



# MINIMUM REQUIREMENTS DECISION GUIDE WORKBOOK

"...except as necessary to meet minimum requirements for the administration of the area for the purpose of this Act..."

-- The Wilderness Act of 1964

**Project Title:** Alternatives to conserve Arctic grayling

## MRDG Step 1: Determination

*Determine if Administrative Action is Necessary*

### Description of the Situation

*What is the situation that may prompt administrative action?*

A rare, endemic Arctic grayling population that largely winters in a Wilderness lake (Upper Red Rock Lake) on a National Wildlife Refuge (Red Rock Lakes National Wildlife Refuge) has declined to fewer than 100 spawning individuals. This is one of only two endemic Arctic grayling populations in the contiguous United States. The population is largely adfluvial meaning they spend most of their life in the lake except when they spawn in tributary streams. This is the only endemic adfluvial population in the contiguous United States. These fish are part of a Distinct Population Segment (DPS) under the Endangered Species Act. The Fish and Wildlife Service (Service) considered this DPS for listing during 2014 and 2020, however listing was not warranted. Several conservation groups are litigating the Service to have the DPS listed. Annual monitoring of the population and it's winter habitat has occurred for nearly a decade. Three limiting factors for the population were analyzed: competition with non-native fish, access to spawning habitat, and winter habitat. Modeling indicated lack of dissolved oxygen during winter may be the largest limiting factor. Three stream restoration projects were completed to provide access to spawning habitat. A program that rewards landowners for taking conservation actions for grayling on their private land (Candidate Conservation Agreement with Assurances) was established. The Service's policy in administering designated Wilderness areas (Part 610 FW 1) is to "preserve the wilderness character of the area and for other such purposes for which it may have been established as also to preserve its wilderness character." Accordingly, the indigenous grayling population was specifically mentioned in the 1976 Wilderness Bill as a contributing reason for the designation of the wilderness area in Red Rock Lakes National Wildlife Refuge (RRLNWR). Furthermore, the legislative purposes for RRLNWR include "the development, advancement, management, conservation, and protection of fish." (USFWS 2009). Loss of the indigenous grayling population results in a significant negative impact to the natural wilderness character of the Red Rock Lakes Wilderness. There is an assumption the population may become extirpated unless dissolved oxygen is enhanced. A grayling conservation group has drafted an Environmental Assessment that considers several alternatives to improve dissolved oxygen in Upper Red Rock Lake.

## Options Outside of Wilderness

Can action be taken outside of wilderness that adequately addresses the situation?

YES

NO

### EXPLAIN & COMPLETE STEP 1 OF THE MRDG

Explain:

An action outside of wilderness (Widgeon Pond releases - Alternative 1) may adequately address the situation, however further study is needed to determine if this action is effective. During the winters of 2020-2021 and 2021-2022, naturally oxygenated water was released from a pond outside wilderness into a tributary that flows into the Wilderness lake. The intent of these releases was to send water to a deeper part of the lake which adult grayling have shown a preference for. Data loggers placed in the lake indicated this action boosted dissolved oxygen to the point that suitable habitat existed across a large portion of the lake. Recent modeling however, indicated that these releases may not be as effective as other options. Further study during winter 2022-2023 will determine how long this effect lasts and whether it is long enough to provide a safety net for the grayling population.

## Criteria for Determining Necessity

Is action necessary to meet any of the criteria below?

### A. Valid Existing Rights or Special Provisions of Wilderness Legislation

Is action necessary to satisfy valid existing rights or a special provision in wilderness legislation (the Wilderness Act of 1964 or subsequent wilderness laws) that **requires** action? Cite law and section.

YES

NO

Explain:

Action is not necessary to satisfy valid existing rights or a special provision in wilderness legislation.

## B. Requirements of Other Legislation

*Is action necessary to meet the requirements of other federal laws? Cite law and section.*

 YES NO

Explain:

Action is not necessary to meet the requirements of other federal laws. Arctic grayling are a candidate for listing but are not currently listed under the Endangered Species Act of 1973. The U.S. Fish and Wildlife Service has determined that listing is not warranted at this time (2014, 2020). Currently several conservation groups are litigating the Service to list the DPS under ESA.

## C. Wilderness Character

*Is action necessary to preserve one or more of the five qualities of wilderness character?*

UNTRAMMELED

 YES NO

Explain:

Action is not necessary to preserve the Untrammeled Wilderness Character Quality.

## UNDEVELOPED

 YES NO

Explain:

Action is not necessary to preserve the Undeveloped Wilderness Character Quality.

## NATURAL

 YES NO

Explain:

This population of endemic Arctic grayling is important to the Natural Wilderness Character Quality. Extirpation of this rare, endemic adfluvial population would degrade the Natural Wilderness Character Quality. Administrative action that improves the Natural Wilderness Character Quality without degrading other Wilderness character qualities may be necessary.

SOLITUDE OR PRIMITIVE & UNCONFINED RECREATION

YES

NO

Explain:

Action is not necessary to preserve the Solitude, or Primitive and Unconfined Recreation Wilderness Character Quality.

OTHER FEATURES OF VALUE

YES

NO

Explain:

Action is not necessary to preserve the Other Features of Value Wilderness Character Quality.

## Step 1 Determination

Is administrative action necessary in wilderness?

### Criteria for Determining Necessity

- A. Existing Rights or Special Provisions
- B. Requirements of Other Legislation
- C. Wilderness Character
  - Untrammelled
  - Undeveloped
  - Natural
  - Solitude/Primitive/Unconfined
  - Other Features of Value

### Summary Responses

Action IS NOT necessary to meet this criterion.

Action IS NOT necessary to meet this criterion.

Action IS NOT necessary to meet this criterion.

Action IS NOT necessary to meet this criterion.

Action IS necessary to meet this criterion.

Action IS NOT necessary to meet this criterion.

Action IS NOT necessary to meet this criterion.

Is administrative action necessary in wilderness?

YES

**EXPLAIN & PROCEED TO STEP 2 OF THE MRDG**

NO

Explain:

The Natural Wilderness Quality is preserved when indigenous species and ecological processes are intact. The Natural Wilderness Character Quality is degraded by effects (intended or unintended) of modern civilization. If this population of endemic fish were extirpated it would degrade the Natural Wilderness Character Quality. Conserving this population without disturbing or disrupting the abundance or distribution of plant or animal species would benefit the Natural Wilderness Character Quality. Preserving the Natural Wilderness Character Quality while significantly degrading the Untrammelled, Undeveloped, and Outstanding Opportunities for Solitude or Primitive & Unconfined Recreation Wilderness Character Qualities would not be consistent with the Wilderness Act.

**Project Title:** Alternatives to conserve Arctic grayling

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**MRDG Step 2**

Determine the Minimum Activity

**Other Direction**

*Is there "special provisions" language in legislation (or other Congressional direction) that explicitly **allows** consideration of a use otherwise prohibited by Section 4(c)?*

**AND/OR**

*Has the issue been addressed in agency policy, management plans, species recovery plans, or agreements with other agencies or partners?*

YES

NO

**SKIP AHEAD TO TIME CONSTRAINTS BELOW**

Describe Other Direction:

There is no "special provisions" language in legislation that explicitly allows consideration of a use otherwise prohibited by Section 4(c). The issue has not been addressed in agency policy, management plans, species recovery plans, or agreements with other agencies or partners.

## Time Constraints

*What, if any, are the time constraints that may affect the action?*

Delays in determining a suitable conservation measure could lead to extirpation of this rare, endemic Arctic grayling population, estimated in 2022 as approximately 88 spawning individuals. To address the limitation of dissolved oxygen when ice covers the lake, action must occur during winter.

## Components of the Action

*What are the discrete components or phases of the action?*

Component X	<i>Example: Transportation of personnel to the project site</i>
Component 1	Transport of personnel and materials in Wilderness
Component 2	Development of action
Component 3	Conduct of action 1
Component 4	Conduct of action 2
Component 5	Conduct of action 3
Component 6	Conduct of action 4
Component 7	Condition of site post action
Component 8	
Component 9	

### Proceed to the alternatives.

Refer to the [MRDG Instructions](#) regarding alternatives and the effects to each of the comparison criteria.



**Project Title:** Alternatives to conserve Arctic grayling

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**MRDG Step 2: Alternatives**

**Alternative 1:** Water releases, beaver dam notching, limited angling closures

**Description of the Alternative**

*What are the details of this alternative? When, where, and how will the action occur? What mitigation measures will be taken?*

During January and February each winter, water stored in Widgeon Pond (outside Wilderness) would be released into Elk Springs Creek, a tributary that flows into designated wilderness and Upper Red Rock Lake (URRL). Research data showed an increase in dissolved oxygen levels in URRL after releases in 2021 and 2022. The effect extended more than 1 kilometer from the mouth of Elk Springs Creek and included a large area (>39 hectares) where water depth below the ice was greater than 1 meter. Previous research using marked fish indicated wintering grayling use a variety of water depths but show some preference for depths over 1 meter. Notching of beaver dams would occur on Red Rock Creek inside and outside wilderness each spring prior to grayling spawning. Approximately 1/3 of the width of each dam would be removed using hand tools. A closure on fishing from May 1 through June 14 on Red Rock Creek, and May 15 to June 15 on Elk Springs Creek would remain in effect. These two creeks are currently the primary spawning tributaries for Arctic grayling. The period of closure is intended to protect the population from disturbance during spawning. Regulations require all Arctic grayling caught by anglers to be released immediately. ***Important Note: the actions of this alternative are currently occurring and will continue to occur no matter which alternative is selected.***

**Component Activities**

How will each of the components of the action be performed under this alternative?

	Component of the Action	Activity for this Alternative
X	<i>Example: Transportation of personnel to the project site</i>	<i>Example: Personnel will travel by horseback</i>
1	Transport of personnel and materials in Wilderness	No transportation in Wilderness would occur
2	Development of action	No development in Wilderness would occur
3	Conduct of action 1	Water releases
4	Conduct of action 2	Beaver dam notching
5	Conduct of action 3	Limited angling closure
6	Conduct of action 4	Not applicable
7	Condition of site post action	The site would be unchanged
8		
9		

## Wilderness Character

What is the effect of each component activity on the qualities of wilderness character? What mitigation measures will be taken?

