.3 rkm	47.98605	-114.8451
Partridge Creek	1.1 rkm	47.65923	-114.95930
Partridge Creek	2.2 rkm	47.66088	-114.9457
Semem Creek	4.98 rkm	47.82077	-114.9687
Semem Creek	5.6 rkm	47.82709	-114.9662
Shroder Creek	0.31 rkm	47.92215	-114.993
Shroder Creek	1.1 rkm	47.91817	-114.98486
Shroder Creek	2.7 rkm	47.91643	-114.96318
Shroder Creek	3.9 rkm	47.91968	-114.94798
Shroder Creek	5.3 rkm	47.91829	-114.93153
Trib to NF Murr		47.96914	-114.87603
Weeksville Creek	7.1 rkm	47.58042	-115.00720
Weeksville Creek	12.1 rkm	47.61603	-115.0117
WF Dry Creek	2.1 rkm	47.52056	-115.3809
WF Fishtrap Creek	1.3 rkm	47.80875	-115.1556
WF Fishtrap Creek	5.0 rkm	47.79946	-115.2032
WF Fishtrap Creek	8.9 rkm	47.77834	-115.2321
WF Thompson River	3.5 rkm	47.67484	-115.188
WF Thompson River	7.4 rkm	47.70236	-115.2069

Appendix 3. Ongoing Outmigration Summary.

Passive Integrated Transponder (PIT) tag arrays were originally installed in the Thompson River drainage as part of a graduate study in 2014 and 2015 (Glaid 2017). Since the conclusion of that study, Montana Fish, Wildlife & Parks fisheries staff have attempted to maintain the remote PIT arrays in Fishtrap Creek and West Fork Thompson River. However, because of difficult access and no permanent power source, there were some time periods in which the tributary arrays did not function. Therefore, the detection rates presented should be considered a minimum estimate.

Between 2014 and 2019, there were 171 uniquely PIT tagged bull trout detected on remote arrays in the Thompson River drainage (TABLE 1). These fish were initially tagged in one of seven general locations: Fishtrap Creek electrofishing surveys (FTC efish), West Fork Thompson River electrofishing surveys (WFTR efish), Fishtrap Creek weir trap (FTC weir), West Fork Thompson River weir trap (WFTR weir), Mainstem Thompson River electrofishing surveys (Mainstem TR), Lake Pend Oreille adult transport fish below Cabinet Gorge Dam (LPO Transport), or other (TABLE 1). Most tags were inserted into sub-adult fish during electrofishing surveys or weir-trapping events in Fishtrap Creek and the West Fork Thompson River in 2015. Of the 564 fish tagged in Fishtrap Creek during electrofishing surveys between 2015 and 2019, only 74 (13%) have been detected leaving that tributary and only 14 (2.5%) were detected leaving the mainstem Thompson River. Interestingly, three fish were also detected entering the West Fork Thompson River, with one subsequently detected on the mainstem array. Similarly, in the West Fork Thompson River, of the 264 fish tagged during tributary electrofishing surveys between 2014 and 2019, 37 (14%) were detected leaving that tributary and only eight (3%) were detected at the mainstem array.

Fish actively captured outmigrating in weir traps from both streams were detected at higher rates leaving the Thompson River. In Fishtrap Creek in 2015, 91 fish were captured moving downstream in a weir trap near the mouth of the stream and 12 (13%) were eventually detected leaving the mainstem Thompson River. In West Fork Thompson River, that number was higher as 47 fish were captured leaving that tributary and 19 (40%) were eventually detected at the mainstem array. Over that same time period, 18 Bull Trout were tagged in the mainstem Thompson River and two have been detected on an array. One was a large adult Bull Trout which was detected shortly after capture on the MSTR array and presumedly left the system (TABLE 2) the other was a sub-adult tagged in the Big Hole section and detected on the WFTR array shortly after. Other detections include bull trout either passed at the Thompson Falls fish ladder, transported above Cabinet Gorge Dam with a genetic assignment to the Thompson River, or sampled outside of the drainage.

Westslope Cutthroat Trout detections have been considerably lower than Bull Trout with only seven of the 442 fish tagged in tributaries detected on tributary array systems through 2019 (1.6%; Table 3). These results indicate there are fewer migratory WCT than Bull Trout as a proportion and by number. Most WCT array detections were from adult fish tagged as they are passed over the ladder at Thompson Falls Dam.

To date we have only determined the fate of two fish that were tagged in the tributaries and outmigrated. One fish (989001004067528) which was originally tagged in Jungle Creek in 2015 was detected on the FTCR array in fall of 2019. Another (989001004500631) was originally tagged in the FTC weir in 2015 and was detected in Prospect Creek in the fall of 2018. Other interesting highlights from these data include multiple adult Bull Trout which were transported from below Cabinet Gorge Dam to be detected on arrays within the Thompson River (Table 2). For example, two of these fish (900226000570690 and 900228000078399) with Thompson River and Fishtrap Creek genetic assignments were detected entering the West Fork Thompson River on nearly the same date (August 23 and 24), likely on an upstream spawning migration. Subsequent detections at the mainstem array in later months were indicative of post-spawn outmigrations. Another transport fish (900228000078315) with a WFTR genetic assignment was released at the ACM bridge in the mainstem Thompson River (rkm 1.4) on September 6 and was detected at Fishtrap Creek on September 14 & 17, then at the mainstem array on September 25. It was subsequently detected in the lower Thompson River multiple times throughout the fall and again the next spring.

TABLE A3.1. Bull Trout detected on remote PIT arrays in the Thompson River with original tagging years and locations of PIT tagged fish within the drainage. See above for location descriptions.

