BRACKETT CREEK HABITAT IMPROVEMENT AND EROSION CONTROL PROJECT

Application to the Future Fisheries Improvement Program Grant
November 15, 2022

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

Mailing Address: 321 E Main Street, Suite 401

City: Bozeman State: MT 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): Greg and Anne Avis

Mailing Address: PO Box 38

City: Clyde Park State: MT Zip: 59018

Telephone: (650)387-0286 E-mail: gavis@mac.com

II. PROJECT INFORMATION

A. Project Name: Brackett Creek Habitat Improvement and Erosion Control

River, stream, or lake: Stream

Location: Township: Range: Section:

Latitude: Longitude: *Within project (decimal degrees)*

County: Park

B. Purpose of Project:

Brackett Creek is a tributary of the Shields River that supports a population of Yellowstone Cutthroat Trout and provides cold, clean water to the frequently dewatered Shields. TU has secured a water lease for instream flow of large senior water rights through the Avis Ranch and is in the process of securing another senior lease. Due to historic land use and a wooden bridge crossing and confining the channel, Brackett Creek on the Avis Ranch has a high level of instability and many high, eroding banks on outside bends, contributing excess fine sediment to the channel, limiting deep pool habitats, and creating potential for further channel degradation. This instability is leading to loss of downstream habitat due to sediment input and channel avulsion. These impairments are typical of recent conditions throughout Brackett Creek, and various landowners along the creek have implemented restoration projects aimed at stabilizing banks and reducing sediment input (Bockmon and Endicott, 2016). The purpose of this project is to increase watershed resilience and protect and improve wild and native fish habitat by stabilizing eroding banks using stable channel geometry, native vegetation, and other “soft” techniques.

C. Brief Project Description (attach additional information to end of application):

This project will employ a variety of natural bank stabilization and restoration techniques to achieve the outcomes of decreasing erosion, stabilizing the channel, and improving aquatic habitat for native and wild fish. We are seeking funding for both design and implementation work; the current project designs are conceptual and subject to change. There are approximately 10 vertical highly eroding outside bend banks with a distance from top of bank to water surface ranging from two to four feet. The vertical faces of these banks are bare soil, making them highly prone to erosion that contributes excess fine sediment to Brackett Creek. The project will employ three primary techniques/actions:

1. Remove a bridge causing channel instability. The wooden bridge just downstream from a road crossing has been identified as a primary cause of channel instability. This bridge is likely remnant infrastructure from when the land between the creek and road was hayed; it is no longer needed and will be removed as part of this project. The bridge removal will relieve the artificial constriction of the channel and allow the stream to function more naturally.
2. Increase riparian vegetation along eroding banks. Willow fascines/wattles and live stakes will be used heavily to increase roughness along outside bends. Fascines/wattles will be created by cutting willows on-site and forming them into log-shaped bundles. These bundles will be placed along the toe of the bank and stakes will be used to hold them in place (Design Example 1). These bundles will disrupt the stream velocity around the outside bend and provide a “soft armor” that will trap sediment at the toe of the bank and naturally create a more stable bank geometry. The willows will take root, further stabilizing the banks. Willow live stakes and other native plants will be used to increase deep rooted riparian vegetation throughout the project area to prevent future erosion in other locations. In time, the willows will provide shade to the channel, overhead cover for fish, and future sources for woody debris and rootwads in the channel. Many of the deepest, most complex pools in this stream reach are formed around the roots of a willow or alder growing on the edge of the bank.
3. Re-slope the banks to create a more stable channel geometry. The eroding banks are typically vertical, with a distance from top of bank to water surface ranging from two to four feet. Where vegetation alone will not provide adequate erosion control, or where the current bank geometry will not easily support vegetative growth (e.g., vertical face of eroding bank), the banks will be re-sloped into a more stable geometry before planting native vegetation. Work will primarily be conducted by hand crews to cause minimal disturbance to the banks, but heavy equipment may be used where re-sloping the banks is necessary.

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

The current channel instability in Brackett Creek is the result of a variety of historic use factors. Prior to the 1990's, the stream was confined into a single-thread channel that was channelized along the base of the county road. The stream was restored to a historic channel in the 1990s, but haying operations continued on both sides of the stream; this is likely when the wooden bridge was constructed and began causing instability. Haying up to the edge of the channel caused shallow rooted grasses to replace deep-rooted, native vegetation in the riparian zone, leaving the banks vulnerable to erosion during high flow events. This project will remove the constriction caused by the bridge and allow the channel to function more naturally, will enlarge or create a vegetative buffer along the existing hayfield on the south side of the channel, and will further ameliorate instability and erosion by using soft methods – stable geometry and native vegetation – to increase bank stability.