### UNTRAMMELED

Component Activity for this Alternative	Positive	Negative	No Effect
X <i>Example: Personnel will travel by horseback</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
1 No transportation in Wilderness would occur	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
2 No development in Wilderness would occur	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
3 Water releases	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
4 Beaver dam notching	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
5 Limited angling closure	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
6 Not applicable	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
7 The site would be unchanged	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
8	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Totals	0	2	NE
<b>Untrammed Total Rating</b>	<b>-2</b>		

Explain:

Trammeling is defined as any authorized actions that manipulate the biophysical environment. The Untrammed Wilderness Character Quality is preserved when actions are not taken to manipulate or control ecological systems and its components. The Untrammed Wilderness Character Quality is degraded by actions that intentionally control or manipulate flora, fauna, or natural processes. Releasing water into a tributary during winter, and notching beaver dams prior to grayling spawning are manipulations of natural processes, and negative impacts on the Untrammed Wilderness Character Quality.

UNDEVELOPED

Component Activity for this Alternative		Positive	Negative	No Effect
X	<i>Example: Personnel will travel by horseback</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
1	No transportation in Wilderness would occur	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
2	No development in Wilderness would occur	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
3	Water releases	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
4	Beaver dam notching	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
5	Limited angling closure	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
6	Not applicable	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
7	The site would be unchanged	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
8		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Totals		0	0	NE
<b>Undeveloped Total Rating</b>		<b>0</b>		

Explain:

Developed is defined as any human-made installations, structures, or developments in wilderness. The Undeveloped Wilderness Character Quality is preserved when human-made features are not located in, and motors or mechanical transport are not used in Wilderness. The Undeveloped Wilderness Character Quality is degraded by structures or installations, or the use of motors or mechanical transport. This alternative would have no effect on the Undeveloped Wilderness Character Quality.

NATURAL

Component Activity for this Alternative		Positive	Negative	No Effect
X	<i>Example: Personnel will travel by horseback</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
1	No transportation in Wilderness would occur	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
2	No development in Wilderness would occur	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
3	Water releases	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
4	Beaver dam notching	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
5	Limited angling closure	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6	Not applicable	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
7	The site would be unchanged	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
8		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Totals		3	1	NE
<b>Natural Total Rating</b>		<b>2</b>		

Explain:

Unnatural is defined as any disturbance or disruption to the abundance or distribution of plant or animal species. The Natural Wilderness Character Quality is preserved when indigenous species and ecological processes are intact. The Natural Wilderness Character Quality is degraded by effects (intended or unintended) of modern civilization. Preserving the grayling population would have a positive impact on the Natural Wilderness Character Quality. The **data** from water releases show a significant benefit in levels and area of dissolved oxygen, so this alternative would have a positive effect on the Natural Wilderness Character Quality. However, **modeling** for the SDM technical report does not support the actual data so it is rated as no effect as well. Assumptions in the modeling (>1 meter depth, winter long benefit) make this alternative appear less effective for grayling than other alternatives. Beaver dam notching has a negative impact on beaver and a positive impact on spawning access for grayling. The limited angling closure has a positive impact on grayling.

**SOLITUDE OR PRIMITIVE & UNCONFINED RECREATION**

Component Activity for this Alternative		Positive	Negative	No Effect
X	<i>Example: Personnel will travel by horseback</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
1	No transportation in Wilderness would occur	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
2	No development in Wilderness would occur	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
3	Water releases	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
4	Beaver dam notching	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
5	Limited angling closure	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
6	Not applicable	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
7	The site would be unchanged	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
8		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Totals		0	2	NE
<b>Solitude or Primitive &amp; Unconfined Recreation Total Rating</b>		<b>-2</b>		

Explain:

Opportunities for Solitude or Primitive & Unconfined Recreation (SPUR) is defined as an environment that is relatively free from the encumbrances of modern society (including sights and sounds), and for the experience of the benefits and inspiration derived from self-reliance, self-discovery, physical and mental challenge, and freedom from societal obligations. SPUR Wilderness Character Quality is preserved when visitors experience minimal encounters, observe landscapes without modern human effects, experience self-discovery, traditional skills, and challenge, and are not encumbered by regulatory restrictions. SPUR Wilderness Character Quality is degraded by encounters, indications of civilization, or restrictions on visitor behavior. Notched beaver dams are an indicator of civilization and a negative impact on SPUR Wilderness Character Quality. The limited angling closure is a restriction on visitor behavior, and a negative impact on SPUR Wilderness Character Quality.

**OTHER FEATURES OF VALUE**

Component Activity for this Alternative		Positive	Negative	No Effect
X	<i>Example: Personnel will travel by horseback</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
1	No transportation in Wilderness would occur	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
2	No development in Wilderness would occur	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
3	Water releases	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
4	Beaver dam notching	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
5	Limited angling closure	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
6	Not applicable	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
7	The site would be unchanged	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
8		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Totals		0	0	NE
<b>Other Features of Value Total Rating</b>		<b>0</b>		

Explain:

The Other Features of Value Wilderness Character Quality is preserved when each identified feature unique to the Wilderness is protected consistent with protection of other Wilderness qualities. The Other Features of Value Wilderness Character Quality is degraded by loss of the feature's Wilderness context. This Wilderness does not have any Other Features of Value identified, so this alternative has no effect on the Other Features of Value Wilderness Character Quality.

**Summary Ratings for Alternative 1**

<b>Wilderness Character</b>	
Untrammeled	-2
Undeveloped	0
Natural	2
Solitude or Primitive & Unconfined Recreation	-2
Other Features of Value	0
<b>Wilderness Character Summary Rating</b>	<b>-2</b>



## MRDG Step 2: Alternatives

**Alternative 2:** Splasher Aeration

### **Description of the Alternative**

*What are the details of this alternative? When, where, and how will the action occur? What mitigation measures will be taken?*

This alternative would involve construction of an underground electrical line outside of Wilderness, and construction of splasher aerators within Wilderness in Upper Red Rock Lake (URRL). The aerators would be powered by a new single phase underground electrical line installed adjacent to the South Valley Road and into the URRL Campground. A splasher is a mechanical aerator that sits on the surface of the water in a permanent installation. Splasher aerators 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 where additional oxygen transfer can occur. The aerators would be powered by permanent submersible electric lines installed on the bottom of the lake from the URRL Campground. The submersible electric lines would be approximately 1,220 meters/4003 feet in length. The splashers would run continuously when ice exists on the lake.

**Component Activities**

*How will each of the components of the action be performed under this alternative?*

Component of the Action		Activity for this Alternative
X	<i>Example: Transportation of personnel to the project site</i>	<i>Example: Personnel will travel by horseback</i>
1	Transport of personnel and materials in Wilderness	Motors and or mechanical transport
2	Development of action	Construction of aerator
3	Conduct of action 1	Water releases
4	Conduct of action 2	Beaver dam notching
5	Conduct of action 3	Limited angling closure
6	Conduct of action 4	Operation of splasher aerator
7	Condition of site post action	Permanent installation of splasher aerator
8		
9		

## Wilderness Character

What is the effect of each component activity on the qualities of wilderness character? What mitigation measures will be taken?

### UNTRAMMELED

Component Activity for this Alternative	Positive	Negative	No Effect
X <i>Example: Personnel will travel by horseback</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
1 Motors and or mechanical transport	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
2 Construction of aerator	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
3 Water releases	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
4 Beaver dam notching	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
5 Limited angling closure	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
6 Operation of splasher aerator	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
7 Permanent installation of splasher aerator	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
8	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Totals	0	3	NE
<b>Untrammed Total Rating</b>	<b>-3</b>		

Explain:

Trammeling is defined as any authorized actions that manipulate the biophysical environment. The Untrammed Wilderness Character Quality is preserved when actions are not taken to manipulate or control ecological systems and its components. The Untrammed Wilderness Character Quality is degraded by actions that intentionally control or manipulate flora, fauna, or natural processes. Releasing water into a tributary during winter, and notching beaver dams prior to grayling spawning are manipulations of natural processes, and negative impacts on the Untrammed Wilderness Character Quality. Operation of the splasher aerator is a manipulation of the natural process of ice formation, and a negative impact on the Untrammed Wilderness Character Quality.

UNDEVELOPED

Component Activity for this Alternative		Positive	Negative	No Effect
X	<i>Example: Personnel will travel by horseback</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
1	Motors and or mechanical transport	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
2	Construction of aerator	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
3	Water releases	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
4	Beaver dam notching	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
5	Limited angling closure	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
6	Operation of splasher aerator	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
7	Permanent installation of splasher aerator	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
8		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Totals		0	4	NE
<b>Undeveloped Total Rating</b>		<b>-4</b>		

Explain:

Developed is defined as any human-made installations, structures, or developments in wilderness. The Undeveloped Wilderness Character Quality is preserved when human made features are not located in, and motors or mechanical transport are not used in Wilderness. The Undeveloped Wilderness Character Quality is degraded by structures or installations, or the use of motors or mechanical transport. Transport of personnel and materials would include the use of motors and mechanical transport in Wilderness, and would negatively impact the Undeveloped Wilderness Character Quality. Construction of the aerator would include the use of motors and mechanical transport, and would negatively impact the Undeveloped Wilderness Character Quality. Operation of mechanical splasher aerators would negatively impact the Undeveloped Wilderness Character Quality. Permanent submersible electric lines and splasher aerators installed in Wilderness are installations, and would negatively impact the Undeveloped Wilderness Character Quality.

