Montana Statewide Fisheries Management Plan

2023 – 2026

Montana Department of Fish, Wildlife & Parks
Helena, MT

Table of Contents

Montana Statewide Fisheries Management Plan

Executive Summary

The first Montana Statewide Fisheries Management Plan was implemented in 2013. This is the third edition of the plan and was required by new legislation passed in 2021 (SB 360). This edition of the plan was written with the intent of being more prescriptive than the previous two versions, shortened the review duration from 8 years to 4 years, and is more comprehensive. These changes are intended to make plan implementation more responsive to changing conditions and more transparent for the public and decision makers. The plan will be updated every 4 years with extensive input from the public. Described in the plan are the programs, current operations, and the management emphasis and priorities for all drainages of the state.

The mission of Montana Fish, Wildlife & Parks (FWP) states: **Steward the fish, wildlife, parks, and recreational resources for the public, now and into the future.** The work of FWP and its divisions is further directed by the Vision and Guide 2016-2026. The Vision and Guide directs the work of FWP through eight core values: serve the public, embrace the public trust, honor tradition and heritage, work with landowners, use science, provide leadership, provide stewardship, and value our workforce. In support of the mission and core values of the agency, the FWP Fisheries Division **preserves, maintains, and enhances aquatic species and their ecosystems to meet the public's demand for recreational opportunities and stewardship of aquatic wildlife.**

The plan provides for an extensive overview of the Fisheries Division Programs along with management direction and priorities common to all drainages of the state that are under the jurisdiction of FWP. The intent is to give the audience not only a description of "what we do" but also the "why we do it". Part II of the plan provides specific fisheries management direction for 40 drainages in Montana (Figure 1). Each drainage section includes a map, a narrative, and a management direction table. The narrative provides an overview of conditions and consists of four parts: Physical Description, Fisheries Management, Habitat, and Special Management Issues. The tables provide management direction and habitat needs for individual species or groups of species by waterbody in each drainage.

Some waters in the state have specific fisheries management plans. These are primarily high-use fisheries with active special interest groups or waters with native fish conservation programs. The statewide plan does not override waterbody specific plans but defers to them and provides guidance for managing adjacent waters in a manner that complements and coordinates with those individual plans. Similarly, species specific management plans supersede the statewide plan. Current waterbody and species management plans are described further in Section 1.4.1. Additionally, there are numerous waterbody-specific native fish species and/or aquatic habitat restoration strategies and interagency agreements. The plan does not supersede these other documents but defers to them, as appropriate.

All FWP Fisheries Programs fall into one of 6 main categories:

- Aquatic Habitat (Chapter 1.1)
- Aquatic Invasive Species and Fish Health (Chapter 1.2)
- Fish Propagation, Allocation and Distribution (Chapter 1.3)

- Fisheries Management Tools and Techniques (Chapter 1.4)
- Youth and Family Fishing (Chapter 1.5)
- Species Management (Chapter 1.6)

All Fisheries programs work collaboratively together to achieve the goals set out in the FWP Vision and Guide 2016-2026 . Policy and management direction is established at the Headquarters level and implemented within the seven administrative regions. The Vision and Guide 2016-2026 outlines the day-to-day work at FWP. The two commitments in the Vison and Guide that are the focus of this plan are: **Public Service** and **Resource Management**. From the perspective of fisheries management, the focus of public service is to ***provide diverse opportunities and services***; and the focus of resource management is to ***conserve, protect, and enhance fish and wildlife populations, their habitats, and the public's opportunity to enjoy them***. This plan provides details on programs and activities FWP has in place to meet these commitments.

Montana is home to 91 species of fish (57 native to the state), and several subspecies and hybrid crosses. Within the seven ecoregions of the state, the lower Yellowstone and lower Missouri have the greatest number of total species (69 in lower Missouri, 65 in lower Yellowstone). By contrast, the ecoregions west of the Continental Divide are relatively less diverse, with the Kootenai having 32 species, the Clark Fork having 43 species and the much smaller St. Mary having only 20 species (Table 1.0-1). Statewide, fish exist in almost 54,000 miles of streams and rivers and over 697,000 acres of lakes, ponds, and reservoirs. These fisheries resources are world class, hosting over 4 million angler days per year, which includes 1.3 million angler days by non-residents. Montana provides a great diversity of angling opportunities from large multi-species reservoirs to small high mountain lakes, and large muddy rivers to clear cold mountain streams. The diversity of habitats in Montana includes cold, cool, and warm water allowing anglers to enjoy a diversity of opportunities including spearing, bow fishing, fly fishing, spin fishing, ice fishing, family fishing, and more.

The tremendous fisheries resources of the state do not happen by accident. The Montana fisheries management philosophy is focused on **Wild Fish Management,** meaning that fisheries are sustained through wild fish reproduction to the extent possible. This management philosophy takes a holistic approach to fisheries management requiring adequate water quality, complex and connected habitat, protection from pathogens and invasive species, angler management, and stocking of quality and appropriate fish species only where and when necessary.

During the early and mid-20th century many of Montana's popular rivers were stocked with hatchery produced fish. Throughout the 1960s fish populations in several popular rivers continued to decline despite steady or increasing rates of stocking. Research led by FWP fisheries biologist Dick Vincent in the early 1970s demonstrated that hatchery stocking inhibited the fish populations in the Madison River and Odell Creek and that the rivers supported higher densities of fish without stocking. At the time the push to limit stocking was exceptionally unpopular both with the public and within parts of FWP. Since the mid-1970s the department no longer stocks most rivers and streams except for species recovery and conservation. To this day Montana's river fisheries are sustained by natural wild fish reproduction which produces a far higher quality fishery than those sustained by stocking.

Maintaining wild fisheries depends on quality habitat and functioning aquatic ecosystems. Sustainable wild fisheries depend completely on their natural environment to meet every need throughout their life history. Survival and health of fish populations is impacted by the presence of key habitat components at critical stages. Key habitat needs for wild fisheries include adequate water quality and flow, cover or shade, spawning structures or substrate, and diversity of food. Maintaining and enhancing quality fish habitat is a priority for FWP.

Even though the wild fish management philosophy was born on trout waters, it carries over to management of most native and non-native sport fisheries. Wild fisheries typically maintain higher fish densities, are more resilient to the impacts of stress and less than ideal environmental conditions and are often preferred by anglers. Throughout this plan you will find the strategies used by FWP to manage fisheries using the holistic wild fish management philosophy to conserve, protect, and enhance fish populations and their habitats while providing diverse opportunities. There are many places where stocking hatchery reared fish is important along with management of wild fish (see [Chapter 1.3](#)). Many stocking programs exist, especially in altered habitats such as large reservoirs. These put-grow-and-take fisheries provide significant angling opportunity that wild fish would not be able to sustain on their own.

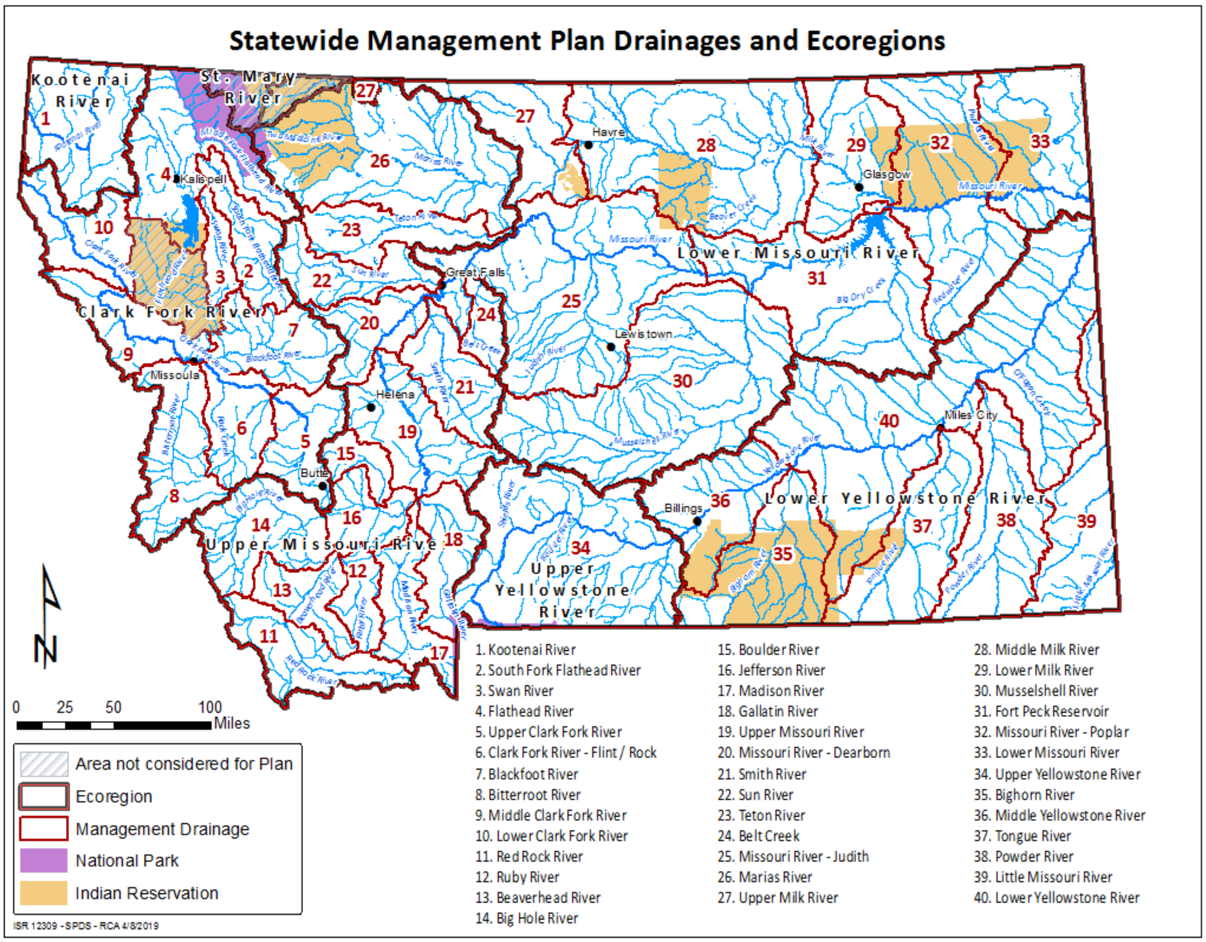

Figure 1: Forty drainage basins and 7 ecoregions used to describe areas within the Statewide Fisheries Management Plan.

Part I: Fisheries Management Program and Priorities

1.0 Introduction to Montana Fisheries Management

Fisheries management focuses on all fish species within the ecosystem with particular interest in angling opportunity and conservation. Specific species or regional watershed goals may differ, but the overarching approach of FWP fisheries management is holistic; it considers habitat, the aquatic community, anglers, and stakeholders. When making fish management decisions, FWP staff consider the whole ecosystem, limiting factors, and potential outcomes. Oftentimes, what benefits one species will improve conditions for many others.

Sport fish species are the driving force behind fisheries management in Montana. Anglers purchase fishing licenses for the opportunity to catch, and potentially harvest fish. Fisheries with high angler-use and harvest are monitored closely to ensure that populations remain sustainable. In some high-use fisheries, such as urban ponds and large reservoirs, where wild reproduction does not sustain the fishery, stocking of fish is necessary to meet public demands and provide angler opportunity. Further, in instances where wild fish production is limited for conservation species, propagation plays an important role in maintaining and improving the genetics of some populations.

Wild fish management is central to fisheries management by FWP and aims to conserve habitat and promote wild production of native and non-native fishes for healthy, resilient, robust fisheries that provide quality angling opportunities. The success of wild fisheries is dependent upon the aquatic environment for species to survive, grow, and reproduce; therefore, the primary focus is aquatic habitat protection and improvement. Aquatic habitat includes water quantity, water quality, and physical habitat; the fisheries management program incorporates these within an all-encompassing approach to support ecosystem health. By supporting entire food webs, all species benefit, from forage fish to native and non-native sportfish.

Challenges to wild fish management include the reduction of aquatic habitat quality and quantity. In recent decades, drought and associated habitat impacts has become a formidable challenge and one FWP is committed to addressing. Manmade structures, alterations, and land use changes cause significant habitat changes and impede connectivity of aquatic organism in many streams and rivers. For example, status and potential recovery of federally endangered pallid sturgeon and Kootenai River white sturgeon are directly linked to dam construction and operation on the Missouri and Kootenai rivers. Many species, including Arctic grayling, paddlefish, sauger, and federally threatened bull trout are impacted by dams and other impediments to movement (see Fish Connectivity Section 1.1.1). While each species' unique life history characteristics affect how they respond to a specific stressor, the extent of the impacts is influenced by the fisheries management approach. FWP staff play a role in identifying and prioritizing habitat restoration needs, informing project development processes to guide the techniques used in restoration, identifying alternatives and protecting aquatic habitat in the permitting process (see Stream Permitting Section 1.1.3), establishing required mitigation (see Fisheries Mitigation Section 1.1.2), responding to water quality issues (see Water Quality Protection Section 1.1.5), and helping fund habitat restoration projects (see Future Fisheries Improvement Program Section 1.1.6).

Montana is home to 57 native fish species (Table 1.0-1), many of which continue to thrive throughout their ranges in the state due in part to progressive habitat conservation and sustainable fisheries management practices. A primary goal of FWP fisheries management is to protect, maintain, and restore native fish populations and their genetic diversity. FWP is required to implement programs that manage sensitive native species in a manner that assists in the maintenance or recovery of those species, and that prevents the need to list the species under the federal Endangered Species Act (§87-1-201, MCA). Ideally, native game fish are sustainably managed and imperiled populations recover to the point of sustainable fishing and harvest.

There are 34 non-native species of fish in Montana (Table 1.0-1). Because the knowledge base related to adverse impacts to native fish species from the introduction of non-native species was limited at the time, many of these species were originally introduced by FWP or the U.S. Fish & Wildlife Service (USFWS) as early as 1895 to create new fisheries or to support an existing one (e.g., introduction of forage species into lakes and reservoirs). This practice was popular throughout the western U.S., so much so that no major drainage in Montana is without at least one non-native species. Some of these areas are prioritized for conservation of native species and others are prioritized for sport fish management. For example, in the mainstem of the upper Missouri River there is a world-renowned non-native rainbow trout fishery that was started by stocking; this stretch of river is currently prioritized as a wild trout fishery with rainbow trout being a priority sport fish (see Part II Section 2.19 Upper Missouri River Drainage).

To the extent possible, the state's fisheries are managed at an ecosystem level; thus, fish populations are managed as part of the aquatic community that may include native and non-native species comprised of species considered sportfish and nongame. While this broad approach has been successful for many areas of the state for many species, management of Species of Concern is typically focused on addressing priority threats and limiting factors to prevent further imperilment. However, some species require a large ecological footprint and approaching species conservation can only feasibly be done at the ecosystem level (e.g., pallid sturgeon, paddlefish). One example, despite their small size, sicklefin chub and sturgeon chub require large expanses (>200 km) of connected habitat to complete their life history. These two species are currently being evaluated for ESA-protection and future conservation efforts will need to be holistic, thought of well beyond patches of habitat.

Although Montana's non-native fish are a valued and critical component of Montana fisheries, the presence of non-native fishes forever changed many native species. Non-native fish can compete and hybridize with, prey on, and displace native fish. Challenges associated with non-native species are widespread and significant, including hybridization between introduced rainbow trout and native cutthroat or redband trout, competition between introduced brook trout and native cutthroat trout, and the competition with, and predation by lake trout on native bull trout. In certain locations, the impacts of non-native species are managed through harvest regulations (see Fishing Regulations Section 1.4.2), active suppression or eradication of non-native fish (see Illegal and Unauthorized Fish Introductions Section 1.4.7 and Fish Removals Section 1.4.8), maintenance or placement of barriers to prevent invasions of non-native fish (see Fish Connectivity Section 1.1.1), or through selective stocking practices (see Hatchery Allocation and Fish Distribution Section 1.3.2). Balancing sensitive native species with other fisheries objectives is an important component of FWP fisheries management (see Species Management Section 1.6).

While the management of certain non-native fishes continues to require particular attention to aspects of their life history and how populations might have impacts on the greater aquatic community, most non-native and native species are managed and monitored one-in-the-same; at the ecosystem-level. The management of native fishes extends widely to focus on wild, sustainable balance for species that are designated as game fish, as well as for nongame species that have no specific conservation status, like channel catfish, shovelnose sturgeon, and mountain whitefish. These species are generally managed much like non-native species with game fish value; their status is monitored and maintained based on their popularity and interactions with other species. Native species *without* game fish value or a specific conservation status, such as longnose dace, Rocky Mountain sculpin, fathead minnow, and longnose sucker, are managed as part of the ecosystem to ensure that the aquatic community functions naturally. While a number of these species are important sources of food (forage), their roles are more complex and vital than simply existing as food for other fishes. The status of native species is monitored for health and with attention to the potential for any conservation need. Under this approach, the greater aquatic community is sustainable, but should this balance diminish continual monitoring and diligence in management should help provide early indication to ultimately prevent a need for increased conservation status or listing under the ESA.

Aquatic systems are conserved and protected to provide a diversity of angling opportunities within the constraints of each managed waterbody. Most non-native fisheries emphasize angler opportunity, and depending on management objectives, range from harvest-oriented fisheries to catch-and-release only (see Fishing Regulations Section 1.4.2). Native fish conservation emphasizes the overall health of an aquatic community and objectives focus on a wild, sustainable balance that includes all species, regardless of game fish value. In streams and rivers, wild fish management practices are emphasized, and fishing regulations are typically used to optimize angler catch rates. In lakes and reservoirs, where wild fish recruitment is often limited, FWP relies upon high quality fish from a strong hatchery propagation and distribution program (see Fish Propagation, Allocation, and Distribution Chapter 1.3).

The FWP Vision and Guide 2016-2026 provides clear direction that management recommendations should be guided by the best available science. FWP biologists and technicians devote significant time and effort to collect quality data that are used to manage fisheries. Electrofishing, seining, trapping, and gillnetting are the most frequently used tools and techniques to gather fish population data on both wild and hatchery-stocked fisheries in Montana (see Monitoring Fish Populations and Ecological Health Section 1.4.3). Surveys of anglers establish usage levels on waterbodies statewide, while creel surveys of anglers on specific waterbodies provide fishing-related information, such as catch rates, sizes of fish captured, gear used, and fishing technique, (see Angler and Creel Surveys Section 1.4.5) and the effectiveness of stocking programs and fishing regulations.

Collectively, the information gathered through evaluation and monitoring is analyzed and used to determine if management objectives are being met. Many of Montana's most popular fisheries are routinely monitored, with some waterbody datasets containing several decades of data. Monitoring fish populations and angler success are crucial to provide quality sportfish angling opportunities. Fisheries that are maintained by hatchery stocking can be adjusted by changing the species, strain, number, or size of fish that are stocked. Management of wild fisheries can be more challenging, as populations are affected by their environment (i.e., habitat quality) and natural or angler-related mortality. Fishing regulations can be used as a management tool to adjust population structure but may not be effective on their own depending on angler activities, ease of capture of target species by hook and line, and angling pressure (see Fisheries Management Tools and Techniques Chapter 1.4).

In addition to monitoring (see Monitoring Fish Populations and Ecological Health Section 1.4.3), research is essential for ensuring the best information available is used to inform fisheries management decisions (see Research Program Section 1.4.4). Research projects are developed and implemented to answer key fish management issues. Fisheries staff are constantly looking to improve their management techniques and methods and keep current with latest technologies and trends in fisheries science through training and engaging with fisheries professionals outside of FWP.

FWP uses a statewide, centralized, web-accessible standardized database, known as the Fisheries Information System (FIS). The goal is to house all of the fisheries data in one location instead of on individual computers or file cabinets across the state and to make these data accessible both internally and to the public via our public facing web applications like FishMT. FIS in its scope and data availability is revolutionary. Other states have modeled similar programs after FIS. The project began in 2009 with the development of the application and in 2012 FIS was born. It now contains tens of thousands of fisheries surveys, millions of fish records, and hatchery information ranging from feeding rates and operations to stocking data, AIS data is updated in real time, and nearly all the data is publicly accessible. FIS is efficient, cost effective and transparent. Fisheries staff enter data directly into the system and are immediately available to the public including everything from fish plants to the results of fisheries surveys. It is the most transparent look at scientific data available. Having this database and the millions of records accessible in one place has enabled FWP to answer complex management and ecological questions. Data accessibility has led to many important partnerships essential to accomplish the research and programs necessary to meet FWP's mission to provide for the stewardship of the fish, wildlife, parks, and recreational resources of Montana, while contributing to the quality of life for present and future generations.

Table 1.0-1. Family, species, conservation status, and ecoregion for native and non-native fish found in Montana. Additional discussion about state and Federal Conservation Status can be found here.

Family		Species		Conservation Status		Ecoregion [3,4]						
Common Name	**Scientific Name**	**Common Name**	**Scientific Name**	**Montana [1]**	**Federal [2]**	**Kootenai**	**Clark Fork**	**St. Mary**	**Upper Missouri**	**Lower Missouri**	**Upper Yellowstone**	**Lower Yellowstone**
Sturgeons	Acipenseridae	**Kootenai River White Sturgeon**	*Acipenser transmontanus*	C (S1)	E	N	-	-	-	-	-	-
		Pallid Sturgeon	*Scaphirhynchus albus*	C (S1)	E	-	-	-	N	N	-	N
		Shovelnose Sturgeon	*Scaphirhynchus platorynchus*	-	T (SA)	-	-	-	N	N	-	N
Paddlefishes	Polyodontidae	**Paddlefish**	*Polyodon spathula*	C (S2)	-	-	-	-	N	N	-	N
Gars	Lepisosteidae	**Shortnose Gar**	*Lepisosteus platostomus*	C (S3)	-	-	-	-	-	N	-	N
Mooneyes	Hiodontidae	**Goldeye**	*Hiodon alosoides*	-	-	-	-	-	N	N	N	N
Carps and Barbs	Cyprinidae [a]	**Goldfish**	*Carassius auratus*	-	-	-	I	-	I	I	I	I
		Common Carp	*Cyprinus carpio*	-	-	-	I	-	I	I	I	I
True Minnows	Leuciscidae [a]	**Northern Redbelly Dace**	*Chrosomus eos*	C (S3)	-	-	-	-	N	N	-	N
		Northern Redbelly Dace x Finescale Dace Hybrid	*Chrosomus eos x C. neogaeus*	C (S3)	-	-	-	-	N	N	-	N

Family		Species		Conservation Status		Ecoregion [3,4]						
		Lake Chub	*Couesius plumbeus*	-	-	-	-	-	N	N	N	N
		Utah Chub	*Gila atraria*	-	-	-	-	-	I	-	-	-
		Western Silvery Minnow	*Hybognathus argyritis*	-	-	-	-	-	N	N	N	N
		Brassy Minnow	*Hybognathus hankinsoni*	P (S4)	-	-	-	-	N	N	N	N
		Plains Minnow	*Hybognathus placitus*	P (S4)	-	-	-	-	N	N	-	N
		Sturgeon Chub	*Macrhybopsis gelida*	C (S2S3)	U	-	-	-	N	N	-	N
		Sicklefin Chub	*Macrhybopsis meeki*	C (S1)	U	-	-	-	-	N	-	N
		Northern Pearl Dace	*Margariscus nachtriebi*	C (S2)	-	-	-	N	N	N	-	N
		Peamouth	*Mylocheilus caurinus*	-	-	N	N	-	-	-	-	-
		Golden Shiner	*Notemigonus crysoleucas*	-	-	-	-	-	I	I	-	I
		Emerald Shiner	*Notropis atherinoides*	-	-	-	I	-	N	N	N	N
		Spottail Shiner	*Notropis hudsonius*	-	-	-	-	-	I	I	-	I
		Sand Shiner	*Notropis stramineus*	-	-	-	-	-	N	N	N	N
		Fathead Minnow	*Pimephales promelas*	-	-	I	I	-	N	N	N	N
		Flathead Chub	*Platygobio gracilis*	-	-	-	-	-	N	N	N	N
		Northern Pikeminnow	*Ptychocheilus oregonensis*	-	-	N	N	-	-	-	-	-

Family		Species		Conservation Status		Ecoregion [3,4]						
		Longnose Dace	*Rhinichthys cataractae*	-	-	N	N	N	N	N	N	N
		Redside Shiner	*Richardsonius balteatus*	-	-	N	N	-	I	-	I	-
		Creek Chub	*Semotilus atromaculatus*	P (S4)	-	-	-	-	I	I	-	N
Suckers	Catostomidae	**River Carpsucker**	*Carpiodes carpio*	-	-	-	-	-	N	N	N	N
		Longnose Sucker	*Catostomus catostomus*	-	-	N	N	N	N	N	N	N
		White Sucker	*Catostomus commersonii*	-	-	-	I	-	N	N	N	N
		Largescale Sucker	*Catostomus macrocheilus*	-	-	N	N	-	-	-	-	-
		Blue Sucker	*Cycleptus elongatus*	C (S2S3)	-	-	-	-	N	N	N	N
		Smallmouth Buffalo	*Ictiobus bubalus*	-	-	-	-	-	N	N	N	N
		Bigmouth Buffalo	*Ictiobus cyprinellus*	-	-	-	-	-	N	N	N	N
		Shorthead Redhorse	*Moxostoma macrolepidotum*	-	-	-	-	-	N	N	N	N
		Plains Sucker [b]	*Pantosteus jordani*	-	-	-	-	-	N	N	N	N
North American Catfishes	Ictaluridae	**Black Bullhead**	*Ameiurus melas*	-	-	I	I	-	I	I	I	I
		Yellow Bullhead	*Ameiurus natalis*	-	-	-	I	-	-	I	-	I
		Channel Catfish	*Ictalurus punctatus*	-	-	-	-	-	N	N	N	N
		Stonecat	*Noturus flavus*	-	-	-	-	-	N	N	N	N

Family		Species		Conservation Status		Ecoregion [3,4]						
Smelts	Osmeridae	**Rainbow Smelt**	*Osmerus mordax*	-	-	-	-	-	-	I	-	I
Trouts and Salmons	Salmonidae	**Cisco**	*Coregonus artedi*	-	-	-	-	-	I	I	-	I
		Lake Whitefish [c]	*Coregonus clupeaformis*	-	-	-	I	N	-	I	-	-
		Yellowstone Cutthroat Trout	*Oncorhynchus clarkii bouvieri*	C (S2)	-	I	I	I	I	I	N	N
		Westslope Cutthroat Trout	*Oncorhynchus clarkii lewisi*	C (S2)	-	N	N	N	N	N	I	-
		Rainbow Trout	*Oncorhynchus mykiss irideus*	-	-	I	I	I	I	I	I	I
		Golden Trout	*Oncorhynchus mykiss aguabonita*	-	-	I	I	-	I	-	I	-
		Columbia River Redband Trout	*Oncorhynchus mykiss gairdneri*	C (S1)	-	N	-	-	-	-	-	-
		Kokanee [d]	*Oncorhynchus nerka*	-	-	I	I	I	I	I	-	-
		Chinook Salmon	*Oncorhynchus tshawytscha*	-	-	-	-	-	-	I	-	-
		Pygmy Whitefish	*Prosopium coulterii*	C (S3)	-	N	N	-	-	-	-	-
		Mountain Whitefish	*Prosopium williamsoni*	-	-	N	N	N	N	N	N	N
		Brown Trout	*Salmo trutta*	-	-	I	I	I	I	I	I	I
		Bull Trout	*Salvelinus confluentus*	C (S2)	T	N	N	N	-	-	-	-
		Brook Trout	*Salvelinus fontinalis*	-	-	I	I	I	I	I	I	I

Family		Species		Conservation Status		Ecoregion [3,4]						
		Lake Trout [e]	*Salvelinus namaycush*	C (S2)	-	I	I	N	N	I	I	I
		Arctic Grayling	*Thymallus arcticus*	C (S1)	-	I	I	I	N	-	I	-
Pikes and Mudminnows	Esocidae	**Northern Pike** [f]	*Esox lucius*	-	-	I	I	N	I	I	I	I
		Northern Pike x Muskellunge hybrid (Tiger Muskie)	*Esox lucius x E. masquinongy*	-	-	-	I	-	I	I	I	I
		Central Mudminnow	*Umbra limi*	-	-	-	I	-	-	-	-	-
Trout-perches	Percopsidae	**Trout-perch**	*Percopsis omiscomaycus*	C (S2)	-	-	-	N	-	-	-	-
Cods	Gadidae	**Burbot**	*Lota lota*	P (S4)	-	N	-	N	N	N	N	N
Topminnows	Fundulidae	**Plains Killifish**	*Fundulus zebrinus*	-	-	-	-	-	-	I	-	I
Livebearers	Poeciliidae	**Western Mosquitofish**	*Gambusia affinis*	-	-	-	I	-	I	I	I	-
		Sailfin Molly	*Poecilia latipinna*	-	-	-	-	-	I	I	-	I
		Shortfin Molly	*Poecilia mexicana*	-	-	-	-	-	I	-	-	-
		Green Swordtail	*Xiphophorus hellerii*	-	-	-	-	-	I	-	-	-
		Variable Platyfish	*Xiphophorus variatus*	-	-	-	I	-	I	-	-	-
Sticklebacks	Gasterosteidae	**Brook Stickleback**	*Culaea inconstans*	P (S4)	-	-	I	-	I	N	I	N

