

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 mi², 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. In Montana the Tongue River 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 cold water 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 managed as fisheries with public access and are stocked by FWP. For the rivers and streams, Hanging Woman Creek, Otter Creek, and Pumpkin Creek have game fish that include native and introduced species.

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 Tongue River in the tail water below Tongue River Dam.

Trend electrofishing is conducted on six reaches of the Tongue River each year to assess the current relative abundance, population structure, and body condition of fish populations in the Tongue River and monitor changes over time. Trend sampling on Tongue River Reservoir includes gillnet, trap net, and seining methods and is conducted to assess catch rates, condition, and length frequency of game fish in the reservoir. Stock ponds are sampled at least 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 for stocking into ponds and the Tongue River Reservoir from FWP hatcheries including walleye, rainbow trout, smallmouth bass, and largemouth bass. Catchable size trout are stocked annually in the coldwater stretch of the Tongue River below Tongue River Reservoir. The statewide wild fish transfer policy 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 in this way include northern pike, yellow perch, black crappie, white crappie, 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. As long as 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 inspected 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.

There is a reduced limit on sauger in the Tongue River above the reservoir to help preserve a remnant population while still allowing for some consumptive harvest. 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 publically 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 fairly low angling pressure. Tongue River Reservoir ranks 30th in the state and 1st in Region 7 for angler pressure. Due to crowding at boat ramps and on the reservoir, fishing tournaments at Tongue River Reservoir are not permitted from May 1-September 15.

HABITAT

The Tongue River has a constrained riparian corridor with much of the floodplain developed for irrigated agriculture. The river above and below the reservoir has more rocky substrates than downstream reaches and is influenced directly by development of the area's coal resources, a major industry in the watershed. Numerous sites in the Tongue River watershed have been permitted for the development of coal bed methane extraction. The extraction of coal bed methane involves pumping methane and groundwater from coal seams. Much of this water, that is high in salt, is discharged into the Tongue River above Tongue River Reservoir.

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 of the reservoir. The upstream end has increased turbidity as a result of the river influence. The middle to lower end have abundant rocky habitats and increased water clarity. Submerged aquatic vegetation is common in the bays throughout the reservoir.

The approximately ten river miles downstream of the dam, is a thermally unique river segment created by hypolimnetic releases out of Tongue River Reservoir that 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 resident Tongue River fish. Downstream of Brandenburg, irrigation has an increasing influence on instream flows and riparian habitat. Below T&Y Diversion dam, chronic dewatering is a major habitat concern for Tongue and Yellowstone River fishes.

Irrigation diversion dams have been barriers to fish movement and have fragmented fish populations in the Tongue River for the last 100 years. In addition, the irrigation canals are responsible for entraining fish. The T & Y canal has a modified headworks structure with louvers to minimize fish entrainment. The SH diversion dam (removed fall 2009) and the Muggli bypass channel (constructed fall 2008) around T & Y Diversion Dam has provided successful passage of many native fish species upstream and restored some connectivity between the Tongue and Yellowstone Rivers, but water and passage continue to be the primary fisheries needs of the Tongue River.

Although the drainage is predominately rural, habitat changes have impacted the system since human settlement. Developments include the construction of railroads, and roads to accommodate vehicle travel (county roads, state highways and a federal interstate highway). All of these developments have impacted the river and streams ability 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 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.

The vast 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 at ponds they own. 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 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

development include sites downstream of Tongue River Reservoir and Twelve Mile Dam FAS that would be within a day's floating distance from those access points. The Birney and Brandenburg reaches, of the Tongue River, would also provide valuable angling opportunity if access was available.

SPECIAL MANAGEMENT ISSUES

Resource management in the Tongue River drainage requires involvement with many agencies, entities, and user groups. Reservoir issues may include involvement with DNRC, the Decker Coal Mine, 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. Land use, energy development, and water allocation are special management issues that affect multiple stakeholders in the drainage.

