

## FUTURE FISHERIES IMPROVEMENT PROGRAM GRANT APPLICATION

(Please fill in the highlighted areas)

\*all sections (IA, IB, IC, etc.) must be addressed or the application will be considered invalid\*

### I. APPLICANT INFORMATION

A. Applicant Name: Madison Conservation District

B. Mailing Address: PO Box 606

C. City: Ennis State: MT Zip: 59729

Telephone: 406-682-3181 E-mail: sunni@madisoncd.org

D. Contact Person: Sunni Heikes-Knapton

Address if different from Applicant: Same

City:  State:  Zip:

Telephone:  E-mail:

E. Landowner and/or Lessee Name (if other than Applicant): Madison Valley Ranch

Mailing Address: 307 Jeffers Road

City: Ennis State: MT Zip: 59729

Telephone: (406) 581-4535 E-mail: danlarsen54@gmail.com

Landowner and/or Lessee Name  
(if other than Applicant):

Landowner and Mailing Address: Fasules Family Montana Property Trust P.O. Box 1017 Ennis, MT 59729

Telephone: 202-621-7825 E-mail: jwfasules@gmail.com

Landowner and Mailing Address: Gary Gustafson, 245 Jeffers Road Ennis MT 59729

Telephone: 406-579-6094 E-mail: gusgary@3rivers.net

### II. PROJECT INFORMATION\*

A. Project Name: Lower Jack Creek Streambank Restoration Project

River, stream, or lake: Jack Creek

Location: Township: 5S Range: 1W Section: 23  
 Latitude: 45.377445 Longitude: 111.695911 *within project (decimal degrees)*

County: Madison

B. Purpose of Project:

The proposed project seeks to restore degraded conditions on a segment of lower Jack Creek, near the confluence with the Madison River. To improve riparian and aquatic habitat by establishing a riparian plant community, and reducing sediment inputs from eroding banks.

C. Brief Project Description:

The Jack Creek Streambank Restoration project area spans 3,600 feet of stream on three private property holdings near the confluence with the Madison River north of Jeffers Montana. In July of 2016, a site assessment was conducted by Gillilan and Associates. The assessment multiple sections of streambank in unstable conditions, a result of a historically dynamic system and site, along with alterations that include channel straightening, placement of carbody bank armor, and historic management practices.

The rates of erosion from 1954 - 2015 on some eroding meanders has occurred at approximately 1 ft/year, which is a very active rate of channel migration. It is suspected that much of the historic channel movement resulted from high flow events, such as those of 1974, when flows reached 511 cfs and stayed above 400 cfs for 5 days. Historic mean stream discharge value for this mid-June time period is 180 cfs.

Eight actively eroding bank lines were identified in the project area. The project team has decided to focus on 4 of these sites and incorporate a meander into the straightened section of the stream project area to dissipate stream energy, and maximize the cost/benefit with anticipated funding.

A previously funded alternatives analysis to identify options for addressing the current conditions was completed. A review and discussion process was held with the land owners at the completion of the alternatives analysis and a consensus was reached on how to proceed. A Restoration Feasibility and Plan report was then drafted by Gillilan Associates, which describes the methods and associated cost estimates for project implementation.

The project now seeks support to fully develop the required designs and construction for the restoration of these priority banks, through bioengineering approaches: gradual sloping of the existing banks, placement of site appropriate materials, and the establishment of robust riparian and upland vegetation where channel migration has been influenced by non-natural activities. This comprehensive multi-landowner approach is unique in its goal to address a substantial reach as a single project area, recognizing that project activities can have upstream and downstream consequences.

Bank treatment includes: a 2" – 5" cobble toe, a 6-10 foot wide bank full bench; grading vertical banks to an approximate 3:1 slope; utilization of adjacent wetland sod for newly constructed banks and surfacing of the bank bench; significant dormant willow stem and bank slope willow bundle planting; application of 3" of topsoil on graded banklines; and mid-bank plantings with native upland shrubs. Upstream thalweg adjustment and downstream opposite bank adjustment will be incorporated in an appropriate manner.

D. Length of stream or size of lake that will be treated: 1,100 feet

E. Project Budget:

**Grant Request (Dollars):** \$ 38,509.60

Contribution by Applicant (Dollars): \$ In-kind \$ 1000.00

(salaries of government employees are not considered as matching contributions)

Contribution from other Sources (Dollars): \$ 60,799.25 In-kind \$ \$10,596.00

(attach verification - See page 2 budget template)

**Total Project Cost:** \$ \$110,904.85

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

G. Attach specific project plans, detailed sketches, plan views, photographs, maps, evidence of landowner consent, evidence of public support and fish biologist support, and/or other information necessary to evaluate the merits of the project. If project involves water leasing or water salvage complete supplemental questionnaire ([fwp.mt.gov/habitat/futurefisheries/supplement2.doc](http://fwp.mt.gov/habitat/futurefisheries/supplement2.doc)).

H. Attach land management and maintenance plans that will ensure protection of the reclaimed area.

### III. PROJECT BENEFITS\*

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

Jack Creek supports well documented populations of brown trout and rainbow trout, with data indicating the stream is an important spawning tributary for Madison River and resident populations. Other non-game fish have been seen in the project area, such as sculpin.

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

Upon completion of this project, over 1,100 linear feet of streambank will be stabilized, resulting in improved instream and riparian habitat, and water quality mitigation. Every stage of life of resident and migratory fish will be benefitted by reduction in fine sediment contributions, establishment of riparian vegetation, diversification of juvenile and adult habitat, and thermal buffering provided by a health riparian plant community. Additionally, the project will provide connectivity from the Madison River to a successful 2010 stream and wetland restoration project located immediately upstream from the proposed work.

C. Will the project improve fish populations and/or fishing? To what extent?:

The goal of the project is to improve the health of the stream through stabilization of eroding streambanks which is an improvement to the crucial habitat the fish populations depend upon. Through the proposed improvements and continued good management of the surrounding lands, the stream will be provided a rest period to improve the vegetation along the stream, and reduce the historic impacts. The project coordinators anticipate that the completed work will provide an opportunity for resident fish populations to prosper, through established cover, improved habitat, and sediment reduction. Multi-year baseline fisheries data exists for the site and would prove a valuable reference for future monitoring efforts.

- D. Will the project increase public fishing opportunity for wild fish and, if so, how?:

Jack Creek sees use by anglers accessing the stream from points along public right of ways. Immediately downstream from the project site is the confluence with the Madison River, one of the most heavily fished rivers in the state. FWP data documents that Jack Creek is used by rainbow and brown trout for spawning. This project provides an opportunity for the Madison River and Ennis Reservoir trout populations to access quality habitat, thereby potentially reinforcing another important tributary for mainstem populations to utilize.