	Number Tagged Per Location							Detected on Arrays						
Location	2014	2015	2016	2017	2018	2019	Total	n	FTC	FTC	WFTR	WFTR	MSTR	MSTR
FTC Efish	0	420	17	56	12	59	564	74	68 (6)	12%	3	0.5%	14	2.5%
WFTR Efish	53	146	0	36	0	29	264	37	0	0%	30 (7)	11.4%	8	3%
FTC Weir	0	91	0	0	0	0	91	16	4	4.4%	0	0%	12	13.2%
WFTR Weir	0	47	0	0	0	0	47	21	0	0%	2	4.3%	19	40.4%
Mainstem TR	5	10	0	3	0	2	20	2	0	0%	1	0.5%	1	0.5%
TF Ladder	1	2	3	1	0	1	8	3	1	12.5%	1	12.5%	2	25%
LPO Transport	11	7	1	4	5	3	31	17	10	32.3%	4	12.9%	15	48.4%
Other	∞	∞	∞	∞	∞	∞	1	1	1	100%	0	0%	0	0%

(Arrays: FTC- Fishtrap Creek, WFTR- West Thompson River, MSTR- Mainstem Thompson River.) (Because several individual fish were detected on multiple arrays, individual array detections do not always add up to the total. Numbers in parentheses indicate fish which were not detected on that specific array but were known to outmigrate based on other detections.)

TABLE A3.2. Westslope Cutthroat Trout detected on PIT arrays in the Thompson River with original tagging years and location.

2014-2019	Number Tagged Per Location							Detected on Arrays						
Location	2014	2015	2016	2017	2018	2019	Total	n	FTC	FTC	WFTR	WFTR	MSTR	MSTR
FTC Efish	0	0	196	174	3	6	379	5	5	1.3%	0	0%	2	0.5%
FTC Weir	0	2	0	0	0	0	2	2	2	100%	0	0%	0	0%
WFTR Efish	0	0	0	65	0	4	69	0	0	0%	0	0%	0	0%
TF Ladder	36	37	36	14	14	21	158	44	3	1.9%	0	0%	44	27.8%

TABLE A3.3. Ladder fish detected on PIT arrays in the Thompson River with original tagging years.

	Number Tagged Per Year							Detected on Arrays						
Species	2014	2015	2016	2017	2018	2019	Total	n	FTC	FTC	WFTR	WFTR	MSTR	MSTR
LL	67	153	169	86	56	183	714	391	7	1.0%	6	0.8%	391	54.8%
MWF	0	54	6	0	3	4	67	11	0	0%	0	0%	11	0.16%
RB	144	238	310	171	103	133	1099	457	3	0.3%	3	0.3%	457	41.6%

TABLE A3.4. Bull Trout detection summary from 2014–2019.

PIT Tag #	Site	Time	Species	Length	Weight	Tagging Date	Detection Date	Original Tagging
900226000570596	MSTR	22:37:40	BULL	532	1304	7/17/2014	6/5/2015	Below CG Dam
900226000570596	WFTR	0:31:26	BULL	532	1304	7/17/2014	9/11/2015	Below CG Dam
900226000570596	MSTR	23:56:03	BULL	532	1304	7/17/2014	9/20/2015	Below CG Dam
900226000570596	MSTR	20:45:28	BULL	532	1304	7/17/2014	9/21/2015	Below CG Dam
900226000570596	MSTR	21:42:15	BULL	532	1304	7/17/2014	5/25/2016	Below CG Dam
900226000570690	MSTR	23:00	BULL	531	1446	8/6/2015	8/10/2015	Below CG Dam
900226000570690	MSTR	0:31:23	BULL	531	1446	8/6/2015	8/11/2015	Below CG Dam
900226000570690	WFTR	23:45:23	BULL	531	1446	8/6/2015	8/24/2015	Below CG Dam
900226000570690	WFTR	1:34:42	BULL	531	1446	8/6/2015	9/16/2015	Below CG Dam
900226000570690	MSTR	5:12:26	BULL	531	1446	8/6/2015	9/17/2015	Below CG Dam
900226000570690	MSTR	22:20:48	BULL	531	1446	8/6/2015	9/18/2015	Below CG Dam
900226000570690	MSTR	1:57:16	BULL	531	1446	8/6/2015	9/19/2015	Below CG Dam
900226000570799	MSTR	1:39:47	BULL	566	1644	7/24/2014	6/7/2015	Below CG Dam
900226000570799	MSTR		BULL	566	1644	7/24/2014	6/15/2015	Below CG Dam
900226000570799	MSTR		BULL	566	1644	7/24/2014	6/16/2015	Below CG Dam
900226000570799	MSTR		BULL	566	1644	7/24/2014	6/17/2015	Below CG Dam
900226000570799	MSTR	22:25:03	BULL	566	1644	7/24/2014	6/18/2015	Below CG Dam
900226000570799	FTCR	22:34:05	BULL	566	1644	7/24/2014	9/11/2015	Below CG Dam
900226000570921	MSTR	23:28:47	BULL	570	1531	10/3/2016	10/11/2014	Below CG Dam
900226000592474	WFTR	20:02:55	BULL	594	2321	11/8/2013	9/25/2015	Below CG Dam
900226000592474	WFTR	7:17:43	BULL	594	2321	11/8/2013	9/26/2015	Below CG Dam
900226000592474	WFTR	14:34:14	BULL	594	2321	11/8/2013	9/27/2015	Below CG Dam
900226000730599	MSTR	22:00:30	BULL	558	2041	4/14/2015	5/22/2015	Below CG Dam
900226000731351	FTCR	9:09:11	BULL	242	116	7/14/2016	9/6/2016	Other
900228000078315	FTCR	5:36:11	BULL	745	3799	9/6/2017	9/14/2017	Below CG Dam
900228000078315	FTCR	21:20:16	BULL	745	3799	9/6/2017	9/17/2017	Below CG Dam
900228000078315	MSTR	20:23:45	BULL	745	3799	9/6/2017	9/25/2017	Below CG Dam
900228000078315	MSTR	20:02:11	BULL	745	3799	9/6/2017	9/28/2017	Below CG Dam
900228000078315	MSTR	7:16:49	BULL	745	3799	9/6/2017	9/29/2017	Below CG Dam
900228000078315	MSTR	1:41:05	BULL	745	3799	9/6/2017	9/30/2017	Below CG Dam
900228000078315	MSTR	1:59:14	BULL	745	3799	9/6/2017	10/2/2017	Below CG Dam
900228000078315	MSTR	18:56:42	BULL	745	3799	9/6/2017	4/21/2018	Below CG Dam
900228000078315	MSTR	18:33:48	BULL	745	3799	9/6/2017	5/15/2018	Below CG Dam
900228000078315	MSTR	18:31:55	BULL	745	3799	9/6/2017	5/18/2018	Below CG Dam
900228000078315	MSTR	5:51:37	BULL	745	3799	9/6/2017	5/19/2018	Below CG Dam
900228000078315	MSTR	14:09:44	BULL	745	3799	9/6/2017	5/20/2018	Below CG Dam
900228000078316	FTCR	21:40:08	BULL	624	2778	8/27/2017	10/6/2017	Below CG Dam
900228000078316	FTCR	19:01:22	BULL	624	2778	8/27/2017	10/19/2017	Below CG Dam
900228000078316	MSTR	23:56:29	BULL	624	2778	8/27/2017	10/23/2017	Below CG Dam
900228000078351	FTCR	2:45:53	BULL	708	3345	9/13/2017	9/22/2017	Below CG Dam
900228000078351	FTCR	21:32:18	BULL	708	3345	9/13/2017	9/24/2017	Below CG Dam

