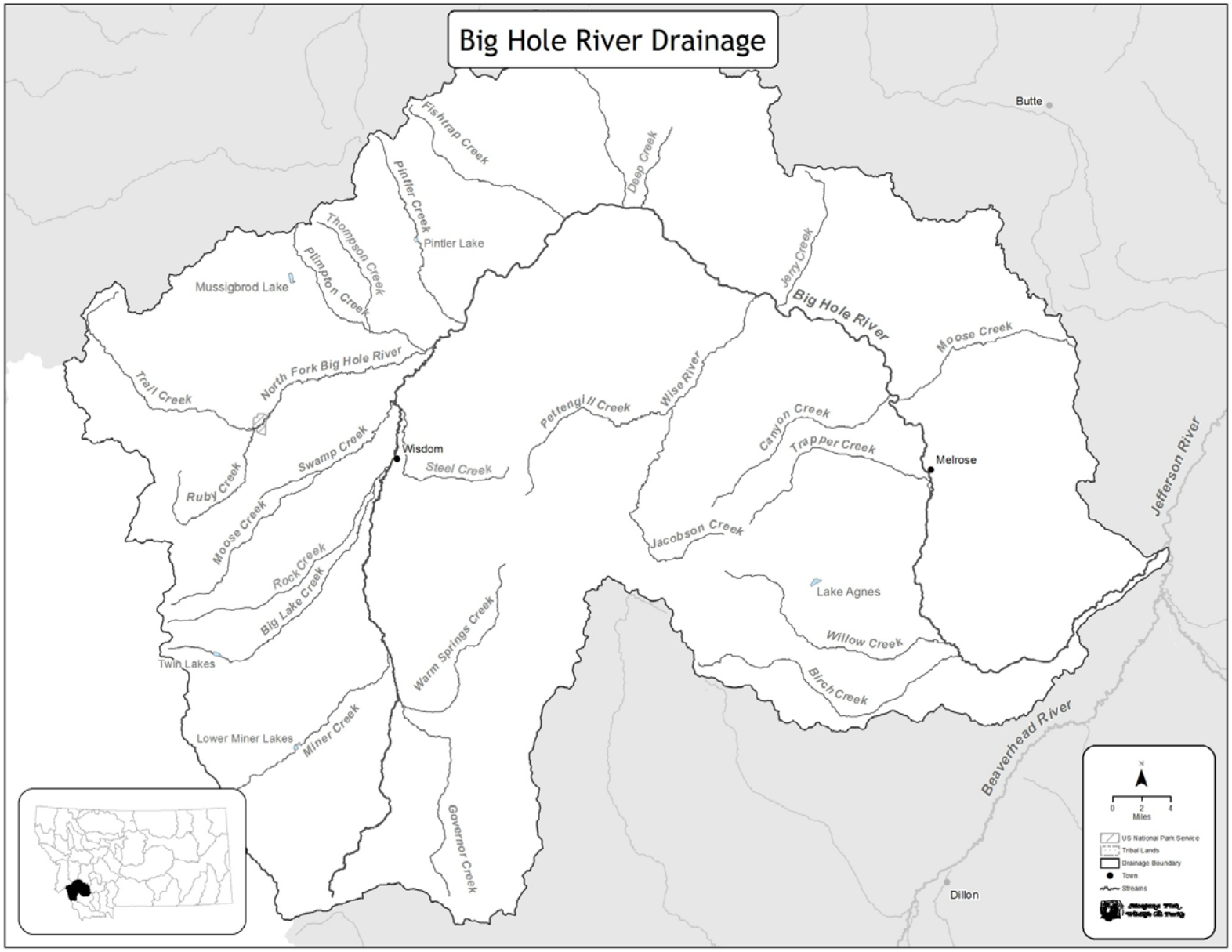
Big Hole River Drainage
Butte
Fishtrap Creek
Deep Creek
Pintler Creek
Pintler Lake
Thompson Creek
Plimpton Creek
Mussigbrod Lake
Jerry Creek
Big Hole River
Moose Creek
North Fork Big Hole River
Trail Creek
Wise River
Pettengill Creek
Canyon Creek
Trapper Creek
Wisdom
Steel Creek
Swamp Creek
Ruby Creek
Melrose
Jefferson River
Moose Creek
Jacobson Creek
Rock Creek
Big Lake Creek
Lake Agnes
Willow Creek
Warm Springs Creek
Twin Lakes
Birch Creek
Beaverhead River
Lower Miner Lakes
Miner Creek
Governor Creek
Dillon
N
0 2 4
Miles
US National Park Service
Tribal Lands
Drainage Boundary
Town
Streams

