Miles

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

Red Rock River Drainage

Physical Description

The Red Rock River originates in the Centennial Valley, flows west to Lima Reservoir, and joins its primary tributary, Horse Prairie Creek, at Clark Canyon Reservoir. The Centennial Valley is over 6,000 feet of elevation, about 50 miles long and 7 miles wide, and remains one of the least inhabited large high valleys in Montana. Two large, shallow lakes, Upper (2,206 acres) and Lower (1,126 acres) Red Rock lakes, dominate the valley floor. Elk Lake, which is 207 acres and about 60 feet deep, is in the northeast corner of the valley at 6,750 feet in elevation. Several other small lakes and reservoirs occur throughout the mountain ranges surrounding the valley. Four major streams, Red Rock, Elk, Tom, and O'Dell creeks, occur upstream of the Red Rock lakes. The Red Rock River begins as the outlet of Lower Red Rock Lake. Lima Reservoir is a 6,800-acre irrigation storage facility built in 1902. From Lima Dam, the river flows 57 miles in a northwesterly direction through agricultural lands where it joins Big Sheep Creek before discharging into Clark Canyon Reservoir. Horse Prairie Creek, and its primary tributary Medicine Lodge Creek, drain the eastern slope of the Continental Divide to the west of Clark Canyon Reservoir. Elevations range from 10,200 feet at Jeff Davis Peak to 5,578 feet at Clark Canyon Dam. The drainage is comprised of many miles of relatively small streams and four mountain lakes. Clark Canyon Reservoir is a 4,900-acre irrigation impoundment that was built in 1964. Prior to construction of Clark Canyon Reservoir, the Red Rock River and Horse Prairie Creek converged to form the Beaverhead River, which now begins at Clark Canyon Dam. The Red Rock River drains an area of 1,580 square miles, about half of which lies on the mountain slopes of the Continental Divide. Twenty-three lakes or reservoirs exist within the drainage, totaling 14,939 surface acres.

Fisheries Management

All flowing waters and several reservoirs and lakes in this drainage that support trout populations are managed as wild trout fisheries, emphasizing habitat protection and natural reproduction. Tributaries and their connectivity to Clark Canyon Reservoir and the Red Rock River are critical for supporting natural reproduction, providing rearing habitats for juvenile trout, and delivering cool summer streamflow. Management of tributary connectivity for non-native brown and rainbow trout recruitment and fisheries is balanced with occasional tributary isolation from the mainstem river to promote westslope cutthroat trout conservation. Conservation of native, wild Arctic grayling in the Centennial Valley are a primary management emphasis.

The current wild trout management strategy replaced hatchery-based management of trout over 50 years ago. Maintenance of healthy fish habitats for all life stages is needed for this strategy to succeed, and the predicted changes in streamflow and water temperatures are high priority topics for fisheries management in this drainage. The Centennial Valley Arctic Grayling Adaptive Management Plan evaluates habitat management approaches on public lands and the Centennial Valley Arctic Grayling Candidate Conservation Agreement with Assurances improves habitat on private lands by addressing threats to instream flows, riparian health, fish passage, and entrainment in irrigation diversions. The Beaverhead Watershed Committee focuses on alleviating habitat degradation or pollution through onthe-ground projects and improved land use practices are critical in managing fish habitats. Specifically, collaborative work with irrigators to improve water monitoring, irrigation efficiency, instream flows and

fish passage stand to greatly benefit fisheries in the Red Rock River and Clark Canyon Reservoir. Over twenty-five 310 or 124 permits are typically issued annually by the Beaverhead Conservation District or FWP to minimize impacts of proposed manipulations to the bed or banks of streams.

The Red Rock River basin contains fish species common to Southwestern Montana, including rainbow trout, brown trout, brook trout, westslope cutthroat trout (primarily in isolated tributaries), hybrid cutthroat trout, mountain whitefish, burbot, common carp, longnose dace, longnose sucker, Rocky Mountain sculpin, and white sucker. Native fish species that occur in the Centennial Valley include Arctic grayling, lake trout, westslope cutthroat trout, burbot, mountain whitefish, white sucker, longnose sucker, longnose dace, and sculpin. Non-native species include brook trout, Yellowstone cutthroat trout, and Utah chub. All rivers and streams and most lakes or reservoirs support wild fisheries, although several lakes and reservoirs are partially or entirely dependent on stocked trout to maintain recreational fisheries.

