U.S. Department of the Interior

Final Environmental Assessment

Beaver Dam Notching

Red Rock Lakes National Wildlife Refuge

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Executive Summary

This Draft Environmental Assessment (EA) has been prepared by the United States (U.S.) Department of the Interior, U.S. Fish and Wildlife Service (Service) Region 6, and the Mountain-Prairie Region Division of Refuge Planning to evaluate the effects associated with the proposed action. The Draft EA complies with the National Environmental Policy Act (NEPA) in accordance with Council on Environmental Quality regulations (40 Code of Federal Regulations [CFR] 1500–1508) and U.S. Department of the Interior (43 CFR 46; 516 DM 8) and Service (550 FW 3) regulations and policies. NEPA requires an examination of the effects of proposed actions on the natural and human environment. Appendix A identifies laws and executive orders not otherwise evaluated within this EA.

Proposed Action

Arctic grayling (*Thymallus arcticus*; grayling) are a freshwater holarctic species of salmonid that reside in the Upper Missouri River (UMR) drainage in southwestern Montana. The Centennial Valley (CV), located in the UMR drainage, contains one of four remaining populations of Arctic grayling in the contiguous U.S. still exhibiting the full spectrum of life history behaviors present in historic grayling populations (USFWS 2020). Red Rock Creek (RRC), located upstream of Upper Red Rock Lake (URRL) in the CV of southwestern Montana, is the primary spawning stream for the UMR Arctic grayling population. However, beaver dams have been documented to partially or entirely block grayling movements on RRC, preventing access to spawning habitat.

The proposed action is for the Service to conduct beaver dam notching on RRC to improve grayling access to RRC spawning habitat.

Background

Red Rock Lake National Wildlife Refuge (Refuge) is situated within a mosaic of state, federal, and private lands in the CV in southwestern Montana. The Refuge was established pursuant to Executive Order 7023 in 1935 as a “refuge and breeding ground for birds and other wildlife species”. The Refuge covers over 53,000 acres, of which 32,350 acres were designated as Wilderness in 1976 under the Wilderness Act of 1964. The 1976 Wilderness Bill mentioned Arctic grayling as a reason for the designation of the Wilderness area in the Refuge. A portion of RRC lies within the designated Wilderness.

The cultural, physical, and biological resources on the Refuge are diverse. Cultural resources include artifacts and outbuildings resulting from its history as a settlement location for prehistoric peoples, Tribes, and more recently, hunters and trappers. The physical resources include 25,000 acres of wetlands, rivers, streams and three lakes. The landscape provides habitat for diverse biological resources, including resident and migratory species such as grizzly bear, black bear, elk, deer, trumpeter swan, eagles, sandhill crane, gray wolf, amphibians, and waterfowl. The Refuge also provides important habitat for one of the last remaining populations of native Arctic grayling in the

lower 48 states (Vincent 1962, Gangloff 1996, USFWS 2020).

Beyond the Refuge's establishing legislation, other acts of Congress that guide resource management decisions include the National Wildlife Refuge System Administration (1966) and Improvement (1997) Acts, Endangered Species Act of 1973, and the Wilderness Act of 1964. In combination, these legislative acts require the Refuge to manage its resources for wildlife-dependent human recreation, conservation of threatened, endangered and other fish and wildlife resources and wetlands (Refuge Recreation Act 1962, Emergency Wetlands Resources Act 1986, Fish and Wildlife Act 1956), and to maintain it as a wilderness area (Wilderness Act 1964).

National Wildlife Refuges are guided by the mission and goals of the National Wildlife Refuge System (NWRS), the purposes of an individual refuge, Service policy, and laws and international treaties. The mission of the NWRS, as outlined by the National Wildlife Refuge System Administration Act (NWRSAA), as amended by the National Wildlife Refuge System Improvement Act (16 U.S.C. 668dd et seq.), is:

"... to administer a national network of lands and waters for the conservation, management and, where appropriate, restoration of the fish, wildlife, and plant resources and their habitats within the United States for the benefit of present and future generations of Americans."

The 2009 Comprehensive Conservation Plan (CCP) for the Refuge outlines the following resource management goals:

- Lake, Pond, and Marsh Habitat – Provide habitat for breeding and staging migratory birds, native fishes, and resident wildlife that maintains the biological diversity and integrity of montane wetland systems.
- Riparian Habitat – Maintain the processes necessary to sustain the biological diversity and integrity of native riparian vegetation for migratory breeding birds, native fishes, and wintering ungulates.
- Wet Meadow, Grassland, and Shrub-Steppe Habitat – Provide structurally complex native meadow, grassland, and shrub-steppe habitats, within a watershed context, for upland- nesting migratory birds, sagebrush-dependent species, rare plant species, and other resident wildlife.
- Aspen Forest, Mixed Coniferous Forest, and Woodland Habitat Goal – Create and maintain aspen stands of various age classes within a mosaic of coniferous forest and shrubland for cavity-nesting birds and other migratory and resident wildlife.
- Visitor Services and Cultural Resources – Provide quality wildlife-dependent recreation, environmental education, interpretation, and outreach opportunities that nurture an appreciation and understanding of the unique natural and cultural resources of the Centennial Valley, for visitors and local community members of all abilities, while maintaining the primitive and remote experience unique to the Refuge.
- Refuge Operations Goal – Prioritize for wildlife first and emphasize the protection of trust resources in the utilization of staff, funding, and volunteer programs.

The CV grayling population is primarily adfluvial, which means they spend non-breeding periods of the year in URRL and move into RRC for spawning each spring. Consequently, access to spawning habitat in RRC is critically important to the continued existence of the population, which has undergone significant declines in abundance in recent years (Leary et al. 2015, USFWS 2020, Kovach et al. 2019, Warren et al. 2022). The current (2023) estimated spawning population of 188 individuals (95% CI = 47-340) (Warren et al. 2023) is significantly lower than the CV population goal of 1,000 fish (Montana Arctic Grayling Workgroup 2022). Metrics of genetic diversity have similarly declined to historic lows, demonstrating the population is experiencing an increasingly severe genetic bottleneck. CV grayling face an increased risk of inbreeding

depression that would likely lead to extirpation if their population continues to decline and remains at low levels for three consecutive years (Cook et al. 2023).

The current decline of the CV grayling population is driven by multiple contributing factors. Despite previous research, scientific uncertainty around several hypotheses made it difficult to identify which factors were most important to address and which actions would be most likely to reverse the population decline. In 2017, the Service and Montana Fish, Wildlife & Parks (MFWP) agreed to collaborate on an adaptive management plan (AMP) to better understand population drivers and identify management actions for improving grayling population (USFWS and MFWP 2017). The purpose of the AMP was to embrace existing uncertainty regarding drivers of the CV grayling population, provide further understanding of important limiting factors, and help guide management actions toward those that would have the most direct benefit to grayling (USFWS and MFWP 2017). Guided by the AMP, a series of management experiments were undertaken to test three competing hypotheses of grayling population declines (USFWS and MFWP 2017):

1. Quality and quantity of spawning habitat
2. Predation by, and competition with, adult non-native Yellowstone cutthroat trout (YCT)
3. Quality and quantity of overwinter habitat in URRL

A mathematical model was created for each hypothesized driver of grayling population, resulting in three competing models that are used to annually predict grayling abundance in response to 1) amount of spawning habitat, 2) abundance of YCT, and 3) area of suitable winter habitat. Hypotheses 1 and 2 were further tested using active management and gauging system response (USFWS and MFWP 2017).

Purpose and Need for the Proposed Action

The purpose of the proposed action is to provide Arctic grayling improved access to spawning habitat within RRC within the Refuge. The need of the proposed action is to address the secondary population driver of CV grayling, which is ensuring quality spawning habitat (Warren et al. 2022, Kovach et al. 2021) and will, in turn, increase reproductive success and the chance of long-term persistence of the CV grayling population. The Service needs to take immediate management action to prevent further loss of genetic variation and reduce the risk of extirpation due to the critically low population size. Because spawning typically begins in May (Mogen 1996), action must be taken == prior to spawning to ensure grayling have unimpeded access to spawning habitat.

The Service acknowledges that there are other important drivers and influences of the long-term recovery of grayling on the Refuge and in the larger landscape, as discussed in the Background section above. The Service continues to work collaboratively with its partners to gain more information and discuss other potential future actions the Service may take. Any other future plans and actions the Service may take will be subject to further analysis in compliance with NEPA, the Wilderness Act, and other applicable laws.

Alternatives to meet the purpose and need of the proposed action must be consistent with the purposes and goals of the Refuge, the mission of the NWRS, and all applicable laws, including the Wilderness Act.

Alternatives

Alternative A – No Action Alternative

Under Alternative A (the No Action Alternative), no action would be taken and beaver dams along RRC would not be notched.

Alternative B – Beaver Dam Notching on Red Rock Creek

Under Alternative B, beaver dams would be notched on the portion of RRC between URRL and Corral Creek during April and May each spring hereafter prior to grayling spawning. Notching removes a portion of each beaver dam with primitive hand tools to ensure grayling have access to upstream spawning areas. Beavers will typically rebuild these dams over the course of the following summer. No ground disturbance would occur.

Although grayling and beaver historically coexisted across much of the Upper Missouri River watershed, grayling spawning was widely distributed among many interconnected tributaries which reduced reliance on access to any one stream in a given year (Nelson 1954, Vincent 1962, Kaya 1992). However, the present CV grayling population spawns almost exclusively in RRC and blocking their access, especially when abundances are low, could have potentially irreversible population and genetic consequences. Beaver dams have been documented partially or entirely block grayling movements on RRC and prevent access to spawning habitats (Warren et al. 2018, Cutting et al. 2018). Probability of passage is based on the characteristics of each individual dam, peak daily flows, whether there are routes around it, and other physical and temporal characteristics. Passage probability resultantly varies for a given dam throughout the grayling spawning period during both high and low flow years. Although probability of a grayling passing a RRC beaver dam is modeled to be relatively high on average (88%), some dams, even those predicted to allow passage are complete barriers (Cutting et al. 2018). Moreover, cumulative passage probability beyond all RRC dams to upstream spawning habitat is low even though average passage probability for individual dams is high. It is predicted that only 8% to 28% of grayling are able to pass the 10-40 dams that typically occur on RRC. Given the current population of grayling (188 fish), the assumption of a 50/50 male-female ratio (94 females), and an average probability of passage of 0.88, it would be expected that only six females would reach the lower end of suitable spawning habitat, and only a single female would reach the primary spawning area near Corral Creek during years of high beaver activity (Figure 1).

While grayling will spawn below beaver dams, it is important that they are not forced to spawn below a dam in an area without suitable spawning habitat (eggs will not survive in sediment). The project area for proposed beaver dam notching is RRC from URRL to Corral Creek (approximately 11 miles). The most suitable spawning habitat is located in the upper half of that reach (approximately 5 miles). RRC as it nears URRL is low gradient (i.e., relatively flat) and naturally contains primarily fine sediment – habitat unsuitable for grayling spawning. As the creek gradient increases (i.e., slope increases) near the wilderness boundary, gravels and cobbles begin to appear. Grayling preferentially select gravel and large cobble for spawning, making it imperative that spawning grayling can access the suitable habitat upstream of the wilderness.

Beaver dam notching would only occur in years when annual surveys demonstrate the population size of spawning grayling is below 1,000 fish. The goal of 1,000 fish was developed as part of a formal expert elicitation of professional fisheries and grayling scientists as a threshold above which demographic and genetic viability and persistence can be expected. This threshold has been empirically validated as grayling genetic diversity has declined rapidly following population declines below 1,000 fish.

Areas along RRC where dams have been present in the past two years can be seen in Figure 2

below. In RRC, the number of intact beaver dams each spring since 2016 has fluctuated from 8-50 per year (Figure 1 and 2). Notching removes a portion of existing beaver dams with primitive hand tools to ensure grayling have access to upstream spawning areas. Typically, between 1/4 and 1/3 of the width of a beaver dam is removed in late April or early May before grayling begin their spawning run (Figure 3). Notching or removing beaver dams has been used as a management tool to improve the grayling population in RRC sporadically since 1951, including within areas presently designated as wilderness. This alternative maximizes access to high quality spawning habitats when grayling are at low abundances to improve survival and recruitment, prevent further loss of genetic variation, and extirpation of the population.

Fig. 1. Map of Beaver Dam Locations on Red Rock Creek observed in 2018. Forty-one dams were located within the proposed project area (URRL to Corral Creek) and 21 dams were located within the wilderness. All existing suitable spawning habitat exists between the wilderness boundary and Corral Creek.

Fig 2. Map of Beaver Dam Locations on Red Rock Creek observed in 2022 and 2023. In 2022, eight of 14 dams were located within the wilderness and in 2023, all eight dams were upstream of the wilderness boundary.

Fig. 3. Photo of beaver dam on Fishtrap Creek in the Big Hole River drainage before and after notching. Access provided by notching dams greatly increased grayling abundance in the stream.

Alternative(s) Considered, but Dismissed from Further Consideration

Complete Removal of Dams: The complete removal of beaver dams was discussed as an alternative but was dismissed from consideration because notching caused less wilderness and habitat disturbance while providing adequate passage for spawning grayling. During most times of the year, a notched beaver dam will quickly be rebuilt and little improvements in fish passage will be realized. However, when dams are notched during high water in the spring coincident with the grayling spawning period, they are usually not rebuilt until high flows recede in the summer. The objective of notching beaver dams is to provide access to spawning habitat for migratory grayling during a discrete period in early to mid-May. Complete removal of dams would achieve the project's purpose and need of providing improved access for grayling to spawning habitat, but we do not believe the disturbances to both the Untrammeled and Natural character of the Wilderness would be justified when there were other alternatives that would meet our purpose and need and have less disturbance to the wilderness character.

Trapping Beavers: Trapping beavers was considered but ultimately dismissed for being

inconsistent with Refuge purpose and goals and the Wilderness Act. Beavers provide many important ecosystem benefits and are an important component of the Wildlife Refuge and the Wilderness. Access can be provided for spawning grayling RRC beaver dams without beaver removal.

Removal of Lima Dam: We received a comment from a member of the public that asked us to consider removal of Lima Dam to restore the original grayling spawning run would not meet the purpose and need of the proposed action. Lima Dam is a privately owned facility that is not on Service land, and so the action proposed is not with the Service's authority. Additionally, removing Lima Dam would not provide grayling access to spawning habitat. Lima Dam currently serves as a fish barrier preventing downstream brown trout and other non-native fishes access to the CV. Brown trout have been shown to negatively impact grayling abundance in other Montana waterbodies (McCullough 2017, MAGWG 2022). The current grayling population in the CV (and the entire Red Rock River subbasin) exists upstream of Lima Dam, and most live in URRL and spawn primarily in RRC. Allowing passage over Lima Dam (with a fish ladder or dam removal) would not benefit grayling, which no longer occur below the dam, but would allow for further invasion of the CV by nonnative species.

Changes to Angling: We received comments from several members of the public asking us to consider changes to angling as an alternative to consider. However, changes to angling would not meet the purpose and need of this EA, as the present regulations already exclude anglers from RRC grayling and habitats during spawning periods. Stream residency for adult grayling is relatively short; female grayling remain in RRC spawning reaches for about 18 days and males for about 35 days. Red Rock Lakes spawning tributaries are already closed to angling when grayling are spawning and their embryos are incubating (May 1-June 15); anglers are not able to walk in the stream or along its edge during this period. The effects of catch and release angling (no harvest of grayling is permitted) on the overall grayling population were quantitively assessed by targeted creel surveys that occur when most grayling are in RRC and accessible to anglers (URRL is closed to fishing and RRC has a seasonal angling closure in place), monitoring stream temperatures throughout the summer, and statistically comparing annual angler use through time in RRC to grayling abundance. These analyses indicate only a small proportion (1-5%) of the grayling population is caught each spring, temperatures that contribute to catch-and release mortality (i.e., >73°F) have only occurred during one day in the past eight years, and there is no statistical relationship between angler use and the number of grayling in the spawning population the following year.

Changes to Grazing: We received several comments from members of the public asking us to look at changes to grazing as an alternative to consider. However, there is currently no grazing happening withing the project area. Livestock are excluded from RRC within the area considered for this EA; there are no grazing impacts within this reach and changes to grazing practices would not meet the purpose and need of improving access to spawning habitat on RRC. For more information on grazing on the Refuge please see page 33 of Appendix C.

Affected Environment and Environmental Consequences

This section is organized by affected resource categories and for each affected resource discusses:

(1) the existing environmental and socioeconomic baseline in the action area for each resource, and (2) the effects and impacts of the proposed action and any alternatives on each resource.

The effects and impacts of the proposed action considered here are changes to the human environment, whether adverse or beneficial, that are reasonably foreseeable and have a reasonably close causal relationship to the proposed action or alternatives. This EA includes the written analyses of the environmental consequences on a resource only when the impacts on that resource could be more than negligible and therefore considered an "affected resource." Any resources that would not be affected by the action have been dismissed from further analyses.

The following is included for each effected resource surrounding the URRL in the Refuge:

1. A brief description of the relevant general features of the affected environment
2. A description of relevant environmental trends and planned actions
3. A brief description of the affected resources in the proposed action area
4. Impacts of the proposed action and any alternatives on those resources, including direct and indirect effect

Arctic Grayling

Affected Environment Description

The distribution of Arctic grayling stretches from eastern Siberia to Western Russia, and in North America from Alaska through northern Canada to the Hudson Bay (Vincent 1962). In the contiguous United States, the only native populations of this fish were in the UMR Basin of southwest Montana and Michigan (extinct in Michigan since 1936) (Vincent 1962). The Montana populations, which are genetically distinct from Canadian and Alaskan populations (USFWS 2020), were patchily distributed but widespread throughout the UMR drainage, and isolated as a relict population after the retreat of Pleistocene glaciation. Grayling have declined across much of their range in the UMR drainage over the past century and now occupy less than 5% of their historic distribution (USFWS 2020).

UMR grayling are considered a distinct population segment (DPS) and have drawn attention for potential listing under the Endangered Species Act. In 2014, the Service determined that Arctic grayling did not warrant listing. That decision was litigated and, subsequently, remanded back to the Service. In 2020, the Service made a second determination that listing was not warranted. The existence of the population in the CV was a significant factor in that decision. However, in 2022 a notice of intent to sue the Service over their 2020 decision was submitted, and the Service is currently in active litigation over the 2020 finding. UMR grayling currently persist in 19 populations; however, the grayling population in the CV is one of four populations in the UMR that exhibits the full spectrum of life history behaviors and high genetic variation (USFWS 2020). The grayling population in URRL is a discrete genetic group even among native UMR grayling populations (Peterson & Ardren 2009) and are considered vital to long-term conservation of Arctic grayling genetic variation in Montana (USFWS 2020, Montana Arctic Grayling Workgroup 2022).

Environmental Trends and Planned Actions Description

There are no planned actions in the project area that would affect grayling; however, monitoring has documented an environmental trend of hypoxic conditions in URRL during some winters that led to high grayling mortality (i.e., winterkill). Factors that likely lead to hypoxic conditions in URRL include prolonged snow and ice cover and macrophyte abundance. While grayling have

seemingly persisted in the CV under persistent risk of winterkill in URRL, the relative significance of winterkill may currently be greater due to decreased streamflow, shallower depths below ice, and lack of connectivity with other UMR grayling populations, which prevents geneflow and a refounding source for the population (USFWS and MFWP 2017).

Suitable spawning habitat for grayling is defined as substrate that is <10% fine sediment and at least 50% gravel/cobble. Spawning habitat in the landscape has been improved with stream restoration projects and establishment of a landscape-scale program that rewards landowners for taking conservation actions for grayling on private land (i.e., Candidate Conservation Agreement with Assurances (CCAA)), in which most landowners along CV grayling spawning streams, and all landowners along RRC, are enrolled. Spawning habitat surveys on Red Rock and Elk Springs creeks have shown an increase in accessible suitable spawning habitat from 0.38 ha in 2016 to 9.08 ha in 2023. However, access to and quality of spawning habitats within these streams can be greatly reduced by beaver dams blocking migrations and inundating or causing siltation of spawning gravels.

Additionally, there are other ongoing actions occurring both in the project area and larger landscape that may have the potential to impact Arctic grayling populations, such as angling, irrigation, grazing, climate change, human development and presence in the landscape, fish sampling and other Service management actions. The Service continues to work with its partners in the landscape to further understand the impacts of these environmental trends and ongoing actions on Arctic grayling both on the Refuge and in the larger landscape. We will continue to work collaboratively with our partners on potential ideas for future management strategies to further the recovery of CV grayling. As discussed above, any future plans or actions the Service may propose would require further analysis in compliance with NEPA, the Wilderness Act, and other applicable laws.

Anticipated Impacts

Alternative A: Under the No Action Alternative, spawning access for grayling would be restricted in most years. Grayling would be limited to spawning below the uppermost beaver dam which hindered access. Impacts to the grayling could range from decline in genetic variation to loss of an entire year class, eventually resulting in extirpation of grayling from the CV.

Alternatives B: Under Alternative B, Arctic grayling would have access to the full 10.8 miles of spawning habitat in RRC between URRL and Corral Creek. Notching or removing beaver dams has resulted in increased grayling abundances and distributions within and outside of the CV. In 1951, the presence of beaver dams had reduced grayling spawning distribution to five tributaries and precluded access to most of RRC. Following dam removal, successful spawning and recruitment was observed in entirety of RRC and three additional streams (Nelson 1954). Notching a single RRC dam in 2011 resulted in 194 grayling moving to upstream spawning areas within two days compared to only 35 being able to access that reach prior to notching. By comparison, 148 grayling were captured in the remaining three miles of stream between the dam and Elk Lake Road, underscoring the importance of providing access to preferred upstream spawning habitat. Between 2016 and 2017, accessible suitable spawning habitat for grayling in RRC was increased from 0.38 ha to 4.04 ha following the notching of about 50 beaver dams (Warren and Jaeger 2018). Accessible spawning habitat was further increased to 6.98 ha in 2019 following continued notching and spawning habitat reconnection and restoration (Warren and Jaeger 2020.) Similar results have been observed outside of the CV. Notching beaver dams on spawning tributaries in the Big Hole River resulted in increased use of and distribution of

grayling in tributaries. In Fishtrap Creek, notching beaver dams resulted in successful grayling spawning being documented for the first time in 14 years. In Steel Creek, age-0 grayling abundance and distribution increased five-fold following beaver dam notching to expand spawning distribution. Fragmentation by beaver dams caused a sharp grayling decline in an Alaska stream and a three-year study documented a return to previous abundances and distributions following removal of dams (Wuttig 2000). This study also documented a notable increase in age-0 grayling abundance in riffle-run habitat reclaimed following beaver dam removal.

Providing passage at beaver dams additionally reduces direct mortality on adult grayling. As observed by fisheries biologists from both the Refuge and MFWP, grayling and other fishes become trapped in and die while trying to negotiate beaver dams. Grayling, Yellowstone cutthroat trout, and white suckers are regularly found dead within RRC beaver dams or exhibit significant scarring and abrasions while attempting to pass them.

Therefore, Alternative B would result in beneficial impacts to Arctic grayling in the project area and, so would help offset some of the adverse impacts to Arctic grayling resulting from changing environmental conditions.

Wildlife and Other Aquatic Species

Affected Environment Description

Native fishes found in the project area include Arctic grayling, mountain whitefish, Westslope cutthroat trout, burbot, white sucker, longnose sucker, and mottled sculpin. Nonnative fishes introduced to Refuge lakes and their tributaries include rainbow, brook, and Yellowstone cutthroat trout (Randall 1978). Most species are believed to seasonally use RRC for spawning and thermal refuge in the summer.

Waterbird species primarily utilize Upper and Lower Red Rock Lake for breeding and foraging may occasionally use RRC. However, most species are migratory and will not be present when beaver dam notching is proposed to occur (late-April/early-May.) Waterbird species include trumpeter swan, canvasback, redhead, lesser scaup, coot, yellow-headed blackbirds, ruddy duck, mallard, northern shoveler, blue-winged and cinnamon teal, gadwall, northern pintail, sandhill crane, Wilson's snipe, sora, Virginia rail, American avocet, yellow warbler, song sparrow, common yellowthroat, white-crowned and Lincoln's sparrows, and northern harrier. American white pelicans are commonly seen near the project area, although no breeding colony exists on the Refuge. Other birds common to the project area include willet, Wilson's phalarope, spotted sandpiper, and killdeer.

Mammals common to the project area include beaver, muskrat, mink, river otter, and meadow and montane voles. Striped skunk, moose, elk, white-tailed deer, long-tailed weasel, coyote, and red fox also commonly forage in these habitats. Additionally, little brown bats commonly forage over lacustrine habitats at night.