E. Length of stream or size of lake that will be treated (project extent): 0.7 miles

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

F. Project Budget Summary:

Grant Request (Dollars):	**$**	**26,000.00**
Matching Dollars:	**$**	**25,997.00**
Matching In-Kind Services:*	**$**	**25,862.00**

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

Other Contributions (not part of this app)	**$**	**6,920.00**
Total Project Cost:	**$**	**84,779.00**

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 fish biologist support). List any other project partners:

Letters of support from the landowner and FWP 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
x	

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

This project is designed to require little to no maintenance once vegetation is established. The project will be monitored for several years after implementation and will be maintained as necessary. After the monitoring period, the landowner will work with Trout Unlimited for any required maintenance.

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 will not be part of or adjacent to the project.

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 determine project success and as required by our permits and funding. Short-term project benefits and lessons learned will be assessed through vegetation monitoring, and photo monitoring at established locations. Long-term project benefits and lessons learned will be assessed through photo monitoring.
Pre-project data will be collected and will include erosion hazard index surveys at each eroding bank and establishment of photo monitoring points. Fish surveys will be conducted to assess species presence/absence. All monitoring 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?

This project will improve habitat and spawning gravels for native Yellowstone cutthroat trout, mountain whitefish and wild brown trout. Rainbow trout and brook trout are present in the area, but relatively rare.

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

This project will protect and enhance wild fish habitat by removing the drivers of channel instability in this reach, thereby improving downstream stability and habitat; increasing riparian vegetation; and using “soft” methods such as vegetation and re-sloping to stabilize banks and decrease erosion. Bank erosion has been identified as one of the primary limiting factors to Yellowstone cutthroat trout in Brackett Creek, and eroding banks contributing fine sediment are abundant on private lands along the creek (Endicott et al., 2012). Excessive fine sediment fills the interstitial spaces between larger channel substrate such as gravels and cobbles, decreasing oxygen availability in coarse substrate and impacting the trout populations by limiting spawning and invertebrate habitat. Historically, sections of Brackett Creek were confined in artificial channels on the margins of the valley bottom to create more available land for agricultural use. Many landowners along the creek have initiated restoration projects to restore Brackett Creek to its natural channel and improve and expand fish habitat. These projects, including re-naturalizing the stream to its historic channel on this property, have largely been successful. However, historic vegetative clearing and replacement with shallow-rooted, non-native grasses has left the re-naturalized channel vulnerable to erosion due to the lack of mature, deep-rooted riparian vegetation. Re-sloping the banks and revegetating with deep rooted woody vegetation and native sod will create a more stable channel geometry and provide protection during high flows, decreasing fine sediment input to the channel. Additionally, mature riparian vegetation will shade the channel and provide instream cover and complex habitat for native and wild fish.

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

This project will protect and improve fish habitat and spawning gravels by decreasing erosion, decreasing future channel avulsion, and increasing riparian vegetation. Decreased erosion will decrease fine sediment input to the channel, improving both spawning habitat and invertebrate habitat. Ameliorating the current channel instability will decrease the likelihood that the channel will cut off a large meander at the downstream end of the project site, which would shorten the stream length and remove approximately 750 feet of fish habitat from the system. Currently the highest quality fish habitat in the project reach is created around willows and alders along the channel margins. This project will enhance pool habitats, vital for overwintering trout. Improving riparian vegetation will increase this type of habitat, will shade the stream and maintain cool water temperatures, and will provide fish with cover from overhead predators. While there is no public fishing access within the project reach, anglers can legally access Brackett Creek just downstream of the project area. Improving the fishery here will translate to improved fisheries throughout Brackett Creek and into the Shields. Anglers at public access points on the Shields River could very well catch a fish that was spawned in the project reach.

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.

The benefits of this project will extend beyond the project reach. While there is no public fishing access directly within the project reach, improving the fishery here will bolster the fishery throughout Brackett Creek and into the Shields. Anglers at public access points nearby and on the Shields River could very well catch a fish that was spawned in the project reach, and decreasing fine sediment input to the stream could improve the spawning and invertebrate habitat of downstream locations as well.

