FUTURE FISHERIES IMPROVEMENT PROGRAM GRANT APPLICATION

. APPLICANT INFORMATION

A. Applicant Name: Montana Natural Resource Damage Program/Montana Fish Wildlife and Parks

Mailing Address: 1720 9th Ave.

City: Helena State: MT Zip: 59601

Telephone: 406-444-1346 Alicia and 406-493-2694 Caleb E-mail: aliciastickney@mt.gov caleb.uerling@mt.gov

B. Contact Person (if different than applicant): Alicia Stickney – NRDP and Caleb Uerling – FWP

Address: 1720 9th Ave.

City: Helena State: MT Zip: 59601

Telephone: 406-444-1346 E-mail: aliciastickney@mt.gov

C. Landowner and/or Lessee Name (if different than applicant): Montana Fish, Wildlife, and Parks

Mailing Address: PO Box 200701

City: Helena State: MT Zip: 59620

Telephone: 406-841-4011 E-mail: jmongoven@mt.gov

II. PROJECT INFORMATION

A. Project Name: O'Neill Creek Culvert Replacement

River, stream, or lake: O'Neill Creek

Location: Township: 09 North Range: 09 West Section: 35

Latitude: 46.489398 Longitude: -112.698878 *within project (decimal degrees)*

County: Powell

B. Purpose of Project:

The purpose of this project is to replace an undersized, completely blocked, and failing culvert with a bridge that will be a long-term solution to improve fish passage and habitat on O'Neill Creek on the Spotted Dog Wildlife Management Area in Powell County. The bridge will allow genetically pure westslope cutthroat trout and fluvial cutthroat trout from the Clark Fork River to access habitat above the crossing.

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

O'Neill Creek is a tributary to the Clark Fork River downstream of Deer Lodge, Montana that supports a population of genetically pure westslope cutthroat trout (Powell County). The project is located on State land managed by Montana Fish, Wildlife, and Parks (FWP) on the Spotted Dog Wildlife Management Area (WMA). See project site map, attached.

About 1.4 miles upstream from the confluence of O'Neill Creek with the Clark Fork River, a culvert of unknown age passes under Rocky Ridge Road, a primary access road to the Spotted Dog WMA. The culvert is a partial and at times complete fish passage barrier and creates impairments in the stream channel. The culvert is undersized and at times has been completely enclosed with overgrown vegetation and sediment. In 2018 and 2019, water was not able to pass through the culvert and the road above the culvert and streambanks to either side of the road were washed out. In order to maintain public access to the Spotted Dog WMA, in September 2019, FWP made temporary repairs to the road and culvert using $3,100 of capital funds from FWP. FWP has been willing to work with the Montana Natural Resources Damage Program and Montana Department of Natural Resources and Conservation to undertake this longer-term solution to the undersized culvert.

The project calls for replacing the culvert with a bridge using cast-in-place concrete abutments and recycled timber stringers supplied by FWP. The purpose of this culvert replacement project is to improve fish passage in O'Neill Creek and maintain it in the long term. A bridge will promote natural stream morphology, correct road drainage problems, and eliminate delivery of excess sediment. The bridge will accommodate bankfull flows and an appropriate floodplain and the O'Neill Creek channel will be able to function more naturally. The adjacent riparian area will also be somewhat restored and improved with the improved stream function.

O'Neill Creek is spawning habitat for fish in the Clark Fork River. With a new bridge allowing fish passage, connectivity between the upper reach of O'Neill Creek and the Clark Fork River will be improved, and spawning and rearing habitat for native salmonids in both O'Neill Creek and the Clark Fork River will be improved. Approximately 1.5 miles of additional habitat above the crossing will be connected. Protection, restoration, and enhancement of tributary habitats are essential for restoring native trout populations in the Clark Fork River due to widespread injury associated with the release of hazardous substances from the mining and mineral processing activities in the Clark Fork Basin.

D. Length of stream or size of lake that will be treated: 5 miles, 1.5 miles of additional habitat will be connected, so 2.9 miles of trout habitat

E. Project Budget:

Grant Request (Dollars):	**$**	**15,250**
Matching Dollars:	**$**	**19,620**
Matching In-Kind Services:	**$**	
Total Project Cost:	**$**	**34,870**

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

- **Please see attached budget.**

Attach specific project plans, detailed sketches, plan views, photographs, maps, evidence of landowner consent, evidence of public support and fish biologist support, and/or other information necessary to evaluate the merits of the project. If project involves water leasing or water salvage complete a *supplemental questionnaire.* (http://fwp.mt.gov/fwpDoc.html?id=36110)

G. **Please see attached:**

- location map,
- photographs of O'Neill Creek showing washed out culvert,
- plan drawings,
- Montana FWP fish biologist support
- Section 3.2.2.17 from the Upper Clark Fork River Basis Aquatic and Terrestrial Restoration Plan dated February 27, 2019, referring to O'Neill Creek Restoration.

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

H. **Please see attached:**

- Montana Statewide Fisheries Management Program and Guide (2019-2027)
- Spotted Dog Wildlife Management Habitat Plan (2017)
- Fish and Wildlife Commission Rules for Public Use of Montana's Wildlife Management Areas, Wildlife Habitat Protection Areas, and Fisheries Conservation Areas, February 2019.

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

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

Genetically pure resident westslope cutthroat trout in O'Neill Creek and fluvial westslope cutthroat trout in the Clark Fork River

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

As recently as this year, the culvert at the Rocky Ridge Road over O'Neill Creek was almost entirely blocked with vegetation and sediments, resulting in little or no fish passage. The culvert was re-opened in 2019 to keep water from flowing over the road, but it is likely to continue to be a fish passage issue as it is undersized and prone being blocked by sediment and debris. Replacing the culvert with a bridge will allow continuous and long-term fish passage at this crossing. The Spotted Dog Wildlife Management Habitat Plan (2017) identified removal of culverts as a special project priority for recovering or restoring aspens, wetland, and riparian systems.

Removing the culvert on O'Neill Creek and replacing it with a bridge will also promote natural stream morphology, correct road drainage problems, and eliminate delivery of excess sediment to the stream. The bridge will span bank-full conditions and allow for an appropriate floodplain. The channel, banks, and riparian area in the immediate area of the new bridge will be restored allowing the creek to function more naturally. Fluvial fish will have access to approximately 2.9 miles of rearing and spawning habitat on O'Neill Creek.

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

The Montana Statewide Fisheries Management Plan section on the Clark Fork River Basin outlines management direction for tributaries to the Upper Clark For River above the confluence with Flint Creek. The plan specifically states that migratory populations should be enhanced, and migratory life histories should be maintained, connectivity with spawning tributaries should be ensured, and tributary populations should be enhanced for conservation and recruitment to the Clark Fork River.

O'Neill Creek supports a genetically pure westslope cutthroat trout population. This population likely provides a source of recruitment to the Clark Fork River when flows allow. For long-term persistence of this small population of westslope cutthroat trout, the populations should be connected the Clark Fork River fluvial system. Likewise, fluvial populations of trout in the Clark Fork River will be improved by providing access to additional spawning habitat and genetic diversity in O'Neill Creek. Providing fish passage will improve the resiliency of both the O'Neill Creek trout population and the Clark Fork River trout population.

The increase in recruitment of native trout from O'Neill Creek to the Clark Fork River will enhance the native trout fishery on this section of the Clark Fork River. This project will also allow continued access to Spotted Dog Wildlife Management Area for fishing and other recreation from Rocky Ridge Road.

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

This project will increase public fishing opportunity for wild fish by connecting an additional 1.5 miles of westslope cutthroat trout inhabited stream to the Clark Fork River. This habitat will increase O'Neill Creeks capacity as a source of recruitment for wild fish to the Clark Fork River. The additional recruitment to the Clark Fork River would increase the opportunity for anglers to catch wild fish in the Clark Fork River.

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

The project is on the Spotted Dog WMA. The property is owned by Montana FWP. The bridge will be maintained according to the Spotted Dog Wildlife Management Area Habitat Plan (2017). The WMA has a full-time maintenance staff that has the capacity to maintain this bridge as part of the network of roads and infrastructure it currently maintains.

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

FWP took ownership of the WMA in 2011 and "inherited" the roads and culverts as is. In 2015 FWP fisheries personnel inventoried all road crossings for fish passage and overall stream health.