Construction of a Tongue River Railroad has been proposed to facilitate increased coal extraction available from opening Otter Creek coal mine and expansion of Decker and Spring Creek coal mines. The railroad would be constructed along the banks of the Tongue River for much of its course.

Securing appropriate instream flow rights is a special management concern for the Tongue River. The lower stretch of the Tongue River downstream of the T & Y diversion dam is chronically de-watered. Instream flow needs have been determined by FWP for sauger, shovelnose sturgeon and channel catfish in the Tongue River. These species need a minimum of 190 cfs in the river in the months of September to February, 525-600 cfs from March through June to facilitate spawning runs and rearing, and 225 cfs from July to August. Securing adjudicated water rights for instream flow in the Tongue River according to these guidelines is a special management concern.

STATEWIDE FISHERIES MANAGEMENT PLAN

FISHERIES MANAGEMENT DIRECTION FOR TONGUE RIVER DRAINAGE

Water	Miles/acres	Species	Recruitment Source	Management Type	Management Direction
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 game and nongame fish, work with Wyoming adjudication process to evaluate Interstate water compact interpretation.					
Tongue River Reservoir	3700 acres	Black crappie, White crappie	Wild	Liberal Regulations	Manage for recreational family fishing opportunity for crappie. Because of congestion during holiday weekends tournaments will be restricted from the week before and after the following weekends: Memorial Day, Fathers Day, Fourth of July, Labor Day.
		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		Smallmouth bass,	Hatchery/	General/	Maintain fishery through regulations and

STATEWIDE FISHERIES MANAGEMENT PLAN

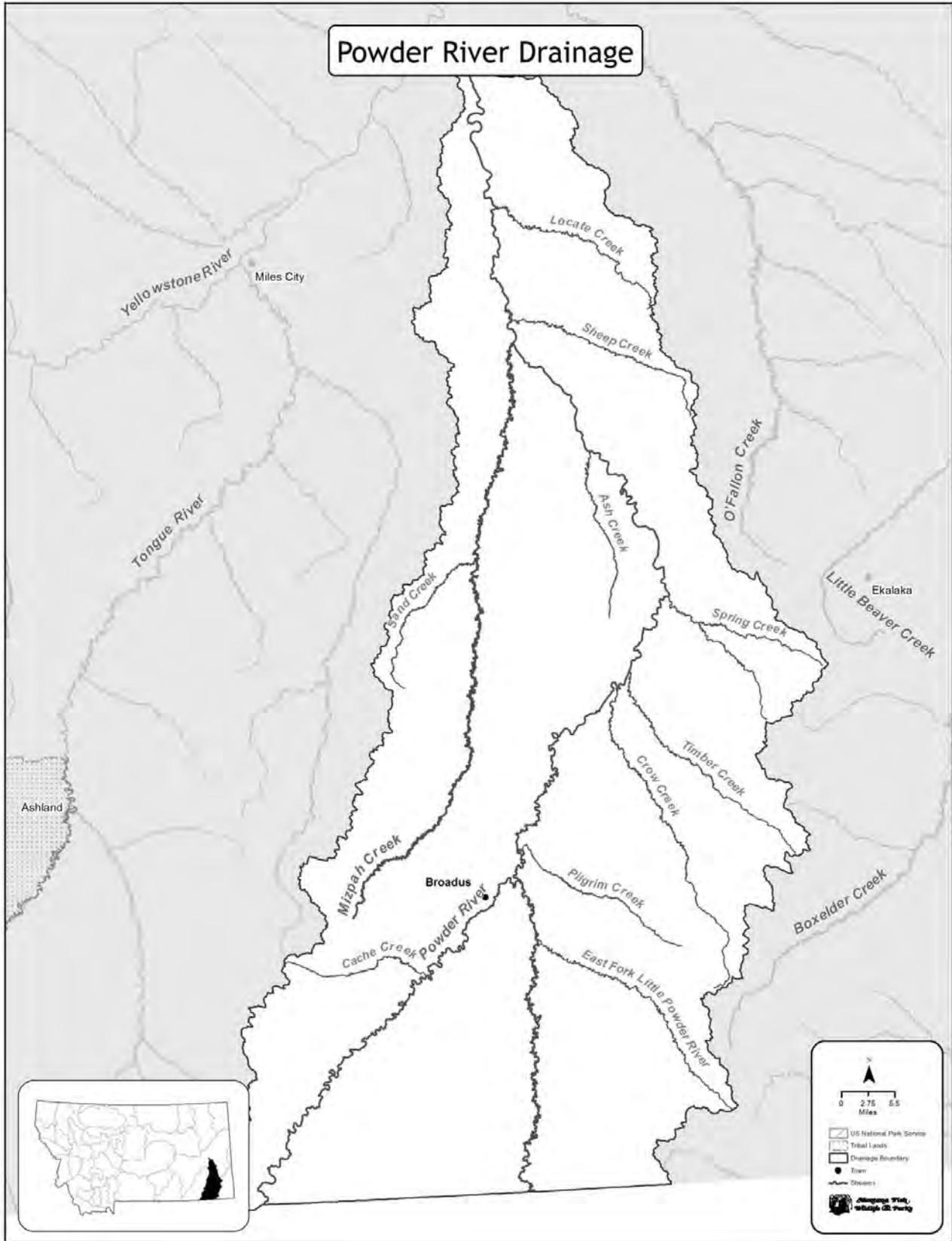
Water	Miles/acres	Species	Recruitment Source	Management Type	Management Direction
		Largemouth bass, Channel Catfish (N), Northern pike, Yellow perch	Wild	Put, Grow and Take	stocking.
Habitat needs and activities: work with reservoir operators to regulate water levels with consideration for fishery benefit.					
Tongue River - Reservoir tailwater to Yellowstone River	189 miles	Sauger(N), Channel catfish (N)	Wild	General	Maintain fishery through regulations and habitat projects
		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 utilize Muggli Bypass and reestablish upstream portion of Tongue River.
		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.
		Walleye, Smallmouth bass, Northern pike	Wild	General	Maximize harvest and fishing opportunity to reduce competition with sauger.
		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.
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STATEWIDE FISHERIES MANAGEMENT PLAN

