Aquatic and Terrestrial Restoration

Concept Proposal Abstracts

Submitted by the Public

June 15, 2012

COMPILED BY:

STATE OF MONTANA
NATURAL RESOURCE DAMAGE PROGRAM
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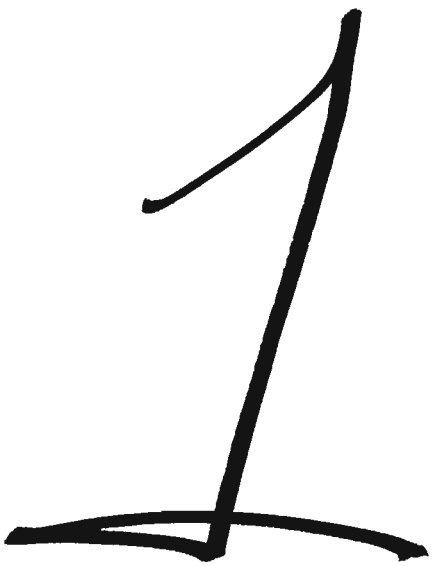


RECEIVED
JUN 15 2012
NATURAL RESOURCE
DAMAGE PROGRAM

BUTTE-SILVER BOW
PUBLIC WORKS DEPARTMENT
UTILITIES DIVISION
126 West Granite Street Butte, MT 59701
(406) 497-6518

June 12th, 2012

State of Montana
Natural Resource Damage Program
1301 E. Lockey Avenue
P.O. Box 201425
Helena, MT 59620-1425

RE: City-County of Butte-Silver Bow Grant Application to the Aquatic Restoration Program

Dear Ms. Fox and Members of the NRDP,

Thank you for your assistance and comment in regards to our grant application to the Aquatics Restoration Program for the proposed improvements to the Silver Lake Water System (SLWS). The intent of this letter is to re-iterate and clarify Butte-Silver Bow's (BSB) proposal and intentions with respect to the in-stream flow augmentation of Warm Springs Creek and the Clark Fork River.

BSB owns and manages the Silver Lake Watershed and holds both in-stream diversion and water storage rights within this watershed. As part of our proposal, BSB suggests that the State of Montana and BSB enter into a water services agreement whereby BSB would continue to own, operate and maintain the SLWS, however, the State of Montana would become a "customer" and be allocated storage within the system that can be released at State's request for in-stream flow augmentation throughout the Warm Springs Creek and Upper Clark Fork system. We have suggested that there are 9,900 acre-feet of water storage available within the system that can be allocated in its entirety or some portion thereof to the State of Montana. We look forward to discussions with the State of Montana to determine your needs for in-stream flow augmentation. This discussion and subsequent negotiations will result in a joint and cooperative water services agreement which we would envision containing, at a minimum, the following salient points:

1. State of Montana's desired storage allocation in acre-feet to be stored in Storm Lake, Silver Lake or Twin Lake for purposes of controlled release to Warm Springs Creek;

2. BSB's obligations for ownership, maintenance and operations;

3. State of Montana's obligations for maintenance and operations;

4. Terms and Termination Rights and Obligations of Both Parties

As you are aware, BSB's proposal to the Aquatics Restoration Program is staged into two phases. The initial capital improvements phase consists of repairing and replacing certain infrastructure components within the SLWS to enhance the fisheries, enable safe and efficient management of the

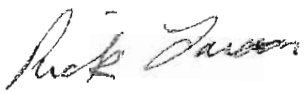
watershed and the water within the system and to minimize operational expenses. This list of capital improvements has been developed over the past three years in concert with the United States Fish and Wildlife Service, the United States Forest Service and Montana Fish, Wildlife and Parks and BSB officials resulting in the Capital Improvements Plan for the entire SLWS. BSB's proposal only reflects those capital improvements that specifically relate to fisheries enhancements and watershed management from Meyer's Dam upstream into the Basin. No requests are made to the NRDP, nor are anticipated, for any capital infrastructure investment or responsibilities for the infrastructure downstream of Meyers' Dam. This is because the State of Montana realizes its allocation of water at Meyers Dam, hence it would have no responsibility for the pipelines, pump stations and other related infrastructure associated with management and delivery of water to other customers of the SLWS. We would envision the water services agreement to memorialize this understanding between the State of Montana and BSB.

The second phase of BSB's Aquatic Restoration Proposal for the SLWS consists of providing an ongoing operations and maintenance budget for the SLWS, again, only as it relates to fisheries management, operations and maintenance and for pumping costs associated with the management of the Silver Lake Watershed including Meyers Dam upstream. Again, we envision the water services agreement to clearly delineate the use of these operation and maintenance funds.

We truly believe that we can achieve a mutually beneficial water services agreement between the State of Montana and BSB that provides the State with the assurance of in-stream flow, limits the long term liability concerns that the State may have and addresses the security of the State's investment into the SLWS. We are excited about the possibilities that have been availed to all of us through this proposal and we look forward to future discussions and developing the water services agreement to both of our satisfactions.

Thank you again for your consideration of our grant request and we respectfully urge your approval of our funding requests for the elements as outlined in our grant request.

Respectfully,



Rick Larson
Operations Manager
Water Utilities Division
City and County of Butte Silver Bow Public Works

Step 1. Applicant Information and Project Summary Form

1. **Name of Applicant(s)** Butte Silver Bow City and County Government

2. **Project Title** Aquatic Improvements to the Silver Lake Watershed

3. **Type of Entity** City - County

4. **Description of Project Location**

The Silver Lake Water System (SLWS) is comprised of a complex network of man-made reservoirs, natural lakes, creeks and tributaries, diversion structures, pipelines, and pump stations that are used to manage the surface water resources of the Warm Springs Creek watershed in Deer Lodge County, Montana. The system is owned and operated by the City and County of Butte-Silver Bow (BSB) and is managed for the purposes of providing water to a variety of industrial customers located within Deer Lodge and Silver Bow Counties, as well as providing in-stream fisheries flows. Initially conceived in the late 1800's, the Silver Lake Water System's original purpose was to provide water for mining, smelting and other industrial purposes.

5. **Injured Natural Resource(s) and/or Impaired Services to be Restored, Rehabilitated, Replaced or Equivalent Acquired through Project.**

The primary objectives of this project are to complete reconstruction and rehabilitation measures to critical components of the Silver Lake Watershed located west of Anaconda, Montana. These improvements could be completed within the next 1 to 3 years enabling the City and County of Butte Silver to enter into a long term water services agreement with the State of Montana for the release of stored water into the upper Clark Fork Basin beginning in 2014. The goal of the in stream flow augmentation using Silver Lake water would be to improve the overall water quality and fisheries in Warm Springs Creek, and ultimately the Clark Fork of the Columbia River.

