U.S. Department of the Interior and Montana Fish Wildlife and Parks

Environmental Assessment

Arctic Grayling Conservation

Red Rock Lakes National Wildlife Refuge

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Executive Summary

This Environmental Assessment (EA) has been prepared jointly by the United States Department of the Interior's (DOI) U.S. Fish and Wildlife Service (Service or USFWS), and Montana Fish, Wildlife & Parks (MFWP) to evaluate the effects associated with the proposed action. The 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 DOI (43 CFR Part 46; 516 DM 8) and Service (550 FW 3) regulations and policies, and the Montana Environmental Policy Act (MEPA) (75-1-101, et. seq, Montana Code Annotated (MCA) and its implementing rules (ARM 12.2.429, et. seq)). NEPA and MEPA require an examination of the effects of proposed actions on the natural and human environment. Appendix A identifies applicable laws, regulations, and executive orders not 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, located in the UMR, contains one of four remaining populations of Arctic grayling in the contiguous United States still exhibiting the full spectrum of life history behaviors present in historical grayling population (USFWS 2020). The primary winter habitat for grayling within the Centennial Valley is in Upper Red Rock Lake (hereafter Upper Lake or URRL) within Red Rock Lakes National Wildlife Refuge (RRLNWR or Refuge). High winter mortality of grayling within Upper Lake during periods of hypoxia (low dissolved oxygen) has been identified as the primary limiting factor for grayling in the Centennial Valley (Warren et al. 2022).

The proposed action is to improve over-winter habitat for grayling in Upper Lake that will ensure long-term, self-sustaining persistence of UMR grayling in accordance with the 2022 Arctic Grayling Conservation Strategy (Montana Arctic Grayling Workgroup 2022). The proposed action would increase dissolved oxygen levels in deeper portions of Upper Lake where grayling over-winter, improve grayling winter survival and maintain existing grayling genetic variability. This would involve creating enough suitable winter habitat to support a grayling population greater than 400 breeding-age individuals. Suitable winter habitat is defined as water greater than or equal to 1 meter (m) in depth below the ice and with greater than or equal to 4 parts per million of dissolved oxygen (USFWS and MFWP 2017).

To accomplish the proposed action, the Service partnered with MFWP, Montana Trout Unlimited and the U.S. Geological Service to develop and analyze multiple alternatives. The Service used that information to make a final decision.

Background

RRLNWR is situated within a mosaic of State, federal, and private lands in the Centennial Valley in southwestern Montana. The Refuge was established pursuant to Executive Order 7023 in 1935 as a "refuge and breeding ground for wild birds and animals". The Refuge covers over 53,000 acres, of which 32,350 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 RRLNWR. Upper Lake falls entirely within 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 (Gangloff 1996).

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"

MFWP's mission is to steward the fish, wildlife, parks, and recreational resources for the public, now and into the future. Montana Code Annotated (MCA) 87-1-201 gives MFWP management responsibility and authority for Arctic grayling within the state of Montana. Montana state law provides MFWP with the authority for implementation of fish management and restoration projects (MCA § 87-1-702; § 87-1-201[9][a]). In addition, Montana state law authorizes MFWP to manage wildlife, fish, game, and nongame animals to prevent the need for listing under the Endangered Species Act or ESA, and listed, sensitive, or species that are candidates for listing under the ESA must be managed in a manner that assists in the maintenance or recovery of the species (MCA§ 87-5-107).

The 2009 Comprehensive Conservation Plan (CCP) for RRLNWR 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.

In addition to the Refuge goals identified in the CCP, RRLNWR must consider other project-specific objectives when making a management decision for a Refuge resource. Finding an optimal management policy to best meet the full set of competing objectives of RRLNWR, with input from collaborators and stakeholders across the Centennial Valley and USFWS Refuge system, requires a deliberative and transparent process. To help inform their decision, USFWS worked with the U.S. Geological Survey (USGS) to utilize a process of structured decision making (SDM) to identify objectives and produce a set of alternatives based on those objectives. SDM is an approach for careful and organized analysis of natural resource management decisions (USGS 2022). Decisions are made based on clearly articulated fundamental objectives, recognizing the role of scientific predictions in decisions, dealing explicitly with uncertainty, and responding transparently to societal values in decision making (USGS 2022). The objectives produced from the SDM process are as follows:

- Improve the abundance, persistence, and sustainability of the Centennial Valley (CV) grayling population
- Minimizing negative effects on wilderness
- Maximize achievement of stakeholder goals
- Minimize negative impacts to other Refuge species
- Minimize negative impacts on watershed function
- Minimize negative impacts to surrounding Refuge areas
- Meet all Refuge mandates and goals
- Reduce project costs.

From January to April 2023, a temporary pilot project to test the effectiveness of Alternative B2 (Diffuser aeration) was conducted on Upper Red Rock Lake. Several documents and analyses were prepared to satisfy the requirements of federal law for this activity. These included: a Record of Categorical Exclusion (NEPA), Environmental Action Statement (NEPA), Minimum Requirements Analysis (Wilderness Act), Section 7 consultation (ESA), and Section 106 cultural resources consultation (National Historic Preservation Act).

Purpose and Need for the Proposed Action

The purpose of the proposed action is to enhance winter habitat for Arctic grayling within Upper Red Rock Lake (URRL) on the Refuge. The intent is to increase overwinter survival of grayling in Upper Lake, which has been identified as a limiting factor for the population. It is imperative to take immediate action to mitigate winter habitat in Upper Lake for grayling to prevent further loss of genetic diversity and reduce the risk of extirpation due to the critically low population. The MFWP's decision to implement any alternative is subject to MEPA (Montana EPA, 75-1-101, Montana Codes Annotated, et seq, and the Administrative Rules of Montana (ARM) 12.2.429, et. seq).

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 once widespread throughout the UMR drainage, and isolated as a relict population after the retreat of Pleistocene glaciation.

UMR grayling currently persist in 19 populations; however, the grayling population in the Centennial Valley (CV) is one of four populations in the UMR that exhibit the full spectrum of life history behaviors and has high genetic diversity, thus this population has high conservation value (USFWS 2020). Most of the CV grayling population spawns in URRL tributaries and migrates into and occupies URRL for the winter. The grayling population in URRL is a discrete genetic group even among native Montana grayling populations (Peterson & Ardren 2009) and are considered vital to long-term conservation of Arctic grayling genetic diversity in Montana (USFWS 2020, Montana Arctic Grayling Workgroup 2022). Consequently, the habitat in URRL 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).

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. Because only four populations of UMR grayling that still exhibit the full spectrum of life history behaviors currently remain (Big Hole, Centennial, Ruby River, Madison River), all actions necessary to conserve the CV population must be taken.

The need for the proposed action is a lack of suitable over-winter habitat that has been identified as the primary factor which led to the population decline of Arctic grayling in the Centennial Valley and threatens its future persistence (Warren et al. 2022, Kovach et al. 2021). The proposed action will improve the amount of deep, well oxygenated under-ice habitat in Upper Lake for wintering grayling. 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). The CV grayling population has experienced these same declines and now occur mostly in Red Rock Creek and URRL. The current (2022) estimated spawning population of 73 individuals (95% CI = 31-209) (Warren et al. 2022) is an all-time low. Metrics of genetic diversity have similarly declined to historic lows, demonstrating the population is experiencing an increasingly severe genetic

bottleneck. The recovery goal of maintaining the population of 1,000 or more spawning adults will become increasingly difficult to achieve if population abundance is not restored quickly.

The current decline of the CV grayling population is likely driven by multiple contributing factors, and many hypotheses have been posited. Despite previous and ongoing research, scientific uncertainty around the competing 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 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 the 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). Extensive and intensive active management included targeted removals of non-native hybrid Yellowstone cutthroat trout, efforts to remove instream obstructions to spawning grayling, improve instream flow, habitat, and riparian health, and increase spawning and rearing habitat (USFWS and MFWP 2017, USFWS 2018). The CV grayling population remained critically low despite all these efforts.

Winter habitat as the primary limiting factor for the CV grayling population is the most supported hypothesis. The Winter Habitat model has predicted grayling population fluctuations more consistently than the other models since the implementation of the Adaptive Management Plan, including a 5-fold decline in grayling spawning abundance in 2016 due to limited winter habitat (USFWS and MFWP 2016). Upper Lake is a shallow (typically <2 m) eutrophic lake that provides the primary winter habitat for grayling in the CV. Eutrophic lakes are rich in organic and mineral nutrients and can support abundant plant life. During winter, much of the plant matter produced the preceding growing season decomposes, a process that consumes oxygen, which in addition to aerobic decomposition of other organize matter in sediments leads to a dissolved oxygen deficit in the waterbody during the winter months. Ice cover exacerbates the plant and sediment oxygen demand by creating an impermeable layer between the atmosphere and the lake, effectively ending re-oxygenation of the lake by diffusion and aeration. URRL is commonly covered by ice for between four and seven months of the year (Cutting et al. 2018; Davis et al. 2019; Flynn et al. 2022). Oxygen losses can be somewhat offset by photosynthesis of algae and submerged vegetation if light is available to support this process. However, snow cover on the ice can effectively eliminate light penetration. Mean snow depth on URRL during late February was 16.7 cm (range = 3–26) and ice thickness was 48 cm (range = 39–61).

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). Multiple instances of human intervention through damming, irrigating, or diverting waterways have exacerbated the lack of connectivity between the CV grayling and other populations in UMR. The construction of a water control structure on Lower Red Rock Lake (Lower Lake) and Lima Dam have precluded the natural movements of grayling. Lima Dam, located downstream of Upper and Lower Red Rock Lakes, was constructed on the Red Rock River in 1893, washed out, and reconstructed in 1910. The Lima Dam cut off upstream access to the Centennial Valley for migratory grayling in the Red Rock and Beaverhead rivers, which likely reduced numbers of spawning grayling in the Centennial Valley. Extensive irrigation occurred from most tributary streams by the early 1900s and complete dewatering of streams for irrigation, especially during periods of drought, likely had a large influence on distribution, abundance, and life history strategies of grayling through time (Deeds and White 1926, Vincent 1962, Randall 1978). Elk Springs Creek, formerly one of the best spawning areas for grayling, was rerouted into Swan Lake by waterfowl hunters in 1908 and impounded by McDonald Pond in 1952. The pond's construction inundated critical headwater spawning habitat and rerouting the stream near URRL blocked access for migratory grayling in Elk Springs Creek, which eliminated that spawning population. The pond and dike were removed in 2009, and stream restoration effort on Elk Springs Creek began in 2016. In addition to the obstructed waterways, the CV has become significantly warmer and drier in the last 75 years (USFWS 2009), which may be worsening winter conditions for grayling through less surface and groundwater inputs to URRL and greater water loss through evapotranspiration. Between 2015 and 2016, the spawning population of grayling experienced a four-fold decline, from 1,100 to less than 300 individuals, with hypoxia (oxygen deficiency) under the ice being the primary causative factor (USFWS 2018).

Based on the AMP, all actions that were supported by experimental findings have been ongoing except for the hypothesis with the most support. Overwintering habitat in URRL has been shown to be limiting to the grayling and managing agencies have identified the need for management actions in URRL to prevent the further decline of grayling. Based on an examination of empirical data, between 10 and 25 hectares (ha) with over 4 ppm of dissolved oxygen and depth over 1 meter (m) below the ice-water interface has been proposed as an interim management target (Davis 2016, Warren et al. 2022).

Montana Environmental Policy Act Process

This document also satisfies MFWP's requirements under MEPA. Any predecisional material contained within this section is to satisfy MEPA and should not be considered pre-decisional under the NEPA process.

MEPA also requires the consideration of the following criteria in addition to those required by NEPA for determining the significance of impacts on the human environment:

a) the severity, duration, geographic extent, and frequency of occurrence of the impact
b) the probability that the impact will occur if the proposed action occurs; or conversely, reasonable assurance in keeping with the potential severity of an impact that the impact will not occur
c) growth-inducing or growth-inhibiting aspects of the impact, including the relationship or contribution of the impact to cumulative impacts
d) the quantity and quality of each environmental resource or value that would be affected, including the uniqueness and fragility of those resources or values

e) the importance to the State and to society of each environmental resource or value that would be affected
f) any precedent that would be set as a result of an impact of the proposed action that would commit the department to future actions with significant impacts or a decision in principle about such future actions
g) potential conflict with local, State, or federal laws, requirements, or formal plans

The significance criteria for each of the 10 environmental parameters are evaluated and addressed in the impacts analysis of the EA. Based on this significance determination, MFWP has concluded there are no significant negative impacts from any of the alternatives. Additionally, MFWP has concluded that no additional mitigation or stipulations other than those described in the EA are required to keep the negative impacts below the level of significance. The MFWP has determined that there are no secondary impacts to the physical or human environment from the proposed action or alternatives and that there are no impacts that require mitigation.

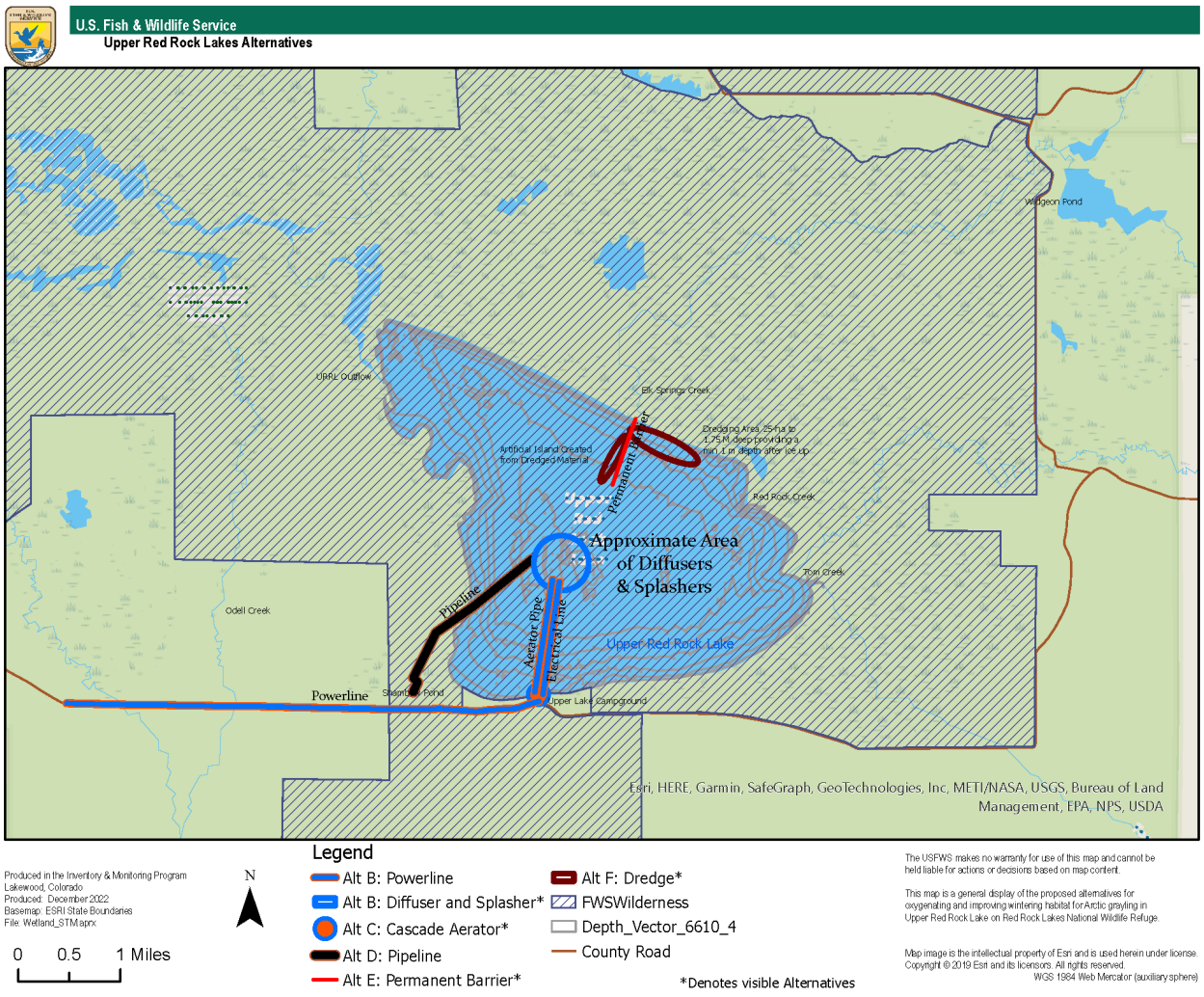
In its determination to use an EA or an Environmental Impacts Statement (EIS), MEPA requires MFWP to consider whether the proposed action or alternatives require regulatory restrictions on private property. None of the alternatives described in this EA would regulate the use of private tangible personal property or real property under a regulatory statute or result in the taking or damaging implications to private property. None of the anticipated impacts to the physical and human environment have been determined to have significant adverse effects.

After public review, the Service determined no additional environmental analysis is required pursuant to NEPA and has prepared a FONSI pursuant to the Council on Environmental Quality regulations and applicable guidance. The MEPA requires that an EA include "a finding on the need for an EA and, if appropriate, an explanation of the reasons for preparing the EA. If an EIS is not required, the EA must describe the reasons the EA is an appropriate level of analysis" (Administrative Rules of Montana 12.2.432(3)(j)). Therefore, for the reasons mentioned above, MFWP concludes that an EIS is not required for analysis of the proposed action under MEPA and, further, a sufficient level of analysis is provided by this EA.

Alternatives

Descriptions of Alternatives B, D, and F were taken from the Preliminary Engineering and Feasibility Analysis to Improve Winter Habitat for Arctic grayling conducted and published by CDM Smith in June 2019 (CDM Smith, 2019) with some alternations.

Fig 1. Map of approximate alternative placement in Red Rock Lake NWR



Alternative A – No Action Alternative

Under Alternative A (the No Action Alternative), the current management strategies, including water releases from Widgeon Pond into URRL, beaver dam notching, and seasonal fishing closures, would continue.

Widgeon Pond is a man-made wetland outside of designated Wilderness on the Refuge. Water releases from Widgeon Pond provide oxygenated water to areas of URRL where grayling overwinter. The rationale of these releases is that oxygenated water released into the lake during winter when dissolved oxygen becomes depleted assumes improvement of conditions during a transient period for the grayling population wintering in the lake. Unlike alternatives B through F, there are no known empirical or modeled benefits of this action that provide habitat for the duration of the winter. During winters 2020-2021 and 2021-2022, Widgeon Pond releases were implemented and monitored. Widgeon Pond has a water control structure that allows regulation of water levels by the addition or subtraction of stop logs. This activity is routinely used to manage water levels on national wildlife refuges. When Widgeon Pond is full and stop logs are removed, water plunges several feet out of the water control structure and into Picnic Creek. The plunging

action oxygenates the water. At the mouth of Picnic Creek, the water joins Elk Springs Creek and flows under the ice and into URRL at the mouth of Elk Springs Creek. Elk Springs Creek is spring-fed, and its flow remains relatively strong even during winter. Further testing in winter 2022-2023 will be focused on releasing water earlier in the winter and in two separate releases approximately 4 weeks apart.

Under the No Action Alternative, the Service would continue current grayling management actions, including notching of beaver dams each spring prior to grayling spawning. The CV grayling population is adfluvial (i.e., fish spend non-breeding portions of each year in Upper Lake and migrate up tributary streams each spring to spawn). Beaver dams can be an impassable barrier to grayling, preventing them from reaching suitable spawning habitat. Notching removes a portion of existing beaver dams to ensure grayling have access to upstream spawning areas. Typically, about 1/3 of the width of a beaver dam is removed using hand tools in late April before grayling begin their spawning run.

The handling of fish or trampling of eggs during angling activities can cause stress and may affect spawning and survival. In response to the grayling population decline MTFWP established an angling closure on Red Rock Creek from May 1 to June 15, and Elk Springs Creek from May 15 to June 15. This is intended to protect Arctic grayling from disturbance during spawning. In addition, MTFWP restricts angling during times of high-water temperature and low flow to further reduce stress on grayling. Both creeks currently support grayling spawning.

Alternative B – Electric Powered Splashers or Diffusers

Alternative B would implement the use of electric powered splashers or diffusers to increase oxygen levels in URRL and improve winter habitat for grayling. Existing systems have been successfully installed in Montana (Montana Fish and Game, 1964) and elsewhere across the county (CDM Smith, 2019). Due to its remote location and wilderness designation, URRL does not have electrical power. Alternative B would require the installation of a reliable power source for continuous operation of reoxygenating equipment. The nearest electric utility connection is 3.31 miles to the west near the town of Lakeview along the road alignment at the intersection of South Valley Road and a private road that serves a residence in Odell Creek. The proposed direct-bury underground alignment would follow the right-of-way on South Valley Road through the existing Wilderness to the non-Wilderness campground on the south shore of the lake. The electrical power cable would also be buried from the electric utility connection in the Upper Lake Campground to the shore of URRL, a distance of approximately 1,220 meters. A vibratory plow would be used to install the electrical conduit. In coordination with the local electric provider, this has been deemed feasible and reasonably achievable.

Alternative B1 – Splashers: A splasher is a type of mechanical aerator that floats on the surface of the water. Splashers continuously circulate and splash surface water to increase the level of oxygen in the surrounding water and create an area of open water in the ice (herein polynya) where additional oxygen transfer can occur from the atmosphere. High-powered electric surface aerators (splashers) cannot be located far offshore given submersible electric cable length limitations (Ashley & Nordin, 1999). Four splashers would be used to aerate URRL and would run approximately from ice over to ice off. A single dedicated submersible electrical wire would be required per electric splasher and would remain in the lake year-round with the splashers to aerate the 25-hectare minimum area goal. The wire would be buried underground on land and some distance out into the lake. We assumed that the total distance of wire from the campground to the

deployment site to be 1,220 meters for each splasher, and that the area affected by the physical infrastructure to be three cubic meters per splasher when in operation.

Alternative B2 – Diffusers: Another electric-powered option is a diffuser aeration system. A diffuser aeration system would include: 1) an array of diffusers at the bottom of the lake, 2) air compressors at Upper Lake Campground, and 3) a submerged weighted hose connecting the air compressor to the diffuser. Each of 16 diffusers (4 diffusers per compressor) would create multiple columns of fine bubbles that cause a buoyant plume of warmer water near the lakebed to rise and melt the ice (creating a polynya), thus allowing atmospheric oxygen transfer with the surrounding water. There is limited oxygen exchange/mass transfer from the bubbles due to their short contact time. Like the splashers, the hose would be buried underground on land and some distance out into the lake. We assumed that the total distance of weighted hose from the campground to the deployment site to be 1,220 meters, and that the area affected by the physical infrastructure to be 1.5 m^3 per diffuser when in operation. Tubing and diffusers would be left year-round. A permanent structure may be built to house the compressors, or, alternatively, compressors could be mounted on a mobile trailer and moved on or off site.

Section 404: A Nationwide Permit (NWP) 18: Minor Discharges would need to be acquired to cover this alternative under Section 404 of the Clean Water Act. NWP 18 limits discharges to less than 10 cubic yards. No notification of the Army Corps of Engineers would be required provided there are no wetland impacts, no impacts to threated or endangered species, and no cultural resource concerns. Furthermore, no wetland delineation would be required.

Alternative C – Electric Generators with Pumped Aeration

Alternative C would use an electrical pump connected to high-density polyethylene (HDPE) pipeline to extract deoxygenated water from URRL and transfer that water to a land-based aerator (cascade or venturi technology) located in the RRLNWR campground. The aerator re-oxygenates the water which is then pumped back into URRL to a separate location, increasing the oxygen content of water in URRL. The aerator and electrical centrifugal pumps would be installed in the campground and 1500 meters of permanent 0.20 m diameter (8-inch, estimated) HDPE withdrawal and return lines would be installed (within a trench) from the cascade aerator to URRL. Like Alternative B, Alternative C would require the installation of a reliable power source for continuous operation of aeration equipment.

Section 404: A Nationwide Permit 18: Minor Discharges would need to be acquired to cover this alternative under Section 404 of the Clean Water Act. NWP 18 limits discharges to less than 10 cubic yards. No notification of the Army Corps of Engineers would be required provided there are no wetland impacts, no impacts to threated or endangered species, and no cultural resource concerns. Furthermore, no wetland delineation would be required.

Alternative D – Shambow Pond Diversion Pipeline

Alternative D would use a buried, gravity flow diversion pipeline to deliver oxygenated water to URRL during winter months to improve conditions for grayling. The Shambow Pond Diversion Pipeline would convey water from East Shambow Creek and Shambow Pond to the center of URRL. Based on stream monitoring during 2021, winter flow available for this alternative is on the order of 2 cubic feet per second (cfs). Shambow Pond is a created and actively managed wetland feature located southwest of URRL in RRLNWR and serves as a suitable diversion point for the proposed pipeline.

An engineered subsurface screened intake and gate structure is recommended at the pond outlet for conveying pond water to the lake through a high-density polyethylene (HDPE) pipeline. Gating would allow the pipeline to be closed when not in use (e.g., late spring, summer, and early fall) so that flow can be returned to the natural channel. The end of the pipeline would contain two lateral lines of perforated PVC or, alternatively, diffuser ports for distribution of tributary water.

The pipeline would be 5,300 ft in total length, with 3,300 ft on land and the remaining 2,000 ft in URRL. Based on an assumed target flow of 0.057 m^3/s (2 ft^3/s) out of Shambow Pond, the engineering design indicates 1,676 meters of 0.36 m diameter (14-inch) HDPE pipeline would be required along with appurtenant intake, regulation, and aeration vault structures (Siddoway et al. 2021). Visible infrastructure will include a vault (20in x 6in x 16in) on the north side of the lake to control flow, some minor infrastructure (below 8in in height) near Shambow Pond, and multiple cleanouts along the pipeline. All would be at ground level and placed in such a way that natural topography would reduce the visibility of any structures.

Section 404: This alternative would be permitted under Section 404 using Nationwide Permit 12: Utility Line Activities. A pre-construction notification would be required because the pipeline exceeds 500 feet. Wetland impacts may be considered temporary and self-mitigating by the Army Corps of Engineers by following these mitigation measures:

- The amount of wetland loss does not exceed 0.10 acres
- Topsoil and vegetation would be salvaged and reinstalled following installation
- Other excavated material would be stockpiled separately in a temporary windrow along the pipeline alignment
- Any excess material would be hauled and reclaimed in a suitable upland area
- The ground surface would be restored to pre-construction elevations and reclaimed with native seed
- Pipe bedding materials would be minimized, and seepage collars or clay plugs would be installed periodically to reduce transmission of groundwater along the pipeline.

Alternative E – Permanent Barrier from Elk Springs Creek to the Lake Center

If Alternative E were implemented, the Refuge would construct a wall of steel sheet piling or similar material to be left in URRL year-round. The impermeable wall would need to be approximately 1,000 meters to direct the dominant flow of oxygenated water from Elk Springs Creek into the center of the lake. The sheet piling would be installed by launching a mobile barge onto URRL and using pile driving equipment (e.g., a vibratory hammer) to drive the sheet piling 3-4 meters into the substrate until stable. The construction would take approximately 1 to 2 months depending on whether single or multiple walls were constructed.

To launch the mobile barge, the boat launch at the campground on the southern shore of URRL would be used for site access. This boat launch is outside of designated Wilderness. The launch is primitive and may have to be reinforced or widened and deepened to deploy the barge.

Section 404: A Nationwide Permit 27: Aquatic Habitat Restoration, Establishment, and Enhancement Activities would need to be acquired to cover this alternative under Section 404 of the Clean Water Act. NWP 27 allows the installation, removal, and maintenance of small water control structures, dikes, and berms, as well as the installation of structures or fills necessary to

restore or enhance wetland or stream hydrology. Both a pre-construction notification and wetland delineation would be required.

Alternative F – Dredge and Berm Elk Springs Creek

Alternative F would use a shallow floating dredge to remove sediments near the mouth of Elk Springs Creek. Dredging would cover 62 acres (25 ha) with removal of up to 1m of sediment (plus sediment storage), tying into existing bathymetry. To launch the floating dredge the boat launch at the campground on the southern shore of URRL would be used. This boat launch is outside of designated Wilderness and the same improvements discussed in Alternative E would be required. Mechanical or hydraulic dredging requires staging and operating construction equipment in the Wilderness area, as well as development of temporary construction access, hauling roads, staging areas, and dredged material drying pads.

Considering ice-cover conditions and sedimentation, the Elk Springs Creek inflow would be dredged to a depth of 1.25 m (4.1ft) noting the total dredged volume needs to be defined through an engineering design. Alternative F would consider the construction of an earthen berm using the dredge cuttings and large geotextile bags, scaled at a size equivalent to the cut volume, which would require additional in-water construction measures and fill material to ensure berm stability. To prevent impacts to other locations in the lake, floating silt and turbidity curtains (effective only in certain parts of the United States, under certain soil conditions) or temporary dikes may be required during placement activities. The generation of turbidity by hydraulic dredge type has already been characterized by the U.S. Army Corps of Engineers and impacts are expected.

With preliminary volume estimates, this project is expected to take about 12 – 14 months of continuous activity with multiple dredges. To avoid disturbing birds during nest season and the early onset of ice cover on URRL, a 4-month dredging window is assumed for each year. In total, the duration of the dredging operation would be expected to last 3 years. Dredging may need to occur repeatedly over time to maintain depths of >1m due to sedimentation and resuspension of in-lake sediments. Based on monitoring with sediment traps, dredging is not expected to be a long-term solution and dredged areas will likely fill in with sediment.

Section 404: Due to the size and the magnitude of Alternative F, the Army Corps of Engineers Montana office recommended an individual permit in accordance with Section 404 of the Clean Water Act. One option for permitting is a Nationwide Permit 27: Aquatic Habitat Restoration, Establishment, and Enhancement Activities. The decision regarding eligibility for NWP 27 will be made at the discretion of the Corps of Engineers. It will be important to begin consultation with the Corps of Engineers early in the project to negotiate in favor of using NWP 27.

Alternative(s) Considered, but Dismissed from Further Consideration

Due to the complexity of this situation, multiple alternatives were considered by the Service and MFWP but dismissed from further consideration as they did not meet the purpose and need.

The Preliminary Engineering and Feasibility Analysis to Improve Winter Habitat for Arctic Grayling conducted and published by CDM Smith in June 2019 assessed 26 alternatives ranging from solar powered aerators, snow plowing, and drilling holes in the ice, to liquid oxygen addition. Twenty-three of those alternatives were dismissed from further consideration.

Additional alternatives considered but dismissed by the Service include:

Propane Generators with Multiple Aerators: This alternative was dismissed because the required maintenance to the propane generators was not feasible with the current staffing and weather conditions present at URRL. Prior experience with internal combustion-powered equipment (e.g., gasoline, diesel, and propane powered compressors or generators) for aeration in British Columbia suggest they are not appropriate for unattended operation in remote locations (Ashley & Nordin, 1999). Excessive noise, emissions, and re-fueling and maintenance considerations present significant operational challenges. Moreover, diesel or propane aeration systems have been shown to be repeatedly unreliable. Considering URRL's remote location, on top of being part of a designated wilderness area, propane generators with multiple aerators was dismissed as an alternative.

Widgeon Pond Diversion Pipeline: This alternative was dismissed because of significantly higher costs and disturbance to wilderness compared to the Shambow Pond Diversion Pipeline (Alternative D). Widgeon Pond Diversion Pipeline would use the same approach as Alternative D but instead diverts water from Widgeon Pond on the northeastern side of URRL which would require a pipeline over four times longer than Alternative D. Shallow gradients exist throughout much of the proposed alignment and would require larger pipe sizes along the entire length to convey the target flow to the center of the lake. Based on site grades, the pipeline would require the use of 12-inch HDPE pipe (2,300 ft) and 18-inch HDPE pipe (18,600 ft) for a total pipeline length of approximately 20,900 ft. While the Widgeon Pond Pipeline could increase the amount of oxygenated water diverted to the center of URRL, this benefit over the Shambow Pond Pipeline is not enough to justify the miles of disturbance to wilderness area.

Population Rescue through Genetic Infusion: This alternative was dismissed because it may negatively impact the genetic variation of the Centennial Valley Arctic Grayling population. Genetic infusion of grayling would occur only to improve genetic variation, including from consequences of demographic decline. A genetic reserve brood is being created using fish with ancestral Centennial Valley origin that were introduced to mountain lakes 50-100 years ago. However, there may be genetic drift and lower variation in this brood relative to the present Centennial Valley population and introducing or translocating fish from the brood may lower genetic variation in the extant population at this time. The best way to conserve existing genetic variation is to alleviate the primary factor limiting the population (overwinter habitat in Upper Lake) and allowing it to recover to previous abundances. If declines in genetic variation or further declines in abundance occur translocation would be considered.

Red Rock Creek Pipeline: This alternative was dismissed to prevent negative impacts to Red Rock Creek and the Centennial Valley Arctic grayling population. Red Rock Creek is the most important tributary of the Upper Red Rock Lakes and is the primary spawning location of the Centennial Valley Arctic grayling population. Diverting flow of Red Rock Creek could negatively impact spawning habitat of the grayling.

Complete Closure of Fishing in Red Rock Creek and Elk Springs Creek: This alternative was dismissed because it is a less significant mortality factor for the CV Arctic grayling population than winter habitat. Catch and release angling was eliminated as a potential driver of grayling decline or as a factor preventing recovery because of: (1) the protective angling regulations in place during periods most grayling use Red Rock Creek, (2) the fact that there were proportionally few grayling captures and low expected mortality in the spring period prior to angling closures, and (3) lack of correlation between annual angler pressure in Red Rock Creek and grayling abundances or the 2016 population decline.

FWP commonly implements closures to angling during periods and in locations where spawning fish or incubating embryos are susceptible to potentially high mortality rates. The timing and duration of these closures are specific to the biology of the grayling. Most spawning fish enter the stream on May 10th and leave by June 15th and embryos are deposited and hatch between May 15th and June 15th, on average. Accordingly, regulations to close Red Rock Creek to angling during this period (May 15th to June 15th) were put in place in 2013 to eliminate the potential for angler trampling of embryos and reduce the likelihood of anglers catching spawning grayling. In 2022, the closure to angling was extended to begin on May 1st to be more protective of fish cued to make earlier spawning runs in warmer years with earlier runoff.

Catch and release only (no harvest) regulations have been in place for grayling in all CV streams for over 25 years. Based on creel survey data, only 1% (2017) and 5% (2018) of the grayling population encountered anglers. Mortality rates for salmonids during catch and release angling depend on water temperature and are near 0% at temperatures less than 73°F (Boyd 2008). Red Rock Creek temperatures were less than 73°F prior to the May 15th angling closure in all years. Additionally, water temperatures exceeded 73°F after June 15th and angling had resumed on Red Rock Creek during one day between 2016-2022, which prompted a full angling closure by FWP for the remainder of that summer.

Data from FWP's annual angling pressure surveys has shown no statistical relationship between angler use and the number of grayling in the population the following year. Despite a recent increase in angling pressure, it is unlikely that fishing played a strong role in the sudden grayling decline.

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 impacts of each alternative on a variety of resource areas over a 25-year period were analyzed in depth by a group of scientists through the SDM process. That report was used to inform the following environmental consequences table. A full detailed report is available on Red Rock Lakes NWR online library https://www.fws.gov/media/structured-decision-making-report-centennial-valley-arctic-grayling-conservation-red-rock.

Tables 1, 2 and 4 through 6 provide the following for each effected resource surrounding the URRL in RRLNWR:

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 effects

The resources analyzed for the purposes of NEPA, while similar, differ from those resources that must be analyzed for the purposes of MEPA, as defined and required by ARM 12.2.432(3)(d) and (e). For the purposes of MEPA, additional resources were analyzed and descriptions of impacts to those resources are found in the appropriate anticipated impacts sections of the following tables.

Table 1. Natural Resources

Wildlife and 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. Non-native fishes introduced to Refuge lakes and their tributaries include rainbow, brook, and Yellowstone cutthroat trout (Randall 1978). Grayling were also stocked in Centennial Valley waters intermittently from 1899 until the early 1960s (Randall 1978). Waterbird species primarily use the project area for breeding and foraging. While some waterfowl do nest on the shores of URRL, the bulrush islands of Lower Red Rock Lake supply the main habitat for nesting birds. Species nesting in these islands include trumpeter swan, canvasback, redhead, lesser scaup, coot, grebes (pied-billed, western, Clark's, red-necked, eared, and horned), Franklin's gull, Forster's tern, white-faced ibis, double-crested cormorant, and great blue and black-crowned night-herons. Marsh wrens and yellow-headed blackbirds are also common nesters on the bulrush islands. Breeding birds include 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 on the Refuge, although no breeding colony exists. Other birds common to the project area include willet, Wilson's phalarope, spotted sandpiper, and killdeer. Mammals common to the project area include 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 RRLNWR see Appendix G of the RRLNWR 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
No long-term impacts are anticipated post-construction for any of the alternatives. Impacts are primarily based on anticipated disturbance during construction, and no impacts to wildlife and aquatic species are anticipated on a 25-year projection.

Alternative A: Current CV Arctic grayling management practices would continue under the No Action Alternative. These management practices may benefit the grayling and have no adverse impacts on other wildlife and aquatic species. However, there is a relatively high likelihood of CV grayling extinction under this alternative.

Alternatives B1, B2, C, and D: Some short-term negligible impacts would be expected from implementation of these alternatives. No long-term distribution or abundance impacts are anticipated. Minimal impact on the distribution of trumpeter swans, other waterfowl, and bald eagle are expected for a very short time frame during the construction phases of these alternatives. Those species would be displaced from areas surrounding the construction sites temporarily, but sufficient habitat exists outside of the project area to allow wildlife to disperse during those periods of disturbance. Since the proposed construction would occur outside of the nesting period, there would be no possible disruption of nesting.

Alternative E and F: While impacts from these alternatives will be greater than the previously described alternatives, impacts are still expected to be short-term and negligible. No long-term distribution or abundance impacts are anticipated despite the more intrusive construction activities. Minimal impact on the distribution of trumpeter swans, other waterfowl, and bald eagle are expected for a very short time frame during the construction phases of these alternatives. Sufficient habitat exists outside of the project area to allow wildlife to disperse during periods of disturbance. Since the proposed construction would occur outside of the nesting period, there would be no possible disruption of nesting. Construction activities should adhere to temporal and spatial recommendations pertaining to Federal bald and golden eagle restrictions during the nesting period. These construction activities should be planned to avoid critical nesting periods to prevent nest abandonment and Federal "take" of eagles.

MEPA – Additional Anticipated Impacts

The previous Wildlife and Aquatic Species analysis is consistent with the Terrestrial, Avian, and Aquatic Life and Habitats analysis required by MEPA.

Threatened and Endangered Species and Other Special Status Species

Affected Environment Description

Grizzly bears are a threatened species and are protected under the Endangered Species Act. They are known to use the terrestrial habitat within the project area. Grizzly bears use the shore of URRL from April through October. URRL appears to be a focal area for feeding after emerging from hibernation. The south shore of the lake is forested and provides resting habitat. Individual bears or a sow with cubs are typically sited, and as many as three bears may be feeding on a single carcass at a time around URRL. Arctic grayling and Westslope cutthroat trout have been listed as species of concern by the state of Montana. Arctic grayling spawn in Red Rock Creek and spend the non-breeding part of the year in Upper Red Rock Lake. 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 Upper Red Rock Lake 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 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

An Intra-Service Endangered Species Act Section 7 consultation was conducted (Appendix B), which resulted in a finding of no effect for Canada lynx and wolverine, and a finding of may affect but not likely to adversely affect for grizzly bear. All impacts to grizzly from construction disturbance are expected to be short-term and negligible. Disturbance to bears from the operation of any alternative is not expected because these noises would occur from approximately January through March, when bears are expected to be hibernating.

Alternative A, B1, B2, and E: Grizzly bears are known to occur on the Refuge. Grizzly bears approaching or near the Project Area may hear construction noise associated with any of the alternatives. These noises may affect grizzly bears, with the most likely response being the bear moving away from or circling around the noise, if traveling. Grizzly bear movement in response to noise associated with any of the alternatives may result in temporary disturbance. Permanent displacement of any grizzly bears is not expected because construction-related impacts associated with all alternatives would be temporary, sites with planned terrestrial disturbance are already disturbed, and, while construction would increase noise disturbance, there is an existing baseline level of human-made noise already associated with those areas. Disturbance to bears from any lake-based construction is not expected because of the distance construction would occur away from the shoreline, associated sound attenuation, and general lack of grizzly bear habitat in the Lake. Compressors used in alternatives B1 and B2 would produce around 70dB, and pumps used in alternative C would produce around 75dB. However, both would only be operated during the winter months when grizzly are in hibernation. Decibel levels could be reduced for alternatives B1 and B2 by housing compressors within a cabinet and using acoustic sound proofing. Thus, effects to grizzly bears from any of the alternatives are expected to be minor in magnitude and frequency and temporary in duration.

Alternative C: Ground-based disturbance associated with Alternative C would occur in the right-of-way of an existing road (South Valley Road) and in the Upper Lake Campground on the south side of URRL. Both these areas are already developed and have some level of baseline noise associated with vehicular noise, Refuge visitors, and other sources. While the use of equipment to bury a powerline in the existing road right-of-way and improve the boat ramp at the campground are expected to cause disturbance, the construction will occur in previously disturbed areas with existing human-caused noise. Although the decibel level generated by operating construction equipment may be higher than that of the baseline noise levels in the existing road right-of-way and the campground, noises levels would be expected to be reduced by distance and topography. For example, the doubling of distance from a noise source reduces the decibel level by 6 decibel (dB) (i.e., going from 10 feet to 20 feet away from the noise source reduces the dB level by 6, then going from 20 feet to 40 feet reduces the dB level by another 6 dB). In this manner, the noise of trenching in the road right-of-way and construction at the boat ramp would be attenuated the further the distance the sound travels from the source.

Alternative D: Activities proposed under Alternative D would be expected to generate construction noise around Shambow Pond and the ground-based portion of the excavation is expected to take between 1-2 months to complete. Similar to Alternative C, noise would be attenuated with distance from the construction site. For example, noise at the construction site is estimated to be 85 dBA. The distance from the construction site to forested habitat on the south side of the road (a plausible habitat type for a grizzly bear to occupy during daylight hours) is approximately 573 feet. At this distance, the dB level of the construction noise when measured at the forest edge would be about 30 dB, similar to the decibel level of a whisper.

Alternative F: Alternative F would involve dredging in URRL for 12-14 months spread among three field seasons. The dredges would be operating in the URRL at varying distances from the shoreline of the northeast corner of the lake. While noise generated associated with dredging would have the longest duration of the alternatives, the dredges would be far enough from shore and on the lake surface where noise levels could attenuate to a low dB.

Threatened and Endangered Species and Other Special Status Species

MEPA – Additional Anticipated Impacts

The previous Threatened and Endangered Species and Other Special Status Species analysis is consistent with the Unique, Endangered, Fragile, or Limited Environmental Resource analysis required by MEPA.

Habitat and Vegetation

Affected Environment Description

Eight different habitat types and eighteen different vegetation classifications are present at RRLNWR, of these, only four habitat types and four vegetation classifications are within the project areas. Wet meadows/emergent palustrine are the dominant habitat type in the project area. Although some project areas for certain alternatives will contain grassland, aspen, and woody dominated riparian habitat types. URRL is primarily surrounded by seasonally flooded temperate or subpolar grassland, however, temporarily flooded cold-deciduous shrubland, seasonally flooded cold-deciduous shrubland, and montane or boreal cold-deciduous forests are present within the project areas as well.