NATURAL

Component Activity for this Alternative		Positive	Negative	No Effect
X	<i>Example: Personnel will travel by horseback</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
1	Motors and or mechanical transport	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
2	Construction of aerator	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
3	Water releases	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
4	Beaver dam notching	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
5	Limited angling closure	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6	Operation of splasher aerator	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
7	Permanent installation of splasher aerator	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
8		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Totals		4	4	NE
<b>Natural Total Rating</b>		<b>0</b>		

Explain:

Unnatural is defined as any disturbance or disruption to the abundance or distribution of plant or animal species. The Natural Wilderness Character Quality is preserved when indigenous species and ecological processes are intact. The Natural Wilderness Character Quality is degraded by effects (intended or unintended) of modern civilization. Preserving the grayling population would have a positive impact on the Natural Wilderness Character Quality. Motors, mechanical transport, and construction would disturb the distribution of plant and animal species, and would be negative impacts to the Natural Wilderness Character Quality. The **data** from water releases show a significant benefit in levels and area of dissolved oxygen, so this alternative would have a positive effect on the Natural Wilderness Character Quality. However, **modeling** for the SDM technical report does not support the actual data so it is rated as no effect as well. Beaver dam notching has a negative impact on beaver and a positive impact on spawning access for grayling. The limited angling closure has a positive impact on grayling. Operation of the splasher aerator is predicted to provide additional suitable habitat and improve survivorship for the indigenous grayling population, however it also would have negative impacts to other species.

## SOLITUDE OR PRIMITIVE & UNCONFINED RECREATION

Component Activity for this Alternative		Positive	Negative	No Effect
X	<i>Example: Personnel will travel by horseback</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
1	Motors and or mechanical transport	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
2	Construction of aerator	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
3	Water releases	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
4	Beaver dam notching	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
5	Limited angling closure	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
6	Operation of splasher aerator	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
7	Permanent installation of splasher aerator	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
8		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Totals		0	6	NE
<b>Solitude or Primitive &amp; Unconfined Recreation Total Rating</b>		<b>-6</b>		

Explain:

Opportunities for Solitude or Primitive & Unconfined Recreation (SPUR) is defined as an environment that is relatively free from the encumbrances of modern society (including sights and sounds), and for the experience of the benefits and inspiration derived from self-reliance, self-discovery, physical and mental challenge, and freedom from societal obligations. SPUR Wilderness Character Quality is preserved when visitors experience minimal encounters, observe landscapes without modern human effects, experience self-discovery, traditional skills, and challenge, and are not encumbered by regulatory restrictions. SPUR Wilderness Character Quality is degraded by encounters, indications of civilization, or restrictions on visitor behavior. Notched beaver dams are an indicator of civilization and a negative impact on SPUR Wilderness Character Quality. The limited angling closure is a restriction on visitor behavior, and a negative impact on SPUR Wilderness Character Quality. Transport, Construction, and Operation of the splasher aerator would involve some motor noise, and would negatively impact the SPUR Wilderness Character Quality. Splasher aerators are visible above the surface of the water, are indications of civilization, and would negatively impact the SPUR Wilderness Character Quality.

**OTHER FEATURES OF VALUE**

Component Activity for this Alternative		Positive	Negative	No Effect
X	<i>Example: Personnel will travel by horseback</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
1	Motors and or mechanical transport	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
2	Construction of aerator	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
3	Water releases	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
4	Beaver dam notching	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
5	Limited angling closure	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
6	Operation of splasher aerator	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
7	Permanent installation of splasher aerator	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
8		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Totals		0	0	NE
<b>Other Features of Value Total Rating</b>		<b>0</b>		

Explain:

The Other Features of Value Wilderness Character Quality is preserved when each identified feature unique to the Wilderness is protected consistent with protection of other Wilderness qualities. The Other Features of Value Wilderness Character Quality is degraded by loss of the feature's Wilderness context. This Wilderness does not have any Other Features of Value identified, so this alternative has no effect on the Other Features of Value Wilderness Character Quality.

<b>Summary Ratings for Alternative 2</b>	
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<b>Wilderness Character</b>	
Untrammeled	-3
Undeveloped	-4
Natural	0
Solitude or Primitive & Unconfined Recreation	-6
Other Features of Value	0
<b>Wilderness Character Summary Rating</b>	<b>-13</b>



## MRDG Step 2: Alternatives

**Alternative 3:** Diffuser Aeration

### Description of the Alternative

*What are the details of this alternative? When, where, and how will the action occur? What mitigation measures will be taken?*

This alternative would involve construction of an underground electrical line outside of Wilderness, and construction of diffuser aerators within Wilderness in Upper Red Rock Lake (URRL). The aerators would be powered by a new single phase underground electrical line and compressor installed adjacent to the South Valley Road and into the URRL Campground. Diffuser aerators would be installed on the bottom of the lake in a permanent installation. Each diffuser would create multiple columns of fine bubbles to provide increased surface area for oxygen exchange with the surrounding water and they would create an area of open water in the ice where additional oxygen transfer can occur. Approximately 1220 meters/4003 feet of weighted tubing serving as an air hose would be permanently installed on the bottom of the lake. A compressor located adjacent to Wilderness in the URRL Campground, would provide the air to power the diffuser aerators. The diffusers would run continuously when ice exists on the lake.

## Component Activities

How will each of the components of the action be performed under this alternative?

Component of the Action		Activity for this Alternative
X	<i>Example: Transportation of personnel to the project site</i>	<i>Example: Personnel will travel by horseback</i>
1	Transport of personnel and materials in Wilderness	Motors and or mechanical transport
2	Development of action	Construction of diffuser aerator
3	Conduct of action 1	Water releases
4	Conduct of action 2	Beaver dam notching
5	Conduct of action 3	Limited angling closure
6	Conduct of action 4	Operation of diffuser aerator
7	Condition of site post action	Permanent installation of diffuser aerator
8		
9		

## Wilderness Character

What is the effect of each component activity on the qualities of wilderness character? What mitigation measures will be taken?

### UNTRAMMELED

Component Activity for this Alternative	Positive	Negative	No Effect
X <i>Example: Personnel will travel by horseback</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
1 Motors and or mechanical transport	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
2 Construction of diffuser aerator	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
3 Water releases	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
4 Beaver dam notching	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
5 Limited angling closure	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
6 Operation of diffuser aerator	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
7 Permanent installation of diffuser aerator	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
8	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Totals	0	3	NE
<b>Untrammed Total Rating</b>	<b>-3</b>		

Explain:

Trammeling is defined as any authorized actions that manipulate the biophysical environment. The Untrammed Wilderness Character Quality is preserved when actions are not taken to manipulate or control ecological systems and its components. The Untrammed Wilderness Character Quality is degraded by actions that intentionally control or manipulate flora, fauna, or natural processes. Releasing water into a tributary during winter, and notching beaver dams prior to grayling spawning are manipulations of natural processes, and negative impacts on the Untrammed Wilderness Character Quality. Operation of the splasher aerator is a manipulation of the natural process of ice formation, and a negative impact on the Untrammed Wilderness Character Quality.

UNDEVELOPED

Component Activity for this Alternative		Positive	Negative	No Effect
X	<i>Example: Personnel will travel by horseback</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
1	Motors and or mechanical transport	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
2	Construction of diffuser aerator	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
3	Water releases	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
4	Beaver dam notching	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
5	Limited angling closure	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
6	Operation of diffuser aerator	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
7	Permanent installation of diffuser aerator	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
8		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Totals		0	4	NE
<b>Undeveloped Total Rating</b>		<b>-4</b>		

Explain:

Developed is defined as any human-made installations, structures, or developments in wilderness. The Undeveloped Wilderness Character Quality is preserved when human made features are not located in, and motors or mechanical transport are not used in Wilderness. The Undeveloped Wilderness Character Quality is degraded by structures or installations, or the use of motors or mechanical transport. Transport of personnel and materials would involve the use of motors and mechanical transport in Wilderness, which would negatively impact the Undeveloped Wilderness Character Quality. Construction of the aerator would include the use of motors and mechanical transport, which would negatively impact the Undeveloped Wilderness Character Quality. The permanent weighted tubing air hose, manifold, and diffuser aerators installed in Wilderness are installations, which would negatively impact the Undeveloped Wilderness Character Quality.

NATURAL

Component Activity for this Alternative		Positive	Negative	No Effect
X	<i>Example: Personnel will travel by horseback</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
1	Motors and or mechanical transport	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
2	Construction of diffuser aerator	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
3	Water releases	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
4	Beaver dam notching	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
5	Limited angling closure	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6	Operation of diffuser aerator	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
7	Permanent installation of diffuser aerator	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
8		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Totals		4	4	NE
<b>Natural Total Rating</b>		<b>0</b>		

Explain:

Unnatural is defined as any disturbance or disruption to the abundance or distribution of plant or animal species. The Natural Wilderness Character Quality is preserved when indigenous species and ecological processes are intact. The Natural Wilderness Character Quality is degraded by effects (intended or unintended) of modern civilization. Preserving the grayling population would have a positive impact on the Natural Wilderness Character Quality. Motors, mechanical transport, and construction would disturb the distribution of plant and animal species, and would be negative impacts to the Natural Wilderness Character Quality. The **data** from water releases show a significant benefit in levels and area of dissolved oxygen, so this alternative would have a positive effect on the Natural Wilderness Character Quality. However, **modeling** for the SDM technical report does not support the actual data so it is rated as no effect as well. Beaver dam notching has a negative impact on beaver and a positive impact on spawning access for grayling. The limited angling closure has a positive impact on grayling. Operation of the diffuser aerator is predicted to provide additional suitable habitat and improve survivorship for the indigenous grayling population, however it also would have negative impacts to other species.

