



FUTURE FISHERIES IMPROVEMENT PROGRAM GRANT APPLICATION

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



I. APPLICANT INFORMATION

- A. Applicant Name: Clark Fork Coalition
 Mailing Address: 140 S 4th St W #1
 City: Missoula State: MT Zip: 59801
 Telephone: 406-542-0359 ext 203 E-mail: karen@clarkfork.org

- B. Contact Person (if different than applicant): Jed Whiteley
 Address: 140 S 4th St W #1
 City: Missoula State: MT Zip: 59801
 Telephone: 406-531-0256 E-mail: jed@clarkfork.org

- C. Landowner and/or Lessee Name (if different than applicant): Denny and Becky Anderson
 Mailing Address: 14525 Miller Creek Rd
 City: Missoula State: MT Zip: 59803
 Telephone: 406-370-1750 E-mail: da@gbrv.net

II. PROJECT INFORMATION

- A. Project Name: Miller Creek Phase 1 Restoration
 River, stream, or lake: Miller Creek
 Location: Township: 11N Range: 18W Section: 7
 Latitude: 46.73292500 Longitude: -113.92000 *within project (decimal degrees)*
 County: Missoula

B. Purpose of Project:

The purpose of this project is to increase wild fish numbers in Miller Creek and the lower Bitterroot River by reducing sediment and stream temperatures on Miller Creek while enhancing aquatic and terrestrial habitat.

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

Miller Creek is a stronghold for native fish in the Lower Bitterroot with at least 3 of Miller Creek's tributaries containing pure-strain westslope cutthroat. All three of these tributaries enter the creek within a 6 mile long reach that includes the proposed 1 mile long restoration site that flows through the Spooner Ranch Property. This project proposes to restore this reach for wild fish as the first Phase of up to 6 miles of restoration of the mid to upper section of Miller Creek.

The current owners of Spooner Ranch are good land stewards but due to past logging and agriculture practices the stream channel on Spooner Ranch ranges from moderately to highly entrenched. A narrow riparian corridor is present along the channel, but the stream is actively eroding as it continues to adjust to a new base elevation. Channel incision averages 4 to 5 ft with multiple areas of active lateral bank erosion occurring. These alterations have resulted in a loss of connectivity between the channel and floodplain, increased fine sediment delivery to the channel, reduced aquatic habitat diversity, and reduced riparian vegetation cover, all of which contribute to overall degraded conditions in the watershed.

The specific objectives of restoration on the Spooner Ranch include:

- Reduce fine sediment delivery to the channel.
- Increase connectivity between the channel and the floodplain.
- Increase riparian corridor width and woody vegetation cover.
- Enhance aquatic habitat.
- Increase ecological function of the riparian and floodplain corridor.

These objectives will be reached by designating a woody riparian vegetation expansion corridor, bed aggradation structures, floodplain grading and roughness, channel shaping and realignment, woody brush matrix streambank treatments, riparian shrub clump planting, exclosures, woody debris habitat structures and increasing floodplain wetlands.

D. Length of stream or size of lake that will be treated: 1 mile

E. Project Budget:

Grant Request (Dollars):	\$	<u>28,400.00</u>
Matching Dollars:	\$	<u>112,200.00</u>
Matching In-Kind Services:*	\$	<u>1,750.10</u>
<i>*salaries of government employees are not considered matching contributions</i>		
Total Project Cost:	\$	<u>142,350.10</u>

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

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

G. necessary to evaluate the merits of the project. If project involves water leasing or water salvage complete a *supplemental questionnaire*. (<http://fwp.mt.gov/fwpDoc.html?id=36110>)

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

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

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

Westslope cutthroat trout and brook trout.

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

The project will enhance wild fish habitat by:

- Reducing fine sediment delivery to the channel.
- Increasing connectivity between the channel and the floodplain.
- Increasing riparian corridor width and woody vegetation cover.
- Enhancing aquatic habitat.
- Increasing ecological function of the riparian and floodplain corridor.

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

We believe meeting these objectives will lead to a better more robust fishery, especially in regards to native Westslope cutthroat trout, and that these restoration efforts will help increase numbers of fish per mile in Miller Creek and the lower Bitterroot.

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

Increased wild fish numbers will translate to greater chance for angling success on Miller Creek and the Bitterroot. There is national forest land directly above the restoration reach that allows for public fishing access.

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

CFC plans to meet this commitment through long term monitoring and maintenance funding that will come with the MARS funding for the project.

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

The property was logged over 80 years ago and then was used to grow pasture grass which encroached into the riparian zone. The current owners have placed the entire property in a conservation easement with RMEF and will not be grazing cattle on the property. The project will help reestablish the creeks connection with it's floodplains, create more wetlands and lead to increased riparian vegetation and shade for the creek.

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

Public benefits from this project will include: increased fish numbers, enhanced fishing opportunities and an improved tourism economy.

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

The project will not interfere with the water supply, water rights, or property rights of adjacent landowners. There are no water rights issues involved in this project.

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

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

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

No

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.

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: Pat Onty Date: 5/31/19

Sponsor (if applicable): _____

Submittal: Applications must be signed and received before December 1 and June 1 of each year to be considered for the subsequent funding period. Late or incomplete applications will be rejected.

Mail to: Montana FWP Fish Management Bureau PO Box 200701 Helena, MT 59620-0701	Email: Michelle McGree mmcgree@mt.gov (electronic submissions must be signed) For files over 10MB, use https://transfer.mt.gov
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Applications may be rejected if this form is modified.

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			
					FUTURE FISHERIES REQUEST	IN-KIND SERVICES**	IN-KIND CASH	TOTAL
Personnel***								
Survey	1		\$8,680.00	\$ 8,680.00			8,680.00	\$ 8,680.00
Design	1		\$11,340.00	\$ 11,340.00			11,340.00	\$ 11,340.00
Engineering				\$ -				\$ -
Permitting	1		\$12,600.00	\$ 12,600.00			12,600.00	\$ 12,600.00
Oversight	1		\$11,000.00	\$ 11,000.00			11,000.00	\$ 11,000.00
				\$ -				\$ -
			Sub-Total	\$ 43,620.00	\$ -	\$ -	\$ 43,620.00	\$ 43,620.00
Travel								
Mileage	500	mile	\$0.55	\$ 275.00			275.00	\$ 275.00
Per diem				\$ -				\$ -
			Sub-Total	\$ 275.00	\$ -	\$ -	\$ 275.00	\$ 275.00
Construction Materials****								
Trees/rootwads	50	Each	\$55.00	\$ 2,750.00		1,750.10	999.90	\$ 2,750.00
Rock (6 in)	50	CY	\$33.00	\$ 1,650.00			1,650.00	\$ 1,650.00
containerized woody plants	625	each	\$4.40	\$ 2,750.00			2,750.00	\$ 2,750.00
containerized wetland plants	625	each	\$1.10	\$ 687.50			687.50	\$ 687.50
Native seed	38	lbs	\$13.20	\$ 501.60			501.60	\$ 501.60
Exclosure Fencing	1250	linear ft	\$2.20	\$ 2,750.00			2,750.00	\$ 2,750.00
				\$ -				\$ -
				\$ -				\$ -
				\$ -				\$ -
			Sub-Total	\$ 11,089.10	\$ -	\$ 1,750.10	\$ 9,339.00	\$ 11,089.10
Equipment and Labor								
Water management	1	LS	\$1,500.00	\$ 1,500.00			1,500.00	\$ 1,500.00
Collect willow cuttings	12500	each	\$0.55	\$ 6,875.00			6,875.00	\$ 6,875.00
Install plants	1	LS	\$3,441.00	\$ 3,441.00			3,441.00	\$ 3,441.00
Grading and structures	1	LS	\$66,800.00	\$ 66,800.00	28,400.00		38,400.00	\$ 66,800.00
Install fencing	1250	linear ft	\$2.20	\$ 2,750.00			2,750.00	\$ 2,750.00
				\$ -				\$ -
			Sub-Total	\$ 81,366.00	\$ 28,400.00	\$ -	\$ 52,966.00	\$ 81,366.00
Mobilization								

BUDGET TEMPLATE SHEET FOR FUTURE FISHERIES PROGRAM APPLICATIONS

	1 LS	\$6,000.00	\$ 6,000.00			6,000.00	\$ 6,000.00
			\$ -				\$ -
			\$ -				\$ -
			\$ -				\$ -
		Sub-Total	\$ 6,000.00	\$ -	\$ -	\$ 6,000.00	\$ 6,000.00
TOTALS		\$ 142,350.10	\$ 28,400.00	\$ 1,750.10	\$ 112,200.00	\$ 142,350.10	

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. \$20/hr for volunteer labor for willow cuttings and planting
 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	IN-KIND SERVICE	IN-KIND CASH	TOTAL	Secured? (Y/N)
MT DEQ 319	\$ -	\$ 80,200.00	\$ 80,200.00	Y
MARS	\$ -	\$ 20,000.00	\$ 20,000.00	N
Westslope Chapter Trout Unlimited	\$ -	\$ 5,000.00	\$ 5,000.00	Y
Landowner	\$ -	\$ 7,000.00	\$ 7,000.00	Y
Landowner in-kind (trees/rootwads)	\$ 1,750.10	\$ -	\$ 1,750.10	Y
	\$ -	\$ -	\$ -	
	\$ -	\$ -	\$ -	
	\$ -	\$ -	\$ -	
	\$ -	\$ -	\$ -	
	\$ -	\$ -	\$ -	
TOTALS	\$ 1,750.10	\$ 112,200.00	\$ 113,950.10	

Additional Project ,Design and Maintenance Information- Miller Creek Phase 1 Restoration

Miller Creek is located in Missoula County, Montana and is listed for temperature and sediment impairments on the 2016 Clean Water Act section 303(d) list. The creek flows west for 18 miles from the Sapphire Mountains to its confluence with the Bitterroot River near the city of Missoula. The watershed encompasses 47.9 square miles and supports a variety of land uses, from silviculture and agriculture, to residential subdivisions. The watershed has been undergoing many changes in land use and ownership in recent decades, and this presents challenges and opportunities for management and restoration.

The Clark Fork Coalition's Habitat Assessment of Miller Creek, completed in October of 2018, followed up on the WRP completed earlier in the year and found impacts from sediment throughout the watershed primarily due to channel incisement. Flow and temperature monitoring in 2018 corroborated past findings of high water temperatures and dewatering in the lower to mid reaches. The high levels of sediment are affecting landowners' infrastructure by constricting road culverts, filling irrigation diversions and adding to channel instability. Additionally, the high sediment load, high water temperatures and dewatering are negatively affecting the fishery, translating to lost angling opportunities on Miller Creek and the Bitterroot River. Miller Creek is a historically productive fishery and an important tributary for spawning Westslope cutthroat and rainbow trout in the lower Bitterroot River and contains pure strain Westslope cutthroat trout in at least two of its tributaries.