Shallow lake (lacustrine) wetland habitats are defined as >20 ac. in total area and having more than 30% cover of emergent vegetation. These habitats often exhibit alternative stable states (Bayley and Prather 2003). One state is characterized by hypereutrophic conditions (excessive nutrient concentration), turbid water, and pelagic (open water) phytoplankton (microscopic plants). The second state, and the current state of Refuge lacustrine habitats, is characterized by clear water and submerged aquatic vegetation (SAV). The most abundant SAV species in Refuge lacustrine habitats, in order of decreasing magnitude, are Richardson's pondweed, sago pondweed, and shortspike watermilfoil (Paullin 1973); however, the abundance of SAV species is highly variable.

Seasonally flooded (palustrine) emergent wetlands are typically flooded each spring and dominated by persistent emergent vegetation (plants which grow underwater but have their tops above water), often on peat-forming soils. The frequency and duration of flooding is highly variable and a major determinant of vegetation communities in this dynamic habitat. Soil characteristics (physical and chemical) are also important. More than 9,000 acres of the Refuge are palustrine emergent wetlands (USFWS 1999). Relatively homogenous stands of beaked sedge represent over 80% of palustrine emergent wetlands on the Refuge. These extensive areas of seasonally flooded sedge are largely associated with Upper Red Rock, Lower Red Rock and Swan lakes, and River Marsh. Moving upslope, much of the sedge dominated habitat is surrounded by the second most common palustrine emergent wetland vegetation on the Refuge, Baltic rush. As noted for lacustrine habitats, other emergent vegetation species often germinate on exposed mud flats during low water years. These include spike rush, American slough grass, smartweed, and common mare's-tail.

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 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 and vegetation. Moreover, the proposed project site is surrounded by fee title land owned by the Service.

Anticipated Impacts

The effects of the alternatives on natural characters are expected to be mostly minor with the greatest effects occurring to sensitive species under Alternatives B1, B2, C, and D, and invasive species under Alternative D. It is important to note that not all the effects are anticipated to occur in the designated wilderness area.

Alternative A: There would be no anticipated impacts to habitat and vegetation with the continuation of current CV grayling management practices.

Alternatives B1, B2, and C: Impacts on habitat and vegetation with implementation of Alternatives B1, B2, or C are expected to be mostly short-term and minor with some effects occurring to sensitive species during the construction phases. The sensitive species that would be most affected are expected to include *Carex idahoa, Potentilla plattensis, Primula incana, Senecio hydrophilus, and Thelypodium sagittatum.* Upland habitat and vegetation could be affected by the installation of a power source for each of these alternatives. Using a vibratory plow, electrical conduit would be buried beginning at a location in the vicinity of the intersection of South Valley Road and a private road that serves a residence in Odell Creek, then follow the right-of-way on South Valley Road to a drop at the campground on the south shore of the URRL. This type of trenching minimizes restoration of the vegetation because no trench is dug. The resulting groove does not require backfilling and does little damage to the above vegetation. As a result, there would be short-term, minor impacts to the habitat and vegetation with the burial of the electrical conduit. Effects are expected to be mostly minor but may increase the distribution and abundance of invasive grasses and native species through the disturbance of the soil and vegetation at the construction sites. In order to minimize the spread of invasive species, any equipment that is brought in would be entirely cleaned before any potential excavation operations begin, and any native habitat disturbed would be reseeded. The footprint for each alternative is comprised of sites that have already been disturbed by human activity and where invasive plant species are already present.

Alternative D: Implementation of this alternative would also result in some short-term minor impacts on habitat and vegetation, including the sensitive plant species listed for Alternatives B1, B2, and C. *Carex idahoa, Potentilla plattensis, Primula incana, Senecio hydrophilus, and Thelypodium sagittatum* were expected to have minor declines in distribution and abundance. Most of these effects are anticipated to occur outside of the designated wilderness area during construction activities associated with installation of the pipeline. Though the pipeline alternative may impact *Senecio hydrophilus* by disturbance to individual plants from the trenching and laying of the pipeline, its likely to have relatively low to no impact to *Senecio hydrophilus* presence throughout the Refuge. Due to the resilience of most wetland species following disturbances, no major long-term impacts to the presence of *Senecio hydrophilus* across the landscape are expected.

In addition, Alternative D would be expected to result in temporary changes to both the distribution and abundance of invasive Kentucky bluegrass and smooth brome during construction activities related to the pipeline trenching and installation. The majority of the landscape along the pipeline footprint is dominated by Kentucky bluegrass and smooth brome. While these species already occur in the area, there is potential for expansion in range and abundance after disturbance in areas between Shambow Pond and URRL. These effects would be minimized by entirely cleaning any equipment brought to the construction site and retaining excavated materials and returning them following the installation. An integrated weed management plan would be developed and remediation and removal of invasives could occur for some time after construction.

Impacts to wetland and uplands would be temporary during the construction phase only.

Alternative E and F: Impacts from these alternatives to wetland and upland habitat and vegetation are expected to be short-term and minor, lasting only during the construction and maintenance of the permanent barrier. Any equipment that is brought into the construction site would be entirely cleaned before any potential excavation operations begin.

MEPA – Additional Anticipated Impacts

The previous Habitat and Vegetation (Including Vegetation of Special Management Concern) analysis is consistent with the Vegetation Cover, Quantity, and Quality analysis required by MEPA.

Geology and Soils

Affected Environment Description

The topography of the Centennial region was significantly modified by glacial action over the last 200,000 years (Pleistocene Epoch). Alpine glaciers deeply eroded the mountains to produce the rugged landscape of the high country and deposited glacial outwash gravels that built large alluvial fans along the northern flank of the Centennial Mountains (for example, the Odell Creek alluvial fan) (O'Neill and Christiansen 2004). The Red Rock lakes were formed from rainfall (pluvial lakes) during the last glacial period due, in part, to increased moisture. As the climate became warmer and drier during the last 10,000 years the area occupied by the lakes has shrunk.

Soils range in texture from loamy sand in the Breca series to heavy clay of the Castle series. The more well-drained soils on the fans are predominately loamy textured containing variable amounts of gravel, cobble, and stone. Two test holes up to seven feet in depth were bored along the route identified in Alternative D for a pipeline between Shambow Pond and URRL. Analysis of the soil samples from the test holes show alluvial and lacustrine (lake) deposits with a mix of clay, sand, silt, and gravels (Castle Rock Civil and Geotechnical Engineering September 2021). Separate bores of the sediments in the bed of URRL by the U.S. Geological Survey found alluvial and organic sediments and gravels.

Environmental Trends and Planned Actions Description

There are no known environmental trends or planned actions that would affect soils in the project area. The proposed project site is surrounded by fee title land owned by the Service and would remain undisturbed.

Anticipated Direct and Indirect Impacts

Alternative A: Under the No Action Alternative, current CV Arctic grayling management practices would continue, none of which involve managing geologic or soil resources. As a result, there would be no impacts to geology and soil under this alternative.

Alternative B1, B2, and C: The implementation of these alternatives would impact geology and soils in several ways: through the burial of an electrical conduit from Lakeview to the URRL, the temporary or permanent laydown of equipment in the Upper Lake Campground, the trenching for the burial of an electrical line (splashers or diffusers) or hose (cascade aerator), and during installation of the equipment on the bed of the URRL.

The operation of the splashers, diffusers, or electric powered cascade aerator as proposed under Alternatives B1, B2, and C would require a connection with the local electric utility, which would be at a location 3.31 miles west of the URRL near the town of Lakeview. Using a vibratory plow, electrical conduit would be buried beginning at a location in the vicinity of the intersection of South Valley Road and a private road that serves a residence in Odell Creek, then follow the right-of-way on South Valley Road to a

drop at the campground on the south shore of the URRL. This type of trenching minimizes restoration of the soils because no trench is dug. The resulting groove does not require backfilling and does little damage to the ground surface. As a result, there would be minor and temporary impacts to the geology and soils with the burial of the electrical conduit.

At Upper Lake Campground, an area of approximately 15 square meters would be reserved for the permanent placement of compressors to support the diffusers or the cascade aerator and centrifugal pumps. If compressors were placed temporarily and moved off site, an area of approximately 4 square meters would be reserved. Soils would be minimally disturbed, and impacts would be negligible. While the cascade aerator would be permanent, the Service could potentially mount the compressors on a mobile trailer that could be moved on-and off-site each season.

To power the splashers or diffusers (Alternatives B1 and B2), an electrical power cable or air tubing would be buried from the electric utility connection in the Upper Lake Campground to the shore of URRL, and out into URRL a distance of approximately 1,220 meters. Under Alternative C, connection to the cascade aerator would require the burial of lake water withdrawal and return HPDE pipelines. Each pipeline would be 0.20 m diameter (8-in, estimated) and 1,500 meters in length. Trenching for the electrical power cable or the pipelines would be accomplished using a vibratory plow to minimize the impact on geology and soils.

The sediments of the bed of the URRL would also be disturbed during placement of the diffusers proposed under Alternative B2. An area of approximately 24 m2 would be required for the placement of the 16 diffusers (1.5 m2 per diffuser). This equipment would rest on the lakebed with minimal disturbance although there could be some minor turbidity caused by the installation of this equipment. This equipment would occupy only a small area of available lakebed (less than 0.0003%).

Alternatives D, E, and F: All three of these alternatives would result in disturbance to geology and soils. Alternative D would require the burial of a 0.36 m (14-in.) diameter HDPE pipeline from Shambow Pond to the shoreline of URRL. The pipeline would be approximately 5,300 ft in length and require the excavation of a 4,700 ft long trench approximately 2 ft wide by 6 ft deep, with an area of disturbance approximately 15 ft wide along the trench. In addition, a subsurface screened intake and gate would be installed within URRL. Alternative E would involve the installation of a pile-driven barrier wall within the lake boundaries and improvements to the Upper Lake Campground boat launch. Lastly, Alternative F would involve dredging of URRL, placing of a berm (or island) of the dredged sediments within the lake boundaries, development of temporary construction access to the lake, including improvements to the boat launch, the development of haul roads, staging areas, and dredged material drying pads.

With adherence to the following best management practices (BMPs), impacts to geology and soils with implementation of Alternatives D, E, and F would be mitigated to minor or negligible during pipeline installation activities:

- Confine site disturbance to the smallest area practical to prevent unnecessary damage to water resources, vegetation, and wildlife disturbance.
- Install silt fencing, as appropriate, and fiber rolls, if necessary, prior to initiating any ground disturbance.
- Avoid storing, fueling, or repairing construction equipment in areas that may drain into URRL, wetlands or other natural areas.
- Inspect all equipment for leaks immediately prior to the start of project activities and conduct regular equipment inspections during construction activities.
- Develop an emergency spill response plan prior to initiation of construction and maintain a spill kit would on-site throughout the duration of the proposed project.
- Following construction, revegetate disturbed areas utilizing native species, to the greatest extent practical.

In addition to these BMPs, to prevent turbidity impacts to other locations in the lake when depositing the dredged sediments within URRL to construct a berm or island, floating silt and turbidity curtains or temporary dikes may be used.

MEPA – Additional Anticipated Impacts

The previous Geology and Soils analysis is consistent with the Geology; Soil Quality, Stability, and Moisture; and the Demands on Environmental Resources of Land, Water, Air, and Energy analyses required by MEPA.

Climate and Air Quality

Affected Environment Description

The climate in the Centennial Valley is characterized by long, cold winters and short, mild summers. Climatic data collected by Refuge staff at Lakeview, Montana (6,690 feet mean sea level) since 1948 have been analyzed through December 31, 2005.

Annual precipitation in the Centennial Valley is highly variable, both temporally and spatially. May and June are typically the wettest months. Precipitation during these months comprises 27% of the annual average. Annual precipitation at Lakeview, Montana, can range from the low of 10.26 inches received in 2002 to the high of 27.0 inches received in 1970 with mean annual precipitation of 19.69 inches. However, between 1948 and 2005, mean annual precipitation declined significantly. In addition, precipitation in the months of December and January has declined significantly during this same period; no other months showed statistically significant changes in precipitation.

Air temperature is similarly variable throughout the Centennial Valley. Mean annual air temperature at Lakeview, Montana is 34.8 degrees Fahrenheit (°F) (range: 31.4° in 1985 to 37.6° in 1981). January is typically the coldest month with a mean air temperature of 11.21°F and July is the warmest month with a mean air temperature of 58.5°F. Although the mean annual air temperature between 1948 and 2005 has not changed significantly, the mean temperatures in March and April have increased significantly. This indicates that spring temperatures are warmer sooner than in recent decades.

The increase in March and April temperatures follows the pattern observed in the rest of Montana and may be a result of climate change. The U.S. Environmental Protection Agency (USEPA) has found that in the past century, most of the state has warmed about two degrees (F). Heat waves are becoming more common, and snow is melting earlier in spring (USEPA, August 2016). Rising temperatures and recent droughts in Montana have killed many trees by drying out soils, increasing the risk of forest fires, or enabling outbreaks of forest insects. In the coming decades, the changing climate is likely to decrease the availability of water in Montana, affect agricultural yields, and further increase the risk of wildfires.

The Refuge is a designated Class I air quality area as defined under the Clean Air Act of 1977. Air quality around the Refuge is considered good, with no nearby manufacturing sites or major air pollution sources. Throughout the year, occasional widespread regional smoke caused by large-scale forest fires located to the west (in Idaho, Oregon, Washington, and Montana) and annual agricultural burning that occurs in Idaho (just south of the Centennial Mountains) causes haze, which results in reduced visibility. The small particles and aerosols resulting from these fires are carried long distances in the air and cause haze in this remote location.

Environmental Trends and Planned Actions Description

There are no known environmental trends or planned actions that would affect climate and air quality in the project area.

Anticipated Impacts

Alternative A: Under the No Action Alternative, current CV Arctic grayling management practices would continue, none of which would result in any changes to existing air quality or result in climate change in the RRLNWR.

Alternatives B1, B2 and C: The proposed splashers, diffusers, or electric powered cascade aerator proposed in Alternatives B1, B2, and C would be powered by a connection to the electric utility in the nearest town, Lakeview. Energy would be required to power some of the machinery (e.g., compressors) under these alternatives and would be needed as long as the systems are in operation. Other than when

any of these systems are installed in the URRL, there would be no air emissions generated during their operation.

Material that would be used as cable or pipeline for these alternatives include PVC, EPR, and HDPE. Alternative B1 would require the use of electrical cable. Submersible cable is typically PVC or EPR (Ethylene Propylene Rubber) insulation. Alternative B2 would have multiple runs of weighted tubing. PVC piping would likely be used since HDPE poly tubing would naturally float. Larger HDPE pipe could be used if weights were added to the tubing. Alternative C would also require the use of HDPE piping, the manufacture of which would require energy expenditures and generate CO2 emissions. It is also non-biodegradable, a property that lends itself to the longevity of the proposed systems. Requiring recycled content in the HDPE piping to be procured would reduce the environmental footprint of the material. Little or no impacts to air quality or climate change in the vicinity of URRL are expected from the construction, implementation, and materials used in these alternatives.

Alternative D: This alternative would involve the installation of a buried, gravity diversion pipeline to provide oxygenated water to URRL. The installation of the pipeline from the Shambow Lake to the URRL shoreline, as well as the construction of a screened intake and gate, would likely result in minor and short-term impacts to air quality, anticipated to last for approximately 1-2 months during the summer season during installation. These minor air quality impacts would be associated with vehicular emissions and fugitive dust from the use of heavy equipment to bury the pipeline. As identified for geology and soils, implementation of best management practices to mitigate fugitive dust and soil erosion would result in negligible short-term air quality impacts.

Alternative E: Short-term and minor air quality impacts would result from the proposed construction of a 1,000-meter permanent barrier to direct the dominant flow of oxygenated water from Elk Springs Creek into the center of the lake. Air emissions would be generated through the use of a pile driver and other vehicles to install the barrier over a 3–4-month period in the summer as well as to improve the boat launch at the Upper Lake Campground.

Alternative F: Air emissions would be generated to allow temporary construction access to the URRL for a dredge and the development of haul roads, a staging area, and a dredged material drying pad. During the dredging process, a shallow floating dredge would operate on the surface of the URRL to remove lake sediments. These activities would occur for a total period of 12 to 14 months, primarily over two to three summer seasons. The dredged material would be dried and then returned to URRL for construction into a berm or island. Fugitive dust from the use of heavy equipment in construction activities, including transporting and drying the dredged sediments would be mitigated by the implementation of best management practices, as described in the analysis of impacts to geology and soils. In addition, all pieces of heavy equipment would be required to meet Montana state emission standards and would be subject to routine preventive maintenance, including tune-ups to manufacturer specifications for efficient combustion and minimum emissions. Consequently, there would only be minor impacts on air quality to implement this alternative.

MEPA – Additional Anticipated Impacts

The previous Climate Change and Air Quality analysis is consistent with the Air Quality and the Demands on Environmental Resources of Land, Water, Air, and Energy analyses required by MEPA.

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. Upper and Lower Red Rock lakes have a combined surface water area of approximately 6,300 acres. These two lakes, along with Swan Lake and River Marsh area, are remnants of a post-glacial lake that is believed to have covered most of the valley floor at one time (USFWS 2009). This wetland complex has many sources of surface and groundwater inputs. Spring runoff plays an important role in the hydrology of the mountain creeks that flow into this wetland complex. Major sources of input into URRL include Red Rock and Tom creeks. In addition, Elk Springs Creek (which originates from Elk and Picnic springs) ultimately provides surface water to the Upper Red Rock Lake. River Marsh, a wetland area that connects Upper and Lower Red Rock lakes, receives surface water input from Teepee Creek. Lower Red Rock Lake has Odell Creek as a major source of input. The outlet of Lower Red Rock Lake, known as Red Rock River, flows west toward Lima Reservoir and eventually becomes the Beaverhead River.

Most Upper Red Rock Lake tributaries have their origins to the south at the eastern end of the Centennial Mountains. Red Rock Creek 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. Tom Creek, about 6.2 miles long, originates at an elevation of 7,910 ft mean sea level and flows northwesterly toward its junction with the eastern shore of Upper Red Rock Lake. Picnic Creek originates at two large springs on the eastern boundary of the Refuge. In the late 1800s, homesteaders dammed Picnic Creek, creating Culver Pond; this pond was enlarged by the Refuge in 1959 to 27 ac. Widgeon Pond (132 ac), which was created by impounding Picnic Creek downstream of Culver Pond in 1964, flows into Elk Springs Creek. MacDonald Pond was originally created by impounding Elk Springs Creek near the spring heads. However, in 2011 MacDonald Pond was drained, and in 2016 and 2021 Elk Springs Creek was restored to its historical flow path directly into Upper Red Rock Lake to improve grayling habitat.

Shambow Pond was also created by homesteaders in the late 1800s. This may have been the work of George Shambow. He and his wife Nellie built a house on the north side of Shambow Pond where they operated a stagecoach station from about 1898 to about 1913, that served as a livery and an overnight stop for the Monida - Yellowstone Stage Line. This was the original route to Yellowstone National Park. The house also served as a dance hall for evening entertainment. Shambow Pond is spring fed. A water control structure controls the elevation of the pond. The outlet of the pond is a creek that flows into URRL. During the 1960s a chain link fence encircled the pond and contained trumpeter swans for visitors to view.

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. The proposed project site is surrounded by fee title land owned by the Service.

Anticipated Impacts

Alternative A: Some short-term negligible effects on water resources are possible under the No Action Alternative. The Widgeon Pond release may alter sedimentation rates, the way water is delivered to the Elk Springs Creek delta, and flow of Elk Springs Creek. Rather than the typical steady flow of water from Elk Springs Creek, during the Widgeon Pond release, water flow is delivered in a large pulse. Those alterations may affect turbidity and other flow conditions in URRL (including temperature gradients, abiotic processes, and fish and invertebrate distribution). Additionally, there may be minor effects to the surrounding riparian habitat under the Widgeon Pond release as increased flow increases sediment mobilization and the distribution of invertebrates.

Alternatives B1, B2, and C: Impacts to URRL from these alternatives are expected to be permanent disturbances that are minor in their overall effect. The primary disturbances would be from the alternatives occurring within the boundaries of URRL. Some localized effects on the dissolved oxygen and hydrodynamics of the lake that affect the physical and biological properties of URRL are expected. Adding dissolved oxygen to areas of URRL that typically experience a loss of oxygen during certain times of the year may alter the natural distribution of some aquatic invertebrates. Based on modeling in the SDM report, these changes; however, will impact only a portion of the lake so would not be significant. The amount of oxygen in the lake during the winter varies greatly by year and some years there is more natural oxygen. In addition, historically the oxygen level was much higher in URRL, so this would be similar to historical natural processes.

Alternative D: Impacts from this alternative include those described under Alternatives B1, B2, and C. Diverting water from Shambow Pond to the center of URRL would temporarily move a dissolved oxygen source from the Shambow Creek delta out to the center of URRL which could alter the natural distribution of aquatic invertebrates. In addition, some effects to the surrounding riparian habitat are expected to occur during the winter with the implementation of this alternative due to temporary alterations to natural flow patterns when water is being diverted from Shambow Pond. Diverting water from Shambow Pond into the pipeline would temporarily dewater Shambow Creek and has the potential to impact riparian habitat in the creek. However, dewatering would only occur during time periods in which riparian vegetation is dormant.

Alternative E and F: Impacts from these alternatives include those described under Alternatives B1. B2, and C. However, Alternatives E and F are anticipated to have long-term larger effects to URRL from the permanent barrier and resultant changes to physical properties and ecological dynamics (e.g., submerged aquatic vegetation distribution) within the lake.

Both alternatives may affect the mouth of Elk Springs Creek and could alter riverine outflows into URRL and any downstream habitats. However, impacts are expected to be minor in their overall effect.

MEPA – Additional Anticipated Impacts

The previous Water Resources analysis is consistent with the Water Quality, Quantity, and Distribution and the Demands on Environmental Resources of Land, Air, and Energy analyses required by MEPA.

Table 2. Affected Visitor Use and Experience

Visitor Use and Experiences

Affected Environment Description

Visitor opportunities within the project area at RRLNWR are available for hunting, wildlife observation, photography, canoeing and kayaking, camping, environmental education, and interpretation. The annual number of visits to the Refuge in 2009 was estimated at 12,000. 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.

A contact station and two primitive campgrounds are available at RRLNWR. 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 lake. Both campgrounds feature a fire ring and toilets. The Upper Lake Campground has picnic tables, potable spring water, and a boat launch. Canoeing and kayaking opportunities area available at URRL. Both campgrounds are available for public use year-round.

Environmental Trends and Planned Actions Description

There has been no trend in angler use near the project area (Red Rock Creek) over the past 10 years, although use has varied considerably among years (489 to 3290 angler days per year). We expect patterns of angler use to be similar in the future.

Anticipated Impacts

Alternative A: Under the No Action Alternative, the continuation of existing CV grayling management activities would have no effect on current visitor use and experience.

Alternatives B1, B2, C, D, E, and F: Visitor use and experience in RRLNWR could be affected by construction activities that would occur should Alternatives B1, B2, C, D, E, or F be selected. Primary mechanisms of disturbance were associated with construction activities in and around the Refuge and any disruption of traffic flow along South Valley Road. Any activities that require use of campground may be disruptive to general Refuge users and would apply equally to hunters, anglers, campers, boaters, education, outreach, and interpretation activities. Additionally, there could be impacts to locals who use South Valley Road during the installation of the electrical conduit. If construction follows the right-of-way, between 1-2 weeks of traffic delays could be expected. However, if the conduit is installed adjacent to the road, no delays are possible. Although road access may be delayed during some of the construction, measures will be in place to ensure through access remains for all users, including neighbors.

To assess these impacts, the days of disturbance from construction, operation, and maintenance for all alternatives were estimated to capture these effects (Table 3, below). As can be seen in the table, the six alternatives vary in the number of days of overlap in summer months to be between 0 – 435 for general Refuge users, and 0 – 60 for hunters.

Table 3. User Experience at Red Rock Lakes NWR and Construction Impacts

Alternative	Days of Overlap Between General Refuge Users at URRL and Construction Activities	Days of Overlap Between Hunters at URRL and Construction Activities	Reduction of Red Rock River Flow to Downstream Water Users Due to Construction
A. No Action	0.0	0.0	0.0

B1. Splashers	74.0	0.0	0.0
B2. Diffusers	74.0	0.0	0.0
C. Pumped Aerator	115.0	0.0	0.0
D. Pipeline	91.0	0.0	0.0
E. Barrier	40.0	0.0	0.0
F. Dredge and Berm	435.0	60.0	0.006

Of the six alternatives under consideration, Alternative F would have the most substantial overlap with Refuge users and hunters because of the prolonged period of construction associated with dredging activities. It is anticipated that moose hunters would experience an overlap with this alternative for about 30 days over the two-year construction period. Waterfowl hunters may experience temporary disruption in the distribution of birds when construction activities were occurring on URRL. However, this might result in birds being more available to hunters off the Refuge or in other areas on the Refuge because they would be less likely to reside on URRL during hunting season. Grazers would not be affected by construction activities because individuals who graze livestock could be rotated around the Refuge property so as not to experience any adverse effects. Anglers and boaters would not be able to recreate in the parts of URRL where this alternative would be installed during the construction periods. Additionally, the distribution of wildlife around the areas of construction would be altered temporarily. Wildlife viewers would likely have less success around the project area and have to move to other areas of the Refuge during the construction period.

In addition, Alternative F would also result in the potential for downstream water users to experience reductions in outflow from Lower Lake and its tributaries, if the capacity of URRL changed. Estimated dredge production rates would be about 10,000 cubic yards (CY) per month for a single SD-110 Crisafulli dredge (6.2 acre-feet). If two dredges were operating, there would be a change in storage at URRL of nearly 13 acre-feet per month, which would result in an average decrease in tributary flow of 0.21 cubic feet per second or 94 gallons per minute, assuming the dredging was spread evenly over 30 days. This presumes that all of the dredged material would be removed from the lake, at least temporarily. It also presumes that excess water removed from the lake during dredging would be allowed to infiltrate into the local groundwater system and return to the lake. The estimate does not consider any onshore evaporative losses, which would be similar to evapotranspiration losses of the covered land area. Once the dredged sediment to create a berm (or island) in the lake, it would cause a similar increase in outflow if returned at approximately the same rate. This value provides a reasonable estimated of the maximum impact to downstream water users. The wetland areas surrounding both the Upper and Lower Lakes would serve to mitigate (provide surge capacity) for abrupt changes in outflow to the Red Rock River.

Under Alternatives B2 and C, campers could experience a slight reduction in the total amount of area available for camping long term to allow for the permanent placement of equipment under Alternatives B2 or C. However, in the case of Alternative B2, the Service could choose to mount the compressors on a mobile trailer that could be moved on-and off-site each season and there would be no difference in campground area outside of the winter season.

There would be some short-term, minor impacts under Alternative D to anglers and boaters during the installation of the portion of the pipeline in URRL. Recreators would have to temporarily avoid those areas of the Lake.

MEPA – Additional Anticipated Impacts

The previous Visitor Use and Experience analysis is consistent with the Aesthetics and Access to and Quality of Recreational and Wilderness Activities analyses required by MEPA.

Table 4. Cultural Resources

Cultural Resources

Affected Environment Description

The Refuge has conducted limited inventories for cultural resources primarily to comply with Section 106 of the National Historic Preservation Act (NHPA). Numerous historic buildings and structures are present on the Refuge, some of which were constructed by the Works Progress Administration (WPA) during the Depression era and are still in use, including the Refuge office, staff housing, and maintenance facilities.

Due to its unique location offering access to wetland and mountain ecotones, the Centennial Valley has supported indigenous cultures for thousands of years. The area has abundant natural springs and game along with 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.

Three previous projects may have been located at least partially within the current proposed project area, including a 1995 telecommunications project, and 1995 and 2009 projects related to the installation and subsequent replacement of a vault toilet on the Upper Lake Campground. It's possible that at least two previous cultural resources inventories associated with the 1995 telecommunications project and the 2009 vault toilet replacement project may have encompassed limited portions of the current proposed project area.

Within the proposed project area, at least two known cultural resources sites occur. The Shambow Way-Station and Pond is a historic stage stop with associated manmade pond which accommodated early visitors to Yellowstone National Park for a number of years during the late nineteenth and early twentieth centuries. A historical marker just north of Shambow Pond commemorates the stage stop; however, no buildings are known to be extant on the site from the period during which the stage stop was operational. The Shambow Way-Station and Pond have not been formally documented as a site, and National Register eligibility is subsequently unknown. A multicomponent archaeological site (4BE1200) with a precontact component is also known to occur near URRL; this site, which is recommended eligible for the National Register, provides evidence of the use of the area as early as 2500 BC (Taylor 1985). In accordance with Section 9 of the Archaeological Resources Protection Act (ARPA), additional details regarding the nature and location of this site will be withheld due to the sensitive nature of the resource. Both the Shambow Way-Station and Pond and site 24BE1200 may be located at least partially within the proposed project area.

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 beyond the impacts associated with the project.

Anticipated Impacts

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

Alternatives B1, B2, C, D, E, and F: A potential exists for physical, visual, and auditory impacts to cultural resources and effects to historic properties from the various alternatives under consideration.

Physical impacts to cultural resources and effects to historic properties are possible in non-inundated, upland areas where ground-disturbing activities could be conducted in association with some project alternatives, in the case that such resources/properties occur in these areas. Although portions of the project area may have previously been subject to intensive pedestrian inventories, these inventories occurred more than ten years ago, and as such, need to be updated. Subsequently, in accordance with

Section 106 of the NHPA and its implementing regulations (36 CFR Part 800), an intensive pedestrian inventory would be conducted for all alternatives involving proposed or potential ground-disturbing activities within non-inundated, upland areas around Upper Red Rock Lake (to include shoreline areas where heavy equipment may maneuver, as well as access routes, staging areas, and areas planned for borrow and/or fill), in order to identify, document, and evaluate National Register eligibility, as well as to analyze associated impacts and assess effects which could result from the proposed project. Additionally, as at least two known sites (the Shambow Way-Station and Pond, and 24BE1200) are located at least partially within the proposed project area, these resources would need to be revisited, and the associated documentation and National Register evaluations updated, in order to adequately analyze possible impacts and assess potential effects of the proposed project. Moreover, to ensure the extent of the site is accurately delineated and that this potential historic property is not subject to physical impacts or adverse effects from proposed project activities, site 24BE1200 may also need to be subject to Phase I testing. The Section 106 compliance process would be completed prior to the implementation of project activities under Alternatives B1, B2, C, D, E, and/or F. Furthermore, although Section 106 consultation has not been initiated to date, it will be initiated and completed for all proposed alternatives prior to a decision being made and a FONSI signed.

In general, physical impacts and effects to archaeological resources/properties in particular are not anticipated, as steps would be taken to avoid any archaeological sites which are identified in the project area as a result of aforementioned intensive pedestrian inventory. However, it's possible that physical impacts and effects to historic resources/properties could result from proposed project activities, and specifically, those associated with Alternative D involving modifications to Shambow Pond, which is a known historic resource and potential historic property.

Additionally, a potential exists for both temporary, short-term as well as long-term visual and auditory impacts to cultural resources present within or in proximity to the project area. In particular, short-term visual and auditory impacts could result from the temporary visual presence of and auditory noise associated with access by individual workers and the operation of equipment (i.e., light vehicles, heavy equipment associated with the installation of various project components and associated infrastructure) during the initial installation of project components, as well as sporadically in association with longer-term project operations and maintenance activities.

Longer-term visual and auditory impacts to cultural resources could result from the use of splashers; air compressor(s) associated with the operation of diffuser(s); electrical pump(s) and aerator(s); and dredge(s) under Alternatives B1, B2, C, and F, although the installation of many of the components associated with Alternatives B and C would comprise relatively impermanent, reversible features on the landscape that could be removed in the future. The installation of subsurface electrical infrastructure under Alternatives B and C, and the installation of a subsurface pipeline under Alterative D, would introduce narrow linear scars on the ground surface in the short-term, but with revegetation over time would be unlikely to result in long-term visual effects to cultural resources occurring in the general area. Other minor visual impacts to cultural resources could also result from the introduction of mobile trailers to mount equipment under Alternatives B2 and C, as well as from the installation of a permanent barrier under Alternative E, and creation of an artificial island and/or use of floating curtains and/or temporary dikes under Alternative F. These longer-term visual and auditory impacts would, however, likely be minimized by distance, vegetation, variable topography, and the generally low vertical profile of planned project components associated with the various alternatives.

MEPA – Additional Anticipated Impacts

The previous Cultural Resource analysis is consistent with the Cultural Uniqueness and Diversity analysis required by MEPA. Additional required analyses for MEPA related to Cultural Resources are addressed below.

Historical and Archeological Sites: No significant adverse impacts to historical and archaeological sites would be expected because of the proposed project. If cultural artifacts were to be discovered during

implementation of the project, FWP and the USFWS would cease activities, contact SHPO, and potentially adjust the project design to avoid impacting these resources. Therefore, no impacts to such resources would be expected because of the proposed project.

Table 5. Wilderness

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 Refuge System 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 as reason for the designation of the Wilderness area in RRLNWR.

Upper and Lower Red Rock Lakes are unique attributes of the Wilderness in RRLNWR. A small portion of the Red Rock Lakes Wilderness falls within the project area, with the potential for aesthetic impacts from Alternatives extending further into the Wilderness.

Environmental Trends and Planned Actions Description

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

Anticipated Impacts

The impact of each alternative on four aspects of wilderness character (untrammeled, undeveloped, natural, and solitude/primitive) were evaluated. In general, Alternative A resulted in the least impact to wilderness characters. Alternatives E and F had the greatest impacts. The Service's policy contained in FWS Policy Part 610.1.14D states the Service should "use restraint in administration of wilderness. As a place 'where the earth and its community of life are untrammeled by man," we minimize actions for administration of wilderness areas. We may allow exceptions to the generally prohibited uses if the uses are the minimum requirement for administering the area as wilderness and are necessary to accomplish the purposes of the refuge, including Wilderness Act purposes. A Minimum Requirements Analysis was completed and can be viewed here URRL Grayling MRA. The alternatives evaluated in this EA represent a minimum requirement for administering wilderness and are necessary to accomplish the purposes of the refuge and the Wilderness Act.

Alternative A: Under the No Action Alternative, the continuation of existing CV grayling management activities would have no effect on wilderness character.

Alternatives B1, B2, C, and D: Alternatives B1, B2, C, and D would result in minor trammeling during the construction phases of each alternative, but most of these effects would be expected to be short-term and negligible. Some long-term, minor impacts would be expected during their operation period. Of these

alternatives, D would have somewhat greater short-term and long-term impacts to untrammeled wilderness character from the excavation and diversion of Shambow Creek. The undeveloped wilderness character generally followed the same pattern as trammeling with Alternatives B1, B2, C, and D, requiring little visible infrastructure in wilderness that would have long-term impacts. Short-term impacts to undeveloped wilderness character would result from the use of motors and mechanized equipment during the construction period. The effects of these alternatives on natural characters are expected to be short-term and negligible with the greatest effects occurring to sensitive species under Alternatives B1, B2, C, and D, and invasive species under Alternative D. The sensitive species most affected were expected to be plants including *Carex idahoa, Potentilla plattensis, Primula incana, Senecio hydrophilus, and Thelypodium sagittatum;* however, it is important to note that not all the effects are anticipated in the designated wilderness area. Additionally, some potential exists for increases in the distribution and abundance of Kentucky bluegrass and smooth brome under Alternative D as the pipeline is being installed through an area of mixed native and invasive vegetation. However, each of these alternatives would provide a benefit to the grayling population which are included when considering natural wilderness character. Impacts to solitude and primitive wilderness character would primarily be short-term and occur during the construction period. Long-term, visible structures would include the splashers, diffusers, compressors, and housing for the compressors. However, if compressors were placed on a trailer and transported off Wilderness after use, they would only be present during a period where there are few visitors.

Alternatives E and F: Alternatives E and F would have the largest overall impact to Wilderness and result in the greatest degree of trammeling to RRLNWR ecosystems considered. Alternatives E and F would require substantial development and construction along with permanent installations that are both visible and relatively large in spatial extent. Alternative F would involve multiple seasons of dredging and subsequent disturbance and impacts on the undeveloped wilderness character of the surrounding Wilderness. However, the effects of these alternatives on natural characters of the wilderness are still expected to be short-term and minor. Alternatives E and F are also anticipated to have the highest impacts on solitude and primitive quality of the wilderness on both a short-term and long-term basis. Alternative E will require loud (>95 dB) equipment on URRL to install a sheet pile wall, whereas Alternative F requires the operation of floating dredges and other construction activities across multiple summer seasons. Visible structures from both alternatives, the permanent barrier and the berm, will cause permanent disturbance year-round.

MEPA – Additional Anticipated Impacts

The previous Wilderness Value analysis is consistent with the Access to and Quality of Recreational and Wilderness Activities and the Locally Adopted Environmental Plans and Goals analyses required by MEPA.

Table 6. Socioeconomics

Socioeconomics and Environmental Justice

Affected Environment Description.

RRLNWR 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 2022). The following table with environmental justice parameters for Beaverhead County was taken from an EPA Environmental Justice (EJSCREEN) Report generated in 2022.

Table 7. 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/km^2)	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, except for a 30-day overlap of Moose hunting with construction activities, should Alternative F (dredge and berm) be selected. In addition, there is a potential for construction activities to temporarily affect the distribution of birds when/if construction activities are occurring on URRL. This might result in birds being more available to hunters off the Refuge or in other areas of the Refuge because they would be less likely to reside on URRL during hunting season.

MEPA – Additional Anticipated Impacts

The previous Socioeconomics and Environmental Justice analysis is consistent with the Local and State Tax Base and Tax Revenues; Social Structures and Mores; Quantity and Distribution of Employment; and the Distribution and Density of Population and Housing analyses required by MEPA. Additional required analyses for MEPA related to socioeconomic are addressed below.

Local and State Tax Base and Tax Revenues: No significant adverse impacts to the local and state tax base and tax revenue would be expected because of the proposed project. The proposed project does not involve the acquisition of land or property, production of any products, or displacement of any existing businesses. Local businesses rely largely on recreation as a staple source of income and many people visiting the area to recreate currently seek opportunities to fish for or otherwise appreciate Montana's native Arctic grayling. The proposed project would, in part, further the ongoing objective to conserve this

native species for the enjoyment of current and future recreation. Any impacts to the local and state tax base and tax revenue would be long-term, minor, and beneficial.

Social Structure and Mores: The proposed project constitutes activities within an existing Wilderness Area/National Wildlife Refuge for the purposes of restoring suitable overwintering habitat for Arctic grayling. Many Montanans and visitors to the state hold high regard for Arctic grayling as an angling resource, as an icon of the state (last remaining population in the lower 48 states), and a valuable component of the ecosystems in which it resides. As such, the Arctic grayling is deeply engrained in the customs and lifestyles of residents and visitors of Montana. The intent of the proposed project is to sustain native Arctic grayling by restoring suitable overwintering habitat in URRL. Therefore, the proposed project would benefit any person who enjoys fishing for Arctic grayling or otherwise values the species' existence and the ecosystem in which they reside. Montana state law requires MTFWP to manage wildlife, fish, game, and nongame animals to prevent the need for listing under the Endangered Species Act or ESA, (MCA§ 87-5-107). Maintenance of existing conditions would likely result in a reduction in the already low population status of the affected population of Arctic grayling and could lead to listing under the Endangered Species Act, changing state management of the species and likely limiting public opportunity to fish for and otherwise interact with and enjoy this native fish species. It is also possible that Arctic grayling would eventually become locally extinct (extirpated) in the connected portions of the Red Rocks Lakes system altogether, thereby forever altering this valued species. Impacts to social structures and mores in the affected area would be long-term, significant, and beneficial.

Quantity and Distribution of Employment: No significant impacts to the quantity and distribution of employment in the affected area would be expected because of the proposed project. The proposed project constitutes waterbody restoration activities within an existing Wilderness Area/National Wildlife Refuge for the purposes of creating suitable overwintering habitat for Arctic grayling. Local contractors would be employed for construction and related infrastructure development aspects of the proposed project and federal and/or state agency staff within the course of their typical duties; therefore, no impacts to the quantity and distribution of employment in the area affected by the proposed project would be expected because of the proposed project.

Distribution and Density of Population and Housing: No significant impacts to the distribution and density of population housing in the affected area would be expected because of the proposed project. The proposed project constitutes waterbody restoration activities within an existing Wilderness Area/National Wildlife Refuge for the purposes of creating suitable overwintering habitat for Arctic grayling. Federal and/or state agency staff and/or contracted services would be employed for construction and related infrastructure development aspects of the proposed project. Existing agency staff would conduct such activities within the course of their typical duties and the few outside contractors needed to complete the proposed project would not require any new or additional housing in the affected area. Therefore, no impacts to the distribution and density of population housing in the affected area would be expected because of the proposed project.

Agricultural or Industrial Production: No significant adverse impacts to agricultural or industrial production in the affected area would be expected because of the proposed project. The proposed project constitutes waterbody restoration activities within an existing Wilderness Area/National Wildlife Refuge for the purposes of creating suitable overwintering habitat for Arctic grayling. Because the affected area is not currently used for agricultural or industrial production the proposed project would not impact such practices. Therefore, no impacts to agricultural or industrial production would be expected because of the proposed project.

Human Health and Safety: No significant adverse impacts to human health and safety would be expected because of the proposed project. The proposed project constitutes waterbody restoration activities within an existing Wilderness Area/National Wildlife Refuge for the purposes of creating suitable overwintering habitat for Arctic grayling. Federal and/or state agency staff and/or contracted services would be employed for construction and related infrastructure development for affected aspects of the proposed project. Because the affected area is remote and wild, such activities can be dangerous if not done in a safe

manner using best management practices. Affected staff or contractors conducting the activity may realize increased risk to human health and safety; however, MTFWP and the Service require staff and paid contractors to operate in a safe manner and utilize available safety precautions while conducting their work. Therefore, any potential impacts to human health and safety would be short-term and negligible, lasting only the duration of the construction phase of the proposed project.

Demands for Government Services: No significant adverse impacts on demands for government services in the affected area would be expected because of the proposed project. The proposed project constitutes waterbody restoration activities within an existing Wilderness Area/National Wildlife Refuge for the purposes of creating suitable overwintering habitat for Arctic grayling. Federal and/or state agency staff and/or contracted services would be employed for construction and related infrastructure development for affected aspects of the proposed project. Agency staff resources used for implementation and long-term maintenance of the proposed project would do so within their typical job expectations. Contracted services would be funded by federal, state, and private funds and grants administered by MTFWP and/or the USFWS for the purpose of native fish conservation. Therefore, any potential impacts on the demand for government services would be minor and consistent with existing responsibilities.

Industrial, Agricultural, and Commercial Activity: No significant adverse impacts to industrial, agricultural, or commercial activity in the affected area would be expected because of the proposed project. The proposed project constitutes waterbody restoration activities within an existing Wilderness Area/National Wildlife Refuge for the purposes of creating suitable overwintering habitat for Arctic grayling. Because the affected area is not currently used for industrial, agricultural and/or commercial activities the proposed project would not impact such practices. Therefore, no impacts to industrial, agricultural, and commercial activity would be expected because of the proposed project.

Other Appropriate Social and Economic Circumstances: No significant adverse impacts to other appropriate social and economic circumstances in the affected area would be expected because of the proposed project. The intent of the proposed project is to sustain Arctic grayling by creating suitable overwintering habitat in URRL, which is located completely within a congressionally designated Wilderness Area. The proposed alternatives are expected to impact Wilderness qualities to varying degrees. Many Montanans and visitors to the state hold high regard for both the Wilderness Act and this population of Arctic grayling. As such, the Wilderness Act and the Arctic grayling are deeply engrained in the customs and lifestyles of residents and visitors of Montana. Affected regulatory agencies must fully implement the law meaning both requirements of the Wilderness Act and maintenance of a population of native fish must be considered in implementing the proposed project, even when these objectives may be at odds with each other. Because of the real potential for extirpation of this distinct population of Arctic grayling, MTFWP and the Service determined certain activities that may be considered inconsistent with wilderness values would be necessary to ensure species longevity and to avoid listing under the ESA. Therefore, impacts to those who value the Wilderness Act and wilderness values above conservation of the affected Arctic grayling population would be short-term and minor, with the majority occurring during construction.