The cause of habitat degradation was a severely undersized culvert at the Rocky Ridge Road crossing of O'Neill Creek that has become plugged with sediment and vegetation. Replacement of the culvert with a bridge will promote natural stream morphology, correct road drainage problems, and eliminate excess delivery of sediment. The bridge will accommodate bankfull flows and allow for an appropriate floodplain.

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

By connecting a tributary to the main stem Clark Fork River, this project supports the long-term viability of a native westslope cutthroat trout population, in both O'Neill Creek and the Clark Fork River.
The replacement of the culvert will also maintain public access to Spotted Dog WMA from Rocky Ridge Road for hunting, fishing, wildlife viewing, hiking and other forms of recreation.

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

The entire project area is on the Spotted Dog Wildlife Management Area. In this area, there is one adjacent landowner, until about a quarter mile downstream. The project will not interfere with this landowner's property rights or water.

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

There are no plans for developing commercial recreational use of O'Neill Creek.

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

Not directly. No mine waste will be removed in O'Neill Creek. However, protection, restoration, and enhancement of this tributary habitat is essential because the Clark Fork River aquatics and fisheries habitat has widespread injury associated with the release of hazardous substances from the mining and mineral processing activities in the Clark Fork Basin.

The Natural Resource Damage Program is implementing the Upper Clark Fork River Basin Aquatic and Terrestrial Resources Restoration Plans, updated February 2019. O'Neill Creek is a priority 2 stream in the restoration plans and was made eligible for funding. The goals of tributary work in the Upper Clark Fork River Basin are 1-to restore the mainstem trout fishery by improving recruitment of fish from tributaries, 2-replacing lost trout angling in the mainstem by improving trout populations in tributaries, and 3-maintaining and improving native trout populations in the Upper Clark Fork River Basin to preserve rare and diverse gene pools and improve the diversity and resiliency of the trout fishery. Improving fish passage on O'Neill Creek supports all of the restoration plan goals.

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.

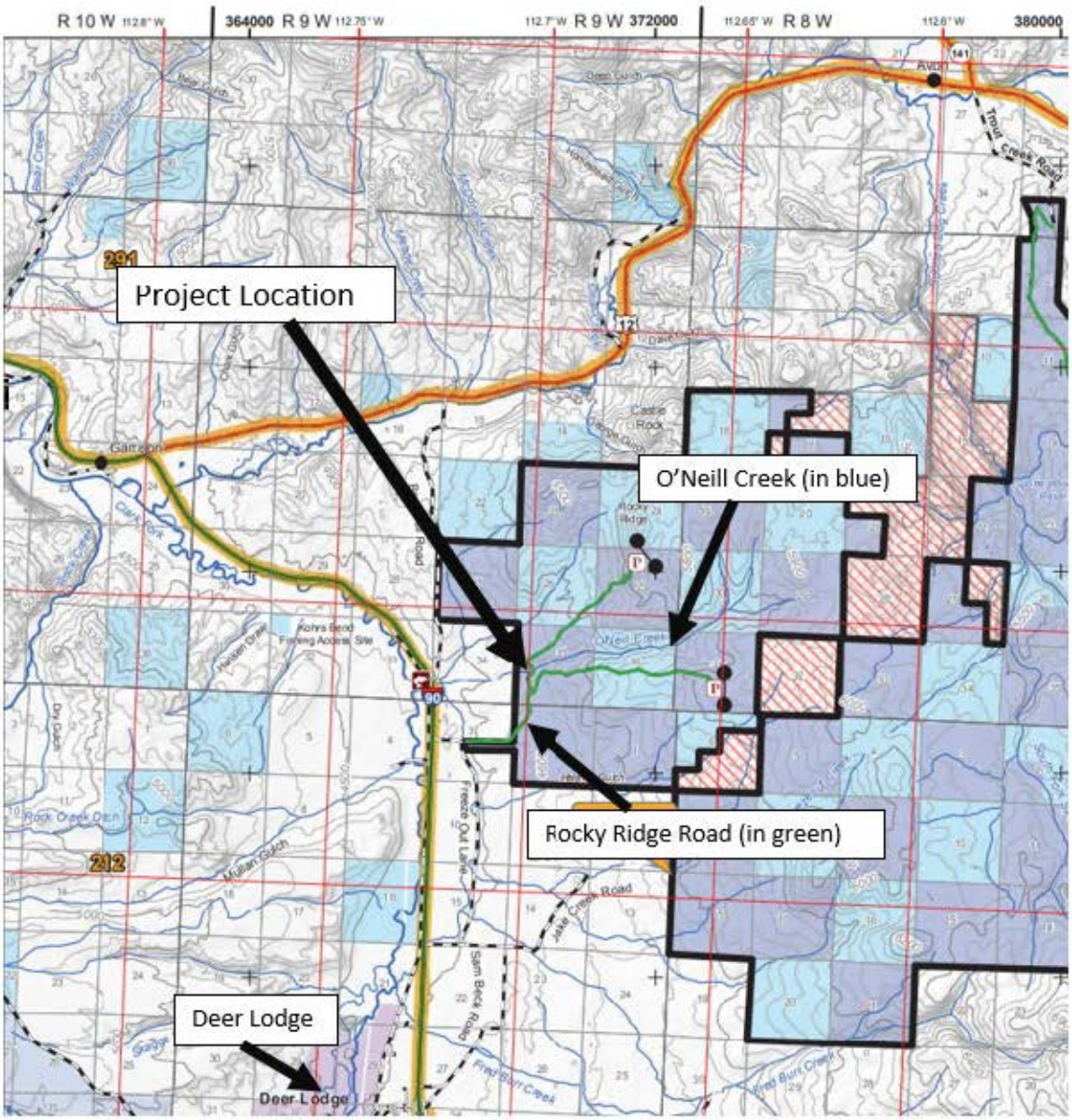
Applicant Signature: Digitally signed by Douglas H Martin Date: 2019.11.26 14:59:37 -07'00' Date: _____

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

Applications may be rejected if this form is modified.



O'Neill Creek Project Location

Map excerpt from Montana FWP Spotted Dog Wildlife Management Area Interim Public Use Regulations map (2014).

Photographs from O'Neill Creek

Rocky Ridge Road overtopped at the O'Neill Creek culvert. Outlet of culvert shown.

Looking down at inlet of the culvert. Culvert entry is entirely blocked with vegetation and sediment. Minimal flows continue through piping around and through the culvert.

Budget

O'Neill Creek Culvert Replacement - Future Fisheries Application

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* **								
Engineering Plans and Specifications	1	Each	$ 2,100.00	$ 2,100.00			$ 2,100.00	$ 2,100.00
Permitting				$ -				$ -
Oversight				$ -				$ -
			Sub-Total	$ 2,100.00	-	-	2,100.00	$ 2,100.00
In-Kind Construction Materials** **								
20-Foot Stringers	9	Each	$ 386.36	$ 3,477.00			3,477.00	$ 3,477.00
8"x18"x18" Header	2	Each	$ 386.50	$ 773.00			773.00	$ 773.00
			Sub-Total	$ 4,250.00		-	4,250.00	$ 4,250.00
Contractor Construction Bid								
Concrete Bridge Abutments Material and Grading	2	Each	$ 1,137.50	$ 2,275.00	$ 2,275.00			$ 2,275.00
Bridge Decking Material	336	Square Feet	$ 9.67	$ 3,250.00	$ 3,250.00			$ 3,250.00
Best Management Practices (i.e. Silt Fence, Straw Wattles, Straw Bales)	120	Linear Feet	$ 5.00	$ 600.00			$ 600.00	$ 600.00
Contract Labor	8	Days	$ 600.00	$ 4,500.00			$ 4,500.00	$ 4,500.00
Contractor Labor	19	Days	$ 600.00	$ 11,175.00	$ 6,725.00		$ 4,450.00	$ 11,175.00
			Sub-Total	$ 21,800.00	$ 12,250.00	-	9,550.00	21,800.00
Mobilization/Demobilization								
Mobilization /Demobilization	1	lump sum	$ 3,000.00	$ 3,000.00	3,000.00			$ 3,000.00
			Sub-Total	$ 3,000.00	$ 3,000.00	$ -		$ 3,000.00
TOTAL Contractor Construction Bid and Mob/Demob				$ 24,800.00	$ 15,250.00	$ -	$ 9,550.00	$ 24,800.00
Contingency 15% Contractor Construction Bid and Mob/Demob				$ 3,720.00			$ 3,720.00	$ 3,720.00
			TOTAL	$ 34,870.00	$ 15,250.00		$ 19,620.00	$ 34,870.00

