

MONTANA FISH, WILDLIFE & PARKS

Future Fisheries Improvement Program

Application Guidelines

Application Dates:	Submission information:
<p>Deadlines:</p> <ul style="list-style-type: none">• November 15 (winter cycle)• May 15 (summer cycle) <p><i>Must be received by midnight</i></p> <p>Citizen Review Panel Meetings for funding recommendations:</p> <ul style="list-style-type: none">• Mid-June (summer cycle)• Mid-December (winter cycle) <p>Fish & Wildlife Commission Meetings for approval:</p> <ul style="list-style-type: none">• August (summer cycle)• February (winter cycle)	<p>Email to: FWPFFIP@mt.gov For files over 10MB, use https://transfer.mt.gov and send to mmcgree@mt.gov</p> <p>Mail to: Future Fisheries Improvement Program FWP Fisheries Division P.O. Box 200701 Helena, MT 59620</p> <p><i>Digital and printed submissions must be signed</i></p>

Comprehensive Program information and guidance can be found at <https://fwp.mt.gov/ffip>

Program Purpose

To provide funding to enhance, restore, or protect wild fish populations and their habitats. These improvements are intended to benefit fish populations, native species conservation, and angling opportunities.

The Citizen Review Panel recommends that any project involving grazing includes participation and/or investment from the landowner, including development of a grazing management plan early in the process. Fencing costs should be reasonable and competitive. Photopoints are a required and important part of pre-project and post-project assessment.

Project Eligibility

Any individual or group can apply. Projects must evaluate the cause of the problem, incorporate a large-scale view of the project and surrounding area, and benefit the angling public. Project design should incorporate natural stream form and function with the goal of obtaining a condition as close to natural as possible.

Funding Eligibility

Program funds can be used for on-the-ground work, including permitting, construction (and construction oversight), materials, water leasing, and maintenance (up to 10% of the total project cost). Funding cannot be used for administration, travel, coordination, overhead, monitoring, assessment or studies, design alone (must be design/build), contingency, or land acquisition. Projects must have written landowner permission. **If proposing a fish screen project, please consider a maintenance request.**

Review Criteria

Project prioritization includes the magnitude of enhancement to aquatic habitats and fish populations, public access and opportunity, waterbody importance, long term effectiveness, cost/benefit, and cost share. Additional emphasis is placed on projects that are in Eastern Montana, involve mineral reclamation, and/or improve native fish.

Available Funding

The Montana Legislature gives authority for the Program to expend funds. Approximately \$1.2 million is available for each biennium (two years; four grant cycles). Approved funding varies by grant cycle; over the last five years, the average grant award was approximately \$30,000.

Proposed projects should include cost share. A 50% match is typical. In-kind services or wages of government agency personnel cannot be used as match. Permanent irrigation diversions must have at least a 50% match.



FUTURE FISHERIES IMPROVEMENT PROGRAM GRANT APPLICATION

All sections must be addressed, or the application will be considered invalid



I. APPLICANT INFORMATION

A. Applicant Name: Clark Fork Coalition

Mailing Address: 140 S. 4th St. W. #1

City: Missoula State: MT Zip: 59801

Telephone: 406-550-5503 E-mail: brian@clarkfork.org

B. Contact Person (if different than applicant): Adam Switalski – Clark Fork Coalition Project Manager

Address: 140 S. 4th St. W. #1

City: Missoula State: MT Zip: 59801

Telephone: 406-396-1941 (cell) E-mail: adam@clarkfork.org

C. Landowner and/or Lessee Name (if different than applicant): USDA Forest Service - Missoula Ranger District

Mailing Address: 24 Fort Missoula Road

City: Missoula State: MT Zip: 59804

Telephone: 406-329-3814 E-mail: Michael.Siemiantkowski@usda.gov

II. PROJECT INFORMATION

A. Project Name: Upper O'Brien Creek Restoration Project – second request

River, stream, or lake: O'Brien Creek

Location: Township: 13N Range: 21W Section: 26

Latitude: 46.850273 Longitude: -114.186882 *Within project (decimal degrees)*

County: Missoula

B. Purpose of Project: *(high level, focus on why the project is important)*

The Future Fisheries Improvement Program awarded the Clark Fork Coalition \$44,222 towards the Upper O'Brien Stream Restoration Project in the fall 2025 cycle. However, after finalizing the design and hiring contractors to implement the project, we were \$40,605 over budget. The initial budget presented in the fall 2025 cycle underestimated the final cost of implementing the project. A final budget is included in the grant proposal package. A final plan set is also included in the proposal package.

The Forest Service has committed to providing \$15,000 towards this deficit, but we are requesting that Future Fisheries Improvement Program provide an additional \$25,605 to completely fund the project. Implementation is planned for fall 2026.

The purpose of this project is to increase the native westslope cutthroat trout (WCT) populations in upper O'Brien Creek. O'Brien Creek is a key spawning and rearing area for trout in the lower Bitterroot River watershed, as it is the only perennial tributary system between Lolo and the mouth of the river. O'Brien Creek supports high densities of WCT in upper reaches and a mix of WCT, *Oncorhynchus* spp. hybrids, brook trout, and brown trout in middle and lower sections. Project partners, including Clark Fork Coalition, Montana Department of Environmental Quality (DEQ), US Forest Service, and Montana Fish, Wildlife and Parks (FWP), will work to improve spawning and rearing habitat, reduce sediment loading, and restore floodplain connectivity in the upper mainstem reach of O'Brien Creek. This project supplements and complements numerous other projects implemented in the drainage since 1998.

- C. Brief Project Description (attach additional information to end of application). Please include the anticipated construction schedule:

The proposed collaborative project would take place on O'Brien Creek, a tributary to Bitterroot River. O'Brien Creek has historically supported a productive coldwater fishery consisting of native and introduced salmonids. Fisheries values are highlighted by high WCT densities and other introduced trout species. Project stream reaches primarily represent spawning and rearing habitats for westslope cutthroat trout and various other coldwater species that provide recruitment for the Bitterroot River fishery.

O'Brien Creek has experienced extensive human uses for more than a century, including a railroad in the valley bottom for timber extraction, extensive road development and timber harvest in the uplands, and severe manipulation from ditching and irrigation withdrawals. These historic uses of the watershed have resulted in the degradation and simplification of fish habitat. Aquatic habitat is mostly riffle habitat features with little in-stream wood, pools, or instream complexity (see photos). The stream is also entrenched, with limited floodplain connectivity in most of the project reach.

