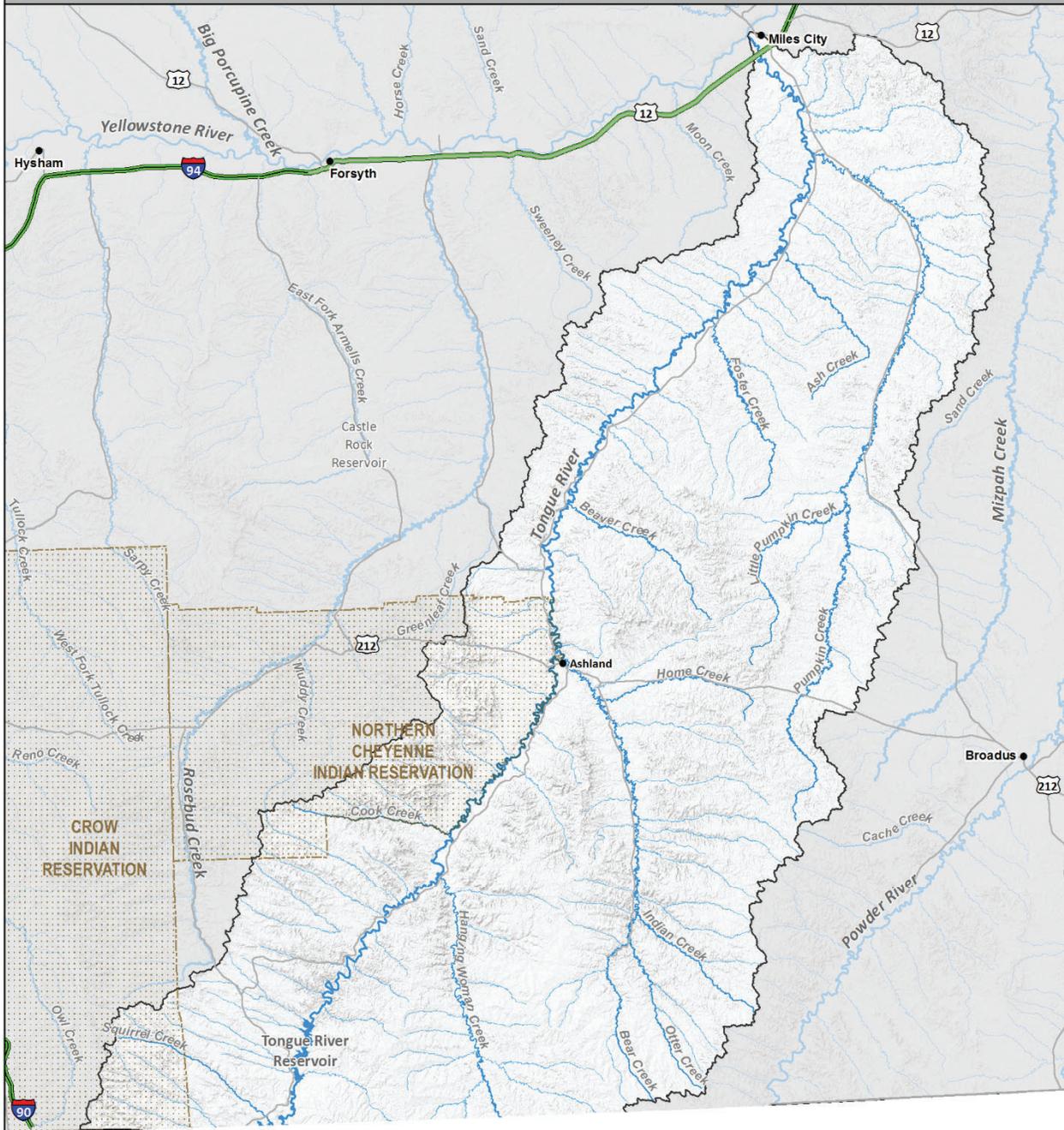


# Tongue River Drainage

MONTANA FWP

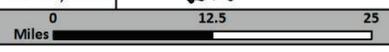


-  Tribal Lands
-  Drainage Boundary



Map Produced by:  
 ASP - Geographic Data Services  
 ISR 43965 - Nov 23, 2018

Administrative boundaries and FWP Lands data from Montana Fish, Wildlife & Parks, Helena, MT. Background Imagery from ESRI



## **TONGUE RIVER DRAINAGE**

### **PHYSICAL DESCRIPTION**

The Tongue River Drainage includes the Tongue River, Hanging Woman Creek, Otter Creek, Pumpkin Creek, Tongue River Reservoir, and numerous stock ponds and prairie streams. Land ownership in the district is mostly private and agriculture is the primary land use practice in the Tongue River watershed with 67,000 acres of irrigated land supporting cattle ranching and farming operations. The Fort Union Coal Formation underlies the watershed. The Tongue River originates on the eastern side of the Big Horn Mountains in north-central Wyoming (Sheridan County) and flows north through Southeast Montana (Big Horn, Rosebud, and Custer counties) to the Yellowstone River. The Tongue River has a drainage area of 5,379 mi<sup>2</sup>, approximately 70% occurring in Montana and 30% in Wyoming. The total length of river in Montana from the state line to its confluence with the Yellowstone River, near Miles City, is 209 miles.

At Decker, Montana, near the Wyoming/Montana border, Tongue River Dam (river mile 189) creates Tongue River Reservoir, a main stem reservoir that can store 79,071 acre-feet of water. Historically, the Tongue River in Montana has been divided into five segments by four dams. There are three irrigation diversion dams: (1) Tongue and Yellowstone (T&Y) Diversion Dam at river mile 20; (2) SH Diversion Dam, which is no longer in existence (river mile 51); and (3) Mobley Diversion Dam, which is mostly gone and does not restrict fish passage (river mile 105); and one flood control dam, Tongue River Dam (river mile 189). There is a thermally unique sixth river segment created by hypolimnetic releases out of Tongue River Reservoir. This coldwater segment is approximately ten river miles long and ends downstream of the dam near the Rosebud/Big Horn County line (river mile 179).

No natural lakes are found within the drainage. There are, however, numerous stock ponds and some are stocked with fish and managed for public access by FWP.

### **FISH MANAGEMENT**

The Tongue River and its tributaries are home to many warmwater and a few coldwater fish species. Native fish species include; sauger, shovelnose sturgeon, channel catfish, burbot, freshwater drum, goldeye, smallmouth buffalo, bigmouth buffalo, blue sucker, river carpsucker, shorthead redhorse sucker, white sucker, longnose sucker, longnose dace, creek chub, lake chub, brassy minnow, fathead minnow, sturgeon chub, flathead chub, western silvery minnow, sand shiner, emerald shiner, and stonecat. Common carp, plains killifish, black bullhead, yellow bullhead, and green sunfish are introduced species that can be found in parts or all of the Tongue River drainage. Largemouth bass, smallmouth bass, walleye, white crappie, black crappie, northern pike, yellow perch, rock bass, pumpkinseed, and spottail shiner have been stocked or illegally introduced in Tongue River Reservoir. Brown and rainbow trout have been stocked in the tail water below Tongue River Dam.

Trend electrofishing is conducted on various reaches of the Tongue River to assess the current relative abundance, population structure, and body condition of fish populations in the Tongue River and monitor changes over time. Annual trend sampling on Tongue River Reservoir

includes gill-net, trap-net, and seining methods and is conducted to assess catch rates, condition, and length frequency of game fish in the reservoir. Stock ponds in the Regional Pond Fishing Program are sampled about every three years to evaluate the status of the fisheries and ensure a catchable stock of fish is present.

A variety of fish species are available from FWP hatcheries for stocking into ponds and Tongue River Reservoir, including walleye, rainbow trout, smallmouth bass, and largemouth bass. Catchable size trout are also stocked annually in the coldwater stretch of the Tongue River below Tongue River Reservoir. The statewide wild fish transfer policy also allows regional staff to transfer a variety of species from source ponds with good populations to receiving ponds with fisheries that have suffered due to winterkill or drought. Species stocked through wild fish transfers include northern pike, yellow perch, black crappie, white crappie, channel catfish and bluegill.

The Tongue River drainage offers many public ponds and private ponds with public access that are managed as a fishery in the Regional Pond Fishing Program. The primary justification for stocking these waters is providing a family fishing opportunity. The program is offered to landowners as a public relations opportunity to provide a fishery for the surrounding community. If the landowner allows free public access to the pond FWP will stock and manage the fishery. Anglers are required to obtain landowner permission each time they want to access the fishery. Rainbow trout, largemouth bass, yellow perch, northern pike and crappie dominate the species available in these systems. Fish populations are established or supplemented when needed through stocking from a state hatchery or by wild fish transfers from another fishery within the region.

Tongue River Reservoir ranks 24<sup>th</sup> in the state and 2<sup>nd</sup> in Region 7 for angler pressure. Due to crowding at boat ramps, the campground and on the reservoir, fishing tournaments at Tongue River Reservoir are not permitted from May 1-September 15. Overall fishing pressure is relatively low on the Tongue River due in large part to lack of public access to the river. Twelve Mile Fishing Access Site (river mile 20) is one of the few publicly accessible sites on the Tongue River and is a popular destination for local and out of state anglers. Due to crowding issues at Twelve Mile FAS there is a special regulation limiting the number of lines an individual angler can fish. Stock ponds and prairie streams in the Tongue River drainage have low angling pressure.

## **HABITAT**

The Tongue River has a constrained riparian corridor with much of the floodplain developed for irrigated agriculture. The river upstream and downstream of Tongue River Reservoir has more rocky substrates than downstream reaches and is influenced by development of the area's coal resources, a major industry in the watershed. Numerous areas in the Tongue River watershed have been permitted or developed for coal bed methane or coal extraction. The extraction of coal bed methane involves pumping groundwater from the coal seams. Much of this water is high in salts and is discharged into the Tongue River upstream and near Tongue River Reservoir. In 2018, methane extraction is nearly absent due to suppressed market prices and low demand for gas resources. Increased extraction is expected in the future when markets become financially lucrative again.

The upstream end of Tongue River Reservoir has abundant submerged woody vegetation as a result of the dam rebuild in 1998 that raised the water level in the reservoir by six vertical feet. The upstream end of the reservoir has increased turbidity as a result of turbid river inflows. The middle and lower end of the reservoir have abundant rocky habitats and increased water clarity. Submerged aquatic vegetation is common in the bays throughout the reservoir.

Approximately ten river miles downstream of Tongue River Reservoir Dam is thermally unique due to cold water releases from Tongue River Reservoir. This stretch of river supports a stocked rainbow trout and naturally-reproducing brown trout population. The Tongue River in the Birney and Brandenburg area is characterized by a dense cottonwood riparian corridor and has deeper holes that are believed to overwinter fish. Downstream of Brandenburg, irrigation has an increasing influence on instream flows and riparian habitat. Downstream of T&Y Diversion Dam, chronic dewatering from irrigation in July and August is a major habitat concern for Tongue River.

Historically, irrigation diversion dams were barriers to upstream fish migrations and have fragmented fish populations in the Tongue River for the last 100 years. In addition, the gravity fed irrigation canals were responsible for entraining fish. Beginning in 1999, large collaborative efforts between irrigators, non-government organizations, and federal and state agencies began making the diversion dams more favorable to upstream fish migrations. The T&Y Canal head gate was rebuilt in 1999 and included fish louvers to minimize fish entrainment. The SH Diversion Dam was removed in the fall of 2009 and the Muggli Bypass channel was constructed the fall of 2008 around T&Y Diversion Dam. In 2005, water withdrawals from the Mobley Diversion Dam were transferred to pumps. The dam is no longer maintained and damage from ice scour and high flow has created some fish passage opportunity. The combination of these habitat improvement efforts provides upstream passage for an additional 165 river miles of the Tongue River for many native fish species from the Yellowstone River.

Although the drainage is predominately rural, habitat changes throughout the Tongue River drainage have impacted the basin since human settlement. The use of rock or concrete rip rap to protect city infrastructure, roads, bridges, homes, and farmland/ranchland has restricted the natural function of the rivers and streams in this drainage. The installation of culverts, fords and dams has similar impacts on the function of the waterways and upstream migration of fish. These developments have also impacted the river and streams ability to migrate laterally and interact with its historic floodplain.

The majority of private and public ponds in the drainage are limited by water depth. Most have a maximum depth of 10-11 feet which is marginal for overwintering fish during winters with sustained snow accumulations. The severity and prevalence of winterkills has been and can be reduced by installing windmill aerators. Some landowners and the BLM have installed aerators at their expense in order to reduce winterkill occurrences. FWP has refrained from installing aerators because of the time and expenses required to service and maintain the structures.

## **FISHING ACCESS**

There is currently public access to the Tongue River through Tongue River Reservoir State Park and Twelve Mile Dam FAS. Additional but limited access is also provided at county bridges and through landowner agreements. Developing more access for ice fishing on the Tongue River

Reservoir is a high priority; of particular interest is State land under DNRC management that would provide access to the upper portion of the reservoir. Other high priority areas for access development include sites downstream of Tongue River Reservoir and Twelve Mile Dam FAS that are within a day's float from existing access points. The Birney and Brandenburg reaches, of the Tongue River, would also provide valuable angling opportunity if access was available.

## **SPECIAL MANAGEMENT ISSUES**

Recreational and resource management in the Tongue River drainage requires involvement with many agencies, entities, and user groups. Reservoir issues include involvement with DNRC, the Decker Coal Mine, Cloud Peak Energy, and adjacent landowners. The Tongue River water users group (representatives from agencies and irrigation districts), Bighorn, Rosebud, and Custer county conservation districts, Northern Cheyenne and Crow Indian Reservations as well as ranchers and farmers are all stakeholders in resource management decisions in the Tongue River drainage.

### Coal and Coal Bed Methane Extraction Activities

The Tongue River Basin is rich with coal deposits and associated extraction activities (strip mining, methane wells, pipelines, and railroads) will always challenge management of the Tongue River water and aquatic resources. Construction of a Tongue River Railroad has been proposed numerous times to facilitate increased coal extraction from current mines (Decker, Spring Creek) and proposed mines (Youngs Creek, Otter Creek). Water discharge from methane wells into the Tongue River and tributaries, although depressed at the current market, continues to have long-term impacts on irrigation operations, which have not been adequately quantified. Management of the Tongue River and fisheries requires involvement with all extraction issues as they evolve to ensure the aquatic resources are understood and evaluated by resource and political decision makers.

### In-stream Flows and Water Compact

Securing more appropriate in-stream flow rights, particularly at the confluence of the Tongue and Yellowstone Rivers, has been a management concern since in-stream flows were established in the late 1970's. Despite requesting 190 cfs in September-February, 525 cfs in March – April, 600 cfs May –July 15, and 225 cfs July 16 – August, only 75 cfs was granted per month through the 1978 water adjudication process. This results in frequent de-watering of the Tongue River downstream of the T&Y Diversion Dam during the month of August. The flows requested by FWP in 1977 were intended to facilitate and maintain spawning migrations and adequate rearing conditions for numerous native fish species found in the Tongue and Yellowstone Rivers. The States of Montana and Wyoming concluded a lawsuit in 2017 regarding the use of water and interpretation of the Tongue River Water Compact between the States. Two conditions of the settlement is annual employment of water commissioners in Montana to adjudicate water usage and installation of water meters on every irrigation structure. Given this recent court dictation and potential change in water usage and operation through commissioners, FWP needs to reiterate fisheries needs into the process. As a result of the settlement Wyoming contends when Montana makes a call for water their first response will be inspection of flows at the Tongue-Yellowstone confluence. If Tongue River water is reaching the Yellowstone River they do not

have to honor the call for water. This change in perspective may have dire consequences and could dewater the twenty river miles downstream of T&Y Dam.

#### Operation of Muggli Bypass Channel and T&Y Canal Fish Screens

During the late 1990 – 2000’s considerable efforts through partnerships between irrigators and multiple State and Federal Agencies improved fish passage at diversion dams and reduced canal entrainment through the following projects: 1) rebuilding T&Y head gate with fish screens in 1997, 2) removal of SH Diversion Dam in 2007, 3) completion of the Muggli Bypass channel at T&Y Dam in 2008, and converting flood irrigation to pumping from the Mobley Diversion Dam in 2005. These efforts have dramatically improved spawning migrations of Yellowstone River fish up the Tongue River during months of adequate flow. Six fish species (Bigmouth Buffalo, Freshwater Drum, Goldeye, Smallmouth Buffalo, Sturgeon Chub and Western Silvery Minnow), historically restricted to 20 miles of the Tongue River downstream of T&Y Dam (built in 1886) have successfully migrated upstream of T&Y Dam. Three of these species have migrated up to Tongue River Dam at river mile 168. Although these historically significant projects have been completed to benefit the fisheries, they have not been secured for the long-term. Specifically, operation of the Muggli Bypass and use of the T&Y Canal fish screens needs to be memorialized through an MOU, lease, or incorporation of an operation plan into the irrigation districts by-laws. This will ensure the long-term operation and derived fishery benefits beyond the current irrigation ditch operator and FWP staff. Establishing this “document of operation” for the bypass and fish screens will establish a need and convey the importance of the structures to water commissioners and other water users.

#### Tongue River Reservoir and Tongue River Upstream

A small population of Sauger exists in the reservoir and Tongue River upstream to the State Line. This small population is remnant of a large population that existed in the 1970’s following an adult stocking effort in the river by Wyoming in the mid-1960’s. Sauger are native to Montana and are classified as a species of concern. Given this designation and a very small population the daily and possession limit was reduced in the reservoir and Tongue River upstream in 2012 to help preserve the population while allowing some consumptive harvest. Future studies should evaluate the size of the Sauger population and dynamic movements between the river and reservoir habitats. Current river studies indicate Sauger occupy the river during the open water months and anecdotal angler harvest events suggest they retreat to the upper end of the reservoir during early winter months. This information along with additional studies will inform future management actions to sustain and potentially increase the Sauger population.

#### Live Bait-Fish Restrictions

The ever increasing and approaching risks of aquatic invasive species (AIS), pathogens, and illegal introductions lead to changes in the State’s live bait-fish regulations in 2016. The goals were: maintaining a bait fish opportunity for anglers, improve bait species identification, increase awareness of AIS, and proactively reduce the potential risk of spreading AIS, pathogens, and illegal introductions. While working through public comments and observing current live bait usage at Tongue River Reservoir it became obvious the new regulations created additional concerns due to the source waters and associated species being utilized at TRR. Specific

challenges for anglers using live bait fish at TRR include: 1) remote location of reservoir with very limited bait rich water supplies, 2) many anglers are non-residents from Sheridan Wyoming (20 miles away) that cannot import or transport live bait fish across the State Line, and 3) the marina is frequently closed during the winter months when live bait-fish are the only practical method for game species like pike and Walleye. The most reliable bait source available under the new regulations is from the Yellowstone River near Billings. Three species (Western Silvery Minnow, Plains Minnow and Emerald Shiner) of the 10 live bait-fish species allowed in the 2016 fishing regulations, do not exist in TRR or the Tongue River upstream of the reservoir. Risk of introduction of these three species to TRR warranted a reduced list of species allowed for bait fishing in Tongue River Reservoir and the Tongue River upstream of the reservoir.

### Fishing Contest Restrictions

Tongue River Reservoir Fishing Contest Stipulations:

Fishing contests are prohibited from May 1 – September 15 due to fish spawning periods, extreme warm water temperatures in August and congested public use.

Spawning induced mortality of adult crappie is common at Tongue River Reservoir due to cumulative stress associated with spawning and increasing water temperatures. Fish contests are prohibited during the crappie spawning period (May 1 – June 30) to prevent additional stress and associated crappie mortality.

Intense public use and associated social pressures occurs on the reservoir and State Park facilities from May 15-July 31. During this period the parks camping, day use area and associated facilities approach or reach capacity. Inclusion of a fishing contest would increase user conflict.

Fish contests are also prohibited in August and early September due to high water temperatures. Additional stress on fish from contest would dramatically increase the likelihood of delayed fish mortality.

Weigh-in type tournaments at a central location are also discouraged at Tongue River Reservoir during the congested public use period (May 15 – July 31). This style of tournament increases congestion at boat ramps that currently suffer from social pressures.

**FISHERIES MANAGEMENT DIRECTION FOR TONGUE RIVER DRAINAGE**

<b>Water</b>	<b>Miles/acres</b>	<b>Species</b>	<b>Recruitment Source</b>	<b>Management Type</b>	<b>Management Direction</b>
Tongue River - Wyoming State Line to Tongue River Reservoir headwaters	10 miles	Sauger (N)	Wild	Conservation	Reduced daily bag and possession limit implemented to protect remnant population.
		Channel Catfish (N)	Wild	General	Maintain fishery through regulations.
		Smallmouth Bass, Walleye	Wild	General	Maximize harvest and fishing opportunity to reduce competition with Sauger.
		Multi species	Wild	General/ Conservation	Manage for recreational fishing opportunity where applicable. Monitor non-game fish species for native fish assemblage and overall ecosystem health.
Habitat needs and activities: Dewatering is a threat to the fishery, work with water commissioners and Water Compact Ruling to deliver State's Instream Reservations at inlet of Tongue River Reservoir: 160 cfs January-February; 200 cfs March-April; 700 cfs May 1-20; 1,200 cfs May 21-31; 1,350 cfs June; 360 cfs July; 100 cfs August-September; 200 cfs October-November; and 150 cfs in December.					
Tongue River Reservoir	3,700 acres	Black Crappie, White Crappie	Wild	Liberal Regulations	Manage for recreational family fishing opportunity for crappie. Fishing tournaments are prohibited from May 1 – September 15 because of user congestion during summer.
		Sauger (N)	Wild	Conservation	Reduced daily bag and possession limit to protect remnant population.
		Walleye	Hatchery	Put, Grow and Take	Manage as recreational fishery with emphasis on harvest. Maintain population through annual stocking to provide additional fishing opportunity.
Continue next page					

Water	Miles/acres	Species	Recruitment Source	Management Type	Management Direction
		Smallmouth bass, Largemouth bass, Channel catfish (N), Northern pike, Yellow perch	Hatchery/ Wild	General/ Put, Grow and Take	Maintain fishery through regulations and stocking.
Habitat needs and activities: work with reservoir operators to regulate water levels with consideration for fishery benefit.					
Tongue River - Reservoir tailwater to Yellowstone River	189 miles	Sauger(N), Channel catfish (N)	Wild	General	Maintain fishery through regulations and habitat projects (passage at diversion dams, increased flow conditions).
		Rainbow trout	Hatchery	Put and Take	Put and take fishery to maximize fishing opportunity in a thermally altered stream reach.
		Brown trout	Wild	General	One-time stocking to establish self-sustaining population in order to maximize fishing opportunity in a thermally altered stream reach.
		Shovelnose sturgeon (N)	Wild	General	Monitor usage of Tongue River and potential for species to successfully use Muggli Bypass and re-establish population or seasonal usage of Tongue River upstream of T&Y Dam.
		Blue sucker (N), Sturgeon chub (N)	Wild	Conservation	Montana Species of Concern, monitor use and potential for spawning activity in Tongue River. Continue to monitor passage of Blue Sucker through the Muggli Bypass and use of river upstream of T&Y Dam.
		Walleye, Smallmouth bass, Northern pike	Wild	General	Maximize harvest and fishing opportunity to reduce competition with Sauger.