BIG HOLE RIVER DRAINAGE

GENERAL DESCRIPTION

The Big Hole River originates in the outlet of Skinner Lake at an elevation of 7,340 ft in the Beaverhead Mountains of southwest Montana. From its modest beginnings, the river gathers volume and velocity due to numerous tributaries along its 115 mile course until its confluence with the Beaverhead River near Twin Bridges at an elevation of 4,600 ft. The Big Hole drainage encompasses approximately 2,476 square miles. The river drains the Beaverhead Mountains on the west and the south side the Anaconda-Pintler Range on the north. The river also collects water from the East and West Pioneer Mountains which includes the largest tributary to the Big Hole, the Wise River. The average annual discharge of the river recorded at Melrose since the early 1900s is 1,117 cfs. The river is not dammed although there were significant attempts in the 1960s to construct a dam downstream of the town of Glen at the "Notch". From the high mountain meadows of its headwaters to the cottonwood bottoms of the lower river, the Big Hole is free-flowing and one of the most scenic rivers in Montana.

Major tributaries to the Big Hole River include the Wise River and the North Fork Big Hole River. There are 106 named high mountain lakes in the Big Hole Drainage, as well as low-land lakes such as Mussigbrod, Miner, Twin and Pintler Lakes which are accessible by vehicle and have native components to their fisheries. Outdoor recreation and angling in particular are important activities that occur in the Big Hole. The river receives significant angling pressure, particularly in the middle and lower reaches. Approximately half of this fishing pressure is from non-resident anglers. There many outfitters in local communities and from areas like Butte, Dillon, Twin Bridges and Ennis that frequent the Big Hole and contribute to the local economy. Because of the importance of agriculture in the valley and the importance of irrigation, the river and many of its tributaries can become dewatered, particularly in dry years. One of the more recent changes that has occurred on the Big Hole is the dividing of larger ranches, particularly in the middle and lower reaches of the river, into smaller parcels including subdivisions and the development of seasonal housing. Such developments have been the cause of concern for the fisheries and river functions because large, expensive homes are being constructed in areas of the river prone to natural channel migration and as the river approaches homes, bank stabilization is often proposed.

In recent years there has been substantial interest in protecting the Big Hole River, the pristine nature of the valley, its fishery and the way of life of the people that call the valley home. Groups such as the Big Hole Watershed Committee and the Big Hole River Foundation among others have collaborated with government agencies, ranchers, sportsmen and other groups to develop conservation plans and perform projects to protect and restore the natural resources of the Big Hole. Some of these major accomplishments include the Big Hole Drought management plan, Arctic grayling habitat restoration, and improvement of irrigation efficiency. These groups have been highly successful at using collaboration to accomplish common conservation goals.

FISHERIES MANAGEMENT

The native fishery in the Big Hole River Drainage was westslope cutthroat trout, Arctic grayling, lake trout, mountain whitefish, white, longnose and mountain sucker, Rocky Mountain sculpin, longnose dace and burbot. Today the mainstem river contains fish species common to Southwestern Montana including rainbow trout and brown trout. Mountain whitefish and other native suckers and minnows are also common, but cutthroat trout and Arctic grayling are rare. Brook trout are the most common trout species in the upper river from Jackson through Wisdom and in most tributary streams. The Big Hole is a Blue Ribbon trout fishery and its trout population trends are closely monitored. The Upper Big Hole River drainage contains the last known fluvial Arctic grayling population in the Lower 48 States. Active conservation programs are ongoing to enhance habitat conditions for this unique species in the Big Hole River. Mussigbrod, Miner and Pintler lakes have self-sustaining populations of Arctic grayling that are assumed to be native. Burbot are common in the river, some tributary streams and lower elevation lakes. Twin Lakes also has a native population of lake trout. There are 106 mountain lakes in Big Hole that contain fisheries. These fisheries include rainbow, brook, Yellowstone cutthroat, westslope cutthroat and golden trout, hybrids between rainbow and cutthroat trout, Arctic grayling and longnose suckers.

Common to many Southwestern Montana rivers, fish were stocked in the Big Hole River beginning in the early 1900s into the late 1970s when wild trout management philosophies were instituted. Prior to 1974 the Big Hole received annual plants of catchable size hatchery rainbow trout similar to most rivers of the region. Research by the Department on the Madison River and Odell Creek in the early 1970s demonstrated that these hatchery plants actually depressed trout numbers and that these rivers could support higher trout populations based on a wild trout fishery without hatchery support. In 1974, the stocking of hatchery trout was virtually eliminated in the Big Hole in favor of wild trout management. The results of that action were an increase in both rainbow and brown trout abundance to more than twice their numbers achieved with stocking despite a substantial increase in angling pressure. Species which were stocked into the Big Hole River include rainbow trout, Arctic grayling, brown trout, kokanee salmon, and undesignated cutthroat trout. Beginning in the late 2000s, Arctic grayling have been stocked into Rock Creek in the upper Big Hole valley using remote streamside incubators (RSI) to reintroduce the species into Rock Creek after habitat improvements. Similarly, westslope cutthroat trout have been stocked into tributary streams of the Big Hole using RSIs as part of efforts to conserve this native species.