Several aspects have been identified as limiting factors for aquatic habitat health. These include lack of instream wood and associated hydraulic and geomorphic complexity, limited areas of robust riparian vegetation and recruitable wood, as well as sediment loading from road prisms/fill slopes and native terrace erosion, road surface runoff, and tributary inputs.

The Bitterroot Watershed Restoration Plan (2020) and Forest Service stream and road surveys (2019), and DEQ sediment / aquatic habitat surveys have identified several current sources of sediment delivery into O'Brien Creek. A streamside Forest Service road is actively delivering sediment into the creek including large road fill failures (see attached photos). O'Brien Creek Road runs along 10.3 miles of its mainstem. In fact, 60% of the road is within 200 ft. of the stream. Several bank failures are also chronically delivering sediment into the stream. These impacts produce sediment at levels high enough to negatively affect fish spawning redds and macroinvertebrate habitat.

Project Partners propose to improve fish spawning and rearing habitat and reduce sediment inputs in upper O'Brien Creek by working closely with River Design Group (RDG), and Geum Environmental Consultants on the project. The goals of the project are to: 1) improve in-stream aquatic habitat, 2) reduce sediment loading, and 3) restore floodplain connectivity/processes. The project is focused on a 1.9 mile section that was identified by FWP as the primary fluvial WCT spawning and rearing reach where the stream is entrenched, has little in-stream wood or complexity, and is producing sediment from road fills and eroding banks.

Implementation is planned for fall 2026. Restoration treatments will include: installing at least 31 channel spanning large wood structures to increase complexity and enhance trout carrying capacity; realignment and recontouring sections of the O'Brien Creek Road and parking area to reduce encroachment and direct sediment inputs. The project will also reduce sediment contributing to O'Brien Creek from the upstream-most tributary by stabilizing the existing head cut and adding passive large wood to the channel; stabilize eroding, high-elevation terraces by lowering terraces to floodplain elevation; realigning short sections of O'Brien Creek away from eroding terraces and building an inset floodplain surface; placing passive large wood or installing large wood structures at the toe of eroding terraces; encouraging shallow emergent wetland vegetation development; and lowering existing berms to floodplain elevation to increase floodplain connectivity.

Public outreach will be coordinated by Clark Fork Coalition, including social media posts, newsletter articles, and hosting field trips for local community members and government agencies to showcase the benefits of restoration work on aquatic habitat, water quality, and watershed health.

D. What was the cause of habitat degradation and how will the project correct the cause?

These historic uses of the watershed have resulted in the degradation and simplification of fish habitat. O'Brien Creek has experienced extensive human uses for more than a century, including a railroad in the valley bottom for timber extraction, extensive road development and timber harvest in the uplands, and severe manipulation from ditching and irrigation withdrawals.

The project will correct the causes of the degradation by creating stream complexity through the addition of wood, reducing sediment inputs by re-routing roads and addressing erosive banks, and re-aligning the stream to activate floodplains.

E. Length of stream or size of lake that will be treated (project extent): 1.9 miles of O'Brien Creek
Length/size of impact, if larger than project extent (e.g., stream miles opened): _____

F. Project Budget Summary:

Grant Request (Dollars):	\$	<u>25,605</u>
Matching Dollars:	\$	<u>240,450 (including \$44,200 in 2025 FF funds)</u>
Matching In-Kind Services*:	\$	<u>0</u>

**salaries of government employees are not considered matching contributions*

Other Contributions (not part of this app)	\$	<u>6,000</u>
Total Project Cost:	\$	<u>272,055</u>

G. Attach itemized (line item) budget – see budget template

H. Attach project location map(s) that include:

- Extent of the project, including context (relation to major landmark or town)
- Indication of public and private property
- Riparian buffer locations and widths (if applicable) and grazing locations

I. Attach project plans:

- Detailed sketches or plan views with the location and proposed restoration
- Pre-project photographs (GPS location strongly recommended)
- If water leasing or water salvage is involved, attach a supplemental questionnaire (<https://myfwp.mt.gov/getRepositoryFile?objectID=36110>)

J. Attach support letters or statements of (e.g., landowner consent, community or public support). For FWP statement, attach provided template. List any other project partners:

This project is a collaborative project between Clark Fork Coalition, Lolo National Forest, Montana Department of Environmental Quality, and Montana Fish Wildlife and Parks.

III. MAINTENANCE AND MONITORING (attach additional information to end of application):

A. A 20-year maintenance commitment is required*. Please confirm that you will ensure this protection and describe your approach. Attach any relevant maintenance plans. Yes No
**If it is a water leasing project, describe the length of the agreement.*

Clark Fork Coalition, public and private land managers, and project partners have been implementing and maintaining stream restoration projects since 1999. Project partners are committed to protection and restoration work, and have staff dedicated to monitoring the effectiveness of these projects.

- B. Will grazing be part of or adjacent to the project? If so, describe or attach land management plans, including short term and long term grazing regimes. If the landowner is not the applicant, please describe their involvement in the project. *If you want assistance with grazing plan development, note your need.*

Grazing is not currently allowed or planned in this area.

- C. Will the project be monitored to determine if goals were met? If so, what are the short-term and long-term plans to assess benefits and lessons learned? Were pre-project data collected? Will monitoring information be shared with FWP?

Several monitoring efforts will be employed in the project. Two University of Montana classes are monitoring the effectiveness of the restoration treatments. Dr. Lisa Eby and Dr. Andrew Whiteley and their students are collecting baseline aquatic habitat data and fish population numbers. Specifically, they are collecting a subset of the PACFISH/INFISH Biological Opinion (PIBO) Effectiveness Monitoring protocol to record baseline and post-treatment habitat conditions. Dr. Whiteley and his students also sampled the stream to document fish species and estimate population sizes in new monitoring sections. This data supplements larger scale and longer-term fisheries data collected by FWP over the past 3 decades related to longitudinal fish species composition, WCT genetics, and fish density.

Pre and post project construction photo point monitoring will occur on major restoration features. Monitoring will take place pre-project in the fall of 2025 and then 2 years later at similar time of year. Additionally, Pre- and post-project Bank Erosion Hazard Index (BEHI) will be completed before the project begins and after the completion of the project on restoration treatment sites. CFC will conduct plant mortality counts on installed wetland container stock in the late summer of 2027.

IV. PROJECT BENEFITS (attach additional information to end of application):

- A. What species of fish will benefit from this project?