These habitats also support all the amphibian and reptile species that occur on the Refuge: western toad, boreal chorus and Columbia spotted frogs; blotched tiger salamander; and western terrestrial garter snake.

For a full list of species inhabiting the Refuge see Appendix G of the Refuge's CCP.

Environmental Trends and Planned Actions Description

There are no known environmental trends or planned actions that would affect wildlife and aquatic species in the project area beyond the impacts associated with this project. The proposed project site is surrounded by fee title land owned by the Service.

Anticipated Impacts

Alternative A: Under the No Action Alternative, beavers would be unaffected but spawning access for grayling would be restricted in most years.

Alternatives B: Impacts to beavers are not expected beyond some short-term, negligible impacts within the project area because beavers are abundant within the Refuge and throughout western Montana. Notching beaver dams in the spring mimics natural process and is not expected to affect survival on an individual or population level in RRC, given the resources available there. Beaver dam damage in the spring, including breaching and complete blow out of dams, commonly occurs as part of natural process in most streams; and if the ponds remain functioning (i.e., they have not sedimented in or there is still building material present), beaver will immediately plug them once flows recede. This type of low-level maintenance is common as beavers fix their dams. Beavers typically have multiple dens and den entrances at different elevations to be resilient to this occurrence and avoid potential negative consequences of dam breaching, which is primarily increased risk of predation. If the existing habitat no longer supports beaver dams (i.e., it has naturally filled with sediment) they typically naturally move to other suitable locations during spring.

The surrounding watersheds and can be presently characterized as healthy. Notching is not expected to affect population viability in RRC or the CV. No impacts to other wildlife and aquatic species are expected.

Threatened, Endangered, and Other Special Status Species

Affected Environment Description

Multiple Endangered Species Act-threatened species are known to occur near the Project Area, including grizzly bears, Canada lynx and wolverine. Grizzly bears use the shore of URRL (including RRC) from April through October and this area appears to be a focal area for feeding after emerging from hibernation. Individual bears or a sow with cubs are typically sighted and as many as three bears may be feeding on a single carcass at a time around URRL. Canada lynx and wolverine are not expected to be in the riparian area next to RRC, as willow-dominated habitats and palustrine wetlands are not preferred by either species. Arctic grayling and Westslope cutthroat trout have been listed as species of concern by the state of Montana. Arctic grayling spawn in RRC and spend the non-breeding part of the year in URRL. A number of adult grayling spend the summer in Red Rock and Odell Creeks where they are caught and released by anglers. Westslope cutthroat trout in URRL are primarily hybrids with Yellowstone cutthroat trout and rainbow trout (Mogen 1996).

Environmental Trends and Planned Actions Description

Climate change or warming in Montana, whether it results from anthropogenic or natural sources, is expected to affect a variety of natural processes and associated resources in the future. The complexity of ecological systems means there is significant uncertainty about the potential magnitude of climate change impacts, and localized effects are still a matter of debate. Climate change has reduced annual precipitation and snowpack levels, diminished the magnitude of spring runoff, and increased water temperatures in Montana (Lohr et al. 1996; Gillilan and Boyd 2009; Vatland 2015). A warming climate could have negative consequences for grayling through increasing water temperatures (Vincent 1962). However, there is no definitive information on how exactly changes in climate would impact species or populations. Potential

impacts could include earlier stop overs in bird migration patterns, increased frequency of wildfires, habitat conversion, and decreased or increased water availability.

There are no planned actions in the area that, when combined with the likely effects of the proposed project, would have a negative compounding impact on the quality or availability of habitat to T&E species. Moreover, the proposed project site is surrounded by fee title land owned by the Service.

Anticipated Impacts
Alternative A: Under Alternative A, beaver dams would be left intact. No impacts to threatened or endangered species would be expected. However, Arctic grayling have been considered for listing under the Endangered Species Act several times, and beaver dams restrict access to quality spawning habitat. This alternative would likely have a negative impact on grayling.

Alternative B: No impacts to threatened or endangered species are expected under this alternative due to the use of primitive hand tools to notch beaver dams and general lack of noise associated with this method. Alternative B is expected to have a beneficial impact on Arctic grayling by increasing access to quality spawning habitat.

Habitat and Vegetation

Affected Environment Description
RRC flows through various land ownership and riparian vegetation before entering URRL. RRC originates in timbered National Forest, flows through state land, and then private property where riparian vegetation is primarily sage Artemisia spp. The project area begins at the confluence of Corral Creek where riparian vegetation is dominated by willow Salix spp. As RRC nears URRL, willows remain common, but the habitat type shifts to a palustrine emergent wetland. Relatively homogenous stands of beaked sedge represent over 80% of palustrine emergent wetlands on the Refuge. Moving upslope, much of the sedge dominated habitat is surrounded by the second most common palustrine emergent wetland vegetation on the Refuge, Baltic rush.

Environmental Trends and Planned Actions Description
Climate change or warming, whether it results from anthropogenic or natural sources, is expected to affect a variety of natural processes and associated resources in the future in Montana. The complexity of ecological systems means there is significant uncertainty about the potential magnitude of climate change impacts, and localized effects are still a matter of debate. Climate change has reduced annual precipitation and snowpack levels, diminished the magnitude of spring runoff, and increased water temperatures in Montana (Lohr et al. 1996; Gillilan and Boyd 2009; Vatland 2015). A warming climate could have negative consequences for grayling through increasing water temperatures (Vincent 1962). However, there is no definitive information on how exactly changes in climate will impact species or populations. Potential impacts could include earlier stop overs in bird migration patterns, increased frequency of wildfires, habitat conversion, and decreased or increased water availability.

Moreover, the proposed project site is surrounded by fee title land owned by the Service and the Service has no ongoing or planned actions that are adversely impacting habitat and vegetation.

Anticipated Impacts
Alternative A: Under Alternative A, no impacts to riparian vegetation are anticipated.

Alternative B: Notching beaver dams is anticipated to have no impact on wetland or upland

habitats within the Refuge (Cook et al. 2023). Willow stands along RRC are robust and resilient; riparian habitat upstream of URRL is in "Proper Functioning Condition" based on current, national riparian assessment methodologies recently used to assess riparian habitat (USFWS 2018, MFWP 2023). Beaver dams have three main feedbacks on willow stands: 1) raise water levels behind the dam giving roots easier access to water allowing for increased growth and expansion in some instances or to kill willows by creating prolonged inundation that create anaerobic and anoxic soil conditions in others; 2) increase over bank flooding, a disturbance required for willow reproduction, that can also increase growth and expansion of existing willows; 3) increased cutting and herbivory of stems that can encourage the root system to develop or thicken and encourages new growth from the base, although extensive cutting, combined with herbivory by ungulates can have the opposite effect.

The extent and influence of these feedbacks is highly variable on the landscape. Willows are highly adapted to water table fluctuations and capable of rapidly elongating roots in response to prolonged drought or lower water tables. While elevated water tables can increase growth and expansion rates of willows, as long as the channel does not actively incise below its current elevation in response to beaver dam removal or notching there is very little short-term effect to existing willow stands. This would be the case even if notching occurred for several years. Pulses of water and brief periods of inundation are good for willows, but lengthy periods of inundation will kill them by creating anoxic soil conditions. In the short-term beavers can promote willow growth via hormone release from trimming.

Notching beaver dams could reduce the lateral extent of over bank flooding which could affect long-term expansion of the willow stand and establishment of young willows. However, this process is driven by deposition and scour processes that occur during high flows and will still occur as long as there is a natural stream flow regime and connected, fairly topographically diverse floodplain. Beaver activity is more important to future willow expansion following dam failure by inducing disturbance, redepositing and creating areas of bare mineral soil, and from distributing cuttings and material in caches to downstream areas suitable for willow colonization. Because colonization of young willows occurs on exposed sediments after a dam naturally blows out, notching dams will mimic natural disturbance processes and increase young willow colonization in some areas. This process is highly variable and naturally patchy. All cuttings removed during dam notching will be placed in the channel so they can be naturally distributed in depositional areas. As long as the floodplain remains connected during annual high flows, notching dams will not have a long-term effect on the extent or cover of willows. Depending on the nature of these specific willow stands and beaver dam complexes, there may be some degradation of individual plants on the outer edges of the stands, but that would take at least 10 years and stands are highly capable of re-invigorating themselves upon the return of beaver dam complexes. There may be local shifts in understory species composition after a few years of notching dams. Willows will die in areas of prolonged inundation as described above. If beaver dams persist and cause inundation the willows would eventually die and there would be a shift from facultative to obligate wetlands species. Overall, dam notching is not expected to affect willow density, recruitment, or riparian health along RRC.

There are no planned actions in the area that, when combined with the likely effects of the proposed project, would have a negative compounding impact on the quality or availability of habitat and vegetation.

Water Resources

Affected Environment Description

The Refuge is in the upper end of the Red Rock River watershed. This watershed is the

headwaters of the Missouri River. The Refuge encompasses approximately 25,000 ac. of natural, enhanced, and created wetlands. RRC is one of the major sources of input unto URRL. RRC begins at an elevation of about 8,400 ft mean sea level (here this creek is known as Hell Roaring Creek) and flows north and west about 13 miles to the eastern shore of URRL. The stream is characterized by a snowmelt-dominated hydrograph with peak discharges (mean = 4.2 m3/s; range = 1.9–8.3 m3/s; data 1994–2017) occurring between 15 May and 2 July. Upper RRC is a sinuous, meandering pool-riffle stream that flows through a willow dominated floodplain supporting abundant populations of mammal, bird, amphibian, and fish species, including endemic Arctic grayling.

Environmental Trends and Planned Actions Description

There are no known environmental trends or planned actions that would affect water resources, including water quality and wetlands in the project area. Moreover, the proposed project site is surrounded by fee title land owned by the Service and the Service has no ongoing or planned actions that are adversely impacting habitat and vegetation.

Anticipated Impacts

Alternative A: Under Alternative A, dams would be left in-tact and no impacts to water quality would be expected. However, access to and quality of spawning habitat for salmonids would be reduced.

Alternative B: Under Alternative B, a temporary increase in sediment can be expected for 1-2 hours following each dam being notched. Most sediment trapped behind dams is retained because only a small notch is made at one end to temporarily allow fish passage. Although beaver dams do temporarily trap fine sediment, all sediment eventually moves downstream and a core sample from URRL suggested rates of sediment accumulation over the past 200 years are not trending upwards (C. Whitlock, pers comm.). However, the flushing of sediments is a natural process during runoff, which is when dam notching would occur, and is beneficial for spawning salmonids. Trout and grayling require spawning substrate to contain minimal amounts of fine sediment (<10%). Beaver dams trap fine sediment and inundate suitable spawning habitat which reduces successful recruitment. Active beaver dams are rebuilt shortly following peak flows and grayling spawning. The sediment stored behind inactive, notched dams allows colonization of young willows that bind exposed sediments. MFWP and the Service have collectively worked to improve riparian habitat in important tributaries to reduce or eliminate sediment sources. Current monitoring shows that beaver dam notching and habitat improvements have increased the amount of suitable habitat for grayling from a low of 0.38 ha in 2016 to 9.08 ha in 2023. Because this activity would occur prior to high run-off, no long-term impacts to water quality are expected.

The scope of this EA is limited to RRC on the Refuge. There are no active water diversions within the scope of project area for this EA. Above Corral Creek, there are several diversions on private lands. Both upstream landowners are enrolled in the CCAA program and have agreed to site-specific plans and flow targets set by the Service and MFWP. Additionally, all water utilized in these diversions is returned to RRC upstream of Corral Creek and no change in base flow of RRC is expected.

Visitor Use and Experiences

Affected Environment Description

The following visitor opportunities are available within the project area: hunting, wildlife observation, photography, canoeing and kayaking, camping, environmental education, and interpretation. The annual visitation to the Refuge in 2009 was estimated at 12,000 visits. In

2020, Red Rock and Odell creeks supported approximately 1,935 angler days. Around URRL, the land to the north and west are open to deer, elk, and pronghorn hunting, and the land to the south and east are within the designated moose hunting area. Hunting season can begin as early as August and last through the end of November.

The Refuge has a visitor contact station and two primitive campgrounds. River Marsh Campground is at the northwest end of Lower Red Rock Lake. The Upper Lake Campground is accessible via South Valley Road, which runs along the south side of the URRL. Both campgrounds feature fire rings and toilets. The Upper Lake Campground has picnic tables, potable spring water, and a boat launch. Canoeing and kayaking opportunities are available at URRL. Both campgrounds are available for public use year-round.

Environmental Trends and Planned Actions Description

There are no environmental trends further impacting visitor use and experience in the project area. While angling use has varied considerably among years (489 to 3,290 angler days per year), we expect patterns of angler use to be similar in the future.

Anticipated Impacts

Alternative A: Fishing for YCT in RRC is a popular activity during spring when snow level allows access prior to May 1 (RRC closes on May 1 to protect spawning grayling). Leaving beaver dams in-tact would not disturb these visitors, but certain dams do prohibit access to upstream portions of the creek for both grayling and YCT. Because YCT spawn before grayling, large groups are typically observed concentrated below large dams. Notching dams allows fish access to all portions of the stream and therefore helps to spread out angling pressure. Under Alternative A, YCT targeted by anglers would likely be concentrated in areas below large dams and not fully distributed throughout the stream.

Alternative B: In some years, the notching of dams coincides with the early-season fishery for YCT in RRC prior to May 1. Notching dams creates a temporary disturbance in the creek through increased turbidity which can last for 1-2 hours. This may cause a disturbance to anglers; however, at least one angler in 2022 commented that YCT were easier to catch once the turbidity increased as they were less wary of anglers. The overlap of notching activities and angling will not occur in all years. This action will not impact anglers' ability to catch grayling, as grayling do not begin to enter the creek until about May 1 (when the creek is closed). When the creek reopens on June 15, grayling spawning has concluded, and most adults will have returned to URRL.

Cultural Resources

Affected Environment Description

Cultural resources are defined as the non-renewable remnants of past human activities that have cultural or historical value or meaning to a group of people or a society. The term "cultural resource" includes historic properties as defined in the National Historic Preservation Act (NHPA) of 1966, as amended, archaeological resources as defined in the Archaeological Resources Protection Act of 1979, cultural items as defined in the Native American Graves Protection and Repatriation Act of 1990, sacred sites as defined in Executive Order 13007, and collections as defined in 36 CFR Part 79.

Section 106 of NHPA (54 U.S.C. § 306108) and its implementing regulations (see 36 CFR 800) require federal agencies to consider the potential effects their actions may have on historic properties and provide the Advisory Council on Historic Preservation, State Historic

Preservation Officer (SHPO), Tribal Historic Preservation Offices (THPO), and other consulting parties an opportunity to review and comment on those actions. The Refuge has conducted limited inventories for cultural resources, primarily to comply with Section 106 of the NHPA.

Due to its unique location offering access to wetland and mountain ecotones, the CV has supported indigenous cultures for thousands of years. The area has abundant natural springs and game, as well as materials suitable for tool manufacture, including obsidian, ignimbrite, cherts, and quadrant quartzite. The east–to–west trending valley and low pass over the Continental Divide would also have been a natural travel route.

The Refuge's Administrative Headquarters Area, which includes the Refuge office and visitor contact station, staff housing, and maintenance facilities constructed by the Works Progress Administration (WPA) in the 1930s, is eligible for inclusion in the National Register of Historic Places. Other historical buildings and structures, some of which were constructed by the WPA, are present on the Refuge and are still in use. Other known cultural resources on the Refuge include the Shambow Homestead, remnants of the Shambow Stage Station, potential ruts associated with the M-Y Stage Route, and archaeological resources associated with the indigenous cultures and Euro-Americans who settled in the CV.

Environmental Trends and Planned Actions Description
There are no known actions being planned that would be likely to impact cultural resources in the project area.

Anticipated Impacts
Alternative A: No impacts to cultural resources are expected under this alternative.

Alternative B: Beaver dams are ephemeral structures built in the active floodplain. All proposed notching would remove a portion of the willow cuttings and other dam materials that were placed by beaver within the past 12 months and would not cause any disturbance to the stream bed or banks. Additionally, there would be no disturbance or impacts outside the active stream channel. The notching of the beaver dams may increase the rate of flow in the stream. This increase would be minimal and impacts from secondary erosion are not anticipated. As such, there are no expected impacts to cultural resources under this alternative. However, consultation with the SHPO, THPO, and other consulting parties, as relevant, in accordance with NHPA Section 106 will be completed prior to notching. As with all Service actions, if any cultural resources are discovered, actions would cease immediately, and the appropriate notifications and protections be initiated.

Wilderness Value

Affected Environment Description
In 1964, the Wilderness Act was signed into law, which established the National Wilderness Preservation System. The legislation set aside certain federal lands as wilderness areas. Wilderness, as defined by the Wilderness Act, is untrammeled, undeveloped, and natural, and offers outstanding opportunities for solitude and primitive recreation. The NWRS manages wilderness to secure an enduring resource of wilderness and to accomplish Refuge purposes in a way that preserves wilderness character. People value wilderness for its wildlife, scenery, clean air and water, opportunities for solitude, and a sense of connection with nature.

Congress designated 32,350 acres of the Refuge as Red Rock Lakes Wilderness in 1976. The Wilderness is one of seventy-one such areas managed by the Service. The purpose of the Refuge is to conserve fish, wildlife, and plants, including Arctic grayling which are an inherent part of the

Red Rock Lakes Wilderness and described in its enacting legislation. Arctic grayling were specifically mentioned in the 1976 Wilderness Bill documentation as a reason for the designation of the wilderness area in the Refuge. The terminal portion of RRC lies within the designated wilderness area; thus, some beaver dams could be located in designated wilderness depending on the year.

Environmental Trends and Planned Actions Description

There are other ongoing actions occurring outside of wilderness in the larger landscape that may have the potential to indirectly impact Wilderness characteristics, such as irrigation, grazing, climate change, human development and presence in the landscape, fish sampling and other Service management actions. The Service continues to work with its partners in the landscape to further understand the impacts of these environmental trends and potential impacts to Wilderness Qualities. We will continue to work collaboratively with our partners on ideas for future management strategies that preserves wilderness character. As discussed above, any future plans or actions the Service may propose would require further analysis in compliance with NEPA, the Wilderness Act, and other applicable laws.

Anticipated Impacts

Alternative A: Under the No Action Alternative, there would no effect on Untrammeled, Undeveloped, Outstanding Opportunities for Solitude or Primitive and Unconfined Recreation, or Other Features of Value Wilderness qualities. If spawning access is impeded by beaver dams and the endemic grayling population declines to extirpation, this alternative will negatively affect the purpose of the Wilderness and the Natural Quality.

Alternative B:

None of the 10 prohibited uses described in Section 4(c) of the Wilderness Act of 1964 would be authorized under this alternative. Alternative B would have the following effect on the purposes of the Wilderness and Wilderness Qualities:

Untrammeled Quality: Notching beaver dams is a manipulation of the biophysical environment. This alternative will have a minor, temporary negative impact on the Untrammeled Quality but would mimic natural beaver dam notching that typically occurs with high water flows. All dams would be accessed on foot and only primitive hand tools would be utilized for notching to minimize any disturbance to the wilderness character.

Undeveloped Quality: Structures and installations will not be developed in wilderness. Motorized tools or mechanical transport will not be used in wilderness. This alternative will have no effect on the Undeveloped Quality.

Natural Quality: Both beaver and grayling are part of the Natural Quality of this wilderness. However, changing environmental conditions here and on the landscape threaten the persistence of CV grayling in the Wilderness. Alternative B proposes to respond to these changing environmental conditions and help ensure that CV grayling persist here, as they have historically by maximizing reproductive success of all remaining individuals to minimize any further loss of population or genetic diversity. While Alternative B does propose some minor human intervention in the wilderness area, which temporarily impacts the Natural Quality, dams are commonly naturally breached or notched by high flow during spring and there would be negligible impacts to beaver or riparian health. As flows recede in the summer, active beaver dams are immediately rebuilt. Therefore, Alternative B helps maintain the Natural Quality of the Wilderness in the long-term by helping to protect an endemic species, as well as ensure we are

stewarding the land consistently with one of the purposes of the Refuge and the Wilderness which is to conserve Arctic grayling.

Outstanding Opportunities for Solitude or Primitive and Unconfined Recreation Quality: Notched dams will look like dams breached by spring runoff. This will have no effect on solitude. No additional regulations will be added. Recreation will remain unconfined. This alternative will have no effect on this Quality.

Other Features of Value: Other Features of Value have not been identified for the Red Rock Lakes Wilderness. This alternative will have no effect on the Other Features of Value Quality.

Socioeconomics and Environmental Justice

Affected Environment Description

The Refuge is in Beaverhead County in southwestern Montana, near the Idaho border. The estimated 2021 population for the county was 9,524, which represented a 3.0% increase compared with the 2010 population (U.S. Census Bureau 2021). According to the Beaverhead County, the county is sparsely populated with an average population density of about 1.7 persons per square mile (Beaverhead County 2023).

The population of Beaverhead County in 2021 predominantly identified as White (89.2%), with the remainder of the population identifying as Black (0.5%), American Indian and Alaska Native (2.1%), Asian (0.6%), Native Hawaiian and Other Pacific Islander (0.6%), Hispanic or Latino (5.5%), and Two or More Races (2.3%) (U.S. Census Bureau 2021).

The median age of Beaverhead County's population in 2020 was 42.6, compared to 40.1 for the entire state of Montana (USFWS 2022). In 2020, the male and female populations were evenly split, each making up 50.0% of the total population. Almost 95% of the county's population were high school graduates and 32.5% have a bachelor's degree or higher (USFWS 2022).

In 2020, the per capita income ($28,798) and median household income ($45,819) for Beaverhead County were less than the per capita income ($32,463) and median household income ($56,539) for the state of Montana as a whole (USFWS 2022). However, the percentage of persons below the poverty level in Beaverhead County was 7.4%, lower for either Montana (7.7%) or the Nation (11.4%) (USFWS 2022). The unemployment rate for Beaverhead County (3.9%) was also lower than both the state (5.8%) and national rates (6.7%) (USFWS 2022). In 2020, 64% of the population of Beaverhead County were employed, of those jobs, 23.8% were non-services related (farming, forestry, construction, etc.), 57.3% were services related (retail trade, health care and social assistance, accommodations, and food services, etc.), and 17.3% were government related (USFWS 2022).

The activities of hunting and angling in Beaverhead County significantly benefit both the county and the state of Montana. These activities produced $74 million more each year in income received by Montana households, with over $66.7 million representing after tax income, and $167 million each year in additional output, or gross receipts to Montana businesses and nonbusiness organizations (University of Montana 2021). The area in proximity to URRL is open to elk, deer, and pronghorn hunting. In Montana, the average daily expenditures for elk hunters are $94.87 for residents and $634.74 for non-residents; for deer hunters is $79.04 for residents and $527.31 for non-residents; and for pronghorn hunters is $113.62 for residents and $727.08 for non-residents (University of Montana 2021).

According to the Environmental Protection Agency (EPA), neither National Priorities List superfund sites or hazardous waste treatment, storage and disposable facilities are located within Beaverhead County (EPA 2023). The following table with environmental justice parameters for Beaverhead County was taken from an EPA Environmental Justice (EJSCREEN) Report generated in 2022.

Table 1. Beaverhead County, Montana averages, and national averages across multiple socioeconomic and environmental justice variables.

Selected Variables	Values	State Avg.	%ile in State	USA Avg.	%ile in USA
Pollution and Sources					
Particulate Matter 2.5 (µg/m³)	4.85	6.84	5	8.67	0
Ozone (ppb)	45.7	42.2	93	42.5	81
Diesel Particulate Matter (µg/m3)	0.0286	0.0761	31	0.294	<50th
Air Toxics Cancer Risk (lifetime risk per million)	10	21	0	28	<50th
Air Toxics Respiratory HI	0.2	0.32	39	0.36	<50th
Traffic Proximity (daily traffic count/distance to road)	16	220	25	760	12
Lead Paint (% Pre-1960 Housing)	0.33	0.27	60	0.27	60
Superfund Proximity (site count/km distance)	0.012	0.15	17	0.13	7
RMP Facility Proximity (facility count/km distance)	0.02	0.49	8	0.77	1
Hazardous Waste Proximity (facility count/km distance)	0.013	0.74	5	2.2	1
Underground Storage Tanks (count/km²)	0.83	5.1	50	3.9	45
Wastewater Discharge (toxicity-weighted concentration/m distance)	5.10E-07	2.2	15	12	7
Socioeconomic Indicators					
Demographic Index	25%	24%	64	35%	42
People of Color	10%	14%	54	40%	24
Low Income	40%	32%	70	30%	68
Unemployment Rate	3%	4%	57	5%	46
Limited English-Speaking Households	0%	0%	0	5%	0
Less Than High School Education	5%	6%	51	12%	36
Under Age 5	4%	6%	46	6%	45
Over Age 64	22%	19%	62	16%	74

Environmental Trends and Planned Actions Description
There are no known actions being planned that would be likely to impact the local and regional economies in the project area.