PIT Tag #	Site	Time	Species	Length	Weight	Tagging Date	Detection Date	Original Tagging
900228000078351	FTCR	5:40:39	BULL	708	3345	9/13/2017	9/28/2017	Below CG Dam
900228000078351	FTCR	2:00:44	BULL	708	3345	9/13/2017	9/29/2017	Below CG Dam
900228000078351	FTCR	2:27:30	BULL	708	3345	9/13/2017	9/30/2017	Below CG Dam
900228000078351	FTCR	0:46:31	BULL	708	3345	9/13/2017	10/3/2017	Below CG Dam
900228000078351	FTCR	21:12:10	BULL	708	3345	9/13/2017	10/4/2017	Below CG Dam
900228000078351	FTCR	3:39:58	BULL	708	3345	9/13/2017	10/5/2017	Below CG Dam
900228000078351	FTCR	20:56:36	BULL	708	3345	9/13/2017	10/7/2017	Below CG Dam
900228000078351	FTCR	0:57:11	BULL	708	3345	9/13/2017	10/8/2017	Below CG Dam
900228000078351	FTCR	20:50:22	BULL	708	3345	9/13/2017	10/9/2017	Below CG Dam
900228000078351	FTCR	2:17:32	BULL	708	3345	9/13/2017	10/10/2017	Below CG Dam
900228000078351	FTCR	19:11:15	BULL	708	3345	9/13/2017	10/19/2017	Below CG Dam
900228000078351	FTCR	2:24:13	BULL	708	3345	9/13/2017	10/20/2017	Below CG Dam
900228000078351	FTCR	1:04:58	BULL	708	3345	9/13/2017	10/21/2017	Below CG Dam
900228000078351	MSTR	20:15:00	BULL	708	3345	9/13/2017	10/27/2017	Below CG Dam
900228000078351	MSTR	21:06:00	BULL	708	3345	9/13/2017	10/31/2017	Below CG Dam
900228000078368	MSTR	21:32:44	BULL	650	3629	5/26/2016	6/4/2016	Below CG Dam
900228000078368	FTCR	10:50:47	BULL	650	3629	6/2/2016	10/10/2016	Below CG Dam
900228000078389	FTCR	23:05:59	BULL	735	4082	8/27/2015	9/6/2015	Below CG Dam
900228000078389	MSTR		BULL	735	4082	8/27/2015	9/28/2015	Below CG Dam
900228000078399	MSTR	5:25	BULL	557	1585	8/3/2015	8/11/2015	Below CG Dam
900228000078399	MSTR		BULL	557	1585	8/3/2015	8/12/2015	Below CG Dam
900228000078399	MSTR		BULL	557	1585	8/3/2015	8/13/2015	Below CG Dam
900228000078399	MSTR	5:26:31	BULL	557	1585	8/3/2015	8/14/2015	Below CG Dam
900228000078399	MSTR	22:01:13	BULL	557	1585	8/3/2015	8/19/2015	Below CG Dam
900228000078399	WFTR	5:20:59	BULL	557	1585	8/3/2015	8/23/2015	Below CG Dam
900228000078399	WFTR	0:50:09	BULL	557	1585	8/3/2015	10/7/2015	Below CG Dam
900228000078399	WFTR	0:15:18	BULL	557	1585	8/3/2015	10/8/2015	Below CG Dam
900228000078399	WFTR	0:09:28	BULL	557	1585	8/3/2015	10/9/2015	Below CG Dam
900228000078399	MSTR	1:13:02	BULL	557	1585	8/10/2015	10/11/2015	Below CG Dam
982000357016064	WFTR	3:35:35	BULL	168	35	10/3/2014	10/6/2015	WFTR
982000357016074	MSTR		BULL	775		6/9/2015	7/15/2015	MSTR
982000357016094	MSTR	21:20:38	BULL	161	29	10/6/2014	10/23/2014	WFTR
982000357016121	WFTR	20:08:00	BULL	154	28	10/3/2014	12/17/2015	WFTR
982000357016242	WFTR	8:28:26	BULL	520	1112	6/3/2015	7/15/2015	TF Fish Ladder
982000357016242	WFTR	8:07:07	BULL	520	1112	6/3/2015	7/16/2015	TF Fish Ladder
982000365193844	WFTR	1:34:20	BULL	185	45	10/13/2015	9/18/2015	WFTR
982000411793246	MSTR	3:50:32	BULL	601	1996	8/17/2018	10/3/2018	Below CG Dam
982000411793267	MSTR	4:54:41	BULL	682	3314	5/3/2018	5/30/2018	Below CG Dam
982000411793267	MSTR	22:04:51	BULL	682	3314	5/3/2018	6/3/2018	Below CG Dam
982000411793267	FTCR	4:28:26	BULL	682	3314	5/9/2018	10/1/2018	Below CG Dam
982000411793267	MSTR	20:51:57	BULL	682	3314	5/3/2018	10/2/2018	Below CG Dam
982000411793270	FTCR	23:24:35	BULL	626	2236	7/5/2018	9/23/2018	Below CG Dam

