FUTURE FISHERIES IMPROVEMENT PROGRAM GRANT APPLICATION

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

I. APPLICANT INFORMATION

A. Applicant Name: Big Blackfoot Chapter of Trout Unlimited-Ryen Neudecker

Mailing Address: PO Box 1

City: Ovando State: MT Zip: 59854

Telephone: 406-240-4824 E-mail: ryen@montanatu.org

B. Contact Person (if different than applicant): See above

Address:

City: State: Zip:

Telephone: E-mail:

C. Landowner and/or Lessee Name (if different than applicant): The Mannix Family Ranch

Mailing Address: 83 Mannix Ranch Rd

City: Helmville State: MT Zip: 59854

Telephone: 406-793-0812 E-mail: mannixbryan@gmail.com

II. PROJECT INFORMATION

A. Project Name: Nevada Creek Restoration Project-Phase 5

River, stream, or lake: Nevada Creek

Location: Township: 12N Range: 10W Section: 5

Latitude: 46.843718 Longitude: -112.920312 *within project (decimal degrees)*

County: Powell

B. Purpose of Project:

The purpose of this project is to build upon the previous four phases of Nevada Creek restoration and improve trout habitat by restoring channel stability, aquatic habitat function and riparian health.

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

Nevada Creek is the largest tributary to the middle Blackfoot River and supports populations of westslope cutthroat trout, rainbow trout, brown trout, and non-game fish species. Historic channel manipulations and agricultural impacts have caused the channel to downcut and severely erode as the stream tries to reconnect with a floodplain and regain the proper pattern, profile and dimensions. The Blackfoot Restoration team has initiated a comprehensive restoration program aimed at addressing the causes and sources of water quality and fishery impairments in Nevada Creek because of its high potential to improve water quality, instream and riparian habitat conditions, and increase trout recruitment. Since our work began in 2010, over 24,400 feet of instream and associated riparian habitat has been restored. Post-restoration monitoring has indicated a strong fishery and habitat response with trout abundance increasing by 100% and bank erosion rates being reduced by over 50%

The proposed Phase 5 project will focus on reducing sediment loading though stream bank treatments (matrices consisting of small wood, willow and sod mats built at bankfull elevations) while improving floodplain connectivity, aquatic habitat complexity, and overall stream function on 9,100 feet of Nevada Creek. This is expected to significantly increase habitat capacity for trout populations, particularly since this section experiences chronically low discharge during the irrigation season. In contrast to past restoration phases, planform modifications are not proposed as the geometry is complex, demonstrating high planform diversity, and within the range of measured reference conditions. Bank Erodibility Hazard Index ratings were conducted to delineate streambanks characterized by low to extreme streambank annual erosion rates and an estimated 381 tons per year of sediment is contributed to Nevada Creek from streambank related sources. Moderately to extremely rated streambanks are due to high, unstable terraces. These formerly willow-dominated surfaces are now supporting grass/forb community types due to land clearing, agricultural practices, and grazing. Restoration strategies aim to create streambank conditions that will promote woody vegetation establishment and reduce streambank erosion rates.

Actively formed and decadent (i.e. compromised) beaver dams are prevalent throughout the project area. These conditions attest to the temporal nature of the beaver dam complexes formed in entrenched channel systems. Within the project area, a majority of the streambanks are rated moderate to very high in terms of bank erodibility potential, are geotechnically unstable as a result of the wet-dry cycles that occurs as beaver dams are formed, and are then compromised. The rapid drawdown of bank pore water pressure in the spring causes block failure and collapse of overlying bank sediments. In these areas, restoration strategies aim to reduce bank height ratios to floodplain elevation and establish woody vegetation, which in turn will provide deep binding root masses to stabilize streambank soils. These strategies will increase streambank resiliency to erosion. The restoration strategies embrace the concept that beaver are a natural and desired component of Nevada Creek, and sediment load reduction strategies can be implemented to support these desired physical and biological riverine components.

D. Length of stream or size of lake that will be treated (project extent): 9,100 ft

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

E. Project Budget:

Grant Request (Dollars):	**$**	**35,000**
Matching Dollars:	**$**	**195,700**
Matching In-Kind Services:*	**$**	**99,941**

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

Other Contributions (not part of this app)	**$**	
Total Project Cost:	**$**	**$330,641**

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

G. **Insert** or **attach** a project location map showing the project area in relation to a major landmark or town. Please indicate if the project location is on public or private property.

H. **Attach** specific project plans (e.g. detailed sketches, plan views [showing location and type of channel modifications], example photographs), current condition photographs, and maps. ***If** project involves water leasing or water salvage complete and attach a supplemental questionnaire (fwp.mt.gov/habitat/futurefisheries/supplement2.doc).*

I. **Attach** letters or statements of support. This includes landowner consent, community or public support, and fish biologist support.

J The project agreement includes a 20-year maintenance commitment. Please indicate (yes or no) that you will ensure project protection for 20 years. Discuss your ability to meet this commitment.

Yes [x] No [ ]

The landowner will sign a 20-year maintenance commitment agreement. The entire project is on private land.

K. **Describe** or **attach** land management & maintenance plans, including changing to grazing regimes, that will ensure protection of the restored area.

A new riparian fence and water gaps are planned to protect the stream banks

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

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

Westslope cutthroat trout, bull trout, brown trout, rainbow trout.

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

The proposed reach along Nevada Creek lacks high-quality habitat. By addressing bank erosion issues, improper channel dimensions, lack of floodplain connection and riparian function we anticipate a dramatic improvement in instream and riparian habitat conditions. This will increase habitat capacity for trout, which is expected to lead to increased downstream recruitment to sections of lower Nevada Creek and the Blackfoot River.

C. Will the project improve fish populations and/or fishing? To what extent? What are the expected short term and long term benefits to the fishery?