The City and County of Butte Silver Bow (BSB) envisions a water service agreement with the State of Montana that would be developed as part of a cooperative exercise over the next year where, subject to the terms of existing water service agreements, the State of Montana would determine the timing and volume of releases of stored water to augment in-stream flows. BSB would retain ownership and operational responsibility for the SLWS. The vehicle to accomplish this transaction is envisioned to be a water services agreement with the State of Montana being the "Customer" and BSB retaining responsibility as the "Service Provider".

In completing the improvements to the Silver Lake Water System (SLWS), several significant benefits will be recognized by the citizens of the State of Montana.

1) The primary benefit will be the regulated and controlled release of fresh water from Storm Lake, Silver Lake and Twin Lakes into the Warm Springs Drainage and the Clark Fork River. This significant in-stream flow augmentation will dramatically enhance aquatic habitat using the reservoirs in order to support diversity and sustainable life in the Clark Fork Basin, most notably Bull Trout.

2) The second benefit will be the establishment, improvement and creation of features and operational protocols that will enhance the habitat and promote sustainability of native Bull Trout and West Slope Cutthroat trout populations throughout the Silver Lake Watershed as well as the Warm Springs and Upper Clark Fork Basin. This benefit will also include the ability to monitor and restrict the passage of non-native species such as rainbow, brown and brook trout in to the prime spawning and rearing habitat afforded by this watershed.

3) The third benefit will be the potential of improved and enhanced public recreational opportunities within the Silver Lake Watershed.

6. **Authorized Representative:**

Authorized Representative:	Paul Babb (Name)	Chief Executive (Title)
Mailing Address:	Courthouse, 155 W. Granite Street (Street/PO Box)	
	Butte, MT 59701 (City/State/Zip)	406) 497-6220 (Telephone)
Contact Person:	Rick Larson (Name)	Operations Manager-Utilities Division (Title)
Mailing Address:	126 W. Granite Street (Street/PO Box)	
	Butte, MT 59701 (City/State/Zip)	(406) 497-6518 (Telephone)
E-mail Address:	ricklarson@bsb.mt.gov	

7. **Proposed Funding Sources**

On the table below, enter the source and amount of all funding that may be used for this project. Indicate all potential sources of funds that you intend to apply for this project, even if you have not yet applied for the funds or have not yet received a commitment from the source. Indicate whether matching funds are cash or in-kind.

2012 Proposed Funding Source Form				
UCFRB Restoration Fund			Amount in ($) Dollars	Funding Percentage
Requested Amount Twenty Million Dollars			$20,000,000.00	100%
Matching Funds				
	Matching Fund Source	Cash Matching Funds	In-kind Matching Funds	Amount in ($) Dollars	Funding Percentage
A					
B					
C					
D					
E					
F					
Total Cash Match $0.00				Total Cash 0%	
Total In-kind Match $0.00				Total In-kind 0%	

8. **Private (non-Governmental) Grant Applicant Financial Information**

NOT APPLICABLE

9. **Certification for Individuals or Public Entities**

NOT APPLICABLE

10. Authorizing Statements

An authorized agent/agents representing the applicant must by his/her signature indicate that the application for funds and expenditure of matching funds, as represented, is officially authorized.

Authorization

I hereby declare that the information included in and all attachments to this application are true, complete, and accurate to the best of my knowledge, and that the proposed project complies with all applicable state, local, and federal laws and regulations.

I further declare that, for Butte Silver Bow City and County Government (Project Sponsor), I am legally authorized to enter into a binding contract with the State of Montana to obtain funding if this application is approved. I understand that the Governor must authorize funding for this project.

Butte Silver Bow City and County Government
Project Sponsor

4/27/12
Date

Authorized Representative (signature)

Chief Executive
Title

Fed Tax Id. No. 81 - 0368698

STEP 2 – PROPOSAL ABSTRACT

Applicant Name: Butte Silver Bow City and County Government

Project Title: Aquatic Improvements to Silver Lake Watershed

Project Description and Benefits to Restoration:

The Silver Lake Water System (SLWS) is comprised of a complex network of man-made reservoirs, natural lakes, creeks and tributaries, diversion structures, pipelines, and pump stations that are used to manage the surface water resources of the Warm Springs Creek watershed in Deer Lodge County, Montana. The system is owned and operated by the City and County of Butte-Silver Bow (BSB) and is managed for the purposes of providing water to a variety of industrial customers located within Deer Lodge and Silver Bow Counties, as well as providing in-stream fisheries flows. Initially conceived in the late 1800's, the Silver Lake Water System's original purpose was to provide water for mining, smelting and other industrial purposes.

Well over one hundred years later, the SLWS remains a critical source of water for its industrial customers as well as for the aquatic health and well being of Warm Springs Creek and the Clark Fork River. The primary industrial customers on the SLWS are currently Montana Resources (MR), for use at its concentrator and its mine permitted area in Butte; Renewable Energy Corporation (REC) formerly ASiMi, for use at its silane manufacturing plant in the Butte Tax Increment Financing Industrial District (TIFID); Northwestern Energy (NWE), for use at the Mill Creek Power Plant; and ARCO Environmental Remediation Limited (AERL), which uses SLWS water to provide in-stream flows in Warm Springs Creek and the Clark Fork River.

The SLWS consists of a network of diversion, storage, and conveyance facilities reaching from the upper portions of the Warm Springs Creek drainage basin to the Town of Butte, approximately 40 miles away. Figure 1 provides a more detailed overview of the SLWS, showing the primary facilities in the system. As can be seen in Figure 1 the SLWS begins in the Twin Lakes Creek and Storm Lake Creek basins, both tributary to Warm Springs Creek. These basins provide much of the water supply for the system. Diversion facilities from these drainages transfer water to Silver Lake where it can be stored and released to meet downstream demands. Historically, water could be released through either the Silver Lake East or West Dams. Water released through the West Dam could be temporarily stored in Georgetown Lake prior to being pumped back to Silver Lake using the Georgetown Lake Pump Station and Pipeline; however, the Georgetown Lake Pump Station is currently not operational. Water released from the East Dam flows within Warm Springs Creek to Meyers Diversion.

