MONTANA 2020

Annual Fishing Newsletter

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MONTANA FISH, WILDLIFE & PARKS

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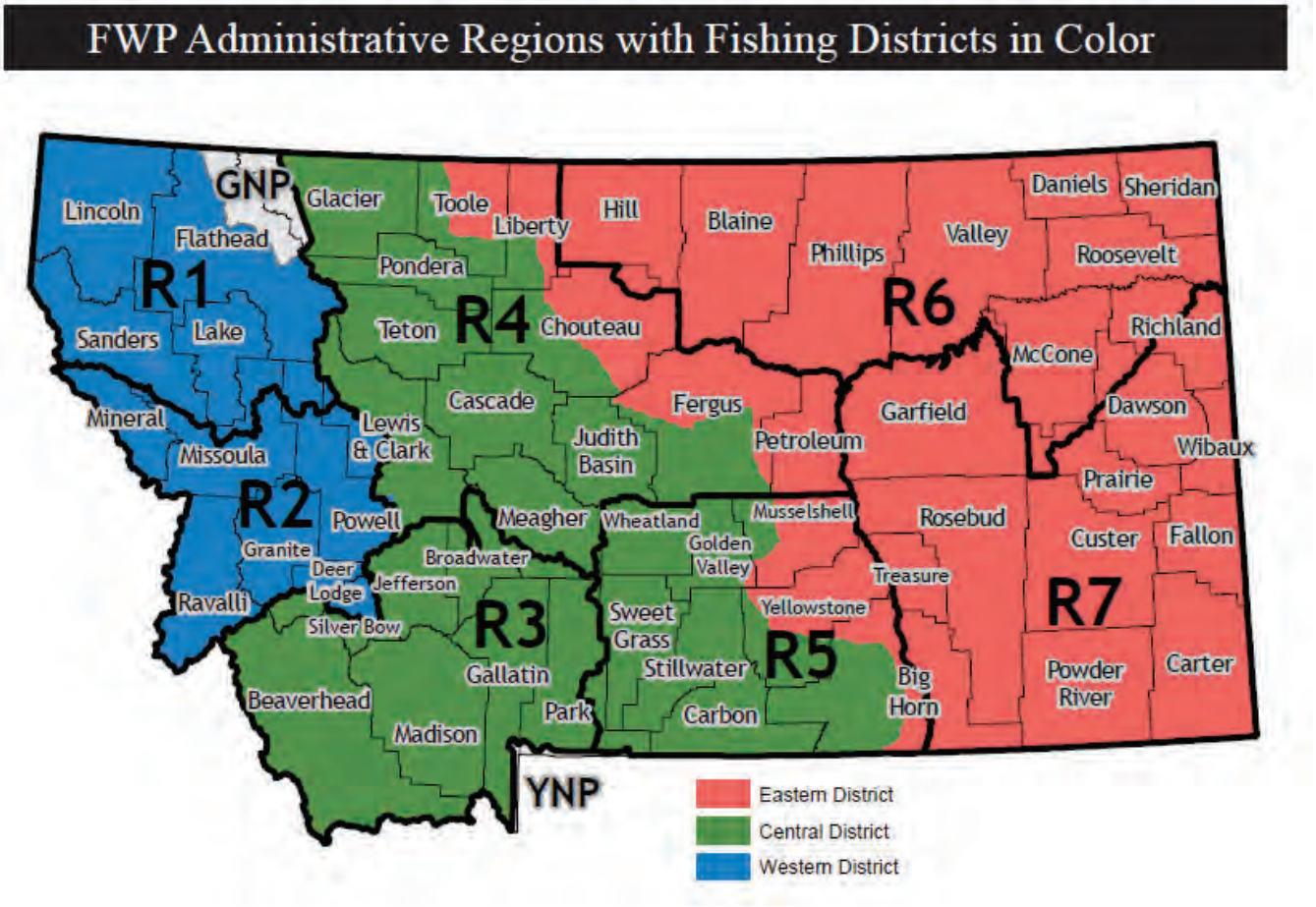
Front cover: "Cutthroat with Fly" photo credit: Jason Blakney



FWP Regional Offices

Headquarters
1420 E. 6th Avenue
Helena, MT 59601
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Region 1
490 North Meridan Road
Kalispell, MT 59901
406-752-5501

Region 2
3201 Spurgin Road
Missoula, MT 59804
406-542-5500

Region 3
1400 South 19th Avenue
Bozeman, MT 59717
406-577-7900

Region 4
4600 Giant Springs Road
Great Falls, MT 59405
406-454-5840

Region 5
2300 Lake Elmo Drive
Billings, MT 59105
406-247-2940

Region 6
1 Airport Road
Glasgow, MT 59230
406-228-3700

Region 7
352 I-94 Business Loop
Miles City, MT 59301
406-234-0900

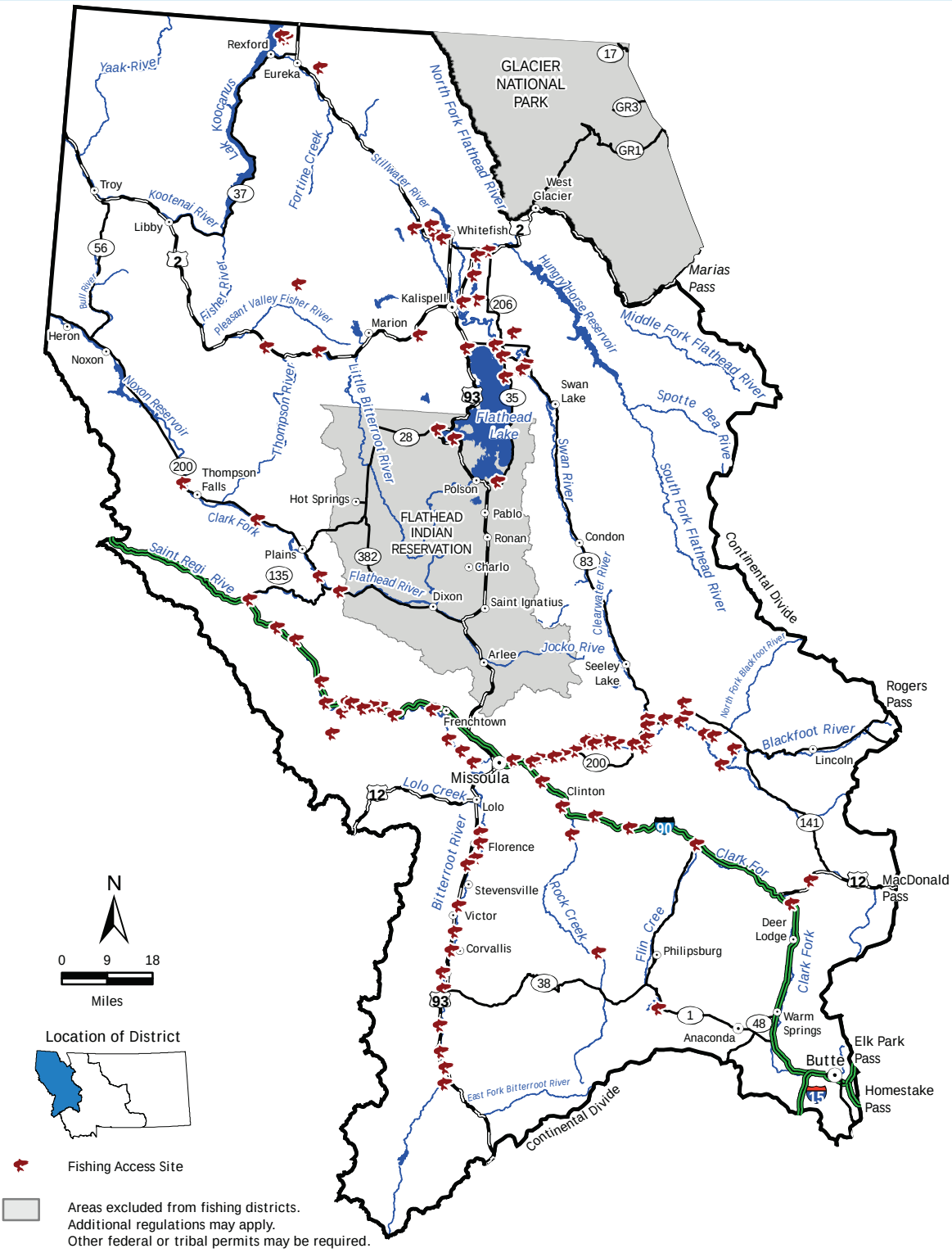
Butte Area Office
1820 Meadowlark Lane
Butte, MT 59701
406-494-1953

Havre Area Office
2165 Hwy 2 East
Havre, MT 59501
406-265-6177

Helena Area Office
930 Custer Avenue West
Helena, MT 59602
406-495-3260

Lewistown Area Office
333 Airport Road, Ste. 1
Lewistown, MT 59457
406-538-4658

Western Fishing District



The Western Fishing District includes all waters in Montana west of the Continental Divide.

For additional information about fishing in this district, please call the following regional headquarters Monday-Friday 8:00 a.m. - 5:00 p.m.:

Kalispell 406-752-5501
Missoula 406-542-5500
TTY (Telephone Device for the Deaf).....406-444-1200

Region 1 Northwest Montana

Angler use and characteristics in the upper Flathead River system

Amber Steed, Fisheries Biologist

Anglers are one of the most valuable sources of information that fisheries professionals have. So naturally, angler surveys are critical tools for gathering useful and interesting information about our fisheries and their user groups, guiding management while connecting the public with resource managers. Often referred to as "creel" surveys, these studies describe a wide range of fishery characteristics such as angling pressure, catch rates, harvest rates, species composition, and the users themselves. However, collecting this information can be expensive and time-consuming, making frequent large-scale efforts impractical. Yet, it was recently time to revisit our understanding of the Flathead River's fisheries, allowing for adaptive management (regulation changes, for example) based on data-driven work.

Within the upper Flathead River system, large-scale angler surveys have been performed about once per decade since the early 1980s. For example, a "fisherman census" of the Mainstem and North Fork Flathead rivers was conducted during spring-fall 1982. Later, a "Flathead River Creel Report" was produced for one year during 1992-1993, expanding to the North and Middle forks as well as the Mainstem Flathead River. Then, during 2002-2003, an angler survey focused on just the Mainstem, surveying anglers during all seasons. Most recently during 2015-2016, we repeated this last survey to update our understanding of how the Flathead River was used by both anglers and non-anglers alike.

Prior angler surveys documented the fisheries changes associated with the establishment of Mysis shrimp in Flathead Lake, which dramatically impacted native and non-native species and the fisheries they support. As in the past, our most recent angler survey in 2015-2016 described fishing pressure, catch rates, harvest rates, species composition, and additional user information. Since the Flathead system is large and accessible from many locations, we used a "roving creel design" – whereby surveyors attempt to interview anglers at common access points after they've completed their fishing trips. We also conducted flights to count river users throughout the year, describing them along the way (for example: boater, shore angler, non-fishing boaters, etc.). By combining this large body of information, we could make comparisons over time and across areas in the drainage.

So, what did we find? For starters, we connected with a lot of people and have them to thank for the information we gained. We conducted 2,249 interviews across all seasons, an increase of 143% over the 2002-2003 survey. We also performed 189 flights of the river to count users, helping us to estimate fishing pressure. As you may imagine, that pressure increased since the early 2000s – by 80%! While that growth represents a big jump in use, it may not surprise residents and long-time visitors to the area. We have seen a steady climb

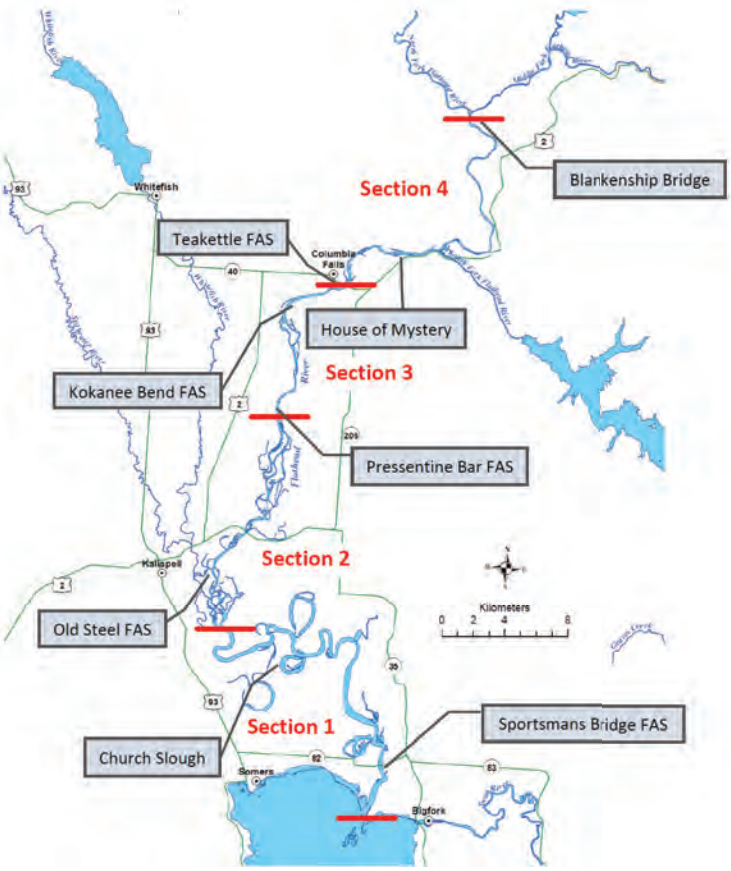


Figure 1.—Study area of the Flathead River system targeted by an angler survey conducted from March 2015 through February 2016. An additional Section 5 included the lower Flathead River sloughs, as in Deleray (2004). Angler access points used by surveyors are shown by name and location, where FAS = Fishing Access Site.

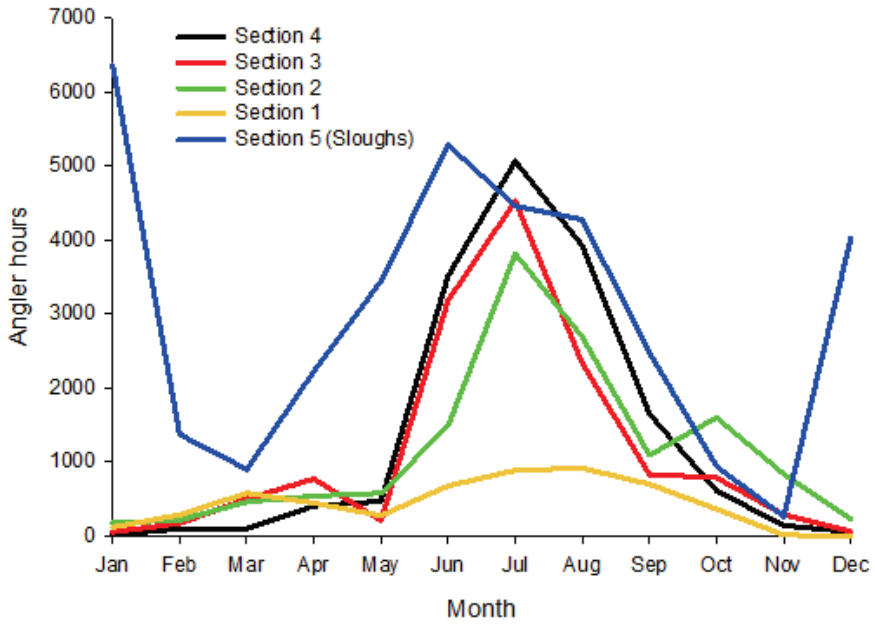


Figure 2—Estimates of angler fishing pressure (hours) in the Flathead River, by section, during 2015-2016. River sections are listed from upstream down and are defined in Figure 1.

in local and statewide outdoor recreation over that same period, including visitation at many local State Parks and nearby Glacier National Park. While we collected more information than we have space to share in this article, we saw a few other changes worth noting here. For example, there was a large drop in both catch and harvest rates for lake whitefish during that autumn river fishery. There are some likely reasons for this: for starters, the loss of a commercial market and associated harvest since 2009 along with natural population variability year-to-year. However, harvest rates were still highest among all species as angling for lake whitefish in the Flathead River remains popular during fall – your luck may just depend on the year.

Additionally, the lower-river sloughs received the most angling pressure across all seasons during 2015-2016 as compared to ranking fourth among the five river sections during 2002-2003. Ice fishing for Yellow Perch contributed to that use; in fact, that was the most frequently caught fish throughout the entire study period and across river sections. Ranking second in catch rate was our state fish, the Westslope Cutthroat Trout. Lake whitefish was not far behind in third. And while lake whitefish was the most-harvested species, the category we called "other" came in second (e.g., Northern Pikeminnow, peamouth chub, etc., often used as bait). Rounding out in third was Northern Pike.