Water	Miles/acres	Species	Recruitment Source	Management Type	Management Direction
Habitat needs and activities: Work with reservoir operator to manage water releases to mimic natural hydrograph and manage flow to avoid stranding fish. Reduce fish entrainment into irrigation intakes. Maintain/restore river ecosystem health and function by minimizing or removing stream bank stabilization projects thereby decreasing channel confinement.					
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 creek flow and fish passage.					
Small Private Ponds/Reservoirs	Various	Trout Bass, Walleye, Northern pike Crappie, Yellow perch, Bluegill	Hatchery Wild/ Hatchery Wild/ Transfer	Put and Take General/ Put, Grow and Take General	Public relations opportunity with landowners to provide local fishing opportunity for rural community. Maintain fishery through regulations and annual stocking. Public relations opportunity with landowners to provide local fishing opportunity for rural community. Maintain fishery through 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 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.					

STATEWIDE FISHERIES MANAGEMENT PLAN

Water	Miles/acres	Species	Recruitment Source	Management Type	Management Direction
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

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 located 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 stream exist within 44 other 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, numerous stock ponds exist and many provide public access are managed as a fishery and stocked by FWP. In addition to the creeks mentioned above there are numerous warm water prairie streams throughout the drainage. Some the prairie streams hold game fish and many host a considerable 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 been limited and sporadic. The infrequent sampling that has occurred utilized electrofishing and seining gears. Much of the recent sampling has been associated with a larger scale prairie fish sampling effort and specific educational activities for school programs. Due to low fishing pressure in the drainage there are no specific management goals. .