Clark Canyon Reservoir is managed to maximize densities of rainbow trout, provide trophy rainbow trout, and maintain wild brown trout and burbot fisheries. Over the past decade, angling pressure on Clark Canyon Reservoir has varied from 14,076 angler-days in 2015 to 32,880 angler-days in 2009. Total use by nonresident anglers averages about 40% and has varied from 7% to 67% of all angler-days over the last decade. Monitoring data show Clark Canyon Reservoir supports a robust rainbow trout fishery with average catch rates of about 9 fish per net and fish up to 23 inches regularly observed. The rainbow trout management goal for Clark Canyon Reservoir is to create a fishery that supports netting catch rates of about 15 fish per net and a trophy component with at least 5% of fish measuring over 24 inches. The goal of 15 fish per net was selected because rainbow trout body condition in Clark Canyon begins to decline at that relative abundance, which is a function of average reservoir carrying capacity. Stocking rates for Clark Canyon Reservoir vary from 150,000 to 350,000 fish annually and a positive relationship exists between stocking rate and the number of rainbow trout observed in netting surveys. However, recent otolith microchemistry studies indicated that about 75% of rainbow trout in the reservoir are of wild, not hatchery, origin. Therefore, a management strategy that emphasizes improving spawning habitats, protecting spawning fish, and evaluating the most effective strains and stocking approaches will be employed. This management direction will also benefit wild brown trout. Because of the relatively high harvest rate and contribution of wild trout to the fishery, the combined trout harvest limit in Clark Canyon Reservoir is three trout daily and in possession. Drivers of the reservoir burbot population are relatively unknown, although harvest appears to impact abundance and size-structure. Because of declining relative abundances and size structure over the past decade, more restrictive regulations were implemented in 2019 where harvest is restricted to three burbot over 23 inches to ensure fish live long enough to reach spawn ages to provide sufficient recruitment.

The Centennial Valley will be managed for native fish conservation. An aboriginal Arctic grayling population is distributed among several tributaries and Upper Red Rock Lake and are the primary focus of Centennial Valley fisheries conservation and management. Arctic grayling in the Centennial Valley are one of two remaining indigenous populations of grayling in the lower 48 states. The Red Rocks National Wildlife Refuge occupies over 39,000 acres in the eastern part of the valley and streams and lakes that occur there are co-managed with the Refuge to ensure fisheries and wildlife goals and mandates are met. The remainder of the valley is private, Bureau of Land Management (BLM), and the Montana Department of Natural Resources and Conservation (DNRC) lands, much of which is managed primarily for cattle grazing. The grayling population has recently declined due to a lack of suitable over-winter

habitat in Upper Red Rock Lake. Arctic grayling abundances are presently critically low with fewer than 100 spawning fish remaining. Rapid, permanent loss of genetic diversity is occurring because of low abundances. Conservation objectives of maintaining existing genetic diversity, spawning or refugia habitat and connectivity in at least two tributaries up and downstream of Upper Red Rock Lake, and at least 1,000 fish in the Red Rock Creek spawning population were established to achieve long-term, selfsustaining Arctic grayling persistence. The Centennial Valley Arctic Grayling Adaptive Management Plan, which was developed to determine population drivers and the most effective management strategies to regularly maintain 1,000 spawning fish, showed that over-winter habitat in Upper Red Rock Lake is the primary population driver. Thus, developing and implementing projects that increase the area of deep, well-oxygenated habitat in Upper Red Rock Lake are the highest priority management need and essential to grayling conservation. A project is being developed to divert a small tributary to the center of the lake to improve dissolved oxygen concentrations under the ice. Other opportunities may be available for grayling reintroductions in the Red Rock drainage following non-native fish removals in ponds or lakes. To maintain connected spawning and rearing habitats on private lands, a joint FWP-U.S. Fish & Wildlife Service (USFWS) Candidate Conservation Agreement with Assurances (CCAA) was developed to address threats to riparian health, instream flows, fish passage, and entrainment. Those on-the-ground efforts, in combination with creation of a genetic reserve that represents the historical genetic diversity of Centennial Valley Arctic grayling as well as possible, will be collectively implemented to achieve conservation goals.