As in prior surveys, gear types and lure use varied across seasons and river sections to suit the fisheries they targeted. For example, fly-fishing and guided angling was most prevalent in the uppermost river sections from Blankenship Bridge downstream to Pressentine Bar FAS, while spin-casting ruled in the lower river near Sportsman's Bridge. Predictably, summer was the most popular season for both overall use and visitation by non-resident anglers. And when it came to boating, just over half (53%) of all users were not anglers – but only during summer months.

Avid angler and FWP employee, Jayden Duckworth, enjoys catching Westslope Cutthroat Trout on the Flathead River..

In this increasingly-popular river system offering seasonally-diverse angling opportunities, our ability to describe important fishery characteristics offers value well worth the investment. Be on the lookout for our final report coming this spring, and thanks again for helping us make it happen. Happy fishing!

New regulation to help conserve native fish in the Flathead River system

Leo Rosenthal, Fisheries Biologist

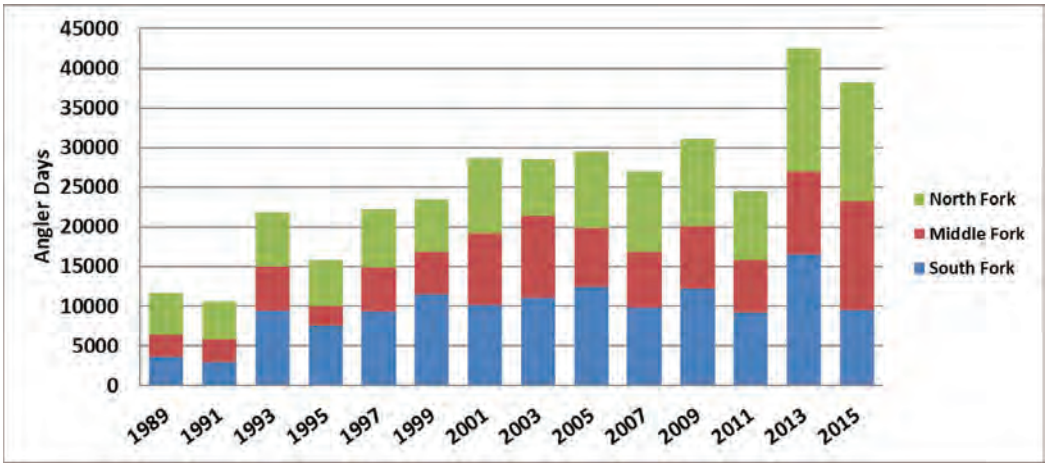
Region 1 provides some of the best Westslope Cutthroat Trout angling opportunities in the state. Anglers can find solitude, crystal clear waters, and exceptional catch rates for Westslope Cutthroat Trout in all three forks of the Flathead River (North, Middle, and South). Additionally, the South Fork is one of only a handful of places in which anglers can catch and release Bull Trout, a fish listed as threatened under the Endangered Species Act.

Fisheries biologists have been monitoring these fish populations since the early 1980's, and because of the remote nature of these rivers, have adapted to using more primitive technologies to acquire their estimates. Much of the Middle Fork and the entire South Fork lie in the Great Bear and Bob Marshall Wilderness areas. Limitations on the type of equipment and the distance to access these locations necessitate the use of pack animals rather than pickup trucks to get there, and angling rather than electrofishing to sample fish. Mark-recapture estimates are conducted using angling to mark the fish with a brightly colored tag near the dorsal fin and snorkeling for the recapture survey. The "recapture" is actually seeing and identifying the tagged and untagged trout. We then calculate an estimate from the proportion of tagged to non-tagged trout. As you can imagine, a lot of time and effort is necessary to complete these surveys, so each reach is completed every three years. Results from these population estimates reveal stable Westslope Cutthroat Trout populations in all three forks of the Flathead River. However, these estimates also describe a relatively low-density trout population, with most reaches containing 300-500 catchable trout per mile. When looking at memorable sized trout (>12"), those estimates shrink to roughly 30-60 fish per mile. To put this in perspective, the Missouri River downstream of Holter Dam typically produces population estimates of 3,000-4,000 trout greater than 10" per mile. The low numbers in the Flathead are likely the result of the very clear and cold waters that make these rivers so visually stunning, but also keep insect populations low. Because bug populations are so low, a survival strategy for Westslope Cutthroat Trout is to "taste" most things that float by; if it tastes bad they can spit it out. That strategy doesn't work so well when there is a hook attached to the item being tasted. So, despite the low numbers of fish, catch rates for fly and spin fishermen remain high, making these rivers an excellent choice for novice and experienced anglers alike. Unfortunately, the fishery does show signs that these high catch rates and an increase in river use have the potential to affect future trout numbers.

A tagged Westslope Cutthroat Trout that shows signs of having been caught previously (hook scarring).

Snorkeling for the recapture survey.

The Flathead valley has experienced considerable population growth over the past 20 years. This growth has been from an increase in residents, as well as unprecedented numbers of visitors to Glacier National Park during the summer months. The rise in popularity has resulted in increased river use in all three forks of the Flathead River. When biologists examine Westslope Cutthroat Trout during population estimates, they report ~40% of fish over 12" show signs (hook scarring) that they have been caught and released before.



Increased river use in all three forks of the Flathead River.

Although scarred fish may survive and behave as normal, the scars do indicate that these low-density fish populations are vulnerable to overfishing as use continues to increase. So as a proactive measure to guard against these potential negative effects, FWP made a recent regulation change to eliminate treble hooks in the forks of the Flathead River upstream of Columbia Falls.

The 2020 fishing regulations for the North, Middle, and South Forks of the Flathead River will now require anglers to fish with only single-pointed hooks upstream of Teakettle FAS in the town of Columbia Falls. With this regulation change, we hope to reduce the amount of handling that occurs while releasing fish. Most of the affected area currently requires catch-and-release for Westslope Cutthroat Trout, so the new regulation should allow anglers to release their fish with greater ease. Anglers can be compliant with the new regulation in several ways: 1) Remove the treble hook from lures and replace it with a single hook, 2) Cut two of the shanks off an existing treble hook, 3) Purchase lures equipped with single hooks. Most anglers have found that replacing treble hooks with in-line eyed hooks in a larger size has been more effective than the clipped treble hook. Lures with multiple hook attachments (i.e. Rapala) can still have multiple hooks but must be single-pointed hooks.

Examples of common lures with single-pointed hooks.

Federal Agencies to complete Columbia River System Operation, Environmental Impact Statement in 2020

Brian Marotz, Hydropower Mitigation Coordinator and
Matt Boyer, Science Program Supervisor

Libby Dam, Hungry Horse Dam, and SKQ Dam on Flathead Lake have been under review for the last four years as part of a Columbia Basin-wide analysis of dam operations. The EIS is scheduled to be completed in 2020, and will guide how the hydrosystem is operated for years to come. You'll have the opportunity to review and comment on the plan this spring. Operations at SKQ Dam on Flathead Lake are not expected to change, so we are closely watching some operations being considered for Hungry Horse and Libby dams. With the many demands placed on the Columbia River hydrosystem it's a challenge striking a balance to meet flood control, renewable power generation, and ecosystem function objectives.

On January 21, 2020, we had our first chance to review the draft "Preferred Alternative", just in time for this newsletter. Montana dams appear to be doing well in the process. During the last two decades, the State of Montana allied with the Confederated Salish and Kootenai Tribes and Kootenai Tribe of Idaho (collectively, the "Upper Basin Sovereigns" or UBS) to design dam operations that maintains clean renewable hydro-

power and current flood protections, while improving habitat for fish and wildlife in our reservoirs and rivers (known as the "Montana Operation"). Our plan and recommended improvements withstood scrutiny and successfully made it into the draft Preferred Alternative, which when finalized will drive future operations.

We successfully argued against operations that would have harmed the Montana Operation and the fisheries in the Kootenai and Flathead they are intended to protect. For example, two of the alternatives (2 and 3) would have drafted Libby Reservoir too deeply by the end of December, which would impact reservoir refill and remove opportunities to optimize river flows during the peak period for trout growth, summer and fall. These same alternatives would have relaxed rules that were established to minimize unnatural flow fluctuations that harm food production for river fish. Although the draft Preferred Alternative does result in greater Libby Reservoir drawdown during springtime, the springtime draft is less deep. The good news is, despite this increased springtime draft, by meshing flood management (VarQ) with flows released to help White Sturgeon, reservoir refill can be improved during summer. The overall change is subtle, but worth investigating if you plan to send comments.

Alternative 4 (MO4, measure 7) would have prioritized meeting flow targets in the lower Columbia River at McNary Dam at great sacrifice to our reservoirs and rivers. This flow augmentation was intended to help juvenile salmon and steelhead migrate to the ocean, but results showed that resident fish upstream would be impacted with little or no benefit to anadromous fish downstream. As good upstream neighbors, UBS share the desire to restore anadromous fish, which is why our Montana Operation was designed to benefit fish systemwide, and was endorsed by independent scientists. Water discharged from Montana reservoirs continues downstream to help recover anadromous fish, without impacting our fisheries.

We recommended winter operations at Libby Dam to restore streamside trees and improve conditions for endangered White Sturgeon in the Kootenai River (MO4, measure 22). Dam discharges would be reduced during winter after a particularly high spring flow event, giving shoreline plants a year or two to grow before being inundated or flushed away. This operation would only have to occur a few years each decade to protect natural seedlings in the floodplain processes, which minimizes costs and impacts to power revenues.

Our recommendation to manage drought year operations using local, basin-specific inflow forecasts instead of triggering dry year operations based mainstem Columbia River flows at The Dalles was found to be better than the current operation. Using site-specific water supply forecasts, helps dam operators better manage variable water supplies and runoff timing in each river basin, optimizing the entire system.

Hopefully these positive changes for Montana's dams will prevail in the final EIS. More information on the Columbia River hydrosystem and timelines for submitting comments on the EIS can be found at: www.crso.info.

Libby Dam spillway.

Community Fishing Ponds in the Flathead Valley

Kenneth Breidinger, Fisheries Biologist

Montana's Flathead Valley has diverse fishing opportunities that include large lakes, mountain lakes, rivers and streams. While many anglers enjoy these fisheries, they can be challenging to fish and access and often require specialized gear. For kids and others who are new to fishing, people who have difficulty accessing natural water bodies or anglers who want to fish from shore and experience higher catch rates, the Flathead Valley has community fishing ponds. The premier community pond in Region One is Pinegrove Pond. On the banks of the Whitefish River and five acres in size, the pond provides a relaxing experience for anglers and non-anglers alike. FWP stocks the pond annu-

ally with 6,500 Westslope Cutthroat and Rainbow Trout and from the last angler survey in 2016, the pond supported more than 1,500 angler days. Rivers Edge Pond in Columbia Falls is the Flathead's newest community fishing pond. The pond is the result of a cooperative effort between the City of Columbia Falls, the Flathead Land Trust and Montana Fish, Wildlife & Parks. Schellinger Construction, Hamilton Excavating and JD Thinning donated time, equipment and expertise to the project. Their help was essential to constructing the pond. The pond opened to fishing in June 2019. Close to the Flathead River and just east of downtown, Rivers Edge Pond is surrounded by cottonwoods. Up to 1,500 Westslope Cutthroat Trout are planted annually into the pond. FWP will monitor the pond and adjust management to assure the best possible fishery. As with most of the family fishing ponds in Region one, Anglers over 14 years old are required to release all fish. Anglers 14 and under may harvest one trout per day. The project is not complete and we hope to improve the site by adding a fishing platform, benches, and a walking path. The City of Columbia Falls manages Rivers Edge Park and has improvements planned for the rest of the park as well. In addition to angling, Rivers Edge Pond will be used for programs such as hooked on fishing and other educational events. Signboards will be placed along the trail to educate users about the Westslope Cutthroat Trout, Montana's state fish. In addition to Pinegrove and Rivers Edge, we help provide community fishing opportunities at Buffalo Head Park, Dry Bridge Slough, Lion Lake, The Mountain Mall, Shady Lane and Swan Pond in the Flathead; Teddy's pond in Troy, the Libby Pond, Triangle Pond near Noxon, Frog Pond by Trout Creek, State Park Pond near Thompson Falls. FWP will continue to improve these fisheries and pursue opportunities to develop new sites. If you're new to fishing or interested in showing a new angler the ropes, give one of these ponds a try. They're great places to learn to fish or just enjoy some time by the water. For more information about these ponds and community fishing ponds throughout the state, go to https://myfwp.mt.gov/fishMT/search/-/0/00/CHLDPOND/Both. Good luck!

Anglers fish for Westslope Cutthroat Trout at the grand opening of Rivers Edge Pond.

Agency collaboration restores native fish to the Camas Drainage, Glacier National Park

Matt Boyer, Science Program Supervisor

Tucked away in the cirque basins of the Livingston Range, Lake Evangeline and Camas Lake form the headwaters of the Camas Creek drainage, a major tributary to the North Fork Flathead River. The Camas drainage provides secure cold-water habiat for Westslope Cutthroat and Bull Trout; however, historic stocking of non-native Yellowstone Cutthroat Trout several decades ago created reproducing populations of this fish, which poses hybridization and competition threats to native species in the watershed.

From the summit of Heavens peak, a view of the upper Camas Creek drainage and Camas Lake (foreground) and Lake Evangeline. Photo credit: Jim Williams

Following several years of aquatic species and habitat surveys, fisheries crews with Montana Fish, Wildlife & Parks and Glacier National Park teamed up in fall 2019 to implement a piscicide restoration project to remove Yellowstone Cutthroat Trout from Lake Evangeline, Camas Lake, and interconnected reaches of Camas Creek. The goal of this effort was to protect Westslope Cutthroat Trout from the threat of hybridization and to protect westslope and Bull Trout against habitat degradation occurring as a result of a changing climate.

Conservation of the unique genetic characteristics of westslope cutthroat and Bull Trout inhabiting waters within the North Fork Flathead watershed is another important objective of this effort. Following genetic and disease testing to screen for potential local donor populations of native trout, crews collected wild juvenile westslope cutthroat that are currently being raised at Sekokini Springs Conservation Hatchery to be spawned to produce fry for restocking in Lake Evangeline and Camas Lake in the coming years.

Once this effort has established naturally reproducing westslope, translocations of Bull Trout from suitable local donor sources can occur to create native trout populations secure from the threats of non-native fish and trending climate warming.

This watershed scale native trout restoration effort was supported with cost-share funding from the Glacier National Park Conservancy and Bonneville Power Administration through the Hungry Horse Fisheries Mitigation Program. Collaborative efforts like this demonstrate the possibility of achieving sustainable native fish conservation while enhancing fishing opportunity. For the angler seeking native trout quarry in a spectacular alpine wilderness setting, these remote lakes will be well-worth adding to your list.

Investigating Illegal Fish Introductions with Forensic Geochemistry

Sam Bourret, Fisheries Biologist

Illegal fish introductions are plaguing recreational sport fisheries and native species biodiversity across the globe. Illegal fish introductions, or bucket biology, are a crude form of biological terrorism where individuals knowingly move fish species from established waters into habitat where the fish did not previously exist. How does moving fish species into foreign waters influence sport fisheries and native organisms? Most fish species being illegally introduced are predators that have dramatic effects on the entire ecosystem. Further, once species become established in a waterbody, they are extremely difficult and expensive to remove, effectively residing in that system forever. Take, for example, the illegal introduction of Lake Trout into Yellowstone Lake in the late 1980's; Lake Trout are a voracious predator and between the years of 1994-2004, caused native Yellowstone Cutthroat Trout populations to decline by 11% every year. Given massive efforts to suppress the illegal fish, native cutthroat have shown signs of rebound, but the efforts have cost millions of dollars and the battle to save Cutthroat is far from over.

In Region One (Northwest Montana) alone, nearly 400 illegal fish introductions in 150 lakes have been documented since 1953. The criminals conducting these illegal activities likely think they are creating more fishing opportunities closer to home. But, what they don't realize is that they are destroying the existing fisheries and the opportunities they provide for other anglers.

In 1992, Yellow Perch were illegally introduced to Lake Mary Ronan in northwestern Montana, the home to the statewide Kokanee Salmon broodstock. The Yellow Perch eliminated the Westslope Cutthroat Trout fishery and greatly reduced Rainbow Trout abundance. They also impacted the Kokanee population to such a degree that state fisheries managers had to stock more fish just to sustain the broodstock. In 2014, illegal Northern Pike were first found in Lake Mary Ronan, and in 2019 they were confirmed to have spawned in the lake. What will be the fate of Montana's Kokanee fisheries with two illegal fish introductions in Lake Mary Ronan? This is a mystery with no clear answer.