The project will benefit the coldwater fish community in O'Brien Creek. Westslope cutthroat trout are the predominant fish species in upper reaches where this project is planned, but the project will also enhance habitat for brook trout and have lesser for benefit for rainbow / cutthroat hybrids, brook trout, brown trout and mountain whitefish which are more prevalent in downstream reaches.

- B. How will the project protect or enhance wild fish habitat?

Currently, fish habitat in the Upper O'Brien Creek is limited by the lack of instream large wood and the associated loss of habitat complexity and habitat benefits. Limited areas of robust riparian vegetation is limiting future wood recruitment. Additionally, sediment loading from road prism / fillslope and native terrace erosion, as well as road surface runoff, is reducing the amount of available spawning habitat.

The addition of wood into the system will enhance habitat complexity and significantly improve trout carrying capacity based on monitoring of similar projects over the past 5 years (L. Knotek, MFWP). Benefits will be realized in reaches known to be important spawning and rearing habitat for native and wild trout in the watershed. Specifically, proper installation of large wood has been demonstrated to increase overhead cover, channel complexity, physical habitat diversity, and deposition of spawning gravels in oversimplified channels, resulting in significantly higher fish densities and enhanced size structure.

Relocating roads away from the stream and re-contouring the original roadbed will eliminate chronic sediment production from surface runoff and catastrophic failures into the creek. Additionally, the erosion of terraces will be mitigated with the installation of large wood structures in several locations. Cumulatively, reducing stream sedimentation is expected to improve the quality of trout spawning and rearing habitat.

- C. What is the expected improvement to fish populations, both short term and long term? How might the project translate to angler success?

By improving trout spawning and rearing habitat in upper O'Brien Creek, the project is expected to benefit migratory and the stream-resident WCT populations. With higher densities of fish, angler success is expected to increase directly in O'Brien Creek and indirectly in the Bitterroot River. The entire project area will occur on public land and is open to angling. Wild trout populations and fishery quality downstream (i.e., Bitterroot River) are also expected to benefit through enhanced wild trout recruitment.

- D. Will the project increase public fishing opportunity for wild fish and, if so, how? Is public fishing allowed onsite? Is it allowed by permission? If not, describe how the public would benefit.

The entire project area lies on accessible public land just outside of Missoula and is open to angling. Wild trout populations are expected to increase as a result of the project, leading to more opportunity for angling success. The proposed project will increase trout abundance, westslope cutthroat trout conservation, and overall health, productivity and resiliency of upper O'Brien Creek, and contribute to a recruitment-limited fishery in the Bitterroot River at a larger scale.

- E. Aside from angling, what local or large-scale public benefits will be realized from this project?

Overall public benefits from this project will include increased WCT population resiliency and density, contributing to conservation efforts for this species. In addition, reducing sediment pollution, riparian enhancement, and other water quality enhancements will benefit the quality of O'Brien Creek and contribute to the improvement of downstream waterways.

- F. Will the project interfere with water or property rights of adjacent landowners? (explain):

The project will not interfere with the water rights or property rights of adjacent landowners. The entire project will take place on USFS property.

G. Will the project result in the development of commercial recreational use on the site (including paid access)? Explain:

No, there is planned development of commercial recreational use at the site of the project.

H. Is this project associated with the reclamation of past mining activity?

No, the project is not associated with mine reclamation.

Each approved project applicant must enter into a written agreement with Montana Fish, Wildlife & Parks specifying terms and duration of the project. The applicant must obtain all applicable permits prior to project construction. A competitive bid process must be followed when using State funds.

V. AUTHORIZING STATEMENT

I (we) hereby declare that the information and all statements to this application are true, complete, and accurate to the best of my (our) knowledge and that the project or activity complies with rules of the Future Fisheries Improvement Program.

Applicant
Signature:



Date:

May 13, 2026

Submittal: Applications must be signed and received on or before November 15 and May 15 to be considered for the subsequent funding period. Late or incomplete applications will be rejected.

Mail to: FWP Future Fisheries Fish Habitat Bureau PO Box 200701 Helena, MT 59620-0701	Email: Future Fisheries Coordinator FWPFFIP@mt.gov (electronic submissions must be signed) For files over 10MB, use https://transfer.mt.gov and send to mmcgree@mt.gov
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BUDGET TEMPLATE SHEET FOR FUTURE FISHERIES PROGRAM APPLICATIONS

Both tables MUST be completed appropriately or the application will be invalid. Please see the example budget sheet for clarification.