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

This project is designed to continue to improve overall watershed health and resiliency beyond fish habitat. Fortunately, what is good for the fish is typically good for the watershed, and this is the case in Brackett Creek. Trout Unlimited has held a water lease of the project, maintaining instream flows for over a decade. This project aims to build on the flow project and fix the causes of the channel instability and erosion, thereby restoring natural function and processes to the stream, in turn improving overall stream health and resiliency. The Shields River at the confluence with Brackett Creek is chronically dewatered resulting in high, mid-summer water temperatures. By restoring habitat, streamflow, and water quality, Brackett Creek provides thermal refuge and spawning habitat for Shields fish populations. By decreasing erosion and increasing riparian vegetation this project will benefit other aquatic and terrestrial animals. Aquatic invertebrates will benefit from improved habitat in interstitial spaces and increased leaf litter and other detritus in the stream, birds will benefit from increased habitat and food availability in the form of insects and fish, and mammals such as beaver, deer, moose, muskrat, and bears will benefit from improved habitat and food sources. This project leverages improving fish habitat and angler opportunity as a means to improve all aspects of the riparian system.

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

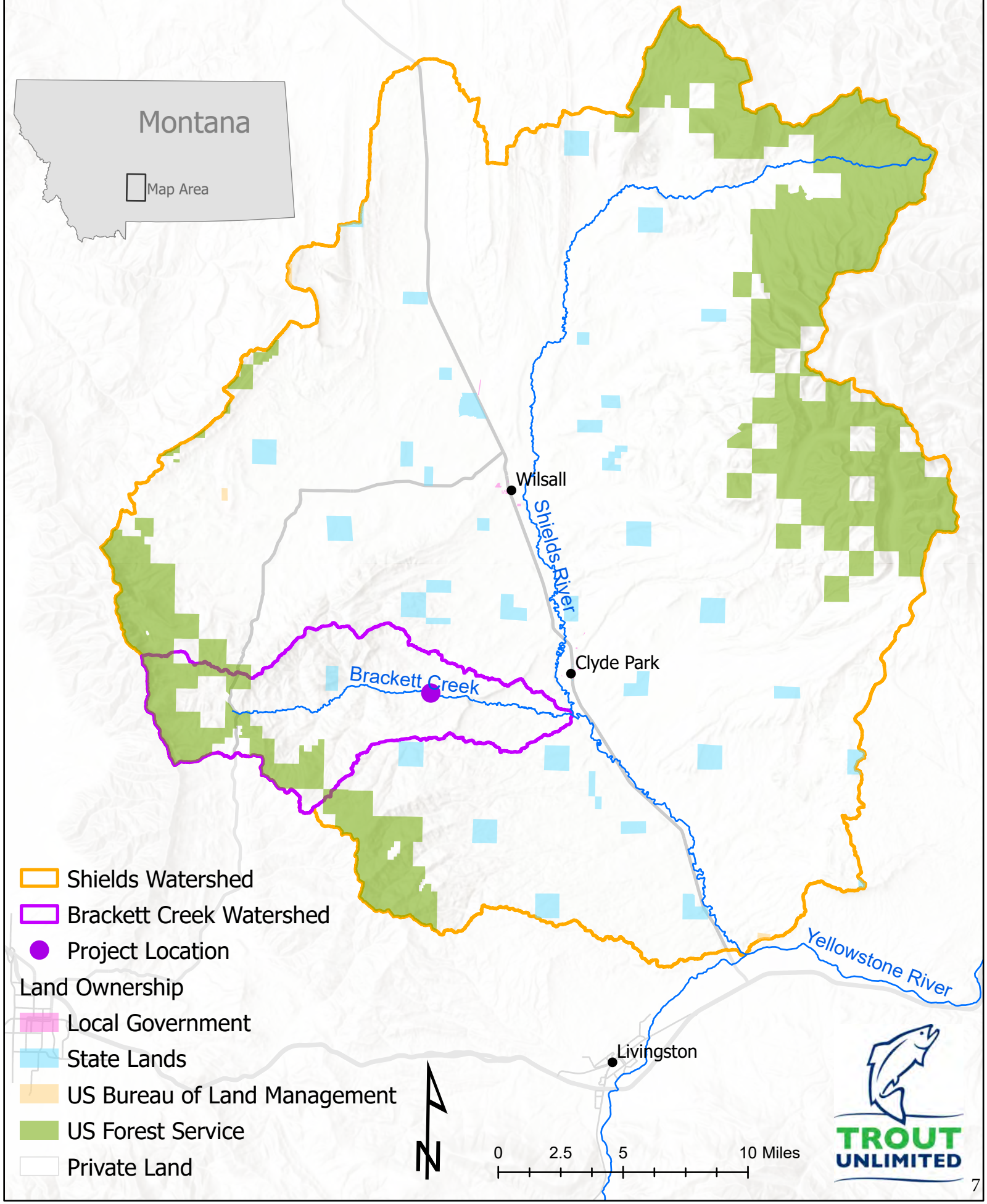
I (we) hereby declare that the information and all statements to this application are true, complete, and accurate to the best of my (our) knowledge and that the project or activity complies with rules of the Future Fisheries Improvement Program.