Like other prairie stream systems the fish assemblage in the Powder River drainage is largely dominated by native species. The Powder River hosts three game fish, channel catfish, sauger, and shovelnose sturgeon. Saugers are classified as a Species of Concern in Montana. In addition to the game fish, 27 native fish species and nine introduced fish species are present in the Powder River. Channel catfish are the only game fish inhabiting the Little Powder River; however, 16 native fish species and four introduced fish species reside within its waters.

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 a fishery 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. As long as 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

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 a significant percentage of 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. 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 natural sediment/turbidity regime, thus its significance to the native species is imperative and deserves additional evaluation.

The Powder River drainage is predominately rural and recent major habitat changes are limited. 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 of these developments have impacted the river and its ability 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 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 resulting in the dewatering of the rivers/streams is also a 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 points of access to the Powder River and one point of access to 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 second point of fishing access is the Broadus Bridge FAS (river mile 152) and provides day use only and no boat ramp. The single point of access to the Little Powder River is near Broadus and provides day use only and no boat ramp. This access is located near the confluence with the Powder River. Considering the rural nature of the drainage and limited game species in the streams, fishing pressure is low. Access to fish streams is likely attained through private property access, county road crossings and public land.

SPECIAL MANAGEMENT ISSUES

There are currently no special management issues in the Powder River drainage because of low fishing pressure and limited game species available.