How can this homogenization of fisheries and destruction of native species assemblages be stopped? When will anglers stop losing fishing opportunities in some of their favorite fishing holes? The answer might have to be when these criminals are convicted for an illegal fish introduction; perhaps that will serve as a deterrent. But, for law enforcement to convict a criminal, more evidence needs to be gathered about the crime. Illegal fish introductions are not usually detected until the fish is found by state biologists or anglers, well after the crime has occurred. To gather evidence about a 2015 illegal Walleye introduction in Swan Lake Montana, FWP, Trout Unlimited, and Walleyes Unlimited offered $30,000 for information leading to the arrest of the individual(s) responsible for the introduction. Even with a large sum of money on the table, no reliable information was gathered, and to this day, no conviction has been made for that introduction into valuable habitat for native species, including the federally threatened Bull Trout.

The good news is that with technological advances in fisheries science, biologists now have a tool to identify the waterbody where the illegally introduced fish was born and whether there is natural reproduction of that

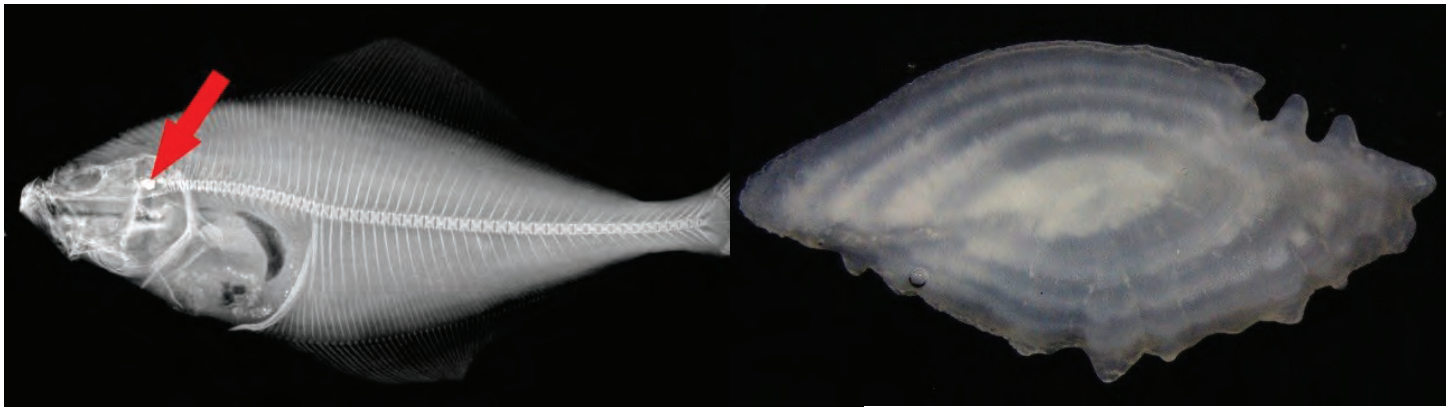


Figure 1. (Left) The location where otoliths are found in a fish, under the brain (wwww.awesomeocean.com). (Right) An extracted otolith showing annual growth rings used to age the fish (www.dnr.sc.gov).

species in the new waterbody where they were recently discovered. These data are gathered by the analysis of a calcium carbonate structure in all bony fishes head called an otolith (Figure 1). Otoliths are used for hearing in all vertebrates, but in fish they naturally absorb chemicals from the water where the fish lives. Through the weathering and erosion processes on the underlying geology of the aquatic environment, the 87Sr/86Sr isotope in each waterbody and river can be unique. This isotope is then absorbed in the fish otolith as the fish grows in its unique chemical environment. Like tree rings, otoliths also record the age of fish, so together this information can be used to deduce where and when a fish was illegally introduced into a waterbody. Furthermore, by comparing the chemical signature of the core of the otolith with lakes or rivers where illegal fish could originate, biologists can use this forensic technique to deduce where the illegal fish was born. For instance, to understand if the two Walleye caught in Swan Lake were illegally introduced, we compared the chemical profile of the Walleye otoliths with those of Lake Trout captured in Swan Lake (Figure 2). The Lake Trout were used as a control, hypothesizing that if the Walleye chemical profile resembled the Lake Trout (which we knew were born and lived in Swan Lake their entire lives), the Walleye would have also originated in Swan Lake. But what we found was quite the contrary. In figure 2, the chemical signature close to the core of the otolith is much different in the Walleye and the Lake Trout. By comparing the annual rings on the Walleye otolith to the distance from the core that the chemical profile resembles that of the Lake Trout, we found that the Walleye were born somewhere other than Swan Lake and were actually the result of an unauthorized placement into Swan Lake in June of 2015. To figure out which lake the Walleye were from we had the help of FWP biologists from around the state to collect otoliths from Walleye in lakes that had the most fishing pressure in Montana. The illegally introduced Walleye matched precisely with those captured from Lake Helena, over 160 road miles from Swan Lake (Figure 3)! These data provide important evidence (the where and when) about the crime that occurred at Swan Lake that can aid law enforcement in making an arrest.

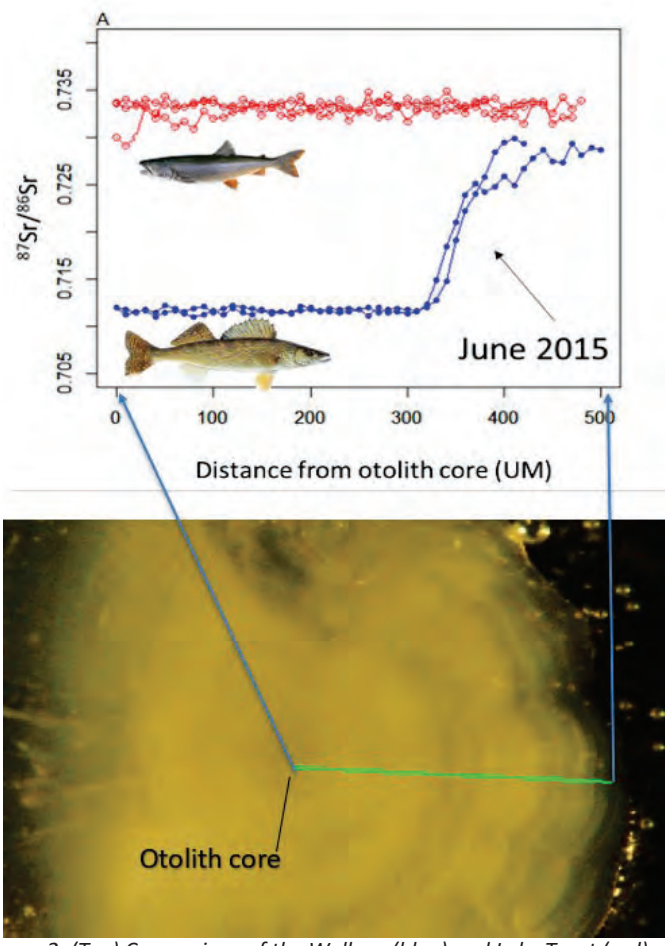


Figure 2. (Top) Comparison of the Walleye (blue) and Lake Trout (red) chemical profiles. The change in the chemical profile of the Walleye compared to annual growth rings showed the fish were introduced into Swan Lake in June of 2015. (Bottom) Picture of a Walleye otolith showing the region (green) where the data is gathered.

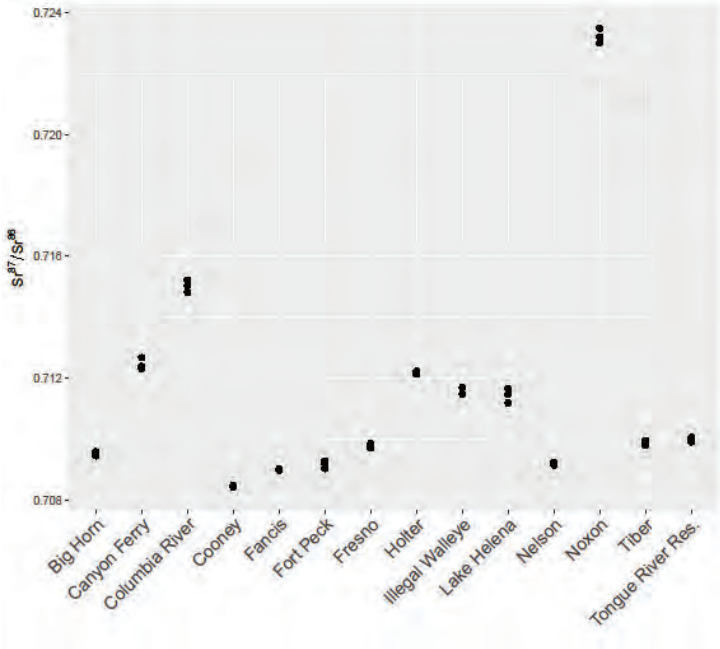


Figure 3. Comparison of 87Sr/86Sr chemicals from 3 Walleye otoliths from lakes in Montana with the largest fishing pressure. The highlighted area shows the matching chemicals of the illegally introduced Walleye from Swan Lake with those caught in Lake Helena.

The ultimate goal is to identify the who part of the evidence. Hopefully in the future, this kind of evidence could help to link a suspect with a place and time and lead to conviction of the perpetrator of this crime. The use of fishing license sales, highway web cams, and gas receipts could be used in combination with this forensic evidence to help make a conviction. In addition, these data give biologists information on how urgently to act in a case of a new population establishment. If a new fish is confirmed to have been born in a lake, management biologists need to act quickly to suppress and hopefully eradicate the unwanted fish population before it establishes in the lake forever.

There are fish in those cricks? Small stream fishing western Montana

Jason Blakney, Fisheries Biologist

The landscape of western Montana is defined by the epic rivers that flow through it. These rivers are fed by a seemingly uncountable number of tributaries. This summer you should take your dog or friend or kid or grandparents and go fish one of these small streams. The vast amount publicly accessible wildlands in this part of the state offer an endless source of small stream fishing opportunities, where low angling pressure and solitude are nearly a given.

In the Western Fishing District, tributary streams are open to fishing from the 3rd Saturday in May through November 30. Anglers have the opportunity to catch non-native trout species such as Brown Trout, Brook Trout, and Rainbow Trout (native to the Kootenai R. drainage and known as redbands) as well as the native Westslope Cutthroat Trout. Bull Trout are also native and can still be found in some streams, however targeting the species is prohibited in all tributaries in western Montana. Due to the diversity of trout species you could catch in a small stream in this part of the state, learning to identify trout species is a must. Some streams also have special regulations including bait restrictions, catch and release, limits on the size or number of fish that can be harvested and/or seasonal closures. The FWP Montana Fishing Regulations has a guide to trout identification and will help you navigate the regulations on the tributary you choose to fish (http://fwp.mt.gov/fish/regulations).

Gear

Whether you choose to fly fish or spin fish, light tackle is the name of the game.

For anglers using spinning gear, a 4.5 to 6-foot (ft.) rod with 4 to 6-pound test line is ideal. Bait and lures are both effective methods for catching trout in tributary streams. Lures such as Panther Martin and Hildebrant spinners and Phobe spoons are classic fare from small stream trout fishing but any small spinner or spoon (1/32 oz. to 1/8 oz.) should do the trick. Garden worms and grasshoppers are excellent options if you like to fish with bait. Live fish are not allowed to be used as bait in the Western Fishing District, regardless of the species or stream. If you plan to fish in a waterbody where there are native trout or plan to release most of the fish you catch, you can replace treble hooks with a single barbless hook. To reduce deep hooking associated with bait fishing, use slightly larger hooks (size 8 or 10 versus size 12 or 14), and pinch down the barb. To figure out what species of fish may live in the stream you plan to fish, use the interactive map and search function found on FWP's website (https://myfwp.mt.gov/fishMT/reports/survey-report) or contact your local FWP fisheries biologist.

Get 'em hooked early. A young angler fishing a small stream in the Bitterroot Mountains.

For anglers that choose to fly fish, a short rod (< 8 ft.),

light line (5 weight or smaller), short leader (7 ft.). and light tippet (5x or smaller) are best. While many choose to fish with dry flies in small streams, subsurface flies can also be effective. Small streams become fishable each year on the descending limb of the spring-runoff, and the best fishing of the year often occurs during this period when the water is clear and still pretty high. Many species of aquatic insects are hatching this time of year, fish are more spread-out because there is more water in the stream which means more habitat and are more willing to take bushy attractor flies. As streams begin to reach baseflow conditions, smaller drab colored patterns will perform best. Flies in the 12-20 size range are ideal for baseflow conditions. Try an elk hair caddis, grey drake, pale morning dun or yellow sally this time of year. Terrestrial insect patterns such as ants, beetles, crickets and grasshopper can keep your line tight mid-summer through mid-fall but be sure to match the size of the fly to that water you're fishing.

Trout checking out a homemade attractor fly on the descending limb of spring-runoff.

Challenges

Small stream trout fishing is not without its challenges. One of the most obvious challenges is casting. Small streams are often brushy and filled with woody debris. Trying to flick a spinner or place a fly in an area the size of a bathtub or smaller is tough and takes practice. Even with ample practice, loosing lures and flies is part of the deal, so don't let it ruin your day. There is nothing better than making a cast into a tight spot and having your lure or fly instantly engulfed by a hungry and colorful trout. Another common challenge with fishing these small waters is the spooky nature of the fish, especially once baseflow conditions are reached in mid-summer. Fish in small streams can be very wary when flows are low and they are often condensed into holding water that provides the best cover. A quick movement, shadow on the water, vibration from walking, bad cast or too heavy of a lure can spook fish and ruin fishing in that pool for a while. Generally, work upstream in a stealthy manner (pretend you're hunting) while trying to minimize splashing and shadows on the water. Trout most often hold in an upstream facing direction because they feed on insects or other prey being washed downstream with the current. If brush precludes an upstream cast, try sneaking above the pool and floating down bait and a small split-shot on a leaf. If you're fly fishing, it's time to practice those seldomly used techniques such as the roll cast, steeple cast or slingshot method. The terrain and forest conditions can also make small stream fishing tough. Brush, deadfall, rock outcrops/cliffs and various other obstacles make navigating along small streams difficult and potentially dangerous. Walk slowly, pay attention, carry bear spray and always let someone know where you're going. The good thing about small stream fishing in western Montana is that you can choose the level of accessibility that meets your physical condition or vision for the day. Whether it be along the side of a logging road, down in a canyon or a few miles up a trail; there will be a pool with a hungry trout waiting.

Rewards

In the darkest depths of winter imagine being on a babbling brook surrounded by mountains, birds singing and the sun on your back. While the rewards of fishing small streams are in the eyes of the beholder, solitude can be one of the best attributes of fishing these types of waters. On most days on most streams, you'd be hard pressed to find another angler. It is amazing how time and the worries of the world melt away when you're alone or with good company along a stream. Problems like figuring out how to make a decent cast without losing your fly and trashing your leader, or how to navigate through dense alders stands

to get to the next pool or what section of stream to fish become the biggest issues of the day. Beyond solitude and beauty, small streams can provide really good fishing. When you can't seem to buy a bite on your favorite river in mid- summer, head to the head-waters. Catch rates can be very high on small streams, and often times multiple fish can be caught out of the same pool or run. Most often you'll be catching resident fish that spend their entire lives in the stream where they were born. Because these streams are small, resident fish are usually relatively small too, a 9 or 10-inch westslope cutthroat is a beast and may be 5 or 6 years old. Trout species in western Montana often spawn in tributaries so there are times and places where larger migratory fish can be caught in smaller streams.

One of the many small and brushy mountain streams in western Montana loaded with hungry trout.

Westslope Cutthroat Trout, the pride of many small streams in western Montana.

Another advantage of exploring small streams is that you'll often find new and exciting places for other types of recreational activities like camping, hiking and hunting. Small stream fishing is also a great way to beat the summer heat. Day time temperatures can be considerably cooler along a mountain stream that flows through a mature forest than in town. While it might even be 90°F on the forest road, it could be 20 degrees cooler down in the cedar forest along the stream.

If you get bored from catching too many fish or get sick of being smacked in the face by willows, bring a snorkel mask and go underwater, you'll step into a different world you won't soon forget. Good times and tight lines!

REGION 2
West Central Montana

Habitat Protection Permitting: The not-so-sexy part of our job that is the foundation of our fishery management.

