FUTURE FISHERIES IMPROVEMENT PROGRAM GRANT APPLICATION

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

I. APPLICANT INFORMATION

A. Applicant Name: Pat Barnes Chapter of Trout Unlimited

Mailing Address: PO Box 275

City: Helena State: MT Zip: 59624

Telephone: (406) 200-0259 E-mail: trimbath.will@gmail.com

B. Contact Person (if different than applicant): Will Trimbath

Address: PO Box 275

City: Helena State: MT Zip: 59624

Telephone: (406) 200-0259 E-mail: trimbath.will@gmail.com

C. Landowner and/or Lessee Name (if different than applicant): Gary Burnham

Mailing Address: 5414 Canyon Ferry Road

City: East Helena State: MT Zip: 59635

Telephone: (406) 439-2360 E-mail: ppsranch@gmail.com

II. PROJECT INFORMATION

A. Project Name: Fish Screen - Prickly Pear Simmental Ranch Canal

River, stream, or lake: Prickly Pear Creek

Location: Township: 10N Range: 3W Section: 25

Latitude: 46.6001 Longitude: -111.9358 *Within project (decimal degrees)*

County: Lewis and Clark

B. Purpose of Project:

Install a fish screen on an irrigation canal to prevent fish entrainment and an in-stream rock ramp at the concrete diversion headwall to increase fish passage and protect the proposed fish screen.

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

The project includes developing a final design and the necessary permitting leading to the installation of a fish screen on an irrigation canal and an in-stream rock ramp below a diversion structure on Prickly Pear Creek near East Helena, MT.

The landowner, Prickly Pear Simmental Ranch, approached Montana Fish, Wildlife and Parks in 2021 with concerns about entrained fish, in their primary irrigation canal, plugging their irrigation infrastructure (center pivot sprinkler heads) during low flow periods annually from approximately August to October. The landowner was also concerned about annual fish mortality in the canal once the canal is turned off each September/October.

Over the summer of 2022 the landowner and Pat Barnes Chapter of Trout Unlimited funded an $8,000 topographic and hydraulic survey, completed by Tetra Tech in Helena, MT, to develop an engineered entrainment mitigation concept plan (Appendix A), with alternatives, and FWP surveyed in the canal from July to September (Appendix B) to support developing entrainment mitigation alternatives.

Fisheries surveys in the canal (Appendix B), beginning in July 2022, identified an increasing number of entrained fish as creek flows reached the annually low flow period (10-20 CFS) from approximately July to October. During that period, diversion into the canal annually is approximately 30-50% of the total in-stream flow. Three fish (3 species) were observed just downstream of the canal head gate in early August and the landowner began reporting irrigation infrastructure plugged with fish in mid-September. The canal was closed on September 29th and FWP staff captured 68 fish (5 species; multiple ages classes of each species) in the uppermost 400 feet of the canal in only approximately five minutes of effort. Total canal length is approximately 2 miles; therefore, fish entrainment is estimated at over 2,000 fish annually. These results suggest that installing an in-canal fish screen will mitigate fish entrainment losses and improve annual irrigation inefficiencies for the landowner. In addition, installing a rock ramp at the irrigation structure headwall will increase fish passage and armor highly erosive banks to better protect the proposed fish screen location.

Topographic and hydraulic survey analysis led to the development of two fish screen alternatives and two rock ramp alternatives (Appendix A). Installing a Corrugated Water Screen in the canal and a 5% rock ramp immediately downstream of the irrigation headwall structure are the preferred and most cost-effective alternative to mitigate fish entrainment, fortify the immediate project area and increase fish passage at the site.

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

Low annual stream flows require that the landowner divert as much as 30-50% of the creek for irrigation purposes each summer/fall. During that period, a portion of the fish population become lethally entrained in the irrigation canal and some fish even plug irrigation infrastructure (Appendix B). Installing a fish screen in the canal and a 5% rock ramp immediately downstream of the irrigation headwall structure will mitigate fish entrainment, fortify the immediate project area and increase fish passage at the site.

E. Length of stream or size of lake that will be treated (project extent): 25-80 feet of stream,
Length/size of impact, if larger than project extent (e.g., stream miles opened): 12+ stream miles

F. Project Budget Summary:

Grant Request (Dollars):	$ 43,000.00
Matching Dollars:	$ 47,000.00
Matching In-Kind Services:*	$

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

Other Contributions (not part of this app)	$ 8,000.00
Total Project Cost:	$ 98,000.00

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

H. Attach project location map(s) that include:

- [x] Extent of the project, including context (relation to major landmark or town)
- [x] Indication of public and private property
- [ ] Riparian buffer locations and widths (if applicable) and grazing locations

I. Attach project plans:

- [x] Detailed sketches or plan views with the location and proposed restoration
- [x] Pre-project photographs (GPS location strongly recommended)
- [ ] If water leasing or water salvage is involved, attach a supplemental questionnaire (https://myfwp.mt.gov/getRepositoryFile?objectID=36110)

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

Attached are a landowner consent letter and letters of support from Lewis & Clark Co. Conservation District, the Lake Helena Watershed Group and fish biologist support.

III. MAINTENANCE AND MONITORING (attach additional information to end of application):

A. A 20-year maintenance commitment is required*. Please confirm that you will ensure this protection and describe your approach. Attach any relevant maintenance plans. Yes [x] No [ ]

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

Once installed, the landowner will be trained to maintain the fish screen, as needed, and contact the applicant or FWP fisheries staff as potential issues arise. Most fish screens like this require daily to weekly maintenance (e.g.; brushing, cleaning debris, etc.) during spring conditions and general maintenance varies by project.

B. Will grazing be part of or adjacent to the project? If so, describe or attach land management plans, including short term and long term grazing regimes. If the landowner is not the applicant, please describe their involvement in the project. *If you want assistance with grazing plan development, note your need.*

The area immediately around the project area is fenced off to grazing.

C. Will the project be monitored to determine if goals were met? If so, what are the short-term and long-term plans to assess benefits and lessons learned? Were pre-project data collected? Will monitoring information be shared with FWP?

Yes, the proposed fish screen bypass pipe, which returns fish screened in the canal back to the creek, will be monitored for entrainment mitigation success. In addition, 2022 FWP surveys in the canal (Appendix B) will initially be duplicated, by FWP, to ensure entrainment in the canal is no longer occurring or significantly reduced. In addition, annual electrofishing surveys by FWP in the drainage (two standardized fisheries population monitoring sections) will continue to monitor fish screen project benefits to the overall fishery.

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

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

FWP's 2022 fisheries surveys in the canal (Appendix B) identified five species of fish entrained in the canal. Three native species (sculpin, longnose dace and white suckers) and two important non-native species (Rainbow and Brown trout) were observed, including multiple age-classes of all but one species (white sucker), in the canal. All observed species were wild fish. The proposed fish screen and rock ramp will benefit these species, and possibly more, during all portions of their life history.

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

The proposed project will enhance wild fish habitat by increasing overall stream connectivity for both resident and migratory fish. Spring Rainbow trout and Fall Brown trout and Kokanee salmon spawning runs will have better access to suitable habitat upstream of the canal diversion structure (Appendix B). In addition, risk of canal entrainment will be significantly reduced, especially since fish will have better access to suitable habitat upstream of the irrigation diversion structure. Furthermore, formerly entrained portions of the Prickly Pear Creek fish population will survive and have access to suitable habitat throughout accessible portions of the drainage.