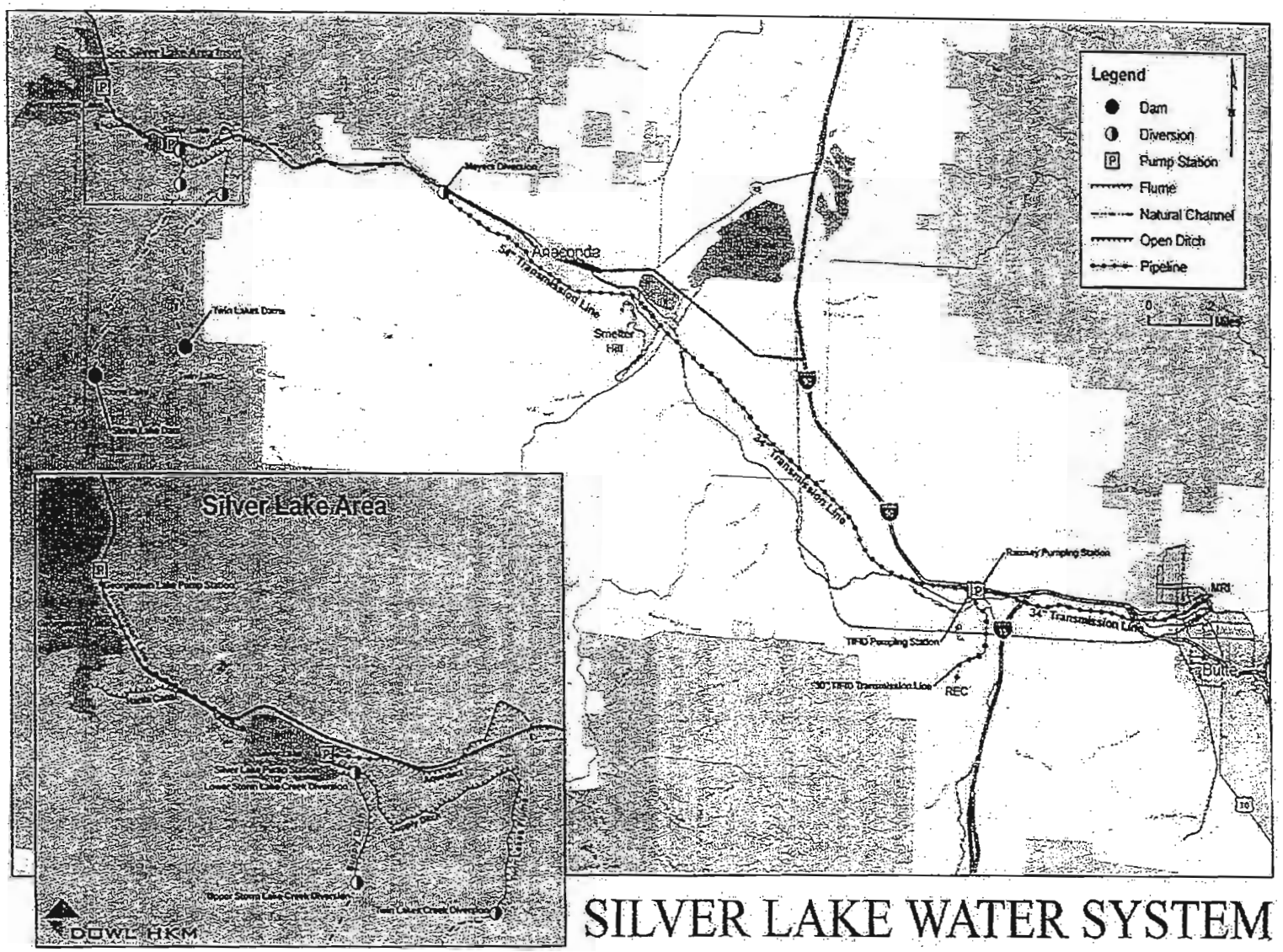
At Meyers Diversion, water is diverted into the transmission pipeline for conveyance to the industrial customers in the vicinity of Anaconda and Butte. Under current operating conditions, at low flows, water can be delivered by gravity to the industrial customers in the vicinity of Butte and the TIFID. At higher flows, the TIFID pump station is required to provide additional head to lift the flow for delivery to the TIFID. Similarly, the Ramsay Pump Station allows delivery of higher flows to MR.

The SLWS is comprised of the following facilities, ordered in the direction of flow from the upper portions of the basin to delivery. Each of these facilities is shown on Figure 1 on the following page.

1) Storm Lake Creek Dam
2) Storm Lake Creek Diversions and Supply Ditch
   a. Upper Diversion
   b. Supply Ditch
   c. Lower Diversion
3) Twin Lakes Creek Diversion
4) Twin Lakes Creek Supply Ditch
   a. Supply Pipeline
   b. Asphalt Channel
5) Silver Lake Dams
   a. East Dam
   b. West Dam
6) Silver Lake Pump Station
7) Hartla Canal
8) Georgetown Pump Station and Pipeline
9) Meyers Diversion
10) SLWS Pipeline – Meyers to Smelter Hill
11) SLWS Pipeline – Smelter Hill to Ramsay
12) TIFID / Ramsay Pump Stations
   a. TIFID Pump Station
   b. Ramsay Pump Station
13) SLWS Pipeline – Ramsay to MR
14) TIFID Pipeline

In 1997 and 1998, the users of the Silver Lake Water System, ARCO, Tax Increment and Finance District (TIFID), REC (formerly ASiMI) invested nearly $12 million in the Silver Lake System repairing the most critical elements to restore the systems functionality. Improvements were made to Storm Lake Dam, with minor improvements at Silver Lake Dam and pump station, replaced replacing approximately 20,000 feet of 60-inch wood stave pipe, constructing the TIFID pump station and installing the TIFID pipeline. In 2011, TIFID invested approximately $1.5 million to replace approximately 17,000 feet of the Twin Lakes Creek Wooden Flume.

In 2011, BSB prepared a Master Plan for the SLWS. The Master Plan included several subsections pertinent to this Grant Application including a Basin Yield Report, Water Rights Summary Report, Source and Use Report and a Capital Inventory and Replacement Plan.



SILVER LAKE WATER SYSTEM

The purpose of the Basin Yield Report was to present an evaluation of the system yield alternatives identified for the SLWS. Evaluation of yield alternatives is completed within a basin operation model. This model is a numeric model which simulates the available natural channel flows and models the SLWS diversion and storage operations over a representative period of years. The model includes the recently experienced demands of the existing industrial water users and explores the potential for use by new users.

The computer program MODSIM-DSS (MODSIM) was used to create the SLWS basin operation model. MODSIM is a generalized river basin decision support system and network flow model developed at Colorado State University. The model was computed using flow data from 1970 through 2010, with one month time steps. This 40 year period of record includes several dry and wet cycles. The model was run using several storage and delivery conditions to evaluate potential basin yield under each scenario.

The results of the basin operations modeling have shown that the current system can and is reliably providing a uniform flow of 7 MGD to the SLWS pipeline. Recent operating experience includes annual average delivery of 1.0 – 3.8 MGD to MR, 1.1 MGD to REC, and 0.45 MGD to NWE. In addition, storage water rights exist within the system of approximately 18,567 acre-feet that can be utilized to augment deliveries to the SLWS pipeline and/or augment in-stream flows in Warm Springs Creek.

Restoring the active storage in Silver Lake from 8,930 Ac-Ft to the historic value of 13,022 Ac-Ft would provide an additional 4,092 Ac-Ft of active storage. This restored storage would require a new pump station with a pump intake at a lower elevation. If this storage is restored, the potential flow in the SLWS pipeline or for in-stream flow augmentation can be increased.

Additionally, the operations model indicates that, for all storage scenarios, a greater annual volume of water can be delivered to the SLWS pipeline if an additional seasonal delivery is made during the high spring runoff months of April through July. This delivery may be valuable to users who have the capability to store water for later use, such as MR, or for seasonal BSB municipal use during periods of high turbidity from the Big Hole River.