**SOLITUDE OR PRIMITIVE & UNCONFINED RECREATION**

Component Activity for this Alternative		Positive	Negative	No Effect
X	<i>Example: Personnel will travel by horseback</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
1	Motors and or mechanical transport	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
2	Construction of diffuser aerator	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
3	Water releases	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
4	Beaver dam notching	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
5	Limited angling closure	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
6	Operation of diffuser aerator	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
7	Permanent installation of diffuser aerator	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
8		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Totals		0	5	NE
<b>Solitude or Primitive &amp; Unconfined Recreation Total Rating</b>		<b>-5</b>		

Explain:

Opportunities for Solitude or Primitive & Unconfined Recreation (SPUR) is defined as an environment that is relatively free from the encumbrances of modern society (including sights and sounds), and for the experience of the benefits and inspiration derived from self-reliance, self-discovery, physical and mental challenge, and freedom from societal obligations. SPUR Wilderness Character Quality is preserved when visitors experience minimal encounters, observe landscapes without modern human effects, experience self-discovery, traditional skills, and challenge, and are not encumbered by regulatory restrictions. SPUR Wilderness Character Quality is degraded by encounters, indications of civilization, or restrictions on visitor behavior. Transport, Construction, and Operation of the aerator would involve some motor noise, which would negatively impact the SPUR Wilderness Character Quality. Notched beaver dams are an indicator of civilization and a negative impact on SPUR Wilderness Character Quality. The limited angling closure is a restriction on visitor behavior, and a negative impact on SPUR Wilderness Character Quality. Diffuser aerators are installed on the bottom of the lake where they are not visible.

OTHER FEATURES OF VALUE

Component Activity for this Alternative		Positive	Negative	No Effect
X	<i>Example: Personnel will travel by horseback</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
1	Motors and or mechanical transport	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
2	Construction of diffuser aerator	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
3	Water releases	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
4	Beaver dam notching	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
5	Limited angling closure	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
6	Operation of diffuser aerator	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
7	Permanent installation of diffuser aerator	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
8		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Totals		0	0	NE
<b>Other Features of Value Total Rating</b>		<b>0</b>		

Explain:

The Other Features of Value Wilderness Character Quality is preserved when each identified feature unique to the Wilderness is protected consistent with protection of other Wilderness qualities. The Other Features of Value Wilderness Character Quality is degraded by loss of the feature's Wilderness context. This Wilderness does not have any Other Features of Value identified, so this alternative has no effect on the Other Features of Value Wilderness Character Quality.

**Summary Ratings for Alternative 3**

<b>Wilderness Character</b>	
Untrammeled	-3
Undeveloped	-4
Natural	0
Solitude or Primitive & Unconfined Recreation	-5
Other Features of Value	0
<b>Wilderness Character Summary Rating</b>	<b>-12</b>



**MRDG Step 2: Alternatives**

**Alternative 4:** Aerator with Recirculating Pump and Pipelines

**Description of the Alternative**

*What are the details of this alternative? When, where, and how will the action occur? What mitigation measures will be taken?*

This alternative would involve construction of an underground electrical line and cascade aerator outside of wilderness, and construction of recirculating pumps and pipelines within designated wilderness in Upper Red Rock Lake (URRL). The pumps would be powered by a new single phase underground electrical line installed adjacent to the South Valley Road and into the URRL Campground. An electrical pump and an intake pipeline would extract deoxygenated water from the the lake and oxygenate that water before it is pumped back to a deep part of the lake via a pipeline of approximately 1,500 meters/4921 feet. The intake and outflow pipelines would be permanently installed in URRL. The pumps would run continuously when ice exists on the lake.

**Component Activities**

How will each of the components of the action be performed under this alternative?

	Component of the Action	Activity for this Alternative
X	<i>Example: Transportation of personnel to the project site</i>	<i>Example: Personnel will travel by horseback</i>
1	Transport of personnel and materials in Wilderness	Motors and or mechanical transport
2	Development of action	Construction of aerator
3	Conduct of action 1	Water releases
4	Conduct of action 2	Beaver dam notching
5	Conduct of action 3	Limited angling closure
6	Conduct of action 4	Operation of aerator
7	Condition of site post action	Permanent installation of aerator
8		
9		

## Wilderness Character

What is the effect of each component activity on the qualities of wilderness character? What mitigation measures will be taken?

### UNTRAMMELED

Component Activity for this Alternative	Positive	Negative	No Effect
X <i>Example: Personnel will travel by horseback</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
1 Motors and or mechanical transport	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
2 Construction of aerator	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
3 Water releases	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
4 Beaver dam notching	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
5 Limited angling closure	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
6 Operation of aerator	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
7 Permanent installation of aerator	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
8	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Totals	0	3	NE
<b>Untrammed Total Rating</b>	<b>-3</b>		

Explain:

Trammeling is defined as any authorized actions that manipulate the biophysical environment. The Untrammed Wilderness Character Quality is preserved when actions are not taken to manipulate or control ecological systems and its components. The Untrammed Wilderness Character Quality is degraded by actions that intentionally control or manipulate flora, fauna, or natural processes. Releasing water into a tributary during winter, and notching beaver dams prior to grayling spawning are manipulations of natural processes, and negative impacts on the Untrammed Wilderness Character Quality. Operation of the aerator is a manipulation of the natural process of ice formation, and a negative impact on the Untrammed Wilderness Character Quality.

UNDEVELOPED

Component Activity for this Alternative		Positive	Negative	No Effect
X	<i>Example: Personnel will travel by horseback</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
1	Motors and or mechanical transport	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
2	Construction of aerator	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
3	Water releases	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
4	Beaver dam notching	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
5	Limited angling closure	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
6	Operation of aerator	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
7	Permanent installation of aerator	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
8		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Totals		0	4	NE
<b>Undeveloped Total Rating</b>		<b>-4</b>		

Explain:

Developed is defined as any human-made installations, structures, or developments in wilderness. The Undeveloped Wilderness Character Quality is preserved when human made features are not located in, and motors or mechanical transport are not used in Wilderness. The Undeveloped Wilderness Character Quality is degraded by structures or installations, or the use of motors or mechanical transport. Transport of personnel and materials would include the use of motors and mechanical transport in Wilderness, which would negatively impact the Undeveloped Wilderness Character Quality. Construction of the aerator and pipelines would include the use of motors and mechanical transport, which would negatively impact the Undeveloped Wilderness Character Quality. Operation of the pumps includes the use of electric motors, which would negatively impact the Undeveloped Wilderness Character Quality. The pumps and permanent pipelines installed in Wilderness are installations, which would negatively impact the Undeveloped Wilderness Character Quality.

NATURAL

Component Activity for this Alternative		Positive	Negative	No Effect
X	<i>Example: Personnel will travel by horseback</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
1	Motors and or mechanical transport	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
2	Construction of aerator	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
3	Water releases	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
4	Beaver dam notching	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
5	Limited angling closure	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6	Operation of aerator	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
7	Permanent installation of aerator	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
8		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Totals		4	4	NE
<b>Natural Total Rating</b>		<b>0</b>		

Explain:

Unnatural is defined as any disturbance or disruption to the abundance or distribution of plant or animal species. The Natural Wilderness Character Quality is preserved when indigenous species and ecological processes are intact. The Natural Wilderness Character Quality is degraded by effects (intended or unintended) of modern civilization. Preserving the grayling population would have a positive impact on the Natural Wilderness Character Quality. Motors, mechanical transport, and construction would disturb the distribution of plant and animal species, and would be negative impacts to the Natural Wilderness Character Quality. The **data** from water releases show a significant benefit in levels and area of dissolved oxygen, so this alternative would have a positive effect on the Natural Wilderness Character Quality. However, **modeling** for the SDM technical report does not support the actual data so it is rated as no effect as well. Beaver dam notching has a negative impact on beaver and a positive impact on spawning access for grayling. The limited angling closure has a positive impact on grayling. Operation of the aerator is predicted to provide additional suitable habitat and improve survivorship for the indigenous grayling population, however it also would have negative impacts to other species.

**SOLITUDE OR PRIMITIVE & UNCONFINED RECREATION**

Component Activity for this Alternative		Positive	Negative	No Effect
X	<i>Example: Personnel will travel by horseback</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
1	Motors and or mechanical transport	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
2	Construction of aerator	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
3	Water releases	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
4	Beaver dam notching	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
5	Limited angling closure	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
6	Operation of aerator	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
7	Permanent installation of aerator	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
8		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Totals		0	5	NE
<b>Solitude or Primitive &amp; Unconfined Recreation Total Rating</b>		<b>-5</b>		

Explain:

Opportunities for Solitude or Primitive & Unconfined Recreation (SPUR) is defined as an environment that is relatively free from the encumbrances of modern society (including sights and sounds), and for the experience of the benefits and inspiration derived from self-reliance, self-discovery, physical and mental challenge, and freedom from societal obligations. SPUR Wilderness Character Quality is preserved when visitors experience minimal encounters, observe landscapes without modern human effects, experience self-discovery, traditional skills, and challenge, and are not encumbered by regulatory restrictions. SPUR Wilderness Character Quality is degraded by encounters, indications of civilization, or restrictions on visitor behavior. Transport, Construction, and Operation of the aerator would involve some motor noise, which would negatively impact the SPUR Wilderness Character Quality. Notched beaver dams are an indicator of civilization and a negative impact on SPUR Wilderness Character Quality. The limited angling closure is a restriction on visitor behavior, and a negative impact on SPUR Wilderness Character Quality.

**OTHER FEATURES OF VALUE**

Component Activity for this Alternative		Positive	Negative	No Effect
X	<i>Example: Personnel will travel by horseback</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
1	Motors and or mechanical transport	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
2	Construction of aerator	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
3	Water releases	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
4	Beaver dam notching	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
5	Limited angling closure	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
6	Operation of aerator	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
7	Permanent installation of aerator	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
8		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Totals		0	0	NE
<b>Other Features of Value Total Rating</b>		<b>0</b>		

Explain:

The Other Features of Value Wilderness Character Quality is preserved when each identified feature unique to the Wilderness is protected consistent with protection of other Wilderness qualities. The Other Features of Value Wilderness Character Quality is degraded by loss of the feature's Wilderness context. This Wilderness does not have any Other Features of Value identified, so this alternative has no effect on the Other Features of Value Wilderness Character Quality.