Applicant Signature: _____ Date: 11/15/2022

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

Brackett Creek Project Location

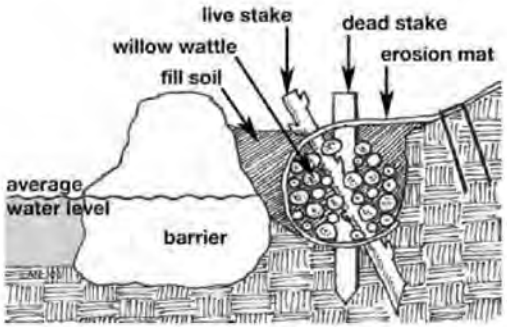


Brackett Creek Habitat Improvement and Erosion Control Project Extent

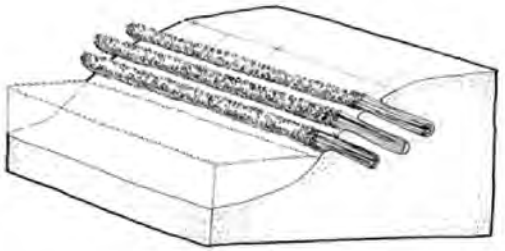
Example Design Sketches

Trout Unlimited is seeking funding for design/build of this project, and design work has not begun. The following sketches and photos are examples of design options for this project.

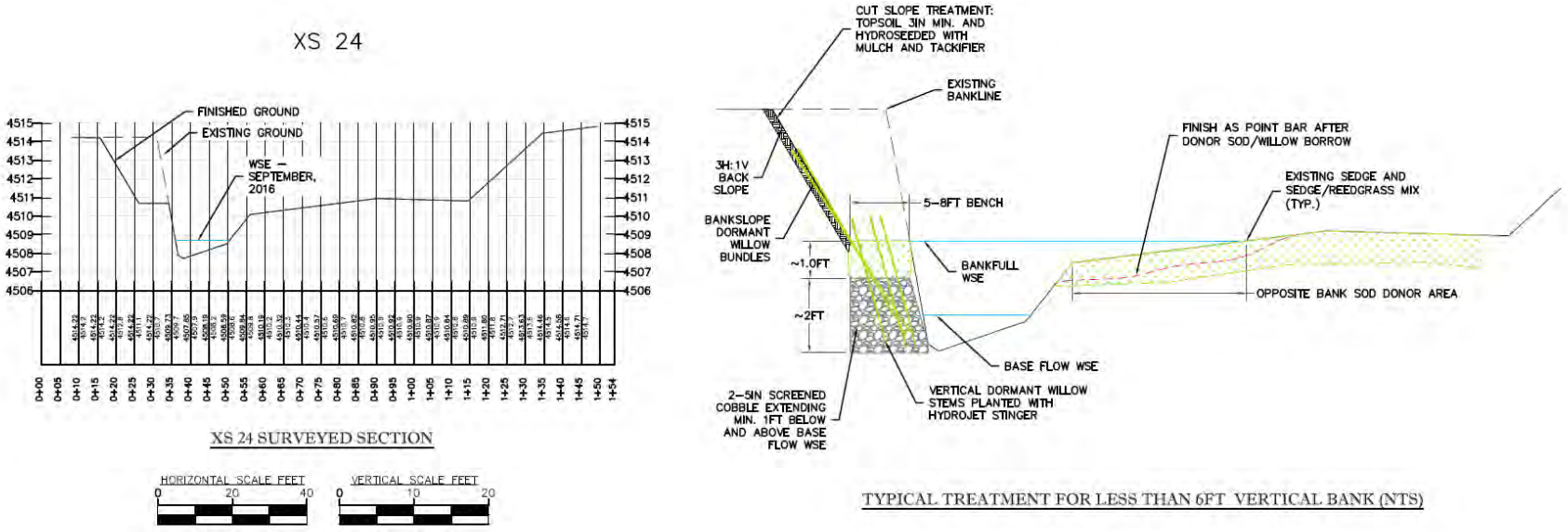
Willow wattles & fascines: Bundles of willow poles bound or woven and installed in shallow trenches along stream banks or other appropriate erosion-prone areas to increase bank stability. Drawings by Larry Nygaard.



