FUTURE FISHERIES IMPROVEMENT PROGRAM GRANT APPLICATION

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

I. APPLICANT INFORMATION

A. Applicant Name: Ashton Bunce, Montana Freshwater Partners (MFP)

Mailing Address: P.O. Box 338, Livingston, MT 59047

City: Livingston State: MT Zip: 59047

Telephone: 406-223-1992 E-mail: abunce@freshwaterpartners.org

B. Contact Person (if different than applicant): N/A

Address:

City: State: Zip:

Telephone: E-mail:

C. Landowner and/or Lessee Name (if different than applicant): Bruce and Carol Angiolillo

Mailing Address: 505 Flathead Cr Rd West

City: Wilsall State: MT Zip: 59086

Telephone: 917-622-0284 E-mail: bangio.fmr@gmail.com

II. PROJECT INFORMATION

A. Project Name: Flathead Creek Streambank Restoration Project

River, stream, or lake: Flathead Creek

Location: Township: T3N Range: R7E Section: S27/S28

Latitude: 45.97617 Longitude: -110.85272 *Within project (decimal degrees)*

County: Gallatin County

B. Purpose of Project:

Flathead Creek, a tributary to the Shields River, supports a population of Yellowstone Cutthroat Trout (YCT) that contributes to the high conservation value of the YCT population in the Shields River Watershed (Endicott et al. 2012). The value of stream restoration on the Shields River and its tributaries, such as Flathead Creek, is high considering their potential to support and sustain genetically unaltered populations of YCT. Within the Angiolillo property, Flathead Creek is degraded due to past cattle grazing activities and encroachment of agricultural activities up to the streambanks. These pressures have resulted in stream channelization and incision, a diminished riparian area, reduced channel length due to multiple minor avulsions (meander cutoffs), bank instability and lateral erosion, and elevated sediment delivery to the stream. The Shields River is listed on the state of Montana's list of impaired 303(d) waters due to physical and ecological impacts related to sediment (SVWG, 2012). Streambank erosion was identified as one of the primary mechanisms for sediment delivery to the Shields River and its tributaries. Therefore, restoration projects aimed at restoring and protecting riparian buffers as well as natural channel morphology, instream habitat complexity and floodplain connectivity are important to improve fish habitat for Flathead Creek YCT as well as reduce sediment loading in the Shields Watershed.

The purpose of the proposed project is to do just this. The project will improve stream-floodplain connectivity and instream fish habitat, while also revegetating and expanding riparian areas to increase stream shading and reduce unnatural, elevated erosion rates. Techniques employed in this project will include composite wood-toe installations coupled with a constructed bankfull bench to prevent further degradation and to stabilize bank margins. Bankfull benches will be planted native vegetation including willow live stakes (cuttings) as well as containerized plantings to add further stability. These treatments will have multiple benefits for stream health, water quality and fish habitat. With regard to native and wild fish, this project will 1) increase stream-floodplain connectivity, thereby increasing nursery areas for rearing juvenile fish; 2) increase overhanging vegetation and stream shading, helping to buffer stream temperatures and improving hiding cover; 3) increase instream structure and habitat complexity, supporting a variety of life stages; and 4) improve water quality and egg-to-fry survival by reducing sediment inputs to Flathead Creek and the Shields River, which can otherwise suffocate fish eggs. The project would ultimately restore approximately 1.75 miles of stream, making it an excellent opportunity to restore an otherwise impaired tributary to the Shields River.

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

Currently, the project reach is degraded due to past land-use practices that have resulted in severe incision and lateral bank erosion. Within the project reach, there are roughly 6,360 feet of active 4–8-foot tall eroding streambanks that are contributing significant sediment to the stream in the sediment-impaired Shields Watershed (See Pre-Project Photos at end of document as well as "active terrace erosion" highlighted in design). Portions of the project reach are channelized and have been moved from their historic alignment within the floodplain. In numerous locations, the stream is disconnected from its floodplain, devoid of a riparian corridor, and oversimplified, providing poor instream habitat for native and wild fish. The landowner currently allows his neighbor to graze cattle on his property, and recently had a fence installed on the south side of the stream with the intent of protecting the riparian buffer from further degradation by cattle. However, in some areas the fence was placed too close to the streambanks by the contractor, constricting the floodplain and riparian buffer.

To remedy this situation, this project will utilize composite wood-toe installations coupled with a constructed bankfull bench to prevent further degradation and to stabilize bank margins (see attached project design). These bankfull benches will serve multiple purposes: 1) they will provide favorable hydrology for establishing riparian vegetation; 2) they will expand the flood prone area; and 3) they will reduce bank height, reducing bank loss due to gravitational collapse. Near-term stability will be provided by a matrix of live and dead wood stems backfilled and compacted with native alluvium. These stems will be angled back into the bank so that live stems are still accessing the water table at base flows. We will also harvest sod from the terraced banks as we are constructing the bankfull benches, and lay that sod on the newly constructed benches. This will provide initial stability to the bankfull benches until native sedges naturally outcompete the upland grasses and take over on these inset floodplains. Native sedges already occur throughout the project area, which will provide a viable seed source to colonize the newly constructed banks. The tops of the bankfull benches will also be planted with additional live willow stakes and containerized plantings including alder, narrowleaf cottonwood, red osier dogwood and Bebb's willow.

Within the project reach, the channel width is appropriate for a C4 Type Channel in some reaches and it is over-widened in others. Where appropriate channel dimensions occur adjacent to bank erosion, the existing terrace will be excavated to accommodate the composite wood toe treatment and bankfull bench (Scenario 1 in attached design set). Where the channel is over-widened adjacent to an eroding terrace, the wood toe treatment will be constructed in the active channel to narrow the channel section (Scenario 2 in attached design set).

Lastly, as part of this project, the landowner has committed to funding fencing setbacks of the recently constructed fence on the south side of the project area, replacing old dilapidated fencing on the north side of the project area and limiting livestock access to the creek by constructing three designated water gaps (see attached design set). These will be hardened water gaps with a geotextile base covered with crushed gravel to prevent siltation and sedimentation by cattle. The goal of moving the fence back on the south side will be to better accommodate the stream and its floodplain, especially as the project increases floodplain connectivity.

If this proposal is funded by the Future Fisheries Improvement Program, permitting for the project would commence immediately, with the goal of constructing the project before spring runoff in 2024. If permitting cannot be completed in time for spring implementation, the project would likely be implemented in the fall of 2024.

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

Historically, the project reach was subject to agricultural pressures including farming up to the streambanks and cattle grazing throughout all portions of the reach. These activities have resulted in the removal of riparian vegetation both mechanically by humans and also through cattle trampling and overgrazing the riparian corridor. It also appears that the stream was actively straightened in some areas and moved out of its historic alignment. As a result of these disturbances, portions of the reach are channelized and have incised, resulting in a complete lack of floodplain connectivity in areas, streambank instability, and unnaturally high levels of erosion and sediment inputs. The project aims to comprehensively combat all aforementioned issues by creating inset bankfull benches that increase stream-floodplain connectivity and reduce gravitational collapse of streambanks. Additionally, the project will employ a variety of revegetation techniques to reestablish the riparian buffer which will add further stability, increase stream shading and help filter out harmful toxicants and sediments from the stream.