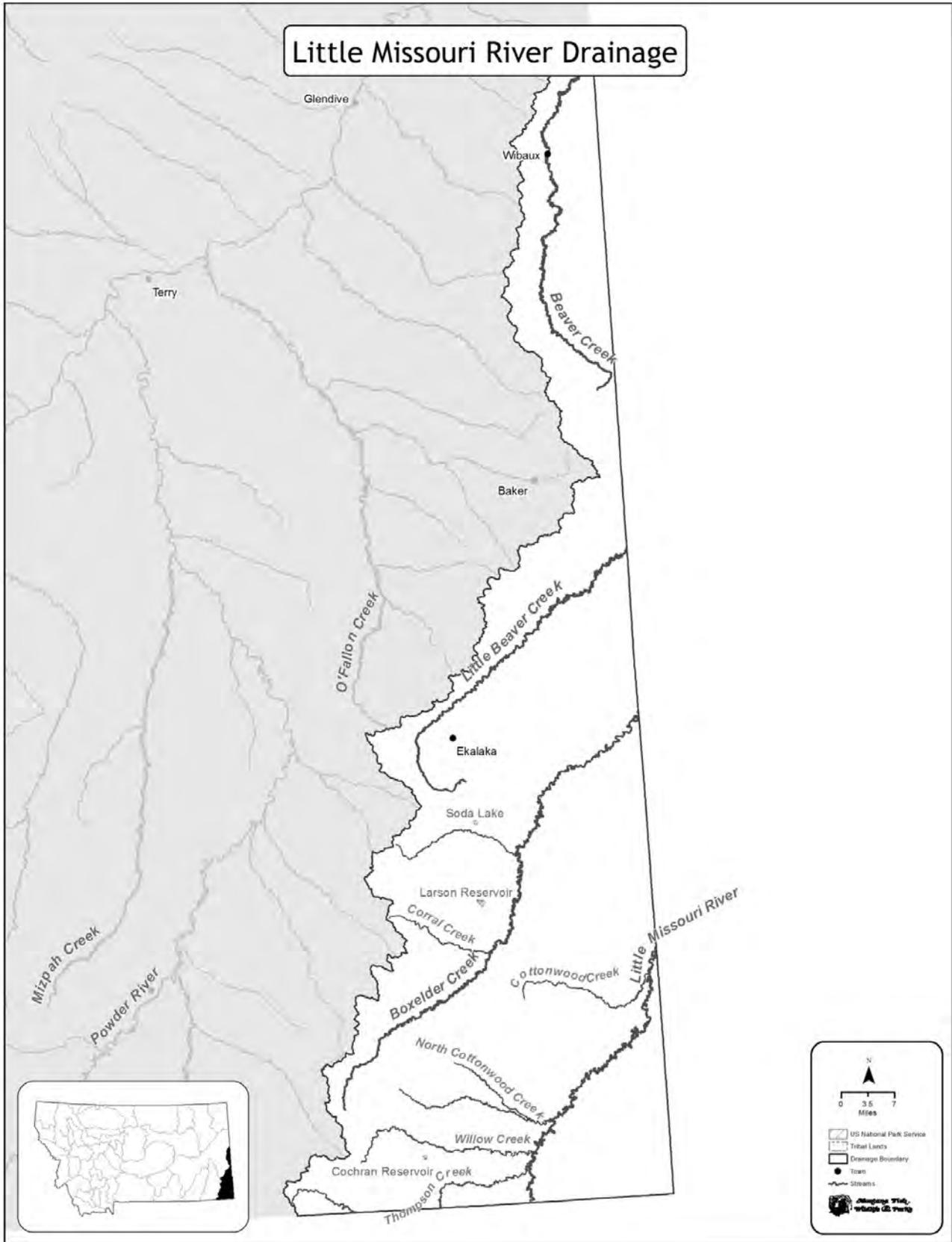
STATEWIDE FISHERIES MANAGEMENT PLAN

FISHERIES MANAGEMENT DIRECTION FOR POWDER RIVER DRAINAGE

Water	Miles/acres	Species	Recruitment Source	Management Type	Management Direction
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.
		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. 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.					
Intermittent Streams: Mizpah Creek, Locate Creek	150 miles 42 miles	Multi spies	Wild	General/ Conservation	Manage for recreational fishing opportunity where applicable. Monitor non-game fish species for native fish assemblage and overall ecosystem health.

STATEWIDE FISHERIES MANAGEMENT PLAN

Water	Miles/acres	Species	Recruitment Source	Management Type	Management Direction
Ephemeral Streams: 10 with documented fish populations	Various				
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.
		Bass, Walleye, Northern pike	Wild/Hatchery	General/ Put, Grow and Take	Public relations opportunity with landowners to provide local fishing opportunity for rural community. Maintain fishery through regulations and 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 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.					
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

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 located 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 located 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 located 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 considerable 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. As long as 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 of 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 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 impact the function of the waterways and upstream migration of fish.

The vast 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 in order to reduce winterkill occurrences at ponds they own. 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.