Energy Impacts: No significant impacts to energy resources in the affected area would be expected because of the proposed project. The proposed project constitutes waterbody restoration activities within an existing Wilderness Area/National Forest for the purposes of creating suitable overwintering habitat for Arctic grayling. Fuel would be used to operate heavy equipment needed for the construction and infrastructure development phase of the proposed project. However, any impacts to fuel use in the area would be negligible, lasting only through the duration of the proposed project construction.

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). A table summarizing the impacts of each alternative on a variety of resource areas can be found in the SDM technical report (Cook 2023).

Alternative A – No Action Alternative (Widgeon Pond Release)

As described above, the No Action Alternative results in relatively few environmental impacts and would be the continuation of current management practices. The most prominent adverse impact would be the lack of sufficient suitable winter habitat and high probability of extirpation for CV Arctic grayling. This alternative only partially meets the purpose and need previously described. While the Widgeon Pond releases can create some short-term suitable habitat for grayling in the winter months, likelihood of CV grayling recovery under this alternative is low. Impacts from this alternative on all resource areas would be none or negligible.

Alternative B – Electric Powered Splashers or Diffusers

As described above, Alternative B would result in the installation of splashers or diffusers in URRL, a hose running from the aerators to the campground, compressors in the campground, and an electrical line to the campground. All construction would happen in previously disturbed areas and would result in some disturbance to Wilderness quality and water resources, specifically URRL. Impacts to URRL from these alternatives are expected to be permanent installations with minimum disturbances and minor in their overall effect. The primary disturbances to water resources and Wilderness were from the alternatives being located directly in URRL. While this alternative would result in permanent structures in URRL, impacts from this alternative on all resource areas would still be primarily none or negligible, with minor impacts to water resources only.

Alternative C – Electric Generators with Pumped Aeration

This alternative would involve the installation of a pumped aerator in the campground, pipes running from the center of the lake to the aerator, electric generators, and an electrical line to the campground. The impacts of Alternative C are very similar to those summarized under Alternative B. Compared to Alternative B, Alternative C would have reduced impacts to water resources since the aeration mechanism would not be located within the lake. However, disturbance to Wilderness character and visitor use would be slightly increased. Overall, impacts from Alternative C on all resource areas are primarily expected to be none or negligible, with minor impacts to water resources only.

Alternative D – Shambow Pond Diversion Pipeline

Alternative D would involve the installation of a pipeline from Shambow Pond to URRL. The pipeline would run through previously disturbed upland and wetland habitat that is comprised of a mix of native and non-native, invasive plant species. Impacts from Alternative D include some short-term disturbance to wilderness and habitat and vegetation due to the increased likelihood of spreading invasive species. Additionally, the trenching required to install the pipeline would

negatively impact soils along the path of the pipeline. Impacts to resource areas from this alternative with mitigation measures would be none, negligible, or minor.

Alternative E – Permanent Barrier from Elk Springs Creek to the Lake Center

The implementation of this alternative would result in the construction of a permanent barrier within URRL. The most prominent adverse impacts of this alternative would be to water resources, soil, and wilderness character. Disturbance to each resource would primarily occur during the construction period, but some negative impacts would continue even after construction due to the permanence of the structure within URRL. Long-lasting effects from the permanent barrier include a visible structure impacting wilderness character and an altered flow-path of Elk Springs Creek. Mitigation measures would be implemented with this alternative to ensure impacts to soil, water resources, and wilderness are minor. Impacts to all other resource areas would be none or negligible.

Alternative F – Dredge and Berm Elk Springs Creek

This alternative would involve dredging the mouth of Elk Springs Creek to create usable habitat for grayling. That dredged material would be used to create a berm which could channel oxygenated water deeper into the lake center. Compared to the other alternatives, the dredge and berm alternative would have the most negative effects on the analyzed resources areas due to the length of construction and invasiveness of dredging. Disturbance to Wilderness, Refuge visitors, air emissions, and soil would primarily occur during the construction phases of this alternative. Air emissions from heavy equipment during the 12-14 month dredging period and impacts to soil from associated construction can be mitigated so overall effects are minor. Additionally, this alternative could also negatively impact downstream water users by reducing outflow from lower lake and its tributaries However, the use of mitigation measures to protect multiple resource areas would ensure minor or negligible impacts from Alternative F.

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Tribal Consultation

Seven Tribal affiliations were identified as having ancestral connections to Beaverhead County, MT, where Red Rock Lakes National Wildlife Refuge is located. The seven Tribes were as follows: Apache Tribe of Oklahoma, Confederated Salish and Kootenai Tribes of the Flathead Reservation, Confederated Tribes of the Umatilla Indian Reservation, Shoshone Tribe of the Wind River Reservation, Fort Belknap Indian Community of the Fort Belknap Reservation of Montana, Nez Perce Tribe, and Shoshone-Bannock Tribes of the Fort Hall Reservation. On February 28th, 2023, leadership of each Tribe were notified of and invited to consult on the Environmental Assessment and associated documents. Additional emails were sent to alert the Tribes of the extended comment period for the draft EA, and follow-up calls were made later in the comment period. To date, no concerns were communicated by any Tribe.

Public Outreach

The Draft EA was posted on the RRLNWR website (https://www.fws.gov/refuge/red-rock-lakes) with instructions on how to provide comments. Comments received on the Draft EA and agency responses are included in Appendix C of this final EA.

The Draft EA was also posted on Montana Fish, Wildlife and Parks' Public Notices webpage at https://fwp.mt.gov/news/public-notices. The Draft EA was posted on Montana Fish, Wildlife and Parks' Public Notices webpage and was available via direct link to the USFWS' Red Rock Lakes National Wildlife Refuge website. Any comments received on the Draft EA were managed by the USFWS, in consultation with Montana Fish, Wildlife and Parks. USFWS requested comments be submitted according to instructions provided by USFWS through the above-cited link.

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

This appendix lists all applicable statutes, regulations, and executive orders not 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

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: 02.16.2023

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 a portion of Red Rock Lakes National Wildlife Refuge, including a portion of Upper Red Rock Lake and Upper Lake Campground, in, SW Montana, near Lakeview, MT.

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 – N/A

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

Candidate – N/A

Proposed Endangered – N/A

Proposed Threatened – Wolverine (*Gulo gulo*)

V. Project Description:

Upper Red Rock Lake (Lake) on Red Rock Lakes National Wildlife Refuge (Refuge) provides overwinter habitat for the majority of Arctic grayling in the Centennial Valley. Overwinter habitat in the Lake can be limited in area and dissolved oxygen concentration in some winters. These limitations occur from snow and ice reducing availability of sunlight to aquatic plants in the Lake. Reduced sunlight levels reduce or preclude photosynthesis, thus creating large expanses of the Lake with dissolved oxygen levels lower than what Arctic grayling can survive.

The Refuge, in collaboration with other conservation partners, recently initiated a Structured Decision Making process to help identify alternatives that would increase the area and concentration of dissolved oxygen in the Lake during harsh winters. Six alternatives were selected by the collaborators to move forward and analyze under NEPA (Table 1; splashers and diffusers are combined for this analysis due to similar magnitude, frequency and duration of

expected effects). However, a preferred alternative has not been selected, so Section 7 consultation will be conducted on Alternatives C, D, and F. These Alternatives were chosen for analysis because: 1) Alternative C has the longest duration of ground-based disturbance and largest quantity of ground-based disturbance, 2) Alternative D has ground-based disturbance in an area that would not be disturbed by the other Alternatives, and 3) Alternative F has the largest amount of Lake-based disturbance and the longest construction duration of all the Alternatives (Table 1). By utilizing this "worst case scenario" approach, the effects of the preferred alternative (when it is chosen) will be accounted for in this analysis, even if it is not one of the analyzed alternatives.

All alternatives are similar in that they are all designed to increase the area and oxygen concentration in parts of the Lake during harsh winters. However, the level of disturbance that would be required to construct, operate and maintain each alternative differs. Below, we outline the differences among alternatives with respect to the type, frequency and duration of expected disturbance for both the construction phase and the operation/maintenance phase.

Table 1. Disturbance type, frequency and duration for construction of alternatives identified to increase the area and oxygen concentration in Upper Red Rock Lake during harsh winters.

Alternative	Type	Frequency	Duration
A- No Action	-	-	-
B- Electric-Powered Splasher/Diffuser	Ground-based excavation, Noise	Daily	2.5 months
C- Electric-Powered Cascade Aerator	Ground-based excavation, Noise	Daily	3 months
D- Shambow Pond Diversion Pipeline	Ground-based excavation, Noise	Daily	1.8 months
E- Permanent Barrier from Elk Springs Creek to Lake Center	Lake-based excavation, Ground-based excavation, Noise	Daily	1.3 months
F- Dredge and Berm Elk Springs Creek	Lake-based excavation, Ground-based excavation, Noise	Daily	29 months (3 seasons)

In addition to the noise associated with construction, there will also be noise associated with the operation and maintenance of some of the alternatives (Table 2). For example, operational noise for Alternative C would be the operation of a pump at a campground near the Lake from approximately January through March. Noise associated with the maintenance of Alternative D is expected to be from any machinery needed to maintain the pipeline and associated cleanouts. No operational or maintenance-related noise is expected from Alternative F.

Table 2. Disturbance type, frequency and duration for operation and maintenance of alternatives identified to increase the area and oxygen concentration in Upper Red Rock Lake during harsh winters. All frequencies listed in this Table are expected to occur annually for 25 years.

Alternative	Type	Frequency	Duration

A- No Action	Noise	Annually	1 day
B- Electric-Powered Splasher/Diffuser	Noise	Annually	101 days
C- Electric-Powered Cascade Aerator	Noise	Annually	101 days
D- Shambow Pond Diversion Pipeline	Noise	Annually	2 days
E- Permanent Barrier from Elk Springs Creek to Lake Center	-	-	-
F- Dredge and Berm Elk Springs Creek	-	-	-

Alternative C is expected to have the most ground-based disturbance during construction, thus we analyzed the effects of this alternative for the purposes of Sec. 7. We also analyzed the effects of Alternative D, because the ground-based disturbance was in a different area than the other alternatives and this alternative had the longest duration of ground-based disturbance and associated noise. We also analyzed the effects of alternative F because it had the longest predicted duration of noise disturbance among all the alternatives, although the majority of the noise disturbance was expected to be created offshore in the Lake. Alternative F also had a smaller duration of land-based disturbance, which we also analyzed. Effects from alternatives A, B and E are covered in this analysis because the effects of those alternatives are bounded by and lesser than the effects of Alternatives C, D, and F.

VI. Determination of Effects:

(A) Description of Effects:

Grizzly bear- The ground-based disturbance associated with Alternative C will occur in the right-of-way of an existing road and in a campground adjacent to the Lake. Both these areas are already disturbed and have some level of baseline noise associated with their presence. Noise from the existing road is likely from passing vehicles, slamming vehicle doors and human voices at turn-outs where Refuge visitors park, leave, and return to their vehicles. Noise from the campground is likely human voices, vehicle noise, slamming vehicle doors and the sounds associated with camping (e.g., camp set-up, cooking, making a fire, etc.). While the use of equipment to bury a powerline in the existing road right-of-way and improve the boat ramp at the campground are expected to cause disturbance, the construction will occur in previously disturbed areas with existing human-caused noise. The decibel level of construction equipment may be higher than that of the baseline noise levels in the existing road right-of-way and the campground. However, these noises are expected to be reduced by distance and topography. For example, the doubling of distance from a noise source reduces the decibel level by 6 dB (i.e., going from 10 feet to 20 feet away from the noise source reduces the dB level by 6, then going from 20 feet to 40 feet reduces the dB level by another 6 dB). In this manner, the noise of trenching in the road right-of-way and construction at the boat ramp will be attenuated the further the sound travels from the source. There are several sections of road and associated right-of-way that are bordered closely by mature forest, where noise levels would be greatest within the forested region south of the road right-of-way.

Alternative D is also expected to create construction noise around Shambow Pond and the ground-based portion of the excavation is expected to take up to 49 days to complete. Similar to Alternative C, noise is expected to attenuate with distance from the construction site. For example, noise at the construction site is estimated to be 85 dB. The distance from the construction site to forested habitat on the south side of the road (a plausible habitat type for a grizzly bear to occupy during daylight hours) is approximately 573 feet. At this distance, the dB level of the construction noise when measured at the forest edge would be about 30 dB, similar to the decibel level of a whisper.

Alternative F involves dredging in the Lake for up to 870 days, among 3 field seasons. The dredges are in the Lake and work at varying distances from the shoreline of the northeast corner of the Lake. While the duration of noise associated with dredging is the longest of the alternatives, we expect the dredges to be far enough out in the Lake where the noise has attenuated to a low dB level when measured at the nearest shoreline.

Grizzly bears are known to occur on the Refuge. Grizzly bears near the Project Area may hear construction noise associated with any of the alternatives. These noises may affect grizzly bears, with the most likely response being the bear moving away from or circling around the noise if traveling. Grizzly bear movement in response to noise associated with any of the alternatives may result in temporary disturbance. We do not expect permanent displacement of any grizzly bears because construction for all alternatives is temporary, sites with planned terrestrial disturbance are already disturbed and there is an existing baseline level of human-made noise associated with them. We do not expect disturbance to bears from any Lake-based construction because of the expected distance construction would occur away from the shoreline, associated sound attenutation, and general lack of grizzly bear habitat in the Lake. Disturbance to bears from the operation of any alternative is not expected because these noises would occur from approximately January through March, when bears are expected to be hibernating. Thus, effects to grizzly bears from any of the alternatives are expected to be minor in magnitude and frequency and temporary in duration.

Canada lynx- The project site is located in primarily open habitat and partly in a lake, both of which are not preferred by Canada lynx. Forested areas surrounding the project site may potentially be used by Canada lynx, but the project footprint will not impact those areas. Noise disturbance from the project is expected to be buffered by distance to forested habitats and by topography.

Wolverine- The project site is located in primarily open habitat and partly in a lake. Wolverines are not typically associated with lake habitat, but do utilize open areas. However, the terrestrial portion of this project would be in the right-of-way of an existing road and in areas adjacent to the road, not in typical alpine habitat used by wolverines. Forested areas surrounding the project site may potentially be used by wolverines, but the project footprint will not impact those areas. Noise disturbance from the project is expected to be buffered by distance to forested habitats and by topography.

(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____
Canada lynx and wolverine	
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.**	___X__
Grizzly Bear	
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.**	_____

Signature: MICHAEL BRYANT Digitally signed by MICHAEL BRYANT Date: 2023.02.21 10:37:33 -07'00' 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: ADAM ZERRENNER Digitally signed by ADAM ZERRENNER
Date: 2023.02.21 10:56:10 -07'00'

Signature: _____ Date _____

Appendix C: Public Comments and Response

Public Comments on the Draft EA

Comment #1:

A 15-day comment period is outrageously short for a project of this magnitude in designated Wilderness. This is not nearly enough time for members of the public and conservation organizations to analyze the proposal and prepare detailed comments.
Wilderness Watch formally requests that the comment period be extended to 45 days.

Comment #2:

I don't understand why you have a 14-day comment period -- actually less than that since the article on it just hit the news today -- on a proposal that will take at least a year to implement.

The STANDARD comment period for both state and federal agencies for public review and comment is 30 days minimum unless there's some real emergency -- like a washed out bridge replacement.

I am therefore requesting you reconsider your comment period, extend it to the full 30 days, and give the public, whom you serve and who own these resources, the opportunity to fully review and consider the consequences pro and con of the Upper Red Rocks Lake "aeration" project.

And one more thing -- Upper Red Rocks Lake is in a wilderness area which is supposed to remain "untrammeled by man" as plainly stated in the Wilderness Act. ALL your proposals include mechanical manipulation of the lake, including potentially, pipelines, pumps, transmissions lines and aerators.

I intend to raise this issue publicly and with Martha Williams, your boss, since what you're trying to do is EXCLUDE, not include, the public.

Sorry to have to write this, but you are way out of line to bring this proposal with a shortened, almost ridiculous, public review and comment period.

I look forward to your reply -- and your decision to rescind the very short comment period and follow the long-standing precedent of a 30-day public review and comment period. The last people to try this in Montana was the Forest Service at Holland Lake Lodge -- and you see where it got them. In very, very hot water -- and they're not out of it yet. Setting up your agency for a lawsuit is not particularly good for you or the public.

Comment #3:

Thank you for your work with Fish and Wildlife. The public, national and international, count on public officials to do so much to help our amazing environment and ecological systems thrive. The public is a mix of nature appreciators, but not scientifically not well versed, and appreciators who understand the complexity you all deal with daily, politically, scientifically, and structurally. Not an easy task, and I wanted to first of all, say, that the work of committed civil servants is central to science based and authentic research and decisions in this Democracy. Thank you for all you do.

As a member of the public, I also appreciate that we can connect with government agencies with observations and ideas which occasionally can be beneficial. I would like to add my 2 cents worth, and

that is, pertaining to the 15-day comment period for the Arctic Grayling in Montana, that it be extended to at least 30 days. Family life is busy enough, but to have a topic of consideration come up, and only two weeks to fit in thoughtful consideration, well - it's not very much time. Please have your agency reconsider all time frames to be at least 30 days for public comment.

Comment #4:
Please take action to keep the native Grayling population in Red Rock Lake MT from going extinct. Many studies have been done. Now is the time to take action.

Comment #5:
From what I gather, the graying in Red Rocks Lake are in dire straits and may need supplemental oxygen injected into the lake to keep them alive. The overwinter habitat is no longer sufficient to allow survival of the grayling. No action is not a good alternative. Thanks for your attention.

Comment #6:
I support taking action to enhance survival of grayling in Upper Red Rock Lake. Select an option that is biologically sound, is reasonably cost effective and minimizes impacts to other fish and wildlife. To take no action may lead to the demise of this population.

Comment #7:
While I do not know which method would be best to re-oxygenate Upper Red Rock Lake, I know something needs to be done. The grayling numbers are so low that a minor disaster could completely wipe out the species. I urge you to choose a method and get it done. Two thought, which I am sure has been mentioned. Why not solar power to run the oxygenation pumps? Considering the cost of most of the options stated it might be less expensive to run 3 miles of wire to a sight on the lake rather than to hire a barge or do other types of construction. In any case I urge you to do something as soon as possible.

Comment #8:
I am reaching out to encourage you to support actions that will ensure the viability of Artic Grayling native to Red Rock Lake. Grayling are an incredible native fish that persists in very few locations in the lower 48 states. With that in mind, I ask you to support the best alternative that will allow Grayling to survive into the future. I believe no action will only ensure the slow demise of one of Montana's most iconic fish.

Comment #9:
I strongly concur with the USFWS's plan to add systems to add oxygen to upper Red Rock Lake during the winter. Please work together to implement this plan.

Comment #10:
The Beaverhead Conservation District was formed in 1950 by local citizens to provide technical assistance to landowners in carrying out soil and water conservation practices. We have supported local agricultural producers in their decades of hard work and sacrifice toward maintaining Arctic grayling populations in the Big Hole River. Currently, similar efforts are underway through the CCAA progrnm in the Centennial Valley and Red Rock watershed. We believe that action is necessary both in Red Rock Lakes and its tributaries to maintain and improve grayling habitat and populations. Without the proper winter habitat provided by oxygenated lake water, this population is in peril, and any efforts agreed to

through a CCAA by local water users and private landowners will be in vain. If we lose the Red Rock grayling population, the decades of work in the Big Hole could also be wasted in the event of an Endangered Species Act designation for grayling.

Beaverhead Conservation District urges action and does not support the No Action alternative from the Environmental Assessment. We support immediate implementation of an action to improve gray ling winter habitat and prevent extinction in Upper Lake and, if needed, a subsequent minimally invasive and effective action to promote long-term recovery of this important population.

Comment #11:

The Beaverhead-Deerlodge Working Group (BDWG) is an independent group that works collaboratively on issues relevant to the Beaverhead-Deerlodge National Forest, the surrounding lands, and reliant communities. The BDWG does not include Forest Service employees and is not directed by the Forest Service. This is a comment letter pursuant to the draft EA for Arctic Grayling Conservation at Red Rock Lakes National Wildlife Refuge. Members and member organizations use the project area and adjacent areas in various ways. Members of the BDWG represent County Commissioners, timber, agriculture, municipal water, mining, conservation NGOs, hunting, fishing, motorized recreation, quiet recreation, and concerned citizens.

The BDWG wants to convey three points: the importance of Arctic grayling conservation in Montana, the need for urgency, and the need for a grayling conservation project.

Importance of Arctic Grayling Conservation in Montana

For over 25 years, Montanans with wide-ranging backgrounds have collaboratively worked together across Southwest Montana to prevent the extirpation of Montana's most iconic salmonid, the Arctic grayling. Drought in the mid-90s led to significant water withdrawals resulting in the drying of river sections causing a massive population decline across the grayling's native range. The threat of a listing under the Endangered Species Act (ESA) brought folks together to improve conditions on the ground for grayling and potentially affected landowners and industries. The primary conservation objective for management agencies in the Upper Missouri River ecosystem is to ensure the long-term, self-sustaining persistence of grayling (2022 Artic Grayling Conservation Strategy). Upper Red Rock Lake (URRL) is home to one of two aboriginal populations that have endured many stressors. The other is in the Upper Big Hole watershed. There is also a small, but important reintroduced population in the Upper Ruby River.

The Need for Urgency

For the past 12-plus years, biologists from the USFWS, Montana Fish, Wildlife & Parks, and multiple other partners have demonstrated, through an adaptive management plan, that overwinter habitat is the limiting factor for the URRL grayling population. Time is of the essence. This population, estimated below 100 fish, has declined dramatically in the last 6 years due to shrinking overwinter habitat from drought and other factors. Anthropogenic habitat alterations in the Refuge have led to an increase in the migratory bird population that uses URRL, leading to an increase in aquatic plant growth, contributing to the hypoxic conditions when the plants die back in the winter.

The draft EA is considering several alternatives, including a No Action alternative. Given the implications of an ESA listing and the enormous number of voluntary efforts across the region for the benefit of grayling, the BDWG believes the No Action alternative would be an irresponsible choice with dramatic ramifications to stakeholders across the grayling's native range. Southwest Montana is a working landscape. If this population was listed under the ESA, it

could negatively affect ranchers' ability to manage profitable grazing allotments and further slow much-needed timber and fuel-reduction projects on Forest Service property. Further impacts would be felt on water rights holders adjacent to the habitat inhabited by grayling, including the Butte-Silver Bow municipal water supply which relies on the Big Hole for approximately 20% of its municipal water supply.

The Need for a Grayling Conservation Project

With the most recent lawsuit to list grayling under the ESA in January 2023, the USFWS must take the bold step to enhance overwinter habitat for this population of grayling that inhabit the Red Rock Lakes Wildlife Refuge. To date, voluntary sacrifices made in the Big Hole watershed, and subsequently the Upper Red Rock watershed through the United States Fish and Wildlife Service (USFWS) administered Candidate Conservation Agreement with Assurances has kept the grayling from being listed under the ESA. In years with minimal water availability like 2021, many CCAA participants have gone above and beyond their discrete site plan to leave more water in the stream for grayling. If the USFWS and the Refuge don't do everything they can for grayling, it jeopardizes voluntary efforts on private land across the region.

The BDWG recommends the USFWS choose a project alternative with immediate benefits while considering the best project alternative to sustain a long-term population of grayling in URRL. Failing to implement a project risks the survival of these grayling, as well as a failure to uphold the values and goals of the Refuge and Wilderness detailed in its enacting legislation. Extirpation of Arctic grayling in Upper Red Rock Lake would be a significant biological, ecological, and cultural tragedy.

Comment #12:

The 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 developed by the US Fish & Wildlife Service (FWS) and Montana FWP, we fully support improving Arctic grayling overwinter habitat both immediately and in perpetuity to ensure and enhance their survival.

Improving overwinter habitat within the Upper Lake has been clearly identified as the primary long-term solution to safeguard Arctic grayling from extirpation on the refuge. To meet this objective, MTAFS initially strongly recommends selecting any alternative outlined in the draft EA other than the No action alternative. The No action alternative is unacceptable, lacks responsibility and will result in further decline and extirpation of a native, endemic Montana fish species.

MTAFS first recommends FWS and the Refuge initiate a project, which have been thoroughly evaluated as alternatives in the draft EA, immediately to improve overwinter habitat for Arctic grayling within the Upper Lake. Next, consider implementing additional projects, based on non-No action alternatives evaluated within the draft EA, as needed to 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 improving Arctic grayling overwinter habitat both immediately and in perpetuity to ensure their survival

by enlisting any or all of the "action" alternatives found in the Arctic Grayling Conservation on the Upper Reck Rocks Lakes National Wildlife Refuge draft EA. Thank you for the opportunity to provide comments.

Comment #13:

I read the article by Duncan Adams in the Helena Independent Record, published last Friday, March 3, and here give you my comments. I have not read the EA on this proposed action but I have a good feel for the dilemma you are faced with.

Let me preface my comments with my credentials. I have a B.S. in Fish and Wildlife Management from the University of Minnesota and a Ph.D. in Botany (with emphasis on limnology and aquatic ecology) from MSU in Bozeman. For the last 50+ years I have worked as an aquatic ecologist for the State of Montana and in private practice. I am familiar with winterkill in the shallow eutrophic lakes of central Minnesota where I grew up and I have caught (and admired) grayling from Hyalite Creek where it enters Hyalite Reservoir and in alpine lakes above Hyalite.

Eutrophication is a natural process that will progress with time until the lake becomes a wetland and, eventually, a wet meadow. It can be slowed only with significant inputs of energy, time, materials and money. Compounded by climate change, summer water temperatures will likely increase, perhaps beyond those tolerated by grayling. Production of plant biomass will also increase, exacerbating the winterkill problem.

Genetics aside, I am aware that there are thriving populations of Arctic grayling in Canada and Alaska, as well as caribou that once occupied marginal habitat in extreme NW Montana. Populations of cold stenothermal organisms at the southern edges of their ranges will be under more thermal stress than those at their centers.

With these caveats, I advise against applying artificial measures to extend the existence of the Upper Red Rock Lake population of Arctic grayling. This includes alternatives that require 1) energy inputs in perpetuity (how will the electrical power be generated; coal-burning power plant?); 2) the use of piping (plastics are made from crude oil and natural gas and require a tremendous amount of energy to manufacture); 3) installation of permanent structures or physical alteration of the natural habitat (of what material would the "impermeable wall" be built in Alternative E?). Further, are these kinds of measures compatible with the Wilderness Act and the refuge's Wilderness status?

All of this leads me to advise Alternative A.

Comment #14:

Mike Bryant sent me a copy of the draft plan for restoring Arctic Grayling in the Centennial Valley. The deadline for comment is now March 28. There were five options for action with few details regarding cost or implementation. Regardless, I would like to comment. I would like the Artic Grayling Project to limit actions to the most natural, least intrusive intervention. Please consider doing nothing.

By way of background, I have lived in the Valley off and on since 1949, when my grandparents owned what is now Walsh's place. My ancestors were the Beans, the Blakes, and the Shambows. I not only have my own experiences, but I also have memories, stories, and pictures from family members, including some great fishing stories. Now, I own a summer cabin in Lakeview, where I see clients online

when I am there. I am sharing this history to establish that I have some knowledge about the Valley's natural and human history and, as a native resident and as someone who fishes, a stake in the outcome of the Artic Grayling Project. I believe fishing has been compromised, directly and indirectly, since restoration efforts were directed at Grayling. The Grayling Project is being conducted on Refuge land and private land, by federal staff and, regarding stream restoration on private land, The Nature's Conservancy. The "five landowners" referenced in supporting documentation include absentee landowners who are new to the Centennial and, in some cases, want to discourage fishing on their land. The Refuge has discouraged fishing from the beginning, first to protect the swan nesting areas and now to relieve pressure on the Grayling. Whether on public land or private land, killing stocked trout and Cutthroat trout and manipulating streams to improve fish habitat does not seem to be working. I believe fishing overall in the Valley is endangered due to many factors. Poorly planned interventions such as dams and ditches, both on the Refuge and on private land, continue to take a toll. Landowners are still putting in new ponds. Almost everything that was done for the birds also hurt the fish. The final blow to fishing has been the recent effort to restore Grayling, remove other trout, and try to improve the streams for the Grayling. These efforts are not working. Finally, regardless of current efforts, the lack of water and the rising water temperature due to drought and warmer weather are problems that cannot be sustainably fixed. A lot of money and effort has been thrown at a problem that will continue to get worse, regardless.

The current project proposal focuses on the low oxygen content of the Upper Red Rock Lake. I do not believe artificially restoring oxygen can be a permanent fix if the temperature continues to rise and the drought continues. Pumps cannot run for eternity. The rumbling generators will pollute. I will be very sad if you permanently destroy the serenity of Shambow Pond with your efforts. Regarding putting a barrier from Elk Springs Creek to the lake, you are talking about a permanent barrier that cannot be undone. The proposal "to dredge and berm Elk Springs Creek" is the most concerning. It sounds as though the plan is to dig a big ditch from Elk Springs to Upper Red Rock Lake. I am afraid the geography and animal habitat of the entire section will be destroyed. Trout prefer streams with swift water, bends, and cool holes in which to hide, not a ditch. The fish will be easy prey for predatory birds. There is just not enough information to know all each option includes and if potential, negative consequences have been considered. I am concerned that construction and other noisy efforts to restore oxygen to the lake will disrupt the swan and migratory birds. I notice Ducks Unlimited is not listed as a collaborator. Would they have supported any of the options? Even small changes have big consequences. Tweaking one part of the system can have unanticipated, undesirable outcomes for other animals and plants. Given the inevitability of climate change and the likely negative consequences of most interventions, I believe it is better to let the grayling die out than to upend the entire ecosystem.

I have seen the impact of this kind of speciesism before, regarding the swan. For years, Refuge staff trapped and killed the animals that threatened the swan, including the snowy owls. Fish were not a priority species at that time. The water was dammed and diverted for the swan. Managers were judged based on the swan count. In the recent period, the Refuge seemed to take a more holistic attitude to their mission. But now, I fear the Artic Grayling are the new swan. There will be similar negative outcomes on birds and animals when other species are not considered.

Finally, the potential amount of money involved is upsetting. Working in Public Health and social services, I have devoted my life to the war on poverty and the health of women and children. A lot could be done with the money that would make an impact on poverty and health. I understand that the money will come from funds that are allocated to Fish and Wildlife but "robbing Peter to pay Paul" is still the dynamic. The priorities seem out of kilter with the need.

That said, if you all persist in going forward, please do the least disruptive, least expensive option. We had a cold winter. It was nothing like the old days, when the temperature dropped to 40 below and stayed there through January, but maybe winter has been cold and wet enough to buy time for the fish. I would like to see you all proceed with low-impact interventions rather than make radical, permanent changes.

I understand there is urgency because of a possible pending lawsuit on behalf of the Grayling and the Endangered Species Act. I believe that you all have demonstrated by this proposal and the five options that you have considered even the most drastic interventions. It looks as though it is impossible to restore the Grayling without damaging big parts of the system, permanently. I think you have done enough due diligence to go to Court and let the judge decide without proceeding further.

The Centennial Valley is not a petri dish. It is a beautiful place that has a history and, hopefully, a future. It is not just a Swan Project or an Artic Grayling Project. The Valley is more than fish or birds. I believe it is a sacred place. Please honor the Valley and be its conservative stewards. If you must intervene, please keep interventions to a minimum.

Thank you for this opportunity to comment.

Comment #15:

The only choice of your listings is Alternative F. The others will wreck havoc. I have been going to watch the swans since the early seventies. Last year I witnessed the draining of the lower lake to meet the ranchers' needs. While it was empty did anyone do soil removal? The erosion factor at the ne corner of refuge is hastened by large number of OHV. Not only does this problem affect Red Rocks, but also the southern access to Gravelly Mtns. By curbing that traffic or by building trails for 4wheelers in that area, the erosion might be reduced. Please go gently to save this precious refuge and do the right thing.
I was glad of the reprinted information & extension. I realized that in my initial response I chose Alternative F only to reread and find I definitely want Alternative A- no action. When I first came to RR it was the early 1970's. As you entered the valley from the East, you crossed a muddy stream strewn with garbage, couches & disgusting debris. The grayling survived that. Let's leave it to them & nature. I will repeat that I believe action should be taken to keep OHV on trails at SE corner of refuge. Thank you.

Comment #16:

I have lived in the heart of RRLNWR for over 50 years and have followed closely the various Refuge programs to increase the grayling population. I have also monitored and documented the population of many of the bird species for which the refuge was created and clearly see a decline in most of these as well as with the grayling. However, bird populations seem to have been overshadowed by concerns for the fish.
In an attempt to increase the grayling, Macdonald pond, which was a prolific duck nursery was completely removed and an attempt to do the same with Culver pond was luckily averted by public pressure. Following these, there was a violent action to open the channel from the upper lake to Elk Lake creek by dynamiting this! I am not aware that there were any public comments solicited for any of these radical actions and clearly the results failed, as well as numerous other activities.

The latest actions are to pump oxygen into the upper lake during the winter from the nearby Shambow Pond. This requires extremely noisy generators and mechanical devices which are strictly against the Wilderness Act! There are generators testing this system at present that can be heard from their position in the campground to my ranch.
I have been informed by two reliable conservation organizations that they will sue the FWS to prevent any invasion of the wilderness area.
It is well documented that these fish started in their current downward direction at the same time as the completion of the Lima reservoir dam, preventing them from using their ancient migration route from the Beaverhead river to the Centennial Valley. Why has not this been publically documented by FWS?
Any further actions will have similar results leaving only one sensible solution; DO NOTHING

Comment #17:

My family and I have lived in the Centennial Valley over 50 years. Over the years we have been eyewitnesses to several projects the Red Rock Lakes National Wildlife Refuge has undertaken.
This News Release states the object of the Arctic Grayling project is to improve overwinter conditions and leans toward the recent drought conditions as causing lower oxygen level in the Upper Red Rock Lake. This winter, 2022-2023, has been like the winters we had as kids in the valley in the 1970's and 1980's with snow totals nearing 5-6' in the valley.
Reading through the proposed plans for protecting the Arctic Grayling it appears that oxygenating the water has been tried before without success. In fact, this year's project to again oxygenate Upper Red Rock Lake has not produced the desired results according to the reports provided. It reminds me of the project to protect the nesting ground of the then plentiful Trumpeter Swan. The results have produced the smallest population of swans ever seen. We are lucky if we see 2-3 pairs in the summer now.
The refuge states that they request public input before they begin a project, however that did not happen regarding a forestry fire protection project just a couple years ago. The homeowners, including me, were told there would be a 130' wide band along the Refuge and privately owned land that would be thinned as a fire protection. Several of us landowners had completed this thinning process on our own land, so we were thrilled to have an additional area processed to protect what we had already done. However, the next summer the Refuge hired a team which girdled trees along boundary line for several miles and left them to die creating an exacerbated fire danger instead of the fire reduction that had been communicated. These trees now stand as dead timber, kindling if you will, for the next possible forest fire.
Nature has been taking care of itself for hundreds of years. The natural balance seems to be upset when we humans try to "manage" it. We cannot control winter weather conditions, summer rain or drought conditions, or lightning ignited fires. We can, however, be good stewards of the land we all enjoy and want to keep beautiful. If the Arctic Grayling populations rise and fall it is because nature makes it so.
After reading the 6 possible solutions, I would ask that Alternative A- No Action Alternative, be the one chosen for this project.

Comment #18:

Of the six alternatives offered I would recommend alternative A – no action. The fish did well for ages, I suspect the gradual warming of the upper lake is the root cause. All of the proposals might at best delay the demise of the grayling but at the cost of possible irreversible damage to the refuge or some other segment of the ecosystem.

As residents and landowners in the Centennial Valley I feel we will be left again with the undesirable outcomes if the other alternatives have unintended results. The risks to the valley and refuge outweigh any possible benefits.

Comment #19:

Thank you for the opportunity to review and submit a comment regarding the Environmental Assessment for Arctic Grayling Conservation at Red Rock Lakes National Wildlife Refuge. My name is Tassi Duffner, and I am a year-round resident of the Centennial Valley. My husband's family has lived and worked in the Centennial Valley for generations. I can confidently speak to the landscape, the realities of the weather, and the impact on the community.

I appreciate the efforts of all the partnering agencies. My interactions with specific individuals has been beneficial, and everyone has gone above and beyond to stay transparent. Matt Jaeger, Mike Bryant, and Jeff Warren have been excellent communicators. I am grateful for their insight, expertise, and time. It is clear that all parties involved have the best intentions.

I find it alarming how little mention there is regarding weed management for the proposed alternatives. Many families in my community depend on the land; the spread of any invasive 1 weed can potentially be financially devastating. Our community and NGO partners put in a tremendous effort to keep our landscape as free of invasive weeds as possible. Knowing that (except for Alternative A) excavating/ground disturbances will be required, it is surprising that the weeds we will have to deal with are not deemed to have a more significant environmental impact. I could only support a proposed action if FWP and USFWS were to develop a formal, comprehensive management plan for weeds that would hold all agencies and partners accountable. A management plan should include input from the Beaverhead County Weed District and Beaverhead County MSU Extension Agent.

Alternative A. While I believe the current efforts are important and have some impact, given the litigious attention the Grayling have drawn, this alternative is not a realistic solution. Without additional measures incorporated, this alternative does not truly satisfy the standards set by the state of Montana to manage wildlife to prevent listing under the Endangered Species Act.

Alternatives B & C. These alternatives appear to have a more negligible environmental impact on the wetlands and designated Wilderness Areas. Although, further considerations regarding community impact are necessary. Vigilante Electric must be consulted and inform the community of the possible effects of extending the power lines on South Valley Road. Developing the power line should be contingent on the potential impact on residents. Additionally, if moving forward with any of these options, diffusers, motors, etc., should be thoroughly investigated to ensure minimal noise disturbances for the wildlife and people living nearby. I request a comprehensive management plan for weeds to be in place and made public before moving forward with alternatives B or C.

Alternative D. Gravity flow pipelines freeze in the Centennial Valley when installed with regular recommendations. My family has had experiences with freezing and has had to re-burry lines multiple times. If this alternative is selected, I urge agencies to reexamine depth recommendations. Additionally, this alternative does invite possible outside interest scrutiny due to the permanent construction in a designated Wilderness area. Again, I request a comprehensive management plan for weeds to be in place and made public before moving forward with alternative D.

Alternatives E & F. These alternatives do not address the issue in an appropriate time frame, and I could not support these options as a practical solution for an immediate problem. Knowing how much and how quickly sediment builds up waterways, ponds, and lakes in the Valley E & F would be expensive and difficult to maintain over the years. Again, I request a comprehensive and ongoing management plan for weeds to be in place and made public before moving forward with alternatives E & F.

Lastly, many in the community have discussed the noticeable increase in recreation in the Centennial Valley since the easing of angling regulations in an attempt to cull non-native Yellowstone Cutthroat. I

cannot stress enough how valuable to the community it would be for involved agencies to provide a more detailed explanation regarding what research and efforts to evaluate the probability of angling as a contributor to declining grayling numbers. I appreciate the response and action in establishing additional angling closures on Red Rock Creek and Elk Springs Creek. I request that the regulations be consistent on Elk Springs Creek and Red Rock Creek. 3 When determining the best path forward, I ask that equal value is put on the grayling, the people of the community, and the wilderness. Jane Goodall has said, "Conservation will never work long-term unless the local people are involved." Goodall has also repeatedly talked about anecdotes and observations being valid to the scientific discussion; I think this is true wisdom and profoundly fitting in the Centennial Valley.
I appreciate the opportunity to submit comments regarding the Arctic Grayling conservation at Red Rock Lakes National Wildlife Refuge. I value the time and energy put forth by all those involved.

Comment #20:

The Trumpeter Swan Society (TTSS) is a non-profit organization, founded in 1968 and dedicated to assuring the vitality and welfare of wild Trumpeter Swans. We are the only non-profit organization working for Trumpeter Swan conservation across North America. Trumpeter Swans are clearly the reason Red Rock Lakes National Wildlife Refuge was established in 1935. The National Wildlife Refuge Administration Act as amended December 27, 2022, states that: “each refuge shall be managed to fulfill the mission of the System, as well as the specific purposes for which that refuge was established.” Since Trumpeter Swans are RRLNWR’s purpose, the Service is required to ensure that any actions taken must be consistent with its purposes. Since our founding, the Trumpeter Swan Society has had a close working relationship with the Refuge on Trumpeter Swan issues throughout our history. We are writing to provide comment on the draft Environmental Assessment relating to Arctic Grayling winter management on RRLNWR. We specifically oppose Alternative F in the proposed Environmental Assessment for Arctic Grayling Conservation: Dredge and Berm Elk Springs Creek. Submersed aquatic vegetation (SAV) is important to Trumpeter Swans as foraging habitat. Dredging will negatively impact SAV in the Upper Lake and will also result in increased siltation beyond the 25 ha proposed for direct impact. Moreover, dredging is not likely to be a permanent solution, as mentioned, meaning that repeated disturbance is likely far into the future if water depth is to be maintained for Grayling. Finally, spoil removed will be deposited elsewhere within the basin, further reducing aquatic vegetation and wetland habitat important to Trumpeters and other wildlife. Alternatives B1, B2, C, D and E are likely to have much less impact on Trumpeter use and their habitat in the Upper Lake. Although the Trumpeter Swan Society views these alternatives as less damaging, we do note that construction and installation activities could have impacts on other 2 fish and wildlife and will detract from the wilderness nature of the area. Before moving ahead with any of these alternatives, because of the costs and impacts of the alternatives proposed, we also suggest broad and rigorous scientific assessment of factors that may be limiting Arctic Grayling populations in the RRLNWR. Thank you for the opportunity to publicly comment on the Draft Environmental Assessment

Comment #21:

Of the proposed actions for conserving the Artic Grayling population at Red Rock Lake National Wildlife Refuge, I support Alternative B2, using electric-powered diffusers to maintain open water on Upper Red Rock Lake during the winter, believing it will accomplish the conservation mission most efficiently in terms of construction, energy consumption, maintenance and impacts on other wildlife. From a practical perspective, commercially available solar-powered systems can do this job even during the snowy winter months. You might consider allowing such a system to operate all summer as it may also mediate

macrophyte growth/improve the health of the lake. I appreciate this effort and hope the service will closely monitor the ecosystem and report on the effects of whatever option is chosen.

Comment #22: 32 total copies received of the following comment

I believe immediate action should be taken by the USFWS to protect Upper Red Rock Lake grayling. The 'No Action' alternative will result in the extirpation of this population. I encourage you to select an alternative to increase overwinter habitat that will have minimal impacts to the Refuge and Wilderness.

Specifically, I believe that underwater diffusers and the Shambow pipeline to be the best options to save these special fish and one or both in succession should be implemented. Thank you for your time and consideration.

Comment #23:

I am a lifelong resident of Montana, a full-time fishing guide and member of Montana Trout Unlimited. I believe that immediate action needs to be taken by the USFWS to protect Upper Red Rock Lake grayling. The “No Action” alternative will without a doubt result in devastation of this population of fish. I encourage you to select another alternative to increase overwinter habitat that will have minimal impacts on the Refuge and the wilderness.

Underwater diffusers and the Shambow pipeline are the best options to save these fish, and one or both in succession should be implemented. No action is not a viable alternative. Please choose a solution that will not devastate a very special species we are privileged to still have in Montana. The URRL population of grayling has already declined due to low oxygen levels in the water during the winters, and this already stressed species may be in danger of disappearing altogether.