Family		Species		Conservation Status		Ecoregion [3,4]						
Sculpins	Uranidea [g]	**Rocky Mountain Sculpin**	*Uranidea bairdii*	-	-	-	N	N	N	N	N	N
		Columbia Slimy Sculpin	*Uranidea cognata*	-	-	N	N	-	-	-	-	-
		Torrent Sculpin	*Uranidea rhotheus*	C (S3)	-	N	-	-	-	-	-	-
		Spoonhead Sculpin	*Uranidea ricei*	C (S3)	-	-	-	N	-	-	-	-
		Cedar Sculpin	*Uranidea schitsuumsh*	-	-	-	N	-	-	-	-	-
		Deepwater Sculpin	*Myoxocephalus thompsonii*	C (S3)	-	-	-	N	-	-	-	-
Temperate Basses	Moronidae	**White Bass**	*Morone chrysops*	-	-	-	-	-	-	I	-	I
Sunfishes	Centrarchidae	**Rock Bass**	*Ambloplites rupestris*	-	-	-	-	-	-	-	-	I
		Green Sunfish	*Lepomis cyanellus*	-	-	-	-	-	-	I	I	I
		Pumpkinseed	*Lepomis gibbosus*	-	-	I	I	-	I	I	I	I
		Bluegill	*Lepomis macrochirus*	-	-	I	I	-	I	I	I	I
		Smallmouth Bass	*Micropterus dolomieu*	-	-	I	I	-	I	I	I	I
		Largemouth Bass	*Micropterus salmoides*	-	-	I	I	-	I	I	I	I
		White Crappie	*Pomoxis annularis*	-	-	-	I	-	I	I	I	I
		Black Crappie	*Pomoxis nigromaculatus*	-	-	I	I	-	I	I	I	I
	Percidae	**Iowa Darter**	*Etheostoma exile*	C (S3)	-	-	-	-	N	N	-	N

Family		Species		Conservation Status		Ecoregion [3,4]						
Perches and Darters		**Yellow Perch**	*Perca flavescens*	-	-	I	I	-	I	I	I	I
		Sauger	*Stizostedion canadense* [h]	C (S2)	-	-	-	-	N	N	N	N
		Walleye	*Stizostedion vitreum* [h]	-	-	-	I	-	I	I	I	I
Drums	Sciaenidae	**Freshwater Drum**	*Aplodinotus grunniens*	-	-	-	-	-	N	N	-	N
Total Species in Montana and Subtotal by Ecoregion				**91**	-	**32**	**43**	**20**	**67**	**69**	**48**	**65**

Note: Species designation according to Brown (1971), Page et al. (2013), FWP (2013), MNHP (2022), and USGS (2018).
[1]C = Species of Concern, P = Potential Species of Concern; S1 = high risk, S2 = at risk, S2S3 = range of uncertainty on status, S3 = potentially at risk, S4 = suspected to be declining.
[2]E = Endangered, T = Threatened, U = Under Review, SA = Listed under Similarity of Appearance provisions.
[3]Ecoregion boundaries and their included major drainages are defined in Part II of the Statewide Fisheries Management Plan (Figure 1).
[4]N = Native, I = Introduced
[a]The order Cypriniformes was reclassified to separate carps and barbs (Cyprinidae) from the true minnows (Leuciscidae) (Tan & Armbruster, 2018).
[b]The taxonomy of western North American mountain suckers was refined to recognize divergence between the genera of *Catostomus* and *Pantosteus* and revised the species present in Montana as plains sucker *Pantosteus jordani*; formerly combined with populations in Utah, Wyoming, and Colorado as mountain sucker *Pantosteus platyrhynchus* (Unmack et al., 2014).
[c]Lake whitefish, though widely introduced, are native to a single drainage in Montana, the St. Mary River drainage.
[d]A population of kokanee, historically native to Kootenay Lake, British Columbia, Canada, may have strayed upstream into the lower Kootenai River downstream of Kootenai Falls; however, that native population went extinct due to stocking of non-native kokanee strains into the system and due to environmental changes to the Kootenai River following the construction of Libby Dam (Knudson, 1994; Behmke, 2002; Ireland et al., 2002; Ericksen et al., 2009).
[e]Lake trout are native to only four lakes in Montana (Elk, Twin, Waterton, and St. Mary).
[f]Northern pike, though widely introduced (illegally introduced into 81 waters in northwest Montana), are native only to the St. Mary River drainage in Montana.
[g]Sculpin taxonomy has been confusing and is still not fully described. In order to differentiate the sculpin species that occur in Montana from those in other parts of the country that have been historically considered the same species, we refer to many using the genera *Uranidea* (Smith & Busby, 2014; Adams et al., 2015). North American sculpins, formerly in the genus Cottus, have been moved to Uranidea or Cottopsis (Smith & Busby, 2014; Adams et al., 2015). All Montana sculpin are now in *Uranidea* (Kinziger et al., 2005; Smith & Busby, 2014). The species most recently referred to as Columbia Slimy Sculpin, *C. sp. cf. cognatus* (Neely, 2010; herein treated as *Uranidea sp. cf. cognata*), was formerly referred to in the Columbia River basin as Slimy Sculpin *C. cognatus* (Holton, 1990; Holton & Johnson, 2003; Schmetterling & Adams, 2004). The Rocky Mountain Sculpin, most recently referred to as *C. sp. cf. bairdii* (COSEWIC, 2010; Neely, 2010; Smith & Busby, 2014; herein treated as *U. sp. cf. bairdii*), was formerly known in the region as the Mottled Sculpin C. bairdii. (Adams et al., 2015).
[h]The genus *Sander* was previously incorrectly applied to be the senior synonym and has since reverted to *Stizostedion* (Bruner, 2021).

1.1 Aquatic Habitat

The goal of the aquatic habitat program is to conserve, protect, and enhance aquatic habitats, thereby strengthening Montana's fish and aquatic resources and fishing opportunities. The priorities of the aquatic habitat program are to address the following challenges:

- Connectivity and restrictions to fish passage, often caused by infrastructure that fragments habitats or entrains fish.
- Mitigating for dam operations and their effects on fish populations.
- Securing conservation fish populations by protecting or restoring important habitats and constructing fish barriers.
- Human-related habitat degradation due to improper bank stabilization or livestock management strategies that do not incorporate stream health. Encourage landowners to build infrastructure away from the stream and make improvements that support both livelihoods and aquatic habitats.
- Drought conditions, changes in precipitation and temperature, and competition for limited supplies of water, which affect instream flow, water availability, water storage, and water quality.
- Development and use of natural resources, such as oil and gas, that can affect groundwater and surface water quantity and quality.
- Unmitigated legacy issues, including abandoned mines and associated pollution.

Much of Montana's aquatic habitats are in excellent condition, thanks to decades of collective conservation ethic, sustainable land management practices, and extensive habitat restoration completed by FWP, landowners, and partners. However, many areas remain threatened or degraded and are negatively affecting wild fish populations through reduced survival, reproduction, or carrying capacity. The aquatic habitat program and Fisheries Division staff have the ability, technology, and obligation to protect and restore these habitats wherever possible. Nearly all that FWP achieves within the habitat program relies upon the cooperation and collaboration of other agencies, non-governmental organizations, landowners, and the public. Partnerships and conversations are essential to the success of the aquatic habitat program.

1.1.1 Fish Connectivity

Overall, the health of aquatic and riparian habitats drives the health of fisheries, especially when it comes to wild fish management. Maintaining or improving habitat connectivity are fisheries management priorities. Oftentimes restoration is required to improve connectivity within a fishery;

these projects can include the replacement of an undersized culvert with a channel-spanning bridge, the installation of a fish screen to eliminate entrainment, or the installation of a fish barrier and subsequent fish removal (see Fish Removals Section 1.4.8) to provide connected, conservation habitat.

Many of Montana's fisheries involve migratory species that require a broad range to complete their life histories. Such species include those that are native (e.g., bull trout), non-native (e.g., rainbow trout), game (e.g., sauger), and nongame (e.g., blue sucker). Connected habitats allow those fish to move between habitats, as reproduction or foraging needs dictate. Changing stream conditions are also important components of connectivity. As an environment changes seasonally or over longer periods of time, connectivity facilitates movements to essential habitats. Recruitment bottlenecks, decreased genetic exchange, altered food-web relationships, or even extirpation may occur following reduced habitat connectivity. Connectivity is key to management of many aquatic species.

Fish barriers can be used to secure the long-term viability of native fish populations by isolating native species from non-native species in downstream habitats. For species that need focused conservation efforts, barriers are a final option to prevent population extirpation and species loss. Barriers serve as a fisheries management tool primarily in headwater streams where aboriginal populations of trout are in danger of extirpation due to hybridization or competition with non-native trout. Additionally, barriers can prevent upstream expansion of non-native predators, such as northern pike that are expanding into prairie streams occupied by northern pearl dace and northern redbelly dace. The use of barriers to conserve populations typically involves the installation of infrastructure or the modification of an existing barrier, removal of non-native or undesirable fish, restocking native fish, and post-project monitoring. Regular inspections to remove debris and ensure barrier function are critical and monitoring the population may be needed to ensure that conservation goals are achieved.

A notable challenge related to management of fish connectivity is working with existing infrastructure and diversions that are partial or complete fish barriers. Current and former land use practices and human development have led to structures across streams and rivers for purposes such as road building, irrigation, and water delivery. Although these structures typically require modification and maintenance to restore fish connectivity, such projects are not considered the same as formal mitigation projects or programs (see Fisheries Mitigation Section 1.1.2). These structures typically serve a more localized purpose and therefore fish management strategies are intended to improve fish connectivity at the local scale while maintaining the function of the infrastructure. For example, irrigation diversions may be upgraded from a pin-and-plank structure to a rock weir to provide fish passage and ensure a water right is protected. A perched culvert may be replaced by a channel-spanning culvert with a natural streambed to allow fish passage and retain a road crossing. In these projects, stakeholder input and partnerships are critical to meet the goals of all parties involved.

Entrainment, which is the unwanted passage of fish through a water intake structure, is a component of connectivity whereby fish may be permanently isolated from nearby streams once they enter a ditch system. Keeping fish out of ditch systems and other diversions from a stream or river is a vital component of fish management in terms of reducing mortality while improving habitat connectivity and enabling free movements between habitats. Projects to reduce entrainment typically involve the installation of fish screens, either in-stream or within ditches. These projects require communication with landowners, water users, and other stakeholders, as perpetual maintenance can be expected. FWP staff provide valuable information to the planning of these projects, and often help with installation or maintenance; however, maintenance is generally the responsibility of the water user or a willing partner.

Like all components of fisheries management, evaluation and monitoring are necessary to understand project success or failure, as well as needs for potential future improvements (see Fisheries Management Tools and Techniques Chapter 1.4). Fish connectivity improvements often come with a need for some level of maintenance and therefore staff are constantly evaluating the restoration projects to ensure fishery improvements are retained long term.

1.1.2 Fisheries Mitigation

Mitigation is the process of reducing or offsetting historical or ongoing degradation. The goal of mitigation is to improve altered ecosystem function, health, and resilience, and to achieve specific restoration thresholds. In aquatic systems, mitigation programs assess and attempt to minimize the effects of construction and operation of various facilities, such as hydropower dams, mining activities, and chemical spills. Mitigation occurs when restoration, or the return to an unaltered state, is not possible. The largest mitigation programs for fisheries management in the State are coordinated with Bonneville Power Administration (BPA; Kootenai River), NorthWestern Energy (NWE; Madison, Missouri, and Clark Fork rivers), Avista (Clark Fork River), and the Department of Natural Resources and Conservation (DNRC; Missouri River) to offset effects of hydropower dams. The Natural Resource Damage Program (NRDP) supports restoration activities with funds collected for mitigation from entities responsible for resource damages caused by spills, mine waste, and industrial contamination.

Whether the mitigation is related to a dam, or other infrastructure/activity they are all unique and impacts vary greatly based on their location and the purpose of the facility or process affecting the waterbody. The fisheries mitigation programs investigate impacts and limiting factors to develop on-the-ground mitigation actions to provide quality fishery opportunities and, where possible, perpetuate self-sustaining wild fisheries. Actions are designed to optimize ecosystem function, health, and resilience, and achieve specific mitigation goals, including modifying dams and operations to restore natural conditions in impoundments and streams, and improve fish passage to benefit surrounding fisheries. Where mitigation cannot be accomplished onsite, offsite mitigation will be implemented. Offsite mitigation refers to compensating resource impacts by implementing habitat or resource improvements at a different location than a project area. For example, a habitat improvement project may be constructed on a small stream to mitigate for loss of habitat covered by a reservoir as part of a hydroelectric project. In this circumstance the stream project is intended to offset the impacts of habitat loss from construction of the hydroelectric project. Progress toward mitigation goals is often tracked by establishing a “loss statement” regarding habitat and fisheries impacts caused by the disturbance, such as construction and operation of a dam or mine, and then monitoring success as corrective measures are implemented.

State and federal laws are established to mitigate damages to fish and wildlife caused by dams, diversions, or mining. The Federal Energy Regulatory Commission (FERC) helps agencies charged with managing fish and wildlife in systems that have been impacted by facilities for hydroelectric power generation and natural gas extraction. In 2005, the Energy Policy Act made FERC responsible for licensing and inspecting all non-federal hydropower dams, it also oversees environmental matters related to these activities. FWP provides recommendations concerning hydropower operations during FERC relicensing negotiations, planning efforts, and annual operations. For example, FWP participates in Technical Advisory Committees (TAC) to best determine how and where mitigation funds are implemented to improve fishery resources on the Madison, Missouri, and Clark Fork rivers, as well as other smaller systems. No matter the type of water control operation, they affect fisheries in numerous ways. However, the effects of these operations can be mitigated by working with dam operators through planning, elevating biological needs during licensing, and establishing and maintaining partnerships with water users.

Federal and private dams and water diversions control water elevations, flow patterns, and environmental conditions (e.g., water temperature, oxygen, water velocity, gas saturation, habitat quality, nutrients, food production), all of which affect fish health, survival, and growth.

Impacts from dams, diversions, and mining include:

- Alterations to timing, intensity, and duration of runoff and peak flow, diversion of flows, reservoir productivity, and mobilization and transportation of sediment.
- Blocking fish migrations and isolating populations above, below, or between barriers.
- Injury or mortality to fish and aquatic life passing through dam turbines and spillways due to impingement and entrainment.
- Loss of or damage to aquatic habitats when reservoirs are drawn down and/or fluctuate significantly on a regular basis.
- Reduced reservoir storage capacity due to sedimentation.
- Streambed degradation, erosion, and bank failure downstream of reservoirs due to the alteration of natural river flows and reduced sediment inputs that alter river channel migration.
- Sediment starvation and reduced transportation of turbidity in rivers resulting from dams in warmwater-prairie systems. These systems reduce natural river processes (e.g., prevents side channel development), impact spawning migration cues of native fish species such as paddlefish, and challenge critical life history stage development for native fish species such as pallid sturgeon.
- Altered stream flows below dams that inhibit new seedling establishment in riparian areas and lead to long-term loss of riparian habitat due to dewatering, the reduction of floodplain activation, or inundation of streamside vegetation along regulated stream and river reaches.
- Mining activities that physically alter stream channels and habitats by removing rock and soil or orebodies.
- Mining wastes deposited in streams or metals leached from adits, tailings, or heap leach piles may be toxic to aquatic life.
- Habitat alteration and disturbance that encourage the establishment of invasive species or altered habitats, which can be more suitable for invasive species than the desired species.

Water control operations are dictated by conflicting demands for power generation, flood management, navigation, irrigation, recreation, water supplies, and other anthropogenic concerns. Water control operations can cause river discharges to fluctuate unnaturally, potentially affecting biological cues (e.g., spawning, hatching, migration) or redd dewatering or stranding of fish along stream margins. Prior to dam installation, the natural hydrologic cycle in Montana's rivers included high spring flows and sediment transport during snow melt (typically May through June) and stabilized, low flows, low sediment periods throughout the remainder of the year (Figure 1.1.2-1). Water regulation essentially reversed this natural flow pattern by storing water during spring runoff to reduce flood risk and releasing stored water later for purposes such as irrigation, power generation, navigation, or water supply, which can deprive the system of necessary sediments.

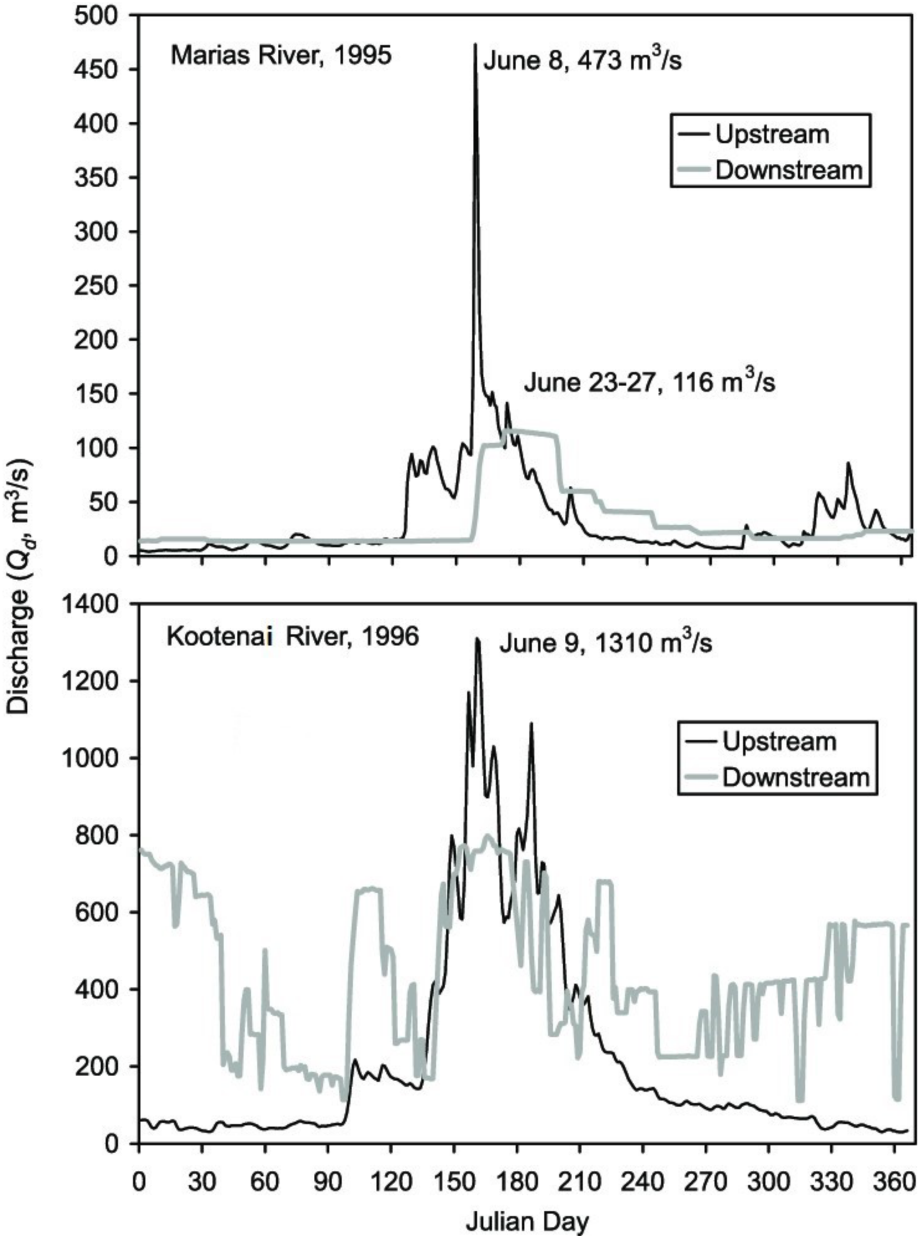

Figure 1.1.2-1. The influence of river damming and flow regulation on daily discharge of the Marias River (top) upstream versus downstream of the Tiber Dam and Elwell Reservoir; and of the Kootenai River (bottom) upstream versus downstream of the Libby Dam and Koocanusa Reservoir. The examples are two examples of how different the dams and their operations can affect a system, the Marias River with the attenuation of the flood peak and stepped flow reduction downstream, and the Kootenai River with the seasonal discharge pattern severely altered as the dam is operated for hydroelectric power generation and other purposes. *Figure from Rood et al., 2007 Canadian Journal of Botany.*

Effective fisheries mitigation programs and efforts can improve fisheries by working with dam operators to implement physical improvements to dams and diversions, and operating rules for water regulation to balance fisheries needs in the reservoirs and rivers with power generation, flood management, and irrigation. As an example, operating rules can limit the duration and frequency of deep reservoir drawdowns, improve reservoir refill, and produce more natural dam discharge patterns. When reservoir drawdowns are followed by refill failures, biological productivity in the reservoirs can be impacted. Fish growth is optimal when reservoirs remain near full pool during the most biologically productive period of the year, summer through fall. At full pool, reservoirs contain the maximum volume of optimal water temperatures for forage and fish growth and a large surface area for the deposition of insects from the surrounding landscape, an important food source for fish during summer and fall. Food availability is reduced when the reservoir surface shrinks, and water recedes from shoreline vegetation. Reduced reservoir drawdown protects aquatic food production, ensuring an ample springtime food supply for fish. The shallow areas near shore (littoral zone) are the most productive and, therefore, it is important that they remain wetted during the warm months.

Outflows from dams affect the downstream aquatic ecosystem. Fisheries in rivers downstream of dams can be enhanced by restoring natural flow patterns, including spring run-off events with high turbidities and sediment transport, followed by gradually declining flows through summer and fall. Instream flow requirements and limits to flow fluctuation have been established through the FERC licensing process and annual TAC meetings to support stream life and restore natural floodplain functions. Spring flushing flows clean fine sediments from riverbeds and defines channels, creating a healthy environment for fish and their food supply, and removes tributary deltas that can impede spawning runs. Rapid flow reductions are especially damaging when a large portion of a riverbed dries out, often stranding insects, zooplankton, fish, and fish eggs. When flows increase, these portions of the river channel may take several weeks to regain biological productivity.

Small impoundments, such as low head diversions dams, disrupt river and fish processes including upstream spawning migrations and recolonization by juveniles that drift or disperse over diversion dams. Such circumstances can require stakeholder engagement and partnership to install fish passage options that were not considered during installation. Long-term resources are needed to ensure monitoring and adaptive management strategies meet the intended goal of increasing fish passage while maintaining irrigation needs.

Dam operations can also be impacted by changing weather patterns. Large reservoir fluctuations occur due to periods of extreme drought or prolonged wet periods. Early spring runoff can further disrupt the natural hydrograph, impacting how reservoirs fill and disrupt important fish life histories. Large dams can provide buffers from increasing air temperatures as tailwater habitats below large reservoirs typically have moderated temperatures. Options such as selective withdrawal can be implemented to provide optimal downstream water temperatures for valued species.

In addition to working on hydropower facilities, FWP’s mitigation program provide comments on varied environmental documents and planning efforts and participates in various environmental stewardship collaborations for other impacted systems. For example, important mine-related fisheries mitigation projects occur in the upper Clark Fork basin to restore or replace fisheries negatively affected by harmful mine wastes. About $36 million was set aside from a settlement between the State of Montana and Atlantic Richfield Company (or ARCO) to restore aquatic habitats upstream of the Blackfoot River including priority areas in and around the Little Blackfoot River. Restoration began in the early 2000s, but a remaining Operable Unit (Warm Springs Ponds) does not yet have an EPA approved cleanup plan.

1.1.3 Stream Permitting

Healthy rivers and streams are important to Montanans for their personal life pursuits and livelihoods, providing healthy fisheries, abundant clean water as well as recreation, aesthetics, agriculture, livestock production, and municipal water supply. Streams and rivers also raise complicated management issues. The Stream Protection Act 124 (SPA 124; §§87-5-501 - 509, MCA) and the Natural Streambed and Land Preservation Act 310 (310 law; §§75-7-101 - 125, MCA) were established to protect stream health throughout Montana from construction activities that physically alter a streambed or bank. Although there are multiple permits that relate to construction activities in or around streams and rivers in Montana, the SPA 124 and 310 law permits are the primary guiding documents to direct and establish construction guidelines at the state level.

These laws formalize the state's policy to protect and preserve Montana's natural rivers and streams, and the property immediately adjacent, to maintain their natural and existing state. The passage of laws placed permitting of stream-related projects within the jurisdiction of FWP for private interests as well as federal, state, and local government agencies.

The 310 law and 124 permit applications are typically submitted as part of the joint permit application (JPA) process for proposed work in Montana's rivers, streams, wetlands, and other applicable waterbodies. This comprehensive document can be utilized to apply for permits related to local, state, or federal entities, including the United States Army Corps of Engineers (USACE) 404 permit, which is required before any dredged or fill material can be discharged into waters of the United States. The areas to which these laws apply extends from the thalweg of active channels to the immediate banks and riparian areas adjacent to the project area.

Under the provisions of SPA 124, federal, state, county, and municipal governments must notify FWP about construction projects that may affect the bed or banks of any stream or its tributaries. FWP reviews the projects and makes recommendations to the applicant to eliminate or reduce any adverse impacts and ultimately decides to approve or deny the application. The 310 law requires FWP staff to act in an advisory role to local conservation districts in reviewing streambed or streambank projects proposed by members of the public. FWP staff make recommendations to mitigate impacts to the streambed or streambank and thereby protect fish habitat. However, approval of the permit remains at the discretion of the conservation districts. Further, FWP has been granted the authority by Montana Department of Environmental Quality (DEQ) to issue 318 Authorizations (§75-5-318, MCA*)*, or short-term temporary turbidity standards for total suspended sediments and water clarity resulting from stream-related construction or stream enhancement projects.

The Montana Department of Transportation (MDT) submits several applications for permits annually. All SPA 124 applications from MDT are managed through a Memorandum of Understanding (MOU) between FWP and MDT. FWP reviews construction plans and erosion control plans for road construction, recommends measures to minimize potential adverse effects of projects on aquatic and riparian habitats, and conducts compliance monitoring. FWP educates MDT's bridge, hydraulic, and project development engineers regarding the role of stream function and habitat in permitting decisions. These interactions foster good working relationships with MDT to bring about improvements in the permitting process to minimize impacts to the aquatic environment while maintaining vital infrastructure.

For all stream projects, FWP's goal is to provide technical advice, as necessary, to mitigate adverse effects of projects on fish populations and associated aquatic habitat resources. This process promotes proper aquatic habitat and fishery management practices by providing applicants with accurate and sound information on habitat and ecological principles, river processes, fish populations, aquatic resources, and economics.

A stream activity not regulated by FWP is recreational suction dredging. Suction dredging is regulated by DEQ but could have ramifications on stream health, and therefore is an activity subject to 310 law. To assist applicants preparing suction dredge applications, FWP has developed an Instream Mining Stream Classification List. The list contains recommendations for stream closures and restrictions with respect to suction dredging, and DEQ has agreed to refer applicants to the list. Suction dredging permits should be carefully reviewed for potential impacts to the stream bed, banks, and channel configuration.

Montana's Stream Protection Act has been in place since 1965, which has helped FWP to implement a successful wild fish management approach. All the work completed by the permitting agencies to conserve, protect, and enhance stream habitat has been critical for Montana waterways and the fisheries that rely on them, setting Montana apart from other states.

1.1.4 Instream Flow Protection

FWP works to conserve, protect, and enhance stream flows and lake levels required to sustain Montana's aquatic species, their habitats and related ecosystems (Montana Water Use Act, Title 85, MCA). While use of water for domestic, agricultural, municipal, and many other uses is essential, it impacts nearly every river, stream, and lake in Montana. And the demand for water is increasing. That demand, coupled with increased temperatures and annual variations in water supplies, presents long-term challenges for fisheries management. For example, warmer water temperatures can force coldwater fish species higher into stream drainages in search of thermal refuge, while warmwater species distribution may expand. In addition, extreme high-water temperatures combined with lack of thermal refuge can cause stress on fish with subsequent impacts to health and survival. Protecting and enhancing instream flows can mitigate this effect by increasing water quantity, which typically improves water quality and can moderate stream temperatures.

FWP addresses these challenges by protecting FWP's water rights while working with those who seek to meet the increasing demand for water. Protection of water resources is focused on minimizing the impact of increasing demands, limited supplies, and changing hydrologic conditions. The primary goals are to restore and maintain: 1) adequate water flow in streams, and 2) ecologically satisfactory water levels in lakes and reservoirs. These goals are achieved using the following strategies:

- Monitoring instream flow leases and purchases for fisheries impact and importance.
- Protecting FWP's existing instream water rights and water reservations through active participation in the water adjudication process and the water rights permitting process, through enforcement of water right priorities and making water calls in priority areas.
- Enhancing streamflow through water leasing, donations, purchases, and other voluntary and/or market-based strategies.
- Enhancing reservoir and run of the river management procedures such that regulation of water flow in streams and water levels in lakes and reservoirs meets not only the owners' purpose but also benefits, or minimizes, impacts to fish and other aquatic life and habitats.
- Protecting and enhancing stream flows and lake and wetland levels in priority areas through community collaboration, such as working with watershed groups.

- Implementation of the instream flow assessment program to validate native and federal Endangered Species Act or ESA-listed species recovery and obtain additional water reservations on priority streams and rivers.
- Acquiring senior water rights or new water reservations to protect water flow in streams and water levels in lakes or other waterbodies.
- Educating the public about the importance of instream flows and lake level protections and the policies used to provide for and protect them.
- Educating and training FWP staff on water measurement and management.

Fisheries monitoring plays a critical role in tracking species distributions and identifying priority habitats for maintaining instream flow. For example, if a tributary stream is a known spawning tributary for native cutthroat trout, that stream may be prioritized to secure instream flow during critical spawning and rearing periods.