Elk Lake, a 207-acre waterbody in the northeast corner of the Centennial Valley, has a unique native fish population; it is one of only two lakes the Missouri River watershed with native lake trout. Wild populations of native burbot and white suckers exist in Elk Lake along with a stocked population of westslope cutthroat trout that supports a sport fishery. Arctic grayling are native to the lake but were extirpated by the 1990s after their spawning tributaries became disconnected. Previous attempts to reconnect one of the tributaries have not been successful. FWP and the U.S. Forest Service (USFS) are working through the feasibility of stream reconnection to re-establish self-sustaining grayling in the lake. Utah chub are the only non-native species present in the lake. Elk Lake has high angler use relative to the size of the lake, with annual effort averaging about 1,500 angler-days. Arctic grayling are protected by catch-and-release regulations throughout the basin while lake trout are protected by catch-and-release regulations in Elk Lake.

The Red Rock River between Lima and Clark Canyon reservoirs is managed as a non-native sport fishery while protecting spawning trout from Clark Canyon Reservoir. The Red Rock River supports about 600 brown trout and 100 rainbow trout per mile. Rainbow and brown trout seasonally use the Red Rock River for spawning and rearing in the spring and fall, respectively. Seasonal closures will be used to protect spawning trout and incubating embryos. Relatively restrictive harvest will be used to manage the sport fishery. Eliminating seasonal dewatering and reducing sedimentation are the primary management needs to improve and maintain this fishery. River streamflow is heavily dependent on Lima Reservoir operations for irrigation; reaches above the town of Dell are frequently dewatered during winter and short sections below Kidd are often dewatered as part of summertime irrigation operations. Public access is limited throughout this reach and annual use of about 1,000 angler-days is typical.

Tributaries and small streams will be managed as either recreational, wild non-native trout fisheries or to sustain wild, conservation populations of westslope cutthroat trout. The largest and most heavily fished tributaries in the Red Rock River are Big Sheep, Horse Prairie, Medicine Lodge, Bloody Dick, and

Selway creeks. Except for Selway Creek, those streams support primarily brown and rainbow trout fisheries in their lower reaches with brook trout and hybrid cutthroat trout fisheries in upper reaches. Selway Creek is being restored to a unique, native westslope cutthroat trout and Arctic grayling fishery. Most other tributaries and small streams in the Red Rock River Drainage support brook trout and cutthroat trout. Thirty-one streams with westslope cutthroat trout populations that are less than 10% hybridized will be managed to reduce or eliminate non-native trout. The long-term westslope cutthroat trout conservation goal of restoring 20% of historical tributary distribution will eventually require additional streams be designated for native fish management, which will occur as part of a public planning process and be described in future iterations of this plan. Most streams (80%) will be managed as non-native trout fisheries under standard Central District fishing regulations.

Mountain lakes will be managed to provide diverse recreational opportunities. <u>Twenty-three mountain lakes</u> exist within the Red Rock River drainage that are managed as trout fisheries. Management of these lakes varies from periodic hatchery stocking to wild, self-sustaining fisheries. Most of these lakes have stocked or self-sustaining populations of moderate-sized (10-16-inch) westslope cutthroat, hybridized cutthroat, brook, and rainbow trout. Where natural reproduction is limited, westslope cutthroat trout or Arctic grayling will be stocked to manage for a balanced opportunity and larger fish. Mountain lakes are managed under standard Central District fishing regulations.

Habitat

The Red Rock River upstream from Lima Reservoir is a low gradient stream, flowing for 29 miles through open sagebrush uplands within the Centennial Valley. In the Centennial Valley, sand-gravel substrates compose much of the riverbed along with vast areas of silt. The narrow riparian zone is vegetated with sedges, grasses, and willows. Over half of this reach passes through parcels of public land controlled by the BLM, State of Montana, and USFWS. Livestock grazing during the summer is the major land use along this stretch of the Red Rock River.