PIT Tag #	Site	Time	Species	Length	Weight	Tagging Date	Detection Date	Original Tagging
982000411793270	MSTR	22:39:08	BULL	626	2236	7/5/2018	10/9/2018	Below CG Dam
982126050371248	FTCR	21:38:28	BULL	482	966	7/12/2019	7/26/2019	Below CG Dam
982126050371271	MSTR	0:00:00	BULL	720	3634	6/12/219	7/7/2019	Below CG Dam
982126050371271	FTCR	0:20:48	BULL	720	3634	6/12/2019	7/7/2019	Below CG Dam
982126050371271	FTCR	0:52:06	BULL	720	3634	6/12/2019	8/12/2019	Below CG Dam
982126050371271	FTCR	20:46:49	BULL	720	3634	6/12/2019	8/20/2019	Below CG Dam
985121027316748	WFTR	14:51:48	BULL	211	68	10/9/2014	10/25/2014	WFTR
985121027319506	WFTR	18:26:32	BULL	185	45	10/14/2014	11/20/2014	WFTR
985121027319829	WFTR	1:49:58	BULL	180	46	10/9/2014	10/13/2014	WFTR
985121027353247	WFTR	4:55:04	BULL	194	52	10/3/2014	10/15/2014	WFTR
985121027359036	WFTR	1:34:20	BULL	185	45	10/13/2015	9/18/2015	WFTR
985121027382845	MSTR	17:42:10	BULL	185	45	10/8/2015	3/20/2015	WFTR
985121027397677	WFTR	1:29:50	BULL	161	29	10/6/2014	10/15/2014	WFTR
985121027402194	WFTR	1:21:14	BULL	209	63	10/6/2014	10/16/2014	WFTR
985121027424804	WFTR	19:24:26	BULL	180	39	10/7/2014	12/5/2014	WFTR
985121027515027	WFTR	7:20:04	BULL	223	80	10/8/2014	9/21/2017	WFTR
985121027515027	WFTR	8:08:25	BULL	223	80	10/8/2014	9/22/2017	WFTR
985121027515027	WFTR	7:56:27	BULL	223	80	10/8/2014	9/23/2017	WFTR
985121027515027	WFTR	22:22:56	BULL	223	80	10/8/2014	9/26/2017	WFTR
985121027515027	WFTR	8:12:04	BULL	223	80	10/8/2014	9/27/2017	WFTR
985121027515027	WFTR	7:43:51	BULL	223	80	10/8/2014	9/28/2017	WFTR
985121027515027	WFTR	7:13:13	BULL	223	80	10/8/2014	9/29/2017	WFTR
985121027515027	WFTR	8:03:15	BULL	223	80	10/8/2014	9/30/2017	WFTR
985121027515027	WFTR	8:04:46	BULL	223	80	10/8/2014	10/1/2017	WFTR
985121027515027	WFTR	8:12:51	BULL	223	80	10/8/2014	10/2/2017	WFTR
985121027515027	WFTR	9:05:51	BULL	223	80	10/8/2014	1/1/2018	WFTR
989001004067472	FTCR	6:40:56	BULL	185	51	8/5/2015	10/13/2015	FTCR
989001004067472	MSTR	7:36:00	BULL	185	51	8/5/2015	10/17/2015	FTCR
989001004067480	FTCR	21:41:23	BULL	163	37	8/5/2015	10/12/2015	FTCR
989001004067491	FTCR	5:40:39	BULL	123	15	8/4/2015	9/21/2017	FTCR
989001004067491	WFTR	10:23:31	BULL	123	15	8/4/2015	9/24/2017	FTCR
989001004067497	FTCR	21:36:15	BULL	174	45	8/5/2015	10/9/2015	FTCR
989001004067512	FTCR	1:06:03	BULL	123	18	8/5/2015	4/9/2018	FTCR
989001004067512	FTCR	12:59:27	BULL	123	18	8/5/2015	4/12/2018	FTCR
989001004067518	FTCR	1:35:29	BULL	179	48	8/4/2015	9/22/2015	FTCR
989001004067528	FTCR	17:41:50	BULL	107	9	8/18/2015	11/23/2019	FTCR
989001004067529	FTCR	21:22:14	BULL	168	45	8/5/2015	9/23/2015	FTCR
989001004067541	FTCR		BULL	134	18	8/17/2015	7/22/2016	FTCR
989001004067541	WFTR	14:29:25	BULL	132	18	8/17/2015	7/26/2016	FTCR
989001004067541	MSTR	6:09:59	BULL	132	18	8/17/2015	7/30/2016	FTCR
989001004067549	FTCR	21:22:47	BULL	136	23	8/5/2015	9/13/2015	FTCR
989001004067566	MSTR	19:35:21	BULL	152	25	10/5/2015	1/10/2016	FTCR

