MILL CREEK 5 BAR 6 RANCH STREAM RESTORATION AND HABITAT IMPROVEMENT

Application to the Future Fisheries Improvement Program Grant
November 15, 2024

TROUT UNLIMITED

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FUTURE FISHERIES IMPROVEMENT PROGRAM GRANT APPLICATION

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

I. APPLICANT INFORMATION

A. Applicant Name: Ashley Brubaker, Trout Unlimited

Mailing Address: 321 E Main St. Ste. 411

City: Bozeman State: Montana Zip: 59715

Telephone: (303)915-9282 E-mail: Ashley.brubaker@tu.org

B. Contact Person (if different than applicant):

Address:

City: State: Zip:

Telephone: E-mail:

C. Landowner and/or Lessee Name (if different than applicant): Hunter Terry

Mailing Address: 14300 Flaming Arrow RD

City: Bozeman State: MT Zip: 59715

Telephone: (406)210-9176 E-mail: The5bar6ranch@gmail.com

II. PROJECT INFORMATION

A. Project Name: Mill Creek 5 Bar 6 Restoration Phase II

River, stream, or lake: Mill Creek

Location: Township: T06 Range: R09 Section: S13

Latitude: 45.31749 Longitude: -110.56843 *Within project (decimal degrees)*

County: Park County

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

The proposed project seeks to improve habitat, spawning grounds, and fishing opportunities for native Yellowstone cutthroat trout and wild fish through increasing floodplain connection and in-channel complexity along a one-mile stretch of Mill Creek. The project will remove a berm built along both sides of the channel through the 5 Bar 6 Ranch that currently confines the channel, cuts off access to the floodplain during high flows, and prevents side channel formation. Mature conifers growing on the berm will be salvaged and used to form log jams along the channel margins. The proposed project is Phase II of the ongoing Mill Creek 5 Bar 6 Restoration project, Phase I of the project was completed in September, 2024.

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

Mill Creek is a major tributary to the Yellowstone River with its confluence near the town of Pray, in Paradise Valley, Park County, MT. Mill Creek is one of the remaining Yellowstone cutthroat trout (YCT) strongholds outside of Yellowstone National Park. Despite its importance to native fish, a legacy of land use has left certain reaches of Mill Creek in a degraded condition. Approximately seven miles upstream of its confluence with the Yellowstone River, Mill Creek flows through the 5 Bar 6 Ranch for 2.5 miles. The project area is on the 5 Bar 6 Ranch in a relatively broad valley in which Mill Creek was confined to its westernmost channel by earthen berms, cutting it off from its historic floodplain to increase grazing acreage by a previous landowner. Throughout the 5 Bar 6 Ranch Mill Creek lacks large wood and log jams, likely from historic removal. As a result of these anthropogenic alterations, the project reach lacks channel complexity and secondary channels, reducing the capacity for the reach to support YCT.

This project proposes to breach the historic berm in strategic locations on the east and west banks of Mill Creek to restore floodplain connectivity, allow side channel formation, and restore natural meadow and stream function through an ecologically important meadow reach of Mill Creek that is also a popular fishing reach. The project will use trees salvaged from the removed berms to build log jams to create fish habitat, prevent excess bank erosion, and encourage water onto the floodplain. Reconnecting Mill Creek to its historic floodplain will restore natural processes and promote long-term stream health. Reconnection will stimulate riparian plant growth, which will provide shade to protect cold water temperatures, reduce the power of high spring flows, and support the accumulation of spawning gravels in the project reach. This project is the second phase of a larger restoration project that will restore floodplain connection, increase habitat complexity, and recruit spawning gravels through the 5 Bar 6 Ranch, ultimately restoring natural stream function and improving habitat along two miles of Mill Creek on private and public land.

The proposed project uses a process-based approach to improving conditions in Mill Creek by mitigating historic channel alterations and restoring natural stream function. Installed wood structures will mimic log jams that would naturally occur without the historic large wood removal from the channel, and breaching berms built to confine the channel will allow the stream renewed access to the floodplain, restoring essential components of natural channel function through important meadow reaches of the stream. Reconnecting Mill Creek to its floodplain and side channels will decrease localized stream velocity and encourage wood and gravel deposition. Floodplain reconnection and side channel formation will help raise the local water table and encourage the growth and re-establishment of a robust riparian corridor throughout the project area which will shade and cool the stream, prevent channel incision and erosion, and create complex habitat.

Mill Creek is one of the largest and most important sub-watersheds in the Upper Yellowstone basin, and TU, Montana Fish, Wildlife & Parks (FWP), and the Custer Gallatin National Forest (CGNF) are taking a multi-pronged approach to protecting and restoring the YCT population and the creek itself. To support the success of these projects TU is working with FWP to conduct brook trout mechanical removal from a small meadow spring creek within the downstream portion of the 5 Bar 6 restoration project reach to improve habitat availability for YCT. Approximately seven miles upstream from the 5 Bar 6 project, TU is working with the CGNF and FWP to construct a fish barrier to protect a genetically unaltered population of YCT in the Mill Creek headwaters from hybridization with and competition from non-native trout. Downstream, TU is working to restore year-around flow to lower Mill Creek, which is routinely dewatered during irrigation season when irrigation demand often exceeds water supply, exposing YCT redds and desiccating eggs and juvenile fish. The 5 Bar 6 restoration project is a critical piece of this basin-wide portfolio of restoration activities underway to protect and restore the YCT population in Mill Creek.

Construction for the proposed Phase II of the 5 Bar 6 Mill Creek Restoration project is scheduled to begin in summer 2025 and will be completed in stages through fall 2026.

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

Aerial imagery from 1949 shows Mill Creek at the project site as a multi-threaded channel occupying the entire valley bottom (map 2). By 1965 the creek had been confined to a single channel pushed to the westernmost edge of the valley in essentially the same configuration seen today (map 3). It is likely that this change to the stream was implemented to create more valley bottom land available for agricultural uses such as pasture and/or hay fields. Some of this land is still used as pasture for a small herd of highland cattle and yacks, so TU is not proposing to return the stream to the configuration seen in the 1949 imagery, but to find a balance that restores stream functions currently lost due to floodplain disconnection.

Additionally, the lack of large wood and instream habitat complexity within this reach indicates that wood has likely been removed and the stream channel simplified. To address these issues the project will salvage mature conifers from the removed berms and use them to create instream log jams. This will increase in-channel complexity and improve instream habitat for YCT and other wild trout.

E. Length of stream or size of lake that will be treated (project extent): 1 Mile

Length/size of impact, if larger than project extent (e.g., stream miles opened): _____

F. Project Budget Summary:

Grant Request (Dollars):	**$**	**86,920**
Matching Dollars:	**$**	**10,000**
Matching In-Kind Services:*	**$**	**35,000**

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

Other Contributions (not used as match)	**$**	**142,850**
Total Project Cost:	**$**	**274,770**

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

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

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

I. Attach project plans:

- [x] Detailed sketches or plan views with the location and proposed restoration
- [x] Pre-project photographs (GPS location strongly recommended)
- [n/a] 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:

Project partners include the 5 Bar 6 Ranch, Montana Fish, Wildlife & Parks, and the Custer Gallatin National Forest. A landowner letter of support is included on page 11.

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 [x] No [ ]

**If it is a water leasing project, describe the length of the agreement.*

Since this project is restoring natural processes, it should be self-maintaining. The ranch managers and TU will monitor this project and will address any issues that may arise.