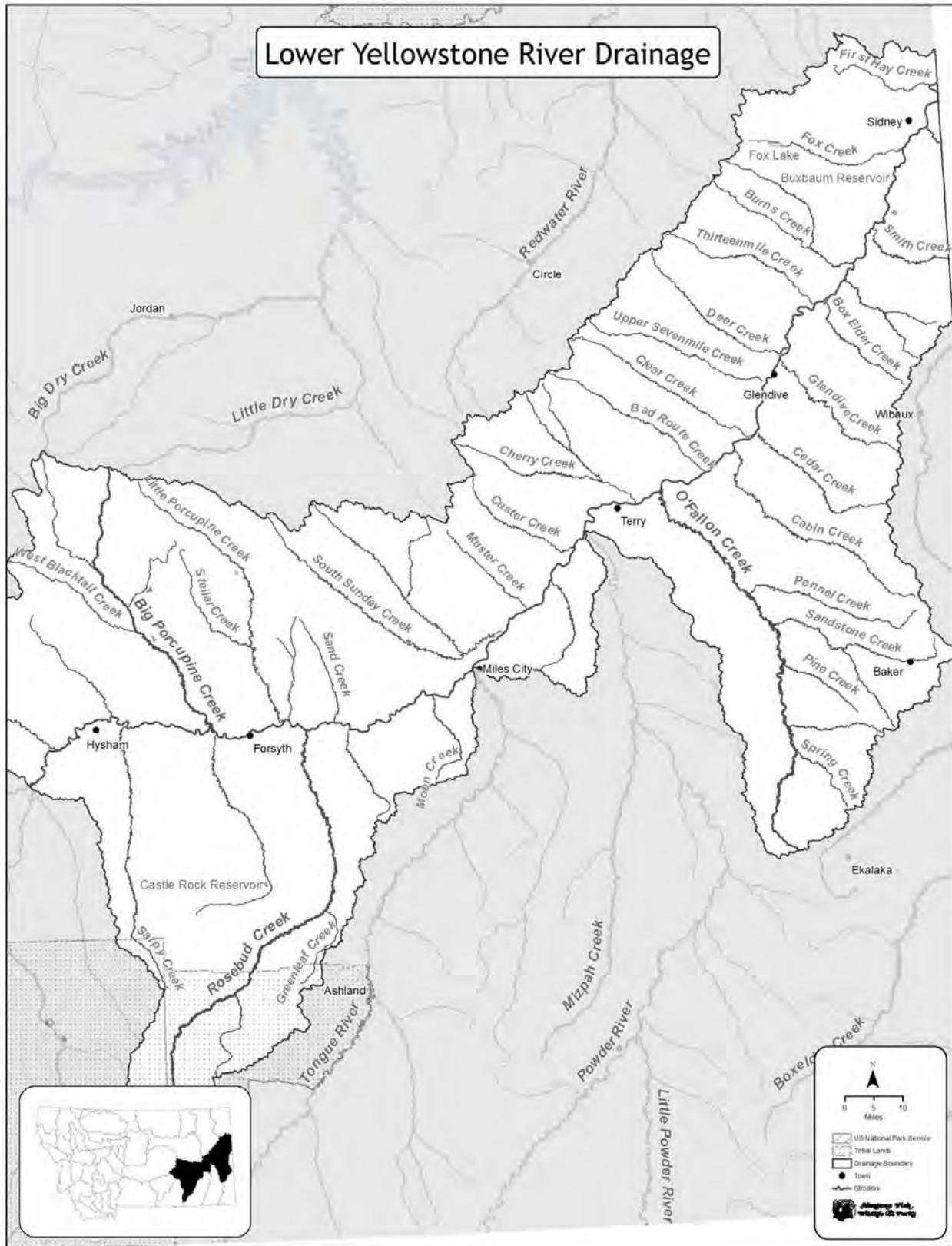
STATEWIDE FISHERIES MANAGEMENT PLAN

FISHERIES MANAGEMENT DIRECTION FOR LITTLE MISSOURI RIVER DRAINAGE

Water	Miles/acres	Species	Recruitment Source	Management Type	Management Direction
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.
		Bass,	Wild/	General/	Promote opportunity with landowners to
Continue next page					

STATEWIDE FISHERIES MANAGEMENT PLAN

Water	Miles/acres	Species	Recruitment Source	Management Type	Management Direction
		Walleye, Northern pike, Crappie, Yellow perch, Bluegill	Hatchery Wild/ Transfer	Put, Grow and Take General	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

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 warmwater prairie streams. No natural fisheries 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, Dawson, and Richland counties.

The Yellowstone River is the largest water body within the drainage. The headwater of the Yellowstone River is above 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 located 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 and Dawson counties.

FISH MANAGEMENT

The relatively natural hydrograph and intact habitat of the lower Yellowstone River and its tributaries support a rich fish assemblage 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 of 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 fisheries staff in Region 7. 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 above 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 is one of the few places left in North America where anglers can 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." Fish from this population spend most of their lives in the headwaters of Lake Sakakawea. In May and June during elevated Yellowstone River discharge, paddlefish seasonally 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 FAS. The paddlefish season has a specific set of regulations and management activities designed to ensure that this long-lived, late to mature species can continue to provide 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 telephone creel is conducted annually to obtain a harvest estimate 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 angling 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 a state operated hatchery including: 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 and increased public access. 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 significant influence on the hydrographs 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 and fine-grained streambed material 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 similar to 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/create fish passage at Intake Diversion Dam.