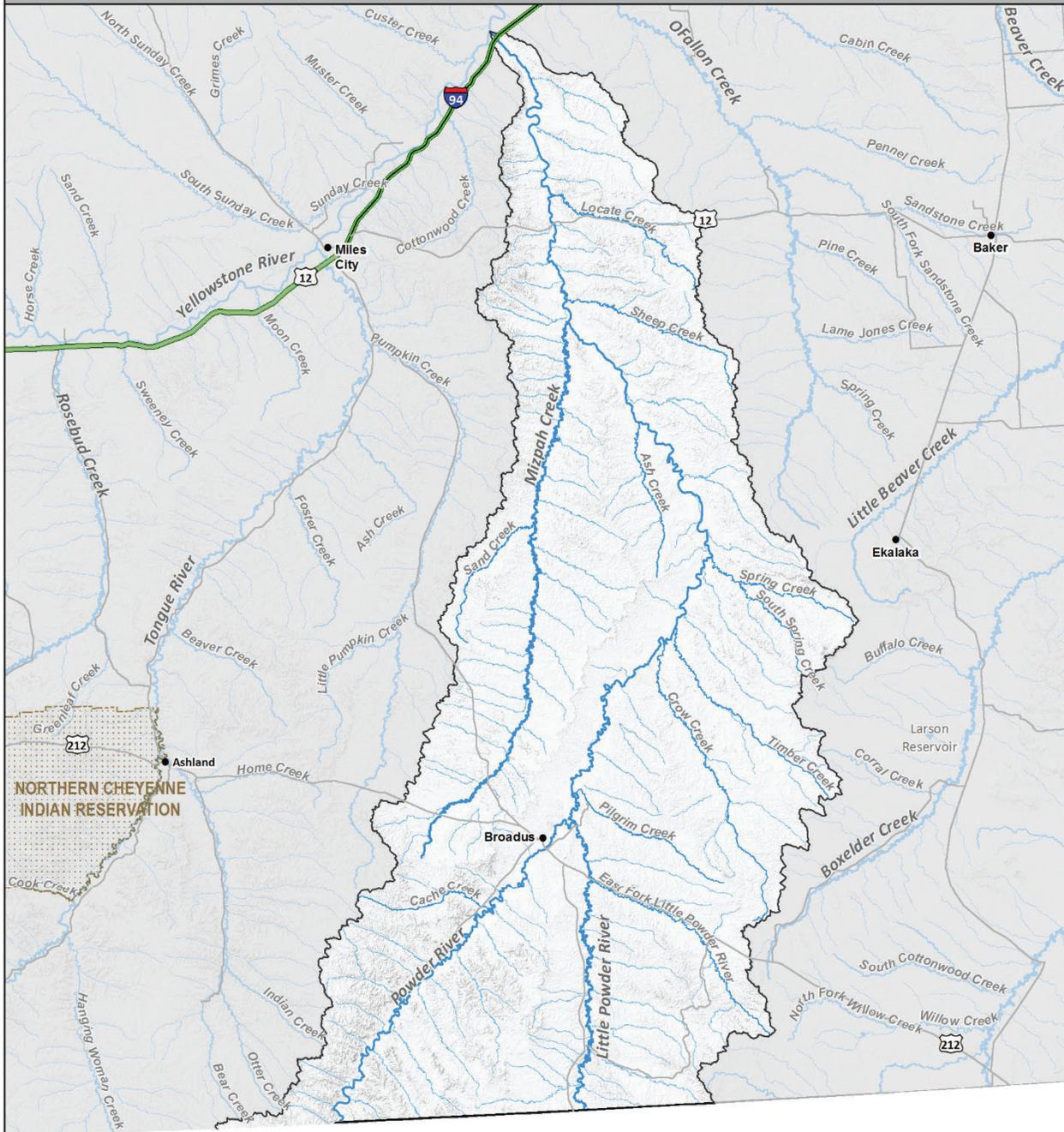
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Water	Miles/acres	Species	Recruitment Source	Management Type	Management Direction
		Multi species	Wild	Conservation/ General	Manage for recreational fishing opportunity where applicable. Monitor non-game fish species for native fish assemblage and overall ecosystem health.
Habitat needs and activities: Work with reservoir operator to manage water releases to mimic natural hydrograph and manage flow to avoid stranding fish. Work with irrigators and water commissioners to maintain State's Instream reservations at Miles City of 75 cfs each month but stress need for following flows to facilitate fish spawning migrations and larval survival: 190 cfs September-February; 525 cfs March-April; 600 cfs May-July 15; 225 cfs July 16-August. Reduce fish entrainment into irrigation intakes. Work with T&Y Canal board to secure written agreement for long-term operation of Muggli Bypass and use of canal fish screens.					
Intermittent Streams: Pumpkin Creek, Otter Creek, Hanging Women Crk  Ephemeral Streams: 9 with documented fish populations	171 miles 103 miles 48 miles  Various	Multi Species	Wild	General/ Conservation	Maintain fishery through habitat protection and restoration. Maintain or increase connectivity. Opportunistic monitor to further understand system and population dynamics.
Habitat needs and activities: Improve fish passage at current restrictions (culverts, fords, dams) and ensure future structures provide for adequate water flow and fish passage.					
Small Private Ponds/Reservoirs   Continue next page	Various	Trout  Bass, Walleye, Northern pike	Hatchery  Wild/ Hatchery	Put and Take  General/ Put, Grow and Take	Public relations opportunity with landowners to provide local fishing opportunity for rural community. Maintain fishery through monitoring, regulations and annual stocking.  Public relations opportunity with landowners to provide local fishing opportunity for rural community. Maintain fishery through monitoring, regulations and stocking or wild fish transfers when necessary.

Water	Miles/acres	Species	Recruitment Source	Management Type	Management Direction
		Crappie, Yellow Perch, Bluegill	Wild/ Transfer	General	Public relations opportunity with landowners to provide local fishing opportunity for rural community. Provide panfish angling opportunity, supplement population through wild fish transfers when necessary.
Habitat needs and activities: Water depth (ponds less than 12 feet deep) is a common limitation that leads to frequent winterkills; limitation offset by frequent sampling and stocking or wild fish transfers.					
Public Trout Ponds: Mud Turtle, Blacks Sawmill, Dean S	2 acre 1 acres 1 acre	Trout	Hatchery	Put and Take	Annual stocking of trout for angler opportunity.
Habitat needs and activities: water depth (ponds less than 12 feet deep) is a common limitation that leads to frequent winterkills; limitation offset by annual stocking.					

# Powder River Drainage

# MONTANA FWP



-  Tribal Lands
-  Drainage Boundary



Area of Interest



Map Produced by:  
ASP - Geographic Data Services  
ISR 43965 - Nov 23, 2018

Administrative boundaries and FWP Lands data from Montana Fish, Wildlife & Parks, Helena, MT. Background Imagery from ESRI



## **POWDER RIVER DRAINAGE**

### **PHYSICAL DESCRIPTION**

The Powder River drainage includes the Little Powder River and two intermittent tributaries (Mizpah Creek and Locate Creek) and drains portions of Carter, Powder River, Custer and Prairie Counties. The headwaters of the Powder River and Little Powder River are in Wyoming. The Little Powder River flows approximately 72 miles from the Wyoming state line before converging with the Powder River. The confluence of the Powder River with the Yellowstone River is approximately 220 river miles downstream from the Wyoming border. Additionally, 550 miles of fish-bearing streams exist in 44 streams or creeks within the drainage.

The drainage is rural and includes the small community of Broadus. The landscape is dominated by plains grassland complex but includes a large area of shrub grassland. Cottonwood bottoms dominate much of the riparian area. Land ownership includes state and federal lands but is dominated by private property. Agriculture, primarily ranching and secondarily dry land farming dominate the land use. Industrial exploration and development of the following natural resources is also occurring: coal and bentonite mining, natural gas and oil drilling, and wind turbines.

No natural lakes are found in the drainage; however, stock ponds exist and some that provide public access are managed as a fishery and stocked by FWP. In addition to the creeks mentioned above, there are numerous warm water ephemeral prairie streams throughout the drainage. Some of these streams hold game fish and many host a number of native and introduced fisheries.

### **FISHERIES MANAGEMENT**

The Powder River and tributaries are managed primarily as a general/conservation fishery. No species are being stocked in any of the rivers/creeks in the drainage. The primary management focus for the entire drainage is to improve fish passage where current restrictions exist (culverts, fords) and ensure future structures provide for adequate stream function and fish passage.

Fish sampling within the drainage has historically been limited and sporadic. Much of the past sampling has used seines and electrofishing gear to assess larger scale prairie fish distribution and abundance as well as to collect fish for specific educational activities for school programs. Recently, increased resources have been directed at monitoring of pallid sturgeon and paddlefish within the river. Specifically, adults of both species are monitored via telemetry equipment to document their spawning use and trawling gear is subsequently deployed to detect the presence of free embryos if spawning was suspected within the Powder River. Due to low fishing pressure in the drainage there are no specific management goals.

The fish assemblage in the Powder River drainage is largely dominated by 27 native species but also includes nine introduced fish species. The Powder River hosts four game fish: channel catfish, sauger, walleye and shovelnose sturgeon when discharge within the river supports their inhabitation. Paddlefish are also seasonal migrants into the Powder River in years when the Yellowstone River discharge allows for upstream fish passage around or over Intake Diversion Dam. Recent telemetry research from 2014-2018 has demonstrated that pallid sturgeon, a

federally listed endangered species, is also attracted to the Powder River in years when they can migrate upstream of Intake Dam. Channel catfish are the only game fish inhabiting the Little Powder River; 16 native fish species and four introduced fish species also reside within its waters.

Recent field studies have highlighted the significance of the Powder River to long-lived, migratory river species like paddlefish and pallid sturgeon. Paddlefish spawning was confirmed in 2014 and 2017 by capturing paddlefish larvae at river mile one in the Powder River. Paddlefish were also abundant in the lower Powder River in 2018 and a considerable number of Acipensiform larvae were collected; at time of publication genetic test results that identify the larvae to species (e.g. paddlefish, shovelnose sturgeon, or pallid sturgeon) were not completed. Also in 2014, three adult pallid sturgeon (one gravid female and two males) with radio transmitters were monitored as they migrated upstream of Intake Dam, via the side channel, and into the Powder River in June. Spawning was confirmed by recapturing and assessing the female pallid sturgeon but only after she entered the Yellowstone River. Body weight comparison confirmed eggs were deposited either in the Powder River or Yellowstone River near the confluence of the two rivers. The apex of upstream migration for the two males was Powder River mile 8 and 5 while the female migrated as far as river mile 20 of the Powder River.

In December 2016, the US Fish & Wildlife Service mandated the Bureau of Reclamation (BOR), owner of Intake Dam, translocate telemetered pallid sturgeon that reach Intake Dam. This is an interim mitigation measure until the BOR completes a fish passage project at Intake Dam. In 2017, six fish were translocated upstream of the dam by BOR staff and 4 additional fish passed upstream of Intake via the side channel. Three of these fish continued upstream to an apex at Powder River miles 97, 90, and 88. In 2018, 7 fish were translocated at Intake and 5 others passed Intake via the side channel. One fish continued upstream to Powder River mile 87. Another fish was near the Powder-Yellowstone Confluence for 14 days, but the automatic logging telemetry data could not confirm use of the Powder River. A third fish from the 2018 group also migrated upstream of the Powder-Yellowstone Confluence, to approximately Cartersville Dam, but did not use the Powder River. These observations demonstrate the importance of the Powder River to pallid sturgeon and are expected to become a relatively common occurrence if improved fish passage at Intake is achieved or while translocation continues as an interim measure.

From 2006-2015, Wyoming Fish & Game has collected multiple adult sturgeon chub in the Powder River as far upstream as Kaycee, Wyoming. Wyoming staff speculate that these fish are Yellowstone River residents that make spawning migrations into Wyoming when river flows are adequate. These findings also demonstrate the importance of the Powder River to native fish species from the Yellowstone River.

The Powder River drainage does not include any large lakes or reservoirs but does support seven private ponds and four public ponds that are managed as fisheries in the FWP Region 7 Pond Fishing Program. The primary justification for stocking these waters is providing a family fishing opportunity. The program is offered to landowners as a public relations opportunity to provide a fishery for the surrounding community. FWP will stock and manage the private fishery in exchange for the landowner granting free public access. Anglers are required to obtain landowner permission each time they want to access the fishery. Rainbow trout, largemouth bass, yellow perch, northern pike and crappie dominate the species available in these systems.

The fisheries are sampled at least once every three years to monitor population dynamics. Populations are established or supplemented when needed through stocking from a state hatchery or by wild fish transfers from a donor fishery that has tested clean for disease and Aquatic Invasive Species within the region.

## **HABITAT**

The Powder River is undammed and exhibits a relatively natural hydrograph. Fluctuations of the hydrograph often consist of rapid but short-duration elevated flows resulting from Wyoming mountain snowpack melt or from local rain events. The basin has highly erodible soils consisting of gumbo, clay and silt. The landscape within the basin is dominated by rough breaks, badlands and buttes. The combination of highly erosive soils and steep/rough terrain often result in large amounts of suspended sediments within the water column and bed load material dominated by sand and silt. Sediment load of the Powder River has the potential to, and often does, alter water turbidity and substrate of the Yellowstone River downstream of the Powder River confluence.

Many native species in the Yellowstone River evolved with and rely upon increased turbidity as a spawning cue and some of these species concentrate downstream of the Powder/Yellowstone River confluence each spring. Sauger, channel catfish, paddlefish (during high flow years that accommodate passage at the Intake Diversion on the Yellowstone River), and shovelnose sturgeon are four native game fishes that rely upon increased turbidity and have been documented to aggregate below the Powder River confluence. Recent studies confirm the presence of paddlefish, pallid sturgeon, and sturgeon chub during spawning periods in the Powder River and suggest habitat conditions may be favorable for spawning by both pallid sturgeon and paddlefish when river flows are adequate during spawning periods. The significance of elevated turbidity and bed load of the Powder River to the native fish species of the Yellowstone River is likely substantial and may be critical to their life history. Prior to construction of Tongue River Reservoir and Yellowtail Dam, the Tongue River and Big Horn River had similar sediment regimes to that of the Powder River. The Powder River is the last large tributary to the Yellowstone River that provides a natural hydrograph with a naturally high sediment/turbidity regime, so it has become an increasingly important piece of habitat to the native species of the Yellowstone River Drainage.

The Powder River drainage is predominately rural and recent major habitat changes are limited. The use of rock or concrete rip rap to protect city infrastructure, roads, bridges, homes, and farmland/ranchland has affected the natural function of the rivers and streams in this drainage. The installation of culverts, fords and dams has similar impact on the function of the waterways and even a greater impact on the upstream migration of fish. Irrigation demands increase the frequency of dewatering the river which creates an additional habitat concern within the drainage.

Many of the private and public ponds in the drainage are limited by water depth. Most ponds have a maximum depth of 10-11 feet which is marginal for overwintering fish during winters with sustained snow accumulations. The severity and prevalence of winterkills may be reduced by installing windmill aerators. Some landowners and the BLM have installed aerators at their expense in attempt to reduce fish winterkill occurrences. The regional Fish, Wildlife and Parks

fisheries program has refrained from installing aerators for multiple reasons but mainly because of the time and expenses required to service and maintain the structures.

## **FISHING ACCESS**

There are currently two public access sites to the Powder River and one on the Little Powder River. The Powder River Depot provides angler access with undesignated camping and a hand-launch only near the confluence with the Yellowstone River. The other access is the Broadus Bridge FAS (river mile 152) which provides day use only and no boat ramp. The single access site to the Little Powder River is near Broadus and provides day use only and no boat ramp. Considering the rural nature of the drainage and limited game species in the streams, fishing pressure is low. Access to fish is attained through private property, county road crossings and scattered public land.

## **SPECIAL MANAGEMENT ISSUES**

### Coal and Coal Bed Methane Extraction Activities

The Powder River Basin in Wyoming is rich with coal deposits and associated extraction activities (strip mining, methane wells, pipelines, and railroads) which can challenge management of the Powder River water and aquatic resources. Water discharge into the Powder River and tributaries from methane wells, although depressed at the current market, continues to have long-term impacts to irrigation practices, which have not been adequately quantified. Management of the Powder River and fisheries requires involvement with all extraction issues as they evolve to ensure the aquatic resources are understood and evaluated by resource and political decision makers.

### In-stream Flows and Water Compact:

Continue to work with Wyoming and irrigators to ensure FWP's in-stream flows are provided at the confluence of the Powder and Yellowstone Rivers. Native species migrations into the Powder River for spawning are substantial; recent documentation of paddlefish and pallid sturgeon use and spawning in the Powder River, stresses the value of protecting in-stream flow in the Powder River. Wyoming also documented nearly annual use by sturgeon chub in the Powder River in Wyoming. Given the near dewatering of the Powder River during the month of August, FWP needs to educate the public and other agencies about the need to secure improved in-stream flows for fisheries benefits. The following instream reservations at the Yellowstone River confluence were granted in 1978: 31.9 cfs in January; 71.8 cfs in February; 291 cfs in March; 347 in April; 424 cfs in May; 184 cfs in June; 70 cfs in July; 14.5 cfs in August; 8.8 cfs in September; 9.4 cfs in October; and 61.6 cfs in November and December.

### Fishing Contest Restrictions:

The following Fishing Contest Stipulations and Recommendations apply to the Powder River. Stipulations incorporated into Contest Rules under Authority of MCA 87-3-121:

- Contest approved only for single water body i.e. distinct reservoir, lake, or river (ARM 12.7.802).

- No tournaments allowed on Holiday Weekends (ARM 12.7.805) including Easter, Mother's Day, Memorial Day, Father's Day, 4<sup>th</sup> of July, Labor Day, Columbus Day, and Veterans Day.
- Only one tournament per weekend will be allowed. A body of water cannot have consecutive weekend tournaments (ARM 12.7.805)
- No contests for listed species, species of concern, or for wild trout (ARM 12.7.807). Walleye tournaments: Sauger are defined as any Sander (Sauger/Walleye) with multiple small, distinct black spots on the spiny (first) dorsal fin ray membrane. Fish meeting this, and only this criterion, are classified as Sauger and are not allowed for weigh in.
- Live bait and fish must be transported in clean domestic water where allowed in current fishing regulations (ARM 12.5.706).
- Vessels and equipment approaching a department inspection station must stop as directed (ARM 12.5.706).
- Vessels and equipment entering the state that don't approach a department inspection station must be inspected for aquatic invasive species prior to launching in any Montana water body (Arm 12.5.706).
- Tournament boundaries must be clearly defined in the application. Proposed boundary size should be minimized in an effort to reduce tournament related fish mortality caused by fish being held in live-wells for extended periods and/or traveling long distances.
- A shotgun-style start for boat tournaments on rivers can be extremely dangerous and must be evaluated by tournament sponsors. If boats are required to start at one location, tournament sponsors need to implement an orderly, single file, timed start for every boat or other method (use multiple boat ramps) to reduce the safety risks and liability associated with a rapid start.
- Contests are prohibited in August due to high water temperatures. Additional stress from a fishing contest dramatically increases the likelihood of delayed fish mortality.
- Participants cannot possess more than a daily limit at one time.
- Catch and release formats only. Limit two poles per person (unless regulations restrict anglers to one rod i.e. Central District streams and rivers).
- Limit two poles per person.
- No setlines, trot lines or hoop nets allowed.
- No stringers allowed.
- Live-wells and other fish holding containers such as coolers are required to have aeration running when fish are held and water exchanged at minimum on an hourly basis.
- Sponsors are encouraged to penalize anglers or teams with dead fish.

- Landowner permission required at private boat ramps or on private property of weigh-ins.

#### Fishing Contest Recommendations:

- Tournaments that don't transport fish to a centralized weigh-in will be given preference over centralized weigh-in tournaments. Bank fishing is discouraged unless fish measurements are recorded by anglers or roving measurement staff and fish are released on site. This prevents handling time and associated stress on fish from poor handling and hauling techniques (e.g. five gallon buckets). Hauling fish away from a water body and then releasing it back into the source water after transportation via vehicle on a county road or highway is technically illegal (see Montana Code Annotated: 87-5-701, -702 & -711).
- Contest sponsor(s) are responsible for safe fish handling procedures and to ensure fish are released back to the source water. Stipulations for tournaments with large geographic boundaries may be required to separate fish taken from different locations and return them to specified locations as part of the permit requirements. This may require sponsors to have tanks large enough to hold fish (1/2 lb of fish per gallon of water is a general recommendation for holding and transporting fish), have oxygenation systems, and the ability to haul fish. Discourage contest during the critical spawning period for Channel Catfish and Walleye. Channel Catfish spawn between 75°F to 85°F which typically occurs from June 15 – July 15 on the Powder River. Walleye spawn at 50°F which typically occurs in April.