1.1.5 Water Quality Protection

Water quality is one of three essential elements for thriving aquatic habitats (quality, quantity, and physical habitat features). It is crucial that water quality be enhanced and protected to maximize abundances and growth of wild and desired fish species. Water quality protection is realized through the collection of field data, participating in, and influencing decision-making processes that have implications to water quality, responding to public concerns related to degradation of water quality, and facilitating corrective actions.

FWP's Water Quality Program is focused primarily on issues related to the health of fisheries and human consumption of fish. To accomplish these goals, FWP's Water Quality Program works closely with other State (DEQ) and Federal (U.S. Environmental Protection Agency, EPA) agencies to quantify risks to the environment and identify solutions (Federal Clean Water Act, 33 U.S.C §1251, et seq, Montana Water Quality Act, §75-5-702, MCA). Current operations include reviewing Montana Pollutant Discharge Elimination System (MPDES) permits, new pesticide registrations, proposed mine plans, toxicity assessments related to extractive types of development (e.g., mining), and forest Best Management Practices (BMP).

FWP works closely with state and federal agencies to collect fish and invertebrates for tissue analyses as part of monitoring and assessment of impaired waters. In part, DEQ is required to submit a list of impaired waters to EPA every two years for approval. In addition, DEQ must develop a Total Maximum Daily Load (TMDL) to determine the allowable amount of pollutant a waterbody may receive and still meet water quality standards. FWP's Water Quality Program duties also include investigating and managing harmful algae bloom (HAB) reports and the proliferation of filamentous green algae. FWP also collects data related to residues of bio-accumulative materials in fishes (e.g., mercury [Hg], polychlorinated biphenyls [PCBs], dioxins and furans), including emerging contaminants (e.g., per- and polyfluoroalkyl substances [PFAS] and 6PPD-quinone). This effort includes working with the Fish Consumption Guidance Board comprised of staff from FWP, Department of Health and Human Services (DPHHS) and DEQ to develop and publish health guidance to protect consumers of sport fishes. This includes publishing a digital brochure and updating the Fisheries Information System (FIS) to inform waterbody-specific guidance displayed on FWP's public webpages in real time.

FWP's Water Quality Program also takes the lead in studying fish kills related to pollution and hazardous-material spills, coordinating closely with other state and federal regulatory agencies. Among other strategies, this work involves monitoring superfund activities that have implications to fisheries resources and responding to emergency spills.

Minimizing aquatic impacts from resource extraction is also a high priority for FWP's Water Quality Program. For example, the program has closely monitored natural resource development by Teck Coal on the Kootenai River. FWP staff have been involved with the collection of data related to selenium in Lake Koocanusa and in efforts toward the adoption of site-specific selenium criteria for Lake Koocanusa and the Kootenai River in December 2020. Since that time, the criteria and overall process used by DEQ has been challenged by the Montana Legislature (HJ 37) and Teck Coal. FWP will continue to collaborate with DEQ and federal partners in monitoring efforts to expand knowledge related to selenium toxicology in fish. Moreover, FWP staff will assist DEQ in state-wide selenium monitoring efforts that target representative species in each ecoregion across the state.

Quickly addressing environmental disasters is critical for FWP's Water Quality Program. In July 2011 and January 2015, Montana's lower Yellowstone River experienced oil spills from ruptured pipelines. FWP's immediate response included closing access points for public safety and assessing impacts to fisheries and aquatic resources, as well as human health, caused by the spill. FWP plays a critical role as a natural resource trustee for the citizens and residents of the State of Montana by coordinating assessment activities with the Natural Resource Damage Program (NRDP) within the Montana Department of Justice (DOJ) and the U.S. Fish & Wildlife Service (USFWS). Spill response must be timely, expansive, and defensible for damages to be awarded from responsible parties. With the use of data collected during the 2011 and 2015 spills, a consent decree awarded $12 and $2 million dollars in total damages from each spill. A Restoration Plan developed from settlement funds is used to fund habitat projects benefitting wild fish, wildlife, and public access within the impacted area.

FWP staff are trained in the Incident Command System (ICS) to rapidly respond to incidents and to interact with other agencies under the National Incident Management System (NIMS). ICS operations under NIMS provides for structured incident response and improved response to future oil spills. For example, the Middle Fork of the Flathead is at risk from the threat of oil or coal spills from a rail line, which parallels the river for 88 miles. To proactively understand baseline conditions, a fish health assessment was conducted with USFWS, and U.S. Geological Survey (USGS) staff related to hydrocarbon exposure. The information collected will help assess injury in the case of any future spills in the basin. The Emergency Operations Plan (EOP) is routinely updated to ensure FWP collects the information needed for future response actions and to assist staff performing various functions during an emergency or disaster that threatens aquatic resources in the state. Proactive data collection like this will ensure FWP has the capacity and expertise to respond to emergency events and be responsible stewards for all Montanans in the event of environmental contamination.

1.1.6 Future Fisheries Improvement Program

Fisheries habitat restoration is accomplished through the initiative and collaboration of FWP and partner agencies, non-governmental organizations, and private landowners who identify beneficial projects and require funding or support to accomplish them. The largest aquatic habitat funding source within FWP is the Future Fisheries Improvement Program (FFIP) (§§87-1-272, 273, and 274, MCA; §87-1-283, MCA; ARM 12.7.1201-1208).

Before 1989, FWP was occasionally involved with projects that restored fish habitat. This changed when the 1989 Montana Legislature passed the River Restoration Act (§§87-1-257, 258, and 259, MCA). For the first time, a portion of fishing license dollars were allocated specifically for fish habitat restoration. The FFIP, established by the 1995 legislature, used funds from the River Restoration Act to provide a funding source for projects that enhance or protect habitat for wild fish populations in lakes, rivers, and streams.

Under the FFIP, projects must accomplish one or more of the following goals: improve or maintain fish passage; restore or protect naturally functioning stream channels or banks; restore or protect naturally functioning riparian areas; prevent loss of fish into diversions; restore or protect essential habitats for spawning; enhance streamflow in dewatered stream reaches to improve fisheries; improve or protect genetically nonhybridized native fish populations; and/or improve fishing in a lake or reservoir. Projects that meet one of these goals are evaluated based on the following criteria: public benefits to wild fisheries; long-term effectiveness; benefits to native fish species; expected benefits relative to cost; in-kind benefits or cost sharing; importance of the lake or stream, local support or participation, approach to the cause of degradation, and sensitivity to the needs of other wildlife species. Commonly funded projects include riparian fencing, fish screening, channel reconstruction, fish passage improvements, barrier construction, and instream flow leases. Since inception, over 860 project grants valued at over $20.4 million have been approved through the FFIP and matched with other funds for over $92 million in funding resources.

The FFIP accepts funding proposals twice a year. Proposals are evaluated by FWP, and a 14-member citizen review panel makes funding recommendations to the Fish and Wildlife Commission. The composition of the review panel is determined by the enabling legislation (§87-1-273, MCA) and appointments are made by the Governor. The applicant must ensure that the investment in restoration is protected for a minimum of 20 years.

From the outset of the FFIP, FWP recognized that monitoring was essential to evaluate the success of various restoration treatments and to ensure that program dollars are spent responsibly and effectively. FWP conducts two types of monitoring for the FFIP: ***implementation monitoring*** and ***effectiveness monitoring***. All project sites are reviewed shortly after construction to confirm that the project was completed as proposed (implementation). A subset of projects are monitored for several years following project completion to determine if the goals of the project are being achieved and that the project complies with project agreements (effectiveness). The monitoring interval is determined by FWP based on the project type and surrounding land use.

One challenge associated with the FFIP is the time between project approval and project completion. Many applicants rely on multiple funding sources to cover project expenses and cannot secure all funding prior to project approval. Further, approved projects are often large, complex, and take several years to complete. This can result in a delay between the time funds are committed to projects and the expenditure of committed dollars. Applicants are expected to complete projects within three years of funding approval.

Public data sharing and storytelling is a critical part of transparency within FWP and an important part of cultivating program support for restoration and funding. Determining the most effective ways to share information digitally can be a challenge. Social media has been used to highlight success stories in a clear and engaging manner, the FFIP website was updated, and a habitat restoration component of the Fisheries Information System is being planned. The goal is to provide the public with the means to readily interact with FWP staff regarding completed projects and to facilitate better understanding of the restoration completed in their backyards and on their favorite rivers, streams, reservoirs, and lakes in across the state.

1.1.7 Community Ponds Program

The Community Pond Program (CPP) is a habitat grant program, primarily used for small projects related to ponds for the purpose of enhancing angling opportunities. The CPP was established in the early 2000s and is guided by a standard operating procedure that includes specific program guidance, timelines, and review criteria. Projects must create or enhance angling opportunity and be located near a community. Projects that enhance youth/family angling, education, and Americans with Disabilities Act (ADA) compliant accessibility are prioritized. Common projects include pond deepening, improved shoreline access, and the addition of fishing platforms. Many of these projects are associated with kids fishing days within local communities.

Most Community Pond projects are developed by local groups, sportsman's clubs, or local governments. FWP biologists are typically involved in the planning, but projects are generally developed and implemented by community leaders. This leads to a large amount of community support and buy-in for projects that benefit local anglers. Matching dollars average 62% of the total project cost, extending the value of CPP dollars. Since 2003, over 50 grants valued over $680,000 have been approved through the CPP and matched with other funds for over $4.5 million in funding resources.

CPP proposals are accepted once per year,are reviewed by FWP staff, and approved by the Fisheries Division Administrator. Similar to the FFIP, sponsors of approved projects must enter into a written agreement with FWP. Landowner permission must be obtained, and project funding may only be used for purposes described in the agreement. The applicant must ensure the investment in restoration is protected for a minimum of 20 years. The CPP has no formal monitoring program, but projects are monitored and tracked by local fisheries biologists, who are generally involved in project development and completion.

The CPP provides an opportunity for local communities to make highly impactful improvements to angling access and success. These projects are near communities, so children can typically walk or ride a bike to go fishing. Many improvements provide ADA-access or make the angling experience better in various ways for all segments of the effected population. As a result, many barriers to fishing are eliminated and angling opportunities are made possible for people who cannot otherwise readily enjoy the resource. Applications for the CPP, as well as approved projects, are announced by press release annually. Additionally, the CPP webpage, located on the FWP website, is updated regularly and social media posts are routinely used to highlight CPP successes.

1.2 Aquatic Invasive Species and Fish Health

Fish pathogens and aquatic invasive species (AIS) present a significant threat to wild fish management in the waters of Montana. Fish pathogens and AIS can cause significant fish population declines, disrupt food webs, degrade aquatic habitats, quickly proliferate once introduced, and compromise surrounding infrastructure. Once introduced and established eradication is difficult or impossible, depending on the circumstances. FWP has robust AIS and Fish Health Programs with a long history, and the programs have been recognized nationally for their innovative and proactive approaches.

1.2.1 Aquatic Invasive Species (AIS)

AIS are non-native species including mussels, clams, snails, crayfish, pathogens, fish, and plants that cause harm to the environment including degrading fisheries, damaging infrastructure, and impacting habitat. Globally, AIS cause billions of dollars of damage every year to fisheries, aquatic habitats, irrigation, hydroelectric power generation, municipal water systems, and water-based recreation. AIS are transported in a variety of ways, often unintentionally, through the movement of watercraft and equipment. AIS transport also occurs through fish stocking activities, the aquarium trade, and the movement of surface waters. AIS can be difficult to detect, especially shortly after introductions when abundances and distributions are low. Many AIS are small, allowing them to be easily transported without detection. Many of the AIS that cause problems in other parts of the United States have not yet been found in Montana, presenting an opportunity to prevent their introduction. Therefore, FWP manages a proactive program to address AIS through prevention, early detection and rapid response.

In 2002, The first statewide AIS management plan was approved by then-Governor Martz and the National Aquatic Nuisance Species Task Force. The first AIS Act (§§80-7-1001 - 1030, MCA) was passed by the Montana legislature in 2009 and amended during the 2011, 2013, and 2015 legislative sessions. In late 2016, the first detection of dreissenid mussel veligers (larvae, juvenile stage) in Montana was reported in Tiber Reservoir on the Marias River, and a suspect detection was reported for Canyon Ferry Reservoir. The detection caused significant concern related to potential impacts and spread of invasive mussels, leading to a rapid expansion of the AIS program during the 2017 legislative session. Changes included the establishment of new statute and an administrative rule (§80-7-1015, MCA; ARM 12.5.706), additional funding, increased watercraft inspection resources, an expanded early detection program, and increased staffing to accommodate these additional responsibilities. Mandatory inspection requirements were put in place for all watercraft exiting Tiber and Canyon Ferry reservoirs to prevent the movement of invasive mussels into other waterbodies (these requirements have been lifted following no detections for over 5 years). Mandatory inspection requirements were also established for all watercraft entering the state and crossing west over the Continental Divide (ARM 12.5.706). Inspection stations were established on major highways to ensure watercraft entering the state were free of AIS when crossing the Continental Divide to protect the Columbia River Basin from invasive mussels and other AIS.

Extensive early detection surveys were conducted on Canyon Ferry and Tiber reservoirs following the initial mussel larvae detection. Intensive annual sampling included veliger microscopy analysis, environmental DNA (eDNA) sampling, SCUBA and snorkeling surveys, Ponar dredge sampling, substrate sampling, shoreline surveys, and mussel detection canines. In accordance with regional standards, Canyon Ferry Reservoir was delisted as a mussel suspect waterbody in 2020 after three years of no detections. Tiber Reservoir was delisted as a mussel positive water in 2022 after five years of no detections. Therefore, exit inspections were discontinued at Tiber and Canyon Ferry reservoirs, so resources could be shifted to inspections of watercraft in other high-risk areas.

1.2.1 (1) AIS Coordination

The detection of mussels in Montana is similar to mussel detections observed in other western states. Initial detections often result in no establishment of invasive mussel populations, which led to western states developing Building Consensus in the West Workgroup and standard protocols for listing and delisting waterbodies as "mussel positive" or "suspect waters." Montana follows those regional standards and coordinates closely with other states to ensure consistency and continuity.

FWP leads the AIS program for Montana and coordinates with a variety of agencies and partners to ensure consistent and effective program implementation. The Montana Aquatic Invasive Species Act (§§80-7-1001 – 1030, MCA) establishes AIS responsibilities between state agencies including the Montana Department of Agriculture (MDA), Montana Department of Transportation (MDT), the Department of Natural Resources and Conservation (DNRC), and FWP. MDA manages the state's Noxious Weed List and is responsible for pesticide registration. MDT provides locations for inspection stations and assists with signage and roadside safety. DNRC administers the AIS Grant Program and provides administrative support for the Upper Columbia Conservation Commission (UC3) and the Montana Invasive Species Council (MISC). FWP is responsible for the prevention program including watercraft inspection implementation, early detection, rapid response, and overall lead coordination for the AIS Program. Other state agencies that support AIS efforts include the Department of Commerce through outreach and education for boaters and anglers coming to the state, the Department of Environmental Quality supporting treatment permitting and AIS early detection, and Montana State Police support compliance at watercraft inspection stations.

Native American tribes also play a critical role in addressing and informing the AIS program. The Confederated Salish and Kootenai Tribes (CSKT) and the Blackfeet Nation have promulgated tribal ordinances that address AIS in tribal waters including closing some waters for boating and requiring fishing equipment inspections. CSKT and the Blackfeet Nation also manage watercraft inspections and coordinate with the state for rapid response planning.

The US Fish & Wildlife Service (USFWS) is the lead federal agency on AIS issues. Authority for AIS through the USFWS includes the Nonindigenous Aquatic Nuisance Species Prevention and Control Act (1990) and the National Invasive Species Act (1996). USFWS provides national coordination for AIS and provides funding to states through State Aquatic Nuisance Species Management Plans. Other Federal agencies support AIS activities as part of their land management role and provide funding to FWP to support AIS program implementation. Those agencies include: the U.S. Army Corps of Engineers, the U.S. Bureau of Reclamation, U.S. Forest Service, and the U.S. Bureau of Land Management.

FWP represents Montana on several regional and national groups that are engaged in western AIS coordination. As an example, FWP staff assisted South Dakota Game and Fish (SDGF) to address zebra mussels on watercraft exiting Pactola Reservoir in September of 2022. FWP staff helped train local watercraft inspectors to ensure boats transporting mussels were decontaminated before leaving Pactola Reservoir. The Western Regional Panel for Aquatic Nuisance Species is a panel of state, federal, tribal, research, non-governmental organizations that advise the Aquatic Nuisance Species Taskforce (ANSTF) to guide national AIS efforts and initiatives. The ANSTF is a committee, created by Congress, to help coordinate AIS activities at the national level. Basin-specific coordination groups includes the Columbia Basin and the Missouri Basin teams that help encourage consistency among AIS programs. Other regional groups that support AIS coordination and initiatives include the Pacific Northwest Economic Region (PNWER) and Western Governors Association (WGA).

Partners, such as those identified above and below, play an integral role in the implementation of Montana's AIS program. FWP contracts with tribes, counties, and conservation districts for operating watercraft inspection stations. This allows for local management and expands local involvement in the AIS issue. Inspection station partners are responsible for staffing and day-to-day operations, but FWP's AIS staff provide equipment, training, management support, and quality control to help ensure inspection stations are effective, consistent, and coordinated. Partners are also involved with AIS early detection and actively sample for AIS statewide. Tribes, conservation districts, counties, universities, non-governmental organization, federal partners, and the public support early detection efforts through sampling for AIS in their local areas. AIS staff provide training and a survey data application that ensure consistent and timely data collection and reporting.

1.2.1 (2) AIS Outreach and Education

AIS outreach and education is an important part of Montana's AIS Program and involves extensive coordination. FWP develops a state-wide marketing campaign and messaging that reinforces the "Clean Drain Dry" and "Don't Let it Loose" messaging. These campaigns help raise awareness and compliance with Montana's AIS rules and regulations and encourage boaters and pet owners to help prevent the introduction and spread of AIS. FWP coordinates with partners such as the Western Montana Conservation Commission, local conservation districts, Walleyes Unlimited, Trout Unlimited, and Flathead Lakers to adapt the statewide messaging and provide needed information to their communities.

AmeriCorps and Big Sky Watershed Corps volunteers also play important roles in AIS outreach and education. Volunteers meet with marinas, boat shops, fly shops, and outdoor retailers about AIS issues and enlist their help in educating customers about AIS and their role in prevention and response strategies. Volunteers also contribute to and attend workshops, county fairs, and schools to expand public awareness of AIS.

1.2.1 (3) AIS Prevention

AIS prevention is critical for the preservation of Montana's wild fisheries and habitat. Treatment of AIS following introduction is difficult and eradication is often impossible, making prevention the most effective tool to protect fisheries resources, habitat, and infrastructure. Prevention is addressed through regular inspections and certification of fish hatcheries, ongoing early detection of waterbodies across the State, and watercraft inspections.

Watercraft are the primary source of AIS transport among waterbodies and across state lines. Watercraft inspection is the primary tool to address that pathway, ensuring boats are clean, drained of all standing water, and dry prior to launching in another waterbody. Each inspection is an opportunity to educate boaters on how they can help prevent the movement of AIS. Montana follows Uniform Minimum Protocols and Standards that have been developed in coordination with other western states to ensure consistent and effective inspection and decontamination. Stopping at watercraft inspection stations is mandatory and enforced by FWP wardens, the State Police, and local county sheriff departments. Stations are established on major routes of travel and operated during daylight hours throughout the boating season. Station locations and periods of operation are determined by the AIS transport risk in the affected area. Major highways entering the state from the south and east, and locations crossing west over the Continental Divide are priority areas due to boat traffic coming from dreissenid mussel positive areas. Boats entering from the west are a high risk for transporting other AIS including Corbicula clams, Eurasian watermilfoil, and flowering rush.

Over 110,000 boats are inspected each year in Montana, with more than half inspected by contracted partners. Boats with ballast systems entering from out-of-state and crossing west over the Continental Divide must be decontaminated prior to launch (§80-7-1030, MCA). In 2022, 53 mussel fouled vessels were intercepted along with over 600 transporting aquatic plants. Wakeboard boats and boats with ballast systems cannot be fully drained, making them high risks for AIS transport. When boats are identified with AIS, they are decontaminated using hot water washers on-sight, to ensure AIS are killed and removed. Decontamination of a ballast system involves using hot water (120 F) and can take from 15 minutes to several hours to complete. For mussel fouled vessels, an additional dry time is often required to ensure the vessel is free of any live AIS.

1.2.1 (4) Early Detection

If prevention fails, early detection of established AIS populations is critical to prevent further spread and facilitate an appropriate response for control or eradication. AIS can spread rapidly through the movements of fish, water, equipment, or watercraft. Early detection facilitates early implementation of measures to prevent further spread of AIS, such as quarantine or mandatory inspection, and improves the probability of effective control or eradication.

All major waterbodies (lakes, reservoirs, rivers, streams, and ponds) in the state are assessed annually to determine the risk of AIS introduction. The assessment evaluates boater and angler use, proximity to known AIS populations, and water chemistry. Then, each waterbody is ranked based on risk of AIS introduction. The highest risk waterbodies such as Flathead Lake and Fort Peck Reservoir are sampled frequently, often with monthly samples collected from multiple locations. Lower risk waters are sampled less frequently, with some sampled every two to three years. Additionally, any waters used as donor streams or ponds for fish transfers are evaluated for both AIS and fish pathogens prior to the transfer (see Fish Stocking, Transfers, and Importation Section 1.2.2(2)).

Montana uses a variety of techniques for AIS early detection. Sampling techniques vary to target a variety of AIS and increase the likelihood of early detection. Sampling methods include the use of plankton nets, kick nets, Ponar dredges, benthic sleds, plant rakes, shoreline visual surveys, visual surveys, artificial substrate samplers, rock picking, mussel detection dogs, eDNA, snorkeling, and SCUBA diving. All of Montana's early detection methods are described in the AIS Field Sampling and Laboratory Standard Operating Procedures. These methods have been peer-reviewed and are coordinated with partners and neighboring states.

The FWP Fisheries Lab in Helena processes field samples using the techniques outlined in the AIS Laboratory Standard Operating Procedures. The lab is not only essential to the work completed in Montana, but also supports many surrounding states through a contract with the USFWS. The lab typically processes more than 3,000 samples a year and has helped to identify new mussel populations in nearby states.

1.2.1 (5) AIS Rapid Response and Control/Eradication

Being prepared to respond to a new detection of AIS is critical for preventing further spread and possibly facilitating eradication. FWP works closely with partners to help ensure all management agencies and other interested parties are prepared when AIS are detected. Rapid response exercises are held periodically to ensure all involved parties are clear on roles, responsibilities, and expected courses of action. Those exercises help ensure all parties involved respond quickly to contain and potentially treat AIS.

Having the ability to treat and possibly eradicate new AIS infestations is an important part of responding to a new detection. Control projects help contain AIS when eradication is no longer feasible while eradication efforts are often only possible when AIS are found soon after detection. Some examples of control projects FWP has been involved with include lake drawdown for invasive corbicula clams in Lake Elmo in Billings in 2019 and herbicide and diver control of Eurasian watermilfoil in Nilan Reservoir near Augusta in 2021. While necessary at times, the cost of response is much greater than the cost of prevention and much less likely to succeed.

1.2.2 Fish Health

Due largely to Montana's dedication to wild fish management, the introduction of new and novel fish pathogens (disease causing organisms) into hatchery and wild fish populations within Montana can have long-lasting, detrimental effects. Once introduced, pathogens can cause acute and chronic diseases, affect food webs, and be difficult or impossible to treat or remove. The fish health program monitors fish populations (hatchery and wild) through sampling to locate new pathogens that are introduced, track the distribution of existing pathogens, and to help better understand the effects of aquatic diseases. Fish health staff work closely with fisheries biologists, hatchery personnel, and AIS staff to identify monitoring needs and priorities.

The fish health program tests fish for both preemptive and reactive reasons. Preemptive testing involves testing fish that appear healthy to determine whether specific pathogens of concern are present at sub-clinical levels. Testing is completed using standardized methods, which are described in the Bluebook Manual, published by the Fish Health Section of the American Fisheries Society. Reactive sampling is used to determine the cause of the problem when clinical signs or mortality are reported in individual fish or fish populations. The department may take a variety of actions if certain pathogens (ARM 12.7.502) are found in hatcheries (§87-3-225, MCA) or in the wild. Therefore, preemptive, and reactive sampling are conducted on both hatchery and wild fish populations. The fish health program works closely with the AIS program to facilitate the detection and prevention of AIS and fish pathogens in the fish hatchery system (see Hatchery Biosecurity Section 1.3.1(1)).

1.2.2 (1) Pathogens of Concern and Disease Outbreaks in Montana

The introduction of harmful fish pathogens into wild fish populations can have drastic adverse effects and a great deal of effort is spent limiting or preventing such introductions. Despite those efforts, new pathogens are occasionally introduced into Montana waters. The following outlines some of the pathogens and diseases that have been detected or could create issues for aquatic habitats and the organisms they support if introduced in Montana. The list is not intended to be all inclusive and the risk that novel or emerging pathogens have already been introduced but have not yet been detected exists (ARM 12.7.502).

Myxobolus cerebralis, the parasite that causes whirling disease, was discovered in Montana in the mid-1990s and has since become widespread in the state. The response of fish populations to whirling disease has been mixed, with some populations rebounding quicker than others. After the first introductions of the whirling disease parasite, significant declines were noted especially in younger year classes of rainbow trout and other salmonids, most notably in the Madison River. In some river systems, populations have developed resistance to the parasite where exposure to the disease is low during susceptible life stages. Species composition has changed in rivers where susceptible species, such as rainbow trout, are less abundant following whirling disease outbreaks than species that possess natural resistance to whirling disease, such as brown trout.

Viral Hemorrhagic Septicemia (VHS) was discovered in the Great Lakes in 2004. Although it is not believed to be in Montana, VHS has had significant impacts on many FWP fisheries programs. VHS is one of the most concerning fish pathogens in North America because mortality rates associated with the disease are high for many species. Widespread prevalence of VHS outside of Montana make it difficult to secure healthy fish and eggs for introduction efforts throughout the state.

In 2012, Infectious Hematopoietic Necrosis Virus (IHNV) was detected in kokanee salmon in the Kootenai River and Lake Koocanusa. While the pathogen has not been detected outside the Kootenai River drainage, there is concern that the virus could mutate and subsequently spread to other species.

Tetracapsuloides bryosalmonae, the parasite that causes Proliferative Kidney Disease (PKD), killed many mountain whitefish in the upper Yellowstone River during the summer of 2016. High stress conditions (low flows and high-water temperatures) combined with exposure to the parasite) are suspected to have resulted in the mortality of hundreds of thousands of whitefish in the river over a very short period. Large portions of the river were closed to recreation during the PKD outbreak to reduce stress on fish. Subsequent surveys revealed widespread prevalence of the parasite throughout Montana, causing concern about the potential for future outbreaks in other rivers.

It is important to recognize that pathogens are always present in individual fish and fish populations. Under ideal conditions with healthy aquatic systems, disease is a rare event. But when external stressors become prevalent, organisms that do not normally cause problems can begin to cause disease and in some cases mortality. Subsequently, the reduction and management of stress in fish populations is an important component of managing disease in wild fish populations. Stress in fish can be both acute (sudden and severe onset) and chronic (long-term or constant exposure to stressful conditions that may not be as severe as acute stressors). Some causes of stress have limited control mechanisms, such as changing weather patterns. The Aquatic Habitat Chapter (Chapter 1.1) describes the extent fisheries managers in Montana go to maintain high quality aquatic habitat to minimize stress on wild fish populations, which in turn reduces the outbreak of disease. As drought cycles continue in the West, and as human populations continue to expand and encroach on aquatic systems, managing stress on fish populations and limiting disease outbreaks will become increasingly challenging.

1.2.2 (2) Fish Stocking, Transfers, and Importation

Fish pathogens and AIS are easily spread through fish stocking and movement activities. To reduce the risk associated with fish stocking, FWP annually inspects all hatcheries (state, federal, and commercial) for both fish pathogens and AIS (§87-3-225, MCA). If an invasive species or pathogen is detected, the facility is quarantined, and actions are taken to minimize, or where possible eliminate the risk of the organism spreading from the affected facility. FWP has developed site-specific AIS and fish health inspection plans and conducts regular biosecurity assessments, making improvements where necessary (see Hatchery Biosecurity Section 1.3.1 (1)).

To meet fisheries management objectives, it is often necessary to move fish or fertilized eggs between locations within the state. These transfers have both conservation and/or recreational angling benefits and are undertaken when hatchery fish are unavailable or inappropriate for the affected waterbody's management objectives. While these transfers are beneficial, they also pose the risk of inadvertent transfer of pathogens and AIS. Risks associated with transferring fish from wild populations usually incurs significantly higher risk than from hatchery populations that have closed, fish-free water sources and biosecurity plans. To mitigate these risks, preemptive testing is done on wild source populations to determine whether harmful pathogens or AIS are present, and an evaluation of risk versus benefit is done by the fisheries management staff. Oftentimes presence of pathogens or AIS will preclude transfer of fish to other waters. However, fish from imperiled populations or populations with high conservation value may be transferred if pathogens are detected. For example, a stream with a localized nonhybridized native cutthroat trout population at high risk of extirpation may test positive for whirling disease, but fish may still be transferred to preserve locally evolved adaptations from that population. In this circumstance, only observed "healthy" fish would be moved; fish showing clinical symptoms of whirling disease (e.g., physical deformities, poor condition) would not be transferred. Additionally, the receiving stream will be evaluated for risk of fostering the potential pathogen (e.g., presence or absence of *tubifex* worms influence risk of whirling disease transmission, fish species present in the drainage). The Aquatic Health Advisory Committee (AHAC) makes recommendations to the Fisheries Division administrator on management actions or situations that pose risks of pathogen and/or AIS spread within the state. Decisions are made by balancing the risks with any associated benefits that come from the management action, acknowledging that greater risk is warranted for greater associated benefit.