Between Lima Dam and Clark Canyon Reservoir, the Red Rock River flows for 57 miles through privately owned valley lands, primarily used for hay production and the wintering of cattle. The river width averages about 45 feet at low flow, and the substrates are comprised of gravel-cobble with silt deposition in the slower reaches. The narrow riparian zone is primarily vegetated with grasses, willows, alders, and cottonwoods. About 35,000 acres of land is irrigated within this reach. Stream dewatering can be severe in this reach of the Red Rock River, with flow ceasing for several days at a time within short stretches of river. Wintering cattle have damaged the streambanks along portions of the reach, creating denuded and eroding banks.

Special Management Issues

Clark Canyon Reservoir Rainbow Trout Management

The rainbow trout fishery in Clark Canyon Reservoir will be optimized by 1) protecting wild spawning fish and improving their habitats, 2) improving survival of stocked fish, and 3) evaluating which strains are most likely to have the longevity to attain lengths over 24 inches. Otolith microchemistry research that assigned hatchery or wild origin to Clark Canyon Reservoir rainbow trout indicated between 50% and 100% were wild fish spawned in tributaries; the average wild contribution by sampling year was 73%

and by cohort was 75% (Table 2.11-1). FWP annually stocks between 250,000 and 350,000 rainbow trout in Clark Canyon Reservoir.

Table 2.11-1. Percentages of wild rainbow trout by cohort in Clark Canyon Reservoir gill netting surveys. Numbers in parentheses are total sample size of otoliths analyzed and includes both wild and hatchery-reared fish.

Cohort or year sampled	Clark Canyon Reservoir by year sampled	Clark Canyon Reservoir by cohort	
2010	NA	NA	
2011	NA	57% (7)	
2012	NA	80% (10)	
2013	69% (13)	57% (7)	
2014	80% (5)	81% (16)	
2015	59% (17)	57% (28)	
2016	67% (12)	75% (4)	
2017	67% (24)	50% (10)	
2018	NA	85% (13)	
2019	79% (19)	89% (9)	
2020	83% (12)	92% (12)	
2021	83% (18)	100% (3)	

Recruitment of rainbow trout to Clark Canyon Reservoir is variable among years and there has been increased angler effort targeting spawning fish in tributaries to the reservoir. Seasonal closures (December 1 to third Saturday in May) are recommended in the Red Rock River as well as the spring creek tributaries to the river and reservoir. Seasonally closing areas where rainbow trout spawn is intended to improve recruitment of wild fish and overall abundance of rainbow trout in the reservoir by reducing harvest and catch-and-release mortality of adult trout and angler redd trampling mortality of embryos. That approach is also intended to improve wild brown trout abundances in Clark Canyon Reservoir. Relative performance and contribution of different strains, hatchery practices, and stocking timing and methods will be evaluated to increase survival of stocked fish and overall abundances of rainbow trout. Stocking approaches will be assessed by comparing proportion of wild versus hatchery fish within a year and overall abundances among years. Stocking of strains that are more likely to live over four years will be emphasized to produce fish over 24 inches; Clark Canyon rainbow trout typically reach 24 inches in four years. Regulations limiting rainbow trout harvest to three daily and in possession will increase the likelihood that some fish live at least four years.

Centennial Valley Arctic Grayling Conservation

FWP will achieve Arctic grayling conservation goals by 1) implementing the <u>Centennial Valley Arctic</u> <u>Grayling Adaptive Management Plan</u> (AMP) and pursuing on-the-ground projects that improve overwinter habitat in Upper Red Rock Lake, 2) managing the <u>Centennial Valley Arctic Grayling CCAA</u> program, and 3) creating a genetic reserve brood for Arctic grayling with Red Rock ancestry in Handkerchief Lake. FWP has partnered with Red Rock Lakes National Wildlife Refuge and other partners to actively implement the AMP to evaluate population-driving management actions since 2013. The AMP has identified that over-winter habitat in Upper Red Rock Lake is the primary population driver for