**Summary Ratings for Alternative 4**

<b>Wilderness Character</b>	
Untrammeled	-3
Undeveloped	-4
Natural	0
Solitude or Primitive & Unconfined Recreation	-5
Other Features of Value	0
<b>Wilderness Character Summary Rating</b>	<b>-12</b>



## MRDG Step 2: Alternatives

**Alternative 5:** Shambow Pond Diversion Pipeline

### Description of the Alternative

*What are the details of this alternative? When, where, and how will the action occur? What mitigation measures will be taken?*

This alternative would involve construction of a permanent, underground, gravity-flow water diversion pipeline within Wilderness. Water would be conveyed from Shambow Pond to a deeper part of Upper Red Rock Lake, during the part of the year when ice forms on the lake. Shambow Pond is a created wetland southwest of Upper Red Rock Lake. Approximately 3,300 feet of excavation would occur in upland sites and 2,000 feet in the lake itself to construct the pipeline. Motorized equipment would be necessary to construct the pipeline in upland sites and in the lake. A subsurface screened intake and gate structure would be located near the pond outlet to divert and control the amount of water conveyed to the lake. An underground cascade aerator would oxygenate the diverted water before it is delivered to the lake. The bottom end of the pipeline would include two lateral lines of perforated pipe or diffuser ports. The pipeline is thought to have relatively low operation or maintenance requirements and expenses; however algae, sediment, debris, or ice could potentially foul the pipeline and diffuser system. Once restoration and regrowth of vegetation is complete this alternative is largely below ground and not visible.

## Component Activities

How will each of the components of the action be performed under this alternative?

	Component of the Action	Activity for this Alternative
X	<i>Example: Transportation of personnel to the project site</i>	<i>Example: Personnel will travel by horseback</i>
1	Transport of personnel and materials in Wilderness	Motors and or mechanical transport
2	Development of action	Construction of pipeline and components
3	Conduct of action 1	Water releases
4	Conduct of action 2	Beaver dam notching
5	Conduct of action 3	Limited angling closure
6	Conduct of action 4	Operation of pipeline and components
7	Condition of site post action	Permanent installation of pipeline and components
8		
9		

## Wilderness Character

What is the effect of each component activity on the qualities of wilderness character? What mitigation measures will be taken?

### UNTRAMMELED

Component Activity for this Alternative	Positive	Negative	No Effect
X <i>Example: Personnel will travel by horseback</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
1 Motors and or mechanical transport	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
2 Construction of pipeline and components	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
3 Water releases	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
4 Beaver dam notching	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
5 Limited angling closure	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
6 Operation of pipeline and components	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
7 Permanent installation of pipeline and components	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
8	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Totals	0	4	NE
<b>Untrammed Total Rating</b>	<b>-4</b>		

Explain:

Trammeling is defined as any authorized actions that manipulate the biophysical environment. The Untrammed Wilderness Character Quality is preserved when actions are not taken to manipulate or control ecological systems and its components. The Untrammed Wilderness Character Quality is degraded by actions that intentionally control or manipulate flora, fauna, or natural processes. Releasing water into a tributary during winter, and notching beaver dams prior to grayling spawning are manipulations of natural processes, and negative impacts on the Untrammed Wilderness Character Quality. Operation of the pipeline would divert East Shambow Creek and prevent it from entering Upper Red Rock Lake, which is a negative impact on a natural process and the Untrammed Wilderness Character Quality. Operation of the pipeline is also a manipulation of the natural process of ice formation, and an additional negative impact on the Untrammed Wilderness Character Quality (component 7 is labeled *Negative* instead of *No Effect* because of this).

UNDEVELOPED

Component Activity for this Alternative		Positive	Negative	No Effect
X	<i>Example: Personnel will travel by horseback</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
1	Motors and or mechanical transport	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
2	Construction of pipeline and components	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
3	Water releases	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
4	Beaver dam notching	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
5	Limited angling closure	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
6	Operation of pipeline and components	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
7	Permanent installation of pipeline and components	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
8		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Totals		0	3	NE
<b>Undeveloped Total Rating</b>		<b>-3</b>		

Explain:

Developed is defined as any human-made installations, structures, or developments in wilderness. The Undeveloped Wilderness Character Quality is preserved when human made features are not located in, and motors or mechanical transport are not used in Wilderness. The Undeveloped Wilderness Character Quality is degraded by structures or installations, or the use of motors or mechanical transport. Transport of personnel and materials would include the use of motors and mechanical transport in Wilderness, which would negatively impact the Undeveloped Wilderness Character Quality. Construction of the pipeline and its components would include the use of motors and mechanical transport, which would negatively impact the Undeveloped Wilderness Character Quality. The permanent pipeline and it components installed in Wilderness are installations, which would negatively impact the Undeveloped Wilderness Character Quality.

NATURAL

Component Activity for this Alternative		Positive	Negative	No Effect
X	<i>Example: Personnel will travel by horseback</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
1	Motors and or mechanical transport	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
2	Construction of pipeline and components	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
3	Water releases	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
4	Beaver dam notching	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
5	Limited angling closure	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6	Operation of pipeline and components	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
7	Permanent installation of pipeline and components	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
8		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Totals		4	4	NE
<b>Natural Total Rating</b>		<b>0</b>		

Explain:

Unnatural is defined as any disturbance or disruption to the abundance or distribution of plant or animal species. The Natural Wilderness Character Quality is preserved when indigenous species and ecological processes are intact. The Natural Wilderness Character Quality is degraded by effects (intended or unintended) of modern civilization. Preserving the grayling population would have a positive impact on the Natural Wilderness Character Quality. Motors, mechanical transport, and construction would disturb the distribution of plant and animal species, and would be negative impacts to the Natural Wilderness Character Quality. The **data** from water releases show a significant benefit in levels and area of dissolved oxygen, so this alternative would have a positive effect on the Natural Wilderness Character Quality. However, **modeling** for the SDM technical report does not support the actual data so it is rated as no effect as well. Beaver dam notching has a negative impact on beaver and a positive impact on spawning access for grayling. The limited angling closure has a positive impact on grayling. Operation of the pipeline is predicted to provide additional suitable habitat and improve survivorship for the indigenous grayling population, however it also would have negative impacts to other species.

## SOLITUDE OR PRIMITIVE & UNCONFINED RECREATION

Component Activity for this Alternative	Positive	Negative	No Effect
X <i>Example: Personnel will travel by horseback</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
1 Motors and or mechanical transport	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
2 Construction of pipeline and components	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
3 Water releases	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
4 Beaver dam notching	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
5 Limited angling closure	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
6 Operation of pipeline and components	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
7 Permanent installation of pipeline and components	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
8	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Totals	0	5	NE
<b>Solitude or Primitive &amp; Unconfined Recreation Total Rating</b>	<b>-5</b>		

Explain:

Opportunities for Solitude or Primitive & Unconfined Recreation (SPUR) is defined as an environment that is relatively free from the encumbrances of modern society (including sights and sounds), and for the experience of the benefits and inspiration derived from self-reliance, self-discovery, physical and mental challenge, and freedom from societal obligations. SPUR Wilderness Character Quality is preserved when visitors experience minimal encounters, observe landscapes without modern human effects, experience self-discovery, traditional skills, and challenge, and are not encumbered by regulatory restrictions. SPUR Wilderness Character Quality is degraded by encounters, indications of civilization, or restrictions on visitor behavior. Transport, and Construction of the pipeline would involve some motor noise, which would negatively impact the SPUR Wilderness Character Quality. Notched beaver dams are an indicator of civilization and a negative impact on SPUR Wilderness Character Quality. The limited angling closure is a restriction on visitor behavior, and a negative impact on SPUR Wilderness Character Quality. A portion of the pipeline will be visible to boaters, which is an indication of civilization and a negative impact on the SPUR Wilderness Character Quality.

**OTHER FEATURES OF VALUE**

Component Activity for this Alternative		Positive	Negative	No Effect
X	<i>Example: Personnel will travel by horseback</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
1	Motors and or mechanical transport	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
2	Construction of pipeline and components	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
3	Water releases	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
4	Beaver dam notching	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
5	Limited angling closure	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
6	Operation of pipeline and components	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
7	Permanent installation of pipeline and components	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
8		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Totals		0	0	NE
<b>Other Features of Value Total Rating</b>		<b>0</b>		

Explain:

The Other Features of Value Wilderness Character Quality is preserved when each identified feature unique to the Wilderness is protected consistent with protection of other Wilderness qualities. The Other Features of Value Wilderness Character Quality is degraded by loss of the feature's Wilderness context. This Wilderness does not have any Other Features of Value identified, so this alternative has no effect on the Other Features of Value Wilderness Character Quality.

**Summary Ratings for Alternative 5**

<b>Wilderness Character</b>	
Untrammeled	-4
Undeveloped	-3
Natural	0
Solitude or Primitive & Unconfined Recreation	-5
Other Features of Value	0
<b>Wilderness Character Summary Rating</b>	<b>-12</b>



## MRDG Step 2: Alternatives

**Alternative 6:** Permanent Barrier from Elk Springs Creek to Lake Center

### Description of the Alternative

*What are the details of this alternative? When, where, and how will the action occur? What mitigation measures will be taken?*

This alternative would involve construction of a permanent wall of sheet piling or similar material, approximately 2500 feet in length that deflects the flow of Elk Springs Creek toward a deeper part of Upper Red Rock Lake. The wall would be visible year round. Sheet piling would be installed by the use of a motorized floating barge using mechanized pile driving equipment to drive the material approximately 4 meters into the bottom of the lake. Construction would take approximately 1 to 2 months. The primitive boat launch at the Upper Red Rock Lake Campground would be used for barge access and would likely need to be modified to deploy a barge. Cultural resources sites exist in the area so ground disturbance would be minimal.

## Component Activities

How will each of the components of the action be performed under this alternative?

	Component of the Action	Activity for this Alternative
X	<i>Example: Transportation of personnel to the project site</i>	<i>Example: Personnel will travel by horseback</i>
1	Transport of personnel and materials in Wilderness	Motors and or mechanical transport
2	Development of action	Construction of barrier
3	Conduct of action 1	Water releases
4	Conduct of action 2	Beaver dam notching
5	Conduct of action 3	Limited angling closure
6	Conduct of action 4	Operation of barrier
7	Condition of site post action	Permanent installation of a barrier in lake
8		
9		

## Wilderness Character

What is the effect of each component activity on the qualities of wilderness character? What mitigation measures will be taken?