It is often necessary to import fish or eggs from a variety of out-of-state sources into Montana. These importations can be done by FWP, other agencies and institutions, commercial hatcheries in Montana, or by private pond owners. Montana Statute requires a Fish Import Permit to be issued by FWP prior to importation (§87-3-210 and §87-3-221, MCA). This gives the department the ability to thoroughly check the source for the presence of harmful pathogens and/or AIS and to evaluate the risk that the importation poses to Montana's aquatic resources. As movement of fish back and forth between nearby states increases, it is important to work together with resource managers in those states to ensure that the risks associated with pathogens and AIS are appropriately managed.

1.3. Fish Propagation, Allocation, and Distribution

Montana state hatcheries have been in production for over 100 years. Oversight and operation of hatcheries was given to FWP through promulgation of §87-3-201, MCA and species allowed for stocking is found in §87-5-714, MCA, and ARM 12.7.701. Hatcheries play a critical role in Montana fisheries management by providing high quality fish where wild stocks do not meet angler demands and are essential for native fish restoration projects by assisting with rearing of wild collected gametes (eggs and sperm) and producing native fish to supplement wild populations where deemed necessary. FWP operates 12 fish hatcheries including two cool/warm water fish species facilities and ten coldwater fish species facilities. These hatcheries can be classified as broodstock and/or production facilities. The annual numbers of fish stocked by FWP fish hatcheries varies depending on spawning success and fisheries management objectives, but on average the hatchery system stocks 35 million fish into about 600 bodies of water.

1.3.1 Fish Propagation

Hatchery produced fish are used to establish or enhance recreational fisheries primarily in urban/family ponds, high-mountain lakes, prairie ponds, and large reservoirs. Fish species are stocked to provide a viable fishery where natural fish reproduction and recruitment is limited. Frequently, hatchery fish are used to restore sportfish populations that have been locally extirpated by various causes, such as drought, winter or summer kill, or chemical/mechanical removal. Hatchery fish also play a vital role in native species conservation.

Most stocked populations are put-grow-and-take fisheries, where fish are stocked from a hatchery early in life to take advantage of natural food sources, which helps to develop a 'wildness' as they grow and are taken by anglers when they reach a catchable size. The quality of stocked fish is considered more important than the quantity of fish to ensure fish managers have the best available product to meet fisheries goals while providing anglers with a quality fishing experience. Stocking healthy fish is key to managing wild fisheries alongside hatchery raised fish. Hatchery staff work closely with fish health and AIS staff to reduce the risk of introducing fish pathogens and invasive species that could significantly impact wild fish populations. Following good fish husbandry practices is critical, not only in producing high quality fish, but also to reduce the risk of stocking fish with active infections or clinical disease. Growing fish at appropriate densities, to avoid overcrowding, providing adequate nutrition, and providing adequate amounts of clean, pathogen-free water, are all examples of good fish husbandry practices employed by FWP.

1.3.1 (1) Hatchery Biosecurity

Biosecurity refers to measures aimed at preventing the introduction or spread of AIS and fish pathogens into a facility and minimize the risk of spread and introduction into waters around the State. Biosecurity has been a priority since the whirling disease pathogen was first detected in the state in the mid-1990s (see Fish Health Section 1.2.2). Since then, biosecurity measures have been incorporated into all twelve of Montana's fish hatcheries. The most important step FWP has taken to protect hatcheries from pathogens is to secure hatchery water supplies. Water supplies were secured by covering and containing the source water, usually a spring, eliminating the potential for a human, bird, or mammal from introducing unwanted pathogens into the affected spring. Operationally, hatcheries isolate and disinfect commonly used equipment, treat incoming eggs with chemicals like iodine, hydrogen peroxide, and formalin, and eliminate the use of lake water to temper fish on the hatchery trucks prior to release.

Hatcheries also incorporate work boot bathmats, hot water, and high-pressure sprayers to clean potentially contaminated surfaces. At Fort Peck and Miles City hatcheries with open water supplies, rotating drum filters and UV sterilization units are used to clean incoming water supplies. Recently, the importance of biosecurity has been re-emphasized due to the discovery of New Zealand mudsnails (an AIS) in a State hatchery, which resulted in the depopulation and decontamination of the affected facility. Routinely updated biosecurity plans address specific concerns at each facility regarding the potential for the introduction and spread of AIS and fish pathogens. Biosecurity plans improve overall facility security, fish health, and reduce economic losses due to depopulation or facility quarantines or closures. The plans are based around the AIS program's principle of "Clean, Drain and Dry" (see AIS Outreach and Education Section 1.2.1 (2)). For example, if hatchery equipment and infrastructure are thoroughly cleaned, drained of all water, and left to completely dry, the risk of spreading AIS and pathogens will be significantly reduced and, in most cases, eliminated. Annually, hatcheries clean raceways and other infrastructure using high pressure water sprayers, applying appropriate chemicals when necessary, and drying the infrastructure for a minimum of 30 days. A novel approach being tested at some hatcheries is lining discharge pipes with copper, which is intended to deter New Zealand mudsnails from entering facilities through volitional movement. If shown effective, this technique will be employed at all hatcheries with this particular risk.

1.3.1 (2) Coldwater Broodstock Hatcheries

A broodstock hatchery is a facility that holds captive mature fish which are artificially spawned and gametes fertilized. Broodstocks are developed by collecting gametes from mature adults in the wild and they are maintained in captivity through their life stages until they reach sexual maturity. Future year classes are collected from subsequent spawning adults in the hatchery and the broodstock becomes self-perpetuating. Fertilized eggs are collected at the brood station and either grown at the originating facility or shipped to a production facility for growth and eventual stocking.

FWP operates two rainbow trout broodstocks, the Arlee rainbow trout strain at the Jocko River Trout Hatchery located in Arlee and a Gerrard rainbow trout strain at the Murray Springs Trout Hatchery located near Eureka. Additionally, FWP hatcheries receive Eagle Lake rainbow trout eggs from the Ennis National Fish Hatchery operated by the USFWS. FWP staff also collect wild Eagle Lake rainbow trout eggs from Holter Reservoir located near Helena. Strains for production are chosen based on fish characteristics such as growth rate, size at maturity, and behavior, in addition to timing of spawning and egg availability. The Arlee strain grow quickly, reaching a catchable size within the first year, and are often easy to catch by anglers. Eagle Lake rainbow trout are slower growing but are typically a wilder fish providing anglers with more of a challenge than the Arlee rainbow trout. Gerrard rainbow trout are a piscivorous rainbow trout (a fish who's main diet is other fish), often attaining very large size, and are one of the longest-lived rainbow trout typically reaching maturity at age 5. Gerrards are often used where fishery managers are trying to control a forage species or trying to create a trophy fishery. Gerrards typically do best in large deep waters.

Two native cutthroat trout broodstocks are maintained by FWP, one for westslope cutthroat trout at the Washoe Park hatchery located in Anaconda, and one for Yellowstone cutthroat trout at the Yellowstone River hatchery located near Big Timber. These unique strains of cutthroat trout are used for both native species conservation and provide sport fish opportunities in areas throughout Montana. FWP utilizes genetic information to develop and maintain non-hybridized broodstocks. Managers use eggs, fingerlings, and adult fish from these cutthroat trout to restore populations and where fish removal projects have eliminated non-native fish. For sport fishing opportunities, fish from both cutthroat trout broodstocks are used for planting mountain lakes. These mountain lakes provide a unique fishery and a unique experience for anglers. Both hatcheries also provide catchable sized (fish > 8-inches in length) and adult fish for urban and family ponds, which provide an accessible opportunity for families, and others to catch a native species.

Where a native fish species exists and managers want to provide a more robust fishery, a sterile (triploid) fish may be used instead of a normal (diploid) fish. Triploid fish have three sets of chromosomes, unlike diploid fish that have two sets of chromosomes. Triploid fish are sterile and non-fertile, meaning they are unable to produce viable gametes for fish reproduction. Triploid fish are used in stocking programs around the state where native species are present. This allows triploid fish to be used as a sport fish without threatening the native population with hybridization. Triploid fish are produced at Murray Springs hatchery (Gerrard rainbow trout), Jocko River hatchery (Arlee rainbow trout), Washoe Park hatchery (westslope cutthroat trout), and Fort Peck hatchery located near the town of Fort Peck (walleye) for use throughout Montana.

1.3.1 (3) Coldwater Production Hatcheries

Production hatcheries raise large numbers of fish for stocking and tend to be larger than broodstock hatcheries. For example, Big Springs hatchery located near Lewistown produces around 1.0 million fish in 43 outside raceways compared to 300,000 fish in 8 outside raceways at Washoe Park hatchery, home of the westslope cutthroat trout broodstock. Coldwater production hatcheries (i.e., hatcheries that rear coldwater salmonid species such as rainbow trout and cutthroat trout) in Montana raise fish yearlong by utilizing natural spring water. The water supply at these hatcheries is at a constant water temperature ideal for coldwater fish species growth. FWP has three production facilities: Giant Springs located near Great Falls, Big Springs, and Bluewater Springs located near the town of Bridger. These production hatcheries on average produce 3.1 million rainbow trout, 40,000 brown trout, and 250,000 kokanee salmon for nearly 300 waters, including some of the largest coldwater reservoirs in the state: Canyon Ferry Reservoir, Clark Canyon Reservoir, and Georgetown Lake.

1.3.1 (4) Coolwater Hatcheries

FWP has two coolwater hatchery facilities. These two facilities include Fort Peck hatchery and Miles City hatchery. Together, these coolwater hatcheries stock on average 30 million fish a year including walleye, northern pike, tiger muskie, largemouth bass, perch, bluegill, crappie, channel catfish, and pallid sturgeon. These facilities grow fish mostly in large, man-made ponds, either earthen or lined. The Fort Peck hatchery has 45 acres of ponds and Miles City hatchery has 54 acres to utilize for fish production. The fish rely on natural food sources developed from incoming water and pond fertilization. The fertilizer is alfalfa based and is used to stimulate and produce phytoplankton (microscopic plant life), which then feeds zooplankton (microscopic animal life) for the young fry to eat and grow, compared to the coldwater facilities, that use commercially produced pelletized feeds that are highly developed to specific nutritional specifications. Coolwater facilities tend to be much more labor intensive than coldwater facilities. This includes preparation and repair of ponds, filling ponds with water, fertilizing ponds, stocking fry into ponds for growth, continually supplying fertilizer, draining of the ponds for fish collection, and stocking of those fingerlings in waterbodies designated by fisheries staff. The coolwater facilities are also much more reliant on mechanical infrastructure than the coldwater facilities. The coolwater hatcheries pump water, which comes with numerous challenges and associated high costs. The Fort Peck hatchery is responsible for raising and stocking walleye, northern pike, chinook salmon, and rainbow trout. The Fort Peck hatchery is also in charge of producing the states only triploid walleye for Bighorn Reservoir. Triploid walleye are stocked in Bighorn Reservoir to decrease hybridization risk with native sauger while providing angling opportunity for walleye. The Miles City hatchery raises and stocks a wide range of species including walleye, largemouth bass, tiger muskie, pallid sturgeon, channel catfish, yellow perch, and rainbow trout for stocking nearby ponds as well as to provide forage for the other species grown on site at the hatchery. The Miles City hatchery also maintains a broodstock of largemouth bass. The Miles City hatchery also acquired white crappie in 2022 to investigate the possibility of creating a broodstock.

1.3.1 (5) Wild Non-native Spawning and Propagation

Wild fish spawning consists of collecting eggs from a wild population and transporting fertilized eggs to hatcheries within the state. For example, kokanee salmon gametes are collected from Lake Mary Ronan and fertilized eggs are prepared at Flathead Lake Salmon Hatchery located near Sommers and its satellite facility, Rose Creek Hatchery located near Bigfork, before shipping to production facilities to grow to stocking size. Other wild non-native spawning and propagation include wild Eagle Lake rainbow trout in Holter Lake, and golden trout eggs are collected from Sylvan Lake in the Beartooth Wilderness.

The largest effort for wild gamete collection is the spring walleye spawn on Fort Peck Reservoir. This effort requires a large hatchery and lake crew, and volunteers to accommodate efforts. Mature adult walleye are collected, transported to temporary spawning barges on the reservoir, spawned, and adults released back into the wild. The fertilized eggs are transported to either the Miles City or the Fort Peck hatchery for hatching and grow out. Most of the hatched walleye are immediately stocked into reservoirs as fry or stocked into hatchery ponds for grow out to two inches before being stocked in reservoirs across the state.

Fort Peck is also home to the wild chinook salmon broodstock. When conditions allow, chinook salmon are collected from the reservoir via boat electrofishing to collect gametes. After the chinook salmon are spawned, the carcasses are provided to anglers who have a valid fishing license as a food source (chinook salmon die shortly after spawning). Fish from these fertilized chinook salmon eggs, are raised at the Fort Peck hatchery throughout the winter and early spring. The goal is to acquire enough fertilized chinook salmon eggs to produce five-inch fingerlings (juvenile fish) for release back into Fort Peck Reservoir during late spring.

1.3.1 (6) Native Fish Propagation for Conservation

Conservation efforts for Yellowstone cutthroat trout, westslope cutthroat trout, Columbia River redband trout, pallid sturgeon, and Arctic grayling utilize Montana hatcheries for eggs and fish from captive and wild origin. On rare occasions, to re-establish native populations, hatcheries stock streams that have had non-native fish removed (see Fish Removals Section 1.4.8). Sekokini Springs Hatchery located just north of the town of Coram was built to enhance and conserve the genetic integrity of westslope cutthroat trout. Fish biologists collect wild juvenile westslope cutthroat trout from headwater streams in the Southfork of the Flathead River basin. The fish are brought to the hatchery to be used as donor stocks for re-establishing non-hybridized westslope cutthroat trout populations in lakes that have been treated to remove non-native and hybrid populations. Hybrid removal eliminates the influx of non-native genes downstream from lakes and secures the state’s largest interconnected stronghold of westslope cutthroat trout. The Washoe Park hatchery also plays an integral part in westslope cutthroat conservation. Washoe Park is home to the westslope cutthroat trout broodstock and supplies native westslope cutthroat trout for stocking waterbodies throughout western Montana. The Yellowstone

River hatchery plays a similar role in the conservation efforts for Arctic grayling and Yellowstone cutthroat trout in southern portions of the state. The Miles City hatchery is involved with the conservation and rehabilitation of the endangered pallid sturgeon, in both the Yellowstone River and Missouri River basins.

Within the last five years, the hatchery system has added two isolation buildings located at the Washoe Park and the Sekokini Springs hatcheries. These buildings were designed and built to allow a broader use of wild fish and eggs. Although these buildings are on hatchery property, they are isolated with their own water supply and water discharge systems. This is for the purpose of bringing in wild broodstock, spawning those fish, and allowing the fertilized eggs to develop, hatch and grow for stocking. This is all done in the confines of these buildings, without risking production of other fish at the facilities due to pathogen and disease issues. To address biosecurity concerns, UV sterilization units treat outflow water to prevent the spread of any pathogen that may have been present among incoming eggs. Currently, the buildings are being used for westslope cutthroat trout and Arctic grayling conservation recovery projects.

1.3.1 (7) Federal Hatchery Partners

There are two USFWS fish hatcheries in Montana. The federal facilities are primarily responsible for stocking federal waters. Ennis National Fish Hatchery is a broodstock facility that plays a critical role in providing fish hatcheries around the country with several strains of rainbow trout eggs. The Creston National Fish Hatchery primarily provides trout species for fisheries management objectives on Tribal waters and mitigation purposes. The Creston facility produces bull trout eggs and fry for research purposes. In 2022, the Creston hatchery propagated Arctic grayling for recovery efforts in the Madison River drainage. For FWP, Creston does some triploid rainbow trout production.

1.3.2 Hatchery Allocation and Fish Distribution

There is a limited amount of rearing space within Montana's fish hatchery system. To efficiently operate each hatchery, the hatcheries must allocate rearing space to fit the priorities of fish management objectives. The guiding document for managing the allocation of fish rearing space in the hatchery system is the 6-year stocking plan. The 6-year stocking plan is a collaborative effort between hatchery and fish management staff to determine the type and species of fish to stock, where, how many, and what size of fish to stock. The plan allows hatchery managers to prepare and allocate rearing space within their hatcheries to meet those requests.

Once fish are grown to the specifications of the 6-year stocking plan, they are released into waterbodies in a variety of ways to assure survival in the wild. The Montana hatchery system uses many different techniques for stocking fish. The primary way fish are released is by large trucks. Three quarter ton and larger trucks, equipped with insulated aluminum tanks supplied with oxygen and aerators, can transport thousands of pounds of fish across the state with minimal stress on fish. Many of Montana's mountain lakes are inaccessible to vehicles, and in those situations helicopters are used to transport and release fish. Helicopters are also used for stocking prairie ponds, which has been found to be far more efficient than traditional truck stocking. Utility terrain vehicles (UTV), and all-terrain vehicles (ATV) equipped with insulated coolers supplied with oxygen are used to transport fish to remote areas that are inaccessible by larger vehicles. Additionally, fish are transported using backpacks and horseback into wilderness areas where rules prohibit the use of motorized vehicles. All FWP stocking data is maintained in a centralized database with all stocking information publicly available on the FWP website.

1.3.3 Outreach and Education at Hatcheries

In addition to raising high quality fish, Montana hatcheries are also a primary resource for informing and educating the public about fisheries and wildlife management in Montana. Hundreds of thousands of people, resident and nonresident, visit FWP fish hatcheries annually. Some hatchery visitors do not participate in fishing or hunting, and a visit to a hatchery is often their only contact with FWP and their only opportunity to observe and appreciate the fish raised. Hatchery personnel and hatchery displays provide information to visitors about FWP's fish and wildlife management activities and conservation efforts. Visitor centers are located at the Washoe Park hatchery, Giant Springs hatchery, Miles City hatchery, Fort Peck hatchery, and Murray Springs hatchery; other hatcheries have informational displays such as at Big Springs hatchery. Hatcheries are also important sites for educating school students, civic groups and the public, with tours given to thousands of students and the public every year. Students often are given the opportunity to get into a fish pond or rearing unit with hatchery personnel to spawn or collect fish or clip fish fins for marking purposes. Using math and science skills, students learn to sample groups of fish, determine an average number of fish per pound, and then determine when the fish will be ready for stocking. Staff are often invited into classrooms to give an overview of the work they do, help teachers with fish physiology and anatomy lessons, and give virtual tours of hatcheries. Educating new anglers, and potentially spurring an interest to pursue a career in fish biology, is a critical component of the FWP Mission.

1.4 Fisheries Management Tools and Techniques

As outlined in the FWP Vision and Guide 2016-2026, one of the core values of the department is to use science to inform and make management decisions. FWP staff use a variety of tools and techniques to collect reliable biological data to be used when managing fish populations. Data is collected and used for monitoring of long-term trends of fish populations, evaluation of stocking objectives, effectiveness of fishing regulations, research of specific management challenges, identification of appropriate management actions to maintain or improve fisheries, among several other activities. Collected biological data is shared with the public and decision makers to assist in using biological information to balance the needs of managing fisheries resources while meeting the demands of the public. Fisheries programs used to collect biological data and use that data to make resource decisions are outlined below.

1.4.1 Management Planning

In addition to the Statewide Fisheries Management Plan, FWP may develop fisheries management plans for specific issues (e.g., Aquatic Invasive Species Plan), areas (e.g., Upper Missouri River Reservoir Fisheries Management Plan), waterbodies (e.g., Fort Peck Reservoir Fisheries Management Plan), or species (e.g., Management Plan for North Dakota and Montana Paddlefish Stocks and Fisheries). Those plans identify the management direction for a species or collection of species within a waterbody or a broader geographic area, such as a drainage or the entire state. Management plans describe the resource being managed, the rationale for management direction, and specific actions that will be implemented to accomplish goals and objectives. Strategic planning ensures that staff evaluate management actions to ensure they are consistent and adequate to achieve stated goals and objectives. Through this process, a written record is created, which provides continuity over time. In addition to providing fisheries managers with documented and scientifically sound fish management practices and strategies, the public benefits from the transparency of a well-constructed plan as it becomes a readily available source of information and rationale behind FWP's fisheries management actions. Further, the planning process provides opportunity for the public to engage with FWP and help shape management direction for a given area of the state or relevant species of interest to the public. Development of management plans are heavily reliant on public input to balance public demands with resource needs and capabilities.

Fisheries management plans identify and respect other jurisdictions that have authority over the affected aquatic resources. Jurisdictions with exclusive authority over fishery resources include Glacier and Yellowstone National Parks and tribal nations located within Montana's borders. Flathead Lake is a unique example of a shared jurisdiction with co-management responsibilities between FWP and the Confederated Salish and Kootenai Tribes (CSKT). Another unique jurisdictional situation involves fisheries management in congressionally designated wilderness areas. Federal law and courts have acknowledged the primacy of states to manage the aquatic resources within wilderness areas. There are certain management activities that were evaluated to accommodate restrictions on the use of mechanized equipment as provided for in the Wilderness Act (PL 88-577). Through an agreement with the U.S. Forest Service, Bureau of Land Management, and the Association of Fish & Wildlife Agencies, mechanized means (such as helicopters or all-terrain vehicles) to stock fish in waters within a wilderness area are permitted only if such practices were in effect prior to the creation of the affected wilderness area. For example, lakes in the Absaroka-Beartooth Wilderness that were stocked by airplane or helicopter prior to 1964 may continue to be stocked in such a manner. Stocking that was initiated postwilderness designation may continue but must be done without the benefit of mechanized means (e.g., on foot or with pack animals).

Currently, waterbody specific management plans are in place for the upper Missouri River reservoirs (Canyon Ferry, Hauser, and Holter reservoirs and associated river sections), Fresno Reservoir, and Fort Peck Reservoir. Individual species plans are in place for paddlefish (co-managed with North Dakota). Similar to management plans, conservation strategies or MOUs to guide management actions are in place for Yellowstone cutthroat trout, westslope cutthroat trout, Arctic grayling, pallid sturgeon, and are under development for bull trout. Management plans and conservation strategies are regularly reviewed and updated to ensure they adequately maintain aquatic resources relevant to public and resource needs.

1.4.2 Fishing Regulations

Fishing regulations are likely the most visible management tool available to fisheries managers and play an important role in managing fish populations. Fishing regulations are intended to preserve, protect, and enhance fish populations while affording the affected public with the opportunity to catch and harvest fish. Fishing regulations must balance simplicity to facilitate public understanding while achieving the desired biological outcome. Regulations work in concert with the other management tools, especially population monitoring (see Monitoring Fish Populations and Ecological Health Section 1.4.3), which is a critical element of informing the need for regulation changes and evaluating their effectiveness.

Fishing regulations are prescribed under three general scenarios: 1) conservative, designed to limit anglers' influence on fish populations; 2) liberal, intended to use angler harvest to influence fish populations by reducing overall abundance or abundance of certain sizes of fish; and 3) general, where angling is not expected to result in population scale impacts from catching or harvesting fish and is often consistent with surrounding waters. Regulation proposals are made by fisheries managers based on the best available biological science and may be used to protect rare or protected species (e.g., Species of Concern and Threatened or Endangered species), enhance fish quality or trophy fish production, balance predator/prey population structure, protect vulnerable life-history stages such as spawning, or create a balance within a complex fishery to optimize angler opportunity and satisfaction.

The goal of fishing regulations is to make them effective but also as simple as possible to improve public understanding and angler compliance. Within each of the three Montana Fishing Districts (West, Central, and Eastern) there are "standard fishing" regulations in place and applicable to all waterbodies, with exceptions listed for specific waters that have regulations that vary from the district standard fishing regulations. Fisheries managers work closely with anglers to identity and address concerns, changes in satisfaction, or changes in the creel. Anglers often advocate for a regulation change to address perceived population issues, such as overharvest or unsustainable harvest of large fish. However, in many cases, fisheries data do not support those claims. Fish populations are limited by many other factors, such as poor habitat, deleterious water operations, or limited survival at an important life-history stage, whereupon changes to the regulations would have no impact on the fishery. Additionally, many fisheries in Montana do not receive enough angling pressure for conservative or liberal fishing regulations to impact a fishery.

FWP managers consider all factors when evaluating the need for a regulation change. Objectives of a regulation change must be defined to determine how angling affects a fish population and how regulations may change that interaction. FWP uses the best information available to evaluate the status of a fish population and factors limiting the fishery. The department typically does not recommend a regulation change when angling is not a limiting factor. Sometimes, regulations are used as a stopgap while other population limiting factors are addressed. For example, conservative regulations may be adopted while habitat improvements are made to improve the overall fish population.

In addition to regulations based on biological recommendations, other regulations may be put in place to address social issues. For example, fishing from a boat may be restricted where conflicts exist between wade and float anglers. Many regulations are perceived as biologically based but are rooted in social value judgements. For example, the broad use of catch-and-release regulations is perceived as a biologically sound management practice, but practically speaking, it removes a critical management tool (harvest) commonly used to maintain or improve a fishery. In many popular fisheries there is a desire to protect large fish from harvest; however, biologically, few large fish are caught and imposing a length restriction or other measure can unnecessarily limit fishing opportunity with a regulation that does not influence the fish population. The FWP's fisheries management philosophy is always to provide harvest opportunity where biologically appropriate. To the extent possible, FWP will recommend fishing regulations based on biological information and sound fisheries science.

The Fish and Wildlife Commission has statutory authority (§87-1-301 and §87-1-303, MCA) to establish seasons, bag-limits, possession-limits, and season-limits for all species of game fish. The commission may also declare a closed season on any fish species or population threatened with undue depletion, for any cause. Collectively, those limits and seasons are referred to as "fishing regulations." FWP, through development of the Statewide Fisheries Management Plan and associated waterbody or species-specific plans, provides the commission with regulatory recommendations based on biology and sound fishery science. The regulation-setting process is currently conducted annually but will change to a biennial process starting with the 2025 regulation setting period and will coincide with the implementation of the Statewide Fisheries Management Plan.

During the regulation setting process, FWP conducts scoping to seek input from the angling public, fisheries staff, enforcement officers, and others within the department to address concerns that might arise from regulation changes. FWP staff use the best available biological information to evaluate regulation requests and make recommendations to the commission. Public comment on the department recommendations is collected prior to the commission making a final decision. The commission will weigh the biological recommendations against any social issues brought by the angling public. Except for emergency or time-sensitive changes, the regulations adopted by the commission go into effect March 1st of the year following the promulgation of the new regulation. Those changes are captured in the Fishing Regulation booklet for the affected year.

FWP is implementing a biennial regulation process to provide affected fisheries with sufficient time to respond to new regulations (i.e., realize the effects of the regulation) and to reduce the time that staff and the public must devote to the regulation setting process. Ideally, a fishing regulation will be in place through at least a generation of the fish population (typically 3 to 4 years) for any impacts to be fully realized and assessed. Typically, regulation changes fall into one or more of the following criteria:

- Clarifications: regulation change is needed to clarify intent of regulation or to correct typos or other errors that led to erroneous information in regulations;

- Enforcement: regulation change is needed to improve enforcement efforts, to prevent illegal take, or to clarify intent to reduce unintentional violations;
- Conservation: regulation change is needed to conserve or protect a population or species of interest including game fish, native fish, and those listed as Threatened or Endangered;
- Relevancy: the regulation may no longer be relevant, for example, a species may no longer be present;
- Management Plans: implementation of regulation changes in response to a prescribed management action outlined in a management plan (see Management Planning Section 1.4.1).

1.4.3 Monitoring Fish Populations and Ecological Health

Data describing trends in fish abundance, distribution, and genetic variation provide staff with essential information to manage Montana's fisheries. These data are used to monitor fishery trends and to understand how human-caused or natural changes affect populations. Making informed, scientifically and biologically-sound, and ecologically defensible decisions is only possible through effective and comprehensive data collection and interpretation.

Fisheries monitoring or fish sampling are important for evaluating wild fish populations; determining if certain factors, such as habitat limitations or environmental variables, are limiting a fishery; evaluating impacts of angling or harvest; determining effectiveness of stocking waterbodies; detection of disease in a population; or for any other circumstance where data is needed to assess a fish population or aquatic resources. The most common type of data collected includes fish size and age, although several other metrics used include temperature and flow, location, cover, environmental conditions, and other habitat variables. Depending on the objectives of the survey, some individual fish may be killed to collect tissue samples or age and growth information. More often, individual measurements and samples are taken, and fish are released relatively unharmed.

Fisheries crews use a variety of techniques to answer research and monitoring questions. The gear used and the methods of collection relate to waterbody-specific conditions and species or fish communities targeted. Each sampling gear has benefits and risks and biologists strive to use the most effective gear in a way that causes the least harm to fish or the fish population as a whole, and provides the best information to answer the questions or issues being addressed by the action. Further, as technologies improve, fisheries scientists constantly evaluate new techniques and share that information with peers. Much of the sampling work conducted by fisheries staff is informed by the American Fisheries Societies' standard sampling techniques, methods for fish biology, and fisheries methods. This professional society is the one of the largest and oldest professional entities in the world and is dedicated to strengthening the fisheries profession, advancing fisheries science, and conserving fisheries resources.