Furthermore, there is excess water available to the system for use in most years. Although there are two periods in the modeled 40 years that are dry, 1992- 1993, and 2001 – 2006. During most other years, additional water could be delivered.

The purpose of the water right summary report was to present the water rights owned by BSB, specifically those related to the SLWS, along with other related water rights from the Warm Springs Creek drainage. All water rights presented are limited to currently active surface water.

The source used to obtain water rights records for BSB was the Montana Department of Natural Resources and Conservation Water Rights Query System, with a keyword search for rights with "Butte-Silver Bow" as the owner. Based on this search, a list of 43 unique records was identified. Thirty-three of these water rights are associated with the SLWS, while the other 10 rights are used by BSB for irrigation or municipal purposes.

The SLWS direct flow water rights for Warm Springs Creek total 57.03 cfs (36.84 MGD) and can be diverted at Meyers Dam. BSB also owns a combined total of 18,567 acre-ft in storage rights for the SLWS that can be stored in Storm Lake, Silver Lake, Upper Twin Lake, and Georgetown Lake.

The primary purpose of the Source and Use Report was to present information relevant to the sources of water for the SLWS, as well as the uses of water within the SLWS, and to identify the presently experienced demands on the SLWS pipeline for use in the basin operations model.

The SLWS supplies water to its users via the SLWS pipeline. Water is diverted into the pipeline at the Meyers Diversion, located on Warm Springs Creek, immediately west of Anaconda, Montana. The entire water supply for the SLWS is from the Warm Springs Creek drainage located in Deer Lodge County. Flow measurements on Warm Springs Creek and some of the tributary creeks have been recorded since the late 1960's, with data for select sites available as early as the 1930's.

Water diverted from Warm Springs Creek at Meyers Diversion consists of direct flow water rights supplemented, as needed, through reservoir storage releases. In general, the system is operated to maximize reservoir storage at Storm Lake in the spring, transfer Storm Lake storage to Silver Lake in the summer and fall, supplement storage in Silver Lake from diversion off of Twin Lakes Creek, and release water from Silver Lake through the East Dam Gravity Outlet and Silver Lake Pump Station to Warm Springs Creek via the Silver Lake Aqueduct.

The primary use of SLWS water is industrial, with a few additional locations where water is used for irrigation purposes, such as the Copper Mountain Youth Park and the Anaconda Cemeteries. The current industrial customers on the SLWS are MR, for use at its concentrator and mine permitted area in Butte; REC, formerly ASiMi, for use at its silane manufacturing plant in the Butte TIFID; Northwestern Energy, for use at the Mill Creek Power Plant; and AERL, formerly ARCO, which uses SLWS water to provide in-stream flows in Warm Springs Creek and the Clark Fork River.

Each of the industrial water users has a water service agreement which stipulate the flow rate and priority of water delivery. In general, MR's water service agreement entitles MR to the first priority from the SLWS of between 1.0 and 18.0 MGD to its concentrator and mine permitted area in Butte. MR's recent annual use has ranged between 1.8 to 3.8 MGD.

The REC water service agreement requires that their demand be satisfied by the second priority date direct flow or storage rights owned by BSB. Although the REC water service agreements states that REC is to be delivered a continuous supply of up to 3.68 MGD (5.7 cfs). REC's recent annual use has ranged between 1.0 to 1.1 MGD.

AERL is to be delivered all unused direct flow for the SLWS and up to 9,970 acre-feet per year of reservoir storage. Delivery of this water is at the times and in the amounts directed by AERL. BSB's responsibility for in-stream flow is limited to measured flow passing Meyers Dam and responsibility for flow protection downstream of Meyers Dam are by others.

The agreement between NWE and BSB requires delivery of a continuous supply of up to 0.432 MGD (0.67 cfs) to the NWE Mill Creek electric generating plant.

Some very significant changes have occurred in 2011 in the customer base of the SLWS that will avail the State of Montana the opportunity to become an active participant in the SLWS and the allocation of water.

Most notably, AERL provided notice of termination as a customer of the SLWS in accordance with the terms of their agreement. As such the entire allocation of 9,970 acre-feet per year of reservoir storage, known as the C-2 Pool, has reverted back to BSB control. As such BSB is actively pursuing customers and markets for this water.

The purpose of the Capital Inventory and Replacement Plan was to inventory, assess the condition of, development repair and replacement alternatives and costs for, and prioritize the rehabilitation needs of the SWLS. Partial rehabilitation of some of the SLWS facilities was completed in the late 1990's; however, additional work is needed, and much of the infrastructure is nearing or has exceeded its original design life expectancy. In an effort to better understand the condition of the SLWS infrastructure and to help ensure that the SLWS remains a reliable source of water for its customers, BSB developed a Capital Inventory and Replacement Plan for the SLWS. The key steps in the development of this plan included an inventory, condition assessment, development of repair or replacement alternatives and costs for each of the SLWS facilities, as well as prioritization of rehabilitation.

An inventory of SLWS facilities was completed through a review of previous reports, design documentation, dam safety inspection reports, construction drawings, maintenance records, and other available sources of information; as well as through site visits and discussions with BSB operation and maintenance personnel. The primary goals of the inventory were to document each of the components of the system, and to identify and obtain existing sources of information for each facility.

The condition assessment followed closely upon completion of the inventory, and in some cases, occurred concurrently. The purpose of the condition assessment was to document the general age and condition of each facility as well as to identify structural, operational, safety, and environmental deficiencies. Additionally, as part of the condition assessment, a range of potential rehabilitation alternatives was developed to address the existing deficiencies at each facility. These potential rehabilitation alternatives were further developed and a preferred rehabilitation concept selected for each facility based on evaluation of operating criteria as well as through discussions with BSB operation and maintenance staff and the various permitting agencies. Conceptual level drawings and cost estimates were then developed for each of the preferred alternatives. The intent of the conceptual level drawings is to provide a means of communicating the intended rehabilitation at each facility as well as to provide a basis for the development of conceptual cost estimates for rehabilitation.

After selection of the preferred rehabilitation alternatives for each facility and cost estimating, the prioritization of improvements was completed. The goal of the prioritization was two-fold: to develop an implementation strategy for the completion of the needed rehabilitation, and to provide the basis for the development of a system-wide rehabilitation funding schedule. The following Table 1 summarizes the recommended rehabilitation actions for each facility of the SLWS.