PIT Tag #	Site	Time	Species	Length	Weight	Tagging Date	Detection Date	Original Tagging
989001004067570	MSTR	11:07:14	BULL	184	45	9/30/2015	4/12/2016	FTC weir
989001004067579	FTCR	3:49:03	BULL	180	42	9/24/2015	10/2/2015	FTC weir
989001004067582	FTCR	4:17:31	BULL	139	22	8/6/2015	12/9/2015	FTCR
989001004067582	MSTR		BULL	139	22	8/6/2015	12/11/2015	FTCR
989001004067589	MSTR		BULL	170	35	10/8/2015	10/11/2015	WFT weir
989001004067598	WFTR	10:59:57	BULL	228	81	10/3/2015	10/3/2015	WFT weir
989001004067601	FTCR	19:52:44	BULL	197	56	8/6/2015	11/5/2015	FTCR
989001004067609	MSTR	9:03:31	BULL	187	45	10/8/2015	2/9/2016	WFT weir
989001004067615	WFTR	4:56:06	BULL	150	26	8/6/2015	2/25/2016	WFTR
989001004067615	MSTR	4:12:07	BULL	150	26	8/6/2015	5/4/2016	WFTR
989001004067616	MSTR		BULL	137	20	10/5/2015	10/11/2015	WFT weir
989001004067617	FTCR	21:33:30	BULL	157	32	8/6/2015	11/2/2015	FTCR
989001004067620	MSTR		BULL	176	35	10/3/2015	11/1/2015	WFT weir
989001004067621	MSTR	21:58:45	BULL	190	55	8/6/2015	4/2/2016	WFTR
989001004067628	MSTR		BULL	161	26	10/3/2015	12/22/2015	WFT weir
989001004067630	WFTR	23:04:34	BULL	199	53	8/6/2015	10/5/2015	WFTR
989001004067643	FTCR	23:06:10	BULL	204	67	9/24/2015	12/8/2015	FTC weir
989001004067644	FTCR	22:28:31	BULL	175	44	8/6/2015	12/14/2015	FTCR
989001004067656	WFTR	0:45:20	BULL	172	43	8/6/2015	12/17/2015	WFTR
989001004449346	FTCR	21:47:25	BULL	175	41	7/23/2015	8/8/2015	FTCR
989001004449363	MSTR	23:41:15	BULL	105	9	7/14/2015	4/17/2016	WFTR
989001004449377	FTCR	19:53:07	BULL	156	31	7/23/2015	9/24/2015	FTCR
989001004449391	FTCR	2:35:12	BULL	178	45	7/17/2015	10/2/2015	FTCR
989001004449392	FTCR	22:50:30	BULL	157	34	7/23/2015	9/16/2015	FTCR
989001004449418	FTCR	20:58:14	BULL	113	12	7/23/2015	10/9/2015	FTCR
989001004449434	FTCR	21:20:01	BULL	175	40	7/21/2015	10/31/2015	FTCR
989001004449452	FTCR	19:03:05	BULL	155	31	7/20/2015	11/18/2015	FTCR
989001004449456	FTCR	2:20:21	BULL	152	29	7/16/2015	9/22/2015	FTCR
989001004449470	FTCR	0:49:56	BULL	157	31	7/23/2015	9/12/2015	FTCR
989001004449470	MSTR	20:37:24	BULL	157	31	7/23/15	4/19/2017	FTCR
989001004449470	MSTR	7:33:07	BULL	157	31	7/23/15	4/20/2017	FTCR
989001004449470	MSTR	6:57:04	BULL	157	31	7/23/15	4/21/2017	FTCR
989001004449470	MSTR	6:45:58	BULL	157	31	7/23/15	4/22/2017	FTCR
989001004449470	MSTR	17:23:43	BULL	157	31	7/23/15	4/28/2017	FTCR
989001004449470	MSTR	17:27:23	BULL	157	31	7/23/15	5/9/2017	FTCR
989001004449470	MSTR	14:15:09	BULL	157	31	7/23/15	5/15/2017	FTCR
989001004449470	MSTR	7:55:12	BULL	157	31	7/23/15	5/29/2017	FTCR
989001004449470	MSTR	2:48:54	BULL	157	31	7/23/2015	9/27/2017	FTCR
989001004449470	MSTR	18:32:02	BULL	157	31	7/23/2015	10/22/2017	FTCR
989001004449470	MSTR	22:24:00	BULL	157	31	7/23/2015	11/2/2017	FTCR
989001004449470	MSTR	16:53:57	BULL	157	31	7/23/2015	12/4/2017	FTCR
989001004449470	MSTR	18:05:12	BULL	157	31	7/23/2015	12/6/2017	FTCR