- E. The project agreement includes a 20-year maintenance commitment. Please discuss your ability to meet this commitment.

The 3 individual landowners are amenable to the 20 year maintenance contract, and they are eager to see the comprehensive project improve conditions on the stream that they all share an interest in.

- F. What was the cause of habitat degradation in the area of this project and how will the project correct the cause?:

It is suspected that the habitat degradation in the area is a combination of historic channelization, hardened bank stabilization efforts, dynamic hydrologic patterns, and previous land use practices and impacts. Much of the conditions have changed with the management of the current owners, and the area has seen less extreme high flow events since commercial timber harvest in the upper watershed ceased 20 years ago.

The goal to remove hardened armored banks is to renaturalize these sections and eliminate the impacts of these non-natural placements. The high eroding terraces are unlikely to revegetate on their own, due to the steepness of the banks and the limited area ideal for willow establishment. The current owners are invested in improving the conditions on the stream. The landowners are amenable to continuing the restriction of livestock use in the area, as has been the approach for a significant period of time. Monitoring of the site will be initiated immediately after construction completion, and again at the conclusion of the growing season.

- G. What public benefits will be realized from this project?:

Immediate benefits to the public include additional higher quality habitat for resident and migratory populations of fish in the immediate and downstream areas. Additional benefits include an excellent example of a multi-landowner project located on a highly valued stream.

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

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

- I. Will the project result in the development of commercial recreational use on the site?: (explain):

Because the property is currently operated as a working farm/ranch, there are no plans to develop commercial recreational use for the area.

- J. Is this project associated with the reclamation of past mining activity?:

This project is not associated with past mining activity.

**Each approved project sponsor must enter into a written agreement with the Department specifying terms and duration of the project.**

#### **IV. 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: November 29, 2016

Sponsor (if applicable):

**\*Highlighted boxes will automatically expand.**

**Mail To: Montana Fish, Wildlife & Parks  
Habitat Protection Bureau  
PO Box 200701  
Helena, MT 59620-0701**

**E-mail To: Michelle McGree  
[mmcgree@mt.gov](mailto:mmcgree@mt.gov)  
(electronic submissions MUST be signed)**

**Incomplete or late applications will be rejected and returned to applicant.  
Applications may be rejected if this form is modified.**

**\*\*\*Applications may be submitted at anytime, but must be signed and received by the Future Fisheries Program Officer in Helena before December 1 and June 1 of each year to be considered for the subsequent funding period.\*\*\***

Attachments:

Letters of Support

Lower Jack Creek Design Drawings

Lower Jack Creek Design Report

Lower Jack Creek Budget



Jack Creek riparian restoration  
**Montana Department**  
**of**  
**Fish, Wildlife & Parks**

006-2017

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Region 3 Headquarters

1400 South 19th

Bozeman, MT 59718

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November 28, 2016

To: Future Fisheries Improvement Program

Re: Moores Creek and Jack Creek stream restoration efforts.

I am fully in support of pending grant applications for stream restoration work on Moores and Jack creeks. Both creeks are important tributaries to the Madison River; a very popular recreational fishery, and one of immense conservation value. Moores Creek is currently degraded from historical land use and agricultural practices. High thermal loading, excessive amounts of fine sediment and elevated nutrients have been identified as ongoing issues in Moores Creek. Importantly, stream restoration efforts in Moores Creek are part of a comprehensive plan with multiple landowners to decrease grazing impacts through offsite watering, grazing infrastructure, and irrigation efficiencies. Moores Creek has been identified as a priority watershed by the Madison Conservation District and is of great concern to Montana Fish, Wildlife & Parks. Moores Creek has historically been an important spawning tributary for trout that reside in the Madison River and Ennis Lake. Current sediment levels and temperature are unfavorable for spawning and resident trout fisheries. Moreover, Moores Creek was one of the last known tributaries to support a viable resident population as well as significant spawning run of Arctic Grayling.

Jack Creek is a very worthy candidate for habitat improvement. Jack Creek is also a significant tributary of the Madison River and has suffered from past anthropogenic land use practices. Jack Creek is hydrologically active, often with strong peaks in the spring hydrograph. Sediment produced by these strong flows and bare eroding stream banks negatively impacts spawning, recruitment, and provides little cover for resident Rainbow Trout and Brown Trout. Some of the proposed work involves removal and replacement of old stabilization efforts, including rock and car body rip rap. The proposed restoration on Jack Creek is part of a comprehensive plan with multiple landowners and stakeholders.

Restoration techniques on both streams are well tested and minimally invasive – allowing access to floodplains and channel migration. Concerted efforts like the proposed projects will ultimately be crucial to maintaining stream temperatures beneficial to trout/salmonids. Montana Fish, Wildlife & Parks wholeheartedly supports both projects and future projects like these. Feel free to call me at 406-994-6938 if you have any further questions about the proposed projects and streams.

Sincerely,

David C Moser, Fisheries Biologist

November 25, 2016

Future Fisheries Improvement Program  
Montana Fish, Wildlife and Parks  
1420 E 6<sup>th</sup> Ave  
P.O. Box 200701  
Helena, MT 59620-0701

Re: Lower Jack Creek restoration project

Dear Grant Review Panel:

My family and I enthusiastically support the Madison Conservation District's grant application for restorations on lower Jack Creek.

Over the last 30 years we have seen the creek erode into pasture land moving 20+ yards to the west. The grant will help stabilize high cut banks, reduce erosion and silting, and help preserve the stretch of Jack Creek immediately above its junction with the Madison River. This area of Jack Creek includes trout habitat and spawning beds, and is an important riparian thoroughfare for wildlife.

In the past our family has partnered with Montana Power, the Corps of Engineers and the USDA on various projects to mitigate bank destruction. We view the work proposed as an essential next step to maintaining a special stretch of stream, and will actively support the project to the extent possible with funds, plantings, and maintaining native vegetation.

We greatly appreciate your consideration and support of this project.