Anticipated Impacts
There would be no socioeconomic impacts associated with implementation of any of the alternatives.

Summary of Analysis

The purpose of this EA is to briefly provide sufficient evidence and analysis for determining whether

to prepare an Environmental Impact Statement (EIS) or a Finding of No Significant Impact (FONSI).

Alternative A – No Action Alternative

As described above, the No Action Alternative would result in minimal impacts to the environment and to all species except Arctic grayling. Arctic grayling, which are an inherent part of the Refuge and Wilderness, would be negatively impacted through a reduction in access to quality spawning habitat.

Alternative B – Beaver Dam Notching

As described above, Alternative B would result in short-term impacts to the environment and to a few wildlife species which inhabit the Refuge. Beavers would be temporarily impacted, but notching would occur at a time when dams usually break down naturally. Dams would be rebuilt over the summer. Arctic grayling will benefit from the implementation of Alternative B by improving access to quality spawning habitat. Currently, most of the CV Arctic grayling population spawns in RRC. The population has recently been documented at historically low levels, and allowing as many individuals as possible to spawn successfully reduces the risk of genetic or demographic extinction.

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Tribal Consultation

Ten Tribal affiliations were identified as having ancestral connections to Beaverhead County, Montana, where the Refuge is located. The ten Tribes were as follows:

- Apache Tribe of Oklahoma
- Confederated Salish and Kootenai Tribes of the Flathead Reservation
- Confederated Tribes of the Umatilla Indian Reservation
- Eastern Shoshone Tribe of the Wind River Reservation
- Fort Belknap Indian Community of the Fort Belknap Reservation of Montana
- Nez Perce Tribe
- Shoshone-Bannock Tribes
- Lac Vieux Desert Band of Lake Superior Chippewa Indians of Michigan

- Keweenaw Bay Indian Community
- Blackfeet Tribe of the Blackfeet Indian Reservation of Montana

On January 31, 2024, leadership of each Tribe were notified of and invited to consult on the EA and associated documents. On April 19, 2024, we notified the State Historic Preservation Office in accordance with Section 106 of the NHPA (54 USC § 306108) and its implementing regulations (36 CFR Part 800). To date, no concerns were communicated by any Tribe.

Public Outreach

A Draft EA was made available for a 30-day public review and comment period on the Refuge's website (https://www.fws.gov/refuge/red-rock-lakes), from February 1- March 1, 2024. A total of 4,860 comments were received during this period. The proposal has been thoroughly coordinated with all interested and/or affected parties. Parties contacted include:

- Montana Fish, Wildlife and Parks
- Montana Trout Unlimited
- Wilderness Watch
- Wild Montana
- Greater Yellowstone Coordinating Committee
- U.S. Geological Service
- Wilderness Society
- Friends of RRL & CV
- The Nature Conservancy
- Earth Concerns
- Centennial Valley Association
- The Trumpeter Swan Society

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Appendix A: Other Applicable Statutes, Regulations, and Executive Orders

This appendix lists all applicable statutes, regulations, and executive orders not otherwise addressed in this EA.

Cultural Resources

American Indian Religious Freedom Act, as amended, 42 U.S.C. 1996–1996a; 43 CFR Part 7

Antiquities Act of 1906, 16 U.S.C. 431–433; 43 CFR Part 3

Archaeological Resources Protection Act of 1979, 16 U.S.C. 470aa–470mm; 18 CFR Part 1312; 32 CFR Part 229; 36 CFR Part 296; 43 CFR Part 7

National Historic Preservation Act of 1966, as amended, 16 U.S.C. 470–470x-6; 36 CFR Parts 60, 63, 78, 79, 800, 801, and 810

Native American Graves Protection and Repatriation Act, 25 U.S.C. 3001–3013; 43 CFR Part 10

Executive Order 11593 – Protection and Enhancement of the Cultural Environment, 36 Fed. Reg. 8921 (1971)

Executive Order 13007 – Indian Sacred Sites, 61 Fed. Reg. 26771 (1996)

Fish and Wildlife

Bald and Golden Eagle Protection Act, as amended, 16 U.S.C. 668–668c, 50 CFR 22

Endangered Species Act of 1973, as amended, 16 U.S.C. 1531–1544; 36 CFR Part 13; 50 CFR Parts 10, 17, 23, 81, 217, 222, 225, 402, 450

Fish and Wildlife Act of 1956, 16 U.S.C. 742a-m

Migratory Bird Treaty Act, as amended, 16 U.S.C. 703–712; 50 CFR Parts 10, 12, 20, and 21

Executive Order 13186 – Responsibilities of Federal Agencies to Protect Migratory Birds, 66 Fed. Reg. 3853 (2001)

Natural Resources

Executive Order 13112 – Invasive Species, 64 Fed.Reg. 6183 (1999)

Appendix B: Section 7 Report

Intra-Service Section 7 Biological Evaluation Form – Region 6

Originating Person: Michael J. Bryant

Date Submitted: 12.15.2023

Telephone Number: 406.276.3536 x103

I. Service Program and Geographic Area or Station Name: Ecological Services, Montana Field Office

II. Flexible Funding Program: N/A

III. Location:

The action area includes the current range of the Grizzly Bear (*Ursus arctos horribilis*) in the United States: Upper Red Rock Lake, Red Rock Lakes National Wildlife Refuge, SW Montana.

IV. Species/Critical Habitat: List federally endangered, threatened, proposed, and candidate species or designated or proposed critical habitat that may occur within the action area.

Endangered

Threatened – Grizzly bear (*Ursus arctos horribilis*); Canada lynx (*Lynx canadensis*); Wolverine (*Gulo gulo*)

Candidate – Arctic grayling (*Thymallus arcticus*)

Proposed Endangered

Proposed Threatened

V. Project Description:

Notch beaver dams to facilitate access to spawning areas for a struggling population of Arctic grayling. This population of Arctic grayling currently numbers approximately 188 spawning individuals, and are one of two endemic populations in the conterminous United States. Notching entails removing approximately 1/3 of the width of a beaver dam across a spawning stream. Hand tools would be used. Access would be by foot travel. This activity would occur immediately before anticipated grayling spawning during April and May of each year. This project would occur between Upper Red Rock Lake and Corral Creek on Red Rock Creek. Beaver dams are found inside and outside designated Wilderness on Fish and Wildlife Service managed land, and on State of Montana managed land.

VI. Determination of Effects:

(A) Description of Effects:

Grizzly bears are transient in the project area; their use is rare, and it is primarily nocturnal. The project activity will occur during the day and its effects are temporary. This project will not affect grizzly bears or their habitat.

Canada lynx are present at low densities in SW Montana however the project area lies largely outside their preferred habitat-dense forest. This project will not affect Canada lynx or their habitat.

Wolverines are transient in the project area; their use is rare, and it is primarily nocturnal. The project activity will occur during the day and its effects are temporary. The project area lies largely outside their preferred habitat-alpine, sub-alpine forest. This project will not affect wolverines or their habitat.

Arctic grayling are found in the project area, however this activity would occur before most of the spawning fish enter the stream. The project would largely support the stability of the population.

(B) Determination: Determine the anticipated effects of the proposed project on species and critical habitat lists in item IV. Check all applicable boxes and list the species (or attach a list) associated with each determination.

	Determination
No Effect: This determination is appropriate when the proposed project will not directly or indirectly affect (neither negatively nor beneficially) individuals of listed/proposed/candidate species or designated/proposed critical habitat of such species. **No concurrence from MT FIELD OFFICE required.**	**X**
All species and critical habitat identified in section IV.	
May Affect but Not Likely to Adversely Affect: This determination is appropriate when the proposed project is likely to cause insignificant, discountable, or wholly beneficial effects, to individuals of listed species and/or designated critical habitat. **Concurrence from MT FIELD OFFICE required.**	
May Affect but Likely to Adversely Affect: This is determination is appropriate when the proposed project is likely to adversely affect individuals of listed species and/or designated critical habitat. **Formal consultation with MT FIELD OFFICE required.**	
May Affect but Not Likely to Jeopardize candidate or proposed species or	

adversely modify proposed critical habitat: This determination is appropriate when the proposed project may affect, but is not expected to jeopardize the continued existence of a species proposed for listing or a candidate species, or adversely modify an area proposed for designation as critical habitat. **Concurrence from FIELD OFFICE optional. SPECIES NAME**

Likely to Jeopardize candidate or proposed species/adversely modify critical habitat: This determination is appropriate when the proposed project is reasonably expected to jeopardize the continued existence of a species proposed for listing or a candidate species, or adversely modify an area proposed for designation as critical habitat. **Concurrence from MT FIELD OFFICE required.**

MICHAEL BRYANT Digitally signed by MICHAEL BRYANT
Date: 2023.12.29 12:13:15 -07'00'

Signature: _____ Date _____
[Supervisor at originating station]

Reviewing Ecological Services Office Evaluation (check all that apply):

A. Concurrence _____ Nonconcurrence _____

Explanation of nonconcurrence:

B. Formal Consultation Required _____
List species or critical habitat unit:

C. Effects are addressed in the Programmatic Consultation _____ On Region's Recovery Program – no further consultation needed

D. Conference required _____
List species or critical habitat unit:

Name of Reviewing ES Official: _____

Signature: _____ Date _____

Appendix C: Public Comments and Responses

The Service received a total of 4,860 comment letters on the proposed action. Of these, one letter was from the staff of U.S. Senator Daines, eight were from non-governmental organizations (including 4,840 form letters), and 11 were from individuals. From these letters, the following substantive comments were received:

A. Effectiveness and Timeliness of Beaver Dam Notching

Comment A.1: Several commenters questioned whether beaver dam notching is an effective or necessary management strategy to improve access to spawning habitat and provided additional scientific literature citations about the efficacy of beaver dam notching.

Response A.1: Thank you for your comment, as well as the information and literature provided, which we have reviewed. We respectfully disagree and believe that beaver dam notching is an effective management tool for improving Arctic grayling access to spawning habits with minimal impacts to beaver populations. We believe this management strategy is supported by both scientific research and empirical evidence. In Red Rock Creek (RRC), the number of intact beaver dams observed each spring since 2016 has fluctuated from 8-50. Although probability of a grayling passing a RRC beaver dam is modeled to be relatively high on average (88%), some dams, even those predicted to allow passage are complete barriers (Cutting et al. 2018). Moreover, cumulative passage probability beyond all RRC dams to upstream spawning habitat is low even though average passage probability for individual dams is high. It is predicted that only 8% to 28% of grayling are able to pass the 10-40 dams that typically occur on RRC. Given the current population of grayling (188 fish), the assumption of a 50/50 male-female ratio (94 females), and an average passage probability of 0.88, it would be expected that only six females would reach the lower end of naturally suitable spawning habitat, and only a single female would reach the primary spawning area near Corral Creek. Similar results have been observed outside of the CV. Notching beaver dams on spawning tributaries in the Big Hole River resulted in increased use of and distribution of grayling in tributaries. In Fishtrap Creek, notching beaver dams resulted in successful grayling spawning being documented for the first time in 14 years. In Steel Creek, age-0 grayling increased in abundance and distribution following beaver dam notching in 2023 (MFWP 2024). Fragmentation by beaver dams caused a sharp grayling decline in an Alaskan stream and a three-year study documented a return to previous abundances and distributions following removal of dams (Wuttig 2000). This study also documented a notable increase in age-0 grayling abundance in riffle-run habitat reclaimed following beaver dam removal. Please see page 7 and page 10 of the EA for more information.

Several studies and reports support that notching beaver dams to improve access to spawning habitat will improve the grayling population (e.g., Nelson 1954, Wuttig 2000), including empirical research on RRC and the grayling that spawn there (Warren et al. 2023).

Comment A.2: Commenters asked the Service to address the need to notch beaver dams during low flow years or during high snowpack years. Cutting et al. (2018) provided a management framework for beaver dams during different water-years.

Response A.2: Probability of passage is based on the characteristics of each individual dam, peak daily flows, whether there are routes around it, and other physical and temporal characteristics. Passage probability resultantly varies for a given dam throughout the grayling spawning period during both high and low flow years. The proposed action maximizes access to high quality spawning habitats when grayling are at low abundances to improve survival and recruitment, prevent further loss of genetic variation, and extirpation of the population. The beaver population and number of beaver dams on RRC vary considerably over time. Beaver are susceptible to disease (e.g., Tularemia) and dam locations and size vary by flow and year. A single impassable dam below spawning habitat could have a significant impact on the population. For example, in 2015 the entire spawning population was trapped below a beaver dam and unable to access preferred spawning habitat. In 2018 there were 41 dams present on RRC between the lake and preferred spawning areas. Because of the channel type and gradient of the lower creek near the lake, suitable spawning habitat does not typically begin until somewhere near the wilderness boundary. Given the current population of grayling (188 fish), the assumption of a 50/50 male-female ratio (94 females), and an average probability of passage of 0.88, it would be expected that only six females would reach the lower end of naturally suitable spawning habitat, and only a single female would reach the primary spawning area near Corral Creek. This population spawns almost exclusively in RRC and blocking their access, especially when abundances are low, will result in extirpation.

Comment A.3: Several commenters noted that beaver and fish have coexisted at RRL since the Ice Age and that beaver dam notching is a proposal for perpetual human intervention.

Response A.3: Thank you for your comment. While we agree that beaver and fish have co-existed here in this landscape, and across much of the northern hemisphere, this does not invalidate the fact that beaver dams impede grayling passage, which could have potentially irreversible population and genetic consequences to CV grayling. Changing environmental conditions here and on the landscape has resulted in grayling in the CV that: 1) number less than 200 breeding age individuals, and 2) predominantly spawn in a single tributary of URRL. Therefore, it is imperative to take action to respond to these changing environmental conditions to ensure that CV grayling persist here, as they have historically, by maximizing reproductive success of all remaining individuals to minimize any further loss of population or genetic diversity.

Comment A.4: One commenter expressed the concern that the experiment under consideration will change the winter conditions at a Montana mountain lake at nearly 7,000 feet in elevation with many months of winter.

Response 5.2: The proposed action will have negligible effects on overwinter habitat in URRL. Beaver dams do result in floodplain connectivity, natural water storage, and temporary capture of fine sediment, but all sediment eventually moves downstream to URRL. Additionally, most sediment trapped behind dams is retained because only a small notch is made at one end to temporarily allow fish passage. Notching does not eliminate floodplain connectivity at high flows and the high-quality riparian condition on RRC readily traps fine sediment. Active beaver dams are rebuilt shortly following peak flows and grayling spawning. The sediment stored behind inactive dams allows colonization of young willows that bind exposed sediments. MFWP and the Service have collectively worked to improve riparian habitat in important tributaries to reduce or eliminate sediment sources. It is currently more important to provide suitable spawning habitat for grayling in RRC (gravel and small cobble).

Comment A.5: One commenter asked whether Service studied RRC to see if grayling were spawning below beaver dams?

Response A.5: Thank you for your comment. Grayling will spawn below beaver dams, but it is important that they are not forced to spawn below a dam in an area without suitable spawning habitat (eggs will not survive in sediment). The project area for proposed beaver dam notching is RRC from URRL to Corral Creek (approximately 11 miles). The most suitable spawning habitat is located in the upper half of that reach (approximately 5 miles). RRC as it nears URRL is low gradient (I.e., relatively flat) and naturally contains primarily fine sediment – habitat unsuitable for grayling spawning. As the creek gradient increases (i.e., slope increases) near the wilderness boundary, gravels and cobbles begin to appear. Grayling preferentially select gravels and large cobble for spawning, making it imperative that spawning grayling can access the suitable habitat upstream of the wilderness. In 2018, there were 41 dams present on RRC between the lake and suitable spawning habitat on RRC. Given the current population of grayling (188 fish), the assumption of a 50/50 male-female ratio (94 females), and an average probability of passage of 0.88, it would be expected that only six females would reach the lower end of naturally suitable spawning habitat, and only a single female would reach the primary spawning area near Corral Creek. This population spawns almost exclusively in RRC and blocking their access, especially when abundances are low, will result in extirpation.

Comment A.6: A commenter noted that although the quality and quantity of spawning habitat is indicated in the EA to be a major contributor to grayling decline, no analysis as to the actual quality and causes of this decline were provided, to include the status of sediment fines in spawning areas and whether these spawning areas were well oxygenated.

Response A.6: Access to quality spawning habitat is necessary for grayling to complete their life cycle. Suitable spawning habitat for grayling is defined as substrate that is <10% fine sediment and at least 50% gravel/cobble. Spawning habitat surveys on Red Rock and Elk Springs creeks have shown an increase in accessible suitable spawning habitat from 0.38 ha in 2016 to 9.08 ha in 2023. In RRC, accessible suitable spawning habitat continues to be a secondary driver of the grayling population, with overwinter habitat remaining the top

driver. Although we may not expect a full recovery by addressing only the secondary driver, it is critical that the few remaining grayling in URRL continue to have access to suitable spawning habitat. We have updated the EA with this additional information and analysis.

Comment A.7: One commenter suggested that the Service consider an analysis of the historical stream flows/precipitation vs grayling numbers as well as what flow the stream overtops the beaver dams, so that a prediction of whether there would be adequate spawning flows and ability to negotiate the dams could be made ahead of time.

Response A.7: Probability of passage is based on the characteristics of each individual dam, peak daily flows, whether there are routes around it, and other physical and temporal characteristics. Dam sizes and densities vary from year to year. Although passage is generally improved during high runoff periods, which often occur in years with greater snowpack, springtime conditions affect the magnitude and duration of runoff in any year. Passage probability resultantly varies for a given dam throughout the grayling spawning period during both high and low flow years. Because of these variations, it would not be possible to predict passage probability in advance.

Instead, we have chosen to use a grayling population threshold in determining what years notching would occur. The proposed action maximizes access to high quality spawning habitats when grayling are at low abundances to improve survival and recruitment, prevent further loss of genetic variation, and extirpation of the population. The beaver population and number of beaver dams on RRC vary considerably over time. Beaver are susceptible to disease (e.g., Tularemia) and dam locations and size vary by flow and year. A single impassable dam below spawning habitat could have a significant impact on the population. For example, based on surveys, the entire spawning population was trapped below a beaver dam in 2015 and was unable to access preferred spawning habitat. In 2018, there were 41 dams present on RRC between the lake and preferred spawning areas. Because of the channel type and gradient of the lower creek near the lake, suitable spawning habitat does not typically begin until somewhere near the wilderness boundary. Given the current population of grayling (188 fish), the assumption of a 50/50 male-female ratio (94 females), and an average probability of passage of 0.88, it would be expected that only six females would reach the lower end of naturally suitable spawning habitat, and only a single female would reach the primary spawning area near Corral Creek. This population spawns almost exclusively in RRC and blocking their access, especially when abundances are low, will result in extirpation.

Quality, or health, of spawning habitats within RRC are monitored every two years to assess the percent of fine sediment; habitats with >10% fine sediment have lower quality. The present quantity of suitable grayling spawning habitat (9.1 ha) is the highest amount observed in the past decade and has increased significantly (from 0.4 ha) since dam notching began.

Comment A.8: Another commenter noted that while the EA describes the relationship of beaver dam notching to floodplains and willows, there are no evaluations of the current status of the willow and other shrubs or trees occurring along the stream courses. As a result, there is no definitive statement on the ultimate outcome for the floodplain and willow communities in the EA.

> **Response A.8:** Thank you for your comment. Riparian conditions are in "Proper Functioning Conditions" based on current, national riparian assessment methodologies that have been completed in the last five years and do not exhibit poor health or impairments. We do not expect the proposed action to have more than negligible impacts on floodplain and willow communities.

Comment A.9: Two commenters mentioned that EA Figure 1 shows beaver dams occurring in the lower reach of RRC in the wilderness in 2022, but in 2023 were upstream and asked why only two years of data are presented and why the differences in dam locations?

> **Response A.9:** The beaver population and number of beaver dams on RRC vary considerably over time as beaver are susceptible to disease (e.g., Tularemia). Thus, dam locations and size vary by flow and year. Each spring since 2016, the number of intact beaver dams each spring has fluctuated from 8 to 50 per year. Many dams were in the wilderness. A single impassable dam below spawning habitat could have a significant impact on the grayling population. For example, in 2015 the entire spawning population was trapped below a beaver dam and unable to access preferred spawning habitat; no grayling were observed in the 10 miles upstream of the dam while 126 were captured in the pool immediately below the dam, with the remaining 153 fish sampled that year distributed further downstream. Only the two most recent years of dam location data were presented in the EA to provide clarity on the map. However, in 2018, there were 41 dams present on RRC between the lake and Corral Creek, including 21 in the wilderness. Because of the channel type and gradient of the lower creek near the lake, suitable spawning habitat does not typically begin until somewhere near the wilderness boundary. Given the current population of grayling (188 fish), the assumption of a 50/50 male-female ratio (94 females), and an average probability of passage of 0.88, it would be expected that only six females would reach the lower end of naturally suitable spawning habitat, and only a single female would reach the primary spawning area near Corral Creek. The numbers of dams encountered are presented in the Adaptive Management Plan Annual Reports (https://fwp.mt.gov/conservation/fisheries-management/arctic-grayling).

B. Human Caused Threats to the Arctic Grayling

Comment B.1: Several commenters also suggested the Service should focus on human caused threats to the grayling, such as irrigation, grazing, angling, and fish sampling techniques, instead of taking a piecemeal approach.

Response B.1: While we agree with commenters that there are other drivers and threats to grayling populations in the landscape, the purpose of this proposed action is more narrowly focused on one of the secondary drivers of grayling populations, which is access to high quality spawning habitat. Additionally, this proposed action is focused at improving conditions for the CV grayling population, which we believe is important for maintaining genetic diversity. We believe that action is needed urgently, to ensure persistence of the CV grayling on the Refuge. Therefore, the scope of this EA is limited to RRC on the Refuge. We have edited our purpose and need in the EA to further clarify any misconceptions about the scope of this proposed action.

The Service continues to work with its partners in the landscape on other recovery efforts for grayling. For example, the Candidate Conservation Agreement with Assurances (CCAA) programs in both the Big Hole and Centennial valleys do focus on threats such as irrigation and riparian habitat. Establishment of minimum instream flow reservations, compact settlement between the Montana Reserved Water Rights Compact Commission and the Refuge (MCA 2000), Refuge fee acquisition of private lands and associated water rights, and changes in management practices on public and private lands have greatly reduced the threat of stream dewatering. Water is no longer diverted from Red Rock or Elk Springs creeks by the Refuge and all private landowners along RRC are enrolled in the CCAA program, which supports ongoing habitat protection and operates under instream flow plans that provide adequate spawning and rearing flows for grayling. Currently, both primary tributaries (Elk Springs and RRCs) to URRL have improved riparian habitat scores and the streams are not dewatered.

Additionally, the Service has committed to working with its partners in the landscape to further understand these drivers and threats to grayling populations and discuss what management strategies the Service could take on the Refuge and in the greater landscape to further recovery efforts for grayling. However, the Service has no other plans or proposed action currently. When the Service does have additional proposed plans or actions, those proposed plans or actions would require further compliance with NEPA, the Wilderness Act, and other applicable laws and regulations.

Comment B.2: A number of commenters asked the Service to consider an alternative that looks at eliminating cattle on public lands in the watershed above and in Upper Red Rock Lake (URRL), since manure deposited in the watershed by cattle grazing in the lake, along and in streams, in the wetlands adjacent to the lake, and on the watershed are the likely major source of the problem of low oxygen in the Refuge.

Response B.2: Thank you for your comment. Livestock are excluded from RRC within the area considered for this EA; there are no grazing impacts within this reach and changes to grazing practices would not meet the purpose and need of improving access to spawning habitat on RRC. Grazing on private property upstream of the Refuge is currently being managed to eliminate disturbance in the RRC riparian corridor during grayling spawning and

incubation periods and to have minimal impact during other times of the year. Those private lands are enrolled in the CCAA program and have an existing riparian management plan that addresses riparian resource concerns and management with cattle to improve/maintain riparian health. The extended period of hypoxic conditions URRL has experienced recently is not correlated with recent improvements in riparian conditions. RRC riparian habitat upstream of URRL is in "Proper Functioning Condition" based on current, national riparian assessment methodologies recently used to assess creek riparian habitat (USFWS 2018, MFWP 2023). Furthermore, many of these reaches have had recent stream restorations completed that improved instream and riparian conditions considerably, and cattle grazing is completely excluded. There is a small "at-risk" reach of upper RRC; however, this condition is due to historic channelization and grazing. This reach now has a grazing plan that has resulted in improved habitat conditions (i.e., reduced sediment generation and bank trampling). Overall, grazing is almost entirely excluded on RRC above the Refuge or has such minimal impact that it is in balance with the associated disturbance regime typical of headwater tributaries.