Comment #24:

I am a Montana resident. I urge you to take action to protect the Upper Red Rock Grayling population in southern Montana. I would be heart-broken to lose a population of beautiful Grayling. These Grayling may be saved by underwater diffusers or a Shambow pipeline. As you probably know, the problem is deoxygenated water under the ice in winter.
Thank you for considering my comments.

Comment #25:

I implore you to work to do what you can to increase survival of the grayling over-wintering in Upper Red Rock Lake. I caught my first grayling in the Centennial Valley in 2010 and then had the privilege in 2020 to try again (fish but not catch). And I want to go back again—this time with my daughter who has become an avid flyfisher and let her have the experience of a lifetime that I had. I am not trained enough to know if the underwater diffuser suggestion or the Shambow pipeline is the best solution—so why not double-down and try both? We cannot lose this fishery!

Comment #26:

Please protect the Upper Red Rock Lake Grayling. Immediate action is necessary, or we will lose this opportunity to save the population. Please do not allow a "no action" situation, but instead choose an action that allows an increase in overwinter habitat. There are choices that would have minimal impact on the Refuge and Wilderness.

It makes sense to me that underwater diffusers and the Shambow pipeline would be the best options to save these fish. You could do one of these at the minimum, but ideally, both of these could be implemented.

Comment #27:

Arctic Grayling are a special native fish, that don't exist in many parts of their original range, at least here in Montana. Upper Red Rock Lake is one place where they do occur, although as you know that population is threatened. According to the science based reports that I have read, these fish may disappear for good if immediate action is not taken. Of the options presented in the EAS, I believe that underwater diffusers and the Shambow pipeline to be the best options to save these special fish and one or both in succession should be implemented. Thank you for your time and consideration.

Comment #28:

It is important to protect the Arctic Grayling in Upper Red Rock Lake, it looks like all alternatives B and D, is completed in concurrence, would be the best protection with minimal impacts.

Comment #29:

I believe immediate action should be taken by the USFWS to protect Upper Red Rock Lake grayling. The 'No Action' alternative will result in the extirpation of this population. I encourage you to select an alternative to increase overwinter habitat that will have minimal impacts to the Refuge and Wilderness.

I understand the concern about disruptive action in a Wilderness area, but the WHOLE POINT of Wilderness areas is to save wilderness characteristics as exemplified by Arctic Grayling. Failure to act would be counter to the needs of that particular wilderness, and the proposed actions can be remediated so that no real, lasting damage to the wilderness is visible or apparent.

Specifically, I believe that underwater diffusers and the Shambow pipeline to be the best options to save these special fish and one or both in succession should be implemented. Thank you for your time and consideration.

Comment #30:

I first would like to congratulate you and thank you for holding what may be the first public consultation on the above. It is much appreciated given the growing concern over the steady decline of this beautiful native holarctic salmonid in the Centennial Valley.

1. Introduction:

I am the Managing member of Grayling Centennial LLC ("GC"), a small 1,500-acre in-holding located at 41600 South Valley Road, Lima, MT in the Centennial Valley's Alaska Basin.

The ranch is made up of two 400-acre and 300-acre deeded spreads acquired separately and brought together in 2017 + 2 contiguous BLM leases totaling 800 acres. It produces high-quality hay and supports a small horse operation managed by two permanent employees and myself. Cadastral references: Township 14 S 1E, S15, S22, S23, S24, S25, S26 & S27.

Three creeks relevant to the Environment Assessment flow through the property:

• 1 mile of Hell Roaring Creek ("HRC") between the HRC Canyon and the South Valley Road where it becomes Red Rock Creek.
• 2 miles of Corral Creek ("CC") between the Eastern Centennials and the Red Rock Lakes National Wildlife Refuge ("RRLNWR") Alaska Basin extension.
• 1/2 mile of Cole Creek, a seasonal creek flowing from Mt Jefferson into HRC.

In 2017, GC initiated and funded a substantial multi-year restoration program which included:

1) the removal of two unpermitted ponds near CC.
2) the full rehabilitation of the entire segments of CC and HRC flowing through the ranch, including the construction of pools and spawning redds, revegetation with native Centennial Valley willows and cottonwoods and the installation of a number of Beaver Dam Analogs in the HRC drainage area, which is prone to Spring flooding.
3) the replacement of two damaged undersized culverts under the South Valley Road (+code 85PCHFX2+M3) which obstructed HRC's flow and fed a large borrow ditch south of the road causing warm water to be released into the Creek throughout the Summer months.
4) the creation of a 6-acre fish pond and wildlife hemi-marsh in lieu of a degraded pasture (+code 85PCJC47+43). The 3-acre hemi-marsh segment of the pond has an average depth of 1 1/2 foot, and the rest of the pond a maximum depth of 15 feet.

The purpose of these investments was to help restore CC and HRC as sustainable spawning creeks and riparian environments for arctic grayling and native westslope cutthroat trout and help promote the return of a healthy fish population to Alaska Basin.

GC is a signatory to a Candidate Conservation Agreement with Assurances for Arctic Grayling in the Centennial Valley, Montana, within the scope of Permit No. TE06690D-O, issued by the U.S. Fish and Wildlife Service to the State of Montana Fish, Wildlife and Parks (MFWP) under the authority of 10(a)(1)(A) of the Endangered Species Act of 1973, as amended, 16 U.S.C. 1539(A)(1)(A).

I have also reviewed the URRL Arctic Grayling technical report available at:

https://fwp.mt.gov/conservation/fisheries-management/arctic-grayling

On a separate note, I am an advisor to Ranchlands Inc., a Colorado-based diversified cattle and bison ranching operation. Ranchlands acquires or manages and restores large-scale degraded ranch properties in Colorado, Wyoming & New Mexico, promoting sustainable cattle ranching practices, hunting, fishing, leather shops, advisory services and ecotourism.

I also operate a 340-acre fully certified organic winery including PEFC-certified sustainable forestry, regenerative agriculture and ecotourism businesses in the Mont Ventoux Unesco Biosphere and Natural Park.

2. Comments on the 5 proposed alternatives:

2.-A) No Action alternative:

If the testimony of a long retired RRLNWR employee (who helps set up the annual Headwaters Relay Race finish line on the ranch) that 25 years ago Alaska Basin was home to an abundant arctic grayling population cohabiting successfully with native and non-native trout and resident beavers is to be believed, the "No Action alternative" may be the least attractive of all 5 alternatives on the table although Alternatives E (dredging) and F (permanent sheet wall) look scary enough. Beavers are known throughout the West as a keystone species for their considerable powers as regards fish and riparian restoration. I understand this is. subject of current scientific disagreement between the various agencies and do not have the required qualifications to weigh in on this debate. I would simply point out that according to the above eyewitness, beavers and graylings seem to have co-habitated successfully in the past in the Centennial Valley. Perhaps a circumscribed experiment in a specific spawning area could provide useful data ?

Sadly, in spite of its clear and cool water flowing from Brower's Spring through the HRC Canyon, the Alaska Basin section of RRC is now almost devoid of fish apart from a small population of non native brook trout.

With new evidence reported in the Centennial Valley Arctic Grayling Adaptive Management Project Annual Report, 2020 (Warren, Jaeger, Kreiner, Gilham, Cutting, Bateman, Gander, Paterson and Duncan 2021) pointing at a successful co-habitation between cutthroat and arctic grayling, and in view of the continuing decline in the grayling population, perhaps some consideration could be given to letting the pristine RRC eco-system within Alaska Basin recover its former diversity and abundance by temporarily experimenting with the suspension of activities such as creek poisoning, electrofishing and beaver dam eradication whilst continuing to work on improving the condition of its spawning tributaries ?

Anecdotally, if it can sometimes be a bit difficult for private stakeholders to consider what useful contribution they could make in light of inter-agency disagreement on the subject of grayling conservation, the prospect of a comprehensive emergency program being put in place under a unified leadership is indeed very much welcome !

2.-B) Electric powered splashers and diffusers:

Although GC has no experience in the use of electrically powered splashers and cannot contribute any useful feedback, I can certainly attest to the efficacy and very low risk/low cost of the air diffuser option on the ranch.

3 years ago, we put in place 2 solar-powered diffusers in our 6-acre pond & hemi-marsh and have experienced excellent winter survival rates even though water depth can occasionally drop off considerably by late winter.
The equipment is rustic and low-cost: a single solar panel + battery + 2 pumps and a short plastic pipe leading to a diffuser. Winter conditions in Alaska Basin are identical to the URRL if not

worse, owing to the brutal winter winds occasionally blowing from Mr Jefferson. Each diffuser manages to keep a small surface area of ca 300 sq ft free of ice & snow through the winter. We used the same technology in another older & much smaller property pond. Although it could not keep the pond's surface free of ice, the oxygen released yielded a survival rate almost identical to the larger pond, i.e. ca 70 to 80%, substantially lowering the replenishment bill from our certified Montana westslope cutthroat trout supplier ($4k in 2020 down to $800.- in 2022) !

2.-C) Electric Generators pumped aeration:

The Draft Assessment doesn't provide much information as to the power & equipment required to sustain the increased oxygenation objective in relation to the size of the URRL. Would a buried power line be preferrable to buried propane tanks to power the generator, or some other solution ? Notwithstanding the high set up & maintenance costs & CO2 emissions of an outdoor generator and pumping system, the lasting olfactive, visual and noise disturbances don't seem compatible with the scenic beauty and serenity of the site in such close proximity to the URRL.

2.-D) Shambow pond pipeline diversion:

In light of known inter-agency disagreements in the matter of the dissolved oxygen (DO) issue and grayling survival in the URRL, I accepted an invitation from former Refuge employee Kyle Cutting to participate in a day's expedition on 12 March 2021, together with two GC employees Cy McCullough and Anne Blackwood. (see pictures below).

Together we drilled and collected measurements and samples under Kyle's expert direction. We even saw a couple of graylings swimming past one of our drilled holes ! As the hand-writing on the last picture shows, the 16 sampled areas reported dissolved oxygen (DO) as low as .40mg/L and as high as 2.0mg/L, so in many cases below the 50% survivability rate for adults (.75mg/L) and borderline for juveniles (1.50-1.96mg/L), 4.0mg/L being the threshold at which grayling behavioral and physiological response starts being impacted negatively (Davis, McMahon, Webb, Ilgen, Hitch, Jaeger, Cutting 2019).
Partial hypoxia may also adversely impact Spring reproductive behavior, particularly if spawning creek options are limited or of poor quality.

I am no scientist, but if the moving patterns of electronically chipped & tracked graylings (see Arctic Grayling Adaptive Management Project Annual Report, 2020) do indeed indicate that they overwinter in the URRL out of preference or lack of better options, the low levels of DO must indeed be a gating factor in their survival and require urgent action.

The Shambow pipeline alternative does seem to provide a long-term sustainable solution with minimal disruption to the natural environment, as well as a quick recovery rate for any displaced vegetation. Applied together with the low-cost seasonal solar-powered Air Diffuser alternative it may prove a powerful and effective long-term solution.

For the sake of full disclosure, GC provided material financial support to Trout Unlimited towards the implementation of the Shambow pond pipeline extension.

2.-E) Permanent barrier from Elk Springs:

Of all the alternatives considered this is the one that frankly seems the most disruptive, speculative in its potential outcome, and rather incompatible with the beauty and serenity of

this wild environment: a permanent 1,000-meter sheet wall driven into the URRL bottom by a vibratory hammer to direct cooler Elk Springs water into the middle of the URRL ? Notwithstanding the installation and maintenance costs, we know that Arctic Grayling already take their winter quarters near the mouth of Elk Springs.
What this alternative seems to aim for as a lasting solution is the mere re-direction of cooler oxygenated water towards the middle of URRL What recent URRL-wide winter investigations have revealed (see para 2.-D above) is that DO must be substantially increased rather than simply re-directed within the Lake. Might not this non-DO additive solution actually make things worse by diluting throughout the URRL the limited inflow of more oxygenated water which graylings have become accustomed to survive on at the mouth of Elk Springs ?

2.-F) Dredge and Berm Elk Springs:

Notwithstanding the significant turbidity issues in such a shallow lake as URRL, dredging is a very costly business. Once dug out, would the silt have to be trucked outside the Valley ? It is clearly not a permanent solution as the RRC puts out a vast amount of silt which would be an obvious drawback when one studies closely both the RRC and its main feeder streams in the Alaska Basin section of the Valley: I have walked both sides of these streams many times, including the private stretch on the Huntsman ranch, with permission. It's clear that aggradation has filled up the Upper Red Rock Lake over the years.

Perhaps Nature will see fit in a year of unusually high snowmelt and heavy Spring rains to solve the problem for us and breach the long and unusually straight levee North of the URRL which is holding all the accumulated silt, whether the levee is natural or man-made. But Nature's timeline may not accommodate the direct threat of extinction facing Arctic Grayling in the Centennial Valley.

3. Comments on 2 dismissed alternatives:

3.-1) Genetic infusion:

If as reported to me by a former RRLNWR leader, some 25 million grayling eggs have been extracted from the Centennial Valley over the past 3 decades to try and populate other streams and lakes throughout the US (including 30 MT lakes according to Montana Outdoors, May 30, 2014) and in at least one particular case to populate a previously sterilized alpine "library" lake in Northern Montana, there may indeed be an opportunity to help re-populate restored spawning streams in the Upper RRC drainage, lest grayling evolve genetically at a speed unheard of by evolutionary biologists.

3.-2) Fishing closure:

A fishing ban would be very unlikely to solve the problem imho:

a) Most of the spawning streams in the RRC drainage upstream from the URRL are so silted as to be mostly unsuitable for wading. The Alaska Basin section where the RRC itself meanders (and where I live) is one case in point: it spews out very large quantities of silt: the slip-off slopes on the inside of the bends are covered in deep muddy layers whereas the river cliffs on the outside of the bends are very high and extremely brittle. To make matters worse for the wading angler, the straighter segments of RRC are home to numerous beaver dams, creating water-logged and somewhat hazardous conditions for wading anglers. To be successful, casting must usually be done from the river's edge and often from a distance. The only exception to this is the cattle ford near the old

corrals within the Refuge extension, but this section is extremely shallow and entirely devoid of fish.
b) the RRC drainage is already closed to fishing during the grayling spawning season !
c) Given the considerable resources already expanded, would a fishing closure crystallize in the mind of the angling public the lack of success of the grayling preservation program thus far ? Anglers would do badly as compared to duck hunters for example. Isn't someone likely to ask probing questions as to the Refuge's priorities over the past twenty years and whether ducks were endangered in the same way as native ad-fluvial graylings and worthy of a higher priority ? Shallow ponds may be good for ducks but not so much for grayling & trout ?

4. Conclusion:

The urgency of the situation clearly seems to call for decisive action. Hopefully this public consultation increases the chance of a unified emergency plan being put in place, ideally under unified inter-agency leadership if that's possible !
Although I am neither a biologist nor a scientist it seems to me that a successful outcome for the arctic grayling requires several simultaneous & urgent actions:

4.-1) drastically improve the grayling's winter survival rate by improving dissolved oxygen levels in the URRL:

Scientific mapping backed by electronic tagging of the grayling population has clearly shown their winter habitat to be concentrated in a number of stations throughout the Upper Red Rock lake: interestingly, many of these stations are situated close to feeder stream inlets (eastern section of the Lake in particular) possibly indicating their preference or desperate search, for higher levels of oxygenation… That winter levels of dissolved oxygen in the URRL are below grayling survival thresholds is not in doubt: if that's where graylings are wintering, whether by choice or absence of a better alternative, that's where oxygen is needed !

Given their already extremely small aggregate numbers (less than 80?) and the presence of large numbers of active winter and spring predators, including otters, crossfoxes, coyotes, wolves and grizzly bears, the lack of winter-killed graylings on the shores of the URRL is unlikely to provide any conclusive evidence as to what causes grayling mortality.

The Shambow pond pipeline project appears to be the quickest, least disruptive and most effective way to bring cool oxygenated water to the URRL, whilst creating no turbidity issues and little to no long-term disturbance. It is as such the most sustainable alternative on offer and feels like a sine qua non.

In addition, the set-up of *low-risk, low-cost seasonal solar-powered air diffusers* to be positioned strategically over graylings' known wintering stations throughout the URRL can only increase the chances of success of the Shambow pipeline by further spreading its benefits to the whole Lake. This low-cost solution has been tested successfully over a 3-year period on our small 6-acre pond and hemi-marsh in the Alaska Basin.

4.-2) expand the number of restored spawning creeks in the URRL drainage area:

It would be interesting to know if the recent restoration of a URRL spawning creek previously repurposed for duck hunting or the removal of Macdonald Pond have yielded any benefits for the cause of grayling reproduction.

In any case, the restoration of additional spawning creek options in partnership with interested local ranches and landowners (see below work done in Alaska Basin) in the URRL drainage area could prove a useful complement to the Shambow pond pipeline project or any.

4.-3) Egg-box program:

If indeed a stock of grayling eggs from graylings reared in isolation in nearby MT alpine lakes and taken from Centennial Valley genetic stock were available for repopulation, one could easily imagine how it might accelerate the recovery process in the Valley.
Would locating grayling egg boxes in strategic protected and/or restored spawning creeks perhaps merit consideration in balancing the possibility of the species total extinction from the Valley with some minor genetic evolution, if that is indeed a risk considering the very short time span from an evolutionary standpoint since the eggs's extraction and relocation in genetically sterilized locations (less than 20 years) ?

Disclaimer:

These comments are born of observation and factual experience as well as a sincere and careful review of the scientific material produced by scientists I know and respect like Matt Jaeger, Kyle Cutting and others.

Please accept my apologies for any errors or
misinterpretations of the data cited in reference that might be found in my submission.

Comment #31:

Please accept the following comments on behalf of the Big Hole River Foundation to request immediate action to preserve grayling in Upper Red Rock Lake (URRL).
As an organization which, since 1988, has advocated for the preservation of the last remaining native fluvial arctic grayling population in the lower 48 states in the Big Hole River, we are very concerned about the dwindling status of this iconic and imperiled fish in URRL.
Arctic grayling (Thymallus arcticus) are a rare, glacial relict species occupying only a fraction of their historic range in Montana. The population in URRL is the only significant remaining native, adfluvial population & has undergone significant declines in abundance and distribution.
To take no action will undoubtedly result in the extirpation of this population. Area biologists have long believed that overwinter habitat was the limiting factor for this remnant population. But that claim largely fell on deaf ears. Instead of addressing habitat, a bounty was placed on cutthroat trout due to the misplaced belief that predation was causing the issue. After four failed years of killing cutthroat, the grayling is no better off and we're running out of time.
I encourage you to select an alternative to increase overwinter habitat that will have minimal impacts to the Refuge and Wilderness. Out of the six viable project alternatives identified in the draft EA, I believe underwater diffusers and the Shambow pipeline to be the best options for long-lasting grayling conservation, and that one or both in succession should be implemented.
Thank you for your time and consideration

Comment #32:

The Montana Wildlife Federation (MWF) is Montana's oldest and largest sportsmen-wildlife conservation organization. We work to protect Montana's public lands, clean waters, and abundant fish and wildlife for the benefit of the hundreds of thousands of Montanans and people all over the nation who hunt, fish, and value Montana's outdoor heritage. On behalf of our 5000+ members and

supporters, we continue to support the improvement of overwinter habitat in Upper Red Rock Lake (URRL) on the Red Rock Lakes National Wildlife Refuge.

As stated in MWF's March 2022 letter of support for this project, Arctic grayling are a unique, native fish species valued by anglers in Southwest Montana, and URRL contains one of two last remaining aboriginal grayling populations in the Continental U.S. Despite only occupying 4% of their historic range, grayling have been kept from listing under the Endangered Species Act largely due to voluntary conservation efforts by landowners and anglers in Southwest Montana.

Overwinter habitat and hypoxic (oxygen deficient) conditions have been identified as the limiting factor for the grayling population in URRL, with current suitable overwinter habitat shrinking to less than five acres. As stated in the draft EA, the Centennial Valley has become significantly warmer and drier in the last 75 years (USFWS 2009), which may be worsening winter conditions for grayling through less surface and groundwater inputs to URRL and greater water loss through evapotranspiration. MWF also understands that between 2015 and 2016, the spawning population of grayling experienced a four-fold decline, from 1,100 to less than 300 individuals, with hypoxia under the ice being the primary causative factor (USFWS 2018). We believe that the time to act on this proposal is now, and that similar projects in other states have been successful in increasing overwinter habitat and that the likelihood of success on the project is high.

For specific alternatives presented in the draft EA, MWF recommends immediate implementation of a project beyond the No Action alternative. The Red Rocks grayling population is unique by being one of the few glacial relic populations left in the lower 48 states. They have persisted for more than 10,000 years, but are now reduced to around 88 spawning adults and less than 5 acres of overwinter habitat. We believe preserving and expanding the genetic diversity of arctic grayling in Upper Red Rocks lakes is imperative to the survival of the species as a whole.

MWF recommends an open ended project that improves current overwinter habitat, and leaves open the option for additional projects outlined in the draft EA, as needed, in the manner of an adaptive management plan. We strongly recommend for consideration immediate implementation of Alternatives B2 and D: electric powered diffusers and a pipeline from Shambow Pond. MWF understands both of these alternatives have minimal, temporary impacts to the wilderness, while also being readily implementable and low maintenance. Although not mentioned in the draft EA, we suggest that windmills might be used to power some of these aerators. This may have been researched and the area does not have suitable wind conditions, but if implemented could be a more cost effective power source compared to propane or electrically powered aerators.

With ongoing monitoring of the grayling population in URRL and their overwinter survivability, MWF recommends that if Alternatives B2 and D are not producing desired results, the agency implements Alternatives E and F. These proposals would move oxygenated water from the mouth of Elk Springs Creek to the center and deepest part of URRL via a barrier or dredging, respectively. Although these two alternatives have the potential for the highest success on oxygenating the lake, MWF understands that both of these projects have high costs and lengthy construction timeframes, and we believe they should be implemented in a step process.

MWF supports the continued water releases from Widgeon Pond to provide oxygenated water to areas of URRL where grayling overwinter, as well as notching beaver dams in the early spring to aid spawning fish passage. We also support the continued angling closures on Red Rock Creek from May 1st to June

15th, and Elk Springs Creek from May 15th to June 15th to reduce stress on spawning fish and prevent disturbance of eggs during this fragile period in the grayling lifecycle.

Montana's anglers have always valued the conservation of native fish species and the unique opportunities to pursue them with rod and reel. This draft EA is a result of thorough data collection, modeling and partner coordination, and provides guidance for the Refuge and FWS to make a decision on how best to meet the urgent needs of URRL grayling. Through scientifically informed alternatives and implementation, MWF believes these actions are important steps to help restore Arctic grayling genetic diversity and populations in Montana. These actions will also benefit all those who care deeply about seeing Montana's fish and wildlife thrive for current and future generations to enjoy.

Thank you for considering our continued support and recommendations for alternatives to improve overwinter habitat for arctic grayling in Upper Red Rock Lake.

Comment #33:

The Big Hole Watershed Committee has represented the diverse interests in the Big Hole watershed for over 26 years on issues of water management. Our 21-member Governing Board have been involved in the recovery of Arctic grayling since the inception of the CCAA (Candidate Conservation with Assurances Program) and we are proud that our efforts, along with those of our partner agencies and voluntary conservation by irrigators, led to the "not warranted" decision by the USFWS on Grayling in 2020.

Projects that enhance the grayling's population and range will further build on the conservation successes we've achieved in the Big Hole. As much as working lands ranchers understand the need for conservation and fish habitat, and are active participants to that end, the most important benefit to them of grayling conservation is protection from litigation, and maintenance of sovereignty over their water rights.

We support Montana Trout Unlimited's project to improve overwinter habitat for grayling in the upper Red Rock lakes National Widlife Refuge. We are confident in the collaborative and partnership-based process that determined this project as the best course of action to enhance grayling populations. The approach was science-based and involved all relevant stakeholders. Given the potential benefits of the project, the designated Wilderness land use of the site should not prevent this restoration project from proceeding. If anything, the urgent need for this habitat creation underscores the limitations of the Wilderness designation of this land.

People who visit Montana value the opportunity to pursue native fish in their native habitat. And that draw is important to the vitality of our local economies. Future generations of fishermen, conservationist, and advocates for wild places that harbor wild, native fish and wildlife will appreciate our commitment to unique resources like the grayling. We see this as a unique opportunity to support a historically significant project for the benefit of Arctic grayling. Thank you for your consideration of our perspective, and I'd be happy to follow with you further.

Comment #34:

I am writing this letter to express the Ruby Valley Conservation District's (RVCD) support for the Red Rock Wildlife Refuge Grayling Overwinter Habitat Improvement project. Arctic grayling play an

important role in the ecosystem of southwest Montana and the decline of the Centennial population could lead to the species being listed under the ESA. For decades, large scale efforts from the SW Montana community has improved reliable habitat for grayling populations through the CCAA program sponsored by the US Fish & Wildlife Service (USFWS). The program has primarily been focused on grayling in the Big Hole watershed while the other populations are dwindling due to changing conditions. It is time to address the decline of the Centennial grayling population due to loss of quality overwinter habitat. With over a decade of research conducted by USFWS, Montana Fish, Wildlife & Parks, and other organizations has proven that survival of the Centennial grayling is dependent upon improving the quality of overwinter habitat. The project partners hope to implement a project on the Upper Red Rock Lake that will increase oxygen levels to provide adequate overwinter habitat to sustain a healthy population of Centennial grayling.

In collaboration, the project partners have drafted an Environmental Assessment for this project; this document includes six alternatives that have been tested over the years. With extensive research and urgency due to population decline and threats of listing, RVCD believes it to be in the best interest to consider implementation of an alternative this year. RVCD believes two of the most sustainable and low-profile alternatives include the underwater diffusers or the Shambow pipeline. The no action alternative may permanently remove the grayling from the ecosystem, and furthermore would be a failure to uphold the values of the Refuge and Wilderness. As the draft EA demonstrates for some of these alternatives, short-term impacts within this Wilderness are far outweighed by the longterm prospects for improving the "abundance, persistence, and sustainability of the Centennial Valley grayling population."

The Ruby Valley Conservation District is committed to supporting the efforts of these partnering entities and this project. There are also several critically important partners who support this project in addition to the Ruby Valley Conservation District, including Trout Unlimited, Fish, Wildlife & Parks, and the US Fish & Wildlife Service. Please consider the benefit of the ecosystem at large that would happen because of this project improving grayling habitat, and the detrimental effects of choosing not to move forward with this project. Thank you.

Comment #35:

Please accept this letter as our public comment on the recently released draft Environmental Assessment for Arctic Grayling Conservation 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 overwinter habitat for the imperiled, endemic population of native Arctic grayling in Upper Red Rock Lake (URRL) on the Red Rock Lakes National Wildlife Refuge.

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. Specifically, the EA states: "High winter mortality of grayling within Upper Lake during periods of hypoxia (low dissolved oxygen) has been identified as the primary limiting factor for grayling in the Centennial Valley (Warren et al. 2022)." Thus, creating additional overwinter habitat – a greater volume of highly-oxygenated water in URRL – has been clearly identified by thorough data collection and sophisticated modeling as the primary solution to ensure long-lasting conservation of the species. Those efforts are clearly articulated in this draft Environmental Assessment (EA), as is the fact that grayling

conservation is one of the founding purposes of this Wilderness and was specifically detailed in its enacting legislation. Conserving this species is also at the core of the Refuge mission (Executive Order 7023 from 1935 and National Wildlife Refuge System Improvement Act, 16 U.S.C. 668dd et seq.). Furthermore, the 2009 Comprehensive Conservation Plan for the Refuge carries the resource management goal of providing habitat for species, including native fish, of which Arctic grayling are the most iconic and imperiled.

MTU strongly supports the implementation of an alternative or a sequence of alternatives articulated in this draft EA that would meet the mission of the Refuge, the Wilderness Act designation within the Refuge, FWP's responsibility for Arctic grayling, and the responsibility to conserve native fish shared by many other Montana conservation organizations and the public. As the draft EA demonstrates for some of these alternatives, short-term impacts within this Wilderness are far outweighed by the long-term prospects for improving the "abundance, persistence, and sustainability of the Centennial Valley (CV) grayling population," a primary objective of the comprehensive Structured Decision-Making process that the FWS, FWP, and others engaged in to produce this important decision document (draft EA, page 6).

As to the specific alternative considered in this draft EA, MTU strongly recommends immediate implementation of a project beyond the No Action alternative. Given the steady decline of grayling numbers under the current management activities that constitute No Action, along with modeling that has accurately predicted that decline if current conditions and management persist, No Action will very likely result in this iconic and integral species in the Wilderness, Refuge and Centennial Valley being lost, in direct conflict with agency mandates and missions.

Of the remaining alternatives, we urge the Refuge and Service to both implement a project to improve overwinter habitat and leave open the option of sequentially implementing additional projects outlined in the draft EA, if needed, in the manner of an adaptive management plan. Monitoring of grayling, dissolved oxygen and viable overwinter habitat in URRL will accompany all alternatives, so can and should help inform project success and the need for additional efforts. The draft EA makes clear that FWP's "significance determination…concluded there are no significant negative impacts from any of the alternatives." Furthermore, the draft EA's section on Wildlife and Aquatic Species impacts anticipates that: "No long-term impacts are anticipated post-construction for any of the alternatives. Impacts are primarily based on anticipated disturbance during construction, and no impacts to wildlife and aquatic species are anticipated on a 25-year projection (page 17)." The same is true for anticipated impacts to all other environments or environmental qualities considered, including Threatened and Endangered Species. Thus, all alternatives above and beyond the No Action should remain on the table.

That said, evaluating the alternatives against MTU's mission of conserving grayling in this landscape, alternatives that move oxygenated water from the mouth of Elk Springs Creek to the center and deepest part of URRL via a barrier or dredging (Alternatives E and F) show the highest potential to create the most viable overwinter habitat for grayling. That said, we recognize that these alternatives are high in cost and lengthy enough in construction time that they might not meet the urgent needs of the fish. We recommend they remain in play as longer-term options.

As the Refuge and FWS balance the urgent needs of these grayling against minimal, very temporary impacts to Wilderness, MTU strongly recommends for consideration Alternatives B2 and D – electric powered diffusers and a pipeline from Shambow Pond, respectively. These alternatives will be readily implementable, affordable in the short term, have very short duration impacts to Wilderness, no lasting Wilderness impacts, low to no maintenance (especially the pipeline), and modeled benefits to grayling

that provide good assurance the goal of an abundant, persistent, sustainable population will be conserved. It is important to note, as the draft EA does, that when considering a pipeline from the man-made impoundment, Shambow Pond, that the 91 days of overlap between construction and general use is, essentially, a metric of construction days (49) and annual maintenance (42 days of opening, closing or adjusting flow controls spread over multiple years). The Shambow Pond pipeline also has been modeled by extensive research and data and agreed upon by partners that it would provide a conservative (minimum) benefit to grayling. Similar projects elsewhere have achieved more than the minimum predicted benefits. Diffusers installed this winter as a pilot project also demonstrated very good promise for grayling by successfully opening a polynya in the URRL ice cover and, hence, are likely to have led to increased oxygen, via atmospheric exchange, in the deepest part of the lake. It is worth pointing out that for both of these alternatives, the draft EA points out that their anticipated impacts to Wilderness consist of "minor trammeling during the construction phases of each alternative, but these effects would be expected to be short-term and negligible (page 33)." Contrast that with the long-term (permanent) and significant impact of allowing Arctic grayling to decline into extirpation.

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 is a unique opportunity to support a historically significant project 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 the Refuge and FWS to decide on how best to meet the urgent needs of URRL grayling.

Thank you for the multi-agency effort that has gone into the effort already and for considering our input on this project. Feel free to contact us with any questions regarding our comments.

Comment #36:

We are residents of the Centennial Valley and are writing in response to the EA issued regarding Upper Red Rock Lake and possible options to mitigate winter kill for the remaining grayling in the lake and connected streams.

We are very supportive of protecting the remaining grayling population and trying to give them the winter conditions and the oxygen levels required to survive and hopefully start to rebuild their population levels. We are separately working with Matt Jaeger and Ryan Kreiner on a potential project on our ranch west of Upper Red Rock Lake that would be a native species restoration project for native west slope cutthroat trout and arctic grayling on Winslow Creek, which predominantly runs through BLM and our property. We are keen conservationists and are eager to support native species work in the great state of Montana.

We urge you to take action to improve conditions allowing the resident grayling population to survive and then thrive in Upper Red Rock Lake. From our own experience, we believe that underwater diffusers would work well even considering the power challenges of running them. We use aerators on our own ponds on our property and they have successfully kept our westslope cutthroat trout alive over the winters in the Centennial Valley, so I think that is a good proxy given we have been doing it in the same

climate conditions successfully. We also know from the refuge's work that the pipeline of water from Shambow would be helpful for this situation, so we urge you to consider that on top of the underwater diffusers.

Thank you very much for your attention to this project among your many things to do. As landowners in the valley, we are very keen to see the native species in the valley protected and this seems to be on the verge of local extinction unfortunately.

Comment #37:

Thank you for the opportunity to comment on the draft Environmental Assessment (EA) for Arctic Grayling Conservation at Red Rock Lakes National Wildlife Refuge. We appreciate your extension of the comment period by 14 days.

The Ruby Valley Strategic Alliance (RVSA) is a diverse alliance of individuals and organizations that finds common ground through shared conservation values for the greater Ruby landscape in Southwest Montana. We strive to maintain and enhance the stewardship of working ranches and public lands. 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. Our group includes the Ruby Valley Stock Association, Madison County Commission, Ruby Dell Ranch, Ledford Creek Grazing Association, Warm Springs Grazing Association, Helle Livestock, Ruby Valley Conservation District, Ruby Habitat Foundation, Greater Yellowstone Coalition, Wild Montana, Montana Trout Unlimited, Montana Land Reliance, and The Nature Conservancy, as well as several individual landowners and local natural resource advocates.

The RVSA members agree that the key to protecting working ranchlands is to conserve, protect, and enhance habitat on public lands for native species in Montana. We recognize the importance and significance of the Arctic Grayling (grayling) and their imperiled status in the Greater Yellowstone Ecosystem. Members of the RVSA have been following the progress of the Upper Red Rock Lake Arctic Grayling Adaptive Management Plan (AMP) conducted by the United States Fish & Wildlife Service (USFWS) and Montana Fish, Wildlife & Parks (FWP). We understand that the AMP continues to support the theory that overwinter habitat in Upper Red Rock Lake (URRL) is the limiting factor for this population of grayling, one of two aboriginal populations that remain in Southwest Montana. Many of our members were instrumental in the success of a third, reintroduced population of grayling in the Upper Ruby River. The RVSA is fully invested in the success of the grayling in the Ruby and Big Hole rivers, and the Centennial Valley.

On January 30, 2023, a lawsuit was filed against the USFWS to provide protections for Montana's Arctic Grayling under the Endangered Species Act (ESA). 1 As a local collaborative organization, we believe the real, immediate threat of this lawsuit is to the nearly 30-year cooperative effort to restore grayling in Southwest Montana. Much of this work has been completed in the Upper Big Hole and Red Rock Rivers through a USFWS-led agreement known as the Candidate Conservation Agreement with Assurances (CCAA). Private land enrollment in the CCAA is voluntary. Locally, we believe it has been a highly successful program. In extremely difficult drought years like 2021-22, many CCAA enrollees went above and beyond their site-specific management plans to leave more water instream for grayling. One primary concern of the RVSA is, if the USFWS fails to commit whatever resources are necessary for

grayling conservation on the Red Rock Lakes Wildlife Refuge (Refuge), voluntary efforts will likely be curtailed elsewhere.

The RVSA commends the USFWS, FWP, and their many partners for their attention to detail when reviewing project alternatives for the EA through a comprehensive Structured Decision Making process. We fully understand that the laws that govern the Refuge and associated Wilderness are complicated. Fortunately, grayling conservation is one of the founding purposes of this Wilderness and was specifically detailed in its enacting legislation. Conservation of this species is also at the core of the Refuge mission (Executive Order 7023 from 1935 and National Wildlife Refuge System Improvement Act, 16 U.S.C. 668dd et seq.). Additionally, the 2009 Comprehensive Conservation Plan for the Refuge carries the resource management goal of providing habitat for species, including native fish, of which Arctic Grayling are the most beloved, yet imperiled.

To add to the urgency of the proposed project alternatives in the EA, in 2022, the population estimate of spawning adult grayling in URRL was 73. Because of this, the RVSA believes the No Action alternative is absolutely not an option. RVSA strongly supports the implementation of an alternative or a sequence of alternatives articulated in this draft EA that would meet the mission of the Refuge, the Wilderness Act designation within the Refuge, FWP's responsibility for Arctic grayling, and the responsibility to conserve native fish shared by many other Montana conservation organizations and the public. As the draft EA demonstrates for some of these alternatives, short-term impacts within this Wilderness are far outweighed by the long-term prospects for improving the "abundance, persistence, and sustainability of the Centennial Valley grayling population."

With the aforementioned in mind, the RVSA encourages the agencies to consider immediately choosing a solution that provides the most sustainable overwinter habitat for grayling with the most short-term, minimal impacts to the Refuge and Wilderness. Given the urgency for grayling, we believe that the underwater diffusers and/or the Shambow pipeline are the bests options. We highly recommend implementing one, or both of these projects, concurrently or in sequence if needed. In the interest of minimizing disturbance activities that impact wilderness character, we prefer that Alternatives E and F not be implemented.

In addition to addressing the overwintering habitat for grayling through one of the activities outlined in the EA alternatives, we request that FWP continue to evaluate all available management tools to further bolster the viability of the grayling population in URRL, including additional angling closures. While angling is not the primary driver of the population level decline, it is well-documented that catch and release can result in delayed mortality, reduced reproductive success, or increased vulnerability to predation. With an estimated 73 spawning adults remaining in 2022; more or less, given this winter's conditions, the success of the oxygen diffuser pilot project, and survival rates, we believe every tool should be available to resource managers to ensure that Arctic Grayling conservation efforts have the best chance of success to restore this endemic population to the Centennial Valley.

The members of the Ruby Valley Strategic Alliance believe grayling are an inherent piece of the Wilderness character in the Refuge. We appreciate the opportunity to comment on the draft EA for Arctic Grayling Conservation at Red Rock Lakes National Wildlife Refuge. We look forward to reviewing the final decision and respectfully request your consideration of our recommendations.

Comment #38:

It is our understanding that low oxygen levels that occur in the winter when the lake is iced over is the primary culprit for the declining numbers. It is also our understanding that two alternatives, "D" and "B2" are designed to increase oxygen levels by transferring water with higher levels from Shambow Pond and by delivering air via a pump into the water of URRL thereby providing a source of dissolvable oxygen.
We support either or both of these remedies, while we do not support any alternative calling for no action. We would also encourage eliminating fishing pressure on the lake until the graying have recovered substantially. Thank you for your consideration of our comments as you make plans for the best outcome for the grayling.

Comment #39:

The Greater Yellowstone Coalition (GYC) appreciates the opportunity to provide comments on the draft Environmental Assessment (EA) for native Arctic grayling at the Red Rock Lakes National Wildlife Refuge. GYC's primary concern is the continued presence and future recovery of Arctic grayling in the upper Centennial Valley, while minimizing impacts to wilderness and wildlife values during management actions. GYC appreciates the attention that the United States Fish & Wildlife Service (FWS), Montana Fish, Wildlife, and Parks (FWP), and its many partners have given to this population of Arctic grayling in recent years through the Upper Red Rock Lake Arctic Grayling Adaptive Management Plan (AMP). After reviewing the draft EA, its component alternatives, and much supplemental research and data, we cautiously support moving forward with certain alternatives identified in the EA to address overwinter habitat limitations. We also express concern about the omission of certain management actions – specifically adjustments to fishing regulations on Red Rock Creek and Elk Springs Creek – from consideration in the EA when they may serve as supplemental tools to more comprehensively protect and restore grayling in this system.

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. GYC's supporters include people who care deeply about the survival of native fish species like Arctic grayling. GYC works with diverse stakeholders to ensure that aquatic systems are managed to function in harmony with the natural world and to ensure that our diverse array of native species retain their historical strongholds and can persist into the future.

The AMP has focused on overwinter habitat in Upper Red Rock Lake (URRL) as a limiting factor in the population of Arctic grayling, though other factors such as competition from non-natives, spawning habitat conditions, and angler disturbance have been considered as possible supporting factors working against grayling recovery (Montana Arctic Grayling Workgroup, 2022). The EA lays out a series of approaches that, if implemented, may increase the volume of oxygenated water in URRL and thereby increase overwinter habitat for grayling. We recognize that these proposed actions, though located in a landscape that has seen substantial human manipulation of water resources over the past century, involve some level of short-term impacts to designated Wilderness. However, we believe in the importance of adaptation and ingenuity to save native species on the brink of local extinction. Having reviewed the EA, and being fully aware of the fact that grayling conservation was one of the founding purposes of this Wilderness and is specifically called out in its enacting legislation, GYC supports the implementation of certain alternatives laid out in the EA to address overwinter habitat limitations for grayling.

Specifically, GYC recommends Alternative B2 (electric-powered diffusers) and, secondarily, Alternative D (the pipeline from Shambow Pond to URRL) as viable approaches to address this issue. These are readily implementable, affordable, and have the shortest-duration impacts to Wilderness and no lasting Wilderness impacts. Modeled benefits to grayling overwinter habitat outlined in the EA and supporting documentation provide reasonable assurance that these efforts would reduce the likelihood of winterkill in this small and vulnerable population (Siddoway et al., 2021). Furthermore, GYC is encouraged from reports that tests using diffusers have successfully opened a polynya in the URRL ice cover and have likely increased oxygen levels in the deepest part of the lake. We feel that these alternatives are preferable to others laid out in the EA that incorporate greater trammeling, higher costs, and longer-lasting impacts to Wilderness and to tributaries to URRL.

In addition to addressing the overwintering habitat for grayling through one of the activities outlined in the EA alternatives, GYC would also like to express concerns about the omission of regulatory closures to fishing as an alternative considered in the EA. We understand that FWS, FWP, and others involved in the Structured Decision-Making (SDM) process omitted this alternative from the EA because it is considered "a less significant mortality factor for grayling (page 15)," and because "data series and limiting factor models indicate that fishing is not a major driver of population decline (page 15)." We appreciate the openness of FWS and FWP in sharing the supporting data behind that rationale with GYC. It is well documented, however, that catch and release can result in delayed mortality, reduced reproductive success, or increased vulnerability to predation. For a population with 73 spawning adults in 2022 (Warren et al., 2022) – some of which remain in-stream long after the spawning run (Mogen, 1996) – we remain concerned about the effects of angler bycatch on incidental mortality for grayling in Red Rock and Elk Springs Creeks.

GYC has reviewed annual and seasonal angler pressure and creel survey data provided by agency partners and acknowledge that the AMP does not consider angling as a primary driver of grayling population dynamics. However, we are aware of a lack of creel survey data in Red Rock and Elk Springs Creeks for the period following the spawning closure. We believe it to be imperative that resource managers collect this information to inform what kind of grayling bycatch is occurring after spawning, when some grayling remain in the system and angler numbers are high. Without this information, we do not support the EA's assertion that angler disturbance is negligible and unworthy of inclusion for assessing management options. We urge agency partners to collect and disseminate this data so that the public can be confident that the existing regulatory structure is not a detriment to grayling population dynamics.