Sincerely,



James W. Fasules, MD  
Trustee, Fasules Family Montana Property Trust  
P.O. Box 1017  
Ennis, MT 59729

Cc:

Michelle McGree, Program Officer Future Fisheries Improvement Program  
Sunni Heikes-Knapton, Madison Watershed Coordinator

# Madison Valley Ranch

Just a cast away

November 14, 2016

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

RE: Lower Jack Creek Restoration Project

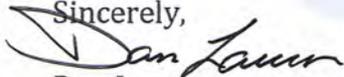
To Whom It May Concern:

Please accept this letter of support for a Future Fisheries grant to assist the Madison Conservation District and the landowners involved with the Lower Jack Creek Restoration Project. As an owner of a portion of the property through which this section of Jack Creek flows we are ready and willing to actively support the proposed Restoration Project, including an owner participation in the overall project costs.

This section of Jack Creek is very close to the junction with the Madison River and already supports active populations of rainbow and brown trout, including some spawners. We believe the Restoration Project will enhance significantly the health of this critical Madison River tributary.

We would support your support for this Restoration Project.

Sincerely,



Dan Larson  
Managing Member  
Madison Valley Ranch, LLC.  
MVR Real Estate, LLC.



307 JEFFERS ROAD · ENNIS, MONTANA 59729

800.891.6158

fishing@madisonvalleyranch.com · www.madisonvalleyranch.com



Sunni Heikes-Knapton <sunni@madisoncd.org>

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## Lower Jack Creek Restoration Project

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gary <gusgary@3rivers.net>  
To: sunni@madisoncd.org

Fri, Nov 18, 2016 at 1:01 PM

Dear Sunni-

The Gustafson Ranch supports the Lower Jack Creek Restoration Project. The Gustafson Ranch will provide backhoe work for their contribution towards the project. The amount of time and resources towards the project by the Gustafson Ranch will be finalized closer to the project startup date.

Sincerely Gary Gustafson

## PROJECT REPORT

**To:** Sunni Heikes-Knapton, Madison Valley Watershed Coordinator  
**From:** Scott Gillilan, GAI  
**Date:** November 20, 2016  
**Re:** **Lower Jack Creek Restoration Feasibility and Plan**

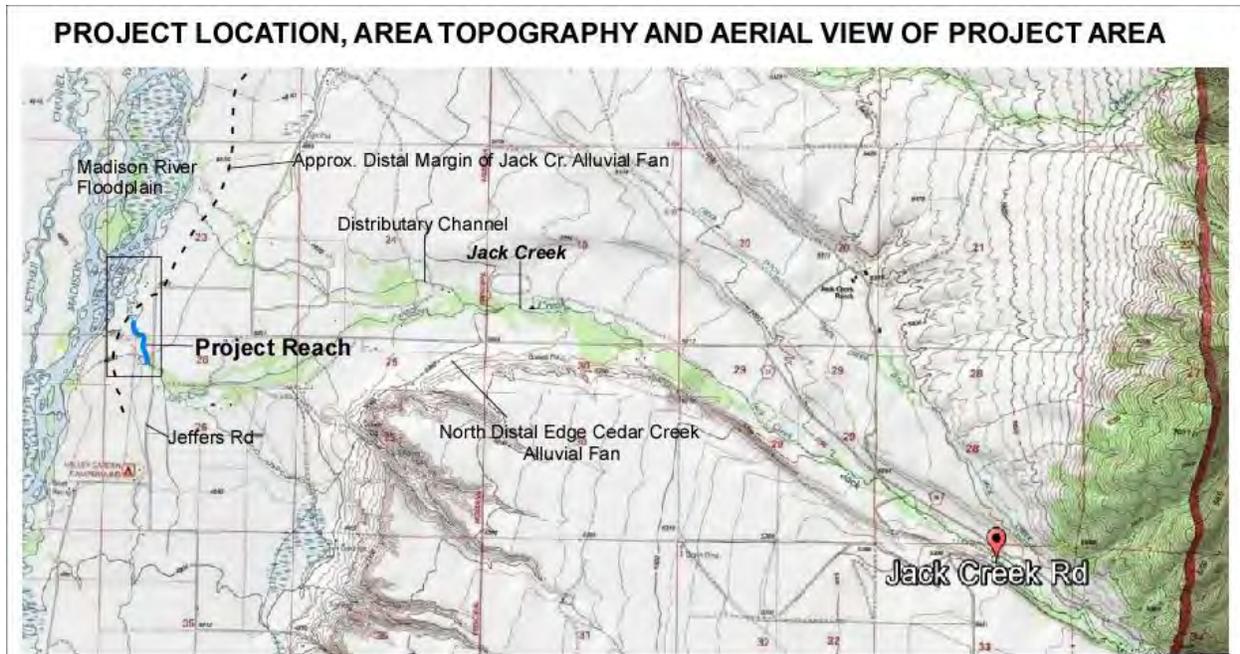
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The following report culminates a contract Gillilan Associates, Inc (GAI) engaged in with Madison Conservation District (MCD) to assess and propose a design solution and construction cost for approximately 1,100' of failing and highly erosive banklines on lower Jack Creek on three adjoining properties. The project design arose from progressive evaluations and meetings with the landowners and other stakeholders. As such, this report does not contain an exhaustive alternatives analysis and mostly emphasizes the design logic, assumptions and rationale for the selected bank stabilization approach. It also assumes that the reader has at least some knowledge of the site location and conditions along with MCD's leadership role in bringing the project about.

### **Review of Site Conditions**

The project reach begins at the Jeffers Rd Bridge over Jack Creek and extends downstream approximately 1,200 feet, though the initial site inventory assessed and documented geomorphic channel conditions over a longer 3,600 reach. The site is at the very distal end of the Jack Creek alluvial fan where Jack Cr. meets the Madison River floodplain (Figure 1).

#### Likely Historic Condition



**Figure 1. Project area in relationship to position on Jack Cr. fan and proximity to Madison River floodplain.**

The likely historic condition of the project area was a beaver-mediated condition inclusive of anastomosing/distributary channels given its position on the distal end of the Jack Creek fan in addition to ample field and aerial photographic indicators (Figure 2). In the project reach, it is likely that prior to settlement and agricultural conversions of the land, there was no real demarcation between where the Madison River floodplain ended and the Jack Creek floodplain began.

### Current Channel Condition

As is very typical in this region, the current channel has incised through both fan and beaver related sediment profiles and is now disconnected from its historic floodplain.

Human channel alterations in the project area include:

- Up-stream primary channel and distributary channel training, including flow consolidations into the current principle channel thread;
- Three rip-rapped banklines;
- Channel relocation/straightening including above and below Jeffers Rd Bridge;
- Two junk cars embedded in bank;
- Levee between the Madison River and Jack Creek.