Comment B.3: A commenter suggested that the Service should undertake further analysis on how water diversions are affecting stream flows and spawning habitats within the Refuge since many of these rights are year-long or encompass most of the spawning and larval periods of the grayling.

Response B.3: The scope of this EA is limited to RRC on the Refuge. There are no active water diversions within the scope of project area for this EA. Above Corral Creek, there are several diversions on private lands. Both landowners are enrolled in the CCAA program and have agreed to site-specific plans and flow targets set by the Service and MFWP. Additionally, all water utilized in these diversions is returned to RRC upstream of Corral Creek and no change in base flow of RRC is expected.

Comment B.4: Another commenter asked about the impacts of allowing anglers into RRC during the month of April and suggesting closing the creek to anglers April 1.

Response B.4: Thank you for your comment. We do not believe anglers are impacting grayling access to spawning habitat on RRC. Stream residency for adult grayling is relatively short; female grayling remain in RRC spawning reaches for about 18 days and males for about 35 days. Red Rock lakes spawning tributaries are already closed to angling when grayling are spawning and their embryos are incubating (May 1-June 15). The effects of catch and release angling (no harvest of grayling is permitted) on the overall grayling population were quantitively assessed by targeted creel surveys that occur when most grayling are in RRC and accessible to anglers URRL is closed to fishing and RRC has a seasonal angling closure in place), monitoring stream temperatures throughout the summer, and statistically comparing annual angler use through time in RRC to grayling abundance. These analyses indicate only a small proportion (1-5%) of the grayling population is caught each spring, temperatures that contribute to catch-and-release mortality (i.e., >73◦F) have only occurred

during one day in the past 8 years, and there is no statistical relationship between angler use and the number of grayling in the spawning population the following year.

Comment B.5: A commenter noted that non-native rainbow trout spawning are regularly protected by MFWP regulations closing spring angling in other Montana streams and why the potentially negative impacts of angling to grayling in April are ignored?

Response B.5: Thank you for your comment. We do not believe anglers are impacting grayling access to spawning habitat on RRC. The existing spawning closure (May 1-June 15) covers the period of time that Upper Lake grayling are spawning and their embryos are incubating in RRC.

Comment B.6: Another commenter suggested that angler boots in the stream in April can cause siltation of spawning gravels, yet liberal April angling since 2013 continues.

Response B.6: Thank you for your comment. We do not believe anglers are impacting grayling spawning habitat quality on RRC. Spawning habitat surveys on Red Rock and Elk Springs creeks have shown large amounts of suitable grayling spawning habitat (< 10% fine silt and sediment) in RRC. Beaver dams cause suitable habitat to be inaccessible but it can be made accessible by notching them; an increase in accessible suitable spawning habitat from 0.38 ha in 2016 to 9.08 ha in 2023 was observed. The existing spawning closure (May 1-June 15) covers the period of time that the grayling are spawning and their embryos are incubating in RRC. Anglers boots do not mobilize sufficient fine sediment to agrade in relatively high velocity grayling spawning habitats (riffles) to negatively affect spawning habitat quality prior to spawning.

Comment B.7: The Service should consider how to make censusing techniques less invasive to reduce grayling mortality. For example, the culvert outside the wilderness on the main spawning stream might be the location for a non-invasive counting device rather than implanting tags.

Comment B.7: Thank you for your comment. While changes to fish censusing techniques are outside of the current proposed action, we would like to respond regarding the impacts of our current methods. Electrofishing has been a common fisheries sampling tool for over 30 years in Montana, and it continues to be an important method for sampling fish populations today. Electrofishing is one of the few methods that allows fishery professionals to quantitatively sample fish populations for assessment of, among others, population dynamics, age and growth, and movement. The most current research on electrofishing safety for fish is used by trained staff in the field. It is currently recognized that direct current (DC), a mobile anode, and as low a voltage as possible is the safest and least harmful method to capture fish in streams. Fish survival of electrofishing surveys is continually documented through repeated captures of marked grayling and Yellowstone cutthroat trout. Other techniques such as automated counters are not as reliable (sensor-based or acoustic based) for enumerating fish populations or species differentiation, especially in higher spring flows.

URRL grayling have been monitored since 1975 (37 of the past 49 years), with springtime multiple-pass electrofishing in RRC. Monitoring has typically occurred in a 2.3-mile-long reach flowing through Refuge and State of Montana administered lands. Additionally, a stationary weir was operated near the Elk Lake Road crossing over RRC and maintained throughout the grayling spawning run in 14 of 23 years between 1994 and 2017 (Mogen 1996). Monitoring techniques occurred concurrently and independently among years.

Electrofishing surveys have typically occurred the week prior to peak grayling spawning to provide a "snapshot" estimate of spawning grayling abundance. The weir has provided more detailed information about timing of grayling movements and duration of occupancy within RRC. Data from these surveys were analyzed together to improve abundance estimates and model grayling migration and spawning timing to develop efficient, minimally invasive sampling designs and protective angling regulations (Paterson 2003, Gander et al. 2019).

Mortality related to sampling was not a potential driver of grayling decline or a factor preventing persistence for a number of reasons: (1) proportionally fewer fish were handled relative to changes in the population, (2) mortality rates associated with these techniques is proportionally low in the scientific literature (McMichael et al. 1998), (3) recaptures of previously sampled RRC grayling that were individually tagged is common among years, and (4) these techniques have individually and concurrently occurred over many years with high and low grayling abundances (Mogen 1996, Warren et al. 2022). Among years, 2% to 36% and 12% to 86% of the spawning grayling population in RRC were handled during electrofishing (1975-2022) and weir sampling (1994-2017), respectively. Population level mortality rates from electrofishing typically range from 0.13% to 4.02%. By comparison, there was an 81% decline in abundance between 2015 and 2016 in the Red Rock grayling population. In the years prior to the 2016 decline when both electrofishing and weir sampling occurred, grayling abundances the following year ranged from 987 to 2,043 and on average about 53% of fish captured and individually marked using one or both sampling techniques were recaptured in subsequent years. Empirical and literature-supported mortality rates related to sampling techniques used in RRC do not align with the magnitude of grayling decline observed in 2016.

C. Impacts to Wilderness

Comment C.1: One commenter was concerned that the Service has misapplied the minimum requirements analysis and the minimum requirements analysis framework (MRA/MRAF), which provided a vehicle for excusing wilderness damage generally.

Response C.1: Thank you for your comment. We agree that no prohibited actions are proposed and that there are activities outside of the prohibitions that can have adverse impacts to wilderness and wilderness character. We also agree that the MRAF was not required for compliance with the Wilderness Act. The MRAF was undertaken to provide

more analysis and transparency for the proposed management actions the Service is proposing in its stewardship of the wilderness. The MRAF is no longer being included.

Comment C.2: Comments were received from several commenters that the proposed action would harm the Red Rocks Lakes Wilderness through human manipulation (trammeling) of the environment and suggested the EA needs to look at other management options for analysis.

Response C.2: Thank you for your comment, but we respectfully disagree and believe that we have done a thorough job analyzing the impacts to the Wilderness from this proposal in the EA.

Furthermore, the Service has considered many options to conserve the Artic grayling population in the wilderness area at URRL. We are continuing to work collaboratively with our partners to look at additional management strategies the agency and partners could take to both conserve the grayling population (one of the Wilderness's purposes) and steward the Wilderness. However, the focus of the current proposed action is to address an urgent need with a proven management strategy that focuses on one narrow issue affecting grayling in RRC -- ensuring access to spawning habitat. We have looked at other alternatives for ensuring access to spawning access (e.g., complete dam removal) and considered alternatives proposed by commenters. However, these alternatives either would result in greater disturbance to the wilderness character or the proposed alternatives do not meet the purpose and need of this proposed action, which is improving access to spawning habitat in RRC (See the "Alternative(s) Considered, but Dismissed from Further Consideration" section of the EA for further information).

We have determined the proposed action would have temporary and negligible impacts on Untrammeled wilderness character, and would, in return, protect a struggling endemic population that is important to the purposes of the Wilderness and maintaining the Natural wilderness character.

D. Sedimentation and Water Quality Impacts Associated with Beaver Dam Notching

Comment D.1: Breaching the beaver dams would reduce the beaver dams' ability to capture sediments in the creek and prevent its downstream movement into URRL, exacerbating the filling of the lake by reducing depth and volume.

Response D.1: Beaver dams do temporarily trap fine sediment, but all sediment eventually moves downstream. Most sediment trapped behind dams is retained because only a small notch is made at one end to temporarily allow fish passage. Notching does not eliminate floodplain connectivity at high flows and the high-quality riparian condition on RRC readily traps fine sediment. Active beaver dams are rebuilt shortly following peak flows and grayling spawning. The sediment stored behind inactive dams allows colonization of young willows that bind exposed sediments. MFWP and the Service have collectively worked to improve

riparian habitat in important tributaries to reduce or eliminate sediment sources. It is currently more important to provide suitable spawning habitat for grayling in RRC (gravel and small cobble). Current monitoring shows that beaver dam notching and habitat improvements have increased the amount of suitable habitat for grayling from a low of 0.38 ha in 2016 to 9.08 ha in 2023.

Comment D.2: How will the proposed alternative affect water quality in URRL? Will it make the ponds more shallow? Breaching, notching, or removing a dam can negatively affect fish and the habitat that supports fish by dewatering the upstream pond, stranding fish, and releasing large volumes of water (that can be devoid of oxygen) and sediment downstream. Releasing sediment can affect downstream spawning areas. Breaching or removing a beaver dam may not prevent future beaver activity in the area. Persistent breaching or removing a beaver dam can increase the risk of negative impacts to habitat.

Response D.2: Beaver dams do temporarily trap fine sediment, but all sediment eventually moves downstream. Over time, a beaver pond fills in with sediment which naturally results in a shallower pond. Notching beaver dams is beneficial to grayling by 1) allowing access to quality spawning habitat (low fine sediment), and 2) providing more areas with suitable spawning gravels. Instream flows in RRC (especially in the spring) are adequate to ensure that fish are not stranded when dams are notched and there is no evidence that water released from ponds are devoid of oxygen. Pond levels are gradually lowered during the notching process and a constant source of freshwater from upstream continually replenishes downstream areas.

Comment D.3: The EA states that the surrounding watersheds are healthy. What does this mean? Do they meet the Ecological Site Descriptions for each type as being at Potential? Degraded? Is there monitoring of ground cover and plant species in the various grazed pastures in both upland and riparian areas upon which this is based?

Response D.3: Riparian conditions are in "Proper Functioning Conditions" based on current, national riparian assessment methodologies (NRCS 2004) that have been completed in the last five year and do not exhibit poor health or impairments from current or past grazing practices on the Refuge. Grazing is entirely excluded from RRC within the Refuge and the Refuge has worked with neighboring private landowners to reduce grazing impacts by providing alternative pasture to private riparian areas over the past 20 years. Grazing impacts on private property upstream of the Refuge are minimal to non-existent. In addition, those private lands are enrolled in the Centennial Valley CCAA plan that addresses riparian resource concerns and management with cattle with the purpose of improving riparian health. Quality, or health, of spawning habitats within RRC are monitored every two years to assess the percent of fine sediment; habitats with >10% fine sediment having lower quality. The present quantity of suitable grayling spawning habitat (9.1 ha) is the highest amount observed in the past decade and has increased significantly (from 0.4 ha) since dam notching began.

Citation:
Natural Resources Conservation Service. 2004. Riparian Assessment: using the NRCS riparian assessment method. Natural Resources Conservation Service, Bozeman, Montana. 43 pp.

E. The 1,000 Fish Threshold

Comment E.1: The Service's plan to notch beaver dams every spring until grayling numbers reach 1,000 will definitely leave a substantially noticeable imprint of man's work. Breaching could go on for decades especially of the dams are not the problem since the EA cites Cutting et al. 2018, which found that 88% of the grayling can get passed beaver dams.

Response E.1: Thank you for your comment. The goal of 1,000 fish was developed as part of a formal expert elicitation of professional fisheries and grayling scientists as a threshold above which demographic and genetic viability and persistence can be expected. This threshold has been empirically validated as grayling genetic diversity has declined rapidly following population declines below 1,000 fish. Abundance of spawning grayling in RRC has been estimated in 17 years between 1994 and 2023 and has ranged from 2,535 fish in 2012 to 73 fish in 2022; average abundance was 691 grayling.

The proposed action maximizes access to high quality spawning habitats when grayling are at low abundances to improve survival and recruitment, prevent further loss of genetic variation, and extirpation of the population. Probability of passage is based on the characteristics of each individual dam, peak daily flows, whether there are routes around it, and other physical and temporal characteristics. Passage probability resultantly varies for a given dam throughout the grayling spawning period during both high and low flow years. Although average passage probability for a given dam in 2014 and 2015 was relatively high, probability of passage at some dams was much lower (<20% in some cases), making probability of passage of all dams to URRL much lower. Because grayling must pass multiple dams in most years cumulative passage probability must also be considered; given the current population of grayling (188 fish), the assumption of a 50/50 male-female ratio (94 females), and an average probability of passage of 0.88, it would be expected that only six females would reach the lower end of naturally suitable spawning habitat, and only a single female would reach the primary spawning area near Corral Creek. A single impassable dam below spawning habitat could have a significant impact on the population. For example, in 2015 the entire spawning population was trapped below a beaver dam and unable to access preferred spawning habitat; no grayling were observed in the 10 miles upstream of the dam while 126 were captured in the pool immediately below the dam, with the remaining 153 fish sampled that year distributed further downstream. In 2018, there were 41 dams present on RRC between the lake and preferred spawning areas. Because of the channel type and gradient of the lower creek near the lake, suitable spawning habitat does not typically begin until somewhere near the wilderness boundary. Given the current population of grayling (188 fish), the assumption of a 50/50 male-female ratio (94 females), and an average probability of passage of 0.88, it would be expected that only six females would reach the

lower end of naturally suitable spawning habitat, and only a single female would reach the primary spawning area near Corral Creek. This population spawns almost exclusively in RRC and blocking their access, especially when abundances are low, will result in extirpation. We have determined the proposed action would have temporary and negligible impacts on Untrammeled wilderness character, and would, in return, protect a struggling endemic population that is important to the purposes of the Wilderness and maintaining the Natural wilderness character.

Comment E.2: Using 1,000 grayling trigger seems disconnected from the science you completed. The nearly restored state the habitat may not support 1,000 fish.

Response E.2: We respectfully disagree. The goal of 1,000 fish was developed as part of a formal expert elicitation of professional fisheries and grayling scientists as a threshold above which demographic and genetic viability and persistence can be expected. This threshold has been empirically validated as grayling genetic diversity has declined rapidly following population declines below 1,000 fish. Abundance of spawning grayling in RRC has been estimated in 17 years between 1994 and 2023 and has ranged from 2,535 fish in 2012 to 73 fish in 2022; average abundance was 691 grayling.

F. Reconnecting the Arctic Grayling to the Upper Missouri River

Comment F.1: Arctic grayling in URRL were once connected to the Upper Missouri River drainage system and thus able to repopulate. While removal of the man-made dams now in place is not feasible, perhaps an experiment more aligned to the way nature solved this issue (repopulation) should also be considered.

Response F.1: We appreciate your comment, and the Service will continue to work with its partners to explore additional actions to support the recovery of grayling in the future. As to the connectivity of the UMR system, grayling were historically distributed among many streams in southwest Montana and periodic low passage or access to spawning habitat within a given tributary was not critical. This population spawns almost exclusively in RRC and blocking their access, especially when abundances are low, could result in extirpation. This will likely remain the case unless overwinter conditions improve in URRL.

Comment F.2: Remove the barrier that the Lima Dam has created keeping the fish from migrating down the river for suitable winter habitat.

Response F.2: Removal of the Lima Dam to restore the original grayling spawning run would not meet the purpose and need of the proposed action and would result in some negative implications to the grayling population. Currently, there are no grayling downstream of Lima Dam and the dam serves as a fish barrier preventing brown trout and other non-native fishes access to the CV. Brown trout have been shown to negatively impact grayling abundance in other Montana waterbodies (McCullough 2017, MAGWG 2022). Allowing passage over Lima

Dam (with a fish ladder or dam removal) would not benefit grayling, which no longer occur below the dam, but would allow for further invasion of the CV by nonnative species. We have updated the "Alternative(s) Considered but Dismissed from Further Consideration" section of the EA accordingly.

G. Stocking of Adfluvial Arctic Grayling and Genetic Diversity

Comment G.1: RRC, and Montana as a whole, has already been stocked with grayling -- in 1962, 1986! And so has Axolotl Lake, the primary source for grayling eggs for Montana's hatcheries. So any concerns about "genetic purity" of the URRL adfluvial arctic grayling is not factual. The commenter provided maps showing the stocking of Arctic Grayling in Montana.

Response G.1: Thank you for your comment. Beginning in the 1890s, Arctic grayling were stocked in hundreds of waterbodies around the state of Montana. However, not all stocking events resulted in self-sustaining populations. Currently, introduced self-sustaining populations exist in 13 waterbodies within the Upper Missouri River (UMR) (six other populations exist outside the UMR). The Service determined in 2007 that all populations within the UMR comprise the Upper Missouri River Distinct Population Segment. Adfluvial (lake-dwelling) and fluvial (river-dwelling) populations of Arctic grayling which exist in the Upper Missouri Basin are one species (Thymallus arcticus) and a single Distinct Population Segment (DPS; USFWS 2020). Aboriginal populations of grayling in Montana currently reside primarily in the Big Hole and Centennial valleys. Because of their indigenous origins, long-term persistence of these two populations is MFWP and the Service's priority for grayling management. The founding populations of introduced CV grayling were isolated and genetically drifted from the current CV population over the past century. Because current CV grayling possess unique and important genetics no longer present in the other populations, including those with CV grayling ancestry, it is important to preserve the historical population of CV grayling in its naturally occupied habitats.

The source of all stockings that have occurred in the CV have been with progeny from wild CV fish. Stockings that occurred in 1962 and 1986 were conducted well before the Axolotl Lake population was created in 1991. Recent genetic analysis confirmed that all indigenous populations have not been compromised by any historic stockings (Leary et al. 2014).

Comment G.2: The commenter indicated the only grayling that are at risk of extinction are the fluvial grayling in the Big Hole River. If the FWS is concerned about grayling going extinct the FWS should list them as endangered under the Endangered Species Act.

Response G.2: Thank you for your comment. The grayling in the Big Hole River have a dedicated conservation program designed specifically to maintain existing habitat and restore suitable habitat (Big Hole Grayling CCAA). In addition, and to further conserve grayling in the Big Hole River, two brood reserves specifically designed to preserve the

existing genetic diversity of Big Hole grayling have been established in two other watersheds (Axolotl Lake and Green Hollow Reservoir). Additionally, all Upper Missouri River (UMR) grayling are considered a single Distinct Population Segment (DPS) (USFWS 2007) and therefore conservation actions should apply to all existing populations within the UMR. Two recent ESA-listing determinations (2014 and 2020) have been made for Arctic grayling, both of which concluded that Arctic grayling do not meet the definition of Threatened or Endangered.

Comment G.3: If the U.S. Fish and Wildlife Service was truly concerned about the Arctic grayling in Montana, it would be concentrating its efforts and resources on the truly endangered population of fluvial arctic grayling in the Upper Big Hole River to actually restore suitable habitat.

Response G.3: Thank you for your comment. As noted above and elsewhere in these response to comments, the Service and its partners are currently working in the Big Hole on efforts to restore suitable habitat and will continue to look for additional opportunities in the larger landscape to further recovery efforts.

H. NEPA Concerns

Comment H.1: The EA states that there are no known environmental trends or planned actions that would affect the Red Rocks Lake Wilderness, wildlife and aquatic species, and cultural resources in the project area beyond the impacts associated with this project. What does this mean?

Response H.1: Thank you for the comment. We have updated the EA to address this comment and clarify. We acknowledge that there are other environmental trends and ongoing and planned actions that are ongoing in the project area that have the potential to impact the above listed affected resources. However, we have determined that this proposed action, will not have any additional substantive impacts on the affected resources, except as related to beneficial impacts to the CV grayling population.

Comment H.2: Commenter suggests an EIS not an EA is required for the proposed action and identifies necessary elements for a project EIS.

Response H.6: Thank you for your comment. We respectfully disagree. Please see the associated Finding of No Significant Impacts for more information.

Comment H.3: Several commenters indicated the proposed action is only one small part of a larger plan that would have even greater impacts on the Red Rocks Lakes Wilderness. The Service should analyze cumulative impacts and connected actions in a single document.

Response H.3: Thank you for your comment. As stated above, the Service has been working collaboratively with partners to look at additional management strategies the agency could

take to better steward the Wilderness and continues to do so. However, at this time, the Service has no larger plans or proposed actions beyond that identified stated in this EA. We need more information, more analysis, and more discussions with all stakeholders to determine what future proposed actions may be appropriate. Further analysis will be conducted on any larger plans or proposed actions for stewarding the Wilderness when such proposed plans or proposed actions have been identified. However, the only proposed action the Service is considering currently is this narrower and more urgent purpose and need to improve grayling access to quality spawning habitat. As discussed above, the other alternatives the commenters suggest do not help meet the purpose and need of this proposed action to ensure timely access of grayling to spawning habitat this Spring and in the future.

I. Scientific Literature Suggested for Review by USFWS

Comment I.1: The following papers were provided for review by USFWS:

"Ecosystem experiment reveals benefits of natural and simulated beaver dams to a threatened population of steelhead (Oncorhynchus mykiss)."

Link to paper about the effects of repeatedly shocking female fish: Abstract https://afspubs.onlinelibrary.wiley.com/doi/abs/ 10.1577/1548-8659%282002%29131%3C0224%3AEICSES%3 E2.0.CO%3B2

Cutting KA, Ferguson JM, Anderson ML, Cook K, Davis SC, Levine R. Linking beaver dam affected flow dynamics to upstream passage of Arctic grayling. Ecol Evol. 2018;8:12905–12917. https://doi.org/ 10.1002/ece3.4728

Montana Department of Fish, Wildlife and Parks planting database at https://myfwp.mt.gov/fishMT/plants/plantreport

Link to paper on persistent breaching or removing a beaver dam and the increased risk of negative impacts to habitat. https://apps.leg.wa.gov/wac/default.aspx? cite=220-660-230

Response I.1: We want to thank commenters for providing the above literature and information. We have considered it, where appropriate, in the Environmental Analyses.

Full Public Comments

Comment 1: Form Comment (4,860 received):

Please accept these public comments regarding the U.S. Fish and Wildlife Services' (USFWS) Red Rock Lakes National Wildlife Refuge Draft Environmental Assessment Beaver Dam Notching and Arctic Grayling Spawning Access Minimum Requirements Analysis Framework.

1. Breaching beaver dams to potentially benefit grayling is trammeling, which the Wilderness Act

does not allow. Actions that manipulate habitat to benefit one species at the expense of another is the kind of management the Wilderness Act militates against.

2. Even if grayling are imperiled and breaching the dams might help, all other actions that can benefit grayling and not compromise the Red Rock Lakes Wilderness, and/or the Wilderness Act, must be pursued first.

3. Closing occupied grayling streams to angling, finding alternatives to electroshocking to census fish, reducing livestock grazing impacts, and restoring habitat connectivity in tributary streams both above and below URRL are all wilderness-compatible actions, and likely essential to long-term grayling survival, which should be pursued before wilderness trammeling actions are considered.

4. Beaver dams trap sediment and likely prevent the sediments from moving downstream into Upper Red Rock Lake. The Environmental Assessment (EA) needs to address how much sediment is released, or not captured at all, by breaching beaver dams.

5. In 2023, the USFWS withdrew an unlawful habitat modifying project and instead pledged to focus on efforts to conserve Arctic grayling that don't undermine the Wilderness Act or compromise Wilderness character within the Red Rock Lakes Wilderness. Unfortunately, this new proposal continues the approach of modifying nature rather than modifying recreational, management, and other human actions that compromise grayling survival.