Entrainment of fishes into unscreened canals is a concern in the drainage. Installation of screens on unscreened structures will prevent or reduce the entrainment of fishes 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 will be installed at the Buffalo Rapids Shirley pump site. Both projects have/will reduce the annual entrainment of thousands 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 of 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 2012 there are 18 FASs 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. 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 and Intake diversion dams. Intake FAS, Elk Island FAS, Seven Sisters FAS, Sidney Bridge FAS, and Richland Park (Richland County) 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. Amelia Island and Stipek FAS's are scheduled to have boat ramps installed. Other high priority areas include securing access in the reaches between the

Bighorn Confluence and Forsyth, between Rosebud and Miles City, at the bridge in Terry, and between Fallon and Intake.

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. Over-allocation of water in the Yellowstone River drainage is poised to be a major threat to fisheries resources in the next drought cycle. The cumulative effect of irrigation withdrawal and withdrawal for oil and gas hydraulic fracturing is of particular concern. Balancing diverse land and aquatic resource uses while maintaining critical habitat for fish and wildlife is also a special management concern. Maintaining current fish passage and recovering lost fish passage due to anthropogenic influences is a special management concern, especially as irrigation districts begin to update infrastructure. Structures such as Yellowstone diversion dam and Ranchers diversion dam do not currently appear to be significant fish passage barriers, but they have the potential to become major barriers if updated without consideration to fish passage.

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. The majority of 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 LYRD. Immigration of people associated with oil development has increased, and will heighten the demand on natural resources and local infrastructure, especially housing. Management of the local FAS and Wildlife Management Areas have become more challenging due to the influx of people, and changes are being considered to limit the use of these sites.

STATEWIDE FISHERIES MANAGEMENT PLAN

FISHERIES MANAGEMENT DIRECTION FOR LOWER YELLOWSTONE RIVER DRAINAGE

Water	Miles/acres	Species	Recruitment Source	Management Type	Management Direction
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.
		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.
<p>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 or removing stream bank stabilization projects thereby decreasing channel confinement.</p>					

STATEWIDE FISHERIES MANAGEMENT PLAN

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)	Wild	Conservation	Monitor paddlefish usage of this section of river in water years that paddlefish successfully migrate upstream of Intake Dam (on average occurs 2 out of every 10 years).
		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 an emphasis on harvest. Monitor to evaluate source of walleye in Yellowstone River to direct management decisions for sauger conservation.

Continue next page

STATEWIDE FISHERIES MANAGEMENT PLAN

Water	Miles/acres	Species	Recruitment Source	Management Type	Management Direction
		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 through stocking following pallid sturgeon recovery plan. Establish fish passage at Intake Diversion Dam and monitor subsequent upstream passage and habitat usage.
		Blue Sucker (N)	Wild	Conservation	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 or removing 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	134 miles	Paddlefish (N)	Wild	Restrictive Regulations	Intensively monitor population to closely harvest with a harvest target reflective of population trends. Management shared and coordinated through a Montana/North Dakota Management Plan. Annual Memorandum of

STATEWIDE FISHERIES MANAGEMENT PLAN

Water	Miles/acres	Species	Recruitment Source	Management Type	Management Direction
State line		Pallid sturgeon (N)	Wild/ Hatchery	Conservation	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. Endangered species, harvest prohibited. Conduct research to assist decision making for recovery of species. Increase genetic diversity through stocking following pallid sturgeon recovery plan. Establish fish passage at Intake Diversion Dam and monitor subsequent upstream passage and habitat usage.
		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.
		Channel catfish (N)	Wild	General	Manage as a recreational fishery. Standardize catfish sampling methods for comparison across eastern Montana.
		Shovelnose sturgeon (N)	Wild	General/	Manage as a recreational fishery with some