Pat Saffel, Regional Fisheries Program Manager

We love to talk about the habitat we restore. We've made something and have evidence to show for it. For example, the stream had eroding banks, few pools and few trout. Now it has undercut banks, pools, thriving vegetation, and lots of fish. What's more, we saw it with our own eyes. The people and machinery come in to shape the channel and plant the vegetation. It's a success to be proud of. There are pictures of before and after, beautiful scenery and lots of fish. The social story is appealing too. Collaboration among people and organizations is often required so the story gets told multiple times in multiple circles (including this Newsletter). If a fish biologist can get famous, then this is how to do it.

Stream permitting is important to protect qualities of natural habitat that are important to fish and properly functioning streams and rivers. FWP regularly works with landowners and other agencies to do this. Some permits aren't easy for technical and social reasons and deliberations and finding solutions can be difficult. Nevertheless, Montana's sport and native fisheries rely on this permitting so they can be around in the future.

In contrast to habitat restoration, is habitat protection through permitting. This includes paperwork, meetings and sometimes requiring folks to change what they had their heart and even their wallet set on doing. Or worse, changing what they already did (that is, they didn't have a permit or didn't follow the conditions). I'll pause here to say that many permits are approved "as is" or there is a cooperative approach to modifying applications. Some projects improve or attempt to maintain quality habitat since a healthy stream is often good for the project proposal as well. Nevertheless, it's the difficult permits that we remember and spend a lot of time and energy on.

High-quality habitat is needed to keep our outstanding fisheries. Wild trout management, for example, depends on excellent habitat to be successful. Relying on habitat goes beyond trout, as well. Bass, pike, Paddlefish, Pallid Sturgeon, Walleye, you name it…, all rely on habitat to thrive. The philosophy is that fisheries will do their best when their habitat is intact. Fortunately, Montana is blessed with an abundance of high-quality habitat across the state. Protecting this habitat is required to continue providing Montana's excellent sport and native fisheries.

Two habitat protection laws are implemented by FWP's Fish Biologists that apply to private and public lands. The Natural Streambed and Land Preservation Act and Stream Protection Act. These laws were passed in the 1960's and 70's. They are very similar and with slight differences in our role and who is applying. I won't get into that here. The similarity is the purpose of the laws, they both state that the streams and rivers of Montana:

"…be protected…in their natural existing state…, except as may be necessary and appropriate after due consideration of all factors involved."

To clarify, "natural" and "existing" may be different, and this is where we might return to restoration work. If the existing condition is degraded, then returning it to a more natural condition is usually a good idea and would fall under restoration. However, if the existing condition is degraded then this does not justify more degradation. Our goal is clear, to maintain or

improve the existing stream or river habitat conditions.

You've probably already picked up on the hard part of permitting – allowing projects "as may be necessary and appropriate after due consideration of all factors involved." This is where we work to understand the purpose of the project and communicate our objectives considering the habitat and fish involved. The result is usually a sharing of creative alternatives until we reach mutual agreement that satisfies the project purpose and fish and wildlife protection – a result we get to in almost every instance.

To achieve habitat protection, we often defer to what the authors of the law were likely thinking when they articulated the laws' purpose as to protect "the natural and existing state." This approach recognizes that fish populations and communities are closely associated to the quantity and quality of the existing habitat and properly functioning streams and rivers. And, whether or not we fully understand the interaction of the habitat and the fish, preserving the habitat should preserve the fish. This is remarkably consistent with saying of Aldo Leopold, the father of wildlife conservation:

"To keep every cog and wheel is the first precaution of intelligent tinkering."

As biologists, we see the existing habitat and apply our understanding of the biology (cogs and wheels, if you will) and seek the appropriate conditions for doing the project so that habitat is maintained or improved (the tinkering).

Though enacted 50-plus years ago, Montana's stream protection laws have become more important today if we intend to maintain our valuable fisheries (which is worth almost $1 billion statewide). Pressures on habitat are increasing with population growth and development, for example. As a result, permitting is becoming a bigger part of our job.

Habitat protection through permitting is the "in-the-trenches" aspect of our Habitat Program compared to the flashy, "show-and-tell" restoration program. Nevertheless, habitat protection is often more effective. For one, you don't have to live with bad habitat in the first place and, two, you don't have to pay to repair it. Making a difference and keeping fisheries the same might seem counter intuitive, but with excellent habitat already, that's exactly what we are doing.

Fish kill in the Upper Clark Fork River

Nathan Cook, Fisheries Biologist

In early September of 2019, FWP received reports of dead fish in the Upper Clark Fork River (UCFR). A few days after the reports, we went out to look for dead fish and investigate the cause of the mortalities. In one day, we counted 32 dead fish including 8 Brown Trout, 2 suckers, and 22 Mountain Whitefish. While this may not sound like a lot of fish, there were not many trout in this part of the Clark Fork River to begin with based on our 2019 spring electrofishing (see section on the Upper Clark Fork Fishery). Because the fish population was low to begin with, it is reasonable to conclude that the fish kill affected most, if not all, of the fish in this part of the river.

Dead Brown Trout collected from the Clark Fork River near Galen. These fish were found a few days after heavy rains washed mine tailings in to the river.

It appears that the fish kill was rather localized as the dead fish were concentrated in a 2 mile reach of the Clark Fork River. All of the mortalities we found were within a reach of the Clark Fork near Galen where the banks and floodplain contain high levels of copper, cadmium, zinc, lead, and arsenic as well as less toxic metals such as iron. These contaminants were deposited in the area by a large flood back in 1908 which carried mine wastes downstream from Butte area mines. In some places, concentrations of these contaminants are so high that vegetation cannot grow, leaving bare soil. These bare patches are referred to as "slickens."

Berms were constructed around slickens in the late 1980s with the goal of keeping contaminants out of

the river. The berms functioned pretty well for 25+ years, but many have started to fail in recent years. Prior to construction of these berms, fish kills in the UCFR were fairly common, particularly right after big rainstorms. These storms can wash slicken material into the river to the point where metal concentrations are toxic to fish and other aquatic life. The September 2019 fish kill occurred shortly after a series of intense thunderstorms. When visiting the area, it was clear that these rains blew out some berms and caused runoff of slicken material into the UCFR. The good news is that the slickens in the area of the fish kill will soon be cleaned up as part of the State's

Large puddle on a "slicken." The blue hue of the water comes from high levels of dissolved copper. Photo credit: Casey Hackathorn

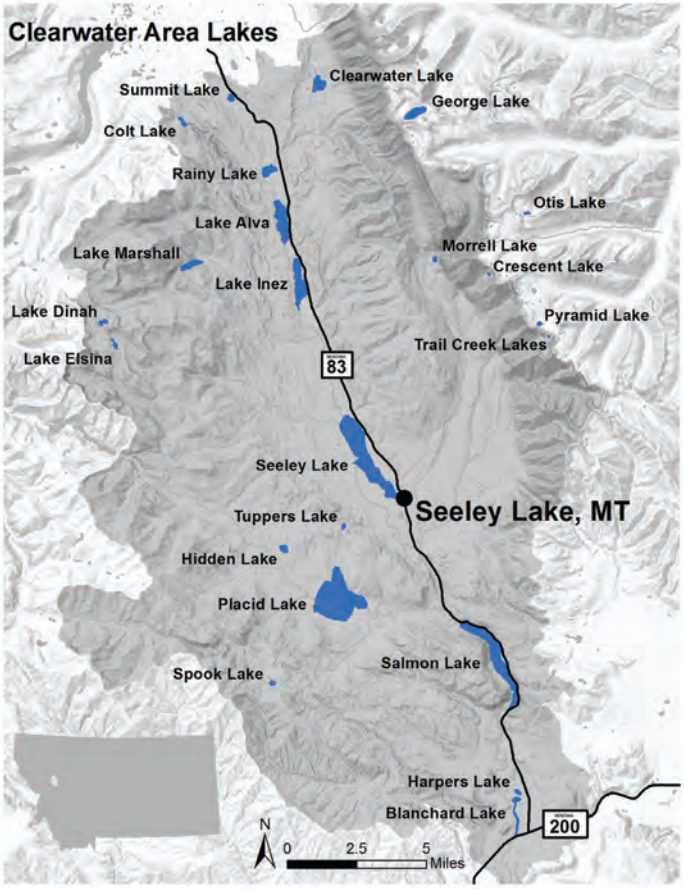
superfund remediation. This area is next on DEQ's list after current work is finished on the Grant-Kohrs National Historic Site. The fish kill this fall was a stark reminder of the impacts of the area's mining history and highlights the importance of a timely and thorough remediation of the Upper Clark Fork River.

Blue-colored rocks in the Clark Fork River that came from aneroding slicken. Photo credit: Casey Hackathorn

Lake Fishing Opportunities Abound in the Clearwater Basin Near Seeley Lake

Ladd Knotek, Fisheries Biologist

The Clearwater Valley and Seeley Lake area offer year-round lake fishing opportunities of all shapes and sizes. Anglers can catch everything from Largemouth Bass to Cutthroat Trout and choose from more than 20 different lakes over a 3,000 ft elevation range, all within a 15 mile radius of Seeley Lake, MT. Best advice: Just pick your quarry, choose the right water body, and pencil in a trip that matches the elevation and peak fishing season for your adventure…



Lake fisheries in the Clearwater Basin area near Seeley Lake, MT

High Elevation 'Mountain' Lake Fishing

In summer and fall, anglers follow forest roads and trails to fish scattered high elevation 'mountain' lakes on both sides of the Clearwater Valley. Because of low productivity and year-round cold water temperatures, these waters only support trout fisheries (typically Westslope Cutthroat or Rainbow Trout). Most mountain lakes form

in glacial cirque basins and, in this area, occur at 5,700-6,800 ft elevation. Examples include Spook, Dinah and Elsina Lakes on the west side of the valley (Mission Mountains) and Crescent and Trail Creek Lakes on the east side (Swan Mountain Range).

Avid adventure seekers even cross the Swan Mountain Divide via Pyramid Pass or other routes and drop into Bob Marshall Wilderness Lakes. Although there is typically a serious elevation gain, many of these waters lie within 3-4 miles of open forest roads or established trailheads and can offer fantastic trout fishing. Examples to the east of the Clearwater Valley, just over the Swan Divide, include Pyramid, Otis and George Lakes.

The mountains surrounding Seeley Lake contain a number of hidden lake 'jewels' that provide great trout fishing near town.

Mid Elevation Lakes

Some of the best fishing for large cutthroat trout and Brook Trout in the Seeley Lake area can be found in mid-elevation (4,200-4,800 ft) lakes scattered around the Clearwater Valley perimeter. All of these lakes are easy to access (either directly or via a short hike) from the open road network, are open to manually or electric powered watercraft, and offer outstanding scenery. They also provide higher productivity than ultra-sterile high mountain lakes, typically turning out some larger fish. Fishing is productive year-round on these waters, but most angling pressure occurs from May-October as road access is normally blocked by heavy snow during the winter ice fishing season. Examples of mid-elevation lakes in the area are Clearwater, Colt, and Hidden Lakes.

Mid-elevation lakes in the Clearwater Basin are easily accessible and offer excellent fishing and scenery.

Fishing on the Clearwater Valley 'Chain of Lakes'

Anglers visiting the Seeley Lake area often associate local lake fishing with the six larger waters that form a chain from north to south along the valley floor (paralleling Hwy 83). This sequence of glacial trough lakes (80-1,300 acres) begins near the subtle divide that separates the Swan and Clearwater Valleys (near Summit Lake) and continues south towards the main Blackfoot River Valley. Good fishing on the Clearwater chain-of-lakes begins with Rainy Lake at the top and proceeds downstream to Alva, Inez, Seeley, and Salmon Lakes, which are all connected by short segments of the Clearwater River. Placid Lake lies just to the west and its outlet enters the chain between Seeley and Salmon lakes. Elbow and Blanchard 'Lakes' also lie on the Clearwater River downstream of Salmon Lake, but are really just slow, wide spots or oxbows along the river.

Upper valley lakes include Rainy Lake, Lake Alva and Lake Inez. All offer good coldwater fishing opportunity, but with different types of boat access/rules, scenery, and fishing experiences. Rainy Lake provides a quality cutthroat trout fishery that is easily accessible via a ~ 100 yd trail from the U.S. Forest Service campground parking lot. The lake is open to any type of carry-in watercraft, as long as it is powered manually or with an electric trolling motor. Lake Alva, a larger lake located just downstream, also provides a good cutthroat trout fishery and trailered boat access. However, no wake regulations are now in place to provide a low key, quiet fishing and boating opportunity. Both Rainy Lake and Lake Alva have

unaltered shorelines and low boat traffic as they are surrounded by public lands. The Lake Inez fishery is similar to the upper lakes, but restrictive boating regulations are not in place and much of the lake perimeter consists of privately owned cabins. Lakes Alva and Inez primarily offer 10-15 inch cutthroat trout, although smaller kokanee are also abundant and Lake Inez maintains low numbers of quality Northern Pike.

Rainy Lake is a popular valley destination for paddlers, photographers, and avid cutthroat trout anglers.

Seeley and Salmon Lakes offer mixed coolwater fisheries consisting of trout and kokanee, as well as introduced warmwater fish like Northern Pike and Yellow Perch. Most anglers on these lakes target illegally introduced Northern Pike, as populations are abundant and regulations allow no limits. However, a growing number of anglers have been attracted to quality Brown Trout and kokanee fisheries on these waters (see below).

Placid Lake is the most productive water in the drainage and is managed as a diverse coolwater fishery. Although much of the lake's fish biomass is tied up in native non-game fish (peamouth, suckers and Northern Pikeminnow or squawfish), it also provides quality fishing for kokanee, Westslope Cutthroat Trout, Largemouth Bass and Brown Trout. The former two species are stocked annually by FWP, while the latter two are self-sustaining. Catch-and-release regulations for bass and low fishing pressure on Brown Trout have sustained quality fishing and some trophy-sized catches.

High Quality Brown Trout

Placid Lake, Salmon Lake, and Seeley Lake also support trophy Brown Trout worth pursuing. Brown Trout over 20 inches are now common in all three lakes, with good numbers over 25 inches. Brown Trout grow to large sizes in lower Clearwater Valley waters due to higher overall productivity and abundant kokanee, an excellent source of protein for fast growth and high body condition. Brown Trout can be caught year-round, but anglers are particularly successful fishing lake inlets and around schools of kokanne in deeper water. However, these same waters are also home to large native Bull Trout that use the same food sources and occupy some of the same habitats, so anglers should be mindful in identifying fish and carefully release all Bull Trout.

28 inch Brown Trout caught and released in Salmon Lake.

Valley Lake Kokanee Fisheries

Abundant kokanee populations can be found in all of the larger valley lakes, including Alva, Inez, Seeley, Salmon, and Placid. The problem in upper lakes is that these landlocked sockeye salmon are a little too abundant. Because kokanee only live a few years and rely almost solely on zooplankton and insects for food, they tend to stunt when things get crowded. Closer monitoring, reduced stocking rates, and liberal-

ized harvest opportunities have been implemented in recent years to help improve the fishery. Efforts have started to pay off in Salmon and Placid Lakes, where adults are now reaching 13 inches prior to spawning. Populations in upper lakes have been slower to respond to management changes due to abundant natural reproduction, less harvest and lower lake productivity (upper lakes are inherently more sterile).

Kokanee Salmon are a popular sport fish that are relatively easy to catch once they reach 11 inches.

Easy Access and Family Fishing Opportunities

A common question to FWP from parents and anglers with limited mobility: Is there a place that's close where I can take my kids or easily access good fishing from shore? One frequent answer is Harpers Lake. This small glacial pothole lies right off Highway 200 on the Blackfoot-Clearwater Wildlife Management Area (B-C Game Range), about 10 miles south of Seeley Lake. Harpers Lake is stocked generously and frequently with larger trout from FWP hatcheries in the region. It is not unusual for anglers to catch a number of 1-2 lb Rainbow Trout and cutthroat trout, and occasionally, a 10 lb retired brood fish right from the shore near the parking lot. Anglers can also fish the entire lake perimeter or launch a small watercraft as long as it's powered manually or with an electric motor.