While the Spooner Ranch reach is not the most degraded reach on Miller Creek the restoration project fits well into CFC's "top down" restoration strategy and the landowner is willing and responsive to restoration on the property. Another reason for starting on the Spooner Ranch is the downstream landowner owns over 2 miles of severely degraded creek but is taking a "wait and see" attitude until the Spooner Ranch project is completed and they see the outcome.

The mile of Miller Creek proposed for restoration is a Rosgen C4 with an average slope of .6-.7%. The reach has a bankfull discharge of 33 cfs that was field verified by CFC with a flowmeter this spring. Bankfull width was 8.7 ft and depth was 2.2 ft. Geum Environmental Consulting has completed surveys of several reference reaches but the results will not be ready until after June 1st.

MARS is contributing \$20,000 of project implementation funding to the project and with this funding comes an endowment which CFC will have access to in order to monitor and maintain the project for at least the next 20 years. MARS will work with CFC for the first 5 years on monitoring and maintenance for the first 5 years after the project is completed and then will release the endowment to CFC to use as needed for long term maintenance/monitoring.



Photo 1: Miller Creek Spooner Creek Ranch-active erosion April 17, 2019



Photo 2: Miller Creek Spooner Creek Ranch—active erosion April 17, 2019



Photo 3: Miller Creek Spooner Creek Ranch—Incisement and poor riparian vegetation April 17, 2019