Many mountain lakes were stocked with trout and grayling in the early 1900s. Active stocking of mountain lakes in the Big Hole still occurs in lakes that do not support natural reproduction. Of the 106 lakes that contain fish, 30 are supported through active stocking while the rest are supported by natural reproduction. Fish stocking in alpine lakes in the Big Hole is done on a biannual basis and is performed primarily using a helicopter. Prior to 2006, Yellowstone cutthroat trout were the primary species stocked into mountain lakes, but since then the native westslope cutthroat trout has been stocked instead. Only one lake in the Big Hole drainage is currently stocked with golden trout.

Fishing regulations on the Big Hole River are complicated and diverse. In 1981 the Big Hole River from Divide to Melrose was placed under special regulations including a slot limit where trout from 13-22 inches had to be released and anglers were allowed to keep only 3 fish less than

13 inches and 1 fish over 22 inches. Angling gear was also restricted to flies and artificial lures. The public supported these regulations because their thought was that harvest was negatively affecting the numbers of larger fish in this reach of river. The remainder of the river upstream and downstream of this reach remained under the Central Fishing District standard limit of 5 fish with only 1 fish over 18 inches. In 1986 the same regulations as previously adopted for the Divide to Melrose section were also adopted for the Dickie Bridge to the Divide section of the river. After adoption of these regulations, trout numbers increased but quickly plateaued within 3-5 years. The slot limit for trout was dropped in the early 2000s for the Dickie Bridge to Melrose section, but the artificials-only rule remains. The entire river is closed from December 1 through the third Saturday in May to the harvest of trout (with the exception of brook trout in the headwaters), but there is an extended season for whitefish during the winter.

Many of the current fishing regulations on the Big Hole are associated with social issues (crowding and conflict between residents and non-residents or between residents and outfitters) and have little biological basis. Specific sections of the river are closed each day of the week from the third Saturday in May through Labor Day to outfitting and sections are closed to non-resident float fishing on the weekend days. Upstream from Dickey Bridge, harvest of trout is encouraged to help minimize impacts to Arctic grayling, and no size restriction is in place on the combined trout limit. Big Hole River tributaries upstream from Divide Bridge are managed for year-round brook trout fishing to minimize impacts to Arctic grayling.

Angler use of the Big Hole River is high. Over the past decade estimates have ranged from 33,121 angler days in 2001 to 77,579 angler days in 2009. Use of the Wise River has varied over the last decade from a low of 2,412 angler days in 2007 to a high of 4,322 angler days in 2009.

HABITAT

Irrigation withdrawal within the Big Hole River drainage can cause periods of low flow and high water temperatures, which can be stressful to fish populations. Sections of the river are listed as impaired by the Montana Department of Environmental Quality because of high stream temperatures. Irrigation practices can also lead to reduced habitat connectivity (channel-wide pin and plank diversions) and entrainment (loss of fish in irrigation ditches). To address low flows and high temperatures and the effects they have on the fishery, the Big Hole Watershed Committee working cooperatively with water users has adopted a voluntary drought management plan with specific stream flow and temperature triggers. This plan is aimed at maintaining minimum flows and asking water users to voluntarily reduce withdrawals from the river to improve flows. There are multiple drought management sections on the Big Hole River with specific flow and temperature triggers. When those triggers are met water users are asked to reduce their water use and angling is also restricted. Those currently enrolled in the CCAA and have completed an approved Site-Specific Plan are required to comply with reductions in diversions as stated in each individual plan. Landowners that have not completed Site-Specific Plans reduce irrigation diversions on a temporary agreement until the Site-Specific plan is completed or approved. The reduction in water use by irrigators and municipalities has resulted in increased river flows during drought conditions.