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.*

The landowner maintains a small mixed herd of approximately 15 highland cattle and yaks, and a herd of 12 horses. These animals are rotated through four pastures throughout the year, one of which is adjacent to the proposed project location (Map 1). The low density of livestock and ability to move them throughout the year ensures they do not negatively impact the stream, and no negative impact from livestock has been observed along the stream through the 5 Bar 6 property. Post-project livestock impact to the stream will be monitored by the ranch managers and TU, if it appears that livestock are impacting the restored stream reach action will be taken to reduce the impacts including permanent or temporary fencing, construction of off-channel water sources, or decreasing time in the project-adjacent pasture.

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?

This project will be monitored to ensure project success. A monitoring plan will be completed as part of the final design and permitting process and will include a minimum of annual photo monitoring points to monitor the project, as well as on-the-ground observations by TU, consultant staff, and the ranch managers. Pre-project photos are included in the design sheets. All information will be shared with FWP.

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

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

The intent of this project is to improve habitat and spawning grounds for Yellowstone cutthroat trout. Wild rainbow trout also occupy this stream and will benefit from the improved habitat conditions.

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

Protecting and restoring cold-water habitat is an important step to ensure the long-term viability of YCT in the Yellowstone River watershed. By improving YCT habitat and reconnection to the floodplain, the 5 Bar 6 Ranch restoration project will preserve and improve YCT populations in Mill Creek. Floodplain connection and constructed log jams will increase in-channel and habitat complexity, leading to increased number of slow-water holding areas and refuge from high flows, increased sediment sorting to increase the amount of suitable spawning gravels, improved riparian vegetation shading the channel and adding inputs of terrestrial insects, leaves, and nutrients.

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

By increasing spawning and rearing habitats, this project is expected to increase the fish population in Mill Creek over the long term. Because sediment deposition and sorting largely takes place during spring high flows, spawning areas will not increase substantially immediately, but will likely need several runoff cycles. Habitat and flow complexity will increase immediately post-project completion, so improved rearing and holding habitat will improve in the short term and continue to improve into the long term as the log jams catch more debris and increase in size, and as localized flow complexity creates scour pools and depositional areas.

Improved habitat conditions should lead to improved angler success through this popular fishing reach.

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.

Due to a Forest Service easement across the private land and adjacent National Forest, this stretch of Mill Creek is a very popular fishing destination (Map 1). The opportunity to fish for a Yellowstone cutthroat trout does not happen just anywhere, and outside of Yellowstone National Park, Mill Creek is one of the most popular fishing destinations for anglers hoping to catch a YCT in Montana. By improving habitat for YCT we hope to ensure that Mill Creek remains a prime location to catch these fish long into the future.

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

While protecting and improving the YCT fishery in Mill Creek is the driver behind this project, that will not be the only benefit. Improved floodplain connection has proved to have numerous benefits ranging from improved bird, bat, and mammal habitat, increased water table height, improved riparian vegetation leading to increased stream shading, bank stability, and decreased flood strength through energy dissipation on the floodplain.

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

This project will not interfere with water of property rights of adjacent landowners.

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

This project will not result in the development of commercial recreational use on the site.

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

This project is not associated with the reclamation of past mining activity.

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: 11/15/2024

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

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**
**Units = feet, hours, cubic yards, etc. Do not use lump sum unless necessary.*								
Personnel								
Survey	0			$ -				$ -
Design	36	hours	$170.00	$ 6,120.00	6,120.00			$ 6,120.00
Engineering	96	hours	$150.00	$ 14,400.00		10,000.00	4,400.00	$ 14,400.00
Permitting	128	hours	$150.00	$ 19,200.00	10,200.00		9,000.00	$ 19,200.00
Oversight	148	hours	$170.00	$ 25,160.00			25,160.00	$ 25,160.00
Maintenance**	0			$ -				$ -
			Sub-Total	$ 64,880.00	$ 16,320.00	$ 10,000.00	$ 38,560.00	$ 64,880.00
Travel								
Mileage	2600	miles	$0.67	$ 1,742.00			1,742.00	$ 1,742.00
Per diem	0			$ -				$ -
			Sub-Total	$ 1,742.00		$ -	$ 1,742.00	$ 1,742.00
Construction Materials								
Logs	2000	each	$21.75	$ 43,500.00		35,000.00	8,500.00	$ 43,500.00
Wooden Posts	4000	each	$8.50	$ 34,000.00			34,000.00	$ 34,000.00
Cobble	3000	CY	$10.00	$ 30,000.00			30,000.00	$ 30,000.00
Slash	440	CY	$5.00	$ 2,200.00			2,200.00	$ 2,200.00
Willow Cuttings	2000	each	$2.00	$ 4,000.00			4,000.00	$ 4,000.00
				$ -				$ -
				$ -				$ -
				$ -				$ -
			Sub-Total	$ 113,700.00	$ -	$ 35,000.00	$ 78,700.00	$ 113,700.00
Equipment, Labor, and Mobilization								
LWD Feature Installation	1600	hours	$36.00	$ 57,600.00	37,600.00		20,000.00	$ 57,600.00
BDA Feature Installation	200	volunteer hours	$19.24	$ 3,848.00			3,848.00	$ 3,848.00
Excavator	160	hours	$125.00	$ 20,000.00	20,000.00			$ 20,000.00
Dump Truck	40	hours	$100.00	$ 4,000.00	4,000.00			$ 4,000.00
Bulldozer	40	hours	$100.00	$ 4,000.00	4,000.00			$ 4,000.00
Mobilization	0.5	5% of const.	$10,000.00	$ 5,000.00	5,000.00			$ 5,000.00
								$ -
								$ -
				$ -				$ -
				$ -				$ -
				$ -				$ -
			Sub-Total	$ 94,448.00	$ 70,600.00	$ -	$ 23,848.00	$ 94,448.00
			OVERALL TOTALS	$ 274,770.00	$ 86,920.00	$ 45,000.00	$ 142,850.00	$ 274,770.00

BUDGET TEMPLATE SHEET FOR FUTURE FISHERIES PROGRAM APPLICATIONS

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.

Additional budget detail:

APPLICATION MATCHING CONTRIBUTIONS

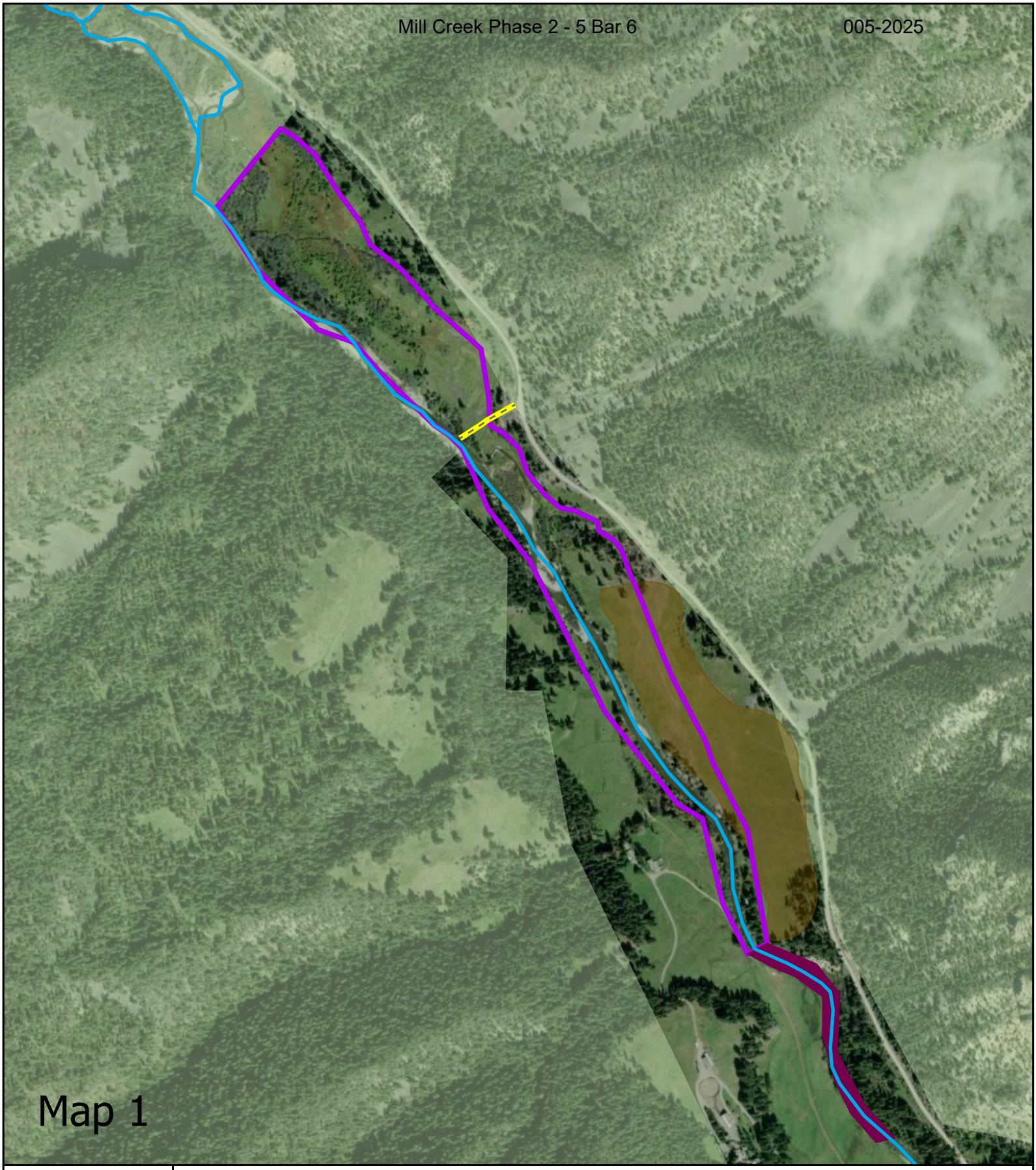
Total should equal match listed above; do not include requested funds

CONTRIBUTOR	IN-KIND	CASH	TOTAL	Secured? (Y/N)
Western Native Trout Initiative	$ -	$ 10,000.00	$ 10,000.00	Y
Landowner	$ 43,500.00	$ -	$ 35,000.00	Y
	$ -	$ -	$ -	
	$ -	$ -	$ -	
	$ -	$ -	$ -	
	$ -	$ -	$ -	
	$ -	$ -	$ -	
	$ -	$ -	$ -	
TOTALS	$ 43,500.00	$ 10,000.00	$ 45,000.00	

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)
Landowner	$ 44,700.00	$ -	$ 44,700.00	Y
Landowner	$ -	$ 45,000.00	$ 45,000.00	N
Volunteer Hours	$ 3,848.00	$ -	$ 3,848.00	N
Trout Unlimited Grant	$ -	$ 15,000.00	$ 15,000.00	N
Trout Unlimited Chapter Contributions	$ -	$ 24,302.00	$ 24,302.00	N
Cooperative Watershed Management Grant, Bureau of Reclamation	$ -	$ 10,000.00	$ 10,000.00	Y
	$ -	$ -	$ -	
	$ -	$ -	$ -	
TOTALS	$ 48,548.00	$ 94,302.00	$ 142,850.00	



Mill Creek 5 Bar 6 Restoration Project

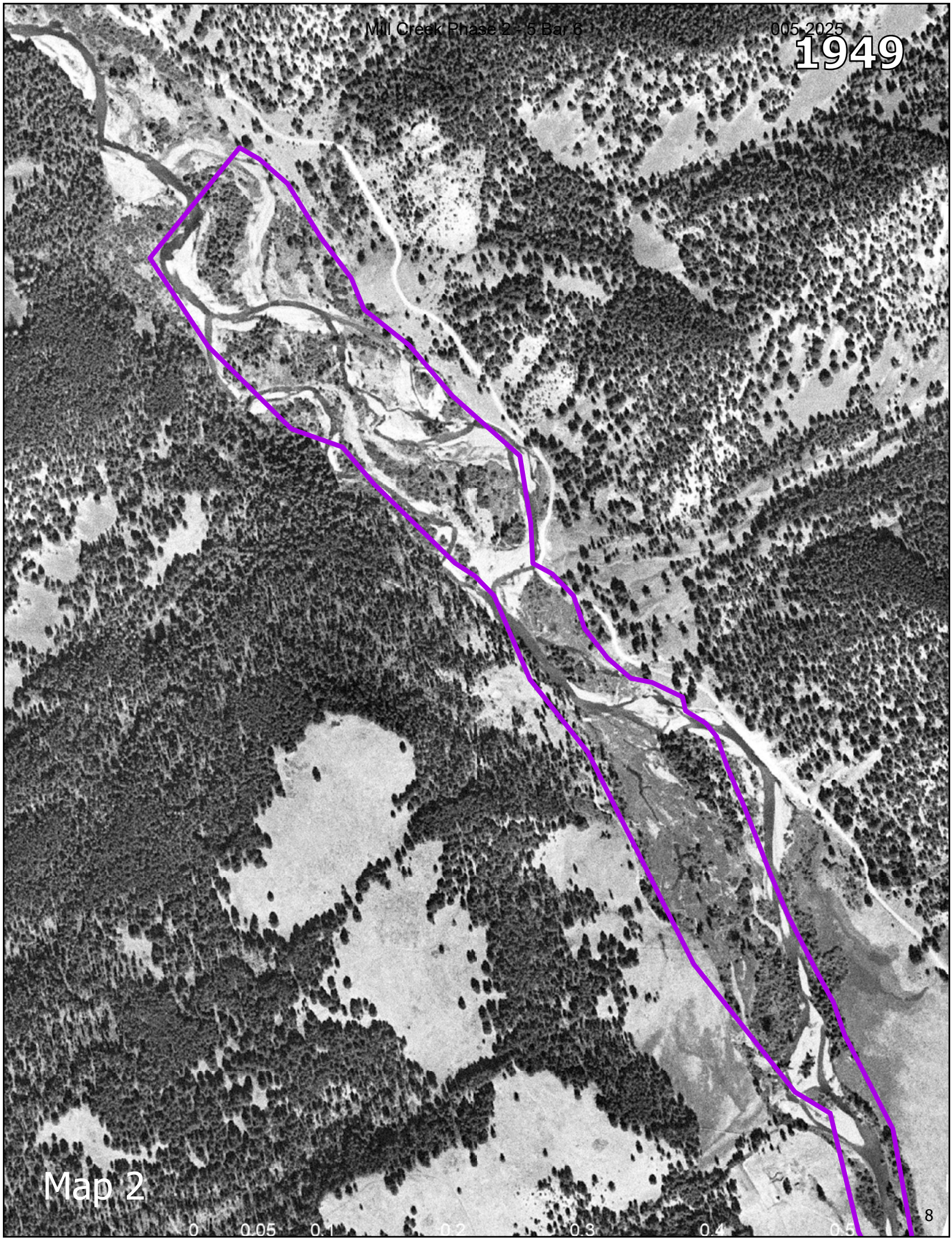
TROUT UNLIMITED

0 0.05 0.1 0.2 Miles

Scale: 1:9,000

N

- Mill Creek
- Public Access Fishing Easement
- Restoration Phase 1
- Restoration Phase 2
- Pasture
- US Forest Service


