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

Draft Environmental Assessment

Arctic Grayling Conservation

Red Rock Lakes National Wildlife Refuge

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Draft Environmental Assessment for Arctic Grayling Conservation at Red Rock Lakes National Wildlife Refuge

Executive Summary

This Draft Environmental Assessment (EA) has been prepared jointly by the United States Department of the Interior's U.S. Fish and Wildlife Service, U.S. Fish and Wildlife Service Region 6, Mountain-Prairie Region Division of Refuge Planning; and Montana Fish, Wildlife & Parks (MFWP) to evaluate the effects associated with the proposed action. The Draft EA complies with the National Environmental Policy Act (NEPA) in accordance with Council on Environmental Quality regulations (40 Code of Federal Regulations [CFR] 1500– 1508) and U.S. Department of the Interior (43 CFR 46; 516 DM 8) and U.S. Fish and Wildlife 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 laws and executive orders not otherwise evaluated within this EA.

Proposed Action

Arctic grayling (Thymallus arcticus; grayling) are a freshwater holarctic species of salmonid that reside in the Upper Missouri River (UMR) drainage in southwestern Montana. The Centennial Valley, 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 Lake within the Red Rock Lakes National Wildlife 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 conditions for grayling in Upper Lake which 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 URRL where grayling over-winter, improve grayling winter survival and maintain existing grayling genetic variability. This would involve creating enough suitable winter habitat, which would consist of 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, to support a grayling population greater than 400 breeding-age individuals (USFWS and MFWP 2017).

To accomplish the proposed action, the U.S. Fish and Wildlife Service (Service) is partnering with the MFWP, Montana Trout Unlimited and the U.S. Geological Service to develop and analyze multiple alternatives.

Background

Red Rock Lakes National Wildlife Refuge (RRLNWR, or Refuge) 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 birds and other wildlife species". The Refuge covers over 53,000 acres, of which 32,350 were designated as Wilderness in 1976 under the Wilderness Act of 1964. Upper Red Rock Lake falls entirely within designated Wilderness. The cultural, physical, and biological resources on RRLNWR 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.

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 URRL, which has been identified as a limiting factor for the population. It is imperative to take immediate action to mitigate winter habitat in URRL 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 Centennial Valley (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 Centennial Valley was a significant factor in that decision. However, in 2022 a formal notice of intent to sue the Service over their 2020 decision was filed. 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). 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 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 will satisfy 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.