(Revised 11/25/2019)

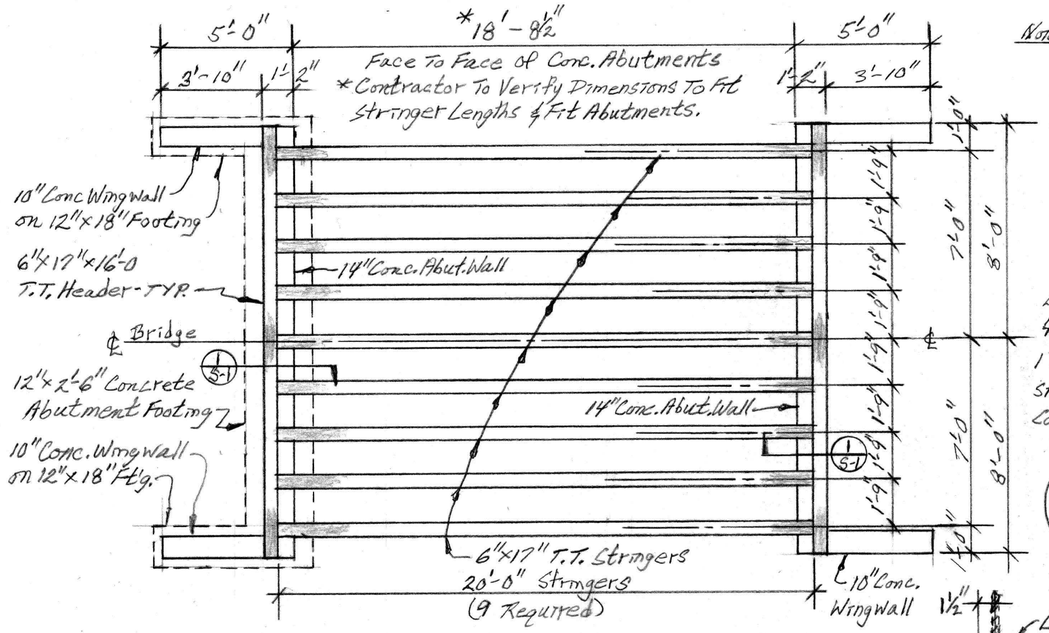
O'Neill Creek Culvert Replacement - Future Fisheries Application

Contingency of 15% is calculated on construction costs, Engineering, and mobilization and demobilization. Contingency calculations do not include the cost of the donated stringers and headers.

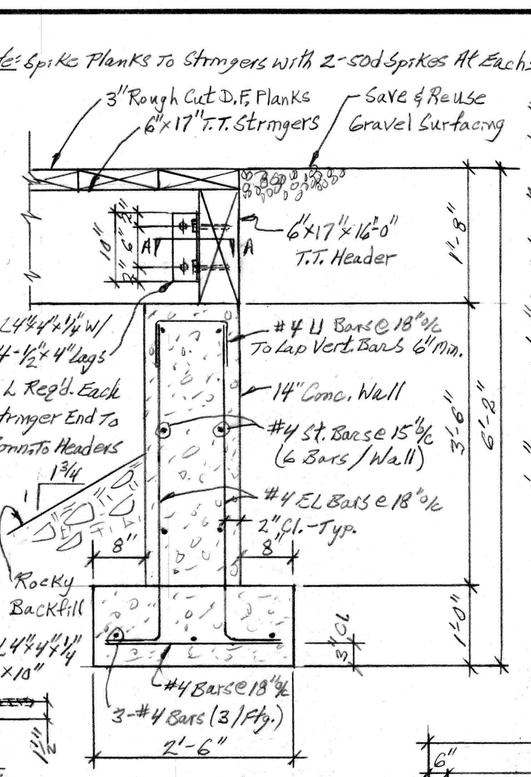
MATCHING CONTRIBUTIONS (do not include requested funds)

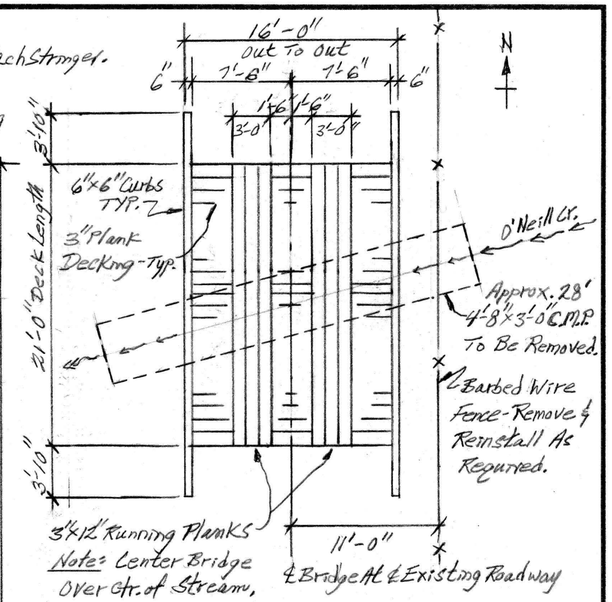
CONTRIBUTOR	IN-KIND SERVICE	IN-KIND CASH	TOTAL	Secured? (Y/N)
Habitat Montana	$ -	$ 6,000.00	$ 6,000.00	Y
Montana DNRC Anaconda Unit	$ -	$ 5,000.00	$ 5,000.00	Y
Natural Resource Damage Program	$ -	$ 4,370.00	$ 4,370.00	Y
FWP Construction (see note below)	$ -	$ 4,250.00	$ 4,250.00	Y
	$ -	$ -	$ -	
	$ -	$ -	$ -	
	$ -	$ -	$ -	
	$ -	$ -	$ -	
	$ -	$ -	$ -	
	$ -	$ -	$ -	
TOTALS	$ -	$ 19,620.00	$ 19,620.00	

Plan Drawings

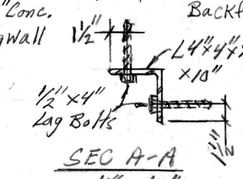


BRIDGE FRAMING & FOUNDATION PLAN
Scale: 1/4" = 1'-0"



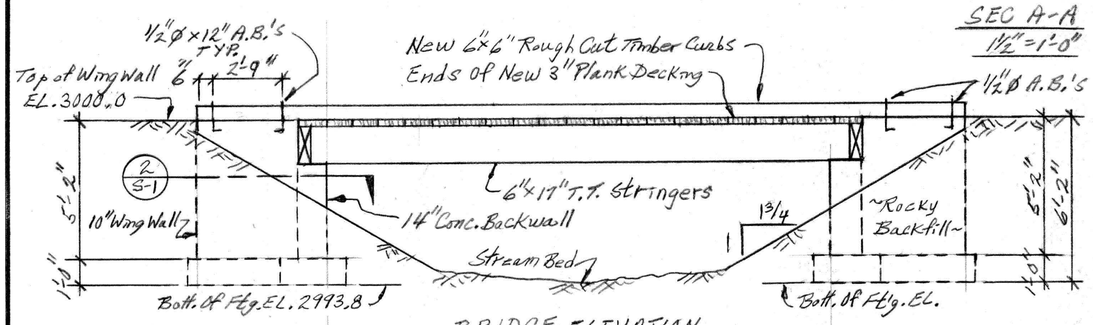


BRIDGE SITE PLAN 1/8" = 1'-0"

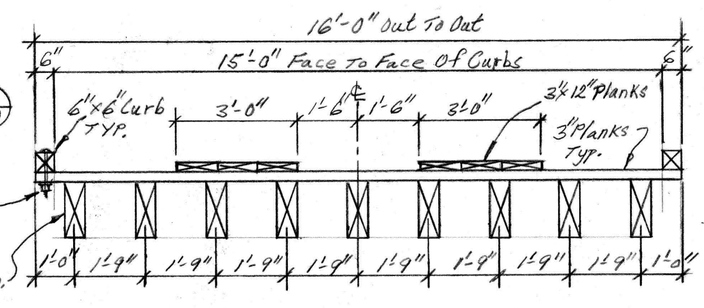


SEC A-A
1½" = 1'-0"