Land management activities in the Big Hole River basin (grazing, willow removals, etc) have caused problems with stream form and function, as well as stream shading. Because the Big Hole River flows primarily through private land, cooperative habitat improvement projects with

landowners is essential to improving fisheries habitat. To date, over 200 habitat improvement projects have been completed on private land in the Big Hole valley. These projects have been focused primarily in the upper valley and have improved riparian health, instream flows, and habitat connectivity and have reduced or eliminated entrainment. Through grazing and instream flow agreements, the Big Hole River and tributaries are showing healthier riparian habitat conditions and improved stream flows, especially during critical periods (spawning and late season). Replacing non-functioning irrigation infrastructure (headgates and diversions), installing fish ladders and fish screens has improved irrigation efficiency, increased connectivity and reduced fish loss.
Streambank stabilization has significantly altered the function of the lower river, particularly downstream of Notch Bottom, and remains a significant threat to river function. In areas of the lower river with a wide floodplain, the river is prone to natural channel migration and channel evulsions, and abandonments are common. These natural channel changes are important in maintaining aquatic habitats in these types of rivers. However, when these channel changes affect irrigation water withdrawals or loss of land and potentially loss of structures, then bank stabilization is often proposed. Groups such as the Big Hole Watershed Committee and county governments are seeking a collaborative approach to ensuring natural river function and responsible development of the Big Hole Valley. The Big Hole was one of the first rivers to have a set-back rule where no structures could be built within 100 ft of the river in all four counties in the drainage. Further collaborative efforts are being made to better understand the floodplain of the river and guide future development in these areas.

The lower section of river from Notch Bottom to the confluence with the Beaverhead River is also a focus area for FWP with the hope of improving the fishery in this reach. The density of trout in this reach of river is only half of that present in the river only 10 miles upstream. Studies indicate that the limiting factors affecting the fishery are suitable spawning and rearing areas and low summer flows due to irrigation withdrawal. The lack of spawning and rearing areas is likely due to the lack of tributary streams in this reach and the significant bank stabilization projects conducted over the past 50 years. Bank stabilization in this reach results in a less diverse river channel and causes less natural channel migration and fewer side channels. These side channels are important spawning and rearing areas because they often contain more complex habitats with log jams and other structure used by juvenile fish and they also contain smaller substrates suitable for spawning. Studies are being conducted to determine if it is possible to create off-channel spawning areas in the lower reach of the river utilizing existing spring creeks and irrigation systems. Also, efforts are underway to work cooperatively with landowners and irrigators and the Big Hole Watershed Committee to increase flows during summer to benefit the fishery.

FISHING ACCESS

FWP has 13 fishing access sites on the Big Hole River from Fishtrap Creek downstream. Additional federal and private (Anaconda Sportsmen) fishing access sites exist within this vicinity. Public land and public road crossings throughout the valley provides fishing access at various points.

SPECIAL MANAGEMENT ISSUES

The Big Hole River is home to the last known native fluvial grayling population in the contiguous United States. A decline in the abundance and distribution of the population was first documented in the1980s, resulting in increased efforts to understand population dynamics, identify critical habitats, and implement conservation projects to address factors limiting the population. These efforts have been directed primarily through the Arctic Grayling Recovery Program (AGRP) and the Candidate Conservation Agreement with Assurances for Fluvial Arctic Grayling in the Upper Big Hole River (Big Hole CCAA).

The Big Hole CCAA was developed to help alleviate private property concerns associated with the potential ESA listing of Montana grayling and to generate support from private landowners to improve habitat conditions for grayling throughout the Big Hole CCAA project area. The project area includes the Big Hole River watershed from Dickie Bridge upstream to the headwaters. Under this agreement the USFWS issued FWP an ESA section 10(a)(1)(A) Enhancement of Survival Permit, which gave FWP the authority to enroll non-federal landowners within the project area. Currently there are 33 enrolled non-federal landowners who are provided incidental take coverage and regulatory assurances once they sign (along with the USFWS and FWP) a Certificate of Inclusion and a site-specific conservation plan for the enrolled property. Site-specific conservation plans are developed for each enrolled landowner by an interdisciplinary technical team made up of individuals representing the Big Hole CCAA partnering agencies (FWP, DNRC, NRCS, and USFWS). Conservation measures outlined in the Big Hole CCAA document are addressed by in each site-specific plan by implementing actions that: 1) improve stream flows; 2) improve and protect the function of riparian habitats; 3) identify and reduce or eliminate entrainment threats to grayling; and 4) remove barriers to grayling migration.

In 2007, FWP, BLM, USFWS, USFS, Montana Council Trout Unlimited, Montana Chapter American Fisheries Society, Yellowstone National Park, Montana Arctic Grayling Recovery Program, the USDA Natural Resource Conservation Service, and DNRC and Conservation all cosigned a Memorandum of Understanding (MOU) concerning Montana Arctic Grayling Conservation. This MOU defines responsibilities and procedures agreed to by all signatory agencies conserving conservation actions to benefit Arctic grayling in Montana.