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

Prickly Pear Creek fish population limiting factors have been identified and addressed over the past 2-plus decades. Projects aimed at improving habitat, in-stream flow and drainage-wide connectivity have, for example, helped the trout population increase by 170% from 2010 to 2022 (Appendix B). The proposed fish screen and in-stream rock ramp will mitigate annual fish mortality associated with canal entrainment and increase drainage-wide connectivity for resident and migratory fish; therefore, a likely increase to the overall fish population will be observed for the 1,000-plus anglers (FWP 2020 Angler Pressure Survey) that target the creek annually. FWP is now observing large, migratory fish (e.g.; Brown trout and Kokanee) in portions of the creek historically know for impaired habitat, a lack of drainage-wide connectivity and chronic dewatering issues. In addition, the creek is home to an important population of at least three native fish species.

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

This fish entrainment mitigation effort will likely increase the overall fish population in Prickly Pear Creek; therefore, fishing opportunity for wild fish will likely increase above and below the proposed project area, especially seasonally during low flow periods.

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

Prickly Pear Creek from ASARCO to the mouth has an established legacy of developing and implementing habitat and water improvements projects after a century-plus of stream corridor degradation. The most important local or large-scale benefit realized from this project is a continued legacy of restoration. The stream corridor and fishery has benefited from each previous improvement project, and this project is another chapter in the success story. Knowledge gained from this and previous projects will be highlighted for the public and used to apply similar restoration efforts to future potential projects in this and other drainages in the area.

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

Temporary in-stream turbidity is expected during installation of the in-stream rock ramp; however, turbidity mitigation will be addressed during the 310 permitting process. The project will not interfere with water or property rights of adjacent landowners.

G. Will the project result in the development of commercial recreational use on the site (including paid access)? Explain:

No.

H. 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.

V. AUTHORIZING STATEMENT

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

Applicant Signature: Date: 11/7/2022

Submittal: **Applications must be signed and received on or before November 15 and May 15 to be considered for the subsequent funding period**. Late or incomplete applications will be rejected.

Mail to:	FWP Future Fisheries Fish Habitat Bureau PO Box 200701 Helena, MT 59620-0701	Email:	Future Fisheries Coordinator FWPFFIP@mt.gov (electronic submissions must be signed) For files over 10MB, use https://transfer.mt.gov and send to mmcgree@mt.gov

BUDGET TEMPLATE SHEET FOR FUTURE FISHERIES PROGRAM APPLICATIONS

Both tables must be completed or the application will be returned

PROJECT COSTS					CONTRIBUTIONS			
WORK ITEMS (Itemize by Category)	**NUMBER OF UNITS**	**UNIT DESCRIPTION***	**COST/UNIT**	**TOTAL COST**	**FUTURE FISHERIES REQUEST**	**MATCH (Cash or Services)****	**OTHER (Not part of this application)**	**TOTAL**
Personnel***								
Survey				$ -				$ -
Design				$ 20,000.00	7,781.50	12,218.50		$ 20,000.00
Engineering				$ -				$ -
Permitting				$ 5,000.00	2,500.00	2,500.00		$ 5,000.00
Oversight				$ -				$ -
Contingency				$ 17,913.00	8,956.50	8,956.50		$ 17,913.00
			Sub-Total	$ 42,913.00	$ 19,238.00	$ 23,675.00	$ -	$ 42,913.00
Travel								
Mileage				$ -				$ -
Per diem				$ -				$ -
			Sub-Total	$ -	$ -	$ -	$ -	$ -
Construction Materials****								
Riffle Rock	130	CY	$125.00	$ 16,250.00	8,125.00	8,125.00		$ 16,250.00
Riprap	37	CY	$200.00	$ 7,400.00	3,700.00	3,700.00		$ 7,400.00
Fish Screen Fab (CWS)	1	LS		$ -				$ -
Fish Return Pipe	30	FT	$50.00	$ 1,500.00	750.00	750.00		$ 1,500.00
				$ -				$ -
				$ -				$ -
				$ -				$ -
				$ -				$ -
				$ -				$ -
			Sub-Total	$ 25,150.00	$ 12,575.00	$ 12,575.00	$ -	$ 25,150.00
Equipment, Labor, and Mobilization								
Mobilzation, etc.	1	LS	$4,000.00	$ 4,000.00	2,000.00	2,000.00		$ 4,000.00
Dewatering	1	WK	$2,500.00	$ 2,500.00	1,250.00	1,250.00		$ 2,500.00
Fish Screen Fabrication (CWS)	1	LS	$8,000.00	$ 8,000.00	4,000.00	4,000.00		$ 8,000.00
Fish Screen Instal (CWS)	1	LS	$2,500.00	$ 2,500.00	1,250.00	1,250.00		$ 2,500.00
Parshall Flume	1	LS	$4,500.00	$ 4,500.00	2,250.00	2,250.00		$ 4,500.00
				$ -				$ -
				$ -				$ -
				$ -				$ -

BUDGET TEMPLATE SHEET FOR FUTURE FISHERIES PROGRAM APPLICATIONS

				$ -				$ -
				$ -				$ -
				$ -				$ -
				$ -				$ -
			Sub-Total	$ 21,500.00	$ 10,750.00	$ 10,750.00	$ -	$ 21,500.00
			TOTALS	$ 89,563.00	$ 42,563.00	$ 47,000.00	$ -	$ 89,563.00

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:The Prickly Pear Creek Fish Screen Concept Design (Appendix A) was funded by the landowner (Prickly Pear Simmental Ranch) and applicant (Pat Barnes Chapter of TU) to inform developing the final design and permitting in hopes of installing the fish screen in Spring/Summer 2023.

APPLICATION MATCHING CONTRIBUTIONS

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

CONTRIBUTOR	IN-KIND	CASH	TOTAL	Secured? (Y/N)
Northwestern Energy MoTac funding	$ -	$ 47,000.00	$ 47,000.00	N (Nov 22nd)
	$ -	$ -	$ -	
	$ -	$ -	$ -	
	$ -	$ -	$ -	
	$ -	$ -	$ -	
	$ -	$ -	$ -	
	$ -	$ -	$ -	
	$ -	$ -	$ -	
TOTALS	$ -	$ 47,000.00	$ 47,000.00	

OTHER CONTRIBUTIONS

(contributions not associated with the application)

CONTRIBUTOR	IN-KIND	CASH	TOTAL	Secured? (Y/N)
Prickly Pear Simmental Ranch - Design Concept Funding	$ -	$ 3,000.00	$ 3,000.00	Y
Pat Barnes Chapter of TU - Design Concept Funding	$ -	$ 5,000.00	$ 5,000.00	Y
	$ -	$ -	$ -	
	$ -	$ -	$ -	
TOTALS	$ -	$ 8,000.00	$ 8,000.00	

To:	Pat Barnes Chapter of Montana TU; Montana FWP
Cc:	File
From:	Matt Barnes, PE, CFM
Date:	October 4, 2022
Subject:	Concepts for Fish Screen and Diversion Improvements on Simmetal Ditch-Prickly Pear Creek

1.0 INTRODUCTION

Tetra Tech was hired by Pat Barnes Chapter of Montana Trout Unlimited (PBTU) in partnership with Montana Fish, Wildlife, & Parks (FWP) and the landowners of the project site to evaluate concepts to add a fish screen and diversion improvements to an existing irrigation diversion on Prickly Pear Creek. The scope included topographic survey of the site, preliminary hydraulic analysis, and development of a concept plan sheet. This memo summarizes this work. The project is located in Lewis & Clark County, MT, northwest of East Helena, and shown in Figure 1.