On all channel bends the creek has migrated into a higher fine sediment dominated terrace/bankline that are actively eroding (Figure 2) and where not straightened has formed an opposite bank inset floodplain (Plate 1). The rates of erosion between 1954 and 2015 on some eroding meanders is up to 50-60 feet or approximately 1 ft/year, which is a very active rate of

channel migration. The straightened reach of channel and rip-rapped bends show the lowest migration rates in this time period (Figure 3). Figure 3 also indicates the length and location of eroding banklines with vertical elevation of banks (range from 3 – 8 feet) to the northern boundary of the Fasules property.

### Other Channel Characteristics

The channel is highly competent transporting sediment and bedload. The particle size distribution of materials is approximately 2" D50 and 3" D84. Overall channel slope is approximately 0.4% and utilizing at-a-section hydraulics bankfull discharge is estimated at 325 cfs. The dominant riparian vegetation on non-eroding banklines is reed canary grass with low to moderate density willows on inset floodplains and upper banks in the most upstream of the project area.



**Plate 1. View upstream to XS-6, the lowermost eroding bankline in the project area. Note vegetated inset floodplain on inside of meander. The pasture was likely the historic floodplain surface.**

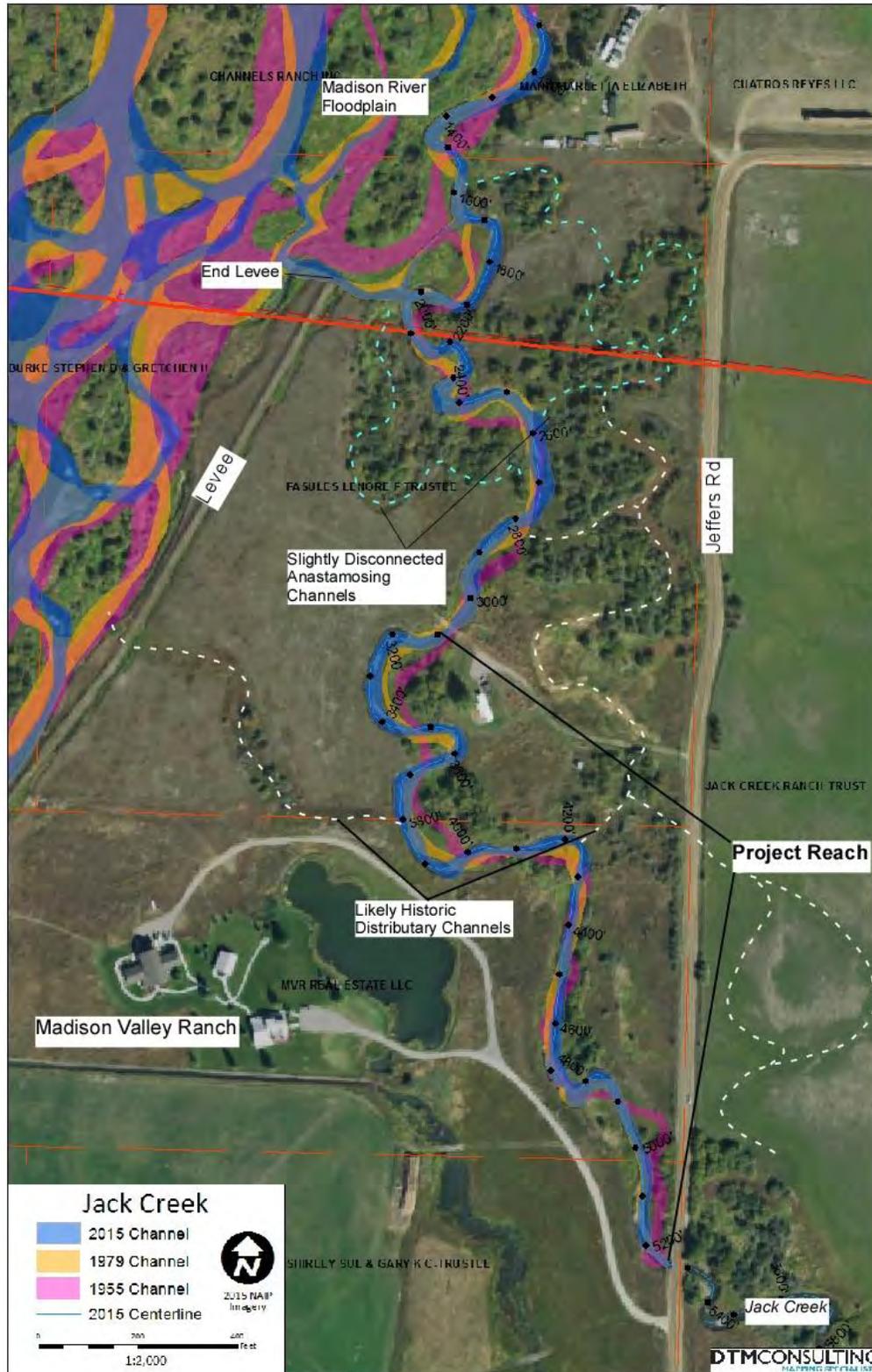


Figure 2. Map of historic channel position from 1954 to current indicating rates of channel migration and mapping of presumed historic distributary channels prior to incision episode. (DTM channel migration map annotated by GAI).



Figure 3. Inventoried banklines indicating eroding areas and vertical bank height.

## Discussion of Alternatives

### Project Area

While 8 eroding banklines were identified between Jeffers Road and the north boundary of the Fasules property, the team (owners, MVCD and GAI), decided to focus on 4 of these plus some slight re-meandering of the straightened section in an effort to keep the total project cost manageable with anticipated funding sources. A future project could address the lower area banklines in addition to potentially reconnecting perched channels.