E. Length of stream or size of lake that will be treated (project extent): 1.75 miles

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

F. Project Budget Summary:

Grant Request (Dollars):	**$**	**100,375**
Matching Dollars:	**$**	**31,920**
Matching In-Kind Services:*	**$**	**29,680**

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

Other Contributions (not part of this app)	**$**	**78,960**
Total Project Cost:	**$**	**$ 240,936**

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
- [ ] 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)
- [ ] If water leasing or water salvage is involved, attach a supplemental questionnaire (*https://myfwp.mt.gov/getRepositoryFile?objectID=36110*)

J. Attach letters or statements of support (e.g., landowner consent, community or public support, and FWP fisheries support). List any other project partners:

Letters of support from the local FWP fisheries biologist and from the landowner are attached.

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.*

MFP plans to monitor the restoration site for several years following implementation. This project is designed to require little to no maintenance once vegetation is established. MFP will have a 20-year agreement in place with the landowner and after the monitoring period, the landowner will work with MFP or any required maintenance. The east half of the property also has an added layer of protection as it is under a conservation easement with Montana Land Reliance, and the landowner plans to put the remainder of the property into an easement with MLR in the near future.

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 stream reach already has riparian fencing installed on the south side to keep cattle out of the stream and will replace an old riparian fence on the north side to exclude cattle from the riparian (prior to construction of the restoration project), so grazing will not be part of the project area. As described above, some of the recently constructed fencing on the south side was placed too close to the stream and as part of this project, we will work with the landowner to set back the current fencing in areas where it is constricting the channel and cutting off the riparian buffer/floodplain. Three hardened water gaps will be constructed within the project area (see attached design), to allow cattle access to the stream in specific locations for drinking water. Channel-spanning fence will prevent cattle from moving upstream or downstream at water gap locations. Management of grazing in pastures adjacent to the riparian buffer will be addressed in the landowner agreement.

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?

Yes, the project will be monitored to determine if goals were met and to set a framework for future projects. Short term plans include photo monitoring of the project area, collection of bank erosion hazard index (BEHI) data throughout the project, and presence/absence electrofishing surveys to better understand what fish species exist within the project area. Long-term plans include continued monitoring of the project area via photo monitoring of the stream reach to monitor success of bank treatments and photo monitoring of the riparian area to assess establishment success. Pre-project data will include current, geotagged site photos, initial BEHI data, and fish species presence /absence data. All data will be shared with FWP. Select pre-project photos are attached at the end of document.

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

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

Electrofishing surveys ranging from 1975-2021 confirm that Yellowstone cutthroat (YCT), brown trout, longnose suckers, mountain suckers, mountain whitefish, white suckers, and brook trout occur in Flathead Creek and thus would benefit from this restoration project (Fish MT Database). Additionally, Flathead Creek contains a genetically intact population of YCT with no currently documented presence of rainbow trout (according to Fish MT Database), thus rendering this project an excellent opportunity to improve habitat for this population of Yellowstone cutthroat (Endicott et al. 2012, Figure 2 below).

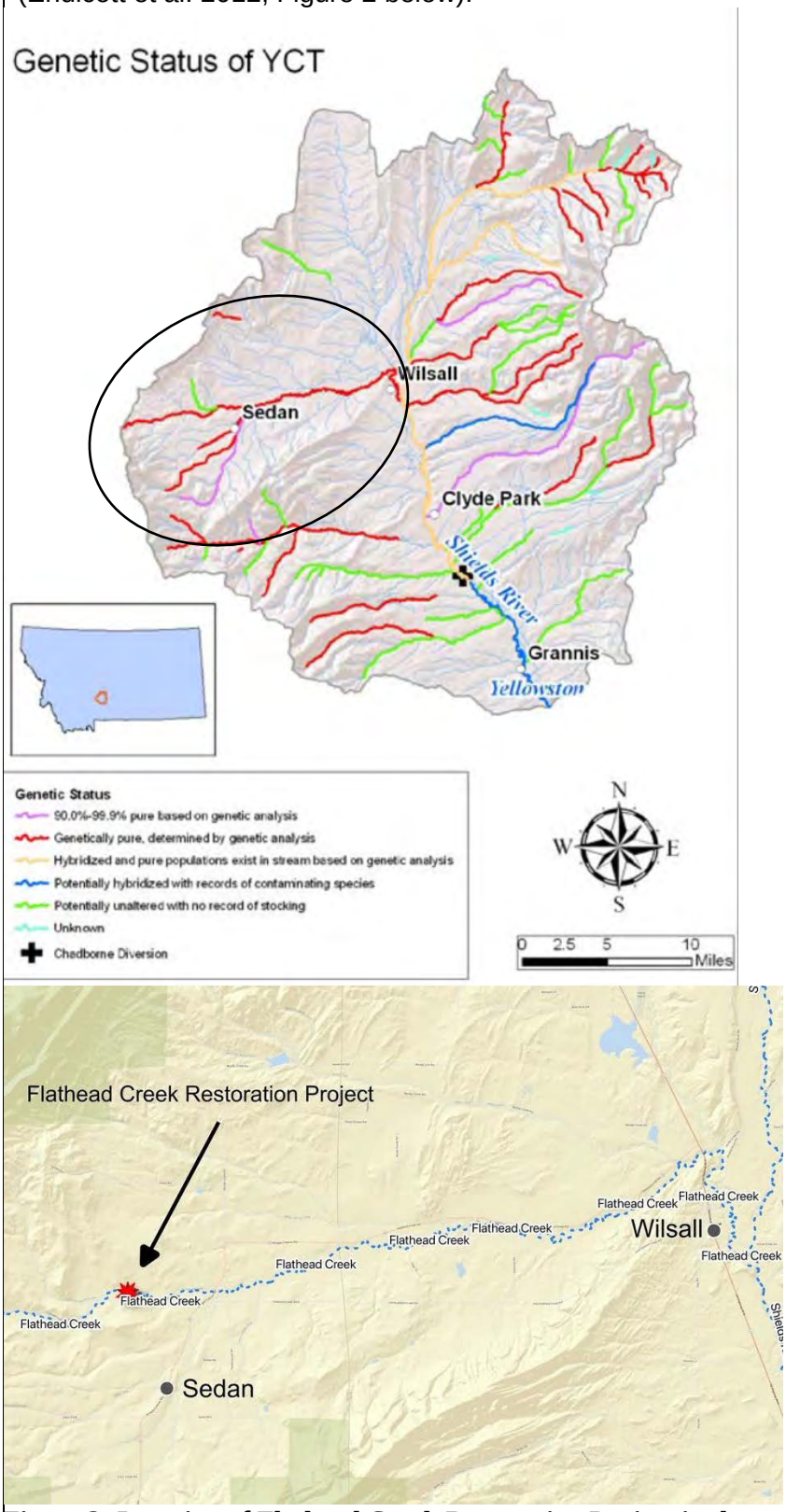


Figure 2: Location of Flathead Creek Restoration Project in the context of YCT genetic status

(Endicott et al., 2012).

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

Restoration activities involved with this project area will reduce erosion, sediment delivery, and prevent further embeddedness of the streambed substrate, thus creating improved habitat and spawning gravels for YCT and other sensitive fish species. Decreased sediment delivery and embeddedness will also create more suitable habitat for aquatic invertebrates which function as a food source for native and wild fish species. Decreases in further streambank erosion, incision, and avulsion will generally decrease sediment inputs to the stream, which aligns with current YCT conservation strategy and the Shields WRP (Endicott et al., 2012; Shields WRP).

Improvements in streambank stability through the use of composite wood-toe installations will prevent further erosion and avulsion of streambanks, while also creating pool habitat, hiding cover and microhabitat for aquatic invertebrates and young-of-the-year (YOY) fish, encouraging more stream complexity which all contribute to healthier and more functional fish habitat.