The methods used to sample fish can be broken down in a number of ways, including the use of active or passive gear. Passive gear relies on the fish to move or behavior in such a way as to be captured, trapped, or entangled. Passive gear is generally simple, but may be selectively-specific to size or species, because this type of equipment relies on fish movement or behavior. In contrast, active gear is moved by the user to collect fish or other aquatic organisms (like invertebrates). Active gear is generally quicker to use, but may result in fewer animals being captured, and active gears may be less selective. It is the job of FWP staff to consider, evaluate, and learn each technique used. Fish sampling gears commonly used by FWP staff are summarized in Table 1.4.3-1.

Table 1.4.3-1: Types of fish sampling gear, common uses, benefits, limitations, and special considerations of common fisheries sampling and monitoring gear. Depending on objectives, a combination of gears may be used for sampling. Other sampling methods not captured in this table may also be used.

Gear	Common uses	Type	Benefits	Limitations	Special considerations
Electrofishing					
Jet boat electrofishing	Large rivers, non-wadable, long-term monitoring, fish presence, collection for bioassays	Active	Non-lethal	Can only sample some habitats that are accessible by boat	Species of concern, temperature thresholds, behavior
Drift boat or raft electrofishing	Medium sized rivers and non-wadable streams, long-term monitoring, fish presence, collection for bioassays	Active	Non-lethal		Species of concern, temperature thresholds
Towable barge electrofishing	Large wadable streams, long-term monitoring, fish presence, collection for bioassays	Active	Non-lethal, capable of sampling many habitats	Limited by water depth and flow	
Backpack electrofishing	Small streams, long-term monitoring, fish presence, collection for bioassays	Active	Non-lethal	Can only sample small streams	
Netting					
Gillnets	Lake, reservoir, and pond sampling; capture for bioassays testing	Active or passive	Simple to use, can be actively fished for non-lethal captures	Passively fished is lethal	Bycatch of nontarget species, can select for certain sizes or physiology
Trawl	Lakes, reservoirs, and rivers; Long-term monitoring	active	Non-lethal		Substrate, habitat, and fish species and their behavior need to be
Seine	Long-term monitoring of shallow, wadable area, that are not suitable for other gears, catch per effort	Active	Non-lethal, captures small fish	Ineffective in some habitats, high variability	Habitat limitations

Gear	Common uses	Type	Benefits	Limitations	Special considerations
Hoop nets/ trap nets/ weir traps	Lakes, reservoirs, rivers	passive	Live releases	Passive, not effective in some habitats	
Angling					
Hook and line	Presence information, catch per unit effort; can be used in many habitats	Active or passive	Non-lethal, simple, not gear intensive	Limited catch	Relies on fish behavior, may select species and size
Setlines	Presence information, catch per unit effort; used mostly in rivers but can be used in lakes and reservoirs	Passive	Efficient	Passive	May select for species and size (which can be good)
Other Monitoring Techniques					
Photo/video captures	Presence of fish; lakes, rivers, and reservoirs	Active or passive	Can show presence, or habitat use	Non quantitative, water clarity, differentiation between species, maybe be selective	
Drone (aerial surveys)	Presence of fish; habitat evaluation or changes		Non-lethal	No handling of fish	
Redd counts	Long-term monitoring, measure of number of spawners		Non-lethal		Water clarity, fish size

Once captured there are a variety of techniques used to identify, track, and monitor fish. These techniques range from conventional marks (like fin clips), tags, or even genetic and microchemical methods. Advancements in these technologies are rapid and provide unprecedented insight into fish species life histories, behaviors, and evolutionary history.

The rigor and amount of sampling that occurs on a fish population depends on the objectives of the monitoring or research. For many fisheries, a relatively simple calculation of relative abundance or catch per unit effort (CPUE) is adequate to evaluate a population. Common metrics include reporting number of fish or species per net for netting surveys or number of fish per minute from electrofishing surveys. These types of evaluations allow fishery managers to assess the number of fish and the size of fish in a population relatively quickly, but population assessment can be limited if few fish are collected or if surveys are conducted with limited frequency. Fisheries with more angling pressure and public interest are typically sampled using more rigorous surveys. Popular tailwater salmonid river fisheries are commonly sampled annually using multiple pass electrofishing surveys to estimate population size, often measured as number of fish per mile. Models from these types of surveys are commonly referred to as “mark-recapture” point estimates, as an initial sampling event will capture target species and those fish will be “marked” with a unique identifier, such as a fin clip or a unique external tag. Subsequent sampling conducted shortly after, compares the proportion of unmarked fish with the number of fish marked from previous sampling to estimate the number of fish per mile.

Results from monitoring and survey activities are used to explain fisheries and aquatic habitat information and used by the public, angling groups, conservation partners, and other stakeholders to understand fishery trends and provide informed input for potential management actions. Information is disseminated to the public through a variety of sources ranging from peer-reviewed publications in scientific journals, through the online FishMT website, to talks with local sporting groups. FishMT is unique in that it provides basic fishing information, such as access site information and species information, but also allows direct public access to FWP monitoring data.

Genetic data have played an integral role in fish population monitoring in Montana since 1979. Annually, genetic samples - typically a small section of fish tissue - are collected from thousands of individuals of numerous fish species throughout the state to address a wide variety of fish management and conservation needs. For example, genetic data are necessary for species ID in cryptic species or life stages (e.g., larval pallid and shovelnose sturgeon), and for quantifying native vs. non-native genetic ancestry in individuals and populations of cutthroat trout and redband rainbow trout, that is, hybridization status. Genetic samples are also used to document the amount of genetic variation in species of conservation concern (e.g., bull trout, Arctic grayling and westslope cutthroat trout), and that information is used to prioritize management actions that address limited genetic variation and potential inbreeding (e.g., translocations). Genetic data also plays a fundamental role in helping identify and demarcate conservation and management units (e.g., populations), which in turn directly informs the spatial scale at which populations are monitored and managed. Finally, in some species, genetic sampling is critical for quantifying abundance or a surrogate for abundance (e.g., for a population with low abundance or difficult to sample, genetic analysis can be used to determine viability and extirpation risk).

Beyond monitoring wild fish populations, genetic data are used extensively within FWP’s hatchery system. Genetic samples are periodically collected from various broodstock to ensure hatchery practices minimize inbreeding and conserve genetic variation, especially in conservation broodstock. Genetic samples are also collected from all wild-caught individual trout that are used for hatchery propagation efforts focused on westslope cutthroat trout and redband trout (primarily at Sekokini Springs Hatchery, Washoe Park, and Libby Field Station). Last, environmental DNA (eDNA) sampling has been increasingly used to identify non-native species (i.e., AIS) in streams, rivers, lakes, ponds, and even hatchery settings. Although FWP uses eDNA sparingly and strategically, the use of this tool will likely increase in the future as needs arise. More broadly, genetics is the fastest moving field in all of biology, and FWP uses cooperative research relationships (primarily with the University of Montana) to ensure the best-available conservation genetic research, science, and tools are used, as appropriate, to help manage and conserve Montana's fisheries.

1.4.4 Research Program

Scientific research is essential to accomplish the mission of FWP and to effectively manage Montana's fisheries and aquatic resources. As discussed throughout the Statewide Fisheries Management Plan, managing aquatic resources is complex and requires staff to not only remain current in fisheries management training and current methods but also requires staff to engage in applied research.

To be most efficient and to ensure use of the best available science for managing Montana's fishery resources, FWP relies on data from a variety of sources. More specifically, FWP relies on developing partnerships with state and federal agencies, universities, and nonprofit organizations. These partnerships have and will continue to enable FWP to conduct world class research with a minimal investment. In addition to providing fishery managers and decision makers with the best available science to support management decisions, the research program facilitates undergraduate and graduate student education, and staff professional development and training.

Many research projects consider both biological and social elements. To effectively manage any fishery, the human or social component must be acknowledged and understood. Commonly, this is accomplished through an evaluation of angler harvest or other human activities associated with a fishery. Even in non-harvest (i.e., catch-and-release) systems anglers have an impact on individual fish and potentially at a population level. As indicated throughout Part II of this plan, one of the largest gaps in information is from the impacts of non-harvest anglers on fisheries. This is an example of an area that FWP is considering for future research.

Southwestern Montana, including the upper Missouri and upper Yellowstone River basins, supports some of the most well-known rainbow and brown trout fisheries in the world and provide a significant portion of the statewide economic benefits. Between 1983 and 2017, total fishing pressure doubled. In addition to angling, other forms of water-based recreation such as rafting, kayaking, inner-tubing, and sight-seeing have increased, though these other kinds of recreation have not been quantified. Of concern is the observation that the rainbow and brown trout populations in sections of the Beaverhead, Big Hole, Madison, and Ruby rivers have declined to near historic lows in recent years. This, along with public concerns about the number of people recreating on the rivers and how that affects the quality of the experience and the aquatic resources, point to the need for a comprehensive study of juvenile trout recruitment, adult trout survival, fish health, and river recreation. Beginning in 2024, and continuing for several years, several cooperative studies will be conducted with scientists and researchers from Montana State University. Results from these studies will directly inform management approaches to ensure trout population conservation while providing ample recreational opportunity.

Another recent priority identified for research is crayfish. This is an example where additional information is required to determine whether crayfish regulations are necessary, or where implemented, if regulations are meeting desired objectives. Very little is known about crayfish throughout Montana and information gained from future research projects will be used to help fisheries managers adequately learn, understand, and manage this aquatic resource.

Other research projects focus on the impacts of habitat fragmentation, requirements for native species conservation, techniques to improve population modeling or sampling, impacts of novel or existing fish pathogens, and many more, all with the objective of providing FWP with the information necessary to better manage Montana fisheries. Research and the subsequent publishing of such research also facilitates greater public understanding of fisheries management. Montana is a world leader in wild fish management to achieve economically and socially important recreational fisheries. Relying on world class research and monitoring has produced world renowned recreational fisheries.

To expand capacity for analyzing large complex data sets and to help answer the complex questions that are encountered in fisheries, a biometrician, also known as a "quantitative ecologist," was recently hired by the Fisheries Division. Previous staff relied on quantitative ecologists at universities and the USGS but having one on staff increases efficiencies and provides additional quantitative services for FWP staff. This position will act as a resource to biologists and will help to develop a proactive long-term direction for the fisheries research program.

To increase public transparency and better communicate research goals and priorities, a process for screening and prioritizing research projects has been developed by FWP. This process will help to ensure the most relevant and scientifically rigorous research is prioritized and effectively communicates those goals both internally to FWP staff and externally to the public. Current research priorities include:

- Maintain long-term monitoring of fish and their habitats and continue to explore more efficient and effective sampling techniques.
- Ensure harvest-focused fisheries remain sustainable by using contemporary and innovative approaches for monitoring and evaluation.
- Understand age, growth, and survival of crayfish in Montana and identify sustainable harvest levels.
- Quantify angling induced morality in catch-and-release fisheries including paddlefish and trout populations.
- Native species conservation and persistence.
- Viability of threatened and endangered fishes.
- Management of commercially important fisheries.
- Evaluation of the effectiveness of angling restrictions related to drought and high-water temperature.
- Invasive species.

1.4.5 Angler and Creel Surveys

In addition to monitoring fish populations and the general ecological health of aquatic systems, considerable effort is spent on creel surveys and statewide angling surveys. An essential aspect to fisheries management is understanding the effects of the anglers who use the resource. FWP monitors levels of use on all waters within the state to inform management strategies, including stocking needs in high-use fisheries, and can help to identify waters where recreational use rules (ARM 12.11.405 and

12.11.415) may need to be implemented to reduce conflict among anglers and other water resource users. The Statewide Angling Pressure Survey has been conducted by mail since 1958, and consistently every other year since 1989 when the Montana Legislature approved funding for an “Enhanced Survey of Angling Pressure,” to provide an accurate estimate of angling pressure (in angler days) on individual lakes, reservoirs, ponds, rivers, and streams of the state.

Angling pressure is summarized biennially by residency, waterbody type (stream/lake), drainage, and FWP region to create monthly, seasonal (summer/winter), and annual estimates. The pressure survey is sent out monthly, by mail, to a random sample of resident and nonresident license holders during the affected license year. The target sample size is approximately 100,000, representing between 20-25% of all licensed anglers. Anglers are asked which lakes and streams they fished, satisfaction and crowding ratings, access (boat/shore/ice), and primary species targeted, among other topics. Estimated angling pressure is calculated monthly for each waterbody, based on the number of respondents, number of days fished on a particular waterbody, and the number of eligible anglers that month.

The pressure survey provides FWP and the public with a reliable measure of angling pressure (angler days) to inform decisions related to fishing regulations, fishing access site management, development of fisheries management plans, and allocation of funds. The survey also helps determine the total economic value of an individual or composite fishery and refines/updates FWP's net economic values for cold-and warm-water streams and lakes by both resident and nonresident anglers. Economic estimates are used to inform local and statewide decision-makers about how angling and aquatic resources contribute to the statewide economy and contributions of local fishery resources to areas and communities. The angling pressure survey also used to update information about social factors, such as the attitudes and preferences of anglers. The statewide angling survey is conducted on odd-numbered license years, with the latest survey started in the spring of 2023.

Efforts are underway to evaluate incorporating email or other automated electronic or e-survey methods for gathering and more comprehensively understanding fishing patterns of licensed anglers. The impetus for the transition to e-surveys is primarily economical, as the cost of surveying via standard mail has risen to a burdensome level and the price of postage and related aspects of standard mail preparation and delivery continues to rise. Evidence also demonstrates a transition to e-surveys would likely improve response rates and thereby provide the agency, and affected public, with more comprehensive data to inform fisheries management. Due to a steady decline in response rates to the angler mail-in surveys over the last decade, especially by younger anglers, alternative survey modes, including mixed-method approaches (mail and electronic surveys) may help to reduce non-response bias and increase the representativeness of Montana anglers.

Traditionally, angler creel surveys have been conducted by staff in the field as anglers leave a particular body of water. Creel surveys are used to determine angler catch rates, harvest rates, size and number of selected species, fishing methods and tackle use, and target species. Waterbodies where surveys are conducted are variable, depending on management needs and fisheries issues. Some waters are surveyed on an annual basis, while others may not be surveyed more than once every five or more years. The creel survey often involves creel clerks interviewing individual anglers, handing out questionnaires to anglers, placing questionnaires at trailheads for use by backcountry anglers, or providing creel boxes with interview cards at prairie ponds. Aerial surveys and car counters are sometimes used to count anglers using large or remote fishing waters. Mail and phone surveys are used for targeting randomly selected anglers or a specific angling group. FWP conducts annual phone surveys of paddlefish tag holders and mail surveys of bull trout catch card holders to estimate catch and harvest of those species. Additionally, FWP will also conduct targeted surveys of specific angling groups, such as anglers who bow fish or use live baitfish for angling, to determine use and resource impacts.

Although traditional creel surveys are still relevant in many put-grow-and-take fisheries and where angler harvest can be high, such as with popular ice fishing waterbodies, many fisheries have restrictive regulations or waterbodies where few fish are voluntarily kept by anglers. In these circumstances little is known about what impacts angling may have on fish populations. For example, in some popular rivers, individual fish may be caught and released multiple times and may see increased mortality after several catch-and-release events. More information is needed to better understand impacts from catch-and-release fishing; therefore, FWP continues its work to better understand this relationship associated with popular species on Montana's most popular angling rivers.

1.4.6 Drought Related Fishing Restrictions and Closures

Changing weather patterns, with a trend towards longer/hotter dry periods have resulted in significant concern related to the ongoing and overall health of Montana's fisheries as well as access to fisheries. Many of the state's reservoirs and smaller waters have experienced conditions where fisheries have suffered due to ever-increasing ambient summer temperatures leading to severe and chronic water drawdowns, which in turn can impact fish population viability over the long and cold winter months. In smaller impoundments and ponds, sustainable fish management is thwarted by poor water quality conditions that can lead to both summer and winter fish kill events. In some situations, stocking plans have been adjusted due to lack of consistent water. In many cases there is little fisheries managers can do to respond to drought conditions except alert the public of conditions and make them aware of the impacts to fisheries. The Aquatic Habitat Chapter (Section 1.1) details water management strategies that can be used to address low water and high temperatures. The other tool available is fishing restrictions, used in extreme situations where limiting fishing opportunity is viewed as a last resort to protect coldwater fisheries during periods of low flow and high temperatures.

Quality habitat is essential for wild fish management and stressors, such as high temperatures or low flows, can negatively influence fish health and increase mortality rates. When environmental stressors and angling pressure are both high, the additional stress of angling can lead to issues including disease outbreaks, reduced spawning success, decreased growth rates, and increased mortality. The Fish and Wildlife Commission has authority (§87-1-301, MCA; ARM 12.5.501 - 509) to work with FWP staff to implement angling restrictions or full fishing closures to protect coldwater fisheries when high angling pressure and/or low flow or high water temperature have the potential to increase fish mortality. Implementation of restrictions or closures occur upon approval of the FWP Director and the Commissioner in the affected district. Angling restrictions prohibit fishing during the period of day when water temperatures are highest, between 2 p.m. and midnight (commonly called "Hoot Owl" restrictions). In contrast, full fishing closures prohibit all fishing activity in the affected waterbody(s) until conditions improve.

Implementation of fishing restrictions related to water temperatures and flow involve a deliberation on current and forecasted weather patterns, angling pressure, the potential of displaced anglers leading to higher concentrations of anglers in other areas, and other conditions that may contribute to increased or excessive fish mortality. The implementation of a restriction may be delayed if weather forecasts suggest a period of upcoming cooler temperatures or improved flows. Similarly, reopening or lifting restrictions may be delayed if favorable environmental conditions are forecasted for a brief period, such as a short-lived storm reducing water temperatures due to cloud cover or rain, followed by hot and dry temperatures soon after. Angling pressure and displacement of anglers is also considered when lifting restrictions and closures.

Extreme low flow and high temperature conditions have become more common. In 2021, the department implemented more restrictions/closures than any other year since the subject administrative rules have been in place (2008). That same year experienced records related to the length of time that restrictions or closures were in place and a record number of restrictions or closures put in place during a single day. In 2022, FWP reviewed and updated ARM 12.5.507 and 12.5.508 to increase consistency in rule implementation across the state. In recent years FWP has prioritized fishing restrictions communication, such as when and why restrictions are implemented or lifted to minimize impacts to anglers planning fishing trips. The FWP website, "Current Waterbody Restrictions," is updated as soon as restrictions or closures are implemented or lifted and press releases are prepared at least weekly to inform anglers about restrictions currently in place and areas that are close to meeting criteria for restrictions. Despite prioritized outreach, conditions can change rapidly, and deteriorating conditions may still impact fishing trips. FWP continues to identify strategies to improve communication during these periods to minimize the impacts of restrictions to anglers and ultimately safeguard the affected fisheries resources.

The following criteria, found in ARM 12.5.507, are used to determine whether to implement an angling restriction for a stream or river:

- angling pressure as determined by the department has the potential to contribute to excessive fish mortality; and
- one or more of the following environmental conditions has been determined by the department to exist:
    - in non-native salmonid streams designated in Appendix C, daily maximum water temperatures equal to or exceeding 73 degrees Fahrenheit at any time during the day for three consecutive days;
    - in cutthroat trout streams designated in Appendix C, daily maximum water temperature equal to or exceeding 66 degrees Fahrenheit at any time during the day for three consecutive days;
    - in bull trout streams designated in Appendix C, a daily maximum water temperature equal to or exceeding 60 degrees Fahrenheit at any time during the day for three consecutive days;
    - stream flows fall to or below the 5th percentile of daily mean values for this day based upon hydrologic records for that waterbody; or
    - water conditions meet the criteria for angling restrictions as stated in a drought management plan (Appendix C); or
    - other biological or environmental conditions such as, but not limited to, waterbody pollution, disease, or concentration of angling pressure due to other restrictions or closures that the department determines have the potential to contribute to excessive fish mortality.

A full fishing closure, prohibiting fishing at all times of day, may be implemented when:

- the restriction criteria continue to degrade, and dissolved oxygen is equal to or less than 4 ppm when measured in the early morning before sunrise; or
- water conditions meet the criteria for fishing closures as stated in a drought management plan.

Restrictions and closures, except on waters with a drought plan, will remain in effect until the following criteria have been met (ARM 12.5.508):

- In non-native salmonid streams designated in Appendix C, daily maximum water temperature does not exceed 70 degrees Fahrenheit for three consecutive days.
- In cutthroat trout streams designated in Appendix C, daily maximum water temperature does not exceed 66 degrees Fahrenheit for three consecutive days.
- Bull trout streams designated in Appendix C, shall remain closed until the following conditions occur:
  - daily maximum water temperature equals or does not exceed 60 degrees Fahrenheit for three consecutive days; and
  - when flow regimes provide adequate security habitat.

More details on implementation of ARM 12.5.507 and 12.5.508 are found within Part 2 of the Plan in the specific drainage sections. In general, cutthroat trout water designations were made when a significant portion of the angler catch was cutthroat, based on professional judgement which may include creel data. Bull trout waters were designated when a significant number of bull trout are present based on survey information and professional judgement.

1.4.7 Illegal and Unauthorized Fish Introductions

Historically, fish distribution in Montana was determined by the retreat of the glaciers about 10,000 years ago. When Europeans appeared in Montana, fish were introduced from other parts of the world and North America and moved around within the state, primarily for food and commerce. In the 1950s biologists started to recognize that many of these early introductions had significant negative influences on existing native and sport fish populations. Currently, fish introductions are tightly regulated by FWP (§§87-5-713 - 715, MCA; ARM 12.7.1501 - 1505) however, anglers continue to illegally introduce species by moving fish into or between private or public waters of Montana. In addition to the introduction of fish into a new water, illegal introductions have the potential to spread disease and AIS.

Introduced fish may prey on and compete with native or sport fish already present in a waterbody and can degrade habitat. Due to the biological carrying capacity of systems, and other potential factors, the illegal introduction of an additional species is often at the expense of existing fisheries. This can lead to reduced fishing opportunities, increased management costs, or costly mitigation to remove the illegally introduced species before the introduction creates problems or concerns related to existing native or other desired fish populations. Not all unauthorized introductions are intentional, including circumstances such as the release of live bait fish or the escapement of fish from private ponds.

More than 600 illegal or unauthorized fish introductions into more than 250 waters across the state have been documented, involving every drainage in the state. In northwest Montana (FWP Region 1) more than 400 individual cases have been documented associated with 142 waterbodies and 32 different species. The first documented illegal introduction was northern pike into Lonepine Reservoir in 1953. More recently, crappie and smallmouth bass are the most frequently illegally introduced species, and in 2022 smallmouth bass were illegally introduced into the headwaters of the Yellowstone River. It is likely many more illegal introductions go undetected until reported by anglers with incidental catch or by FWP monitoring crews. To date, 50 different species of fish have been illegally introduced in Montana waterbodies.

Once established, most illegally introduced fish species are nearly impossible to eliminate and their impacts are irreversible, especially in larger waterbodies. In some cases, primarily small ponds and streams, fish removal techniques (see Fish Removals Section 1.4.8) can be used to control or eliminate the illegally introduced species. For small ponds and reservoirs, dewatering or drawing down water levels coupled with physical or chemical removal of fish can effectively eliminate an introduced population. However, preventing introduction is the best strategy, and FWP's' education and outreach activities related to such practices is the is key to prevention. Angler reporting of illegal introductions and early detection is another important element of managing illegal introductions. Anyone can report illegal introductions by calling 1-800-TIP-MONT, which allows tipsters to remain anonymous and, in some circumstances, receive rewards. A consortium of angling organizations and conservation groups have pledged to increase the reward for prosecuted illegal introductions up to $13,850.

Intentionally introducing fish to Montana waters without authorization is a criminal action. Persons convicted face a fine of not less than $2,000 to more than $10,000 (§87-5-721, MCA). Violators may also be liable for damage restitution, the cost of restoration, or sentencing of up to a year in prison and loss of hunting and fishing privileges for at least 5 years.

Administrative Rules (ARM 12.7.1501 - 1505) were adopted in 2014 to provide FWP with direction regarding the appropriate management actions to take after the discovery of unauthorized fish introduction. The rules were promulgated due to increasing concerns over the impacts illegal introductions were causing. The rules recognize that unauthorized fish introductions are likely to have many adverse impacts, including but not limited to the following:

- Adverse impacts associated with competition with and hybridization or native, wild, and stocked fish populations.
- Potential to spread disease.
- Degradation of water quality.
- Degradation of aquatic habitat.
- Increased fishery management costs.
- Loss of angling opportunities and quality.
- Harm to local and regional tourism economies.

The rule directs the FWP and the commission to make prevention of, and response to, unauthorized species introduction a top priority. Prioritization is necessary to protect the previously existing fishery and suppress or eradicate the unauthorized species to maintain the existing management objectives associated with the affected fishery.

When a report of an unauthorized introduction has is received, the rule directs FWP to respond in the following manner:

- Begin an initial investigation within 30 days of the report to confirm that an unauthorized introduction has occurred and to estimate the distribution, abundance, age structure, and potential population expansion of the unauthorized species.
- Prepare an action plan for response, which identifies the immediate and long-term management objectives and management actions that may be implemented to achieve those objectives. The

management objectives shall be based on a risk and feasibility assessment, with consideration for the following:

  - risk the unauthorized species will expand into connected or nearby waters.
  - current distribution of the unauthorized species, if any, and the proximity of those existing populations to the new placement.
  - probability the unauthorized species will survive and propagate.
  - impact the unauthorized species may have on the existing fishery, especially any existing threatened or endangered species, native species, sport fish, and important forage species.
  - immediate and long-term impacts the unauthorized species might have on previously existing angling opportunities.
  - immediate and long-term economic impacts the unauthorized species may have on FWP, the public, and the economy.
- Attempt eradication or suppression if determined practical and necessary based on the risk and feasibility assessment, to protect existing fisheries, local economies, wildlife enjoyment, and angler opportunities.
- Identify and cite responsible parties for the unauthorized placement and seek penalties and restitution pursuant to the penalties and fines outlined in applicable rule and law.

FWP's action plan for responding to a confirmed unauthorized introduction may include the following management strategies:

- Discontinue stocking the waterbody if the presence of the unauthorized species reduces the effectiveness of the stocking effort.
- Discontinue stocking of any forage fish species that benefits the unauthorized species.
- Modify angling regulations for the immediate and connected waterbodies, which may include:
  - liberalizing or removing daily angling limits.
  - enacting catch-and-release fishing.
  - extending or removing the angling season.
  - allowing capture methods other than hook and line.
  - mandatory catch-and-kill or catch-kill-and-report regulations.
  - closing the water to all fishing.
- Deny applications for fishing contests that target the unauthorized species, except in cases where the department determines the contest is an essential tool for suppression or eradication and requires that the contest has catch-and-kill rules.
- Authorize commercial harvest or economic harvest incentives for the unauthorized species if statutory authority is provided and is prescribed by a management plan.
- Implement physical control measures to reduce the population of unauthorized species, including:
  - installation of fish barriers.
  - removal using chemical or mechanical methods.
  - Netting spawning fish or other techniques to reduce reproductive success.
  - habitat manipulation (e.g., reservoir drawdown).
  - removing illegal species when encountered incidental to other management or survey activities.
  - disturbing spawning areas to reduce survival.
  - implement angler harvest incentive programs.

Adaptive fisheries management is important for all fisheries. In the case of illegal introductions, the management objectives are adjusted based on an evaluation of the success of the management actions in suppressing or eradicating the unauthorized or illegally introduced species. Revisions to management objectives may prescribe management actions that are more tolerant or less tolerant of the presence of an introduced species; any revisions to management objectives will be reported to the commission. An electronic database is maintained to document and track illegal and unauthorized introductions including information on the initial report, investigation, and management actions taken, including any updates to the management plan.

The incidence of illegally introduced species into the aquatic environment continues at an alarming rate causing impacts to recreationally important fish and native species. These introductions can change fishing in Montana forever. Report illegal fish introductions to 1-800-TIP-MONT.

1.4.8 Fish Removals

Fish removal is a common technique used to manipulate population densities and species composition of a fishery. Fish removals may be used to reduce competition between species, remove undesirable or invasive species, protect species with elevated conservation risk, or to improve the quality of a sport fishery. The intention of fish removal projects is to ultimately restore or reintroduce native fish to a drainage or to improve an existing fishery. It is generally the goal of fish removal projects to ensure the source population is removed so recolonization of the undesirable species does not occur following removal. Most fish removal projects aspire to improve fishing opportunities by removing all fish present in a waterbody and reintroducing species better suited for available habitats or by reducing competition with other species. Tools commonly used by FWP for removal include fishing regulations, netting and electrofishing, dewatering, construction of barriers, and the use of piscicides/chemicals (Table 1.4.8-1).

Table 1.4.8-1: Comparison of fish control or removal methods commonly used for fisheries management.

Control Method	Advantages	Disadvantages	Typical Use
Fishing regulations	Allows harvest of fish, and less fish waste	Slow, angling pressure often inadequate for significant population change, and many species/sizes not vulnerable	Used where total removal is not possible or necessary
Netting and electrofishing	Allows for selective removal	Unlikely to completely eradicate fish and could harm non-targeted species through bycatch	Used in large lakes or rivers where chemical removal is not feasible, small streams to reduce species competition, or where sensitive/ endangered species must be protected
Dewatering of pond/reservoir	May be low cost and allows for less mechanical effort or use of chemical	Water remains in pools, detrimental to aquatic community, and often environmentally disruptive	Removal of most fish and serves to prep waterbody for piscicide use or more efficient mechanical removal
Physical barriers	Relatively permanent	Does not block downstream migration, less effective under floods, high cost, isolates populations	Block upstream migration of undesirable species and create closed system for piscicide use or mechanical removal

Piscicides/chemicals	Effective in complex habitats, avoidance by fish difficult	Kills all gilled organisms, including target and non-target species	Removal of entire fish assemblage

Fishing regulations are a common fish removal tool. This tool can be applied through bag limits or length restrictions to direct harvest of a particular species or age/size class while protecting others. Though cost-effective, regulations typically take a long time for a notable population change to occur, the species desirable for removal may not be vulnerable to angling, or angling pressure may be too low to effectively influence the fishery.