Photo 4: Miller Creek Spooner Creek Ranch—Avulsion April 17, 2019

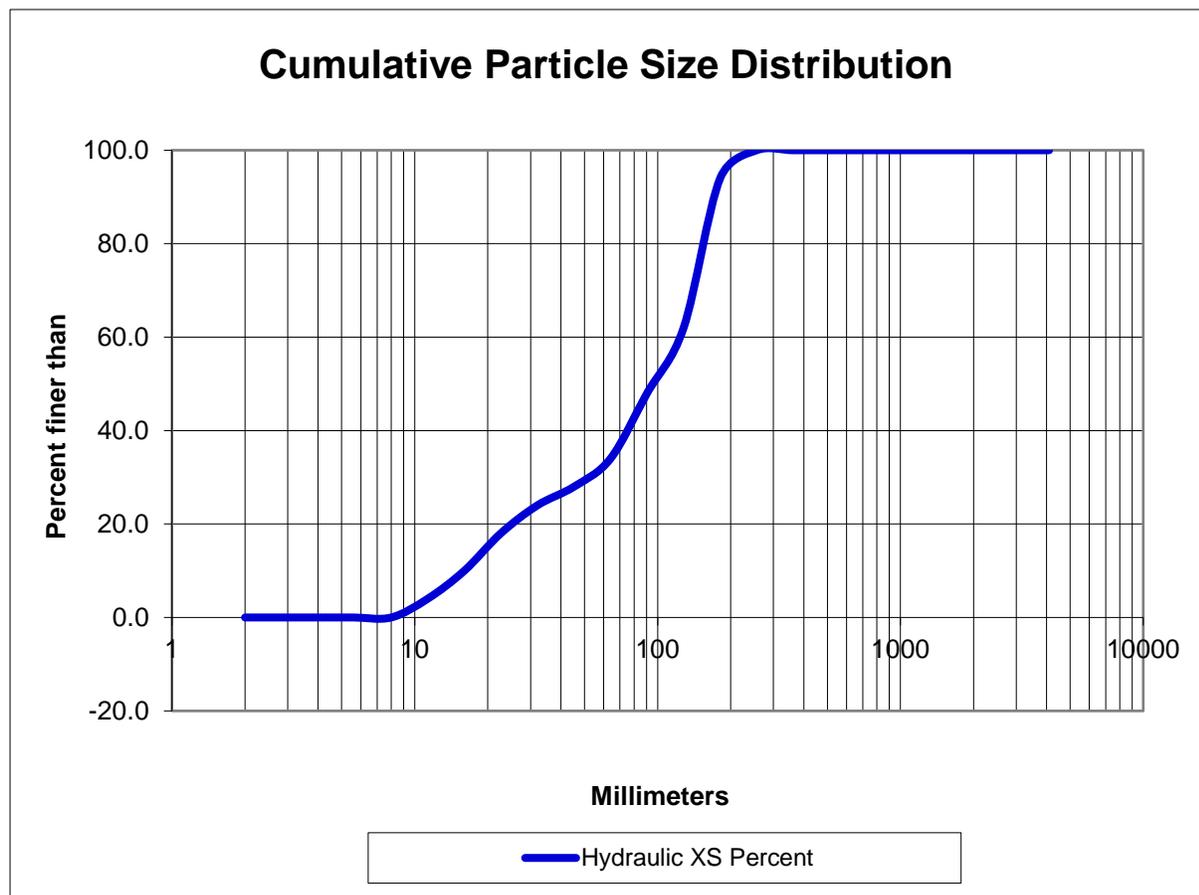




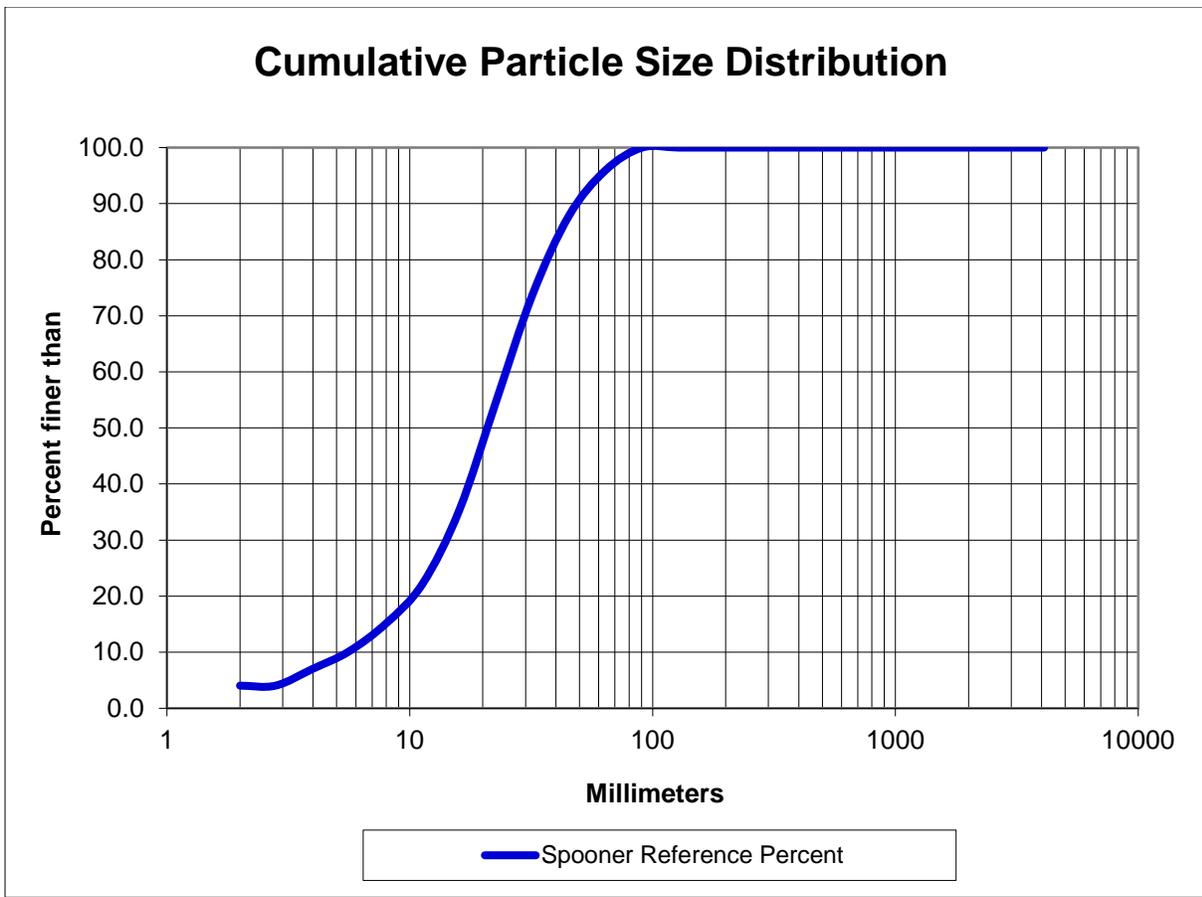




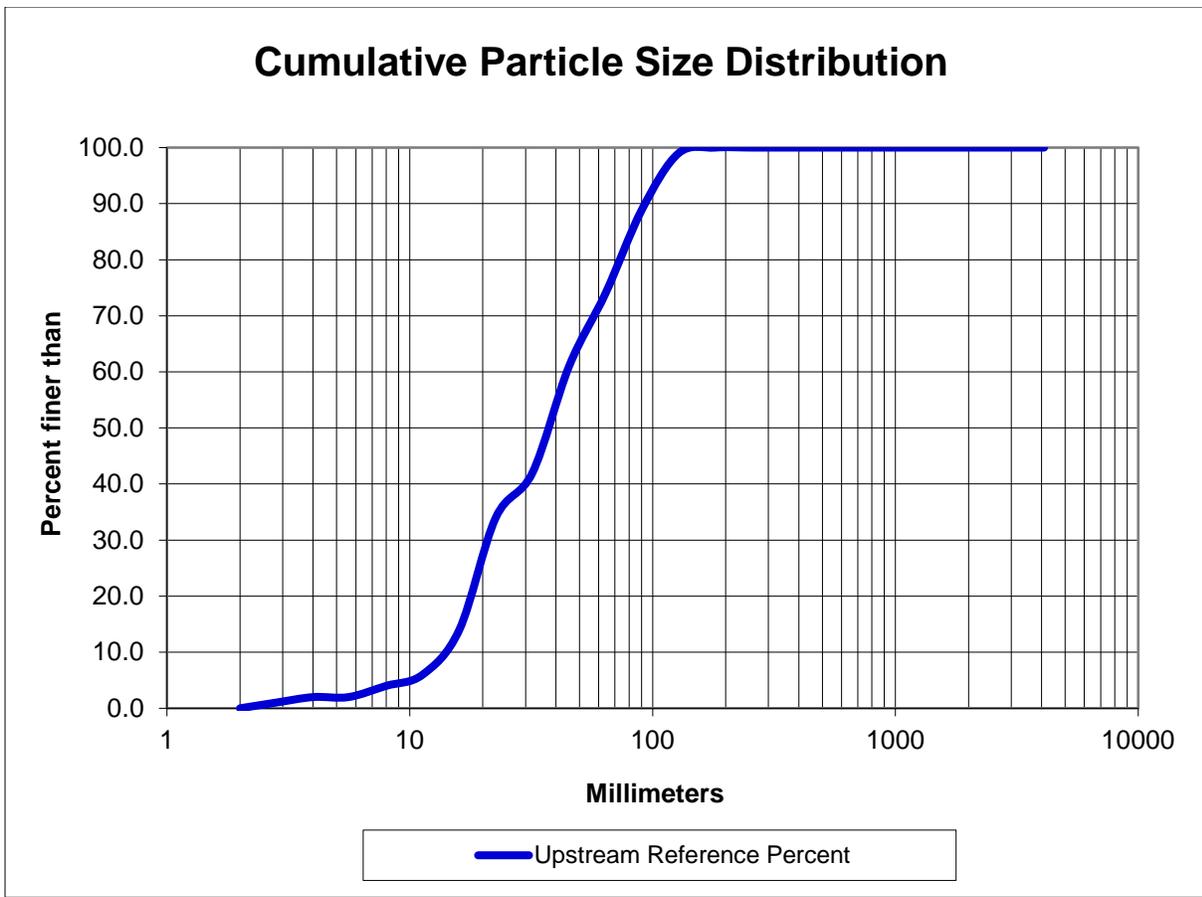
Miller Creek Pebble Count Data



	Reference Percent	
	percent	mm
d ₁₆	16.32026	21.500
d ₅₀	50.17730	97.000
d ₈₄	84.87824	168.000



	Reference Percent	
	percent	mm
d ₁₆	16.05676	8.500
d ₅₀	50.74239	21.500
d ₈₄	84.13529	42.000



	Reference Percent	
	percent	mm
d ₁₆	16.01454	17.000
d ₅₀	51.11576	39.000
d ₈₄	84.47023	83.000



307 State Street
P.O. Box 1956
Hamilton, Montana 58940
Phone: 406-363-2353, Fax: 406-363-3015
<http://www.geumconsulting.com>

TO: Jed Whiteley, Clark Fork Coalition
FROM: Amy Sacry, Geum Environmental Consulting
DATE: March 25, 2019
RE: DRAFT Miller Creek Restoration Design Concepts – Spooner Ranch

This memo outlines restoration design concepts for a property on Miller Creek. The purpose of this memo is to support funding acquisition for the work. Restoration concepts were developed primarily through aerial photo interpretation with limited site review.

Spooner Ranch Restoration Design Concept

Approximately 1 mile of Miller Creek flows through the Spooner Ranch Property. The channel ranges from moderately to highly entrenched. A narrow, well-vegetated riparian corridor is present along the channel, but the stream is actively eroding as it continues to adjust to a new base elevation. Channel incision averages 4 to 5 ft with several areas of active lateral bank erosion occurring. These alterations have resulted in a loss of connectivity between the channel and floodplain, increased fine sediment delivery to the channel, reduced aquatic habitat diversity, and reduced riparian vegetation cover, all of which contribute to overall degraded conditions in the watershed.

The goals of restoration on the Spooner Ranch Property include:

- Reduce fine sediment delivery to the channel.
- Increase connectivity between the channel and the floodplain.
- Increase riparian corridor width and woody vegetation cover.
- Enhance aquatic habitat.
- Increase ecological function of the riparian and floodplain corridor.

Restoration Concept Elements

To achieve the desired goals for restoration on the Spooner Ranch Property, the restoration concept includes the following elements:

- **Woody Riparian Vegetation Expansion Corridor.** Designate a buffer along the channel where riparian vegetation is allowed to grow and expand. This area would not be managed for hay production or other land management actions that prevent natural vegetation growth.
- **Bed Aggradation Structures.** Locally elevate the streambed to reconnect to floodplain surfaces. This would be done through installation of bed aggradation structures.
- **Floodplain Grading and Roughness.** Lower floodplain surfaces to increase connectivity with the channel and allow woody riparian vegetation expansion. Topographic diversity and woody

debris would be incorporated into graded floodplain surfaces. Where there is room, side channels and distributary flow channels will also be incorporated into graded floodplain surfaces

- **Channel Shaping and Realignment.** Realign the channel away from fine sediment sources (i.e. vertical eroding streambanks). This element includes shaping the channel to create pools or other habitat features. Channel realignment is also proposed in the area where a recent channel avulsion occurred to increase aquatic habitat diversity and restore floodplain connectivity.
- **Woody Brush Matrix Streambank Treatments.** Install streambank structures consisting of woody debris and brush to enhance aquatic habitat, restore woody riparian vegetation, and increase overall riparian function.
- **Riparian Shrub Clump Planting.** Selectively plant riparian shrubs and trees. Planted trees and shrubs will require installation of small fences to prevent browse by ungulates. Planting would generally occur in graded floodplain areas where existing vegetation will be removed. The site is dominated by introduced pasture grasses so weed mats may be needed due to prevent competition.
- **Small Enclosure Fences.** In areas where natural regeneration or existing riparian woody vegetation is suppressed by deer and elk browse, small enclosure fences are proposed to encourage growth and expansion.
- **Woody Debris Habitat Structures.** Install woody debris habitat structures in areas where structures alone can enhance floodplain connectivity and increase aquatic habitat diversity. Several types of woody debris structures can be used depending on desired site-specific functions.
- **Floodplain Wetlands.** In the avulsion realignment area, the abandoned channel segments can be converted to floodplain and riparian wetlands to increase ecological diversity. This would be done through grading and planting of herbaceous wetland vegetation. These areas would be activated with side channels or distributary flow channels.

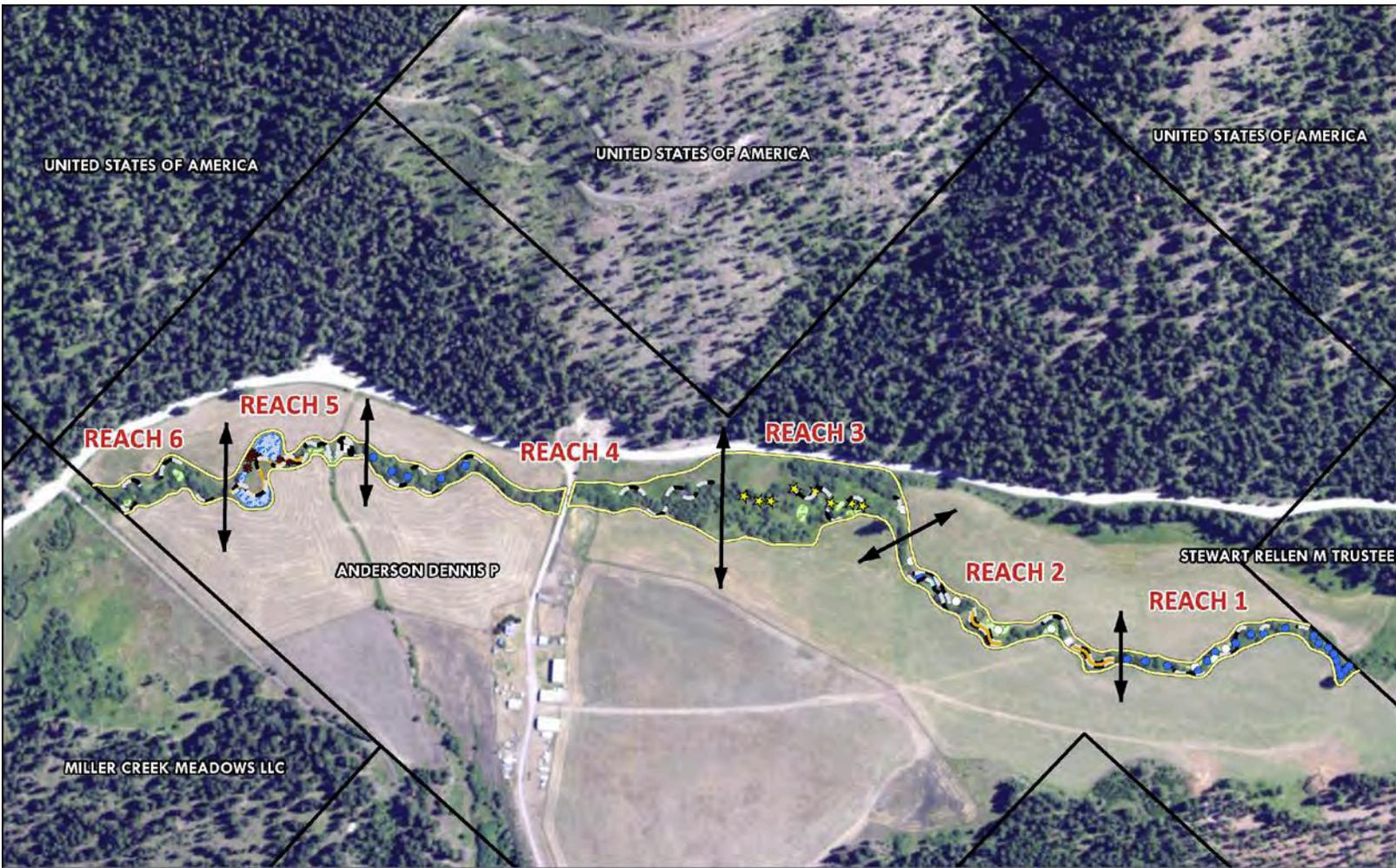
The Spooner Ranch Project was broken into six distinct reaches (Table 1 and Attachment A). Conceptual restoration design elements were applied to each reach based on the constraints within each reach and desired restoration outcomes. Figures showing conceptual treatment locations are provided by reach in Attachment A. Estimated costs for implementing the conceptual restoration design are provided in Attachment A. Typical detail drawings of streambank and channel structures are provided in Attachment C.

Table 1. Spooner Ranch Property reach descriptions and restoration concept.