Mill Creek Phase 2 - 5 Bar 6
005 2025
1949
Map 2
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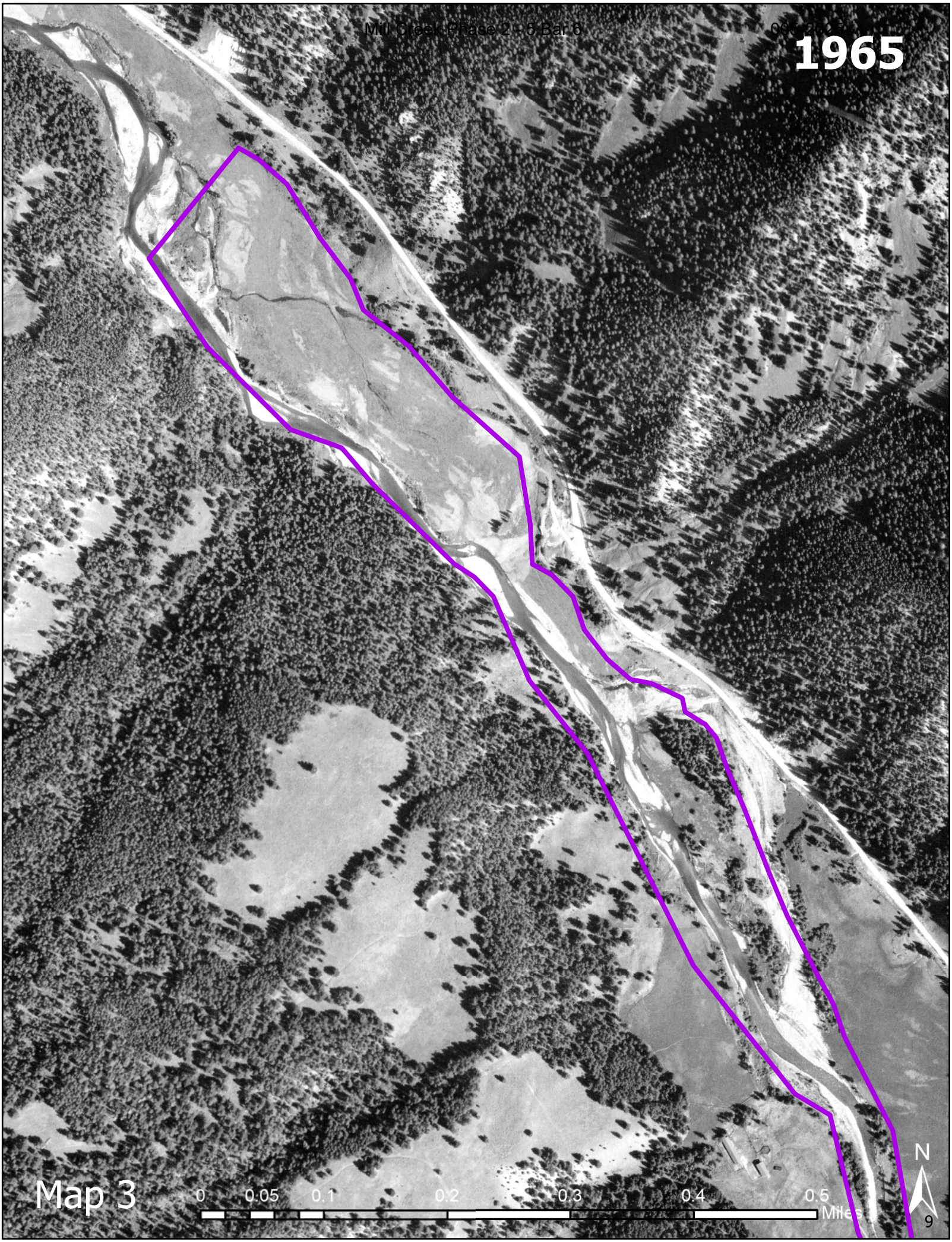
0.05
0.1
0.2
0.3
0.4
0.5


Mill Creek Phase 2 - 6 Bar 6
1965
Map 3
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0.3
0.4
0.5
Miles
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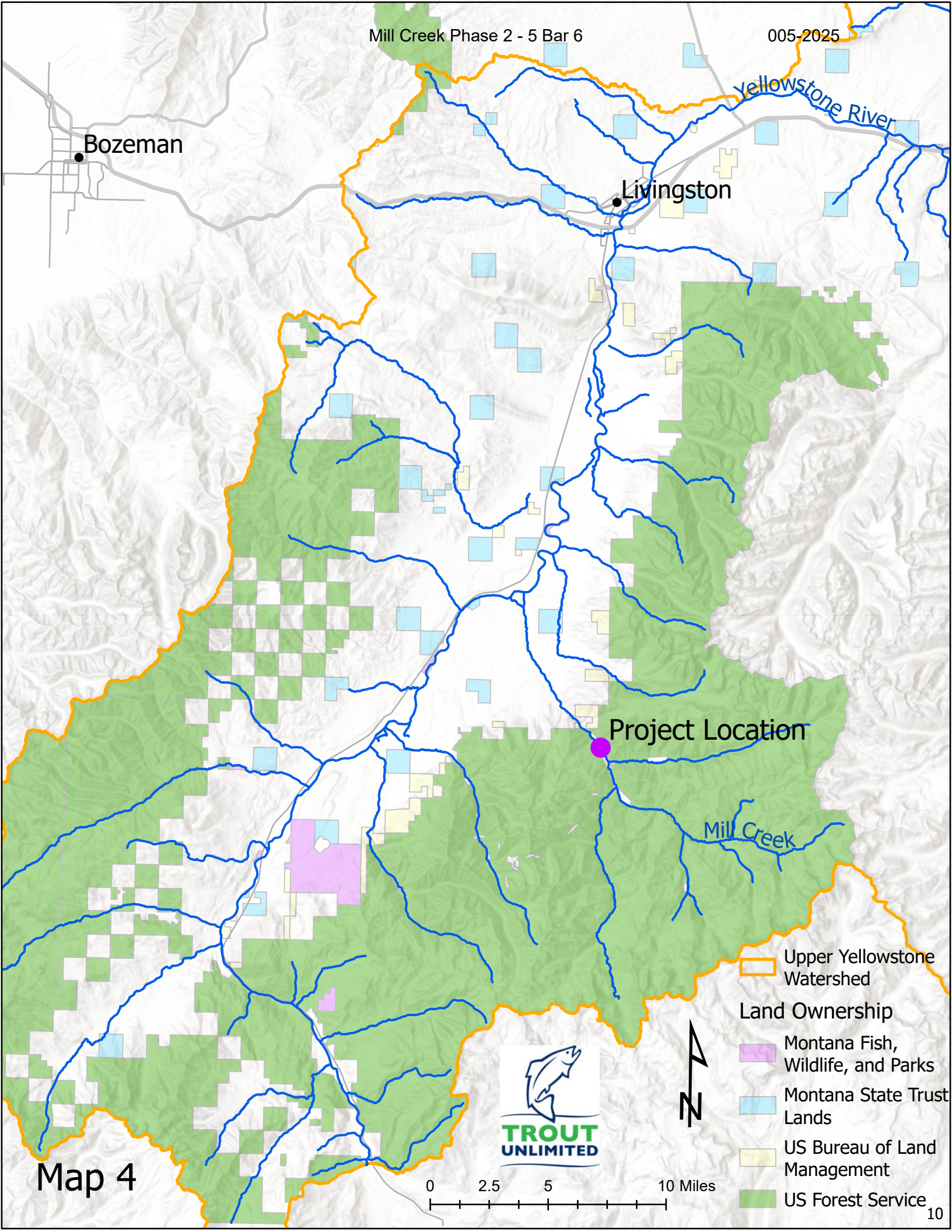