PIT Tag #	Site	Time	Species	Length	Weight	Tagging Date	Detection Date	Original Tagging
989001004449473	FTCR	23:14:34	BULL	146	26	7/17/2015	9/28/2015	FTCR
989001004449491	FTCR	4:45:17	BULL	159	36	7/16/2015	10/13/2015	FTCR
989001004449494	FTCR	22:54:34	BULL	144	23	7/20/2015	10/8/2015	FTCR
989001004449497	FTCR	20:06:47	BULL	150	25	7/20/2015	11/6/2015	FTCR
989001004449507	FTCR	20:16:54	BULL	199	67	7/20/2015	9/25/2015	FTCR
989001004449516	FTCR	0:28:46	BULL	162	35	7/16/2015	9/9/2015	FTCR
989001004449538	FTCR	2:06:20	BULL	116	13	7/22/2015	10/10/2015	FTCR
989001004449540	FTCR	0:45:46	BULL	142	22	7/22/2015	10/24/2016	FTCR
989001004449544	FTCR	20:34:27	BULL	188	49	7/22/2015	10/7/2015	FTCR
989001004449545	FTCR	20:19:25	BULL	172	40	7/22/2015	11/1/2015	FTCR
989001004449545	MSTR		BULL	172	40	7/22/2015	12/10/2015	FTCR
989001004449557	FTCR	15:41:38	BULL	192	41	7/22/2015	9/12/2015	FTCR
989001004449563	FTCR	23:11:13	BULL	195	66	7/22/2015	11/17/2015	FTCR
989001004449568	FTCR	3:39:20	BULL	130	19	7/22/2015	10/9/2015	FTCR
989001004449571	FTCR	21:40:47	BULL	150	30	7/21/2015	11/11/2015	FTCR
989001004449572	FTCR	4:34:26	BULL	140	23	7/21/2015	11/18/2015	FTCR
989001004449582	FTCR	2:24:41	BULL	139	24	7/21/2015	10/7/2015	FTCR
989001004449590	FTCR	9:17:15	BULL	142	24	7/21/2015	4/17/2018	FTCR
989001004449601	FTCR	20:22:35	BULL	171	42	7/20/2015	10/9/2015	FTCR
989001004449608	FTCR	5:59:55	BULL	139	20	7/22/2015	12/12/2015	FTCR
989001004449611	FTCR	1:16:09	BULL	156	31	7/22/2015	11/2/2015	FTCR
989001004449616	FTCR	22:53:36	BULL	168	45	7/21/2015	9/24/2015	FTCR
989001004449621	FTCR	20:46:41	BULL	153	29	7/22/2015	12/10/2015	FTCR
989001004449621	MSTR	1:28:22	BULL	153	29	7/22/2015	2/14/2016	FTCR
989001004449628	FTCR	2:06:23	BULL	161	32	7/22/2015	10/10/2015	FTCR
989001004449652	WFTR	8:27:15	BULL	194	57	8/2/2015	6/28/2016	WFTR
989001004449652	WFTR	21:48:56	BULL	194	57	8/2/2015	7/3/2016	WFTR
989001004449652	WFTR	9:16:31	BULL	194	57	8/2/2015	7/4/2016	WFTR
989001004449652	WFTR	8:01:14	BULL	194	57	8/2/2015	7/6/2016	WFTR
989001004449652	WFTR	0:29:47	BULL	194	57	8/2/2015	7/18/2016	WFTR
989001004449652	WFTR	0:08:08	BULL	194	57	8/2/2015	7/19/2016	WFTR
989001004449652	WFTR	6:18:25	BULL	194	57	8/2/2015	7/20/2016	WFTR
989001004449652	WFTR	0:46:00	BULL	194	57	8/2/2015	7/21/2016	WFTR
989001004449652	WFTR	22:15:08	BULL	194	57	8/2/2015	7/22/2016	WFTR
989001004449652	WFTR	7:37:17	BULL	194	57	8/2/2015	7/23/2016	WFTR
989001004449652	WFTR	9:02:27	BULL	194	57	8/2/2015	7/24/2016	WFTR
989001004449652	WFTR	6:45:03	BULL	194	57	8/2/2015	7/25/2016	WFTR
989001004449652	WFTR	5:26:35	BULL	194	57	8/2/2015	7/29/2016	WFTR
989001004449652	WFTR	7:05:43	BULL	194	57	8/2/2015	7/31/2016	WFTR
989001004449652	WFTR	22:18:27	BULL	194	57	8/2/2015	8/12/2016	WFTR
989001004449652	WFTR	1:36:02	BULL	194	57	8/2/2015	8/13/2016	WFTR
989001004449652	WFTR	1:13:13	BULL	194	57	8/2/2015	8/14/2016	WFTR