Reach	Description	Restoration Concept Elements
1	Reach 1 is entrenched with little room for expansion. The restoration concept is to treat sediment sources and reconnect the channel and floodplain through bed aggradation structures and floodplain grading.	Bed Aggradation Structures Woody Brush Matrix Streambank Treatments Floodplain Grading and Roughness Riparian Planting with Small Fences
2	Reach 2 is slightly less entrenched than Reach 1 and has a wider riparian corridor. The restoration concept is to realign the channel away from eroding banks and reconnect the floodplain to the extent possible.	Bed Aggradation Structures Channel Shaping and Realignment Woody Brush Matrix Streambank Treatments Floodplain Grading and Roughness Riparian Planting with Small Fences

3	Reach 3 has a much wider riparian corridor and was influenced by fairly recent beaver activity that created more channel and floodplain diversity. The restoration concept for this reach is to selectively lower high points in the floodplain to increase connectivity and use woody debris habitat structures to reconnect and backwater overflow channels into the floodplain.	Woody Debris Habitat Structures Woody Debris Matrix Streambank Treatments Floodplain Grading and Roughness
4	Reach 4 is similar to Reach 1. The restoration concept is to treat sediment sources and reconnect the channel and floodplain through bed aggradation structures.	Bed Aggradation Structures Woody Brush Matrix Streambank Treatment
5	Reach 5 includes a small tributary and a recent channel avulsion. The restoration concept is to restore channel diversity and create floodplain wetlands.	Woody Debris Matrix Streambank Treatments Floodplain Grading and Roughness Riparian Planting with Small Fences Channel Realignment Woody Debris Channel Plugs Floodplain Wetland Creation Wetland Herbaceous Planting
6	Reach 6 becomes heavily entrenched with very little room for expansion. The restoration concept is to treat sediment sources and selectively lower floodplain benches where possible.	Woody Debris Matrix Streambank Treatments Floodplain Grading and Roughness Riparian Planting with Small Fences

Attachment 1: Spooner Ranch Conceptual Restoration Design and Costs

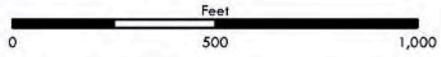


ANDERSON PROPERTY - OVERVIEW

- - Woody brush matrix
- Channel shaping/realignment
- Woody riparian vegetation expansion corridor

- Bed aggradation structure
- * Woody debris channel plug
- ☆ Woody debris habitat structure
- Riparian shrub clump planting with fence

- Floodplain grading and roughness
- Floodplain wetland
- Parcel ownership



Aerial imagery:
USDA NAIP 2015

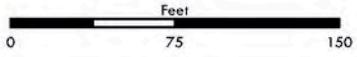


ANDERSON PROPERTY - REACH 1

- Woody brush matrix
- Channel shaping/realignment
- Woody riparian vegetation expansion corridor

- Bed aggradation structure
- Woody debris channel plug
- Woody debris habitat structure
- Riparian shrub clump planting with fence

- Floodplain grading and roughness
- Floodplain wetland
- Parcel ownership



Aerial imagery:
USDA NAIP 2015

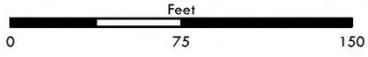


ANDERSON PROPERTY - REACH 2

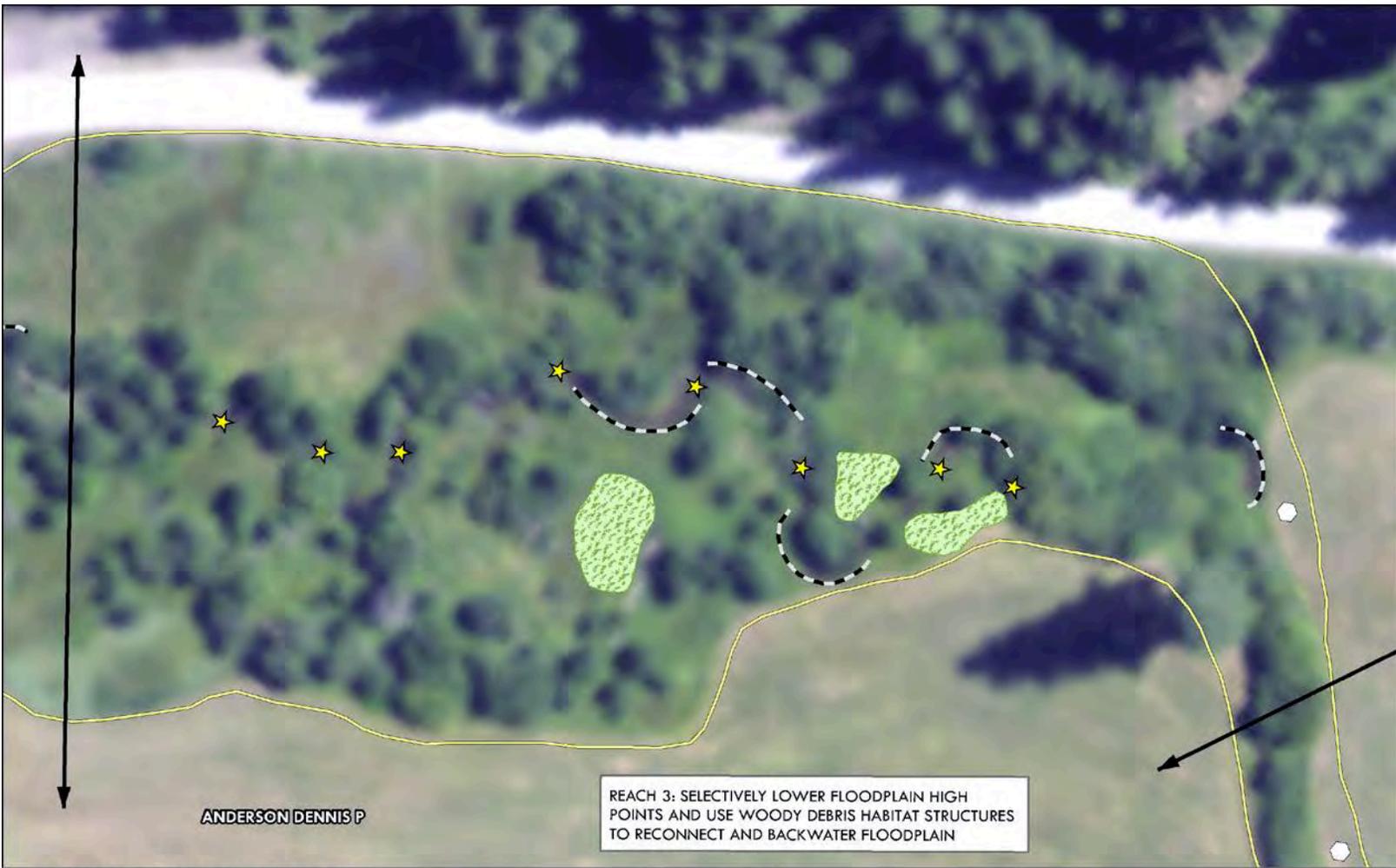
- Woody brush matrix
- Channel shaping/realignment
- Woody riparian vegetation expansion corridor

- Bed aggradation structure
- Woody debris channel plug
- Woody debris habitat structure
- Riparian shrub clump planting with fence

- Floodplain grading and roughness
- Floodplain wetland
- Parcel ownership



Aerial imagery:
USDA NAIP 2015



ANDERSON DENNIS P

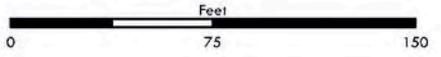
REACH 3: SELECTIVELY LOWER FLOODPLAIN HIGH POINTS AND USE WOODY DEBRIS HABITAT STRUCTURES TO RECONNECT AND BACKWATER FLOODPLAIN

ANDERSON PROPERTY - REACH 3

- - - Woody brush matrix
- Channel shaping/realignment
- Woody riparian vegetation expansion corridor

- Bed aggradation structure
- * Woody debris channel plug
- ★ Woody debris habitat structure
- Riparian shrub clump planting with fence

- Floodplain grading and roughness
- Floodplain wetland
- Parcel ownership



Aerial imagery: USDA NAIP 2015



ANDERSON PROPERTY - REACH 4

- - - Woody brush matrix
- Channel shaping/realignment
- Woody riparian vegetation expansion corridor

- Bed aggradation structure
- * Woody debris channel plug
- ★ Woody debris habitat structure
- Riparian shrub clump planting with fence

- Floodplain grading and roughness
- Floodplain wetland
- Parcel ownership



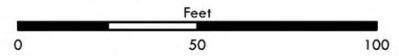


ANDERSON PROPERTY - REACH 5

- Woody brush matrix
- Channel shaping/realignment
- Woody riparian vegetation expansion corridor

- Bed aggradation structure
- Woody debris channel plug
- Woody debris habitat structure
- Riparian shrub clump planting with fence

- Floodplain grading and roughness
- Floodplain wetland
- Parcel ownership



Aerial imagery:
USDA NAIP 2015

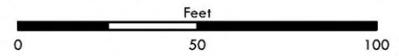


ANDERSON PROPERTY - REACH 6

- - - Woody brush matrix
- Channel shaping/realignment
- Woody riparian vegetation expansion corridor

- Bed aggradation structure
- * Woody debris channel plug
- ★ Woody debris habitat structure
- Riparian shrub clump planting with fence

- Floodplain grading and roughness
- Floodplain wetland
- Parcel ownership



Aerial imagery: USDA NAIP 2015

Treatment	Estimated Quantity
Woody Brush Matrix Streambank Treatment	3,000 linear feet
Bed Aggradation Structure	27
Woody Debris Habitat Structure/Channel Plug	14
Channel Shaping/Realignment	650 linear feet
Floodplain Grading and Roughness	10,000 square feet (370 cubic yards)
Floodplain Wetland Grading	8,000 square feet (300 cubic yards)
Riparian Shrub Planting with 6-ft Fence	10 locations approx. 20' x 20' each, 50 plants each
Small Enclosure Fences (to protect existing vegetation)	200 feet (no conceptual locations identified)

Item	Description	Quantity	Units	Unit Cost	Cost
1	Mobilization and Demobilization (5% of total cost)	1	Lump Sum	\$3,600.00	\$3,600.00
2	Water Management	1	Lump Sum	\$500.00	\$500.00
3	Acquire Trees (min dbh 12")	40	Trees	\$50.00	\$2,000.00
4	Acquire Rock (6 inch)	40	Cubic Yards	\$30.00	\$1,200.00
5	Vegetation Salvage and Transplant	2,000	Square Feet	\$0.25	\$500.00
6	Channel Realignment/Construction	650	Linear Feet	\$15.00	\$9,750.00
7	Bed Aggradation Structures	27	Each	\$125.00	\$3,375.00
8	Woody Brush Matrix Streambank Treatment	3,000	Linear Feet	\$10.00	\$30,000.00
9	Woody Debris Habitat Structures/Channel Plugs	14	Each	\$200.00	\$2,800.00
10	Willow cuttings for Streambank Treatments	10,000	Each	\$0.50	\$5,000.00
11	Floodplain Grading	370	Cubic Yards	\$3.00	\$1,110.00
12	Floodplain Wetland Grading	300	Cubic Yards	\$3.00	\$900.00
13	Floodplain Roughness Treatment	0.23	Acre	\$500.00	\$114.78
14	Containerized Woody Plants	500	Each	\$3.50	\$1,750.00
15	Install Containerized Woody Plants (30 cubic inch)	500	Each	\$4.00	\$2,000.00
16	Fencing: small 6-ft wire fences to protect planted shrubs or existing vegetation	1,000	Linear Feet	\$2.00	\$2,000.00
17	Install Fencing	1,000	Linear Feet	\$2.00	\$2,000.00
18	Containerized Wetland Plants (10 cubic inch)	500	Each	\$1.00	\$500.00
19	Install Containerized Wetland Herbaceous Plants	500	Each	\$1.00	\$500.00
20	Native Seed	30	Lb	\$12.00	\$360.00
21	Apply Seed	1	Acre	\$85.00	\$85.00
				Estimated Construction Sub-total	\$70,044.78
				10% Contingency	\$7,000.00
				Estimated Construction Total	\$77,044.78
				Estimated Construction Sub-total Minus In-Kind Costs	\$55,659.78

¹ Items in ***BOLD ITALICS*** indicate where the landowner or Clark Fork Coalition can provide in-kind services as funding match.