Mill Creek Phase 2 - 5 Bar 6
005-2025
Yellowstone River
Bozeman
Livingston
Project Location
Mill Creek
Upper Yellowstone Watershed
Land Ownership
Montana Fish, Wildlife, and Parks
Montana State Trust Lands
US Bureau of Land Management
US Forest Service
TROUT UNLIMITED
N
0
2.5
5
10 Miles
Map 4

Future Fisheries Coordinator

Montana Fish, Wildlife & Parks

Fisheries Division

1420 E Sixth Ave.

P.O. Box 2200701

Helena, MT 59620-0701

November 12, 2024

Dear Future Fisheries Coordinator and Review Panel,

I am writing you to provide support for Trout Unlimited's Mill Creek 5 Bar 6 Restoration Project application to the Future Fisheries Improvement Program grant. Since purchasing property along Mill Creek, I have been in frequent discussions with Trout Unlimited about our shared goals of improving fish habitat and fishing opportunities in our treasured local stream. TU's proposed project would benefit native Yellowstone cutthroat and wild rainbow trout by improving instream habitat and reconnecting historic floodplain. The ranch pledges to support this project by donating funding, materials, and heavy equipment time to breach earthen berms that are currently confining the channel and cutting off floodplain and side channel access. The completed project will provide long-lasting benefits to trout that reside in Mill Creek and those that migrate up from the Yellowstone River to spawn. We thank you for considering this project for funding.

Sincerely,

Hunter Terry, Owner 5 Bar 6 Ranch

MONTANA FISH, WILDLIFE & PARKS

Future Fisheries Improvement Program

Appendix: FWP Statement

Project Title: Mill Creek 5 Bar 6 Ranch Stream Restoration and Habitat Improvement

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

Mill Creek is a significant tributary to the Yellowstone River and is a focus area for YCT restoration and habitat improvement for FWP. FWP has been working with TU and the Forest Service to complete multiple projects in this basin, this being one of them.

This project will allow Mill Creek to access its historic flood plain and create side channels through the removal of a historical berm that pushed the creek to the south side of the basin to create pasture for livestock. Prior work has been completed in this area, post assisted log jams, and structures have already begun to collect woody debris and create scour in the stream bed as intended.

TU has worked with and consulted FWP and the Forest Service on the design and implementation of this project in order to ensure that it meets department goals and objectives for wild trout in this system, including Yellowstone cutthroat trout. As mentioned in application, this project is part of a suite of projects being implemented in the basin that will competent each other.

This portion of Mill Creek has consistently been popular with anglers, as it is located immediately upstream of a public access point. The implementation of this project will improve stream form and function, create more complex aquatic and floodplain habitat, and provide an excellent angling experience.

Name of FWP Biologist Scott Opitz Date: 11/18/24

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

MILL CREEK RESTORATION: PHASE II
PARK COUNTY, MT

TROUT UNLIMITED

WGM GROUP
WWW.WGMGROUP.COM

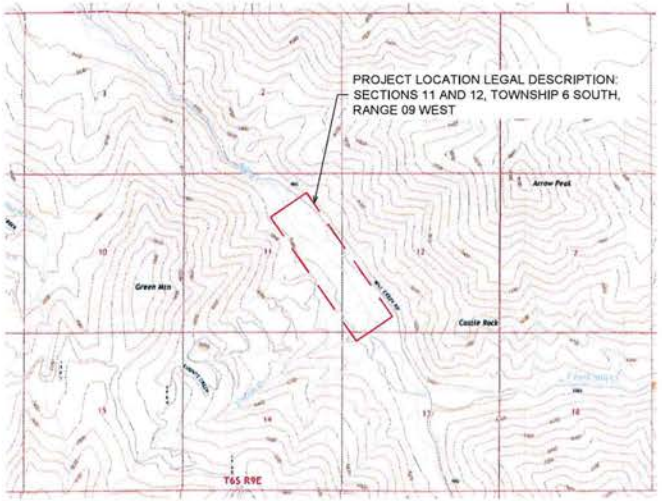
PRELIMINARY DESIGN

SHEET INDEX

PROJECT OVERVIEW

400 0 400 800
SCALE - FEET

LOCATION MAP



N

USGS TOPORGRAPHIC VICINITY MAP

2000 0 2000 2000
SCALE - FEET

COVER SHEET
MILL CREEK RESTORATION: PHASE II
PARK COUNTY, MT

REVISIONS:

NO.	DESCRIPTION	DATE

PROJECT: 21-06-10
LAYOUT: CVR
SURVEYED: OTHERS
DESIGN: JD
DRAFT: PJT
APPROVE: JD
DATE:

NOVEMBER 2024

SHEET 1 OF 6

GENERAL NOTES:

1) CONTRACTOR SHALL NOTIFY ALL UTILITY COMPANIES AND DETERMINE LOCATION OF ALL UNDERGROUND UTILITIES BEFORE COMMENCING WORK. CALL 811 (OR ONE CALL UTILITY LOCATE: 1-800-424-5555) A MINIMUM OF 72-HOURS BEFORE WORK IS PLANNED. CONTRACTOR IS RESPONSIBLE FOR PROTECTING AND PROPERLY REPAIRING ANY AND ALL DAMAGED UTILITIES.

2) ANY UTILITY LOCATIONS SHOWN ON THE DRAWINGS ARE APPROXIMATE. ALL UTILITY LOCATIONS ARE SUBJECT TO THE ACCURACY OF THE LOCATION METHOD AND SUBJECT TO RELOCATION FROM THE TIME THAT THESE DRAWINGS WERE PREPARED.

3) THE CONTRACTOR SHALL HAVE ONE (1) SIGNED COPY OF THE APPROVED PLANS, AND A COPY OF ANY PERMITS AND EXTENSION AGREEMENTS NEEDEDFOR THE JOB, ON-SITE AT ALL TIMES.

4) THE CONTRACTOR IS RESPONSIBLE FOR THE SAFETY OF ALL PERSONNEL, ALL SITE VISITORS, AND THE GENERAL PUBLIC WHO MAY BE AFFECTED BY THE CONSTRUCTION. THIS INCLUDES BUT IS NOT LIMITED TO GENERAL AND CHANNEL EXCAVATION, SHORING, TRAFFIC CONTROL, AND SECURITY.

5) CONTRACTOR SHALL IMMEDIATELY NOTIFY THE ENGINEER OF ANY CONFLICTS FOUND BETWEEN THE CONSTRUCTION PLANS AND CONDITIONS ENCOUNTERED IN THE FIELD.

6) CONTRACTOR SHALL, UNLESS OTHERWISE DIRECTED, REPLACE ALL SIGNS, FENCES, CABLES, APPROACH DELINEATORS, OR OTHER FEATURES THAT MAY BE REMOVED TO ACCESS THE CONSTRUCTION AREA. CONTRACTOR SHALL VERIFY THE NATURE AND EXTENT OF ANY OF THESE FEATURES PRIOR TO BIDDING THE WORK. COST OF THIS WORK SHALL BE INCIDENTAL TO THE PROJECT UNLESS OTHERWISE STATED IN THE CONTRACT DOCUMENTS.