Comment 2:
No. No. No. Notching beaver dams to improve fish passage is an ill-conceived idea based on only poor anecdotal evidence. Fluvial arctic grayling evolved in a beaver rich environment. Before grayling became practically extinct in the upper Big Hole River basin, I several times saw them (and also exotic rainbow trout) “swimming” through the willow brush to pass over beaver dams. This occurred during the spring fluvial Arctic grayling and rainbow trout spawning period, which is also the high water period, in the early to late 1990s on French Creek, an upper Big Hole River tributary that is now a restoration project for grayling, westslope cutthroat trout, and western pearlshell mussels.

There is abundant peer-reviewed evidence that beaver dams do not impede the passage of salmonids. See e.g. Lokteff et all (2013) and Lokteff (2012).

For beaver and grayling or salmon and beaver, which have co-evolved in post-glacial environments, Mitchell and Cunjak (2007) summarize the situation nicely:

“. . . dependent upon streamflow, with high discharge facilitating passage past the dams for those species adept at swimming in high flows and leaping obstructions. . .”

Even a “strong” proponent of the effect of beaver dams in blocking grayling, Cutting et al (2018)

found that "the average passage probability over unbreached beaver dams was 88%".

The rare paper that supports dam breaching to improve grayling spawning passage, such as Bollinger and Lutz (2018) has 0 –- that's z-e-r-o –- citations. No offense, but this was an undergraduate student paper at UM-Western in Dillon, and not even a PhD dissertation by a reasonably respectable graduate program such as UM or MSU.

My head is ringing with Pink Floyd, "Hey, teacher, leave those kids alone." Indeed. So hey, biologist, leave those beavers alone. Whether it's a national wildlife refuge or a wilderness area, your well intended but faddish meddling often does more harm than good, not to mention wasting precious resources that could be better directed elsewhere. If you really want to improve grayling populations in Red Rock or the Big Hole, then focus on the real problems: dewatering due to irrigation diversions and habitat destruction by cattle. Spend your money and time on things like water leasing and riparian fencing.

Comment 3:
I'll conceived. I vote no.

Comment 4:
Introduction
There are three main concerns we have with the proposal in the EA:

- The MRA/MRAF process (referring to a minimum requirements analysis and the minimum requirements analysis framework1) is misapplied here. That framework derives directly from the very narrow exceptions to the prohibitions in Section 4(c) of the Wilderness Act. But this proposal does not regard any 4(c) prohibited uses. Instead, the agency appears to have morphed the minimum requirements framework into a vehicle for excusing wilderness damage generally. Rather than assess whether a 4(c)-prohibited activity is minimally necessary to preserve wilderness character, the use of the framework here appears to serve as a vehicle for justifying violations of the general wilderness preservation mandate in exchange for purported benefits to discrete resource concerns. Such an approach has no basis in the law. Not everything that has a negative impact on Wilderness or wilderness character involves the prohibitions in Section 4(c).
- The EA fails to adequately address the impact to the Wilderness from the proposal and fails to look at other options. It would harm the Red Rocks Lakes Wilderness through human manipulation (trammeling) of the environment. The Wilderness Act places the onus on the agency to minimize human impact and human-associated harms to the wilderness environment and to species such as arctic grayling. But this proposal and analysis fail to consider any such approaches and instead leap to overt trammeling, which negatively affects Wilderness as a place and an idea. The EA needs to look at other options, such as those that should reduce or possibly eliminate the agency perception that it needs to manipulate the Wilderness.

- The EA is also inadequate in other ways. Besides too narrowly defining the purpose and need, thereby limiting options (see bullet point above), it leads the reader to conclude that this project is only one small part of a larger plan that would have even greater impacts on the Red Rocks Lakes Wilderness. As such, this proposal involves anticipated cumulative impacts and connected actions that should be analyzed together in a single document.

The MRA/MRAF Process

Page 1 of the MRAF states that "[t]his document is intended for uses prohibited by Section 4(c) of the Wilderness Act in designated wilderness, but it can be used to analyze all projects in wilderness." But such a use of the "minimum requirements framework," which was designed with Section 4(c) in mind, has no basis in the law. Conflating various parts of the Wilderness Act under the rubric of Section 4(c) for analysis to justify actions incompatible with Wilderness is a legally dubious approach and would circumvent FWS's singular statutory obligation to preserve wilderness character.

Regardless of whether the MRAF is the appropriate method for analyzing a project that does not invoke the prohibitions in Section 4(c), and we maintain that it is not, a major problem with the WRAF process is it adopts a view of the Wilderness Act that pits five needlessly dissociated qualities of Wilderness into conflict. A coherent reading of the Wilderness Act maintains that natural conditions generally flow from untrammeled conditions. To the extent that there is an administrative conflict between various uses of wilderness and preservation of wilderness, the statute and the agencies' regulations and management guidance provide direction for resolving those conflicts in favor of wilderness preservation. See, e.g., 16 U.S.C. § 1133(b). FWS policy states as follows:

> The character of wilderness refocuses our perception of, relationship to, and use and enjoyment of nature. It requires changing our view of a landscape from the utilitarian, commodity orientation that often dominates our relationship with nature to respect for and deference to other life forms and natural processes. It requires us to recognize that we are embedded in these natural processes. Wilderness character imposes upon us an obligation to leave to future generations what remains of the world we did not make and do not control. Wilderness represents a symbol of respect for the natural conditions and wildness that civilization has displaced.

Part 610 Wilderness Stewardship, FWS 1.13C

Similarly, "[a] key descriptor of wilderness in the Wilderness Act, untrammeled refers to the freedom of a landscape from the human intent to permanently intervene, alter, control, or manipulate natural conditions or processes." FWS Policy 1.5(DD).

The MRAF is the subject of much disagreement and controversy, not only because it promotes—intentionally or not—an interpretation of the Wilderness Act that is internally inconsistent and results in management actions that are antithetical to Wilderness preservation—see, e.g. Cole, et.

al. 2015—but also because it is structured to favor management actions that trammel Wilderness. Untrammeled wilderness will always play second fiddle to the other claimed wilderness attributes because doing something in the Wilderness will prevail over letting nature call the shots. Unlike the active management paradigm common to areas outside the National Wilderness Preservation System, keeping wilderness wild and untrammeled requires human and management restraint. In other words:

> In contrast to other public land management statutes, which typically authorize agencies to consider and weigh diverse values through exercise of their scientific and policy expertise, the Wilderness Act required certain areas to be managed predominantly for one use: wilderness preservation....
>
> Unlike all other land-management statutes, the Wilderness Act's basic purpose was not to delegate authority to expert agencies, but rather, to exclude certain lands from the application of the agencies' specialized expertise, to restrain agency flexibility, and to protect (with limited, narrow exceptions) certain lands from the impact of the sort of policy choices land managers typically make.

Sean Kammer, Coming to Terms with Wilderness: The Wilderness Act and the Problem of Wildlife Restoration, 43 ENVTL. L. 83, 100-101 (2013).

In sum, the WRAF is not the appropriate framework to analyze this proposal. Further, the biases in the WRAF process amount to an illegal rewrite of the Wilderness Act, abdicating the law's substantive preservation mandate and substituting a procedural, check-box approach.

Harming and Trammeling the Wilderness, Inadequate Analysis

While the proposal does not invoke 4(c) prohibitions, it is a management action that trammels and manipulates Wilderness. Removing natural features and manipulating the impact of native species is hardly consistent with Wilderness.

Before considering this option, other things that negatively affect Arctic grayling and their spawning habitat need to be considered. Human uses and associated uses need to be better managed. The following topics should have been better analyzed in the EA and could improve Arctic grayling survival.

The EA does not analyze or propose to close the refuge spawning stream(s) to fishing. Fishing creates two problems. The first is that walking in the stream or on its edge can destroy grayling eggs or increase sediment, even after spawning has been completed. Grayling don't create redds like other salmonids that co-inhabit the same area. The second is that the catch and hopefully successful release of any grayling causes stress to the fish. Mortality of Arctic grayling can be relatively high. (See Falk, M.R. and D.V. Gillman, 1975. Mortality data for angled arctic grayling and northern pike from Great Slave Lake area, Northwest Territories, Canada; Fisheries and Marine Service. Resource Management Branch. Central Region. Data Report Series CEN D-75-1 cited in Laberge Environmental

Services. 1998. An evaluation of hooking mortality resulting from live-release fishing. Prepared for Yukon Fish and Wildlife Trust, Report Series #2). The problem is compounded when best practices for keeping fish alive often necessitate wading into the water to release them. (See Cook, Katrina V. Robert J. Lennox, Scott G. Hinch, and Steven J. Cooke. 2015. Fish out of water: how much air is too much? Fisheries Volume 40 2015 - Issue 9 Published online). Table 1 of the EA admits, "A number of adult grayling spend the summer in Red Rock and Odell Creeks where they are caught and released by anglers." EA at pdf 12, unpaginated.

Cattle grazing is yet another impact. The USFWS uses cattle to supposedly mimic bison grazing in Red Rock Lakes according to the Draft Compatibility Determination For Prescribed Grazing as a Habitat Management Tool Red Rock Lakes National Wildlife Refuge. However, one of the only studies to compare the bison and cattle clearly shows that cattle prefer riparian areas and water far more than bison do (Allred, B. W., S. D. Fuhlendorf, and R. G. Hamilton. 2011. The role of herbivores in Great Plains conservation: comparative ecology of bison and cattle. Ecosphere 2(3):art26. doi:10.1890/ES10- 00152.1). While fences divide the units and may be employed to protect riparian areas, the Fish and Wildlife Service's 2011 Red Rock Lakes NWR Report on Wilderness Character Monitoring states:

> The public and grazing permittees sometimes undertake unauthorized actions in wilderness that manipulate the environment in unplanned and impactful ways. This can include diverting water before it enters the refuge, grazing without authorization, poaching, use of salt licks to attract wildlife, etc. In 2011, the unauthorized trammeling actions that results in a refuge response primarily constituted livestock trespass by both grazing permittees and non- permittees. On six instances, refuge staff had to request a local cattle owner (Tash) to remove trespass cattle from refuge wilderness.

Wilderness Character Monitoring Report at 15. Further:

> Most wilderness boundaries at Red Rock Lakes NWR are marked, but the public, grazing permittees, or refuge volunteers and seasonal employees may, either knowingly or unknowingly, use motor vehicles, motorized equipment, or mechanical transport in wilderness. Observed or reported unauthorized uses will be recorded in the log on the wall near the printer in refuge headquarters. In 2011, there were two observed, unauthorized uses. On 9/21 a local cattle owner, while moving their herd, used ATVs in wilderness. On 10/1 a large, red and white helicopter flew low over refuge headquarters and west over wilderness. There is speculation that this may have been a military flight.

Ibid. at 31. Page 39 also indicates that written records were not kept of unauthorized use or trespass and page 43 suggests that this problem might be remedied in the future.

The upshot is, there is no monitoring data presented in the EA to quantify cattle impacts on the spawning streams in the Wilderness or other parts of the refuge, whether authorized or unauthorized. This omission is critical. The amount of grazing is significant, some 3100 AUMs annually in the Wilderness, more than half of which is water.

Regarding the beaver dams, the EA recognizes that in high flow years, grayling can pass the dams without notching as they are usually washed out. Thus, the proposed action should exclude notching during higher snowpack years. And the EA is far from clear about the possibility of passage through the dams. Grayling and beavers have co-inhabited the Centennial Valley for millennia. Proper wilderness administration demands management restraint in Wilderness and requires managers accept natural processes rather than what they want as desired end goals, be they numbers of a particular species or specific vegetative types.

Furthermore, Figure 1 in the EA is clear that no beaver dams were in the Wilderness in 2023. Only two years of dam location data are presented.

One additional concern with breaching the beaver dams is breaching would reduce the beaver dams' ability to capture sediments in the creek. This would be particularly important during spring run-off when the dams are breached. We recognize that the question of whether sediment has been filling Upper Red Rock Lake is under contention, but reducing the beaver dams' ability to intercept these sediments can only exacerbate any sediment issues in Upper Red Rock Lake.

The 1000-fish threshold, below which notching would occur, is based upon an end goal from a habitat group. It may also be based on greater numbers that were the result of artificial propagation when fish were raised and then planted into the area earlier in this century. The 1000 number seems far in excess of what was naturally occurring prior to that planting effort. There is some doubt as to the whether the 1000 goal is legitimate and, depending on the source of the grayling eggs for propagation, whether the population is entirely native as the EA suggests it is.

Heavy-handed management and handling of grayling may result in additional mortality and conflict with Wilderness. While the EA provides little detail on how grayling are handled and counted, ideas on how to make censusing techniques less invasive should be considered to reduce mortality. For example, the culvert outside the Wilderness on the main spawning stream might be the location for a non-invasive counting device rather than implanting tags. At the very least, the EA should look at ways to lessen the impact on grayling and the Wilderness by management actions.

<u>Cumulative/Connected Actions</u>

The EA (pages 6 and 10) leads the reader to conclude that other actions are planned. This includes action inside the Wilderness to oxygenate Upper Red Rock Lake, which was found to be inconsistent with Wilderness by Judge Molloy. The EA states:

> Monitoring has documented hypoxic conditions in URRL during some winters that led to high grayling mortality (i.e., winterkill). Factors that likely lead to hypoxic conditions in URRL include prolonged snow and ice cover and macrophyte abundance. While grayling have seemingly persisted in the CV under persistent risk of winterkill in Upper Lake, the relative significance of winterkill may currently be greater due to lack of connectivity with other UMR grayling populations, which prevents geneflow and a refounding source for the population

(USFWS and MFWP 2017).

EA at pdf 10.

Targeting natural factors like the impact of beavers—which have coevolved with grayling in this environment for millennia—is antithetical to Wilderness preservation under the law and should be the last sort of action considered by administrators after exhausting all sources of human degradation to the wilderness environment. This proposal, for example, entirely fails to assess relevant factors outside the Wilderness such as restoring habitat connectivity for grayling both up- and downstream of Red Rock Lakes. And FWS has certainly not yet acted to fully abate all detrimental impacts that occur through fishing, through livestock grazing, through management activity, and through other human presence on the landscape. Furthermore, since this proposal anticipates cumulative impacts and connected actions, these items should be analyzed together in a single document.

Please keep Wilderness Watch updated on this proposal.

Comment 5:
While I support the restoration of habitat for the Arctic graylings in the Red Rock Lakes National Wildlife Refuge, I urge you to find a solution that does not artificially manipulate the wilderness by injuring other wildlife.

Your agency acknowledges that notching beaver dams is considered "a trammeling" of the wilderness, and would result in "disturbance to the Wilderness natural character".

Better options exist to benefit graylings, such as changing angling regulations, reducing the impact of grazing cattle, and restoring natural habitat.

I urge you to work with the environment through ecological restoration, rather than manipulation.

Comment 6:
Thank you for the opportunity to provide comments on the Draft Environmental Assessment released in January 2024. We are active, full time, year-round residents of the Centennial Valley in Lakeview, volunteers of several Valley organizations (including the Red Rock Lakes National Wildlife Refuge) and board members of two Southwest Montana organizations with close ties to the Centennial Valley. We grew up in the Mountain West (Wyoming and Utah) and lived in Alaska prior to moving back to Montana. We first visited the Centennial Valley in 2016 and plan to spend the rest of our years in Lakeview.

The management experiments recently proposed by the US Fish & Wildlife Service and Montana Fish, Wildlife & Parks are aligned with three competing hypotheses of Arctic grayling population

declines agreed to under a 2017 adaptive management plan:

1. Quality and quantity of spawning habitat
2. Predation by, and competition with, adult non-native Yellowstone cutthroat trout
3. Quality and quantity of overwinter habitat in URRL

This draft EA outlines an experiment to notch beaver dams on Red Rock Creek (on wilderness and upstream of the wilderness boundary) to improve the spawning habitat of the Arctic grayling. Below are our comments:

- Beaver dams are not permanent structures and do break, leak, etc without human intervention.
- This action, if approved, is not harmful to beaver.
- While the proposed action is considered a trammeling (for the dams located in the Wilderness) the plan is to minimize the impact through the use of hand tools, accessing each dam on foot and will provide an appropriate, natural disposal of the removed material.
- Beaver and fish have coexisted here and in many other areas (including of course outside of the area of discussion). This is a proposal for perpetual human intervention, in a Wilderness area, at least until the population exceeds 1,000 fish. The natural solution is for fish to find a way through or high-volume water breaking through the dams. We do not believe implementing a perpetual human-dependent solution to this problem in a Wilderness area is in alignment with the Wilderness Act.
- It is noted in the draft EA that Grayling, Yellowstone cutthroat trout and white suckers are regularly found dead within Red Rock Creek dams as a supporting fact for this experiment. We believe it is an inaccurate determination in the draft for no affect to wildlife in the project area. Naturally deceased fish are a benefit to mammals commonly found in this area. While a decrease in the fish mortality is on the surface a positive, this naturally occurring process, if changed, will impact something else negatively in the habitat. In a Wilderness area, this impact should not be minimized or ignored.
- The beaver dam notching proposal is an experiment that managers hope will improve spawning habitat in Red Rock Creek, but as noted in the draft assessment, "…is the only action that can be taken until the primary limiting factor, improving winter conditions in URRL, is addressed." We are deeply concerned about the experiments under consideration to change the winter conditions at a Montana mountain lake at nearly 7,000 feet in elevation with many months of winter.

This draft proposal is an improvement over the options presented last year for the Arctic grayling, due to the balance of the impact to the Wilderness Area, its limit of scope and transparency. However, the focus of this experiment is on impacting natural forces rather than boldly addressing what humans are doing to impact the population decline of the Arctic grayling. It is our opinion that the US Fish & Wildlife Service and Montana Fish, Wildlife & Parks should propose experiments limiting the human actions and activities that are potentially impacting the population decline. These would likely be unpopular to anglers and researchers but could still be aligned with the adaptive management plan approach.

Alternatively, a solution aligned with the real problem should be considered. The Arctic grayling in URRL were once connected to the Upper Missouri River drainage system and thus able to

repopulate. Winterkill and spawning issues were natural and frequently occurring issues, since winter weather and beaver are also not new to the Valley. The fish population maintained a balance through connectivity to the UMR system. While removal of the man-made dams now in place is not feasible, perhaps an experiment more aligned to the way nature solved this issue (repopulation) should also be considered.

Comment 7:
I have read the draft plan to notch beaver dams on the RRLNWR to potentially provide grayling access to more spawning habitat. While I don't fundamentally object to this, despite being in the wilderness area, I think it is a very weak attempt to help the grayling and I am not sure the disturbance to the dams in the wilderness area is worth the effort. At best it provides a false hope that it will make a difference for the grayling instead of actually addressing the real issues.

The biggest issue for the grayling is the lack of winter habitat. The only real way to fix that is to remove the barrier that the Lima Dam has created keeping the fish from migrating down the river for suitable winter habitat. Dam removal (or some type of laddering – I have no idea if that is even feasible for grayling) creating what was there when the grayling did so well in the Centennial Valley is what should be being discussed.

The second issue is that fishing is without doubt harming some fish and eliminating fishing in Red Rock Creek is the way to fix that. I am an avid fisherman and while I always use barbless hooks, practice only catch and release and do whatever I can to avoid harming any fish, but I know there is occasionally a fish or two that do not survive being caught. With the grayling population at the very low point they are at, any harmed fish is a very big deal and stopping fishing would prevent any unintentional harm to the few remaining grayling. Not a popular option but one that should be aggressively pursued.

Please try addressing the real issues that effect grayling at RRLNWR rather than messing around with weak attempts to do something.

Comment 8:
The draft EA states that there are an estimated 188 grayling which is short of the goal of 1000 grayling?

How are you sure that beaver dams are the problem since there have been beavers there since the last ice age?

Please consider an alternative that looks at eliminating cattle in on public lands in the watershed above and in Upper Red Rock Lake.

The FWS seems to have left out an important piece of information in the EA.

What the EA left out was there is a lack of oxygen in Red Rocks Lakes because of all the increased nutrients from the manure from cattle grazing.

Please analyze an alternative that examines how manure deposited in the watershed by cattle grazing, in the lake, along and in streams, in the wetlands adjacent to the lake, and on the watershed are the likely major source of the problem of low oxygen in Red Rock Lakes National Wildlife Refuge.

Grazing cattle will trample and eat the wetland vegetation that can buffer nutrients thru plant uptake.

Instead of treating the symptoms, the EIS or EA, if you refuse to write an EIS, should look at the ecology, keep the plant community intact, and consider removing cattle. Please consider offering grazing buyouts if that's what it takes.

The EA states: There are no known environmental trends or planned actions that would affect Wilderness in the project area beyond the impacts associated with this project.

The EA also states: There are no known environmental trends or planned actions that would affect wildlife and aquatic species in the project area beyond the impacts associated with this project.

The EA also states: There are no known actions being planned that would be likely to impact cultural resources in the project area beyond the impacts associated with the project.

What does this mean? An EIS or an EA is not supposed to be a tautology. The purpose of NEPA is to look before you leap.

Section 102 of NEPA establishes procedural requirements, applying that national policy to proposals for major Federal actions significantly affecting the quality of the human environment by requiring Federal agencies to prepare a detailed statement on: (1) the environmental impact of the proposed action; (2) any adverse effects that cannot be avoided; (3) alternatives to the proposed action; (4) the relationship between local short-term uses of man’s environment and the maintenance and enhancement of longterm productivity; and (5) any irreversible and irretrievable commitments of resources that would be involved in the proposed action. 42 U.S.C. 4332(2)(C).

The tautologies in the draft EA violate NEPA. Please fully explain all of the impacts of the proposed alternative.

The proposal seems to violate the Wilderness Act which states: (c) A wilderness, in contrast with those areas where man and his works dominate the landscape, is hereby recognized as an area where the earth and its community of life are untrammeled by man, where man himself is a visitor who does not remain. An area of wilderness is further defined to mean in this Act an area of

undeveloped Federal land retaining its primeval character and influence, without permanent improvements or human habitation, which is protected and managed so as to preserve its natural conditions and which (1) generally appears to have been affected primarily by the forces of nature, with the imprint of man's work substantially unnoticeable; (2) has outstanding opportunities for solitude or a primitive and unconfined type of recreation; (3) has at least five thousand acres of land or is of sufficient size as to make practicable its preservation and use in an unimpaired condition; and (4) may also contain ecological, geological, or other features of scientific, educational, scenic, or historical value.

Breeching beaver dams every spring until grayling numbers reach 1000 will definitely leave an imprint of man's work substantially noticeable. Breaching could go on for decades especially of the dams are not the problem since the EA cites Cutting et al. 2018, which found that 88% of the grayling can get passed beaver dams.

The Forest Service must complete a full environmental impact statement (EIS) for this proposed amendments because the scope of the amendments will likely have a significant individual and cumulative impact on the environment. Alliance has reviewed the statutory and regulatory requirements governing National Forest Management projects, as well as the relevant case law, and compiled a check-list of issues that must be included in the EIS for the Project in order for the Forest Service's analysis to comply with the law. Following the list of necessary elements, Alliance has also included a general narrative discussion on possible impacts of the Project, with accompanying citations to the relevant scientific literature. These references should be disclosed and discussed in the EIS for the Project.

I. NECESSARY ELEMENTS FOR PROJECT EIS or even an EA if you refuse to write an EIS:

A.Disclose all Red Rocks Lakes National Wildlife Refuge (RRLNWR) Plan requirements for logging projects and explain how the the proposed amendments complies with them;

B.Disclose the acreages of past, current, and reasonably foreseeable logging, grazing, and road-building activities within the RRLNWR;

C. Disclose the biological assessment for the candidate, threatened, or endangered species with potential and/or actual habitat in the RRLNWR;

D. Disclose the biological evaluation for the sensitive and management indicator species with potential and/or actual habitat in the RRLNWR.;

E.Disclose the BNF's record of compliance with its monitoring requirements as set forth in the RRLNWR Management Plan;

F.Disclose the results of the field surveys for threatened, endangered, proposed, sensitive, and rare plants and species, the RRLNWR;

G.Disclose the level of current noxious weed infestations in the RRLNWR and the cause of those infestations;

H.Disclose the impact of the Project on noxious weed infestations and native plant communities;

I.Disclose the amount of detrimental soil disturbance that currently exists in the RRLNWR from grazing activities;

J.Disclose the expected amount of detrimental soil disturbance in each unit after ground disturbance;

K.Disclose the expected amount of sedimentation in Upper Red Rock lake due to cattle grazing;

L. Disclose the analytical data that supports breeching beaver dams;

M. Disclose the benefits of beaver dams to all fish and wildlife in the RRLNWR.

N. Disclose the amount manure going into Red Rocks Lakes from cattle manure and how it effects grayling;

O. Disclose how cattle grazing effects nesting birds.

Beavers play an important ecological role in creating and maintaining ponds and wetlands for fish and wildlife habitat. Ponds also provide surface water storage that improves summer flows, as well as improving water quality through retaining sediment. How will the proposed alternative affect water quality in Upper Red Rock Lake? Will it make the ponds more shallow?