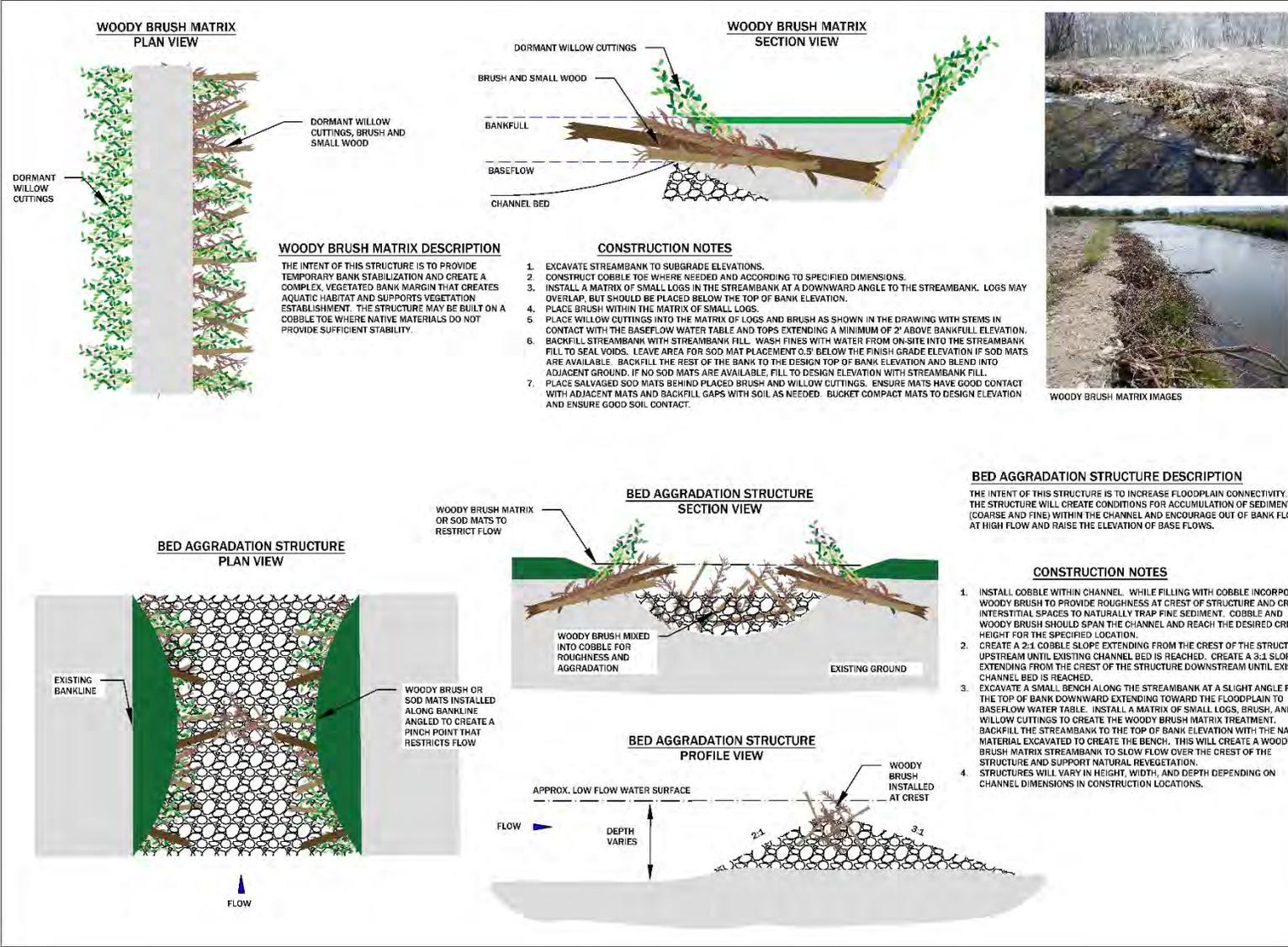
Table 2 Continued. Additional Project Costs		
Item	Description	Estimated Cost
1	Design (analysis, plan set, permitting, bid support, logistics)	\$15,000.00
2	Construction Oversight (staking, 2 weeks oversight)	\$10,000.00
3	<i>Labor Support for Construction</i>	<i>\$3,000.00</i>
4	<i>Construction Completion Documentation</i>	<i>\$3,000.00</i>
5	<i>Monitoring and Maintenance (5%)</i>	<i>\$3,000.00</i>
	Sub-total Other Costs	\$34,000.00
	Sub-total Other Costs Minus In-Kind Costs	\$25,000.00
	<u>TOTAL PROJECT ESTIMATE</u>	<u>\$111,044.78</u>
	<u>TOTAL PROJECT ESTIMATE MINUS IN-KIND COSTS</u>	<u>\$80,659.78</u>

¹ Items in ***BOLD ITALICS*** indicate where the Clark Fork Coalition can provide in-kind services as funding match.

Assumptions for Construction Cost Estimate

1. Costs are based on Conceptual Estimates – a 10% contingency was added for uncertainty
2. Mobilization and Demobilization could be significantly less for local contractor
3. Costs assume that permits will allow construction to occur in the wet or by isolating the work area

Attachment 3: Typical Structure Treatment Details



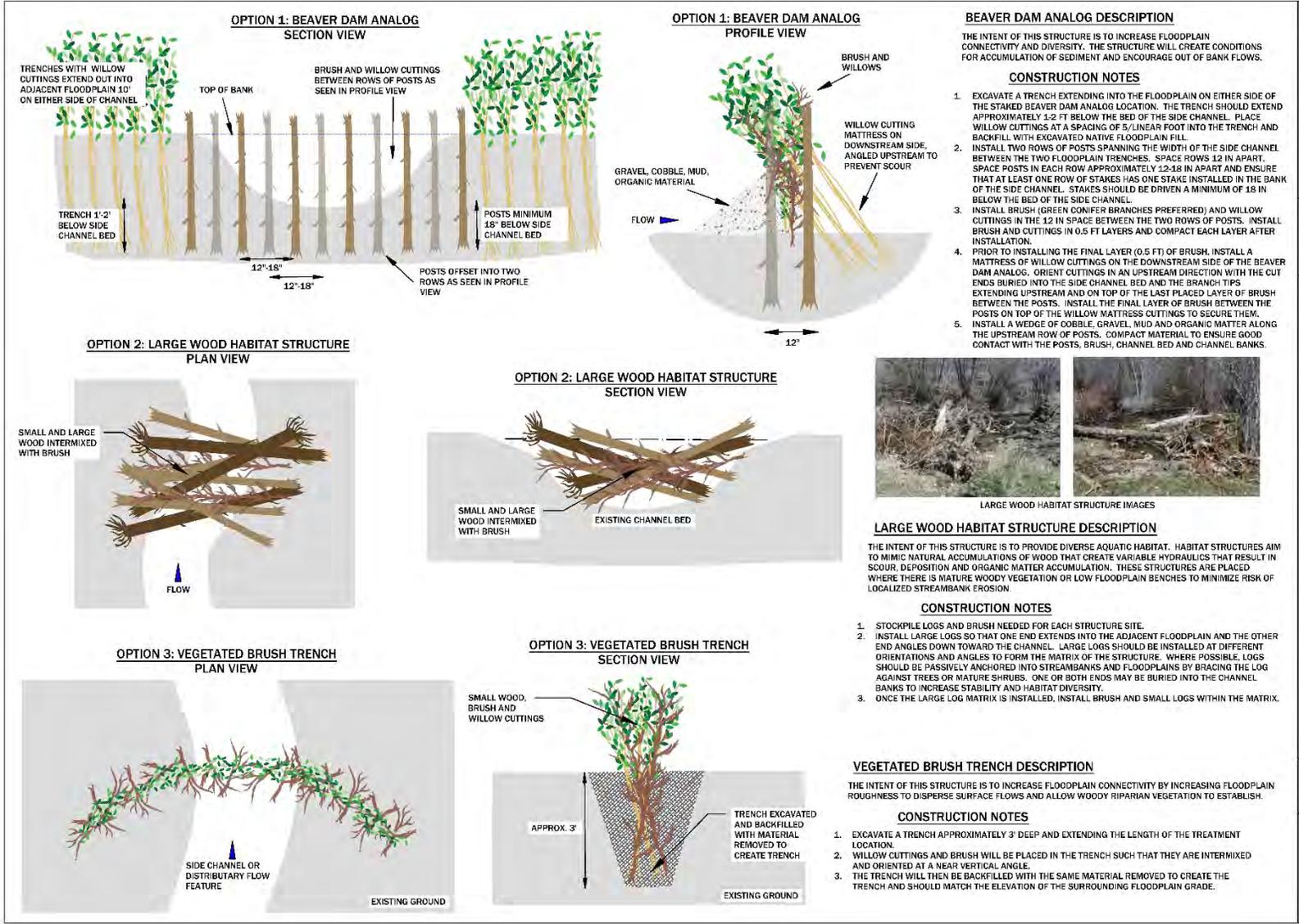
307 BRYCE ST.
HAYALON, MT 59842
406.455.3901
WWW.EUMCONSULTING.COM

WOODY BRUSH MATRIX AND BED AGGRADATION
STRUCTURE DETAILS

MILLER CREEK

DRAWN BY: A. GILLEY
DESIGNED BY: A. BACRY
DATE: FEBRUARY 2019

SHEET
1.0



BEAVER DAM ANALOG DESCRIPTION

THE INTENT OF THIS STRUCTURE IS TO INCREASE FLOODPLAIN CONNECTIVITY AND DIVERSITY. THE STRUCTURE WILL CREATE CONDITIONS FOR ACCUMULATION OF SEDIMENT AND ENCOURAGE OUT OF BANK FLOWS.