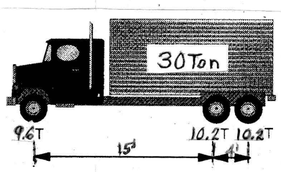
TYPICAL SECTION (1/S-1)
Scale: 3/4" = 1'-0"



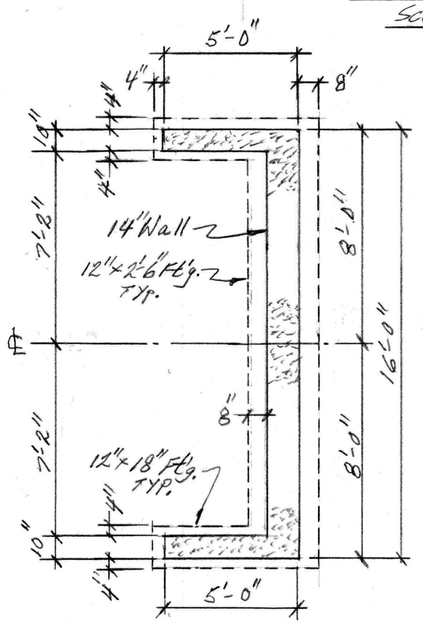
BRIDGE ELEVATION
Scale: 1/4" = 1'-0"



TYPICAL DECK CROSS SECTION
Scale: 3/16" = 1'-0"

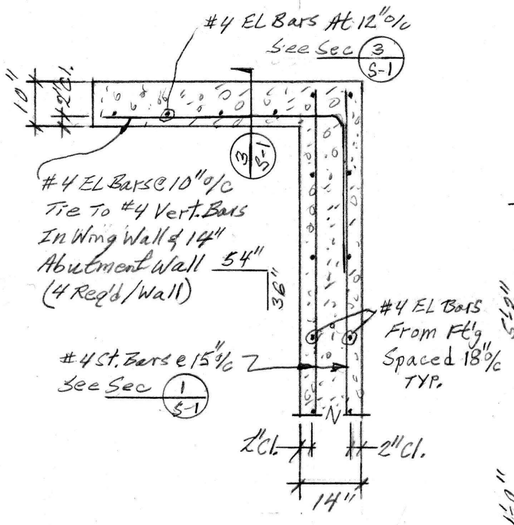


DESIGN TRUCK LOAD

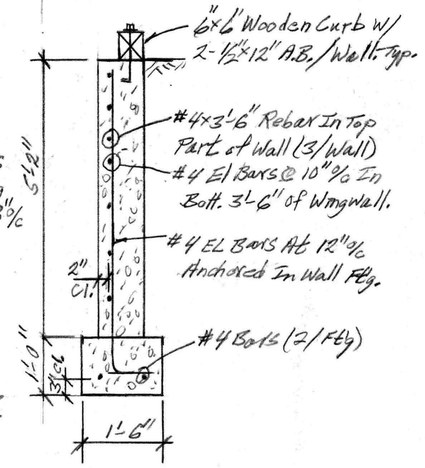


SECTION (2/S-1)
Scale: 1/4" = 1'-0"

Note: RE Abutment Same Except Opp. Hand



TYPICAL WALL REINF. DETAILS
Scale: 1/2" = 1'-0"



TYP. SECTION (3/S-1)
Scale: 1/2" = 1'-0"

Construction Notes

1. 11-6"x17" Used Creosote Treated Timbers Will Be Furnished & Delivered To The Bridge Site By Montana FWP For The Stringers & Headers.
2. The Existing CMP Culvert Shall Be Removed From The Site & Kept Or Properly Disposed Of By The Contractor.
3. The Existing Gravel Surfacing In The Zone of The New Bridge Shall Be Saved & Reused On The Approaches After The Backfill Is In Place. If Additional Gravel Is Needed, It May Be Obtained From The Gravel Pit Located Approx. 0.3 Miles Beyond The Bridge Site.
4. Elev. Datum: A Stake & Hub Is Located Approx. 16' East of The Fence Line & 32' S. of The Upstream CMP End. Top of Hub Assumed EL. 3000.00

Materials Specifications

1. 6"x6" Curbing: No. 2 or Better Rough Cut Douglas Fir.
2. 3" Plank Decking: No. 2 or Better Full Dimension Rough Cut Doug. Fir In 10" Min. Width. Approx 1400 B.F. Req'd.
3. Structural Concrete: 3/4" or 1½" Aggregate Mix Design
   Min. Lab Strength: 7 Days - 2000 psi 4% To 7% Entr. Air
   28 Days - 3000 psi
   Max Water/Cement Ratio - 0.53 (6 Gallons/Sack Cement)
   Estimated Conc Req'd: Footings - 4.0 CYD Walls - 7.5 CYD
4. Reinforcing Steel: Meet ASTM Specs. For Grade 60 Bars
5. Misc. Steel & Bolts: ASTM A36 or Equal.
   18 Pcs. L 4x4x1/4x10" Req'd. 72 - 1/2"ø x 4" Lag Bolts Req'd.
   8 - 1/2"x12" A.B.'s w/ Wash. & Nut 12 - 1/2"ø x 10" Carriage Bolts. 50 #50d (5½") Spikes
6. All Work To Conform To Montana Public Works Standard Specs.

REVISIONS	BY

NEW BRIDGE FOR O'NEILL CREEK CROSSING - SPOTTED DOG W.M.A.
PLANS, ELEVATION & TYPICAL CROSS SECTIONS & DETAILS
PREPARED FOR MONTANA FISH WILDLIFE & PARKS
By: Martin R. Driydahl, P.E.
Helena, Montana

MONTANA MARTIN R. DRIVDAHL 2930 E REGISTERED PROFESSIONAL ENGINEER 10/18/19

Date	10/18/19
Scale	As Shown
Drawn	MRD
Job	FWP
Sheet	S-1
Of	1 Sheets

FWP Biologist Support Letter

FWP.MT.GOV THE **OUTSIDE** IS IN US ALL.

3201 Spurgin Road
Missoula, MT 59804
Phone: (406) 529-8058
E-mail: caleb.uerling@mt.gov

October 18, 2019

Montana Fish, Wildlife & Parks
Future Fisheries Program, Attn: Michelle McGree
PO Box 200701
Helena, MT 59620

RE: Support for O'Neill Creek Culvert Replacement

This letter is being written in support of the O'Neill Creek culvert replacement project proposed by the Montana Natural Resource Damage Program and Montana Fish, Wildlife and Parks. The current culvert is at times completely blocked, undersized, and hindering fish movement. O'Neill Creek supports a genetically pure population of westslope cutthroat trout and little to no non-native trout. The compromised culvert is approximately 1.4 miles upstream of the confluence of O'Neill Creek and the Clark Fork River. Currently fluvial cutthroat trout from the Clark Fork River use O'Neill Creek to spawn, but they are only able to access the 1.4 miles of habitat below the culvert. Replacing this culvert with a bridge would allow fluvial westslope cutthroat trout to access an additional 1.5 miles of spawning and rearing habitat in O'Neill Creek above the culvert.

The upper Clark Fork River currently supports very few fluvial, native trout. This is in part due to poor water quality related to past mining activities in the upper reaches of the drainage. However, DEQ is currently in the process of remediating damages relating to this mining, and water quality is expected to improve in the coming years. As the upper Clark Fork River becomes more suitable for native trout connectivity in tributaries such as O'Neill Creek will be important for recruitment of native trout to the river. This bridge will provide a long-term solution to the current fish passage issues at this culvert on O'Neill Creek.

Please consider this application and feel free to contact me if you have any questions or want more information about O'Neill Creek or the benefits of this project to the fishery.