Breaching, notching, or removing a dam can negatively affect fish life and the habitat that supports fish life by dewatering the upstream pond, stranding fish life, and releasing large volumes of water (that can be devoid of oxygen) and sediment downstream. Releasing sediment can affect downstream spawning areas. Breaching or removing a beaver dam may not prevent future beaver activity in the area. Persistent breaching or removing a beaver dam can increase the risk of negative impacts to habitat. https://apps.leg.wa.gov/wac/default.aspx? cite=220-660-230

The Draft EA states that Beaver dams harm trout and grayling because they reduce fine sediment and the draft EA also states that trout and grayling need less than 10% fine sediment for successful recruitment. How much fine sediment is there in the spawning streams in RRLNWR now? Is it more than 10%? Cattle grazing puts lots of find sediment into streams. How much of the find sediment in the spawning streams is caused by cattle grazing?

Would grayling have more successful recruitment when spawning if all cattle grazing were prohibited on public lands in the watershed around and above RRLNWR?

Please see the attached paper: Cutting KA, Ferguson JM, Anderson ML, Cook K, Davis SC, Levine R. Linking beaver dam affected flow dynamics to upstream passage of Arctic grayling. Ecol Evol. 2018;8:12905–12917. https://doi.org/ 10.1002/ece3.4728.

Cutting et al. concluded: It is important to note that 88% of all observations in our study resulted in a successful passage of an unbreached beaver dam. The high passage success suggests that most beaver dams on Red Rock Creek during the duration of the study pose little risk to passage for upstream migrating grayling.

They also concluded: We also assumed that grayling preferred the upper portions of the creek for spawning which is based on historic anecdote instead of objective redd survey data. Rather, spawning may occur in lower portions of the stream which allows for wider spatial distribution of spawning areas.

Did you study Red Rock Creek to see if grayling of spawning below beaver dams? If not, please do.

There is nothing about the watershed function. If beaver dams are blowing out then the floodplains have lost function, willows compromised, livestock removing veg and increasing overland flow and flood velocities. The beaver dams should collect sediment..isn't this counter to the goal of reducing sedimentation in spawning areas?

Please analyse further upstream and examine groundcover, and the effect of cows in the watershed.

It's a piecemeal approach and just more meddling by humans without correcting human caused problems.

The EA reflects the lack of attention to the overall ecosystem and answering the question as to causes..but FWS and MT FWP always seem to want to deal with symptoms,not causes.

In reality, arctic grayling have been planted all over Montana as George Ochenski pointed out in his comments. The only graying that are at risk of extinction are the fluvial grayling in the Big Hole River. If the FWS is concerned about graylign going extinct the FWS should list them as endangered under the Endangered Species Act.

What are the effects of repeatedly shocking grayling to count them?

Please find the following paper about the effects of repeatedly shocking female fish attached.

Abstract https://afspubs.onlinelibrary.wiley.com/doi/abs/ 10.1577/1548-8659%282002%29131%3C0224%3AEICSES%3 E2.0.CO%3B2

While electrofishing has become a common capture technique in fisheries research, the potential impact of this technique on the fish is not completely understood. Mature female chinook salmon Oncorhynchus tshawytscha and eggs at key developmental stages were electroshocked with 10-s pulsed DC from a standard backpack electroshocker in a controlled environment. Eggs from one-third of the shocked females showed extreme mortality (>93%), while the remaining shocked families shared egg mortality (12-20%) similar to the controls (9.9%). Eggs shocked at the early eyed stage showed significantly higher mortality (34.2%) than control (unshocked) eggs, while mortalities were low (≤2.1%) for shocked eggs and for controls at all other developmental stages.Upon examination of fish radiographs, we found that the electroshocked juvenile fish had significantly more spinal aberrations than the unshocked fish. Hematocrit, serum cortisol and glucose, serum lysozyme activity, and total leukocyte counts were monitored in control and shocked juvenile fish for 3 weeks. Hematocrit declined over 3 weeks in both groups. Serum cortisol and glucose levels increased significantly in both groups within 12 h, but shocked fish showed a slower return of cortisol levels to preshock values and an overall higher glucose response. The combination of electroshock and handling did not affect serum lysozyme levels, but unshocked (handled) fish exhibited immediate and significantly reduced lysozyme activity for up to 2 weeks. Total leukocyte numbers were higher in shocked fish late in the experiment (at 2 and 3 weeks). Although electrofishing is useful to determine the precapture physiological status of field-caught fish, our data show that electrofishing can have significant detrimental impacts on the fish.

The one paper that the EA cites that supports dam breaching to improve grayling spawning passage, such as Bollinger and Lutz (2018) has 0 –- that's z-e-r-o –- citations. No offense, but this was an undergraduate student paper at UM-Western in Dillon, and not even a PhD dissertation by a reasonably respectable graduate program such as UM or MSU. Nobody publishes a paper with zero citations.

The EA is not following the best available science in violation of NEPA.

Please find attached a paper titled, "Ecosystem experiment reveals benefits of natural and simulated beaver dams to a threatened population of steelhead (Oncorhynchus mykiss)"

Comment 9:
Hope all's well, but gotta say, I have to **OPPOSE** the latest FWS plan to once again attempt to manipulate Nature by notching the beaver dams in Red Rock Creek, both in and out of the Red Rock Lakes Wilderness Area and Red Rock Lakes National Wildlife Refuge as a total and useless waste of time, money, and government resources.

I really can't understand how, after millennia of evolving together, the "managers" think they have to step in between grayling and beavers to somehow assist the grayling in negotiating beaver dams. How did those poor fish ever manage to survive before humans "managed" the landscape??

Plus, it's getting real old reading the same old excuse FWS used for their failed and illegal Upper Red Rocks Lake proposal to trammel the wilderness with compressors, pipelines, sheet piling, dredging, and an aerator was to supposedly "save" less than 100 adfluvial arctic grayling.

What's even worse, these same individuals illegally installed an aerator, completely ignoring federal law (National Environmental Policy Act, Wilderness Act) -- only to have the bubbler make exactly no difference in the dissolved oxygen in the lake. Yet, we, the public, were told these "scientists" absolutely determined that low dissolved oxygen was a fatal threat to the grayling -- and then, well, didn't turn out quite that way, ehh?

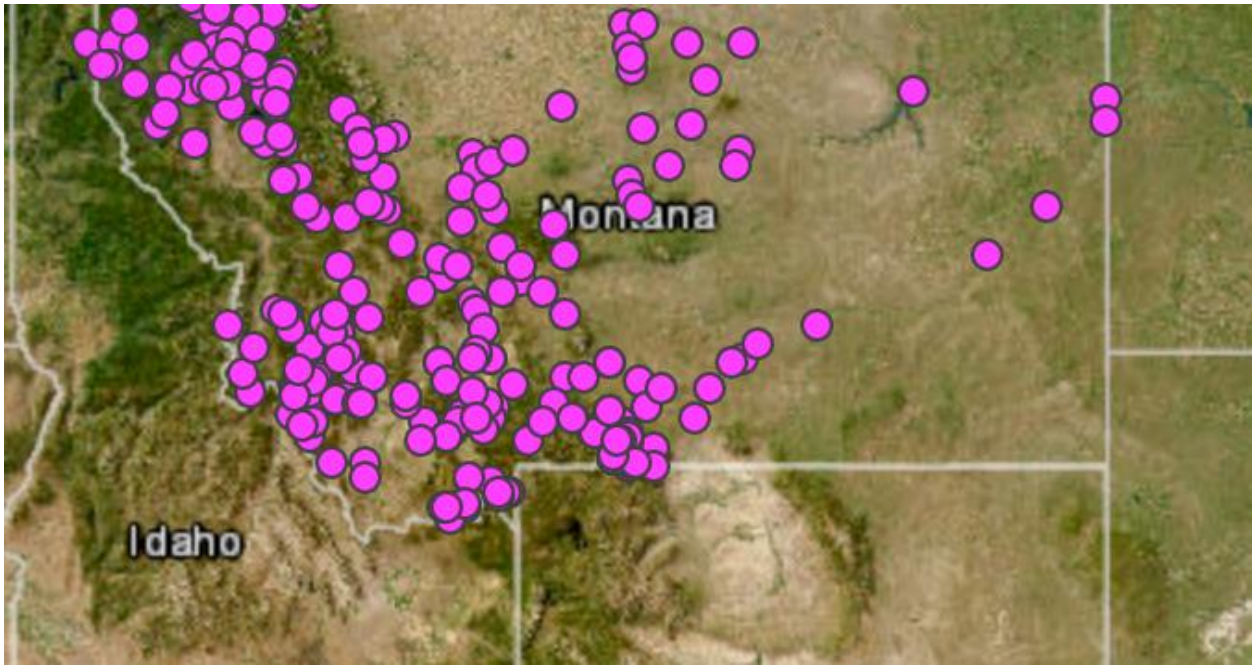
Besides the costs incurred by the federal government to defend that project in court, they lost and were chastised by the judge besides for failing to follow the law.

But now, once again, it's time to do a little more trammeling in a wilderness area and go pull out some "notches" in beaver dams or, gosh, for sure the grayling are going to disappear this time!

What baloney!

Here's a map showing where grayling from this exact same area (Axolotl Lakes) have been planted in rivers, streams, and lakes throughout Montana. As you can see, there is absolutely ZERO chance that adfluvial arctic grayling are anywhere near extinction in Montana. In fact, they're dumping hatchery grayling from the Axolotl Lakes stock all over the state, including in Red Rock Creek -- and in places they have virtually no chance of surviving such as Eastern Montana.

The vast numbers of grayling being raised in hatcheries and planted all over Montana -- millions -- is even more stunning as you can see in the chart below the map, both of which come from the Montana Department of Fish, Wildlife and Parks planting database at https://myfwp.mt.gov/fishMT/plants/plantreport



Plant Date	Water	Region	County	Species	#Fish	Size (in)	Hatchery
7-28-2023	Chiquita Lake	3	Madison	Arctic Grayling	431	2.34	Bluewater Springs Trout Hatchery
7-25-2023	Twin Lake (Upper)	3	Madison	Arctic Grayling	600	6.47	Yellowstone River Trout Hatchery
7-18-2023	French Creek	3	Deer Lodge	Arctic Grayling	1683	6.44	Yellowstone River Trout Hatchery
6-22-2023	Sylvia Lake	1	Flathead	Arctic Grayling	11400	1	Flathead Lake Salmon Hatchery
6-21-2023	Rogers Lake	1	Flathead	Arctic Grayling	60000	1	Flathead Lake Salmon Hatchery
5-30-2023	South Fork Madison River	3	Gallatin	Arctic Grayling	1052	5.82	Yellowstone River Trout Hatchery
5-19-2023	South Fork Madison River	3	Gallatin	Arctic Grayling	480000	Eggs	Bluewater Springs Trout Hatchery
1-4-2023	French Creek	3	Deer Lodge	Arctic Grayling	2000	3.95	Yellowstone River Trout Hatchery
10-28-2022	French Creek	3	Deer Lodge	Arctic Grayling	5000	2.98	Yellowstone River Trout Hatchery
9-27-2022	French Creek	3	Deer Lodge	Arctic Grayling	5000	2.1	Yellowstone River Trout Hatchery

Showing 1 to 10 of 1,132 entries

Previous 1 2 3 4 5 ... 114 Next

Please note that this is just a tiny sampling of the "1,132 entries" -- on 114 pages of records going back to 1926! Please see the attached folder for more records of the enormous amount of hatchery grayling and eggs planted in Montana in the last century.

Moreover, as you'll see below, **Red Rock Creek has already been stocked with planted grayling -- in 1962, 1986!** And so has Axolotl Lake, the primary source for grayling eggs for Montana's hatcheries.

So any concerns about "genetic purity" of the Upper Red Rock Lake adfluvial arctic grayling is manufactured by the biologists, not a fact due to prior hatchery plants that undoubtedly contributed to current genetics of Red Rock grayling. Please find the arctic grayling planting record attached in a CSV file which can be popped into data base software.

6-18-1952	Lower Red Rock Lake	3	Beaverhead	Arctic Grayling	60000	0	Washoe Park Trout Hatchery
6-27-1962	Red Rock Creek (RED ROCK CR)	3	Beaverhead	Arctic Grayling	4154	5	Ennis National Fish Hatchery
5-27-1986	Red Rock Creek (RED ROCK CR)	3	Beaverhead	Arctic Grayling	240	1	Bozeman Fish Cultural Center
9-24-1997	Axolotl Lake	3	Madison	Arctic Grayling	1760	1.9	Bluewater Springs Trout Hatchery
9-19-2003	Red Rock River Ranch Res	3	Beaverhead	Arctic Grayling	4900	1.5	Flathead Lake Salmon Hatchery

The inescapable conclusion is that there is exactly NO reason for any manipulation of the beaver dams on Red Rocks Creek above Upper Red Rocks Lake to supposedly enhance access to more spawning areas for adfluvial arctic grayling.

In fact, given the state's incredible record of planting millions of hatchery grayling in water bodies all over Montana, even if every grayling in Upper Red Rock Lake were somehow extirpated (which they are not being threatened by -- this project is about spawning, not extirpation), one could credibly argue the exact same genetics for the exact same adfluvial grayling are in abundant supply from the state hatcheries.

I'm sure others will raise good points about the theoretical outcomes of this proposal, particularly given the wisdom of holding back those waters in what looks to be an exceptionally low snowpack year. Come August, it may well be far more important to have that cold water in the beaver ponds than the supposed benefit to grayling from breaching those dams. One might think a fisheries

biologist could understand that and take current climate-change induced circumstances extant into consideration when coming up with make work projects like this.

Moreover, given that excess nutrients and sediment are contributing to the eutrophication of the very shallow Upper Red Rocks Lake, allowing the beaver dams to trap the nutrient rich run-off sediments may actually be one of the better things that could be done for the lake.

This is purely a "make work" project and quite frankly, maybe these FWS employees could make better use of their time and our taxpayer money by doing something actually constructive -- like planting willows on the banks of Red Rock Creek in the "spawning" zone. Or fencing cattle out of the riparian areas outside of the wilderness boundary. Or perhaps admitting this is another sham project, totally unnecessary, likely to wind up accomplishing exactly nothing beneficial since even the EA says the beavers will quickly rebuild the dams.

In all my many decades of dealing with state and federal agencies on a wide host of environmental and conservation issues, I have to say, these people at Red Rocks take the cake for coming up with the worst project -- and then illegally implementing them, as with the installation of the aerator last winter.

And finally, if the U.S. Fish and Wildlife Service was truly concerned about the arctic grayling in Montana, it would be concentrating its efforts and resources on the truly endangered population of **fluvial arctic grayling in the Upper Big Hole River** to actually restore suitable habitat -- enough cold, clean and connected water in the Big Hole and its tributaries -- instead of simply planting millions of hatchery grayling and eggs and hoping a few will survive in the sorry conditions of the habitat in which they're being planted.

In closing, no, there's no need whatsoever for notching the beaver dams. Time to leave the Upper Red Rock Lake grayling alone for awhile -- you're managing them to death.

Comment 10:

These comments are submitted on behalf of Alliance for the Wild Rockies, Native Ecosystems Council, and Yellowstone to Uintas Connection. We have reviewed the draft EA and found many unanswered questions. We previously commented on the Draft EA Arctic Grayling Conservation Red Rock Lakes NW (comments dated March 27 ,2023). Those comments focused on the degraded water quality and the role livestock play in the water pollution, streambank alteration and habitat modification. We have seen no data or analysis of the current grazing management scheme at Red Rock Lakes, nor have we seen any data, reports, photos characterizing the condition of the streams (water quality, hydrology, bank condition, spawning areas) and riparian floodplains upon which arctic grayling depend. This information would provide the needed setting within which the public could understand the current state of habitats.

In our 2023 comments we provided a map of the watershed showing impaired stream reaches.

These included E.coli, sediment, and metals. That map is included here as Figure 1. The lack of dissolved oxygen in Upper Red Rock Lake where the grayling overwinter results from excessive nutrient loads. E. coli, nutrients, and sediment are likely the result of two factors. First and foremost, would be the grazing of livestock in the watersheds and allowing their access to streams. They deposit massive amounts of manure in the streams and watersheds, directly increasing nutrient loads and E.coli. In addition, they trample streambanks and alter the bank structure leading to accelerated erosion and sediment loading. This is in addition to the sediments emanating from the grazed watersheds. The EAs we have seen ignore these facts and provide no analysis. Where is the monitoring data for these aspects of the system? Where is the livestock grazing management plan and annual report for numbers, locations, and season? What streams are fenced for protection?

The Red Rock Lakes Comprehensive Plan emphasizes maintaining the processes for riparian habitats to support migrant birds, fish, and wintering ungulates. Similarly, emphasis is placed on meadow, grassland, shrub steppe, aspen, mixed conifer habitats. We have seen no reports, maps, or analysis of current and potential conditions as influenced by refuge management and other factors.

We received the GIS files for the pastures within the Refuge and appreciate FWS generosity in providing those and a brief outline of the current grazing management within the Refuge. The note provided with the GIS files stated that:

> Please note that I was told by the person who sent it that the layer is not accurate for current management of the Refuge. For example, on the Refuge there is newer fencing along Red Rock Creek that excludes any prescriptive grazing in the riparian areas, unit G10 has been removed from grazing rotation since 1999, and other units proximate to G10 are grazed on a three-year rest rotation schedule - a late-season graze (no earlier than 1 July start date) is followed by at least two full years of rest.

This leaves the Fish and Wildlife Service as well as the public with a situation that does not lend itself to accurate determinations of causes and effects to the streams, lakes, and habitats within the bounds of the Refuge. This is a critical gap in addressing the overall health of the ecosystem and certainly means that a proposal to notch the beaver dams lacks sufficient detail.

In trying to understand the scale of land uses and watershed inputs to the Refuge, we obtained land ownership from the Fish and Wildlife Service national database, stream occurrence from the State of Montana, along with the above mentioned Refuge pasture shapefiles. Figures 2 – 5 illustrate these.

Figure 2 illustrates that a number of land leases and easements occur within the Refuge. It is not clear whether these are also grazed by livestock, perhaps in conjunction with other private lands in their vicinity.

Figure 3 shows the streams coming from the surrounding watershed into the various areas of the

Refuge. The Grazing Allotments shown are on the National Forest, but drain into the Centennial Valley and Refuge.

Figure 4 delineates the best available information we have based on the GIS files provided. Analysis of the data shows that there have been 35 pastures allocated that encompass 33,807 acres within the Refuge.

Figure 5 shows Red Rock Lake and Red Rock Creek along with the Wilderness and Refuge Boundaries. The EA Figure 2 noted that: "Map of Beaver Dam Locations on Red Rock Creek observed in 2022 and 2023. In 2022, eight of 14 dams were located within the wilderness and in 2023, all eight dams were upstream of the wilderness boundary." Does notching indicate "trammeling" of the Wilderness?

Specific Points from the EA

Given the paucity of data, we are limited in our scope of analysis. Above, we have described the interactions and effects of livestock grazing on Refuge attributes. The Montana DEQ data shown in Figure 1 bears out our hypothesis regarding nutrient and sediment inputs.

The EA Purpose and Need is to provide "all grayling access to high quality spawning habitats". How do we know the spawning habitats are high quality? What is the status of sediment fines in spawning areas? Are these spawning areas well oxygenated? The EA notes that the quality and quantity of spawning habitat is indicated to be a major contributor to grayling decline but provides no analysis as to the actual quality and causes of this decline.

The EA notes that modeling indicates lack of dissolved oxygen during winter is the largest limiting factor. This means addressing the nutrient loading to the lake. It seems apparent that no amount of spawning success can overcome the mortality in the lake as the nutrients continue to enter and sedimentation from the watershed continues to fill the lake. The EA did not address this.

The EA shows Figure 1 in which beaver dams occurred in the lower reach of Red Rock Creek in the wilderness in 2022, but in 2023 were upstream. This is strange. Did the beavers pick up and move from the wilderness to upstream, or does this reflect that observations were made in different locations in those two years and the dams remain in place? How many dams are to be notched?

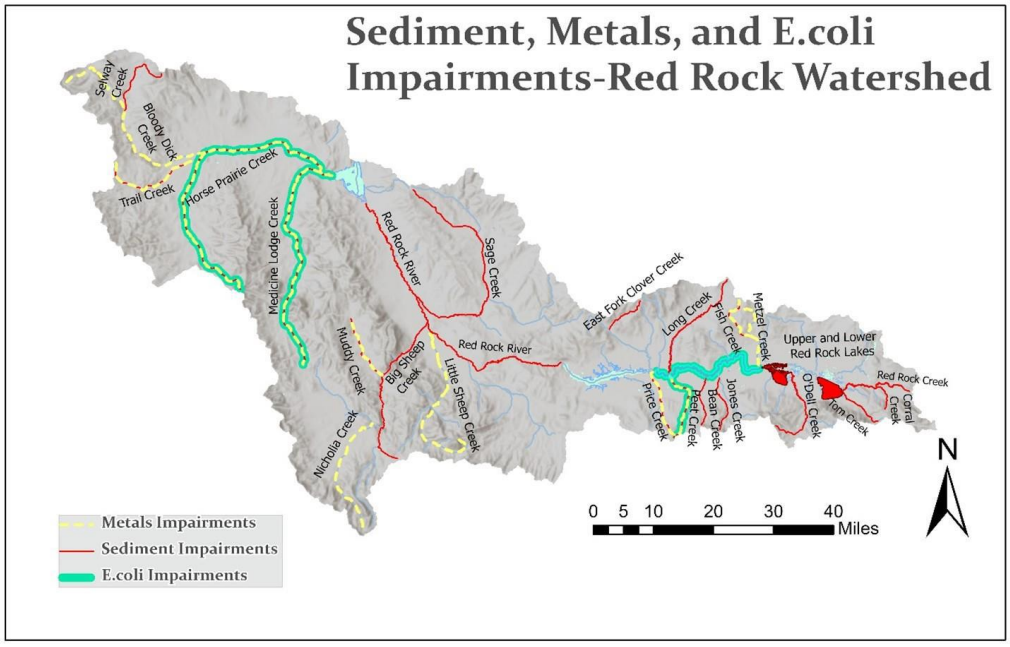
The EA states that the surrounding watersheds are healthy. What does this mean? Do they meet the Ecological Site Descriptions for each type as being at Potential? Degraded? Is there monitoring of ground cover and plant species in the various grazed pastures in both upland and riparian areas upon which this is based? Figures 2 – 4 indicate the possibility of livestock being grazed throughout the Centennial Valley with the possible exception of the steep slopes to the south where Forest grazing allotments occur across the Continental Divide and are not in the Refuge watershed.

While climate change impact is described as being uncertain, some analysis of trends in temperature and precipitation in the watershed should shed light on this issue. We accessed the

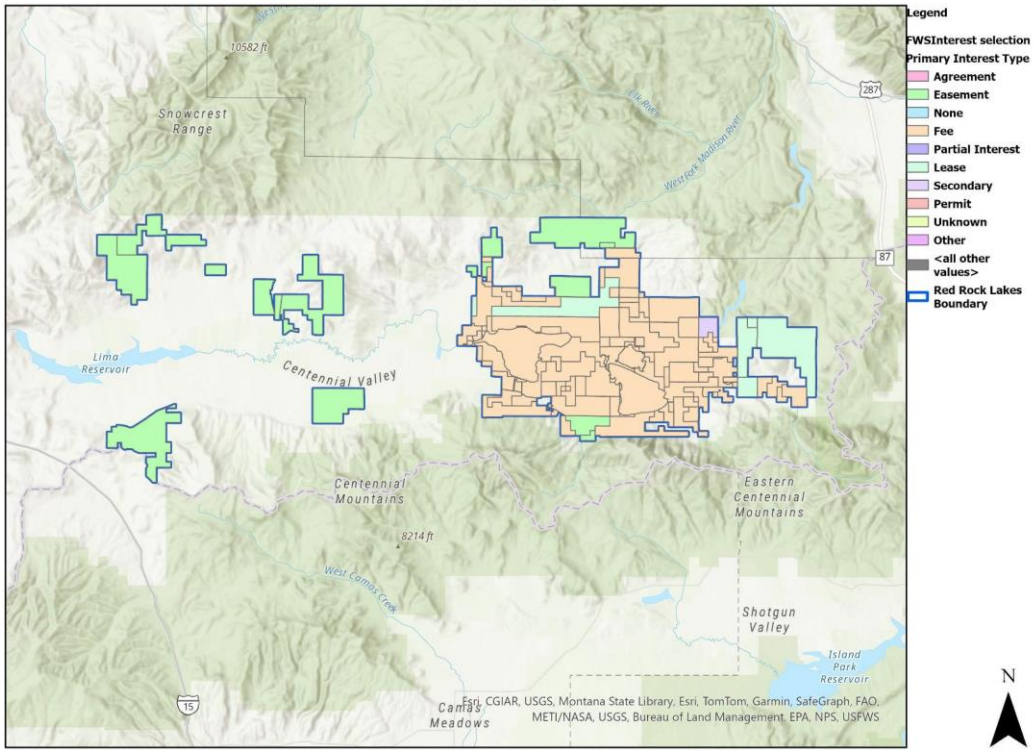
USDA National Water and Climate Center website and found that the three stations affecting Red Rock Lakes are below normal as of February 23, 2024. These ranged from 64- 87%. (Figure 6). Of interest would be an analysis of the historical stream flows/precipitation vs grayling numbers as well as knowing at what flow the stream overtops the beaver dams. Knowing this would allow a prediction ahead of time whether there would be adequate spawning flows and ability to negotiate the dams.