7) CONTRACTOR SHALL COMPLY WITH ALL CONDITIONS AND RESTRICTIONS FOUND IN REGULATORY PERMITS OBTAINED BY THE ENGINEER.

8) LEGAL LOAD LIMIT REQUIREMENTS SHALL BE ADHERED TO ON ALL STATE HIGHWAYS, COUNTY ROADS, AND CITY STREETS.

9) THE CONTRACTOR IS TO PROVIDE HIS OWN WATER FOR COMPACTION AND DUST ABATEMENT.

10) CONSTRUCTION SHALL COMPLY WITH THESE PLANS IN ADDITION TO THE CONTRACT DOCUMENTS AND SPECIFICATIONS.

11) ALL EQUIPMENT USED ONSITE WILL BE CLEAN AND WASHED PRIOR TO ARRIVAL TO THE PROJECT AREAS.

12) EMERGENCY SPILL KITS WILL BE MAINTAINED ON EACH PIECE OF EQUIPMENT, OR IN AREAS THAT CAN RAPIDLY BE REACHED.

13) FOR INSTALLATION OF STREAMBANK TREATMENTS, ALL WORK WILL BE DONE DURING LOW FLOWS.

14) STRUCTURAL BMPS, SUCH AS SILT FENCE, STRAW BALES OR WATTLES MAY BE USED TO ISOLATE CONSTRUCTION ALONG THE ACTIVE CHANNEL AS NECESSARY.

15) ALL EXPOSED SOILS WILL BE STABILIZED ONCE CONSTRUCTION IS COMPLETED; SOILS WILL BE STABILIZED USING VARIOUS TECHNIQUES AS DESCRIBED IN THIS PLAN INCLUDING SEEDING AND PLANTING.

16) THE CONTRACTOR SHALL BE RESPONSIBLE FOR SAVING AND PROTECTING ALL EXISTING TREES AND VEGETATION WHERE REMOVAL FOR CONSTRUCTION IS NOT MANDATORY.

17) IF WOUNDING OF SAVED TREES OCCUR, A NON-TOXIC WOUND DRESSING MUST BE APPLIED IMMEDIATELY. EXCAVATORS MUST HAVE A NON-TOXIC TREE WOUND DRESSING WITH THEM ON CONSTRUCTION SITES.

18) ALL EXCAVATED MATERIAL FROM STREAMBANKS WILL BE PLACED IN AN AREA APPROVED BY THE ENGINEER.

19) ALL REMOVED ITEMS SHALL BECOME THE CONTRACTOR'S PROPERTY TO BE DISPOSED OF IN AN APPROVED MANNER IN ACCORDANCE WITH REGULATION AT NO ADDITIONAL EXPENSE TO THE OWNER, UNLESS SPECIFIED WITHIN THE PLANS. NO CONCRETE, RUBBLE, OR EXTRA MATERIALS SHALL BE BACKFILLED ON SITE.

20) MATERIAL STOCKPILE AREAS, ACCESS ROUTES, AND EQUIPMENT STORAGE AREAS WILL BE IDENTIFIED PRIOR TO THE ARRIVAL OF CONTRACTOR HEAVY EQUIPMENT.

21) MATERIALS STORED ON THE SITE WHICH MIGHT CONTRIBUTE POLLUTANTS TO RUNOFF SHALL BE LOCATED IN AN ENCLOSED, COVERED, AND LOCKABLE CONTAINER. THESE MATERIALS ARE EXPECTED TO CONSIST MAINLY OF FERTILIZERS, FUELS, AND MACHINERY LUBRICANTS.

22) ALL EXISTING AND PROPOSED CONTOURS ARE LABELED IN FEET AND REFERENCE THE 1988 VERTICAL DATUM. ALL SLOPES ARE SHOWN AS DIAGRAMMATIC AND SHALL BE ROUNDED AT THE TOP AND BOTTOM.

23) THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE CLEANUP OF THE PROJECT SITE AND SURROUNDING AREAS ON A DAILY BASIS OF ANY TRASH OR MUD AS A RESULT OF CONSTRUCTION.

24) THE CONTRACTOR SHALL RESTORE ALL STAGING AND STOCKPILING AREAS TO THEIR ORIGINAL CONDITION OR BETTER UPON COMPLETION OF THE PROJECT. THE COST TO RESTORE THESE AREAS SHALL NOT BE MEASURED AND PAID FOR SEPARATELY BUT SHALL BE INCLUDED IN THE COST OF THE WORK.

25) THE CONTRACTOR SHALL MAINTAIN ALL HAUL ROUTES AND RESTORE THEM TO THEIR ORIGINAL CONDITION OR BETTER UPON COMPLETION OF USE AT NO EXPENSE TO THE OWNER.

26) ALL PAVED HAUL ROUTES SHALL BE MAINTAINED FREE OF MUD AND DEBRIS RESULTING FROM CONSTRUCTION OPERATIONS.

27) CONTRACTOR IS RESPONSIBLE FOR REPAIRING/REPLACING ALL DAMAGED INFRASTRUCTURE.

28) THE CONTRACTOR SHALL NOT DEVIATE FROM THE PLANS WITHOUT FIRST OBTAINING WRITTEN APPROVAL FROM ENGINEER. THE CONTRACTOR SHALL CONTACT THE ENGINEER IMMEDIATELY UPON DISCOVERY OF ANY ERRORS OR INCONSISTENCIES.

29) ALL ESTIMATES OF QUANTITIES SHALL BE VERIFIED BY THE CONTRACTOR/SUBCONTRACTOR, WHO SHALL BE RESPONSIBLE FOR DETERMINING ALL QUANTITIES AND PROVIDING THE WORK AND MATERIALS AS SHOWN ON THE PLANS.

30) THIS PROJECT UTILIZES PROCESS-BASED RESTORATION TECHNIQUES INTENDED TO SET THE STAGE FOR DYNAMIC NATURAL CHANNEL PROCESSES. ACTUAL STREAM CHANNEL AND WETLAND FEATURES LOCATIONS AND CONDITIONS MAY VARY DEPECTED DESIGN POST-IMPLEMENTATION DEPENDING ON THE NATURAL VARIABILITY OF FUTURE HYDROLOGIC EVENTS.

PROJECT SPECIFIC NOTES:

1. IMAGERY: IMAGERY SHOWN ON PLAN SHEETS IS PER WGM AERIAL DRONE FLIGHT COMPLETED ON OCTOBER 10, 2024.

2. TERRAIN DATA: FLOODPLAIN EXISTING GROUND CONTOURS SHOWN ON PLAN SHEETS ARE FROM THE QL1 PHASE 1 GALLATIN 2020 LIDAR PROJECT. CHANNEL BATHYMETRY CONTOURS AND THALWEG ELEVATION DATA SHOWN ON PLAN SHEETS ARE FROM NOVEMBER 2021 SURVEY DATA COLLECTED BY OTHERS. THE LIDAR AND SURVEY DATA DEPICTS PRE-2022 FLOOD CONDITIONS AND MAY NOT REFLECT CURRENT EXISTING GROUND CONDITIONS THROUGHOUT THE PROJECT REACH.

3. PRELIMINARY PERMITTING NOTES:

3.1: ANTICIPATED REQUIRED PERMITS INCLUDE: PARK COUNTY CONSERVATION DISTRICT 310 PERMIT, PARK COUNTY FLOODPLAIN PERMIT, AND U.S. ARMY CORPS OF ENGINEERS (USACE) SECTION 404 PERMIT.