### UNTRAMMELED

Component Activity for this Alternative	Positive	Negative	No Effect
X <i>Example: Personnel will travel by horseback</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
1 Motors and or mechanical transport	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
2 Construction of barrier	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
3 Water releases	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
4 Beaver dam notching	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
5 Limited angling closure	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
6 Operation of barrier	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
7 Permanent installation of a barrier in lake	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
8	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Totals	0	3	NE
<b>Untrammed Total Rating</b>	<b>-3</b>		

Explain:

Trammeling is defined as any authorized actions that manipulate the biophysical environment. The Untrammed Wilderness Character Quality is preserved when actions are not taken to manipulate or control ecological systems and its components. The Untrammed Wilderness Character Quality is degraded by actions that intentionally control or manipulate flora, fauna, or natural processes. Releasing water into a tributary during winter, and notching beaver dams prior to grayling spawning are manipulations of natural processes, and negative impacts on the Untrammed Wilderness Character Quality. Operation of the barrier would change the natural flow of water from the mouth of Elk Springs Creek into Upper Red Rock Lake, which would have a negative impact on a natural process and the Untrammed Wilderness Character Quality.

UNDEVELOPED

Component Activity for this Alternative		Positive	Negative	No Effect
X	<i>Example: Personnel will travel by horseback</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
1	Motors and or mechanical transport	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
2	Construction of barrier	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
3	Water releases	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
4	Beaver dam notching	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
5	Limited angling closure	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
6	Operation of barrier	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
7	Permanent installation of a barrier in lake	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
8		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Totals		0	4	NE
<b>Undeveloped Total Rating</b>		<b>-4</b>		

Explain:

Developed is defined as any human-made installations, structures, or developments in wilderness. The Undeveloped Wilderness Character Quality is preserved when human made features are not located in, and motors or mechanical transport are not used in Wilderness. The Undeveloped Wilderness Character Quality is degraded by structures or installations, or the use of motors or mechanical transport. Transport of personnel and materials would include the use of motors and mechanical transport in Wilderness, which would negatively impact the Undeveloped Wilderness Character Quality. Construction of the barrier would include the use of motors and mechanical transport, which would negatively impact the Undeveloped Wilderness Character Quality. Operation of the barrier is a visible year round indicator of development and a negative impact on the Undeveloped Wilderness Character Quality. A permanent barrier installed in Wilderness is an installation, which would negatively impact the Undeveloped Wilderness Character Quality.

NATURAL

Component Activity for this Alternative		Positive	Negative	No Effect
X	<i>Example: Personnel will travel by horseback</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
1	Motors and or mechanical transport	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
2	Construction of barrier	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
3	Water releases	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
4	Beaver dam notching	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
5	Limited angling closure	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6	Operation of barrier	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
7	Permanent installation of a barrier in lake	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
8		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Totals		4	5	NE
<b>Natural Total Rating</b>		<b>-1</b>		

Explain:

Unnatural is defined as any disturbance or disruption to the abundance or distribution of plant or animal species. The Natural Wilderness Character Quality is preserved when indigenous species and ecological processes are intact. The Natural Wilderness Character Quality is degraded by effects (intended or unintended) of modern civilization. Preserving the grayling population would have a positive impact on the Natural Wilderness Character Quality. Motors, mechanical transport, and construction would disturb the distribution of plant and animal species, and would be negative impacts to the Natural Wilderness Character Quality. The **data** from water releases show a significant benefit in levels and area of dissolved oxygen, so this alternative would have a positive effect on the Natural Wilderness Character Quality. However, **modeling** for the SDM technical report does not support the actual data so it is rated as no effect as well. Beaver dam notching has a negative impact on beaver and a positive impact on spawning access for grayling. The limited angling closure has a positive impact on grayling. Operation of the barrier is predicted to provide additional suitable habitat and improve survivorship for the indigenous grayling population, however it also would have negative impacts to other species and permanently change the distribution of plant and animal species.

## SOLITUDE OR PRIMITIVE & UNCONFINED RECREATION

Component Activity for this Alternative	Positive	Negative	No Effect
X <i>Example: Personnel will travel by horseback</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
1 Motors and or mechanical transport	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
2 Construction of barrier	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
3 Water releases	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
4 Beaver dam notching	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
5 Limited angling closure	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
6 Operation of barrier	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
7 Permanent installation of a barrier in lake	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
8	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Totals	0	6	NE
<b>Solitude or Primitive &amp; Unconfined Recreation Total Rating</b>	<b>-6</b>		

Explain:

Opportunities for Solitude or Primitive & Unconfined Recreation (SPUR) is defined as an environment that is relatively free from the encumbrances of modern society (including sights and sounds), and for the experience of the benefits and inspiration derived from self-reliance, self-discovery, physical and mental challenge, and freedom from societal obligations. SPUR Wilderness Character Quality is preserved when visitors experience minimal encounters, observe landscapes without modern human effects, experience self-discovery, traditional skills, and challenge, and are not encumbered by regulatory restrictions. SPUR Wilderness Character Quality is degraded by encounters, indications of civilization, or restrictions on visitor behavior. Transport, and Construction of the barrier would involve some motor noise, which would negatively impact the SPUR Wilderness Character Quality. Notched beaver dams are an indicator of civilization and a negative impact on SPUR Wilderness Character Quality. The limited angling closure is a restriction on visitor behavior, and a negative impact on SPUR Wilderness Character Quality. A barrier would be visible year round, which is an indication of civilization and a negative impact on the SPUR Wilderness Character Quality.

### OTHER FEATURES OF VALUE

Component Activity for this Alternative		Positive	Negative	No Effect
X	<i>Example: Personnel will travel by horseback</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
1	Motors and or mechanical transport	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
2	Construction of barrier	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
3	Water releases	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
4	Beaver dam notching	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
5	Limited angling closure	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
6	Operation of barrier	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
7	Permanent installation of a barrier in lake	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
8		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Totals		0	0	NE
<b>Other Features of Value Total Rating</b>		<b>0</b>		

Explain:

The Other Features of Value Wilderness Character Quality is preserved when each identified feature unique to the Wilderness is protected consistent with protection of other Wilderness qualities. The Other Features of Value Wilderness Character Quality is degraded by loss of the feature's Wilderness context. This Wilderness does not have any Other Features of Value identified, so this alternative has no effect on the Other Features of Value Wilderness Character Quality.

**Summary Ratings for Alternative 6**

<b>Wilderness Character</b>	
Untrammeled	-3
Undeveloped	-4
Natural	-1
Solitude or Primitive & Unconfined Recreation	-6
Other Features of Value	0
<b>Wilderness Character Summary Rating</b>	<b>-14</b>



## MRDG Step 2: Alternatives

**Alternative 7:** Elk Springs Creek Dredge and Deflection Berm

### Description of the Alternative

*What are the details of this alternative? When, where, and how will the action occur? What mitigation measures will be taken?*

This alternative would involve dredging sediments from Upper Red Rock Lake near the mouth of Elk Springs Creek in Wilderness. Approximately 62 acres (25 hectares) would be dredged to a depth of greater than 3 feet. The cuttings would be used to fill geotextile bags and form a peninsula approximately 2500 feet in length that deflects the flow of Elk Springs Creek toward a deeper part of Upper Red Rock Lake. Dredging would be accomplished by the use of two shallow floating mechanical dredges. Construction would take approximately 3 years, working 4 months a year, avoiding nesting season and periods when the lake is iced over. Floating silt and turbidity curtains or temporary dikes might be required during placement. The primitive boat launch at the Upper Red Rock Lake Campground would be used for dredge access and would likely need to be modified to deploy dredges. Cultural resources sites exist in the area so ground disturbance would be minimal. Given the mobility of sediment in the lake the effect of dredging is expected to be temporary.

## Component Activities

How will each of the components of the action be performed under this alternative?

	Component of the Action	Activity for this Alternative
X	<i>Example: Transportation of personnel to the project site</i>	<i>Example: Personnel will travel by horseback</i>
1	Transport of personnel and materials in Wilderness	Motors and or mechanical transport
2	Development of action	Dredging and constructing peninsula
3	Conduct of action 1	Water releases
4	Conduct of action 2	Beaver dam notching
5	Conduct of action 3	Limited angling closure
6	Conduct of action 4	Operation of peninsula
7	Condition of site post action	Permanent installation of peninsula
8		
9		

## Wilderness Character

What is the effect of each component activity on the qualities of wilderness character? What mitigation measures will be taken?

### UNTRAMMELED

Component Activity for this Alternative	Positive	Negative	No Effect
X <i>Example: Personnel will travel by horseback</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
1 Motors and or mechanical transport	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
2 Dredging and constructing peninsula	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
3 Water releases	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
4 Beaver dam notching	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
5 Limited angling closure	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
6 Operation of peninsula	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
7 Permanent installation of peninsula	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
8	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Totals	0	4	NE
<b>Untrammed Total Rating</b>	<b>-4</b>		

Explain:

Trammeling is defined as any authorized actions that manipulate the biophysical environment. The Untrammed Wilderness Character Quality is preserved when actions are not taken to manipulate or control ecological systems and its components. The Untrammed Wilderness Character Quality is degraded by actions that intentionally control or manipulate flora, fauna, or natural processes. Removing sediment would change a natural process, which would negatively impact the Untrammed Wilderness Character Quality. Construction of a peninsula would change the natural flow of water from the mouth of Elk Springs Creek into Upper Red Rock Lake, which would have a negative impact on a natural process and the Untrammed Wilderness Character Quality. Releasing water into a tributary during winter, and notching beaver dams prior to grayling spawning are manipulations of natural processes, and negative impacts on the Untrammed Wilderness Character Quality. Operation of the peninsula would change the natural flow of water from the mouth of Elk Springs Creek into Upper Red Rock Lake, which would have a negative impact on a natural process and the Untrammed Wilderness Character Quality.