Centennial Valley Arctic grayling and management strategies that increase area of suitable habitat are most likely to improve grayling abundances. FWP and other partners have evaluated over 26 alternatives to improve over-winter habitat, completed several pilot projects to help direct long-term solutions, and raised funding for implementation of a selected alternative. FWP will work with the Refuge and other partners to select and construct an alternative by-2024. FWP will also continue to improve and maintain high-quality spawning and rearing habitats by addressing threats to instream flows, riparian health, entrainment in irrigation diversions, and fish passage and connectivity in tributaries by implementing the CCAA program. On-the-ground efforts include population and entrainment surveys, active habitat restoration, grazing and site plan development, flow compliance monitoring, barrier removal, stock tank and fencing installation, and improvements to headgates, irrigation diversions, and measuring devices. A genetic reserve will be created by surveying all lakes that were historically stocked with Red Rock origin grayling to determine the best combination of donor populations to establish Handkerchief Lake, which has been designated for this purpose. Grayling will be spawned at donor lakes and their progeny stocked into Handkerchief Lake as embryos or fry. This overarching approach to grayling conservation follows and is described in more detail in the Upper Missouri River Arctic Grayling Conservation Strategy.

Elk Lake Spawning Habitat Improvement

Flows and habitat that support native fish spawning will be prioritized in Elk Lake. Arctic grayling are native to and present in Elk Lake until the 1990s when their lone spawning tributary, Narrows Creek, ceased to reach the lake during spawning periods. In 2011, permanent flows were restored by piping water past losing reaches and spawning habitat was improved. However, timing of runoff, which cues grayling spawning, was not consistent with historical timing and precluded successful reproduction by re-introduced grayling. Future work will explore options to increase flows by accessing water stored in a nearby pond or installing groundwater drains. Arctic grayling will be stocked in Elk Lake again following tributary improvements. That work is also expected to increase abundances of wild westslope cutthroat trout in Elk Lake as hundreds of cutthroat trout already use the improved habitat for spawning.

Red Rock River Dewatering

FWP will partner with irrigators, the Beaverhead Watershed Committee, Natural Resources Conservation Service (NRCS), and other groups to identify and pursue collaboratively developed alternatives that reduce chronic dewatering of the Red Rock River. Alternatives to improve instream flows and fish passage in the Red Rock River may include improved water monitoring capabilities, efficient irrigation infrastructure, or development of cooperative drought planning strategies.

Selway Creek Native Fish Restoration

Native westslope cutthroat trout and Arctic grayling will be restored to the Selway Creek drainage beginning in 2022. That restored population will have conservation value and create a unique native fishery.

Westslope Cutthroat Trout Conservation

Westslope cutthroat trout conservation will occur as prescribed by the Westslope Cutthroat Trout Conservation Strategy for the Missouri River Headwaters of Southwest Montana. The Red Rock River drainage is also home to several conservation populations of westslope cutthroat trout providing opportunities to conserve this native species in the drainage. Current populations exist in Bean, Bear (Centennial), Bear (Horse Prairie), Browns, Carver, Deadman, East Fork Clover, Indian, Jones, Little Basin, Little Sheep, Long, Meadow, Middle (Centennial) Muddy, Nicholia, North Fork Divide, North Fork Everson, Odell, Painter, Peet, Price, Rape, Rock, Sage, Sawmill, South Fork Everson, Sheser, Shineberger, Simpson, and Trapper creeks. The short-term goal is to conserve all remaining non-hybridized populations of westslope cutthroat trout. The long-term goal of cutthroat trout conservation in the Red Rock drainage is to restore westslope cutthroat trout to 20% of the historically occupied habitats (see Part I, 1.6.8(1) Westslope Cutthroat Trout for details).

<u>Fisheries Management Direction for Red Rock River Drainage</u>

Water	Miles/acres	Species	Recruitment Source	Management Type	Management Direction
Elk Lake	207 acres	Lake trout (N)	Wild	Conservation	Continue native species conservation to maintain a viable, self-sustaining population.
		Burbot (N)	Wild	General	Manage fish density through angler harvest to maintain fish growth.
		Arctic grayling (N)	Wild/ Hatchery	Conservation	Identify and implement feasible options to provide adequate flow to a spawning tributary with Elk Lake. Introduce Red Rock origin grayling in order create a viable, genetically unaltered, self-sustaining population and, secondarily, to provide angling opportunity. Augment population as necessary to maintain viability and genetic diversity.
		Westslope cutthroat trout (N)	Wild/ Hatchery	General	Manage stocking and harvest to maintain fish abundance and growth. Augment population as necessary to maintain viability and genetic diversity.
Habitat needs and	activities: Resto	ore and maintain suitable spawning	g tributary habi	tats.	
	2,200 acres	Arctic grayling (N)	Wild	Conservation	Continue native species conservation to maintain viable, genetically unaltered, self-sustaining populations. Work with USFWS to improve over-winter habitat for grayling in Upper Red Rock Lake.
		Yellowstone cutthroat trout, Brook trout	Wild	Liberal Regulations/ General	Manage to minimize potential impact on viability of Arctic grayling and secondarily for recreational angling.