Sincerely,

Caleb Uerling

Caleb Uerling
Montana Fish, Wildlife & Parks
Fisheries Biologist – Upper Clark Fork

Section 3.2.2.17 from the Upper Clark Fork River Basis Aquatic and Terrestrial Restoration Plan dated February 27, 2019 referring to O'Neill Creek Restoration

3.2.2.17 O'Neill Creek Watershed

O'Neil Creek is Priority 2 tributary to the Clark Fork River that drains for approximately 5 miles before entering the Clark Fork upstream of the Little Blackfoot River. Connectivity between the O'Neil Creek and the Clark Fork River is seasonal in most years, with the lower reaches appearing to support flow only during spring runoff. O'Neil Creek supports a genetically pure Westslope cutthroat trout population and this population likely provides a source of recruitment to the Clark Fork River when flows allow. In 2018 the proposed restoration actions were prioritized based on available data and information gathered and analyzed by FWP. The order of priority for encouraged restoration actions reflects current understanding of drainage scale fish population limiting factors and the cost-benefit of proposed actions. The following are encouraged restoration activities for O'Neill Creek that, when implemented, will improve the fishery of the tributary as well as the fishery in the mainstem of the Clark Fork River.

O'Neill Creek

1. Fish Passage: Fish passage improvement.

2. Fish Entrainment: Ditch screening to reduce fish entrainment into irrigation ditches.

3. Water Quantity: Flow augmentation (e.g., water right purchases, water leases, irrigation efficiency improvements); throughout drainage, with greater preference given to projects where flows are protectable to or beyond the mouth.

4. Riparian Habitat: Riparian habitat protection/enhancement (e.g., conservation easements, riparian fencing); on private grazing lands.

Proposed Actions

Actions specific to the O'Neill Creek watershed are set forth below, summarized in Table 3-16, and shown in Figure 3-16.

1. Fish Passage Improvement: Active diversion dams and other fish barriers on O'Neill Creek are known to impair fish passage in the O'Neill Creek watershed. Further analyses will first be performed on all structures prior to implementation of design and implementation of fish passage actions.

2. Fish Entrainment: All diversions in the O'Neill Creek drainage have a potential for fish entrainment. Entrainment evaluation for all diversions will be performed and fish screens designed and implemented if warranted.

3. Flow Quantity: Flow needs for O'Neill Creek watershed will be addressed through the Flow Augmentation process set forth in Section 3.2.1.

4. Riparian Habitat Protection/Enhancement: Further data collection and other information gathering will first be performed to determine the specific types and location of the following actions: fencing, off-stream stockwater development, and other grazing management improvements.

The actions within the O'Neill Creek watershed will have high net benefits with respect to accomplishing aquatic restoration goals and objectives, provide a cost-effective implementation approach, and are technically feasible to implement.

These actions were based on activities identified in the 2018 update to the *Aquatic Prioritization Plan*, taking into consideration the restoration concept proposal offered the public scoping process. The concept proposal submitted by the public for the O'Neill Creek watershed is set forth in abstract #86. The proposed action for this watershed generally cover the concepts in the abstract. These concepts adequately focus on factors within the O'Neill Creek watershed which limit restoration in the Clark Fork River mainstem, without the need for reliance on additional State generated alternatives.

Costs

The costs to implement the O'Neill Creek actions are estimated by combining the costs for the concept proposals plus additional funds due to the conceptual nature of project proposals and additional unknown costs associated with project implementation (e.g. engineering, permitting, fluctuating construction material costs, etc.). As costs for individual projects within the watershed are conceptual, funding individual projects within the watershed will be based on identified priorities, cost-effectiveness and cost benefit, rather than concept proposal estimates.

A total cost of $200,000 is preliminarily estimated to implement the proposed actions in the Gold Creek Watershed.

Implementation Schedule

2019:

- Evaluate fish passage and entrainment issues in Lower Gold Creek.
- Evaluate riparian habitat.

2020:

- Design fish passage and entrainment reduction projects.

2021:

- Implement fish passage and entrainment reduction projects
- Evaluate watershed budget and develop riparian projects based on available funds.

Table 3-16. Relationship of restoration plan components to limiting factors and encouraged activities for the O'Neill Creek Watershed

Limiting Factor	Encouraged Activities To Address Limiting Factors	Objectives	Project Components To Address Limiting Factor	Data Gaps And Feasibility Issues	Estimated Cost
Water Quantity	Flow augmentation.	Increase instream flows by TBD cfs.	Augmentation of flows as set forth in Section 3.2.1.	Further analysis of flows as set forth in Section 3.2.1.	N/A
Fish Passage	Fish passage improvement at select irrigation diversions and structures (e.g., diversion redesign or retrofit to allow for fish passage).	Provide fish passage in the O'Neill Creek watershed.	Implement fish passage structures at select diversions or culverts. Other fish passage projects TBD.	Evaluate diversions and road crossings for fish passage. Completion of designs.	$50,000
Fish Entrainment	Ditch fish screening projects at diversions in the O'Neill Creek watershed.	Implement TBD fish screen projects in the O'Neill Creek watershed.	Implement fish screening projects at diversions where warranted.	Evaluate need for fish screens at all other diversions. Completion of designs.	$90,000
Riparian Habitat	Riparian habitat protection/enhancement (e.g., conservation easements, riparian fencing); on private grazing lands along O'Neill Creek.	Identify riparian protection and/or enhancement projects.	Habitat management (fencing, grazing management, off-stream water development), active revegetation where needed if natural recovery is not possible.	Evaluate for specific types and locations of riparian protection/enhancement. Completion of designs.	$50,000
Data gaps and feasibility questions	Develop overall project work plan.	Complete integrated project work plans for each restoration component.	Fill data gaps and answer feasibility questions.	Described above for each restoration component.	$10,000
				Total	**$200,000**

TBD: To Be Determined as part of the project work plan development.

Figure 3-16. O'Neil Creek

O'Neill Creek culvert replacement 009-2020

Project Components to Address Limiting Factors on O'Neil Creek (except flow)

- Evaluate fish passage and entrainment issues
- Design and install fish passage and fish screens
- Protect and enhance riparian areas