PROJECT COSTS					GRANT REQUEST AND FUNDING			
Work Items (Itemize by Category)	Number of Units	Unit Description*	Cost/Unit	Total Cost	FUTURE FISHERIES REQUEST	Matching Contributions (Cash or In-Kind)***	Other Contributions (Funds not used as match)	Total Funding
<i>*Units = feet, hours, cubic yards, etc. Do not use lump sum unless necessary.</i>								
Personnel								
Survey	1	EA	\$3,000.00	\$ 3,000.00			3,000.00	\$ 3,000.00
Engineering/Design	1	EA	\$40,232.00	\$ 40,232.00		\$40,232.00		\$ 40,232.00
Permitting	1	EA	\$3,000.00	\$ 3,000.00			3,000.00	\$ 3,000.00
Contractor oversight	1	EA	\$24,775.00	\$ 24,775.00		\$24,775.00		\$ 24,775.00
CFC coordination, education, oversight, and monitoring	1	EA	\$23,400.00	\$ 23,400.00		\$23,400.00		\$ 23,400.00
Maintenance**	1	EA	\$1,600.00	\$ 1,600.00		\$1,600.00		\$ 1,600.00
			Sub-Total	\$ 96,007.00	\$ -	\$ 90,007.00	\$ 6,000.00	\$ 96,007.00
Travel								
Design firm Mileage	2000	MI	\$0.725	\$ 1,450.00		1,450.00		\$ 1,450.00
CFC Mileage	750	MI	\$0.725	\$ 543.75		543.75		\$ 543.75
Per diem				\$ -				\$ -
			Sub-Total	\$ 1,993.75		\$ 1,993.75	\$ -	\$ 1,993.75
Construction Materials								
FURNISH STREAMBANK ALLUVIUM (6")	216	CY	\$36.56	\$ 7,896.96	4,986.96	2,910.00		\$ 7,896.96
FURNISH STREAMBANK ALLUVIUM (10")	39	CY	\$54.37	\$ 2,120.43		2,120.43		\$ 2,120.43
FURNISH BARRIER ROCKS / BOULDERS	50	EA	\$30.36	\$ 1,518.00		1,518.00		\$ 1,518.00
FURNISH WILLOW CUTTINGS	4225	EA	\$1.25	\$ 5,281.25		5,281.25		\$ 5,281.25
NATIVE GRASS AND FORB SEED	20	LBS	\$16.00	\$ 320.00		320.00		\$ 320.00
CONTAINAIRIZED WETLAND HERBACIOUS PLANTS	300	EA	\$1.60	\$ 480.00		480.00		\$ 480.00
				\$ -				\$ -
				\$ -				\$ -
			Sub-Total	\$ 17,616.64	\$ 4,986.96	\$ 12,629.68	\$ -	\$ 17,616.64
Equipment, Labor, and Mobilization								
MOBILIZATION, ACCESS AND STAGING AREA IMPROVEMENTS	1	EA	\$8,640.00	\$ 8,640.00		8,640.00		\$ 8,640.00
SEDIMENT CONTROL BMPs	1	EA	\$2,760.00	\$ 2,760.00		2,760.00		\$ 2,760.00
FURNISH WOOD AND BRUSH FROM ONSITE	80	HR	\$190.00	\$ 15,200.00	5,000.00	10,200.00		\$ 15,200.00
EARTHWORK (EXCAVTE, LOAD, HAUL AND PLACE ON SITE)	2471	CY	\$12.00	\$ 29,652.00	15,618.12	14,033.88		\$ 29,652.00
CONSTRUCT CHANNEL STREAMBED	112	LF	\$21.32	\$ 2,387.84		2,387.84		\$ 2,387.84
CONSTRUCT LARGE WOOD STRUCTURES	7	EA	\$1,597.14	\$ 11,179.98		11,179.98		\$ 11,179.98
CONSTRUCT LARGE WOOD ARRAYS / AGGREGATES	21	EA	\$792.38	\$ 16,639.98		16,639.98		\$ 16,639.98
CONSTRUCT VEGETATED WOOD MATRIX	719	LF	\$25.36	\$ 18,233.84		18,233.84		\$ 18,233.84
CONSTRUCT CHANNEL- SPANNING LOG ARRAY	4	EA	\$835.00	\$ 3,340.00		3,340.00		\$ 3,340.00
PASSIVE LARGE WOODY DEBRIS	25	EA	\$250.40	\$ 6,260.00		6,260.00		\$ 6,260.00
BERM REMOVAL	193	SQ YD	\$10.29	\$ 1,985.97		1,985.97		\$ 1,985.97
ROAD RECONTOURING	2204	LF	\$6.62	\$ 14,590.48		14,590.48		\$ 14,590.48
ROAD CONSTRUCTION	1885	LF	\$7.64	\$ 14,401.40		14,401.40		\$ 14,401.40
FLOODPLAIN GRADING AND ROUGHNESS TREATMENT	0.25	AC	\$3,500.00	\$ 875.00		875.00		\$ 875.00
WETLAND CONSTRUCTION (SHAPING AND GRADING)	0.3	AC	\$12,534.00	\$ 3,760.20		3,760.20		\$ 3,760.20
WEED MANAGEMENT	3	EA	\$1,877.00	\$ 5,631.00		5,631.00		\$ 5,631.00
INSTALL CONTAINAIRIZED WETLAND HERBACIOUS PLANTS	300	EA	\$3.00	\$ 900.00		900.00		\$ 900.00
				\$ -				\$ -
			Sub-Total	\$ 156,437.69	\$ 20,618.12	\$ 135,819.57	\$ -	\$ 156,437.69
OVERALL TOTALS				\$ 272,055.08	\$ 25,605.08	\$ 240,450.00	\$ 6,000.00	\$ 272,055.08

OTHER REQUIREMENTS:

**For projects that include a maintenance request, it cannot exceed 10% of the total project cost.

***Match can include in-kind materials or labor. Justification for in-kind labor (e.g. hourly rates used) can be noted below. Do not use government salaries as match.

BUDGET TEMPLATE SHEET FOR FUTURE FISHERIES PROGRAM APPLICATIONS

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Additional budget detail:

APPLICATION MATCHING CONTRIBUTIONS				
Total should equal match listed above; do not include requested funds				
CONTRIBUTOR	IN-KIND	CASH	TOTAL	Secured? (Y/N)
Montana Department of Environmental Quality	\$ -	\$ 131,250.00	\$ 131,250.00	Y
Montana Department of Natureal Resources	\$ -	\$ 50,000.00	\$ 50,000.00	Y
USDA Forest Service (new in spring 2026 propsal)	\$ -	\$ 15,000.00	\$ 15,000.00	
Future Fisheries 2025 grant (new in spring 2026 proposal)	\$ -	\$ 44,200.00	\$ 44,200.00	
	\$ -	\$ -	\$ -	
	\$ -	\$ -	\$ -	
	\$ -	\$ -	\$ -	
	\$ -	\$ -	\$ -	
TOTALS	\$ -	\$ 240,450.00	\$ 240,450.00	

OTHER CONTRIBUTIONS				
Total should equal other contributions listed above; these are funds not specically matched to the Future Fisheries application				
CONTRIBUTOR	IN-KIND	CASH	TOTAL	Secured? (Y/N)
Forest Service survey and permitting	\$ 6,000.00	\$ -	\$ 6,000.00	Y
	\$ -	\$ -	\$ -	
	\$ -	\$ -	\$ -	
	\$ -	\$ -	\$ -	
	\$ -	\$ -	\$ -	
	\$ -	\$ -	\$ -	
	\$ -	\$ -	\$ -	
TOTALS	\$ 6,000.00	\$ -	\$ 6,000.00	

Decision Memo

Upper O'Brien Creek Restoration Project

U.S. Forest Service, Lolo National Forest

Missoula Ranger District

Missoula County, Montana



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Background

The proposed Upper O'Brien Creek Restoration Project consists of improvements to O'Brien Creek Road (Forest System Road (FSR) 371) where it interacts negatively with O'Brien Creek, instream habitat improvements in O'Brien Creek, and stabilization of sediment producing "hot spots" in O'Brien Creek and adjacent tributaries. The project area encompasses approximately 1.8 miles along the O'Brien Creek valley bottom and is bounded in width by the slopes that bound the valley. O'Brien Creek is one of the only perennial tributaries to the lower Bitterroot River and is designated bull trout spawning and rearing critical habitat per the US Fish and Wildlife Service. However, past land use in the watershed has degraded watershed function and aquatic species habitat.