Water	Miles/acres	Species	Recruitment Source	Management Type	Management Direction
Habitat needs and Valley Arctic Gray	•	_	improve over	winter habitat in Upper Ro	ed Rock Lake as prescribed by the Centennial
Centennial Valley Streams		Arctic grayling (N), Westslope cutthroat trout (N)	Wild	Conservation	Continue native species conservation to maintain or create viable, genetically unaltered self-sustaining populations.
		Hybridized cutthroat trout, Rainbow trout, Brown trout, Brook trout, Mountain whitefish	Wild	General	Manage fish density through angler harvest to maintain fish growth and, in some instances, to ensure they are not limiting the viability of westslope cutthroat trout populations.
Secure and replication accordance with examples and the secondarian secondaria	ate extant genetion existing conservat	cally unaltered westslope cutthroa	at trout populat	tions and create meta-po	reats to grayling persistence on private lands. pulations of westslope cutthroat trout in Idress stressors and limiting factors. Develop
Red Rock River	79 miles	Brown trout, Rainbow trout, Mountain whitefish (N)	Wild	General	Maintain abundances and sizes.
	d activities: Work		ursue collabor	atively developed alter	natives that reduce chronic dewatering and
	4,422 acres	Hybridized cutthroat trout, Burbot (N)	Wild	General	Maintain abundances and sizes.
		Arctic grayling (N)	Wild	Conservation	Continue native species conservation to maintain viable, genetically unaltered, self-sustaining populations.
Clark Canyon Reservoir	4,815 acres	Rainbow trout	Hatchery	Put and Take/ Quality	Manage stocking and harvest to support qualit angling opportunity for large fish. Identify additional opportunities to enhance the wild rainbow trout fishery.
		Brown trout	Wild	General	Maintain present numbers and sizes.

Water	Miles/acres	Species	Recruitment Source	Management Type	Management Direction
_		Burbot (N)	Wild	Restrictive Regulations	Manage harvest to support quality angling opportunity for large fish.

Habitat needs and activities: Develop and implement a reservoir management plan that, in conjunction with flow management in the Beaverhead River, optimizes fisheries benefits and irrigation needs. Pursue development and implementation of alternatives that reduce likelihood of reservoir destabilization and resuspension of fine sediment. Evaluate the performance of stocking strains and wild recruitment to determine importance of tributary spawning habitat.

Improve spawning habitat and protect spawning and fish.

Mountain Lakes	23 lakes and 148 acres	Westslope cutthroat trout, Hybridized cutthroat trout, Yellowstone cutthroat trout, Rainbow trout, Brook trout	Wild/ Hatchery	Put and Take/ General	Manage stocking and harvest to maintain fish growth
Westslope Cutthroat Trout Conservation Tributaries Bean, Bear (Centennial), Bear (Horse Prairie), Browns, Craver, Deadman, EF Clover, Indian, Jones, Little Basin, Little Sheep, Long, Meadow,	185 miles	Westslope cutthroat trout	Wild	Conservation	Secure at-risk populations of westslope cutthroat trout in tributary streams through isolation from non-native fish. That may include barrier construction and fish removal. Protect or secure conservation populations in 20% of their historically occupied tributaries within the Red Rock River watershed (316 miles). Utilize existing populations of non-hybridized fish to repopulate future projects.
Middle (Centennial)					

Water	Miles/acres	Species	Recruitment	Management Type	Management Direction
			Source		
Muddy,					
Nicholia, NF					
Divide, NF					
Everson, Odell,					
Painter, Peet,					
Price, Rape,					
Rock, Sage,					
Sawmill, SF					
Everson,					
Sheser,					
Shineberger,					
Simpson, and					
Trapper creeks					
			<u> </u>		

Habitat needs and activities: Restore native fish to Selway Creek. Protect and secure westslope cutthroat trout populations as described in the Missouri Headwaters Conservation Strategy.