Flint-Rock Drainages

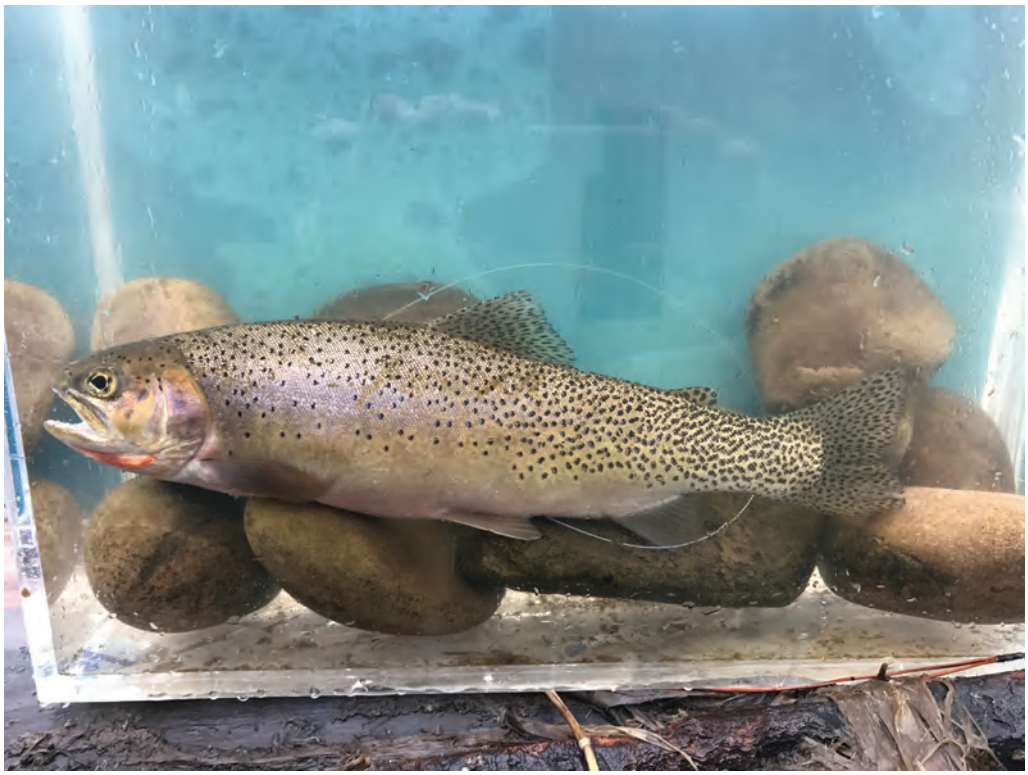
Brad Liermann, Fisheries Biologist

Rock Creek

Rock Creek is a world class trout fishery which also supports a robust native fish community including large river-dwelling Westslope Cutthroat Trout. Westslope Cutthroat Trout comprise a major component (appx. 40%) of the salmonid sport-fishery in the Upper Rock Creek drainage. While Westslope Cutthroat Trout are found in lower densities lower in the drainage, these populations still provide quality angling opportunities with angler catch rates of Westslope Cutthroat Trout being quite high in comparison to their abundance.

Understanding native fishes' migratory behaviors is a key component of properly managing these species. Spawning migrations are obviously an important period in a native fishes' life as the successful completion of spawning is imperative to sustaining populations. Due to the long distances commonly traveled by Westslope Cutthroat Trout to spawn in their natal tributaries, they commonly encounter difficulties in completing these migrations and may not even survive. Monitoring these migrations often identifies causes for mortality/impairment that may be improved via restoration such as screening an irrigation diversion or removing a culvert barrier. Identifying key spawning habitat also allows managers to better protect these habitats and may provide a way to identify and prioritize areas in need of restoration or land acquisition/easement projects. Radio telemetry was the chosen method used to understand spawning migrations of Westslope Cutthroat Trout in Rock Creek.

Harpers Lake is an easily accessible, year-round trout fishery that is stocked frequently with catchable trout and trophy-sized, retired 'brood' fish from the FWP hatchery system.



Westslope Cutthroat Trout implanted with a radio tag in Rock Creek- notice the thin antennae dangling behind the fish.

Results from the 2018 and 2019 radio telemetry efforts yielded some interesting results. Multiple tributaries were identified as key spawning tributaries with those located in the middle and upper portions of the drainage being most used by spawning fish. Interestingly, multiple fish also used the lower portions of larger tributaries to spawn which was a surprise to biologists. Generally native trout spawning occurs primarily in upper portions of drainages where the highest quality habitat is typically found. During implantation of radio tags, fin clips are taken off each fish to assess genetic purity of tagged fish due to Westslope Cutthroat Trout commonly hybridizing with non-native Rainbow Trout. Results of these genetic analyses in 2018 and 2019 showed that fish classified as adult Westslope Cutthroat Trout caught in Rock Creek were commonly non-hybridized fish. This was another result that was very surprising to biologists. These results from genetic analyses showing that a high proportion of radio tagged Westslope Cutthroat Trout were non-hybridized led to a shift in study objectives in 2020. The new focus will be on understanding how a large portion of this population is avoiding hybridization. Methods we will use to assess this includes a combination of radio telemetry and tributary genetic analyses to determine how Westslope Cutthroat Trout appear to be avoiding hybridization both in terms of the timing of spawning and the locations they select for spawning. Westslope cutthroat, Rainbow Trout and hybrids of these species will be tracked in 2020 and 2021 to better understand these factors. A graduate student from the University of Montana will assist with completing this research.

Georgetown Lake

Following the fish kill observed in spring 2018, Montana Fish, Wildlife & Parks monitored dissolved oxygen levels closely at Georgetown Lake in 2019. Measurements indicated that dissolved oxygen concentrations were again lower than normal and were nearly as bad as those observed in 2018. Ice also stayed on Georgetown Lake longer than normal in 2019 which can cause dissolved oxygen conditions to further deteriorate. Fortunately, no fish kills were observed during spring 2019.

Snowpack was very good in 2019 allowing operators to easily fill Georgetown Lake to full pool. This also allowed operators to maintain good water levels going into winter 2019. This should provide for excellent overwinter conditions in Georgetown Lake this winter and hopefully excellent overwinter survival of trout and salmon. Montana Fish, Wildlife & Parks staff will again be monitoring dissolved oxygen several times over the winter to ensure that habitat conditions are acceptable for trout and salmon survival. Current snowpack in the Georgetown Lake area is below normal so hopefully further snow is accumulated to provide adequate water to fill Georgetown Lake this spring. Gill netting to assess fish abundance and size structure is completed every other year at Georgetown Lake and will be completed in Fall 2020.

Bitterroot

Jason Lindstrom, Fisheries Biologist

This past year was a time of change for fisheries management in the Bitterroot Valley. Longtime fisheries biologist Chris Clancy retired after more than 30 years of dedicated service to the aquatic resources of the basin. Jason Lindstrom replaced Chris as the new management biologist in June of 2019. Jason brings more than a decade of fish management experience to the Bitterroot from his previous position with Fish, Wildlife & Parks (FWP) in Montana's Upper Clark Fork Basin. Jason was raised in the Bitterroot Valley and is excited to return to the area that means so much to him and his family. He looks forward to working with the numerous stakeholders with interests in the watershed to protect and improve aquatic resources.

While this may not be news to many anglers who frequent the Bitterroot River, it has become an extremely popular place to fish. During the average summer season (May-September) the mainstem Bitterroot River and its forks (the East Fork and West Fork) see over 60,000 angler days. That's a lot of fishing trips in a five-month period! What also may not be news to many people is that water is the lifeblood of a fishery. Especially a trout fishery like the Bitterroot River. Without an adequate amount of cold, clean water, the fishery suffers. In many large rivers in western Montana, drought conditions in the summer can lead to low flows, high water temperatures and low oxygen levels, all of which can limit trout survival, especially native species like westslope cutthroat and Bull Trout. During these times, FWP is often required to initiate "hoot-owl" restrictions to limit fishing activity to the morning and early afternoon hours to reduce stress on angled fish. This is done when flows drop to predetermined levels or water temperatures rise to 73º F or higher for three consecutive days. Fortunately, in the Bitterroot, we are rarely forced to implement these sorts of restrictions. That is because we have an ace in the hole, sort of speak. That "ace" is Painted Rocks Reservoir located approximately 20 miles up the West Fork of the Bitterroot River, southwest of Darby. Painted Rocks is a 600-acre reservoir owned and operated by Montana Department of Natural Resources and Conservation (DNRC) that can store approximately 32,000 acre-feet of water. An acre-foot is the amount of water it takes to cover one acre of land, one foot deep. While the reservoir was originally constructed in 1939 to store irrigation water for farm lands in the Bitterroot Valley, a unique agreement between agricultural users, government agencies and conservationists in 2004 allows FWP to reserve 15,000 acre-feet of water each year for the purpose of instream flow in the mainstem of the Bitterroot River. Agricultural users, represented by the Painted Rocks Water User Association (PRWUA), have an additional 10,000 acre-feet of water that they can store and release each year to help meet downstream irrigations needs. All releases are administered by the Bitterroot River Water Commissioner who is tasked with making sure FWP and the agricultural users receive their contracted water when they call for it.

Painted Rocks dam.

FWP's instream flow water stored in Painted Rocks Reservoir is typically not called on until mid-to-late July, but this is dependent on things such as remaining snowpack and the amount of spring moisture that was received. Ideally, we like to hold on to the water for as long as possible to ensure there will be enough to meet downstream flow targets in the late summer. Ideally, we like the water to be available through September, because by this time many agricultural users

have stopped irrigating and the weather pattern has shifted to cooler temperatures. The critical reach that we try to keep flows in during the summer is the mainstem of the Bitterroot River upstream of Bell Crossing (north of Victor). Historically, this reach has struggled most with summer flows. Ideally, we try to maintain a flow rate of 400 cubic feet per second (cfs) at the Bell Crossing Bridge. However, in years when water is in short supply, this can be tough to do. FWP meets each spring with the PRWUA, DNRC, and the Bitterroot Water Commissioner to come up with a realistic flow target given the water year that is forecasted. In years of shortage we often find it necessary to lower the flow target. If we don't, we run the risk of running out of water before the summer is over. While the Painted Rocks water is a great source of instream flow, it is not a bottomless bucket. Each year in late June or early July FWP receives inquiries about when water will be released from Painted Rocks Reservoir. Often these inquiries come from people fishing and recreating on the West Fork of the Bitterroot River. As spring runoff subsides and flows drop to levels that make floating difficult, requests come in asking the department to release water from storage. However, it's important to remember that the stored Painted Rocks water isn't for recreation flows on the West Fork. Often flow and temperatures are still okay in the mainstem of the river and it is in the best interest of the Bitterroot fishery to hold on to the stored water a little longer to guard against running out in late summer. Over the last 15 years, the Bitterroot River has survived a number of drought years and remained open to fishing despite FWP initiated closures on other rivers in the region.

Bitterroot River Brown Trout captured near Bell Crossing that benefited from instream flows provided from Painted Rocks Reservoir.

Blackfoot River Fishery Update

Patrick Uthe, Fisheries Biologist and Craig Podner, Conservation Technician

Every two or three years, FWP personnel use drift boat electrofishing units to assess trout status and trends in the mainstem Blackfoot River. We shock the river as flows increase with runoff, but while the river is still safe to float (2,500 cfs – 8,000 cfs). Two crews survey simultaneously, but independently, along each bank. Many fish seek slow-water refuge along the stream margins when discharge increases during runoff, so shocking near the banks enables us to capture enough of the population to generate a population estimate.

We survey three long-term monitoring sections – Johnsrud, Scotty Brown, and Wales Creek. The Johnsrud and Scotty Brown sections have been surveyed since 1989 and the Wales Creek section has been surveyed since 2002. Our surveys rely on mark-recapture techniques. We electrofish the section, marking each fish with fin-clip, and then resample the same section a week later. During the recapture event, we are able to identify fish that were marked in the original sampling event. We can estimate population size using models that incorporate the proportion of marked to unmarked fish in the recapture event. This provides us with abundance estimates, so we can assess changes in species composition and population size through time.

Long-term trends in overall trout abundance have remained relatively stable (Figure 1). Estimates in 2019 were similar to long-term averages within each section. The trend in the Johnsrud section shows a slight decrease, but the 2019 estimate was only slightly lower than the long-term average (average=713 trout/mile). However, it was very similar to the estimates from the previous surveys since 2014. Since the late 1980's, cutthroat trout have increased dramatically in the Blackfoot River (Figure 2). We attribute this increase to harvest restrictions implemented in 1990 and the systematic restoration of priority tributaries in the basin over the past three decades. Fish in the mainstem river migrate to the tributaries to spawn. Their offspring spend 1-3 years in the tributaries before migrating to the mainstem Blackfoot River or Clark Fork River to mature prior to returning to spawn in their natal tributaries. Therefore, improving passage, habitat quality, and spawning and rearing habitat in the tributaries are effective strategies for improving trout abundance in the mainstem river.

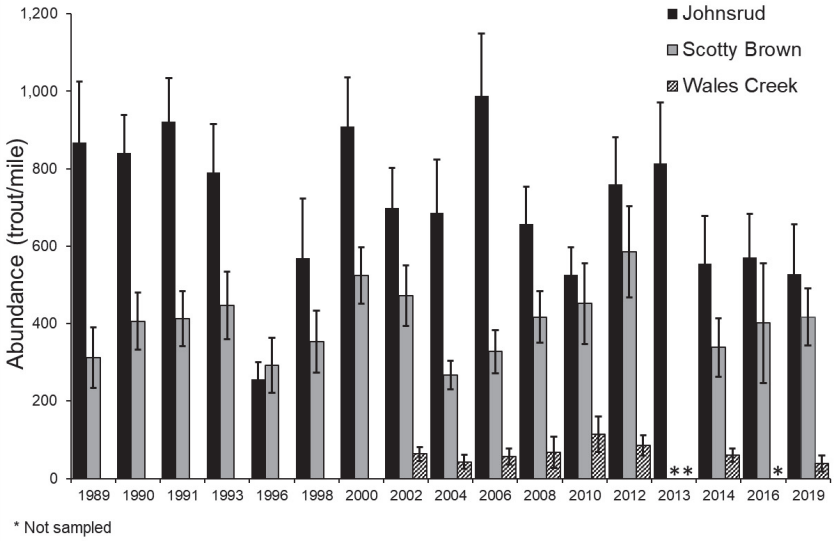


Figure 1. Abundance estimates and 95% confidence intervals for trout with lengths greater than 6 inches (species combined). Asterisk denotes years in which a particular section was not sampled.

Biologists rely on size structure data to make inferences about survival of different year-classes, as well as the overall recruitment to the fishery. Looking at Figure 3, an initial observation is the presence of multiple size (age) classes. Of particular note, is the large proportion of the total catch that is comprised of 6-10 inch fish, which are sub-adult fish. This indicates recent year-classes had high survival and are recruiting to the fishery. Furthermore, this suggests that anglers should continue experiencing quality fishing as this sub-adult size class grows and matures. Anglers should also note the presence of fish greater than 20 inches for all species! Reports from anglers in 2019 indicated high catch rates, and based on the size structure in these surveys, good fishing with the opportunity to catch quality-sized fish should continue into the coming years.

The mainstem surveys also provide a great opportunity to capture and evaluate adult Bull Trout. Recent developments in genetic technology enable biologists to assign captured bull to their tributary of origin. This is a viable technique because Bull Trout have a strong homing rate, which causes individuals to have unique genetic signatures among spawning tributaries. We captured 44 Bull Trout in the 2019 surveys, with most of them assigning back to the North Fork Blackfoot. We also had some that assigned to Monture Creek. Interestingly, a couple of them assigned to Rock Creek, which provides further evidence of large-scale, inter-basin movements in the upper Clark Fork drainage. Other interesting life history information gathered in this year's survey were age and growth data from PIT-tagged fish. As part of the Milltown Dam removal evaluation, Bull Trout were PIT tagged in the Clark Fork and Blackfoot rivers from 2010 through 2015. We captured two Bull Trout this year that were originally tagged in 2012. The fish were 20-22 inches long when they were tagged in 2012. Although they both grew only 8 inches in length to reach current lengths of 28 and 30 inches, one grew 8 pounds and the other grew 5 pounds! These individuals are prime examples of biological benefits that these migratory trout gain from rearing in tributaries and then migrating to large rivers to grow and mature.

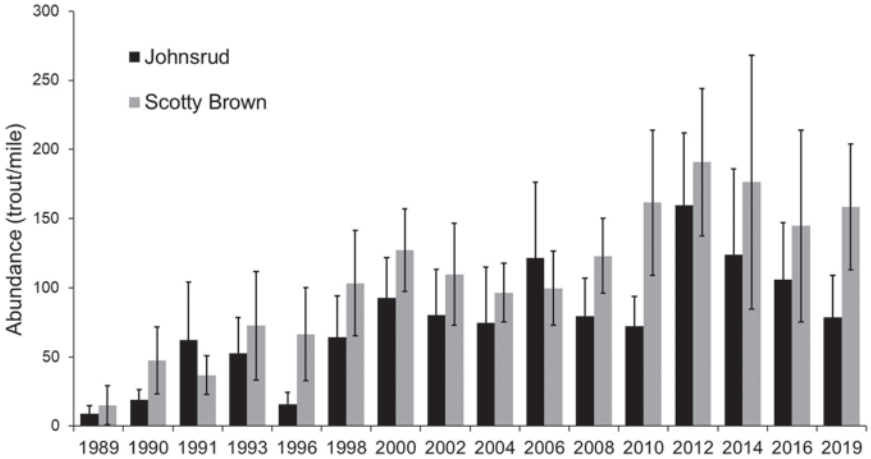


Figure 2. Abundance estimates and 95% confidence intervals for Westslope Cutthroat Trout with lengths greater than 6 inches.