Yes: Fisheries monitoring data completed on the reach of Nevada Creek restored in 2010, has shown an increase in trout abundance. Specifically, the average abundance of age-1 and older trout in the Phase 1 section exhibited a two-fold increase following restoration actions. See data chart included within this application.

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

Yes: Public access is available. Landowners request permission is asked prior to accessing their property. Due to the monitoring data of the phase 1 project, we have seen a significant increase in the number of trout and thus we anticipate adding close to two miles of fishable habitat on Nevada Creek. The project is also expected to increase trout recruitment to publicly-accessible sections of lower Nevada Creek and the Blackfoot River.

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

Historic channel manipulations and streamside vegetation removal have contributed to the bank erosion issues. The project design includes both active and passive techniques to rectify the specific issues and their causes.

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

This project involves the continuation of the Blackfoot River Restoration program and the restoration of an important tributary. Public benefits include: 1) expanding suitable habitat conditions for pure westslope cutthroat trout, 2) improved habitat for rainbow and brown trout,3) improved water quality conditions in Nevada Creek and the Blackfoot River, and 4) increased trout recruitment

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

No.

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

No.

I. 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: Ryan Nendecker Date: November 9, 2021

Sponsor (if applicable): _____

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

Applications may be rejected if this form is modified.

BUDGET TEMPLATE SHEET FOR FUTURE FISHERIES PROGRAM APPLICATIONS Nevada Creek restoration project phase 3 009-2022

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	30	Hrs	$120.00	$ 3,600.00		3,600.00		$ 3,600.00
Design	100	Hrs	$120.00	$ 12,000.00		12,000.00		$ 12,000.00
Engineering	85	Hrs	$100.00	$ 8,500.00		8,500.00		$ 8,500.00
Permitting	45	Hrs	$45.00	$ 2,025.00		2,025.00		$ 2,025.00
Oversight	215	Hrs	$100.00	$ 21,500.00		21,500.00		$ 21,500.00
Project Mgmt	159	Hrs	$45.00	$ 7,155.00		7,155.00		$ 7,155.00
			Sub-Total	$ 54,780.00	$ -	$ 54,780.00	$ -	$ 54,780.00
Travel								
Mileage	3300	miles	$0.57	$ 1,881.00		1,881.00		$ 1,881.00
Per diem				$ -				$ -
			Sub-Total	$ 1,881.00	$ -	$ 1,881.00	$ -	$ 1,881.00
Construction Materials****								
Sods	1	Acre	$21,780.00	$ 21,780.00		21,780.00		$ 21,780.00
Pulp wood	12	Loads	$1,200.00	$ 14,400.00	2,000.00	12,400.00		$ 14,400.00
Willlows	28000	each	$1.00	$ 28,000.00	6,000.00	22,000.00		$ 28,000.00
Gravel	1000	yd	$10.00	$ 10,000.00		10,000.00		$ 10,000.00
Fencing	8000	ft	$1.00	$ 8,000.00	2,000.00	6,000.00		$ 8,000.00
Water Gaps	3	each	$500.00	$ 1,500.00		1,500.00		$ 1,500.00
Transplants	500	each	$50.00	$ 25,000.00		25,000.00		$ 25,000.00
			Sub-Total	$ 108,680.00	$ 10,000.00	$ 98,680.00	$ -	$ 108,680.00
Equipment, Labor, and Mobilization								
Excavator	700	hrs	$175.00	$ 122,500.00	20,000.00	102,500.00		$ 122,500.00
Articulated truck	120	hrs	$165.00	$ 19,800.00	5,000.00	14,800.00		$ 19,800.00
Skid steer	90	hrs	$100.00	$ 9,000.00		9,000.00		$ 9,000.00
Labor	80	hrs	$50.00	$ 4,000.00		4,000.00		$ 4,000.00
Mob	1	LS	$10,000.00	$ 10,000.00		10,000.00		$ 10,000.00
			Sub-Total	$ 165,300.00	$ 25,000.00	$ 140,300.00	$ -	$ 165,300.00
			TOTALS	$ 330,641.00	$ 35,000.00	$ 295,641.00	$ -	$ 330,641.00

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:

APPLICATION MATCHING CONTRIBUTIONS

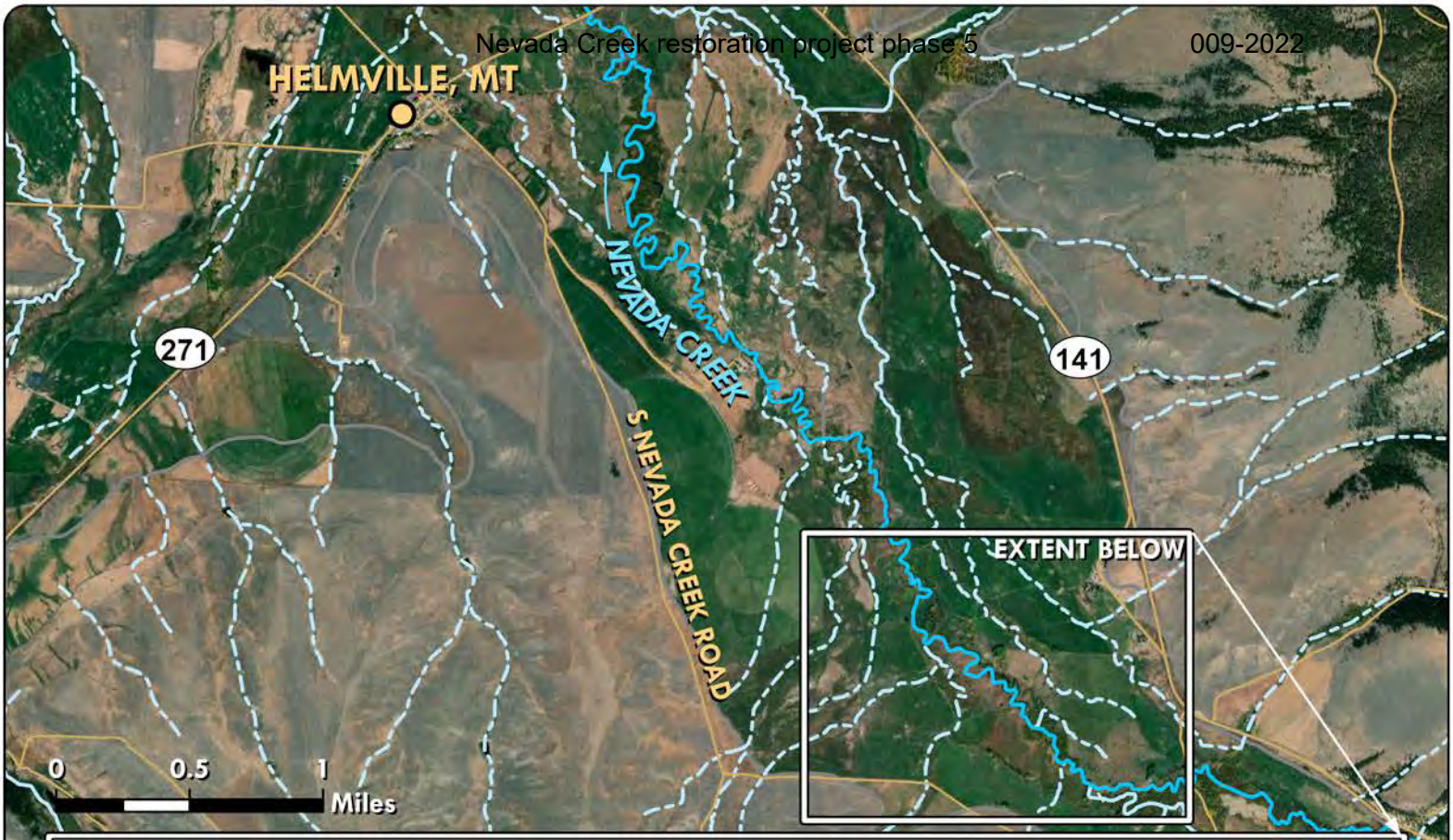
(do not include requested funds or contributions not associated with the application)

CONTRIBUTOR	IN-KIND	CASH	TOTAL	Secured? (Y/N)
Private Landowner	$ 84,780.00		$ 84,780.00	Yes
USFWS	$ -	$ 60,000.00	$ 60,000.00	Yes
MT DEQ		$ 99,700.00	$ 99,700.00	No
Montana Trout Unlimited		$ 10,000.00	$ 10,000.00	Yes
BBCTU	$ 15,161.00	$ 26,000.00	$ 41,161.00	Yes
TOTALS	$ 99,941.00	$ 195,700.00	$ 295,641.00	