Table 1: Recommended Improvements to the SLWS

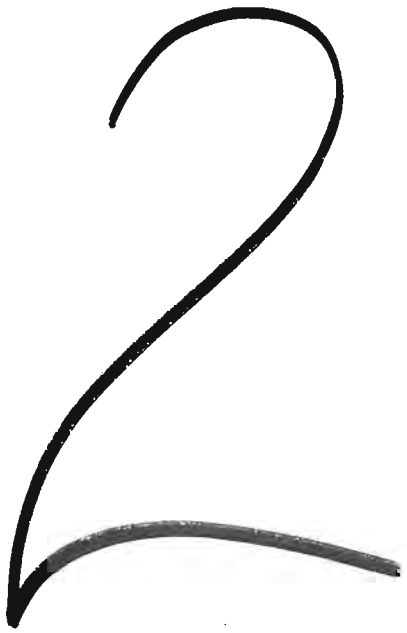
#	COMPONENT	RECOMMENDED ACTION/IMPROVEMENT
1	Storm Lake	Toe drain seepage collection and other minor rehabilitation efforts.
2	Storm Lake Creek Diversions and Supply Ditch	Replacement of the Upper and Lower Diversion structures, and improvements to the supply ditch to support the needs of Threatened fish species.
3	Twin Lakes Creek Diversion	Replacement, including installation of a fish screen and selective fish passage structure.
4	Twin Lakes Ck. Supply Ditch (Wooden Flume)	BSB replaced this section with a closed conduit in 2011.
5	Twin Lakes Ck. Supply Ditch (Asphalt Channel)	Replacement with a closed conduit
6	Silver Lake Dams (East and West Dams)	Outlet rehabilitation of the west dam and installation of seepage cutoff and collection systems for the east dam.
7	Silver Lake Dams (East Dam Gravity Outlet)	Replacement of the gravity outlet at a lower elevation to increase active storage.
8	Silver Lake Pump Station	Replacement to eliminate operational inefficiencies and safety concerns. New intake is at a lower elevation to increase active storage.
9	Hartla Canal	No rehabilitation proposed.
10	Georgetown Pump Station and Pipeline	No rehabilitation proposed.
11	Meyers Diversion	Replacement with a new diversion and intake. Elimination of the sediment pond. Installation of a fish ladder at the diversion and fish barrier and selective fish passage structure near Stumptown Road, upstream.
12	SLWS Pipeline – Meyers to Smelter Hill	Recommend more detailed inspection
13	SLWS Pipeline – Smelter to Ramsay	Recommend more detailed inspection
14	SLWS Pipeline – Ramsay to MR	Recommend more detailed inspection
15	TIFID / Ramsay Pump Stations	Replace Ramsay Pump Station through an expansion of the existing TIFID Pump Station building.
16	Summit Valley Inter-Connect	Replace within the Summit Valley Pump Station building.
17	TIFID Pipeline	No rehabilitation necessary.
18	Flow Measurement	Improvements throughout the system, including stream gaging stations, reservoir level instrumentation, pipeline and pump station flow meters, as well as satellite telemetry.

In completing the improvements to the Silver Lake Water System (SLWS), several significant benefits will be recognized by the citizens of the State of Montana.

1) The primary benefit will be the regulated and controlled release of fresh water from Storm Lake, Silver Lake and Twin Lakes into the Warm Springs Drainage and the Clark Fork River. This significant in-stream flow augmentation will dramatically enhance aquatic habitat using the existing reservoirs in order to support diversity and sustainable life in the Clark Fork Basin, most notably Bull Trout.

2) The second benefit will be the establishment, improvement and creation of features and operational protocols that will enhance the habitat and promote sustainability of native Bull Trout and West Slope Cutthroat trout populations throughout the Silver Lake Watershed as well as the Warm Springs and Upper Clark Fork Basin. This benefit will also include the ability to monitor and restrict the passage of non-native species such as rainbow, brown and brook trout in to the prime spawning and rearing habitat afforded by this watershed.

3) The third benefit will be the potential of improved and enhanced public recreational opportunities within the Silver Lake Watershed.



To Whom It May Concern:

I live in Gold Creek, Montana and the restoration project that I am proposing is on Pikes Peak Creek. Years ago miners had put a pipeline past the "Crater Area" (which now takes all of the water from the Pikes Peak Creek, except for 1 to 2 weeks a year, during high water) While that pipeline was in use the creek had a year round water flow, and a viable fish population. We now see only intermittent flow where springs feed water into the dry creek bed, and then the bed being dry again further down the creek. There is a fish population in the creek above the "Crater Area", but no fish in the creek until you reach the point where "Muddy Water Creek and other water sources put water into Pikes Peak Creek. (This is in about the last quarter of a mile before Pikes Peak Creek runs into Gold Creek.)

My proposal is to put a 24 inch pipe (or what ever size would be determined to be adequate) around the "Crater Area". I had made a similar proposal about this same matter, back in 2004, and had even received the paperwork to fill out, but as the company that I was working for shut down, I had to go to work in Alaska, and so I didn't follow up on it at that time. I am retired now and living in Gold Creek, and would look forward to working with you on this project.

Putting pipe or a culvert around the "Crater Area" could be done in several ways.

The first is to lay a 24 inch pipe or culvert around the "Crater Area" following an old miner's ditch, picking the water up above the "Crater Area" and dropping it back into the creek bed below the area that has the porous limestone sinks. This would take approximately ½ to ¾ of a mile of pipe, but the cost would not be all that high, since an old ditch is still in existence, eliminating a lot of the cost (not having to do much dirt work to lay the pipeline), and not having any environmental impact on the area, since almost no trees would have to be cut down, and very little soil would have to be disturbed. (Cost would depend on what type of pipe/culvert used - if a 24 inch culvert was used it cost approximately $90,000 for the pipe)

The second possibility is to capture the water just up stream of the "Crater Area" and lay the pipe or culvert directly down the Creek bed (which is dry except for the 1 to 2 weeks a year that we have high water when enough water gets past the 'Crater Area", to fill the Crater Pond (which has a rock reef at it's lower end), allowing the water to go down the creek. This proposal would only require about 1,050 - 1,100 feet of pipe or culvert. The rock reef at the end of the "Crater Area" is 10 to 12 feet high and so the pipe/culvert would have to come up to go over that. I'm not an engineer, but I believe that there is more than enough drop in the creek from the intake point of the pipe to the point to where it would have to go up and over the reef to make it workable. (pipe cost approximately $25,000)

A third option is to capture the water at the point where the miners did for their pipeline, revamp their ditch to the point where they started their pipeline (their pipe ran up on a trestle that took the water down through the canyon past the reef at the end of the "Crater

Area") At this point it would require us to make a 10 to 15 foot deep cut (approximately 20 to 30 foot long) in each of 2 ridges that protrude out in front of where the pipe would need to go. The material from the cuts would be used to fill washed out areas which are right next to where the cuts would be. (Pipe costs $30,000 - Dirt work ?)

No matter which proposal was used, the result would be:

1. Restoring a fish population to over 8 miles of Pikes Peak Creek.
2. Adding stream flow volume to Pikes Peak Creek, Gold Creek, and the Clark Fork River.
3. Creating habitat for other wildlife that would use the creek (such as ducks, other water birds, beaver, deer, elk, moose, etc.
4. It would provide irrigation and water source for cattle on the forest, as well as on the private property that Pikes Peak Creek flows through. After leaving the Forest Service the creek goes through Hansen/Lingenfelter pasture, Tomlinson pasture, Don Beck pasture, Francis Hogan pasture, Philip Wohlers pasture and meadows, Jan and Dave Bluford pasture and meadows and Don Beck meadows. After joining Gold Creek, it would add flow the creek going through Harry Allen pasture and meadows, and Richard Thomas pasture and meadows.