- CONSTRUCTION NOTES**
1. EXCAVATE A TRENCH EXTENDING INTO THE FLOODPLAIN ON EITHER SIDE OF THE STAKED BEAVER DAM ANALOG LOCATION. THE TRENCH SHOULD EXTEND APPROXIMATELY 1-2 FT BELOW THE BED OF THE SIDE CHANNEL. PLACE WILLOW CUTTINGS AT A SPACING OF 5' LINEAR FOOT INTO THE TRENCH AND BACKFILL WITH EXCAVATED NATIVE FLOODPLAIN FILL.
 2. INSTALL TWO ROWS OF POSTS SPANNING THE WIDTH OF THE SIDE CHANNEL BETWEEN THE TWO FLOODPLAIN TRENCHES. SPACE ROWS 12 IN APART. SPACE POSTS IN EACH ROW APPROXIMATELY 12-18 IN APART AND ENSURE THAT AT LEAST ONE ROW OF STAKES HAS ONE STAKE INSTALLED IN THE BANK OF THE SIDE CHANNEL. STAKES SHOULD BE DRIVEN A MINIMUM OF 18 IN BELOW THE BED OF THE SIDE CHANNEL.
 3. INSTALL BRUSH (GREEN CONIFER BRANCHES PREFERRED) AND WILLOW CUTTINGS IN THE 12 IN SPACE BETWEEN THE TWO ROWS OF POSTS. INSTALL BRUSH AND CUTTINGS IN 0.5 FT LAYERS AND COMPACT EACH LAYER AFTER INSTALLATION.
 4. PRIOR TO INSTALLING THE FINAL LAYER (0.5 FT) OF BRUSH, INSTALL A MATTRESS OF WILLOW CUTTINGS ON THE DOWNSTREAM SIDE OF THE BEAVER DAM ANALOG. ORIENT CUTTINGS IN AN UPSTREAM DIRECTION WITH THE CUT ENDS BURIED INTO THE SIDE CHANNEL BED AND THE BRANCH TIPS EXTENDING UPSTREAM AND ON TOP OF THE LAST PLACED LAYER OF BRUSH BETWEEN THE POSTS. INSTALL THE FINAL LAYER OF BRUSH BETWEEN THE POSTS ON TOP OF THE WILLOW MATTRESS CUTTINGS TO SECURE THEM.
 5. INSTALL A WEDGE OF COBBLE, GRAVEL, MUD AND ORGANIC MATTER ALONG THE UPSTREAM ROW OF POSTS. COMPACT MATERIAL TO ENSURE GOOD CONTACT WITH THE POSTS, BRUSH, CHANNEL BED AND CHANNEL BANKS.



LARGE WOOD HABITAT STRUCTURE DESCRIPTION

THE INTENT OF THIS STRUCTURE IS TO PROVIDE DIVERSE AQUATIC HABITAT. HABITAT STRUCTURES AIM TO MIMIC NATURAL ACCUMULATIONS OF WOOD THAT CREATE VARIABLE HYDRAULICS THAT RESULT IN SCOUR, DEPOSITION AND ORGANIC MATTER ACCUMULATION. THESE STRUCTURES ARE PLACED WHERE THERE IS MATURE WOODY VEGETATION OR LOW FLOODPLAIN BENCHES TO MINIMIZE RISK OF LOCALIZED STREAMBANK EROSION.

- CONSTRUCTION NOTES**
1. STOCKPILE LOGS AND BRUSH NEEDED FOR EACH STRUCTURE SITE.
 2. INSTALL LARGE LOGS SO THAT ONE END EXTENDS INTO THE ADJACENT FLOODPLAIN AND THE OTHER END ANGLES DOWN TOWARD THE CHANNEL. LARGE LOGS SHOULD BE INSTALLED AT DIFFERENT ORIENTATIONS AND ANGLES TO FORM THE MATRIX OF THE STRUCTURE. WHERE POSSIBLE, LOGS SHOULD BE PASSIVELY ANCHORED INTO STREAMBANKS AND FLOODPLAINS BY BRACING THE LOG AGAINST TREES OR MATURE SHRUBS. ONE OR BOTH ENDS MAY BE BURIED INTO THE CHANNEL BANKS TO INCREASE STABILITY AND HABITAT DIVERSITY.
 3. ONCE THE LARGE LOG MATRIX IS INSTALLED, INSTALL BRUSH AND SMALL LOGS WITHIN THE MATRIX.

VEGETATED BRUSH TRENCH DESCRIPTION

THE INTENT OF THIS STRUCTURE IS TO INCREASE FLOODPLAIN CONNECTIVITY BY INCREASING FLOODPLAIN ROUGHNESS TO DISPERSE SURFACE FLOWS AND ALLOW WOODY RIPARIAN VEGETATION TO ESTABLISH.

- CONSTRUCTION NOTES**
1. EXCAVATE A TRENCH APPROXIMATELY 3' DEEP AND EXTENDING THE LENGTH OF THE TREATMENT LOCATION.
 2. WILLOW CUTTINGS AND BRUSH WILL BE PLACED IN THE TRENCH SUCH THAT THEY ARE INTERMIXED AND ORIENTED AT A NEAR VERTICAL ANGLE.
 3. THE TRENCH WILL THEN BE BACKFILLED WITH THE SAME MATERIAL REMOVED TO CREATE THE TRENCH AND SHOULD MATCH THE ELEVATION OF THE SURROUNDING FLOODPLAIN GRADE.

eum Environmental Consulting
 307 STATE ST.
 HAVEN, ONT L0M4C
 905.883.3301

WOODY DEBRIS HABITAT STRUCTURE OPTIONS

MILLER CREEK

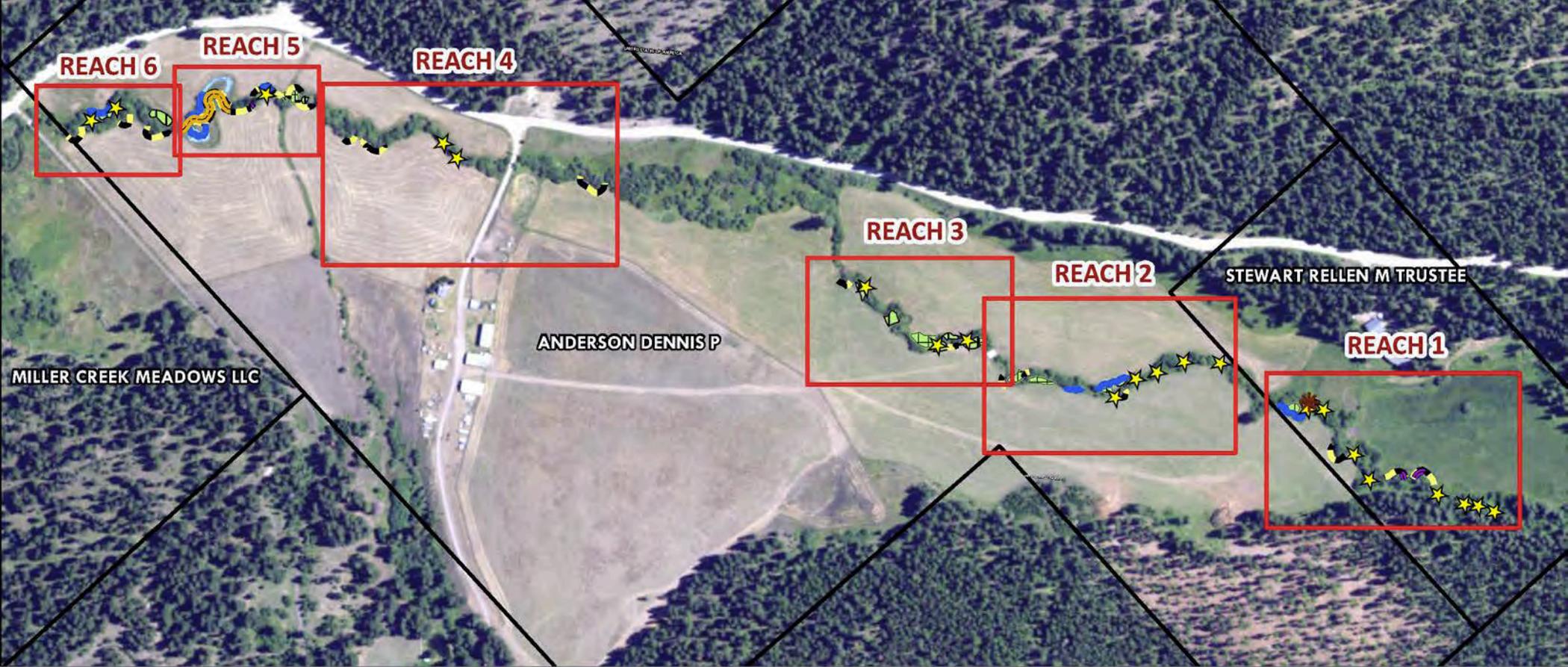
DRAWN BY: A. GILLEY
 DESIGNED BY: A. BACRY
 DATE: FEBRUARY 2019