### Restoration Options

1. **No Action.** Taking no action would include continued channel migration into vertical silt banks and long-term and excessive sediment delivery to the Madison River. This alternative was not considered.
2. **Full Restoration.** This would include re-connecting the currently incised channel with its former floodplain and re-establishment of an anastomosing system versus a single thread channel. Given the development on the former floodplain including the Jeffers Rd, buildings on the Madison Valley Ranch (MVR) and the Fasules dwelling, this was not deemed feasible or warranted.
3. **Restore/Enhance Existing Channel.** The most obvious channel degradation is the eroding banklines as the channel will remain on the high silt terraces indefinitely. It was therefore determined stabilizing these banklines was the highest priority. Regarding the straightened reach, we considered restoring appropriate sinuosity but after some preliminary investigation and costing this was determined to be too costly, (and this reach is relatively stable as-is). We did conclude that creating a “micro-meander” in the straightened reach was feasible and would help diversify the aquatic habitat and reduce channel energy during high flow events

## Project Design

Please refer to Figure 4 and separately attached Project Drawings for the following discussion

For bank stabilization the project was conceived to utilize bioengineered methods versus rip rap. Given the highly erodible nature of the banklines we concluded that the bankline treatments needed to be very robust such that the channel would not migrate back into the high terraces over a period of several decades

The typical bankline treatment includes: a 3-8” cobble toe, a 6-10 foot wide bankfull bench; grading vertical banks to an approximate 3:1 slope; utilization of onsite wetland sod for newly constructed banks and surfacing of the bank bench; dormant willow stem and bankslope willow bundle planting; application of 3” of topsoil on graded banklines; and mid-bank plantings with native upland shrubs (see Figure 5).



without potentially re-exposing high terraces to erosion. However, while the current plans have a specified gradation of 3-8 inches for toe cobble, this gradation can be adjusted downwards for permit submittals, with any loss of as-built stability from this downsizing compensated by a more aggressive willow planting plan that should provide longer-term stability.

For the “micro-meander” section the left bankline will be constructed with the typical treatment and the opposite bankline will be composed of a created point bar with existing stream gravels with a sodded upper bank line.

### **Other Design Elements for Consideration**

Preliminary review of this restoration plan raised some additional channel treatments that may be important to consider including: 1) making thalweg adjustments above stabilized banklines to reduce bankline shear stress and; 2) potential need for treatments on opposite downstream banklines that may experience increased channel energy from the upstream stabilization work. Regarding thalweg adjustment, this will be added into the final designs submitted for permitting. However, we have concerns that thalweg training may not prove to be a lasting channel adjustment if this training is achieved just through bedform adjustments with native gravel given the high mobility of existing bedload. If it is determined in review that thalweg adjustments beyond bedroom re-shaping upstream of the bend entrances is necessary, this would require some further investigation and design as one would likely be looking at strategies involving rock weirs and/or large woody debris.

Regarding opposite bankline treatments, we feel that those banklines are currently resilient due to either downstream existing rip rap or well vegetated surfaces. We recommend that for this current effort that a “wait-and-see” approach is adopted. In other words, monitor these banklines and if there is unintended erosion then address the issue. Another alternative would be to prophylactically address the situation with increasing bankline resilience with some treatments in the final design stage of the project.

### **Estimated Project Costs**

#### Construction Cost Estimate

The project cost estimate is broken down in the following table.

## LOWER JACK CREEK RESTORATION PROJECT

### Project Estimate

18-Nov-16

ITEM	AMOUNT	UNITS	\$/UNIT	TOTAL	BUDGET TOTAL
<b>BANKLINE CONSTRUCTION</b>					<b>\$96,381</b>
Excavation - cut material and haul to fill site	2939	CY	\$3.75	\$11,021.25	
Cobble Toe - delivered	998	CY	\$17.00	\$16,966.00	
Topsoil - delivered	101	CY	\$25.00	\$2,524.98	
Pit Run - delivered	330	CY	\$12.00	\$3,960.00	
Remove and dispose of 2 car bodies	2	EA	\$800.00	\$1,600.00	
Bankline construction - place cobble toe, build bench, harvest sod, place sod, topsoil	1,108	LF	\$22.00	\$24,376.00	
Willow stems - harvested and installed	6648	EA	\$3.00	\$19,944.00	
Willow bundles - harvested, bundled, installed	336	EA	\$12.00	\$4,029.09	
Planting - 1-gallon upland shrubs purchased and	222	EA	\$7.00	\$1,551.20	
Hydroseed and tackifer - bank slopes	10908	SF	\$0.45	\$4,908.56	
Planted material browse protection	1	LUMP	\$3,000.00	\$3,000.00	
Fill Site - grade and seed	1	LUMP	\$2,500.00	\$2,500.00	
Open					
<b>GENERAL CONDITIONS</b>					<b>\$11,210.49</b>
Mobilization	1	LUMP	\$3,500	\$3,500	
Project Management/Supervision	1	LUMP	\$7,710.49	\$7,710.49	
<b>TOTAL PROJECT CONSTRUCTION ESTIMATE</b>					<b>\$107,592</b>
					<b>COST/FT \$97.10</b>

Notes on the cost estimate include:

- Costs for toe cobble, pit run and topsoil and delivery quoted by AM Welles, Norris, MT.
- Cost for excavation and haul to fill site assumes good surface travel conditions.
- Cost for willows assumes local harvest including Fasule property and roadside borrow ditch.
- All costs assume onsite supervision by project designer or other qualified individual

Note also that the total per/foot cost is \$97.10. A large cost component not typical of similar projects is the need for importation of cobble toe material, pit run, and topsoil. Further, there are not satisfactory sod borrow areas adjacent or near the treated banklines and will require loading and hauling from the Fasule property and through the MVR. Finally, while many projects do not import and place topsoil, the eroding bank substrate is not considered highly suitable for seed germination. With the bank backslopes and length, we are also prescribing hydroseeding with a tackifier.

### Project Estimates by Property

Broken down by treated bankline feet per property, the percentages of total cost associated with each property is:

- Fasule – 39% or \$33,045

- MVR – 47% or \$39,901
- Gustafson – 0.15% or \$12,402

### Final Design and Permitting

I have estimated that the final design and permitting phase will cost \$7,950. Inclusive in this cost is a \$3,750 wetland delineation, estimated by Sundog Ecological, (who has been on site). As you are aware, obtaining 404 permits has become very costly due to often protracted interactions with the Corps of Engineers, typically surrounding mitigation requirements. This cost estimate assumes filing for a Nationwide 27 Restoration permit. Other included elements in the above cost estimate are:

- Preparation and submittal of a Joint Application, attending CD field review and CD meeting;
- Preparation of a modest bid package that includes slightly more refined drawings and a construction narrative and attending a bid meeting;
- Finalizing construction cost estimate.

MCD could save some costs in this phase if they undertook their own permitting effort.

### **Summary**

This report provided project history and development of a restoration project on Lower Jack Creek entailing approximately 1,100 feet of new bankline construction and a minor channel relocation. The project approach includes bioengineering treatments inclusive of a robust cobble toe, donor sod, willow plantings, shrub plantings, bank re-sloping and hydroseeding. The estimated cost for construction is \$96,381 of \$97/ft for treatments. An additional \$7,950 is anticipated for final design, bid preparation and permitting, with the 404 permit application accounting for the bulk of this cost. It is anticipated the project will be constructed when willows are in dormancy. Site access for heavy equipment is considered good.