Little Blackfoot River

Clark Fork River

O'Neil Creek

12

90

Miles

0 1 2

Project Location

Kalispell

Havre

Great Falls

Missoula

Helena

Miles City

UCF River Basin

Bozeman

Billings

Detail Area

NRD Restoration Priority Areas

Priority 1 Stream Area

Priority 2 Stream Area

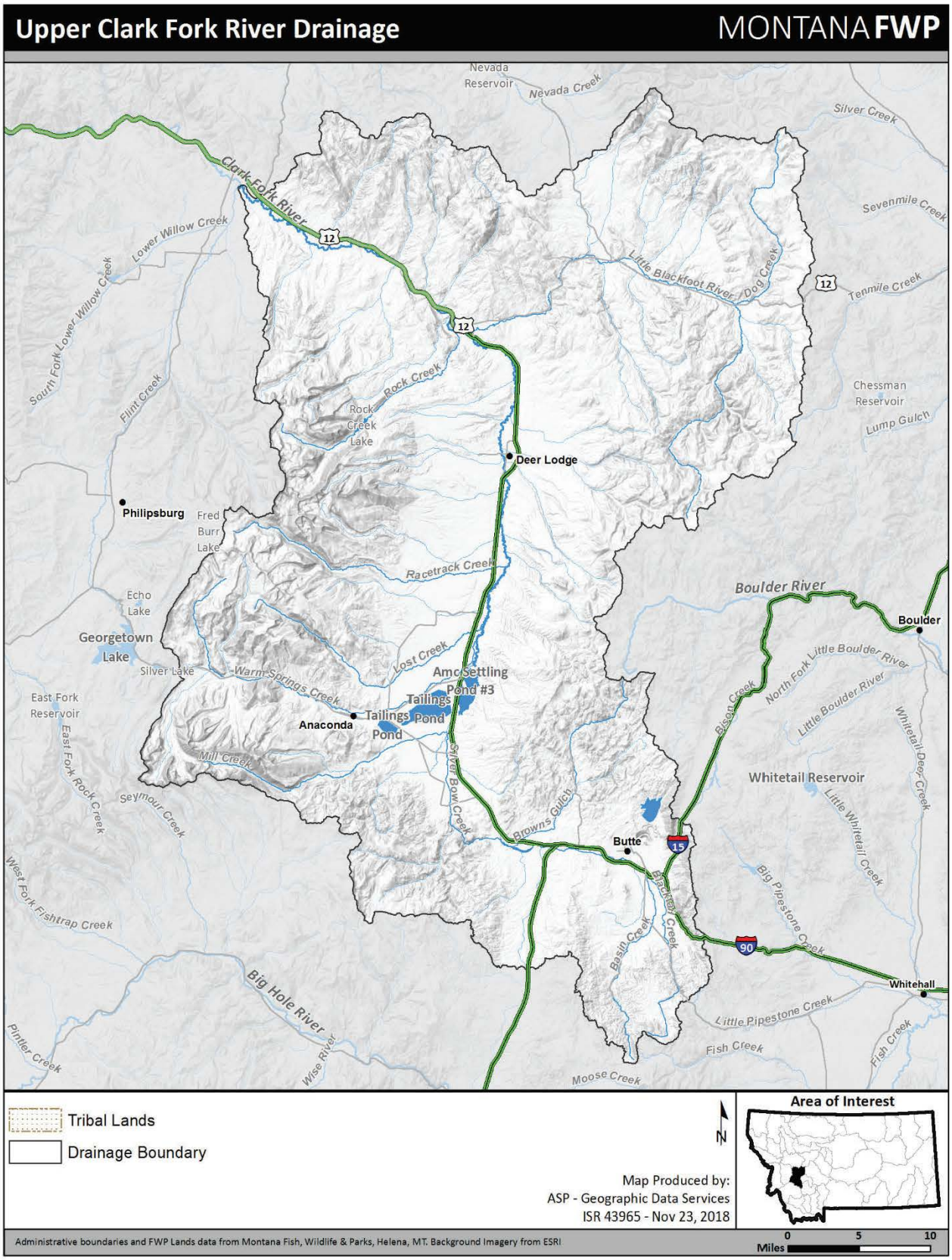
Priority 1 Terrestrial Area

Priority 2 Terrestrial Area

Conservation Easement

Subwatershed Boundary

Upper Clark Fork River Drainage Section from the State Fisheries Management Plan


Upper Clark Fork River Drainage
MONTANA FWP
Nevada Reservoir
Nevada Creek
Silver Creek
Clark Fork River
Sevenmile Creek
Lower Willow Creek
South Fork Lower Willow Creek
Little Blackfoot River
Dog Creek
Tenmile Creek
Rock Creek
Rock Creek Lake
Flint Creek
Chessman Reservoir
Lump Gulch
Deer Lodge
Philipsburg
Fred Burr Lake
Racetrack Creek
Boulder River
Boulder
Echo Lake
Georgetown Lake
Silver Lake
Warm Springs Creek
Lost Creek
Amc Settling Pond #3
Tailings Pond
Anaconda
Tailings Pond
East Fork Reservoir
East Fork Rock Creek
Mill Creek
Seymour Creek
Silver Bow Creek
Browns Gulch
North Fork Little Boulder River
Little Boulder River
Bison Creek
Whitetail Deer Creek
Whitetail Reservoir
Little Whitetail Creek
Butte
Big Pipestone Creek
West Fork Fishtrap Creek
Basin Creek
Big Hole River
Whitehall
Little Pipestone Creek
Pintler Creek
Wise River
Fish Creek
Moose Creek
Tribal Lands
Drainage Boundary
Map Produced by:
ASP - Geographic Data Services
ISR 43965 - Nov 23, 2018
Area of Interest
Administrative boundaries and FWP Lands data from Montana Fish, Wildlife & Parks, Helena, MT. Background Imagery from ESRI
0 5 10
Miles

UPPER CLARK FORK RIVER DRAINAGE

PHYSICAL DESCRIPTION

The Upper Clark Fork River drainage lies near the heart of western Montana and extends from its headwaters near Butte downstream to the mouth of Flint Creek. The drainage includes the uppermost segment of the Clark Fork River and its tributaries, including Silver Bow Creek, Warm Springs Creek, and the Little Blackfoot River. The Clark Fork River begins at the junction of Silver Bow and Warm Springs Creeks, near the small community of Warm Springs. From its headwaters, the river flows northwesterly for approximately 70 miles through Deer Lodge, Powell, and Granite Counties. The Upper Clark Fork is bordered throughout much of its length by the Garnet Mountains to the north and east and the Flint Range to the south and west. The first 40 miles of the river meander through the flat plains of the Deer Lodge Valley where agriculture is the primary land use. Downstream from the mouth of the Little Blackfoot River, the Upper Clark Fork enters a narrow canyon. In this area the river channel has also been shortened by highway and railroad construction activities. However, downstream of Jens the river moves away from the transportation corridor and begins to meander downstream to its confluence with Flint Creek.

There are 76 lakes and reservoirs in the drainage, totaling 4,468 surface acres. Most natural lakes are mountain lakes in the Anaconda-Pintler and Flint Mountain Ranges. These lakes range in size from less than an acre to over 75 acres. A number of these lakes have been fitted with dams to increase storage capacity for downstream agricultural and industrial water users. The largest reservoirs in the drainage are the Warm Spring Settling Ponds, which are located near the beginning of the Clark Fork River, and Silver Lake, which is located at the head of the Warm Springs Creek drainage not far from the community of Anaconda.

FISHERIES MANAGEMENT

Located in the west-central part of the state, the Upper Clark Fork has a long history of mining related impacts that have negatively affected the fishery and aquatic resources along much of the river. This has led to the stream being one of the more underutilized rivers in western Montana. However, ongoing environmental cleanup by the State and the U.S. Environmental Protection Agency, as well as a diversity of recreational opportunities, has contributed to an increase in the Upper Clark Fork's popularity in recent years.

The Upper Clark Fork River is managed as a wild trout fishery, emphasizing natural reproduction. The basin is also the focus of native fish recovery efforts, particularly in the Little Blackfoot, Warm Springs and Silver Bow drainages. The Upper Clark Fork is home to eleven native fish species including bull trout, westslope cutthroat trout, mountain whitefish, longnose and largescale sucker, northern pike minnow, peamouth, longnose dace, redside shiner, Columbia slimy sculpin, and Rocky Mountain sculpin. Nonnative fish species with widespread distribution in the Upper Clark Fork include brown trout, rainbow trout, and brook trout. Nonnative lake trout and kokanee salmon can also be found in Silver Lake and Georgetown lakes, respectively. Dominant fish species vary from westslope cutthroat and brook trout in the

headwaters, to brown trout in the Clark Fork River and the lower reaches of valley-bottom tributary streams.

Bull trout are very rare in the mainstem of the Upper Clark Fork River above Flint Creek. The species is primarily isolated in the Warm Springs Creek drainage near Anaconda. Bull trout historically occurred in other drainages such as the Little Blackfoot and Racetrack Creek, but fish are rare to absent in these areas at present. Most of the populations in the Warm Springs Creek drainage appear to be genetically isolated from these other drainages, with little intermixing occurring. Fluvial (river dwelling) forms are rare. Adfluvial (lake dwelling) forms exist in Silver and Twin Lakes. Resident forms exist in most of the larger tributaries upstream of Anaconda including Barker, Foster, Twin Lakes, and Storm Lake Creeks.

Westslope cutthroat trout are present in many of the tributary streams in the Upper Clark Fork. Angling restrictions and habitat improvements in the Little Blackfoot and Silver Bow drainages have sought to improve westslope cutthroat numbers in these areas in particular. Many of the cutthroat populations in the Upper Clark Fork show little to no hybridization with introduced rainbow trout. Additionally, fluvial forms still remain in a number of locations. While westslope cutthroat trout are relatively uncommon in the mainstem of the Upper Clark Fork River, the species does provide a unique fishing opportunity in a river largely dominated by brown trout. Information is lacking on the abundance and life histories of mountain whitefish and non-game native fishes. Efforts are needed to describe these and monitor trends.

Angling in the Upper Clark Fork River occurs year-round and is most popular in the early spring, summer and fall. Opportunities exist for both wade and float angling and while fly-fishing is particularly popular, use of artificial lures and bait fishing are also common.

Lowland ponds and reservoirs provide valuable recreational fisheries. The Warm Springs and Job Corp Ponds are stocked primarily with rainbow trout, but westslope cutthroat trout and brown trout are also planted into some waters. Warm Springs Pond #3 is a popular location where anglers go to pursue trophy-sized trout. Racetrack Pond, Skyline Pond, and the Kids Pond at the Warm Springs Wildlife Management Area are stocked with rainbow and/or westslope cutthroat trout and have special fishing regulations that seek to provide quality angling opportunities for youth anglers.