Grayling have been recorded entering tributary streams prior to the newly established May 1 closure date for Red Rock Creek (Cutting et al., 2018), and it is likely that some bycatch is occurring prior to the stream closure. We'd also like to point out that Elk Springs Creek still contains a May 15 closure start date. This is happening while FWP has set a precedent in other drainages of restricting angler access during the entirety of spring and early summer to avoid disrupting spawning fish. It has been done for species like Rainbow Trout in nearby systems, where the population is (a) less depressed than URRL grayling, and (b) not a critically imperiled remnant population. It is hard to reconcile a closure of equal measure not being used to safeguard grayling in this system. GYC is disappointed by the omission of an alternative considering regulatory changes to the creek and requests that the USFWS include this in the final record of decision. Specifically, we would recommend a comprehensive seasonal closure covering the entire period from January 1 through June 30 for both Red Rock and Elk Springs Creeks.

GYC appreciates mention of Tribal consultation in the draft EA, though we do not understand why specific mention of the Tribal entities involved has been omitted. Doing so makes it difficult for the public to evaluate whether adequate consideration is being given to those whose traditional homelands are being managed by the U.S. Fish and Wildlife Service. We encourage more transparency related to this process. We also want to express concern about the original comment period – while we appreciate the extension of the comment period by an additional fourteen days, it is important for the public to have adequate time to review conservation actions that pertain to critically imperiled populations of our native species. We recommend that future comment periods are set up at the start to adequately allow for meaningful interaction and evaluation by the public.

In summary, and for the reasons mentioned above, we cautiously support the implementation of Alternative 2B or D – in that order – alongside a seasonal angling closure from January 1 – June 30 to reduce stress on fish from bycatch and to address the risks posed to URRL grayling by lack of overwinter habitat and adequately oxygenated water. We do so while strongly encouraging FWS, FWP, and the other partners involved with the AMP and EA to collect additional grayling bycatch data and keep other management options on the table to address other sources of mortality to this population following project implementation to address overwinter habitat. It is imperative that managers are doing all in their power to protect this vulnerable Arctic grayling population. Thank you for the opportunity to comment.

Comment #40:

From the moment I caught my first wild, native Arctic grayling from LaMarche Creek in the upper Big Hole, they've gripped my imagination: a slice of the Far North right here in Montana. That was on Independence Day, 1990. It was a decade before I had the pleasure of briefly holding one beneath the current of the Red Rock River above the lake in the far wilder upper reaches of the Centennial Valley. With those two relict populations (Big Hole and Red Rock) the last of their kind in the Lower 48, protecting them deserves the most rigorous science and investment we can muster. And saving the Upper Red Rock Lake grayling requires immediate action.

I believe that underwater diffusers and the Shambow pipeline offer the best options to ensure the survival of this unique population, and one or both in succession should be implemented as soon as possible. Thank you very much for your consideration.

Comment #41:

As a Montana angler and conservationist, I believe immediate action should be taken by the USFWS to protect Upper Red Rock Lake grayling. The 'No Action' alternative will result in the extirpation of this population and we've already lost so so many populations of both fluvial and afluvial Grayling across the state. I encourage you to select an alternative to increase overwinter habitat that will have minimal impacts to the Refuge and Wilderness.

Specifically, I believe that underwater diffusers and the Shambow pipeline to be the best options to save these special fish and one or both in succession should be implemented. Thank you so much for your time and consideration, I'm sure it is as important to you as it is to me that we protect this awesome species of fish!

Comment #42:
We prefer Alternative C which, hopefully, would allow Arctic Grayling population to recover and flourish in the Upper Red Rock Lake and tributaries.
This iconic fish is important for the wild and diverse ecosystem this wonderful National Wildlife Refuge is known and appreciated for.

Comment #43:
To boost dissolved oxygen for wintering grayling in Upper Red Rock Lake/Centennial Valley, I prefer: Alternative D – A buried, gravity flow pipeline would convey water from East Shambow Creek and Shambow Pond to the center of the Upper Red Rock Lake. I believe this alternative will help satisfy the need for oxygenated water while being the most passive and least intrusive means. Electric powered machines have no place in this setting, and the alternatives with wall construction or dredging are far too intrusive.

Comment #44:
I support Alt D a buried gravity flow pipeline to bring oxygenated water into the lake. It seems like the simplest and less intrusion means of elevating winter oxygen levels in the lake.

Comment #45:
Trout Unlimited, Inc. and its Montana Water Program appreciates the opportunity to comment on the Draft Environmental Assessment (EA) for Arctic Grayling Conservation at Red Rock National Wildlife Refuge (RRNWR). Trout Unlimited and its 450,000 angler conservationist members nationwide concur with our close affiliate, Montana Trout Unlimited and its chapters, in voicing our support for conservation measures to improve overwinter habitat for Arctic grayling at RRNWR.
As the Draft EA describes, the grayling population at RRNWR is one of the last remnants of the once widespread meta-population of grayling inhabiting the Upper Missouri from the Sun River to the headwaters at RRNWR. In 1907, J.A. Hensall published his account Culture of the Montana Grayling describing the migratory nature of grayling gathering to spawn at Red Rock and Elk Creek from as far away as the Jefferson River. The remnant population in Upper Red Rock Lake represents one of three last vestiges of this endemic species. They are uniquely Montanan and a touchstone to our history. Their survival at RRNWR reaffirms the wisdom of protecting, preserving, and managing this crown jewel of the refuge system to benefit fish and wildlife.
We are in a race with time to preserve our native grayling. Significant investments by private, state, and federal conservationists have forestalled extinction of grayling, but further immediate action is necessary at RRNWR. For this reason, Trout Unlimited cannot support the No Action alternative. Addressing the limiting factor of deoxygenation of Upper Red Rock Lake is critical to survival of this population. Trout Unlimited is cognizant of the wilderness values of the RRNWR and realizes some, short-term disturbance may be necessary to enable grayling to persist. For this reason, Trout Unlimited recommends adopting Alternative D, the Shambow Pond Diversion and Pipeline and, if necessary, considering Alternative E as an additional step. Both alternatives address the primary limiting factor and minimize intrusion into wilderness values. We urge the Fish and Wildlife Service not to view the alternatives as mutually exclusive.

On a personal note, grayling conservation occupied much of my professional career. I worked on grayling restoration in the Big Hole, Centennial Valley, Ruby, and Madison and am grateful for all the many partners' efforts to keep this unique native species on our landscape. If I learned anything from years of my own research and that of dozens of professors, graduate students, fisheries biologists, and refuge managers, its that grayling are survivors given a fighting chance. This Draft EA represents our chance to take decisive action to sustain Arctic grayling at the headwaters of their historic range and recommit to the long-term persistence of this species that is a paradigm value of RRNWR wilderness. We urge the Service and MFWP to move forward and implement Alternative D or E as soon as possible. Trout Unlimited is grateful to you and the many professionals that contributed to the thoughtful development of alternatives.

Comment #46:

I read the recent story about the oxygen issues in Red Rock Lake in our Helena, Mt paper.
I'm Jeff Ryan the Chairman of the Lewis and Clark Conservation District based in Helena. We sponsor numerous willow soil lift projects and have constructed a portable solar pump system to automatically water our projects. Was a solar powered pump system considered in any of the EA alternatives. The solar pump technology has improved dramatically in recent years and costs have also lowered. Our system only cost about $10,000 to build and that includes a trailer to move the pump and hundred of feet of poly pipe.
Let me know if you have questions.

Comment #47:

Though not a frequent user of Red Rock Lakes, I've visited and used the area since about the late 1970s for recreation, most recently the summer of 2021. I'm also a proponent of preserving Grayling populations in Red Rock Lakes, the upper Big Hole Valley and the Greater Yellowstone Ecosystem. I'm also a proponent of preserving wilderness areas, and have hiked in them since my first backpacking trip into the Pintler Wilderness Area during the summer of 1971. I also believe that at times, it is necessary to "trammel" into a wilderness area for administrative purposes to preserve the resource and its wildlife.
I believe that Arctic Grayling deserves protection within the US, though it has been refused protection repeatedly.

I'm also surprised that something similar to Solar Bees were not researched or mentioned.

Comment #48:

First Comment
I applaud your accomplishments on this decision process, seeking truth and developing decision alternatives to inform decision makers. Humans have a great capacity to solve problems if they can get past bias.

I don't have much quarrel with what is in the EA or most of the Adaptive Management Plan (AMP). I do have quarrel with what is left out of the EA document and the AMP that should better inform decision makers of a high correlation and likely a cause of Arctic grayling decline in the count during the Red Rock Creek spawning since 2013. It is an electrofishing capture/recapture census. It only began on Refuge lands in 2010. There were other capture eras using weir and trap (2000-2002) ((1994-1997), but I will

speak to the time during my tenure (2008-2019) as the Project Leader (Manager) of RRL NWR. Montana Fish Wildlife & Parks (FWP) and the U.S. Fish & Wildlife Service (USFWS) collaborated well until the grayling census in May of 2016. Census that spring showed the population had crashed (1131 to 220). I and the Refuge biologist suspected the fishing regulations FWP implemented in 2013 were so liberal that they had become a detriment to grayling egg hatching and hooking of adult grayling that remained in the creek. As a lead USFWS decision maker I asked FWP biologists to add to the AMP a hypothesis of angler handling of adults and boot disturbance to grayling eggs as a possible reason for population decline. That would mean closing the angling, opened in 2013. They resisted. Grayling do not have redds/nests like trout, where parent fish clean the gravels. Grayling scatter their eggs/gametes and they are vulnerable to the sediment kicked up by anglers in the stream during the spawning run. Many people per day fish Red Rock Creek during the summer months (post June 15). This is new over the past decade. Anglers are currently catching hundreds of individual grayling every summer in Red Rock Creek. This was evidenced by conversations throughout the summer months and by a one-day creel survey in summer of 2022 by the previous Red Rock Lakes NWR biologist. We know that based on the spawning season census of grayling that hundreds currently do not exist. This means the same individual grayling is being captured multiple times during the summer. What are the effects of disturbance on Red Rock Lakes grayling related to historic and current angler numbers? Adding a disturbance hypothesis to the AMP is important if the outcome of AMP models is to be accepted as a true reduction to uncertainty (close to truth), a believable AMP, not the one you have now. Stopping angler caused disturbance to sedimentation and hooking the same adult individuals repetitively during the summer (post June 15) may be more important than addressing O2 in Upper Red Rock Lake. The disturbance hypothesis likely correlates the decline of grayling, and is inversely correlated with non-native fish removal. Thus, the two variables are confounded. This idea has gotten zero consideration from FWP partners. Worse case, the disturbance hypothesis is being withheld from the public view as a means of not discussing all possible causes for low grayling numbers. That is a real ethical concern for all involved. FWP still resists or even scoffs at this hypothesis. I do not think data developed on dissolved oxygen (O2) shown in referenced in the EA is synonymous with the truth. We don't know that Upper Red Rock Lake grayling die due to hypoxia. There is no direct data that show grayling are dying in Upper Lake. From previous radio-tagged grayling across multiple winters, overwinter survival was > 90% (Davis et al. 2019). We have a model in the AMP that predicts grayling numbers in the spring electrofishing census and the hypoxia hypothesis comes closer at predicting the observed number of grayling than the 2 other hypotheses, (competition from hybrid trout or spawning grayling blocked by beaver dams on creeks). If hypoxia, I add to your information that on the day of ice out on Upper Red Rock Lake in 2017 and in 2018, a technician and I surveyed Upper Red Rock Lake and the shorelines down wind of the prevailing winds, looking for dead fish of any species. We found none. If hypoxia had occurred those two years, one would expect to find dead fish, as is most often the case in such events. This result is in line with observations by the former Refuge wildlife biologist. He spent weeks on Upper Lake during winter and spring since 2010 and has never seen a dead grayling there.

The graph the USFWS and FWP use to depict grayling populations in the AMP and reports (Warren et al. 20xx) fails to inform the reader that higher populations depicted in 2012 through 2015 were the result of grayling eggs hatched 3 years earlier by artificial incubation of tens of thousands of grayling eggs in remote site incubators (RSIs) during years 2010 through 2012 (the primary cohort/age for spawning grayling is 3 years). The DNA work completed by MFWP on 2015 gametes harvested that year show that effective breeders (Nb) that produced that high population was actually quite small. In other words, all those 2012-15 grayling were offspring of just a few parents, a sign of low genetic diversity. Low Nb is what one would expect when the bulk of the successfully hatched eggs came from just a few fish that humans cultured. USFWS should accept that there haven't been 1000 naturally spawning grayling in

Red Rock Creek in decades. Other head scratching data not adequately explained to decision makers is that 113 telemetry radios were implanted into grayling during winters of 2014 and 2015 for graduate study by M. Davis (MS. Thesis 2016) and later published in Davis et al. (2019). 90+% of the radioed grayling survived both winters. However, the number of grayling in the spring census declined by half from 2014 to 2015. (Spawning Estimate: 2014 = 2043 vs. 2015 = 1131). Yet, direct radio telemetry data shows overwinter survival of individual radio-tagged adult grayling was very high (>90%). Something other than low O2 caused/started the decline. A good hypothesis is that angling in the stream in 2013 was already having a negative impact by 2015. The impact was more visible in the 2016 crash because that is 3 years post regulations change (3yr. cohort was depleted). This grayling decline may not be a climate induced low O2 event. It may be the result of human disturbance during spring spawning caused by FWP 2013 angling regulation change. Those regulations were stable for forty years until 2013. Historically angling opened statewide on the third Saturday in May and closed November 30. West of the continental divide in Montana, that is still the regulation for streams. Historically the cutthroat limit on the Creek was one over 18 inches. Annual high-water flows in the creek from mountain melt meant anglers had difficulty wading in the stream until those flows subsided. Effectively, angling was difficult until mid-June. Opening the stream to an abundance of anglers all of April and 1st half of May was a major management action. It has endured to this day. A 20 cutthroat limit attracted many anglers. Angling should stop!

The data available to USFWS on disturbance by anglers is compelling and I want to share some of that data with you, but fear you have too much material to review and you may skip a longer argument. Please consider examining my attachments. No one expected so many anglers to respond to the liberal regulation changes. The removal of Yellowstone cutthroat/rainbow hybrid trout was the first test of the AMP. It was supposed to last 5 years, as outlined in the 2013 USFWS EA on the matter (attached & highlighted). The Finding of No Significant Impact (FONSI) was signed by Regional Director Noreen Walsh. We planned to remove at least 3375 hybrid trout over 5 years using a government weir and trap. No one thought anglers would help that much (including USFWS, FWP & MT Trout Unlimited). However, allowing them to angle during April and 1st half of May would give them access to these hybrids when long standing FWP regulations kept most all streams in Montana closed until the third Saturday in May. Allowing anglers in might lower their anger about USFWS removing these 'wild' but hybrid fish. In fact, the removal did not take 5 years. USFWS ended employee removal/suppression after 4 years (2016). By then over 7100+ hybrid trout had been removed. To our surprise, half had been removed by anglers. We had created a monster angler base of both meat anglers and catch/release anglers. Why? Because these fish average 3 pounds. Some are over 6 pounds. Angling pressure has not lowered. There has been a huge influx of new residents into SW Montana since the pandemic. Social media amplifies the story of Red Rock Creek angling opportunity to the masses.

A few miles east of the Red Rock Lakes NWR, at Hebgen Lake, FWP closes tributaries Grayling Creek, Duck Creek and south fork of the Madison River to spring angling. Their reasoning is " to protect spawning rainbow trout". In 2016 MFWP restored a fishing closure between Nov. 30 and the third Saturday in May on those three streams after opening them year-round. Why is it that FWP believes angling can be detrimental to non-native rainbow trout and yet they would not close the angling back down on Red Rock Creek once the hybrid trout suppression was done in 2016? USFWS must submit a request to the Montana Fish and Wildlife Commission to close down angling until at least June 15. If grayling are approaching extinction, FWP will have to limit angling, maybe close it all year for a time. Don't your intuitions agree?

I note that FWP displayed this statement in a News Release during their public comment period for their 2023-24 draft fishing regulations:

"Fisheries managers hope that seasonally closing areas where rainbow trout spawn will improve their recruitment and abundance. They also hope to reduce the number of adult fish that are kept and to limit cases of anglers trampling redds."

If you must augment O2, I support a permanent powerline buried to the campground at Upper Lake. It could serve hardware sited in the campground to serve a temporary pipe to a splasher/diffuser (alternative B2). Consider repeating what is being done this winter. I also encourage continued water releases from Widgeon Pond as this action shows promise at improving dissolved oxygen to Upper Lake during the winter months. I also do not support the redirection of inlet water delivered from streams into Upper Lake. These tributaries are likely the reason why grayling have been able to persist in Upper Lake since the last glaciation 10,000 years ago. These inlet streams are likely the major contributor toward dissolved oxygen dynamics during winter. Mike Davis's thesis has shown that grayling congregate at these tributaries. Redirecting inlet water to the middle of the lake would have permanent and lasting impact on Upper Lake. The alternatives that propose changing the tributary mouths are not founded on empirical data and rather through assumption and simulating data. Water releases and activities that occur out of the campground (alternative B2) is the least trammeling and intrusive alternative in the Wilderness. I see no reason to build/construct a permanent pipe into the Wilderness until a temporary O2 augmentation pipe has shown an increase in grayling in the spawning run. Every piece of data presented in the EA accepts the story that inadequate O2 is the only driver. No employee of RRL NWR shared that view when I retired, the spawning season, May 2019.

Second Comment
See the below map and the two attached PDF documents. They are my 2nd set of comments. They outline the history of grayling in the Red Rock River watershed, Beaverhead County, Montana. Please accept them for the record on this NEPA action. I do so to inform decision makers on the substantial history of this species on lands near to or now a part of the Red Rock Lakes NWR.

This Upper Missouri River grayling population is the southernmost extant population of grayling on the planet. Red Rock Lakes is the most southern of the populations in the Upper Missouri River. The Centennial Valley is the utmost point in the entire Missouri/Mississippi River watershed, 3,768 miles from the Gulf of Mexico, the fourth longest River in the world. The next extant population in North America is 500 miles north in Saskatchewan. Text & map are from Revised 12-month Finding Upper Missouri River Arctic grayling 9/08/2010
(*The attached PDFs included a timeline of arctic grayling in SW Montana and the CV made by the commentator and the following document*
https://www.google.com/books/edition/Forest_and_Stream/hkkhAQAAMAAJ?hl=en&gbpv=1&pg=GBS.PA70&printsec=frontcover)

Third Comment
My 3rd set of comments are to assist decision makers in understanding my and past Refuge biologist's contention that heavy angling likely caused negative impacts to the grayling population. I hope the USFWS effort to save grayling will not be limited to augmentation of O2. I support alternative B2. Graphs and figures attached to this email, provide copious data to support a request from USFWS, to the Montana Fish and Wildlife Commission to close angling in Red Rock Creek and Elk Springs Creek for 3-4 years and add a 4th hypothesis to AMP models.

Adding angling related disturbance to the AMP will expand testing from the current three competing models to 'four'. The mechanisms behind the new disturbance model would be anglers stirring sediment with their boots while traveling the stream in April and first half of May and multiple hooking of those few grayling (73) in the creek during times when angling is not closed. A management action of closing angling for 3-4 years is needed to test this hypothesis.

The first attachment (Cumulative Disturbance graph) depicts the correlation between grayling numbers and the cumulative disturbance in Red Rock Creek by FWP and USFWS management actions. As disturbance increased from none to extreme 2009 through 2016, grayling in the spawning run 3 years later (hatched eggs are now adults) declined significantly, as disturbance increased. Within that PDF the graph is on page one. Page two of that PDF provides definitions of 'none', 'moderate' and 'extreme' disturbance. The graph shows very low grayling numbers during spawning 2016 through 2018. I understand it has remained low through 2022 at 73. Most grayling spawners are 3-year-olds. They were hatched from eggs 2013 through 2015. Cumulative disturbance was extreme for those years and continued in 2016-2017. Anglers could harvest 20 of the average 3-pound cutthroats. This attracted hordes of anglers. Angling was eventually limited to catch and release only in 2018-2020 (my negotiation with FWP). FWP added a one cutthroat over 18 inch in 2021. The stream was open to angling all year long from 2013 to present with an angling closure May 15 thru June 14 all years except 2022 when the closure went to May 1 thru June 14. FWP regulations proposed to the MT Fish and Wildlife Commission for 2013 said that May 15- June 14 "*will protect Arctic grayling during the majority of the period that spawning and egg incubation occur*". At 73 (2022) remaining grayling I think all spawning and egg incubation needs to be protected.

Litigants and FWP writings cite cattle grazing near streams as a cause of sedimentation detrimental to grayling. At the same time FWP has not acknowledged angler boots stirring sediment in Red Rock Creek could be negatively impacting grayling spawning and egg survival. FWP has at times pointed to the Refuge grazing program as a possible cause for grayling decline. I submit a description of the grazing program as implemented during my tenure through summer 2019. It was, and I think still is, by 4-year rotation on a limited number of grazing units. No one grazing unit is grazed more than 6-8 weeks, once every 4 years and usually after July 10th. Almost no cattle graze along Red Rock Creek on the Refuge or on State lands. Grazing is mostly along stream banks of Red Rock Creek or its tributaries on private land. Cattle that escape fences have ended up in Red Rock Creek, but not in big numbers and not for long. Cattle were never on the Refuge during grayling spawning run; only in July, August or September. Anglers in the stream overlap spawning every year.

The 2nd attachment is a Google Earth map. Most of the angling (90%) takes place on the 2 linier miles = 4 sinuous stream miles downstream of the Elk Road parking lot. The Fish trap and weir were also at this 4-mile mark upstream. Grayling census was not accomplished until they were trapped upstream at that 4-mile mark. Thus, we knew very little about grayling numbers or dates they entered the stream for these 4 miles. We do know that 90% of the April and first half of May angling was in these 4 miles. It is very high angling pressure, with boot stirring of sediment each year until May 15. Willow covered streambanks force anglers to get in the stream. Angling closures from 2013 to present were not adequate to protect grayling eggs.

The 3rd attachment (RR Ck Grayling Spawning Timing) is a figure constructed from data collected at the weir/trap 4 miles upstream. It depicts the peak count of grayling at the trap (vertical blue line) over several years. From that data comes a prediction of the onset of spawning (vertical red bar). Spawning

lasts a matter of hours, a day or two, at water temperatures of 9-degree C. The data for this "spawning timing figure" is collected at the 4 mile mark on the previous map. We know little about the 4 miles downstream except that 90 percent of the angling takes place there.

I submit to you the data from radio tagged grayling in 2014 and 2015 collected by Refuge staff and published in peer reviewed publication (see the next blue link). Grayling entered the stream on April 23 in 2014 and April 25 in 2015. An angling closure of May 15–June 14 is inadequate to protect those early spawning grayling and their eggs. With those April 2014-15 dates in mind please reexamine the 3rd attachment **Spawning Timing** and see the vertical blue line for those two years. The angling closure was completely inadequate in 2015. In 2014 many of the grayling counted at the trap were hatched 3 years before in 2011from remote site incubators. Their genetics were not diverse, eggs from just a few fish squeezed by biologists. In other words, if the blue line is the peak number in the trap, many are of the same genetics (low gene diversity). What if those grayling that entered the stream on April 23, 2014 (radio tagged) were different and were early spawners? Anglers' boot stirred sediment would have covered their eggs. Remember grayling scatter their eggs and do not tend Redds like a trout.

The radioed tagged grayling were tracked/studied while navigating beaver dams. This study, led by the Refuge biologist can be downloaded with associated data
here: https://datadryad.org/stash/dataset/doi:10.5061/dryad.70h0b6b

Both female and male grayling were in the stream by April 23 in 2014 and by April 25 in 2015 yet there was no grayling detected at the weir/trap until May 4 in 2014 and until April 28 in 2015. Ironically the weir is where the data is collected to calculate the spawning onset. Note grayling numbers peaked at the weir in 2012 on April 13 so the old regulations (angling closed until 3rd Saturday in May) protected them. Opening the creek to hordes of anglers by liberal FWP regulations did not occur until 2013. Anglers are now in the stream, boots and hooks, as soon as the road is cleared of snow by the county. That can be as early as April 1st and most often is before mid-April. It is seldom later than April 20. The angling closure period used by FWP is trying to protect some of the grayling spawning and egg incubation period but it has also given heavy weight to allowing angling to occur in April on the cutthroat. I contend that the most angled portion of the stream is 4 miles downstream of the trap. We don't protect grayling in the stream in April because our weir provides no direct data in that 4 mile section highly disturbed by anglers. Note in the 3rd figure for the years 2012 -2017 the May 15- June 14 closure was not adequate to protect grayling during peak trap (blue line) or spawning onset (red bar) in 5 of those 6 years. FWP closure also did not protect spawning grayling from hooking during those 5 years and was not conservative at protecting those fish with early egg/spawning.

Please re-examine my earlier comments along with these. Earlier comments covered the Environmental assessment the USFWS-Refuge produced in 2013 which said we would only have liberal angling for 5 years. This will be the eleventh year of cumulative disturbance by that management action. Given that there are only 73 grayling, the angling needs a timeout!

My comments on other less that professional parts of your EA process:
I am disappointed that Montana Trout Unlimited was allowed to participate in the Government-to-Government Structured Decision Making (SDM) meeting in Helena. When the parties made that decision, the former Refuge biologist and I, the former Project Leader, and now president of the Friends of Red Rock Lakes NWR, should have been invited too.

Apparently, Trout unlimited has long wanted to dig a big ditch for the Shambow pond alternative. They applied for NFWF funding one year after I left (2020). It is evidence of a predetermined selection of a preferred alternative. No mention of the ditch being in Wilderness. Seems at risk of litigation if that alternative is in FONSI. https://www.nfwf.org/media-center/press-releases/nfwf-announces-more-15-million-grants-rocky-mountain-rangelands-program

Is it a 29 day comment period or 30? It started Feb. 28 closed March 28, that is 29.

A document "AGAMP Fact sheet" was sent to some public but not others? (See attached copy). That document speaks to several items not in the EA and calls them facts. It was not available to the general public by the Refuge web site or linked to the News Release you used to alert the public. I highlighted in yellow a false statement that is not a fact. FWP regulations that closed Red Rock Creek to angling May 1 were not "recent years". That closure was only implemented in 2022. For the previous 9 years, anglers could access the stream until May 15.

This italicized statement from the EA would lead the public to believe there have been May 1 closures for several years. In fact, FWP only established a May 1 closure in 2022 and allowed angling until May 15 for the previous nine years, during which time grayling plummeted.

> *"The handling of fish or trampling of eggs during angling activities can cause stress and may affect spawning and survival. In response to the grayling population decline MTFWP established an angling closure on Red Rock Creek from May 1 to June 15, and Elk Springs Creek from May 15 to June 15'.*

This italicized paragraph in the EA dismissing angling caused disturbance would not have been tossed aside if the former Refuge Biologist 2011- Sept. 2022 and retired Project Leader 2008-May 2019 were invited to the Structured Decision Making (SDM) meeting in Helena Sept. 2022. "Data" on angler boot sedimentation during spawning is not mentioned because there is none. The hooking data is not from the Centennial Valley. The data and limiting factor models mentioned are general, not from information collected from these streams and this population.

> *Complete Closure of Fishing in Red Rock Creek and Elk Springs Creek: This alternative was dismissed because it is a less significant mortality factor for the Centennial Valley Arctic grayling population than winter habitat. Data series and limiting factor models indicate that fishing is not a major driver of population decline. Grayling are caught outside of spawning periods in Red Rock Creek; however, this represents a limited proportion of the population, and these fish are usually caught when stream temperatures are low enough to limit catch and release mortality. Additionally, Red Rock Creek is presently closed to all angling during spawn periods. Despite a recent increase in angling pressure, it is unlikely that fishing played a strong role in the sudden grayling decline.*

Comment #49:

In the brief comment time allowed my purpose here is to speak against building permanent infrastructure in the Red Rocks National Wildlife Refuge, redirect ancient streams, etc for the purpose of "oxygenating" the water. I am opposed to these measures because I believe these strategies are only an environmentally/monetarily expensive decoy proposed by Montana Fish Wildlife and Parks to continue a liberal fishing policy for a very dangerously low population of Arctic Grayling there. Instead, that fish's pertinent stream beds should be entirely closed off to fishermen until their numbers increase satisfactorily for fishing to resume—with no possibility of their spawning period to ever be disturbed (as

happens now) by early season anglers. This recently permitted tolerance is perhaps the foremost cause of that fish's near extermination.

Comment #50:

On February 28, 2023, the U.S. Fish and Wildlife Service (USFWS) released a draft environmental assessment on proposed action to enhance oxygen augmentation in the Red Rock Lakes National Wildlife Refuge (RRLNWR). The purpose of such action was and is to enhance oxygen levels in the shallow lake to counteract oxygen depletion resulting from ice build-up throughout winter months. Oxygen depletion causes a condition known as "hypoxia" in living organism including, in this case, arctic grayling, a species of fish that has been proposed for listing as an endangered species under the Endangered Species Act of 1973.

Initially, the public comment period was open for only 2-weeks, closing March 14. The Gallatin Wildlife Association, a wildlife advocacy organization located in southwest Montana, strongly opposes such a narrow time window for public comment. We, ourselves, just learned of this EA on the 7th of March. We urge the USFWS to make more liberal decisions in the future when proposing time windows for public comment. Fortunately, during the write up of our comments, we learned of a 2-week extension, now closing on March 28. We shouldn't have to remind a federal agency that a 2-week time frame is not enough time for the public and for those with knowledge of an issue to show jurisprudence in a matter. It is unfair and unfortunate to expect a vigorous debate on this issue within this time constraint.
We understand the Council of Environmental Quality regulations does not mandate a set time period for public comment and apparently the Interior Department regulations leave it to the staff's discretion. See below. 43 C.F.R. § 46.305

Public involvement in the environmental assessment process.
(a) The bureau must, to the extent practicable, provide for public notification and public involvement when an environmental assessment is being prepared. However, the methods for providing public notification and opportunities for public involvement are at the discretion of the Responsible Official.
With that being said, we thank the agency for extending the public comment period for another two weeks. In conversations with the current Refuge Manager, we understand the time constraints for the agency. We should state here, the Gallatin Wildlife Association has been in consultation with both present and former staff of RRLNWR.

Gallatin Wildlife Association (GWA) is a local, all volunteer wildlife conservation organization dedicated to the preservation and restoration of wildlife, fisheries, habitat and migration corridors in Southwest Montana and the Greater Yellowstone Ecosystem, using science-based decision making. We are a nonprofit 501 (c) (3) organization founded in 1976. GWA recognizes the intense pressures on our wildlife from habitat loss and climate change, and we advocate for science-based management of public lands for diverse public values, including but not limited to hunting and angling.

The Heart of the Matter:
Arctic grayling, Red Rock Lakes National Wildlife Refuge (RRLNWR) and the Centennial Valley (CV) are an astonishing treasure to the American people. In a state with an abundance of wildlife, natural resources, National Parks, National Wildlife Refuges, National Forests and BLM lands, RRLNWR is extraordinary. But as most areas that become popular over time, that popularity increases stress on management and resources.

The more we learn of the endemic problems of the area, and the recent behavior by state entities such as Montana Fish, Wildlife and Parks and their respective Fish and Wildlife Commission, the more concern we have over the management ability of both agencies to make the right decision. We have seen an increased willingness by the Montana State Legislature and the Governor's office to instill and insert itself into wildlife management decisions. The Montana Fish and Wildlife Commission and Montana Fish, Wildlife, and Parks have become increasingly brazened over time, incorporating the wishes of the state legislature into wildlife management regulations, making wildlife issues more political, based upon a consumptive premise – that wildlife and fisheries are there for the taking. This is of grave concern to GWA for it is likely to cause depletion in fisheries and wildlife and their respective habitat.

GWA makes this statement knowing scrutiny is needed. Science needs to be applied properly in order to discern the proper course of action. Speedy decisions are not conducive to sound land and wildlife resource management. Unless the proper decision is made, we believe the general public is in danger of losing another species within the Greater Yellowstone Ecosystem (GYE), the arctic grayling. The statement at the bottom of page 8 is exceedingly alarming.

"Between 2015 and 2016, the spawning population of grayling experienced a four-fold decline, from 1,100 to less than 300 individuals, with hypoxia (oxygen deficiency) under the ice being the primary causative factor (USFWS 2018)."

In reviewing the draft EA and consulting with both present and former staff of RRLNWR, the issue of population numbers of arctic grayling has not improved much, if any since 2016. In order to mitigate the problem, one must fully comprehend the totality of the problem. In that regard, on the same page as that above, just above this paragraph in the EA, there are these statements.

"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). Moreover, the CV has become significantly warmer and drier in the last 75 years (USFWS 2009), which may be worsening winter conditions for grayling through evapotranspiration."
There is no doubt that climate change is most likely at play to some degree in this scenario. We would be surprised if that were not the case. But it may also not be the only justification for the decline. Man can only control what he can. We cannot control climate. We can alter it and change it as we have learned in studying climate change, but we cannot control it. We can, however, control other factors that may mitigate those effects.

One solution according to the draft EA is to permanently build infrastructure in the wilderness area to replenish oxygen within the lake. To that end, GWA says: there must be better options. From our understanding, Montana Fish, Wildlife and Parks liberalized fishing regulations in 2013. Not only will the liberalization of fishing regulations lead to an increase of "take" from the resource, but it also means more access and damage to creek beds and banks from an increased amount of disturbance from visitation. In the descriptions of alternatives, under the heading "Alternative(s) Considered, but Dismissed from Further Consideration", a possible alternative was described on page 16. That Alternative was called "Complete Closure of Fishing in Red Rock Creek and Elk Springs Creek". There stated is the following: "Despite a recent increase in angling pressure, it is unlikely that fishing played a strong role in the sudden grayling decline." Statements like this are not particularly helpful. This is a highly subjective phrase that needs context. What and where is the proof of such a statement?

In fact, this statement appears to be in direct conflict with the statement found on page 11 under the No Action Alternative, for it states: “The handling of fish or trampling of eggs during angling activities can cause stress and may affect spawning and survival.”

We as an organization try to adhere to science, the law, and tenets of the North American Model of Wildlife Conservation. The denial that increased fishing pressure and disturbances in and along the stream channel by anglers are not affecting the population of grayling is questionable at best and needs further examination.

There is only one paragraph in the EA which addresses angling disturbance. It is very inadequate. We need to address the elephant in the room. For the public to respect this process, USFWS should discuss all aspects that could potentially define the reasons of grayling decline. In the meantime, Montana Fish, Wildlife and Parks must not be so quick to diss the idea of closing fishing access. Such a decision could be made on a temporary or selective basis and decisions made as the science dictates.

The Refuge Improvement Act of 1997:
Passed in 1997, the purpose of this act states that the USFWS should collaborate with states wildlife (and fish) departments for timely and effective management. In this case, what is "timely" will vary according to the level of threat and rate of decline of the fish population. GWA believes that for the RRNWR grayling, there might not be a lot of time left. We surmise this suggests FWS can use its supremacy over management of state wildlife and fish departments on Refuges and move ahead without a state’s approval, especially if a matter such as species extirpation is imminent. Waiting longer, and risking the fish population is "impracticable" and unwise, which is a general standard in the Refuge Improvement Act.

The elk/vaccination decision is only one such decision in which the courts (in more than one circuit) have upheld federal supremacy over resources on federal lands. There are many other referenced cases in Nie et al. (2017) Environmental Law 47:797-932. Unfortunately, the "feds" have shied away from challenging the states over wildlife issues. It may be a difficult political issue, but as we have seen, that has not stopped states from trying to impose their will on federal lands when it comes to wildlife. When we are talking about species that are circling the drain of extirpation of an area or region, there needs to be a more persistent and feverish approach on the side of preservation.

As a result, GWA believes that the USFWS should close Red Rock Creek and Elk Springs Creek on the Refuge to angling. Perhaps a more collaborative approach would be for MWFP to request Montana Fish and Wildlife Commission to close those two creeks for at least four years. This would show both agencies and Commission are serious in helping the preservation of the arctic grayling, a move which would go a long way in wildlife and fisheries conservation. GWA hopes Montana Fish Wildlife and Parks (FWP) will support a U.S. Fish and Wildlife Service request to close angling.

We agree that vastly increased angling and associated increased disturbance was a management decision that FWP brought to the CV and it is something FWP needs to end. They likely will not make a request to the Fish and Wildlife Commission on their own. We understand their angling constituency will not be happy, but anglers in Montana drive by an abundance of great Blue-Ribbon streams when coming to RRLNWR. It is a major maneuver FWP can do to partner in rescue of CV grayling from possible extinction. It will not keep anglers from coming to Montana to fish. They will just fish elsewhere.

Oxygen Augmentation:
For our comments on augmenting oxygen to Upper Red Rock Lake during winter, the EA points out that winter related methods to augment oxygen would not significantly impact wilderness wildlife or wilderness stakeholder experience. Alternatives that are visible in the wilderness year-round, in perpetuity, such as alternative E & F seem at odds with the way all other Federal Agencies would manage wilderness. GWA is surprised that USFWS would even put forth such horrible alternatives knowing that building and installing permanent features in wilderness areas is contrary to the Wilderness Act of 1964. USFWS should have dismissed E & F when 17 other alternatives were considered and dismissed. This makes us suspicious, wondering how much impact did MFWP have in drafting this EA?

In our reading of Alternative A (No Action Alternative), it is our analysis that it only consists of the following current management strategies:

· Water releases from Widgeon Pond into Upper Red Rock Lakes
· Beaver dam notching
· Seasonal fishing closures

There is, however, a current management strategy of using diffusers operated by compressors to blow bubbles causing openings into the URRL ice, thereby helping to oxygenate the lake. This is a temporary strategy similar to that described in Alternative B, the only difference is the current operation of compressors are not being done by electricity, but by heroic efforts in daily attending to the needs of the compressors located at the Upper Lakes Campground.

GWA proposes the combination of or the principals of Alternative A, B, and C; to continue the current efforts being employed this winter in addition to full and total closure on angling. We do not support building infrastructure, in perpetuity, in wilderness. GWA cannot support alternative D at all. That is because it cannot be implemented without digging a 15-foot wide by 6.5-foot-deep trench, 5,500 feet long entirely in the wilderness. Your proposed need for this pipe is only supported by your modeling and not by direct data that shows grayling have died from hypoxia.

GWA believes that a combination of closing angling season to the creeks listed above (Red Rock Creek and Elk Springs Creek) and the continuation of temporary methods to augment oxygen via splasher or diffusers in the lake should be methods to be employed currently into the next few years. In comparing this to the Alternatives provided, this would resemble Alternative B or C. GWA does agree that running power to the campground in order to support the operation of the compressors is a necessary step and would have no impact upon wilderness. In conversation with the current Refuge Manager, this is how oxygen augmentation is currently being managed (only without the electrical outlets in the campground). We believe these steps need to be analyzed to determine if they are making a positive impact over time.

Conclusion:
Alternatives A, B & C are not visible to stakeholders year-round. They all improve dissolved oxygen. Please continue current temporary efforts using parts of A, B or C for the next few years. Continue that path and close angling. Burying a powerline to Upper Lake campground does not impact wilderness. An electric compressor/pump, on a trailer, removable when not in use (quote from the EA), with temporary pipe in winter to service a diffuser/splasher does not impact wilderness. The wilderness line is crossed when you enter the lake. There is already a pipe laid out on the ice this winter, and the temporary

power source is running on propane. Refuge staff appear to visit compressors daily which is a manpower drain. In addition to this fact, they ride a snow machine about 8 miles round trip to change oil in the power source. A more permanent power source at the campground would help remove the drain on manpower hours. There are only two staff right now, so it is a strain.

Buried electric power could be an improved power source. Building a permanent infrastructure (8-inch pipe) from the campground to the middle of the lake conflicts with the wilderness management policy of the USFWS. GWA would be against that option. The no-action alternative still means impounding water in Widgeon pond each fall and slowly releasing it into Elk Springs Creek during winter to augment dissolved oxygen. Widgeon Pond is not in wilderness, so that management action is a very minimum tool.

Elk Springs Creek is open most of the winter because of its spring water source. Thus, it gains dissolved oxygen from atmospheric O2 during its 10-mile descent down to Upper RR Lake. GWA knows that radio tagged grayling aggregated at the mouth of Elk Springs Ck during winters of 2014 and 15, before the Widgeon Pond management was implemented. The pond release has improved dissolved oxygen the past two winters.

The recent litigation suing USFWS on Upper Missouri River grayling complicates the decision for USFWS on this EA. GWA believes FWP is also conflicted. They resist closing angling regulations they liberalized in 2013 because there is now an abundance of anglers visiting the Refuge. USFWS needs to bypass MFWP and request a closure to the Montana Fish and Wildlife Commission. It will be interesting to see if MFWP supports that USFWS request.

GWA wants to thank the USFWS for the opportunity to comment and to the past and current staff for helping us understand the issue at hand. We strongly urge both agencies, USFWS and MFWP to take (what may seem as drastic) steps to close angling for a period of years and then through onsite analysis and documentation, determine if the oxygenation of URRL and fishing closures are having a positive impact. Sometimes the best management can be the least management- in this case, fishing closure.

Comment #51:

The AMP should better inform decision makers of a high correlation and likely a cause of Arctic grayling decline in the count during the Red Rock Creek spawning since 2013. It is an electrofishing capture/recapture census. It only began on Refuge lands in 2010. Montana Fish Wildlife & Parks (FWP) and the U.S. Fish & Wildlife Service (USFWS) collaborated well until the grayling census in May of 2016. Census that spring showed the population had crashed (1131 to 220). It is suspected that the fishing regulations FWP implemented in 2013 were so liberal that they had become a detriment to grayling egg hatching and hooking of adult grayling that remained in the creek. The AMP should consider the hypothesis of angler handling of adults and boot disturbance to grayling eggs as a possible reason for population decline.

Grayling do not have redds/nests like trout, where parent fish clean the gravels. Grayling scatter their eggs/gametes and they are vulnerable to the sediment kicked up by anglers in the stream during the spawning run. Many people per day fish Red Rock Creek during the summer months (post June 15). This is new over the past decade. Anglers are currently catching hundreds of individual grayling every summer in Red Rock Creek. We know that based on the spawning season census of grayling that hundreds currently do not exist. This means the same individual grayling may be captured multiple

times during the summer. What are the effects of disturbance on Red Rock Lakes grayling related to historic and current angler numbers? Adding a disturbance hypothesis to the AMP is important if the outcome of AMP models is to be accepted as a true reduction to uncertainty (close to truth), a believable AMP, not the one you have now. Stopping angler caused disturbance to sedimentation and hooking the same adult individuals repetitively during the summer (post June 15) may be more important than addressing O2 in Upper Red Rock Lake. The disturbance hypothesis likely correlates the decline of grayling, and is inversely correlated with non-native fish removal. Thus, the two variables are confounded. This idea has gotten zero consideration from FWP partners. Worse case, the disturbance hypothesis is being withheld from the public view as a means of not discussing all possible causes for low grayling numbers. That is a real ethical concern for all involved. FWP still resists or even scoffs at this hypothesis. It is not known that Upper Red Rock Lake grayling die due to hypoxia. There is no direct data that show grayling are dying in Upper Lake. From previous radio-tagged grayling across multiple winters, overwinter survival was > 90% (Davis et al. 2019). A model in the AMP that predicts grayling numbers in the spring electrofishing census and the hypoxia hypothesis comes closer at predicting the observed number of grayling than the 2 other hypotheses, (competition from hybrid trout or spawning grayling blocked by beaver dams on creeks).