**FISHERIES MANAGEMENT DIRECTION FOR POWDER RIVER DRAINAGE**

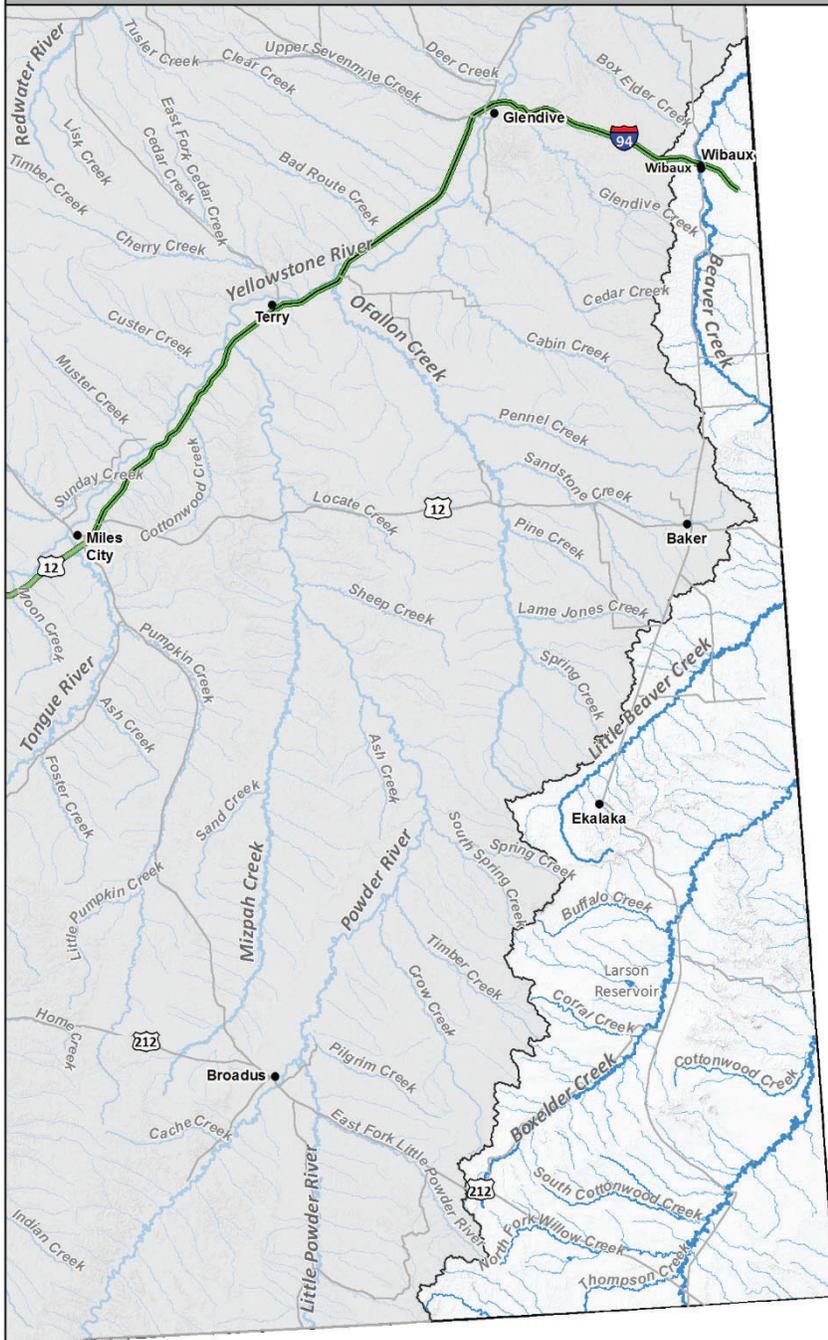
<b>Water</b>	<b>Miles/acres</b>	<b>Species</b>	<b>Recruitment Source</b>	<b>Management Type</b>	<b>Management Direction</b>
Powder River	220 miles	Sauger (N) Channel catfish (N)	Wild	General	Maintain harvest level, relative abundance, and size structure through regulations.
		Shovelnose sturgeon (N)	Wild	General	Manage as a recreational fishery with some harvest opportunity. Monitor health of this long lived native species.
		Pallid sturgeon (N), Paddlefish (N)	Wild	Conservation	Monitor usage, degree of residency and spawning activity in this river.
		Blue sucker (N)	Wild	Conservation	Monitor population and investigate life history and movements.
		Multi species	Wild	General/ Conservation	Manage for recreational fishing opportunity where applicable. Monitor non-game fish species for native fish assemblage and overall ecosystem health.
Habitat needs and activities: Dewatering is a threat to game and non-game fish, work with Wyoming adjudication process to evaluate compact interpretation and meet the following instream reservations: 31.9 cfs in January; 71.8 cfs February; 291 cfs March; 347 cfs April; 424 cfs May; 184 cfs June; 70 cfs July; 14.5 cfs August; 8 cfs September, 9.4 cfs October, and 61.6 cfs November and December. Reduce fish entrainment into irrigation intakes.					
Little Powder River	72 miles	Channel catfish (N)	Wild	General	Maintain harvest level, relative abundance, and size structure through regulations.
		Multi species	Wild	General/ Conservation	Manage for recreational fishing opportunity where applicable. Monitor non-game fish species for native fish assemblage and overall ecosystem health.
Habitat needs and activities: Improve fish passage at current restrictions (culverts, fords, dams) and ensure future structures provide for adequate creek flow and fish passage.					

Water	Miles/acres	Species	Recruitment Source	Management Type	Management Direction
Intermittent Streams: Mizpah Creek, Locate Creek  Ephemeral Streams: 10 with documented fish populations	150 miles 42 miles  Various	Multi species	Wild	General/ Conservation	Manage for recreational fishing opportunity where applicable. Monitor non-game fish species for native fish assemblage and overall ecosystem health.
Habitat needs and activities: Improve fish passage at current restrictions (culverts, fords, dams) and ensure future structures provide for adequate creek flow and fish passage.					
Small Private Ponds/Reservoirs	Numerous	Trout  Bass, Walleye, Northern pike  Crappie, Yellow perch, Bluegill	Hatchery  Wild/ Hatchery  Wild/ Transfer	Put, Grow and Take  General/ Put, Grow and Take  General	Public relations opportunity with landowners to provide local fishing opportunity for rural community. Maintain fishery through monitoring, regulations and annual stocking.  Public relations opportunity with landowners to provide local fishing opportunity for rural community. Maintain fishery through monitoring, regulations and stocking when necessary.  Public relations opportunity with landowners to provide local fishing opportunity for rural community. Provide panfish angling opportunity, supplement population through wild fish transfers when necessary.
Habitat needs and activities: Water depths. (less than 12 feet deep) is a common limitation that leads to frequent winterkills; limitation offset by frequent sampling and stocking or wild fish transfers.					

Water	Miles/acres	Species	Recruitment Source	Management Type	Management Direction
Public Trout Ponds: Beardsley Rest Boulware	2 acres 1 acre 1 acre	Trout	Hatchery	Put, Grow and Take	Annual stocking of trout for angler opportunity.
Habitat needs and activities: Water depths. (less than 12 feet deep) is a common limitation that leads to frequent winterkills; limitation offset by frequent sampling and stocking.					

# Little Missouri River Drainage

MONTANA FWP



-  Tribal Lands
-  Drainage Boundary



Area of Interest



Map Produced by:  
 ASP - Geographic Data Services  
 ISR 43965 - Nov 23, 2018

Administrative boundaries and FWP Lands data from Montana Fish, Wildlife & Parks, Helena, MT. Background Imagery from ESRI



## **LITTLE MISSOURI RIVER DRAINAGE**

### **PHYSICAL DESCRIPTION**

The Little Missouri River drainage includes the Little Missouri River and two perennial tributaries (Box Elder Creek and Beaver Creek) and drains portions of Carter, Fallon and Wibaux counties. Only a small segment of each tributary exists in Montana and all are tributaries of the Missouri River in North Dakota. The headwater of the Little Missouri River is in Wyoming and only 104 miles exist in Montana before crossing into North Dakota. The headwaters for the other three tributaries occur in Montana and converge with the Little Missouri River in North Dakota.

The drainage is in a rural setting which includes three small communities: Ekalaka, Baker and Wibaux. The landscape is dominated by plains grassland complex but includes a large area of shrub grassland and a smaller area of plains forest called the Custer National Forest. Land ownership includes state and federal lands but is dominated by private property. Agriculture, primarily ranching and secondarily dry land farming dominate the land use. Industrial exploration and development of the following natural resources is also occurring: coal and bentonite mining, natural gas and oil drilling, and wind turbines.

No natural lakes are in the drainage; however, numerous stock ponds exist, and many are managed as fisheries with public access. In addition to the creeks mentioned above, there are numerous warm water prairie streams throughout the drainage. Some hold game fish and many host a number of native and introduced fish species.

### **FISHERIES MANAGEMENT**

The Little Missouri River and tributaries are managed primarily as a general/conservation fishery. Walleye are stocked in Beaver Creek and is the only species currently being stocked in any of the creeks/rivers in the drainage. However, past and current stocking practices in Montana and North Dakota have influenced the fish assemblage. The primary management focus for the entire drainage is to improve fish passage at existing restrictions (culverts, fords, dams) and ensure future structures provide for adequate stream function and fish passage.

Fish sampling within the drainage has been limited to sporadic and infrequent seining activities associated with a larger-scale prairie fish sampling effort and specific educational activities for school programs. Most of the fisheries data in the drainage has been collected in the last decade. Because fishing pressure is very low, there are no specific management goals or fishing regulations for the drainage.

Like other prairie stream systems, the fish assemblage in the Little Missouri drainage is broad and dominated by native species. The Little Missouri River hosts eleven native fish species, five introduced fish species and only one game species (channel catfish). Box Elder Creek supports sixteen native fish species, five introduced fish species, and three game species (northern pike, channel catfish and sauger). Sauger are classified as a Species of Concern in Montana. Little Beaver Creek contains seven native fish species, three introduced fish species, and two game

species (northern pike and channel catfish). Beaver Creek hosts eleven native fish species, six introduced fish species, and two game species (northern pike and walleye).

The Little Missouri River drainage does not include any large lakes or reservoirs but does have eleven private ponds and thirteen public ponds that are managed as fisheries in the Regional Pond Fishing Program. The primary justification for stocking these waters is providing a family fishing opportunity. The program is offered to landowners as a public relations opportunity to provide a fishery for the surrounding community. If the landowner allows free public access to the pond FWP will stock and manage the fishery. Anglers are required to obtain landowner permission each time they want to access the fishery. Rainbow trout, largemouth bass, yellow perch, northern pike and crappie dominate the species available in these systems. The fisheries are sampled at least once every three years to examine population densities and size structures. Populations are established or supplemented when needed through stocking from a state hatchery or by wild fish transfers from another fishery within the region.

## **HABITAT**

Although the drainage is predominately rural and major changes have not occurred, habitat changes have impacted the system since human settlement. Developments include the construction of railroads, as well as numerous roads to accommodate vehicle travel (county roads, state highways and a federal interstate highway). All these developments have impacted the ability of rivers and streams to migrate laterally and interact with their historic floodplain. The use of rock or concrete rip rap to protect infrastructure, roads, bridges, homes, and farmland/ranchland has restricted the natural function of the rivers and streams in this drainage. The installation of culverts, fords and dams impact the function of the waterways and upstream migration of fish.

The majority of private and public ponds in the drainage are limited by water depth. Most have a maximum depth of 10-11 feet which is marginal for overwintering fish during winters with sustained snow accumulations. The significance and prevalence of winterkills has been and can be reduced by installing windmill aerators. Some landowners and the BLM have installed aerators at their expense to reduce winterkill occurrences. FWP has refrained from installing aerators because of the time and expenses required to service and maintain the structures.

## **FISHING ACCESS**

Considering the rural nature of the drainage and limited game species in the streams, fishing pressure is extremely low and demand for a fishing access site has not occurred. Consequently, development of a fishing access site is a low priority within the drainage. Access for fishing in the streams is probably met through private property access, county road crossings and public land.

## **SPECIAL MANAGEMENT ISSUES**

There are no special management issues in the Little Missouri River drainage considering the low fishing pressure experienced and limited game species available.

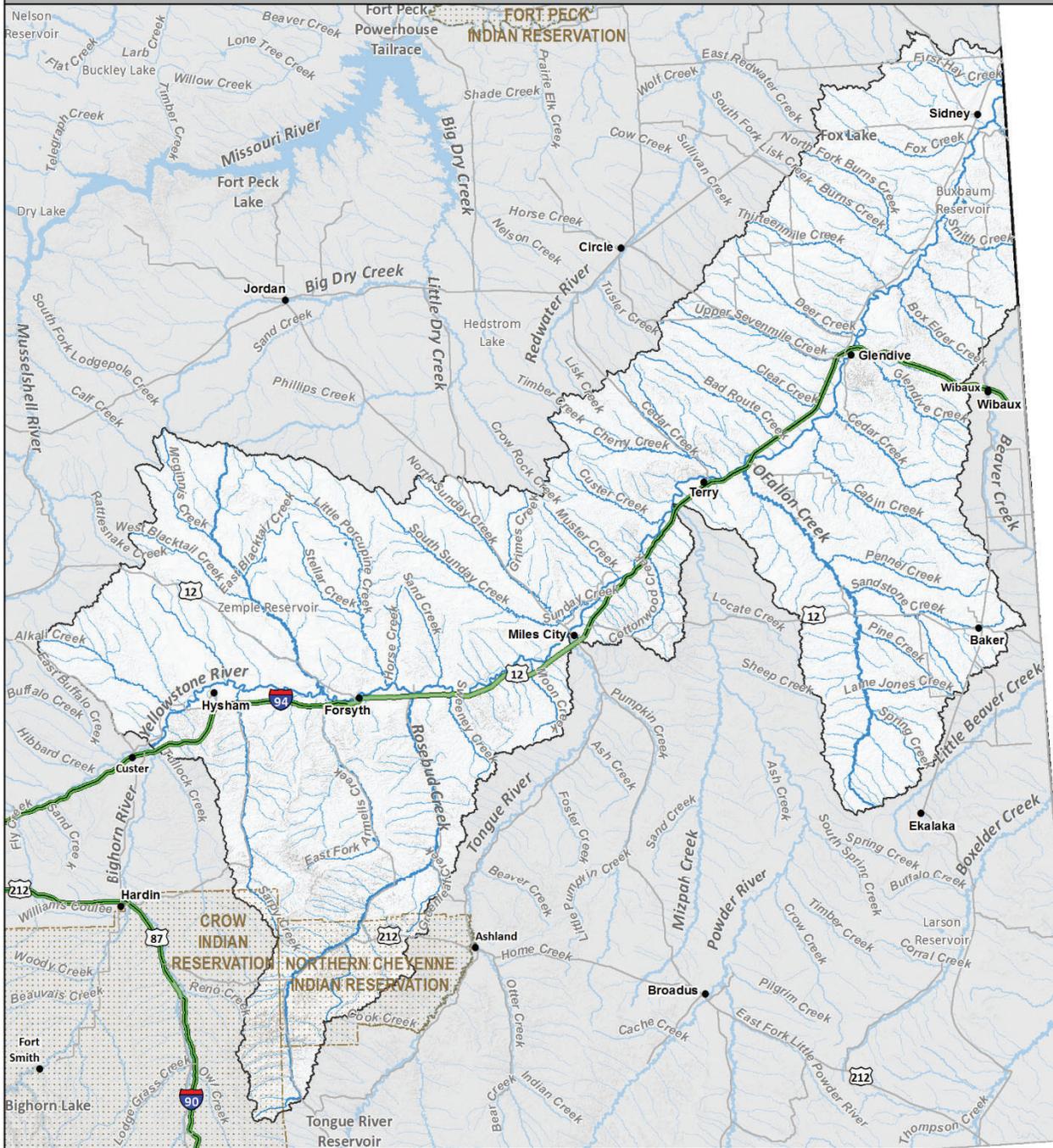
**FISHERIES MANAGEMENT DIRECTION FOR LITTLE MISSOURI RIVER DRAINAGE**

<b>Water</b>	<b>Miles/acres</b>	<b>Species</b>	<b>Recruitment Source</b>	<b>Management Type</b>	<b>Management Direction</b>
Beaver Creek	120 miles	Walleye	Hatchery	General	Annual stocking of walleye for increased angler opportunities.
		Multi species	Wild	General/ Conservation	Manage for recreational fishing opportunity where applicable. Monitor non-game fish species for native fish assemblage and overall ecosystem health.
Habitat needs and activities: improve fish passage at current restrictions (culverts, fords, dams) and ensure future structures provide for adequate creek flow and fish passage.					
Perennial Streams: Box Elder Creek Little Missouri,	151 miles 106 miles	Multi species	Wild	General/ Conservation	Manage for recreational fishing opportunity where applicable. Monitor non-game fish species for native fish assemblage and overall ecosystem health.
Intermittent Streams: Little Beaver	12 miles				
Ephemeral Streams: 28 with documented fish populations					
Habitat needs and activities: improve fish passage at current restrictions (culverts, fords, dams) and ensure future structures provide for adequate creek flow and fish passage.					
Small Private Ponds/Reservoirs	Numerous	Trout	Hatchery	Put, Grow and Take	Public relations opportunity with landowners to provide local fishing opportunity for rural community. Maintain fishery through regulations and annual stocking.
Continue next page					

Water	Miles/acres	Species	Recruitment Source	Management Type	Management Direction
		Bass, Walleye, Northern pike,  Crappie, Yellow perch, Bluegill	Wild/ Hatchery  Wild/ Transfer	General/ Put, Grow and Take  General	Promote opportunity with landowners to provide local fishing opportunity for rural community. Maintain fishery through regulations and stocking when necessary.  Promote opportunity with landowners to provide local fishing opportunity for rural community. Provide panfish angling opportunity, supplement population through wild fish transfers when necessary.
Habitat needs and activities: water depth (ponds less than 12 feet deep) is a common limitation that leads to frequent winterkills; limitation offset by frequent sampling and stocking or wild fish transfers.					

# Lower Yellowstone River Drainage

MONTANA FWP



-  Tribal Lands
-  Drainage Boundary



Map Produced by:  
 ASP - Geographic Data Services  
 ISR 43965 - Nov 23, 2018

## **LOWER YELLOWSTONE RIVER DRAINAGE**

### **PHYSICAL DESCRIPTION**

The Lower Yellowstone River Drainage includes the Yellowstone River, seven perennial streams (Burns, Rosebud, O'Fallon, Cedar, Cabin, Fox, and Thirteen Mile creeks) and numerous intermittent and ephemeral warm water prairie streams. No natural lakes are located within the drainage; however, nine public reservoirs (Castle Rock, Baker, Hollecker, South Sandstone, Gartside, Johnson's, Rattlesnake, Homestead, and Spotted Eagle) and numerous smaller public and private reservoirs and stock ponds are managed for fisheries. The drainage includes all or portions of Big Horn, Treasure, Rosebud, Custer, Prairie, Fallon, Dawson, and Richland counties.

The Yellowstone River is the largest water body within the drainage. The headwaters of the Yellowstone River is upstream of Yellowstone Lake in northwest Wyoming. The Yellowstone River flows north into Montana and continues northeast through central and eastern Montana and crosses into North Dakota approximately fifteen miles prior to its confluence with the Missouri River. The Yellowstone River in administrative Region 7 consists of 293 river miles between the Bighorn River confluence and North Dakota state line. About 90% of all uses of Yellowstone River water in the drainage is for irrigation; roughly 1.5 million acre-feet of water is used annually. Irrigation pumps, gravity-feed canals without dams, and gravity-feed canals with mainstem low-head irrigation diversion dams (Ranchers, Yellowstone River, Cartersville and Intake) are used to withdraw water for irrigation.

The Lower Yellowstone River Drainage is in a rural setting with small communities (Hysham, Forsyth, Colstrip, Rosebud, Miles City, Terry, Fallon, Glendive, Savage, Crane, Lambert and Sidney). The landscape is dominated by plains grassland complex but includes a large area of shrub grassland and a smaller area of plains forest. Land ownership includes state and federal lands but is dominated by private property. Agriculture, primarily ranching and secondarily dry land and irrigated farming, dominate the land use. Industrial activities include coal mining at Colstrip and natural gas and oil drilling in Richland, Dawson, and Fallon counties.

### **FISH MANAGEMENT**

The relatively natural hydrograph and intact habitat of the lower Yellowstone River and its tributaries support a rich fish assemblage of 61 species (41 native 20 non-native) composed of many warmwater and coolwater species, and a few coldwater species. Native fish species include: sauger, shovelnose sturgeon, pallid sturgeon, channel catfish, burbot, paddlefish, freshwater drum, goldeye, shortnose gar, smallmouth buffalo, bigmouth buffalo, blue sucker, river carpsucker, shorthead redhorse sucker, white sucker, longnose sucker, mountain sucker, longnose dace, northern redbelly dace, creek chub, lake chub, sturgeon chub, brook stickleback, brassy minnow, fathead minnow, plains minnow, flathead chub, western silvery minnow, sand shiner, emerald shiner, golden shiner, and stonecat. Common carp, plains killifish, black bullhead, yellow bullhead, and green sunfish are introduced species that can be found in parts or all the drainage. Largemouth bass, smallmouth bass, walleye, white crappie, black crappie,

northern pike, yellow perch, bluegill, and pumpkinseed have been stocked or illegally introduced and are found in reservoirs, stock ponds; some species are also established in the Yellowstone River and tributaries. Brown trout, rainbow trout, brook trout, and mountain whitefish inhabit reaches of the Yellowstone River near and upstream of the Bighorn River confluence. Brook trout are also found in four small tributaries of the lower Yellowstone River. All four tributaries are influenced by coldwater releases from large groundwater springs.

A primary fisheries management objective for the lower Yellowstone River is monitoring and maintaining the wild and self-sustaining populations of native species. This objective includes maintaining recreational harvest, on a limited basis, for native game species. Another primary objective is monitoring, maintaining and improving the overall ecosystem health of the river. This objective includes monitoring stream bank projects to ensure habitat protection and allowing for natural stream form and function for efficient transport of both water and sediment. A secondary management objective is to maintain a recreational fishery for introduced fish species with an emphasis on harvest.

The lower Yellowstone supports a wild sauger population. Monitoring and sustaining this population for native species preservation and recreational angling is a primary management concern for FWP. Annual spring tagging of spawning sauger and subsequent recapture information from department sampling efforts and angler tag returns provides data used to estimate angler harvest and document fish movement. In the Yellowstone River upstream of Cartersville Diversion Dam there is a reduced limit on sauger because trend data suggest lower relative abundance of Sauger upstream of this structure.

One threat to maintaining the sauger population in the Yellowstone River is the expanding population of nonnative smallmouth bass. The smallmouth bass population has the potential to outcompete and displace sauger in some reaches of its historic range. In 2005, stable isotope analysis was used to investigate competition for prey between sauger and smallmouth bass in the Yellowstone River. Tissue samples for isotope analysis were collected from 10 prey species in July 2005 near Rosebud Montana. Results show that sauger and smallmouth bass (>200mm) overlap almost completely in both carbon and nitrogen, indicating that these species are at the same trophic level and are consuming prey with the same carbon isotope signature in similar proportions (i.e. they are dependent on the same prey source).

Trend sampling on the Yellowstone River has demonstrated that sauger abundances are negatively correlated with smallmouth bass abundances. Smallmouth bass progressively replaced sauger as the most abundant predator in the Forsyth and Miles City areas during the consecutive drought years experienced in the 1980's and early 1990's. Specific life history stages, like spawning and foraging, are dependent on a natural hydrograph and increased turbidity. Smallmouth bass are visual feeders well suited to low turbidity conditions. Drought or low flow years result in reduced turbidity which favors smallmouth bass, while wet or high flow periods increase turbidity and favor sauger populations. Loss of the natural hydrograph and reduced turbidity from drought and dam operations on tributaries (Yellowtail and Tongue River Reservoirs), along with continued allocation of river water for irrigation or municipal use and armoring of stream banks on the Yellowstone River, all create conditions that favor smallmouth bass over sauger.