3.2: FLOODPLAIN PERMIT: THE PROJECT REACH IS DESIGNATED AS A FEMA ZONE A SPECIAL FLOOD HAZARD AREA. AN ENCROACHMENT ANALYSIS MAY BE REQUIRED FOR FLOODPLAIN PERMITTING.

3.3: USACE SECTION 404 PERMIT: A WETLAND DELINEATION HAS BEEN COMPLETED FOR THE PROJECT REACH IN NOVEMBER 2021.

PROJECT QUANTITIES ESTIMATE:

MATERIAL	SIZE RANGE	TYPE	QUANTITY	SOURCE
LOGS	14 TO 16 FT LENGTH 4 TO 8 IN DIAMETER	CONIFER TREE TRUNKS - ROOTBALLS AND LIMBS MAY BE INTACT	2,000 EA	IMPORT FROM LOCAL TIMBER HARVEST OR THINNING PROJECT
WOOD POSTS	4 TO 5 FT LENGTH 2 TO 3 IN DIAMETER	THICK BRANCHES, SMALL TREE TRUNKS, OR MILLED WOODEN POSTS	3,500 EA	IMPORT FROM LOCAL SOURCE
SLASH	5 TO 10 FT BRANCH LENGTH VARIABLE DIAMETER	CONIFER AND/OR WILLOW BRANCHES WITH NEEDLES/LEAVES INTACT	330 CY	IMPORT FROM LOCAL TIMBER HARVEST OR THINNING PROJECT
ARTIFICIAL BERM MATERIAL REMOVAL	VARIES	NATIVE COBBLE AND GRAVEL ORIGINALLY FROM MILL CREEK CHANNEL AND FLOODPLAIN	3,000 CY	ON-SITE
BERM MATERIAL PLACEMENT	VARIES	NATIVE COBBLE AND GRAVEL	3,000 CY	ON-SITE
PILOT CHANNEL EXCAVATION	VARIES	NATIVE COBBLE, GRAVEL, AND SOILS	2,000 CY	ON-SITE EXCAVATION

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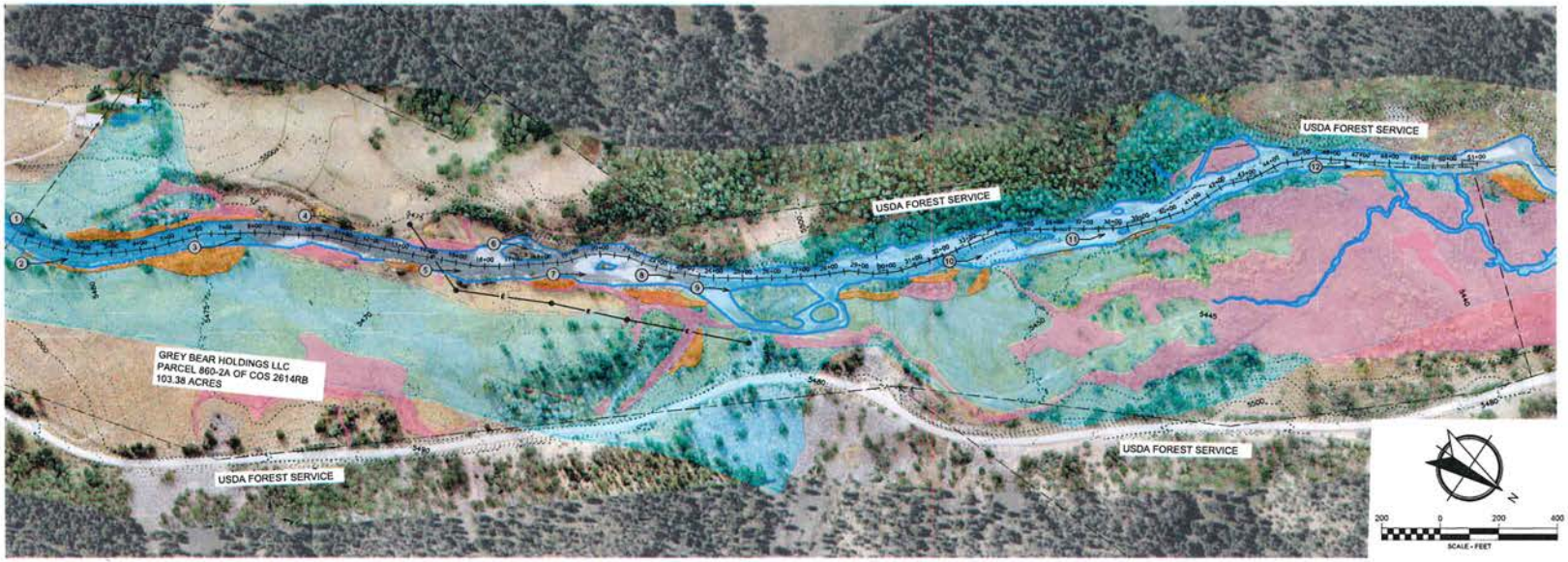
PRELIMINARY DESIGN

GENERAL NOTES AND QUANTITIES
MILL CREEK RESTORATION: PHASE II
PARK COUNTY, MT

REVISIONS:
NO. DESCRIPTION DATE

PROJECT: 21-06-10
LAYOUT: CN&Q
SURVEYED: OTHERS
DESIGN: JD
DRAFT: PJT
APPROVE: JD
DATE:
NOVEMBER 2024

SHEET 2 OF 6



PROJECT REACH EXISTING CONDITIONS - PLAN VIEW

AS NOTED

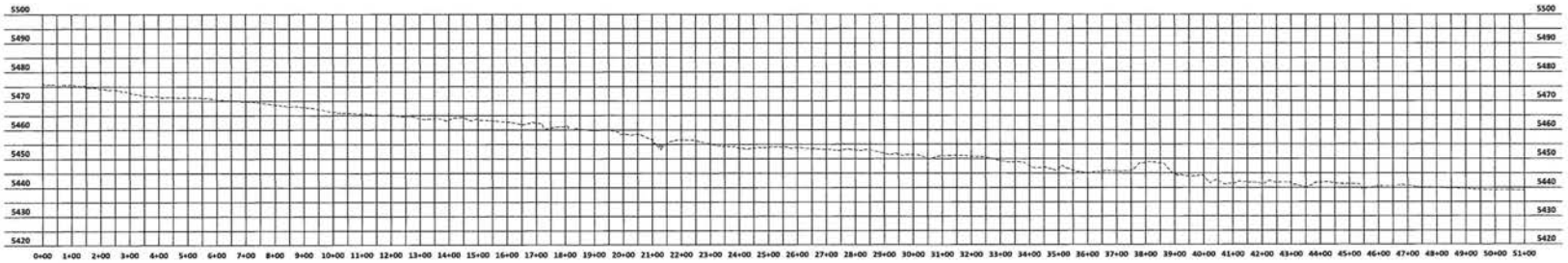
LEGEND - EXISTING CONDITIONS
- CONTOUR (5-FT INTERVAL)
- PROJECT REACH CENTERLINE
- PROPERTY LINE
- ARTIFICIAL BERM
- POWER LINE
- POWER POLE

LEGEND - AQUATIC RESOURCES
- DELINEATED WETLAND
- DELINEATED ORDINARY HIGHWATER
- FEMA ZONE A 100-YR FLOODPLAIN

LEGEND - REACH PHOTOS

REACH DRONE OBLIQUE PHOTOS ARE PROVIDED ON SHEET 5.