Brush Layering: Vertical bundles of willow poles installed in 2-3 foot deep layers (back and down into bank), along stream banks to increase bank stability. USDA-NRCS, Aberdeen Plant Materials Center. Drawing by Gary Bentrup.



Design Example 1. Example drawings of willow wattles/fascines and potential uses (Lezberg and Giordanengo, 2008)



Design Example 2. Example of the design for re-sloping banks to create a stable bank geometry.

Pre-project Photographs

Photograph locations align with letters on the Brackett Creek Habitat Improvement and Erosion Control Project Extent map.

C. 45.87225, -110.72362

F. 45.87231, -110.72261

H. 45.87240, -110.72141

L. 45.87183, -110.72021

Ashley Brubaker
Upper Yellowstone-Shields Project Manager
Trout Unlimited
321 E Main St. Suite 411
Bozeman, Mt 59715

November 4, 2022

Re: Brackett Creek

Dear Ashley Brubaker,

Montana Fish, Wildlife & Parks (FWP) appreciates the opportunity to comment on this stream restoration project on Brackett Creek.

FWP supports the proposed bank stabilization and restoration on Bracket Creek. This includes the removal of the bridge that is no longer needed, increasing and improving the riparian vegetation on eroding banks, and re-sloping of vertical banks to stabilize channel geometry. We believe these efforts will improve stream form and function, reduce sediment deposition, and improve habitat for native Yellowstone cutthroat and brown trout in Brackett Creek.

For further questions or concerns, please reach out to the following FWP personnel: Scott Opitz, Fisheries Biologist (phone:406-223-3951, email: sopitz@mt.gov)

Sincerely,

Marina Yoshioka
Region 3 Supervisor

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

November 15, 2022

Dear Future Fisheries Coordinator and Review Panel,

I am writing in support of Trout Unlimited's Brackett Creek Habitat Improvement and Erosion Control Project application to the Future Fisheries Improvement Program grant. This project will improve Brackett Creek fish habitat, decrease bank erosion, and improve the overall resiliency of the stream using minimally disruptive methods. Our family has supported Trout Unlimited for over 10 years and has partnered with them to maintain instream flows through water leases in Brackett, Bangtail, and Canyon Creeks. We have had many conversations about our shared goals to improve fish habitat and watershed resiliency and are pleased to partner with them on a stream restoration and habitat improvement project on our ranch. We will support this project by donating funds and materials to decrease sediment input to the stream from heavily eroding banks and to increase native riparian vegetation. The completed project will provide long-lasting improvements to wild and native trout habitat and support a robust fishery in the Shields River. We thank you for considering this project for funding.