Several high mountain lakes are stocked with westslope cutthroat trout. Lakes currently planted on a regular basis include Alpine, Alibicaulis, Little Racetrack, and Upper and Lower Barker Lakes. Other lakes are planted on a more irregular basis depending on need, while other lakes are kept fishless to help conserve amphibian populations.

HABITAT

The Upper Clark Fork Basin has a long history of human disturbance beginning in earnest in the mid-1800s when placer mining for gold began on many basin streams. By 1896, copper had become the target metal and mining and smelting operations near the town of Butte, located near the headwaters of the Clark Fork, were processing thousands of tons of copper ore per day. Mining and smelting activities in the Butte and Anaconda areas continued into the early 1980s, and while some mining activity persists near Butte to this day, most of the operations have now been completely shut down and abandoned. Nevertheless, the environmental consequences of

over 100 years of large scale mining activity in the Upper Clark Fork Basin have left their mark. Enormous amounts of fine material, mostly mine tailings, were released into the drainage, and were transported and deposited downstream. These tailings, containing heavy metals, proved toxic to aquatic life and negatively altered the aquatic biological community of the upper river.

For years, the Upper Clark Fork River was considered void of fish. It wasn't until efforts were made to retain and prevent the downstream movement of some portion of the toxic tailings in the Warm Springs Treatment Pond System that water quality improved to a level where trout could begin to re-colonize the lower sections of the river, upstream of Missoula. However, by that time, most of the trout in the river were nonnative species, including rainbow and brown trout. Brown trout have been shown to have a higher tolerance to metals and degraded habitat conditions than other trout species, and it is likely because of this that the species dominates the current trout community in much of the Upper Clark Fork River. While trout are common in the upper river today, past research has shown that trout populations are only one fifth of what would be expected without contamination from mining wastes.

The Clark Fork River from its headwaters to the former Milltown Dam site was designated a Superfund Priority Site in 1986. While cleanup activities have been underway for a number of years on Silver Bow Creek near Butte as well as at Milltown Dam near Missoula, active remediation is only just beginning on the mainstem Clark Fork River. Cleanup of metals-contaminated soils along the Upper Clark Fork River is expected to improve water quality and allow for more tolerable conditions for fish and other aquatic life.

Other factors that affect habitat quality in the Upper Clark Fork include mid-summer dewatering. Irrigation withdrawal can have severe impacts on summer stream flows in the river upstream of Deer Lodge, especially during drought years. Low flows increase water temperatures to levels not suitable for trout, and extensive algae and aquatic plant growth impact dissolved oxygen levels along much of the river.

Fishing Access

In the Upper Clark Fork above Flint Creek, there are relatively few FWP-owned or managed fishing access sites. Designated fishing access sites are located at Kohrs Bend upstream of Garrison, as well as on the lower Little Blackfoot River. There are additional public properties that serve as river and stream access, but these lands are not specifically managed for fishing access. Examples are MDT and county bridge crossings, DNRC and USFS ownership.

Regulations prohibit float fishing in the segment of the Clark Fork River from its beginning to the Perkins Lane Bridge, a distance of approximately three miles.

Special Management Issues

In recent years, recreational use of the Upper Clark Fork River has increased steadily. This is likely due to significant press related to ongoing and future efforts to restore the river's health from the devastating effects of mining contaminants on the river for more than a century. While much of the work still needs to be accomplished, the desire for a clean river to recreate on is apparent. Planning efforts by the Department of Justice (Natural Resource Damage Program), FWP, and others are underway to hopefully address the need for additional fishing access sites in the Upper Clark Fork.

FISHERIES MANAGEMENT DIRECTION FOR UPPER CLARK FORK RIVER DRAINAGE

Water	Miles/acres	Species	Recruitment Source	Management Type	Management Direction
Silver Bow Creek and Tributaries	25 miles mainstem plus tributaries	Westslope cutthroat trout (N)	Wild	Conservation	Eliminate harvest and enhance fluvial populations for conservation and catch-and-release angling. Promote connectivity among tributary populations.
		Brook trout, Rainbow trout, Brown trout	Wild	General	Manage for the recovery of westslope cutthroat trout by continuing to allow liberal harvest of nonnative trout. Consider other options to reduce nonnative trout numbers if options are practical and would increase native trout density.
Habitat needs and activities: Clean up of mining contamination throughout reach. Increase instream flow and enhance habitat to support ecosystem function and production of native trout. Improve water quality of Butte Metro Sewage Treatment Plant discharge. Maintain a barrier on the mainstem (just below German Gulch) to prevent colonization of brown trout and rainbow trout and allow for a westslope cutthroat trout fishery to develop.					
Warm Springs Creek and Tributaries	30 miles mainstem plus tributaries	Bull trout (N)	Wild	Conservation	Continue yearlong closure on angling for bull trout. Enhance migratory and resident populations for conservation.
		Westslope cutthroat trout (N)	Wild	Conservation	Preserve existing genetics in currently isolated resident populations. Improve migratory populations for angling and conservation.
		Brown trout, Brook trout, Rainbow trout	Wild	General	Manage for harvest opportunity and reduce numbers to lessen competition, hybridization with, and predation on native trout. Above Meyers Dam, consider other options to reduce numbers if options would increase native trout density and cutthroat angling opportunity.
Habitat needs and activities: Clean up of mining contamination downstream of Anaconda. Secure instream flow and enhance habitat to support ecosystem function and production of trout and whitefish. Manage connectivity to favor native trout, particularly bull trout.					

Water	Miles/acres	Species	Recruitment Source	Management Type	Management Direction
Silver Lake	300 acres	Bull trout (N)	Wild	Conservation	Continue yearlong closure on angling for bull trout. Enhance adfluvial population for conservation.
		Westslope cutthroat trout (N)	Wild	Conservation	Enhance population for conservation and to provide angling opportunity.
		Rainbow trout, Brook trout, Lake trout	Wild	General	Allow liberal harvest to reduce competition and hybridization with, and predation on native trout. Consider other options to reduce numbers if options would increase native trout density and cutthroat angling opportunity.
Habitat needs and activities: Better public access needed. Manage connectivity with Storm Lake Creek to favor adfluvial bull trout moving upstream to spawn. Pursue leasing or purchasing stored water to supplement Warm Springs Creek and the Clark Fork River.					
Clark Fork River Headwaters Downstream to Confluence with Flint Creek.	70 miles	Bull trout (N), Westslope cutthroat trout (N)	Wild	Conservation	Continue yearlong closure on angling for bull trout. Enhance migratory populations for conservation. Enhance catch-and-release westslope cutthroat trout fishery.
		Brown trout, Rainbow trout, Brook trout	Wild	Quality/ Restrictive Regulations	Manage harvest to support quality angling opportunity. Ensure adequate connectivity with important spawning tributaries to provide for natural recruitment.
Habitat needs and activities: Clean up mining contamination throughout reach. Enhance instream flow. Enhance connectivity with tributaries where appropriate. Protect and improve habitat quality in spawning and rearing areas to enhance natural recruitment of wild and native trout and whitefish.					

Water	Miles/acres	Species	Recruitment Source	Management Type	Management Direction
Warm Springs and Job Corps Ponds	897 acres	Rainbow trout, Brown trout, Westslope cutthroat trout (species not present in all ponds)	Hatchery	Quality	Restrict trout harvest and manage stocking densities to promote quality catch-and-release angling opportunity for large trout.
Habitat needs and activities: Improve water quality of ponds. Slow eutrophication process by improving water quality of Butte Metro Sewage Treatment Plant discharge. Understand the effects of stored contaminants on the biota in and downstream of the Warm Springs Ponds.					
Racetrack Pond, Kids Pond at Warm Springs Wildlife Management Area, Gravel Pit Pond adjacent to Highway 48, Skyline Pond	45 acres	Rainbow trout, Westslope cutthroat trout	Hatchery	Family Fishing Water	Encourage youth angling through special regulations (Racetrack Pond and Warm Springs WMA Kids Pond), or special fishing day events (Gravel Pit Pond). Manage stocking densities and trout harvest to promote quality angling opportunity for stocked trout.
Little Blackfoot River and Tributaries Continue next page	50 miles mainstem plus tributaries	Westslope cutthroat trout (N)	Wild	Conservation	Eliminate harvest and conserve and enhance migratory and resident populations for conservation and catch-and-release angling. Consider isolation of local populations only if hybridization or competition is a threat and habitat and fish numbers are sufficient to allow persistence.