Mechanical tools are more effective at removing fish than angling and may be used in conjunction with other removal tools. Mechanical tools include netting and electrofishing, draining or dewatering a waterbody, and construction of physical barriers. Nets and electrofishing allow managers to selectively remove undesirable species and leave desirable fish in the waterbody. Fish removed through these methods may be killed, transferred to another waterbody, or transferred below a physical barrier in the same stream, depending on project objectives. Rarely are species completely eradicated from a waterbody through nets or electrofishing alone. More commonly this approach is used as a long-term suppression method of invasive or undesirable species. This approach is labor intensive and may take years to decades with a low likelihood of complete species removal.

Draining or dewatering can completely remove all fish and other aquatic organisms from a waterbody or can be used to improve removal efficiency by other means. Dewatering might not eliminate the undesirable species unless the waterbody is completely drained of all water, which is not always possible. Complete draining is highly impactful and may extend the timeline for population re-establishment.

Physical barriers are often used to conserve native fish populations and in many waterbodies are the first step before initiating other strategies, such as mechanical or chemical removals. Physical barriers prevent upstream migration of undesirable species, but they also fragment habitat and can isolate fish populations detrimentally. Construction of physical barriers can be expensive and are often permanent. Barriers impact fisheries above and below, and long-term sustainability of the upstream and downstream fishery are thoroughly considered prior to construction. The benefits of the project must be thoroughly weighed against the long-term potential for adverse impacts to habitat and associated fish behaviors (e.g., migration).

Use of piscicides, or chemicals, are an effective tool to remove all fish from a waterbody. Piscicides are commonly used in streams above barriers to remove non-native fish and replace with native species. In eastern Montana, piscicides are used in ponds to remove undesirable species that are competing with popular sport fish. Following treatment, managers restock with the desired species and often see improvement in the fishery for several years. Piscicides are also commonly used to quickly remove illegal introductions that threaten the local fishery.

Piscicides use is restricted and closely regulated by the EPA and MDA. All applications require the presence of a certified licensed applicator during treatment. Piscicide chemicals are safe for nongilled organisms and are chemically neutralized at waterbody outlets or downstream barriers to prevent impacts to humans and nontarget organisms outside the treatment area. In contrast, all gilled organisms are impacted by piscicides, but non-fish aquatic life in treated waterbodies, such as amphibious tadpoles and certain insects, typically rebound quickly due to reduced competition for habitat and abundant food supply; this also leads to quick reestablishment of the fishery when fish are reintroduced. FWP has a very thorough and restrictive policy on the use of piscicides.

The commission may approve fish removal projects through its broad authority to set policy for the conservation, protection, management, and propagation of fish species under §87-1-301, MCA. Approval of fish removal projects varies depending on the type of project, be it Future Fisheries Improvement Program projects, aquatic invasive species projects, or others. For all projects, FWP solicits public input pursuant to Montana Environmental Policy Act (MEPA) prior to any specific removal effort. The commission approves all angling regulations, projects funded through the Future Fisheries Improvement Program, and aquatic invasive species removals. Fish removal projects, which don't fall into these categories, are reviewed and approved by the commission on an annual basis, unless an emergency calls for approval outside of the regular schedule, such as illegal fish introductions or immediate conservation needs.

Appendix A summarizes fish removal projects that are expected to occur January 2023 through December 2026. Fish removal projects that were reviewed and approved by the commission prior to January 2023 are not included in the Appendix.

1.4.9 Permitted Commercial and Private Activities

To protect the aquatic resources of Montana, the FWP Fisheries Division regulates several commercial and private activities that have the potential to impact fish and/or other aquatic resources. The Parks and Outdoor Recreation Division is responsible for permitting activities related to access and river recreation. The following is a summary of the activities and the license or permits required under the responsibilities of the Fisheries Division.

1.4.9 (1) Bait Collection and Use

Live bait fish use and collection is a time-honored tradition in eastern and central Montana for anglers pursuing warm and cool water species. The use of live minnows is essential to early spring and winter ice fishing success for top predators like northern pike and walleye. In recent years, fisheries managers have voiced concern over the collection and transport of live minnows as it can serve as a vector for fish pathogens and AIS and can unintentionally move new species to other waters. A challenge with live baitfish use in Montana is identifying and ensuring clean sources of bait to minimize the risk of AIS or fish pathogen introductions. Another is preventing the over-harvest of native minnows while also providing bait fish for use by the angling public. Lastly, is the general angler's ability to correctly identify the species of minnow being used. Fishing regulations allow the use of 10 species of minnows as live bait in the Central and Eastern fishing districts. Due to the risk of importing pathogens or AIS from out of state sources, no live bait fish may be imported into Montana except by permit for use in Bighorn Lake and Afterbay Reservoir. Most bait fish sold commercially are collected within the lower Yellowstone River drainage and could have unintended consequences to naturally occurring populations. Leeches may only be imported into Montana from FWP-approved leech dealers. Anglers who import leeches must keep a receipt from the approved out-of-state leech dealer.

FWP has the authority to regulate the use of fish as bait (§87-3-203, MCA). Bait fish collection for live and dead use (for both private and commercial purposes) is allowed throughout the state but with varying restrictions depending on the fishing district, as described in the fishing regulations booklet. The commission (under authority of §87-3-204, MCA) may designate waters where commercial bait collection may occur. A license is required for commercial bait collection (ARM 12.7.201 - 203). A bait fish seining license is required for anyone who seines and has in possession more than 24 dozen nongame bait fish, and for persons 15 years of age and older who are seining and transporting bait fish for commercial purposes.

1.4.9 (2) Commercial Fishing

Regulating commercial fishing is an important component of conserving the long-term viability of Montana's fisheries while minimizing conflicts between recreational and commercial anglers. Commercial fishing may be used to suppress or eliminate unauthorized or unwanted fish populations that prevent FWP staff from achieving management or conservation goals. The commercial sale of fish or spawn is authorized under §§87-4-601, 602, 605, and 609, MCA, including paddlefish roe, nongame fish, whitefish, crayfish and mysis shrimp. Whitefish may be taken commercially by hook and line for sale in the Flathead River north of Flathead Lake, Flathead Lake north of the Flathead Reservation boundary, Fisher River, Kootenai River, and Whitefish Lake. Whitefish, along with nongame fish, may also be harvested for sale using nets or traps from the Kootenai River or its tributaries within one mile of their mouths (ARM 12.7.101 - 105). Through the commission, FWP may issue a license for other commercial fishing activities for nongame species (ARM 12.7.101). Three classes of permits may be issued, based upon the species targeted and the type of commercial activity (ARM 12.7.103).

1.4.9 (3) Fishing Contests

Fishing contests continue to grow in popularity, using either live weigh-in or live release formats. In recent years, additional tournament formats have been proposed to capitalize on advancements in technology and social media. As interest in tournaments increases, so do concerns related to potential impacts to fish populations, social implications (i.e., impacts to nontournament anglers), and the risk of AIS movement. Regulation of fishing contests is important to ensure the resource is not impacted while minimizing user conflicts and impacts to access areas and facilities (i.e., boat ramps, docks, marinas, latrines). FWP's authority to regulate fishing contests is found at §87-3-121, MCA and ARM 12.7.801 – 809. Traditionally, fishing contests are held on one body of water with a centralized weigh or check stations and typically occur over one or two consecutive days. There is an increased interest in contests that vary in format from traditional contests, such as catch-photo-release and on-line contests, that may involve multiple species of fish or waterbodies and may occur over an extended period of non-consecutive days.

A permit is required to conduct a fishing contest on Montana waters where FWP has jurisdiction. The rules define a "fishing contest" as "any event, contest, derby, or tournament where an entry fee is charged or where people are expected to compete for prizes or cash based on the capture of individual fish or combinations of fish. Fishing contests involving fewer than 30 people with cash prizes or merchandise worth $500 or less do not require a permit but must comply with the provisions of this subchapter." (ARM 12.7.801 – 809). Contest applications may be denied for a variety of reasons including significant public opposition, detrimental impacts on fish populations, or conflicts with other fishing or recreational interests. FWP may also place conditions on permits to alleviate issues that may otherwise result in denial of the application, such as those described above. Contests involving species of special concern are prohibited, except for lakes and reservoirs stocked with Yellowstone cutthroat trout or westslope cutthroat trout. Contests involving wild trout in rivers and streams are also prohibited, as are contests on holiday weekends. Fees may be applied to contests using FWP FASs or State Parks.

Additional guidelines (Appendix B) were developed to provide guidance for evaluation of contests that fall outside of the traditional tournament format while maintaining consistency with traditional fishing contests. The focus of the guidelines is based on evaluating potential biological impacts from a fishing contest; other recreational considerations, such as crowding, will be considered separately under the authority of FWP's Parks and Outdoor Recreation Division.

1.4.9 (4) Private Fish Ponds

Private fish ponds, which are ponds on private property that are authorized by the department for fish stocking (§§87-4-603, 606, and 607, MCA), pose substantial risks to wild fisheries in Montana. About 10,000 licensed private ponds exist, which along with a continual demand for new licenses, results in an unattainable demand on fish from in-state, private fish hatcheries. A lack of available authorized in-state sources of fish has increased applications for fish importations by 5-fold over the last decade. Further, the incidence of private ponds illegally stocked from non-permitted out-of-state sources has also increased, leading to additional risks for the introduction of fish pathogens or AIS. Private ponds can increase water temperatures associated with downstream habitats while increasing non-consumptive water loss through evaporation. Such factors coupled with the increasing frequency and severity of drought will exacerbate water availability issues that already threaten Montana's fisheries, agriculture industry, and domestic water supplies.

A private fish pond cannot exceed 500 surface acres and may not pose an unacceptable risk to sport fish or fish species of concern in adjacent waters. A private fish pond is created by artificial means or is an instream pond with a tributary spring or stream that does not support game fish or fish species of special concern.

The licensee may stock the fish pond with fish procured from a lawful source. FWP will designate the species of fish that may be released in the pond and otherwise condition the license if there is a possibility of fish escaping from the pond into adjacent waters. The licensee may take fish from the pond in any manner. Private ponds are licensed for a period of 10-years and a license fee of $10 applies. Other ponds, such as naturally occurring ponds fully surrounded by private property, may be conditionally licensed for 1-year if FWP determines the pond will not pose an unacceptable risk.

1.4.9 (5) Commercial Hatcheries

Commercial hatcheries are permitted by FWP under §87-4-603, MCA which allows for the sale of live fish to authorized sources, primarily private fish ponds that have been permitted (see section 1.4.9 (4)) for fish stocking. The main purpose of the permit is to ensure these facilities are not stocking fish that could be detrimental to the wild fisheries of the state and to minimize the potential of these facilities to spread AIS and fish pathogens. All commercial hatcheries receive both a fish health inspection and an AIS inspection annually as a condition of their commercial permit under §87-3-225, MCA. If a regulated pathogen or AIS is detected at a facility, the facility is immediately quarantined as per ARM 12.7.507. FWP then works with the facility to develop a plan remove the organism from the facility and conduct follow-up testing to verify the effectiveness of the actions. Upon completion, the FWP Director can remove the quarantine so that the facility can resume propagation and the transport of fish.

1.4.9 (6) Scientific Collections

Members of the public and representatives from schools, colleges, universities, and government agencies often have an interest in studying the aquatic resources of Montana. Montana statute (§87-2-806, MCA) and rule (ARM 12.7.1301) allows FWP to authorize the collection of fish for the purpose of a scientific investigation through a Scientific Collectors Permit. The application requires a description of the purpose of the collection, collection methodologies, and qualifications of those who will be doing the collecting. Based on the application, FWP may issue a permit without restrictions or may place special conditions in the permit to limit potential impacts of the action, such as restrictions on the time or location of the collections. FWP may deny a permit if the applicant is not qualified, the proposed collections are considered unnecessary, the method of collection inappropriate, or if collection may threaten the viability of the species. The permittee is required to provide FWP with data collected under authority of the permit. About 50 permits are issued annually, mostly to universities and state and federal agencies, but also to consultants. These permits ensure that the aquatic resources are not negatively impacted through these investigations and makes the staff aware of others who may be on the waters doing scientific research in order to avoid conflicts.

1.5 Youth and Family Fishing

FWP provides a wide variety of fishing opportunities across the state, but none is more important than Youth and Family Fishing. Promoting fishing with kids and families has always been a priority for FWP and shows up in many places, including kid's art contests, take a kid fishing promotion, the new Montana Kid's Fishing webpage, hatchery outreach/education, and through more formal programs. The goal is not only to make fishing accessible for everyone in Montana but to develop the next generation of anglers, fish biologists and conservationists. Plus, FWP believes, there is nothing better than the sight of a happy kid with their first fish.

FWP implements several programs designed to help expose young anglers to the sport of fishing and to provide locations so that they and their families can enjoy fishing. The Aquatic Education Program sponsors the "Hooked on Fishing- Not on Drugs" (HOF) program, which was developed nationally by the Future Fisherman Foundation. HOF is conducted in nearly 200 Montana classrooms annually involving about 2,500 students. The primary objectives of this program are to: (1) help students develop awareness and appreciation for the fish and aquatic resources in Montana; (2) help students develop an interest in fishing and outdoor recreation; (3) teach safe and responsible outdoor skills; and (4) help teachers develop skills and interest in teaching natural resource topics. Students take part in a variety of activities, both inside and outside the classroom.

The role that families and parents play in teaching their children about fishing and fostering a lifetime interest in the outdoors cannot be over-stated, and as such represents an important aspect of Montana's fishing heritage. Annually, there are two designated free fishing weekends in Montana, which allow anyone to fish without a license. These include Mother's Day and Father's Day weekends providing an inexpensive means for families to enjoy a weekend fishing together.

Most communities around the state have access to a family friendly pond, often referred to as community ponds, urban ponds, kids fishing waters, or family fishing ponds. Regardless of their name the purpose is to provide an easily accessible area where kids and families can fish with an emphasis on high catch-rates. These ponds are stocked annually, or more frequently, with catchable cutthroat and rainbow trout. The Community Pond Program was established to provide funds for communities to either develop ponds or to provide additional access to community ponds, including ADA-compliant access. Competitive angling at these sites is discouraged, with emphasis on fun family fishing. Kid's fishing days are encouraged and include lots of opportunity for parents and guardians to teach the joy of fishing to kids. Quite often local sporting shops, angling clubs, community organizers, and FWP collaborate to offer free angling items in the form of attendance raffles, especially to less fortunate and new anglers. Additionally, the department may provide license exceptions for family fishing events to promote participation by families and volunteers.

Take a Kid Fishing!

1.6 Species Management

Montana is home to 57 native fish species and 34 non-native species (Table 1.0-1). Many of these species have unique conservation plans in place or guided by management strategies contained within this plan or in waterbody specific management plans. Each of the following species or groups of species have driving conservation issues, recreational importance, or other management issues that should be considered when taking management action.

1.6.1 Arctic Grayling

Upper Missouri River Arctic grayling are a unique native species and important part of Montana's history and natural heritage. In the lower 48 states, Arctic grayling are native to portions of northern Michigan and the upper Missouri River of Montana; however, it is only in the upper Missouri River that Arctic grayling have persisted through droughts, introductions of non-native species, and changes in habitat. Grayling were found in patches but were widely distributed prior to the mid-1850s. They inhabited the mainstem Missouri River as well as the Smith, Sun, Jefferson, Madison, Gallatin, Big Hole, Beaverhead, Red Rock, and Ruby rivers and several Centennial Valley streams. Arctic grayling also occupied Red Rock and Elk lakes in the Centennial Valley and Miner, Mussigbrod, and Pintler lakes in the upper Big Hole River drainage. The distribution of native grayling has declined since the late 1800s, particularly in riverine habitats. Potential causes of the decline include habitat degradation, non-native species, historic overharvest, and water temperature changes.

Currently there are 19 extant Arctic grayling populations. Riverine populations of grayling exist in the Big Hole River and its tributaries, Red Rock Creek and its tributaries, the upper Ruby River, and the headwaters of the Gibbon River in the Madison drainage. Native lake populations reside in Miner, Mussigbrod, and Pintler lakes in the upper Big Hole River drainage and the Red Rock lakes in the Centennial Valley. Twelve additional mountain lake populations in the Gallatin, Madison, Big Hole, Missouri, and Sun rivers drainages are the result of historical stockings yet are important for genetic conservation of Arctic grayling. About 20 additional lakes contain populations of grayling sustained entirely by stocking and managed as recreational fisheries.

Arctic grayling management in Montana includes conservation and recovery of native populations and expansion of the species' distribution within the Upper Missouri River basin. The conservation goal for Arctic grayling is to ensure their long-term self-sustaining persistence. Conservation of the species existing genetic diversity and maintaining or increasing the distribution of self-sustaining populations are emphasized in the *Upper Missouri River Arctic Grayling Conservation Strategy*, which is the guiding document for Arctic grayling conservation in Montana. To formalize commitments to Arctic grayling conservation in Montana, a 2007 *Memorandum of Understanding Concerning Montana Arctic Grayling Restoration* was developed and signed by state, federal, and private agencies and stakeholders. This MOU was renewed in 2018 and commits the parties to a cooperative restoration program and provides a means to obligate financial resources as they are available.

Conservation partnerships with private landowners and other agencies are the backbone of Artic grayling management. In the Big Hole River Valley, FWP, private landowners, and numerous partners have engaged in Arctic grayling recovery through enhancement of habitat and improvement of irrigation practices. Since 2006, implementation of an interagency Candidate Conservation Agreements with

Assurances (CCAA) program has helped secure Arctic grayling in the upper Big Hole River by improving streamflow, protecting and enhancing stream habitat and riparian areas, increasing fish passage, and eliminating entrainment of fish in irrigation ditches. These instream and riparian habitat improvements have increased this population's resiliency through several drought years and the population has increased since the CCAA began. Given the success of the Big Hole CCAA, a similar program was enacted in the Centennial Valley in 2018. However, the population of Arctic grayling in Upper Red Rock Lake has declined dramatically since 2015 due to limited suitable overwinter habitat in the lake. Extended periods of drought have resulted in a shallower lake with less tributary and groundwater inputs, which causes anoxic conditions in many years. Currently, FWP and the U.S. Fish & Wildlife Service are considering options for a project which would improve overwinter habitat conditions in Upper Red Rock Lake. In the Madison River basin, efforts are presently underway to establish Arctic grayling populations in tributaries to Hebgen Lake.

FWP has developed and maintains conservation broods from Big Hole River Arctic grayling in Upper Twin and Green Hollow lakes and for the Centennial Valley in Handkerchief Lake. These broods have been used to reestablish native Arctic grayling in portions of their historical range, including the Ruby River near Alder. The Rogers Lake Arctic grayling population (a mix of Red Rock and Madison strains) near Kalispell provides a source for the recreational stocking program in several western lakes, and FWP personnel from Flathead Lake Salmon Hatchery collect and raise eggs and fry for these efforts.

Arctic grayling are currently listed as *Species of Concern* by the State of Montana and a *Sensitive Species* by the Bureau of Land Management and the U.S. Forest Service. Though previously identified as a *Candidate Species* under the Federal Environmental Species Act, in 2014 and again in 2020 following legal challenge, the USFWS found that upper Missouri River Arctic grayling were *not warranted* for listing as threatened or endangered due to the success of conservation efforts in the Big Hole River and the presence of 19 naturalized, Montana-origin Arctic grayling populations within the upper Missouri which help ensure long-term persistence.

Relevant Management Documents: *Upper Missouri River Arctic Grayling Conservation Strategy* (FWP 2022); *Endangered and Threatened Wildlife and Plants; Four Species Not Warranted for Listing as Endangered or Threatened Species* (USFWS 2020); additional reports and resources can be found on the FWP website.

1.6.2 Black Bass (Largemouth Bass and Smallmouth Bass)

Largemouth bass and smallmouth bass are two species of black bass present in Montana. Both are non-native and widely distributed throughout east, central and western Montana. Largemouth bass are typically found in slow flowing rivers and lakes and are most associated with quality structured woody or vegetated habitat. Smallmouth bass are typically found in cool, clear lakes and streams but they can also exist and thrive in places largemouth bass are found.

Quality largemouth bass fisheries are found in northwest Montana in the lower Clark Fork reservoirs (Noxon Rapids, and Cabinet Gorge), Echo Lake near Kalispell, and Placid and Upsata lakes in the Blackfoot River drainage. Largemouth bass also provide fishing opportunity in several urban and rural ponds across the state. Quality smallmouth bass fisheries also are present in those same systems and in large rivers such as the lower Flathead River and Yellowstone River, as well as large reservoirs such as

Fort Peck, Tongue River and Bighorn reservoirs. Bass are pursued by many sport anglers and are also highly sought after by tournament anglers. Nevertheless, their prolific and predatory nature can lead to management challenges. For example, the recent expansion of smallmouth bass in the Yellowstone River, upstream of the Powder River-Yellowstone River confluence, has raised concerns about impacts to native fish populations. Illegal bass introductions also confound fisheries management efforts in many waterbodies, especially in northwest and western Montana. Over 20 illegal introductions of smallmouth bass have occurred in western and northwest Montana and several illegal smallmouth introductions have been documented in southwest Montana. In some waters these introductions have had impacts to existing fisheries through increased predation of other fish, decreased fish quality due to high fish densities, or have thwarted efforts to maintain quality of existing sport fisheries or threated conservation efforts for native species.

Generally, fishing regulations for bass are conservative for largemouth bass and more liberal for smallmouth bass. Most largemouth bass fisheries are maintained by stocking due to relatively slow growth rates in Montana and limited spawning habitat in most waterbodies. Conservative harvest limits often coupled with length restrictions minimize impacts of angler harvest while fish grow to preferred size. Smallmouth bass are better adapted for many habitats across the state, which often confounds management of a quality fishery. Smallmouth bass are prolific spawners with few factors limiting recruitment which can lead to overpopulation and low-quality fisheries. Since largemouth bass fisheries can be better managed through stocking and restrictive regulations, FWP has reduced its rearing and stocking of smallmouth bass.

1.6.3 Bull Trout

Bull trout are native to rivers, streams, and lakes in the Columbia (Kootenai, Clark Fork, Bitterroot, Blackfoot, Flathead, and Swan drainages) and Saskatchewan (St. Mary and Belly drainages) river basins in Montana. Bull trout express both resident and migratory life history strategies and have specific habitat requirements. Resident bull trout reside and spawn in small streams and tend to be smaller in size and produce fewer eggs than migratory fish. Migratory bull trout use large rivers (fluvial) or lakes or reservoirs (adfluvial) as adults and migrate to small streams or mainstem rivers for spawning. Bull trout require particularly cold water and clean gravel for spawning and egg incubation. Migratory fish rely on large, connected habitats for seasonal use at various life stages.

Although bull trout remain widespread in northwest Montana, the numbers of populations and individuals within populations have declined. Many populations are small and at risk for extirpation due to declining abundances. Bull trout are a Montana Species of Concern and all populations in the coterminous United States were listed as Threatened under Endangered Species Act by the U.S. Fish & Wildlife Service (USFWS) in 1998. The primary causes for declines include warmer water temperatures, habitat degradation, human-made barriers that prevent movement of migratory fish, predation by and competition with non-native fish such as northern pike, brown trout, walleye, bass, and lake trout, and hybridization with non-native brook trout. Bull trout populations in the Kootenai River drainage (upstream of Libby Dam) and in the South Fork of the Flathead River (above and including Hungry Horse Reservoir) remain some of the best strongholds for the species; hence, intentional angling for bull trout is only permitted in these waters.

All major river systems in western Montana (except the Yaak River) are designated by the USFWS as Critical Habitat for bull trout. Critical Habitats are specific geographic areas that the USFWS considers essential for conservation and recovery of bull trout and may require special management and protection to meet recovery objectives. As such, habitat protection and restoration are key elements of bull trout conservation and recovery. The large-scale habitat restoration program in the Blackfoot watershed, removal of Milltown Dam on the Clark Fork River, and the trap and transport program at Cabinet Gorge Dam are notable examples of these types of efforts. Many river reaches identified as critical habitat currently support few if any bull trout or are only seasonally utilized as migratory corridors. Such waters may have substantial habitat alterations that make them unsuitable for bull trout spawning and rearing for the foreseeable future; in other watersheds, a mix of habitat changes and established non-native fish populations limit the likelihood that non-native species can be effectively managed to benefit bull trout.

FWP is mandated to provide recreational fisheries for native and non-native fish while protecting and establishing viable populations of bull trout in drainages where they co-occur. Balancing this dual mandate is particularly challenging because bull trout populations typically require open systems for migration, which makes them more susceptible to the negative impacts associated with non-native fish. The presence of predatory non-native fish, particularly lake trout, northern pike, bass, and walleye are ongoing threats to address. However, management of non-native species using liberalized harvest limits or active suppression may not be practical approaches to bull trout management in all waters designated by the USFWS as Critical Habitat. Some rivers occupied by bull trout are recreationally and economically important trout fisheries that are highly valued destinations for Montanans and out-of-state visitors. FWP will continue to monitor bull trout fisheries and work with agency partners to determine which USFWS Critical Habitats may warrant suppression of non-native fish to benefit bull trout.

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

1.6.4 Burbot

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

The exceptions are the Kootenai River and Koocanusa Reservoir populations. The Kootenai River population declined to near extirpation in Montana and Idaho due to habitat and flow regime changes resulting from decades of diking in Idaho and the construction and operation of Libby Dam beginning in 1974. The population was petitioned for federal ESA listing in 2000 but the petition was found unwarranted.

In 2003, the Kootenai Tribe of Idaho (KTOI) initiated investigations of burbot aquaculture methods in collaboration with the University of Idaho. These efforts yielded significant advances in aquaculture techniques for burbot and demonstrated that captive rearing of burbot was feasible. The burbot program is designed to reintroduce this native species into the lower Kootenai River and rebuild the population using genetically and behaviorally similar stock from within the Kootenai subbasin. In 2014 KTOI, with funding from BPA and in partnership with Idaho Fish and Game, FWP, and British Columbia fisheries constructed the Twin Rivers hatchery, dedicated to sturgeon and burbot culture. They secured eggs from Moyie Lakes in the Kootenai drainage in British Columbia and successfully cultured and released fry and juveniles into the mainstem Kootenai River. The project was successful, so much so that Idaho re-established a limited harvest fishery for burbot in 2020. FWP has monitored the Kootenai River burbot population since the early 1970s. This was re-established in earnest in 2016 with the intention of monitoring the effectiveness of the KTOI hatchery program and re-establishing a harvest regulation in Montana.

The remnant population of burbot upstream of Libby Dam in Koocanusa Reservoir has also declined since construction of Libby Dam was completed in the 1970s. The apparent decline of burbot in Koocanusa Reservoir occurred later than the population downstream of Libby Dam and the population has been stable at low relative abundance levels for the past couple decades. There are currently multiple monitoring and research efforts attempting to identify the reason(s) for this populations decline.

All Montana burbot populations are self-sustaining, except the Montana portion of the Kootenai River downstream of Kootenai Falls. Although spawning occurs, levels of wild recruitment to the population are very low. As a result, the burbot population downstream of Kootenai Falls is still mostly supported by KTOI hatchery releases. Other than harvest regulations, the species is not currently actively managed in much of Montana although there are efforts to introduce burbot into lakes in the Kootenai River drainage and may be considered to provide additional fishing opportunity in some Montana reservoirs. FWP fisheries biologists have recently devoted more attention to burbot and are evaluating methodologies to monitor their abundance in rivers, lakes, and reservoirs. Although burbot angling pressure is relatively minor, they are avidly pursued by some for harvest. The species provides popular winter fisheries in reservoirs like Clark Canyon, Fort Peck, and Newlan Creek.

1.6.5 Channel Catfish

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

Numerous ponds across eastern Montana are periodically stocked with channel catfish to diversify sport fish opportunities and serve as predatory control of stunted prey populations. It can take several years for channel catfish to reach quality size thus ponds where they are stocked must have sufficient depth to successfully overwinter fish. Adult channel catfish are occasionally transferred from donor waters in eastern Montana to re-establish populations after winter kill events or to enhance fisheries.

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

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

There is growing interest in tournament angling for channel catfish. A large live weigh-in event occurs annually on the Milk River at Glasgow and several on the Yellowstone River. To minimize impacts to catfish populations, fishing tournaments are generally approved with restrictions such as: no stringers or setlines, catch-and-release formats only, capping the number of contests on one waterbody by species each year, prohibit contests during the spawning period, and prohibit contests during the month of August when water temperatures are extreme.

1.6.6 Columbia River Redband Trout

Columbia River redband trout (redband trout) are a subspecies of rainbow trout native to the Kootenai River drainage in northwest Montana. Historically, redband trout were common in the Kootenai River and associated tributaries downstream of what is believed to have been a natural barrier near the present-day Libby Dam. Due to habitat changes, competition with non-native brook trout, and hybridization with non-native coastal rainbow trout and Yellowstone cutthroat trout, the subspecies has declined in abundance and distribution and is presently restricted to headwater streams, or streams with barriers that provide isolation from non-native trout.

Columbia River redband trout have been listed as a Species of Concern in Montana due to declines in distribution and threats to remaining populations. During the most recent assessment, FWP estimated that redband trout that are introgressed <10% currently occupy 20.6% of their historically occupied habitat in Montana. Hybridization with introduced coastal rainbow trout is a leading factor that has contributed to the declines of redband trout in the Kootenai watershed, and once extensive hybridization occurs, the trend is not likely to reverse without management intervention. Although several tributaries to the Kootenai River have relatively low levels of hybridization, the only known nonhybridized redband trout populations occur in Wolf Creek and East Fork Yaak River, in which natural barriers prevent the invasion of non-native coastal rainbow trout.