Sincerely,

Greg Avis

BUDGET TEMPLATE SHEET FOR FUTURE FISHERIES PROGRAM APPLICATIONS

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	survey and wetland delineation	$5,000.00	$ 5,000.00		5,000.00		$ 5,000.00
Design	1	consultant design	$25,000.00	$ 25,000.00	11,170.00	13,830.00		$ 25,000.00
Engineering				$ -				$ -
Permitting	40	Hours	$45.00	$ 1,800.00		1,800.00		$ 1,800.00
Oversight	40	Hours	$45.00	$ 1,800.00		1,800.00		$ 1,800.00
TU Staff Time	140	Hours	$45.00	$ 6,300.00		6,300.00		$ 6,300.00
			Sub-Total	$ 39,900.00	$ 11,170.00	$ 28,730.00	$ -	$ 39,900.00
Travel								
Mileage	1000	mile	$0.68	$ 680.00		680.00		$ 680.00
Per diem				$ -				$ -
			Sub-Total	$ 680.00	$ -	$ 680.00	$ -	$ 680.00
Construction Materials****								
gravel	85	cubic yard	$15.00	$ 1,275.00	1,275.00			$ 1,275.00
landscaping cloth/burlap	13	rolls	$235.00	$ 3,055.00	3,055.00			$ 3,055.00
fabric stakes	1	box	$87.00	$ 87.00		87.00		$ 87.00
Posts	300	post	$2.00	$ 600.00		600.00		$ 600.00
Willow Stakes	10000	stakes	$1.50	$ 15,000.00		15,000.00		$ 15,000.00
			Sub-Total	$ 20,017.00	$ 4,330.00	$ 15,687.00	$ -	$ 20,017.00
Equipment, Labor, and Mobilization								
Heavy equipment and operator	5	days	$1,000.00	$ 5,000.00	1,000.00	4,000.00		$ 5,000.00
Mobilization	1	mobilization	$500.00	$ 500.00	500.00			$ 500.00
MCC Hand Crew	2	weeks	$4,500.00	$ 9,000.00	9,000.00			$ 9,000.00
TU Staff labor	40	hours	$45.00	$ 1,800.00		1,800.00		$ 1,800.00
Volunteers	50	person hours	$19.24	$ 962.00		962.00		$ 962.00
Bridge Demolition	1	Demolition	$6,920.00	$ 6,920.00			6,920.00	$ 6,920.00
			Sub-Total	$ 24,182.00	$ 10,500.00	$ 6,762.00	$ 6,920.00	$ 24,182.00
			TOTALS	$ 84,779.00	$ 26,000.00	$ 51,859.00	$ 6,920.00	$ 84,779.00

BUDGET TEMPLATE SHEET FOR FUTURE FISHERIES PROGRAM APPLICATIONS

OTHER REQUIREMENTS:

All of the columns in the budget table and the matching contribution table MUST be completed appropriately or the application will be invalid. Please see the example budget sheet for additional clarification.

*Units = feet, hours, inches, etc. Do not use lump sum unless there is no other way to describe the costs.

**Can include in-kind materials. Justification for in-kind labor (e.g. hourly rates used). Do not use government salaries as match. Describe here or in text.

***The Review Panel suggests that design and oversight costs associated with a proposed project not exceed 15% of the total project budget. If design and oversight costs are in excess of 15%, applications must include a justification or minimum of two competitive bids for the cost of undertaking the project.

****The Review Panel recommends a maximum fencing cost of $1.50 per foot. Additional costs may be the responsibility of the applicant and/or partners.

Additional details: ** In-kind labor justification: TU staff time for this particular project will be billed to an unrestricted project fund, rate is loaded employee rate/hr. Volunteer hourly rate is based on 2021 State Occupational Employment and Wage Estimates for Montana (https://www.bls.gov/oes/current/oes_mt.htm#45-0000). The mean rate for "Farming, Fishing, and Forestry Occupations" was used in calculations = $19.24. ***This project is seeking funding for design/build. The design will be put out for competitive bid and price is subject to change. Much of the labor will be done by hand by the Montana Conservation Corps, volunteers, and TU staff, and a large amount of the materials will be sourced on site, keeping labor and materials costs to a minimum.

APPLICATION MATCHING CONTRIBUTIONS

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

CONTRIBUTOR	IN-KIND	CASH	TOTAL	Secured? (Y/N)
Trout Unlimited	$ 10,862.00	$ -	$ 10,862.00	Y
Landowner	$ 15,000.00	$ 26,000.00	$ 41,000.00	Y
	$ -	$ -	$ -	
TOTALS	$ 25,862.00	$ 26,000.00	$ 51,862.00	Y

OTHER CONTRIBUTIONS

(contributions not associated with the application)

CONTRIBUTOR	IN-KIND	CASH	TOTAL	Secured? (Y/N)
Bridge Demolition	$ -	$ 6,920.00	$ 6,920.00	N
	$ -	$ -	$ -	
TOTALS	$ -	$ 6,920.00	$ 6,920.00	

Citations

Bockmon, S, and Endicott, C.L. 2016. Future Fisheries Improvement Program Monitoring, 2016. Montana Fish, Wildlife, and Parks, Livingston Fisheries Office, Livingston, Montana.

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.

Lezberg, A., J. Giordanengo. 2008. A guide for harvesting, storing, and planting dormant willow cuttings. Wildlands restoration Volunteers, Fort Collins, CO.