The lower Yellowstone River provides a unique opportunity for anglers to catch and harvest a paddlefish. With technical guidance provided by the University of Idaho, Montana FWP and North Dakota Game and Fish manage the paddlefish population in the lower Yellowstone River cooperatively. Paddlefish management is guided by the 10-year “*Management Plan for North Dakota and Montana Paddlefish Stocks and Fisheries.*” Paddlefish from this population spend most of their lives in Lake Sakakawea. In May and June during elevated Yellowstone River discharge, paddlefish migrate up the Yellowstone and Missouri Rivers to spawn. During paddlefish season, anglers can fish for paddlefish from the Bighorn River confluence to the North Dakota state line, but most angling occurs at and downstream of Intake Diversion Dam. The paddlefish season has specific regulations and management activities designed to ensure that this long-lived, late to mature species can continue to provide a sport fishing opportunity in Montana. FWP attempts to maximize angler opportunity while ensuring sustainability with a split season, with harvest-only days and catch-and-release-only days. Data collected from tagging efforts during catch-and-release fishing allows estimation of the population size each year. Data collected from harvested fish allows evaluation of population structure. Together this information allows FWP to monitor the overall size of the population and condition of the individuals within the population through time. A statewide paddlefish phone creel is conducted annually to obtain harvest estimates that is compared to the field-measured harvest.

Research activities are conducted to understand and aid recovery of pallid sturgeon, a federally endangered species and state Species of Concern. Recent research includes monitoring adult pallid sturgeon migration pathways and reproduction within the Yellowstone River. The lack of successful natural recruitment prompted the stocking of juvenile hatchery-reared pallid sturgeon into the Yellowstone River as far upstream as Cartersville Diversion Dam. These fish are reared by state and federal hatcheries including the Miles City State Fish Hatchery. Annual monitoring of juvenile pallid sturgeon occurs in late summer/early fall to assess the survival rate of hatchery-stocked pallid sturgeon into the Yellowstone River. No harvest is allowed for pallid sturgeon because of its endangered species status.

Trend electrofishing is conducted annually on five reaches of the lower Yellowstone River to assess and monitor relative abundance, population structure, and relative condition of all fish species. Trend sections are six miles long and are located at Hysham, Forsyth, Miles City, Fallon, and Intake. Each site is sampled once in the months of August, September, and October. Data collected during this period is the baseline information for monitoring relative abundance and condition of sport fish and native species in the lower Yellowstone River. In the Yellowstone River and tributaries, the primary objective for all fish species is to monitor and sustain a wild fishery. Fish stocking will not occur in a river system unless natural spawning and recruitment are failing, or habitat is deemed to be irreparable.

The Lower Yellowstone River Drainage also has many private and public reservoirs and stock ponds that are managed as fisheries in the Regional Pond Fishing Program. The primary justification for stocking these waters is providing a family fishing opportunity. The program is used as a public relations opportunity with landowners and provides a fishing opportunity for the surrounding community. If the landowner agrees to allow free public access to the pond, FWP will stock and manage the fishery. Anglers are required to obtain landowner permission every time they access the fishery. Fish populations are established or supplemented when needed through stocking from a state hatchery or by wild fish transfers from another fishery. A variety

of fish species are available for stocking from the state's hatcheries which include: walleye, rainbow trout, smallmouth bass, largemouth bass, channel catfish and northern pike. The statewide wild fish transfer policy also allows transferring fish between waters. Northern pike, yellow perch, black crappie, white crappie, and bluegill are often available for transfer. Transfers are usually done to re-establish, or augment ponds affected by winterkill or to provide forage. Reservoirs and stock ponds are sampled by FWP at least every three years to evaluate the status of the fisheries and ensure a catchable stock of fish is present. A Regional Pond Fishing Guide is generated annually that summarizes the pond program, locations of ponds, and fish species available. The guide is available to the public at the regional office.

Overall fishing pressure is low to moderate in the drainage but increasing on the Yellowstone River due to increasing numbers of anglers owning riverboats. Stock ponds and prairie streams in the drainage have high to low angling pressure. Spotted Eagle Pond in Miles City, Hollecker Lake in Glendive, Baker Lake in Baker, South Sandstone Lake near Baker, Castle Rock Lake in Colstrip, and Gartside Reservoir near Sidney all experience high fishing pressure because of proximity to population centers. Many of the public reservoirs and private ponds in the district get moderate to low angling pressure.

## **HABITAT**

The Yellowstone River, touted as the longest undammed river in the lower 48 states, has a relatively intact and natural hydrograph. Hydrograph fluctuations often consist of short-duration elevated flows in early spring from local snow melt and rain events, but longer, sustained, elevated flows in spring/early summer from mountain snow melt. Historically, two major tributaries that are now dammed (Bighorn and Tongue rivers) provided a major influence on the hydrograph and sediment regime of the lower Yellowstone River. Construction of Tongue River Reservoir (on the Tongue River) and Yellowtail Dam (on the Bighorn River) permanently altered the hydrograph and sediment contribution to the lower Yellowstone River.

These anthropogenic habitat alterations are noteworthy because many native species in the lower Yellowstone River evolved and relied upon increased turbidity as a spawning cue. The increased turbidity may be critical to the life history of native fish species in the lower Yellowstone River. The resulting reduced turbidity creates favorable conditions for introduced species such as smallmouth bass. Prior to construction of Tongue River Reservoir and Yellowtail Dam, the Tongue River and Bighorn River had sediment regimes like the Powder River. Sauger, channel catfish, paddlefish (during high flow years that accommodate passage at Intake) and shovelnose sturgeon are four native game fishes that have been documented to aggregate in the high-turbidity waters downstream of the Powder/Yellowstone River confluence. It is probable that similar fish aggregations historically occurred in the Yellowstone River downstream of the confluences with the Tongue and Bighorn Rivers prior to dam construction.

Four low-head diversion dams on the lower Yellowstone River (Ranchers, Yellowstone, Cartersville and Intake) create anthropogenic barriers to upstream fish migrations. The impact on migration is different at each dam. Cartersville and Intake dams are the most significant fish barriers. Native fishes exhibit extensive seasonal migrations that are critical to their life history and to maintaining populations throughout the lower Yellowstone River. Working with irrigation districts to facilitate fish passage at barriers is critical for habitat improvement and is a primary goal for the regional fisheries management program. Designs are currently underway to

improve fish passage at Intake Diversion Dam. Specifically, USACE and BOR plan to construct a bypass channel around Intake Diversion Dam accompanied by a new concrete weir (bypass channel alternative) immediately upstream of the existing rock-filled wooden crib structure (see BOR and USACE 2016 Lower Yellowstone Intake Diversion Dam Fish Passage Project, Montana, Final Environmental Impact Statement for full details of the project). During the planning process of the bypass channel project, FWP collaborated with BOR to document that status of fish passage at the original Intake structure. A telemetry approach was used to monitor the movements of five native species; pallid sturgeon, shovelnose sturgeon, sauger, blue sucker, and paddlefish. Individuals of these species were implanted with radio transmitters in both a test reach immediately downstream of Intake Diversion Dam as well as in an unimpeded control reach upstream of Glendive. The first four years of the project (2015-2018) were meant to establish a baseline passage dataset to which post-construction passage could then be compared to. Passage at the current structure was observed for all five species, but both the rate and the route of passage varied by species and by discharge. Pallid sturgeon, the species driving the large-scale construction project, encountering the dam passed upstream during times of high discharge utilizing an existing high-flow side channel (HFSC) that circumvents the dam. Conversely, shovelnose sturgeon, which are often used as a surrogate species to Pallid Sturgeon, passed upstream over top of the dam at times of low discharge. Approximately half of the sauger encountering Intake Diversion Dam were observed passing upstream both over the dam and around the dam via the HFSC. Nearly all blue sucker encountering Intake Diversion Dam passed upstream over the structure. Paddlefish exhibited a similar pattern to pallid sturgeon in that they mostly passed upstream via the HFSC when river discharge was high. Once constructed, monitoring fish passage at the bypass channel alternative to evaluate the intended goal of improving “passage of pallid sturgeon and other native fish at the Lower Yellowstone Project Intake Diversion Dam” will be a vital role to ensure the project is a success for not only pallid sturgeon but the entire fish assemblage of lower Yellowstone River.

Entrainment of fishes into unscreened canals is also a concern in the drainage. Installation of screens on unscreened structures will prevent or reduce the entrainment of fish into canals and other irrigation structures. In 2011, a new head gate with screens was completed at Intake canal. A screening structure has also been purchased and installed at the Buffalo Rapids Shirley pump site. Operation of the Shirley fish screens has been problematic, and operators continue to make modifications with the manufacturer to improve its function. Both projects have the potential to significantly reduce the annual entrainment of fish into these canals.

The lower Yellowstone River riparian corridor provides critical wildlife habitat. It varies from sparse ribbons of trees to robust cottonwood galleries. Much of the floodplain is developed for irrigated agriculture. Other developments include the construction of railroads, as well as numerous roads to accommodate vehicle travel (county roads, state highways and a federal interstate highway). All these developments have impacted the ability of the Yellowstone River to migrate laterally and interact with its historic floodplain. The use of rock or concrete rip rap to protect city infrastructure, roads, bridges, homes, and farmland/ranchland has restricted the natural function of the Yellowstone River and prairie streams in this drainage. These impacts may extend to the quality of fish habitat in the river. The installation of culverts, fords and dams has similar impacts on the function of the river, tributaries, and prairie streams and even greater impacts on upstream fish migrations.

The Lower Yellowstone River Drainage has some of the deepest ponds and reservoirs in the region, but many private and public ponds in the drainage are limited by water depth. Ponds with a maximum depth of 10-11 feet are generally marginal for overwintering fish during winters with sustained snow accumulations. The severity and prevalence of winterkills may be reduced by installing windmill aerators. Some landowners and the BLM have installed aerators at their expense in attempt to reduce winterkill occurrences. FWP has refrained from installing aerators because of the time and expenses required to service and maintain the structures.

## **FISHING ACCESS**

In 2016 there are 21 Fishing Access Sites that provide access to the Lower Yellowstone River. There are several private or undeveloped public access points as well. The Yellowstone River upstream of Ranchers Diversion Dam can be accessed by Manuel Lisa FAS on the Bighorn River. Myers Bridge FAS provides access to the Yellowstone River between Ranchers Diversion and Yellowstone Diversion. Amelia Island and Rosebud West FAS provides access to the Yellowstone River from Yellowstone Diversion to Cartersville Diversion. Rosebud East FAS, Far West FAS, Roche Jaune FAS, Kinsey Bridge FAS, Bonfield FAS, Powder River Depot FAS, Calypso Bridge (BLM), Fallon Bridge FAS, Black Bridge FAS, Walleyes Unlimited Boat Ramp (Glendive), and Stipek FAS provide access to the Yellowstone River between Cartersville Diversion Dam and Intake Diversion Dam. Intake FAS, Elk Island FAS, Seven Sisters FAS, Sidney Bridge FAS, Richland Park (Richland County), and Diamond Willow FAS provide access to the Yellowstone River downstream of Intake Diversion Dam. There are also a few sites available at county bridge crossings and some landowner agreements that provide limited access. High priority areas to secure additional public access to the Yellowstone River include the reaches between Rosebud and Miles City, at the bridge in Terry, and between Fallon and Glendive. Recently, public access to two private sites (Fort Keogh and Botrell) upstream of Miles City have been lost due to changes in public tolerance or change in ownership. This has created an additional priority area to secure future public access to the Yellowstone River.

## **SPECIAL MANAGEMENT ISSUES**

Resource management in the Lower Yellowstone River Drainage requires involvement with many agencies, entities, and user groups. River issues may include involvement with Department of Natural Resources and Conservation, BLM, FWS, BOR, Army Corp of Engineers, Burlington Northern Santa Fe railroad, Yellowstone River Conservation District Council, local conservation districts, and adjacent landowners. Land use, energy development, and water allocation are special management issues that affect multiple stakeholders in the drainage.

Securing appropriate in-stream flow rights is a special management concern for the lower Yellowstone River, particularly the continued development of conservation district water reservations (CDWR) in the lower basin (downstream of the Bighorn-Yellowstone river confluence). In the 1970's, when Yellowstone River Water Reservations were established, a compromise occurred, CDWR in the upper basin (upstream of the Bighorn River) were designated junior to the states in-stream reservations and senior in the lower basin. In other words, the state would not be able to make call on approximately 60% of water rights issued through CDWR in the lower basin to improve river flow conditions. For example, applicants that purchase a CDWR today from the lower basin will have a senior water right to the states 1978 in-stream flow reservation. In 2016, only 12.7% and 14.6% of CDWR have been allocated

from the upper and lower basins respectively. This reality creates a tremendous burden for future management of the Yellowstone River and large warm water fish species like Paddlefish and Pallid Sturgeon.

Over-allocation of water in the Yellowstone River drainage, particularly in July and August, is poised to be a major threat to fisheries resources and existing water rights in the future and certainly in the next drought cycle. The cumulative effect of irrigation withdrawal and withdrawal for oil and gas hydraulic fracturing is of concern.

Paddlefish management on the lower Yellowstone River includes an annual Memorandum of Understanding and permit for a commercial caviar operation conducted by the Glendive Chamber of Commerce. During the paddlefish season the Chamber has a paddlefish processing facility at the Intake FAS. In exchange for having paddlefish cleaned, anglers donate their paddlefish eggs to the caviar operation. The 1993 Legislature authorized paddlefish caviar sales by the Glendive Area Chamber of Commerce and funds generated from the caviar sales must be used for a grant program. Funds are available to non-profit entities through grant applications for projects that meet a historical, cultural, or recreational need. The project must show public benefit and funding is not allowed for projects that are for private benefit. Emphasis is on small non-profit groups in Eastern Montana.

Coal development began in the mid 1970's and continues to be a large industrial activity in the Colstrip area. In 2011, the State of Montana also sold its Otter Creek mineral rights to an out-of-state company. The impact of continued coal operations at Colstrip and development of new mines will be a management concern for many years in the drainage. Oil and natural gas extraction from the Bakken and other shale zones is another industrial activity that will have unknown impacts to the drainage. Most of the drilling is focused in the Sidney and Baker areas. Infrastructure for the oilfield, especially pipeline construction, is a secondary product of oil development that will continue to have impacts on the resources of the lower Yellowstone River. In 2016 oil development activity slowed because of lower market prices. This has reduced the demand on natural resources and local infrastructure, especially housing from a recent high observed between 2011 and 2014. Management of the local FAS and Wildlife Management Areas became more challenging due to the influx of people, and changes were made in response to ensure the use of these sites remains as intended. Although the impact to these sites has reduced along with oil field activity recently the changes made will be in place once market prices and activity increases in the future.

Interest in fishing contests on rivers continues to grow in Montana. To address biologic and social concerns related to fishing contests, the following Fishing Contest Restrictions and Recommendations have been jointly developed for the Yellowstone River between the Region 5 and 7 FWP offices:

***Stipulations incorporated into Contest Rules under Authority of MCA 87-3-121:***

1. Contest approved only for single water body i.e. distinct reservoir, lake, or river (ARM 12.7.802).

2. No tournaments allowed on Holiday Weekends (ARM 12.7.805) including Easter, Mother's Day, Memorial Day, Father's Day, 4<sup>th</sup> of July, Labor Day, Columbus Day, and Veterans Day.
3. Only one tournament per weekend will be allowed within each region 5 and 7. A body of water cannot have consecutive weekend tournaments (ARM 12.7.805)
4. No contests for listed species, species of concern, or for wild trout (ARM 12.7.807).

Walleye tournaments: sauger are defined as any Sander (sauger/walleye) with multiple small, distinct black spots on the spiny (first) dorsal fin ray membrane. Fish meeting this, and only this criterion, are classified as sauger and are not allowed for weigh in.

5. Live bait and fish must be transported in clean domestic water where allowed in current fishing regulations (ARM 12.5.706).
6. Vessels and equipment approaching a department inspection station must stop as directed (ARM 12.5.706).
7. Vessels and equipment entering the state that don't approach a department inspection station must be inspected for aquatic invasive species prior to launching in any Montana water body (Arm 12.5.706).
8. No contests in the Bighorn River from the confluence of the Little Bighorn to Afterbay Dam or in the Yellowstone above Huntley Diversion Dam (smallmouth bass tournaments may be considered above Huntley Diversion Dam)
9. Tournament boundaries must be clearly defined in the application. Proposed boundary size should be minimized in an effort to reduce tournament related fish mortality caused by fish being held in live-wells for extended periods and/or traveling long distances.
10. A shotgun-style start for boat tournaments on rivers can be extremely dangerous and must be evaluated by tournament sponsors. If boats are required to start at one location, tournament sponsors need to implement an orderly, single file, timed start for every boat or other method (use multiple boat ramps) to reduce the safety risks and liability associated with a rapid start.
11. Contests are prohibited in August due to high water temperatures. Additional stress from a fishing contest dramatically increases the likelihood of delayed fish mortality.
12. Participants cannot possess more than a daily limit at one time.
13. Catch and release formats only.

14. Limit two poles per person (unless regulations restrict anglers to one rod i.e. Central District streams and rivers).
15. No setlines, trot lines or hoop nets allowed.
16. No stringers.
17. Livewells and other fish holding containers such as coolers are required to have aeration running when fish are held and water exchanged at minimum on an hourly basis.
18. Sponsors are encouraged to penalize anglers or teams with dead fish.
19. Landowner permission required at private boat ramps or on private property of weigh-ins.

Recommendations:

1. Tournaments that don't transport fish to a centralized weigh-in will be given preference over centralized weigh-in tournaments. Bank fishing is discouraged unless fish measurements are recorded by anglers or roving measurement staff and fish are released on site. This prevents handling time and associated stress on fish from poor handling and hauling techniques (e.g. five gallon buckets). Hauling fish away from a water body and then releasing it back into the source water after transportation via vehicle on a county road or highway is technically illegal (see Montana Code Annotated: 87-5-701, -702 & -711).
2. Contest sponsor(s) are responsible for safe fish handling procedures and to ensure fish are released back to the source water. Stipulations for tournaments with large geographic boundaries may be required to separate fish taken from different locations and return them to specified locations as part of the permit requirements. This may require sponsors to have tanks large enough to hold fish (1/2 lb of fish per gallon of water is a general recommendation for holding and transporting fish), have oxygenation systems, and the ability to haul fish.
3. Discourage contest on the Yellowstone River during the critical spawning period for channel catfish and walleye (same as sauger). Channel catfish spawn between 75°F to 85°F which typically occurs from June 15 – July 15 on the Yellowstone River. Walleye and sauger spawn at 50°F which typically occurs in April.

**FISHERIES MANAGEMENT DIRECTION FOR LOWER YELLOWSTONE RIVER DRAINAGE**

<b>Water</b>	<b>Miles/acres</b>	<b>Species</b>	<b>Recruitment Source</b>	<b>Management Type</b>	<b>Management Direction</b>
Yellowstone River - Confluence of Bighorn River to Cartersville Dam	59 miles	Sauger (N)	Wild	Conservation	Manage sauger population for limited consumptive harvest by reduced harvest limits.
		Paddlefish	Wild	Conservation	Monitor paddlefish usage of this section of river in years that paddlefish successfully migrate upstream of Intake Dam.
		Channel catfish (N)	Wild	General	Manage as a recreational fishery. Standardize catfish sampling methods for comparison across eastern Montana.
		Smallmouth bass	Wild	General	Recreational fishery with an emphasis on harvest. Monitor to evaluate the impacts of smallmouth bass on native fish populations in the Yellowstone River.
		Walleye	Wild	General	Recreational fishery with emphasis on harvest. Monitor to evaluate source of walleye in Yellowstone River to direct management decisions for sauger conservation.
		Multi species	Wild	General/ Conservation	Manage for recreational fishing opportunity where applicable. Monitor non-game fish species for native fish assemblage and overall ecosystem health.
Habitat needs and activities: Increase fish passage and reduce fish entrainment into canals at Ranchers, Yellowstone, and Cartersville diversion dams and other irrigation intakes. Maintain/restore river ecosystem health and function by minimizing impacts of stream bank stabilization projects thereby decreasing channel confinement.					