Figure 1 – Project Location Map

2.0 SURVEY & ANALYSIS

Tetra Tech hired Morrison-Maierle to complete the topographic survey of the immediate diversion area and cross section data on the ditch and creek channel. The survey for completed on 8/24/2022. This data was used to create a digital terrain surface of the project area for use in the hydraulic analysis, conceptual design, and can be used for future design effort. Survey data was collected on the south channel of Prickly Pear Creek, Simmetal Ditch (named for this memo), and existing structures.

The hydraulic analysis was completed with HEC-RAS version 6.3 using the one-dimensional surface modeling capability. The model analyzes water surface elevations in the south channel of Prickly Pear Creek, the existing diversion, existing ditch, and with a new fish screen in the ditch. Based on input from FWP on the typical irrigation diversion flows, 4.0 cubic feet per second (cfs) was used for the design flowrate in the ditch. Low flows in Prickly Pear Creek can reach as low as 20 cfs according to mean daily data at USGS gage 06061500, Prickly Pear Creek at Clancy. Since this gage is located miles upstream and does not include several tributaries and diversions between the gage and the project location, 20 cfs was used for the design low instream flow.

Future hydraulic analysis will be required during design to determine diversion and streambank stability, floodplain permitting, and irrigation diversions.

Figure 2 – Existing Diversion and Headgate Structure

3.0 CONCEPT DESIGNS

3.1 FISH SCREEN OPTIONS

Two options for a fish screen have been evaluated. The first option is a corrugated water screen. The second option is a Farmers Conservation Alliance screen. The options are shown on the attached conceptual design sheets. Preliminary hydraulic analysis indicates that the water surface elevations required to deliver irrigation water for either screen are nearly the same.

A corrugated water screen (CWS) is a sloped screen that allows irrigation water to flow downward through perforated corrugation walls and downstream in the ditch. Screen bypass water flows along the bottom of the corrugations to a screen bypass pipe. The CWS panels are proprietary and made by Brent Mefford in Colorado (corrugatedwaterscreens.com). The panels are supported by a metal structure for screens of this size. CWS is a newer technology with less of a track record than comparable screens. The CWS option is shown on sheet EX-1.

Figure 3 – Corrugated Water Screen near Opportunity, MT

A Farmers Conservation Alliance (FCA) screen is a horizontal screen that allows irrigation water to flow vertically through a flat perforated plate and downstream in the ditch. The plate narrows downstream to maintain flow depth and deliver screen bypass water to the return pipe. A description of how FCA screens operate is attached. FCA screens are proprietary to a company in Oregon (farmerscreen.org) but they have a manufacturer in Seeley Lake. This structure is also metal. FCA screens have been in use across western Montana with a good track record. The FCA screen option is shown on sheets EX-2.

Figure 4 – FCA screen near Anaconda, MT

Table 1 – Fish Screen Concept Comparison

Consideration	CWS	FCA
Track Record	Newer Technology	Good
Typical Maintenance	Brush daily or weekly	Brush weekly
Bypass ability	Yes	No
NMFS (see reference)	No	Yes

3.2 DIVERSION OPTIONS

The two options evaluated for diversion improvement are variations of the same concept design. One would construct a stable riffle from the existing diversion structure crest downstream at a slope of 5%. Then second option would construct a similar riffle at a slope of 10%. Both design concepts would maintain the current operations of the irrigation system. The 10% slope may require additional stability with grout or larger boulders to resist scour and rolling of material.

The existing diversion crest provides adequate water surface elevations on the existing headgate to deliver irrigation water needs. The riffle downstream of the structure crest would only alter the downstream water

depths and velocities to improve up and downstream fish passage. The riffle materials would be designed to remain stable at high flows and maintain surface water connectivity during low flows.

Figure 5 – Rock riffle with diversion crest at 5% slope near Hall, MT

Table 2 – Diversion Concept Comparison

Consideration	5% Riffle	10% Riffle
Track Record	Several in region working well	Some with grout having issues with passage and hydraulics
Stability	Good with appropriate material design	May require grout of large boulders
Fish Passage	Good	Ok at certain flows

4.0 CONCEPTUAL COST ESTIMATE

The conceptual cost estimates for implementation of the project are included below. The quantities of construction are based on the conceptual designs shown on EX-1 and EX-2 and are approximate. The unit prices of the work are taken from similar past projects with inflation factored in depending on the year of the project. The cost for design and permitting is based on past experience on these projects. Bidding and construction inspection costs are not included at this time since they can vary widely based on funding requirements and owner preference. A 25% contingency has been included to account for the conceptual level of design. The cost estimates are summarized below and attached to this memo.

Table 3 – Conceptual Cost Estimates

Conceptual Design	Estimated Cost
CWS & 5% Riffle	$89,563
FCA & 10% Riffle	$105,031

5.0 REFERENCES

United States Army Corps of Engineers (USACE). *HEC-RAS 6.3,* August 2022.

United States Army Corps of Engineers (USACE). *HEC-RAS Hydraulic Reference Manual, Version 6.0*, December 2020.

United States Army Corps of Engineers (USACE). *HEC-RAS User's Manual, Version 6.0*, December 2020.

Ven Te Chow. *Open-Channel Hydraulics*, 1959.

U.S. Bureau of Reclamation (BOR). *Rock Ramp Design Guidelines,* September 2007.

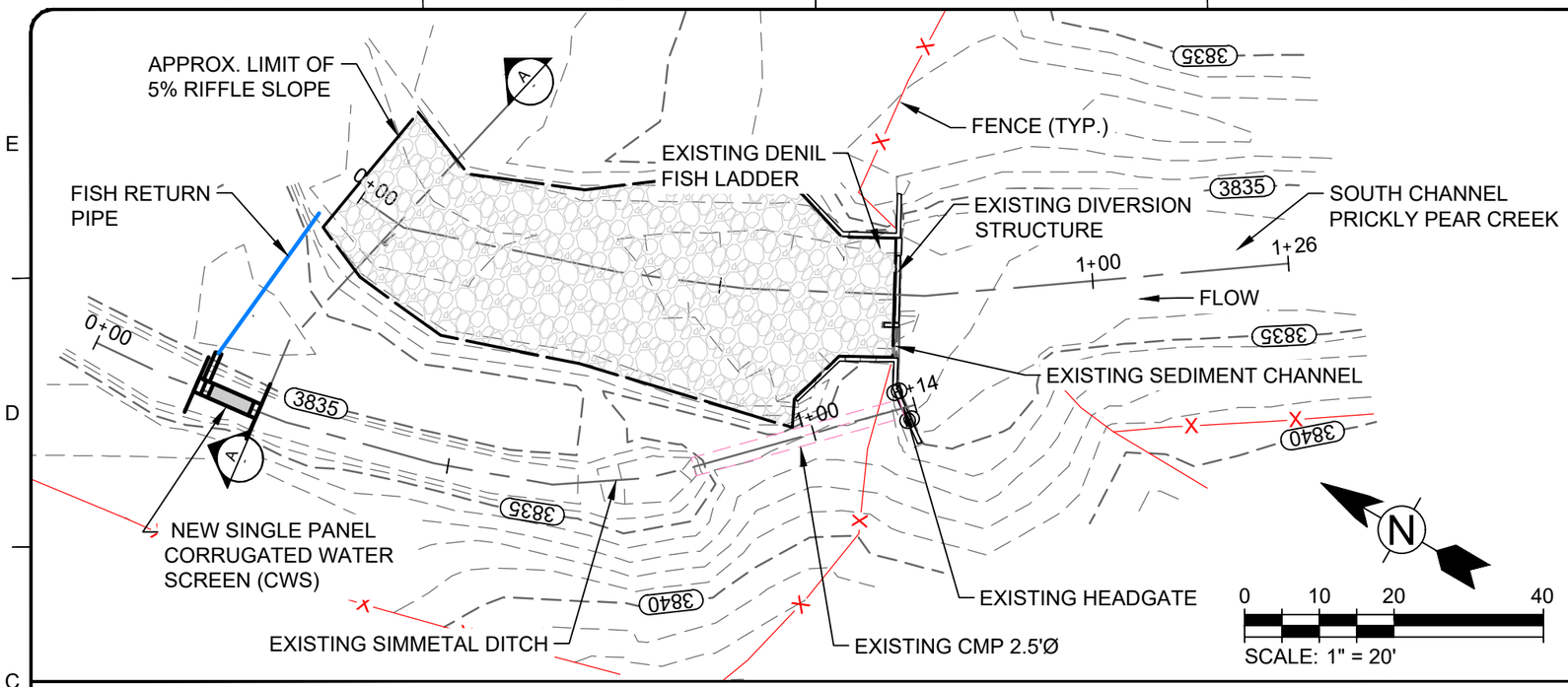
NMFS (National Marine Fisheries Service). 2011. Anadromous Salmonid Passage Facility Design. NMFS, Northwest Region, Portland, Oregon.