Image courtesy of USGS Earthstar Geographics SIO © 2016 Microsoft Corporation

NO.	REVISIONS	DRAWN BY	DATE

<p>SCALE (FEET)</p>	
PROJECT ENGINEER:	DRAWN BY: JWJ
DESIGNED BY:	REVIEWED BY:

**JACK CREEK**  
**CROSS-SECTION OVERVIEW**  
 MADISON COUNTY, MT

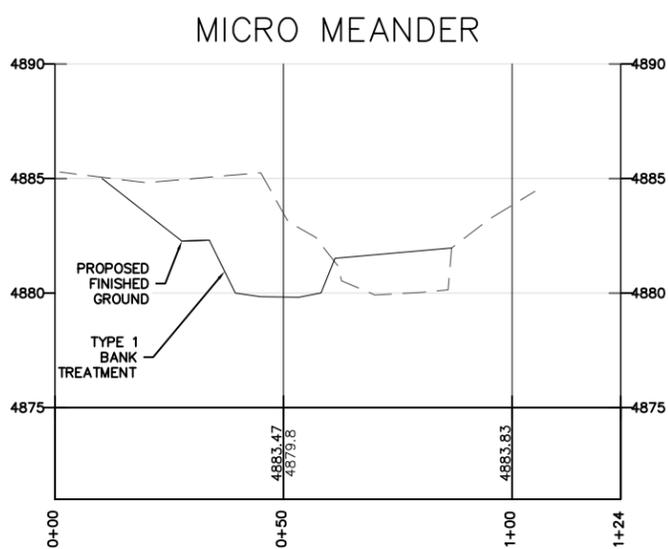
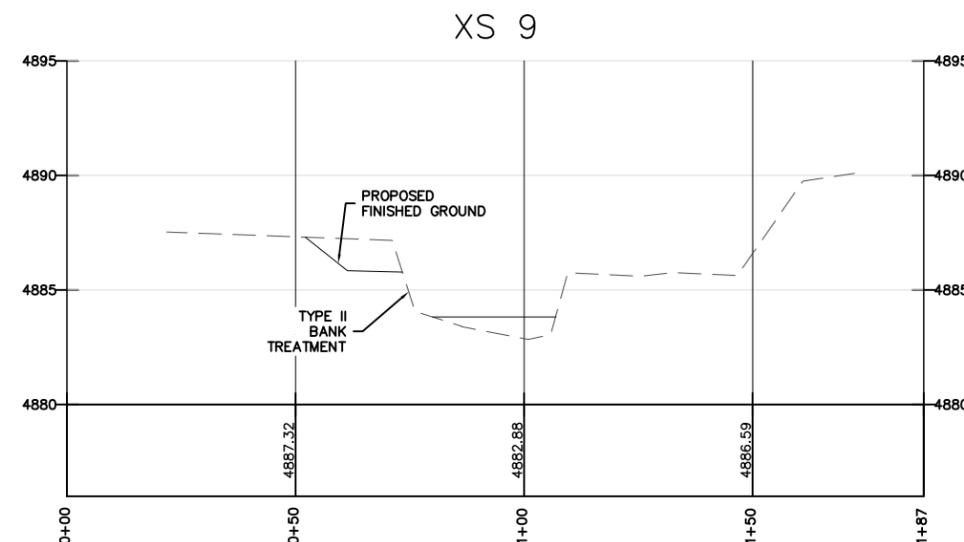
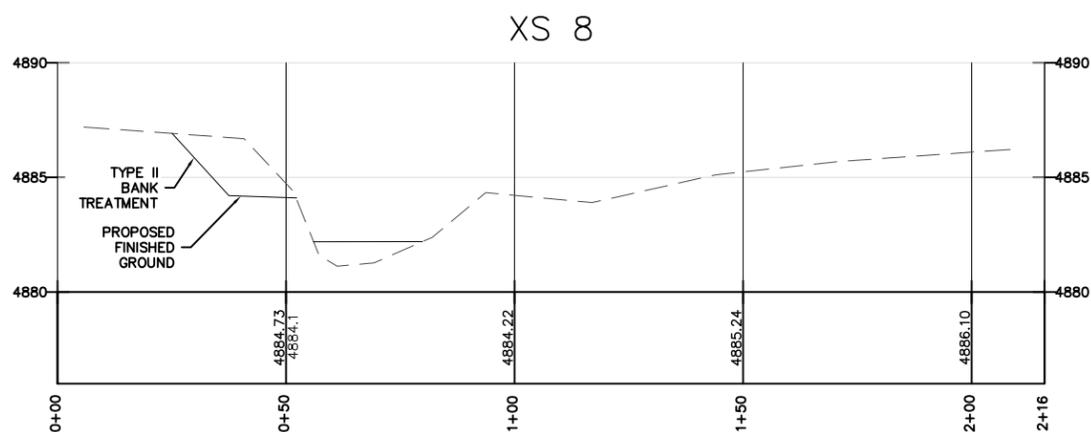
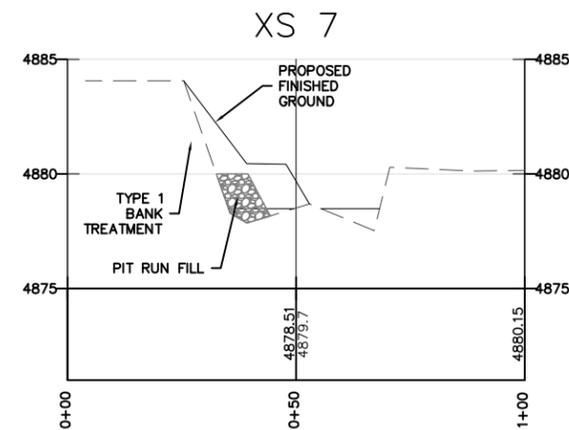
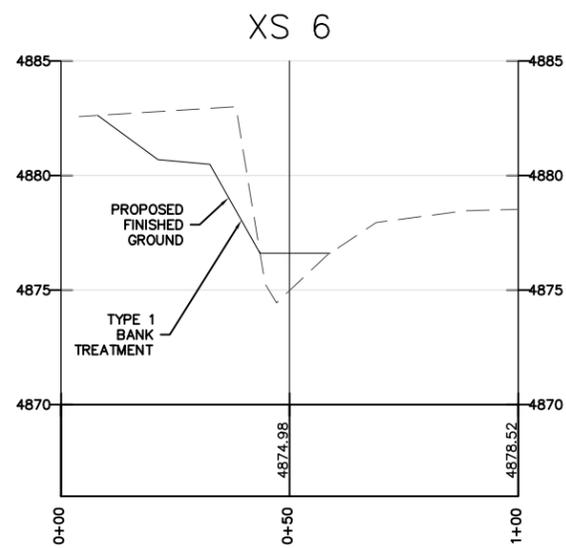
32 DISCOVERY DRIVE  
 BOZEMAN, MT 59718  
 PHONE (406) 582-0221  
 FAX (406) 582-5770  
 www.alliedengineering.com