Water	Miles/acres	Species	Recruitment Source	Management Type	Management Direction
		Brown trout, Brook trout, Rainbow trout	Wild	General	Manage for harvest opportunity and reduce numbers to lessen competition and hybridization with, and predation on native trout, particularly above Elliston where westslope cutthroat trout are abundant. Consider other options to reduce numbers if they would increase native trout density and angling opportunity.
Habitat needs and activities: Protect and improve habitat to support ecosystem function and natural production of native trout and whitefish. Manage connectivity to favor native trout.					
Tributaries to Upper Clark Fork River Above Confluence with Flint Creek, Other Than Those Specifically Listed	---	Westslope cutthroat trout (N)	Wild	Conservation	Enhance populations for conservation and recruitment to the Clark Fork River sport fishery. Maintain currently isolated (or consider isolating) populations only if hybridization or competition is a threat and habitat is sufficient to allow persistence. Preserve connectivity with streams currently connected to allow for maintenance of migratory life histories. Monitor these populations closely for hybridization and/or competition threats.
		Brown trout, Rainbow trout, Brook trout	Wild	General	In streams with westslope cutthroat trout, continue to allow liberal harvest to reduce competition, hybridization and predation. Consider other options to reduce numbers if options and would increase native trout numbers and angling opportunity. Where native species concerns are not present, enhance migratory populations to improve recruitment to recreational fishery in the Clark Fork River.
Habitat needs and activities: Protect and improve habitat to support ecosystem function and natural production of trout. Manage connectivity to favor native trout.					

Excerpt from Spotted Dog Wildlife Management Habitat Plan (2017)

continued . . .

Executive Summary

Part of a Larger Whole (pages 33-34)

Cooperation is essential to achieve compatible management of fish and wildlife habitat across the larger landscape, of which the WMA is but a part. It will be a priority to budget for the time commitment required to work thoughtfully and effectively with our neighbors. For that purpose, FWP employs a decentralized operational structure. Locally-based professionals are vested with the delegated authority to speak and act on behalf of FWP, and are charged with becoming part of their local communities.

Native Species Diversity (pages 35-36)

Direction: Enhance the food web, focusing on the base of the energy pyramid: soil health, litter, native forbs, pollinators and the like.

Base Budget Items and Work Priorities:

- Prevent new weed establishments with early detection and eradication.
- Where herbicide is needed to control weeds, spot-spray whenever possible rather than broadcast spray, and use the most selective herbicide for the job.
- Watch cheatgrass distribution and avoid creating niches for cheatgrass expansion.
- Maintain boundary fences to minimize livestock trespass.
- Consider prescribed cattle grazing to enhance structural diversity in grasslands.
- When grazing, limit grazing impacts during the nesting season and/or rotate treatments.
- Allow litter to develop and decay in grassland communities where litter should accumulate.
- Prevent off road vehicular travel.
- Recruit and retain large snags in forests.

Priorities for Special Projects when Feasible:

- Consider forest restoration treatments to foster the recruitment of naturally occurring stand characteristics in historically harvested stands.
- Develop forest management treatments to manage the risk of stand replacement events.
- Remove conifer encroachment in grasslands, aspen, and wetlands as appropriate.

Species of Concern (pages 37-38)

Direction: Reverse population declines for Species of Concern.

Base Budget Items and Work Priorities:

- Maintain native species diversity in healthy habitats, and work to restore species diversity in degraded habitats. Native species diversity includes managing native plant communities to support species-rich native animal communities including songbirds, raptors, reptiles, amphibians, small mammals, and insects.
- Riparian, wetland, and aspen communities support the highest wildlife species diversity, so those communities need to be managed with special care to ensure their protection and enhancement on the WMA.
- Maintain and/or restore populations of Species of Concern that are naturally found in WMA habitats.
- Explore ways for the public to view and learn about wildlife, while minimizing impacts to wildlife and plants.

Elk Winter Habitat (pages 39-40)

Direction: Prioritize Elk Winter Habitat in MUs 1 & 2.

Base Budget Items and Work Priorities:

- Maintain fences to minimize livestock trespass and reserve forage for wintering elk.
- Identify and eradicate first occurrences of new weed species or weeds in new places.
- Watch cheatgrass distribution and avoid creating niches for cheatgrass expansion.
- Coordinate closely with communications towers maintenance and powerline right-of-way maintenance.
- Retain forest stringers and thickets.
- Close WMA to the public from December 2-May 15.
- Control hunting access if hunting is needed during winter to achieve elk harvest goals, while minimizing disturbance to elk on their winter range.

Priorities for Special Projects when Feasible:

- Forest management will employ a light touch as needed in MU-1 and MU-2, if at all, to extend the function of small-acreage stands into the future and to manage risk.

Aspen, Wetlands & Riparian (pages 41-42)

Direction: Recover or restore aspen, wetland and riparian systems

Base Budget Items and Work Priorities:

- Protect aspen, wetland and riparian areas from noxious weeds as a focus of overall weed management efforts.
- Protect these areas from unauthorized livestock.
- Avoid and correct road, culvert and sediment impacts.
- Prevent damage from off road vehicles.
- Manage conifer encroachment in aspen.
- Protect beaver on Spotted Dog WMA.
- Recruit and protect snags, especially deciduous spp.

Priorities for Special Projects when Feasible:

- Plant native riparian vegetation (i.e., willows).
- Prescribe more extensive forest management and conifer treatment to rejuvenate aspen.
- Consider redistributing beaver at such time as the forage base would support beaver.
- In the absence of beaver, consider mimicking beaver activity with instream structures.

Fisheries (pages 43-44)

Direction: Enhance habitat for native westslope cutthroat trout.

Base Budget Items and Work Priorities:

- Protect streamsides from noxious weeds to minimize sediment delivery to streams.
- Protect streams from livestock impacts.
- Avoid and correct road, culvert and sediment impacts.
- Prevent damage from off road vehicles.

Priorities for Special Projects when Feasible:

- Utilize active stream restoration to address habitat degradation and channelization.
- Plant woody riparian vegetation where absent due to past land use practices.
- Remove or resize stream crossings (e.g., culverts).

Native Bunchgrass (pages 45-46)

Direction: Maintain climax rough fescue stands where they currently exist, and manage for soil stability and a healthy mix of native increasers and decreasers in bunchgrass vegetation types overall.

Base Budget Items and Work Priorities:

- Maintain fences to minimize livestock trespass.
- Identify and eradicate first occurrences of new weed species or weeds in new places.
- Watch cheatgrass distribution and avoid creating niches for cheatgrass expansion.
- Consider prescribed cattle grazing to add vegetation community structure in grasslands other than designated rough fescue reference sites., and as a tool for achieving grazing improvements on privately owned bunchgrass communities as well.
- Confine motorized traffic to open roads.

Priorities for Special Projects when Feasible:

- Restore native communities on sites dominated by cheatgrass on a prioritized basis, pending the development of sound methodologies for cheatgrass control.
- Develop interpretive signage to increase the public's appreciation for native grasslands and their management.
- Remove conifer encroachment.

Antelope Bitterbrush (pages 47-48)

Direction: Reserve antelope bitterbrush stands for their unique wildlife habitat qualities.

Base Budget Items and Work Priorities:

- Maintain fences to minimize livestock trespass.
- Identify and eradicate new weeds or weeds in new places.
- Watch cheatgrass distribution and avoid creating niches for cheatgrass expansion.
- Use biological controls or spot spray with the most selective herbicides to avoid damage to bitterbrush while addressing noxious weeds in MU-1 and MU-2.
- Keep elk numbers in balance.
- In MU-1 and MU-2 discourage public camping and prohibit fires.
- Limit motorized access to few well worn roads.

Priorities for Special Projects when Feasible:

- Monitor bitterbrush condition and trend over time.
- Monitor wildlife use in bitterbrush.
- Develop interpretive signage to help the public appreciate bitterbrush and its value.
- There may be a need at some point to intensively treat cheatgrass in bitterbrush stands, pending development of effective cheatgrass control methods.