Water	Miles/acres	Species	Recruitment Source	Management Type	Management Direction
Yellowstone River – Cartersville Dam to Powder River confluence	88 miles	Sauger (N)	Wild	Conservation	Manage sauger populations for limited consumptive harvest. Monitor threat of hybridization with walleye and direct management decisions that maximize angler opportunity while protecting genetic integrity of the sauger population. Protect critical spawning habitat from Miles City to Glendive.
		Paddlefish (N) Channel catfish (N)	Wild	Conservation	Monitor paddlefish usage of this section of river in years that paddlefish successfully migrate upstream of Intake Dam Manage as a recreational fishery. Standardize catfish sampling methods for comparison across eastern Montana.
		Smallmouth bass	Wild	General	Recreational fishery with an emphasis on harvest. Monitor to evaluate the impacts of smallmouth bass on native fish populations in the Yellowstone River.
		Walleye	Wild	General	Recreational fishery with an emphasis on harvest. Monitor to evaluate source of walleye in Yellowstone River to direct management decisions for sauger conservation.
		Shovelnose sturgeon (N)	Wild	General/Conservation	Manage as a recreational fishery with some harvest opportunity. Monitor health of this long lived native species.
		Pallid sturgeon (N)	Wild	Conservation	Endangered species, harvest prohibited. Conduct research to assist decision making for recovery of species. Increase genetic diversity
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Water	Miles/acres	Species	Recruitment Source	Management Type	Management Direction
		Blue Sucker (N)	Wild	Conservation	through stocking following pallid sturgeon recovery plan. Establish fish passage at Intake Diversion Dam and monitor subsequent upstream passage, habitat usage, and spawning activities.  Monitor population and investigate life history and movements throughout Yellowstone River.
		Multi species	Wild	Conservation/ General	Manage for recreational fishing opportunity where applicable. Monitor non-game fish species for native fish assemblage and overall ecosystem health.
<p>Habitat needs and activities: Increase fish passage at Cartersville and Intake Diversion Dams and reduce fish entrainment into irrigation intakes. Maintain/restore river ecosystem health and function by minimizing impacts of stream bank stabilization projects thereby decreasing channel confinement. Protect critical sauger spawning habitat from Miles City to Glendive</p>					
Yellowstone River – Confluence of Powder River to North Dakota State line	134 miles	Paddlefish (N)	Wild	Restrictive Regulations	Intensively monitor population and harvest to be reflective of population trends. Management shared and coordinated through a Montana/North Dakota Management Plan. Annual Memorandum of Understanding between FWP and Glendive Chamber of Commerce for processing of paddlefish and sale of paddlefish roe for funding of a nonprofit community grant program. Increase fish passage at Intake diversion dam to provide additional upstream spawning habitat.
		Pallid sturgeon (N)	Wild/ Hatchery	Conservation	Endangered species, harvest prohibited. Conduct research to assist decision making for recovery of species. Increase genetic diversity through stocking following pallid sturgeon

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Water	Miles/acres	Species	Recruitment Source	Management Type	Management Direction
		Sauger (N)	Wild	Conservation	<p>recovery plan. Establish fish passage at Intake Diversion Dam and monitor subsequent upstream passage, habitat usage, and spawning activities.</p> <p>Manage sauger populations for limited consumptive harvest. Monitor threat of hybridization with walleye and direct management decisions that maximize angler opportunity while protecting genetic integrity of the sauger population.</p>
		Channel catfish (N)	Wild	General	<p>Manage as a recreational fishery. Standardize catfish sampling methods for comparison across eastern Montana.</p>
		Shovelnose sturgeon (N)	Wild	General/ Conservation	<p>Manage as a recreational fishery with some harvest opportunity. Monitor health of this long lived native species.</p>
		Walleye, Northern pike	Wild	General	<p>Recreational fishery with emphasis on harvest. Monitor to evaluate source of walleye in Yellowstone River to direct management decisions for sauger conservation.</p>
		Blue sucker (N)	Wild	Conservation	<p>Monitor population and investigate life history and movements throughout Yellowstone River.</p>
		Multi species	Wild	Conservation/ General	<p>Manage for recreational fishing opportunity where applicable. Monitor non-game fish species for native fish assemblage and overall ecosystem health.</p>

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Water	Miles/acres	Species	Recruitment Source	Management Type	Management Direction
Habitat needs and activities: Increase fish passage at Intake Diversion Dam and reduce fish entrainment into irrigation intakes. Maintain/restore river ecosystem health and function by minimizing impacts of stream bank stabilization projects thereby decreasing channel confinement. Establish fish passage at Intake Diversion Dam and monitor subsequent upstream passage and habitat usage.					
Perennial Streams: Rosebud O'Fallon Big Porcupine Sarpy Cabin South Sunday Cedar Thirteen Mile Fox Burns	208 miles 157 miles 107 miles 103 miles 98 miles 87 miles 60 miles 50 miles 49 miles 42 miles	Multi species	Wild	Conservation/ General	Maintain fishery through habitat protection and restoration. Maintain or increase connectivity. Opportunistic monitor to further understand system and population dynamics.
Intermittent Streams: South Sunday Sandstone North Sunday Cherry Glendive Sweeney Armells Reservation Sunday	87 miles 72 miles 68 miles 63 miles 53 miles 33 miles 27 miles 27 miles 15 miles				
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Water	Miles/acres	Species	Recruitment Source	Management Type	Management Direction
Ephemeral Streams: 48 with documented fish populations					
Habitat needs and activities: Improve fish passage at current restrictions (culverts, fords, dams) and ensure future structures provide for adequate creek flow and fish passage.					
Castle Rock Lake	153 acres	Largemouth bass, Walleye	Wild/Hatchery	General/ Put, Grow and Take	Manage as a recreational fishery, supplement population through stocking if necessary.
		Northern pike	Wild/Hatchery	General	Provide additional angling opportunity and control forage base, supplement population through stocking if necessary.
		Bluegill, Crappie	Transfer	General	Provide additional panfish angling and prey base for bass, pike, and walleye. Maintain fisheries through wild fish transfers.
Habitat needs and activities: Maintain current conditions.					
South Sandstone Reservoir	114 acres	Largemouth bass, Walleye	Wild/Hatchery	General/ Put, Grow and Take	Manage as a recreational fishery, supplement population through stocking if necessary.
		Northern pike	Wild/Hatchery	General	Provide additional angling opportunity and control forage base, supplement population through stocking if necessary.
		Yellow perch, Crappie	Transfer	General	Provide additional panfish angling and prey base for bass, pike, and walleye. Maintain fisheries through wild fish transfers.
Habitat needs and activities: Evaluate and modify overflow structure at dam to reduce escapement of adult fish into South Sandstone Creek.					

Water	Miles/acres	Species	Recruitment Source	Management Type	Management Direction
Baker Lake	96 acres	Largemouth bass	Wild/ Hatchery	General/ Put, Grow and Take	Manage as a recreational fishery, supplement population through stocking if necessary.
		Northern pike	Wild/ Hatchery	General	Provide additional angling opportunity and control forage base, supplement population through stocking if necessary.
		Yellow perch, Crappie	Transfer	General	Provide additional panfish angling and prey base for bass and pike. Maintain fisheries through wild transfers.
Habitat needs and activities: A substantial rehabilitation of the lake has occurred and will be completed in 2019. This may increase water depths and reduce frequency of historical problem of winterkills; limitation offset by frequent sampling and stocking or wild fish transfers.					
Spotted Eagle Pond	36 acres	All Species	Wild/ Hatchery/ Transfer	Restrictive regulations	High angler pressure and limited natural fish production mandates a reduced harvest: 5 fish daily and in possession, any combination of species.
		Largemouth bass, Walleye, Northern pike	Wild/ Hatchery	Put, Grow and Take	Manage as a recreational fishery, supplement population through stocking if necessary.
		Channel catfish	Wild/ Transfer	General	Provide additional angling opportunity and control forage base, supplement population through wild fish transfers if necessary.
		Yellow perch, Crappie, Bluegill	Transfer	General	Provide additional panfish angling and prey base for bass, pike, and walleye. Maintain fisheries thorough wild fish transfers.
Habitat needs and activities: Poor natural fish production, growth, and recruitment because of competition with non-target species (migrating from Tongue River), little habitat complexity, and aquatic vegetations is limited. Offset with frequent wild fish transfers and habitat projects aimed at increasing water quality and reducing non-target fish abundance.					

Water	Miles/acres	Species	Recruitment Source	Management Type	Management Direction
Gartside Reservoir	35 acres	Largemouth bass, Northern pike	Wild/ Hatchery	General/ Put, Grow and Take	Maintain fishery through regulations and stocking if necessary.
		Bluegill, Yellow perch, Crappie	Transfer	General	Provide additional panfish angling and prey base for bass, pike, and walleye. Maintain fisheries through wild fish transfers.
Johnson Reservoir	21 acres	Yellow perch	Wild/ Transfer	General	Manage as a recreational fishery. Supplement population through wild fish transfers if necessary. Utilize population for transfer to other ponds.
Habitat needs and activities: Utilize yellow perch population as donor source for wild fish transfers to other ponds/reservoirs. Explore opportunities to control forage base.					
Rattlesnake Reservoir	12 acres	Crappie	Wild/ Transfer	General	Provide panfish angling opportunity, supplement population through wild fish transfers when necessary.
Habitat needs and activities: Limited water depth and severity of winter creates an annual problem of partial or total winter kill; BLM rebuilt dam in 2018; limitation offset by aerator installation and frequent sampling and wild fish transfers.					
Homestead Reservoir	12 acres	Yellow perch	Wild/ Transfer	General	Manage as a recreational fishery. Supplement population through wild fish transfers if necessary.
		Northern pike	Wild/ Hatchery	General	Provide additional angling opportunity and control forage base, supplement population through stocking if necessary.
Habitat needs and activities: Water depth (less than 12 feet deep) that occasionally leads to winterkill; limitation offset by windmill aerator, frequent sampling and stocking or wild fish transfers.					

Water	Miles/acres	Species	Recruitment Source	Management Type	Management Direction
Marshall Reservoir, Silvertip Reservoir	11 acres 10 acres	Largemouth bass	Wild/ Hatchery	General/ Put, Grow and Take	Manage as a recreational fishery, supplement population through stocking if necessary.
Habitat needs and activities: Water depth (less than 12 feet deep) is a limitation that leads to winterkill; limitation offset by windmill aerator, frequent sampling and stocking or wild fish transfers.					
Hollecker Pond	7 acres	Largemouth bass	Wild/ Hatchery	Restrictive regulations	Manage as a recreational fishery, supplement population through stocking if necessary.
		Bluegill	Wild/ Transfer	General	Provide additional angling opportunity and control forage base, supplement population through wild fish transfer if necessary.
		Trout	Hatchery	Put and Take	Annual stocking of catchable sized trout for kids fishing day and general angler enjoyment.
Habitat needs and activities: Frequent establishment of undesirable species via irrigation water supply or from illegal introductions. Management of undesirable species may require pond rehabilitation by mechanical draining.					
Maier Pond	6 acres	Yellow perch	Wild/ Transfer	General	Provide panfish angling opportunity; maintain fisheries through wild fish transfers when necessary.
Habitat needs and activities: Water depth (less than 12 feet deep) is a limitation that leads to winterkill; limitation offset by windmill aerator, frequent sampling and stocking or wild fish transfers.					
Public Trout ponds: Clarks, South Fork Oil Pump, Harms, Fort Keogh	34 acres 19 acres 7 acres 5 acres 3 acres	Trout	Hatchery	Put, Grow and Take	Annual stocking of trout for angler opportunity.
Habitat needs and activities: Water depth (less than 12 feet deep) is a limitation that leads to winterkill; limitation offset by annual stocking.					

Water	Miles/acres	Species	Recruitment Source	Management Type	Management Direction
Small Private Ponds/Reservoirs	Various	Trout	Hatchery	Put, Grow and Take	Public relations opportunity with landowners to provide local fishing opportunity for rural community. Maintain fishery through regulations and annual stocking.
		Bass, Walleye, Northern pike	Wild/ Hatchery	General	Public relations opportunity with landowners to provide local fishing opportunity for rural community. Maintain fishery through regulations and annual stocking when necessary.
		Crappie, Yellow perch, Bluegill	Wild/ Transfer	General	Public relations opportunity with landowners to provide local fishing opportunity for rural community. Provide panfish angling opportunity, supplement population through wild fish transfers when necessary.
Habitat needs and activities: Water depth (less than 12 feet deep) is a limitation that leads to winterkill; limitation offset by windmill aerator, frequent sampling and stocking or wild fish transfers.					

## **Management Direction for Individual Species or Groups of Species**

Montana has some of the highest freshwater fish diversity in the western United States and it is home to an array of famed fisheries that continue to attract anglers. While many of these unique species have separate conservation plans tailored to their specific life history constraints, and while many high-use fisheries are guided by separate management plans, it is worth noting particular species and groups of species that are often generally focused on as part of the Fisheries Management Program. Each of the following species and groups of species have driving conservation issues or recreational importance that management typically must consider.

### **Arctic Grayling (native; Montana Species of Concern)**

Arctic grayling are native to the Missouri River drainage in Montana and have been stocked in numerous lakes in the western third of the state. Native “fluvial” Arctic grayling, those that reside in rivers and streams, were historically widespread throughout the upper Missouri River drainage upstream of Great Falls. Habitat changes and the introduction of nonnative fish have significantly impacted the distribution of fluvial Arctic grayling, and the remaining populations in Montana (and the entire lower 48 states) are found in the Big Hole, Madison, Centennial, and Ruby. Though similar in appearance, “lacustrine” or lake dwelling Arctic grayling are genetically different from the fluvial form. Native populations of the lacustrine grayling persist in four lakes in Montana, including upper and lower Red Rock lakes in the Red Rock River drainage, and Minor and Musigbrod lakes in the Big Hole River drainage. Other introduced lacustrine Arctic grayling populations in Montana (about 100) are the result of stocking from sources in Montana (e.g., Big Hole and Red Rocks) or Canada as part of recent conservation efforts to “replicate” Red Rocks River Arctic grayling in Elk Lake near Lima, MT. Fluvial Arctic grayling are a Montana Species of Concern.

Arctic grayling management in Montana includes activities directed towards providing recreational angling opportunities, and conservation and recovery of native populations. Approximately 100 lakes and reservoirs in western and south-central Montana support Arctic grayling populations. These waters provide the bulk of angling opportunities for Arctic grayling in Montana and harvest is generally allowed under standard combined trout regulations. Most of these populations are self-sustaining but several are supported by periodic stocking efforts. The Rogers Lake Arctic grayling population (a mixed Upper and Lower Red Rock lakes and Big Hole River strain) near Kalispell provides a source for the recreational stocking program in several western lakes, and FWP personnel from Flathead Lake Salmon Hatchery collect and raise eggs and fry for these efforts. FWP has developed two conservation broods from aboriginal Big Hole River fluvial stock for fluvial Arctic grayling restoration purposes and occasional lake stocking in south-central Montana. Conservation broods are maintained in two lakes in the Madison and Gallatin river drainages, and are used in efforts to reestablish native fluvial Arctic grayling in portions of their historic range, most recently including the Ruby River near Alder, MT. The reestablished Ruby River Arctic grayling population, like all populations occupying streams and rivers, are protected from harvest by catch-and-release regulations.

Habitat alterations are a key factor in the decline and extirpation of fluvial Arctic grayling in most of their historic range in Montana. In an effort to conserve and recover fluvial Arctic

grayling in Montana, FWP and numerous partners have engaged private landowners in the Big Hole River Valley to aid Arctic grayling recovery through enhancement of habitat and improvement of irrigation practices. Over the past decade, implementation of a USFWS approved Candidate Conservation Agreements with Assurances (CCAA) program has helped secure Arctic grayling in the upper Big Hole River by improving streamflow, protecting and enhancing stream habitat and riparian areas, increasing fish passage, and eliminating entrainment of fish in irrigation ditches.

An Arctic Grayling Workgroup meets on an annual basis to develop Arctic grayling conservation strategies and work-plans. The technical advisory group is chaired by FWP and includes participants from state and federal resources agencies, universities, and private interest groups. To formalize commitments to Arctic grayling conservation in Montana, a 2007 *Memorandum of Understanding Concerning Montana Arctic Grayling Restoration* (MOU) was developed and signed by numerous state, federal and private stakeholders. This MOU was renewed in 2018 and commits the parties to a cooperative restoration program and provides a means to obligate financial resources as they are available.

### **Black Bass (nonnative)**

There are two species of black bass present in Montana: largemouth bass and smallmouth bass. Both species are nonnative and widely distributed throughout the eastern half of the state and locally in northwest Montana. Smallmouth bass are found in cool, clear lakes and streams while largemouth bass are typically more restricted to slower flowing water (backwaters) and lakes. Largemouth bass fisheries are best in northwest Montana in the lower Clark Fork reservoirs (Noxon Rapids, and Cabinet Gorge) and Echo Lake near Kalispell. Smallmouth bass fisheries are best in large rivers such as the lower Flathead River and Yellowstone River, as well as large reservoirs such as Fort Peck, Tongue River and Bighorn reservoirs. They are pursued by many sport anglers (2.4% of total angler days) but are also highly sought after by many tournament anglers. Their ferocity as a fighter under angling circumstances contributes to their popularity, but their prolific and predatory nature can lead to challenges managing them in balance with their forage base. The recent expansion of smallmouth bass in the Yellowstone River, upstream of the Powder River-Yellowstone River confluence, has raised concerns about potential effects that their predation may have on native fish populations.

Fishing regulations for both species of black bass are 5 daily and in possession for all Fishing Districts, although the Western District restricts harvest during the spawning period to 1 over 22 inches. As Northwestern Montana provides conditions typically thought of as less-optimal for black bass species, with glacial relic lakes with simple bottom configurations, late weed growth and a lack of woody debris for cover, it may require 8-10 years for an individual to reach 18" or 3 pounds and 15 years to reach 5 pounds. Under slow growth, it does not take much angling harvest to confound quality black bass management. While FWP does raise largemouth bass and smallmouth bass at the Miles City State Fish Hatchery, and stocks them in numerous ponds and reservoirs in Eastern Montana, as well as Echo Lake in northwest Montana, they are not as widely spread as other cosmopolitan species..

Common challenges to bass management are adequate recruitment, lack of cover and overharvest. Recruitment is limited initially by weather. Young of the year bass need to reach about 2" by fall to survive overwinter. Late spawned fish due to cold weather may not have sufficient growth to survive. Many waters have abundant predators and a lack of suitable hiding/rearing habitat in which to escape predation.

### **Bull Trout (native; federal ESA threatened species; Montana Species of Concern)**

Bull trout are native to rivers, streams and lakes in the Columbia River basin (Kootenai, Clark Fork, Bitterroot, Blackfoot, Flathead, and Swan drainages) and in the Saskatchewan River basin (St. Mary and Belly drainages) in Montana. Bull trout are a char and display a variety of life-histories strategies. Populations that reside entirely in small streams are classified as "resident" and rarely reach 12 inches in length. More common and well known are migratory bull trout populations that use a combination of lakes, reservoirs (adfluvial) or large rivers (fluvial) as adults, and small streams for spawning and juvenile rearing. Migratory bull trout are the largest native salmonid in Montana and adults exceeding 10 lbs. are common in these populations. The state record fish is over 25 lbs. For successful spawning, bull trout require pristine habitat conditions, particularly cold headwater streams with clean gravel bottoms.

While bull trout remain widespread in Montana, significant declines in abundance have been observed in most populations. Causes for these declines include changes in habitat that reduce spawning success, barriers that prevent movement of migratory fish, predation and competition by and with nonnative fish such as lake trout brown trout, and hybridization with nonnative brook trout. Bull trout populations in the South Fork of the Flathead River, above Hungry Horse Reservoir, remain a stronghold for the species. Recent management efforts have shown that the presence of nonnative trout does not necessarily mean that bull trout populations will decline. Variability between bull trout populations may include interactions between the nonnative trout and bull trout, as well as food web dynamics, and habitat condition or type. Bull trout are a Montana Species of Concern and were listed as threatened under ESA by the USFWS in 1998.

All major river systems in western Montana (except the Yaak River) are designated by the USFWS as Critical Habitat for bull trout. Critical Habitats are specific geographic areas that the USFWS considers essential for conservation and recovery of bull trout and may require special management and protection to meet recovery objectives. As such, habitat protection and restoration, and removal of barriers to movement are among key elements to bull trout conservation and recovery. The large-scale habitat restoration program in the Blackfoot Valley and the removal of Milltown Dam on the Clark Fork River are notable examples of these types of efforts. However, because nonnative trout occupy portions of all the drainages listed as Critical Habitat, a challenge for FWP is to continue to provide recreational fisheries for nonnative trout while protecting and establishing viable populations of bull trout. Balancing the two is particularly challenging because bull trout populations typically require open systems for migration, which makes them more susceptible to the negative impacts associated with nonnative trout.

The presence of predatory nonnative fish, particularly lake trout, northern pike and walleye, are ongoing threats to address. However, management of nonnative species using liberalized harvest limits or active suppression is not a practical approach to bull trout management in all waters designated by the USFWS as Critical Habitat. While experimental lake trout removal efforts in specific waterbodies to aid in the conservation of bull trout have been attempted, limited success in bull trout recovery have been seen in undergoing those efforts. As such, intentional angling for bull trout is prohibited everywhere except in Hungry Horse Reservoir and Lake Koocanusa, Swan Lake, and the South Fork of the Flathead River upstream from Hungry Horse Reservoir. At this time, Hungry Horse Reservoir and Lake Koocanusa are the only places in the state where a limited bull trout harvest is allowed.

Many river reaches identified as Critical Habitat currently support few if any bull trout, or are only seasonally utilized as migratory corridors. Such waters may have substantial habitat alterations that make them unsuitable for viable bull trout populations for the foreseeable future, such as the Upper Clark Fork River above Flint Creek; or a mix of habitat changes and established nonnative trout populations which limit the likelihood that nonnative species can be effectively managed to benefit bull trout, such as the lower Bitterroot River. These river reaches may also support recreationally and economically important trout fisheries that are highly valued destinations for Montanans and out-of-state visitors. FWP will continue to monitor bull trout fisheries and work with agency partners to determine which USFWS Critical Habitats may warrant suppression of nonnative fish to benefit bull trout. Changes to nonnative management to improve bull trout will be considered only if there is a high likelihood of the action improving bull trout abundance.

Relevant management documents: *Restoration Plan for Bull Trout in the Clark Fork River Basin and Kootenai River Basin in Montana* (FWP 2000); *An Integrated Stream Restoration and Native Fish Conservation Strategy for the Blackfoot River Basin* (FWP 2005); *Flathead Lake and River Co-Management Plan, 2001 – 2010* (FWP and Confederated Salish and Kootenai Tribes 2001). *Clark Fork River Native Salmonid Restoration Plan* (Avista 1998); *Columbia Headwaters Recovery Unit Implementation Plan for Bull Trout (Salvelinus confluentus)* (USFWS 2015); *Columbia Headwaters Recovery Unit Implementation Plan for Bull Trout (Salvelinus confluentus)* (USFWS 2015); *St. Mary Recovery Unit Implementation Plan for Bull Trout (Salvelinus confluentus)* (USFWS 2015); *Recovery Plan for the Coterminous United States Population of Bull Trout (Salvelinus confluentus)* (USFWS 2015).

## **Burbot (native)**

Burbot, also known as “ling”, are native to the Kootenai, Missouri, Saskatchewan, and Yellowstone river basins in Montana, and were introduced, with apparent minimal success, to the lower Clark Fork River drainage in the 1970s and 1980s. Burbot occupy many habitat types but are generally associated with larger rivers and coldwater lakes and reservoirs. It is speculated that overall burbot abundance is currently greater in Montana than pre-European settlement times owing to the creation of cold water habitats within and below impoundments on traditionally warmer rivers (e.g., Nelson, Tiber and Fort Peck reservoirs). Though burbot populations are not closely monitored, the status of most is believed to be stable. An important exception includes

the Kootenai River population, which has declined in Montana and Idaho due to habitat and flow regime changes resulting from the construction and operation of Libby Dam. The population was petitioned for federal ESA listing in 2000 but the petition was subsequently found unwarranted.

All Montana burbot populations are self-sustaining. Other than harvest regulations, the species is not actively managed. FWP fisheries biologists have recently devoted more attention to burbot and are evaluating methodologies to monitor their abundance in rivers, lakes and reservoirs. Although burbot angling pressure is relatively minor (about 0.1% of annual angler days), they are avidly pursued by some for harvest and consumption. The species provides popular winter fisheries in reservoirs like Clark Canyon, Fort Peck and Newlan Creek. The current angler record for burbot is 17 pounds (Missouri River), though fish typically weigh less than 5 pounds.