The graph the USFWS and FWP use to depict grayling populations in the AMP and reports (Warren et al. 20xx) fails to inform the reader that higher populations depicted in 2012 through 2015 were the result of grayling eggs hatched 3 years earlier by artificial incubation of tens of thousands of grayling eggs in remote site incubators (RSIs) during years 2010 through 2012 (the primary cohort/age for spawning grayling is 3 years). The DNA work completed by MFWP on 2015 gametes harvested that year show that effective breeders (Nb) that produced that high population was actually quite small. In other words, all those 2012-15 grayling were offspring of just a few parents, a sign of low genetic diversity. Low Nb is what one would expect when the bulk of the successfully hatched eggs came from just a few fish that humans cultured. USFWS should accept that there haven't been 1000 naturally spawning grayling in Red Rock Creek in decades. Other data not adequately explained to decision makers is that 113 telemetry radios were implanted into grayling during winters of 2014 and 2015 for graduate study by M. Davis (MS. Thesis 2016) and later published in Davis et al. (2019). 90+% of the radioed grayling survived both winters. However, the number of grayling in the spring census declined by half from 2014 to 2015. (Spawning Estimate: 2014 = 2043 vs. 2015 = 1131). Yet, direct radio telemetry data shows overwinter survival of individual radio-tagged adult grayling was very high (>90%). Something other than low O2 caused/started the decline. A good hypothesis is that angling in the stream in 2013 was already having a negative impact by 2015. The impact was more visible in the 2016 crash because that is 3 years post regulations change (3yr. cohort was depleted). This grayling decline may not be a climate induced low O2 event. It may be the result of human disturbance during spring spawning caused by FWP 2013 angling regulation change. Those regulations were stable for forty years until 2013. Historically angling opened statewide on the third Saturday in May and closed November 30. West of the continental divide in Montana, that is still the regulation for streams. Historically the cutthroat limit on the Creek was one over 18 inches. Annual high-water flows in the creek from mountain melt meant anglers had difficulty wading in the stream until those flows subsided. Effectively, angling was difficult until mid-June. Opening the stream to an abundance of anglers all of April and 1st half of May was a major management action. It has endured to this day. A 20 cutthroat limit attracted many anglers.

No one expected so many anglers to respond to the liberal regulation changes. The removal of Yellowstone cutthroat/rainbow hybrid trout was the first test of the AMP. It was supposed to last 5 years, as outlined in the 2013 USFWS EA on the matter (attached & highlighted). The Finding of No Significant Impact (FONSI) was signed by Regional Director Noreen Walsh. We planned to remove at

least 3375 hybrid trout over 5 years using a government weir and trap. No one thought anglers would help that much (including USFWS, FWP & MT Trout Unlimited). However, allowing them to angle during April and 1st half of May would give them access to these hybrids when long standing FWP regulations kept most all streams in Montana closed until the third Saturday in May. Allowing anglers in might lower their anger about USFWS removing these 'wild' but hybrid fish. In fact, the removal did not take 5 years. USFWS ended employee removal/suppression after 4 years (2016). By then over 7100+ hybrid trout had been removed. Half had been removed by anglers. There has been a huge influx of new residents into SW Montana since the pandemic. Social media amplifies the story of Red Rock Creek angling opportunity to the masses.

A few miles east of the Red Rock Lakes NWR, at Hebgen Lake, FWP closes tributaries Grayling Creek, Duck Creek and south fork of the Madison River to spring angling. Their reasoning is " to protect spawning rainbow trout". In 2016 MFWP restored a fishing closure between Nov. 30 and the third Saturday in May on those three streams after opening them year-round. Why is it that FWP believes angling can be detrimental to non-native rainbow trout and yet they would not close the angling back down on Red Rock Creek once the hybrid trout suppression was done in 2016? I recommend the USFWS submit a request to the Montana Fish and Wildlife Commission to close down angling until at least June 15. If grayling are approaching extinction, FWP will have to limit angling, maybe close it all year for a time.

I note that FWP displayed this statement in a News Release during their public comment period for their 2023-24 draft fishing regulations:
"Fisheries managers hope that seasonally closing areas where rainbow trout spawn will improve their recruitment and abundance. They also hope to reduce the number of adult fish that are kept and to limit cases of anglers trampling redds."

I encourage continued water releases from Widgeon Pond as this action shows promise at improving dissolved oxygen to Upper Lake during the winter months. I do not support the redirection of inlet water delivered from streams into Upper Lake. These tributaries are likely the reason why grayling have been able to persist in Upper Lake since the last glaciation 10,000 years ago. These inlet streams are likely the major contributor toward dissolved oxygen dynamics during winter. Mike Davis's thesis has shown that grayling congregate at these tributaries. Redirecting inlet water to the middle of the lake would have permanent and lasting impact on Upper Lake. The alternatives that propose changing the tributary mouths are not founded on empirical data and rather through assumption and simulating data. Water releases and activities that occur out of the campground (alternative B2) is the least trammeling and intrusive alternative in the Wilderness. The EA accepts the story that inadequate O2 is the only driver. This assumption must be reevaluated.

Comment #52:

I have reviewed the Draft Environment Assessment relative to Arctic grayling conservation in the Red Rock Lakes National Wildlife Refuge. My comments, to follow, are based upon 62 years of observations of fish life in the Centennial Valley.

When I first came to the valley, there were healthy populations of grayling, rainbow and lake trout in Elk Lake, and very healthy populations of rainbow, brook and cutthroat trout and grayling in the ponds in the Centennial Valley and Upper Red Rock Creek. Today, the grayling population in Elk Lake is gone, and the vibrant populations of fish in the ponds are also largely extinct. In my opinion, this affects all of the

wildlife in the Centennial Valley. In the last several years, I have also seen significant increased fishing pressure on Red Rock Creek which, apart from Elk Lake, is the last real remaining fishery in the valley.

Even if fishermen are careful with catch and release practices, there are always some released fish that will not survive. Because the grayling population is at a critical low, and because the fishery is not extremely important to the Montana economy, I recommend that no fishing be permitted anywhere that grayling can be found in the creek. I also note that grayling are caught in the creek all summer long, not just in spawning season, as fish move into the stream during warmer weather to find cooler water.

Please also note that oxygenation has been extensively tried in Henrys Lake, and it was not effective. For more information on that, you might contact Damon Keen, the former IDFG biologist who was involved in that project. He can be contacted at 208/790-6298.

If you would like more information or have further questions, please contact me at 727/266-4766 or, during the summer, 208/558-7360. Thank you for your efforts to save the grayling, we very much want to see this fishery protected.

Comment #53:

I would like to comment on the 2023 Environmental Assessment on Arctic Grayling in the Red Rock Lakes NWR. I have spent a lot of time at this refuge, over many years. My husband and I, along with Tad Sweet, founded the Friends of Red Rock Lakes NWR and Centennial Valley. I live in Island Park, Idaho, and visit the refuge every summer.

I believe the options you have outlined are overkill and are not proven to solve the problem. I suggest that you begin with looking at the fishing pressure, which has increased substantially over the last ten years. Montana FWP relaxed the fishing regulations in 2013 and every summer Red Rock Creek is swarmed with anglers. Not only are the same fish being caught over and over, but the sediment kicked up by these anglers is detrimental to the grayling eggs/gamettes. Grayling do not lay their eggs in redds, as trout do, but scatter them on the bottom where they are susceptible to angler disturbance.
Take a good look at the size of the grayling population and life cycle of this fish, leaving low oxygen out of the equation. What other factors could there be?
I suggest you start with closing the creek, or at least lessening the fishing season for a few years and see if you can see an increase in Grayling.

Comment #54: 3,204 total copies received of the following comment

I support preserving the population of Arctic grayling in the Centennial Valley, but I oppose all of the action alternatives in the Arctic grayling EA. All of these alternatives would degrade the wild character of the Red Rock Lakes Wilderness and violate the 1964 Wilderness Act.

You must consider and analyze a full range of alternatives, including action alternatives that don't damage the wilderness character of the Red Rock Lakes Wilderness.

I urge you in particular to analyze an alternative proposed by a former Refuge manager at Red Rock Lakes to end recreational fishing in the Centennial Valley. Such an alternative could be implemented by Montana Fish, Wildlife, and Parks, and wouldn't degrade the Red Rock Lakes Wilderness at all.

Comment #55:
I am deeply concerned about your proposal to install certain structures in the red rocks lakes wilderness area in order to assist the survival of arctic grayling. Since this wilderness, like other wilderness areas, is protected by the wilderness act, it means quite clearly that no structures are to be constructed in a wilderness area. I fail to understand why an agency of the United States government should propose the degradation of a wilderness area, most especially on the basis of an unproven hypothesis about the decline of arctic grayling. I believe you should back off and reconsider alternatives including other equally possible reasons for the decline of Grayling, including recreational fishing which disturbs grilling habitat and takes a significant number of Grayling which should be not taken. I therefore oppose moving forward with this project proposal. I support preserving the population of Arctic grayling in the Centennial Valley, but I oppose all of the action alternatives in the Arctic grayling EA. All of these alternatives would degrade the wild character of the Red Rock Lakes Wilderness and violate the 1964 Wilderness Act.

You must consider and analyze a full range of alternatives, including action alternatives that don't damage the wilderness character of the Red Rock Lakes Wilderness.

I urge you in particular to analyze an alternative proposed by a former Refuge manager at Red Rock Lakes to end recreational fishing in the Centennial Valley. Such an alternative could be implemented by Montana Fish, Wildlife, and Parks, and wouldn't degrade the Red Rock Lakes Wilderness at all.

Comment #56:
I support preserving the population of Arctic grayling in the Centennial Valley, but I oppose all of the action alternatives in the Arctic grayling EA. All of these alternatives would degrade the wild character of the Red Rock Lakes Wilderness and violate the 1964 Wilderness Act.

Red Rock Lakes NWR was specifically established for Trumpeter Swans. As a former Migratory Bird Bird Program Chief for FWS legacy Region 6 and a former Executive Director for The Trumpeter Swan Society I believe the action alternatives in the EA would be detrimental for the swans and other migratory birds that depend on the refuge for habitat.

You must consider and analyze a full range of alternatives, including action alternatives that don't damage the wilderness character of the Red Rock Lakes Wilderness.

I urge you in particular to analyze an alternative proposed by a former Refuge manager at Red Rock Lakes to end recreational fishing in the Centennial Valley. Such an alternative could be implemented by Montana Fish, Wildlife, and Parks, and wouldn't degrade the Red Rock Lakes Wilderness at all.

Comment #57:
In Wilderness, the priority should always be to leave it untrammeled.
While I support your proposal to help Arctic graylings in southwestern Montana, the specifics would seriously degrade Red Rock Lakes Wilderness - which is NOT acceptable.

Please consider the full range of alternatives and choose one that doesn't damage the wilderness character of Red Rock Lakes Wilderness. One alternative is to end recreational fishing in Centennial Valley.

Comment #58:

We aren't going to make a long comment or go into our history in the Centennial Valley. After reviewing the proposals, we agree that there needs to be something done to help oxygenate the lake to help alleviate the problems caused by the snow cover and the decomposition of the plants. It appears that there is going to be a significant cost involved. That said, we feel that unless the fishing is stopped during the spawning period it will be a worthless effort. Studies were done which indicated fishing wasn't causing a problem. Isn't it really? Are we placating the fishing industry or trying to save the Grayling? The fishermen should be able to deal with this temporary closure during the spawning season or they aren't real sportsmen.

Not being scientists, we aren't going to propose one method of oxidation over the other but we trust those who are to make a sound judgment.

Comment #59:

I am writing to oppose all of the action alternatives in the Arctic grayling EA. All of these alternatives would degrade the wild character of the Red Rock Lakes Wilderness and violate the 1964 Wilderness Act. Alternative F would be especially damaging to nesting Trumpeter Swans and other nesting waterfowl at the refuge. As a retired non-game biologist for Wyoming Game and Fish Department who studied swans and other species of conservation concern, I urge you to consider all the important resources that will be impacted by this current proposal.

Red Rock Lakes National Wildlife Refuge (RRLNWR) was established in 1935 expressly to conserve Trumpeter Swans. The National Wildlife Refuge Administration Act as amended December 27, 2022, states that: "each refuge shall be managed to fulfill the mission of the System, as well as the specific purposes for which that refuge was established." Since Trumpeter Swans are RRLNWR's purpose, the Service is required to ensure that any actions taken must be consistent with its purposes.

I would also encourage you to consider that Ruth Shea, an Idaho biologist who studied Trumpeter Swans for decades in the Greater Yellowstone area investigated the status of grayling in the Centennial Valley after some bad proposals to manage fish habitat were proposed some years ago. What she found was that contrary to the claim by fisheries biologists at that time-- grayling in the RR lakes were a rare lake adapted form--that grayling had actually been planted in the lake in the early 1900's. Is this fish really native to the refuge? This needs to be determined. Ruth found old newspaper articles that described planting grayling into Red Rock Lakes. She described this in a talk at a meeting held by the Greater Yellowstone Trumpeter Swan Working Group meeting held at RRLNWR, October 5-6, 2012. Ruth unfortunately passed away this February so I do not have access to her notes, but I know she would have much to say about this new proposed project.

I urge you to investigate why grayling are declining in this drainage of Montana, and get to the real causes such as perhaps the long-term impact of Lima Dam on fish movements. Recreational fishing has increased greatly throughout the area, yet where are the studies that investigate increasing human use on wetland habitats? After such a thorough study, then you should consider and analyze a full range of

alternatives, including action alternatives that don't damage the wilderness character and existing species of Red Rock Lakes Wilderness.

I urge you to consider an alternative proposed by a former Refuge manager at Red Rock Lakes to end recreational fishing in the Centennial Valley. Such an alternative could be implemented by Montana Fish, Wildlife, and Parks, and wouldn't degrade the Red Rock Lakes Wilderness at all. The pressure to increase one species of fish with impacts to wilderness and other sensitive wildlife would not be an issue then.

Comment #60:

I am writing on behalf of Cottonwood Environmental Law Center (Cottonwood), a Bozeman based conservation organization. For over 10 years, Cottonwood has worked to protect the people, forests, water, and wildlife of the American West. We represent our members in court to protect the places where we all love to fish, hunt, and recreate.

Thank you for the opportunity to provide public comment to the U.S. Fish & Wildlife Service (USFWS) on the 2023 Draft Environmental Assessment (EA) on Arctic grayling at Red Rock Lakes National Wildlife Refuge (RRLNWR). Cottonwood commends the USFWS's commitment to protecting one of the last wild grayling populations in the West. While we understand that addressing dissolved oxygen depletion is an important aspect of grayling protection at RRLNWR, it is also important to consider other, less intrusive restoration methods. Limiting the impacts of angler disturbance via fish handling and boot disturbance to grayling eggs is one of the least intrusive restoration methods at the Montana Fish, Wildlife, and Parks' and USFWS's disposal, yet this alternative was not adequately considered in the EA or the Adaptive Management Plan. The USFWS should consider angling closures as a part of its efforts to protect grayling in RRLNWR. Angling closures are unintrusive and inexpensive, and they would not detract from the area's wilderness status. Building permanent, year-round oxygenation infrastructure should be a last resort, especially when less intrusive, temporary, and effective alternatives have not been considered.

Cottonwood acknowledges the loss of some recreational benefit that would come from angling closures; many of our members are anglers who relish the opportunity to catch wild and native grayling. However, we also see the long-term benefits of foregoing some recreational benefits in the name of species protection.

Please don't hesitate to contact Cottonwood with any questions you may have about our comments. Thank you for your time and consideration.

Comment #61:

I come to see that native Arctic grayling are just at 73 in spawning population. While dissolved oxygen during winter to prevent winter kill is a great idea, I see a bigger problem while fishing red rock creek and it's that for every graying there are 100 brook trout. Brook trout may not cause grayling to disappear but the enormous amount of brook trout to grayling is taking important food sources and habitat from native grayling. Grayling babies are also more vulnerable than brook trout babies in that the grayling young resemble more of a larvae than a fish. Non native Brook trout are also kings of small water environment such as streams and dominate the tributaries. I think to boost population numbers we need to remove non native brook trout with electro fishing to allow native grayling to come back. Even put out bounties on non native brook trout.

Comment #62:

Thank you for this opportunity to comment on the Draft Environmental Assessment for Arctic Grayling Conservation at Red Rock Lakes National Wildlife Refuge. Please accept these additional comments from me on behalf of the Alliance for the Wild Rockies, Council on Wildlife and Fish, Center for Biological Diversity, Yellowstone to Uintas Connection, and Native Ecosystems Council.

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

According to the article below from the Bozeman Chronicle the FWS did not tell the public that they have already been installing and using a mechanical bubbler in Upper Red Rocks Lake -- without going through the proper and legally required NEPA and ESA analysis a possibly in violation of the Wilderness Act.

Arctic grayling at Red Rock Lakes National Wildlife Refuge are struggling. Biologists are considering ways to help them Michael Wright Chronicle Staff Writer

https://www.bozemandailychronicle.com/news/ environment/arctic-grayling-at-red-rock-lakesnational-wildlife-refuge-are-struggling-biologists-are-considering-ways/article_90884a84- c8f1-11ed-b16a-0b6297db3802.html

There's a hole in the ice on Upper Red Rock Lake. It's man made, but it wasn't cut or drilled. In the quiet of the remote and frozen Centennial Valley — accessible only by snowmobile in the winter — generators and air compressors have been powering underwater devices called diffusers. The machines move warmer water from the bottom of the lake to the top, which melts the ice.

The opening has been there since mid-January. It stayed open through punishing cold snaps, even when temperatures dropped well below zero. That's encouraging news for Mike Bryant, the manager of Red Rock Lakes National Wildlife Refuge. "There's a good size area of open water," Bryant said. "You can see the bubbles coming to the surface if you're out there. They're still doing their job." It's a high stakes science experiment that's testing an option for helping one of the refuge's original residents: Arctic grayling.

> *Grayling, a colorful member of the trout family with a sail-like dorsal fin, were once abundant in southwest Montana. Now there are only a few native populations left, including the one in the Centennial Valley, a vast open space flanked by tall peaks along the Montana-Idaho border.*
>
> *Upper Red Rock Lake is considered the heart of the population, and for years, the number of adult fish in the lake bounced between 1,000 to 2,000, a level biologists consider healthy. But the population cratered in 2016, and hasn't bounced back. Montana Fish, Wildlife and Parks estimated there were 73 adults in the lake's population in 2022. The fish spawn in streams in the spring and move around in the summer to then settle in the shallow lake for the winter, which is where biologists say the problem is. Ice and snow cover, the lake's shallow depth and decomposing vegetation combine to limit the amount of dissolved oxygen available for the fish. Without enough oxygen, part or all of the lake becomes unlivable, and fish die.*
>
> *Now Montana Fish, Wildlife and Parks and the U.S. Fish and Wildlife Service are looking for ways to boost oxygen levels in the lake during the winter. Last month, the agencies released an environmental analysis of ways to fix the problem, including using the diffusers. An opening in the ice allows oxygen to be transferred from the air into the water, and devices in the lake are measuring whether it's working. Officials are also considering physical changes to a major tributary and piping water into the lake from a nearby pond.*
>
> *Most of the refuge is federally protected wilderness, and each option involves some level of human tinkering with a relatively untouched place. But supporters of the work see grayling as a crucial part of what makes the place wild. They also see conserving the fish in the Centennial as an important front in the battle to keep Montana's native grayling around at all.*

Glacial relict

Arctic grayling are found in the northernmost parts of the world. Thriving populations are found in places like Alaska and Canada. In the Lower 48, they were historically found in just two states: Michigan and Montana. In Montana, the fish were historically found in streams throughout the upper Missouri River basin — the Sun, the Smith, the Gallatin, the Madison. Over time, however, overfishing, habitat problems and competition for food from other fish led to a major decline in grayling numbers. The Michigan population went fully extinct in the 1930s. In Montana, their numbers dwindled to the point of rarity. The fish can be found in a number of lakes where they were stocked, but truly native populations of the glacial relict now hang on only in the Big Hole and Centennial valleys. "They're the remnants of the natural, wild grayling that disappeared over the last 100 years," said Pat Byorth, a former FWP biologist who now works for Trout Unlimited. Environmental groups have sought Endangered Species Act protections for the fish several times over the past few decades. The efforts have focused more on the Big Hole River grayling, which is the last remaining river dwelling population in the Lower 48, but federal officials consider the fish in the Centennial Valley part of the same group — the Upper Missouri River distinct population segment. A listing decision would affect both populations. The Fish and Wildlife Service found twice in the last decade that that Upper Missouri grayling don't warrant protections under the law, most recently in 2020. The agency argues that its conservation work is benefitting the fish and will keep them from going extinct. In January, the Center for Biological Diversity, Western Watersheds Project and Butte resident Pat Munday sued the agency in federal court, arguing that the fish are threatened by climate change and that the Fish and Wildlife Service is relying too much on voluntary conservation agreements to ensure the fish survive. Their lawsuit asks the court to vacate the agency's 2020 finding that the fish didn't need federal protections. Munday said in an interview that federal protections are the best way to ensure grayling get the help they need. He said it could lead to water conservation and stream restoration that would "make up for the damage done for growing hay, irrigation withdrawals and overgrazing." The lawsuit focuses mostly on the Big Hole population, but it was flagged as part of the need to preserve the Centennial Valley grayling in the Fish and Wildlife Service's environmental analysis. The document mentions a letter of intent to sue that the groups filed last fall as one of the reasons they need to look at boosting oxygen in Upper Red Rock Lake. The document says that because so few populations of native grayling remain in the state, "all actions necessary to conserve the (Centennial Valley) population must be taken."

Population crash

Red Rock Lakes National Wildlife Refuge spans some 52,000 acres in the Centennial Valley, including upper and lower Red Rock Lake. It's best known as a preserve for waterfowl, particularly trumpeter swans. It also contains the uppermost headwaters of the Missouri River. The grayling that live there are almost a sideshow, but an important one. More than 100 years ago, grayling eggs from the area were used in government efforts to stock the fish elsewhere. "It was the primary source of the original grayling propagation program beginning in the 1890s," said Ryan Kreiner, a native fish biologist for FWP. Like everywhere else in Montana, however, the population declined over time. Today, FWP's goal for Upper Red Rock Lake is 1,000 spawn- ing adult fish — those older than three years old. In the run-up to the crash, the population was doing well. In 2012, FWP counted more than 2,500 fish in the spawning population. It fluctuated some, but stayed above 1,000 until 2016, when biologists saw a five-fold decline in the population — going from about 1,100 to a little more than 200. Matt Jaeger, regional native fish program manager for FWP, said biologists were already testing some theories about what drove the population's success or failure. They looked at the fish's ability to access spawning areas and competition with non-native fish for food, and they tried helping the fish deal with both

problems. That work didn't make a big difference, so they concluded winter conditions in Upper Red Rock Lake were the real culprit.

Ice and snow cover in the winter prevents two natural ways the lake can replenish its oxygen supply — sunlight reaching underwater vegetation and direct contact between water and air. That means after the lake is covered, there's a finite amount of oxygen available. "You're just running through the oxygen that's in that volume of water," Jaeger said. This isn't a problem in most lakes, because they're deep enough to store plenty of oxygen for their fish. The problem with Upper Red Rock Lake is that it's shallow, about 6 feet deep or less in most places, and in many places much shallower. Kreiner and Jaeger tracked the amount of habitat available for the fish in the winter based on a minimum level of dissolved oxygen. In some years, they saw an abundance of habitat for the fish. In others, they saw none. Once they were certain they'd found the problem, the focus turned to finding the right solution. Now officials are weighing all the options in the environmental analysis released last month, and considering which ones are most feasible long-term — maybe for 20 years — and which will have the least impact on the landscape.

Part of the wild

About 32,000 acres of the refuge is federal wilderness, including the entirety of the upper lake. That limits human development there, and it forces officials to consider whether the work to save grayling mars the wilderness quality. Grayling are considered a key part of that ecosystem, though. The legislation that created both the refuge and the wilderness designation mentioned grayling, so preserving them is a part of preserving the wilderness. "That's one of the tricky things about this," Jaeger said. "One of the wilderness qualities that's out there is that there's Arctic grayling as part of this wilderness." It presents the officials trying to save these fish with a question: How much human manipulation is too much?

With the diffusers, it's a question about electricity. Propane generators have kept them going this winter, but long-term use would require burying an electrical line along 3 miles of road from the town of Lakeview to a campground on the shore of the lake — conveniently just outside the wilderness boundary. Two of the options involve making changes Elk Springs Creek, one of the major tributaries to Upper Red Rock Lake. One calls for diverting the flow of the creek toward the deepest part of the lake to bring more oxygenated water there. Another calls for dredging near the mouth of the creek — digging up sediment from the bottom to make the inlet deeper. David Brooks, executive director of Montana Trout Unlimited, said the dredge cut would likely fill back in with sediment over time, meaning the work would have to be done repeatedly. "That one is a lot of doing," Brooks said, adding that the analysis showed it would have substantial impacts to the area's wilderness character. "We want to avoid those kind of impacts."

There's one option that's viewed as the least impactful to wilderness — no electricity, no digging up the bottom of the lake, low maintenance. It would involve a gravity-powered pipeline moving water from nearby Shambow Pond into the deepest part of Upper Red Rock Lake. The idea hasn't been tested, but it's worked in high mountain lakes in other states. Brooks said that's one of the more efficient options. Maintenance-wise, officials will just need to make sure the pipeline is open at the right times of the year and that the water keeps flowing. "In a harsh environment like that, that makes some sense to me in terms of low operational maintenance and cost," he said. It's also the option Pat Munday likes best. Because of the wilderness designation, Munday said the government really shouldn't do any- thing, but he sees the option of piping water in from the pond as the least bad option. Really, though, he has the same goal as everyone else: ensuring this fish doesn't blink out. "The sad part is these fish had survived there on their own just fine for thousands of years," Munday said. "And if it weren't for all these other kind of human-caused, anthropocentric population pressures on them, we wouldn't be in this position."

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There is no mention in the EA that the FWS is already using a propane powered diffuser in violation of NEPA and the APA. If the propane powered diffuser is in a wilderness area then the FWS is also violating the Wilderness Act? How was the diffuser transported to the location? If mechanical equipment was used to transport it, and it was put in a wilderness area then this is another violation of NEPA, the APA and the Wilderness Act.

How would the action alternatives effect grizzly bears, lynx whitebark pine, and wolverines? Please write a Biological Opinion of the effect of the project on grizzly bears, lynx whitebark pine, and wolverines.

Grazing

The EA does not examine grazing as the source of the problem of the decline in artic grayling at Red Rocks Lakes.

Please see the following link to EPA pages that tabulate nutrients by area from livestock and the oxygen depleting effects.

https://www.epa.gov/nutrient-policy-data/estimated-animal-agriculture-nitrogen-and-phosphorus-manure

https://www.epa.gov/nutrient-policy-data/documented-hypoxia-and-associated-risk-factors-estuaries-coastal-waters-and

https://www.epa.gov/nutrient-policy-data/technical-resources-nutrient-pollution

Please see the attached paper titled, "Survey of livestock influences on stream and riparian ecosystems in the western United States," by Belsky et al. 1999.

ABSTRACT: *This paper summarizes the major effects of livestock grazing on stream and riparian ecosystems in the arid West. The study focused primarily on results from peer-reviewed experimental studies, and secondarily on comparative studies of grazed versus naturally or historically protected areas. Results were summarized in tabular form. Livestock grazing was found to negatively affect water quality and seasonal quantity, stream channel morphology, hydrology, riparian zone soils, instream and streambank vegetation, and aquatic and riparian wildlife. No positive environmental impacts were found. Livestock also were found to cause negative impacts at the landscape and regional levels. Although it is sometimes difficult to draw generalizations from the many studies, due in part to differences in methodology and environmental variability among study sites, most recent scientific studies document that livestock grazing continues to be detrimental to stream and riparian ecosystems in the West.*

Please also find attached: "Ecological Costs of Livestock Grazing in Western North America" By THOMAS L. FLEISCHNER, which states on page 635 of Conservation Biology Volume 8, No 3, September 1994: *Wildlife Committee (1979), composed of biologists from several government agencies, concluded that grazing is the most im-portant factor in degrading wildlife and fisheries habitat throughout the 11 western states. Likewise, ecologists in Montana suggested that livestock grazing is the major cause of habitat disturbance in most western riparian communities (Mosconi & Hutto 1982).*

Please find Mosconi and Hutto 1982 attached which finds that livestock grazing has major negative effect on birds. Since the Red Rock Lake NWR was created in part to protect birds, this should be considered in the EA or EIS.

Please find attached, "Livestock and Water Quality Literature and Examples," by Dr. John Carter. Carter notes on page 2: *The feeding, housing and grazing of livestock throughout the U.S. is a pervasive presence. Watershed and water quality degradation accompany this industry and affect nearly every water body in the U.S. Government regulation is inconsistent and ineffective at controlling these problems. This discussion explores the scope of the problem nationally but provides a focus on one problem area that for a variety of reasons is not addressed in any*

meaningful fashion by government agencies. This is the influence of livestock on our Public Lands, their watersheds and water quality, particularly in the eleven contiguous western states. The Scope of the Problem The Environmental Defense fund summarized statistics from the 1997 U.S. Department of Agriculture Census of Agriculture (EDF 2000). The amount of animal manure and urine generated in the United States on an annul basis is staggering. Table 1 provides a summary of the waste generated and the amounts of nitrogen and phosphorous contained in that waste by type of livestock. A further summary of livestock in the eleven western states is shown in Table 2. Cattle are by far the largest generators of waste, producing about 3.5 tons/year for every man, woman and child in the U.S.

Thank you for your time and consideration of our comments.

Comment #63:

These comments are submitted on behalf of Alliance for the Wild Rockies, Center for Biological Diversity, Council on Wildlife and Fish, Native Ecosystems Council, and Yellowstone to Uintas Connection. Previous comments have been made on behalf of these entities by Michael Garrity. I was recently informed of this project and reviewed the EA to find a disappointing lack of insight into the issue. While remedies are focused on construction and manipulation to address low dissolved oxygen, there was no analysis of what most likely is a major causal factor in the oxygen depletion in Upper Lake as well as stream habitat degradation and water quality imparment. This is the livestock grazing which is only mentioned once in the EA, *"Grazers would not be affected by construction activities because individuals who graze livestock could be rotated around the Refuge property so as not to experience any adverse effects."* (p30).

The EA describes the goals of the RRLNWR to provide habitat, maintain processes needed to sustain biological diversity, maintain aspen, provide wildlife dependent recreation, and *"Prioritize for wildlife first and emphasize the protection of trust resources in the utilization of staff, funding and volunteer programs."* (p6). Nowhere in these goals is livestock grazing mentioned.

A visit to the Montana Department of Environmental Quality website provides sufficient information to point the finger at livestock grazing as a major factor in the degraded conditions occurring here. The map below is from that website. The list of probable impairment causes for the streams and lakes on that website include sedimentation, nitrogen, phosphorous, E.coli, stream alteration and littoral vegetative cover, physical substrate alteration, flow regime modification, and metal. All these factors with the exception of the metals can be directly caused by livestock grazing. You have been provided with papers by Belsky (etal), Fleishner, and a white paper by myself that review the effects of livestock grazing on water quality, riparian habitat and wildlife. It is amazing that the US Fish and Wildlife Service does not know these things. Below I provide some supplemental information regarding water quality, aspen and riparian habitat as affected by livestock grazing.

Water Quality and Livestock:

> Of particular concern with growing recreational demand is the pollution of surface water by livestock. E. coli is typical of fecal bacteria found in the digestive tracts of animals and humans and are used as indicators of fecal contamination. Their presence may also be indicative of contamination by other bacteria or protozoans that can cause illness resulting in diarrhea, nausea, and vomiting. They can cause eye, ear, nose, and throat infections, or even death such as that experienced in the Milwaukee cryptosporidium outbreak in 1993.1 Cattle have been shown to produce 5.4 billion fecal coliform and 31 billion fecal streptococcus bacteria in their feces per day. Since cattle spend a significant portion of their time in or near streams, lakes, and wetland areas and average 12 defecations per day, they can contribute significant numbers of these organisms to surface waters. 2

Recent research in areas used by cattle, recreationists, pack animals or wildlife is pertinent. Research conducted in wilderness areas in the Sierra Nevada mountains included areas of high use by backpackers, high use by pack animals, and cattle grazed watersheds. Fifteen areas used by backpackers yielded only one site containing E.coli and this site was significantly lower than those used by cattle or pack animals.3 Five years of data collection from these sites found similar results, concluding, "Surface water from watersheds below cattle areas and those used by pack animals is at high risk for containing coliform organisms. Water from Wild, Day Hike, or Backpack sites poses far less risk for contamination by coliforms". 4

The costs of nutrients and bacteria from cattle grazing in the Sierra Nevada were characterized as, "summer cattle grazing on federal lands affects the overall water quality yield from this essential watershed as cattle manure is washed into the lakes and streams or directly deposited into these bodies of water. This organic pollution introduces harmful microorganisms and also provides nutrients such as nitrogen and phosphorus which increase algae growth causing eutrophication of otherwise naturally oligotrophic mountain lakes and streams. Disinfection and filtration of this water by municipal water districts after it flows downstream will become increasingly costly. This will be compounded by increasing surface water temperatures and the potential for toxins release by cyanobacteria blooms."5

Another study in the Sierra Nevada mountains sampled coliform bacteria in one ungrazed site and four sites grazed by cattle. Before cattle entered the area, all sites were below criteria for coliforms and E.coli. After cattle entered the area, the ungrazed site remained low, while the grazed sites rapidly increased above criteria and remained there until after cattle left the area, then quickly declined.6 The influence of differing climatic regimes on coliform bacteria in cattle grazed areas in the Sierra Nevada mountains showed, "Water year 2009 had near normal precipitation; 2010 had late precipitation and snowmelt; and 2011 had 150% above normal precipitation" … "After the beginning of grazing, mean E. coli counts increased as follows: 2009 from 8 to 240 CFU/100mL, 2010 from 7 to 561 CFU/10mL; 2011 from 7 to 657 CFU/100mL ($p < 0.05$ all years)." 7

In a study of the effect of high precipitation years on benthic algae and coliform bacteria in areas grazed by cattle, areas used predominantly by pack animals, recreation areas used only by humans and remote wildlife areas in the Sierra Nevada mountains, mean benthic algae coverage was 29.5% in cattle grazed areas compared to 8.5% in pack animal areas, 3.7% in human use areas and 1.8% in wildlife only areas. E.coli attached to the benthic algae was 90% at cattle grazed sites, 23% at pack animal sites, 0% at human and wildlife sites. E. coli was detected suspended in water at concentrations greater than 100 colony forming units/100 ml at 70% of cattle grazed sites and none at pack animal, human or wildlife sites.8 While this study focused on E. coli impacts, it is worth noting that livestock have many negative effects on stream systems. They impair water quality and quantity by increasing nutrients and sediment. They alter channel morphology through hoof shear causing channel widening and reducing depth. They alter hydrology by destroying bank stabilizing vegetation, increase water temperature by loss of stream shading vegetation and cause loss of fish and wildlife populations as a result.9

Riparian Habitat and Grazing:

A Forest Service study determined the order in which cattle grazed particular areas; "Ravine bottoms were usually grazed first. Next in order were openings in timber stands on gentle slopes, areas near water, areas along fences and ridgetops, salt grounds, accessible openings in timber stands on steeper slopes, areas under large trees, and finally areas covered by tree thickets." 10 In another study, "cattle dispersion was constrained by the spatial distribution of water and slope. Across 3 seasons, 77% of observed use was within 366 meters of water. Approximately 65% of the land area was beyond 723 meters from water and sustained only 12%

of observed use. Cattle concentrated use (79%) on slopes less than 7%. Consequently 35% of the area, on or surrounded by slopes > 10%, received only 7% of observed use. Loamy, grazable woodland and wetland sub-irrigated range sites were most preferred and accounted for over 65% of observed use while occupying less than 35% of the land area. Overall, coarse upland, very shallow and shallow loamy sites were not preferred" 11

Vigorous woody plant growth and at least 6 inches of residual herbaceous plant growth at the end of the growing/grazing season typified riparian areas in excellent, good, or rapidly improving condition. This corresponds to a riparian utilization rate of 24 – 32%. "Most riparian grazing results suggest that the specific grazing system used is not of dominant importance, but good management is – with control of use in the riparian area a key item." Degraded riparian areas may require complete rest to initiate the recovery process.12

W. S. Platts reviewed grazing systems and found that none were compatible with healthy aquatic ecosystems13. A study of long-term riparian exclosures found that, after 30 years of livestock exclusion, willow canopy cover was 8.5 times greater in livestock exclosures than in adjacent grazed riparian areas. 14 Grasses were 4 to 6 times greater in cover within the exclosure than outside. Mean peak standing crop of grasses within the exclosure was 2,410 Kg/Ha (1950 lb/acre), while outside in caged plots, mean peak standing crop was 1,217 Kg/Ha (1083 lb/acre).

Another study of upland and wet meadow communities that had livestock excluded for 9 – 18 years found major differences between the ungrazed communities and those continuing to be grazed. In each case, the area without grazing had greater belowground plant biomass, lower soil bulk density and higher soil pore space. In dry meadows the infiltration rate was 13 times greater than those dry meadows continuing to be grazed and in wet meadows, infiltration of rested areas was 2.33 times greater.15 A long-term study in Utah sage-steppe comparing results of implementing a deferred rotation grazing system and upland water troughs found that riparian use did not decrease after implementation of the new system and troughs.16 Riparian use remained extreme at 90 - 100% and while greenline stubble heights declined following implementation, bank alteration remained constant at 80%.

Aspen and Livestock Grazing:

Agencies typically ignore livestock grazing effects on forest structure and understory conditions as related to potential that might be described in Natural Resource Conservation Service Ecological Site Descriptions or other scientific reports. Those ESDs acknowledge the role of livestock and other factors in state changes and degradation of natural conditions. Recent projects we have reviewed have failed to address this issue, but it is foundational in determining the ecological status of the Habitats.

Browsing of aspen by livestock has been studied by Forest Service scientists such as Bartos, Mueggler, and Campbell using exclosures. They documented the use by livestock, deer and elk showing the disproportionate influence of livestock.17 A historic study Charles Kay performed for BLM in Nevada reported the results of a study of hundreds of aspen clones in the Shoshone, Simpson Park, Diamond, Desatoya and Roberts Mountains on BLM lands in central Nevada.18 Aspen in these areas was found to be in poor condition and many stands had not successfully regenerated in 100 years or more. No evidence of elk presence was found in or near any of the stands, so elk were not contributors to the problem. Forest succession was not a problem as conifer invasion had not taken place in the communities studied. Other than pinyon pine, conifers were absent from the study area. Kay observed that where aspen in central Nevada has been protected from grazing, aspen has maintained its position in the vegetation community and, in fact, has replaced sagebrush, contrary to the opinion of some that say sagebrush naturally replaces aspen. He cited exclosure studies that found aspen stands have expanded and

eliminated sagebrush. Exclosure studies also suggested that climate has little impact on aspen in central Nevada. Aspen inside exclosures regenerated without fire or other disturbance while aspen in adjacent, unprotected areas did not. Numerous papers were cited that demonstrate that climatic variation does not account for observed declines in aspen.

Fire exclusion was also examined. It was noted that BLM has suppressed fires for a long period and the study areas contained little evidence of fires. In fact, only a few out of the hundreds of clones studied had experienced fire during the past 20 years. Aspen age data suggest that few aspen stands in central Nevada have burned during the past 100 years. Kay points out that while the burned stands did regenerate, in all cases where aspen were protected from livestock grazing, aspen regenerated. So, while fire may benefit the species, aspen declines cannot be attributed to absence of fire.

Exclosure data indicated that herbivory had a major influence on aspen stem dynamics and understory composition in central Nevada. Most herbivory was from livestock. Pellet counts were used and showed that 59.3% were from domestic sheep, 40.2% from cattle and 0.4% from deer. Exclosures that excluded cattle but not deer, including canyons closed to livestock, had aspen stands that all were regenerating. When fallen trees blocked livestock access, aspen were able to regenerate in the protected spaces. Reductions in livestock numbers also resulted in aspen regeneration. Distance to water and slope were also factors that related to aspen regeneration or the lack of regeneration. Cattle use was generally related to distance from water and slope. Steeper slopes or areas further from water received less use. Aspen stands further from water and on steeper slopes were in better condition than those nearer water or on more gentle slopes, again indicating that grazing by livestock was the operative factor causing declining health of aspen clones. While Kay cited other research indicating that wildlife has impacts on aspen regeneration, he states that in all cases where aspen is protected from livestock, it successfully regenerated and formed multi-aged stands without fire or other disturbance. He concluded by saying, “The single stem-aged stands seen in central Nevada and found throughout the West are not a biological attribute of aspen, but a result of excessive ungulate herbivory. … In central Nevada, however, domestic livestock are the predominate ungulate herbivore.”

A recent study in Utah's famous Pando clone looked at the lack of recruitment of aspen. The study documented “4.5 times the amount of cattle use herbivory in two weeks than the mule deer use over six months. Forage utilization by mule deer prior to the onset of livestock grazing was unobservable, while forage utilization by livestock (plus mule deer) during the 2 weeks of cattle grazing consumed 70 to 90 percent of the understory vegetation’s annual production.”19 This demonstrates that the effect of wildlife, in this case, deer, are negligible compared to domestic livestock.

Age structure of aspen was determined in the Hart Mountain National Antelope Refuge to determine the relationship to the presence of livestock and climate. A significant decline in aspen recruitment occurred in the late 1800s that coincided with the onset of high levels of livestock grazing. Livestock grazing was terminated in 1990 and aspen recruitment increased "by more than an order of magnitude". Climate variables were not a significant factor. "Where long-term declines in aspen are currently underway on grazed lands in the western US, land managers need to carefully consider the potential effects of livestock and alter, as needed, management of these ungulates to ensure retention of aspen woodlands and their ecosystem services."20

The Environmental Assessment is Inadequate:

The lack of analysis of proper alternatives, the extent of livestock grazing and its impact on riparian and lake habitats, vegetation, cover, substrate, and water quality should result in the EA being withdrawn

and an EIS prepared. An added alternative should include removal of livestock either by permit cancellation or permit buyout.

Comment #64:
Please accept the following comments on behalf of Council on Wildlife and Fish, Alliance for the Wild Rockies, Center for Biological Diversity, Native Ecosystems Council.