SHEET 2.0

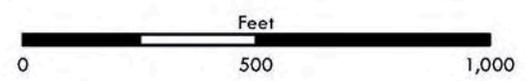
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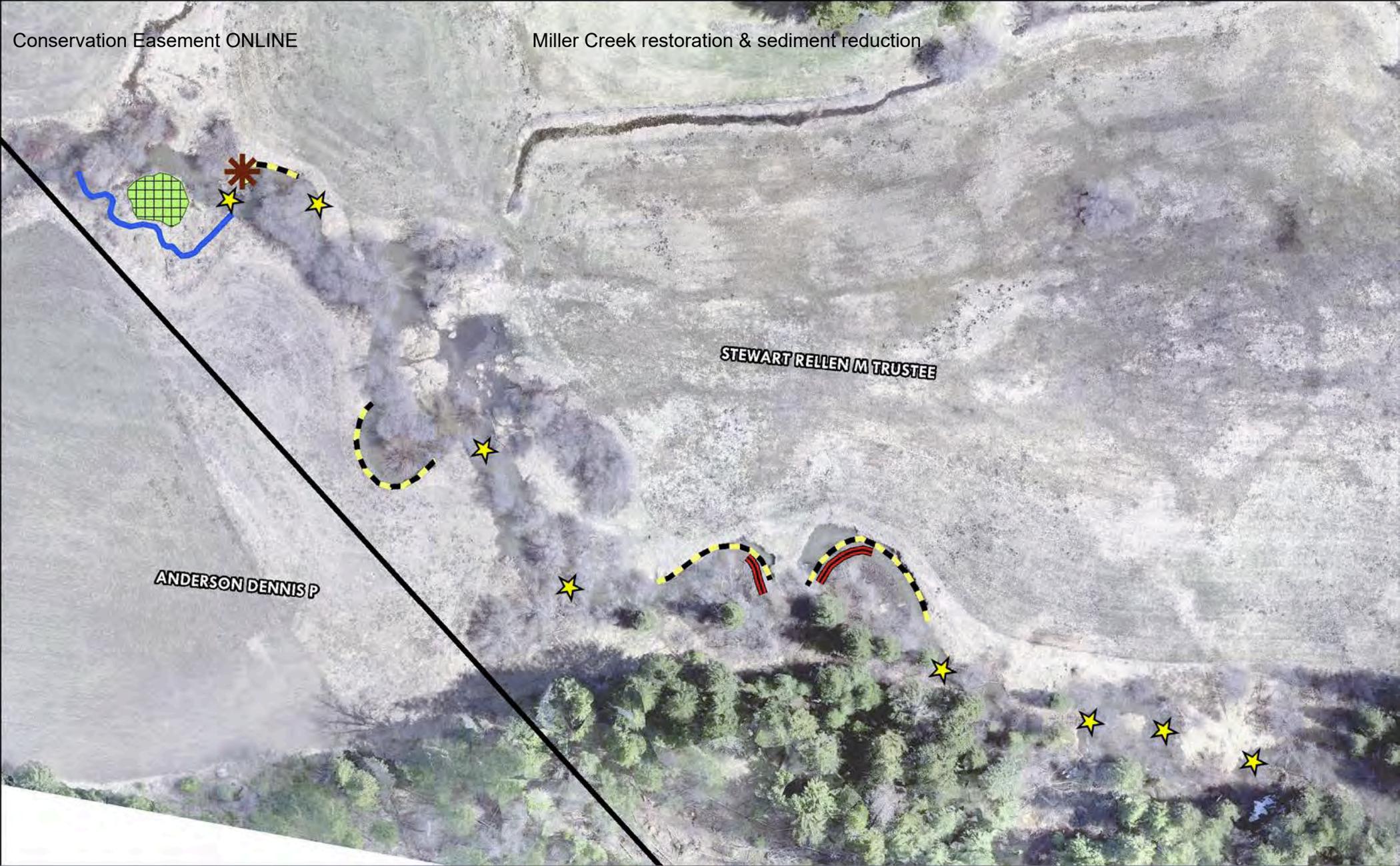
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UNITED STATES OF AMERICA



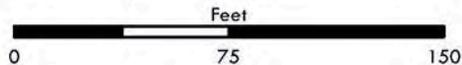
- | | | | |
|---|--|---|--|
|  Channel Realignment |  Lower, Floodplain Treatment, Plant |  Large Woody Habitat Structure |  Parcel Ownership |
|  New Channel Construction |  Scalp, Floodplain Treatment, Plant |  Root Wad | |
|  Side Channel |  Wetland Enhancement | | |
|  Woody Debris Matrix |  Hardened Crossing | | |

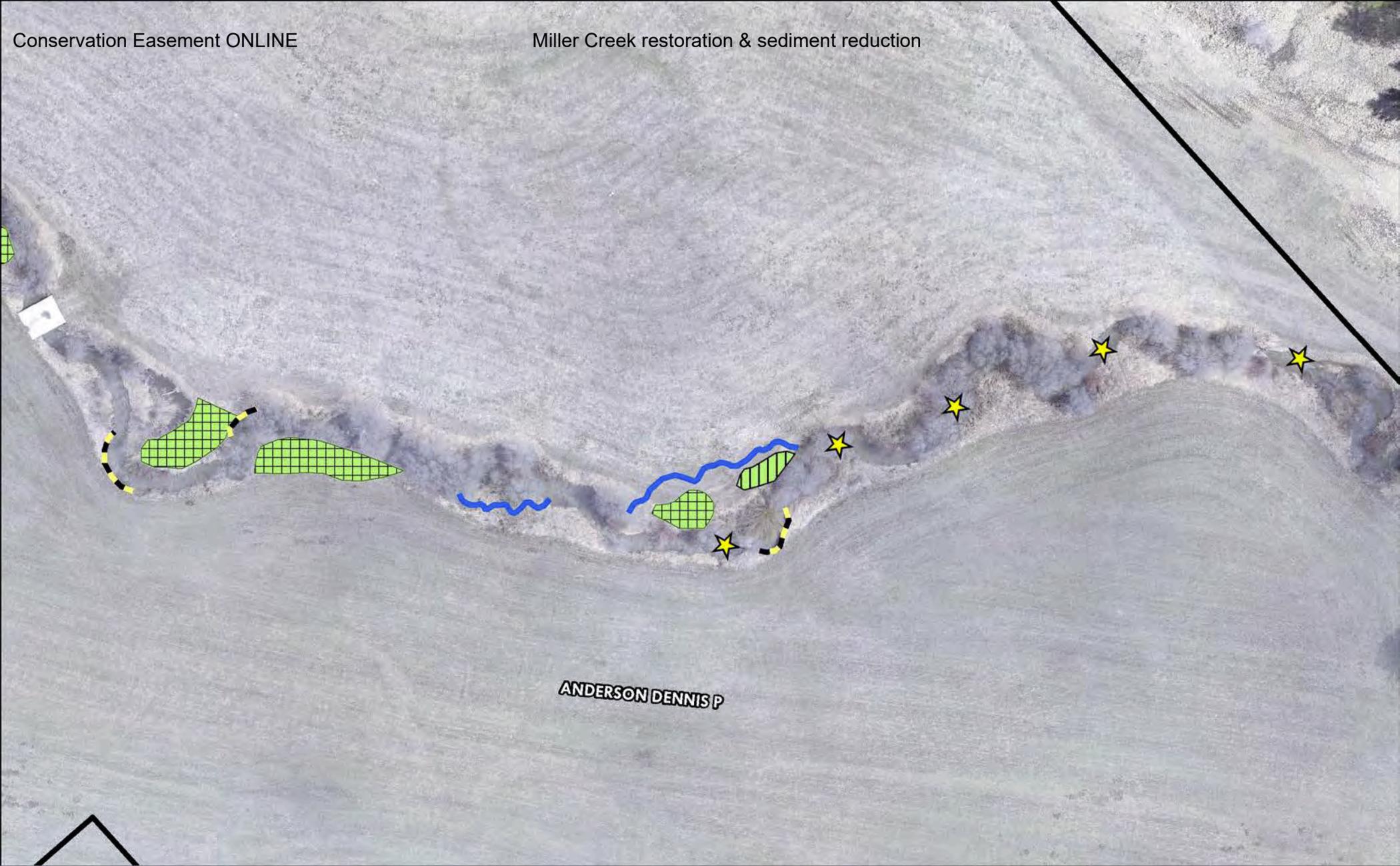




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|---|--|---|--|
|  Channel Realignment |  Lower, Floodplain Treatment, Plant |  Large Woody Habitat Structure |  Parcel Ownership |
|  New Channel Construction |  Scalp, Floodplain Treatment, Plant |  Root Wad | |
|  Side Channel |  Wetland Enhancement | | |
|  Woody Debris Matrix |  Hardened Crossing | | |

REACH 1

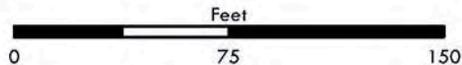




ANDERSON DENNIS P

-  Channel Realignment
-  New Channel Construction
-  Side Channel
-  Woody Debris Matrix
-  Lower, Floodplain Treatment, Plant
-  Scalp, Floodplain Treatment, Plant
-  Wetland Enhancement
-  Hardened Crossing
-  Large Woody Habitat Structure
-  Root Wad
-  Parcel Ownership

REACH 2

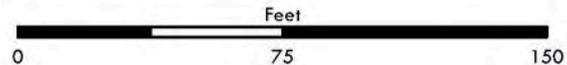


Aerial imagery: Geum Drone 2019



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|---|--|---|--|
|  Channel Realignment |  Lower, Floodplain Treatment, Plant |  Large Woody Habitat Structure |  Parcel Ownership |
|  New Channel Construction |  Scalp, Floodplain Treatment, Plant |  Root Wad | |
|  Side Channel |  Wetland Enhancement | | |
|  Woody Debris Matrix |  Hardened Crossing | | |

REACH 3



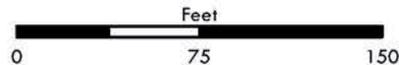
Aerial imagery: Geum Drone 2019



ANDERSON DENNIS P

-  Channel Realignment
-  New Channel Construction
-  Side Channel
-  Woody Debris Matrix
-  Lower, Floodplain Treatment, Plant
-  Scalp, Floodplain Treatment, Plant
-  Wetland Enhancement
-  Hardened Crossing
-  Large Woody Habitat Structure
-  Root Wad
-  Parcel Ownership