FCA (Farmers Conservation Alliance). farmerscreen.org

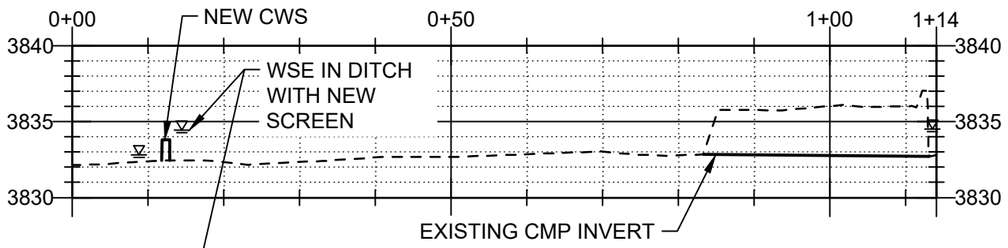
CWS (Corrugated Water Screen). corrugatedwaterscreens.com

6.0 ATTACHMENTS

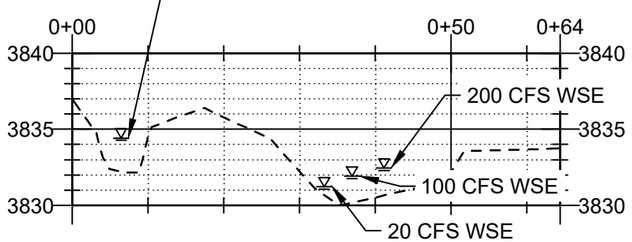
- Conceptual Design Sheets EX-1 and EX-2
- HEC-RAS Creek and Ditch combined profile results
- Conceptual Cost Estimates



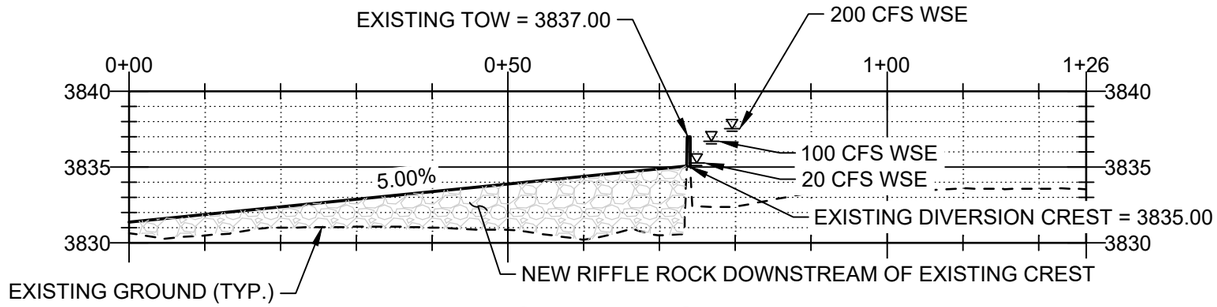
NOTES:
1. CONCEPT PLAN BASED ON IRRIGATION DESIGN FLOW OF 3 CFS AND INSTREAM FLOW OF 20 CFS IN SOUTH CHANNEL OF PRICKLY PEAR CREEK.
2. PROJECT GOALS INCLUDE EXCLUDING FISH ENTRAINMENT IN DITCH AND INCREASING UPSTREAM FISH PASSAGE ABILITY.
3. SURVEY DATA PROVIDED BY MORRISON-MAIERLE, AUGUST 2022. HORIZONTAL COORDINATE SYSTEM = MT83IF, VERTICAL DATUM = NAVD88.
4. SCREEN TYPE, DESIGN FLOWS, DIVERSION ELEVATIONS, AND PASSAGE CRITERIA TO BE DETERMINED DURING DESIGN.
5. CFS = CUBIC FEET PER SECOND, WSE = WATER SURFACE ELEVATION.



DITCH PROFILE



SECTION A-A



CREEK PROFILE

CONCEPT NOTES:
1. MAINTAIN EXISTING DIVERSION STRUCTURE, HEADGATE, AND CMP.
2. CONSTRUCT RIFFLE DOWNSTREAM OF CONCRETE DIVERSION CREST WITH STABLE ROCK MATERIALS. OPTIONAL TO ADD OR MODIFY SEDIMENT GATE OR CHANNEL ON LEFT SIDE.
3. SCREEN TYPES CONSIDERED INCLUDE CORRUGATED WATER AND FARMERS CONSERVATION ALLIANCE SCREENS. BOTH APPEAR EQUALLY FEASIBLE.

DRAFT
NOT FOR CONSTRUCTION

TETRA TECH
www.tetratech.com
825 W. Custer Ave.
Helena, Montana 59602
PHONE: 406-443-5210 FAX: 406-442-7182