The Big Hole is also home to more conservation populations of westslope cutthroat trout (39) than any other drainage in the upper Missouri River providing several opportunities to conserve this native species in the drainage. Management for nonnative trout (brown and rainbow trout) will continue to be emphasized in the lower mainstem river while opportunities for cutthroat conservation will be pursued in some tributary streams. The goal of cutthroat conservation work is to secure populations in habitat that is free from the threats of nonnative species and much of this work will be done upstream of natural and man-made fish barriers. A cutthroat trout population is considered secure when it has a minimum population size of 2,500 fish, occupies at least 5-6 miles of stream and is free from the threats of competition and hybridization from non-native species. The long-term goal of cutthroat conservation in the Big Hole is to have 20% of the historically occupied habitat restored to cutthroat trout. The estimated amount of stream in the Big Hole drainage historically occupied by cutthroat trout is 1,748 miles and therefore the long-term goal of cutthroat conservation in the Big Hole is to have approximately 350 miles of stream occupied by secure populations of westslope cutthroat trout.

FISHERIES MANAGEMENT DIRECTION FOR BIG HOLE RIVER DRAINAGE

Water	Miles/Acres	Species	Origin	Management Type	Management Direction
Big Hole River and Tributaries - Headwaters to Dickey Bridge	93 miles	Arctic grayling, Lake trout, Mountain whitefish, Burbot, Westslope cutthroat trout	Wild	Conservation	Continue native species conservation to maintain a viable, self-sustaining population
		Brook trout, Rainbow trout, Brown trout, Hybridized cutthroat trout	Wild	General/ Special Regulations	Continue to manage to minimize potential impact on viability of Arctic grayling and secondarily for recreational angling
Habitat needs and activities: Continue to improve stream flows, improve riparian habitats, improve stream channel form and function, continue to prevent fish entrainment into irrigation ditches.					
Big Hole River and Tributaries - Dickey Bridge to Mouth	72 miles	Brook trout, Rainbow trout, Brown trout, Hybridized cutthroat trout	Wild	General	Maintain present numbers and sizes. Consider increasing angler harvest to reduce numbers if necessary to maintain fish growth and, in some instances, to ensure they are not limiting the viability of westslope cutthroat trout or Arctic grayling populations.
		Westslope cutthroat trout, Mountain whitefish	Wild	Conservation	Continue native species conservation to maintain a viable, self-sustaining population
Habitat needs and activities: Implement and refine drought management plans to minimize impacts on fish populations. Continue to look for opportunities to increase river flows and develop spawning habitat in the Big Hole River downstream from Notch Bottom FAS. Pursue Fishing Access acquisition near High Road Bridge at Twin Bridges and between East Bank FAS and Jerry Creek FAS.					

Continued on next page.

Water	Miles/Acres	Species	Origin	Management Type	Management Direction
Wise River and Tributaries	25 miles	Brook trout, Rainbow trout, Brown trout, Hybridized cutthroat trout	Wild	General	Maintain present numbers and sizes. Consider increasing angler harvest to reduce numbers if necessary to maintain fish growth and, in some instances, to ensure they are not limiting the viability of westslope cutthroat trout.
		Westslope cutthroat trout, Mountain whitefish	Wild	Conservation	Continue native species conservation to maintain a viable, self-sustaining population
Habitat needs and activities: Develop drought management plan for Wise River. Pursue opportunities for habitat improvements in river section from Pettengill Creek to confluence with Big Hole which was affected by thePettingill Dam breach in 1920's. Determine if Wise River could serve as possible Arctic graying reintroduction area.					
Mountain Lakes		Westslope cutthroat trout, Hybridized cutthroat trout, Yellowstone cutthroat trout, Rainbow trout, Brook trout, Golden trout	Wild	Put- Take/ General	Monitor mountain lakes. Continue to manage stocking and harvest to maintain present numbers and sizes. Consider increasing angler harvest to reduce numbers if necessary to maintain fish growth. Where appropriate pursue opportunities to expand golden trout into mountain lakes where such management would not conflict with cutthroat conservation.
Cutthroat Conservation Streams	350 miles	Westslope cutthroat trout and other native fish species	Wild/ Transport	Conservation	Secure populations in tributary streams by removing non-native fish upstream of fish barriers and restoring westslope cutthroat trout.
Habitat needs and activities: Work with Forest Service, BLM and DRNC and private landowners on grazing regimes to minimize livestock impacts to streams. Work on water conservation projects to improve stream flows. Construct or utilize natural fish barriers to preclude non-native fish movement upstream. Remove non-native fish and restore WCT upstream.					