PIT Tag #	Site	Time	Species	Length	Weight	Tagging Date	Detection Date	Original Tagging
989001004449652	WFTR	0:40:14	BULL	194	57	8/2/2015	8/15/2016	WFTR
989001004449652	WFTR	0:25:36	BULL	194	57	8/2/2015	8/16/2016	WFTR
989001004449652	WFTR	1:44:47	BULL	194	57	8/2/2015	9/17/2016	WFTR
989001004449652	WFTR	7:21:48	BULL	194	57	8/2/2015	9/21/2016	WFTR
989001004449652	WFTR	22:28:32	BULL	194	57	8/2/2015	9/27/2016	WFTR
989001004449652	WFTR	19:31:04	BULL	194	57	8/2/2015	10/9/2016	WFTR
989001004449653	WFTR	3:53:46	BULL	169	40	7/29/2015	9/4/2015	WFTR
989001004449659	WFTR	1:01:46	BULL	180	41	7/29/2015	10/31/2015	WFTR
989001004449665	WFTR	1:29:29	BULL	151	28	7/29/2015	9/7/2015	WFTR
989001004449665	WFTR	5:33:40	BULL	151	28	7/29/2015	9/8/2015	WFTR
989001004449665	WFTR	0:56:17	BULL	151	28	7/29/2015	9/9/2015	WFTR
989001004449667	FTCR	2:54:13	BULL	163	37	8/3/2015	12/7/2015	FTCR
989001004449667	MSTR		BULL	163	37	8/3/2015	12/16/2015	FTCR
989001004449693	MSTR	21:59:17	BULL	139	23	7/29/2015	8/12/2016	WFTR
989001004449708	FTCR	23:40:23	BULL	147	27	7/27/2015	11/13/2015	FTCR
989001004449716	FTCR	21:28:14	BULL	138	21	7/27/2015	11/3/2015	FTCR
989001004449716	MSTR	3:32:11	BULL	146	23	11/4/2015	4/26/2018	FTC weir
989001004449720	MSTR	23:16:38	BULL	123	16	7/27/2015	6/16/2016	FTCR
989001004449723	FTCR	19:58:54	BULL	180	43	7/27/2015	9/25/2015	FTCR
989001004449734	WFTR	14:29:29	BULL	152	29	7/27/2015	7/26/2016	FTCR
989001004449734	WFTR	7:08:15	BULL	152	29	7/27/2015	7/28/2016	FTCR
989001004449736	MSTR	1:38:58	BULL	194	56	8/3/2015	9/11/2016	FTCR
989001004449737	WFTR	23:49:57	BULL	145	25	7/28/2015	11/1/2015	WFTR
989001004449742	FTCR	3:22:33	BULL	134	20	8/4/2015	10/15/2015	FTCR
989001004449748	MSTR	21:18:34	BULL	220	89	8/3/2015	7/30/2016	FTCR
989001004449751	WFTR	2:07:26	BULL	177	42	7/30/2015	10/31/2015	WFTR
989001004449772	FTCR	21:53:01	BULL	195	53	8/3/2015	10/31/2015	FTCR
989001004449773	FTCR	20:51:02	BULL	172	43	8/3/2015	12/6/2015	FTCR
989001004449774	WFTR	2:30:03	BULL	176	42	7/30/2015	11/25/2015	WFTR
989001004449795	FTCR	23:44:17	BULL	159	37	8/3/2015	10/12/2015	FTCR
989001004449796	WFTR	12:30:24	BULL	153	29	7/30/2015	1/12/2017	WFTR
989001004449809	WFTR	19:37:46	BULL	155	30	7/30/2015	12/13/2015	WFTR
989001004449809	WFTR	3:22:00	BULL	155	30	7/30/2015	2/19/2016	WFTR
989001004449809	WFTR	0:24:33	BULL	155	30	7/30/2015	2/27/2016	WFTR
989001004449809	WFTR	1:22:34	BULL	155	30	7/30/2015	3/7/2016	WFTR
989001004449809	WFTR	2:38:55	BULL	155	30	7/30/2015	3/15/2016	WFTR
989001004449809	WFTR	1:41:41	BULL	155	30	7/30/2015	3/29/2016	WFTR
989001004449809	WFTR	1:25:16	BULL	155	30	7/30/2015	3/30/2016	WFTR
989001004449811	WFTR	19:37:43	BULL	137	22	7/30/2015	9/4/2015	WFTR
989001004449823	FTCR	4:31:36	BULL	148	25	8/3/2015	10/6/2015	FTCR
989001004500600	MSTR		BULL	172	33	10/19/2015	11/18/2015	WFT weir
989001004500610	WFTR	12:30:29	BULL	185	44	11/1/2015	12/14/2015	WFT weir