In 2016, FWP along with other state and federal agencies, tribes, and nongovernmental organizations across six states formed the Interior Redband Conservation Team to develop a conservation strategy for interior redband trout across their historic range. This strategy provides a framework for long-term conservation for the three subspecies of interior redband, including the Columbia River redband trout. Full implementation of the strategy is expected to significantly reduce or eliminate threats to interior redband trout populations and their ecosystems and will require the cooperation among all signatories and interested parties. FWP's conservation strategies for Columbia River redband trout are cohesive with the goals and objectives of this overarching guiding strategy.

The current management goals for Columbia River redband trout includes maintaining the existing distribution and genetic diversity of remaining populations and developing conservation plans and projects that ensure the long-term, self-sustaining persistence of this subspecies in Montana. Currently, collaborative management efforts include assessing and monitoring remaining populations, protecting important habitats, and developing long-term conservation strategies, such as reintroduction and the removal of, and isolation from, non-native trout. Alternatives for reintroduction of redband trout may include wild fish transfers or hatchery production where appropriate to the specific waterbodies.

FWP plans to develop a broodstock of redband trout that can be used as a source population for conservation efforts and production fish. The broodstock will be created using multiple genetically unaltered populations of redbands and housed at FWP facilities. Stocking redband trout in native waters instead of non-native rainbow trout or westslope cutthroat trout may reduce the further hybridization among these species and increase fishing opportunities. The redband broodstock would also serve as a source population for introductory efforts to expand the species current distribution.

Though recreational angling opportunities for the Columbia River redband trout are currently limited outside of small streams, the development of a Columbia River redband trout broodstock should provide future opportunities to establish recreational fisheries in streams and lakes in the Kootenai River drainage. Likewise, efforts to secure and expand the distribution of existing populations and reintroduce them into streams where they have been lost will result in additional opportunities to pursue this unique native sportfish.

Relevant Management Documents: *Conservation Strategy for Interior Redband (Oncorhynchus mykiss subsp.) in the States of California, Idaho, Montana, Nevada, Oregon, and Washington* *(2016).*

1.6.7 Crappie (White Crappie and Black Crappie)

Montana has introduced populations of white crappie and black crappie. Both species prefer ponds, lakes, reservoirs, and slower rivers and sloughs. Popular Montana crappie fisheries include Tongue River, Fort Peck, Nelson, and Bighorn reservoirs, although crappie have recently been documented as illegal introductions in many natural lakes of northwest Montana.

These species feed mainly on zooplankton and small fish. Like yellow perch, crappie can often overpopulate a waterbody and become stunted where they tend to have cyclical population structures and quality fishing for larger individuals only occurs occasionally. Size structure and abundance of crappie populations can be impacted by a combination of angler harvest, predation by other fish species, and competition for limited food resources with other species like yellow perch and sunfish species.

In 2022, FWP personnel captured 100 white crappie from Spotted Eagle Lake in Miles City and transported them to the Miles City hatchery as an experiment to see if a white crappie brood population can be maintained in the hatchery. Hatchery personnel will attempt to spawn these fish in the spring of 2023 and 2024 to produce fry for general stocking in appropriate waterbodies. Adult crappie are occasionally transferred from donor waters in eastern Montana to reestablish populations after winter kill events or to enhance fisheries.

Crappie are seasonally very catchable and are highly sought after as a food fish. They account for 0.53% of the total statewide fishing days. At the time of print, the standard Eastern and Central District regulations are 15 daily and 30 in possession. There are no bag limits for crappie in the Western fishing districts where they tend to be less common or were illegally introduced. Quality fish usually start at around 9 to 10 inches but can vary depending on fish condition factor (weight at length), which depends on forage quality and availability.

1.6.8 Cutthroat Trout (Westslope Cutthroat Trout and Yellowstone Cutthroat Trout)

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

Historically, westslope cutthroat trout and Yellowstone cutthroat trout occupied all accessible, coldwater streams and lakes in their respective drainages, with resident (stream occupant), fluvial (migratory river fish), and adfluvial (migratory lake fish) forms present. Distributions and abundances of both species have declined across their ranges largely due to competition with non-native species of trout, hybridization with rainbow trout or other cutthroat trout stocked outside their historical range, habitat changes, and migratory barriers. Across Montana, nonhybridized westslope cutthroat trout occupy an estimated 20% of historically occupied habitat while nonhybridized Yellowstone cutthroat trout occupy an estimated 16% of their historical range. Due to significant population declines both subspecies are listed as Montana Species of Concern. Both species were petitioned for listing under the federal Endangered Species Act, but these petitions were found “not warranted.” In their decision, the U.S. Fish & Wildlife Service (USFWS) cited both species’ broad geographical distributions within their historical range and occupancy of high-quality habitats on federal lands. The USFWS was also encouraged by ongoing state conservation programs, especially those in Montana.

As a species of concern and sport fish, both subspecies receive considerable management attention and resources from FWP, federal land management agencies, and private organizations. Although exceptions exist, cutthroat-occupied lakes and reservoirs are generally managed as recreational fisheries where harvest is allowed and may periodically be stocked with progeny from FWP's cutthroat broods maintained at Washoe Park Trout Hatchery and the Yellowstone River Trout Hatchery. Populations with minimal or no non-native ancestry have been identified as "conservation populations," which indicates the need to manage the population for natural, self-sustaining persistence. Streams and rivers are not stocked with hatchery fish, except for restoration efforts where cutthroat brood or wild eggs are introduced in small streams to reestablish populations.

Management concerns for westslope cutthroat trout and Yellowstone cutthroat trout vary by drainage and region of the state. In some waters, restrictive angler harvest and habitat protection are suitable management measures to ensure robust populations. Stream and river creel regulations vary based on cutthroat abundances and distributions, with catch-and-release or limited harvest with size limits being the most common types of regulations. Habitat protection and restoration is important for species conservation, and addressing concerns related to riparian condition, passage concerns at road crossings, entrainment in irrigation systems, and instream flow are important for conserving cutthroat populations. In some drainages, fish barriers are used and non-native trout species are removed upstream of those barriers to reduce threats to "at-risk" populations. Such barrier and removal projects are more common in the upper Missouri and Yellowstone drainages where fewer cutthroat trout populations exist.

1.6.8 (1) Westslope Cutthroat Trout

The status of westslope cutthroat trout throughout its distribution in Montana is variable. Nonhybridized westslope cutthroat trout populations on the west side of the Continental Divide are more widely distributed and represent most of the occupied habitat in Montana. Migratory westslope cutthroat trout only exist west of the Divide, where habitats support connectivity among populations and angling opportunities for large fish. Declines are pronounced east of the Continental Divide, as nonhybridized westslope cutthroat trout populations in the upper Missouri River basin occupy 4% of their historical distribution and are largely limited to small headwater streams.

The negative effects of non-native rainbow trout, brook trout, and Yellowstone cutthroat trout (non-native outside of the Yellowstone River drainage) on westslope cutthroat trout populations are well-documented. The effects of other non-natives, such as brown trout, are less clear. Therefore, management actions will focus on addressing known threats, including habitat concerns, and rely on research to determine effects of other non-native fish species. Across their range in Montana, nonhybridized westslope cutthroat populations are a high priority; however, many populations are hybridized and as such, populations with less than 10% non-native trout ancestry are considered "conservation" populations.

The conservation goal for westslope cutthroat trout west of the Continental Divide is to maintain viable populations with diverse life histories throughout their existing distributions in all drainages. Identified "conservation" populations west of the Continental Divide include isolated resident populations and populations with a migratory life-form that provide connectivity among populations and angling opportunity for large fish. Westslope cutthroat trout are primarily managed through angling regulations and habitat protection and restoration. Isolation of some tributary westslope cutthroat trout populations using barriers may be considered if hybridization or competition from non-native trout threatens a population's persistence and migratory bull trout are not present. Opportunities to expand the distribution of the subspecies into historically unoccupied habitats may be explored on a limited basis, such as upper reaches of the North Fork of the Blackfoot River. Where necessary and feasible, non-native trout may be removed from isolated drainages to protect existing westslope cutthroat trout populations from competition or hybridization, such as with the South Fork of the Flathead Westslope Cutthroat Conservation/Restoration Project.

The restoration goal for westslope cutthroat trout east of the Continental Divide (upper Missouri River basin upstream from and including the Judith River) is to restore and secure conservation populations to 20% of the historical distribution within each sub-basin. Restoration should proceed in a manner that 1) ensures the long-term, self-sustaining persistence of each subspecies distributed across their historic ranges, 2) maintains the genetic integrity and diversity of nonhybridized populations, as well as the diversity of life histories represented by the remaining local populations, and 3) protects the ecological, recreational, and economic values associated with each subspecies. Restoration of westslope cutthroat trout to 20% of their historic distribution east of the Continental Divide is expected to secure long-term vitality and genetic integrity while minimizing effects to non-native sport fisheries that will occupy the vast majority (80%) of waters suitable for coldwater fish.

Conservation populations of westslope cutthroat trout occupy about 8% of the historical distribution in the upper Missouri River basin. Historically, westslope cutthroat trout occupied an estimated 19,000 stream miles in the upper Missouri River watershed. Achieving the 20% goal requires securing 3,800 miles of streams for conservation populations, protecting existing conservation populations from non-natives, expanding or introducing new populations into an additional 12% of historical habitat, and addressing genetic consequences of isolation in small populations by translocating nonhybridized fish between populations. The 20% conservation goal does not include mainstem river systems. These large rivers are popular sport fisheries and native fish restoration is not feasible. Therefore, conservation efforts for westslope cutthroat trout in the upper Missouri River basin would be focused on smaller tributary streams. Over the past decade, 18 projects to protect westslope cutthroat trout from non-native trout were implemented in 5 sub-basins that increased distribution by 250 miles; however, about 100 miles of non-hybridized westslope cutthroat trout distribution were also lost during that period due to competition and hybridization with non-native trout. Therefore, biologists in the upper Missouri prioritize protecting nonhybridized, at-risk populations of westslope cutthroat trout before developing new projects that expand their distribution. All cutthroat conservation projects are vetted through the MEPA process, providing public opportunity to evaluate and comment on projects that expand cutthroat distribution or limit existing fisheries.

Logistically, the westslope cutthroat trout conservation goal would be proportionally applied to all major drainages within the upper Missouri River basin. Distributing conservation populations throughout entire drainages minimizes the potential to compromise multiple populations during stochastic events, like flood, fire, drought, or disease. Generally, the 20% goal applies to each drainage so that the species is resilient to stochastic events across their geographic range; however, exceptions may be made in instances where it is logistically or practically infeasible.

1.6.8 (2) Yellowstone Cutthroat Trout

Yellowstone cutthroat trout are native east of the Continental Divide in the Yellowstone River drainage and their status and distribution varies spatially. Yellowstone cutthroat trout are isolated from non-native fishes in some areas, but many of the existing populations overlap with non-native species and are not secure. Nonhybridized Yellowstone cutthroat trout populations in Montana currently occupy an estimated 18% of their historical distribution, and conservation populations occupy 30% of the historical distribution. Many of these populations of Yellowstone cutthroat trout coexist with non-native rainbow trout, brook trout, and brown trout and therefore are not secure from competition and hybridization, which are primary threats to their persistence.

The Shields River is a priority watershed for Yellowstone cutthroat trout conservation. The watershed is at high elevation and is at the northern extent of the Yellowstone cutthroat trout's historical range, and this area should remain more resilient to warmer temperatures. Yellowstone cutthroat trout remain widely distributed in the Shields River watershed, although hybridization with rainbow trout and competition with brook trout are harming existing populations. Management actions to secure Yellowstone cutthroat in the Shields include determination of distribution of non-native and hybridized trout, construction of barriers to prevent upstream passage of non-native trout, and mechanical or chemical removal of non-native trout where appropriate.

Habitat degradation, siltation, and dewatering limit Yellowstone cutthroat trout populations throughout its historical range. The Shields River watershed has completed a watershed restoration plan that identifies priority sub-watersheds for sediment reduction under requirements of the Clean Water Act. Implementing this plan will improve resilience of Yellowstone cutthroat trout in the Shields River watershed. Elsewhere, FWP will work with landowners on habitat restoration projects and providing for fish passage. Dewatering is acute to chronic in many streams supporting Yellowstone cutthroat trout. Working with individuals, watershed groups, and canal companies to increase water use efficiency, develop drought plans, and lease water rights for instream flow are conservation priorities.

The influence of brown trout on Yellowstone cutthroat trout is a current topic of research. Yellowstone cutthroat trout are rarely abundant in waters that support brown trout, although the mechanism favoring brown trout is unclear in many streams. Brown trout may be replacing Yellowstone cutthroat trout in waters that are no longer suitable owing to human-induced changes in habitat. Conversely, brown trout may be displacing Yellowstone cutthroat trout through competition. FWP and partners will continue to research species interactions between brown trout and Yellowstone cutthroat trout populations. Brown trout may be targeted for removal where their presence threatens conservation populations of Yellowstone cutthroat trout. Lower Deer Creek is an example of a stream where rotenone was used to remove brown trout and salvaged Yellowstone cutthroat trout rapidly repopulated the reclaimed waters.

FWP has also implemented management actions to remove non-native fish in the upper Boulder River drainage (upstream from the Hawley Falls) and upper Soda Butte Creek (upstream of Ice Box Canyon). Efforts in the upper Boulder River watershed have established Yellowstone cutthroat trout populations in multiple lakes and streams. In some lakes management actions to increase Yellowstone cutthroat trout abundance relative to other non-native species or hybrids are underway. Monitoring efforts are ongoing to document Yellowstone cutthroat trout population changes resulting from the management actions in the upper Boulder River watershed. In Soda Butte Creek, FWP will continue to work with Yellowstone National Park and other partners to monitor status of the Yellowstone cutthroat trout population and ensure brook trout are not present in the basin.

Conservation goals for Yellowstone cutthroat trout address protecting existing populations, reestablishing lost populations where possible, and translocating Yellowstone cutthroat trout to historically fishless waters that can provide refuge from non-native trout and warming temperatures. FWP will continue to look for conservation opportunities within the Yellowstone River drainage to secure Yellowstone cutthroat trout populations and increase the percentage of the historical range where secure populations can persist. Ensuring large, secure populations exist throughout the historical range can offset losses where stochastic events are less likely to compromise localized strongholds such as the Shields River or Boulder River drainages. Conservation populations existing in open systems, which are those coexisting with non-native trout, will be managed to conserve Yellowstone cutthroat trout and their migratory life histories, while accepting some levels of competition and hybridization with non-native species. Yellowstone cutthroat trout occupy a greater percentage of historical habitat than westslope cutthroat trout do on the east side of the Continental Divide. Maintaining the current 30% occupancy with additional goals of increasing distribution where possible is a feasible goal for securing Yellowstone cutthroat trout in Montana.

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

1.6.9 Kokanee Salmon

Kokanee salmon, also called bluebacks or silvers, are the landlocked, freshwater form of sockeye salmon. Historically, kokanee salmon were native to Kootenay Lake in British Columbia, Canada and because there were no barriers to migration in the lower Kootenai River in Montana, they were found downstream of Kootenai Falls, primarily as minor spawning runs. However, that unique stock of kokanee salmon was likely lost after non-native stocks were introduced into the drainage in the 1950s.

Today, all populations of kokanee salmon in Montana have hatchery origins. They were first stocked into Flathead Lake probably around 1914 from wild and stocked populations in western Washington. The Flathead population was used to establish kokanee statewide including Lake Mary Ronan, currently the sole source for kokanee eggs statewide.

Wild, populations are found in several natural lakes and reservoirs in the state, primarily west of the Continental Divide. Spawning takes place along lake shorelines or in streams with good clean gravels. If spawned in streams, fry will migrate quickly upon hatching to still waters where they will grow to maturity in 3 or 4 years primarily eating zooplankton and aquatic insects, though they are known to feed on young-of-year yellow perch.

Growth of kokanee can be rapid and is often dependent on quality food availability and fish density. Where populations are dense, fish may mature at 8 to 10 inches, while populations with extremely low densities may produce 18- to 20- inch fish. In most circumstances, sizes of kokanee are generally driven by quality prey availability and less frequently by predation. Where densities are high, and sizes are low, liberal bag limits are created to take advantage of those numbers and attempt to reduce densities. In some instances, introducing a predatory species such as Gerrard rainbow trout or tiger muskellunge can help create a quality fishery for those large predators while improving the kokanee fishery by reducing densities. Since kokanee die after spawning, typically by age 3, some waterbodies have a snagging season that corresponds with fall spawning to allow additional harvest opportunity.

Managing quality kokanee fisheries can be challenging due to numerous factors influencing recruitment and growth. Hauser and Holter reservoirs on the Missouri River once had exceptional kokanee fisheries but lost much of the kokanee fishery due to reservoir operations and flushing losses, compounded by walleye predation. The Flathead Lake population was dramatically altered after *Mysis* shrimp were introduced into upstream lakes. *Mysis* migrated downstream to Flathead Lake and created a virtually unlimited food supply for juvenile lake trout. Lake trout abundance increased substantially and created a "predator trap" and the kokanee population collapsed due to heavy predation. This scenario has played out consistently where *Mysis* were stocked into or migrated into systems where lake trout and kokanee were established.

Lake Mary Ronan has been used as the primary brood source for kokanee salmon propagation for several decades. Flathead Lake Salmon Hatchery personnel collect wild kokanee, spawn, and hatch fertilized eggs to fry or fingerling stage, and stock in western Montana lakes, including Lake Mary Ronan. Additionally, a portion of the fertilized eggs are sent to other state hatcheries to hatch and rear fish to be stocked east of the Continental Divide.

Egg-take from Lake Mary Ronan continues to produce adequate eggs to maintain the statewide needs for kokanee stocking, but that population is in peril due to illegal introduction of northern pike. Lake Mary Ronan is a relatively shallow lake with ample northern pike habitat and minimal cover for kokanee, making them highly vulnerable to northern pike predation. Due to concerns over loss of production from Lake Mary Ronan, FWP has started assessing other opportunities to maintain the statewide kokanee stocking program. Ashley Lake and Little Bitterroot Lake were sampled in 2022 to determine if they could supplement or replace Lake Mary Ronan as a brood source to continue statewide kokanee stocking.

1.6.10 Kootenai River White Sturgeon

The Kootenai River white sturgeon was listed as an endangered species under the Endangered Species Act in 1994 and is a Montana Species of Concern. The historical range of Kootenai River white sturgeon includes approximately 168 river miles from Kootenai Falls in Montana downstream through Idaho and into Kootenay Lake in British Columbia, Canada. The construction of Corra Linn (1930s) and Duncan (1960s) dams in British Columbia, Libby Dam in Montana (1970s), and levees in Idaho significantly reduced the availability of spawning and rearing habitat and system productivity. The combined effects of these alterations have resulted in very limited natural recruitment and decline in the number of wild adult sturgeon. An estimated 1,750 adult sturgeon remain, but natural recruitment remains low. Currently, there is no evidence sturgeon are spawning in Montana. Angling for Kootenai River white sturgeon has not been allowed in Montana since 1979.

Management plans and conservation efforts for Kootenai River white sturgeon are developed and implemented through a U.S. Fish & Wildlife Service (USFWS) coordinated recovery team composed of state, provincial, federal, and tribal representatives from the U.S. and Canada. Short-term recovery objectives for the species include reestablishing successful natural recruitment and preventing extinction through population supplementation. Ultimately, the Kootenai River white sturgeon population could be delisted if the population becomes naturally self-sustaining, a process that could take decades to realize because sturgeon do not become reproductively mature until about 30 years of age. The USFWS recovery plans (1999 and 2019) for the Kootenai River population of white sturgeon details management activities including release of hatchery origin sturgeon, manipulation of dam discharges and water temperature, and instream habitat and wetland restoration efforts to improve conditions suitable for spawning, rearing, and recruitment.

A conservation aquaculture program for Kootenai sturgeon was established in Idaho by Kootenai Tribe of Idaho (KTOI) near Bonners Ferry, Idaho in 1990 to prevent extinction of this native species. The aquaculture program uses hatchery production to rebuild the population by supplementing the extremely low levels of natural recruitment and prioritizes maximizing genetic diversity. Juvenile sturgeon are propagated using gametes from wild adults and stocked into the Kootenai River. A recently developed genetic tool, parental based tagging, may allow for evaluations of fertilized eggs/larval releases to occur in the near future. In 2014 KTOI, with funding from Bonneville Power Administration (BPA) and in partnership with Idaho Fish and Game, FWP, and British Columbia fisheries, constructed the Twin Rivers hatchery, dedicated to sturgeon and burbot culture. They continue to secure eggs from Kootenai drainage in Idaho. The state and provincial co-managers collaborate to evaluate the efficacy of the aquaculture conservation efforts. FWP has monitored the population within the Montana portion of the Kootenai River since the early 1970s. Monitoring was re-established in 2009 with the intention of monitoring the effectiveness of the KTOI sturgeon aquaculture program.

To date, conservation aquaculture efforts have released approximately 300,000 juvenile sturgeon into the Kootenai/Kootenay River system with about 10% of those releases occurring in Montana. The current abundance estimate of juvenile hatchery origin sturgeon is about 14,000-16,000 fish and about 250 sturgeon currently occupy their historical range in Montana downstream of Kootenai Falls. The largest/oldest hatchery origin male sturgeon in the system are just now becoming sexually mature at 25+ years of age and at lengths of 150-200 cm total length.

Kootenai River white sturgeon will likely remain a federally listed and managed species for the foreseeable future; however, FWP will remain active participants in the development, promotion and implementation of conservation aquaculture and other research, monitoring, and evaluation efforts that result in recovery and delisting of the species.

<u>Relevant management documents:</u> *Recovery Plan for the Kootenai River Population* (USFWS, 1999); *Revised Recovery Plan for the Kootenai River Distinct Population Segment of the White Sturgeon* (USFWS, 2019); *Critical Habitat Revised Designation for the Kootenai River Population of White Sturgeon (Acipenser transmontanus): Final* (USFWS, 2008); *Biological Opinion on the Effects of the Federal Columbia River Power System on Five Endangered or Threatened Species* (USFWS, 1995); *Biological Opinion on the Effects to Listed Species from Operations of the Federal Columbia River Power System* (USFWS, 2000). *Fish and Wildlife Service Biological Opinion Regarding the Effects of Libby Dam Operations on the Kootenai River White Sturgeon, Bull Trout, and Kootenai Sturgeon Critical Habitat* (USFWS, 2006). *Clarification of the 2006 Fish and Wildlife Service Biological Opinion Regarding the Effects of Libby Dam Operations on the Kootenai River White Sturgeon, Bull Trout, and Kootenai Sturgeon Critical Habitat* (USFWS, 2008). *Kootenai River resident fish mitigation: White Sturgeon, Burbot, native salmonid monitoring and evaluation* (Hardy et al. 2020). *Kootenai River White Sturgeon Acipenser transmontanus: 2009-2021 investigations in Montana* (Sylvester et al., 2022)

1.6.11 Lake Whitefish

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

Though lake whitefish are a high-quality sport fish (typically 18 to 22 inches long), their limited distribution and catchability result in only about 0.1% of the total fishing days spent pursuing the species in Montana. Flathead Lake provides the bulk of angling pressure for lake whitefish in Montana. Catch rates for this fishery can vary substantially year-to-year and are closely associated with young-of-year yellow perch production. Anglers also target lake whitefish through the ice on Echo and Whitefish lakes, during fall spawning migrations on the Flathead River near Kalispell, and spring through autumn in the Milk River tailwater below Fresno Reservoir. Commercial hook and line angling for lake whitefish is permitted on the north half of Flathead Lake, Whitefish Lake and the Flathead River. The Confederated Salish and Kootenai Tribe captures a considerable number of lake whitefish in gillnets during their lake trout suppression program currently in the south half of Flathead Lake. Numbers are great enough that they process and sell them commercially under the product name Native Fish Keepers, Inc.

Monitoring efforts of lake whitefish occur each fall at Fresno and Nelson Reservoirs and spring and fall at Flathead Lake during adult population monitoring of the entire fish community. These trend data are used to monitor lake whitefish relative abundance, condition, and size structure.

1.6.12 Mountain Whitefish

Mountain whitefish is a common native species distributed widely in the western half of Montana, including the Columbia, Missouri, Saskatchewan, and Yellowstone River basins. The species typically inhabits relatively cold streams, rivers, lakes, and reservoirs and are abundant in many larger rivers where they are commonly captured by anglers who are targeting trout. Mountain whitefish play an important role in ecosystem dynamics; they often represent the highest biomass in a fish assemblage, are important to aquatic food webs, and can act as an indicator species. Typical adult mountain whitefish are 12 to 16 inches in length.

Although mountain whitefish remain present throughout their historical range in Montana, there are concerns of potential declines in abundance in some locations. Owing to their typically high abundances and active movement, mountain whitefish populations have not been historically monitored in rivers and population trends are generally not well documented. FWP is developing monitoring protocols that will help to better understand current mountain whitefish status and future trends in abundance. Despite concerns, mountain whitefish remain one of the most widespread and abundant sport fish in Montana.

Causes of possible declines in some locations are currently only speculative, but may include disease, drought, or other habitat changes. In August 2016, a large scale die-off of mountain whitefish in the

Yellowstone River was attributed to proliferative kidney disease (PKD). Additional testing found the parasite that causes PKD is present in waterbodies throughout western Montana; however, fish in those waterbodies were not symptomatic of the disease. Low flows and warmwater temperatures, in combination with high levels of the PKD parasite, may be responsible for the outbreak that occurred in the Yellowstone River. Additional research is ongoing to help better understand the complex relationship between the various environmental stressors, parasite loads, and infection levels. Likewise, research efforts are underway to better understand the ecology of the species, including its habitat needs, movements, thermal tolerance, and possible cause of declines in some waters.

1.6.13 Nongame Fish

Montana is home to 59 native fishes, of which 41 are considered "nongame" fish (Table 1.0-1). Many of these species are small-bodied minnows that occupy a wide diversity of habitats, like fathead minnows east of the Continental Divide and longnose suckers and longnose dace throughout the state. Nongame fish also includes several sucker and sculpin species as well as several rare Montana Species of Concern including blue sucker, northern redbelly dace, northern pearl dace, shortnose gar, sicklefin chub, spoonhead sculpin, sturgeon chub, torrent sculpin, trout-perch, and Iowa darter. Native nongame fish range in size from the 2-inch sand shiner to the bigmouth buffalo that can reach 3-feet in length and weigh nearly 60 pounds. Although not typically targeted by anglers, native nongame species are important for overall species diversity and aquatic ecosystem function. Nongame species that are commonly targeted for food consumption include freshwater drum and goldeye.

In general, little is known about the population dynamics for many of these species. Some species, such as, blue sucker, shortnose gar, bigmouth buffalo, and smallmouth buffalo, can live longer than previously thought. Blue suckers have been aged to 42 years, gar species have been aged to 60 years old, and a bigmouth buffalo was aged at 112 making it the oldest age-validated freshwater fish in North America. In addition, those long-lived species are slow to reach sexual maturity and demonstrate episodic spawning behavior. Those two factors make them at high-risk for population declines with harvest or significant alteration of the environment such as dam construction.

Accurate identification of small-bodied species is challenging and can lead to a general dismissal or lack of value assigned to these fishes by the public. Additionally, small-bodied species collected for use as live bait fish can be misidentified and can lead to unauthorized introductions into waterbodies where the species is not already present. It is also common to find reference to many of the nongame species as trash fish or rough fish due to general unfamiliarity by the public. For example, bigmouth buffalo and smallmouth buffalo are commonly mistaken with nonnative carp due to similar appearance.

Many native nongame fish risk extirpation from habitat degradation, competition from non-native species, habitat fragmentation, or other human influenced factors. This is the case with some small-bodied prairie species such as northern redbelly dace, northern pearl dace, and Iowa darter. These species face additional threats from expanding northern pike abundance in some systems. Other species that inhabit the Missouri and Yellowstone systems, such as sturgeon chub and sicklefin chub, are currently being assessed by the U.S. Fish & Wildlife Service (USFWS) to determine if federal protection is warranted. Bigmouth buffalo and smallmouth buffalo are popular species for bow fishers, as are Species of Concern shortnose gar and blue sucker. The harvest of these species is largely unregulated and unstudied. Many small native minnows and suckers, such as lake chub, emerald shiner, fathead minnow, and white sucker maintain robust populations east of the Continental Divide. However, anecdotal reports indicate these same species are experiencing localized population declines from private and commercial seining for use as live bait.

Small-bodied species are often important prey for predacious sport fish. These species are monitored on a regular basis in ponds and reservoirs to ensure adequate forage is available to maintain a quality sport fishery. In some cases, FWP transfers these species from one waterbody to another to establish or bolster existing prey populations. Fish disease and aquatic invasive species (AIS) testing are completed prior to any fish movement. Fathead minnows are the most common species used for this purpose.

1.6.14 Non-native Trout

Since their introduction to Montana starting in the late 1800s, rainbow trout, brown trout, brook trout, golden trout and lake trout have become some of the most common and widely dispersed fish species in the state. Also referred to as "non-native trout," the origins of these species span much of North America and Europe. They have proven to be highly successful in Montana and thrive in typical coldwater habitats.