The DEA is woefully deficient. The proposed project fails to identify and analyze adverse cumulative environmental effects, in violation of NEPA. Livestock grazing is an obvious place to look for the cause of water quality problems wherever livestock and water meet. NEPA requires a "hard look," not a "nolook" coverup of the most obvious cause of accelerated eutrophication. Remove the livestock or walk away from this foolishness. Why not begin by locating the source oxygen depletion in Upper Lake and aquatic ecosystem degradation?
Grazers would not be affected by construction activities because individuals who graze livestock could be rotated around the Refuge property so as not to experience any adverse effects. (DEA, p. 30).
The DEA fails to mention livestock grazing as a goal of this project, however there is no mitigation, no monitoring, no water quality testing for the usual pollutants associated with livestock grazing.
Conflicting goals make this project a no-go until one of the goals is prioritized in a public disclosure document. You can never realistically achieve both goals in these shallow waterbodies. Livestock or clean water and fisheries, you must choose – choose wisely.
Livestock increase nutrients and sediment and cause stream bank erosion that widens the stream and makes a shallow channel, which in turn warms the water. Stream bank vegetation is trampled and eaten, destroying fish populations and aquatic insect populations, disrupting the ecological system until it fails. Isn't this what has happened in the project area? You need to investigate, sample water, take pictures, gather data, and analyze the findings in a proper environmental analysis, preferably an EIS.
And what about the adverse (direct, indirect and cumulative) impacts of livestock on migratory birds, wetlands, riparian features and threatened and endangered species? NO mention in the DEA. Trumpeter swans are an endangered species. The refuge was set up to protect birds.
What are your priorities here? Emphasis added.
It seems like a no-brainer that you need to consult with the FWS division that conducts T&E species biological opinions and issued incidental take statements. It appears that you have not consulted on grizzlies, Trumpeter swans, lynx, white bark pine, wolverine, and other listed species that "may be present" in the project area. Where is your BO (biological opinion)? This appears to be a "right-hand; left-hand problem." What gives? Some of the species that call the Refuge home, whether migratory or year-round residents include grizzly bears, black bears, elk, deer (mule and whitetail), Shiras moose, pronghorn, trumpeter swans, tundra swans, bald eagles, golden eagles, sandhill cranes, ground squirrels, badgers, wolves, coyotes, foxes, martens, all species of waterfowl in the Pacific Flyway, and numerous neotropical migrant songbirds to name just a few. https://www.fws.gov/refuge/red-rock-lakes
And what data, analysis and findings have resulted in your (FWS) study of hypoxia impacts to Arctic grayling in Upper Red Rock Lake "…linking beaver dam affected flow dynamics to upstream passage of arctic grayling winter survival, resource use." (livestock grazing?!). Ibid. Please disclose the impacts and analysis of this ongoing study in the EIS.
Tributary streams flowing into Upper Red Rock Lake should be monitored for temperature, organics and nutrients (E.coli, phosphorus, nitrogen, etc.) If levels exceed state water quality standards, these waterbodies should be included on Montana's biennial 303(d) list of "impaired" waterbodies. Surely, the lake should be listed as it is already exhibiting low oxygen levels. This is a good reason to contact

Montana DEQ (Dept. of Environmental Quality) for a water quality assessment of the lake and all its tributaries. Are any tributary streams or lakes in the Refuge/wilderness area already listed the 303(d) list? If so, have TMDLs already been established?
Montana FWP (Fish, Wildlife and Parks) should be asked to conduct spawning surveys in tributary streams. Are livestock impacting spawning and rearing stream reaches? Please disclose and analyze the condition of spawning and rearing habitats in the EIS. Riparian habitats are the preferred place livestock congregate to graze, trample and excrete waste. Test the water, let DEQ test the water, let the EPA test the water, let someone test the water, and disclose your findings in the EIS.
The wilderness character has apparently already been compromised, with no NEPA, and no public disclosure of the violation of the provisions of The Wilderness Act. The proposal (all action alternatives) further threaten the wilderness ("untrammeled") character of the project area. Odd, how FWS seems to equate installation of "…mechanical bubblers, diffusers, sheet piling, dredging or (laying) pipes…" as a way to "minimize" development of wilderness characteristics. What machine does that? Please cite the authority (legal "exception") that permits this imagined cognitive model. At this point (DEA), we can only say, implementing the "no action" alternative may prevent further wilderness degradation, but does nothing to remedy the already "rogue" action of the existing machine being used in the lake today. First, do no harm. Second, remove this mechanical abomination and begin anew with a proper EIS analysis. What seems to be going on is an institutional version of Munchausen syndrome by proxy, a mental illness where the caretaker of a child, – in this case the caretaker (FWS) of a wilderness area -- either makes up fake symptoms (to cover for livestock-caused pollution) or causes real symptoms (by permitting and ignoring ecological impacts) to make the habitat unhealthy, so it can appear to remedy the problem it caused in the first place. Or does this operation more resemble a simple case of racketeering – obtaining or extorting money illegally or carrying on illegal business activities to boost FWS and NGO ("stakeholder/collaborator(s)") budgets. I certainly hope neither would apply in this case. FWS can never engineer a legal, effective remedy to low oxygen levels. Look at the ecological conditions, find the cause(s) of water quality impairment, and clean up the mess created by man-made foolishness. We appreciate this opportunity to comment and recommend a "do-over" followed by an EIS.

Comment #65:

I am happy to see that there is serious consideration to the problem of decreasing populations of Artic Grayling in the Red Rock Lakes National Wildlife Refuge (and surrounding areas). This has been an ongoing problem for many years.

My history in the Centennial Valley stretches back to 1977 and I have been an annual visitor since that time. I have had the privilege over that time to have interacted with many of the now deceased but long time residents/ranchers/visitors to the valley. I heard many stories of how the grayling were so plentiful in years past, including stories of 4th of July picnics where large quantities of this fish were extracted from Odell Creek to feed those celebrating this holiday while camping on the property now owned by the Taft Family. It would seem that this all came to an end shortly after the Lima Reservoir was installed in 1958 which stopped the movement of grayling from the summer range of the Red Rock Lakes and streams to deeper water found below this structure. This is not mentioned in your Environmental Assessment although the facts around this are well known and documented. Why are you not thinking about the steps necessary to remove the dam in your assessment?

I also saw no mention of the draining of McDonald Pond in your report. This happened somewhere around 15 years ago (I cannot remember exactly) but it clearly provided both deep water over the winter and movement of water flowing through the dam creating McDonald Pond at the tail that would

have provided more oxygenated and moving water than exists today. It seems like quite a coincidence that the grayling population had declined dramatically since it was removed (and the level of Culver Pond was lowered). I believe your options should consider these factors and look at rebuilding these structures with adequate structure to allow the fish to access them easily. I do know that there has been some enthusiasm for the pond created by Xavier Rolet on his property as a potential refuge for wintering grayling given its depth so why not look to the same thing with the old McDonald Pond and level of Culver Pond?

Also not mentioned in your assessment is the fact that despite the rapid and deeply concerning decline in population, fishing is still allowed in the areas holding grayling on Red Rock Creek. While there is no legal taking of Grayling allowed, they must be being caught and perhaps injured in the process. It makes absolutely no sense for a species or population to be on the brink of extinction and still allow activity that could harm them. Until the population recovers, fishing should be banned in areas where the fish are found.

And speaking of Red Rock Creek, there seems to be significant issues with erosion and slumping of the bank. In fact I was asked to help fund the restoration of the banks by the refuge staff. The destabilization/slumping of the banks does then effect spawning habitat for the grayling.

This is undoubtedly on some level due to the agricultural practices upstream and with them increased water quantity which leads to bank destabilization. This has certainly improved to some degree over time but the grazing that does take place upstream removes wintering grass cover and in the spring, then leads to faster melt and runoff. Since the Refuge now owns the Alaska Basin property, one way to address this problem would be to eliminate grazing on the refuge property that flows into Red Rock Creek. Another should be to prioritize the streambank stabilization to prevent more erosion/slumping into the creek. But there is nothing in your plan to address any issue related to streambank erosion which seems to be a major oversight. This would have an additional benefit of then reducing the sediment flowing into Red Rock Lakes and most of your written alternatives in your EA tend to identify the sedimentation of the lakes as a major concern for the wintering grayling.

This of course then begs the question of why grazing anywhere near the upper lake on Refuge property is permitted. A wildlife refuge is a place that under law prioritizes wildlife and any grazing in a system that is holding a species that is very threatened with sediment runoff should eliminate this factor. If nothing else, it should be stopped until it can be carefully studied and understood – something that is not true at this time. We are dealing with a situation that is dire and it requires us to be far more careful than normally would be the case.

That all said, doing the things I have outlined above in addition to some of the other things you are considering would be the best course of action. Take dramatic action or we will not be worried about the grayling as they will be gone.

Comment #66:

I wish to go on record as OPPOSING ALL the alternatives offered in your recent Environmental Analysis to theoretically “save” the adfluvial arctic grayling in Upper Red Rocks Lake Wilderness Area and National Wildlife Management Refuge.

Please note, these are NOT the river-dwelling Fluvial Arctic Grayling that are threatened with extirpation in Montana (and the Lower 48) primarily due to the Wildlife Service's refusal to list them as Endangered and take the steps necessary to provide the cold, clean and connected waters they require for existence.

Montana has many, many lakes with adfluvial, lake-dwelling, grayling in them – many of which came from the exact genetic brood stock that still hangs on in Upper Red Rocks Lake. There is no shortage of adfluvial grayling in Montana nor significant threats to their future.

The Environmental Analysis (EA) spends an inordinate amount of time proposing a rather shocking array of "alternatives" that apparently ignore the fact that Upper Red Rocks Lake is in a Wilderness Area protected by the Wilderness Act of 1964 with very strict legal sidebars on activities within Wilderness Area boundaries. Likewise, the National Wildlife Management Refuge comes with its own set of federal laws and management guidelines that don't envision driving wildlife out of the Refuge by agency management activities.

Moreover, FWS also seems to have decided to ignore the Endangered Species Act and the fact that at least two listed species – grizzly bears and lynx – occupy the Wilderness Area and the National Wildlife Refuge. Under the legal requirements of the Endangered Species Act, it is illegal to harass protected species, which all the alternatives for intrusive mechanical actions – running compressors, driving sheet piling, installing underground power lines, dredging, and installation of permanent water pipes – will do.

How the US Fish and Wildlife Service, that is tasked with restoring threatened and endangered species, could possibly come up with a proposal like this is beyond comprehension – especially since virtually all of the alternatives violate the Service's own "Fundamental Objectives" for managing both the National Wildlife Refuge and the Wilderness Area.

Add to that the proposal is woefully deficient in providing the public with details about significant information – including fiscal and scientific. We don't know how much it will cost, we don't know what the dissolved oxygen levels will be with the various alternatives, and we don't know if there will even be any grayling left after the lake's surface is opened to natural predators in winter. Nothing regarding these parameters has been provided by the Service in its Environmental Analysis.

We also don't know where the nutrient load is coming from – at least in the EA – because it seems to focus not on the causes of the eutrophication and subsequent potential for winter kill, but on unproven and unsupported "solutions."

The proposal is most like someone living in a home with a leaking gas pipe that's poisoning them – but instead of fixing the pipe, they want to put in exhaust fans. Clearly, the nutrient input to the lake has been ignored because the Service apparently doesn't want to consider dealing with the actual cause of the problem – merely "fixing" them through artificial mechanical means that only have a theoretical chance of working – and even that is not well documented.

We know there are significant nutrient inputs from upstream land uses – primarily grazing, but including housing and irrigation. Yet, none of those inputs were quantified, explained, or ameliorated in the proposal.

Somehow, FWS has managed to "lose" 1,927 grayling from its population estimates in the last few years. Now you say you're down to 73 fish and so drastic and illegal actions must be taken to "save" them. Nowhere do you admit many Montana lakes have been stocked with grayling from Upper Red Rocks Lake – and that those fish will contain the same genetic makeup of the stock from which they were taken.

The idea that Upper Red Rocks Lake could easily and cheaply be restocked with grayling directly descended from the original genetic stock is not even mentioned. Yet, if the Service was serious about maintaining adfluvial grayling in the lake, it would take the steps necessary to stop the nutrient inputs and ensure historic flows of input streams to return the lake to its former capability of sustaining thousands of grayling – and then restock it if, thanks to the lack of real and effective pro-active management, the pitiful 73 remaining fish could be gone by ice out.

Finally, a recent article in the Bozeman Chronicle indicates the Service is already running compressors and "diffusers" in the lake – without following the requirements of federal law on environmental analysis as well as public review and comment as codified in the National Environmental Policy Act and the Administrative Procedures Act.

Following are the specifics of what the Service has ignored, intentionally not addressed, and its suggested actions in violation of its own Fundamental Objectives for managing Upper Red Rocks Lake and the surrounding Wilderness Area and National Wildlife Refuge.

The EA contradicts a number of the "Fundamental Objectives" from its own management-guiding document: "Decision-Making for Centennial Valley Arctic Grayling (Thymallus arcticus) Conservation on Red Rock Lakes National National Wildlife Refuge," which is directly quoted below with comments. "Fundamental objectives describe the full range of concerns that a decision maker has when selecting among a set of management actions. In this decision setting, USFWS and stakeholders identified a hierarchy that included four higher-order objectives broken down into eight unique fundamental objectives for consideration. Higher-order objectives are numbered, and corresponding fundamental objectives are lettered:"

1. Manage resources to maintain and enhance the population of CV grayling: A. Maximize CV grayling probability of persistence over 25 years.

> Comment: Installing ANY of the suggested alternatives will not meet the goal of "maintaining and enhancing" the population of grayling for 25 years even if you run the "trammeling" electrical/mechanical devices for the entire time. Yet, it would be a tremendous and on-going disruption of the Wilderness Area and the National Wildlife Refuge. Your own EA admits that it would likely drive waterfowl from the area "so they could be hunted" – which is antithetical to the purpose for which the National Wildlife Refuge was established...to say nothing of the Wilderness Area.
>
> Moreover, there is nothing in the EA to acknowledge or address the mounting consequences and impacts of global warming and climate change. Instead, for some unknown reason, FWS has determined – and expects the public to accept – that things are going to be the same as they are now vis-a-vis snow and rainfall, temperature gradients, and land use. Those are all assumptions that current science and monitoring of global warming dispute and, in fact, predict hotter temperatures, shorter winters, longer summers, and less precipitation.

Somehow, the FWS managed to extirpate 1,927 of the grayling that inhabited the lake prior to 2016 – a mere 7 years ago. Now the Service postulates that it's going to "save" the remaining 73 grayling and miraculously repopulate the lake without addressing the most significant impacts to the aquatic environment.

2. Preserve character of wilderness on Red Rocks Lake National National Wildlife Refuge:

A. Minimize the manipulation or control of the biophysical environment (untrammeled character).

Comment: All of the alternatives except the "no action" alternative significantly "manipulate" and/or "control" the biophysical environment and "untrammeled" character. Unfortunately, the "No Action" alternative ignores the on-going nutrient inputs and the very real ability of the Service to engage in activities to minimize or eliminate the root cause of the lake's eutrophication.

B. Minimize the authorized development of wilderness (undeveloped character).

Comment: Obviously the alternatives to install electric/mechanical bubblers, diffusers, sheet piling, dredging or pipes does not "minimize" development of the wilderness – just the opposite.

C. Minimize disturbance to plant and animal species and communities (natural character).

Comment: The engineering alternatives significantly disturb both plant and animal species and communities. There is no analysis of what happens to the plants at the bottom of this shallow lake when they are subjected to significant changes – introduction of oxygen, sedimentation, the likelihood that the activities will drive wildlife out of the wilderness and refuge – particularly the endangered species and waterfowl as noted in the EA.

Why the EA didn't address the potentials for ecological disruption is a mystery considering the proposals to dredge, install sheeting piling, barriers and pipes.

The lake, as noted in the USGS geology and hydrogeology publication (https://pubs.usgs.gov/of/2014/1157/pdf/ofr2014-1157_pamphlet.pdf) is sitting on permeable glacial till and gravels with a lens of impermeable sediment on part of the bottom.

As noted, the area around the lake and part of the lake itself are permeable and groundwater actually percolates UP through those gravels. Driving sheet piling could very well pierce the impermeable layer or intercept the permeable layer and could significantly change the internal water exchange of the lake. NOTHING was done to analyze that potential and, in fact, the geology and hydrogeology of the lake and surrounding areas was largely ignored in the EA. Figure 2 (above) specifically shows not only the geologic profile, but also the very important known surface and groundwater flows into the lake from the surrounding lands.

D. Minimize the sights and sounds of people inside of wilderness (solitude or primitive character).

Comment: Anyone who sees Upper Red Rocks Lake looking like a municipal sewage treatment pond with its aerator bubbling away as compressors in the campground pound will have a hard time connecting those activities with a Wilderness Area since they are so easily identified as the intrusion of man that destroy both the "solitude" and "primitive character."

3. Preserve and enhance stakeholder values:

A. Minimize disturbance to refuge users and neighbors.

Comment: Once again, it is impossible to believe any of the engineering alternatives will not increase the disturbance to refuge (and wilderness) users.

Apparently, however, the Service decided to minimize the disturbance to "neighbors" by refusing to analyze the nutrient inputs from those neighbors or suggesting how they might be

minimized or eliminated. Without the nutrients driving the plant growth in this very shallow lake, there likely wouldn't be a significant consumption of available oxygen as the plants decompose during ice over and snow cover. But if you continue to fertilize the plant communities instead of limiting the nutrient input, there's no reason to believe they will not exacerbate the problem instead of ameliorating it. In this instance, the Service is dodging its responsibility because it doesn't want to consider changes to upstream land use and the subsequent nutrient inputs.

4. Consider monetary cost of management activities:

A. Minimize cost of management activities.

Comment: Since the EA didn't include any cost estimates nor the source of the revenue required to install buried electric lines, pipelines, diffusers, compressors, sheet piling, dredges, or the time and equipment required to install them, it is impossible for members of the public to quantify the cost and determine whether the Service is actually meeting these "Fundamental Objectives" and whether the costs are worth the dubious and theoretical "benefits." Again, it's a complete failure by the EA to address significant issues required to meet the goals of the agency's own "objectives."

Nutrient inputs ignored

Unfortunately the EA is woefully inadequate in analyzing or even noting the nutrient inputs from the various uses in the drainage basin – including land use, grazing, commercial activities, roads, and agriculture.

However, as shown in the USGS geology and hydrogeology analysis, it becomes clear that the area has a variety of potential nutrient inputs, including surface and shallow groundwater, as noted: "With high surface runoff during the spring snowmelt, surface water from Red Rock, Odell, Elk, Tom, and other creeks flow through the central wetland inside the "water plane" in a manner somewhat comparable to that of a freshwater lake."

The "water plane" is actually the shallow water table that mixes with the surface water AND EMERGES UPWARD through the bottom of the lake and surrounding wetlands. As noted by the USGS: "The central part of the map area is nearly horizontal, sloping to the west only 0.6 m in 13km (2 feet in 8 miles). This forms a flat, watery, lowland that contains upper and lower lakes, many ponds, and peat lands included inside the nearly flat "water plane" that is bounded by somewhat steeper slopes. Beneath the sediments of Lake Centennial are permeable sands and gravels that host groundwater recharged by surface and subsurface flows from the adjacent mountains and uplands (fig. 2). Groundwater from these sands and gravels leaks upward to sustain local vegetation adjacent to and within the central wetland (fig. 2)."

Simply put, because both Upper and Lower Red Rocks Lakes are the remnants of the original Centennial Lake (22,000 years ago) this is one continuous, interconnected hydrologic system with very little down-gradient slope and Given this, it's difficult to understand why the Service didn't full analyze the system to determine where nutrients are coming from and suggest actual alternatives to reduce or eliminate them instead of spending an inordinate amount of time and energy putting forth intrusive – and unproven – engineering "fixes." Again, as noted by the USGS: "Understanding of this surficial geology enhances understanding of how the landscapes operate in and around the Red Rock Lakes National National Wildlife Refuge."

Potential unintended consequences of opening the lake ice in winter through continuous diffusers/bubblers

As anyone knows who has ever fished for them, grayling are voracious surface feeders. It's part and parcel of one of the reasons the Service and others use to explain their decline – they're too easy to catch.

While the actual reason for their decline is habitat destruction, there's no question they willingly come up for flies.

Unfortunately, the EA did not even consider the consequences of opening the ice on a formerly iced-over lake in winter for the handful of remaining grayling. What it did laud was that the open water would give access for eagles and otters. Although both otters and eagles are known predators on fish, apparently the Service didn't think about the possibility that the new mid-winter predator-prey relationship could actually exacerbate the demise of the remaining grayling in Upper Red Rocks Lake.

The lake is extremely shallow (mean depth 6 ft), so neither eagles nor otters would have a difficult time finding grayling...especially if they're congregated around the bubbler/diffusers since that's where the highest dissolved oxygen is likely to be.

But thanks to the midge hatch – which goes on all winter – it's virtually certain that grayling will be attracted to the surface to feed on the flies. Midges, although small, are prolific in winter. As noted in a recent article (https://www.flyfisherman.com/editorial/winter-midges/393645) titled "Successful strategies for Yellowstone Country's longest hatch...Winter Midges" – these tiny flies are the "longest hatch" in the Upper Red Rocks Lake area, which means the grayling will undoubtedly be keying on them at the surface.

It was shocking to read the article in the Bozeman Chronicle that says the Service has already installed an aerator in the lake!
(https://www.bozemandailychronicle.com/news/environment/arctic-grayling-at-red-rock-lakes-national-wildlife-refuge-are-struggling-biologists-are-considering-ways/article_90884a84-c8f1-11ed-b16a-0b6297db3802.html).

Here's the quote from the article:
There's a hole in the ice on Upper Red Rock Lake. It's man made, but it wasn't cut or drilled. In the quiet of the remote and frozen Centennial Valley — accessible only by snowmobile in the winter — generators and air compressors have been powering underwater devices called diffusers. The machines move warmer water from the bottom of the lake to the top, which melts the ice. The opening has been there since mid-January. It stayed open through punishing cold snaps, even when temperatures dropped well below zero. That's encouraging news for Mike Bryant, the manager of Red Rock Lakes National Wildlife Refuge.

Apparently the Service already installed a diffuser in the lake without going through required environmental analysis, opportunity for public review and comment, and final decision-making as required by federal law. Dumb move, to say the least, and very curious as to how the Service will rationalize this action if and when litigation is brought to challenge the exclusion of the public in the management of the public's resources.

CONCLUSION
While it's understandable that the Service seeks to somehow maintain the tiny remnant population of adfluvial grayling in Upper Red Rocks Lake, the engineering, mechanical, and highly disruptive and intrusive alternatives offered are simply unacceptable. Moreover, they miss the mark.

As I noted in my opening, if you have a leaky gas pipe poisoning your home, you don't put in an exhaust fan, you fix the pipe.

The Service ignored an incredible amount of science with its proposals, as well as the apparent decision to simply ignore the nutrient inputs, which are the base cause of the eutrophication, the abundant plant growth, and the subsequent over-winter decomposition and consumption of available dissolved oxygen.

Obviously, it's time to address the nutrient inputs instead of this patchwork plan to dredge, pipe, electrify and artificially oxygenate the lake.

While the desire to maintain the pitiful remaining population of grayling is understandable since no biologist would want a native fish to be extirpated on their watch, it's somewhat facetious for a federal agency that routinely stocks lakes and streams nationwide to discard the fact that the lake could be replanted with the exact same brood stock that originated in the lake.

But before that can happen, the Service must RESTORE the livable habitat the grayling require, and which existed in the lake for thousands of years before upstream activities poisoned the lake with excess nutrients from human activities. THAT should be the highest priority for the U.S. Fish and Wildlife Service, not emplacing artificial mechanical devices in a Wilderness Area in a flailing attempt to "save" a handful of fish that will likely be doomed if the nutrient inputs continue – with or without the bubblers.

Comment #67:
Protecting the Arctic grayling population in the Centennial Valley is a worthwhile endeavor; however, the action alternatives proposed in the Arctic grayling EA are not acceptable. The Red Rock Lakes Wilderness also must be protected under the guidelines (law) laid down in the Wilderness Act. Too many federal agencies are disregarding the most basic rule of management of designated Wilderness areas do not undertake management, leave it wild and untrammeled.

There must be other solutions considered that protect grayling without the highly intrusive and damaging proposal to install aerators, power lines and other structures. Construction inside the boundaries of Wilderness is just not acceptable- it is contrary to the very definition of wilderness as described in the law. Please go back to the drawing board on this one, develop a fish-saving plan that leaves the Red Rock Wilderness alone.

Comment #68:
Thank you for the opportunity to provide comments on the Draft Environmental Assessment published on February 28, 2023. We are full time, year-round residents of the Centennial Valley in Lakeview, volunteers of several Valley organizations (ex: 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) as well as many years living in Alaska. We first came to the majestic Centennial Valley in 2016 and plan to spend the rest of our years in Lakeview.
The position of the Environmental Assessment is that an immediate need is upon us: Save the Arctic Grayling from extinction or from being listed as endangered. The agencies in care of the Arctic Grayling are unsure of the reason(s) for the sudden drop in the population, despite summer after summer of invasive electro-shocking of the creeks, traps that catch the fish for testing (blocking the creeks) and other research we are told will not in any way harm or otherwise bother this otherwise near-to-extinct fish. Next, the Adaptive Management Process is developed, devoid of geographic location (a Wilderness Area) so as to not impact the potential solutions. The decision? Winter is killing the Arctic Grayling. The shallow water in Upper Red Rock Lake is freezing over in the long Centennial Valley winters, when the ice is then covered in snow, causing low dissolved oxygen in the water. The "experimental" solutions are to build permanent infrastructure to increase dissolved oxygen in the lake.
We are disappointed that the Adaptative Management Process concluded winter in the Centennial Valley (ice and the resulting snow buildup on Upper Red Rock Lake) as the likely case of the recent decline in the Arctic Grayling population. This is a flaw that creates problems with the solutions. While we are not scientists or biologists, we cannot see how WINTER can be blamed for the recent population demise when there has always been winter in this Valley. We are also concerned the agencies involved failed to propose solutions that aligned with helping this Arctic Grayling that resides in a Wilderness Area. We've been reminded that wildlife do not adhere to geographical boundaries, which we understand. However, this particular Grayling is known for being located in the Centennial Valley, spending nearly all of its time in the Wilderness Area. It is unwise of us who live, love and are charged with caring for this area to make decisions that are aligned only for the benefit of the Arctic Grayling or for the Wilderness.
Additional Concerns:

- We learned the Montana Trout Unlimited organization was awarded a grant in March 2021 for the Alternative D – Shambow Pond Diversion Pipeline. The organization has been advertising and communicating to their members to select this alternative in comments to USFWS. We are concerned about the timing of the awarding of the grant and including it as an alternative in the Draft….
- The decision makers thus far are taking advantage of the small non-Wilderness designated area (Upper Campground) to locate compressors and generators. Stating the noise generated by these motors as low impact due to low visitor numbers in the winter, grizzles in hibernation, or simply the noise is lessened by moving away or the nearby trees will filter the noise is a huge disappointment in how these agencies are supposed to care for the character of wilderness. It's possible these people have not been out to the Upper Campground this winter to hear the generators for the current related project tht is underway. It is frankly sad to hear the roaring of the generators and compressors in this beautiful setting, jarring to read in the Draft Environmental Assessment that USFWS thinks this impact to Wilderness is not an issue and definitely ruins any chance of solitude in the Wilderness anywhere near the lake.
- The proposed Installation of splashers on the lake requires motors out on the lake surface and is essentially making Upper Lake into a city park pond with water features (sprinklers). Realizing this is an attempt to balance saving the Arctic Grayling with sacrificing wilderness character, this "experiment" is simply beyond the balance needed when man's work is substantially noticeable simply by looking out at the lake. Further, it is noted in the Assessment as a "benefit" to other species such as bald eagle and otter to have access to open water and fish created by the splasher, diffuser, or aerator during the winter. This

open water will substantially change the natural environment beyond that of increasing dissolved oxygen in the lake.

In summary, we would like to see solutions that start with a fair premise. We are not in favor of stating "winter" as the cause of the issue for the dramatic drop in Grayling population, in an area with long winters, then implementing "experiential" solutions requiring permanent infrastructure in a Wilderness Area. We believe solutions that balance the needs of the Arctic Grayling and taking into consideration this particular Arctic Grayling is primarily located in a Wilderness Area are solutions that should be considered and would be successful. Currently, the language used in the document is aligned with taking the authority to do what is needed to save the Grayling and over and over, stating impact on the Wilderness is minimal. Installing motors, aerators, splashers, diffusers, roaring generator and compressors, digging up the Wilderness, dredging the lake, installing permanent barriers in the lake, pipes and drains in the lake requiring maintenance, draining a nearby pond, installing electricity from miles away, upgrading the boat dock, creating open water for the benefit of eagles and otters to eat the fish in winter, etc. are not minimal impacts. This approach will not be successful or beneficial to the Arctic Grayling or the Wilderness.

Comment #69:

The profound problem with this EA, is that it is clear that the Service has already made the decision to trammel the wilderness by manipulating dissolved oxygen levels in the lake within the designated wilderness of the refuge: "The proposed action would increase dissolved oxygen levels in deeper portions of URRL where grayling over-winter, improve grayling winter survival and maintain existing grayling genetic variability." In the EA, all the Service is doing is looking at different ways of taking this action, not evaluating whether this or any other action should be taken at all. Yes, there is the No Action alternative, but that is far different than considering other actions the Service could take that would not involve trammeling the wilderness by manipulating oxygen levels.

Since the Service is proposing a management activity in wilderness, according to U.S. Fish and Wildlife Service policy 610 FW 1.21, the refuge should have prepared a Minimum Requirement Analysis (MRA) in conjunction with the EA.* Preparation of an MRA is the process the Service uses to identify what actions (if any) constitute the minimum requirement for managing an area as wilderness. (It would be enormously helpful to the public if an MRA had been shared, to see the analysis of the proposed action.)

This EA cannot substitute for the MRA. The EA only analyzes alternatives to accomplish the trammeling of manipulating dissolved oxygen levels in the lake; it does not answer the question of whether taking any action was necessary in the first place. This is a critical part of Sec. 4(c) of the Wilderness Act, which identifies uses prohibited in wilderness, but offers refuge managers the leeway to use them if it is necessary to meet the minimum requirements for the administration of the wilderness to preserve its wilderness character. Again, this is the first step of an MRA. The MRA would also have provided information about how much and in what ways the various alternatives would specifically impair wilderness character. It is entirely possible that taking no action in wilderness is the minimum requirement, and that should be the preferred alternative for the EA. Or if taking action was determined to be necessary, then the alternative identified in the MRA as the minimum requirement should be the preferred alternative for the EA. Because the EA does not identify a preferred alternative, it seems to be a further indication that the refuge has not yet prepared an MRA.

Momentarily overlooking the enormous flaw of having already decided to take action in the wilderness, when the refuge prepares the MRA it should consider an alternative that was rejected in the EA: Complete Closure of Fishing in Red Rock Creek and Elk Springs Creek. I understand that this alternative was dismissed because fishing was thought to be a less significant mortality factor for the Centennial Valley Arctic grayling population, but this alternative probably would be completely compatible with

preserving wilderness character. Even if fishing is not the major driver of population decline, it appears that taking this action would be in accordance with the Service's Wilderness Stewardship policy (610 FW 1 and 2) and would likely benefit the grayling population.
It also concerns me that the Service is essentially proposing to conduct a research project in the wilderness. One of the values of designated wilderness is to serve as a control for experiments done in non-wilderness. Scientists can then compare the effects of experimental actions taken in the non-wilderness to better understand the effects and the extent of the effects of those actions. Experiments should not be conducted in the wilderness itself. If research is necessary to conserve Arctic grayling conduct that research outside of the wilderness.
Another problem I see is, saying that "Montana Code Annotated (MCA) 87-1-201 gives MFWP management responsibility and authority for Arctic grayling within the state of Montana. Montana state law provides MFWP with the authority for implementation of fish management and restoration projects (MCA § 87-1-702; § 87-1-201[9][a]). In addition, Montana state law authorizes MFWP to manage wildlife, fish, game, and nongame animals to prevent the need for listing under the Endangered Species Act or ESA, and listed, sensitive, or species that are candidates for listing under the ESA must be managed in a manner that assists in the maintenance or recovery of the species (MCA§ 87- 5-107)," overlooks the fact that the U.S. Fish and Wildlife Service has jurisdiction over managing the wildlife on a national wildlife refuge. While we partner closely with the MFWP, the Service has the final say in how we will manage wildlife on a refuge. This paragraph leaves the impression that the State of Montana will be able to make the final decision. This is incorrect.
I am also concerned that this EA is elevating the importance of the Arctic grayling in refuge and wilderness-establishing documents. The purposes of the refuge do not mention Arctic grayling specifically. And grayling may have been mentioned in a wilderness bill that proposed wilderness designation, but I see no mention of grayling in the law that designated the Red Rock Lakes wilderness, which stated, "certain lands in the Red Rock Lakes National Wildlife Refuge, Montana, which comprise approximately thirty-two thousand three hundred and fifty acres, which are depicted on a map entitled "Red Rock Lakes ·wilderness Proposal", dated January 1974, and which shall be known as the Red Rock Lakes Wilderness;"
I hope the Service will follow current policy for evaluating proposed refuge management actions in wilderness before deciding to trammel the wilderness based on this EA.
*U.S. Fish and Wildlife Service policy 610 FW1.21 asks the question: What is the relationship of the MRA to the requirements of NEPA? Under NEPA, we must consider alternatives to, and the environmental effects of, our actions, incorporate environmental information, and use public participation. We will prepare MRAs in conjunction with the documentation of NEPA compliance (i.e., categorical exclusion, environmental assessment, finding of no significant impact, environmental impact statement, record of decision). (See 550 FW 3 for more information about NEPA.) We will use information gathered for the MRA to document the purpose and need for a proposal project and to develop and describe the proposed action and alternatives."

Comment #70:

Since it is so important to save the Artic Grayling in the Centennial Valley Red Rock Lakes, I beg to wonder why it was imperative to poison them out of the upper Red Rock Lake in the 1940's? I know this is true as I was raised there and saw the grayling comeback in the 1950's, Tom Creek would have so many you could scoop them out with your bare hands, and the creek that runs through elk Lake Camp would have so many that Utah fishermen would fill wading boots with them. The population declined quickly after 1968 due to the action of no beaver control on the refuge.
Too many actions are undertaken without full understanding of the facts.

Comment #71:
I would like to submit the following comment on the US Fish and Wildlife's plan to address saving the artic grayling in Red Rocks Lake.
This is obviously a difficult and complex situation. I would tend to agree with the assessment that any of the suggested solutions (other than doing nothing) would involve activities that are both inconsistent with wilderness status and potentially could result in more devastating "unintended consequences" including possibly hastening the demise of the grayling population, deterring wildfowl from using the refuge and possible doing irreparable harm to the Spring plus other unknown unintended consequences to the ecosystem. Also, it appears that at least some of the solutions proposed may only result in stop-gap measures that may not be able to save the grayling population given the potential future effects of climate change on the condition of the lake.
It seems to me that the question is, which of these "solutions" offers the greatest good to the greatest number (both human and wildlife) and which honors the already established designations of "wilderness" and "wildlife refuge"?
Thanks for considering my comments.

Public Comments Response

Introduction
The Service would like to thank all the organizations and individuals for taking the time to review the draft Environmental Assessment (EA) for Arctic Grayling Conservation at Red Rock Lakes National Wildlife Refuge (NWR) and submit written comments. The public comment period is an essential aspect of the environmental review process under the National Environmental Policy Act (NEPA).

The Service received 3,326 correspondences from over 3,313 separate commenters, including organizations and individuals. 3,255 of these comments were sent in the form of standard form messages. All comments were submitted electronically, in the form of emails to elizabeth_tsang@fws.gov and by mail to U.S. Fish & Wildlife Service NWRS Planning Division P.O. Box 25486 DFC Denver, CO 80225. The initial 15-day public comment period began on February 28, 2023, and was scheduled to end on March 14, 2023. The availability of the EA was announced in a news release by the Service on February 28, 2023, and posted on social media. In addition, notices were emailed to members of Congress, Native American Tribes, and other stakeholders.

Early in the comment period, the Service received requests from several commenters to extend the 15-day public comment period to 30 or 45 days to afford them the opportunity to review the draft EA. In response to these requests, the Service extended the comment period to 30 days. This extension was made despite the urgent need to ensure the conservation of the grayling by implementing any of the action alternatives before the next winter. In order to take timely action for the grayling, the Service is heavily constrained by the need to complete design, contracting, funding, and construction to allow implementation of the selected action before

winter weather begins in the latter quarter of 2023. The Service determined a 45-day comment period would make it difficult to implement any of the action alternatives, if selected, in order conserve the remaining grayling.

As identified immediately above, the Service extended the comment period for the EA by an extra 15 days for a total of 30 days for public review. The public was notified of the extension of the public comment period in the same manner as for the original notice. However, in calculating the closing date for comments, the Service inaccurately identified March 28 as the final date for receiving comments. To assure consideration of all public comments, the Service did accept comments submitted on March 29 and 30. From the written comments received, the Service identified over 71 individual substantive comments and over 34 different topics to address. The primary topic areas identified in the submitted comments addressed CV grayling mortality and uniqueness, the EA and NEPA process, impacts to resources, possible new alternatives, the use of renewable resources, and identified additional areas to be addressed in the final EA. All comments received were carefully considered by the Service with respect to possible additions/corrections to the EA and comment responses were developed. These responses identify, as appropriate, the sections of the EA where revisions were made or additional information/analysis is provided in the EA, or an explanation is provided for why a comment does not warrant a change in the EA or further response. Full-length comments are published in their entirety as this appendix of the final EA followed by the Service's responses.

Comment Topics and FWS Responses

CV Grayling Mortality and Uniqueness

Angling Mortality and Regulations. Multiple commentators identified angling pressure as the cause of grayling mortality and requested that fishing closures be reconsidered as an alternative. The Service and FWP eliminated catch and release angling as a potential driver of grayling decline or as a factor preventing persistence (USFWS 2020) because of: (1) the protective angling regulations in place during periods most grayling use Red Rock Creek, (2) the fact that there were proportionally few grayling captures and low expected mortality in the spring period prior to angling closures, and (3) lack of correlation between annual angler pressure in Red Rock Creek and grayling abundances or the 2016 population decline (evidenced by statistical comparison of angler pressure numbers and grayling abundance the following year conducted by MFWP (MFWP unpublished data 2023)).

FWP commonly implements closures to angling during periods and in locations where spawning fish or incubating embryos are susceptible to potentially high mortality rates (e.g., Hebgen Reservoir tributaries). The timing and duration of these closures are specific to the biology of the species they are intended to protect.

For the URRL grayling, FWP placed restrictive angling regulations on Red Rock Creek and timed these restrictions specifically to protect the spawning grayling and their incubating embryos. Because URRL is closed to angling year-round, grayling are only accessible to anglers while in Red Rock Creek and other spawning tributaries. The majority of the CV grayling population migrates into Red Rock Creek to spawn each May (Mogen 1996). Movement into Red Rock Creek is cued by discharge and temperature (Gander et al. 2019), with the average peak of the spawning migration occurring on May 10th and ranging from May 1st to June 5th as recorded for the period between 1994 and 2022. Grayling spawning begins when water temperatures are over 50^{o}F, and typically occurs about a week after peak migration. Stream

residency for adult grayling is relatively short; females remained in the Red Rock Creek spawning areas for about 18 days and males for about 35 days (Mogen 1996). Incubation duration of grayling embryos is temperature dependent and ranges from 7-9 days at 55°F to 21-25 days at 40°F. In summary, most spawning fish enter the stream on May 10th and leave by June 15th and embryos are deposited and hatch between May 15th and June 15th, on average. Accordingly, regulations to close Red Rock Creek to angling during this period (May 15th to June 15th) were put in place in 2013 to eliminate the potential for angler trampling, referred to as boot disturbance by commentors, of embryos and reduce the likelihood of anglers catching spawning grayling. In 2022, the closure to angling was extended to begin on May 1st to be more protective of fish cued to make earlier spawning runs in warmer years with earlier runoff.

FWP's Catch and release only (no harvest) regulations have been in place for grayling in all CV streams for over 25 years. Potential angler-induced catch-and-release mortality of grayling prior to May 15th is negligible based on the timing of grayling movements, angler creel surveys, and fish and temperature monitoring data from Red Rock Creek. One commentor claimed that a one-day creel survey in 2022 showed hundreds of grayling being caught in Red Rock Creek during the summer. However, creel surveys with robust, statistically valid experimental design have shown a low catch rate of grayling. Single day interviews of some anglers or speculative catch rates provide little inference; there is no statistical relationship between annual angler use, which includes summertime angling, and grayling abundance the following year. Because peak grayling movement to spawning areas occurs on May 10th on average, there is limited opportunity for anglers to catch them in most years. Based on creel survey data, there were 2 grayling reported as being caught in access point surveys and 0 by catch cards in 2017 creel surveys compared to 176 in the spawning population, yielding about 1% encountered by anglers. In 2018, FWP required all anglers use catch cards, a management tool for estimating recreational catch of a species, for grayling. There were a total of 6 grayling reported by catch cards and 13 from access point surveys compared to 387 in the spawning population and depending on how non-reporting is calculated, it is expected between 3.6% and 9% of the population may have been caught and released by anglers. Similarly, 2015 population surveys observed hook scars in <2% of grayling in the year prior to the population decline. Mortality rates for salmonids during catch and release angling depend on water temperature and are near 0% at temperatures less than 73°F (Boyd 2008). Red Rock Creek temperatures were less than 73°F prior to the May 15th angling closure in all years. Additionally, water temperatures exceeded 73°F after June 15th and angling had resumed on Red Rock Creek during one day between 2016-2022, which prompted a full angling closure by FWP for the remainder of that summer.

Overall annual angler use in Red Rock Creek among years is not statistically related to grayling abundance. Annual angler pressure has been estimated in Red Rock Creek at least every other year since 1982 by Montana FWP as part of a statewide mail survey (Figure 1). Because these surveys describe angler use throughout the entire year, they capture periods before and after spawning closures in years those regulations were in place (2013-2022). Angler use varied from 4,311 angler days in 1997 to 56 angler days in 2007. However, there was no statistical relationship between angler use and the number of grayling in the population the following year. During the first year of the non-native trout suppression associated with the Adaptive Management Plan (2013), angler use was relatively high (1,156 days) and the grayling population the following year had 2,043 spawners, which was the second highest abundance recorded. The decline in grayling happened after a similar but lower amount of angler use in 2015 (773 angler days). If angler use was a population driver, then a population decline would have been expected in 2014 not 2016. Grayling abundance following high use in 2017 (3,290 angler days) actually increased in 2018 (214 grayling in 2017 to 387 grayling in 2018). The concurrent amount of suitable habitat in URRL during the winter of 2018 was also the highest amount observed since the 2016

population decline. Although there have been varying levels of angler use of Red Rock Creek through time, winter habitat in URRL remains the best predictor of grayling abundances.

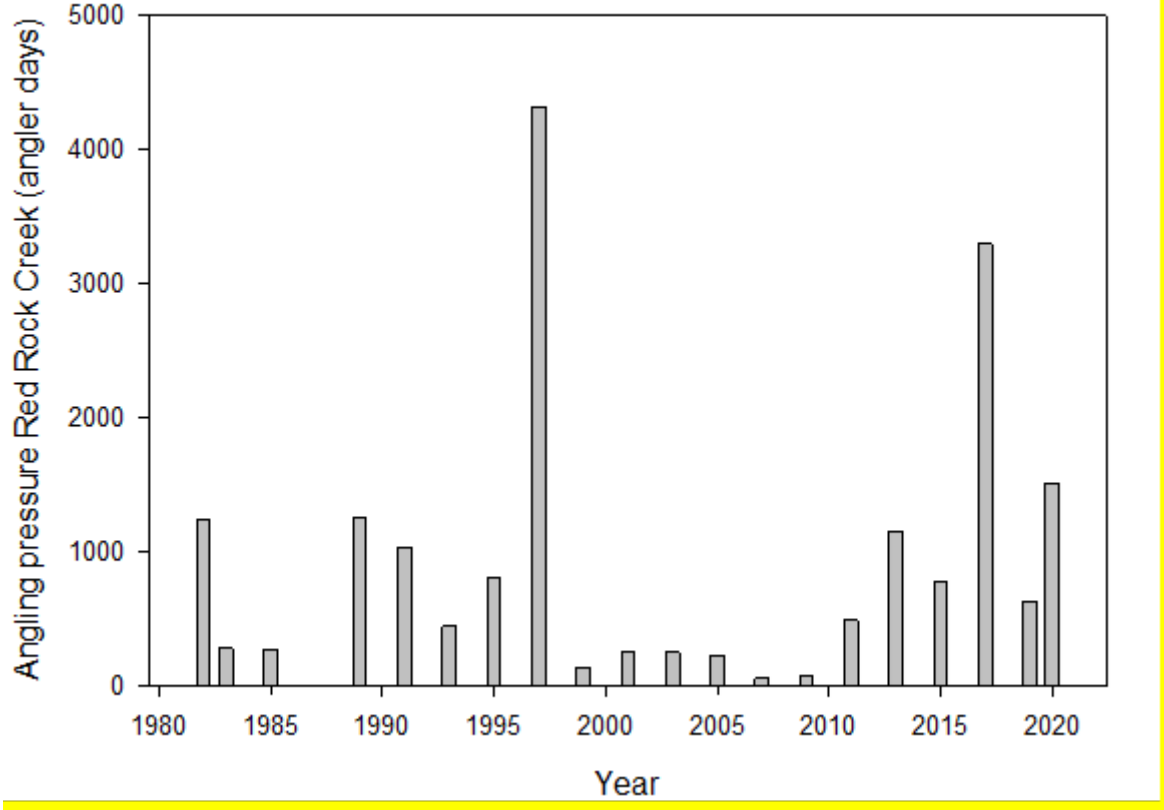

Figure 2. Angler pressure in Red Rock Creek, 1982-2020.