PIT Tag #	Site	Time	Species	Length	Weight	Tagging Date	Detection Date	Original Tagging
989001004500631	MSTR	20:58:48	BULL	159	31	11/10/2015	10/14/2017	FTC weir
989001004500638	MSTR		BULL	211	64	11/10/2015	12/8/2015	FTC weir
989001004500639	MSTR		BULL	173	34	11/10/2015	12/11/2015	FTC weir
989001004500642	MSTR		BULL	150	23	11/1/2015	12/14/2015	WFT weir
989001004500650	MSTR		BULL	134	17	10/11/2015	12/12/2015	FTC weir
989001004500650	MSTR	18:54:02	BULL	134	17	10/11/2015	1/1/2016	FTC weir
989001004500650	MSTR	8:50:38	BULL	134	17	10/11/2015	1/2/2016	FTC weir
989001004500650	MSTR		BULL	134	17	10/11/2015	12/11/2015	FTC weir
989001004500657	MSTR		BULL	162	31	10/13/2015	11/1/2015	WFT weir
989001004500662	MSTR		BULL	183	42	10/17/2015	12/8/2015	WFT weir
989001004500663	MSTR	22:01:40	BULL	168	34	10/12/2015	3/30/2016	WFT weir
989001004500664	MSTR		BULL	163	28	10/11/2015	11/13/2015	FTC weir
989001004500665	MSTR		BULL	157	28	10/15/2015	12/17/2015	FTC weir
989001004500671	MSTR	0:48:26	BULL	186	46	10/22/2015	2/29/2016	WFT weir
989001004500672	FTCR	16:53:46	BULL	194	49	10/11/2015	10/11/2015	FTC weir
989001004500674	MSTR		BULL	192	49	10/25/2015	12/9/2015	WFT weir
989001004500677	MSTR		BULL	160	29	10/13/2015	12/9/2015	WFT weir
989001004500684	MSTR		BULL	158	24	10/25/2015	11/9/2015	WFT weir
989001004500688	MSTR	2:01:44	BULL	158	27	10/29/2015	10/23/2017	FTC weir
989001004500693	MSTR		BULL	153	27	10/28/2015	11/11/2015	FTC weir
989001004500708	MSTR	5:38:13	BULL	132	17	10/18/2015	5/19/2016	WFT weir
989001004500710	MSTR		BULL	147	22	10/14/2015	12/12/2015	WFT weir
989001004500711	MSTR		BULL	149	24	11/1/2015	11/15/2015	FTC weir
989001004500712	MSTR		BULL	162	29	10/11/2015	12/11/2015	WFT weir
989001004500713	MSTR		BULL	144	22	10/23/2015	12/2/2015	WFT weir
989001004500723	MSTR		BULL	136	18	10/14/2015	11/3/2015	WFT weir
989001004500728	FTCR	19:39:27	BULL	222	76	10/11/2015	10/11/2015	FTC weir
989001004500733	MSTR	23:40:42	BULL	160	25	11/6/2015	12/21/2016	FTC weir
989001005230393	FTCR	9:17:10	BULL	179	46	8/3/2016	4/17/2018	FTCR
989001005230437	FTCR	9:17:18	BULL	125	18	8/21/2017	4/17/2018	FTCR
989001005372387	MSTR	20:23:14	BULL	615	1934	5/18/2016	9/18/2016	TF Fish Ladder
989001005372387	MSTR	6:57:30	BULL	615	1934	5/18/2016	9/19/2016	TF Fish Ladder
989001005372387	MSTR	20:26:38	BULL	615	1934	5/18/2016	9/21/2016	TF Fish Ladder
989001005372387	MSTR	21:23:23	BULL	615	1934	5/18/2016	9/24/2016	TF Fish Ladder
989001005372387	MSTR	21:06:15	BULL	615	1934	5/18/2016	9/26/2016	TF Fish Ladder
989001005372387	MSTR	0:16:25	BULL	615	1934	5/18/2016	9/27/2016	TF Fish Ladder
989001005372387	MSTR	20:22:24	BULL	615	1934	5/18/2016	9/28/2016	TF Fish Ladder
989001006028828	WFTR	0:20:31	BULL	186	58	8/24/2017	12/24/2018	WFTR
989001006028836	MSTR	3:04:24	BULL	100	9	8/24/2017	5/25/2019	WFTR
989001006028862	WFTR	20:41:44	BULL	103	9	8/24/2017	10/22/2018	WFTR
989001006028867	WFTR	2:05:33	BULL	100	9	8/24/2017	10/28/2018	WFTR
989001006028881	MSTR	22:14:00	BULL	166	35	8/23/2017	5/2/2018	WFTR

PIT Tag #	Site	Time	Species	Length	Weight	Tagging Date	Detection Date	Original Tagging
989001006028914	MSTR	7:44:36	BULL	151	29	8/27/2018	3/14/2019	FTCR
989001006028914	MSTR	7:53:16	BULL	151	29	8/27/2018	3/15/2019	FTCR
989001006028914	MSTR	18:50:09	BULL	151	29	8/27/2018	3/18/2019	FTCR
989001006028914	MSTR	7:46:16	BULL	151	29	8/27/2018	3/20/2019	FTCR
989001006028924	WFTR	6:47:08	BULL	302	246	6/19/2019	6/20/2019	MSTR
989001006028933	FTCR	22:55:15	BULL	149	29	8/27/2018	10/2/2018	FTCR
989001006028969	FTCR	22:48:44	BULL	159	39	8/27/2018	8/29/2018	FTCR
989001006028978	FTCR	21:01:49	BULL	122	15	8/31/2017	11/4/2018	FTCR
989001006029020	FTCR	5:06:15	BULL	114	19	8/21/2017	6/11/2019	FTCR
989001006029020	FTCR	7:51:33	BULL	114	19	8/21/2017	6/12/2019	FTCR
989001006029086	FTCR	23:23:15	BULL	228	91	8/22/2017	10/6/2017	FTCR
989001006029199	MSTR	0:02:47	BULL	408	522	9/18/2017	10/23/2017	TF Fish Ladder
989001006029199	MSTR	18:35:34	BULL	408	522	9/18/2017	2/4/2018	TF Fish Ladder
989001006029199	MSTR	21:13:04	BULL	408	522	9/18/2017	3/28/2018	TF Fish Ladder
989001006029199	FTCR	2:05:09	BULL	408	522	9/18/2017	6/5/2018	TF Fish Ladder
989001006029199	FTCR	7:05:09	BULL	408	522	9/18/2017	9/16/2018	TF Fish Ladder
989001030300915	FTCR	18:34:37	BULL	202	69	8/1/2019	10/20/2019	FTCR
989001030300925	FTCR	17:24:42	BULL	133	19	8/1/2019	8/3/2019	FTCR
989001030300925	MSTR	6:29:39	BULL	133	19	8/1/2019	8/6/2019	FTCR
989001030300925	MSTR	6:30:07	BULL	133	19	8/1/2019	8/7/2019	FTCR
989001030300956	FTCR	19:23:01	BULL	145	22	8/1/2019	9/23/2019	FTCR
989001030300959	FTCR	0:18:44	BULL	181	54	8/27/2019	9/13/2019	FTCR
989001030300971	FTCR	17:24:49	BULL	135	24	8/1/2019	8/3/2019	FTCR
989001030300971	MSTR	6:29:37	BULL	135	24	8/1/2019	8/6/2019	FTCR
989001030300971	MSTR	6:29:23	BULL	135	24	8/1/2019	8/7/2019	FTCR
989001030300977	WFTR	5:02:07	BULL	172	33	7/31/2019	10/15/2019	WFTR
989001030300978	WFTR	6:34:15	BULL	205	81	7/31/2019	10/23/2019	WFTR
989001030300998	FTCR	2:53:50	BULL	225	94	8/1/2019	8/24/2019	FTCR