MARK	DATE	DESCRIPTION	BY

PAT BARNES CHAPTER TROUT UNLIMITED
MONTANA FISH, WILDLIFE, & PARKS

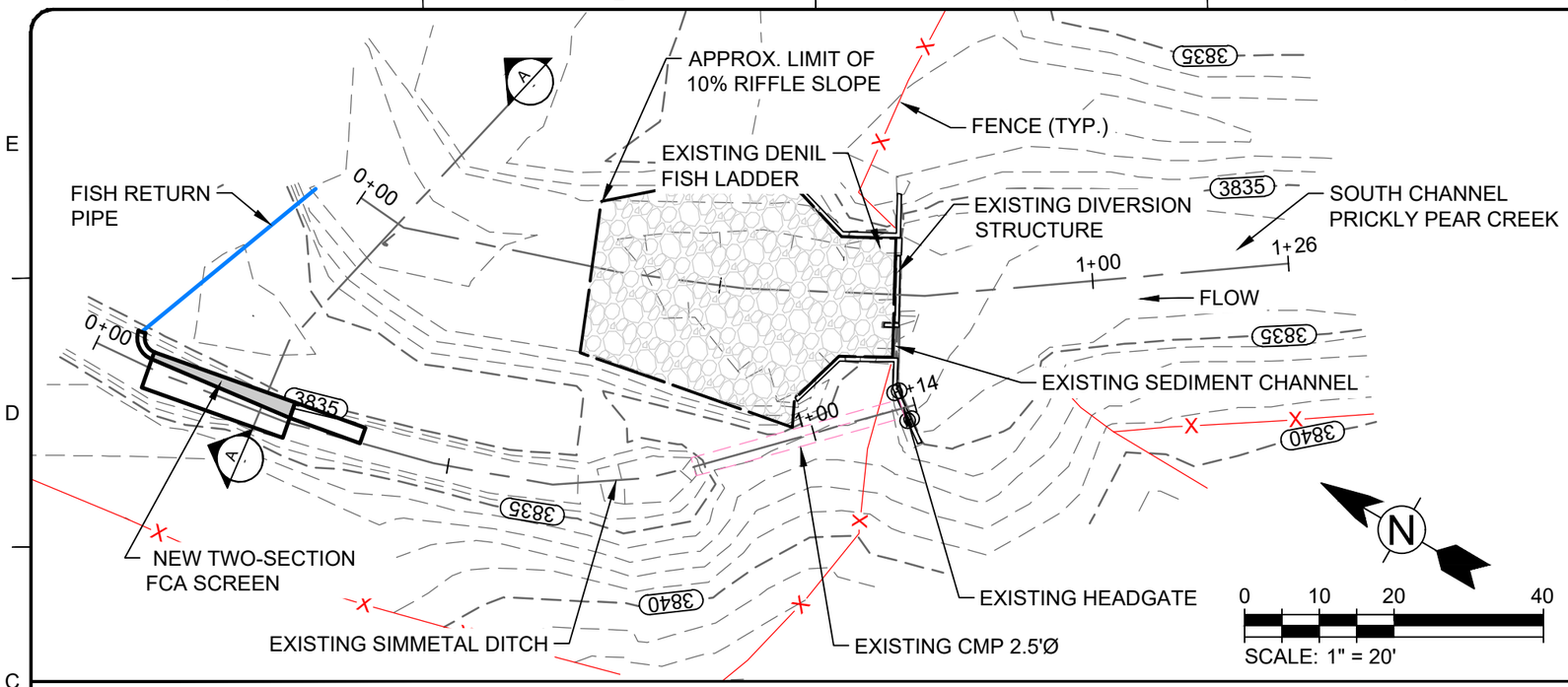
SIMMETAL DITCH IMPROVEMENTS
LEWIS & CLARK COUNTY, MT

FISH SCREEN & DIVERSION CONCEPT
CWS & 5% RIFFLE SLOPE

Project No.:	117-9162001
Designed By:	MDB
Drawn By:	MDB
Checked By:	####

EX-1

Bar Measures 1 inch



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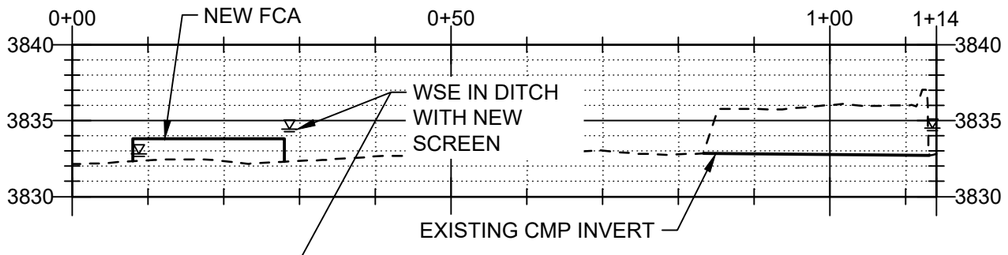
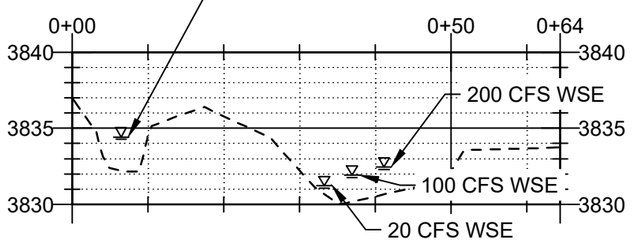
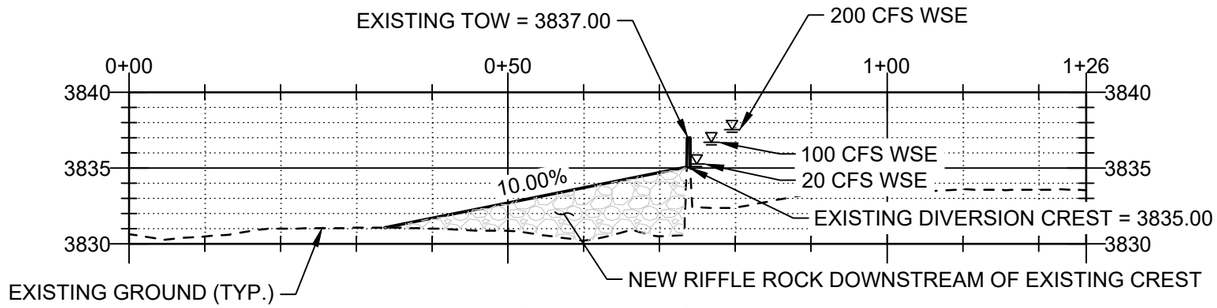
6. FCA = FARMERS CONSERVATION ALLIANCE SCREEN.



DITCH PROFILE



SECTION A-A



CREEK PROFILE

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2. CONSTRUCT RIFFLE DOWNSTREAM OF CONCRETE DIVERSION CREST WITH STABLE ROCK MATERIALS. OPTIONAL TO ADD OR MODIFY SEDIMENT GATE OR CHANNEL ON LEFT SIDE.
3. SCREEN TYPES CONSIDERED INCLUDE CORRUGATED WATER AND FARMERS CONSERVATION ALLIANCE SCREENS. BOTH APPEAR EQUALLY FEASIBLE.

DRAFT
NOT FOR CONSTRUCTION

TETRA TECH
www.tetratech.com
825 W. Custer Ave.
Helena, Montana 59602
PHONE: 406-443-5210 FAX: 406-442-7182