Non-native trout management is a high priority for FWP as they are some of the most popular game fish in the state. As shown in Part II of this plan, most drainages across the state actively manage for non-native trout in many waterbodies. Management of non-native trout varies by species, body of water, and management objectives. Since the 1970s, "wild trout" management has been a priority in Montana rivers and streams. The fundamental elements of wild trout management are to maintain populations through natural reproduction and the protection or restoration of high-quality habitats rather than stocking trout into rivers. This management philosophy has been extremely successful and several rivers in Montana are among the most popular trout fisheries in the nation.

Concurrently, hatchery raised non-native trout (primarily rainbow trout) are a production priority in several of the state's hatcheries. These fish are primarily stocked in reservoirs, ponds, and lakes under a put-grow-and-take management prescription. This program produces numerous high-quality fisheries and harvest opportunities that account for a significant portion of the total state-wide angling pressure.

Management of non-native trout varies widely across the state. Specific management objectives for each species by drainage and waterbody can be found in Part II of this plan. Listed below are general management direction for non-native trout from a statewide perspective.

1.6.14 (1) Brook Trout

Brook trout are found throughout the state in small rivers, streams, spring creeks, and smaller valley and mountain lakes. They are a popular sport fish that are relatively easy to catch and are excellent camp or table fare. Brook trout are also one of the most brilliant and colorful species of fish in Montana. Brook trout are generally prolific and almost wholly sustained through wild reproduction, although popular hatchery-stocked fisheries are maintained in eight closed basin lakes in northwest Montana and in Georgetown Lake. Fishing regulations for brook trout are typically liberal as increased rates of harvest often lead to improved fish growth. Brook trout compete and hybridize with native species in some drainages and are targeted for removal in certain waterbodies where native species conservation is the priority. Nevertheless, brook trout are one of the most widely distributed and available sport fish in Montana.

1.6.14 (2) Brown Trout

Brown trout occupy coldwater habitats throughout Montana but exhibit higher temperature tolerances than other trout. High temperature tolerances and the ability to occupy degraded habitats allow brown trout to exist in waters unsuitable for other salmonids. Nearly all brown trout fisheries in Montana, including those in lakes and reservoirs, are managed as wild trout fisheries and are not maintained through stocking. They are a popular sport fish and reach trophy sizes in many Montana rivers and lakes often due to their piscivorous nature. The proclivity to prey on other fish and fish imitating flies and lures and their striking coloration are among some of the reasons brown trout are such a popular game fish. Brown trout management faced challenges in recent years as abundances in some traditionally brown trout dominated fisheries have declined. This decline is likely related to declining stream flows and elevated water temperatures. Warming temperatures have facilitated expansion of brown trout into headwater tributaries, which increases competition with established populations including cutthroat and bull trout. Concurrently, brown trout abundance at lower elevations in many popular fisheries has declined, often as a function of poor stream flow and elevated water temperatures. Additionally, despite relative tolerance to increased stream temperatures, their preference of structural habitat, especially in shallow stream margins, may also be a disadvantage in flow depleted rivers where shoreline cover is dewatered.

Management strategies for brown trout vary across the state. Most popular sport fisheries with high angling pressure maintain conservative harvest limits, gear restrictions, and sometimes closed angling seasons during critical periods. Many drought plans for rivers in central and western Montana include restrictions that protect brown trout during periods of low water and high temperatures. In some areas with critical native species habitats, brown trout harvest limits may be increased to reduce the potential impacts on imperiled native fishes. Priorities for brown trout management generally include improving flows and habitats during critical periods, such as spawning and rearing, and evaluating potential population-scale impacts from catch-and-release fishing. Additionally, the importance of connecting mainstem rivers with spawning and rearing tributaries and thermal refuge will be emphasized. Improving flows, habitat, and connectivity should result in higher quality and more resilient brown trout fisheries in waters where this is the management goal. However, increasing harvest and limiting expansion is a management priority in many western Montana native trout strongholds.

1.6.14 (3) Lake Trout

Lake trout are the largest member of the trout family in Montana. Relict native lake trout populations from the last ice age exist in Elk Lake and Twin Lake in southwest Montana and Waterton and St. Mary lakes in Glacier National Park. Other populations are introduced. Lake trout typically prefer deep lakes and reservoirs and are highly piscivorous. Fishing regulations are relatively conservative in waterbodies where lake trout are managed as sport fish east of the Continental Divide, such as Tiber and Fort Peck reservoirs, while harvest limits west of the Continental Divide tend to be much more liberal. Lake trout have altered the abundances and size structures of native sport fish populations, especially in western Montana. For example, in Flathead and Swan lakes, lake trout have altered threatened bull trout populations to the point where active removal of lake trout may be needed to reduce impacts to bull trout. Prevention of additional unauthorized introductions and associated impacts is a management priority in western Montana.

1.6.14 (4) Rainbow Trout

Rainbow trout are the most targeted sport fish in Montana and have been introduced into every region of the state. Rainbow trout are most popular in large rivers, tailwater fisheries, and reservoirs but are also common in small coldwater lakes and ponds. Rainbow trout fisheries in rivers and streams are sustained through wild reproduction while rainbow fisheries in most large reservoirs, lakes, and ponds are supplemented with hatchery-reared fish. Stocking is required in these waterbodies because of insufficient spawning habitats to support natural reproduction. Generally, daily bag limits allow angler harvest, with various length restrictions in place on most rivers. Fisheries with high angling pressure might require conservative regulations, such as lower bag limits or length restrictions, to minimize population impacts from angler harvest.

Many rainbow trout fisheries are closely monitored due to high angler use. River rainbow fisheries are typically managed through modified bag or length limits whereas management actions in reservoirs, lakes, and ponds typically involve adjustments to stocking practices. Rainbow trout can pose a problem to native species management in some areas, as rainbow trout can hybridize with Yellowstone and westslope cutthroat trout, as well as native redband rainbow trout. Introduced rainbow trout are targeted for removal in some cutthroat and redband conservation projects to reduce the risk of hybridization.

Most popular rainbow trout fisheries have proven resiliency and have endured numerous challenges over the years. Many rainbow trout fisheries saw substantial impacts from whirling disease in the late 1990s and early 2000s, but most wild populations have recovered despite the continued presence of the disease. Extended periods of drought in the early 2000s and early 2020s have also impacted populations through elevated water temperatures and low flows. Efforts to improve streamflow in popular sport fisheries coupled with drought related angling restrictions and closures are expected to reduce stress to individual fish during periods of extreme temperature and flow.

1.6.14 (5) Golden Trout

Golden trout occupy mountain lakes and are primarily found in southwest Montana. Many of these lakes maintain self-sustaining wild populations, although some are periodically supplemented through stocking. Golden trout can grow to large sizes, but typically range between 6- to 12-inches. They are considered one of the most beautiful trout species and provide a rare opportunity to catch a unique fish in pristine environments. Golden trout hybridize with cutthroat trout and other spring spawning trout, but this risk is minimized by restricting golden trout to lakes with limited connectivity to native cutthroat populations. Sylvan Lake in the Beartooth Mountains serves as the wild broodstock population for all lakes stocked with golden trout in Montana. Approximately every six years, gametes are collected from golden trout in Sylvan Lake which are then raised in the Big Timber hatchery and stocked in lakes across the state.

1.6.14 (6) Chinook Salmon

Fort Peck Reservoir is currently the only Chinook salmon fishery in Montana. The earliest stocking records of Chinook salmon occurred in 1971 in the Missouri River upstream of Fort Peck Reservoir. Initial fingerlings stocked into the reservoir were from eggs collected in Lake Michigan. The species has been stocked in earnest since 1983 and has continued since this time. Chinook salmon were introduced into Fort Peck Reservoir to add diversity, utilize the coldwater habitat of the reservoir, and provide a trophy component to the existing sport fishery. The addition of cisco as a forage species into Fort Peck in 1984 dramatically improved growth rates of this species. Landlocked chinook do not reproduce naturally in the reservoir due to absence of suitable spawning habitat thus annual stocking is required to maintain the population. The current state record chinook salmon was caught in 2020 from Fort Peck Reservoir weighing 32.05 pounds.

Most fishing activity for chinook salmon occurs during late summer and fall near Fort Peck dam. Angler catch rates have been relatively low since introduction averaging 0.01-0.06 fish per hour. Despite low catch rates, chinook salmon are the second most targeted species in Fort Peck Reservoir. The percentage of anglers targeting chinook salmon has nearly doubled from historic creel surveys (2004 and 2014) due to a more consistent and improved propagation and stocking program.

1.6.15 Northern Pike

Northern pike is the second largest member of the family *Esocidae* (behind muskellunge) and has one of the broadest natural distributions of any freshwater fish species. Its native range extends around the globe in the northern hemisphere. Throughout its native range, northern pike have tremendous commercial, recreational, and cultural importance. In Montana, northern pike are only native to the St. Mary drainage and have been introduced elsewhere. All populations of northern pike west of the Continental Divide stem from illegal introductions.

Northern pike are primarily piscivorous, though they are known to be opportunistic, omnivorous predators. The popularity of northern pike as a sport fish stems from their ability to attain large sizes, high catchability, and good meat quality. Popular northern pike fisheries are primarily in lakes, reservoirs, and large rivers in the western, north central, and eastern part of the state, including the lower Clark Fork, Clearwater, Kootenai and Flathead River systems, as well as Fort Peck, Tongue River, Tiber, Pishkun, Fresno, and Nelson reservoirs.

In most Montana waters, northern pike have few natural predators and can quickly change the dynamics of a fish community. In general, outside of trout waters, northern pike are managed as a sport fish. Within trout waters (both east and west of the Continental Divide) the management goal is often to suppress populations to limit their geographic range and reduce their impact on existing native and sport fish populations. In some cases where species of special concern, Threatened and Endangered species or other important sport fish are impacted, northern pike eradication may be prescribed. Recent literature indicates northern pike are largely responsible for dramatic declines of native pearl dace in prairie streams. In these environments, northern pike rarely achieve sizes that are attractive to anglers, but they can eliminate diverse prairie stream fish populations when fish are forced into intermittent pools. There are additional concerns over competition with sauger which has led to increased monitoring and potential population suppression activities where predation is a conservation concern.

Since all populations in western Montana are from illegal introductions, liberal harvest regulations, including unlimited harvest in some drainages, are in place to encourage harvest and suppress populations. In many drainages spearing is allowed to promote additional harvest. Regulations in the Central and Eastern Fishing Districts are somewhat more conservative, but still allow for ample harvest opportunity. Exceptions are found in the upper Missouri, Gallatin, Madison, and Jefferson drainages where unlimited harvest is allowed to suppress population expansion.

1.6.16 Paddlefish

Paddlefish are an ancient, cartilaginous fish and the only living paddlefish (*Polyodontidae*) species worldwide. They are planktivorous and Montana's largest native fish with the state record weighing 143 pounds, although typical size for a harvested fish is between 20 and 100 pounds. Paddlefish are long-lived, with fish commonly reaching 50 to 60 years old. Paddlefish were relatively uncommon prior to the completion of Fort Peck Dam in Montana and Garrison Dam in North Dakota. Abundance increased markedly after completion of the mainstem Missouri River dams, which exponentially increased backwater and reservoir habitats and subsequently improved fry survival and zooplankton production. In recent decades paddlefish abundances and recruitment has diminished as reservoirs age and shallow water headwaters habitats silt in, although smaller trophic upsurges following reservoir filling events after prolonged drawdowns occasionally produces large year classes of paddlefish.

While paddlefish are more often found in the lentic portions of the Missouri River, such as Fort Peck Reservoir, Fort Peck Dredge Cuts, and Lake Sakakawea in North Dakota, they are seasonal occupants of the Missouri, Milk, Marias, Powder, Tongue, Bighorn, and Yellowstone rivers during spring spawning. Spawning migrations can exceed 100 river miles during high flow events.

In the Missouri River paddlefish are found downstream of Fort Peck Dam to Lake Sakakawea, and from downstream of the Fred Robinson Bridge upstream to Fort Benton, depending on river discharge. In the Yellowstone River, distribution during spawning migrations is also correlated to river discharge. At low discharge and water turbidity, paddlefish are typically downstream of the Intake Diversion Dam near Sidney. When river discharge and turbidity is high, paddlefish move upstream to Terry and Miles City areas at the tributary confluences of the Powder and Tongue rivers. In recent history paddlefish were found as far upstream as Fort Smith on the Bighorn River. Use of spawning habitats upstream of Intake Diversion Dam is expected to be more common as paddlefish use the constructed fish bypass channel around the diversion to ascend upstream.

Paddlefish are managed as two naturally reproducing stocks with three discretely managed fisheries: the Yellowstone River and Missouri below Fort Peck Dam (Sakakawea stock), the Missouri River above Fort Peck Dam, and the Fort Peck Dredge Cuts. Paddlefish fishing is not open year-round and season dates vary among the three fisheries. Paddlefish regulations have evolved over time to ensure sustainable harvest is occurring and to maintain angler participation.

The Lake Sakakawea stock is managed cooperatively through a joint management plan with the State of North Dakota to monitor the paddlefish population and demographics to annually evaluate the sustainability of harvest. Harvest of this recreational fishery is accomplished by snagging, and harvest targets for each stock are set on an annual basis. Since 2010 the harvest target has been 1,000 fish. Harvest is closely monitored and can be closed immediately or with 24 hours' notice. Traditionally most harvest occurred immediately downstream of Intake Dam, but the fish bypass channel completed in 2022 could shift paddlefish migration behavior and angler use resulting in a more dispersed fishery. FWP substantially increased monitoring efforts before bypass channel completion and will continue intensive monitoring to document changes to the paddlefish fishery and address management needs to sustain paddlefish in the Yellowstone and lower Missouri.

The Upper Missouri River stock is managed for sustainable harvest ranging between 400 to 600 fish annually. Harvest tags are allocated via a lottery draw and 1,000 harvest tags issued annually. Unsuccessful harvest draw anglers are still allowed to snag and release paddlefish during the season. In addition, anglers wanting to participate in this fishery can purchase a snag and release tag over-the-counter. Future studies will focus on angler snag and release mortality and boat propeller strike mortality.

The Fort Peck Dredge Cut fishery is managed separately from the Sakakawea and Upper Missouri River stocks, although mixing of paddlefish between lentic habitat found in the Dredge Cuts and the Missouri River below Fort Peck Dam does occur. Bowfishing is the only method of paddlefish harvest permitted in the Dredge Cuts, and harvest tags are available over-the-counter. Currently, there is no quota regulating annual paddlefish take in the Dredge Cuts, as historic harvest levels are relatively low (< 50 fish annually). Recently, FWP has increased efforts to monitor age and growth of Dredge Cut harvested paddlefish, as well as quantify the degree of mixing between Dredge Cut and Missouri River/Sakakawea stocks.

Relevant management documents: *Management Plan for Montana and North Dakota Paddlefish Stocks and Fisheries* (FWP 2021).

1.6.17 Pallid Sturgeon

Pallid sturgeon are long-lived (50+ years), highly migratory, and require large, turbid, relatively warm, and free flowing rivers to successfully reproduce. The historical distribution of pallid sturgeon in Montana includes the Missouri River downstream of Fort Benton, the lower reaches of the Marias River, the lower reaches of the Milk River, the Yellowstone River downstream of Forsyth, the mouth of the Tongue River, and significant stretches of the Powder River. The construction of dams and corresponding impoundments on the upper Missouri River, Yellowstone River, and Marias River have impeded successful spawning and recruitment of pallid sturgeon in Montana. Dams and impoundments block migration routes, alter natural spawning cues such as discharge, temperature and turbidity, fragment populations, and alter habitats necessary for survival of fry. It is currently estimated that fewer than 100 wild-origin adult pallid sturgeon persist in the Missouri and Yellowstone rivers above Lake Sakakawea, though several abundant year classes of hatchery-origin pallid sturgeon are present in the system. Even fewer wild-origin pallid sturgeon remain in the population upstream of Fort Peck Reservoir (<20 individuals), but similar stocking events over the past 25 years has resulted in thousands of hatchery-origin pallid sturgeon being found in this reach of the Missouri River. The pallid sturgeon was listed as a federal endangered species in 1990 and is a Montana Species of Concern. Angling for pallid sturgeon is not allowed in Montana and restrictions are in place for the similar looking shovelnose sturgeon to further protect pallid sturgeon from accidental harvest.

Management plans and conservation efforts for pallid sturgeon have been developed and implemented through a U.S. Fish & Wildlife Service coordinated recovery team that includes state and federally appointed staff. Short-term management objectives for the species include preventing local extirpation through population supplementation with hatchery-propagated fish, improving connectivity throughout drainages where pallid sturgeon are distributed (e.g., ensuring bi-directional passage at Intake Diversion Dam on the Yellowstone River), developing strategies to address impacts to natural reproduction and recruitment related to dam operations (e.g., Tiber, Fort Peck, and Garrison (North Dakota) dams), and maintaining ecological health to provide for an increasing population of maturing pallid sturgeon. Long-term and natural persistence of pallid sturgeon will require changes to reservoir operations that result in reestablishment of spawning cues and habitats necessary for fry survival.

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

Relevant management documents: *Revised Recovery Plan for the Pallid Sturgeon (Scaphirhynchus albus)* (USFWS, 2014); *Biological Opinion on the Operation of the Missouri River Mainstem Reservoir System, the Operation and Maintenance of the Bank Stabilization and Navigation Project, the Operation of the Kansas River Reservoir System, and the Implementation of the Missouri River Recovery Management Plan* (USFWS, 2018); *Pallid Sturgeon Range-wide Stocking and Augmentation Plan* (USFWS, 2019); *Memorandum of Understanding for Upper Basin Pallid Sturgeon Recovery Implementation* (Upper Basin Pallid Sturgeon Workgroup, 2008, 2018); *Pallid Sturgeon Conservation and Management Plan for Montana (FWP, in prep); Upper Basin Pallid Sturgeon Survival Estimation Project* (Rotella & Hadley, 2009; Rotella, 2010, 2012, 2015, 2017). *Record of Decision, Fort Peck Dam Test Release Environmental Impact Statement, Fort Peck Dam, Montana. Department of Army, U.S. Army Corps of Engineers, Northwest Division* (USACOE, 2021).

1.6.18 Sauger

Sauger is a member of the perch family and a native game species in the Missouri River and Yellowstone River basins. Their historical distribution includes the Missouri River and its major tributaries downstream of Great Falls, and the Yellowstone River and its major tributaries downstream of the Clarks Fork of the Yellowstone River near Billings. Sauger prefer turbid and unimpeded rivers which permit spawning migrations of up to several hundred miles. Sauger also occupy reservoirs with suitable habitat, but are better adapted to large, turbid rivers. However, dams, diversions, and impoundments on rivers have altered water temperature, turbidity, flow regime, and obstructed migrations and are attributed to population declines. Additional threats include entrainment in irrigation canals, streambank alterations, and competition or hybridization with non-native species, such as smallmouth bass and walleye. Although widely distributed in the Missouri and Yellowstone rivers, and common in some locations, the sauger is listed as a Montana Species of Concern owing to an estimated 50% reduction in distribution and widespread habitat threats.

Sauger have received considerable management attention since reductions in abundance were first noted in drought years in the 1980s. Several studies were completed to describe species status, habitat needs, movement patterns and threats. These assessments have provided important information on the influence of habitat alterations on sauger and other prairie river species, such as blue sucker, pallid sturgeon, and paddlefish. Recent restoration efforts have been directed towards reducing entrainment in irrigation canals and promoting upstream migrations through bypass channels constructed at Tongue & Yellowstone Rivers Diversion Dam on the Tongue River, Huntley, and Intake Diversions dams on the Yellowstone River. Additionally, efforts to improve connectivity in the Musselshell River have helped encourage a recent return of sauger in the lower portions of system. Modifying dam operations to promote more natural hydrographs and temperatures on mainstem rivers and tributaries will continue to be important but difficult issue to address.

Hybridization between sauger and non-native walleye appears to be low in most locations, however periodic genetic monitoring will be used to evaluate hybridization rates. With open passage created at Intake Diversion Dam in 2022, annual spawning migrations of walleye from Lake Sakakawea will have access to upstream areas currently dominated by sauger. In Bighorn Reservoir hybridization risk is minimized through stocking of sterile walleye to maintain the reservoir fishery.

On larger rivers, spring and fall aggregations of sauger provide for popular fisheries, though overall, less than 0.2% of statewide angling pressure is targeted towards the species. Due to relatively low angling pressure bag limits focus on allowing harvest opportunity while sustaining the population. Some areas like Tongue River Reservoir maintain conservative sauger bag limits to minimize population impacts from harvest.

1.6.19 Shovelnose Sturgeon

The shovelnose sturgeon is native to Montana with a current distribution that includes the length of the Missouri River downstream of Morony Dam near Great Falls, the Marias River downstream of Tiber Dam, the Yellowstone River downstream of its confluence with the Bighorn River, the Powder River, and within the lower reaches of the Milk, Tongue, and Teton rivers. Shovelnose sturgeon are also present in Bighorn, Fort Peck and Tiber reservoirs. Shovelnose sturgeon and pallid sturgeon coexist in portions of the Missouri and Yellowstone rivers, but unlike their endangered cousin, shovelnose sturgeon are less impacted by dams and impoundments and remain common to abundant in many locations. Nevertheless, impediments to movement and altered flow, sediment, and temperature regimes have resulted in reduced distribution and abundance of shovelnose sturgeon in portions of their range, particularly tributaries to the major rivers. On-going efforts to address these issues will benefit shovelnose sturgeon as well as many other game and nongame species.

Shovelnose and pallid sturgeon can be hard to distinguish from one another, especially at younger age classes. Anglers targeting shovelnose sturgeon have the potential to accidentally harvest the endangered pallid sturgeon and educating anglers on the differences between the two species is a high priority. These two species are so similar in looks that the U.S. Fish & Wildlife Service has used the "Similarity of Appearance" provision within the endangered species act to list shovelnose sturgeon as threatened (this listing has no immediate bearing on shovelnose sturgeon management in Montana). Since few shovelnose sturgeon attain the large size of an adult pallid sturgeon, FWP has implemented a regulation that no sturgeon over 40 inches in length may be harvested.

Across their current range, few Montana anglers specifically target shovelnose sturgeon. An exception is the lower Marias River where a popular late spring fishery exists for adult shovelnose sturgeon migrating from the Missouri River. Shovelnose sturgeon are also occasionally captured by anglers targeting other species, particularly channel catfish.

1.6.20 Walleye

Walleye is a non-native species found widely in lakes, reservoirs, and large rivers in Montana east of the Continental Divide. They are also found west of the Continental Divide in the lower Clark Fork reservoirs downstream of Thompson Falls dam, the result of one or more unauthorized introductions. The range and abundance of walleye has increased in recent years in the Missouri River between Holter Dam and Great Falls, as well as in the Yellowstone River downstream of the Ranchers Diversion near Bighorn.

Walleye are one of the most popular sport fish in North America and have achieved an avid following among anglers in Montana with nearly 10% of angler days dedicated to the pursuit of this species. Walleye fisheries remain harvest oriented as the fish is considered one of the best tasting freshwater species, and they can achieve impressive size when forage is abundant.

Walleye require rock, rubble, or gravel substrates for successful spawning. Natural recruitment is better at waterbodies such as Canyon Ferry Reservoir that contains abundant spawning habitat. Waterbodies such as Fort Peck have lower natural reproduction due to shorelines dominated by fine sediments which smother eggs and reduce reproduction success. In reservoirs, dam operations can be detrimental if water levels drop during spawning and incubation. Recruitment is highly influenced by weather conditions in the spring, probably more so than by the number of spawning fish present or the number of eggs laid. Walleye forage is also influenced greatly by reservoir levels. Water levels rising during the time of forage spawning in the spring, combined with the availability of vegetation for spawning and cover, will greatly influence forage abundance.

FWP stocks walleye as fry or fingerlings in reservoirs where habitat or dam operations limit natural production. Most of the hatchery capacity and staff at Fort Peck and Miles City hatcheries are devoted to collecting walleye spawn, hatching the eggs, and growing fish to a fingerling size. Between 2015 and 2021, FWP stocked approximately 160 million fry and 19 million fingerlings into Montana reservoirs, with the bulk of them going to Fort Peck Reservoir. FWP Policy prohibits the stocking of walleye west of the Continental Divide. Adult walleye are occasionally transferred from donor waters in portions of eastern Montana to reestablish populations after winter kill events or to enhance existing fisheries.

Management of fisheries that include walleye can be challenging because they can be a prolific voracious predator. It is not uncommon for walleye abundance to outstrip forage resources, leading to poor growth or stunted populations that are unappealing to anglers. Most walleye fisheries that are maintained through stocking see relatively conservative stocking rates to balance predator and prey abundance. In fisheries maintained through natural reproduction, liberalized harvest limits may be implemented to limit over abundant populations and subsequential poor growth. Illegal introduction of walleye also poses problems, especially in western and west central Montana. To combat illegal introductions in northwest Montana, all walleye captured outside of Noxon Reservoir are required to be reported to FWP.

1.6.21 Yellow Perch

Yellow perch are among the most widespread and popular harvest-oriented sportfish in Montana. They thrive in ponds, lakes, and reservoirs and are also common in sloughs and slow-moving rivers. Yellow perch were initially introduced to Montana waters more than a century ago, and through stocking efforts, natural dispersal, and illegal introductions are now present in most major drainages of the state. Limited propagation of yellow perch has occurred in Montana hatcheries. More commonly, yellow perch are transferred from donor ponds in eastern Montana to reestablish or enhance fisheries after winter kill events. Yellow perch, especially young-of-year, are important forage for predatory sportfish like black bass, walleye, sauger, northern pike, burbot, lake whitefish, and cannibalistic yellow perch. Their presence is a key factor in the quality and stability of many fisheries. High reproductive rates allow yellow perch to overpopulate in some waters, particularly ponds with adequate spawning and rearing habitat and limited predation. These scenarios can result in poor quality fisheries comprised mostly of stunted fish. Yellow perch have also been illegally introduced to numerous waters resulting in significant biological changes to some fisheries.

Yellow perch are targeted by anglers in all seasons, and favored fisheries are those where quality fish are produced. Most yellow perch populations can support high levels of angler harvest and on these waterbodies, there are no daily or possession limits. On some waters, anglers can reduce abundance and affect size structure by selectively removing large individuals. Restrictive bag limits are in place on some waterbodies to produce higher quality perch fisheries.

Balanced yellow perch populations are a management challenge because of highly variable recruitment and growth rates. Growth rates are influenced by a host of variables but benthic invertebrate production, density of yellow perch, and density of predators play an important role. They are highly sought after for table fare, but anglers are generally not interested in perch smaller than 8 inches; 10 inch and greater perch are the desired size by anglers in most waters. In some waters, slow growth confounds management; it can take 4 to 6 years for perch to reach 8 inches and 8 to 9 years to reach 10 inches.

Yellow perch are also aggressive and can out-compete other sport fish for food and space. The common problem with yellow perch is overabundance. Methods to decrease yellow perch densities are limited, labor intensive, and costly.

1.6.22 Crayfish

Crayfish are important to the ecology of many Montana waters, in part because they are a dominant prey item for many fish and terrestrial animals. Further, in many waterbodies, crayfish themselves provide an increasingly popular fishery. Information on Montana's crayfish is scarce, and concerns have arisen about the sustainability of some crayfisheries and the potential for transport of invasive crayfish around the state.

Crayfish are one of the most invasive species groups in the world. The consequences of their introductions can be profound. Non-native crayfish may disrupt their environments by changing plant densities, disturbing sediments, and altering food webs. Live crayfish can be legally transported in Montana for use as food or bait, increasing the likelihood of both intentional and unintentional release. Crayfish are also often released into the wild from aquaria or from bulk purchases from the southern

United States. In Montana, recent illegal introductions may further impact crayfish populations in some popular recreational crayfish fisheries.

The increase in recreational harvest of crayfish raises concerns about sustainability. Relevant information gaps about crayfish include current population densities, individual growth rates, population growth rates and how to determine crayfish age. Another key question is what role density dependence plays in growth and survival of crayfish. Filling such information gaps is needed to guide management to ensure that populations can withstand harvest.

In 2021, Montana FWP, in collaboration with the USDA Forest Service, began a 2-year crayfish project to answer many questions about crayfish, species distribution, and human consumption in Montana.

The project had multiple objectives including to:

- Provide guidance for human consumption (i.e., mercury levels, dioxins, furans, coplanar PCBs).
- Determine species distribution.
- Locate and delineate non-native and invasive species.
- Compare sampling techniques to provide recommendations for future monitoring.
- Develop crayfish expertise within FWP and partners.

FWP and partners sampled nearly 2,800 sites and found crayfish in over 550 locations. Partners included federal and state agencies, tribes, universities, counties, educators, and private citizens. We found no AIS-listed crayfish species, such as rusty crayfish (*Faxonius rusticus*) or red swamp crayfish (*Procambarus clarkii*), but at the Miles City State Fish Hatchery, we found a non-native crayfish species (southern plains crayfish, *Procambarus simulans*) not previously documented in Montana.

Results of mercury contaminant testing were published in the fish consumption advisories on the FWP website. The survey made the first report of crayfish displaying clinical signs (e.g., lesions) of crayfish plague (*Aphanomyces astaci*) in North America. Crayfish plague is endemic to crayfish in North America, although very little is known about the pathogen or disease in Montana. The pathogen was introduced to Europe and has spread throughout the continent, where the resulting disease has decimated native crayfish. Although common in North American crayfish, crayfish here do not typically exhibit clinical plague signs. The effects of the disease in Montana crayfish are unknown, and further investigation will evaluate and monitor the disease in Montana crayfish populations. Montana crayfish and the pathogen that causes crayfish plague will be further evaluated by a Graduate Research Project scheduled to start in 2023.