### **Channel Catfish (native)**

Channel catfish is a native sportfish species found primarily in lowland lakes and large rivers east of the Continental Divide. It thrives at water temperatures above 70°F and tolerates turbid water. Principally it is found in the Yellowstone River downstream of Billings, along with major tributaries such as the Bighorn, Tongue and Powder rivers. In the Missouri River, it is found downstream of the Great Falls and in major tributaries such as the Marias, Teton, Milk and Musselshell rivers. At least some of the populations in the state are migratory, with mature fish moving many miles upstream to spawn. Notable among these populations are the individuals that move out of the Missouri River and into the Musselshell River to spawn. During these movements, fish may congregate near the mouths of the tributaries, making them more vulnerable to angling.

Spawning takes place in nests built by the male in holes in undercut banks, log jams or rocks. Once hatched, and as the fish grow older, their preferred habitat includes waters with little velocity. Channel catfish achieve this in rivers by occupying backwaters, pools and sheltered habitat, and by orienting to the bottom where water is slower. It is from these lairs that the channel catfish pursues food sources, primarily at night. Channel catfish eat a variety of foods, including crayfish, insects, snails, clams, worms, and fish.

Angling is most successful through the use of setlines with live or dead bait. Most fish are sought for consumption, although there is a contingent of catch-and-release tournament anglers in Eastern Montana. Overall, angling pressure for this fish is low, although it can be seasonally high where fish congregate. This has led to a change towards more restrictive regulations in 2012 due to largely anecdotal evidence that suggested populations may be declining. The change was from 20 daily and in possession to 10 daily and 20 in possession. This species is only occasionally cultured and the wild populations fluctuate as natural conditions allow. As such, FWP will endeavor to find means to monitor this fish species to ensure harvest is at levels that do not exceed natural production.

## **Columbia River Redband Trout (native; Montana Species of Concern)**

Columbia River Redband trout are a subspecies of rainbow trout native to the Kootenai River drainage in northwest Montana. Historically Columbia River redband trout were common in the Kootenai River and associated tributaries downstream of what is believed to have been a natural barrier near the present-day Libby Dam. Due to habitat changes and competition and hybridization with nonnative brook trout and rainbow trout, the subspecies has declined in abundance and distribution and is presently restricted to headwater streams, or streams with barriers that prevent invasion of nonnative trout. It is estimated that Columbia River redband trout with > 90% genetic purity currently occupy about 41% (306 miles) of their historic range in Montana. Due to this reduced distribution and threats to remaining populations, Columbia River redband trout have been listed as a Species of Concern in Montana.

FWP and land managers (state, federal, and private) are integral partners in the management of Columbia River redband trout. Current management efforts include assessing and monitoring remaining populations, protecting important habitats, and developing long-term conservation strategies. Strategies may include removal of nonnative trout and placement of barriers to prevent their return and reintroduction of Columbia River redband trout to streams where they have been lost. In addition, since 2002 FWP has been developing and testing a Columbia River redband trout broodstock at FWP's Libby Isolation Facility and Murray Springs State Fish Hatchery. Established from a wild Columbia River redband population, this brood is being developed to replace the stocking of hatchery rainbow trout or westslope cutthroat trout in drainages where Columbia River redband trout are native. This is expected to reduce the likelihood of additional hybridization of the species.

Current management direction for Columbia River redband trout includes maintaining the existing distribution and genetic diversity of remaining populations, and developing conservation plans and projects that ensure long-term, self-sustaining persistence of the subspecies in Montana. Though recreational angling opportunities for the Columbia River redband trout are currently limited outside of small streams, the development of a Columbia River redband trout broodstock should provide future opportunities to establish recreational fisheries in closed-basin lakes in the Kootenai River drainage. Likewise, efforts to secure and expand the distribution of existing populations and reintroduce them into streams where they have been lost will result in additional opportunities to pursue this unique native sportfish.

## **Crappie (nonnative)**

Montana has introduced populations of both white crappie and black crappie. Both species prefer ponds, lakes, reservoirs, and slower rivers and sloughs. Popular Montana crappie fisheries include: Tongue River, Fort Peck, Nelson, and Big Horn (Yellowtail) reservoirs, although crappie have recently been showing up as illegal introductions in the natural lakes of Northwestern Montana.

These warmwater-coolwater species feed mainly on zooplankton and small fish. Like yellow perch, crappie can often overpopulate a waterbody and become stunted where they tend to have

cyclical population structures and quality fishing for larger individuals only occurs occasionally. Size structure and abundance of crappie populations can be impacted by a combination of angler harvest, predation by other fish species, and competition for limited food resources with other species like yellow perch and sunfish species.

FWP does not produce crappie in the hatchery system but does occasionally transfer wild fish from existing fisheries to ponds that have experienced winter kill, or to establish a new fishery. Crappie are very catchable, seasonally, and are highly sought after as a food fish. They account for 0.53% of the total statewide fishing days. The standard Eastern District regulations are 15 daily and 30 in possession with the exception of Tongue River Reservoir that currently has a 30 daily and 60 in possession limit. There are no bag limits for crappie in the Central and Western fishing districts where they tend to be less common. Quality fish usually start at around 9-10 inches, but that can vary depending on fish condition factor (weight at length), which depends on forage quality and availability. The state records for crappie are 3.13 lbs for black and 3.68 lbs for white crappie.

### **Kokanee Salmon (nonnative)**

Kokanee salmon, also called bluebacks or silvers, is the landlocked form of sockeye salmon. Historically, kokanee salmon were thought to be native to the lower Kootenai River and upstream into Montana below Kootenai Falls. However, that unique stock of kokanee salmon was likely lost after nonnative stocks were introduced into the drainage in the 1950s. Today, all populations of kokanee salmon in Montana have originated from stocking. The species is now found in several natural lakes and reservoirs in the western part of the state, primarily west of the Continental Divide. Spawning takes place along lake shorelines or in streams with good clean gravels. If spawned in streams, fry will migrate quickly upon hatching to still waters where they will grow to maturity in 3 or 4 years eating zooplankton almost exclusively.

Growth of this fish can be rapid and is density-dependent. Where populations are dense, fish may mature at 10-12 inches, while populations with low densities may produce 18-20 inch fish. In most circumstances, FWP uses liberal bag limits or a predatory species such as gerrard rainbow trout or tiger muskellunge to reduce densities of kokanee salmon. Occasionally, FWP has struggled to maintain populations in some waters. Hauser and Holter Reservoirs on the Missouri River once had renown kokanee fisheries, but lost much of the kokanee fishery due to reservoir operations and flushing losses, compounded by walleye predation. The Flathead Lake population collapsed after *Mysis* shrimp both competed for food resources and helped predatory lake trout to increase dramatically.

Lake Mary Ronan has been used as the primary brood source for kokanee salmon propagation for many years. The Flathead Lake Salmon Hatchery collects wild-spawn individuals and several state hatcheries hatch and rear fish to fry or fingerling size. These fish are stocked in lakes with poor natural recruitment, including most notably the Helena Regulating Reservoir, the Thompson Lakes, and Deadmans Basin Reservoir. Bitterroot Lake has a unique population of kokanee salmon that achieves large sizes, and hatchery staff is currently attempting to culture this fish to determine if this trait is genetic or behavioral.

## **Kootenai River White Sturgeon (native; federal ESA endangered species; Montana Species of Concern)**

The historic range of the landlocked population of Kootenai River white sturgeon includes approximately 168 river miles of the river from Kootenai Falls downstream through Idaho and into Kootenay Lake in British Columbia, Canada. Corra Linn and Duncan dams in British Columbia (completed in the 1930's and 1960's), Libby Dam in Montana (1970's) and levee construction in Idaho significantly reduced the quality and availability of sturgeon spawning and rearing habitat, resulting in very limited natural recruitment and a declining population of wild fish. Current estimates indicate fewer than 1,000 wild, adult white sturgeon remain in the population, and very few occupy their historic range in Montana. The Kootenai River white sturgeon was listed as an endangered species under ESA in 1994 and is a Montana Species of Concern. Angling for Kootenai River white sturgeon has not been allowed in Montana since 1979.

Management plans and conservation efforts for Kootenai River white sturgeon are developed and implemented through a USFWS-coordinated Recovery Team composed of state, federal, tribal and Canadian appointments. Short-term recovery objectives for the species include reestablishing successful natural recruitment and preventing extinction through population supplementation. Ultimately, the Kootenai River white sturgeon population could be delisted if the population becomes naturally self-sustaining, a process that could take decades to realize because sturgeon do not become reproductively mature until about 30 years of age. The USFWS recovery plan (1999) for the Kootenai River population of white sturgeon details management activities including release of hatchery sturgeon propagated in Idaho and British Columbia, manipulation of dam discharges and water temperature, and habitat restoration to improve spawning and rearing.

Though Kootenai River white sturgeon will likely remain a federally listed and managed species for the foreseeable future, FWP will remain active participants in the development, promotion and implementation of conservation efforts that result in recovery and de-listing of the species.

Relevant management documents: *Recovery Plan for the Kootenai River Population* (USFWS, 1999); *Critical Habitat Revised Designation for the Kootenai River Population of White Sturgeon (Acipenser transmontanus): Final* (USFWS, 2008); *Biological Opinion on the Effects of the Federal Columbia River Power System on Five Endangered or Threatened Species* (USFWS, 1995); *Biological Opinion on the Effects to Listed Species from Operations of the Federal Columbia River Power System* (USFWS, 2000). *Fish and Wildlife Service Biological Opinion Regarding the Effects of Libby Dam Operations on the Kootenai River White Sturgeon, Bull Trout, and Kootenai Sturgeon Critical Habitat* (USFWS, 2006). *Clarification of the 2006 Fish and Wildlife Service Biological Opinion Regarding the Effects of Libby Dam Operations on the Kootenai River White Sturgeon, Bull Trout, and Kootenai Sturgeon Critical Habitat* (USFWS, 2008).

## **Lake Whitefish (native to St. Mary River drainage, nonnative otherwise)**

Lake whitefish are members of the salmonid family, and although uncommon in Montana, they are a popular sportfish for a small, but dedicated group of anglers. Lake whitefish generally prefer deep, cold lakes but can also be found in relatively warm lakes and reservoirs. During spawning migrations lake whitefish will congregate in rivers and in Montana, the species is believed to be native to the Saint Mary River drainage, including Saint Mary Lake and Upper Waterton Lake in Glacier National Park. Other populations, including Echo (near Big Fork), Flathead and Whitefish lakes, and Fresno and Fort Peck reservoirs, have been established through stocking and subsequent dispersal.

Though lake whitefish are a high quality sportfish (typically 18 – 22 inches; state record: 10 lbs), their limited distribution and often poor catchability result in only about 0.1% of the total fishing days in Montana spent pursuing the species. Flathead Lake provides the bulk of angling pressure for lake whitefish in Montana, although catch rates for this summer fishery can vary substantially year-to-year. Anglers also target lake whitefish through the ice on Echo and Whitefish lakes, during fall spawning migrations on the Flathead River near Kalispell, and spring through autumn in the Milk River tailwater below Fresno Reservoir.

## **Mountain Whitefish (native)**

Mountain whitefish is a common native species distributed widely in the western half of Montana, including the Columbia, Missouri, Saskatchewan and Yellowstone river basins. The species typically inhabits relatively cold streams, rivers, lakes, and reservoirs and are abundant in many larger rivers where they are commonly captured by anglers who are targeting trout (less than 1% of total angler days are spent directly pursuing the species). Typical adult mountain whitefish are 12 –16 inches in length and the state angling record is 5 lbs (Hauser Reservoir).

Although mountain whitefish remain present throughout their historic range in Montana, there are concerns of potential reductions in abundance in some locations (e.g., Madison River). Owing to their typically high abundances and active movement, mountain whitefish populations have not been historically monitored in rivers and population trends are generally not well documented. Cause of possible declines in some locations are currently only speculative, but may include disease, drought, or other habitat changes. In August 2016, a large-scale die-off of mountain whitefish in the Yellowstone River was attributed to proliferative kidney disease (PKD). Additional testing found the parasite that causes PKD is present in waterbodies throughout western Montana; however, fish populations in those water bodies were not symptomatic of the disease. It is thought that low flows and high water temperatures, in combination with the presence of the PKD parasite, were responsible for the Yellowstone River outbreak. FWP is developing monitoring protocols that will help to better understand current mountain whitefish status and future trends in abundance. Likewise, research efforts are underway to better understand the ecology of the species, including its habitat needs, movements, and possible cause(s) of apparent declines in some waters. Despite some concerns, mountain whitefish remain one of the most widespread and abundant sportfish in Montana. The

bag limit was reduced to 20 daily and 40 in possession (down from 100 daily and in possession) in 2008 as a result of concerns over their diminishing abundance.

### **Nongame Fish (native)**

Montana waters are home to 59 native species, of which 41 are considered “nongame” fish. Many of these species are small-bodied minnow (cyprinid) species that occupy a wide diversity of habitats throughout the state and include such common fish as longnose dace and fathead minnow. The nongame group includes several sucker and sculpin species that are common and well-known to most anglers, as well as several Montana Species of Concern that can be quite rare including the blue sucker, northern redbelly dace, northern pearl dace, shortnose gar, sicklefin chub, spoonhead sculpin, sturgeon chub, torrent sculpin and the trout-perch. Native nongame fish range in size from the two-inch sand shiner to the bigmouth buffalo that can reach three feet in length. Although many anglers would classify native nongame fish as “bait fish,” the group also includes predators like northern pikeminnow and shortnose gar.

FWP is giving greater management attention to several nongame Species of Concern, and recent studies have evaluated the status of several sculpin species, as well as presence/absence of prairie-stream fish species including pearl dace and northern redbelly dace. Many prairie streams in the Eastern District have fish assemblages largely comprised of nongame/native fish which are adapted to intermittent and ephemeral stream conditions. Oil and gas development in the Bakken and Powder River areas come with water demands, and FWP is devoting more attention to monitoring the viability of these fish populations.

### **Nonnative Trout: Brook Trout, Brown Trout, Lake Trout, Rainbow Trout, Golden Trout (nonnative)**

Since their introduction to Montana starting in the late 1800s, rainbow trout, brown trout, brook trout, golden trout and lake trout have become the most common and widely dispersed fish species in the state. Also referred to as “nonnative trout,” the origins of these species span much of North America and as far away as Europe (brown trout). They have proven to be highly successful in Montana and they thrive in typical coldwater trout habitats in the western half of the state and in the tailraces of constructed reservoirs.

Almost three quarters of all anglers in Montana identify trout as their target fish species. Much of this fishing is for rainbow trout, which exist throughout many coldwater habitats in Montana. Brown trout often occupy similar habitat as rainbow trout, although brown trout are typically more tolerant of warmer water but less tolerant of large reservoirs. Brook trout thrive in smaller rivers, streams, spring creeks, and mountain lakes and lake trout are more typically found in deep lakes and reservoirs. It is important to note that there are two lakes with native lake trout in southwest Montana (i.e., Elk Lake and Twin Lake), and two lakes in Glacier National Park (i.e., Waterton Lake and St. Mary Lake) where populations of the species exist as apparent relicts from the last glacial age. Finally, several dozen mountain lakes, primarily in southwest Montana,

support unique golden trout fisheries that are self-sustaining or periodically supplemented with hatchery produced fish.

Management of nonnative trout varies greatly by species, body of water, and management objectives. Since the 1970s, “wild trout” management has been a priority in Montana rivers and streams. The fundamental elements of wild trout management are to maintain populations through natural reproduction and through the protection or restoration of high quality habitat. This management philosophy has been extremely successful and several rivers in Montana are among the most popular trout fisheries in the nation.

Harvest regulations for introduced trout in streams and rivers are based on both biological and social issues. More stringent regulations such as “catch-and-release only” are used to maintain satisfactory trout densities in heavily fished reaches of some rivers. Regulations that limit the harvest of larger fish are also commonly used to help maintain trophy fisheries and sufficient number of reproducing adults. More liberalized harvest regulations are generally applied towards brook trout, which are very common in many smaller streams, and lake trout where their potential impacts on native species is a concern (e.g., Flathead River drainage).

Lake and reservoir trout fisheries are also managed on an individual basis for a variety of objectives (e.g., put-grow-take, trophy, self-sustaining). In most cases, flat-water harvest is generally less restricted with more liberal opportunities to harvest fish compared to streams and rivers. Hatchery stocked rainbow trout provide the bulk of introduced trout fishing opportunities on many lakes and reservoirs. Other introduced trout fisheries are generally self-sustaining through natural reproduction. Like regulations for streams and rivers, liberal harvest limits for brook trout are standard in mountain lakes to reduce issues of stunted populations with small fish size. Angler harvest of lake trout is encouraged in Flathead and Whitefish lakes to aid conservation of native bull trout and westslope cutthroat trout. Lake trout are uncommon in the Central and Eastern fishing districts, primarily Tiber and Fort Peck reservoirs, and limits are relatively restrictive. Georgetown Lake provides a unique trophy brook trout fishery and is an exception to typical liberal limits for the species. Finally, brown trout are generally managed under the combined trout limits for lakes and reservoirs, and are often a part of mixed fisheries with rainbow trout. The predatory nature of brown trout allows them to reach a relatively large size (5 – 10 lbs.) in many waters, and though not commonly caught, these large fish occasionally provide anglers targeting other species with an unexpected trophy catch.

### **Northern Pike (native to the St. Mary drainage, nonnative elsewhere)**

Northern pike is the second largest member of the family Esocidae (behind only the muskellunge) and has one of the broadest distributions of any freshwater fish species. Its native range extends around the globe in the northern hemisphere in North America, the United Kingdom, Europe and Asia. Throughout its native range the northern pike has tremendous commercial, recreational and cultural importance.

Northern pike reach sexual maturity as early as age 1 for males and 2 for females, though most spawning aged fish are usually between 3 and 4. Spawning occurs in spring as water temperature exceeds 42°-50° F, which may occur as early as March and even under the ice in some areas. Adhesive eggs are laid on emergent plants, and hatching may occur rapidly (as early as a few days). After hatching, young northern pike feed on small invertebrates and their cohorts. When their body length is 2-4 inches they start feeding on small fish almost exclusively. Northern pike are typically ambush predators; they lie in wait for prey for long periods and then rapidly swim forward to strike prey. However, in the winter and late-summer, they will feed in the open-water (pelagic) zone of lakes.

Northern pike are primarily piscivorous (fish-eaters) though they have been known to take rodents and even ducklings. The popularity of northern pike as a sportfish stems from their ability to attain large sizes, the relative ease in catching them, and they are considered good table fare. The Montana state record is 37.5 lbs from the Tongue River Reservoir. Popular northern pike fisheries are primarily in lakes, reservoirs, and large rivers in the western, north central, and eastern part of the state, including the Lower Clark Fork, Clearwater, and Flathead river systems, and Fort Peck, Tongue River, Tiber, Pishkun and Nelson reservoirs. Northern pike normally live 5 to 15 years, but can be as old as 30.

Because of its popularity as a sportfish and as a food fish, the northern pike has been introduced in many waters outside its native range and its range continues to expand through introductions (both illegal and authorized) to this day. In Montana, northern pike are only native to the St. Mary River in the upper Saskatchewan River drainage in extreme north-central Montana. The first northern pike scientifically documented in Montana was collected in 1874 from the St. Mary River.

In the Columbia River drainage (to which the Clark Fork is a primary tributary) northern pike are not native and share no evolutionary history with fish fauna. As a result, prey species (sucker, minnows, and salmonids) are naïve to this predator. Within their native range, fish have evolved behavioral, chemical, and physical defenses, including sharp and stiff fin rays. When given a choice, northern pike will consume soft-rayed fishes. Northern pike are thus able to quickly exploit these prey and have few natural predators in these systems.

In general, outside of trout waters, northern pike are managed as a sportfish. Within trout waters (both east and west of the continental divide) the management goal is suppression, to limit increase in distribution, limit new populations, and even eradication in certain instances. Even outside of trout waters, recent concern over competition with sauger and their effects on native fishes in prairie streams has led to more monitoring.

In the Western Fishing District (west of the continental divide) regulations are generally structured to allow for liberal harvest to suppress northern pike populations. In the Clark Fork and Blackfoot drainages, regulations allow unlimited harvest and opportunities for spearing, while in the Flathead and Lower Clark Fork drainages, management reverts to district wide standards (15 fish daily and in possession) with some extended seasons to allow harvest during the winter in waters otherwise closed to winter fishing. In the Central and Eastern fishing districts, standard regulations allow for 10 northern pike daily and in possession. However, in the

upper Missouri, Madison, Gallatin and Jefferson drainages, concern over the potential deleterious effects of feral, illegally-introduced northern pike on salmonids in particular, has led to more liberal harvest (no limits) and extended seasons. Aggressive management actions are currently in place for northern pike from Holter Dam to the headwaters of the Missouri River.

### **Paddlefish (native; Montana Species of Concern)**

Paddlefish are an ancient, cartilaginous (not bony) fish and one of only two paddlefish species worldwide. They are Montana's largest native fish with the state record being 77 inches in length and weighing 143 pounds. A more typical size for a harvested fish is between 20 and 100 pounds. This species was quite uncommon prior to the completion of Fort Peck Dam in Montana and Garrison Dam in North Dakota. Its abundance has increased markedly in the past 50 years due to the fact that the fry survive much better in the still water of reservoirs compared to the swift water of rivers. This is probably because the primary food for this species (zooplankton) is more abundant in reservoirs than rivers. The species is long lived, with older fish commonly reaching 50-60 years old. Current distribution of the fish in Montana is the Missouri, Milk, Marias and Yellowstone rivers. In the Missouri River they are found downstream of the Great Falls. Yellowstone River distribution is typically downstream of the Intake Diversion near Glendive; in high water years fish may use a side channel around the diversion and ascend the river as far as the Cartersville Diversion near Forsyth.

The fish are managed as two naturally-reproducing stocks: the Yellowstone River and Missouri below Fort Peck Dam, and the Missouri River above Fort Peck Dam. The Yellowstone River-lower Missouri River stock is managed cooperatively through a joint management plan with the State of North Dakota to monitor the population and demographics of each stock and to annually evaluate the sustainability of harvest. Harvest of this recreational fishery is accomplished by snagging, and targets for each stock are set on an annual basis. Since 2010 the target has been 1,000 fish for the Yellowstone River-lower Missouri River and 500 fish for the Missouri River upstream of Fort Peck Reservoir. The harvest is closely monitored by biologists and creel clerks and can be closed immediately or with 24 hours notice, depending on the location. One unique aspect of the Yellowstone River-lower Missouri River fishery is the presence of a caviar operation, which is run by the Glendive Chamber of Commerce on the Yellowstone River. Proceeds from this operation are divided between the City of Glendive and FWP, with the State's share going to help fund research and management activities for the species.