MARK	DATE	DESCRIPTION	BY

PAT BARNES CHAPTER TROUT UNLIMITED
MONTANA FISH, WILDLIFE, & PARKS

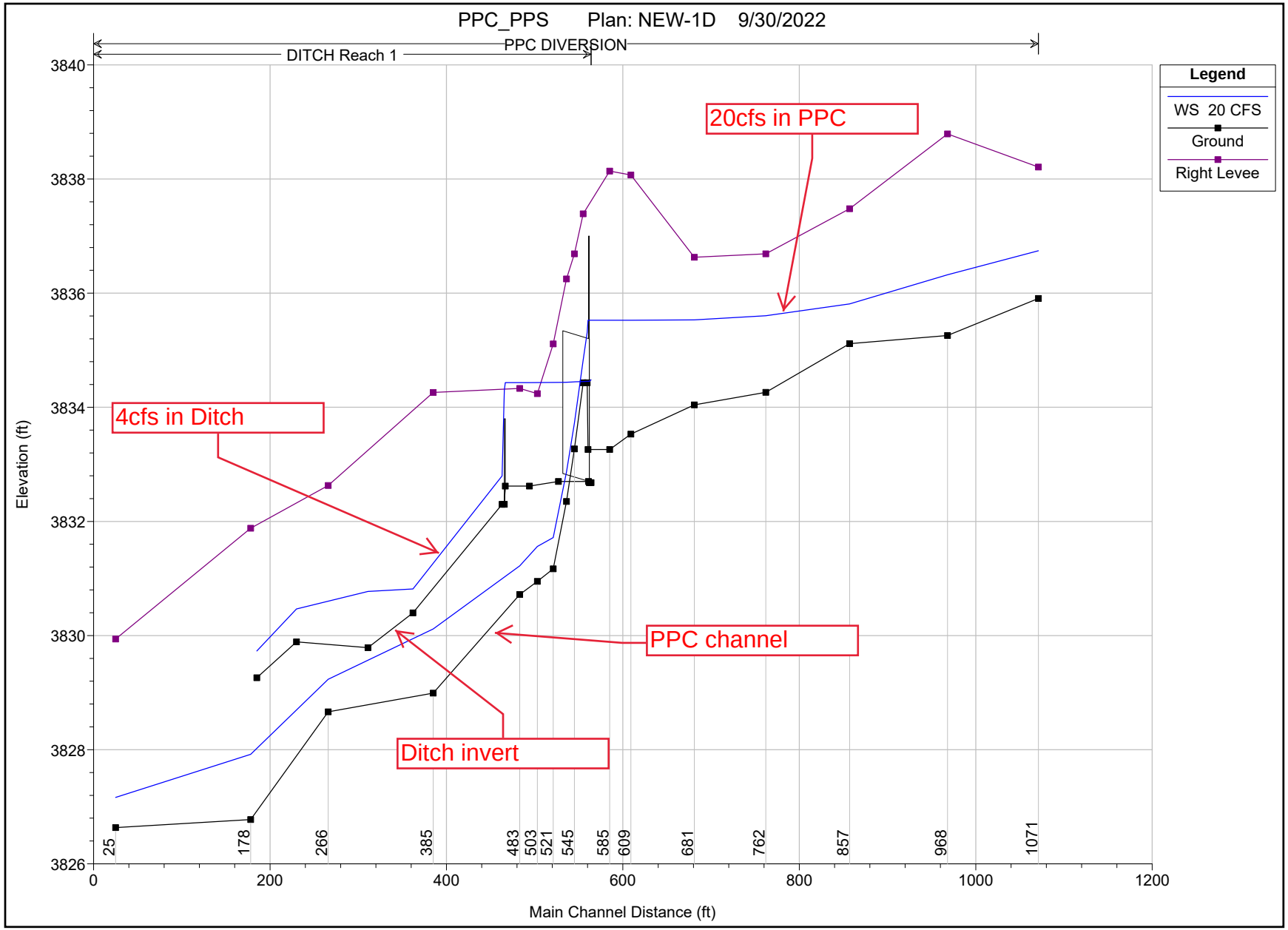
SIMMETAL DITCH IMPROVEMENTS
LEWIS & CLARK COUNTY, MT

FISH SCREEN & DIVERSION CONCEPT
FCA SCREEN & 10% RIFFLE SLOPE

Project No.:	117-9162001
Designed By:	MDB
Drawn By:	MDB
Checked By:	####

EX-2

Bar Measures 1 inch


PPC_PPS Plan: NEW-1D 9/30/2022
DITCH Reach 1
PPC DIVERSION
Legend
WS 20 CFS
Ground
Right Levee
20cfs in PPC
4cfs in Ditch
PPC channel
Ditch invert
Elevation (ft)
Main Channel Distance (ft)
3840
3838
3836
3834
3832
3830
3828
3826
0
200
400
600
800
1000
1200
25
178
266
385
483
503
521
545
585
609
681
762
857
968
1071

TETRA TECH
825 W Custer Ave
Helena, MT 59602

Engineer's Opinion of Construction Cost

Date:	10/4/2022
Project #:	117-9162001
Project Name:	PPC-Simmetal Ditch Improvements
Engineers:	M Barnes

CWS and 5% Riffle

Project Status: Concept Design

Item #	Item Description	Qnty	Unit	Unit Price	Total Cost
101	Mobilization, Bonding, and General Requirements (~10% of total bid price)	1	LS	$4,000	$4,000
102	Temporary Dewatering	1	WK	$2,500	$2,500
103	Riffle Rock - Boulder/Cobble	130	CY	$125	$16,250
104	Rock Riprap Bank Stabilization	37	CY	$200	$7,400
105	CWS - Screen Panel & Fabrication	1	LS	$8,000	$8,000
106	CWS - Installation	1	LS	$2,500	$2,500
107	Fish Return Pipe	30	FT	$50	$1,500
108	6-inch Parshall Flume	1	LS	$4,500	$4,500

Subtotal		$46,650
Design		$20,000
Permitting		$5,000
Contingency	25%	$17,913
TOTAL		$89,563

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825 W Custer Ave
Helena, MT 59602

Engineer's Opinion of Construction Cost

Date:	10/4/2022
Project #:	117-9162001
Project Name:	PPC-Simmetal Ditch Improvements
Engineers:	M Barnes

FCA and 10% Riffle

Project Status: Concept Design

Item #	Item Description	Qnty	Unit	Unit Price	Total Cost
101	Mobilization, Bonding, and General Requirements (~10% of total bid price)	1	LS	$4,000	$4,000
102	Temporary Dewatering	1	WK	$2,500	$2,500
103	Riffle Rock - Boulder/Cobble	65	CY	$125	$8,125
104	Rock Riprap Bank Stabilization	37	CY	$200	$7,400
105	FCA - Fabrication	1	LS	$28,000	$28,000
106	FCA - Installation	1	LS	$3,000	$3,000
107	Fish Return Pipe	30	FT	$50	$1,500
108	6-inch Parshall Flume	1	LS	$4,500	$4,500

Subtotal		$59,025
Design		$20,000
Permitting		$5,000
Contingency	25%	$21,006
TOTAL		$105,031

Consent Letter

I hereby grant Pat Barnes Chapter of Trout Unlimited, in collaboration with Montana Fish, Wildlife and Parks, permission to design and construct a fish screen, as described in the attached design concept memo, for irrigation infrastructure on Prickly Pear Creek at the following location:

Lat: 46.60096, Long: -111.93580.

(Landowners Signature) (Date) 11/7/2022

Gary Burnham
Prickly Pear Simmental Ranch
2515 Canyon Ferry Rd.
Helena, MT 59602

FWP.MT.GOV

THE **OUTSIDE** IS IN US ALL.

November 10, 2022

PO Box 200701
930 Custer Ave W
Helena, MT 59620

To: Future Fisheries Citizen Review Panel

RE: Prickly Pear Creek Fish Screen Project

Dear Panel Members,

I am writing to support Pat Barnes Chapter of Trout Unlimited's (TU) application for funding to mitigate fish entrainment at an irrigation structure on Prickly Pear Creek near East Helena, MT. Future Fisheries funding would benefit designing and implementing a fish screen, while increasing in-stream fish passage (Appendix A), at the irrigation structure to mitigate fish entrainment.