UNDEVELOPED

Component Activity for this Alternative		Positive	Negative	No Effect
X	<i>Example: Personnel will travel by horseback</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
1	Motors and or mechanical transport	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
2	Dredging and constructing peninsula	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
3	Water releases	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
4	Beaver dam notching	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
5	Limited angling closure	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
6	Operation of peninsula	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
7	Permanent installation of peninsula	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
8		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Totals		0	4	NE
<b>Undeveloped Total Rating</b>		<b>-4</b>		

Explain:

Developed is defined as any human-made installations, structures, or developments in wilderness. The Undeveloped Wilderness Character Quality is preserved when human made features are not located in, and motors or mechanical transport are not used in Wilderness. The Undeveloped Wilderness Character Quality is degraded by structures or installations, or the use of motors or mechanical transport. Transport of personnel and materials would include the use of motors and mechanical transport in Wilderness, which would negatively impact the Undeveloped Wilderness Character Quality. Removing sediment would include the use of motors and mechanical transport, which would negatively impact the Undeveloped Wilderness Character Quality. Construction of a peninsula would include the use of motors and mechanical transport, which would negatively impact the Undeveloped Wilderness Character Quality. A permanent peninsula installed in Wilderness is an installation, which would negatively impact the Undeveloped Wilderness Character Quality.

NATURAL

Component Activity for this Alternative		Positive	Negative	No Effect
X	<i>Example: Personnel will travel by horseback</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
1	Motors and or mechanical transport	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
2	Dredging and constructing peninsula	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
3	Water releases	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
4	Beaver dam notching	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
5	Limited angling closure	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6	Operation of peninsula	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
7	Permanent installation of peninsula	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
8		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Totals		4	5	NE
<b>Natural Total Rating</b>		<b>-1</b>		

Explain:

Unnatural is defined as any disturbance or disruption to the abundance or distribution of plant or animal species. The Natural Wilderness Character Quality is preserved when indigenous species and ecological processes are intact. The Natural Wilderness Character Quality is degraded by effects (intended or unintended) of modern civilization. Preserving the grayling population would have a positive impact on the Natural Wilderness Character Quality. Motors, mechanical transport, and construction would disturb the distribution of plant and animal species, and would be negative impacts to the Natural Wilderness Character Quality. Dredging and constructing a peninsula would degrade water quality and soils, cause turbidity, and negatively impact the Natural Wilderness Character Quality. The **data** from water releases show a significant benefit in levels and area of dissolved oxygen, so this alternative would have a positive effect on the Natural Wilderness Character Quality. However, **modeling** for the SDM technical report does not support the actual data so it is rated as no effect as well. Beaver dam notching has a negative impact on beaver and a positive impact on spawning access for grayling. The limited angling closure has a positive impact on grayling. Operation of the peninsula is predicted to provide additional suitable habitat and improve survivorship for the indigenous grayling population, however it also would have negative impacts to other species and permanently change the distribution of plant and animal species.

## SOLITUDE OR PRIMITIVE & UNCONFINED RECREATION

Component Activity for this Alternative	Positive	Negative	No Effect
X <i>Example: Personnel will travel by horseback</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
1 Motors and or mechanical transport	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
2 Dredging and constructing peninsula	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
3 Water releases	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
4 Beaver dam notching	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
5 Limited angling closure	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
6 Operation of peninsula	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
7 Permanent installation of peninsula	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
8	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Totals	0	6	NE
<b>Solitude or Primitive &amp; Unconfined Recreation Total Rating</b>	<b>-6</b>		

Explain:

Opportunities for Solitude or Primitive & Unconfined Recreation (SPUR) is defined as an environment that is relatively free from the encumbrances of modern society (including sights and sounds), and for the experience of the benefits and inspiration derived from self-reliance, self-discovery, physical and mental challenge, and freedom from societal obligations. SPUR Wilderness Character Quality is preserved when visitors experience minimal encounters, observe landscapes without modern human effects, experience self-discovery, traditional skills, and challenge, and are not encumbered by regulatory restrictions. SPUR Wilderness Character Quality is degraded by encounters, indications of civilization, or restrictions on visitor behavior. During 14 months of construction, transport, removing sediment, and constructing a peninsula would involve motor noise and the sight of two dredges working, which would negatively impact the SPUR Wilderness Character Quality. Notched beaver dams are an indicator of civilization and a negative impact on SPUR Wilderness Character Quality. The limited angling closure is a restriction on visitor behavior, and a negative impact on SPUR Wilderness Character Quality. The peninsula would be visible year round, which is an indication of civilization and a negative impact on the SPUR Wilderness Character Quality.

### OTHER FEATURES OF VALUE

Component Activity for this Alternative		Positive	Negative	No Effect
X	<i>Example: Personnel will travel by horseback</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
1	Motors and or mechanical transport	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
2	Dredging and constructing peninsula	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
3	Water releases	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
4	Beaver dam notching	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
5	Limited angling closure	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
6	Operation of peninsula	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
7	Permanent installation of peninsula	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
8		<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
9		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Totals		0	0	NE
<b>Other Features of Value Total Rating</b>		<b>0</b>		

Explain:

The Other Features of Value Wilderness Character Quality is preserved when each identified feature unique to the Wilderness is protected consistent with protection of other Wilderness qualities. The Other Features of Value Wilderness Character Quality is degraded by loss of the feature's Wilderness context. This Wilderness does not have any Other Features of Value identified, so this alternative has no effect on the Other Features of Value Wilderness Character Quality.

**Summary Ratings for Alternative 7**

<b>Wilderness Character</b>	
Untrammeled	-4
Undeveloped	-4
Natural	-1
Solitude or Primitive & Unconfined Recreation	-6
Other Features of Value	0
<b>Wilderness Character Summary Rating</b>	<b>-15</b>



**Project Title:** Alternatives to conserve Arctic grayling

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## MRDG Step 2: Alternatives

**Alternative 8:**

### **Description of the Alternative**

*What are the details of this alternative? When, where, and how will the action occur? What mitigation measures will be taken?*

**Component Activities**

*How will each of the components of the action be performed under this alternative?*

	Component of the Action	Activity for this Alternative
X	<i>Example: Transportation of personnel to the project site</i>	<i>Example: Personnel will travel by horseback</i>
1	Transport of personnel and materials in Wilderness	
2	Development of action	
3	Conduct of action 1	
4	Conduct of action 2	
5	Conduct of action 3	
6	Conduct of action 4	
7	Condition of site post action	
8		
9		

**Wilderness Character**

*What is the effect of each component activity on the qualities of wilderness character? What mitigation measures will be taken?*

**UNTRAMMELED**

Component Activity for this Alternative		Positive	Negative	No Effect
X	<i>Example: Personnel will travel by horseback</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
1		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Totals		0	0	NE
<b>Untrammeled Total Rating</b>		<b>0</b>		

Explain:

UNDEVELOPED

Component Activity for this Alternative		Positive	Negative	No Effect
X	<i>Example: Personnel will travel by horseback</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
1		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Totals		0	0	NE
<b>Undeveloped Total Rating</b>		<b>0</b>		

Explain:

NATURAL

Component Activity for this Alternative		Positive	Negative	No Effect
X	<i>Example: Personnel will travel by horseback</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
1		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Totals		0	0	NE
<b>Natural Total Rating</b>		<b>0</b>		

Explain:

SOLITUDE OR PRIMITIVE & UNCONFINED RECREATION

Component Activity for this Alternative		Positive	Negative	No Effect
X	<i>Example: Personnel will travel by horseback</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
1		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Totals		0	0	NE
<b>Solitude or Primitive &amp; Unconfined Recreation Total Rating</b>		<b>0</b>		

Explain:

OTHER FEATURES OF VALUE

Component Activity for this Alternative		Positive	Negative	No Effect
X	<i>Example: Personnel will travel by horseback</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
1		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Totals		0	0	NE
<b>Other Features of Value Total Rating</b>		<b>0</b>		

Explain:

**Summary Ratings for Alternative 8**

<b>Wilderness Character</b>	
Untrammeled	0
Undeveloped	0
Natural	0
Solitude or Primitive & Unconfined Recreation	0
Other Features of Value	0
<b>Wilderness Character Summary Rating</b>	<b>0</b>