The project would start in Township 8N - Range 11W, in either Section #9 or Section #10, dropping the water back to the creek bed in Section #10.
The restoration of the stream bed would start in Township 8N - Range 11W, Section #10 and continue through a corner of Section #3, then through Section #2, and Section #1. It would continue into Township 9N - Range 10W, in Sections #31, #30, and #19, continuing into Township 9N - Range 11W, in Sections #24, #13, and #12, before merging with Gold Creek.

Of the eight miles of creek that would be restored to a viable fishing stream, approximately 2.5 miles is on Forest Service property (with access via Forest Service road #302), and after crossing private property (of Hansen/Lingenfelter, Tomlinson, and Beck, the creek goes through State Prison property (in 2 palces), and BLM property, adding approximately another mile of public access (via the "Old Stage Road") between Gold Creek and Deer Lodge.

I would be glad to show you the proposed project, and feel that it is the kind of project that would give you one of the best returns on the money that would be invested.

My phone # (406) 288-3410
Email - drm3410@blackfoot.net

Sincerely, William (Bill) Wohlers

DRUMMOND KIWANIS CLUB
TOWN OF DRUMMOND

DRUMMOND RIVERSIDE PARK PROJECT

NATURAL RESOURCE DAMAGE PROGRAM
RESTORATION CONCEPT ABSTRACT

PREPARED BY:

DRUMMOND KIWANIS CLUB
In cooperation with the
TOWN OF DRUMMOND

1. NAME AND CONTACT INFORMATION:

Chuck Johnson, Treasurer
Drummond Kiwanis Club
P.O. Box 70
Hall, MT 59837
Phone: (406) 288-5000
Email: csjohnson@blackfoot.net

2. PROJECT PURPOSE AND BENEFITS:

The goal of this project is to create a Clark Fork riverside park for public enjoyment of natural resources in the floodplain of the Clark Fork River near the Town of Drummond. The objectives of this proposal are to (1) purchase a tract of land adjacent to the Clark Fork River near Drummond, (2) construct an entrance roadway, parking area and trail system on the property, and (3) provide for river bank fishing access on the Clark Fork River. Creating a park in this location would preserve the natural floodplain of the Clark Fork River including natural wetlands and would serve as a recreational amenity for the community of Drummond and the surrounding region. The area is currently in a natural condition, hosting cottonwood trees and other riparian and wetland vegetation which serves as habitat for wildlife, including deer, beaver, muskrats, geese, blue herons, ducks and osprey. The site would provide walking paths, wildlife viewing opportunities and a walk-in Clark Fork fishing access for the Drummond Community and the public at large.

3. PROJECT LOCATION:

All of Tract T in Section 31, Township 11 North, Range 12 West, Granite County, Montana, according to the Map of Land Holdings of Colonel G.W. Morris on file with the Granite County Clerk and Recorder. Tract T is approximately 38 acres in size. Attached to this abstract are a topographic map, recorded plat map, flood map, soils map and site drawing.

4. PROJECT DESCRIPTION:

Acquisition of the property is the first component of the project. The property described is owned by Cy Curtis Corlett who resides near Drummond. Mr. Corlett is interested in selling the property and is supportive of the project. In 2007, Drummond Kiwanis Club obtained an appraisal of the property by William Bandy, a certified appraiser. Mr. Bandy appraised the subject property at $58,985.00. Neither the Town of Drummond nor Drummond Kiwanis Club have entered into negotiations with Mr. Corlett for the purchase of the tract.

The second component would be to acquire legal access to Tract T and to obtain bids for the construction of an entrance roadway, parking area and trails on the site. A single trail inside the circumference of the tract with several side trails are contemplated. The third component would be to install appropriate signage in Drummond, at the entrance to the riverside park and at the parking area.

Chuck Johnson, on behalf of the Drummond Kiwanis Club, has consulted with the Drummond Town Council, Granite County Commissioners and Granite Headwaters. All entities are supportive of the project. Chuck Johnson has also consulted with local representatives of the Montana Department of Fish, Wildlife and Parks, Brad Liermann and Ray Vinkey, concerning the proposed project. Both have given information concerning the aquatic and terrestrial values to be preserved and enhanced by the project. Ultimately, it would be desirable to have the MDFWP as an implementation and management partner, and ultimate owner, of the project.

5. PROJECT SCHEDULE:

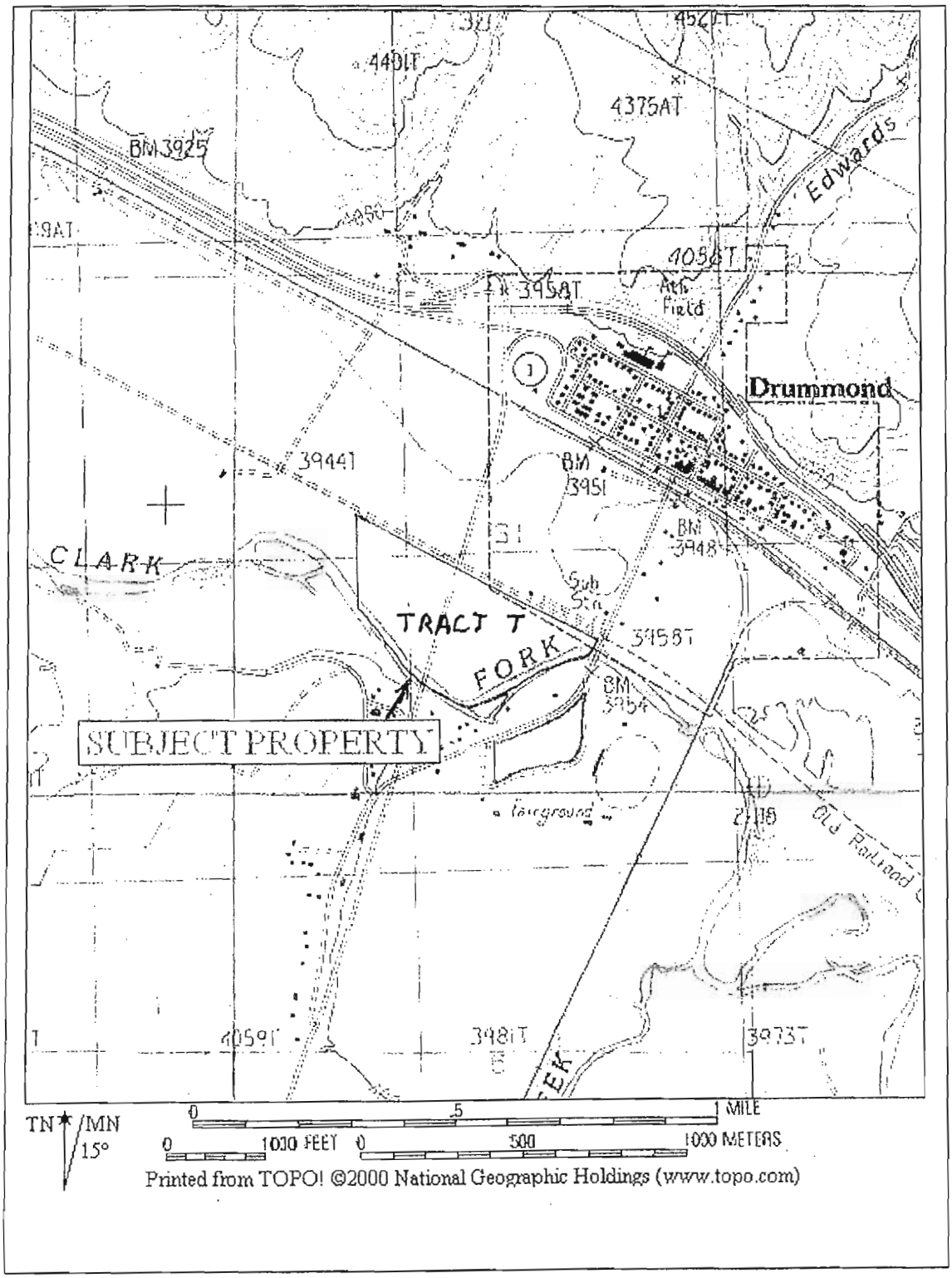
Once the subject property is acquired, proponents believe the project, including acquisition of roadway access, and construction of the entrance roadway, parking area, nature trails and signage could be accomplished within one year. At present, proponents have not arranged any matching funds.