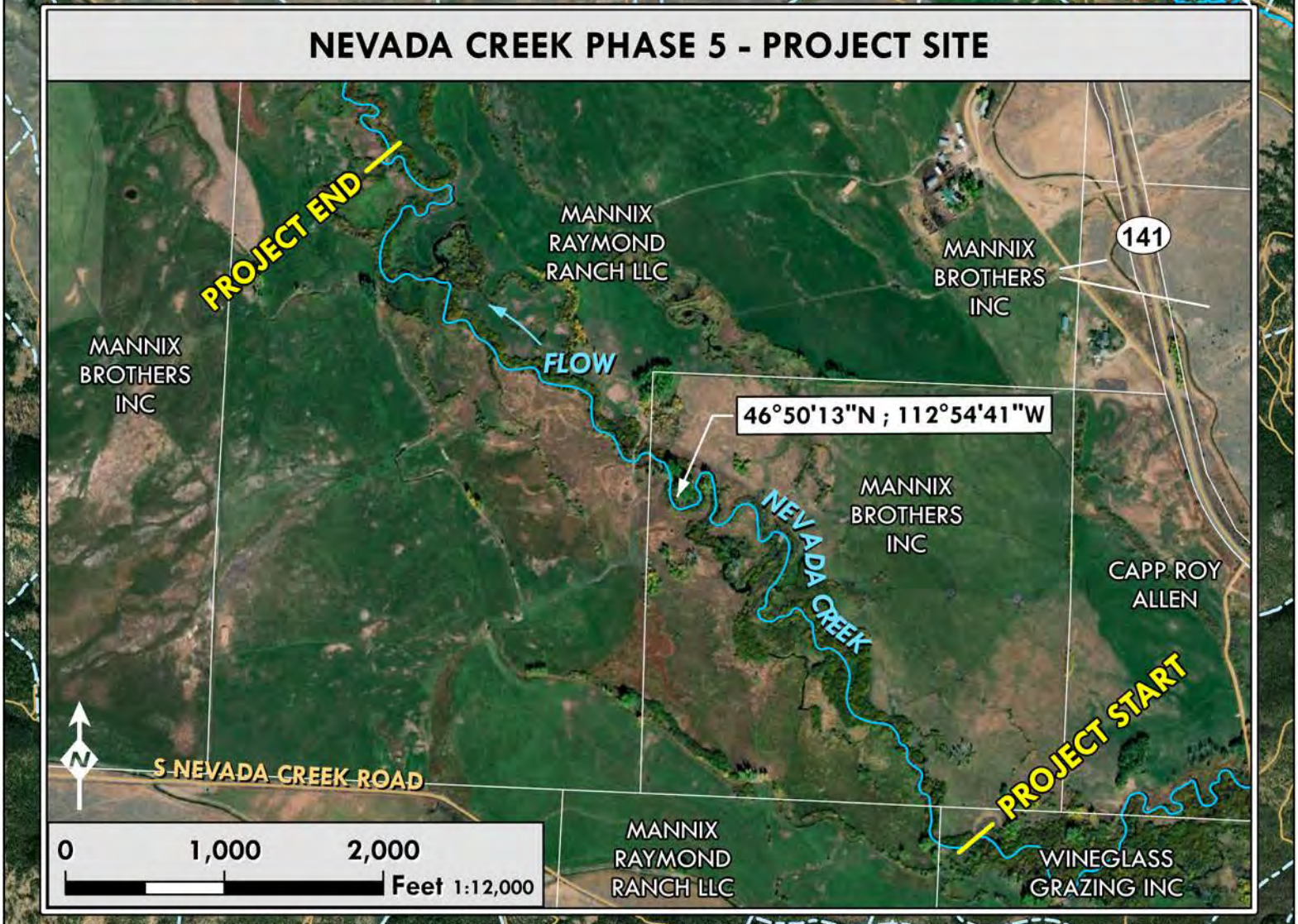
OTHER CONTRIBUTIONS

(contributions not associated with the application)

CONTRIBUTOR	IN-KIND	CASH	TOTAL	Secured? (Y/N)
	$ -	$ -	$ -	
	$ -	$ -	$ -	
	$ -	$ -	$ -	
	$ -	$ -	$ -	
	$ -	$ -	$ -	
	$ -	$ -	$ -	
	$ -	$ -	$ -	
	$ -	$ -	$ -	
TOTALS	$ -	$ -	$ -	



NEVADA CREEK PHASE 5 - PROJECT SITE



10.28.2021. RIVER DESIGN GROUP, INC. IMAGERY: MAXAR VIVID 2020. POWELL COUNTY PARCEL DATA: MSL MT CADASTRAL.

Montana Fish, Wildlife and Parks
Region 2 Headquarters
3201 Spurgin Road
Missoula, MT 59804

November 5, 2021

Montana Fish, Wildlife and Parks
Attn: Michelle McGree
1420 East 6th Ave.
Helena, MT 59620

Dear Future Fisheries Panel:

I am writing in support of the Nevada Creek Restoration-Phase 5 application submitted by the Big Blackfoot Chapter of Trout Unlimited. This project will expand on the success of previous restoration projects in Nevada Creek by improving habitat conditions in the immediate stream reaches while contributing trout recruitment to the Blackfoot River. Habitat restoration efforts in the Nevada Creek drainage have increased in recent years, creating high-quality habitat conditions and measurable decreases in downstream sediment delivery. Although this project does not have the same direct angling benefits as the previous projects below the reservoir, it is expected to provide public benefits in the form of increased trout production and subsequent recruitment to downstream reaches and the Blackfoot River.

Nevada Creek is a severely degraded tributary impacted from sedimentation, low flows, nutrient inputs, elevated water temperatures, and lack of instream habitat complexity. Furthermore, the section of the Blackfoot River from Nevada Creek to the North Fork Blackfoot River is a high priority reach that has low densities of trout attributed to poor recruitment from tributaries. Achieving restoration goals in lower Nevada Creek will also improve conditions within this important section of the mainstem Blackfoot River by addressing excessive sediment, nutrient, and warm-water inputs from Nevada Creek. The biological response from previous projects indicated a significant improvement in habitat quality and habitat capacity. A before-after evaluation of the Phase 1 project documented a two-fold increase in trout abundance following restoration.

The Phase 5 project area contains relatively intact sections interspersed with heavily degraded and eroding sections. This proposal represents a balanced design that leverages the recovery potential of large areas of the project section through passive approaches, while focusing active restoration and channel reconstruction in the specific areas that require an intensive approach to achieve restoration objectives. This cost-effective approach will result in significant improvements to nearly two miles of important tributary habitat in the Blackfoot River watershed. This will be the first major restoration project in the middle section of lower Nevada Creek, which experiences the most problematic low-flow conditions below the Douglas Canal.

The community support and restoration momentum in Nevada Creek is extremely encouraging, and the ability to work on a large section under single-ranch ownership presents a unique opportunity to implement large-scale, comprehensive restoration that will greatly improve water quality, riparian conditions, and fisheries resources.

Your continued investment in Nevada Creek will contribute to restoring the quality of aquatic resources in this large tributary while improving conditions in the Blackfoot River. This work advances our broader fisheries management and conservation objectives in the watershed. Thank you very much for consideration of this funding application.

Sincerely,

Randy Arnold
Regional Supervisor

Examples of condition of banks proposed to be treated with sod, willow wood matrix structures

Block failure and existing water quality issues on Nevada Creek Phase 5

Example of hoof shear on a reach of Nevada Creek Phase 5

To whom it may concern,

I would like to voice our support for the grant proposal that the Big Blackfoot Chapter of Trout Unlimited (BBCTU) has presented to you. The Mannix family is fully committed to BBCTU's plans to restore portions of Nevada Creek throughout our property. We recognize the value in collaboration on conservation projects and have had a great experience in the past working with BBCTU. One of our family's most prominent values is to better our natural resources for future generations to come. Working with BBCTU makes this possible. The experience and knowledge that they bring to projects is unmatched and these restoration goals would be financially infeasible without them. We look forward to this opportunity to help do our part in bettering the Blackfoot watershed.