Revegetation of riparian areas and streambanks will further contribute to overhanging cover and microhabitat for YOY fish while also contributing to critical ecological stream functions including shade and temperature moderation, reduction in sedimentation from runoff, and water storage.

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

The landowner has observed cutthroat spawning within the project reach. We expect that short-term effects of the restoration work will include decreased erosion, sedimentation, and embeddedness resulting in improved spawning conditions and egg survival. Additions of habitat structures and wood-toe installations will immediately improve microhabitat and hiding cover for wild and native fish species. In addition to improved spawning conditions, long-term effects will also include increased stream shading (moderating instream temperatures) due to a healthy riparian area, and an overall improved habitat for native and wild trout in the Shields Watershed. Both short and long-term outcomes will support the health of Flathead Creek and the Shields River which will in turn result in in more sustainable trout populations for anglers to pursue for years to come.

D. Will the project increase public fishing opportunity for wild fish and, if so, how? Is public fishing allowed onsite? If not, describe how the public would access the project benefits.

While there is no public land immediately adjacent to the project site, the downstream boundary for the project is the highway 86 bridge. This allows the public to legally access the project via the highway 86 bridge, up to the ordinary high-water mark. Therefore, this project will enhance public fishing opportunities within the project reach by improving habitat complexity and hiding cover for different life stages of native and wild trout. It will also improve cover and organic matter for aquatic macroinvertebrates, thus increasing food resources and likely making this a more productive fishery for native and wild trout. This project will also reduce sediment inputs that impact habitat and water quality downstream of the project area. Thus, the project also has the potential to result in improved conditions for public fishing opportunities in downstream reaches of Flathead Creek and the Shields River.

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

The 2012 Shields Watershed Restoration Plan (WRP) was developed by the Shields Valley Watershed Group in an effort to maintain productive and sustainable ranching lifestyles throughout the Shields watershed into the future. The main focus of this planning effort was the protection and management of the limited watershed resources available for agriculture, drinking water, and recreation (Shields WRP, 2012). Within the plan, sediment was identified as the driving force of water quality impairment throughout the Shields watershed and major sources include adjacent roads and road crossings, stream and riverbank erosion, and delivery from uplands. The project proposed here strives to actively reduce and prevent further stream and riverbank erosion and stream sedimentation. The restoration of 1.75 miles of stream on Flathead Creek has wide-scale implications for the health of the Shields River watershed and its future resilience, especially on the front of reducing sediment delivery to the watershed.

In conjunction with human-related needs, Yellowstone Cutthroat and other species of wild trout in the Shields watershed are sediment-sensitive and rely on clean spawning gravels and low levels of stream embeddedness for reproduction and the maintenance of aquatic insect communities for feeding. Stream sedimentation remains one of the driving threats for Yellowstone Cutthroat and wild trout populations, thus a reduction in sediment loading to streams is necessary to maintain these populations into the future (IDFG et al., 2019; Endicott et al., 2012). Generally, the maintenance of healthy native and wild fish populations has direct implications for the maintenance of watershed health and resiliency as the function of a healthy watershed relies on the existence of healthy fish populations (Holmlund and Hammer, 1999).

To tie it all together, Montana Freshwater Partner's plan to restore 1.75 miles of degraded stream on Flathead Creek has implications for the watershed, its fish species, and its human users, which are all inherently intertwined. The proposed restoration techniques and treatments will combat future disturbances in the reach including erosion and sedimentation and will restore necessary habitat requirements including a healthy riparian area, channel complexity, floodplain connection, and improved water storage. For the Shields River watershed to support sustainable farming, ranching, recreation, and living, it requires a healthy and resilient watershed. This project directly supports the improvement in the Shields River watershed health and resilience and may also set a positive example for future restoration activities throughout the watershed. To that end, the landowner has also said that they would be willing to permit access to their property to showcase the project to other landowners interested in doing similar restoration on their properties.

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

The project will not interfere with water or property rights of 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.

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

This project has no association 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: 11/10/23

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

Literature Cited

Endicott, C.L., S. Opits, B. Shepard, P. Byorth, S. Shuler, S. Barnde, B. Roberts, L. Roulson. 2012. Yellowstone cutthroat trout conservation strategy for the Shields River watershed above Chadbourne diversion, 2012. Montana Fish, Wildlife & Parks, Helena, Montana.

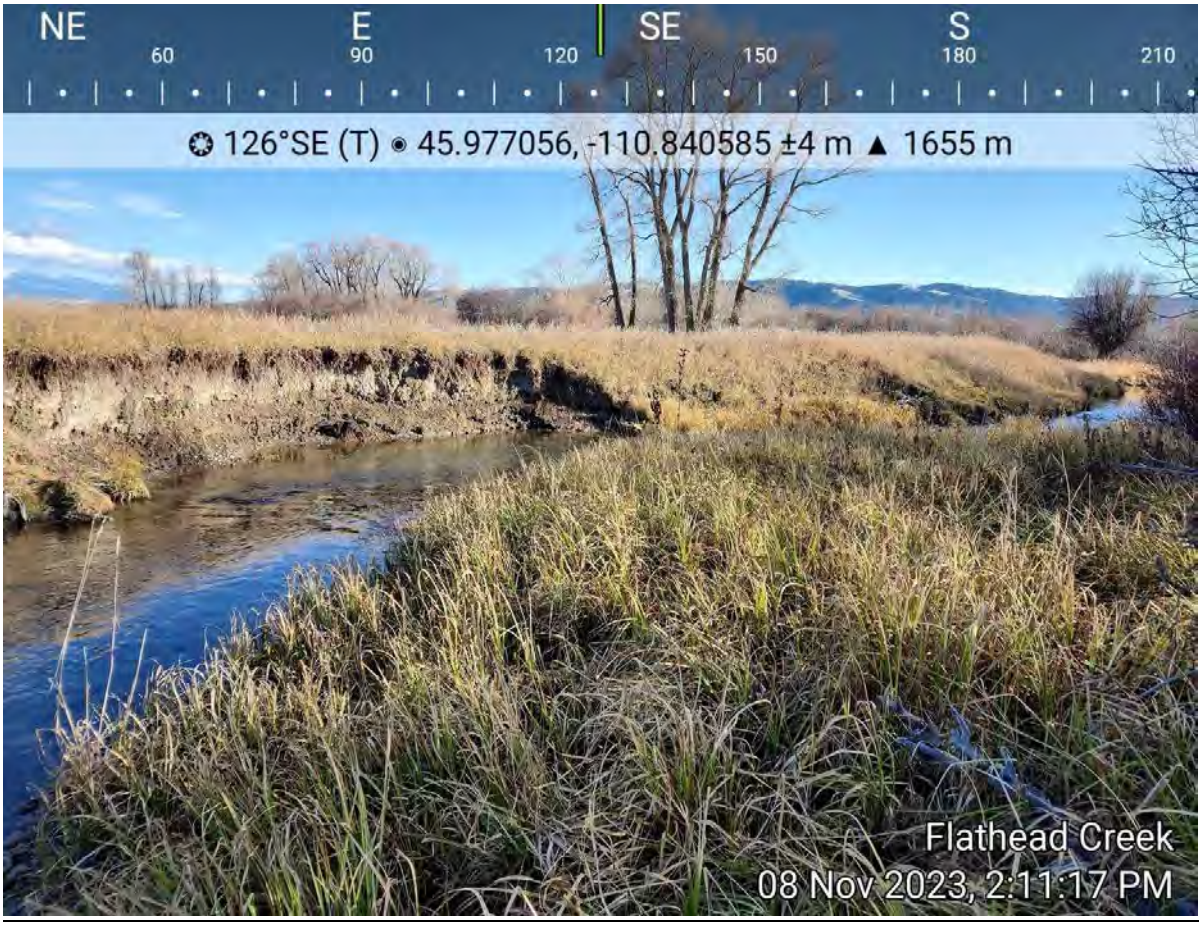
Fish MT Database (Fisheries Information System). Montana Fish, Wildlife, and Parks (FWP). Accessed November 8th, 2023. Accessible at https://myfwp.mt.gov/fishMT/reports/surveyreport.