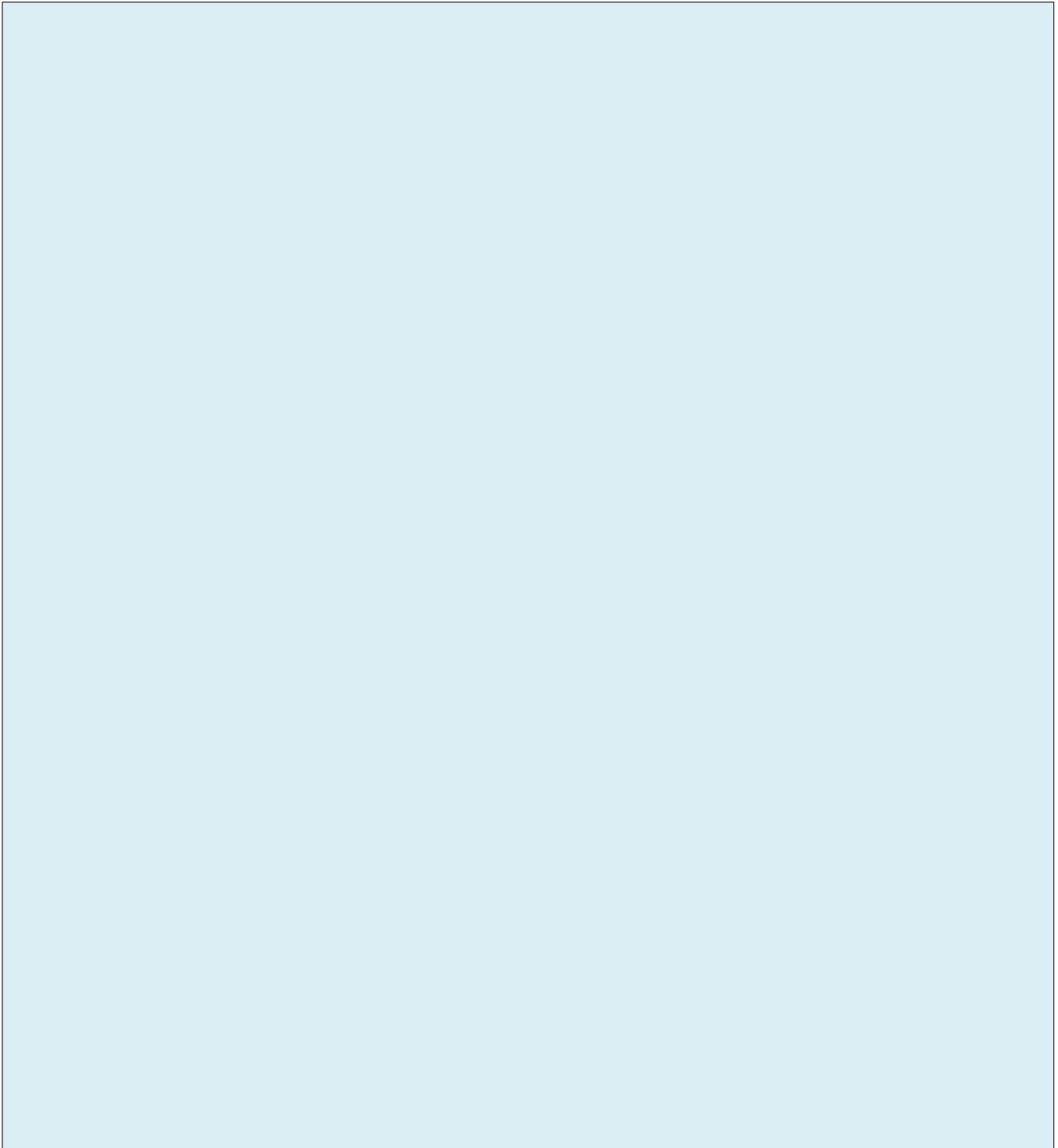


**Project Title:** Alternatives to conserve Arctic grayling

**MRDG Step 2: Alternatives Not Analyzed**

**Alternatives Not Analyzed**

*What alternatives were considered but not analyzed? Why were they not analyzed?*



**Project Title:** Alternatives to conserve Arctic grayling

**MRDG Step 2: Alternative Comparison**

**Alternative 1:** Water releases, beaver dam notching, limited angling closures

**Alternative 2:** Splasher Aeration

**Alternative 3:** Diffuser Aeration

**Alternative 4:** Aerator with Recirculating Pump and Pipelines

Wilderness Character	Alternative 1		Alternative 2		Alternative 3		Alternative 4	
	Positive	Negative	Positive	Negative	Positive	Negative	Positive	Negative
Untrammeled	0	2	0	3	0	3	0	3
Undeveloped	0	0	0	4	0	4	0	4
Natural	3	1	4	4	4	4	4	4
Solitude/Primitive/Unconfined	0	2	0	6	0	5	0	5
Other Features of Value	0	0	0	0	0	0	0	0
Totals	3	5	4	17	4	16	4	16
<b>Wilderness Character Rating</b>	<b>-2</b>		<b>-13</b>		<b>-12</b>		<b>-12</b>	

**Alternative 5:** Shambow Pond Diversion Pipeline

**Alternative 6:** Permanent Barrier from Elk Springs Creek to Lake Center

**Alternative 7:** Elk Springs Creek Dredge and Deflection Berm

**Alternative 8:** \_\_\_\_\_

Wilderness Character	Alternative 5		Alternative 6		Alternative 7		Alternative 8	
	Positive	Negative	Positive	Negative	Positive	Negative	Positive	Negative
Untrammeled	0	4	0	3	0	4	0	0
Undeveloped	0	3	0	4	0	4	0	0
Natural	4	4	4	5	4	5	0	0
Solitude/Primitive/Unconfined	0	5	0	6	0	6	0	0
Other Features of Value	0	0	0	0	0	0	0	0
Totals	4	16	4	18	4	19	0	0
<b>Wilderness Character Rating</b>	<b>-12</b>		<b>-14</b>		<b>-15</b>		<b>0</b>	

**Project Title:** Alternatives to conserve Arctic grayling

**MRDG Step 2: Determination**

Refer to the [MRDG Instructions](#) before identifying the selected alternative and explaining the rationale for the selection.

**Selected Alternative**

- Alternative 1: Water releases, beaver dam notching, limited angling closures
- Alternative 2: Splasher Aeration
- Alternative 3: Diffuser Aeration
- Alternative 4: Aerator with Recirculating Pump and Pipelines
- Alternative 5: Shambow Pond Diversion Pipeline
- Alternative 6: Permanent Barrier from Elk Springs Creek to Lake Center
- Alternative 7: Elk Springs Creek Dredge and Deflection Berm
- Alternative 8:

**Explain Rationale for Selection:**

Conservation benefits to the grayling population in the technical report titled *Decision-Making for Centennial Valley Arctic Grayling (Thymallus arcticus) Conservation on Red Rock Lakes National Wildlife Refuge* (Technical Report), are largely based on how well an Alternative provides additional dissolved oxygen to the portion of URRL that is >1 meter below the ice.

**The purpose of this analysis is to determine which Alternative supports conservation of the URRL population of grayling while having the minimum negative impact on Wilderness character.** A Structured Decision Making process (SDM) evaluated each Alternative and based on models, quantified how effective it was for achieving fundamental objectives that included grayling conservation and wilderness impacts, and other objectives. The results can be found in the Technical Report.

Alternative 1 (A in EA): Alternative 1 has the least negative impact to Wilderness character. Data collected over two winters indicate that Alternative 1 added a significant amount of additional dissolved oxygen to a portion of URRL deeper than 1 meter below the ice. However, modeling for the SDM did not support the data. Currently it is not known if the effect of releasing oxygenated water into URRL lasts long enough to cover a critical period each winter when dissolved oxygen becomes unsuitable for grayling in the center of the lake. Data will be available June 2023 that show how long the effect lasts. The other Alternatives provide a benefit for the entire winter.

Alternative 2 (B1 in EA): Alternative 2 has approximately 2.6 times the negative impact to Wilderness character compared to Alternative 1.

Alternative 3 (B2 in EA): Alternative 3 has approximately 2 times the negative impact to Wilderness character compared to Alternative 1.

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### Explain Rationale for Selection, Continued:

Alternative 4 (C in EA): Alternative 4 has approximately 4.6 times the negative impact to Wilderness character compared to Alternative 1.

Alternative 5 (D in EA): Alternative 5 has approximately 8.4 times the negative impact to Wilderness character compared to Alternative 1.

Alternative 6 (E in EA): Alternative 6 has approximately 51.9 times the negative impact to Wilderness character compared to Alternative 1.

Alternative 7 (F in EA): Alternative 7 has approximately 145.4 times the negative impact to Wilderness character compared to Alternative 1.

This analysis is intended to select the Alternative that provides an improvement in grayling conservation while having the least impact on Wilderness character. Technical Report modeling predicts Alternatives 1 - 5 (A - D in EA) have a good chance to prevent extinction, but a poor chance to recover the population to >400 spawning adults. Modeling predicts Alternatives 6 and 7 (E and F in EA) have a good chance to prevent extinction and recover the population; however their impact to Wilderness character is severe and long-term. Studies on URRL indicate that bottom sediments are highly mobile and would likely refill any areas that are dredged to make them deeper. Given the time, cost, and temporal benefits of dredging, Alternative 7 may not be practically effective. A decision was made to only consider Alternatives 1 - 5 (A - D in EA). Alternative 1 (A in EA) was dismissed due to uncertainty of the temporal nature of its effects. Alternative 3 (B2 in EA) was tested as a pilot project during spring 2023. It did not produce habitat the modeling predicted and was dismissed. Alternative 2 (B1 in EA) was also dismissed because of its generally similar mode of action to Alternative 3 (B2 in EA). That left Alternatives 4 (pumped aeration) and 5 (diversion pipeline). Alternative 4 relies on electricity and pumps to function. A power outage or a pump breakdown could render this Alternative inoperable. Also, the annual cost to run the pumps is high. Alternative 5 relies on gravity flow, has no pumps or motors to fail, and no electricity cost. Its biggest risk is fouling from: snow, ice, plant material, or sediment. Alternative 5 was thought to be more reliable. For these reasons Alternative 5 (D in EA) was selected as the Minimum Requirement.

### Describe Monitoring & Reporting Requirements:

Dissolved oxygen and the size of the spawning population will be monitored annually to determine the effectiveness of the Alternative selected.

## Approvals

Which of the prohibited uses found in Section 4(c) of the Wilderness Act are approved in the selected alternative and for what quantity?

<u>Prohibited Use</u>	<u>Quantity</u>
<input checked="" type="checkbox"/> Mechanical Transport:	6 months
<input checked="" type="checkbox"/> Motorized Equipment:	6 months
<input checked="" type="checkbox"/> Motor Vehicles:	6 months
<input checked="" type="checkbox"/> Motorboats:	6 months
<input type="checkbox"/> Landing of Aircraft:	
<input checked="" type="checkbox"/> Temporary Roads:	6 months
<input type="checkbox"/> Structures:	
<input checked="" type="checkbox"/> Installations:	permanent

Record and report any authorizations of Wilderness Act Section 4(c) prohibited uses according to agency policies or guidance.

Refer to agency policies for the following signature authorities:

Prepared	Name		Position	
	Michael J. Bryant		Wildlife Refuge Manager	
	Signature		Date	
Recommended	Name		Position	
	Signature		Date	
Recommended	Name		Position	
	Signature		Date	
Approved	Name		Position	
	Stacy Armitage		Assistant Regional Director, R6 Refuge Program	
	Signature		Date	