Additional background information was added to the EA based on comments and can be referenced starting on page 16.

Mortality Associated with Hypoxic Conditions in URRL. A few commentors asserted they did not believe hypoxic conditions were the cause of grayling decline. One commentor referred to a telemetry study in 2014 and 2015 that showed a 90+% survival of the tagged grayling overwintering in URRL and their own personal observation that no dead grayling were spotted on the shores of URRL after ice off in 2017 and 2018. Grayling abundance fluctuated between 1100 and 2500 grayling between 2010 and 2016; 50% changes in abundance between years were common. The population declined by 81% following poor overwinter conditions in Upper Lake in 2016 and declined further in subsequent years with low lake-wide oxygen concentrations. Furthermore, dead fish are scavenged or decay quickly and the highest number of potentially observable dead fish would have been present in 2016 when no surveys occurred. Based on post-decline abundances, only tens rather than hundreds of dead fish would have been potentially observable in 2017 and 2018.

Mortality Associated with Monitoring. A few commentors indicated that monitoring of grayling was contributing to their decline. URRL grayling have been monitored since 1975 (37 years), with springtime multiple-pass electrofishing in Red Rock Creek. 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 Red Rock Creek and maintained throughout the grayling spawning run in 14 of 33 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 Red Rock Creek. 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 Red Rock Creek 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 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 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 Red Rock Creek do not align with the magnitude of grayling decline observed in 2016.

Mortality Associated with the use of Toxicant. Several commenters suggested that the Service and FWP should consider a cessation of creek poisoning, electrofishing, and beaver dam eradication in the CV to allow the condition of spawning tributaries to improve in lieu of implementing the alternatives proposed in the EA. Another identified creek poisoning as a practice that occurred in the 1940s. No toxicant projects have occurred in Red Rock Lakes or upstream tributaries. Therefore, there are no toxicant related issues impacting grayling. FWP commonly removes non-native fish using the fish toxicant, rotenone, for the conservation of westslope cutthroat trout in Montana. However, fish removals are undertaken in closed systems with a barrier in place to prevent the reestablishment of non-native species. Neither the Service nor FWP are presently planning rotenone projects within the Red Rock Creek system due to the need to maintain an open system for grayling migrations and the extensive distribution of non-native species.

Electrofishing was addressed in the section of the response titled "Mortality Associated with Monitoring".

Beaver dams are not eradicated in spawning streams. Rather, beaver dams are notched as part of ongoing management for grayling. Notching only removes a portion of existing beaver dams to ensure grayling have access to upstream spawning areas. For more information on beaver dam notching see page 11 of the EA.

Uniqueness of CV Grayling Population. Some comments suggested that the CV grayling population is not unique or important to the grayling population as a whole or could be restocked with grayling directly descended from the original genetic stock. We disagree. Adfluvial (lake-dwelling) and fluvial (river-dwelling) populations of Arctic grayling which exist in the Upper Missouri Basin are a single species (*Thymallus arcticus*) and a Distinct Population Segment (DPS; USFWS 2020). Aboriginal populations of grayling in Montana currently reside in only the Big Hole (fluvial and adfluvial) and Centennial valleys (primarily adfluvial). Because of their indigenous origins, long-term persistence of these two populations is FWP and the USFWS's top priority.

Introduced populations of self-sustaining Arctic grayling do exist in at least 15 lakes in Montana. The genetic ancestry of these fish is comprised of a combination of grayling introduced from the CV and the Madison River beginning in the 1890s and around 1910, respectively. All 15 lakes contain important conservation populations, which provide resiliency against the extirpation of the Upper Missouri River grayling population (USFWS 2020, MAGWG 2022). However, 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, the priority of the Service and FWP is to preserve the historical population of CV grayling in its naturally occupied habitats.

Stocking grayling from other Upper Missouri River populations, especially in high numbers, would lead to the loss of the remaining genetic diversity and evolutionary legacy of the Red Rock Lakes grayling. As a result, stocking fish would only occur under extreme circumstances (e.g., genetic variability of extant population was lower than the brood) and as a last resort. However, if habitat conditions in Upper Lake are not improved prior to genetic infusion efforts, introduced fish will have similarly low survival and overall grayling abundances will not improve.

EA and NEPA Process

Alternative Selection. Multiple commentors asserted that a full range of alternatives were not considered in the NEPA process. However, the Service considered over 34 unique alternatives throughout the Adaptive Management Plan (AMP), Structured Decision Making (SDM), and EA process. In 2019, by request of USFWS and MFWP, CDM Smith assessed 26 different alternatives in their Preliminary Engineering and Feasibility Analysis to Improve Winter Habitat for Arctic Grayling. Out of those 26 alternatives, 3 were identified as potentially feasible: mechanical aeration with solar aerators, tributary diversion and point of inflow modification (pipeline) and dredging or lake modifications. Based on their recommendations, a solar powered aerator was piloted near the center of URRL in the winter of 2019-2020. However, the solar aeration system failed due to accumulation of snow and ice on the solar panels. More details of this project can be found in the "Solar Powered Aerators" section of this response. Following the failure of the solar aerator, the Service, MFWP, Montana Trout Unlimited, and USGS engaged in a structured decision making (SDM) process to identify additional alternatives. 8 new alternatives not described in the Feasibility Report were identified through this process. 5 of those alternatives were considered but dismissed due to not meeting the purpose and need of the EA. In the end, 3 alternatives from the SDM process and 2 from the Feasibility Report were selected as the action alternatives analyzed in the EA. Refer to page 15 of the EA for more information on alternatives considered but dismissed.

Decision Maker not Clear. One commentor pointed out that some language in the EA made it seem that MFWP were the final decision maker. The final decision maker for this EA is the Service, not MFWP. It is

important to note that this EA has been written as a joint EA between both USFWS and MFWP and must fulfill both NEPA and Montana Environmental Policy Act (MEPA) requirements. The specific language the commentor quoted was added to the EA to describe the mission of MFWP to ensure compliance with MEPA. Clarifying language was added to the EA in response to this comment and can be found on page 4 of the EA.

EIS is Required for this Project. A few commentors asserted that an EIS should have been prepared for this project instead of an EA. One commentor stated that the impacts of the alternatives would upend the entire ecosystem. The Service disagrees. The Service and FWP have been engaged in a multi-year process to identify alternatives to ensure the survival of the grayling in URRL. This effort has involved the implementation of the Candidate Conservation Agreement with Assurances program (CCAA) in 2007 and the development and implementation of an Adaptive Management Plan (2017). To guide their decision-making moving forward, the Service and FWP used a structured decision making (SDM) process to inform the preparation of the EA. This SDM process considered measures to maintain and enhance the population of CV grayling as well as to preserve the wilderness character of the designated wilderness in the RRLNWR. Alternatives evaluated in the EA were developed through application of the SDM process.

The EA circulated for public review takes a hard look at and provides full disclosure of the potential environmental impacts that would be associated with implementation of each of the six proposed alternatives on the surrounding physical and social environment of the RRLNWR. The conclusions of the analyses were that the potential impacts on wildlife and aquatic species, threatened and endangered species, habitat and vegetation, geology and soils, climate and air quality, water resources, visitor use and experience, cultural resources, wilderness values, and socioeconomics and environmental justice would be negligible, short-term, and not significant. Some longer-term but minor impacts were identified for wilderness value should the selected alternative involve visible structures, but these impacts would primarily occur in the winter when few visitors would be present in the RRLNWR. Both the EA analysis and the SDM technical report are available to the public.

Implementing Multiple Alternatives. Multiple commentors requested the Service consider implementing multiple alternatives as the same time or in succession. The EA does not assess the cumulative impacts of implementing multiple alternatives at once, so this is not an option for the Service. However, the Service may opt to update the EA in the future to implement a different alternative should the selected alternative not result in grayling persistence.

Inaccessibility and Inaccuracy of the Fact Sheet. One commentor stated that a document referred to as the “fact sheet” was only sent to some individuals and was not made available to the public. They also expressed the concern that the information addressing angling mortality and regulations in the fact sheet was inaccurate. The Service disagrees with both statements. The document “Supplemental Information on RRLNWR Draft EA” was posted to the Red Rock Lakes National Wildlife Refuge website library under the name “Supplemental Information on RRLNWR Draft EA” on February 28th, 2023, alongside the draft EA. It was subsequently shared by request with some of the local landowners under the name “AGAMP Fact Sheet”. This document is still available for review on the Refuge website. The facts identified within this document are consistent with the analyses contained in the EA. The commentor’s concern about angling mortality and regulations is addressed in the response of the same name (“Angling Mortality and Regulations”).

Montana Trout Unlimited Involvement. A few commentors disagreed or were concerned with the inclusion of Montana Trout Unlimited (MTU) in the EA process. They expressed the belief that the

inclusion of the pipeline alternative could be considered pre-decisional because MTU was awarded funding for a pipeline in March 2021. The Service does not agree the inclusion of the pipeline alternative is pre-decisional. MTU applied for funding from the National Fish and Wildlife Foundation (NFWF) in 2020 with the support of the Service and MFWP. It is necessary for government agencies to plan for projects years in advance, including obtaining available funding sources. The awarded funding was originally allocated for implementation of the Shambow pipeline; however, in 2022 the Service decided to re-evaluate potentially viable alternatives for grayling conservation through the SDM process. As a result, MTU communicated with NFWF the need to consider different alternatives than the pipeline, and the NFWF funding was changed to be for the implementation of a project to support grayling survival. In recent communications between MTU and NFWF grant managers and scientists, NFWF reiterated their support for going through the SDM and EA process for the decision-makers to determine the best solution for future grayling persistence. Should the Service select an action alternative other than the No Action alternative, NFWF funding will be used to implement that alternative. If the No Action alternative is selected, MTU would either not accept the funding or would look for other projects outside the Refuge that benefit grayling for NWFW consideration. While MTU has been involved with the SDM and EA process, they are not a government agency and do not have decision-making authority for the proposed action. In compliance with the NEPA process, the Service is the federal agency decisionmaker that is required to assess a full range of alternatives that would meet its purpose and need. Alternative D (Shambow Pond Diversion Pipeline) could be a potential solution to grayling conservation and excluding it as an alternative would be counter to NEPA requirements.

Tribal Engagement. One commentor noted that the EA included mention of the Tribal engagement process undertaken but not specific mention of the Tribal entities involved. In response, the Service has added additional information to the EA regarding Tribal engagement that can be found on page 42 of the EA.

Urgency of Completing the NEPA Process for the EA. One commentor believed the urgency for the Service to complete the NEPA process for this EA was due to a pending lawsuit on behalf of the grayling and the Endangered Species Act. While this lawsuit increases the complexity and importance of this EA, it is not the main cause for urgency. In 2022, the estimated spawning population of CV grayling was only 73 individuals. CV grayling are now one of the four remaining Upper Missouri River populations that display the full spectrum of life history behaviors. If action is not taken to improve conditions in URRL by the winter of 2023, the CV population of grayling has a high chance of extirpation. More information regarding the urgency of this EA can be found in the Purpose and Need of the EA on page 6.

Impacts to Resources

Climate Change and Environmental Concerns. Climate change has been identified by commenters as a threat to grayling persistence by FWP and the USFWS (USFWS 2020, MAGWG 2022). 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; Vatland 2015), while conversely it may alter winterkill effects due to a shorter duration of ice cover (Feng and Steffan 2000). In the Centennial Valley, a significant decrease in winter precipitation caused by climate change was identified as a contributor to the extirpation of grayling in Elk Lake (Gillilan and Boyd 2009). Reduced winter precipitation has exacerbated the recent period of prolonged drought which is a factor that has likely contributed to the loss of available over-winter habitat for grayling in URRL. During periods of reduced snowpack and winter precipitation, lake levels are lower and freshwater inputs (i.e., tributary streams and springs) are reduced. Each proposed alternative is intended to help offset the effects of climate change and provide

a more stable over-winter environment for grayling, especially during periods of drought. While climate change has impacted the Centennial Valley, even during extreme drought conditions such as those in 2021, water temperatures in Red Rock Creek remained well below lethal thermal thresholds for grayling.

Warming alone is not the cause of the habitat decline, rather it is the combination of long-term hydrologic changes and persistent drought (e.g., lower tributary inflows and lake levels) in conjunction with poor overwinter conditions due to long ice-cover duration (which isolates the lake from the atmosphere), snow cover (which limits photosynthesis), and organic rich sediments and macrophyte beds that deplete the lake of oxygen during decomposition.

Some commentors expressed concerns about the environmental impacts of the materials and the energy requirements for their manufacture. No significant impacts are expected from either the materials or energy usage and mitigation measures could be implemented to further reduce impacts. Additional information was added to the "Climate and Air Quality" section of the EA analysis starting on page 26.

Dissolved Oxygen Levels Produced by each Alternative. Commentors asked that the Service provide a comparative evaluation of the dissolved oxygen that would be provided by each of the proposed alternatives. The quantity of suitable habitat (i.e., areas of the lake containing more than 4 milligrams per liter of dissolved oxygen [mgO2/L] and at greater than 1.25 meters in depth) that could be produced with implementation of each alternative was modeled and described in the USGS SDM technical report. The modeling effort found implementation of the No Action alternative would be unable to produce enough dissolved oxygen to sustain the suitable habitat requirements for the grayling in the URRL throughout the winter. These are currently the conditions under which the grayling have suffered a population decline. Alternative B1, B2, and C were predicted to create 1.5 ha, 2.6 ha, and 2.7ha of suitable habitat, respectively. Alternative D was predicted to produce 1.5 ha of habitat. The barrier (Alternative E) and dredge and berm (Alternative F) were predicted to result in the largest areas of suitable habitat, 26.9 ha and 37.3 ha, respectively. For more on the modeling and results, please see pages 45-49 of the SDM technical report.

Endangered Species. A commenter was concerned that the proposed alternatives would involve intrusive mechanical actions (e.g., running compressors, driving sheet piling, installing underground power lines, dredging, and installation of permanent water pipes), which could harass endangered species, specifically grizzly bear, wolverines, lynx, and whitebark pine. Impacts to whitebark pine were not analyzed since it does not occur within the project area. The impacts of each alternative on endangered species found within the project area (lynx, grizzly bear, and wolverine), were analyzed in the EA. In addition, an Intra-Service Section 7 Biological Evaluation was conducted and is included in the EA as an appendix. The Section 7 evaluation determined there would be no effect on Canada lynx or wolverine and determined the alternatives may affect but are not likely to adversely affect grizzly bear. Impacts to grizzly from noise disturbance may occur during the construction phases of the alternatives but will be temporary. In addition, for alternatives A, B1, B2, C, E, and F construction would occur in locations of the refuge that already have an existing baseline of human-made noise disturbance. No permanent displacement of grizzly from any of the alternatives is expected. Alternatives B1, B2, and C that involve the use of compressors during the winter months would produce around 70 dB. It is important to note these impacts would occur during the winter months when grizzly are in hibernation. Additional information was added to the threatened and endangered species affected environment section of the EA and can be found on page 19. The Section 7 Evaluation can be found on page 46.

Impacts to Grayling from Alternative D. One commentor stated they did not support the redirection of water from Shambow Pond in the center of URRL. They felt doing so would have a negative impact on grayling who rely on oxygenated water from tributary mouths in the winter. While some grayling do use the oxygenated water at tributary mouths to survive, grayling preferentially select deep, well oxygenated locations in Upper Lake. Tributary mouths are shallow and not optimal for grayling. The presence of shallow, well oxygenated habitat was not adequate to prevent grayling decline or allow grayling recovery. Redirecting the oxygenated water from Shambow Pond to the deeper portions of URRL will create an area of refugia better suited for grayling survival.

Impacts to Vegetation from Oxygenation. One commentor asserted that the EA does not discuss the impact of oxygenation on aquatic vegetation in URRL. Impacts to vegetation were analyzed in the EA and can be found on page 22. Only Alternative F (Dredge and berm) is anticipated to have significant impacts on aquatic vegetation because of the disturbance associated with dredging activities. There would also be minor effects during the construction of Alternative C (pumped aeration) and Alternative D (Shambow Pond Diversion Pipeline) during pipeline installation. A linear disturbance for the buried portion of the pipeline in the near-shore lake environment is expected, but these impacts would be temporary. Since human occupation of the valley, shifts in the aquatic vegetation communities of refuge lakes and ponds have been observed which were attributed to over-grazing by trumpeter swans, changes in macro-nutrients, and lake succession (Paullin 1973, Randall 1978). Despite all of this and the introduction of up to 9 non-native vegetative types in valley lakes, the five predominate species of aquatic vegetation are the same as they were around 1899 (Paullin 1973, Randall 1978, USFWS 2009). Additionally, aeration could buffer against submerged aquatic vegetation die-off which would reduce anaerobic effects of decomposition on dissolved oxygen. Open water (polynya) and thin ice around the project could allow for early growth of aquatic vegetation which could provide a food-source for early nesting trumpeter swans.

Impacts to Water Exchange in URRL from Alternative E. One commentor expressed concern that the installation of sheet piling for Alternative E could negatively impact the internal water exchange within the bed of URRL. The Service disagrees. The installation of sheet pile is not expected to negatively impact the geohydrology of the semiconfined aquifer underlying Upper Red Rock. The depth of the layer of low permeability sediments deposited under paleo Lake Centennial which remain under Upper and Lower Red Rock Lakes was found to be 8.5 meters thick (Pierce et al, 2014). The sheet pile would penetrate this layer to a depth of 3-4 meters. It is not anticipated that the sheet pile will fully penetrate the layer. If it did fully penetrate into the underlying more permeable sands and gravel, the limited extent of penetration would not impede the movement of water through this lower layer. Well logs in the area north of the Red Rock Lakes indicate that the layers of more permeable materials are several meters thick at a minimum (GWIC 270229 [mbmggwic.mtech.edu], GWIC 273911 [mbmggwic.mtech.edu]) indicating that a minor intrusion by sheet pile if it did occur would have minimal impact on water movement. Given the semipermeable nature of the sediments already allowing some upward movement of water, the pressure in the underlying sands and gravel is relatively low and water would not likely migrate up along the sheet pile as the sediments would seal against the rough, rusted surface of the sheet pile.

Potential for Predation of Grayling During Period of Open Ice. One commentor expressed concern that opening a polynya on URRL would increase opportunities for predation of grayling from otter and bald eagle. The presence of a polynya on URRL and its potential effects on predation of grayling were considered in the analysis of EA alternatives and were considered in the SDM analysis. Based on expert elicitation from ten resource professionals (i.e., wildlife biologists, fish biologists, riparian ecologists,

resource and wilderness managers), each alternative analyzed in the EA was only predicted to have minor and temporary effects for predators such as bald eagles and river otters (Table 5; SDM Technical Report). River otters and bald eagles have access to grayling most of the year in the open lake and in Red Rock Creek during the spawning period, and no additional predation risk is expected under any alternative. River otters can access fish in the lake during the winter from openings near tributary mouths, and bald eagles are not common in the valley during the winter. Improved over-winter conditions in URRL are predicted to benefit all fish species which exist in the lake. Species composition of the fish community located near a deep-water oxygen source should be proportional to species composition observed throughout the lake, therefore species which exist at higher densities than grayling such as white sucker and Yellowstone cutthroat trout will be more readily available as prey items. Bald eagles typically prey upon non-game fish when their densities are abundant (McClelland 1992). In Alberta, river otters commonly fed on suckers and occupied beaver-impounded streams rather than larger lakes during the winter (Reid et al. 1994). Additionally, other birds and mammals as well as mammalian carrion have been shown to comprise a large portion of bald eagle diets in the winter (Todd et al. 1982, Young 1983). Bald eagles also commonly feed on dead fish or steal fish captured by osprey (Todd et al. 1982), and osprey are absent from the Centennial Valley during the winter. While many bird species leave the Centennial Valley in the winter (including bald eagles), small mammals remain in the Centennial Valley throughout the winter and are available as prey. Although most alternatives do predict that a certain amount of polynya (up to 50-foot radius) will be maintained in the deeper portions of Upper Lake for the duration of the winter, the area of improved oxygen is expected to extend beyond the polynya and therefore grayling will not be restricted to spending the winter directly in the open water. Water temperatures in the polynya are predicted to be only 1-2 degrees F above freezing, and it is unlikely that grayling will be actively feeding on the surface. In fact, during harsh winter conditions, Arctic grayling have been documented to exhibit stationary behavior for extended periods of time (Lubinski 1995). During outreach with biologists experienced in winter aeration, increased predation was not described as a limiting factor for the target fish species despite large concentrations of fish observed near recently established oxygen sources.

Trumpeter Swans. Several commenters indicated that the alternatives proposed in the EA would be detrimental for trumpeter swans, the conservation of which was the primary reason for the establishment of the Red Rock Lakes NWR in 1936. These commenters also suggested that proposed alternatives could also negatively affect other migratory birds that depend on the refuge for habitat. After initial acquisition in 1936, the Refuge was expanded under several different authorities. These authorities were intended to meet broad purposes such as conservation of recreation, fish, and wildlife, including the arctic grayling. As the trumpeter swan population increased and has been maintained at a secure level, the Refuge has also expanded its conservation mission to other species in the Refuge. This is reflected in the Refuge's 2009 Comprehensive Conservation Plan. In addition, impacts to trumpeter swans and migratory birds were analyzed in the EA and can be referenced starting on page 16. It is expected that minimal impacts would occur on the distribution of trumpeter swans, other waterfowl, and bald eagle during the short timeframe required for the construction phases that would be associated with the alternatives. Although those species could be temporarily displaced from areas surrounding the construction sites, sufficient habitat exists outside of the project area to allow wildlife to disperse during those periods of disturbance. Since the proposed construction would occur outside of the nesting period, there would be no possible disruption of nesting. Because long-term operation of any selected alternative would occur in the winter, they would have no impact to swans or other migratory birds

Wilderness Impacts. Many commentors strongly opposed any action in the Wilderness and some were concerned with the impacts to wilderness and asked how the Service could implement solutions involving motorized equipment or permanent, visible structures within the Wilderness Area. When managing designated Wilderness, each of five wilderness qualities must be considered (Untrammeled, Undeveloped, Natural, Solitude or Primitive & Unconfined Recreation, Other Features of Value). The Service's policy in administering designated Wilderness areas (Part 610 FW 1) is to "preserve the wilderness character of the area and for other such purposes for which it may have been established as also to preserve it wilderness character." Accordingly, the indigenous grayling population was specifically mentioned in the 1976 Wilderness Bill as a contributing reason for the designation of the wilderness area in RRLNWR. Furthermore, the legislative purposes for RRLNWR include "the development, advancement, management, conservation, and protection of fish." (USFWS 2009). Loss of the indigenous grayling population result in a significant negative impact to the natural wilderness character of the Red Rock Lakes Wilderness.

The Wilderness Act prohibits the development of any structure within a wilderness area, subject to only one exception: "except as necessary to meet minimum requirements for the administration of the area for the purpose of this chapter." 16 U.S.C. § 1133(c). Because the purpose of the refuge is *A breeding ground for wild birds and animals* and Arctic grayling were specifically mentioned in the Wilderness legislation, proper preservation of the designated Wilderness area requires the Service to consider necessary actions to maintain grayling. Through both the Adaptive Management Plan and the SDM process, the Service researched alternatives that would both conserve the population and maintain the five wilderness qualities. The SDM process and the analyses contained in the EA demonstrates that each of the proposed alternatives would greatly reduce the likelihood of grayling extinction when compared with the No Action alternative. The Service's policy contained in FWS Policy Part 610.1.14D states the Service should "use restraint in administration of wilderness. As a place 'where the earth and its community of life are untrammeled by man," we minimize actions for administration of wilderness areas. We may allow exceptions to the generally prohibited uses if the uses are the minimum requirement for administering the area as wilderness and are necessary to accomplish the purposes of the refuge, including Wilderness Act purposes. As detailed in the SDM technical report, the proposed alternatives were specifically designed to meet the need for grayling conservation in the RRLNWR while at the same time preserving wilderness character of affected areas. Most environmental impacts associated with the proposed alternatives would be short-term and minor, some of the minor impacts that would affect wilderness value would be longer-term, but these impacts would primarily occur in the winter when few visitors would be present in the RRLNWR. The alternatives evaluated in the EA and Minimum Requirements Analysis (MRA) represent a minimum requirement for administering wilderness and are necessary to accomplish the purposes of the refuge and the Wilderness Act. The EA analysis, MRA, and the SDM technical report are available to the public.

One commentor, expressed that an EA is not a substitute for a MRA and indicated that they believed the Service had not completed this analysis. However, the Service did prepare an MRA addressing the alternatives in the EA, which assesses the impacts on wilderness value for each of the alternatives. This analysis was informed by the SDM Technical Report. Table 4 of the SDM report (p. 53) quantifies and summarizes the wilderness impact of each alternative. As such, the proposed alternatives to prevent extirpation of arctic grayling in the CV can be considered the minimum to accomplish the purposes of the Wilderness Act and the refuge. The MRA can be viewed here URRL Grayling MRA.

A few commentors asserted that the Service violated NEPA by implementing a pilot project that involved installing diffusers in URRL without proper compliance and documentation. The Service disagrees. The

temporary pilot project to test the effectiveness of Alternative B2 (Diffuser aeration) conducted on URRL during the winter of 2023 was fully evaluated in compliance the requirements of federal law prior to its initiation. Specifically, the Service prepared a Record of Categorical Exclusion (NEPA), Environmental Action Statement (NEPA), Minimum Requirements Analysis (Wilderness Act), Section 7 consultation (ESA), and Section 106 cultural resources consultation (National Historic Preservation Act). Information pertaining to the decision-making process and regulatory compliance was added to the Background of the EA on page 6.

Some commentors expressed concern regarding a potential lack of analysis in the EA concerning visual, auditory, and olfactory impacts associated with implementation of the alternatives on Wilderness value. The visual and auditory impacts to Wilderness value were analyzed and discussed in the EA. Both alternative B1 (splashers) and E (permanent barrier) would involve the placement of visible structures in URRL, and alternatives B1, B2 (diffusers), and C (pumped aeration) would result in the placement of visible structures in the campground area. Two commentors asserted that splashers would be a huge disturbance to wilderness character and likened them to "sprinklers in a city park". While splashers would sit on the surface of URRL and cause a visible disturbance in a small section of the lake, they will only be in use during the winter months when the Refuge is mostly inaccessible to visitors. In addition, there would be no impact on the majority of the Wilderness Area from the placement of visible structures, and the campground already contains visible man-made structures. Auditory disturbances would be temporary during construction except for the aeration alternatives. Compressors used in alternatives B1 and B2 would produce around 70dB (approximately the noise level of an air conditioner), and the pumps that would be employed for alternative C would produce around 75dB (approximately the noise level of a vacuum cleaner). However, both would only be operated during the winter months. Decibel levels for alternatives B1 and B2 could be reduced to 65dB (approximately the noise level of a normal conversation) by housing compressors within a cabinet and using acoustic sound proofing. No olfactory impacts are expected from any of the alternatives outside of the construction period. Propane would not be used for any equipment for any of the alternatives. Additional information about auditory and visual impacts and mitigation can be referred starting on both page 21 and 33 of the EA.

Proposed New Alternatives

Dam Removal/Restoration of Waterbodies. Commenters identified two historic changes to waterbodies in the Red Rock River watershed and asked that the effects of these changes be addressed as causes of grayling decline. These changes include the construction/reconstruction of the Lima Dam and the establishment and drainage of McDonald Pond.

The original earthen structure of Lima Dam was constructed on the Red Rock River in 1893, washed out, and was reconstructed in 1910. The current concrete structure was completed in 1934. The reservoir provides water for irrigation to downstream water users. Upon the dam's construction in 1893 and reconstruction in 1910, upstream access to the Centennial Valley by migratory grayling in the Red Rock and Beaverhead rivers was cut off, which likely reduced numbers of spawning grayling in the Centennial Valley. Eventually the downstream grayling population was extirpated because of a variety of stressors; however, since the 1930s the CV grayling population has fluctuated with high and low distributions and abundances occurring in most of the subsequent decades (Gander et al. 2019). During these same years, suitable overwinter habitat in Upper Red Rock Lake was adequate for relatively high grayling survival.

Removal of the Lima Dam to restore the original grayling spawning run would be problematic and is not being considered. Lima Dam currently serves as a fish barrier preventing downstream brown trout and

other non-native fishes access to the Centennial Valley. Brown trout have been shown to negatively impact grayling abundance in other Montana waterbodies (McCullough 2017, MAGWG 2022).

Elk Springs Creek, formerly one of the best spawning areas for grayling, was rerouted into Swan Lake by waterfowl hunters in 1908 and impounded by McDonald Pond in 1952. From 1898 to 1908, 33 million grayling eggs were harvested from this area. The purpose of the impoundment was to benefit waterfowl, principally for trumpeter swan conservation. The pond's construction inundated critical headwater spawning habitat and rerouting the stream near URRL blocked access for migratory grayling in Elk Springs Creek, which eliminated that spawning population. The dike forming the pond, impassable to fish downstream, was breached in 2009 and the pond was removed. Stream restoration projects on Elk Springs Creek between 2016 and 2022 rehabilitated spawning habitat that had been degraded by the instream pond and reconnected the lower stream to Upper Lake after it had been rerouted. Following restoration, low levels of sub-adult grayling use in Elk Springs Creek have been documented, although higher abundances are expected once overwinter conditions in URRL are improved.

Additional background information was added to the EA based on these comments about historic changes to waterbodies and can be referenced starting on page 8 of the EA.

Egg Box Program. One commentor suggested the Service utilize egg boxes in grayling restoration. Remote site incubators (RSIs; i.e., egg-boxes) are a common strategy used to reintroduce salmonids (including grayling) to formerly occupied habitats. RSIs were utilized in the successful reintroduction of grayling into the Ruby River from 2000-2008 and are currently being used to re-establish grayling in the Madison River. RSIs were utilized in Elk Springs Creek to re-establish grayling between 2010 and 2015 and although no adult grayling have been subsequently observed, wild juvenile grayling have been observed every year since introductions ceased. Over-winter habitat in URRL limits survival of grayling produced in tributaries once they move to the lake; most stocked grayling would die unless habitat conditions in URRL are improved. Once an alternative is implemented to improve hypoxic conditions in the URRL, FWP will likely use RSIs to boost genetic diversity (i.e., genetic rescue) of the overall population which now spawns primarily in Red Rock Creek.

Grazing and Nutrient Excess. Multiple commentors asserted that the cause for grayling decline was grazing on and upstream of the Refuge and excess nutrients in the lake from human activities. Some commentors also asserted the EA was deficient for not analyzing the impacts of grazing on grayling. However, the Service was able to dismiss both grazing and nutrient excess as the cause for grayling decline. Current grazing within the Refuge is entirely excluded from all grayling spawning tributaries and from URRL. Riparian conditions for almost all tributaries are presently considered to be in "Proper Function Conditioning" and do not exhibit poor health/impairments from current or past grazing practices on the Refuge over the last several decades. Rather, tributaries with impaired conditions are legacy impairments from anthropogenic disturbances caused nearly a century ago. Thus, grazing on the Refuge is not a driver for grayling decline in URRL.

Grazing conditions on private property upstream of the Refuge are minimal to non-existent. In addition, those private lands are enrolled in the Centennial Valley CCAA program and have an existing riparian management plan that addresses riparian resource concerns and management with cattle. Riparian conditions are in "Proper Functioning Conditions" based on current, national riparian assessment methodologies that have been completed in the last five years (USFWS 2018, MFWP 2023). Furthermore, many of these reaches have had recent stream restoration completed on them, which has improved instream and riparian conditions considerably and cattle grazing is completely excluded. There

is a small “at-risk” reach of upper Red Rock Creek; however, this reach has an existing grazing plan that is achieving improved habitat conditions (reduced sediment generation and bank trampling). Furthermore, this reach is slated for future stream restoration. Overall, grazing is almost entirely excluded above the Refuge or has such minimal impact that it is in balance with the associated disturbance regime typical of headwater tributaries.

Invasive Brook Trout Removal. Commenters suggested that non-native brook trout present in the Red Rock Lakes watershed may be taking important food sources and habitat from native grayling. Brook trout are the most widespread non-native fish in the Upper Missouri River. Brook Trout and Arctic grayling have coexisted in the CV for over a century, since brook trout were first introduced into Red Rock Creek in 1915. Over that time, the grayling population has fluctuated widely without correlation to brook trout abundance.

Brook trout exist in low numbers in Red Rock Creek, and the relative abundance of brook trout in Upper Lake has been low and consistent since the 1950s (1951-1979: 0.58 brook trout per net night; 2011-2014: 0.50 brook trout per net night). A predation study in the 1990s documented that brook trout predation on grayling eggs was low and no predation on age-0 grayling was observed (Katzman 1998). In the Big Hole River, brook trout did not affect grayling habitat use or growth rates (Magee and Byorth 1994), and age-0 grayling abundance was positively correlated with brook trout abundance (McCullough 2017). In addition, previous work demonstrated that non-native fish (Yellowstone cutthroat trout) have had little influence on the abundance of spawning grayling in Red Rock Creek compared to overwinter conditions in URRL (Warren et al. 2022).

If FWP needed to remove brook trout, this removal would be undertaken in closed system with a barrier in place to prevent the reestablishment of the non-native species. However, in this instance, a complete eradication of brook trout in the CV is not possible due to the need to maintain an open system for grayling migrations and the extensive distribution of the species, nor is it needed for the grayling.

Restore Spawning Creeks. Commenters suggested that the Service consider restoring spawning creeks as a new alternative. One of the stated Conservation strategies in the Adaptive Management Plan (AMP) for CV grayling is to *establish or maintain grayling spawning and/or refugia in at least two tributaries up and downstream of Upper Lake and connectivity among tributaries.* Consistent with this strategy, biennial spawning habitat surveys are conducted by FWP in tributary streams in the Centennial Valley. Suitable spawning habitat is defined as riffles with <10% fine sediment and >50% cobble/rubble. As part of the AMP, mean available suitable spawning habitat has been increased by over 3 times from 1.78 ha to 5.83 ha. This was done through reconnecting Elk Springs Creek, habitat restoration following removal of instream ponds, and providing grayling with access around beaver dams, which has limited the species access to spawning areas. FWP, the USFWS, and other partners have spent over $1,000,000 to re-connect and improve spawning habitat in Elk Springs Creek and other spawning tributaries over the past 15 years. Elk Springs Creek has historically been one of the most productive spawning tributaries for grayling in the contiguous United States. However, significant alterations made to Elk Springs Creek for the benefit of waterfowl in the early to mid-1900s eliminated access for migratory fish and degraded the channel to the point it was no longer suitable for grayling spawning.

Specifically, beginning in 2009, the USFWS removed McDonald Pond, an in-stream reservoir on Elk Springs Creek that had blocked grayling migration and inundated spawning gravels. Following pond removal, two phases of restoration (2016 and 2022) were undertaken to undo the damage caused by the presence of the pond. Also in 2016, lower Elk Springs Creek was rerouted to its historical channel

after having been diverted into Swan Lake since 1907. These actions have improved access to and suitability of the creek and low numbers of grayling have since been documented in the newly restored channel. Additionally, FWP continues to work with private landowners in the Centennial Valley to improve connection and suitability of three tributary streams in the lower valley. Efforts to restore spawning creeks are important for grayling persistence and have been implemented and monitored by USFWS and FWP in accordance with the AMP. However, data and modelling has shown that, despite spawning creek restoration, grayling persistence is unlikely until hypoxic conditions in Upper Lake have been improved.

Use of Renewable Power Sources

Solar Powered Aerators. Several commenters suggested that the Service assess the use of solar-powered aerators instead of fossil fuel systems. Solar aerators were considered by the Service during the planning phases for the proposed project given that solar-powered aeration has been used for reservoir mixing or destratification and aeration of wastewater treatment plant facilities (EPA 2005). The Service weighed the benefits of solar aeration with its risks and limitations for use at URRL. The benefits identified were that solar is a renewable resource and inexpensive when compared to the other alternative, the infrastructure could be located in the target habitat area and not on shore thus having the relatively low wilderness site impacts, and such systems have relatively low expected maintenance. The risks and limitation of the use of solar power would include: a limited solar resource at URRL during the winter with resulting power intermittency, chance of snow accumulation on the photovoltaic panels, potential damage during ice breakup, potential limitations due to shallow water operation in URRL, the fact that units may need to be removed during summer months, and risk of increased sediment oxygen demand due to circulation and potential for resuspension of sediment in the lake.

The Service evaluated the potential for use of a solar-powered aerator (see CDM Smith, June 19, 2022). This engineering study proposed conducting a pilot program using a solar-powered aerator to test the feasibility of the technology. This pilot program was initiated during the winter of 2019-2020 with the installation of a solar-powered aerator was installed near the center of URRL. Dissolved oxygen (DO), temperature, turbidity, and changes to ice formation on the lake were monitored. The solar-powered aerator was able to create an area of open water in the ice where additional oxygen transfer can occur from the atmosphere (a polynya) that lasted until late November. The system did not increase lake turbidity and facilitated oxygen exchange through the aerator-created-polynya for at least 3 weeks after an adjacent lake became ice covered. Thereafter, operation of the solar circulator failed from accumulation of snow and ice on the solar panels such that the lake froze completely over during a period of low light in December.

Subsequent discussions were undertaken with biologists who have successfully operated solar-powered aerators on lakes (Richard Hepworth, Utah DNR, personal communication). These biologists indicated that they used elevated solar panels mounted on the shore. However, given the size of URRL and the need to open a polynya one mile out on URRL, mounting solar panels onshore was not considered feasible. Consequently, the Service did not pursue this technology as an alternative for evaluation in the EA. Full details of this work and pilot project are discussed at the following URL: https://journals.plos.org/water/article/authors?id=10.1371/journal.pwat.0000012.

Windmill Powered Aerators. The use of windmill-powered aerators was another renewable energy source suggested by several commenters. Scientific research into the use of wind-powered aerators was initiated in the 1970s for sites like URRL that are without electricity. The benefits of wind-powered

aeration are low cost and use of a renewable resource. The risks and/or limitations of such systems include: potential for lack of a steady wind source or insufficient windspeed to fully power compressors, many units could be required and have negative aesthetic impacts, condensation buildup during winter operation could cause equipment failure, and a windmill set in pilings on the lake could sustain ice damage in the spring. To assess the feasibility of using wind-powered aerators, the Service identified available wind speed data for an area located three miles north of Lower Red Rock Lake. These data were from 2009 through 2019 (October-March) (MesoWest 2019) and showed the average wind velocity during that period was 6.49 miles per hour with the wind blowing from the north-northeast. Nearly half of the wind measurements for that location were insufficient to keep the blades of the windmill turning or provide enough torque to be reliable for application. Thus, the Service concluded that there was insufficient wind power at URRL to power a windmill at full capacity and dismissed this alternative from further consideration in the EA.

Other Comment Topics

Grayling introductions in Elk Springs Creek and Red Rock Creek abundances. One commentor indicated that an increase in grayling populations during 2012-2015 depicted in the AMP was a result of artificial incubation of grayling eggs from 2010-2012. Grayling embryos were introduced to Elk Springs Creek between 2010 and 2015 to re-establish a spawning population (Gander et al. 2019). Although Elk Springs and Red Rock creeks are connected via URRL, fish from the Elk Springs Creek restoration project would not first recruit into the Red Rock Creek spawning population until they reached 3 years old in 2013. High grayling abundances in Red Rock Creek prior to 2013 were not synchronous with or bolstered by the population restoration efforts in Elk Springs Creek. The highest abundance of spawning grayling in Red Rock Creek (2535) occurred in 2012; less than 1% of spawning fish that year were 2 years old. Although some grayling introduced into Elk Springs Creek may have contributed to the spawning population in Red Rock Creek in subsequent years, the number of embryos stocked into Elk Springs Creek were small relative to the number naturally produced in Red Rock Creek. Between 32,552 and 70,956 grayling embryos were introduced into Elk Springs Creek; however, because average Red Rock Creek grayling fecundity is 8,730 eggs, this represents the equivalent contribution of 4 to 8 female grayling. For comparison, between 2010 and 2015 448 to 1,394 female grayling annually contributed over 6 million eggs to Red Rock Creek on average. The contribution of embryos to Elk Springs Creek was negligible compared to the number provided by wild Red Rock Creek grayling.

Henry's Lake Oxygenation. One commentor recommended the Service look into failed oxygenation attempts at Henry's Lake. Based on this comment, staff at Henry's Lake were contacted to better understand the circumstances and outcomes of their lake oxygenation efforts. Henry's Lake is located in Idaho, just over Red Rock Pass from URRL. The lake is situated at 6,400 feet elevation with a surface area of the lake is about twice that of URRL (6,000 acres) and a maximum depth of 16 feet. The Idaho Department of Fish and Garm operates a fish hatchery at Henry's Lake for the purposes of maintaining a source of cutthroat trout, rainbow trout, and their hybrids for stocking. In the 1990's, an electrical aeration system (similar to Alternative B2 – the electric powered diffuser) was installed to alleviate partial winter-kills which occurred in certain years. The system was primarily designed to improve dissolved oxygen content in the immediate area of the hatchery and is only utilized when within year DO monitoring indicates it is necessary. After installation and some tough winters, observations of dead, trophy-sized fish were an alarming sight to anglers, but a complete kill in the lake was not documented. However, the former Idaho Fish and Game biologist at Henry's Lake recommended focusing on alternatives with a source of oxygenated water (such as the pumped aeration or pipeline alternatives) rather than bottom-oriented diffusers based on their direct experience with this system.

No Action Alternative Could Restore Grayling. Some commentors expressed they preferred the No Action Alternative (Widgeon Pond releases) and believed that this alternative alone would be enough to restore grayling. While the Widgeon Pond release does temporarily provide oxygenated water to URRL and theoretical modeling results show some benefit for grayling, data loggers indicate that benefit only lasts approximately 3.5 weeks. The low oxygen period in URRL, which is year-dependent, last for roughly about 8 weeks (Davis, 2016). The low oxygen period for 2014 ran approximately from at least January 9th to Feb. 27th and in 2015 ran from at least Jan. 5th to Feb. 2nd. Currently, no evidence exists that indicates the Widgeon Pond release will meet the O2, depth, or duration criteria for suitable habitat. However, the releases do show potential as an additive beneficial action if implemented in conjunction with other management actions.

Removal of Dredged Material. One commentor expressed concern about the cost of removing dredged material from URRL. If Alternative F was implemented, the Service does not plan to remove the dredged material from the Refuge. Rather, the material would be used to create a berm directing the oxygenated water from Elk Springs Creek to the center of URRL. More information regarding this alternative and expected sedimentation can be found on page 14 of the EA.

Weed Management. A commenter was concerned with the spread of invasive plant species with disturbance of soil during implementation of the proposed alternatives. The Service acknowledges that weed management will be a significant aspect of post-construction monitoring associated with any of the proposed alternatives. Currently, Canada thistle poses the most risk; however, current weed management practices on the Refuge have reduced its overall abundance significantly, especially in areas that may be temporarily disturbed as part of alternative implementation. In addition, spotted knapweed, black henbane, houndstongue, and common tansy are of particular concern for the Refuge and are actively being treated or are almost entirely eradicated, as is the case for common tansy. The Refuge is also an active partner in spray days hosted within the CV. Reseeding of native species in disturbed areas will be implemented as needed. Lastly, any equipment that is brought in must be entirely cleaned before any potential excavation operations begin. This point is now made in the EA and can be referenced starting on page 23. This is a strict contracting requirement that is enforced through any contract with the State of Montana directed through FWP.