Holmlund, C.M. and Hammer, M., 1999. Ecosystem services generated by fish populations. *Ecological economics*, *29*(2), pp.253-268.

Idaho Fish and Game (IDFG), Montana Fish, Wildlife, and Parks (FWP), Nevada Department of Wildlife (NDOW), Utah Division of Wildlife (UDW), Wyoming Game and Fish Department (WGFD), U.S. Fish and Wildlife Service (USFWS), U.S. Forest Service (USFS), U.S. Bureau of Land Management (BLM), U.S. National Park Service (NPS), U.S. Geological Survey (USGS), Crow Tribe of Indians, Trout Unlimited, Montana Trout Unlimited, Friends of the Teton River, and Western Native Trout Initiative. 2019. Western Native Trout Status Report: Yellowstone Cutthroat Trout (*Oncorhynchus clarkii bouvieri*).

Shields River Watershed Restoration Plan (WRP). 2012. Prepared for Shields Valley Watershed Group, Livingston, MT. Prepared by Confluence Conlsulting, Inc., Bozeman, MT.

Attachments and Photos

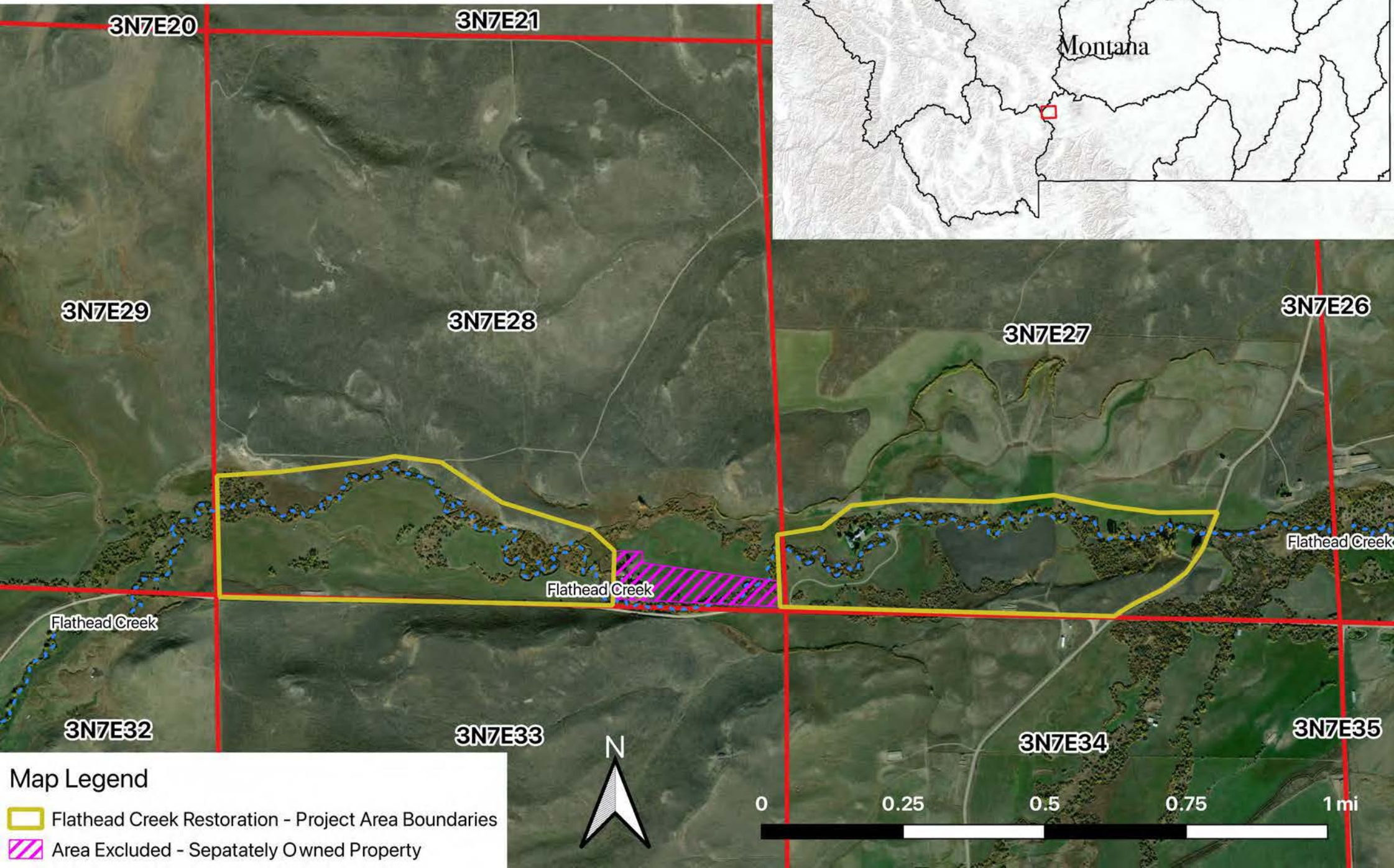



South East Elevation
347°NW (T) 45.975338, -110.860769 ±7 m ▲ 1678 m
Flathead Creek
08 Nov 2023, 2:58:32 PM


E
90
120
SE
150
S
180
210
SW
240
156°SE (T) 45.976634, -110.844487 ±4 m ▲ 1658 m
Flathead Creek
08 Nov 2023, 1:57:37 PM

Additional photos provided by the landowner:

Flathead Creek Restoration Project Location



Map Legend

- Flathead Creek Restoration - Project Area Boundaries
- Area Excluded - Sepatately Owned Property

Bruce & Carol Angiolillo
505 Flathead Creek Road West
Sedan (Wilsall) MT 59086-9571
bangio.fmr@gmail.com
406.578.2539
917.622.0284 (cell)

November 14, 2023

Future Fisheries Improvement Program
Montana Fish, Wildlife & Parks
Fisheries Division
1420 E. Sixth Ave
P.O. Box 200701
Helena, MT 59620-0701

Dear FFIP Review Panel,

Since 2005, our family has owned the property that is the subject of Montana Freshwater Partners' Future Fisheries grant proposal for stream bank restoration on Flathead Creek to support, conserve and enhance the existing population of native Yellowstone Cutthrout Trout found there. While I am not a trained fish biologist, I have been a stream observer and fly fisher for more than 50 years. For nearly two decades, I have caught and released countless fish on our stretch of Flathead Creek. Virtually every fish has been a native Yellowstone Cutthroat Trout. With your support, I believe we may partner together to protect the existing high genetic diversity of this population for generations to come.

Our land has been used for cattle grazing and hay production for more than a century. More than a decade ago, we placed an agricultural conservation easement on our property with Montana Land Reliance. Our objective has been to lead by example to preserve the Shields Valley as a vibrant ranching community. As we embarked on our project to do stream bank restoration work, we recognized that a 100 years of cattle grazing had taken its toll on Flathead Creek and the first step needed to be a fencing plan that restricted access and gave nature the opportunity to work its restorative powers.