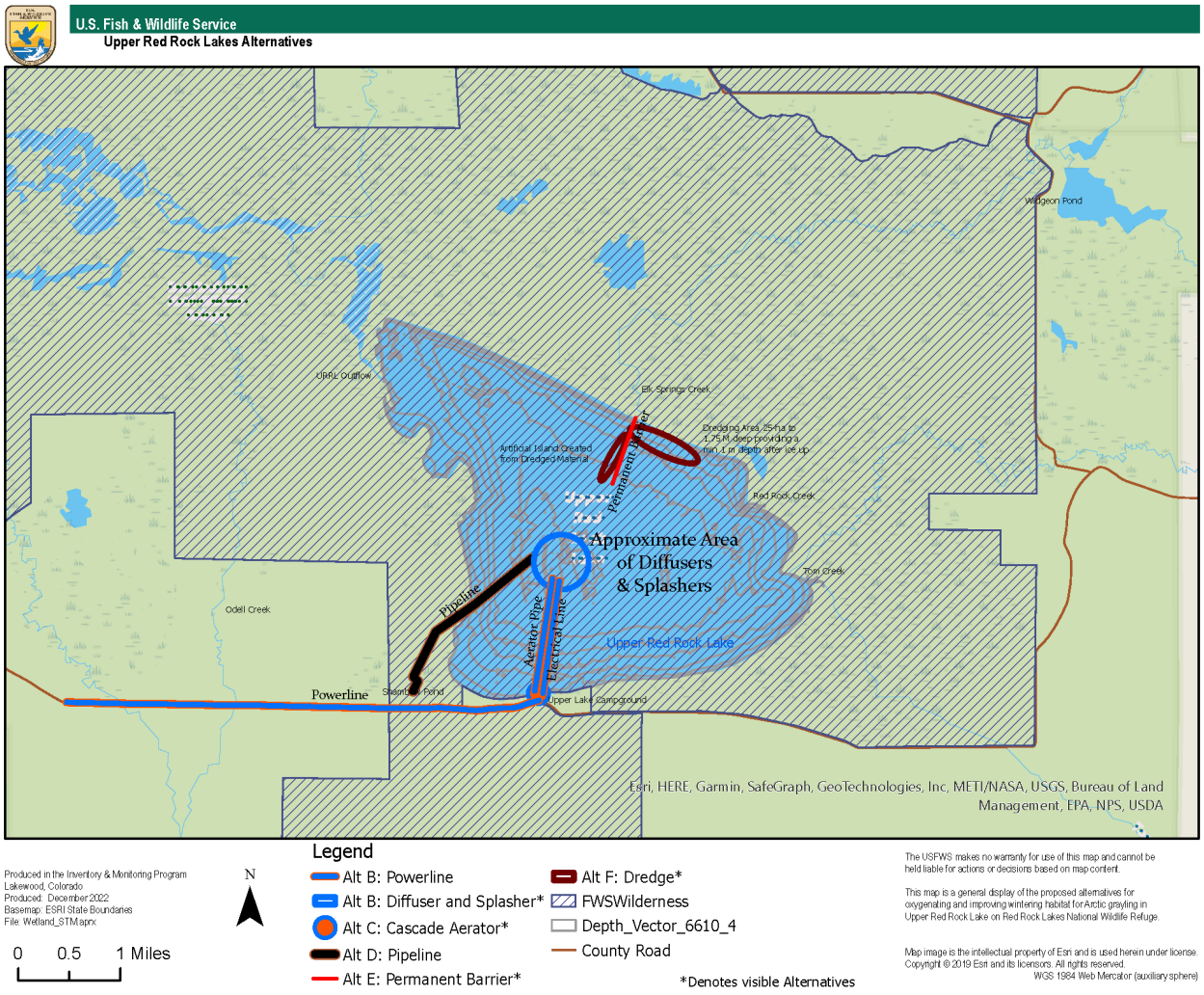
After public review, the Service will determine if additional environmental analysis is required pursuant to NEPA or if a FONSI can be made pursuant to the Council on Environmental Quality regulations and applicable guidance. The MEPA requires that an EA include "a finding on the need for an EA and, 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 Graying 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. In addition, MTFWP restricts angling during times of high water temperature and low flow to further reduce stress on grayling. This is intended to protect Arctic grayling from disturbance during spawning. 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. 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 cfs (cubic feet per second). 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.

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).

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 U.S. 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 permanent wall of sheet piling or similar material. 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 20 alternatives ranging from snow

plowing and drilling holes in the ice, to liquid oxygen addition. Seventeen 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 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.

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 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 the MFWP's Arctic grayling page https://fwp.mt.gov/conservation/fisheries-management/arctic-grayling.

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. Nonnative 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,

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. In addition, bald eagle and other species such as otter may benefit from access to open water and fish created by the splasher, diffuser, or aerator during the winter.

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. 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 up to 49 days 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.

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. 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 installing the electrical powerline from Lakeview to the campground. 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 can be minimized by retaining excavated materials and returning them following the installation. Further, 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.

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 excavation would be approximately 1,697 m in length and require a trench approximately 4-4.5 m wide by 2 m deep. 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. Other than when any of these systems are installed in the URRL, there would be

no air emissions generated during their operation. Therefore, there would be little or no impacts to air quality or climate change in the vicinity of URRL.

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 Upper Lake Campground 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. 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-to-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 with the implementation of this alternative due to alterations to natural flow patterns when water is being diverted from Shambow Pond. Diverting water from Shambow pond into the pipeline would dewater Shambow creek during the winter 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 visitor center 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 during summer months 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.

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.

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

The Service is working with the Tribes on this project and will complete any Tribal consultation requested before finalizing this EA.

Public Outreach

The Draft EA will be 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 will be identified and responded to in the Final EA.

The Draft EA will also be posted on Montana Fish, Wildlife and Parks' Public Notices webpage at https://fwp.mt.gov/news/public-notices. The Draft EA posted on Montana Fish, Wildlife and Parks' Public Notices webpage will be available via direct link to the USFWS' Red Rock Lakes National Wildlife Refuge website linked above. Any comments received on the Draft EA will be managed by the USFWS, in consultation with Montana Fish, Wildlife and Parks. Comments are to 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 otherwise addressed in this EA.

Cultural Resources

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

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

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

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

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

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

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

Fish and Wildlife

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

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

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

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

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

Natural Resources

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

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 _____