The proposed action would mitigate negative road-stream interactions through fill slope stabilization and roadway realignment, thus reducing long-term fine sediment input to O'Brien Creek and improving Lolo National Forest administrative access to the area. At two tributaries, past channelization has led to channel erosion and fine sediment transport to O'Brien Creek. Stabilization of erosive locations would be implemented under the proposed action. The installation of large wood structures (LWS) would increase instream habitat complexity and benefit the species community. LWS can also be used to improve watershed function by promoting connection between stream channels and their floodplains. Improved floodplain connectivity leads to a more robust riparian area adjacent to the stream, improved near-surface aquifer recharge, and nutrient/carbon exchange between streams and floodplains.

Purpose and Need

Based upon the existing condition described above and consistent with the Lolo National Forest Plan direction and its goals, the Interdisciplinary Team identified that the purpose of the Upper O'Brien Creek Restoration project is to:

- Mitigate negative road-stream interactions
- Decrease fine sediment loading into O'Brien Creek
- Improve instream habitat for aquatic species, including potential spawning and rearing habitat for bull trout
- Improve watershed function

Given these purposes, there is a need to stabilize eroding fill slopes and streambanks, realign segments of FSR371, and install large wood structures in O'Brien Creek.

Decision

I have decided to approve the following actions within the Upper O'Brien Creek Restoration Project area:

Four existing segments of road, totaling approximately 2000 feet in length, are proposed to be realigned to mitigate negative effects on aquatic resources. No part of proposed realigned road segments would be further than 300 feet from the existing road location. Where feasible, the realigned road would be constructed on hillslope or terrace features to separate the road from the stream channel, floodplain, and riparian areas. As part of road realignment activities, the existing road prism would be decommissioned between the tie-in locations where the new road segment is

constructed. Road segment decommissioning would involve recontouring the cut/fill slopes to mimic the surrounding (undisturbed) topography, roughened with slash and woody debris, scarified, spread with topsoil salvaged during road realignment activities, and stabilized from erosive stream flows where necessary.

A road segment in the vicinity of the existing USFS gate (approximate coordinates: 46.85037, -114.18758) is currently used as a turn-around. This segment is compromised by a retreating, unstable streambank. At this location the road would be realigned by cutting into the adjacent hillside and the existing road fill slope would be laid back and stabilized to prevent further erosion and retreat. The gate at this location would be moved no more than 200 feet up or down the road such that the proposed gate placement meshes with existing land management direction while serving as an effective blockade for unauthorized motorized access.

LWS would be installed in the O'Brien Creek channel at locations where instream habitat complexity is lacking, or to enhance floodplain connectivity. Specific locations and the number of structures have not been determined and would be based on pool spacing in undisturbed systems. LWS could be installed by mechanical means (i.e. heavy equipment) or by hand-felling (i.e. sawyers with chainsaws) depending on the ease and level of disturbance associated with accessing the desired locations. If installed mechanically, access routes would be naturalized and decommissioned after use by decompacting the soil and applying large wood debris and native transplants as opportunities arise. Wood for the LWS would be sourced from clearing the road realignment segments and opportunistically on site with input from forest silviculture and fuels staff.

Along an unnamed, perennial tributary to O'Brien Creek (approximate location: 46.84990, -114.21617) a remnant berm adjacent to the stream would be removed to allow the stream to flow into a clearing where past surface water flow is evidenced by relict channel forms on its surface. By promoting streamflow into the relict channels, the area would change from a "high and dry" clearing colonized by noxious weeds into a plant community associated with wet meadow ecosystems. Within this area the existing roadway would be regraded to improve drainage and prevent the roadway from becoming inundated during high water.

At another unnamed, intermittent tributary to O'Brien Creek (approximate location: 46.84966, -114.22342) a headcut¹ is propagating up a channel and producing fine sediment that is transported into O'Brien Creek. This headcut would be stabilized by re-grading the channel at the progressing front of the headcut and placing large wood debris to increase channel roughness.

At locations where O'Brien Creek is actively eroding into existing road fill slopes, and road realignment is not a feasible option, the streambanks/fill slopes would be stabilized. Stabilization methods would be "biotechnical" in nature by utilizing native rock, wood, and transplanted vegetation to provide stability while promoting a natural aesthetic.

Additionally, resource protection measures as listed below are incorporated into this decision for implementation.

¹ A headcut is an erosional feature characterized by a lowering in the streambed elevation at a starting point that progresses upstream, forming a deeper gully.

- Engineering: Lolo National Forest Engineering has participated in the development of the proposal regarding road realignment and will be consulted as necessary through implementation.
- Fisheries and Hydrology: All in-stream work will be conducted during low flow within the fish window (July 15 – September 1).

De-watering will occur within project area during implementation. Work areas will be isolated using clearwater bypass channels and cofferdams to control sediment. Cofferdams will be constructed with bulk bags, sandbags, or approved alternative material. Bulk bags will be carefully placed to ensure no tearing or cutting of the bag(s) occurs, and post-treatment removal is possible.

Revegetation of riparian area will occur for locations disturbed during implementation. Equipment will perform work from existing road prism to mitigate disturbance to the extent possible. Disturbed areas will be stabilized and revegetated with native materials sourced in-situ (i.e. salvaged woody debris, alder, willow, dogwood transplants, native seed mixture).

- Fuels: NA
- Recreation: Work ideally would occur during the summer months prior to big game hunting season. Coordinate with line officer, recreation, and public affairs on road closures. Perform any needed gate repair/maintenance and add any kiosks or signs needed for protection of the area.
- Soils: Plan activities and use appropriate equipment to minimize new soil disturbance (loss of soil cover, rutting, compaction, displacement of topsoil) from heavy equipment and vehicle traffic.

Heavy equipment travel off of roads will be on dry soils. Preference will be for travel on existing disturbed areas where available.

Soils disturbed during project activities will be rehabilitated to provide for effective drainage, ground over, revegetation, and erosion prevention. Compacted soils will be decompacted to depth of compaction, emphasizing lifting and fracturing (not deep mixing) A lighter scarification method may be applicable in less compacted or very rocky areas.

Continuous ruts will be removed and displaced topsoil recovered.

Ground cover will be restored using available slash, coarse woody debris, litter and other on-site organic material.

Disturbed soils will be seeded or planted when needed to assure successful revegetation.