A common question from anglers is, how old are these large Bull Trout? Fish ageing is typically assessed by analyzing scales or otoliths (inner ear bones) and viewing cross sections under the microscope, much like reading like the growth rings on a tree cross section. Bull Trout ageing studies have not been conducted in the Blackfoot, but we can look at studies conducted elsewhere and use age-at-length keys to estimate the age of the fish we caught. We know that they have

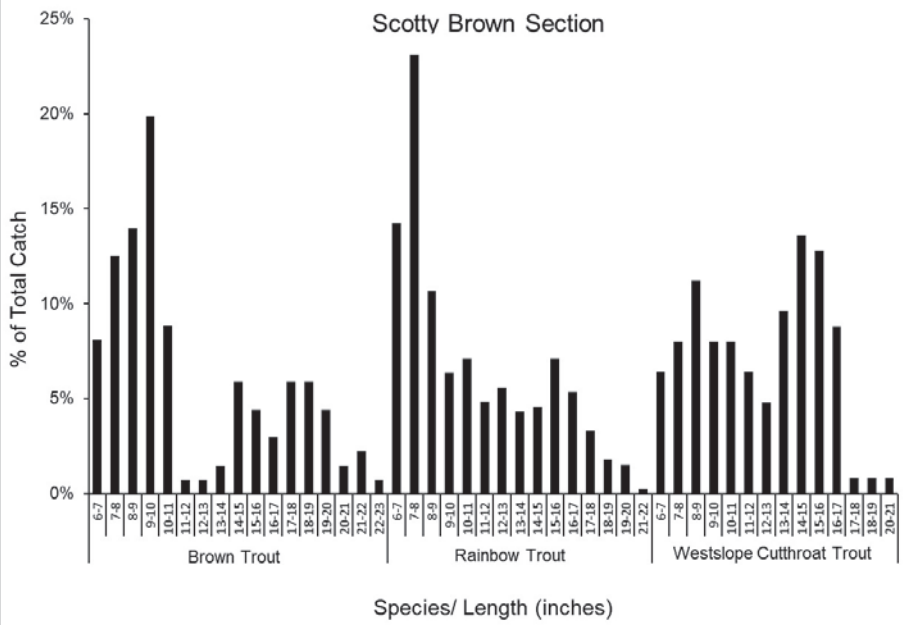


Figure 3. Length frequency histograms for trout captured in the Scotty Brown Section, 2019.

survived for at least seven years since they were originally tagged, so we can add those years to their estimated age at tagging. Age and demographic studies have been conducted in Eastern Oregon, the Flathead River drainage, and St. Mary's River. In those studies, the 20-22 inch size class was estimated between 6 and 8 years old. Based on those studies, we estimate that the Bull Trout we handled were likely 13-15 years old when we captured them this year, and those weren't even the largest Bull Trout encountered in our surveys! This is a strong confirmation that Bull Trout in the Blackfoot are surviving to very large sizes and old ages. With the threatened status of Bull Trout and the longevity of individual fish, it really highlights the importance of doing everything we can to help Bull Trout and eliminate any controllable sources of mortality. Anglers are reminded that intentionally targeting Bull Trout is illegal in the Blackfoot watershed, and all incidentally caught Bull Trout must be released immediately.

Fish and Fire

If you are a regular angler on the Blackfoot, you likely experienced abnormally turbid conditions throughout the summer and early fall. Many large rainfall events occurred in the middle section of the watershed that burned in the 2017 Rice Ridge Fire. Periodic storm events in early summer caused noticeable increases in turbidity, but the largest increase occurred in late-July when a massive thunderstorm in the Monture Creek drainage caused landslides and debris flows in tributaries to Dunham Creek (Figure 4). Excessive sediment can suffocate incubating eggs and cause direct mortality to fish from gill abrasion. However, not all the effects from fire and increased sediment are negative. In nutrient-poor streams, the nutrient-rich sediments can boost primary productivity and insect production, which increase food availability for fish populations. For example, following the Snow Talon fire in 2003, cutthroat trout and Bull Trout populations in Copper

Figure 4. Debris flow in Spruce Creek (Left, Credit: Forest Service). Sediment deposition in Dunham Creek following the disturbance upstream in Spruce Creek (Right, Credit: FWP).

Creek (upper Blackfoot drainage) experienced significant increases in abundance, which was attributed to increased stream productivity following the fire.

Figure 5. Installing the new ditch liner before the 2019 irrigation season.

Another storm in September caused a debris flow in Yellowjacket Creek, a tributary to upper Monture Creek. This caused elevated turbidity and sediment input throughout Monture Creek. Anglers should be aware that more sediment will likely be mobilized in the future when flows increase and entrain sediment that was deposited along the margins and in slow water habitats (Figure 4). Given the potential increase in turbidity outside the normal runoff season, the unpredictable nature of these disturbances may catch anglers off-guard. Please stay in tune with changing conditions, and if they disrupt your original plans, take the opportunity to experience some of the other excellent fishing opportunities on the many tributaries and lakes in the watershed.

Water Conservation in the Blackfoot

As the snowpack continues to develop through the winter, it's a good time to reflect on the previous water year. The Blackfoot River experienced an early, but above-average runoff in 2019. However, after runoff subsided, discharge was well below the median for most of the summer. We kept a close eye on river conditions because of the elevated temperatures and lack of frequent precipitation. Fortunately, those same storms that created unfavorable fishing conditions also improved flows and moderated temperatures in the Blackfoot River. Although temperatures remained elevated through early August, they did not reach the critical threshold for implementing angling restrictions (maximum temperature of 71 degrees for three consecutive days). Restoration partners, including the Big Blackfoot Chapter of Trout Unlimited, The Blackfoot Challenge, and state and federal agencies work with private landowners to restore habitat and implement water conservation measures. Furthermore, The Blackfoot Challenge works with water users in the basin to develop individual drought response plans as a proactive measure to conserve water and irrigate more efficiently. In addition to working with private landowners to develop fish habitat projects, FWP works to improve aquatic resources on department-owned lands. A recent example is the lining of the Dryer diversion ditch that conveys irrigation water from Cottonwood Creek to pastures on the Blackfoot-Clearwater WMA. Prior to lining in 1995, the ditch experienced a 90% water loss between the point of diversion and the point of use. Since 1996, the water savings has been converted to instream flow to prevent dewatering in Cottonwood Creek. During the exceptionally high runoff in 2018, overland flow damaged the irrigation ditch and destroyed a large section of the liner. We were able to repair the ditch and reinstall approximately 2,500 feet of new liner in 2019 (Figure 5).

Upper Blackfoot Mining Complex Restoration

With many great restoration projects occurring in the basin, it can be hard to pick one project to highlight, but for this year's newsletter I want to focus on the Upper Blackfoot Mining Complex (UBMC). This has been a top priority since the tailings dam breached in 1975. The dam failure released 100,000 tons of toxic mine tailings that became deposited in the river channel and floodplain. Fish numbers were severely depressed throughout the upper Blackfoot River, and the most heavily impacted tributaries and upper river sections were devoid of aquatic life. In 2009, Montana DEQ, Montana NRDP, and the USFS initiated cleanup and completed a water treatment plant. Since that time, over

one million cubic yards of contaminated material have been removed and hauled to the repository! The restoration and mine waste removal has been completed downstream of the water treatment facility to the Pass Creek marsh. For more information about project background, upcoming plans, and project updates visit the MT DEQ website (https://deq.mt.gov/Land/statesuperfund/ubmc). In September, we conducted post-restoration surveys in a few sections that were completed earlier in 2019 (Figure 6). We were pleasantly surprised to find fish in areas of the upper Blackfoot River that had not supported fish since 1975. We captured multiple Brook Trout and a Westslope Cutthroat Trout. Fish presence in these recently completed sections is very encouraging, and we are excited to monitor fish expansion throughout the UMBC impact area over the next few years.

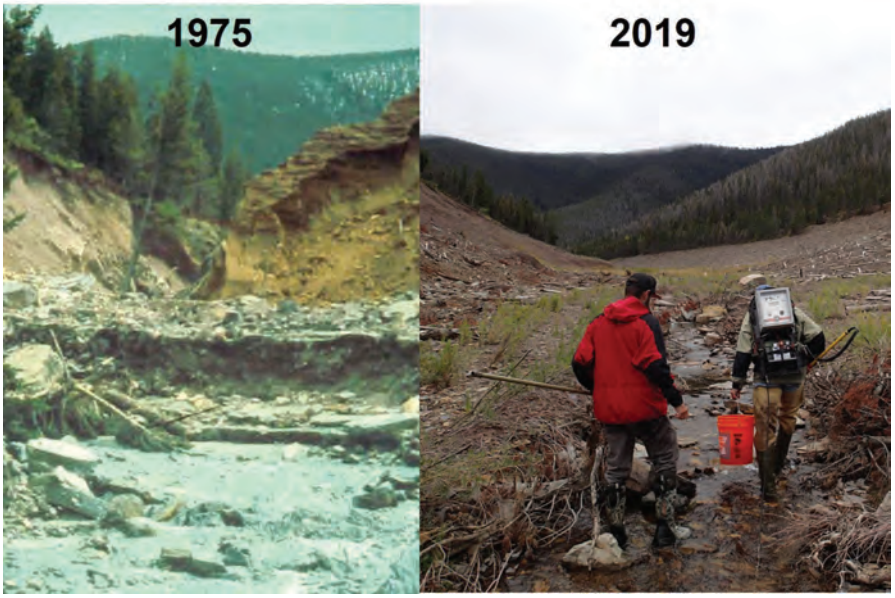


Figure 6. Beartrap Creek below the dam in 1975 (left) and Beartrap Creek after restoration in 2019 (right).

Sampling the Upper Clark Fork River while remediation is ongoing in the background.

Upper Clark Fork Fishery

Caleb Uerling, Fisheries Biologist

Every year FWP samples fish populations along the Upper Clark Fork River (UCFR) at long-term monitoring sites. We use the long-term dataset as a tool to monitor trends in fish populations, these data can answer many questions we have about the fishery. One of those questions is simply 'how do the fish populations look compared to the long-term average?'. In my area of the UCFR, we have five long-term sites from Warm Springs Ponds downstream to Gold Creek. We primarily monitor Brown Trout at these sites, as they make up most of the trout fishery. Cutthroat and Rainbow Trout are present in low densities, but we generally catch too few to calculate a population estimate. Mountain Whitefish and several nongame species are also found in this reach of the Clark Fork River.

How are Fish Numbers in the Upper Clark Fork River?

At the upper most section below Warm Springs Ponds, the Brown Trout population estimate for 2019 was 82 fish per mile. This is the lowest population estimate since FWP started monitoring this reach in the early 1970s. Additionally, the last five years at this site have been five of the lowest six estimates we have had at this site since monitoring started. The average estimate for this site has been 1,265 Brown Trout per mile since the 1970s, but the general trend since the mid 1980s has been downward. The next section as we move downstream is just above Perkins Lane, Brown Trout were estimated at 13 fish per mile in 2019. This site was only recently added to our long-term monitoring, but the estimate was well below the average and far lower than we would expect in a river this size. The next section is upstream of Deer Lodge, the Brown Trout population was estimated at 95 fish per mile in 2019. This is also the lowest estimate we have observed at this section. However, we have only monitored this site since 2010. We then go to a section downstream of Deer Lodge where the Brown Trout population estimate was 233 fish per mile in 2019. This site has been monitored since the 1970s, with the 233 fish estimate from this year being about average for this section. The most downstream section we monitor is upstream of Gold Creek, and the Brown Trout population was estimated at 279 fish per mile. This section has been monitored since 2008 and has generally had between 200 and 600 fish per mile. This years estimate of 279 fish per mile was slightly below average, but well within the range we have observed since 2008. It should be noted that the upstream sites had the lowest estimates on record this year but the decline started several years ago.

Explaining the Numbers

The UCFR has a variety of issues that influence the fish population. Some of the main issues include chronic dewatering and low flows, contamination due to past mining practices, water temperature, and harmful land use practices. However, tying the declining fish numbers to one specific variable has been difficult. The most drastic declines have been in sections nearest Warm Springs Settling Ponds, but this area has historically supported some of the highest densities. Understanding the relationship between variables in the ponds and fish numbers is an ongoing effort. Trout numbers in the UCFR have been relatively variable compared to other rivers, but one variable that has explained some of the variability is flow. In the past, fish recruitment has been highly predictable based on what kind of water year we had three years previously. For instance, higher flows one year is related to higher numbers of trout three years later. However, recent population estimates have deviated from that trend, causing concern that there are other issues impacting the fishery in ways they haven't in the past (Figure 1). With the exceptional water years over the past several seasons we will have a great opportunity to see how the fishery responds because recruitment is predicted to be high. Muddying the waters is the effect of mine waste in the floodplain entering the river and causing fish kills. This past summer a large September thunderstorm near Galen washed mine contaminants into the river. Dead fish were observed in the river for several weeks. It is likely these fish kills might have been taking place for several years as berms that were designed in the 1980's to keep contaminants out of the river began to fail. It is unknown whether fish kills alone are responsible for the declining trout populations or if one of the other variables that impact the UCFR could be the cause.

Remediation of the Upper Clark Fork

The good news is the UCFR is currently being cleaned up as part of the nation's largest superfund complex, with individual sites ranging from Butte to Missoula. In 2012 the Montana Department of Environmental Quality (DEQ) and The Montana Natural Resource Damage Program began cleaning up the heavy-metal contaminated soils in the floodplain and banks of

the UCFR. There are 22 phases of this cleanup spread from Warm Springs to Garrison. To date two phases near Warm Springs and two near Racetrack have been cleaned up and re-opened to the public. In 2019 DEQ began work on two more phases on the Grant-Kohrs National Historic Site near Deer Lodge. Anglers should be aware the FW Commission voted to close the 2.6 mile stretch of river through the Grant-Kohrs Ranch until October 2020 for safety reasons. The closure stated DEQ could provide periods when the river was safe and could be open to the public. Up to this point the river has been able to remain open as DEQ has deemed it safe for recreating. When contacted for this letter, DEQ did not have any immediate plans that would require closing the river, but recreationalists should be aware that it is possible at any time. If the river is closed signs will be posted at Arrowstone Park in Deer Lodge and at the upstream extent of the phase being worked on. DEQ plans to be finished with these two phases in the coming year, they will then move upstream to begin cleaning up the area impacted by the fish kill upstream of Galen.

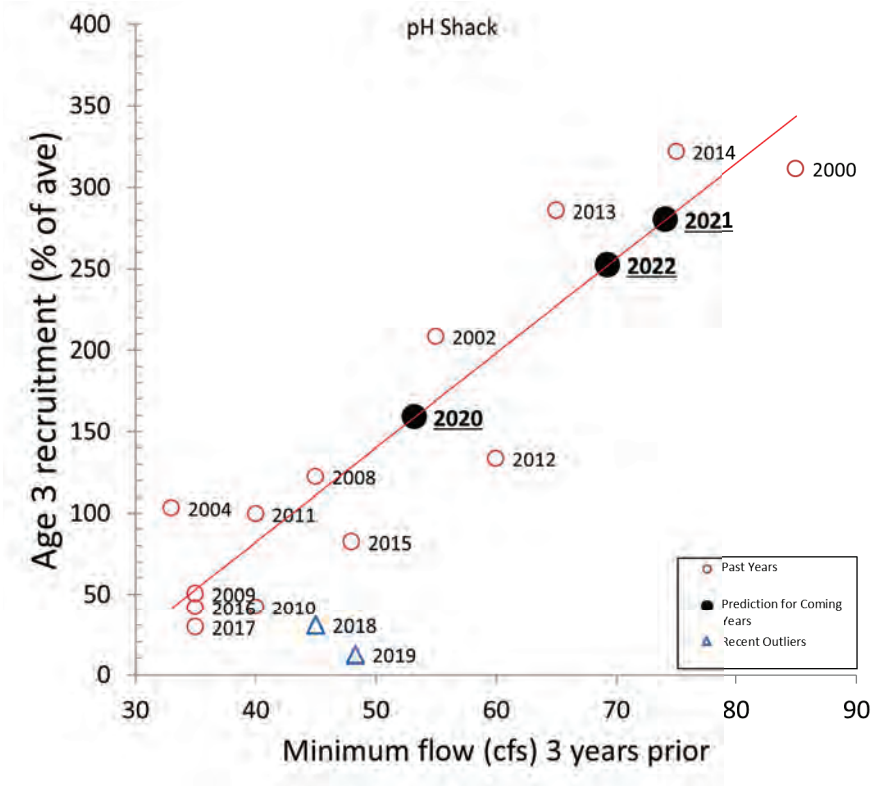


Figure 1 Caption: The percent of age 3 fish recruiting to the fishery in our section below Warm Springs Ponds plotted against the minimum flow from the year three years prior. Blue triangles represent the last two years of data that have deviated from the red trend line. Black circles represent the predicted recruitment for the next three years based on the past three years of minimum flow data.