Prickly Pear Simmental Ranch approached Montana Fish, Wildlife and Parks (FWP) in 2021 to discuss fish entrainment in their canal that affects irrigation infrastructure and leads to 100% fish mortality. FWP surveyed the canal in 2022 (Appendix B) and determined an in-canal fish screen would benefit the fishery and mitigate the landowners' irrigation issues.

Identifying and mitigating limiting factors for the Prickly Pear Creek fishery over the past two decades, like those in the Prickly Pear Simmental Ranch irrigation canal, has significantly benefited the fishery and funding this project will perpetuate that legacy into the future. In this case, the landowner has a genuine interest in saving lethally entrained fish, at least five different species, in their canal and its FWP's duty to serve the public, work with landowners and provide stewardship to develop a solution for the resource. Designing and implementing a fish screen at this location benefits all stakeholders, especially the public, by simply making the fishery better.

TU's conservation approach, which aligns well with FWP's Mission, is aimed at "protecting, reconnecting, restoring and sustaining...coldwater resources." Mitigating lethal fish entrainment with a fish screen, while adding stream connectivity, mirror's TU's conservation goals and will surely benefit the fishery and public and propel a restoration into the future. FWP fully supports TU's proposed fish screen project on Prickly Pear Creek.

Sincerely,

Adam Strainer
Helena Area Fish Biologist

October 19th, 2022

Montana Fish, Wildlife, & Parks
Future Fisheries Improvement Program
Helena, MT 59620-0701

RE: Prickly Pear Fish Screen Project

Dear Committee:

The Lewis and Clark Conservation District (LCCD) is writing to support the efforts of Fisheries Biologist Adam Strainer and the Trout Unlimited Pat Barnes Chapter to help fund the installation of a fish screen on the Burnham property on Prickly Pear Creek. These partners have a proven track record of implementing conservation projects through community partnerships. The FWP Future Fisheries funding awarded to these two partners would be well-spent and sure to result in a collaborative, on-the-ground project benefiting the fisheries resource of Prickly Pear Creek and the communities of East Helena and Helena.

This project would build off of past efforts to restore the Prickly Pear Creek system and falls well within the goals and objectives of LCCD. A fish screen installation at the Burnham canal would reduce significant fish entrainment during the irrigation season, protecting more than 5 species of fish (including native sculpin, suckers, and dace) that currently inhabit the creek.

LCCD works closely with Adam Strainer in its Natural Streambed and Land Preservation Act permitting process and other restoration projects and is confident that any project under his oversight will lead to a successful outcome that will benefit both the fisheries resource of Prickly Pear Creek and surrounding communities.

Please feel free to call or email our Resource Technician if you have any questions at 406-449-5000 ext. 3886 or connor@lewisandclarkcd.org.

Sincerely,

LEWIS AND CLARK CONSERVATION DISTRICT

Jeff Ryan
LCCD Board Chair

Lake Helena Watershed group

Date: October 24th, 2022

Montana Fish, Wildlife, & Parks
Future Fisheries Improvement Program
Helena, MT 59620-0701

Subject: Prickly Pear Creek Fish Screen Project

To Whom It May Concern,

This letter is to confirm the Lake Helena Watershed Group's (LHWG) support for the Prickly Pear Creek Fish Screen Project. The LHWG's mission is to improve the health of our watershed to benefit our communities and increase the enjoyment of our resources.

This project will help provide a healthy and reconnected fishery for Prickly Pear Creek, benefitting many members of the public who fish and recreate along Prickly Pear Creek as well as Lake Helena. Providing this type of benefit to the Lake Helena watershed fishery and associated aquatic life is consistent with the goals and objectives of the LHWG.

We offer this letter of support because we are confident that Fisheries Biologist Adam Strainer and the Trout Unlimited Pat Barnes Chapter will make a positive impact with any funding awarded for the Prickly Pear Creek Fish Screen Project.

Sincerely,

Erin Wall
LHWG Chair

Dean Yashan
LHWG Projects Committee Chair

lakehelenawatershed@gmail.com 406-457-8584 316 N Park Ave

Summary

An irrigation canal diverting water from Prickly Pear Creek on the Prickly Pear Simmental Ranch near East Helena, Montana is annually responsible for fish entrainment, affecting at least five fish species in the drainage, which results in seasonally plugged irrigation infrastructure and is lethal to all entrained fish, post diversion shut-off. Fisheries surveys in the canal, beginning in July 2022, identified an increasing number of entrained fish as creek flows reached the annually low flow period (10-20 CFS) from approximately July to October. During that period, diversion into the canal annually is approximately 30-50% of the total in-stream flow. Three fish (3 species) were observed just downstream of the canal headgate in early August and the landowner began reporting irrigation infrastructure plugged with fish in mid-September. The canal was closed on September 29th and FWP staff captured 68 fish (5 species; multiple ages classes of each species) in the uppermost 400 feet of the canal in only approximately five minutes of effort. Total canal length is approximately 2 miles; therefore, fish entrainment is estimated at over 2,000 fish annually. These results suggest that installing an in-canal fish screen will mitigate fish entrainment losses and improve annual irrigation inefficiencies.

Study Area

An irrigation structure and canal responsible for fish entrainment is located on Prickly Pear Creek on the Prickly Pear Simmental Ranch and the diversion structure head gate is approximately 0.35 miles downstream of Wylie Drive (Figure 1). The stream is diverted by a concrete headwall with a fixed wheel headgate (Photo 1) that feeds approximately two miles of canal for both center pivot and flood irrigation infrastructure (Photo 2). The ranch has the headgate open annually from approximately late June to October.

Figure 1. Project Area – Prickly Pear Creek irrigation diversion and canal located on the Prickly Pear Simmental Ranch near East Helena.

Photo 1. Diversion structure and fixed-wheel headgate (June 9, 2022; 110 CFS).

Photo 2. View of from the headgate pipe looking downstream into the irrigation canal (June 9, 2022).

Survey Methods

Two types of fisheries surveys were conducted in the canal during summer/fall of 2022 to monitor landowner reported fish entrainment. FWP staff used backpack electrofishing survey techniques (Photo 3) in three sections of the canal (approximately 100 meters each) in July and August and in the canal, immediately downstream of the headgate, post canal shut off (September 29). In addition, FWP staff used a mini fyke net (Photo 4) to passively capture fish for one net-night in August. Survey location, effort and results were recorded.

Photo 3. An example of backpack electrofishing survey techniques (Helena IR, 2018).

Photo 4. Mini-fyke net survey technique (August 10, 2022).

Results

July

Three sections of the canal (Figure 2), all within the first mile, were electrofished on July 13 and no fish were captured in approximately 30 minutes of shocking. No other surveys were conducted in July.

Figure 2. Electrofishing sections within the irrigation canal.

August

Three electrofishing sections (Figure 2), established in July 2022, were duplicated in the canal on August 10 and no fish were captured in approximately 15 minutes of shocking. In addition, a mini-fyke net was deployed on August 10 for one net-night just downstream of the canal headgate (Figure 3). Three juvenile fish (3 species; Photo 5) were captured in the mini-fyke.

Figure 3. Mini-fyke net survey location.

Photo 5. Mini-fyke net survey results. A sculpin (left to right), rainbow trout and brown trout.