- Botany: If new occurrences of federally listed or Region 1 sensitive plants are detected within the project area, the botanist would be contacted immediately so protective measures may be prescribed. This could include buffers or timing restrictions.
- Weeds: Follow Lolo National Forest 2007 Weeds FEIS, USDA – FOREST SERVICE Guide to Noxious Weed Prevention BMPs to comply with Executive Order 13751 (amended EO 13112) and the Lolo Forest Plan, as amended in 1991 (Forest-wide standard 59):

Apply the following project design features to prevent/reduce undesirable effects from the proposed management activities:

- ◆ Incorporate weed prevention and control into project layout, design, alternative evaluation, and project decisions.
 - Determine prevention and maintenance needs, to include the use of herbicides, if needed, at the onset of project planning.
 - Clean contracted and Forest Service motorized equipment before it is moved into the project area to removed weed seed, mud, or other debris that might contain noxious weed seeds.
- ◆ Minimize roadside sources of weed seed that could be transported to other areas.
- ◆ Schedule and coordinate blading or pulling of noxious weed-infested roadsides or ditches in consultation with the local weed specialist. Do not blade or pull roadsides and ditches that are infested with noxious weeds unless doing so is required for public safety or protection of the roadway.

Monitor project footprint for a minimum of three years after implementation is completed and treat noxious/invasive weeds as needed on areas impacted by ground disturbing operations.

- **Wildlife:** Anyone working in grizzly bear habitat will adhere to bear country safety protocols, including measures to avoid providing attractants and minimize potential for conflicts and disturbance to bears, and will comply with applicable attractant storage orders. No seeding or planting of species palatable to grizzly bears will occur. Grizzly bear sightings and/or incidents will be reported to the appropriate action agency office within 48 hours.
- **Heritage:** Please notify the Lolo National Forest Heritage Program if any cultural resources are located during project implementation.
- **Minerals:** NA
- **Timber:** NA
- **Visuals:** NA

Public Involvement and Issues

The Forest Service partnered with the Clark Fork Coalition to develop this proposal. On February 9th, 2024, a scoping letter was sent to nearby landowners, interested parties, and organizations who have requested notification about this type of project. In addition, this project was listed on the Schedule of Proposed Actions, which is posted on the Lolo National Forest website. The scoping period ended on February 22nd, 2024. Comments received were supportive of the proposed action, however several commentors mentioned the negative road-stream interactions occurring on O'Brien Creek Road. This section of road is downstream of the project area and is the jurisdiction of Missoula County. The Lolo National Forest is committed to working with Missoula County to mitigate the negative impacts occurring along this stretch of O'Brien Creek Road. Additionally, commentors mentioned that lack of clear signage and maps at 122/123 O'Brien Loop Trailhead and gate on FSR 371. The Lolo National Forest is committed to working with our partners to improve signage at these locations.

Reasons for Categorically Excluding the Action

Forest Service resource specialists reviewed this project to evaluate potential environmental effects and to determine whether any extraordinary circumstances exist. Public comments and the environmental review completed by the Forest Service were used to make the final determination on whether the Upper O'Brien Creek Restoration Project may be categorically excluded. It is my determination that this project may be categorically excluded from documentation in an Environmental Assessment or an Environmental Impact Statement because the proposed actions fit within the following categorical exclusion from the Code of Federal Regulations (Title 36, Chapter II, Part 220):

- 36 CFR 220.6(e)(25): Forest and grassland management activities with a primary purpose of meeting restoration objectives or increasing resilience. Activities to improve ecosystem health, resilience, and other watershed and habitat conditions may not exceed 2,800 acres.
 - i. Activities to meet restoration and resilience objectives may include, but are not limited to:
 - A. Stream restoration, aquatic organism passage rehabilitation, or erosion control;
 - B. Invasive species control and reestablishment of native species;
 - C. Prescribed burning;
 - D. Reforestation;
 - E. Road and/or trail decommissioning (system and non-system);
 - F. Pruning;
 - G. Vegetation thinning; and
 - H. Timber harvesting.
 - ii. The following requirements or limitations apply to this category:
 - A. Projects shall be developed or refined through a collaborative process that includes multiple interested persons representing diverse interests;
 - B. Vegetation thinning or timber harvesting activities shall be designed to achieve ecological restoration objectives, but shall not include salvage harvesting as defined in Agency policy; and
 - C. Construction and reconstruction of permanent roads is limited to 0.5 miles. Construction of temporary roads is limited to 2.5 miles, and all temporary roads shall be decommissioned no later than 3 years after the date the project is completed. Projects may include repair and maintenance of NFS roads and trails to prevent or address resource impacts; repair and maintenance of NFS roads and trails is not subject to the above mileage limits.

During initial public scoping, multiple categorical exclusion authorities were recommended to encompass the road realignment and stream habitat restoration activities proposed. However, 220.6(e)(25) (listed above) covers all activities proposed in this project, and the project meets the requirements and limitations listed in part (ii) of the CE authority.

The following resource conditions were evaluated as part of our analysis with reports available in the project record.

- Federally listed threatened or endangered species or designated critical habitat, species proposed for Federal listing or proposed critical habitat, or Forest Service sensitive species.

- ◆ Plants – There are no known occurrences of threatened or endangered plant species in the project area or suitable habitat. The project is likely to have beneficial impacts to rare plant habitat by restoring natural stream functioning. Regarding, endangered, threatened, or sensitive plants, no extraordinary circumstances exist.

Federally Listed Species: There are no known Threatened or Endangered plants present in the project area. Forest specialists have determined that whitebark pine is not present within the project area and there is no modeled habitat for whitebark pine in the project area. Therefore, there will be no effect to any listed threatened or endangered species.

Forest Service Sensitive Species: A determination of no impact to sensitive plant species has been made, except for Colville Indian paintbrush, western snakeroot, clustered lady's slipper, rareflower heterocodon, and western joe-pye weed, for which the project may impact individuals or habitat but is not likely to result in a trend toward federal listing or loss of viability to population or species.