Relevant management documents: *Management Plan for Montana and North Dakota Paddlefish Stocks and Fisheries* (FWP 2008).

### **Pallid Sturgeon (native; federal ESA endangered species; Montana Species of Concern)**

The historic distribution of pallid sturgeon in Montana includes the Missouri River downstream of Fort Benton, the lower reaches of the Marias River, the lower reaches of the Milk River, the Yellowstone River downstream of Forsyth, the mouth of the Tongue River, and significant

stretches of the Powder River. Pallid sturgeon are long-lived (50+ years), highly migratory, and require large, turbid, relatively warm, and free-flowing rivers to successfully reproduce. The construction of dams and corresponding impoundments on the upper Missouri River beginning in the early 1900s, (e.g., Canyon Ferry and Fort Peck reservoirs, and North Dakota's Lake Sakakawea), Yellowstone River (e.g., Intake Diversion Dam), and associated dammed tributaries (e.g., Yellowtail, Tongue and Tiber reservoirs on the Bighorn, Tongue and Marias rivers) have impeded successful spawning and recruitment of pallid sturgeon in Montana. Dams and impoundments block migration routes, alter natural spawning cues such as discharge, temperature and turbidity, fragment populations (i.e., above Fort Peck Reservoir), and alter habitats necessary for survival of fry. It is currently estimated that fewer than 100 wild adult pallid sturgeon persist in the upper Missouri and Yellowstone rivers above Lake Sakakawea, though several abundant year-classes of hatchery-reared pallid sturgeon are present in the system (Jaeger et al. 2009; Rotella 2017). The pallid sturgeon was listed as a federal endangered species in 1990 and is a Montana Species of Concern. Angling for pallid sturgeon is not allowed in Montana.

Management plans and conservation efforts for pallid sturgeon have been developed and implemented through a USFWS-coordinated Recovery Team that includes state- and federally-appointed staff. Additionally, FWP is in the process of developing its own Pallid Sturgeon conservation and management plan to complement federal efforts while specifically addressing priorities and objectives within Montana. Short-term management objectives for the species include preventing local extirpation through population supplementation with hatchery-propagated fish, providing adult upstream passage at Intake Diversion Dam on the Yellowstone River, and developing strategies to address impacts to spawning and recruitment related to Fort Peck and Sakakawea reservoirs. Long-term and natural persistence of pallid sturgeon will require changes to reservoir operations that result in re-establishment of spawning cues and habitats necessary for fry survival.

Though pallid sturgeon will likely remain a federally listed and managed species for the foreseeable future, FWP will remain active participants in the development, promotion and implementation of conservation efforts that result in recovery and de-listing of the species.

Relevant management documents: *Revised Recovery Plan for the Pallid Sturgeon (Scaphirhynchus albus)* (USFWS, 2014); *Biological Opinion on the Operation of the Missouri River Mainstem Reservoir System, the Operation and Maintenance of the Bank Stabilization and Navigation Project, the Operation of the Kansas River Reservoir System, and the Implementation of the Missouri River Recovery Management Plan* (USFWS, 2018); *Pallid Sturgeon Range-wide Stocking and Augmentation Plan* (USFWS, 2006); *Memorandum of Understanding for Upper Basin Pallid Sturgeon Recovery Implementation* (Upper Basin Pallid Sturgeon Workgroup, 2008, 2018); *Pallid Sturgeon Conservation and Management Plan for Montana* (FWP, in prep); *Upper Basin Pallid Sturgeon Survival Estimation Project* (Rotella and Hadley, 2009; Rotella, 2010, 2012, 2015, 2017).

## **Sauger (native; Montana Species of Concern)**

Sauger is a member of the perch family and a native game species in the Missouri and Yellowstone river basins of Montana. Their historic distribution includes the Missouri River and its major tributaries downstream of Great Falls, and the Yellowstone River and its major tributaries downstream of the Clark's Fork River near Billings. Sauger prefer turbid and unimpeded rivers, which permit spawning migrations of up to several hundred miles. Sauger also occupy reservoirs with suitable habitat, and several in Montana support sizable populations (e.g., Yellowtail and Fort Peck reservoirs). Sauger have become rare or absent in a number of larger rivers in Montana (e.g., Judith, Poplar, Big Horn and Tongue rivers), due in part to dams, diversions and impoundments that have altered temperature, flow regime and favored river habitats, and obstruct migrations. Additional management concerns include entrainment in irrigation canals, streambank alterations, and competition or hybridization with nonnative species (e.g., smallmouth bass and walleye). Though widely distributed in the Missouri and Yellowstone rivers, and is common in some locations, the sauger is listed as a Montana Species of Concern owing to an estimated 50% reduction in distribution and widespread threats.

Sauger have received considerable management attention since reductions in abundance were first noted in the drought years in the 1980s. Several studies have since been completed to better understand the species overall status, habitat needs, movement patterns and threats. These assessments have provided important information on the impact of habitat alteration on sauger and other prairie river species (e.g., blue sucker, pallid sturgeon and paddlefish), and recent restoration efforts have been directed towards reducing entrainment in irrigation canals, and promoting movement in the Tongue River through construction of a bypass channel around an irrigation dam. Modifying dam operations to promote more natural hydrographs and temperatures on mainstem rivers and tributaries will continue to be important but difficult issue to address. Hybridization between sauger and nonnative walleye is also a concern, and the issue is being preemptively addressed in the Bighorn River system through stocking of sterile walleye in Yellowtail Reservoir.

On larger rivers, spring and fall aggregations of sauger provide for popular fisheries, though overall, less than 0.2% of statewide angling pressure is targeted towards the species. Standard angling limits for sauger are 5 daily and 10 in possession, though to protect some populations from the potential stress of over-harvest, in many locations limits are reduced to 1 daily and 2 in possession. A draft version of a sauger conservation agreement was produced by FWP in 2004 (*Memorandum of Understanding and Conservation Agreement for Sauger (Sander canadensis) in Montana*) with the goal of enlisting the support and assistance from other agency partners to conserve this species.

## **Shovelnose Sturgeon (native)**

The shovelnose sturgeon is native to Montana with a current distribution that includes the Missouri River below Morony Dam near Great Falls, the Marias River below Tiber Dam, the Yellowstone River downstream of Cartersville Diversion Dam at Forsyth, and the lower reaches of the Milk, Powder, Tongue and Teton rivers. Shovelnose sturgeon are also present in Bighorn,

Fort Peck and Tiber reservoirs. Shovelnose sturgeon and pallid sturgeon coexist in portions of the Missouri and Yellowstone rivers; but unlike their endangered cousin, shovelnose sturgeon are less impacted by dams and impoundments and remain common to abundant in many locations. Like many prairie river fish species however, impediments to movement, entrainment in irrigation canals, and altered flow and temperature regimes have resulted in reduced distribution and abundance of shovelnose sturgeon in portions of their range, particularly tributaries to the major rivers. On-going efforts to address these issues will benefit shovelnose sturgeon as well as many other game and nongame species. Furthermore, the Pallid Sturgeon Recovery Team has supplemented the adult pallid sturgeon population with hatchery-propagated fish from 2000-2012. As such, densities of juvenile pallid sturgeon are reaching levels that shovelnose sturgeon anglers are beginning to catch hatchery-reared pallid sturgeon. The “Similarity of Appearance” provision needs to be watched closely by FWP since juvenile pallid sturgeon are the same size and similar in appearance to shovelnose sturgeon. Educational efforts to aid anglers with sturgeon identification, to eliminate accidental harvest, needs to be an increased component for FWP and the pallid sturgeon program.

Though they remain common in many portions of their range, shovelnose sturgeon are treated as a federally *threatened* species under “Similarity of Appearance” provision of the Endangered Species Act (ESA). This provision has been applied to shovelnose to protect endangered pallid sturgeon from inadvertent commercial “take” in areas where the species’ range overlap. The ESA-listing of shovelnose sturgeon only applies to commercial activities, and while both species occupy the Missouri and Yellowstone rivers in Montana, recreational fishing is not impacted by the rule. Accidental angler harvest of pallid sturgeon is a concern in Montana, and to address the issue, fishing regulations require release of all sturgeon greater than 40 inches. The basis of this regulation is that pallid sturgeon adults are typically greater than 40 inches, while shovelnose sturgeon rarely reach that length. Furthermore, the Pallid Sturgeon Recovery Team has supplemented the adult pallid sturgeon population with hatchery-propagated fish from 2000-2012.

Even though shovelnose sturgeon can reach more than 3 feet of length and 5 – 10 pounds, and are considered high quality table-fare, few Montana anglers specifically target the species and they account for only about 0.03% of the annual angler days in the state. An exception is the lower Marias River where a popular late spring fishery exists for adult shovelnose sturgeon migrating from the Missouri River. Shovelnose sturgeon are also occasionally captured by anglers targeting other species, particularly catfish. Central and Eastern district harvest limits for shovelnose sturgeon are 5 daily and in possession, with an exception being Bighorn Lake where the harvest limit is two daily and in possession. As previously noted, all sturgeon greater than 40 inches in length must be released.

Shovelnose sturgeon may be vulnerable to over exploitation as a result of their low recruitment. Surveys on the Middle Missouri River from 2007 – 2011 indicated a moderate harvest of shovelnose sturgeon with similar catch rates in 2007 and 2011, but the proportion of shovelnose sturgeon that were caught and harvested was relatively high at 62% in 2007 and 65% in 2011. Total harvest could easily surpass 2,000 adult fish per year when total fishing pressure is factored in. Further study is needed to determine what harvest level will keep this high quality population at its present level.

## **Westslope Cutthroat Trout and Yellowstone Cutthroat Trout (native; Montana Species of Concern)**

Two subspecies of cutthroat trout are native to Montana: westslope cutthroat trout and Yellowstone cutthroat trout. Together they share the distinction as “Montana’s State Fish.” Westslope cutthroat trout are native to the Clark Fork, Kootenai, Missouri (above and including the Judith) and St. Mary drainages. Yellowstone cutthroat trout are native to the Yellowstone River and associated tributaries upstream of the confluence with the Big Horn River.

Historically westslope cutthroat trout and Yellowstone cutthroat trout occupied all accessible, coldwater streams and lakes in their respective drainages, with resident (stream occupant), fluvial (migratory river fish) and adfluvial (migratory lake fish) forms were present. While westslope cutthroat trout remain common in many waters west of the continental divide, and both subspecies have been stocked in numerous lakes and reservoirs, their distribution and abundance has declined in many portions of their historic range. Major factors contributing to the decline include competition with nonnative species of trout, hybridization with rainbow and Yellowstone or westslope cutthroat trout that were stocked outside their historic range, habitat changes, and migratory barriers. In Montana it is currently estimated that genetically pure westslope cutthroat trout occupy about 20% (5,950 miles) of their historic range and genetically pure Yellowstone cutthroat trout occupy about 16% (705 miles) of their historic range. If slightly hybridized populations with <10% level of hybridization were combined with the genetically pure populations, the current distribution of westslope cutthroat trout and Yellowstone cutthroat trout increases to 30% (8,830 miles) and 28% (1,210 miles) of their respective historic ranges.

The status of westslope cutthroat trout throughout its distribution in Montana is variable. Non-hybridized westslope cutthroat trout populations on the west side of the continental divide are more widely distributed and represent the majority of the occupation percentage listed above. Non-hybridized westslope cutthroat trout populations in the Upper Missouri River Basin presently only occupy 4% of their historic distribution and are commonly limited to small headwater streams. Similarly, Yellowstone cutthroat trout status and distribution varies spatially. Some areas exist where Yellowstone cutthroat trout have been isolated from nonnative fishes, but many of the existing populations overlap with nonnative species and are not secure. Non-hybridized Yellowstone cutthroat trout populations in the Upper Yellowstone River Basin presently occupy 26% of their historic distribution. Owing to significant declines in westslope cutthroat trout and Yellowstone cutthroat trout, each is listed as a Montana Species of Concern. Both were petitioned for listing under the federal Endangered Species Act but these petitions were found “not warranted.”

As a Species of Concern and sportfish, both subspecies receive considerable management attention and resources from FWP, federal land management agencies, and private organizations. Though exceptions exist, cutthroat-occupied lakes and reservoirs are generally managed as recreational fisheries where harvest is allowed, and may periodically be stocked with progeny from FWP’s cutthroat broods maintained at Washoe Park Trout Hatchery and the Yellowstone River Trout Hatchery. In most cases populations residing in rivers and streams have been identified as “conservation populations,” which indicates the need to manage the population for natural, self-sustaining persistence. Streams and rivers are not stocked with hatchery fish, with

the exception being restoration efforts where cutthroat brood or wild eggs are introduced in smaller streams to reestablish populations. Stream and river creel regulations vary based on strength of populations, with “catch and release” or limited harvest with size limits the most common types of regulation.

Management concerns for westslope cutthroat trout and Yellowstone cutthroat trout vary by drainage and region of the state. Efforts to address threats are often developed specific to an individual body of water. In some waters, angler harvest limits and habitat protection are suitable management measures to ensure robust populations remain. Habitat conservation is important for species conservation, and addressing concerns related to riparian condition, passage concerns at road crossings, entrainment in irrigation systems, and in-stream flow are important for conserving cutthroat populations. In some drainages, nonnative trout species are removed to reduce threats to “at-risk” populations, or to develop areas for cutthroat restoration. Barriers to upstream fish passage may be constructed at the lower end of recovery areas to prevent re-invasion of nonnative species. Projects to reestablish populations for conservation purposes are common in the upper Missouri and Yellowstone drainages, and these efforts often include transferring eggs or live fish from existing threatened populations to preserve their genetic legacy.

Management of Montana’s two cutthroat subspecies is directed by regional and statewide management plans. The *Memorandum and Conservation Agreement for Westslope Cutthroat Trout and Yellowstone Cutthroat Trout in Montana* (FWP 2007) is the principal document that sets objectives and goals for overall cutthroat conservation in Montana, and has been signed by numerous state, federal, tribal, and private stakeholders.

Relevant management documents: *Memorandum and Conservation Agreement for Westslope Cutthroat Trout and Yellowstone Cutthroat Trout in Montana* (FWP 2007);

### ***Conservation Goals for Westslope Cutthroat Trout***

The conservation goal for westslope cutthroat trout west of the Continental Divide is to maintain viable populations throughout their existing distribution in all drainages, primarily through angling regulations and habitat protection and restoration. Identified “conservation” populations include those that are non-hybridized or slightly hybridized, isolated resident populations, and populations that include a mainstem river migratory life-form that promotes connectivity between populations and provide angling opportunity for larger fish. If migratory bull trout are not present, isolation by placement of barriers of some tributary westslope cutthroat trout populations may be considered if hybridization or competition from nonnative trout threatens the population’s persistence. On a limited basis some opportunities to expand the distribution of the subspecies into historically occupied habitat may be explored, such as upper reaches of the North Fork of the Blackfoot River. Where necessary and feasible, nonnative trout may also be removed from isolated drainages to protect existing westslope cutthroat trout populations from competition or hybridization, such as the South Fork of the Flathead Westslope Cutthroat Conservation/Restoration Project.

The restoration goal for westslope cutthroat trout east of the Continental Divide (Upper Missouri River Basin upstream from and including the Judith River) is to restore secure conservation

populations of westslope cutthroat trout to 20% of the historic distribution. This is a long-term goal and not expected to be reached within the timeframe of this document. Populations of westslope cutthroat trout are considered secure by FWP when they are isolated from nonnative fishes, typically by a physical fish passage barrier, have a population size of at least 2,500 fish, and occupy sufficient (5 to 6 miles) habitat to assure long-term persistence. The effect of nonnative rainbow and brook trout on westslope cutthroat trout populations is well known and less well known for others, such as brown trout; thus, management actions will focus on known threats, including habitat concerns, and rely on future research to determine threats of other nonnative fish species. Ongoing projects in the upper Missouri River basin are expected to secure or create new westslope cutthroat trout conservation populations; however, the total amount of habitat secured will likely be less than an additional 4% of historic distribution.

In the upper Missouri River Basin, all remaining populations with less than 10% nonnative trout hybridization are considered “conservation” populations. Estimates of the historic distribution of westslope cutthroat trout within the Upper Missouri River Basin are approximately 19,000 stream miles. Therefore, having 3,800 miles of secure conservation populations within the basin would satisfy this 20% goal. Conservation populations of westslope cutthroat trout currently occupy approximately 8% of the historic distribution in the basin. In satisfying the 20% conservation goal, existing conservation populations would be protected, and populations would be expanded or introduced into approximately 12% more of the historic habitat within the basin. Implementation of the 20% historic range goal for westslope cutthroat trout would assure persistence of subspecies in the Upper Missouri River Basin for the foreseeable future, provide numerous fishing opportunities for Montana’s State Fish, and leave unchanged the vast majority of fisheries that have developed for nonnative trout. All conservation projects to expand westslope cutthroat trout distribution would be vetted to the public through the MEPA process, and because of feasibility issues, are generally limited to small to medium sized tributary streams.

Logistically, the westslope cutthroat trout conservation goal would be proportionally applied to all major drainages within the Upper Missouri River Basin. Having conservation populations spread out geographically within the basin is a prudent approach that prevents stochastic events, like floods, fire, drought or disease, in a portion of the drainage from having an impact on all conservation populations. In some situations, a drainage may exceed the “20% of historic goal” due to opportunities, whereas other drainages may fall short due to logistic realities. As a general rule, the 20% goal would be applied in each drainage, unless the regional fisheries manager makes an exception based on logistics or opportunities.

### ***Conservation goals for Yellowstone Cutthroat Trout***

The estimated historic distribution of Yellowstone cutthroat trout in the Upper Yellowstone River (upstream and including the Stillwater River near the town of Absarokee, MT and excluding areas within Yellowstone National Park) is 2,336 stream miles. The estimated current distribution of YCT conservation populations with less than 10% hybridization is approximately 48% of their historic distribution. Many of these populations of Yellowstone cutthroat trout coexist with nonnative rainbow trout, brook trout and brown trout and therefore are not considered secure, as defined above for westslope cutthroat trout in the Upper Missouri River Basin.

FWP is implementing management actions to secure Yellowstone cutthroat trout populations in the Shields River upstream from Chadbourne Diversion. Management actions that have been completed to secure these populations include an effort to determine the distribution of brook trout, rainbow trout and hybridized YCT upstream from the diversion and a rebuild of Chadbourne Diversion to prevent upstream fish passage and ensure the structural integrity of the diversion. A second barrier was completed in partnership with the Custer Gallatin National Forest at the Crandall Creek Campground to prevent upstream passage of brook trout into the Shields River headwaters. Future actions to secure the Yellowstone cutthroat trout population in the Shields drainage will include continued removal and management of nonnative fishes (brook trout, rainbow trout, and hybridized cutthroat trout) primarily through mechanical removal. This work is being completed under an EA that was approved for 10 years (2014-2024). FWP will continue to research the long-term impacts of brown trout on Yellowstone cutthroat trout populations.

In recent years, FWP has also implemented management actions to remove nonnative fish in the Upper Boulder River drainage (upstream from the Hawley Falls) and Upper Soda Butte Creek (upstream of Ice Box Canyon). Efforts in the Upper Boulder have yielded Yellowstone cutthroat trout populations in multiple lakes and streams and other lakes shifting to Yellowstone cutthroat trout dominated populations via the efforts. Monitoring efforts are ongoing to document the Yellowstone cutthroat trout populations changes resulting from the management actions in the Upper Boulder. Brook trout residing in Upper Soda Butte Creek threatened to expand downstream and invade Yellowstone cutthroat trout populations in Yellowstone National Park (YNP). In collaboration with all respective agencies (YNP, Wyoming Game & Fish, Custer Gallatin NF and Shoshone NF) brook trout were removed from Soda Butte Creek upstream of Ice Box Canyon Barrier in 2015 and 2016. No brook trout have been found in Upper Soda Butte Creek since the treatment of 2016.

If successful, conservation actions in the Shields river would result in approximately 20% of the historic distribution of Yellowstone cutthroat trout in the Upper Yellowstone River Drainage having secure populations. Further, these actions would result in monumental steps for the range-wide status of the species. FWP will continue to look for conservation opportunities within the Yellowstone River Drainage to secure Yellowstone cutthroat trout populations and increase the percentage of the historic distribution where secure populations exist. This is especially important in a spatial perspective, where stochastic events, like drought, disease, or forest fire, are less likely to impact localized strongholds such as the Shields or Boulder drainages. Conservation populations existing in open systems (coexisting with nonnative trout) will be managed to conserve Yellowstone cutthroat trout and their migratory life histories, while accepting some levels of competition and hybridization with nonnative species. Examples may include securing spawning tributaries and allowing selective passage of Yellowstone cutthroat trout during spawning runs.

## Walleye (nonnative)

Walleye is a nonnative species found widely in lakes, reservoirs and large rivers in Montana east of the Continental Divide. It is also found west of the Continental Divide in Noxon Rapids Reservoir, apparently a result of an unauthorized introduction. The range and abundance of walleye has increased in recent years in the Missouri River between Holter Dam and Great Falls, as well as in the Yellowstone River downstream of the Ranchers Diversion near Bighorn.

Walleye have achieved an avid following among anglers in Montana. According to the 2015 Statewide Angler Survey, over 9% of angler days in Montana were spent in pursuit of this species. Walleye are considered by many anglers to be a handsome fish with excellent flavor, and they also achieve impressive size when forage is abundant. The current state record is 17.75 pounds from Tiber Reservoir.

Walleye require rock, rubble or gravel substrates for successful spawning, therefore, natural reproduction is better at some lakes such as Canyon Ferry and Tiber reservoirs, while worse at others such as Fort Peck, Hauser and Nelson reservoirs where fine sediments will smother eggs and reduce the successful hatch. In reservoirs, dam operations can be detrimental if water levels drop during spawning and incubation. Recruitment is highly influenced by weather conditions in the spring, probably more so than by the number of spawning fish present or the number of eggs laid. Walleye forage is also influenced greatly by reservoir levels. Water levels rising during the time of forage spawning in the spring, combined with the availability of vegetation for spawning and cover, will greatly influence forage success.