Sincerely,

Bryan Mannix

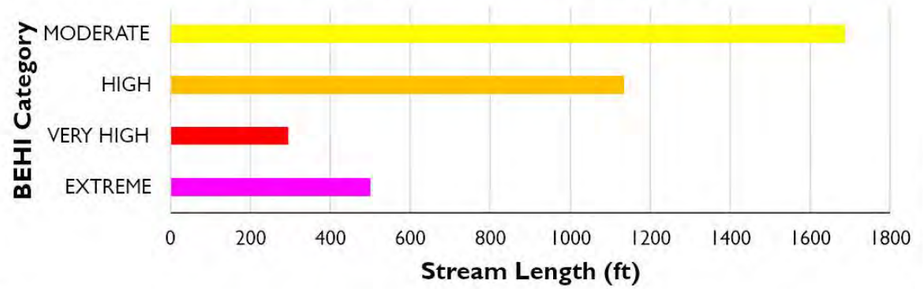
Nevada Creek Phase 5
Conceptual Restoration Site Overview

0 250 500 1,000 Feet

N

Scale: 1:3,000

2021-10-29 River Design Group. UAS Imagery 2020 RDG



009-2022

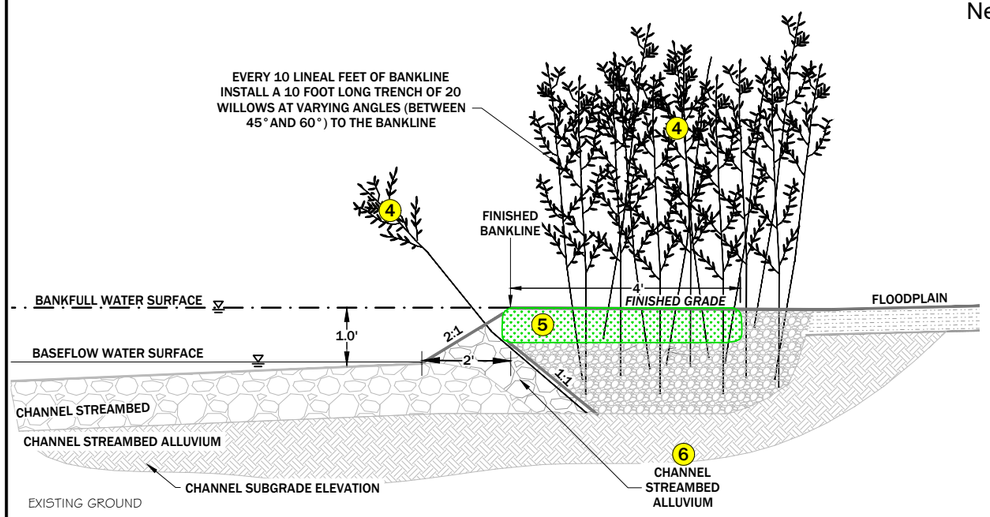
Flow

GENERAL NOTES

1. CONSTRUCTION OF THE VEGETATED WOOD MATRIX WILL OCCUR AFTER THE CHANNEL AND FLOODPLAIN BACKFILL IS PLACED AND THE CHANNEL STREAMBED IS CONSTRUCTED. INSTALLATION OF FLOODPLAIN TREATMENT SHALL BE COMPLETED AFTER VEGETATED WOOD MATRIXES ARE INSTALLED.
2. IF VEGETATED WOOD MATRIX STRUCTURES ARE INSTALLED PRIOR TO OCTOBER 1, LEAVE BACK TRENCH UNFILLED AND COMPLETE STRUCTURE WHEN DORMANT WILLOWS ARE AVAILABLE.
3. IT IS CONTRACTOR'S RESPONSIBILITY TO CUT WOOD INTO APPROPRIATE SIZE LENGTHS TO FIT STRUCTURE DIMENSIONS.
4. ANY CHANGES TO THE CONSTRUCTION SEQUENCE MUST BE APPROVED BY CONSTRUCTION MANAGER.
5. CONTRACTOR SHALL MARK AND CONSTRUCTION ENGINEER SHALL APPROVE THE GENERAL LOCATION FOR EACH VEGETATED WOOD MATRIX STRUCTURE PRIOR TO CONSTRUCTION.

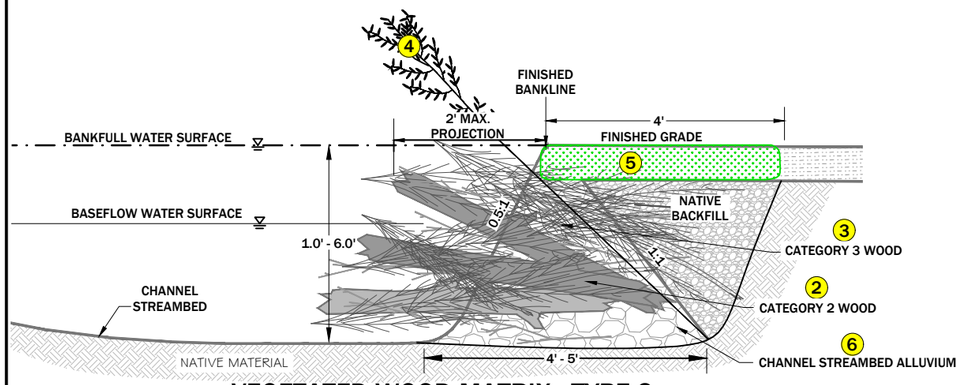
NOTES ON VEGETATED WOOD MATRIX INSTALLATION