- ◆ Wildlife – A determination of “may affect, not likely to adversely affect” has been made for grizzly bear. A No Effect/Impact determination has been made pertaining to all other federally listed threatened and endangered species, designated critical habitat, or species proposed for listing or proposed critical habitat. A determination of No Impact has been made pertaining to sensitive species of the Lolo National Forest except for gray wolf, northern bog lemming, townsend's big eared bat, boreal toad, and northern leopard frog, for which a determination of “may impact individuals or habitat” has been made. Regarding wildlife, no extraordinary circumstances exist.
- ◆ Fisheries – A determination of No Impact has been made for western pearlshell mussel, and a determination of May Impact Individuals or Habitat has been made for westslope cutthroat trout. A determination of May Affect, Likely to Adversely Affect has been made for bull trout and bull trout critical habitat. O'Brien Creek does not currently support resident or migratory bull trout, but critical habitat is present. Impacts will be short in duration and concentrated in limited, discrete locations. The actions are unlikely to result in long-term negative effects and are likely to result in long-term benefits for multiple primary constituent elements for bull trout habitat as the project will overall restore proper function and health to O'Brien Creek. Lolo National Forest Fisheries Biologists have consulted with the US Fish & Wildlife Service and support the finding that potential impacts to threatened or sensitive aquatic species and critical habitat do not constitute the existence of an extraordinary circumstance.
- Flood plains, wetlands, or municipal watersheds – While the proposed action involves short-term disturbances to stream channels and floodplains, the long-term effects will be beneficial to watershed functions. O'Brien Creek is not within a municipal watershed, and therefore no extraordinary circumstances exist.
- Congressionally designated areas such as wilderness, wilderness study areas, or national recreation areas – The project area is not within or adjacent to a wilderness area, wilderness study area, or a national recreation area, and therefore no extraordinary circumstances exist.
- Inventoried roadless areas or potential wilderness areas – There are no inventoried roadless areas or potential wilderness areas within or adjacent to the project area, and therefore no extraordinary circumstances exist.

- Research natural areas – There are no research natural areas in or near the project area, and therefore no extraordinary circumstances exist.
- American Indians and Alaska Native religious or cultural sites - There are no known sites in the proposed area. If unknown sites were encountered during implementation, these sites would be subject to appropriate Tribal Historic Preservation Officer review and comment, as per the 36 CFR 800 compliance process.
- The proposed project would cause no effect to historic properties (36 CFR 800.4(d)(1)). No field survey is required due to the nature of the proposed project, sufficiently adequate previous survey and inventory, and low potential for cultural resources within the area of potential effects.

Table 1: TEPC Effect Determinations for the Endangered Species Act

Species/Habitat	Status	Proposed or Designated Critical Habitat Present?	Determination*	Brief Rationale
Canada Lynx (Lynx canadensis)	Threatened	no	NE	Outside lynx LAU, not within lynx habitat, outside linkage area
Grizzly Bear (Ursus arctos horribilis)	Threatened	yes	NLAA	See Bull Trout Restoration Programmatic Form
Yellow-billed Cuckoo (Coccyzus americanus)	Threatened	no	NE	See Bull Trout Restoration Programmatic Form
Monarch butterfly (Danaus plexippus)	Candidate	no	NE	No habitat present
Bull Trout (Salvelinus confluentus) and Bull Trout Critical Habitat.	Threatened	yes	LAA	See Fisheries BA/BE Form
Whitebark pine (Pinus albicaulis)	Threatened	no	NE	No habitat present
Wolverine (Gulo gulo luscus)	Proposed-Threatened	yes; male dispersal habitat	NE	See Biological Assessment

*NE = No Effect; NLAA = Not Likely to Adversely Affect; LAA = Likely to Adversely Affect

Table 2: Summary of Biological Determinations for Sensitive Species

Species/Habitat	Determination*	Brief Rationale
Bald Eagle	NI	No habitat affected
Bighorn Sheep	NI	No habitat affected
Black-backed woodpecker	NI	No habitat affected
Coeur d'Alene salamander	NI	No habitat affected

Species/Habitat	Determination*	Brief Rationale
Common Loon	NI	No habitat affected
Fisher	NI	No habitat affected
Flammulated Owl	NI	No habitat affected
Gray Wolf	MIIH	No habitat affected but individuals could experience some temporary disturbance during project actions
Harlequin Duck	NI	No habitat affected
Northern Bog Lemming	MIIH	Species may be present during season of project
Northern Leopard Frog	MIIH	Species present during season of project
Peregrine Falcon	NI	No habitat affected
Townsend's big-eared bat	MIIH	No habitat affected but actions could occur during feeding so there may be very limited disturbance
Boreal Toad	MIIH	Species present during season of project
Westslope cutthroat trout	MIIH	Instream work may have short-term impacts to population and habitat
Western Pearlshell Mussel	NI	Species not present in the project area

*NI =No Impact; MIIH = May Impact Individuals or Habitat, But Will Not Likely Contribute To A Trend Towards Federal Listing Or Loss Of Viability To the Population Or Species; WIH = Will Impact Individuals Or Habitat With A Consequence That The Action May Contribute To A Trend Towards Federal Listing Or Cause A Loss Of Viability To the Population Or Species

Table 3: Summary of Biological Determinations for Indicator Species

Species/Habitat	Effect on species or habitat	Brief Rationale
Northern Goshawk	no	No suitable habitat present
Elk	yes	There are no anticipated effects to this species beyond some potential noise disturbance
Pileated Woodpecker	no	No suitable habitat present

Findings and Consistency with Laws, Regulation, and FS Policies

National Forest Management Act (Consistently with the Lolo Forest Plan)

The authorized actions are consistent with the standards and guidelines as determined in the Lolo National Forest Plan (USDA Forest Service, 1986). The purpose of the project is to enhance aquatic habitat and contribute to the recovery of bull trout to a non-threatened status (Forest Plan, pages II-13 to 14). Best management practices will be applied to assure that water quality is maintained at a level that is adequate for the protection and use of the National Forest and that meets or exceeds Federal and State standards (Forest Plan, page II-12). The project was designed to have minimum adverse impacts on the aquatic ecosystem and will not cause permanent or long-term unnatural stress (Forest Plan, page II-14).

No effects to Lolo National Forest Management Indicator Species (MIS) were identified in our analysis. This project meets requirements found in, but not limited to, the National Forest Management Act, the Endangered Species Act, the Clean Water Act, and the National Environmental Policy Act.

ENDANGERED SPECIES ACT

The purpose of this project is to improve habitat for bull trout, a listed Threatened species. Consistent with Section 7 of the Endangered Species Act, consultation with the U.S. Fish and Wildlife Service was completed. The USFWS determined that project activities will likely result in incidental take of bull trout in the form of harm, harassment or mortality related to the expected short-term degradation of aquatic habitat parameters because of increased levels of activity generated sediment. Sediment from associated project activities is anticipated to have short-term adverse effects and likely result in mortality to some individuals during the juvenile and sub-adult life history stages by harming or impairing feeding and sheltering patterns of bull trout.