Over the past 12 months, at our expense ($59,226.00), we have installed 5,600' of fencing that follows the meandering course of the South side of the creek. This spring, we will commence fencing work on the bench above the North side of the creek. The fence height is lower than the traditional four strand fencing to allow moose, elk and deer safe passage. Additionally, we now limit cattle access to the creek for water and crossing to three designated, fenced locations. At these locations, we will be installing a crushed rock crossing on a geotextile base that will mitigate and reduce future siltation downstream.

Looking upstream, our stretch of Flathead Creek begins at the bridge crossing MT 86. From there to its headwaters, there are no paved roads or development. From our perspective, our property anchors a native Yellowstone Cutthroat watershed that is well worth preserving. We hope that if we are successful with this project that — as a "first mover" — it will encourage others to undertake similar work upstream.

Thank you for your interest. Please do not hesitate to contact us with any questions or thoughts on how we may better accomplish our shared goals.

Sincerely,

BUDGET TEMPLATE SHEET FOR FUTURE FISHERIES PROGRAM APPLICATIONS

Flathead Creek streambank restoration 008-2024

Both tables must be completed or the application will be returned

PROJECT COSTS					CONTRIBUTIONS			
WORK ITEMS (Itemize by Category)	**NUMBER OF UNITS**	**UNIT DESCRIPTION***	**COST/UNIT**	**TOTAL COST**	**FUTURE FISHERIES REQUEST**	**MATCH (Cash or Services)****	**OTHER (Not part of this application)**	**TOTAL**
Personnel***								
Survey	1	topographic survey and wetland delineation	$5,000.00	$ 5,000.00		5,000.00		$ 5,000.00
Design and Engineering	1	consultant design	$10,000.00	$ 10,000.00		10,000.00		$ 10,000.00
Permitting	40	Hours	$75.00	$ 3,000.00	3,000.00			$ 3,000.00
Engineer	80	Hours	$140.00	$ 11,200.00	11,200.00			$ 11,200.00
Monitoring	40	Hours	$75.00	$ 3,000.00		3,000.00		$ 3,000.00
			Sub-Total	**$ 32,200.00**	**$ 14,200.00**	**$ 18,000.00**	**$ -**	**$ 32,200.00**
Travel								
Mileage	1000	Miles	$0.68	$ 680.00		680.00		$ 680.00
			Sub-Total	**$ 680.00**	**$ -**	**$ 680.00**	**$ -**	**$ 680.00**
Construction Materials****								
Willow/Wood Collection	13000	Stems	$2.00	$ 26,000.00		26,000.00		$ 26,000.00
Containerized Shrub Plantings	350	Plants	$12.00	$ 4,200.00	4,200.00			$ 4,200.00
Mix	30	lbs	$26.60	$ 798.00	798.00			$ 798.00
Installed	11,280	feet	$1.50	$ 16,920.00		16,920.00	78,960.00	$ 95,880.00
			Sub-Total	**$ 47,918.00**	**$ 4,998.00**	**$ 42,920.00**	**$ 78,960.00**	**$ 126,878.00**
Equipment, Labor, and Mobilization								
Bulk Excavation	1585	Cubic Yards	$4.50	$ 7,132.50	7,132.50			$ 7,132.50
Soil Disposal	790	Cubic Yards	$5.00	$ 3,950.00	3,950.00			$ 3,950.00
Construction	4673	Linear Feat	$15.00	$ 70,095.00	70,095.00			$ 70,095.00
			Sub-Total	**$ 81,177.50**	**$ 81,177.50**	**$ -**	**$ -**	**$ 81,177.50**
			TOTALS	**$ 161,975.50**	**$ 100,375.50**	**$ 61,600.00**	**$ 78,960.00**	**$ 240,935.50**

Additional details: In-kind labor and material justification: MFP staff time and mileage will be billed to an unrestricted project fund; rate is loaded employee rate/hr. Willow collection by volunteers was based on $2/stem which is comparable to the cost of purchasing them.

APPLICATION MATCHING CONTRIBUTIONS

(do not include requested funds or contributions not associated with the application)

CONTRIBUTOR	IN-KIND	CASH	TOTAL	Secured? (Y/N)
Montana Freshwater Partners	$ 3,680.00	$ -	$ 3,680.00	Y

Landowner	$ -	$ 31,920.00	$ 31,920.00	Y
Volunteers	$ 26,000.00		$ 26,000.00	N
TOTALS	**$ 29,680.00**	**$ 31,920.00**	**$ 61,600.00**	

OTHER CONTRIBUTIONS

(contributions not associated with the application)

CONTRIBUTOR	IN-KIND	CASH	TOTAL	Secured? (Y/N)
Landowner	$ -	78,960.00	$ 78,960.00	Y
	$ -	$ -	$ -	
	$ -	$ -	$ -	
	$ -	$ -	$ -	
	$ -	$ -	$ -	
	$ -	$ -	$ -	
	$ -	$ -	$ -	
	$ -	$ -	$ -	
TOTALS	$ -	**$ 78,960.00**	**$ 78,960.00**	

Montana Fish, Wildlife & Parks
Region 3 Headquarters
1400 South 19th Street
Bozeman, MT 59718

November 15, 2023

Future Fisheries Improvement Program
FWP Fisheries Division
P.O. Box 200701
Helena, MT 59620

Dear Future Fisheries Improvement Review Panel,

Montana Fish Wildlife and Parks is supportive of Montana Freshwater Partners' (MFP) Future Fisheries grant proposal for streambank restoration on Flathead Creek. Flathead Creek supports a population of native Yellowstone cutthroat trout and contributes to the high genetic diversity and conservation value of the Shields River Watershed.

Over the past 18 months, MFP brought a diverse group of water resource professionals and landowners together to collaboratively identify and prioritize restoration, planning, and outreach projects, with the goal of increasing watershed health and resilience of the Upper Yellowstone and Shields Watersheds. This planning effort has been in direct concert with the Upper Yellowstone and Shields Watershed Groups, as well as other local partners including non-governmental organizations, local, state, and federal agencies. The project proposed here ranked out as a high priority project through this planning effort, due to its benefits to aquatic habitat and sensitive and threatened fish and wildlife species as well as the scale of the project.

More specifically, due to intensive historic overgrazing and agricultural practices, portions of the stream channel throughout the project area are lacking in woody riparian vegetation and have become oversimplified. The stream is actively incising creating tall eroding streambanks that contribute to the unnaturally high sediment in the Shields River, which is listed on the states' 303(d) list of impaired waterbodies due to physical and ecological impacts resulting from sediment. This project will improve fish habitat through riparian shading and increased floodplain connectivity, while also reducing unnatural levels of erosion and resulting sediment inputs into Flathead Creek. The project will also prevent future degradation of the stream and riparian area by establishing riparian fencing that will prevent further overuse by livestock.

Thank you for considering this request for funding.