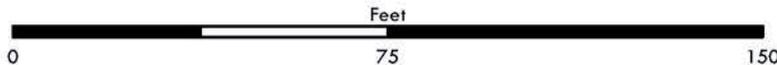
REACH 4

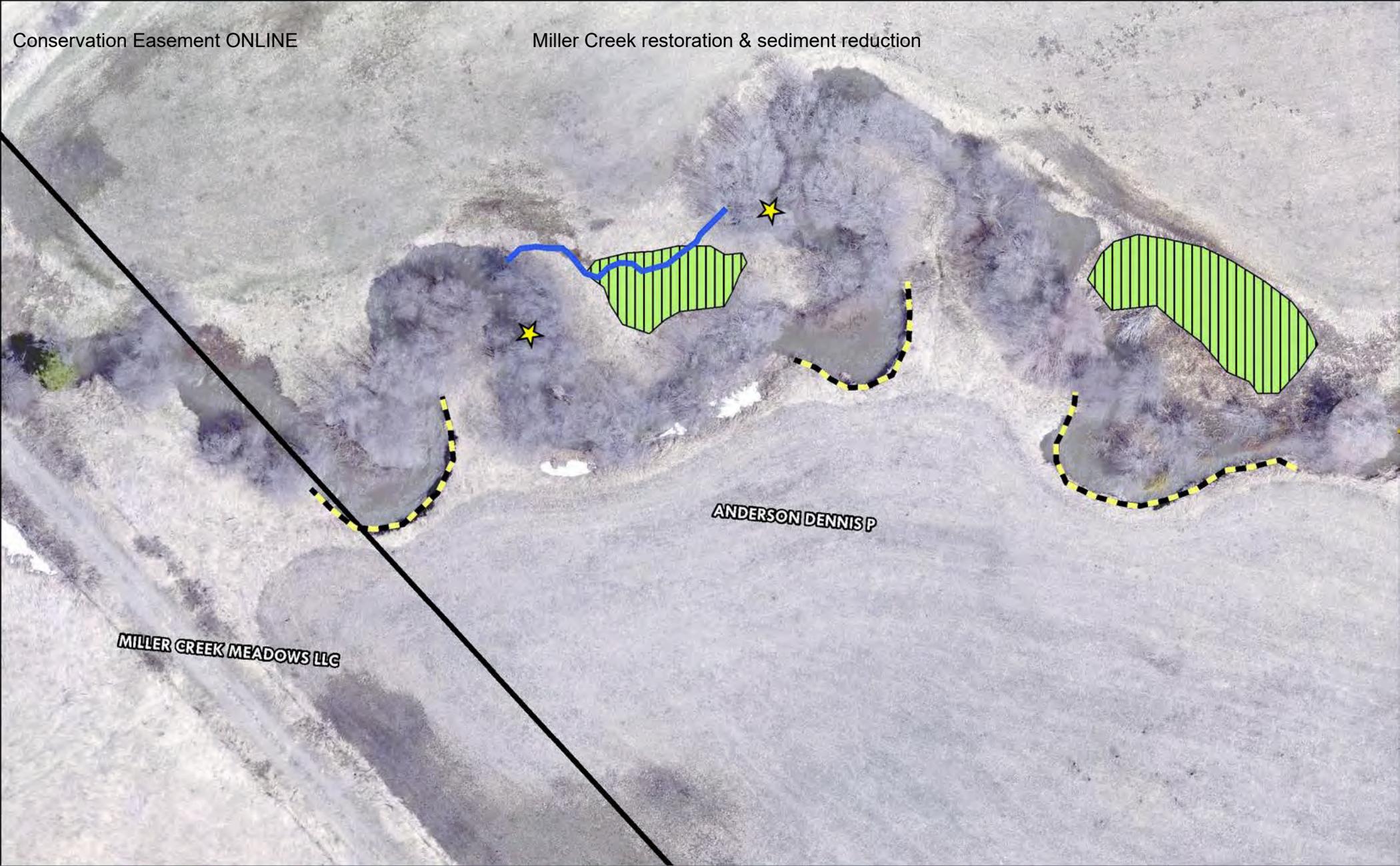




-  Channel Realignment
-  New Channel Construction
-  Side Channel
-  Woody Debris Matrix
-  Lower, Floodplain Treatment, Plant
-  Scalp, Floodplain Treatment, Plant
-  Wetland Enhancement
-  Hardened Crossing
-  Large Woody Habitat Structure
-  Root Wad
-  Parcel Ownership

REACH 5



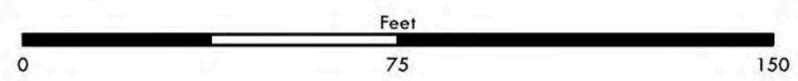


-  Channel Realignment
-  New Channel Construction
-  Side Channel
-  Woody Debris Matrix
-  Lower, Floodplain Treatment, Plant
-  Scalp, Floodplain Treatment, Plant
-  Wetland Enhancement
-  Hardened Crossing
-  Large Woody Habitat Structure
-  Root Wad
-  Parcel Ownership

REACH 6



Aerial imagery:
Geum Drone 2019



April 8, 2019

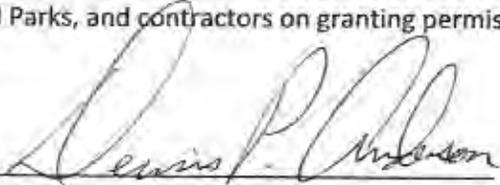
TO: Jed Whiteley, Project Manager
Clark Fork Coalition
Box 7593
Missoula, MT 59807

FROM: Denny Anderson, Landowner
Missoula County, upper Miller Creek

RE: LETTER OF SUPPORT FOR ANDERSON-MILLER CREEK SEDIMENT REDUCTION PROJECT

I am a landowner on upper Miller Creek, downstream of the National Forest boundary. I would like to support improvements to water quality, fisheries habitat, riparian condition and stream channel stability on this reach of Miller Creek. Conserving fish and wildlife habitat is important to my land management.

The Miller Creek Sediment Reduction Project led by Clark Fork Coalition (CFC) is proposing restoration on a 1 mile reach of Miller Creek starting at the National Forest boundary in order to reduce fine sediments, increase connectivity, enhance aquatic habitat and to increase ecological function of the riparian and floodplain corridor. I support this project and will coordinate with CFC, DEQ, Fish Wildlife and Parks, and contractors on granting permission for access to the site. Thank you.



Date: April 5, 2019

FWP.MT.GOV

THE OUTSIDE IS IN US ALL.

3201 Spurgin Road
Missoula, MT 59804
Phone 406-542-5506
April 9, 2019

PROJECT INFORMATION & SUPPORT LETTER

RE: Miller Creek Restoration and Enhancement

Dear Miller Creek Restoration Partners and Sponsors:

This letter is written in support of ongoing and planned enhancement efforts in the Miller Creek watershed near Missoula. This stream system has been heavily impacted by past and current land management practices, but has retained wild trout populations and other functional aspects that indicate long term potential for restoration. Miller Creek is also considered a key tributary system for the lower Bitterroot River and middle Clark Fork River fisheries in the greater Missoula area. These heavily-used river reaches are consistently recruitment-limited, suggesting potential sources for enhanced trout production are extremely valuable.

The Miller Creek fish community is comprised of native and introduced wild trout: westslope cutthroat trout, westslope cutthroat x rainbow trout hybrids, brook trout, and brown trout. The fact that upper and middle portions of the drainage (perennial) support relatively high trout densities, despite being heavily modified in many reaches, indicates good overall productivity and potential for response to stream restoration. Several tributaries in the upper basin also support genetically pure westslope cutthroat trout, a Species of Concern in Montana.

Lower reaches of Miller Creek are more heavily developed, degraded and generally intermittent. However, enhancement efforts are initially focused on extending the period of instream flow, mitigating fish passage barriers, and enhancing channel function to the point where this reach can serve as a connective corridor between core spawning and rearing habitat (middle/upper reaches) and the Bitterroot River.

Public support for restoration efforts in Miller Creek is building among local landowners and in the greater Missoula community. Although stream corridors are degraded and some lower reaches have been subdivided, many reaches are still intact. More importantly, key landowners in the watershed are stepping forward in support of restoration. I expect this momentum will only build as projects are implemented and landowner awareness increases.

In summary, Montana Fish, Wildlife & Parks supports comprehensive and inclusive watershed enhancement efforts in Miller Creek that restore natural basin function and improve habitat conditions for fish and wildlife populations. This system has a great deal of potential and lies in a key location in the lower Bitterroot Basin adjacent to Missoula.

Please don't hesitate to contact me if you would like additional fisheries data or other pertinent aquatic resource information for the watershed.

Sincerely,

W. Ladd Knotek

Fisheries Management Biologist



Missoula City-County Health Department

Water Quality Advisory Council

301 W Alder | Missoula MT 59802-4123

www.missoulacounty.us/wqac

Phone | 406.258.4890

Fax | 406.258.4781

April 16, 2019

DEQ 319 Interim Review Committee
Montana Department of Environmental Quality
P.O. Box 200901
Helena, MT 59620

RE: Clark Fork Coalition Spooner Creek Ranch Proposal

Dear Review Committee,

The Missoula Water Quality Advisory Council would like to extend our support for the Clark Fork Coalition's application for Interim 319 Funding targeted at restoration work within the Bitterroot Watershed. The Missoula Water Quality Advisory Council is a volunteer council organized to protect, maintain, and restore the chemical, physical, and biological integrity of the waters of Missoula County. Revegetation and connection to the floodplain are important factors in decreasing temperature and sediment impairments. Restoration projects such as the proposed project on the Spooner Creek Ranch are vital initial steps toward restoring the chemical, physical, and biological integrity of Miller Creek. Our longstanding partnership with the Clark Fork Coalition, their history of successful restoration projects, and ongoing work with the Water Quality District on planning efforts ensures that this project will contribute toward improved water quality in the upper reaches of Miller Creek.

Thank you for the opportunity to support the Spooner Creek Ranch Proposal.

Sincerely,

A handwritten signature in black ink, appearing to read "IM", is written over a light blue rectangular background.

Ian Magruder

Chair

Missoula Water Quality Advisory Council

**Missoula City-County Health Department****WATER QUALITY DISTRICT**

301 W Alder | Missoula MT 59802-4123

www.missoulacounty.us/wqd

Phone | 406.258.4890

Fax | 406.258.4781

March 18, 2019

319 Review Committee
Montana Department of Environmental Quality
P.O. Box 200901
Helena, MT 59620

RE: Clark Fork Coalition Spooner Creek Ranch Proposal

Dear 319 Review Committee,

The Missoula Valley Water Quality District would like to extend our support for the Clark Fork Coalition's 319 application. As part of our mission to protect and improve surface and groundwater quality in the Missoula Valley, we recently developed the Miller Creek Watershed Restoration Plan. The Clark Fork Coalition was an important partner in the process through their thoughtful input, feedback, and identification of restoration projects crucial to decreasing nonpoint source pollution in the Miller Creek Watershed. In the Watershed Restoration Plan, we elaborated on the importance of restoring riparian vegetation, increasing woody debris, and modifying channel structure to create more stable banks and access to floodplain. The proposed work of the Clark Fork Coalition strives to meet these restoration objectives through the Spooner Creek Ranch reach. Furthermore, all aspects of the project are identified as Measurable Milestones (EPA Element G). Our history in collaborating with the Clark Fork Coalition and the success of their previous work make us confident this project will decrease temperatures and sediment in Miller Creek.

Thank you for the opportunity to demonstrate our support for this project.

Sincerely,

A handwritten signature in cursive script that reads "Elen Evans".

Hydrogeologist

Missoula Valley Water Quality District

eevans@missoulacounty.us