Continue next page

STATEWIDE FISHERIES MANAGEMENT PLAN

Water	Miles/acres	Species	Recruitment Source	Management Type	Management Direction
		Walleye, Northern pike	Wild	Conservation General	harvest opportunity. Monitor health of this long lived native species. Recreational fishery with emphasis on harvest. Monitor to evaluate source of walleye in Yellowstone River to direct management decisions for sauger conservation.
		Blue sucker (N)	Wild	Conservation	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 Intake Diversion Dam and reduce fish entrainment into irrigation intakes. Maintain/restore river ecosystem health and function by minimizing or removing stream bank stabilization projects thereby decreasing channel confinement. Establish fish passage at Intake Diversion Dam and monitor subsequent upstream passage and habitat usage.</p>					
Perennial Streams: Rosebud O'Fallon Big Porcupine Sarpy Cabin South Sunday Cedar	208 miles 157 miles 107 miles 103 miles 98 miles 87 miles 60 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.

STATEWIDE FISHERIES MANAGEMENT PLAN

Water	Miles/acres	Species	Recruitment Source	Management Type	Management Direction
Thirteen Mile Fox Burns Intermittent Streams: South Sunday Sandstone North Sunday Cherry Glendive Sweeney Armells Reservation Sunday Ephemeral Streams: 48 with documented fish populations	50 miles 49 miles 42 miles 87 miles 72 miles 68 miles 63 miles 53 miles 33 miles 27 miles 27 miles 15 miles				
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 Continue next page	153 acres	Largemouth bass, Walleye Northern pike	Wild/ Hatchery Wild/ Hatchery	General/ Put, Grow and Take General	Manage as a recreational fishery, supplement population through stocking if necessary. Provide additional angling opportunity and control forage base, supplement population

STATEWIDE FISHERIES MANAGEMENT PLAN

Water	Miles/acres	Species	Recruitment Source	Management Type	Management Direction
		Bluegill, Crappie	Transfer	General	through stocking if necessary. 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.					
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.

Continue next page

STATEWIDE FISHERIES MANAGEMENT PLAN

Water	Miles/acres	Species	Recruitment Source	Management Type	Management Direction
Habitat needs and activities: Water depth (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.					
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.					
Gartside Reservoir	35 acres	Tiger muskie	Hatchery	Quality	Monitor population and supplement stock if justified to control forage base. Restrict harvest to 1 fish over 40 inches.
		Largemouth bass, Northern pike	Wild/ Hatchery	General/ Put, Grow and Take	Maintain fishery through regulations and stocking if necessary.

Continue next page

STATEWIDE FISHERIES MANAGEMENT PLAN

Water	Miles/acres	Species	Recruitment Source	Management Type	Management Direction
		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; 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.					
Marshall Reservoir, Silvertip	11 acres 10 acres	Largemouth bass	Wild/ Hatchery	General/ Put, Grow and Take	Manage as a recreational fishery, supplement population through stocking if necessary.

STATEWIDE FISHERIES MANAGEMENT PLAN

Water	Miles/acres	Species	Recruitment Source	Management Type	Management Direction
Reservoir					
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.					

STATEWIDE FISHERIES MANAGEMENT PLAN

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.
<p>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.</p>					

GLOSSARY

Term or Phrase	Definition
<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.

STATEWIDE FISHERIES MANAGEMENT PLAN

Term or Phrase	Definition
<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.

STATEWIDE FISHERIES MANAGEMENT PLAN

Term or Phrase	Definition
<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.

STATEWIDE FISHERIES MANAGEMENT PLAN

Term or Phrase	Definition
<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.

STATEWIDE FISHERIES MANAGEMENT PLAN

Term or Phrase	Definition
<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.

STATEWIDE FISHERIES MANAGEMENT PLAN

Term or Phrase	Definition
<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 form 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.

STATEWIDE FISHERIES MANAGEMENT PLAN

Term or Phrase	Definition
<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.
<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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