- PHOTO LOCATION AND NUMBER



PROJECT REACH EXISTING THALWEG PROFILE

10x VERTICAL EXAGGERATION

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PRELIMINARY DESIGN

EXISTING CONDITIONS AND AQUATIC RESOURCES

MILL CREEK RESTORATION: PHASE II

PARK COUNTY, MT

REVISIONS:

NO.	DESCRIPTION	DATE

PROJECT: 21-06-10
LAYOUT: 3-EC
SURVEYED: OTHERS
DESIGN: JD
DRAFT: PJT
APPROVED: JD
DATE:

NOVEMBER 2024

SHEET 3 OF 6

PROJECT REACH PROPOSED CONDITIONS - PLAN VIEW

AS NOTED

LEGEND - EXISTING CONDITIONS

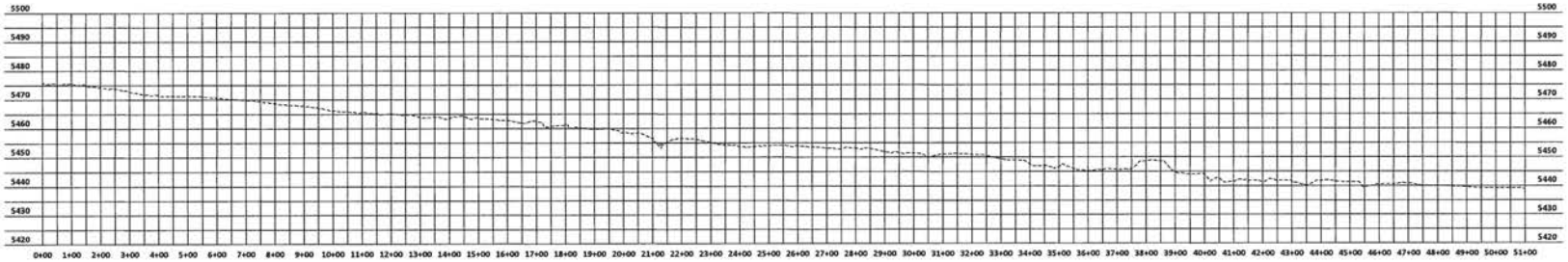
- CONTOUR (5-FT INTERVAL)
- PROJECT REACH CENTERLINE
- PROPERTY LINE
- ARTIFICIAL BERM
- POWER LINE
- POWER POLE

LEGEND - PROPOSED CONDITIONS

- LARGE WOODY DEBRIS FEATURE (LWD)
- ARTIFICIAL BERM REMOVAL (BR)
- CHANNEL NARROWING WITH BERM MATERIAL (CN)
- PILOT CHANNEL EXCAVATION (PC)
- BEAVER DAM ANALOG INSTALLATION AREA (BDA)

PROPOSED CONDITIONS SUMMARY

RESTORATION TREATMENT	PROPOSED NUMBER
LARGE WOODY DEBRIS STRUCTURE	20
ARTIFICIAL BERM REMOVAL	4 BERMS, 1,300 LF TOTAL LENGTH
CHANNEL NARROWING WITH BERM MATERIAL	4
PILOT CHANNEL EXCAVATION	5
BEAVER DAM ANALOG STRUCTURE	100



PROJECT REACH PROPOSED THALWEG PROFILE

10x VERTICAL EXAGGERATION

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PRELIMINARY DESIGN

PROPOSED CONDITIONS
MILL CREEK RESTORATION: PHASE II
PARK COUNTY, MT

REVISIONS:

NO.	DESCRIPTION	DATE

PROJECT: 21-06-10
LAYOUT: 4-PC
SURVEYED: OTHERS
DESIGN: JD
DRAFT: PJT
APPROVE: JD
DATE: NOVEMBER 2024

SHEET 4 OF 6

PHOTO 1: PC-1, PC-2, BR-1, BR-3, LWD-1, AND LWD-2. UPSTREAM END OF PROJECT REACH.

PHOTO 2: BR-2, LWD-2, LWD-3, AND LWD-4

PHOTO 3: LWD-4, LWD-5, LWD-6, AND LWD-7

PHOTO 4: BR-4, LWD-8, AND LWD-8

PHOTO 4: LWD-10 AND LWD-11

PHOTO 5: LWD-12, LWD-13, LWD-14, AND LWD-15

PHOTO 7: LWD-13, LWD-14, LWD-15

PHOTO 8: LWD-14, LWD-15, LWD-16, AND LWD-17

PHOTO 9: LWD-16, LWD-17, AND LWD-18

PHOTO 10: LWD-19 AND LWD-20

PHOTO 11: LWD-20 AND PC-5

PHOTO 12: LWD-20 AND PC-5. DOWNSTREAM END OF PROJECT REACH

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PRELIMINARY DESIGN

REACH PHOTOS

MILL CREEK RESTORATION: PHASE II

PARK COUNTY, MT

REVISIONS:

NO.	DESCRIPTION	DATE

PROJECT: 21-06-10
LAYOUT:
SURVEYED: OTHERS
DESIGN: JD
DRAFT: PJT
APPROVE: JD
DATE:

NOVEMBER 2024

SHEET 5 OF 6

RELATIVE ELEVATION MODEL (REM)

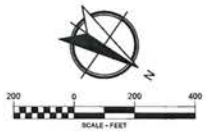
AS NOTED

LEGEND - REM

- BASEFLOW WATER SURFACE ELEVATION
- 0 TO 2 FT ABOVE BASEFLOW
- 2 TO 4 FT ABOVE BASEFLOW
- 4 TO 6 FT ABOVE BASEFLOW
- 6 TO 10 FT ABOVE BASEFLOW

REM SUMMARY:

THIS REM MAP DEPICTS THE FLOODPLAIN ELEVATION RELATIVE TO BASEFLOW WATER SURFACE ELEVATIONS. QL1 LIDAR DATA COLLECTED IN 2020 WAS USED TO DEVELOPED THE REM.



HYDRAULIC MODEL RESULTS: 2-YR RECURRENCE INTERVAL FLOOD EVENT

AS NOTED

LEGEND - HYDRAULIC MODEL RESULTS

- EXISTING CONDITIONS - FLOODPLAIN AREAS INUNDATED
- PROPOSED CONDITIONS - ADDITIONAL FLOODPLAIN AREAS INUNDATED
- MAIN CHANNEL AREAS

HYDRAULIC MODEL SUMMARY:

THIS MAP DEPICTS EXISTING AND PROPOSED CONDITIONS RESULTS FROM WGM'S 2D HEC-RAS MODEL OF THE PROJECT REACH DURING THE 2-YR RECURRENCE INTERVAL FLOOD EVENT TO REPRESENT ANTICIPATED BANKFULL CONDITIONS. WGM USED USGS STREAM STATS TO ESTIMATE THE 2-YR PEAK FLOW FOR THE PROJECT REACH. THE STREAM STATS REPORT INDICATED THAT THE PEAK FLOW IS 600 CFS.

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PRELIMINARY DESIGN

FLOODPLAIN CONNECTIVITY ANALYSIS
MILL CREEK RESTORATION: PHASE II
PARK COUNTY, MT

REVISIONS:

NO.	DESCRIPTION	DATE

PROJECT: 21-06-10
LAYOUT:
SURVEYED: OTHERS
DESIGN: JD
DRAFT: PJF
APPROVE: JD
DATE:

NOVEMBER 2024

SHEET 6 OF 6