For questions or concerns, please reach out to the following FWP personnel:

Scott Opitz, Fisheries Biologist (406-223-3951, sopitz@mt.gov)
Jen Smitham, Region 3 public comment coordinator (406-495-3262, jsmitham@mt.gov)

Sincerely,

Warren Hansen
Acting Region 3 Supervisor

FLATHEAD CREEK CHANNEL RESTORATION

PROJECT LOCATION

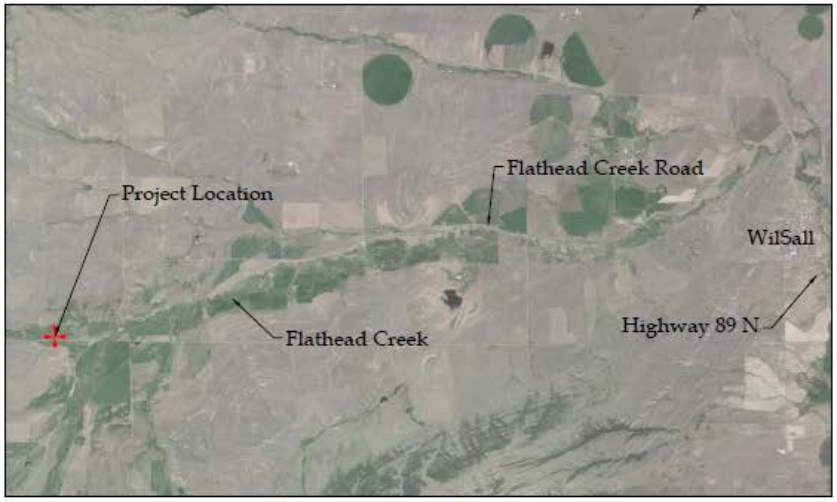
LOCATED IN GALLATIN COUNTY AT 505 FLATHEAD CREEK ROAD, WILSALL, MT

AT

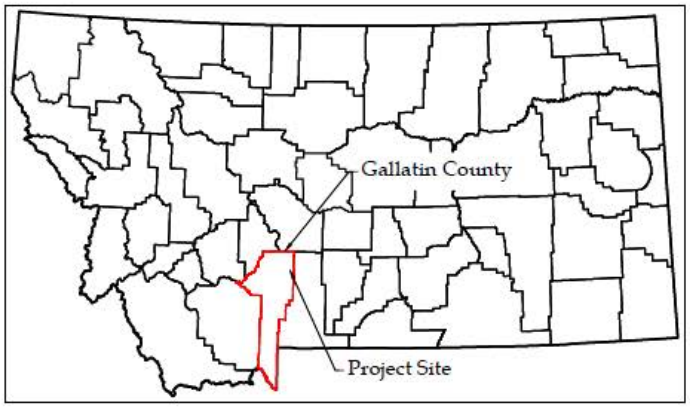
N ½ SW ¼ SE ¼ , N ½ SE ¼ SW ¼ , AND N½ SW¼ SW ¼ & SW ¼, SW1/4 OF SECTION 27, & S½ SE¼ SE¼, S½ SW¼ SE¼ , N½ SE¼ SW¼ & N½ SW¼ SW¼ OF SECTION 28 All IN TWP 3N, RANGE 7E

APPROXIMATE PROJECT CENTROID - LATITUDE = 45° 58' 30" NORTH; LONGITUDE = 110° 51' 18" WEST

PROJECT OWNER: BRUCE ANGIOLILLO



PROJECT SITE MAP
Scale: 1" = 4,000'



VICINITY MAP

SHEET INDEX:

RESTORATION ENGINEERING LLC
Aquatic Restoration and Environmental Hydraulics

VICINITY MAP AND SHEET INDEX
FLATHEAD CREEK CHANNEL RESTORATION
ANGIOLILLO PROPERTY

NO.	DATE	DESCRIPTION

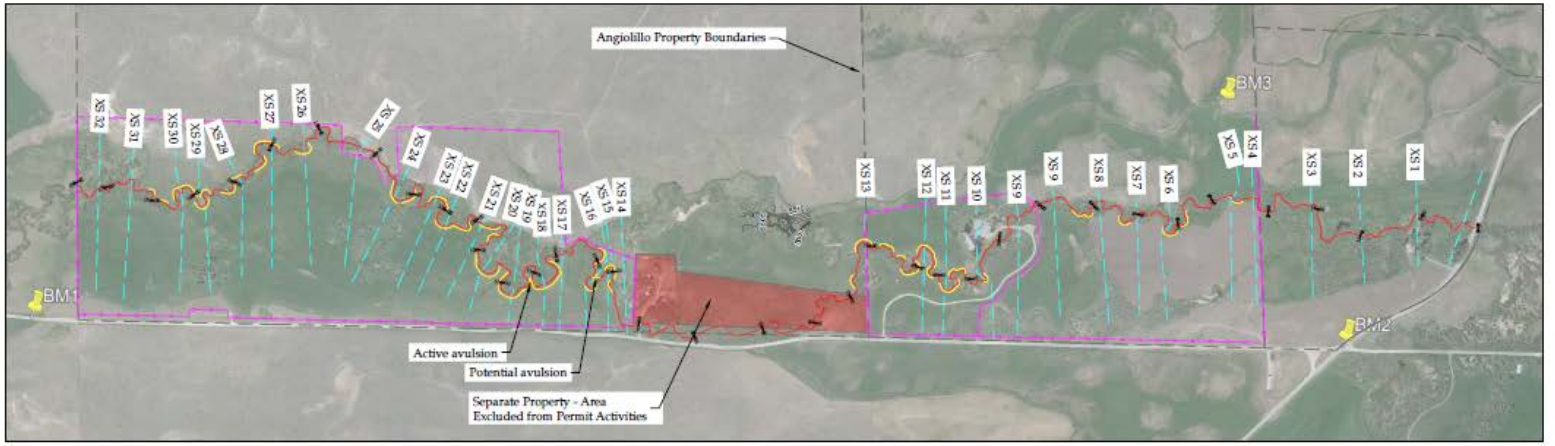
PROJECT NO: 0623-01

DESIGNED: TC DRAWN: TC CHECKED:

PROJECT NO:

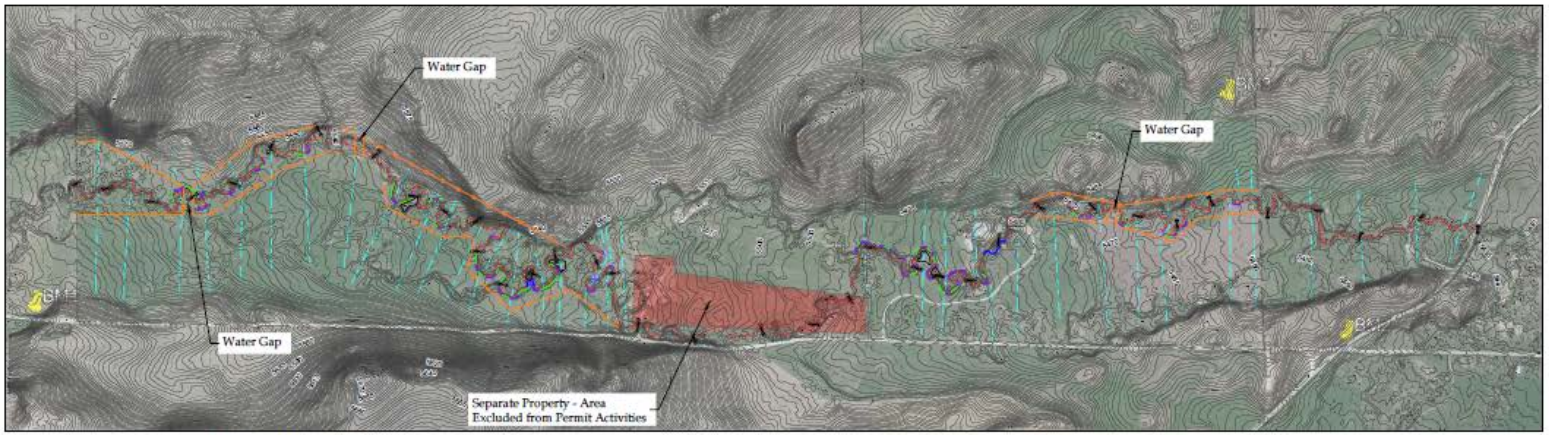
DATE: 11/6/2023

FIGURE: 1



Existing Conditions - Terrace Erosion	
Active Terrace Erosiong	6,360 Feet

Existing Fence
XS ## Cross Sections
Channel Centerline Alignment



Proposed Treatment Quantities	
Terrace Excavation/Composite Wood Toe (Pools)	2800 Feet
Terrace Excavation/Sod Bank Construction	1870 Feet
Avulsion Reversal/Prevention	Included in Channel Realignment
Channel Realignment	325 Feet
Floodplain Excavation	17275 Ft²
New Fence	11,280 Feet