1. EXCAVATE TO THE EXCAVATION LIMITS AS SHOWN. EXCAVATED MATERIAL SHALL BE STOCKPILED ON THE FLOODPLAIN OUTSIDE OF THE IMMEDIATE WORK AREA.
2. PREPARE THE BENCH OF THE STRUCTURE BY PLACING CHANNEL STREAMBED ALLUVIUM FROM THE BASE OF THE EXCAVATION DEPTH/BOTTOM OF EXCAVATION TO WITHIN 1.0-FT. OF FINISHED GRADE.
3. CATEGORY 2 AND CATEGORY 3 WOOD (TYPE 2 AND 3 ONLY), AND CHANNEL STREAMBED ALLUVIUM SHALL BE PLACED IN ALTERNATING LAYERS AND BUCKET COMPACTED UP TO 0.8 FEET OF THE TOP OF BANK ELEVATION AS SHOWN BELOW IN THE INSTALLATION SEQUENCE. PLACE SIX (6) FT TO EIGHT (8) FT. DORMANT WILLOW CUTTINGS AT A DENSITY OF 5 PER LINEAR FT ALONG THE TOP OF BANK LINE ELEVATION. WILLOW CUTTINGS SHALL SLOPE AT AN APPROXIMATE 1:1 SLOPE AS SHOWN IN SECTION VIEW. STEMS MAY OVERLAP. THE CUT ENDS SHALL BE PLACED AT THE BASE OF THE SLOPES WITH THE UN-CUT ENDS EXTENDING BEYOND THE EDGE OF THE TRENCH SO NO GREATER THAN ONE-THIRD OF THE TOTAL CUTTING LENGTH IS EXPOSED BEYOND THE FRONT EDGE OF THE BASE. PLACE SOD MATS ON TOP OF MATRIX EXTENDING FROM EDGE OF CHANNEL MARGIN BACK A MINIMUM OF 4' INTO THE FLOODPLAIN. TOP OF SOD MATS SHALL BE PRESSED TO ESTABLISH TOP OF BANK DESIGN ELEVATION.
4. THE UPSTREAM AND DOWNSTREAM ENDS OF THE STRUCTURE SHALL TRANSITION SMOOTHLY INTO ADJACENT STREAMBANK STRUCTURES TO MINIMIZE EROSION, FLANKING, AND BANK FAILURE. STRUCTURE ENDS MAY BE STABILIZED WITH ADDITIONAL CATEGORY 1 ROCK AS APPROVED BY ENGINEER.
5. AFTER INSTALLATION OF THE VEGETATED WOOD MATRIX, BACKFILL THE STRUCTURE WITH STOCKPILED MATERIAL TO FINISHED GRADE, AND BUCKET COMPACT. INSTALL WILLOW TRENCHES AT A RATE OF 2 PER LINEAR FOOT (OR 20 PER TRENCH) AS SHOWN. NO AREAS BEHIND THE FINISHED BANKLINE ARE TO BE LEFT BELOW FINISHED GRADE.



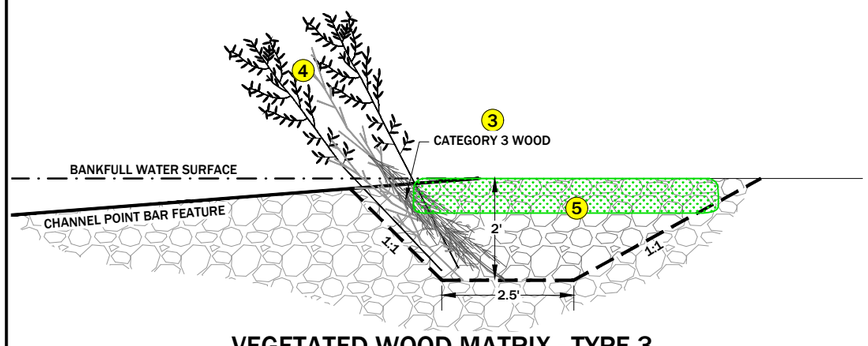
VEGETATED WOOD MATRIX - TYPE 1
SECTION VIEW

0' 1' 2'



VEGETATED WOOD MATRIX - TYPE 2
SECTION VIEW

0' 1' 2'



VEGETATED WOOD MATRIX - TYPE 3
SECTION VIEW

0' 1.5' 3'

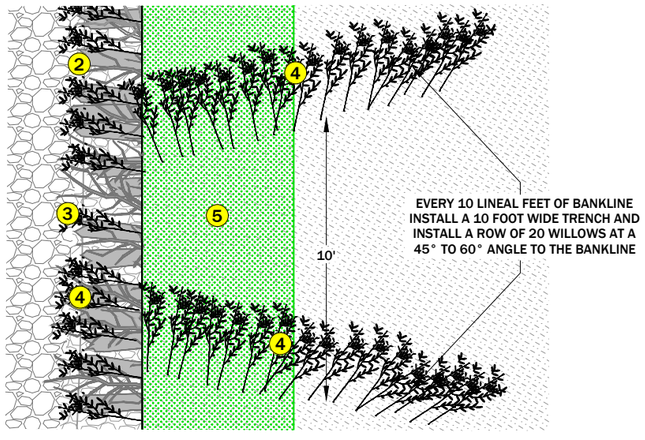
ALLUVIUM GRADATION

SIZE (INCHES)	PERCENT PASSING	REPRESENTATIVE SIZE CLASS
8	95	D100
7	80 - 90	D84
2	45 - 55	D50
1	30 - 40	D35
0.6	20 - 30	D16
0.08	20	