Biological Evaluations/Biological Assessments for threatened, endangered and sensitive terrestrial and aquatic species and their proposed or designated critical habitat are contained within the Project File and the findings are summarized in section *V – Reasons for Categorically Excluding the Action*, within this document.

NATIONAL HISTORIC PRESERVATION ACT (NHPA) – SECTION 106 REVIEW

A Forest Service archaeologist has reviewed the site and determined there will be no impacts to heritage resources. This action is consistent with Forest Plan direction and Section 106 of the National Historic Preservation Act.

TRIBAL CONSULTATION

Based on the nature of the proposal, the Line Officer/responsible official made the following determination regarding Tribal Consultation: Consultation with American Indian Tribes is not needed. A scoping letter was sent to the Confederated Salish and Kootenai Tribes and Nez Perce Tribe. No comments were received.

CLEAN WATER ACT (CWA)

Best management practices and required mitigation measures will be used to minimize impacts to water quality. All necessary permits will be obtained prior to implementation. Thus, this project is consistent with the Clean Water Act and State water quality laws.

Implementation

This project is not subject to administrative review procedures (appeal/objection process). For specific project information, please contact Traci Sylte, Soil and Water Program Manager at 24 Fort Missoula Road, Missoula, MT 59804, 406-329-3750; or by email at traci.sylte@usda.gov.

Crystal Stonesifer
Missoula District Ranger

Date



United States
Department of
Agriculture

Forest Service

Lolo Nat'l Forest
Missoula Ranger
District

Bldg. 24 Fort Missoula Rd.
Missoula, MT 59804
(406) 329-3814

Date: October 30, 2025

C/O Michelle McGree
P.O Box 200701
1420 E. 6th Avenue
Helena, MT 59620

Dear Ms. McGree,

The Lolo National Forest supports the Clark Fork Coalition's grant application for the Upper O'Brien Stream Restoration Project. The Clark Fork Coalition is applying for grant funds from the Future Fisheries Improvement Program to work with the US Forest Service to improve spawning and rearing habitat for trout, reduce sediment loading, and restore floodplain connectivity. Furthermore, the strategic road and gate realignment would provide permanent benefits not only to O'Brien Creek, but to road infrastructure and public safety as well.

The Clark Fork Coalition and the Lolo National Forest have been working on cooperative restoration projects for several years, including upsizing AOP culverts, installing large wood jams, and decommissioning roads and stream crossings. The CFC has also worked on establishing temperature monitoring stations, collecting stream discharge data for instream flow management, and monitoring beaver activity on the Lolo National Forest.

The Clark Fork Coalition and the Lolo National Forest have a track record of proven success and are now continuing the partnership with the Upper O'Brien Steam Restoration Project. Funds from the Future Fisheries Improvement Program are essential to completing on-the-ground aquatic restoration projects.

Thank you for the funding opportunity and your continued work for the conservation of natural resources. Please do not hesitate to contact me at crystal.s.stonesifer@usda.gov if you have any questions.

Sincerely,

Crystal Stonesifer
Missoula District Ranger



Caring for the Land and Serving People

MONTANA FISH, WILDLIFE & PARKS

Future Fisheries Improvement Program

Appendix: FWP Statement

Project Title: Upper O'Brien Creek Restoration Project – Clark Fork Coalition

Please describe the potential impact of the project, including the priorities of the Fisheries Division and the importance to Montana's anglers.

The proposed project is planned on upper O'Brien Creek, a small tributary of the lower Bitterroot River located just outside Missoula. This stream is the only perennial tributary between Lolo and the river mouth. The stream is a key spawning and rearing area for migratory trout that support the fishery in that river reach and the Clark Fork River located just downstream.

O'Brien Creek supports a mixed salmonid fish community that varies in composition longitudinally. The lower end of the stream is dominated by various non-native trout species and mountain whitefish, while upper reaches (where this project is proposed) transition to predominantly westslope cutthroat trout (WCT) with higher genetic purity (> 95% WCT contribution).

The proposed project is planned for upper reaches of O'Brien Creek on USFS lands. This project was conceived more than 20 years ago by aquatic resource and land managers as numerous enhancement actions on private and public lands were being implemented in other lower and middle stream reaches (e.g., riparian fencing, fish passage improvements, channel reconstruction, instream flow conservation etc). The proposed project addresses instream habitat deficiencies, water quality impacts, and road encroachment that are a logical extension of past projects (many of which were funded through FFIP) and focus more on stream sections supporting native WCT.

The project design concepts were developed collaboratively among public resource managers, NGO project sponsors (CFC), and private consultants to address pervasive limiting factors. In terms of anticipated fisheries benefits, the large-scale addition of LWD and cover will address obvious deficiencies in habitat complexity and surely increase fish abundance based on FWP monitoring of similar projects. Other listed objectives and benefits (e.g. water quality and floodplain) are expected to provide indirect fisheries benefits as well through enhanced overall stream and floodplain health.

Name of FWP Biologist W. Ladd Knotek Date: 11/7/2025

Please attach to the FFIP application and materials and submit according to listed deadlines.

Upper O'Brien Stream Restoration Implementation Project

Lolo National Forest

26



25


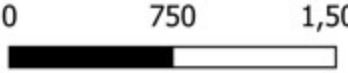
O'Brien Creek

↑
Start of Project:
46.84839, -114.22398

35

36

-  Streams
-  Section lines
- Google Satellite

0 750 1,500 ft

Upper O'Brien Stream Restoration Implementation Project

Lolo National Forest

End of Project:
46.850273 -114.186882

O'Brien Creek

Streams
Section lines
Google Satellite



0 750 1,500 ft



Upper O'Brien Creek Restoration – Photos



Figure 1. O'Brien Creek is eroding the stream-side roadbed at several locations. This picture shows an actively eroding section of roadbed the at the beginning of the restoration reach. The road will be re-located away from the stream, and vegetated wood matrix and large wood structures will be installed creating an inset floodplain.



Figure 2: O'Brien Creek has simplified habitat with little in-stream wood. At least 31 large wood array / aggregates will be installed along the restoration reach.



Figure 3: Another example of overly simplified aquatic habitat devoid of wood and complexity.



Figure 4: Bank erosion is severe at several sections of the creek. They will be treated with vegetated wood matrix and large wood structures creating inset floodplains.



Figure 5: Another example of an actively eroding bank that will be treated.