XS ## Cross Sections
Channel Centerline Alignment

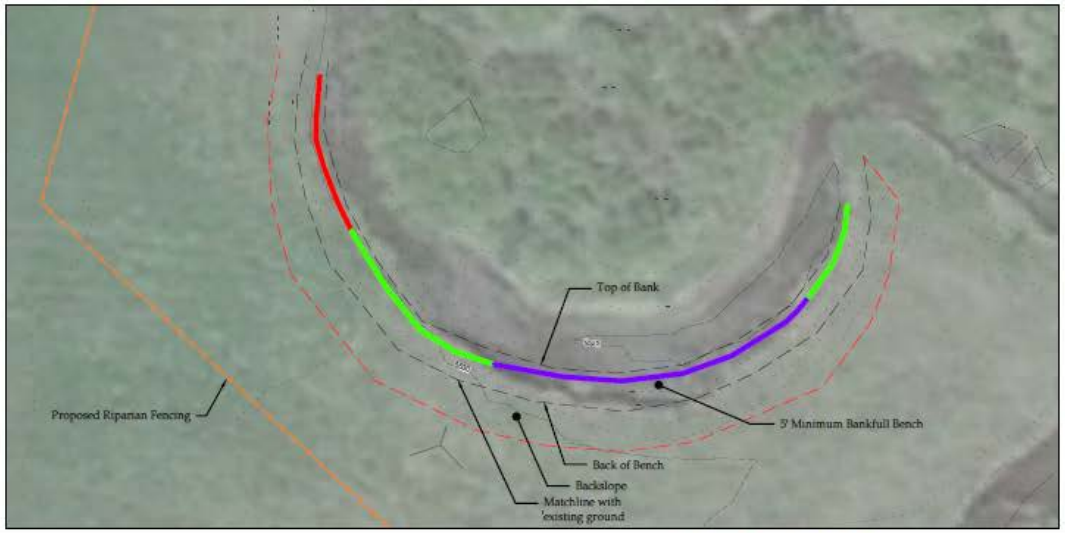
0 800 1600 Feet

RESTORATION ENGINEERING LLC
Aquatic Restoration and Environmental Hydraulics

PROJECT OVERVIEW
FLATHEAD CREEK CHANNEL RESTORATION
ANGIOLILLO PROPERTY

NO.	DATE	DESCRIPTION

PROJECT NO: 0623-01
DESIGNED: TC DRAWN: TC CHECKED:
PROJECT NO:
DATE: 11/6/2023
FIGURE: 2



General Notes:
Lateral bank erosion into terrace surfaces occurs throughout the project reach. A composite wood toe treatment in conjunction with a constructed bankfull bench is proposed to create a stable bank margin. Near term stability is provided by a matrix of live and dead wood stems backfilled and compacted with native alluvium. Over time as wood materials degrade, long term stability will transition to be governed by mature native vegetation. The bankfull bench serves multiple purposes. It provides favorable hydrology for establishing riparian vegetation, it expands the flood prone area and it reduces bank height, reducing bank loss due to gravitational collapse.

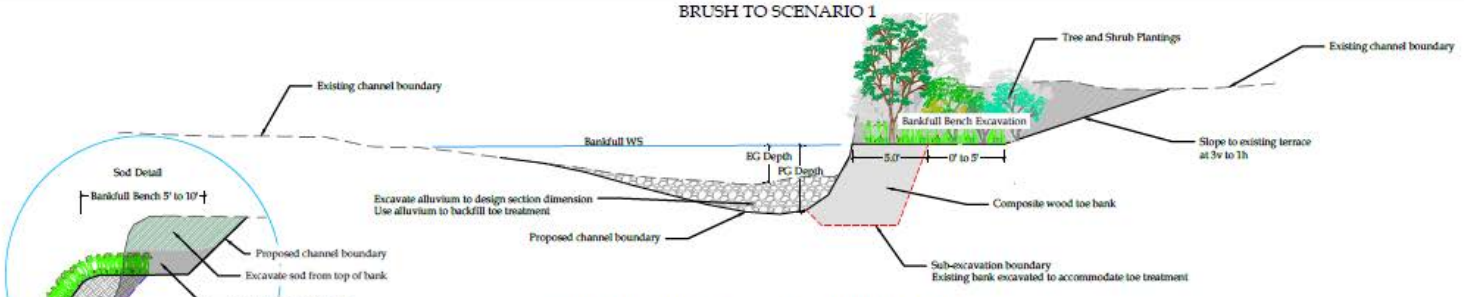
Though the reach, the channel width is appropriate for a C4 Type Channel in some reaches and it is over-widened in others. Where appropriate channel dimensions occur adjacent to terrace erosion the existing terrace will be excavated to accommodate the composite wood toe treatment and bankfull bench (Scenario 1). Where the channel is over-widened adjacent to an eroding terrace the wood toe treatment will be constructed in the active channel to narrow the channel section (Scenario 2).

BRUSH TOE SCENARIO 1

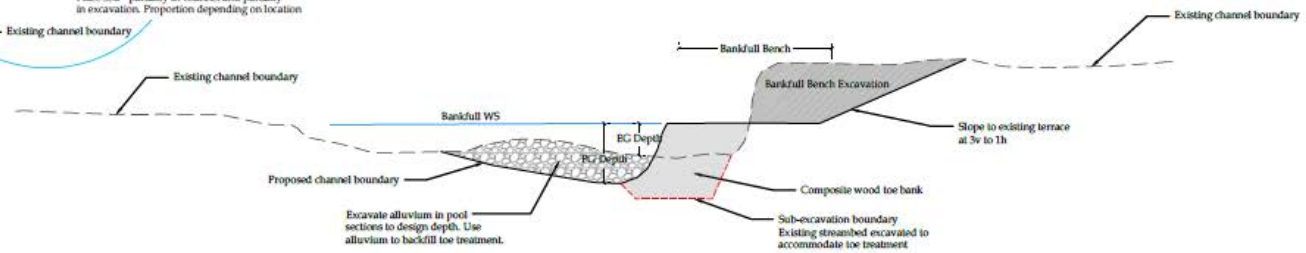
BRUSH TOE SCENARIO 2

SOD TOE SCENARIO

BRUSH TO SCENARIO 1



BRUSH TOE SCENARIO 2 - (OVER-WIDENED SECTIONS)