PROVIDE MINIMUM 20% RETAINED IN 0.08" SIZE CLASS

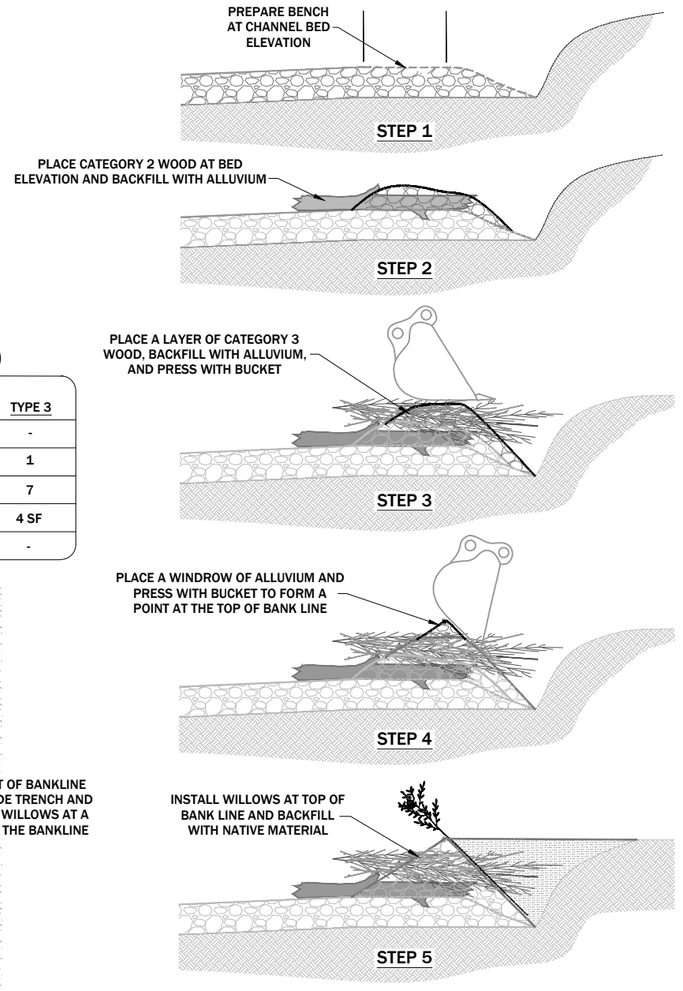
MATERIAL SCHEDULE (PER LINEAR FOOT)

	ITEM	DIA.	QUANTITY TYPE 1	QUANTITY TYPE 2	QUANTITY TYPE 3
2	CATEGORY 2 WOOD	6" - 12"	-	2 - 4	-
3	CATEGORY 3 WOOD	3" - 6"	-	2 - 4	1
4	WILLOW CUTTINGS	0.25" - 1"	7	7	7
5	SOD MAT	5" - 8" THICK	4 SF	4 SF	4 SF
6	CHANNEL STREAMBED ALLUVIUM	8" MINUS	0.11 CY	0.2 CY	-



WILLOW TRENCH DETAIL
PLAN VIEW

0' 1' 2'



RECOMMENDED VEGETATED WOOD MATRIX INSTALLATION SEQUENCE
SECTION VIEW

0' 2.5' 5'

RDG RIVER DESIGN GROUP
311 SW Jefferson Avenue Corvallis, OR 97333 tel.541.738.2920 fax.541.758.8524
236 Wisconsin Avenue Whitefish, MT 59937 tel.406.862.4927 fax.406-862-4963

VEGETATED WOOD MATRIX DETAIL

NEVADA CREEK PHASE 5
NEAR HELMVILLE, MONTANA

NO.	DATE	BY	DESCRIPTION	CHK
1	10-29-21	NW	CONCEPTUAL DESIGN	JM

PROJECT NUMBER
RDG-21-009

SHEET NUMBER
1.0

Nevada Creek BEHI Assessment Phase 5 Pre-Restoration (2021)