River Access Improvements on the Clark Fork River Upstream of Missoula

Caleb Uerling, Fisheries Biologist and Rory Zarling, Fishing Access Site Manager

History of Fishing Access Sites on the Clark Fork River Upstream of Missoula

Montana Fish, Wildlife & Parks (FWP) Fishing Access Site (FAS) program has been robust on rivers near Missoula for a long time, including the Clark Fork River (CFR) between Missoula and Rock Creek. However, even as recently as ten years ago the CFR further upstream was sparsely populated with developed (boat ramp, parking, latrine, etc.) FASs. For example, on the 23 river miles between Missoula and Rock Creek FWP has three developed FASs, on the 100 miles of the CFR upstream of Rock Creek FWP had only two developed FASs five years ago. It is reasonable that the upper reaches of the CFR have fewer FASs as it is a smaller river that can sustain less recreational pressures, but several more sites were needed. The long distance between access points was limiting access, causing unreasonably long float distances, and encouraging river recreationalists to pioneer sites on public property and right of ways.

Recent Developments in the Fishing Access Site Program

In 2013 the Montana Natural Resource Damage Program (NRDP) awarded FWP one million dollars to further develop the FAS program on the upper CFR. One goal FWP had for this money was to prioritize sites that could fill the gaps between current FASs (including non-FWP owned sites), hopefully alleviating some of the access issues on the upper CFR. The most downstream

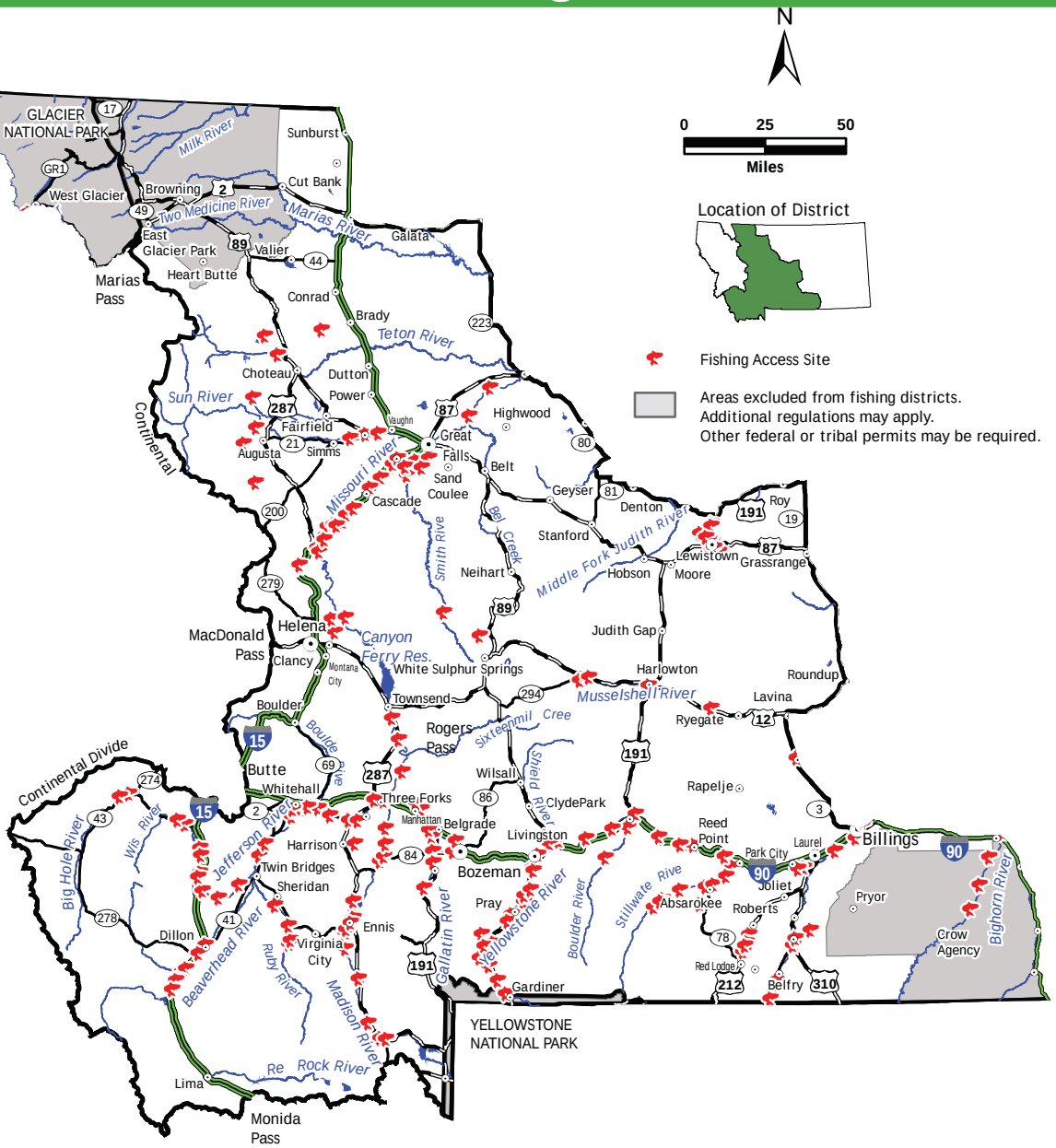
selected site developed was Bearmouth FAS, between Schwartz Creek FAS (near Clinton, MT) and Drummond FAS. Development of Bearmouth FAS included a latrine, parking and a boat launch. The site was completed in 2019 and is within reasonable floating distance of an undeveloped Bureau of Land Management access point upstream. The next site moving upstream was the Gold Creek FAS. The site sits right between the Drummond FAS and Kohrs Bend FAS. The property was acquired about three years ago and development of the site was completed in 2019. The site is situated about five miles upstream of the county-owned Jens access site on Dunkleberg Creek Rd. The most upstream project completed is the Racetrack Pond FAS near Racetrack, MT. The 272-acre parcel is owned by the Department of Environmental Quality, was funded by the NRDP and FWP for infrastructure improvements and is now managed as an FAS by FWP. This site contains a large fishing pond and about a mile of walk-in riverfront access. Development of the site was completed in 2019 and included enhancing the pond for better fishing opportunity and trout habitat, installing a latrine, parking, and a boat ramp on the pond. The pond has been stocked with Westslope Cutthroat Trout and sterile Rainbow Trout. Fishing on the pond will be open to bank anglers and small watercraft powered by electric trolling motors. Future plans for the site include possibly developing a small boat launch on the river to provide access for small watercraft such as kick boats. Another access site FWP has been involved with recently is Arrowstone Park on the south side Deer Lodge, MT. Fishing access facilities including a parking lot, boat launch, and latrine. The site is owned by Powell County. Recently, a memorandum of understanding has been signed by FWP and Powell County in a cooperative effort to more efficiently manage the fishing access facilities at the boat launch location.

Future Projects

FWP has spent about 750,000 of the original one million dollars awarded by NRDP to develop FASs on the CFR upstream of Missoula. There are enough funds remaining to develop one or two more FASs, and several priorities remain on the CFR. The most immediate priority that will be addressed is the pioneered access site known as the "Vet Clinic". The site sits between Arrowstone Park and Kohrs Bend FAS. The plan for the site is to decommission the current pioneered site and develop a permanent fully-developed FAS several hundred feet further upstream. The FAS will include a boat launch, parking lot and latrine. Anglers should expect this project to be done sometime in 2020 or 2021. After the Vet Clinic FAS is completed the plan is to use the remaining funds on an FAS near Garrison, MT. To date a site has not been selected but there appears to be several options in the area. Once the remaining funds are fully spent on site development FWP will evaluate the FAS program on the CFR upstream of Missoula to determine if more site development is needed.

The recently developed Gold Creek Fishing Access Site on the Upper Clark Fork River.

Central Fishing District



The Central Fishing District includes all waters in Montana east of the Continental Divide, (including the Belly and St. Mary's River drainages) and west of the following described boundary: Interstate 15 from the Montana-Canada border south to its junction with Hwy 2 at Shelby, then east on Hwy 2 to Chester, then south on Hwy 223 to State Hwy 80 at Fort Benton, then southeasterly along State Hwy 80 to its junction with State Hwy 81, then easterly on State Hwy 81 to its junction with U.S. Hwy 191, then northeasterly along U.S. Hwy 191 to its junction with State Hwy 19, then south on State Hwy 19 to its junction with U.S. Hwy 87 at Grassrange, then south on U.S. Hwy 87 to its junction with U.S. Hwy 12 at Roundup, then west on U.S. Hwy 12 to its junction with State Hwy 3 at Lavina, then south on State Hwy 3 to its junction with Interstate 90 at Billings, then easterly and southerly on Interstate 90 to the first crossing of the Little Bighorn River, then southerly along the west bank of the Little Bighorn River to the Montana-Wyoming border.

Note: Roadways that are used as boundaries between the Central and Eastern Fishing Districts are interpreted to be in the Central Fishing District.

For additional information regarding the boundaries in this fishing district, please call the following regional headquarters Monday-Friday 8:00 a.m. - 5:00 p.m.:

Billings.....406-247-2940
Bozeman.....406-994-4042
Butte Area Office.....406-494-1953
Great Falls.....406-454-5840
Helena Area Office.....406-495-3260
Lewistown Area Office.....406-538-4658
TTY (Telephone device for the deaf).....406-444-1200

REGION 3 SOUTHWEST MONTANA

Tributaries and Rivers: Exploring the Connection

Ron Spoon, Fisheries Biologist

For many, tributary streams are an afterthought. An angler may pass by several small streams when traveling to favorite fishing rivers without much notice. Some boat anglers, however, are likely to slow down when they approach the confluence of tributaries and big rivers. Beside the benefits of cool water, veteran anglers sometimes notice a bump in trout numbers near these streams.

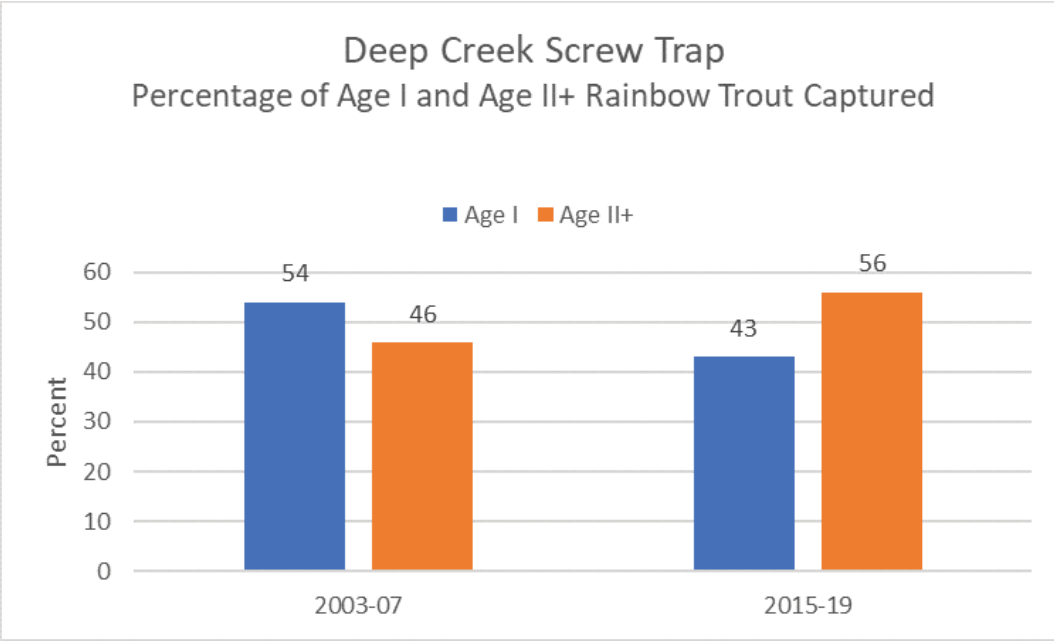
Likewise, FWP biologists spend more time working on tributaries than the fishing pressure on a small creek might otherwise warrant. One tributary to the Missouri River near Townsend, Deep Creek, has been monitored to determine its contribution to the Missouri River for nearly 20 years. One of the tools to understand the role of this tributary has been a 5 ft diameter rotary screw trap – a large rotating "sieve" that discards debris and safely holds small fish traveling downstream. It turns out that there is a lot going on, ecologically, when a tributary flows high and muddy.

Rotary screw trap on Deep Creek near Townsend, MT.

Biologists previously knew that a few thousand Rainbow Trout enter Deep Creek for spawning during the spring, and a few hundred Brown Trout do the same in the fall. We didn't know the number of juvenile trout that return to the river from this process. We also had no idea how other fish species used this tributary that was re-connected to the Missouri River by modifying an irrigation system in 1991.

The rotary screw trap was operated near the mouth of Deep Creek ten years between 2003 and 2019. We found that juvenile Brown Trout numbered between 300 and 9000 annually. Also, about 400 to 5000 young Rainbow Trout were delivered to the Missouri River. About 20% of the young rainbows showed deformities due to whirling disease (32% in 2005 and 7 to 18% in recent years). Trout production varied widely between years, but numbers improved when summer flow was enhanced from 2013-19. The percentage of older Rainbow Trout migrating to the Missouri River increased after the summer flow improvement project, indicating that the healthier tributary provided better habitat for young trout to spend an extra year in Deep Creek.

In addition to counting trout, opening the catch box of the screw trap provided insight into the many other aquatic organisms that drift from the creek to the river. Some years found crayfish to be abundant, but otherwise rare. The native stonecat was not a full-time resident in the tributary, but apparently move in and out of the creek during June, and the catch has increased significantly in recent years. Adult Mountain



Walleye documented in Deep Creek was discovered in the screw trap in 2019 -- a non-spawning subadult that traveled into the tributary and was caught on the way back to the river.

Placing a device in a stream that acts as a large, rotating sieve filtering debris from aquatic life during spring runoff begins to tell a story about the biologic contribution of a small watershed. The process often generates more questions than answers, but always reminds the observer that a wide variety of aquatic life in a big river is enhanced by the connection to feeder streams.

Whitefish did not spawn in Deep Creek, but juvenile whitefish were surprisingly captured during three of the 10 years of evaluation. Longnose Dace were the most consistent visitor to the trap box. And, the first

Pedestrian Bridge at Cobblestone Fishing Access Site

Jay Pape, Fishing Access Site Manager

In Region 3, the FAS Program built a new pedestrian bridge over the Darlington Ditch at the Cobblestone FAS. In a cooperative agreement between the Madison-Gallatin Chapter of Trout Unlimited (MGTU), Northwest Energy and FWP, the aging log stringer bridge was replaced by two new bridge sections spanning 60 feet.

Design & Construction provided surveys and site plans while Dave Moser and Jay Pape were able to secure funding for the bridge materials after several site visits with MGTU President, Kris Kumlien. The contributions from Northwest Energy were used for the minor excavation and crane work needed to swing the four 30 foot beams into place.

The new bridge is a welcome access improvement to hunters, anglers and all who visit this very popular, 190-acre site on the Madison River. Construction was finished in August of 2019.

Big Hole River Mountain Whitefish

Lance Breen, Fisheries Technician

Mountain Whitefish are an important native species located in many of the cold-water river systems in Montana. While they are a member of the trout family, they often do not receive as much attention and admiration as other members of this family such as Cutthroat, Rainbow, Brown, and Brook Trout.