6. ESTIMATED PROJECT COSTS:

The appraisal performed by William Bandy would place the purchase price of the property at $58,985.00. Michael Nelson Construction, L.L.C. has estimated the cost of installing 6 foot wide compacted gravel walkways at a gravel depth of 4 inches would be $2.80 per foot. Using this same estimated cost for compacted gravel, it is projected that installing an eighteen foot wide graveled roadway into the parking lot would cost $5,000, installing a 48 foot by 100 foot graveled parking lot would cost approximately $3,000, including leveling, and installing 1 mile of graveled walkways would cost approximately $14,800. It is estimated that purchase and installation of signage in Drummond, at the park entrance and at the parking lot would cost $2,500. Survey costs and legal fees should be no more than $5,000. While we believe a minimum amount of engineering services will be required to design the roadway, parking area and walkways, engineering and other miscellaneous costs should be approximately $5,000. The total projected initial cost of the Drummond Riverside Park is $94,285.

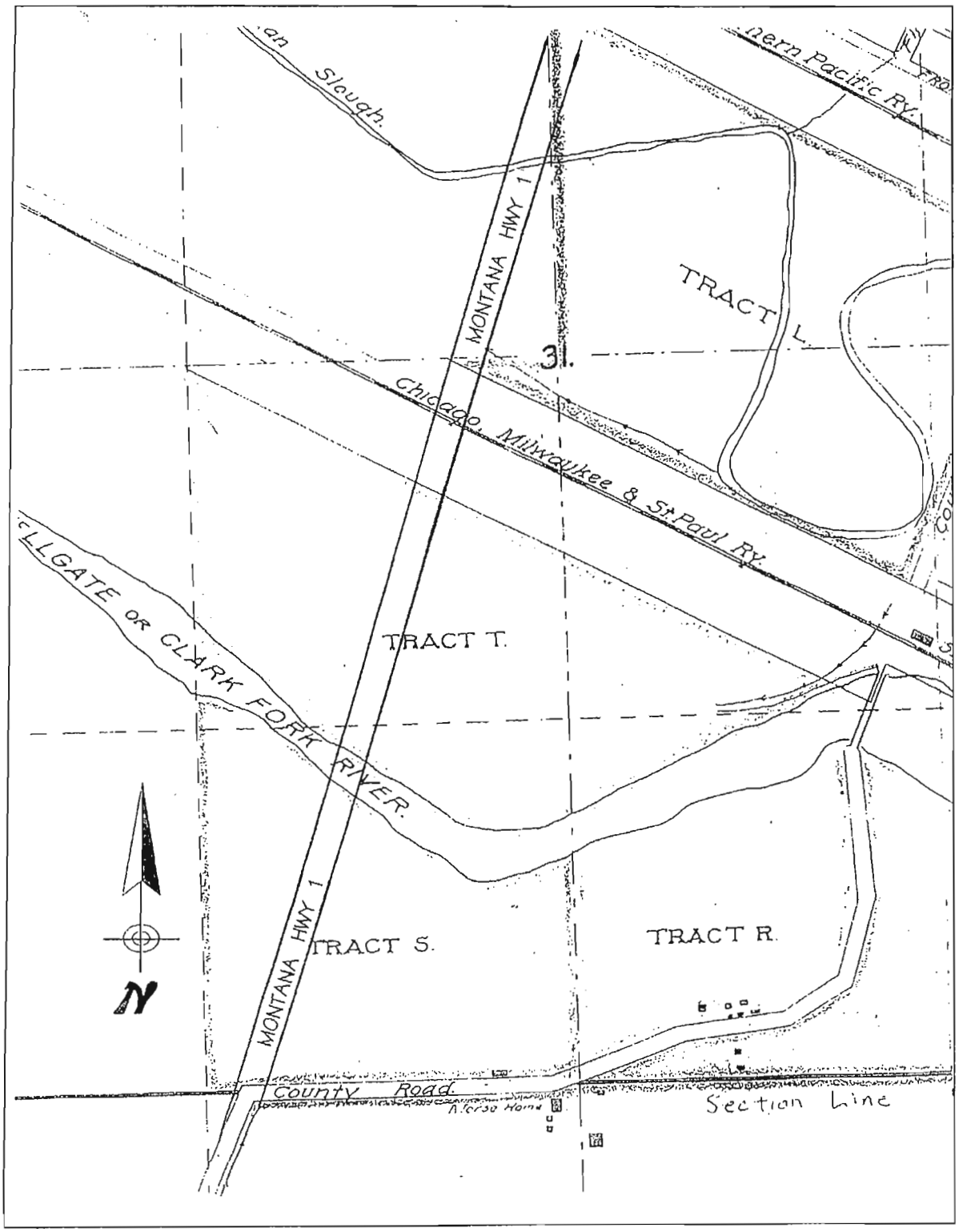
Topographic Map

Borrower/Client					
Property Address	Old Highway 10A				
City	Drummond	County Granite	State MT	Zip Code 85832	
Client	Drummond Kiwanis Club				