FWP stocks walleye as fry or fingerlings in reservoirs where habitat or dam operations limit natural production. Most of the hatchery capacity and staff at Fort Peck and Miles City hatcheries are devoted to collecting walleye spawn, hatching the eggs, and growing fish to a stockable size. Between 2000 and 2010, FWP stocked approximately 329 million fry and 27 million fingerlings into Montana reservoirs, with the bulk of them going to Fort Peck Reservoir. FWP Policy prohibits the stocking of walleye west of the Continental Divide

Walleye sometimes hybridize with sauger, a native Species of Concern. A recent FWP study of sauger populations from 21 sites in the Missouri and Yellowstone drainages found low levels of hybridization (2%), with the greatest incidence (44%) of the hybrids detected in samples from the lower Yellowstone River near the mouth of the Powder River. Genetically, the hybrids were of three types: first generation crosses between pure sauger and walleye, second generation crosses between hybrids, or backcrosses between hybrids and pure sauger. In sum, most of the hybrids (ten of eighteen) were post second-generation, indicating that sauger/walleye hybrids are to some extent capable of reproducing. Even with these low levels of introgression, another concern is for the wasted reproductive effort that can occur through mating that results in highly unfit offspring. To avoid impacts of hybridization, FWP has begun to stock triploid (sterile) walleye into some systems. Bighorn Lake has stocked triploids for nearly a decade and other reservoirs may be considered in the future.

## **Yellow Perch (nonnative)**

Yellow perch are among the most widespread and popular sportfish in Montana. They thrive in ponds, lakes and reservoirs, and are also common in sloughs and slower rivers. Yellow perch were initially introduced to Montana waters more than a century ago, and through stocking efforts, natural dispersal and illegal introductions, are now present in most major drainages of the state. Yellow perch are not propagated in Montana hatcheries for stocking efforts but are occasionally transferred between ponds in eastern Montana to reestablish fisheries after periodic winter kills. Yellow perch are an important forage species for predatory sportfish like black bass, walleye, sauger, northern pike, and burbot, and their presence is a key factor in the quality and stability of many fisheries. High reproductive rates also allow yellow perch to overpopulate some waters, particularly ponds, resulting in poor quality fisheries of small fish and possible impacts to other game species. Unfortunately, yellow perch have also been illegally introduced to numerous waters, resulting in significant biological changes to some fisheries.

Yellow perch are a highly valued sportfish in Montana, and based on angling days, only trail trout and walleye in statewide popularity. Yellow perch are targeted by anglers in all seasons, and favored fisheries are those where quality fish are produced. Yellow perch populations can generally support high levels of angler harvest, and on most waterbodies, there are no daily or possession limits. On Canyon Ferry, Hauser, and Holter reservoirs, restrictive regulations are in place due to high angler pressure and walleye predation.

Yellow perch management is a challenge. They are highly sought after for table fare but anglers are generally not interested in perch smaller than 8-inches, which is the common adult size in most waters. Yellow perch can provide forage for other species but generally are not useful for prey past the yearling stage except for large predators like older walleyes and northern pike. Yellow perch are also aggressive and can out-compete other sportfish for food and space. The common problem with yellow perch is overabundance. Methods to decrease yellow perch densities are limited, manpower intensive and costly. Importantly, yellow perch are relatively slow growing in Montana, commonly requiring 4 years to reach 8 inches and 8 years to reach 10 inches. The key to quality yellow perch management is to limit recruitment and/or maintain strong harvest/predation pressure on perch less than 8" while severely restricting harvest of perch longer than 8".

## GLOSSARY

<b>Term or Phrase</b>	<b>Definition</b>
<i>Adfluvial</i>	Life history strategy in which adult fish spawn and juveniles subsequently rear in streams but migrate to lakes or reservoirs to feed and mature.
<i>Adipose fin</i>	A small fleshy fin (with no fin rays or muscles) on the back of salmonids, Ictalurids (catfishes), and other fish between the dorsal fin and the caudal fin. When removed, it does not grow back.
<i>Algae</i>	A simple organism (either single cellular or multi cellular) that lacks the structural components of plants, but generally still conduct photosynthesis.
<i>Algal bloom</i>	A rapid increase in the amount of algae in a water body.
<i>Amphipods</i>	Aquatic crustaceans with compressed bodies (also known as freshwater shrimp or scuds).
<i>Angler day</i>	A term used to describe fishing pressure, or angling use. An angler day is one day of fishing for one angler, regardless of actual length.
<i>Anthropogenic</i>	Describes the effects of humans on the environment.
<i>Appropriation</i>	In fisheries management this term refers to the water law (irrigation) in western states known as the Appropriation Doctrine. This doctrine is essentially a rule of capture, and awards a water right to a person actually using the water. It has two fundamental principles: First in time of use is first in right. Application of the water to a beneficial use is the basis and measure of the right.
<i>Assemblage</i>	A group or collection of species making up a community of organisms at a given place in a given time.
<i>Assessment of Biological Integrity</i>	A classification tool to assess <u>water pollution</u> problems. This classification associates <u>anthropogenic</u> influences on a water body with biological activity in the waterbody.
<i>Avista</i>	Avista corporation (utility).
<i>Barbel</i>	Thread-like projections near the mouths of some fish species (e.g., catfish, carp sturgeon, etc.).
<i>Benthic macro invertebrate</i>	Aquatic animals (without backbones, including crustaceans, insects and others) that live on or within the bottom of a waterbody and are visible without the aid of magnification.
<i>Blue ribbon</i>	A designation used to define a trout stream with high recreational value.
<i>Boulder</i>	Stream substrate particle size greater than 256 mm (10 inches).
<i>Caudal fin</i>	Tail fin on a fish.
<i>Char or charr</i>	Species of fish belonging to the genus <i>Salvelinus</i> , including bull, lake and brook trout in Montana, but also includes Dolly Varden and arctic charr elsewhere in the US and Canada.
<i>Cladocera</i>	Micro crustaceans or water fleas (a type of zooplankton).
<i>Cobble</i>	Stream substrate particles between 64 and 128 mm (2.5- 5 inches) in diameter.
<i>Cold water fish</i>	This is a general term that broadly refers to fish that prefer cold water 4-15 C (40-60F), like trout, char and grayling.
<i>Community</i>	An assemblage of plants and animals, or two or more populations of organisms, occupying a specific area within a specific time.
<i>Confined channel</i>	A stream channel that is well defined and stable (Does not exhibit lateral or vertical movement).
<i>Confluence</i>	Meeting of two or more water bodies, usually refers to the junction of a river and a stream.

<b>Term or Phrase</b>	<b>Definition</b>
<i>Consumptive fishery</i>	Population or group of fish population managed for the purpose of harvest or consumption.
<i>Cool water fish</i>	This is a general term that broadly refers to fish that prefer cool water 10-21 C (50-70), like northern pike or smallmouth bass.
<i>Critical habitat</i>	This term defines an official designation of the Endangered Species Act and refers to a physical area essential to the conservation of a listed species.
<i>Culvert</i>	A metal, plastic or concrete pipe (most often corrugated) placed under a road or railway to transport water.
<i>Dam</i>	A barrier that obstructs the flow of water either naturally (e.g., a beaver dam or landslide) or manmade (anthropogenically) that increases the water's surface elevation on the upstream side of the barrier.
<i>Delta</i>	The flat area at the mouth or confluence of a stream where alluvial deposits accumulate.
<i>Discharge</i>	Rate at which a volume of water flows past a specific point over time. Dam or stream discharge, usually expressed as cubic feet per second (CFS).
<i>DJ Act</i>	Dingell-Johnson Act or Wallop-Breaux Act provides Federal aid to states for management and restoration of fish. In addition, the act funds states for aquatic education, wetlands restoration, boat safety and clean vessel sanitation devices. Funds are derived from a tax on sport fishing tackle, gear and equipment, and motor boat fuel.
<i>DJ reports</i>	A document summarizing how federal Aid or Dingle Johnson Act funds were spent on a particular project. These reports are produced by Montana Fish, Wildlife and Parks' biologists at least every two years.
<i>Dorsal</i>	Referring to the back or top of a fish.
<i>Ecosystem</i>	Refers to a discrete community of living organisms and non-living components (like air, water and substrate) that interact to form a cohesive assemblage or system.
<i>Effective population size</i>	A term used in population genetics that refers to an hypothetical population where the number of breeding individuals in a population that exhibit genetic characteristics (including genetic drift, mutation, allelic frequencies and inbreeding) as a natural population.
<i>Electrofishing</i>	A common, effective and non-invasive technique to capture fish using an electrical field. Electro fishing is conducted using a variety of gear ranging from backpack mounted battery powered units to generator powered jet boat mounted units. All gears rely on two electrodes- a positive anode and a negative cathode.
<i>Endangered Species</i>	The Endangered Species Act (ESA) provides a program for the conservation of threatened and endangered plants and animals and the habitats in which they are found. The lead federal agencies for implementing ESA are the U.S. Fish and Wildlife Service (FWS) and the U.S. National Oceanic and Atmospheric Administration (NOAA) Fisheries Service. The FWS maintains a worldwide list of endangered species. Species include birds, insects, fish, reptiles, mammals, crustaceans, flowers, grasses, and trees.
<i>Endemic species</i>	An "endemic" species is one that has a very limited geographic area or region. Physical, climatic and biological factors can contribute to endemism. Endemism can arise in two ways, either from a shrinking range, called paleoendemism, or more commonly as a result of reproductive isolation that leads to speciation or the creation of a new species. Because of their inherent limited geographic distribution, endemics can easily become threatened, endangered or extinct.
<i>Epilimnion</i>	Uppermost layer of water in a lake or reservoir, defined by uniform temperature.

<b>Term or Phrase</b>	<b>Definition</b>
<i>Eutrophication</i>	A condition when too many nutrients are present in a water body. This can be a natural process, but it is often a result of human activities including the addition of fertilizers or sewage into waterways. Primarily refers to the additions of phosphates and nitrates into waters.
<i>Exotic species</i>	"Exotic" or "non-native" refers to a species that is originally from outside a particular area. This does not imply it is "invasive". It can represent anything from a fish native to elsewhere in the US (e.g., eastern brook trout), or one native to Asia (e.g., Common carp).
<i>Extant</i>	A species or even a population that is currently in existence. The opposite of "extant" is extinct.
<i>Extirpate</i>	To remove, destroy or eliminate completely
<i>Eye to fork length</i>	A common method of measuring paddlefish, from the anterior (front) of the eye to the fork in the tail.
<i>Fecundity</i>	Refers to an animal's fertility and usually refers to potential egg production capacity.
<i>Fertile</i>	Able to produce viable offspring.
<i>Fidelity</i>	Refers to being faithful or loyal and in fisheries parlance it refers to a fish being loyal to its place of origin, by returning to that place to spawn.
<i>Fin ray</i>	The supporting structure of fish's fin, made of cartilage or bone that provides rigidity but still allows the fins to be moved.
<i>Fingerlings</i>	Young fish general term describing fish between fry or larvae and adult. Most commonly used in reference to hatchery fish.
<i>Fish mark</i>	A modification made to a fish for identification (e.g., a fin clip).
<i>Fish tag</i>	A metal, plastic, or rubber object that is applied to a fish- either internally or externally - that allows for the fish's identification (either as part of a group or as an individual).
<i>Fishery</i>	A population or a group of populations of fish that receive use (either consumptive- harvest or non-consumptive, like a recreational fishery).
<i>Fluvial</i>	Relating to a river, and in particular usually refers to a life history strategy where a fish uses a river for part of its life cycle. Typically a fish will hatch in a stream, and migrate to a river to grow and mature, and return to the stream of its origin (natal stream) to spawn.
<i>Fork length</i>	A measure of fish length from the tip of the nose to the fork in the tail.
<i>Fry</i>	Newly hatched fish, commonly salmonids, and fish that don't go through a larval stage.
<i>Fyke net</i>	A hooped net that guides fish into a capture area using one or more wings and leads.
<i>Game fish</i>	Species of fish that are pursued for recreation or sport by recreational anglers.
<i>Gas Bubble Trauma</i>	Gas bubble trauma (GBT), also known as gas bubble disease, is a physiological condition that occurs among fish residing in water that is supersaturated with atmospheric gasses. In Montana it happens mostly below dams.
<i>Gas super saturation</i>	Occurs when water and atmospheric gasses must be forced together under pressure, or the capacity of water to hold gasses in solution must be reduced. Water and gasses are often mixed under pressure in deep plunge pools below dam spillways or waterfalls when gasses forced into solution by falling water.
<i>Genera</i>	Plural of genus- a taxonomic rank, a form of biological classification, above species, and below family.
<i>Genetic assignment</i>	This tool is used to identify an organism and relate it to its population source. Assignment results often contain a probability or a likelihood of appropriately matching an individual to the population.
<i>Genotype</i>	The genetic makeup of an organism.

<b>Term or Phrase</b>	<b>Definition</b>
<i>Gill net</i>	A commonly used sampling gear for the capture of fish in fisheries management and research. A gill net is made up of horizontal or vertical panels of netting and fish are captured by entanglement, often by their gills (hence the name). Although typically used in lakes and reservoirs gill nets can be used in slow moving rivers and even drifted in rivers.
<i>Gravel</i>	A substrate whose particle size is between 2 and 64 mm (0.1 an 2.5”) in diameter.
<i>Gravid</i>	Containing eggs.
<i>Habitat</i>	The physical, biological and chemical features of a specific place that an organism lives. The term habitat is species-specific, though it often refers to a population or a community of organisms.
<i>Head gate</i>	A device that controls or regulates water flow through an irrigation structure.
<i>Heavy metal</i>	A broad classification of elements that have the potential to cause toxicity to aquatic life. In general the heavy metals commonly referred to in Montana are copper, cadmium, lead, zinc, mercury, but also could refer to many more elements.
<i>Herbivorous</i>	Feeds mostly or entirely on plants.
<i>Hybrid</i>	A cross between two or more genera or species, may or may not be fertile.
<i>Hypolimnion</i>	Bottom thermal layer of water in a lake or reservoir that is typically cold, poorly oxygenated, poorly illuminated and is removed from surface influences.
<i>Incised channel</i>	A deep stream channel, usually formed as the result of stream down-cutting vertically into substrate. This type of channel does not move laterally, but moves or cuts downward.
<i>Indigenous</i>	A fish native to a particular waterbody.
<i>Interstitial spaces</i>	Openings in or between substrate that allow for water to flow through and provides habitat for benthic invertebrates.
<i>Introduced species</i>	Animals or plants that have been moved, transported, transplanted or stocked outside their native range, also known as “non-native” or “exotic”.
<i>Introgression</i>	Movement of genes from one species to another from repeated backcrossing. This implies more than simple hybridization, and suggests multiple and repeated reproduction events with fertile offspring.
<i>Invasive species</i>	Plants or animals which are usually non-native, become a nuisance, displace of native species, and spread and become established quickly.
<i>Lateral line</i>	A row of pores along the side of fish that create a sensory organ for detecting movements of water and presence of fish and other animals.
<i>Lentic</i>	Associated with still water (e.g., a lake, reservoir or pond).
<i>Life history strategy</i>	This describes an animal’s anatomical, physiological and behavioral adaptations that reflect how an individual invests in reproduction and self-maintenance in response to their environmental conditions. Typically this term refers to the behaviors associated with migration strategies and habitat use at different stages in an animal’s life to take advantage of the environment to maximize survival and potential for offspring.
<i>Lotic</i>	Associated with flowing water (like a river or stream).
<i>Mesic</i>	Wet areas.
<i>Metalimnion</i>	Thin layer or stratum of water between the hypo- and epilimnion also known as a thermocline.
<i>Migration</i>	An extended movement of an animal (often for feeding or reproduction), usually followed by a return to its former location.
<i>Mysis</i>	Any species of the genus “Mysis”, a small shrimp-like crustacean.

<b>Term or Phrase</b>	<b>Definition</b>
<i>Natal</i>	Refers to the place of birth or hatching and for fish, it usually refers to a stream or section of stream to which fish will show fidelity for spawning.
<i>Natal stream</i>	Stream of origin for a fish.
<i>Native species</i>	Typically defined as a animal that was here prior to European establishment, and was not transported here or introduced by humans.
<i>Nodal habitat</i>	This term refers to migratory corridors, overwintering areas, or other critical life history requirements. This is a term that is typically used in reference to bull trout, and does not refer to spawning habitat.
<i>Non-native fish</i>	"Exotic" or "non-native" refers to a species that is originally from outside a particular area. This does not imply it is "invasive", and can represent anything from a fish native to somewhere else in the US, or one native to Asia.
<i>Non-game fish</i>	Refers to the fact that the species have not been classified in Montana statute as "sport" fish.
<i>Pelagic</i>	Lives in open water.
<i>Phenotype</i>	The physical makeup of an organism, or the organism's observable properties or form (like color, and morphology).
<i>Photosynthesis</i>	The process by which plants make oxygen.
<i>Phytoplankton</i>	Microscopic, free-floating plants.
<i>Piscivorous</i>	Fish-eating.
<i>Piscicide</i>	A natural or synthetic compound that kills fish.
<i>PIT tag</i>	Passive Integrated Responder. A small internally applied electronic tag that is activated by an externally powered device to identify an individual animal through a alpha numeric code.
<i>Plankton</i>	Refers to all free-floating plants (phyto-plankton) and animals (zoo-plankton), usually microscopic.
<i>Pool</i>	A stream or river habitat type characterized by a low gradient (<1%) that is deeper and wider than adjacent habitat units.
<i>Population</i>	Individuals of the same species in a discrete geographic area and a specific time. This can also refer to a group of related species (e.g., trout).
<i>Prairie Pothole</i>	Ponds, pools and wetlands found in depressions that were formed by glacial activity.
<i>Recreational fishery</i>	Population or group of fish population managed without the purpose of harvest or consumption. This is typically categorized as a "catch and release" fishery.
<i>Redd</i>	A spawning nest or bed constructed by trout or salmon. The redd is a depression made in gravel (usually in a stream but not always) and is composed of a pit (where material for the "nest" is excavated) and a tail spill where the excavated material is piled to cover and protect the eggs.
<i>Redd survey</i>	A common monitoring technique where trout or salmon nests (redds) are counted by observers.
<i>Reservoir</i>	Artificial lake or impoundment where a dam is used to store water.
<i>Resident</i>	A life history strategy that does not involve migration.
<i>Retention time</i>	Length of time that water is stored in a waterbody (usually describes a reservoir).
<i>Riffle</i>	Shallow reaches of streams where substrate causes breaks in the surface water causing waves, or ripples.
<i>Rip rap</i>	Typically angular rock, but can also refer to rubble, broken concrete and other things used to armor a stream bank to prevent erosion.
<i>Riparian area</i>	Relating to the margin of a river, stream, lake or other waterbody. Usually refers to vegetation types and habitats along water bodies.
<i>Rotenone</i>	A commonly used piscicide derived from a South American vine.

<b>Term or Phrase</b>	<b>Definition</b>
<i>Salmonid</i>	Any member of the family Salmonidae including trout, salmon, charr, whitefish and grayling.
<i>Sand</i>	Substrate size that ranges from 0.062 and 2 mm (0.00003- 0.01”) in diameter
<i>Scuds</i>	Amphipods or commonly called freshwater shrimp.
<i>Scutes</i>	An external or bony plate, like those found on sturgeon.
<i>Silt</i>	Very fine substrate with particle sizes ranging from 0.004 to 0.062 mm (0.00002- 0.0003) in diameter.
<i>Sinuosity</i>	A measure of the curvature of a stream or river and describes the general pattern.
<i>Spawn</i>	To produce or deposit eggs, typically refers to fish, but can also refer to any aquatic animal (like mussels) or semi aquatic animals (like toads).
<i>Species</i>	The most basic unit of biological classification. In its most clear definition, a species is one that can produce viable (fertile) offspring. However, many fish of different species can produce viable offspring (hybrids).
<i>Species of Concern</i>	Is a protective designation by Montana Fish, Wildlife and Parks to wildlife species that are at risk.
<i>Sport fish</i>	Refers to any fish that has a recreational value (including harvest) and has management or regulation tied to it. Often this is synonymous with “game fish”, which are species of fish that are pursued for sport by recreational anglers.
<i>Standard length</i>	The most accurate measure of fish length, because it relies on skeletal length from the tip of the nose to the last vertebrae. Typically only used in the lab.
<i>Sterile</i>	An organism that is unable to reproduce sexually.
<i>Stratification</i>	Arrangement of water into distinct horizontal layers that are associated with temperature, dissolved oxygen and suspended particles.
<i>Stream order</i>	A hierarchical classification of stream based on the number of branches (or tributaries). For example, a first order stream has no tributaries, a second order stream has two first order streams flowing into it, and a third order stream is the result of two second order streams combining.
<i>Substrate</i>	Materials that form the base of a waterway, either organic or minerals. Substrates are usually classified into categories based on their diameter.
<i>Summerkill</i>	A fish killing condition that typically affects lakes in the summer as a result of high water temperatures and low dissolved oxygen. Often the low dissolved oxygen is a result of plants taking up a lot of oxygen at night causing very low amount of oxygen during the dawn hours (also known as a dissolved oxygen or DO “sag”), before plants can produce oxygen.
<i>Telemetry</i>	Measurement and transmission of information via radio or ultrasonic signal to a receiving unit. A technique used to locate and/or track tagged fish.
<i>Thalweg</i>	Path of a stream of river that follows the deepest part of the channel and usually contains the greatest amount of energy.
<i>Thermocline</i>	Thin layer or stratum of water between the hypo- and epilimnion also known as a metalimnion.
<i>Threatened Species</i>	A category of protection under the ESA (e.g., bull trout).
<i>Total length</i>	The most common measure of fish length- the maximum length of the fish from the tip of the nose to the tip of the tail (when the lobes of the tail are compressed).
<i>Triploid</i>	A fish having three sets of chromosomes, and, as a result, is not capable of reproduction, it is sterile.
<i>Vermiculatons</i>	Worm like markings on the skin as commonly found on brook trout dorsal fins.

<b>Term or Phrase</b>	<b>Definition</b>
<i>Wallop-Breaux Act</i>	Dingell-Johnson Act or Wallop-Breaux Act provides Federal aid to states for management and restoration of fish. In addition, the act funds states for aquatic education, wetlands restoration, boat safety and clean vessel sanitation devices. Funds are derived from a tax on sport fishing tackle, related fishing gear and equipment, and motor boat fuel.
<i>Warm water fish</i>	This is a general term that broadly refers to fish that prefer warm (between 15-17 C or 60-80 F) water temperatures.
<i>Weir trap</i>	A barrier than spans a stream to divert fish into a holding pen.
<i>Whirling disease</i>	A disease caused by a myxosporean parasite ( <i>Myxobolus cerebralis</i> ), in trout and other fish.
<i>Wild fish</i>	A fish that is reproducing and sustaining a population without the help of humans. A wild fish can be native or non-native species.
<i>Winterkill</i>	A specific event when fish or other aquatic organisms are killed usually after a prolonged period of snow or ice cover and usually related to depletions in available oxygen as a result of the lack of photosynthesis.
<i>Xeric</i>	Locations that lack water.
<i>Zooplankton</i>	Small, often microscopic animals, typically rotifers, copepods and cladocerans. Very important for food, especially in ponds, lakes and reservoirs.

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