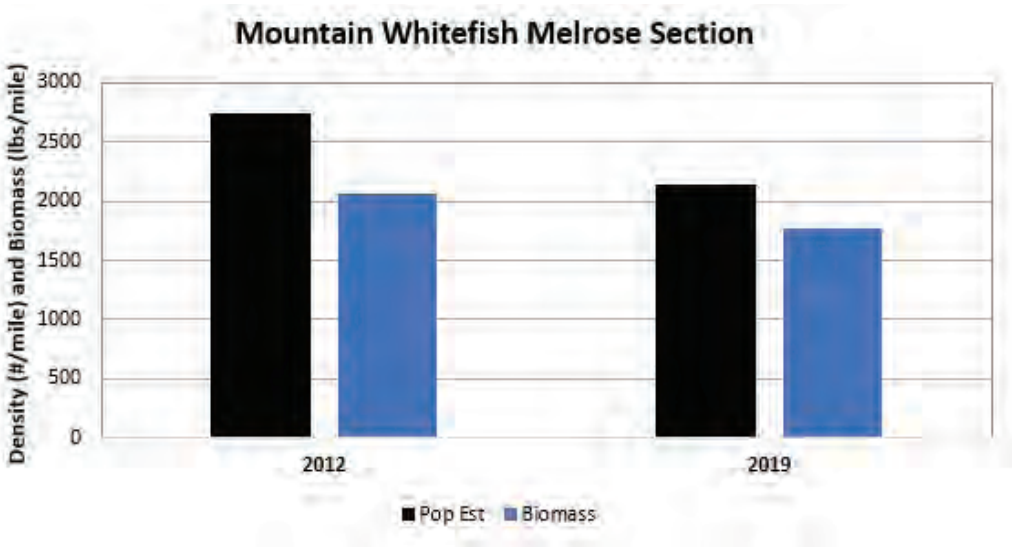
So why should we bother monitoring whitefish? One reason is the canary in the coal mine sort of scenario. An observed significant decline in whitefish numbers can potentially be an indicator of larger concerns that may affect the entire fish community in the river. Understanding what is going on with the whitefish population is an important part of evaluating the health of the river as a whole. Small whitefish can also be utilized as forage by some of the larger fish in the river.

From an angling perspective, anyone who has spent a significant amount of time on the Big Hole has come across those days when the only fish that seem to be willing to bite are whitefish. While it may not be the most frequently targeted species, these fish can definitely save the day and keep an angler from getting skunked. In addition, whitefish are delicious when either cooked or smoked and regulations are more liberal for this species than others in the river. From December 1 through the third Saturday in May, much of the Big Hole River is catch and release only for trout. However, an angler may still keep whitefish during this period and take home some quality meat to put in the smoker.

Historical data pertaining to the population density and structure of Mountain Whitefish in the Big Hole River is much more incomplete compared to that of more studied species such as Rainbow Trout and Brown Trout. Much of this historical data is anecdotal rather than scientifically collected. In recent years biologists have put forth a greater effort to monitor whitefish populations in rivers throughout the state. This is in response to perceptions that whitefish populations may be on the decline in some areas. In order to better understand whitefish populations, biologists have collected additional data and conducted mark/recapture population estimates to help monitor trends and guide future management of this species.

In the Pennington section of the Big Hole River, which is located near Twin Bridges, population estimates were obtained for Mountain Whitefish in 2009, 2011, and 2019. The data shows that over this 10-year timespan, the whitefish population has shown some fluctuations, but no significant overall decline. Estimates ranged from 1,339 fish per mile in 2009, to 1,570 fish per mile in 2019. An apparent jump in the population estimate to 2,108 fish per mile in 2011 was largely influenced by a large age class of 2-year-old fish (7.0-9.9 inches total length) observed in that year.

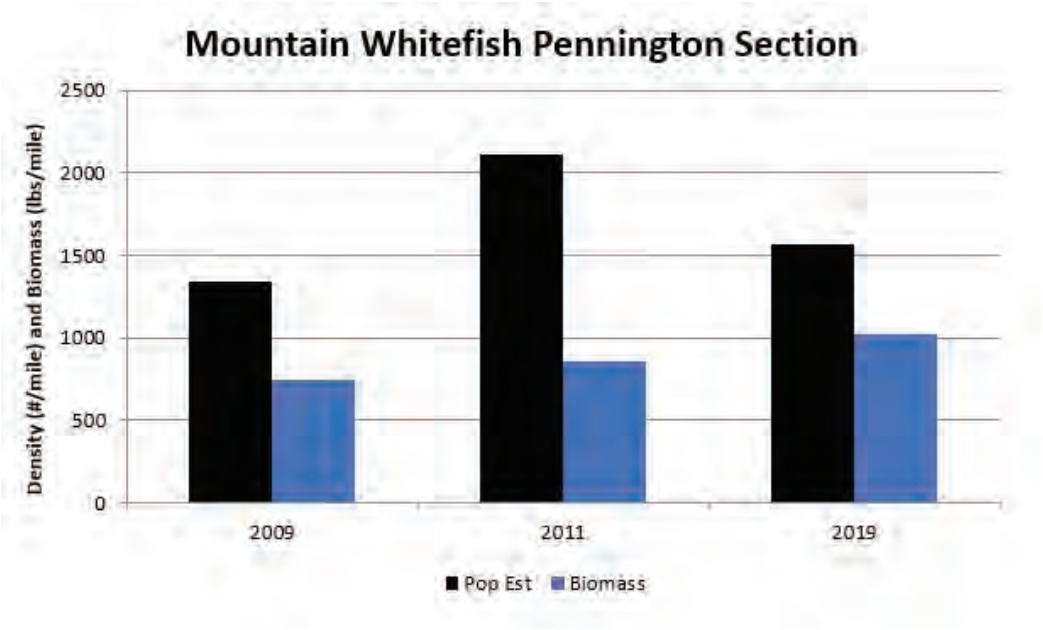
In the Melrose section of the Big Hole River, Mountain Whitefish population estimates were obtained in 2012 and 2019. In 2012, whitefish density was estimated to be 2,737 fish per mile. In 2019, densities were estimated a bit lower at 2,137 fish per mile. While this does show a slight drop from 2012 to 2019, without any historical data to compare with, it is difficult to determine if this is an acceptable natural fluctuation in population size or if it is something that is more indicative of an actual slow long-term decline in the whitefish population. Additional data collection and monitoring in future years will help answer this question.



Estimated population density and biomass of Mountain Whitefish in Melrose section of Big Hole River 2012 and 2019.

How does this compare to the trout numbers in these same sections? For the period from 2009-2019 in the Pennington section, the combined numbers of rainbow and Brown Trout averaged across sampling years from 2009-2019 was estimated to be 720 fish per mile. Over this timeframe, whitefish numbers were nearly double to triple the number of trout. In the Melrose section, the combined numbers of rainbows and browns averaged across sampling years from 2012-2019 was estimated at 1639 fish per mile. Similar to Pennington, whitefish remained much more abundant in this section than trout.

With the baseline data that is now being collected on Mountain Whitefish populations, biologists are beginning to develop a better comprehension of the population dynamics related to this native fish. After many years of being considered somewhat of an afterthought, biologists are now paying more attention to this important species and the role they play in our fisheries.



Estimated population density and biomass of Mountain Whitefish in Pennington section of Big Hole River 2009, 2011, and 2019.

Dillon Area Fisheries Update

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Recent population declines in the Beaverhead and Ruby drainages have resulted in more focused research and regulations changes. Over the past decade Burbot in Clark Canyon Reservoir have decreased in average size, which is a possible indication of higher than healthy rates of angler harvest. As a result, a new regulation is in place that requires anglers to release all fish less than 23 inches long. Twenty-three inches is an important number because it ensures that virtually all Burbot of this size will have had at least one chance to spawn. In Clark Canyon Reservoir most Burbot reach sexual maturity at around 3 years old, at which point all fish are less than 23 inches long. In 2007 about 62% of the population was comprised of fish over 23 inches and 3% of the fish were over 28 inches. However, the percentage of fish over 23 inches dropped to 44% in 2012 and 38% in 2017 with no fish over 28 inches observed. So, how long does it take a Burbot to get to 23 inches? About 10% of the population will reach this length after four years; however, the average fish doesn't get that long until it's about 9 years old. This new regulation will ensure angler harvest doesn't adversely affect future recruitment by overharvesting small immature fish in this self-sustaining native fishery and that good numbers and sizes of Burbot persist into the future.

We've also noticed fewer fish overall and especially fewer large fish than we'd expect to in our rivers. In both the

Beaverhead and Ruby rivers overall Brown Trout abundances or the proportion of fish over 18 inches are typically correlated with years of good streamflow. A good water year can result in a strong cohort of new fish, but because it takes between 4 and 5 years for trout to reach 18 inches it takes that many consecutive good water years to produce a large proportion of big fish. Based on evaluation of datasets spanning between 20 and 50 years, we'd expect that about 20% of the population should be over 18 inches in the upper Beaverhead given the relatively good overwinter discharges that have occurred during the last 5 years. However, the proportion of big fish has hovered around 5%, which constitute historic lows. In previous years this would typically mean the population was simply made up of many small fish but overall abundances of Brown Trout have been at about two thirds of the long-term average the past three years as well. A similar pattern has been observed on the upper Ruby River where overall abundances were at near historic lows and the proportion of Brown Trout over 18 inches was less than 5%, even though we'd expect it to be much higher based on the way the population has responded in the past to the discharge regimes we've experienced the past several years. Overall, these patterns suggest that something other than discharge has been driving the population recently. We conducted some preliminary fish health sampling and will more closely investigate age-specific growth rates over the coming year to attempt to gain a better understanding of what new factors may be influencing abundance. The silver lining is that both streams still boast populations of about 1000 Brown Trout per mile and, despite low abundances, folks still had good fishing this past year. And, although there are fewer fish over 18 inches than we'd expect to see, both rivers still have a few big ones swimming around.

A very large Brown Trout from a late Fall electrofishing survey on the Beaverhead River.

Conservation programs for Westslope Cutthroat Trout and Arctic Grayling have been continuing to gain momentum over the past year and have experienced some breakthrough successes.

At the turn of the 19th century Westslope Cutthroat Trout (WCT) were the most abundant and widespread trout species in Montana west of the Continental Divide; however, WCT were also native in some drainages east of the divide. These fish, which were first described by the Lewis and Clark Expedition in 1805 near Great Falls, have also been referred to as Upper Missouri River Cutthroat. Distribution and abundance of WCT in Montana has declined significantly in the past 130 years, especially in the Missouri River drainage where genetically unaltered WCT are estimated to persist in less than 5% of the habitat they once occupied. In the Beaverhead, Red Rock and Ruby River drainages WCT conservation populations (>90% pure) persist in 12% of their historic range. Within this same area, genetically unaltered WCT (100% pure) remain in only 3% of their historic range and are typically isolated in small headwater streams.The conservation goal for WCT in the Montana Statewide Fisheries Management Plan is to restore secured conservation populations to 20% of their historic distribution. Populations are considered secured when they're comprised of at least 2,500 fish in 5 or more miles of stream with no immediate threats. To reach this goal WCT distribution needs to double within the Beaverhead, Red Rock and Ruby sub-basins and about 300 stream miles be reclaimed by secured populations. WCT are in a dire situation because of multiple threats including predation, competition, and hybridization from non-native trout, reduced distribution, low abun-

dances, poor habitat conditions and spatial isolation. Over the next 100 years most remaining WCT populations in Montana face a high risk of local extinction if remaining populations are not protected and secured. While it may be impossible to return to historic distributions and abundances, there are different management actions that can be implemented to help reverse the species decline. WCT populations can be protected from non-natives by constructing barriers to upstream fish movement. Oftentimes piscicides like rotenone are used in conjunction with fish barriers to remove non-natives and expand or restore WCT populations. WCT expansion projects like these require time, money, coordination and boots on the ground. However, with adequate funding and coordinated efforts between multiple agencies and other groups it is possible to reclaim certain streams for WCT. Two such WCT conservation projects are currently nearing completion in southwestern Montana's Greenhorn and Peet creeks.

Genetically unaltered WCT reintroduced into the Greenhorn Creek project area during 2016.

Greenhorn Creek flows west out of the Greenhorn Mountains and enters the upper Ruby River upstream of Ruby Reservoir. A man-made concrete fish barrier was constructed during the fall of 2012 on DNRC land near the confluence of the South and North Forks of Greenhorn Creek. Genetically unaltered WCT from Dark Hollow Creek and the Meadow Fork of Greenhorn Creek were salvaged and about 26 stream miles were then treated with rotenone to remove all non-native fish upstream of the barrier in 2013 and 2014. In 2015 the project was evaluated by electrofishing and testing water samples for fish DNA throughout the drainage to verify all non-natives were successfully removed. Greenhorn Creek was repopulated with WCT between 2016 and 2018 by translocating 682 fish from six Southwestern Montana populations. Each transferred fish was held in its donor stream until it could be individually genotyped to ensure it was genetically unaltered. Post-project monitoring designed to evaluate the genetic diversity of the new Greenhorn Creek population began in 2019. This work, which is part of a University of Montana graduate study, will assess the long-term evolutionary potential of the progeny of the original donor fish and help us understand how restoring populations by translocating fish compares to other approaches like propagation. Almost 500 WCT produced in Greenhorn Creek by the original donor fish were sampled last year, indicating there were successful spawns in 2016 and 2017. Genetic monitoring will continue for an additional year or two to determine whether more fish should be moved to improve diversity, but it appears the population is well on its way to becoming self-sustaining and successfully restored.

Peet Creek flows north out of the Centennial Mountains and enters the Red Rock River upstream of Lima Reservoir. Two existing Peet Creek impoundments served as fish barriers, which allowed treatment of 11.4 stream miles to remove hybridized fish in 2013 and 2014. The treatment was evaluated in 2015 and determined to be ready for reintroduction. Two Centennial Valley streams with small populations of at-risk but genetically unaltered WCT were selected as donors. To avoid harming the donor populations, population size is determined each year and no more than 10% of the fish are moved. To date, 174 fish have been transferred from these donor streams into Peet Creek. Monitoring in 2019 found that donor fish are successfully reproducing, and genetic samples were collected to determine the diversity of young fish spawned in Peet Creek. Monitoring, and likely translocation, will continue but Peet Creek appears to be another success story in the making.

These two projects significantly increased the WCT population within the Red Rock and Ruby River drainages; Peet and Greenhorn creeks increased the distribution of genetically unaltered WCT by 50% and reduced the total amount of habitat to be reclaimed to 270 miles. Projects like these continue to bring the state of Montana closer to achieving its WCT conservation goal and show just how attainable it is in the future.

Montanans are fortunate to have the last native populations of Arctic Grayling in the lower 48 states. Grayling, nicknamed the "Sailfish of the North," are characterized by their large, sail-like dorsal fin that displays nearly all colors of the rainbow. Grayling were historically found throughout the upper Missouri River watershed, but populations declined to 4% of that range by the 1990s. This decline is attributed to loss of habitat, introduction of non-native species, and overfishing. Active management plans have been implemented to sustain the presence of this unique, native fish in southwest Montana. Two distinct grayling populations reside in the upper Big Hole Valley and the Centennial Valley. Following declines throughout the 1990s, the largest native fluvial grayling population was found in the Big Hole River drainage. To help conserve this population, FWP partnered with the US Fish and Wildlife Service, Department of Natural Resources and Conservation, and Natural Resource Conservation Service to create the Big Hole Candidate Conservation Agreement with Assurances (CCAA) in 2006. The CCAA creates agreements with private landowners to provide water and habitat for grayling on private land and provides regulatory assurances for landowners if grayling become listed as endangered species. Currently, thirty-two private landowners and 154,550 acres are enrolled in this CCAA program. Cooperative projects between landowners and agencies have vastly improved riparian habitat and instream flows in the Big Hole River drainage. The 2019 water year was especially challenging due to a short runoff period and low summer water availability from higher elevations; however, the Big Hole River met its flow targets because of all the private landowners that turned back irrigation water as part of the commitment they made to the CCAA program and Arctic Grayling conservation. The grayling seemed to have noticed; 2019 fall surveys resulted in the one of the highest numbers of young-of-the-year grayling on record.

A beautiful, Big Hole Arctic Grayling from spring sampling.

Native Arctic Grayling also reside in the Centennial Valley, which is drained by the Red Rock River watershed upstream of Lima Dam. Centennial Valley Grayling are found primarily in Upper Red Rock Lake and Red Rock Creek, although smaller populations occur in the other tributaries. Because the Centennial Valley Grayling population has fluctuated over the last century due to various causes, several conservation approaches have been taken. Grayling using Upper Red Rock Lake experienced a large population decline following a severe winter in 2016 that depleted oxygen and, resultantly, habitable areas throughout the lake. A partnership was developed between the US Fish and Wildlife Service and FWP to evaluate how to provide habitats with suitable depths and oxygen concentrations and in 2019 the agencies contracted an engineering firm to find potential solutions for the winter habitat problem, one of which is being piloted this winter. To make tributary populations more resilient, a Centennial Valley CCAA, similar to the one previously mentioned in the Big Hole, was implemented in 2018 and four private landowners have since enrolled. This CCAA and other partnerships will help ensure cold water and suitable habitat are available for future generations of grayling in the Centennial Valley.