The EA describes the relationship of beaver dam notching to floodplains and willows. What we don't see are evaluations of the current status of the willow and other shrubs or trees occurring along these stream courses. Photographs would be valuable. The EA speculates about the outcome on the willows but makes no definitive statement as to the ultimate outcome for the floodplain and willow communities.

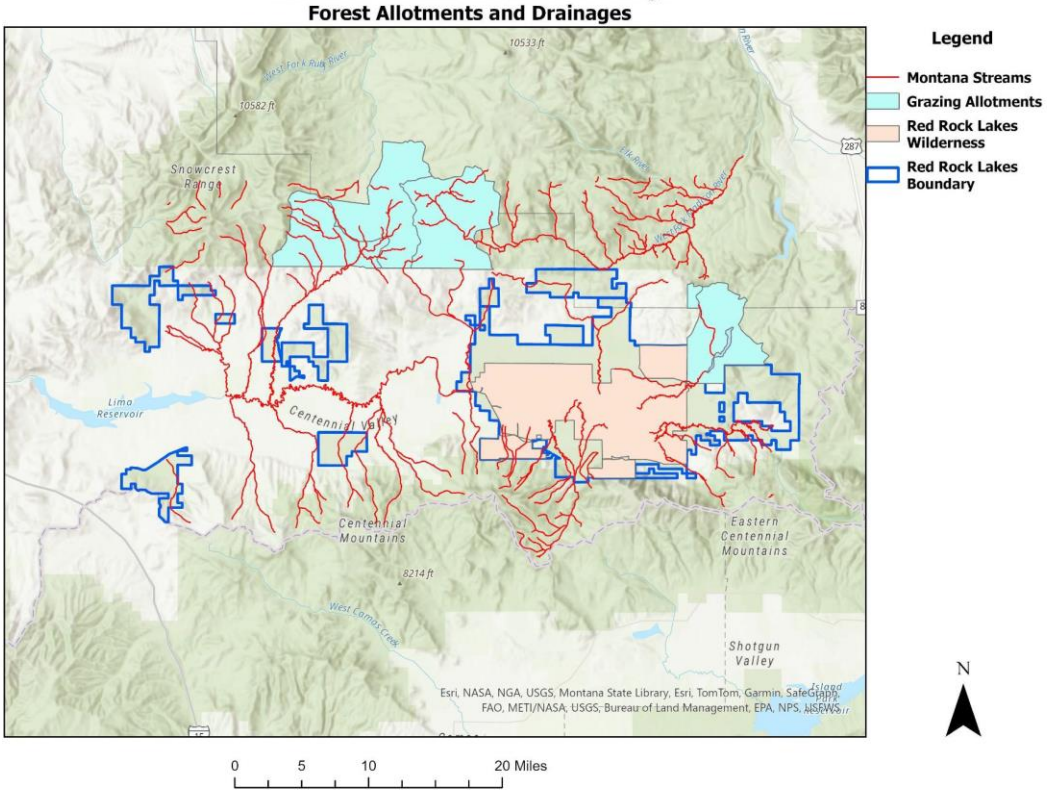
When discussing Water Resources, the EA describes notching beaver dams as helpful in the flushing of sediments during runoff. It would seem natural that runoff would help reduce sediment fines in spawning gravels, and those sediments would mostly collect behind the beaver dams. Notching the dams will allow the sediment to pass and move into the lake. This would exacerbate the filling of the lake which reduces depth and volume. This would increase the risk of winter kill. So, the Refuge is trapped between a rock and a hard place. In our view, other than getting rid of livestock in the refuge, there is little the FWS can do to perpetuate the grayling. With livestock, they are doomed. Without, they might have a chance even though upstream resorts and camping can continue to add nutrients, but naturally functioning floodplains could absorb some of that.



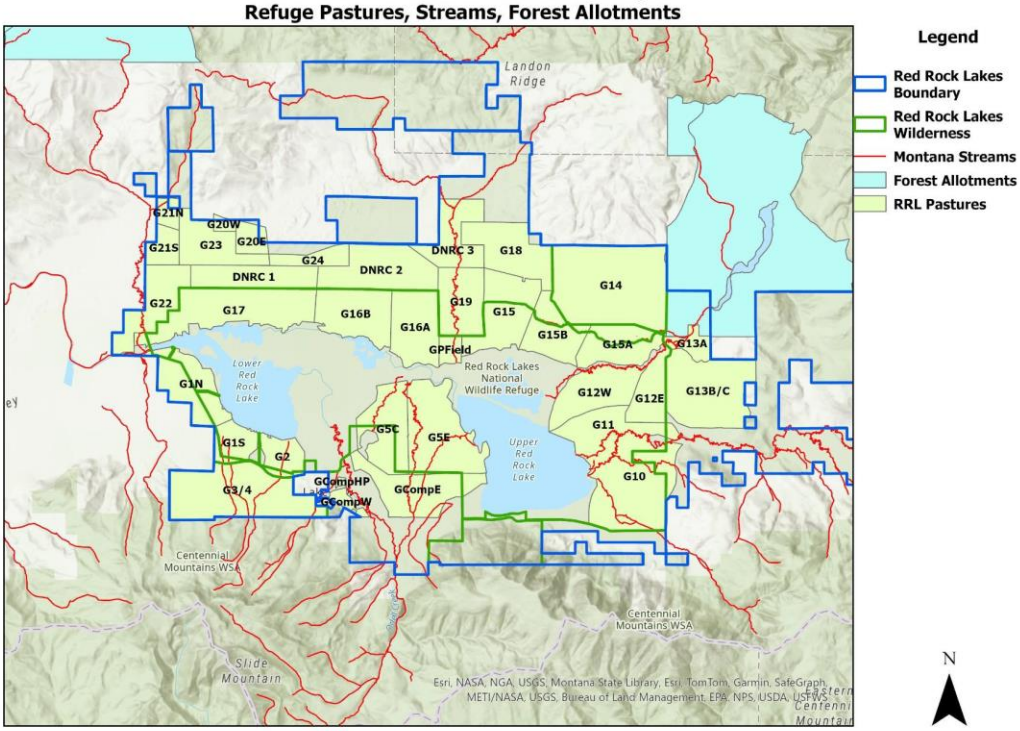
Red Rock Lakes National Wildlife Refuge
Land Status



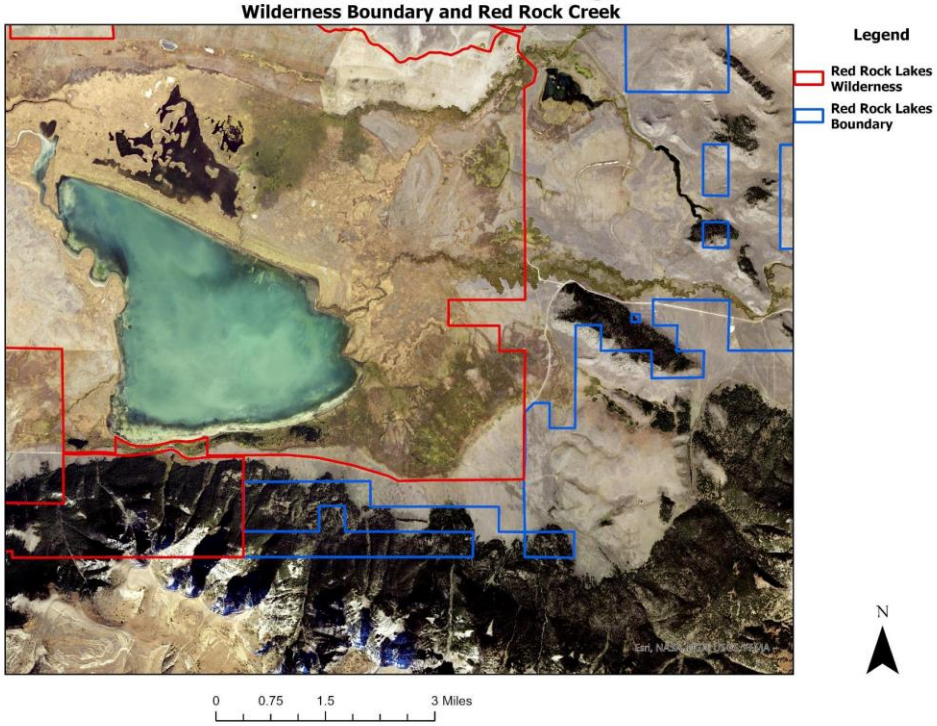
Red Rock Lakes National Wildlife Refuge
Forest Allotments and Drainages

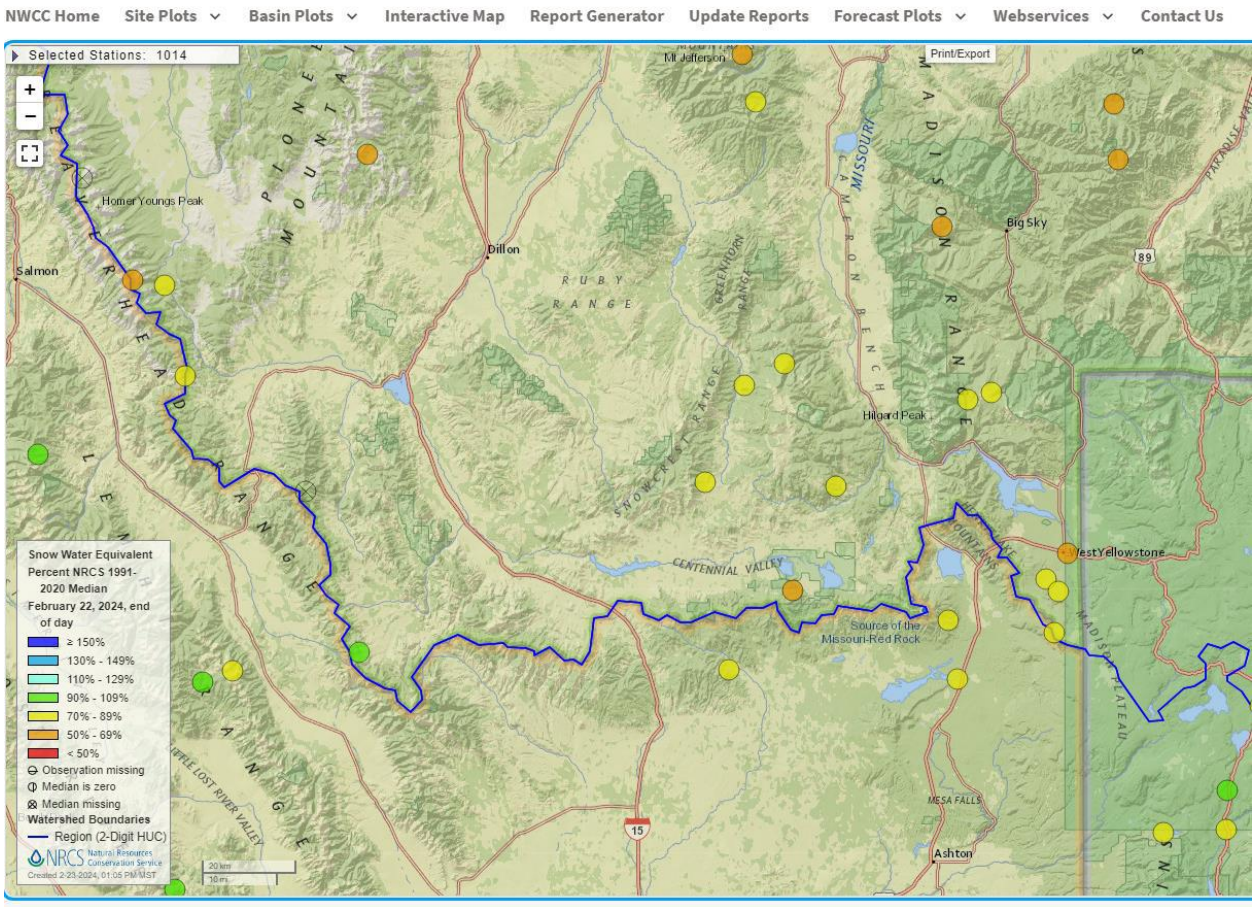


Red Rock Lakes National Wildlife Refuge
Refuge Pastures, Streams, Forest Allotments



Red Rock Lakes National Wildlife Refuge
Wilderness Boundary and Red Rock Creek





Comment 11:
Thank you for this opportunity to comment on the Red Rock Lakes National Wildlife Refuge Draft Environmental Assessment Beaver Dam Notching. These comments are submitted on behalf of Alliance for the Wild Rockies, Council on Wildlife and Fish, Yellowstone to Uintas Connection, and Native Ecosystems Council. They supplement the comments we submitted dated February 23, 2024.

The issue of beaver dam notching raised our concern regarding the state of stream or groundwater diversions affecting Red Rock Lake and its tributaries. We accessed the Montana State Water Rights GIS portal and downloaded the water rights information. The maps shown in Figures 1, 2, and 3 illustrate the HUC10 watersheds and points of diversion therein.

Figure 1 shows the points of diversion (POD) within the two HUC10 watersheds containing Red Rock Lakes NWR. There are 2,857 PODs (some active, some not). Figure 2 shows the places of use within the watersheds. Figure 3 shows the POD within 500 feet of the streams entering Upper Red Rock Lake. There are 311 of these PODs.

The point of this is to illustrate that this is a broad, area wide issue that relates to altered stream flows into Red Rock Lakes and tributaries. If you consult Table 1, which contains a subset of these

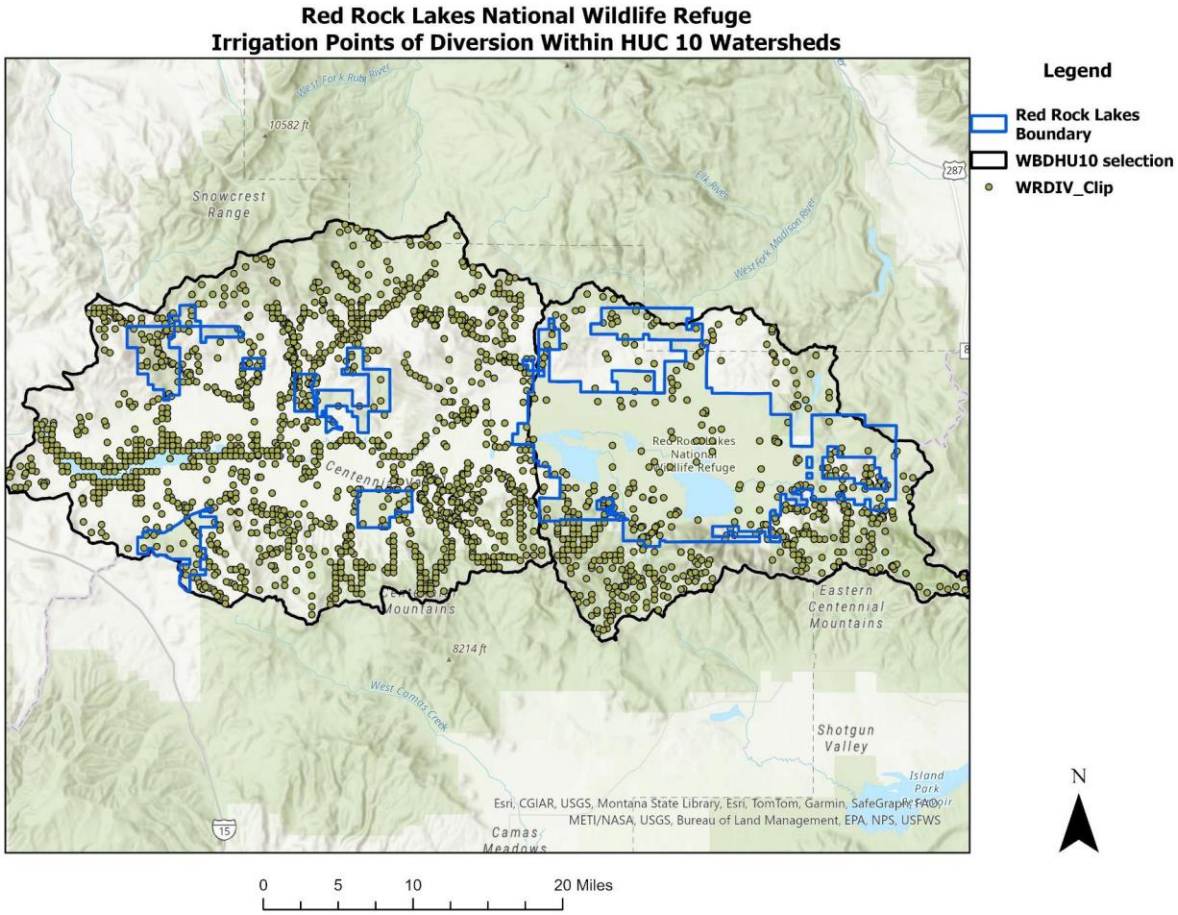
records, you will see the RRLNWR has some rights, and there is a list of ownership across public and private lands.

Before doing any additional manipulations of this system, it is advisable for the US Fish and Wildlife Service to undertake further analysis to address just how water diversions are affecting stream flows and spawning habitats within the Refuge. Many of these rights are year long or encompass most of the spawning and larval periods of the grayling.

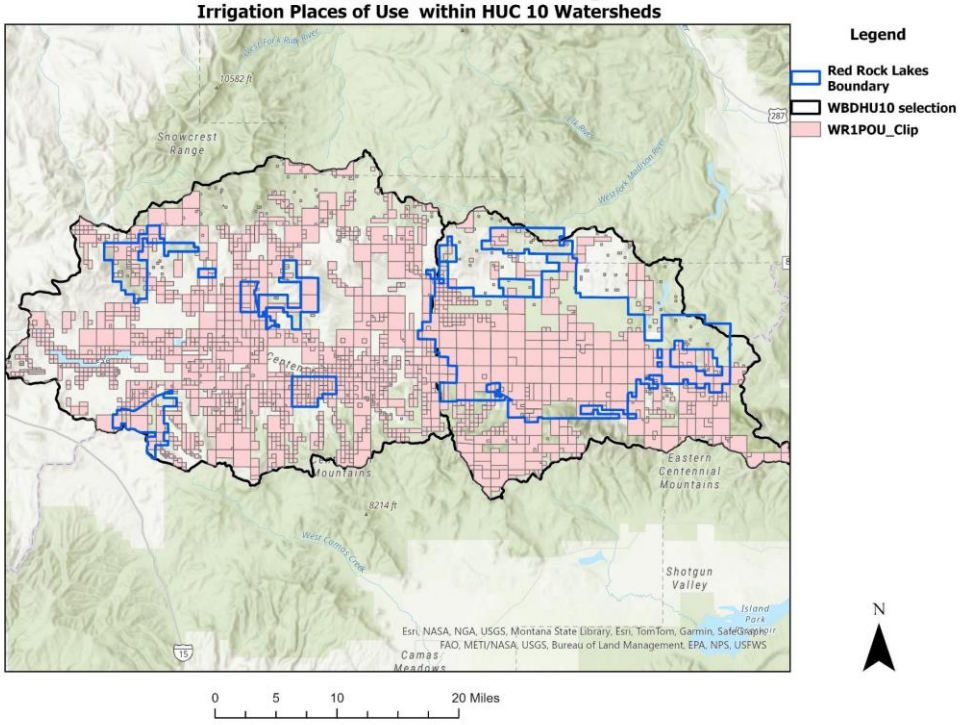
There needs to be a comprehensive review of Refuge management that should address the livestock component by documenting exactly how, where, and when livestock are allowed to graze the Refuge. This should also include an accounting of how livestock grazing has and continues to alter the ecosystem based on actual, quantitative monitoring.

In addition, a comprehensive review of water management, flows and the needs of the ecosystem must be done. What are the impacts of water diversions on stream and lake habitats. What are the impacts in conjunction with livestock grazing? How can this be ameliorated?

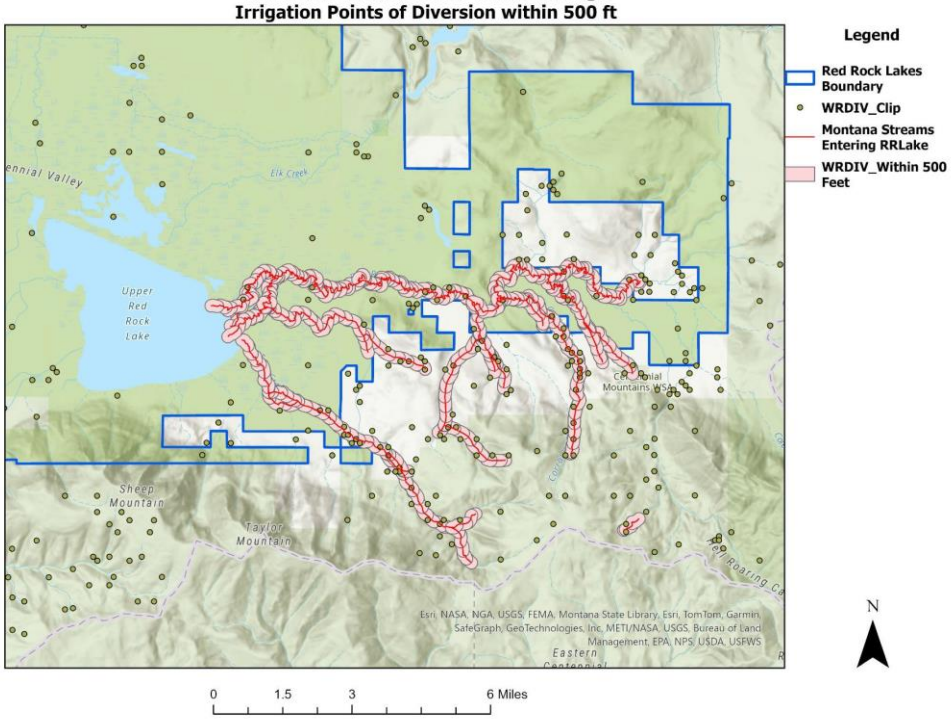
We appreciate your efforts, but much remains to be done.



Red Rock Lakes National Wildlife Refuge
Irrigation Places of Use within HUC 10 Watersheds



Red Rock Lakes National Wildlife Refuge
Irrigation Points of Diversion within 500 ft



Comment 12:
I would like to support the option of notching beaver dams to help the low population of grayling in the Red Rock Lakes area. This is a low disturbance procedure that can help the low fish numbers. The first option of using a pipe was a long-term fix, which would help year after year, and required minimum maintenance. Some have argued that fish go around beaver dams. Nothing more than common sense is needed to realize more fish will migrate upstream if the dam is notched. The beavers will repair these dams as the flow goes down, leaving the dam as it was prior to notching.

Management tools such as notching should be used since closing the public use is a poor option.

Comment 13::
I am writing on behalf of the Centennial Valley Duck Club, Inc. (a Montana corporation), to express our strong support for implementation of "Alternative B - Beaver Dam Notching on Red Rock Creek", as described in the Draft Environmental Assessment - Beaver Dam Notching- Red Rock Lakes National Wildlife Refuge, issued in January, 2024. As a member and officer of the Centennial Valley Duck Club, Inc. (CVDC), and a frequent visitor to the Refuge, I have followed the USFWS efforts to restore and protect the Refuge's Arctic gray ling population for many years. It is heartening that the Service takes its responsibility for the restoration of gray ling populations in the Centennial Valley seriously, and the CVDC fully supports this proposal. Our organization has been very concerned about the decline in the gray ling population on the Refuge, and hope that the beaver dam notching initiative proposed by the Service will result in an increase in the Refuge's Arctic gray ling population, and its sustainability. Moreover, the proposal has the advantage of being minimally disruptive of the Refuge's natural habitat and Wilderness characteristics.