RESTORATION ENGINEERING LLC
Aquatic Restoration and Environmental Hydraulics

BANK RESTORATION DETAIL

FLATHEAD CREEK CHANNEL RESTORATION

ANGIOLILLO PROPERTY

NO.	DATE	DESCRIPTION

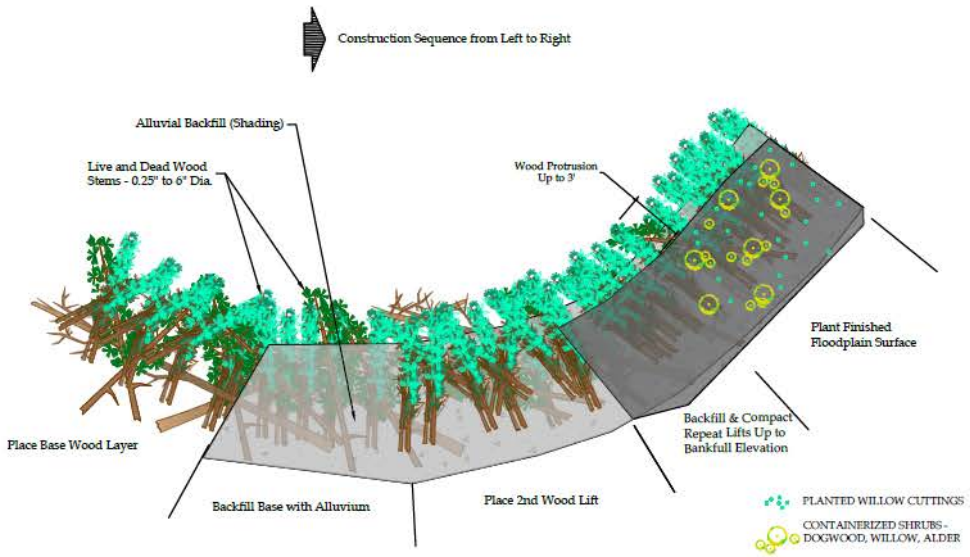
PROJECT NO: 0623-01

DESIGNED:	DRAWN:	CHECKED:
TC	TC	

PROJECT NO:
DATE: 11/6/2023

FIGURE: 3

COMPOSITE WOOD TOE PLAN VIEW DETAIL

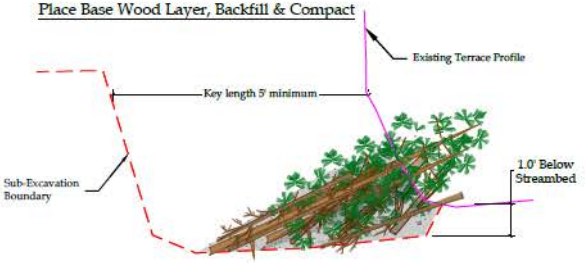


Composite Wood Toe Construction - Typical Installation

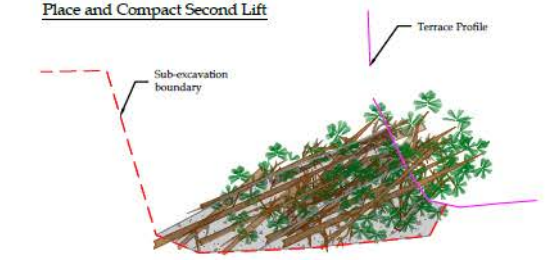
WOOD TOE BANK CONSTRUCTION SEQUENCE:

1. Composite wood toe banks shall be constructed in lifts with large and small wood stems from 0.25" to 6.0" in diameter and 3 to 10 feet in length.
2. Larger stems can be used as base logs and within the wood toe matrix.
3. Stems may be both live and dead wood.
4. Composite wood toe banks shall be keyed laterally into channel banks a minimum 5 feet.
5. Stems shall be placed in 1' - 1.5' lifts at a density of approximately 5 - 10 stems per lineal foot of bank.
6. Stems shall be placed at a variety of orientations to the flow direction.
7. Each wood toe lift shall be backfilled with alluvial gravels per material specification.
8. Backfilled lifts will be bucket compacted until the lift is firm and unyielding.
9. Placement and compaction of lifts shall be repeated until the finished bank height is achieved.
10. Lifts shall be constructed so that brush and live willow stems angle back into the bank as shown.
11. Live stems should protrude from the face and top of the constructed bank with at least 2-lateral stem buds exposed.
12. Flexible stems shall be placed so that they protrude into the channel 1' to 3' at a density that provides full coverage of the finished bank surface.

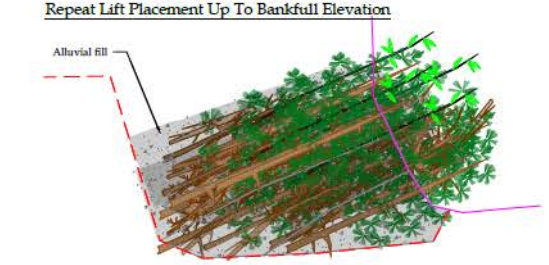
Place Base Wood Layer, Backfill & Compact



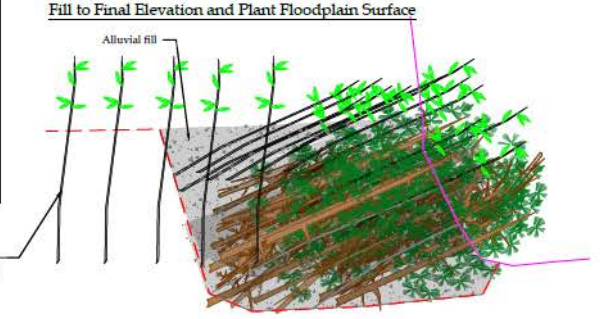
Place and Compact Second Lift



Repeat Lift Placement Up To Bankfull Elevation



Fill to Final Elevation and Plant Floodplain Surface



RESTORATION ENGINEERING LLC
Aquatic Restoration and Environmental Hydraulics

COMPOSITE BRUSH TOE DETAIL

FLATHEAD CREEK CHANNEL RESTORATION

ANGIOLILLO PROPERTY

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FIGURE: 4

MATERIAL QUANTITIES & ESTIMATED COSTS				
DESCRIPTION	QUANTITY	UNITS	UNITS COST	TOTAL ESTIMATED COST
Bulk Excavation	1,585	YD^3	$4.50	$7,130.00
Soil Disposal	790	YD^3	$5.00	$3,950.00
Bank Construction	4,673	LF	$15.00	$70,095.00
Live Willow/ Wood Collection	13,000	STEMS	$2.00	$26,000.00
Containerized Shrub Plantings	350	STEMS	$12.00	$4,200.00
Riparian Seed Mix	30.00	LBS	$26.60	$798.00
Riparian Fence Installed	11,280	FT	$8.80	$99,265.00
			TOTAL	$211,438.00

Containerized Tree & Shrub Species List
Species
Alder (*Alnus incana*)
Narrowleaf Cottonwood (*Populus angustifolia*)
Red Osier Dogwood (*Cornus sericea*)
Bebb Willow (*Salix bebbiana*)

Sizes vary depending on availability

Riparian Seed Mix
Species
Baltic Rush (*Juncus balticus*)
Bluejoint Reedgrass (*Calamagrostis canadensis*)
Tufted Hair Grass (*Deschampsia cepitosa*)
Blue Wildrye (*Elymus glaucus*)
Nebraska Sedge (*Carex nebrascensis*)
Mountain Bromegrass (*Bromus marginatus*)
Slender Wheatgrass (*Elymus trachycaulus*)
Western Wheatgrass (*Pascopyrum smithii*)
Beaked Sedge (*Carex rostrata*)
Western Yarrow (*Achillea millefolium*)

RESTORATION ENGINEERING LLC
Aquatic Restoration and Environmental Hydraulics

MATERIAL QUANTITIES & ESTIMATED COSTS

FLATHEAD CREEK CHANNEL RESTORATION

ANGIOLILLO PROPERTY

NO.	DATE	DESCRIPTION

PROJECT NO: 0623-01

DESIGNED: TC DRAWN: TC CHECKED:

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SHEET NO: 5