BANK EROSION HAZARD INDEX ASSESSMENT

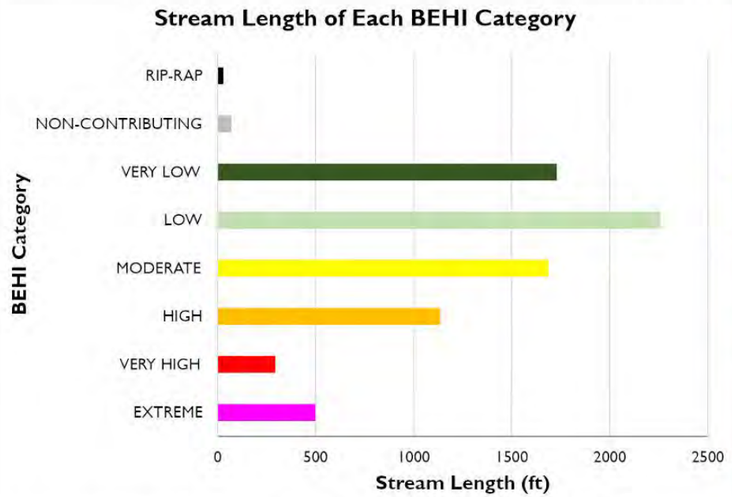
CATEGORY

- EXTREME
- VERY HIGH
- HIGH
- MODERATE
- LOW
- VERY LOW
- NON-CONTRIBUTING
- RIPRAP

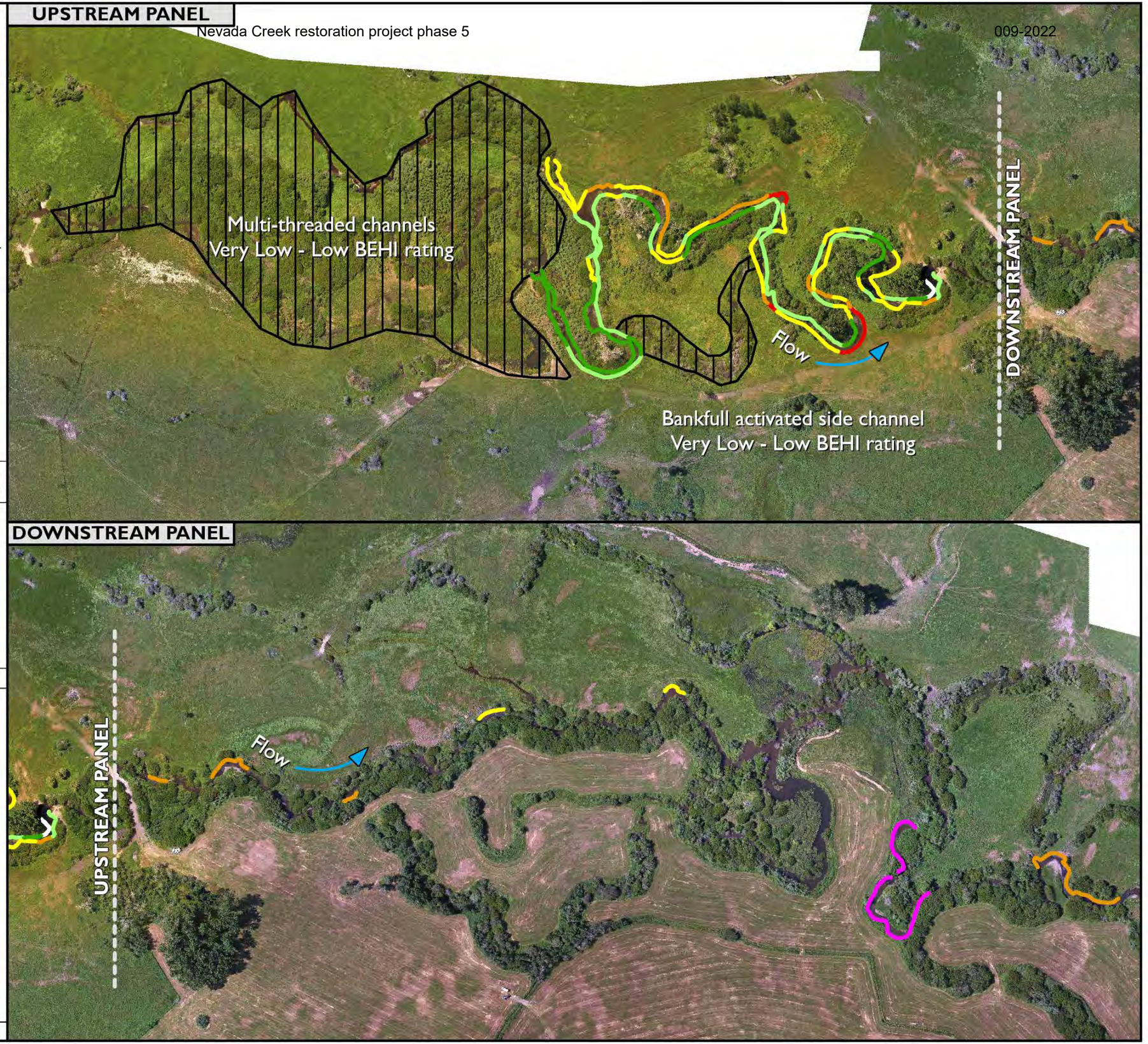
0 125 250 500 Feet

Scale: 1:3,000

BEHI CATEGORY	LENGTH (FT)	RATE (FT/YR)	HEIGHT (FT)	DENSITY (LBS/FT³)	YIELD (TONS)
EXTREME	500	0.47	6.5	100	76
VERY HIGH	296	0.39	6	100	35
HIGH	1135	0.31	5	100	88
MODERATE	1688	0.23	4.5	100	104
LOW	2,258	0.17	3.0	100	58
VERY LOW	1,731	0.1	2.5	100	21
NON-CONTRIBUTING	70	0	0	100	0
RIP-RAP	31	0	5.0	100	0
TOTAL	**7,708**				**381**



2021-10-29 River Design Group. UAS Imagery 2020 RDG



Nevada Creek BEHI Assessment Phase 5 Pre-Restoration (2021)

BANK EROSION HAZARD INDEX ASSESSMENT

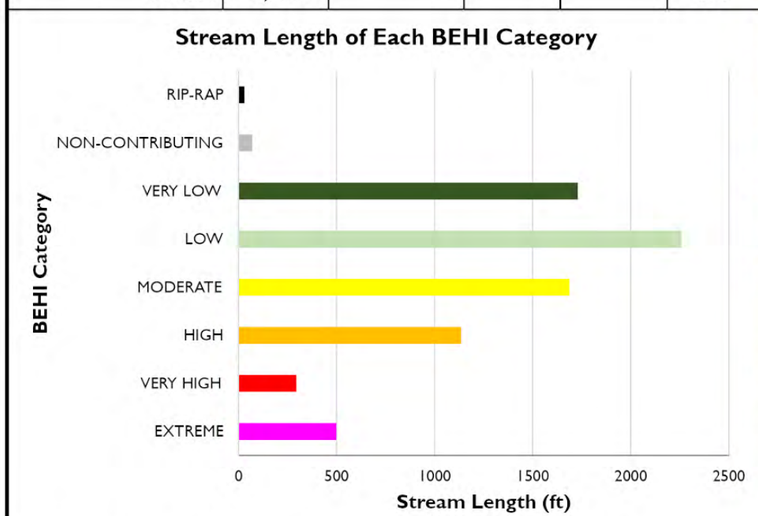
CATEGORY

- EXTREME
- VERY HIGH
- HIGH
- MODERATE
- LOW
- VERY LOW
- NON-CONTRIBUTING
- RIPRAP

0 125 250 500 Feet

Scale: 1:3,000

BEHI CATEGORY	LENGTH (FT)	RATE (FT/YR)	HEIGHT (FT)	DENSITY (LBS/FT³)	YIELD (TONS)
EXTREME	500	0.47	6.5	100	76
VERY HIGH	296	0.39	6	100	35
HIGH	1135	0.31	5	100	88
MODERATE	1688	0.23	4.5	100	104
LOW	2,258	0.17	3.0	100	58
VERY LOW	1,731	0.1	2.5	100	21
NON-CONTRIBUTING	70	0	0	100	0
RIP-RAP	31	0	5.0	100	0
TOTAL	**7,708**				**381**



2021-10-29 River Design Group. UAS Imagery 2020 RDG