**Civil Engineering**  
**Geotechnical Engineering**  
**Land Surveying**



PROJECT #: 16-106	SHEET S-2
DATE: 11/04/16	
XS OVERVIEW	
JACK CREEK CROSS-SECTION OVERVIEW	

P:\2016\16-106 Jack Creek XS OVERVIEW FIGURES.dwg



NO.	REVISIONS	DRAWN BY	DATE

HORIZONTAL SCALE FEET		VERTICAL SCALE FEET	
0	20	0	8
PROJECT ENGINEER:	DRAWN BY: <b>JWJ</b>	DESIGNED BY:	REVIEWED BY:

**JACK CREEK  
CROSS-SECTIONS  
MADISON COUNTY, MT**

32 DISCOVERY DRIVE  
BOZEMAN, MT 59718  
PHONE (406) 582-0221  
FAX (406) 582-5770  
www.alliedengineering.com

**Civil Engineering  
Geotechnical Engineering  
Land Surveying**

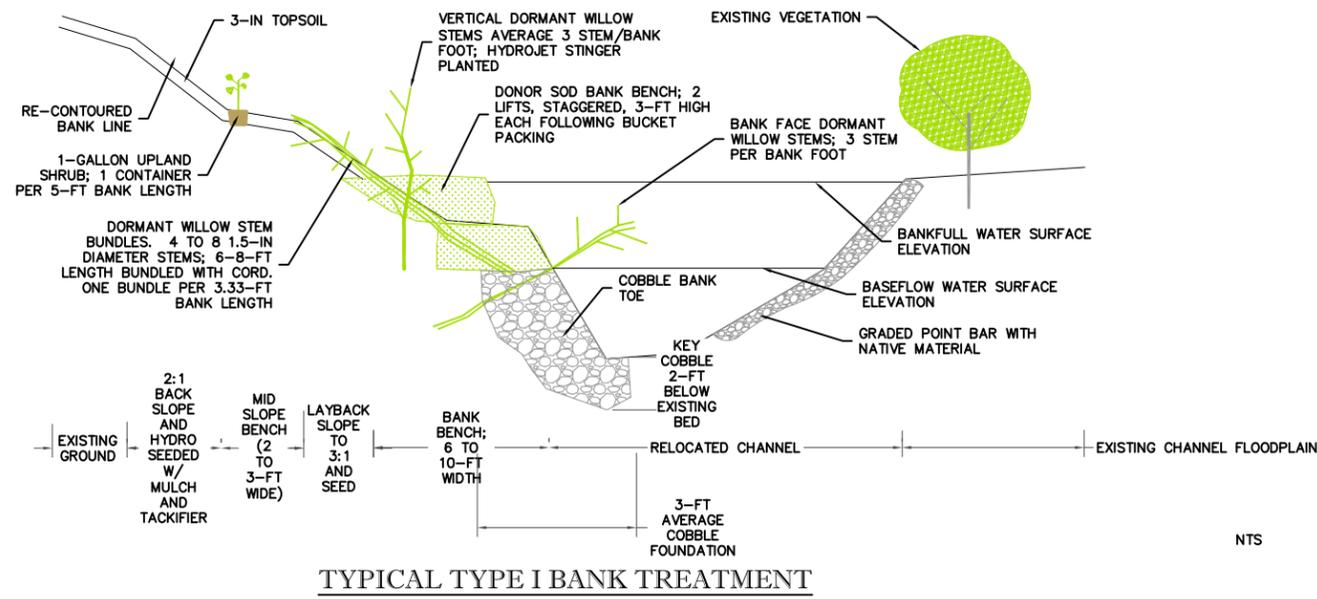


PROJECT #: **16-106**  
DATE: **11/04/16**  
XS

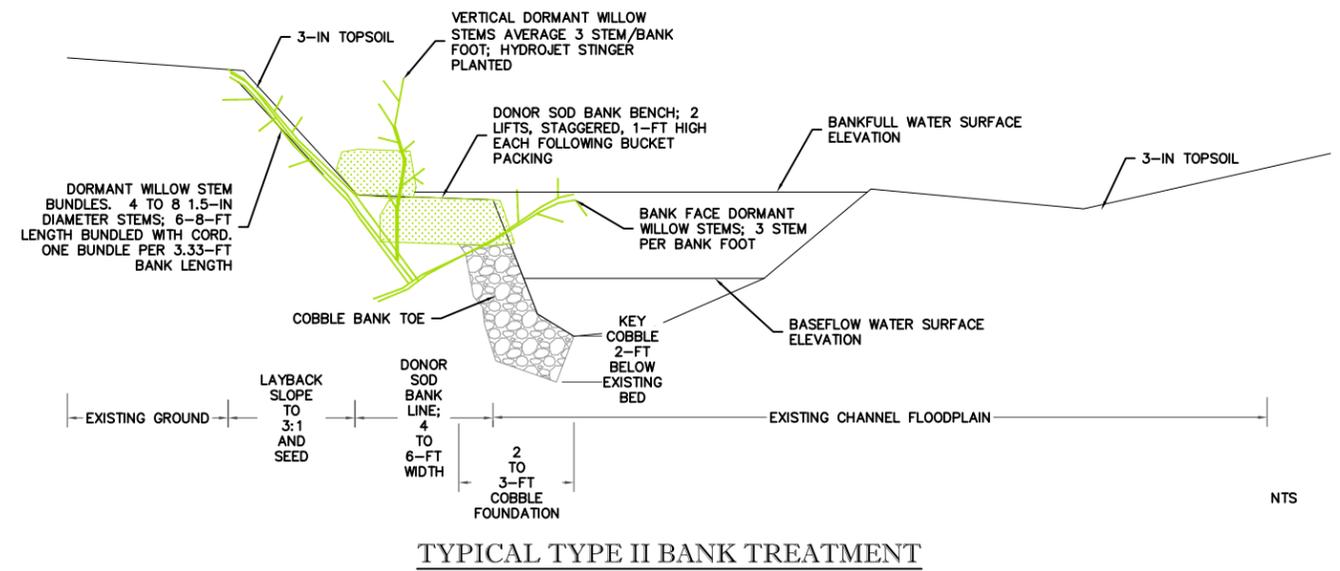
SHEET  
**S-3**

**JACK CREEK  
CROSS-SECTIONS**

F:\2016\16-106 Jack Creek X-sections\CAD\XS FIGURES.dwg



TYPICAL TYPE I BANK TREATMENT



TYPICAL TYPE II BANK TREATMENT

NO.	REVISIONS	DRAWN BY	DATE

PROJECT ENGINEER:	DRAWN BY: <b>JWJ</b>
DESIGNED BY:	REVIEWED BY:

**JACK CREEK  
TYPICAL TREATMENTS  
MADISON COUNTY, MT**

32 DISCOVERY DRIVE  
BOZEMAN, MT 59718  
PHONE (406) 582-0221  
FAX (406) 582-5770  
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**Civil Engineering  
Geotechnical Engineering  
Land Surveying**



PROJECT #: <b>16-106</b>	SHEET <b>S=4</b>
DATE: <b>11/04/16</b>	

**JACK CREEK  
TYPICAL TREATMENTS**

Both tables must be completed or the application will be returned

WORK ITEMS (ITEMIZE BY CATEGORY)	NUMBER OF UNITS	UNIT DESCRIPTION*	COST/UNIT	TOTAL COST	CONTRIBUTIONS			
					FISHERIES	SERVICES**	IN-KIND CASH	TOTAL
<b>Personnel***</b>								
Survey				\$ -				\$ -
Design	38	Hours	\$110.00	\$ 4,180.00			4,180.00	\$ 4,180.00
Engineering		hours		\$ -				\$ -
Permitting	35	Hours	\$110.00	\$ 3,850.00			3,850.00	\$ 3,850.00
Project Management	100	Hours	\$30.00	\$ 3,000.00		1,000.00	2,000.00	\$ 3,000.00
Oversight	77	Hours	\$110.00	\$ 8,470.00			8,470.00	\$ 8,470.00
				\$ -				\$ -
			Sub-Total	\$ 19,500.00	\$ -	\$ 1,000.00	\$ 18,500.00	\$ 19,500.00
<b>Travel</b>								
Mileage	1300	miles	\$0.54	\$ 702.00			702.00	\$ 702.00
Per diem				\$ -				\$ -
			Sub-Total	\$ 702.00	\$ -	\$ -	\$ 702.00	\$ 702.00
<b>Construction Materials****</b>								
Cobble Toe	998	Cubic Yards	\$17.00	\$ 16,966.00	16,966.00			\$ 16,966.00
Topsoil	101	Cubic Yards	\$25.00	\$ 2,525.00	2,525.00			\$ 2,525.00
Pit run	330	Cubic Yards	\$12.00	\$ 3,960.00	3,960.00			\$ 3,960.00
Willow stems	6600	stems	\$1.00	\$ 6,600.00		6,600.00		\$ 6,600.00
Willow bundles	333	bundles	\$12.00	\$ 3,996.00		3,996.00		\$ 3,996.00
Upland shrubs	222	containers	\$8.00	\$ 1,776.00	1,776.00			\$ 1,776.00
Hydroseeder	10908	square feet	\$0.45	\$ 4,908.60	4,908.60			\$ 4,908.60
Fill Site Grade and Seed	2000	square feet	\$1.25	\$ 2,500.00	2,500.00			\$ 2,500.00
Plant protection upland	222	protectors	\$2.00	\$ 444.00	444.00			\$ 444.00
Plant protection riparian	100	protectors	\$2.00	\$ 200.00	200.00			\$ 200.00
Riparian fencing	1500	feet	\$0.82	\$ 1,230.00	1,230.00			\$ 1,230.00
			Sub-Total	\$ 45,105.60	\$ 34,509.60	\$ 10,596.00	\$ -	\$ 45,105.60
<b>Equipment and Labor</b>								
Excavation	2939	Cubic Yards	\$3.75	\$ 11,021.25			11,021.25	\$ 11,021.25
Bankline Construction	1108	Linear Feet	\$22.00	\$ 24,376.00			24,376.00	\$ 24,376.00
Remove and dispose of car bodies	2	car bodies	\$800.00	\$ 1,600.00			1,600.00	\$ 1,600.00
Plant Protection Riparian	100	plants	\$10.00	\$ 1,000.00			1,000.00	\$ 1,000.00
Riparian Fencing	1500	feet	\$0.92	\$ 1,380.00			1,380.00	\$ 1,380.00

Plant Protection Upland	222	plants	\$10.00	\$ 2,220.00			2,220.00	\$ 2,220.00
			Sub-Total	\$ 41,597.25	\$ -	\$ -	\$ 41,597.25	\$ 41,597.25
<b>Mobilization</b>								
Excavator	2	trips	\$1,000.00	\$ 2,000.00	2,000.00			\$ 2,000.00
Haul truck	2	trips	\$1,000.00	\$ 2,000.00	2,000.00			\$ 2,000.00
				\$ -				\$ -
				\$ -				\$ -
			Sub-Total	\$ 4,000.00	\$ 4,000.00	\$ -	\$ -	\$ 4,000.00
<b>TOTALS</b>				\$ 110,904.85	\$ 38,509.60	\$ 11,596.00	\$ 60,799.25	\$ 110,904.85

**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 for calculations). Describe here or in text.

Reminder: Government salaries cannot be used as in-kind match

\*\*\*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 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.

**MATCHING CONTRIBUTIONS (do not include requested funds)**

CONTRIBUTOR	N-KIND SERVICE	IN-KIND CASH	TOTAL	Secured? (Y/N)
Landowner	\$ -	\$12,500.00	\$ 12,500.00	Y
NW Energy	\$ -	\$ 20,000.00	\$ 20,000.00	Y
NW Energy	\$ -	\$ 15,000.00	\$ 15,000.00	N
MCD	\$ 1,000.00	\$ -	\$ 1,000.00	Y
Volunteer	\$ 10,596.00	\$ -	\$ 10,596.00	N
Private	\$ -	\$13,299.25	\$ 13,299.25	N
	\$ -	\$ -	\$ -	
	\$ -	\$ -	\$ -	
	\$ -	\$ -	\$ -	
	\$ -	\$ -	\$ -	
<b>TOTALS</b>	\$ 11,596.00	\$60,799.25	\$ 72,395.25	