Given beavers' well-known industriousness and persistence we would recommend that

"notching" become an ongoing management intervention on Red Rock Creek. It is probable that once a notch is introduced in a beaver dam, the gap will soon be "repaired" by Castor canadensis. For this management intervention to succeed, dams that are notched will have to be consistently monitored and repeated adjustments made over time.

Thank you for taking the steps proposed to restore this important species component of Montana's wildlife heritage.

Comment 14:
Regarding the above subject, we concur with the assessment that beaver dam notching is the less intrusive manner to potentially augment the arctic grayling population. In fact, if the project has no affect on the population, natural restoration on the dam will occur courtesy of the beaver. Brilliant idea.

But ,we would like the Fish and Wildlife Service to simultaneously require removing livestock grazing

from streams as well as restore tributary streams back to their natural courses and vegetation. We know the Service has fostered cooperation with adjoining land owners in promoting wildlife health in the Centennial Valley. We also support the proposed Upper Missouri Headwaters Project as it too will help preserve lands by Conservation Easements in the watershed that are important to the arctic grayling, amongst others.

The arctic grayling was the first fresh water fish I ever caught back in 1986 during a trip to Montana. It was at Kintla Lake in Glacier National Park. I returned it to the lake. I don't know if it was stocked there or naturally occurring. Nice fish nonetheless.

Comment 15:
Please accept this letter of support from the Big Hole Watershed Committee (BHWC) relating to your proposed action to notch beaver dams to encourage spawning habitat for Arctic grayling in Red Rock Creek.

Established in 1995, BHWC is a watershed group and central hub of diverse viewpoints on resource and community concerns. Over the last 28 years, we have created a culture of cooperation and collaboration in the Big Hole, recognizing that maintaining the health of the river and the survival of the Grayling is compatible with the vitality of the surrounding communities and all who live, work, and recreate here. We have been a steadfast supporter of the Arctic grayling recovery program and CCAA programs since their inception and see this proposal as connected to the overall recovery of the grayling.

Any improvement of the Grayling population at Red Rock support our efforts in the Big Hole with our fluvial populations and our goals to improve the fishery without the need for an endangered species listing. We believe the resource professionals considering this and previous restoration projects are basing their decisions on sound science and are doing their best to manage resources for the best outcome for the Grayling. It is unfortunate that others who don’t participate in resource management or collaboration consistently put up legal barriers to prevent well-meaning efforts such as this project.

Comment 16:
Please accept this letter as our public comment on the recently released draft Environmental Assessment (EA) for Beaver Dam Notching at Red Rock Lakes National Wildlife Refuge by Montana Trout Unlimited (MTU), on behalf of nearly 5,000 statewide members and friends, including local members of the Chuck Robbins, Madison-Gallatin and George Grant Chapters of Trout Unlimited. Our organization and chapters fully support improving conditions for the imperiled, endemic population of native Arctic grayling within the Red Rock Lakes National Wildlife Refuge (Refuge). In short, our organization strongly supports the proposed action of notching beaver dams to benefit Arctic grayling passage and access to spawning habitat.

The United States Fish & Wildlife Service (FWS), Montana Fish, Wildlife & Parks (FWP), and numerous partners have been working for over a decade to understand Arctic grayling population drivers. As the EA reiterates, the 2017 adaptive management plan adopted and implemented by FWS and FWP determined that "spawning habitat quality and quantity" is a "secondary driver" of grayling persistence and recovery. The proposed action of notching beaver dams has been clearly shown to allow significantly improved passage of spawning grayling to vital spawning habitat in Red Rock Creek (RRC). Whereas access to spawning and, hence, the chance for continued reproduction, genetic viability and, in fact, survival can be greatly reduced by beaver dams blocking upstream migration of these fish. During low discharge years, breaching many dams may be necessary to increase fish passage (Cutting et al, 2018). As the EA for the proposed action makes clear: "It is predicted that only 8% to 28% of grayling are able to pass the 10-20 dams that typically occur on RRC." Such low passage success "can lead to rapid demographic and genetic losses and increases likelihood of extirpation." Conversely, the EA's section on "Anticipated Impacts" of beaver dam notching provides convincing data from recent years that grayling pass notched beaver dams very successfully and, thus, have access to an order of magnitude more spawning habitat ("spawning habitat for grayling in RRC was increased from 0.38 ha to 4.04 ha following the notching of about 50 beaver dams…(and) was further increased to 6.98 ha" with subsequent notching. There is equally clear evidence that notching beaver dams reduces injury and direct mortality of adult grayling, as the migrating fish are less likely to be trapped in unmanaged beaver dams.

The negligible impacts to the Refuge and Red Rock Lakes Wilderness (Wilderness) are as clearly evidenced in the EA as are the positive benefits to grayling from beaver dam notching. Notching will be done by primitive hand tools. And because it will be done in the spring, it will mimic natural breaching of beaver dams that spring high flows can cause. While we acknowledge the ecosystem services beaver provide, the human disturbance will be short-term. When a fish population exists at such low abundance, one low spawning season can have extremely negative consequences. MTU recognizes the importance of beaver as a keystone species who promote healthy stream and wetland ecosystems. In fact, we frequently advocate for the installation of beaver dam analogs and the reestablishment of beaver populations for the benefit of native salmonids. However, with Arctic Grayling existing at critically low numbers, we believe in this situation that it is prudent to notch beaver dams to improve fish passage.

Past experience informs us that the beavers will rebuild dams within the summer season to prepare for winter. In fact, much of the restoration work we've completed across the state has directly benefited the species. Meanwhile, the proposed action would improve the prospects for grayling which are "an inherent and explicitly described part of the Wilderness and Refuge." In other words, there will be no harm to any individual beavers or beaver populations, minimal and short-term change to beaver dam habitat (which is abundant in the area and in Montana), along with vital improvement for a native and iconic species that helps define this Wilderness and Refuge.

The need for managing the Refuge and Wilderness with an emphasis on protecting and restoring the extant population of grayling is unambiguous. As the EA reminds us, considerable long-term research makes it clear that grayling have faced significant declines in abundance to historic lows,

which is now being accompanied by a severe genetic bottleneck. This genetic bottleneck will exacerbate the population decline through inbreeding depression if the historically low levels of fish remain for too many consecutive years. Providing as much opportunity for grayling to spawn is essential to preventing that bottleneck to narrow further and, hopefully to promoting population and genetic expansion. Data in the EA clearly supports the need for the proposed action.

MTU's mission is to conserve, protect, and restore Montana's world class fisheries and their watersheds. We have been a steadfast partner in many projects in the Centennial Valley, including this one, that improves Arctic grayling habitat. Like many Montanans and visitors to this state, our members prize the opportunity to pursue native fish in their native habitat. That is why MTU advocates for the restoration of Arctic grayling across their native range. This EA is an opportunity to support a significant effort for the benefit of Arctic grayling, as well as for the benefit of future generations of anglers, conservationists, and advocates for wild places that harbor wild, native fish and wildlife. The draft EA is a result of thorough data collection, modeling, and partner cooperation. It provides a scientifically-informed, legally-sound basis for one small step the Refuge and FWS can implement to meet the urgent needs of the Upper Red Rock Lake grayling population.

Comment 17:
The Ruby Valley Strategic Alliance appreciates the opportunity to comment on the draft Environmental Assessment (EA) for Beaver Dam Notching at Red Rock Lakes National Wildlife Refuge (Refuge) released in January 2024. We recognize that native Arctic grayling (grayling) are an inherent element of the wilderness character in the Refuge. Unfortunately, anthropogenic modifications to grayling habitat before Wilderness designation, locally and across their native range, have put this distinct population segment, and others, at risk. Grayling only persists in approximately 5% of their native range. Where possible, reasonable management actions should be utilized to improve habitat for grayling. In this case, we believe increasing access to spawning habitat by notching beaver dams is a reasonable management action.

The Ruby Valley Strategic Alliance (RVSA) is a diverse alliance of individuals and organizations that find common ground through shared conservation values for the greater Ruby landscape in Southwest Montana. In our landscape, working ranches and public lands are inextricably tied; we believe management decisions about both are strengthened through lasting partnerships. We value maintaining and enhancing our working lands, outdoor way of life, wilderness heritage, quiet country, and high-quality recreation experiences. The RVSA works collaboratively on a foundation of trust to respond to threats to our values, advocate for the places and way of life we cherish, and promote positive stewardship of the Ruby Valley. Before the formation of our group in 2017, a majority of our membership and member organizations, supported the reintroduction of grayling in the Ruby watershed in the 1990s, and 2000s, with a keen interest in supporting projects that ensure the long-term viability of the species across their native range.

The United States Fish & Wildlife Service (FWS), Montana Fish, Wildlife & Parks (FWP), and

numerous partners have been working for over a decade to understand grayling population drivers. As the EA states, the 2017 adaptive management plan adopted and implemented by FWS and FWP determined that “spawning habitat quality and quantity” is a “secondary driver” of grayling persistence and recovery. Recently, the RVSA publicly supported the FWS in their effort to address the “primary driver” of grayling persistence and recovery, “over winter habitat.”

The proposed action of notching beaver dams has been clearly shown to allow significantly improved passage of spawning grayling to vital spawning habitat in Red Rock Creek (RRC). Whereas access to spawning and, hence, the chance for continued reproduction, genetic viability, and survival can be greatly reduced by beaver dams blocking upstream migration of these fish. During low discharge years, breaching many dams may be necessary to increase fish passage (Cutting et al, 2018). The EA’s section on “Anticipated Impacts” of beaver dam notching provides convincing data from recent years that grayling pass notched beaver dams very successfully and, thus, have access to an order of magnitude more spawning habitat from 0.38 hectares to 4.04 hectares following the notching of about 50 beaver dams.

While we acknowledge beaver and grayling coevolved and tout the ecosystem services that beavers provide, the discrete disturbance will be short-term and is anticipated to promote grayling reproduction. Experience informs us that the beavers will rebuild dams within the summer season to prepare for winter. The negligible impacts to the Refuge and Red Rock Lakes Wilderness (Wilderness) are as clearly evidenced in the EA as are the positive benefits to grayling from beaver dam notching. Notching will be done by primitive hand tools. The process will mimic the natural breaching of beaver dams that spring high flows can cause. There is no harm anticipated to any individual beavers or beaver populations. Minimal and short-term impacts to the beaver dam habitat, along with vital improvement for a native and iconic species define this action in the Refuge Wilderness.

The need for managing the Refuge and Wilderness with an emphasis on protecting and restoring the extant population of grayling is unambiguous. As the EA reminds us, considerable long-term research makes it clear that grayling has faced significant declines in abundance to historic lows, which is now being accompanied by a severe genetic bottleneck. This genetic bottleneck will exacerbate the population decline through inbreeding depression if the historically low levels of fish remain for too many consecutive years. Providing as much opportunity for grayling to spawn is essential to preventing that bottleneck from narrowing further and, hopefully to promoting population and genetic expansion. Data in the EA supports the need for the proposed action. This is not the only effort in the basin to prevent a genetic bottleneck. RVSA member, Montana Trout Unlimited, is working on an upstream tributary to increase spawning habitat and genetic infusion.

Like many Montanans and visitors to this state, RVSA members advocate for the conservation, protection, and restoration of projects that support native fish in their native habitat. This EA is an opportunity to support a concerted effort for the benefit of Arctic grayling, as well as for the benefit of future generations of anglers, conservationists, and advocates for wild places that harbor wild, native fish and wildlife. The draft EA is a result of thorough data collection, modeling, and partner

cooperation. It provides a scientifically informed, legally sound basis for one small step the Refuge and FWS can implement to meet the urgent needs of the Upper Red Rock Lake grayling population.

Comment 18:
The Greater Yellowstone Coalition (GYC) appreciates the opportunity to provide comments on the draft Environmental Assessment (EA) for notching beaver dams to benefit Arctic grayling at the Red Rock Lakes National Wildlife Refuge (Refuge). GYC is a regional conservation organization based in Bozeman, Montana with offices in Idaho and Wyoming and over 90,000 supporters across the country. Our mission is to work with all people to protect the lands, waters, and wildlife of the Greater Yellowstone Ecosystem now and for future generations – in this specific case, our concern is ensuring the continued presence and future recovery of Arctic grayling in the upper Centennial Valley. After reviewing the draft Environmental Assessment (EA), we support moving forward with the proposed action of notching beaver dams in Upper Red Rock Creek to maximize access for adult grayling to spawning habitat.

The United States Fish and Wildlife Service (USFWS), Montana Fish, Wildlife, and Parks (FWP), and its many partners have spent considerable time and resources investigating the reason(s) for the Arctic grayling's continued population decline in the Centennial Valley. The Adaptive Management Plan (AMP) adopted in 2017 identifies spawning habitat quality and quantity as one of the drivers of grayling populations. While the majority of beaver dams typically allow for fish passage, it's recognized in the literature that cumulative passage probabilities decrease for Arctic grayling when faced with a series of consecutive beaver dams (Cutting et al., 2018). Moreover, while beaver dams do not significantly impede passage on average, just one or two dams acting as barriers can have large impacts on the passage of spawning fish. During low flow years these effects are magnified. For these reasons, we agree with the draft EA's assertion that a series of 20+ beaver dams on Upper Red Rock Creek could significantly impact how many adult fish are able to access spawning areas upstream.

GYC also recognizes, with so few spawning adult grayling present, the importance of maximizing access to spawning habitat on the Refuge. Given the historic low population of Arctic grayling that exists in this system in the past decade, management actions that increase the likelihood of maximum spawning access will be essential to avoid a genetic bottleneck and local extirpation. Notching beaver dams is a management tool that could help achieve this goal. We further appreciate that the proposed notching will be completed with hand tools and in synchrony with the typical runoff period in the Upper Red Rock Creek system. By mimicking the natural impacts and timing of spring runoff, the disturbance will be minimized and most closely reflect natural dam breaching processes. Beavers are expected to repair the notched dams, which would minimize hydrological impacts to the creek and adjacent wetlands. GYC advocates that the USFWS and FWP formally monitor dam repair activity post-breaching to confirm the extent to which these assertions are true, as the draft EA does not cite any specific monitoring or published papers regarding what percentage of dams are repaired. Without this information, it is difficult to know whether or not to agree with the EA's assertion that "no impacts to other wildlife and aquatic species are expected."

It's important to mention that, while GYC is supporting the proposed alternative in this EA, we wholeheartedly recognize and celebrate the contributions of beavers to riverscapes. The positive impacts related to habitat diversity, water storage, and floodplain reconnection are well catalogued in the literature and essential for ecosystem function at large scales. GYC is a proponent for beavers as a native species with which our other native aquatic species have co-evolved with over the millennia. We are supportive of dam notching in this unique case specifically because of the importance of maximizing spawning access for grayling.

In summary, and for the reasons mentioned above, we support the notching of beaver dams in this unique case to benefit the imperiled native population of Arctic grayling on the Refuge. Thank you for your time and consideration.

Comment 19:
American Fisheries Society, established in 1870, is the largest and oldest science-based organization of fishery professionals in the world, and the Montana Chapter (MTAFS) represents over 200 professional fisheries scientists and students from multiple state and federal agencies, universities, and the private sector across Montana. Since 1967, MTAFS has been an advocate for collection of fisheries resource information, conservation and restoration of native fishes, and protection and conservation of water and aquatic habitats in Montana. As such, we have been monitoring Arctic grayling conservation in Upper Reck Rock Lake (URRL) on the Red Rock Lakes National Wildlife Refuge (Refuge). After reviewing the draft EA for Beaver Dam Notching at Red Rocks Lake National Wildlife Refuge, we fully support proposed action of notching beaver dams for Arctic grayling passage.

Improving native salmonid passage, especially with critically low numbers of Arctic grayling in the drainage, by notching beaver dams is necessary and warranted to benefit the fishery. Implementing this effort helps enhance, secure, and protect the Arctic grayling on the Refuge, ultimately benefitting the overall population within the drainage and Montana.

MTAFS' objectives are "conservation, development, and wise utilization of the fisheries; promotion of the educational, scientific, and…exchange and dissemination of knowledge about fish, fisheries, and related subjects". Based on our objectives and the best scientific information available, MTAFS supports implementing beaver dam notching as outlined in the EA in Thank you for the opportunity to provide comments.

Comment 20:
I write in support of the U.S. Fish and Wildlife Service's (FWS) proposed action to improve Arctic grayling survivability by notching beaver dams on Red Rock Creek in Red Rock Lakes National Wildlife Refuge to improve spawning habitat.

Arctic grayling are native to the Upper Missouri River in southwestern Montana and one endemic population lives in the Centennial Valley. Estimates suggest that 80-90% of this population spawns in Red Rock Creek, but beaver dams can partially or entirely block grayling movement to this critical spawning habitat, which harms the long-term survivability of these fish. Data collected from studies under the FWS and Montana Fish, Wildlife, and Parks' collaborative 2017 Adaptive Management Plan show that notching beaver dams during the highwater season in spring will provide grayling adequate passage between Upper Red Rock Lake and Red Rock Creek for spawning.

This proposal clearly aligns with the intent of the Executive Order that established Red Rock Lake National Wildlife Refuge in 1935 as a "breeding ground for birds and other wildlife species" and with Congressional intent under the National Wildlife Refuge System Improvement Act which states that the goal of wildlife refuges is "...to administer a national network of lands and waters for the conservation, management and, where appropriate, restoration of the fish…and their habitats…". Finally a portion of the Red Rock Lakes National Wildlife Refuge was designated as Wilderness in 1976 with Arctic grayling being specifically mentioned as the reason for the designation, so action taken to improve the habitat of this species aligns with Congressional intent for its management.

Importantly the proposed action is crafted to have minimal long-term impacts on the surrounding ecosystem since beaver dam notching mimics natural breaching and complete blow outs that occur during high water flow years. The beavers are expected to repair the notches by the summer months after spawning season. Additionally, the proposal would limit beaver dam notching to years when grayling numbers in Red Rock Lakes drop below 1,000, which further minimizes the impact while ensuring that the grayling population can remain healthy.

Given the importance of this grayling population and clear Congressional intent for its management, I support the proposed action to improve its habitat.

Comment 21:
In a normal mountain snowpack year radio telemetered Red Rock Creek grayling navigated past as many as 10 dams in their 2014 upstream run. Cutting et.al (2018): Linking beaver dam affected flow dynamics to upstream passage of Arctic grayling. *Ecology and Evolution*, *8*(24),12905-17.

In that same study, grayling appear to have difficulty navigating beaver dams in 2015, a low snow pack year, as telemetered grayling did not make it as far upstream as they did the year prior. Your EA quotes Cutting et al. (2018), the former RRLNWR biologist, but focuses on the 88% chance of passage figure from that paper and omits the primary finding and purpose of that study to balance management of beaver dams for their ecological benefits while considering grayling passage during spawning migration. Study findings show that grayling navigate past beaver dams when flow dynamics are high and water comes around the dam on either side while the height of water below the dam is maximized by high flows allowing grayling to navigate around a dam, not jump it. Thus, during low flow years, beaver dam notching may be needed for certain dams until the population of grayling recover. During a normal or above snowpack years notching is not needed. Cutting et al.

(2018) provided a management framework for beaver dams during different water-years. This study was conducted and led by USFWS staff, published in a peer-reviewed journal, reviewed by State fisheries personnel, and seems the best information for when to notch dams given variation in environmental conditions during spring. The implication of this study seems appropriate given this management action is occurring within a high-bar of working in a National Wildlife Refuge and in designated Wilderness areas. Using 1,000 grayling trigger seems disconnected from science you completed.

That 1000 goal may not be attainable! I understand that it is a good number for maintaining genetic diversity. During my tenure as Refuge manager of RRLNWR 1000 was chosen when the core concern was genetic drift. We assumed projects improving habitat would help elevate the grayling population from an estimated 500 to the 1000 goal. Grayling numbers prior to the vast increase in human disturbance that started in 2010 were estimated at around 500. Now, in a nearly restored state the habitat may not support 1000. During my tenure, our partnership wanted to improve all grayling habitat in the landscape and we/you did.

Allowing all grayling access to high quality spawning habitats, thereby increasing reproductive success is a good goal, but breaching dams can release accumulated sediment downstream. Do you have data showing there are no negative impacts from sediment when beaver dams are breached on this creek? If not, I hope you will consider your bias, which is "assume there is no negative impact".

Quote from the EA: "*Because spawning typically begins in May (Mogen 1996), action must be taken in early-mid April to ensure grayling have unimpeded access to spawning habitat*". What is the impact of all the anglers you allow into Red Rock Creek during the month of April? Up until spring 2022 you allowed heavy angling up until May 15. Prior to 2013 when angling regulations were liberalized by Montana Fish Wildlife & Parks (MFWP), anglers were not allowed until May 15 for nearly 40 years. With those regulations grayling populations were around 500. High flows from mountain melt usually start around mid-May (80+ cfs). Thus, anglers had difficulty wading the stream and bank fishing is difficult due to the thick riparian corridor of willows. Prior to 2013 angling was very minimal until mid-June when flows subsided. Few anglers even fished this creek since their primary target, cutthroat hybrids, had finished their spawning run and most were back downstream to Upper Red Rock Lake by mid-June. Angler numbers mushroomed when MFWP liberalized angling in Red Rock Creek in 2013. Angling is still very high, especially in the last half of April.

Quote from EA: "*The current estimate of 188 grayling is significantly lower than the CV population goal of 1,000 fish (Montana Arctic Grayling Workgroup 2022)*".

To reach 1000 fish, The Montana Arctic Grayling Workgroup pushed human disturbance upon this landscape. Grayling are lower, not higher, given all your work. By 2013 grayling were subjected to a weir, traps, electrofishing and heavy angling during their April/May spawning run.

Long quote/story from the EA: *"In 2017, the Service and Montana Fish, Wildlife & Parks (MFWP) agreed to collaborate on an adaptive management plan (AMP) to better understand population drivers and identify management actions for improving grayling population (USFWS and MFWP 2017). The purpose of the AMP was to embrace existing uncertainty regarding drivers of the CV grayling population, provide further understanding of important limiting factors, and help guide*

management actions toward those that would have the most direct benefit to grayling (USFWS and MFWP 2017). Guided by the AMP, a series of management experiments were undertaken to test three competing hypotheses of grayling population declines (USFWS and MFWP 2017):

1. *Quality and quantity of spawning habitat*
2. *Predation by, and competition with, adult non-native Yellowstone cutthroat trout*
3. *Quality and quantity of overwinter habitat in URRL*

A mathematical model was created for each hypothesized driver of grayling population, resulting in three competing models that are used to annually predict grayling abundance in response to 1) amount of spawning habitat, 2) abundance of Yellowstone cutthroat trout, and 3) area of suitable winter habitat. Hypotheses 1 and 2 were further tested using active management and gauging system response (USFWS and MFWP 2017). Modeling indicated lack of dissolved oxygen during winter is the largest limiting factor, with spawning habitat quality and quantity being a secondary driver".

Missing from this quote/story is that the Refuge was not going to sign this AMP document unless liberal angling in April/May was ended. I suggested the Refuge could close to angling and portions of the stream off Refuge could stay open to liberal angling. A weeks-long stalemate occurred that resulted in MFWP and the Refuge negotiating a compromise. Angling for hybrid cutthroats would be catch and release for the entire stream. The Refuge hoped this more conservative regulation would drastically reduce angling pressure in April/May. It did not. In 2022 MFWP unilaterally moved the closure from May 15 to May 1. They must be a bit worried about the angler disturbance to have made that change. I think you/they should close angling April 1. Radio telemetry, Cutting 2018 et.al. showed grayling entered Red Rock Creek the last 10 days of April in both 2014 and 2015.

As an aside, non-native rainbow trout spawning is regularly protected by MFWP regulations closing spring angling in other Montana streams. Why do you/they ignore the potential negative impacts of angling to grayling in April?

Angler boots in the stream in April can cause siltation of spawning gravels yet liberal April angling since 2013 continues. Authors of the AMP refuse to add human disturbance to the AMP as a 4th hypothesis. That hypothesis is "the grayling decline is driven by a recent, but vast increase in anglers & human disturbance". The increase from 73 grayling in 2022 to 188 in 2023 after a very tough winter indicates the AMP model for winter O2 did not align well with reality. Maybe 73 to 188 was because anglers were not able to access the stream in spring of 2022 or 2023, effectively protecting two spawning runs. Is this reality?

In summary, I support beaver dam notching in low snowpack years. However, I hope you will consider leaving the fish alone for a few years (no angling, electrofishing, trapping or weir) and then count them in 2026. They may recover on their own. Significant habitat restoration has been completed; we know competition from cutthroat hybrids is not driving grayling populations.