September

Prickly Pear Simmental Ranch reported fish plugging their center pivot sprinkler heads (Photo 6) just before they turned off the canal on September 29. FWP staff electrofished approximately 400 feet of the dewatered canal (Photo 7), beginning at the headgate, on September 30. In total, electrofishing resulted in 68 total fish (5 species). The effort, approximately only five minutes of shocking time, yielded 35 brown trout (range 2.7 to 13.5-inches), 24 rainbow trout (range 2.7 to 10.5-inches), 6 longnose dace (range 2.6 to 3.2-inches), 2 rocky mountain (RM) sculpin (range 1.5 to 3.2-inches) and 1 white sucker (5.4-inches) (Photo 8). The latter three species are native fish species.

Photo 6. Evidence of plugged center pivot sprinkler heads, fed by the canal, as reported by Prickly Pear Simmental Ranch staff on September 27.

Photo 7. Dewatered canal looking upstream at headgate pipe (left to right) and location of August mini-fyke net survey location and downstream from August mini-fyke net survey location.

Photo 8. Dewatered canal electrofishing effort examples (clockwise from top left): adult brown trout, 4 species (RM sculpin, rainbow trout, brown trout and longnose dace), adult rainbow trout and a white sucker.

Discussion

Historically, Prickly Pear Creek from approximately East Helena to the mouth has seen over a century of habitat degradation, seasonal pollution and dewatering issues responsible for creating limiting factors to the overall fishery. This portion of the creek has seen an incredible amount of effort in recent decades to restore large portions of critical habitat, maintain annual instream flow and increase public access. These projects have involved many area collaborators (FWP, NWE, Pat Barnes TU, PPLT, LCCo WQPD, HVID, LHWG, LCCo CD, private landowners, etc.), with the goal of returning Prickly Pear Creek into a thriving fishery and a healthy, functioning, accessible and stable stream corridor.

Habitat restoration has included increasing stream access to the historic floodplain, bank stabilization, habitat development, irrigation structure navigation and recreational access. Cumulatively these projects have benefitted the overall fishery by increasing available habitat to both resident and migratory fish in the drainage throughout all life histories.

Prickly Pear Creek discharge consistently reaches 10-20 CFS annually, measured at the USGS gauge near Clancy (USGS Gauge 06061500), from summer to fall (Figure 4) and in canal flow from June to October is typically 3-5 CFS (Prickly Pear Simmental Ranch, *personal communication*). Historically, reaches of Prickly Pear Creek downstream of the headgate went dry annually; however, the Lewis and Clark County Water Quality Protection District began leasing water for in-stream flow from the Helena Valley Irrigation District (HVID) canal in 2012 and the creek has not been dry since.

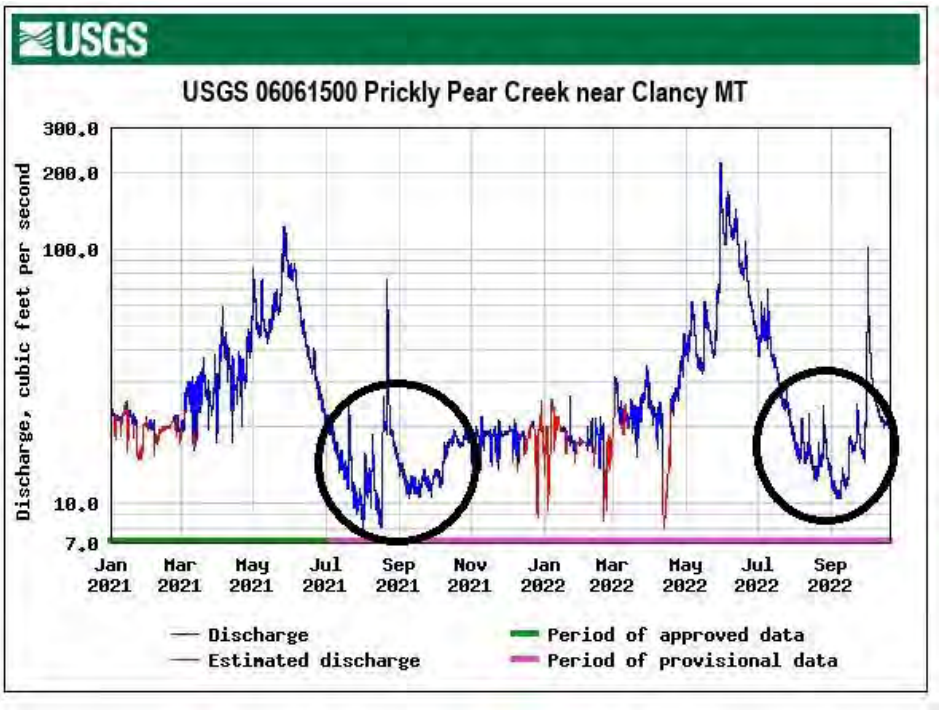

Figure 4. Prickly Pear Creek stream discharge, as measured at USGS gauge 06061500, from January 2021 to September 2022. Black circles indicate low annual flow periods each summer/fall.

FWP has been monitoring the fishery, via a catch-per-unit-effort (CPUE) electrofishing survey targeting rainbow and brown trout, within a standardized stream section (Figure 5), since 2003. The 2010 survey identified 22.6 total fish (rainbow and brown trout combined) per 1,000 feet. In 2014, two years HVID

Figure 5. Prickly Pear Creek Burnham Section electrofishing survey location. Start of the section is approximately 1.6 miles downstream of the Prickly Pear Simmental canal headgate.

water was leased to sustain in-stream flow in summer and fall, combined total fish numbers increased to 38.7 per 1,000 feet (71% increase). In 2022, combined total fish numbers were 170% higher than pre-2012 levels and large migratory fish, like kokanee salmon (Photo 9), from Hauser Reservoir/ Lake Helena are beginning to be observed in historic degraded habitat and seasonally dewatered stream reaches and above historic low water fish barriers (irrigation structures).

Photo 9. Kokanee Salmon surveyed in the Burnham Section on Prickly Pear Creek in September 2022.

Lastly, a September 2022 FWP electrofishing survey on Prickly Pear Creek at FWP's Upper Prickly Pear Fishing Access Site (FAS), a new FAS in 2018, FWP yeilded a 28.5-inch brown trout (Photo 10) while it was likely migrating upstream to spawn. Progeny from the large, migratory brown trout, or other adfuvial fish species (fish migrating out of Lake Helena) in the drainage, could possibly be traced to the entrained fish observed in the Prickly Pear Simmental Ranch irrigation canal in 2022.

Photo 10. A 28.5-inch brown trout captured by FWP in September 2022 in Prickly Pear Creek adjacent to Upper Prickly Pear Creek FAS.

Conclusion and Management Implications

Trout numbers in Prickly Pear Creek within the standardized Burnham electrofishing survey, have risen 170% since 2010 and both resident and migratory fish have better access to suitable stream habitat and flows that are clearly benefitting the overall fishery. Identifying and mitigating drainage-wide limiting factors, like the fish entrainment reported and observed in Prickly Pear Simmental irrigation canal, has significantly benefited the Prickly Pear Creek fishery over the past two decades and will continue to be the goal of all collaborators moving forward.

Collectively, this information suggests that installing a fish screen on the Prickly Pear Simmental irrigation canal will further benefit the overall fishery and drive the Prickly Pear Creek restoration legacy into the future. In addition, installing a fish screen will reduce irrigation infrastructure inefficiencies for a landowner who 1) initially identified the entrainment issue and approached potential mitigation partners and 2) is a willing participant, financially, in mitigating the issue.