Recorded PLat Map

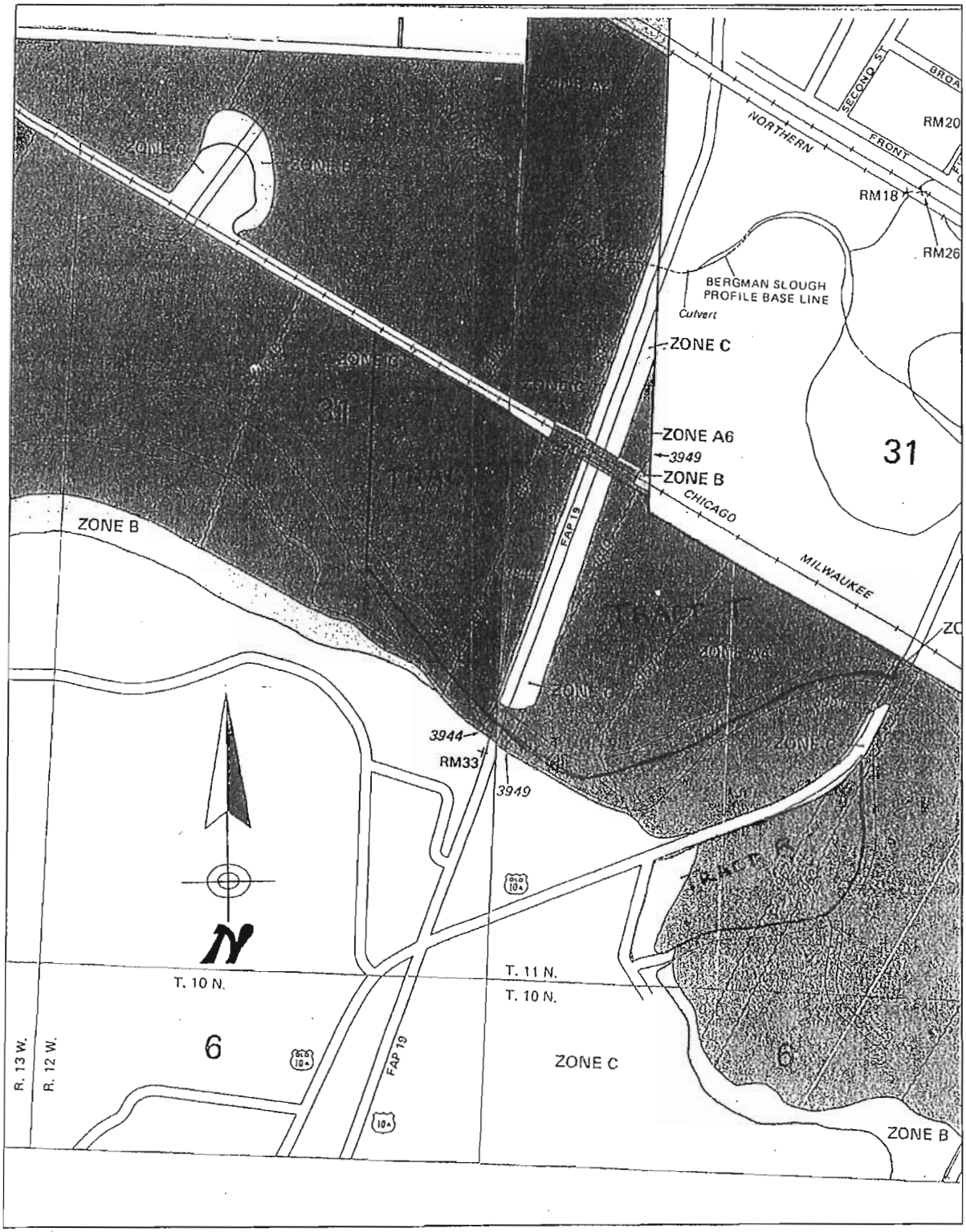
Borrower/Client					
Property Address	Old Highway 10A				
City	Drummond	County Granite	State MT	Zip Code 85832	
Client	Drummond Kiwanis Club				

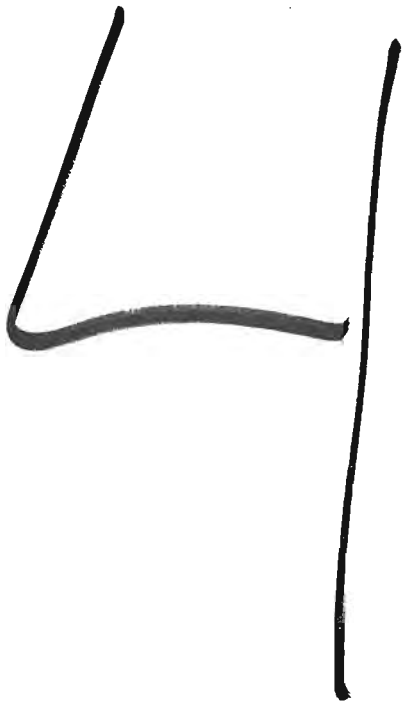


Flood Map

Borrower/Client				
Property Address	Old Highway 10A			
City	Drummond	County Granite	State MT	Zip Code 85832
Client	Drummond Kiwanis Club			

This information is taken from Community Panel Number 30014 0216 A and 30014 0217 A and have an Effective Date of July 5, 1982.





Natural Resource Damage Program
Proposes Restoration Conceptual Abstract

1. **PROJECT TITLE: Silver Bow Creek Headwaters Streamflow Augmentation Project**

2. ORGANIZATION AND CONTACT:

Trout Unlimited's Montana Water Project
Patrick Byorth, Staff Attorney
321 East Main Street, Suite 411
Bozeman, MT 59715
(406) 522-7291x100
pbyorth@tu.org

3. PROJECT PURPOSE AND BENEFITS:

The **Purpose** of this project is to improve habitat for fish and aquatic life by addressing water quality and quantity problems in the Silver Bow Creek basin upstream of German Gulch. Low stream flows exacerbate water quality problems including high water temperatures, low dissolved oxygen, and nutrient concentrations. Low stream flows also hinder fisheries restoration by reducing habitat suitability and survival rates. Flow augmentation was identified as a key aspect of aquatic restoration in the Final Upper Clark Fork River Basin Interim Restoration Process Plan. This project will: analyze existing streamflow data; identify minimum and ideal stream flows necessary to fully restore fisheries and buffer water quality issues; seek out partnerships and opportunities to dedicate existing water rights to instream flow through purchase, lease, or infrastructure upgrades; and most prominently, to maintain instream flows in the upper reaches of Silver Bow Creek.

The **benefits** of this project include improved water quality, improved fish habitat resulting in restoration of a recreational and native westslope cutthroat trout fishery, and building community partnerships between agricultural and municipal water users and the broader Butte-Silver Bow community. This project builds on extensive streamflow and water quality data collected during decades of research, remediation and restoration and provides a means to build a bridge from municipal water and wastewater needs to fisheries and aquatic restoration. In 10 years, we expect native westslope cutthroat trout, brook trout, and native sucker, minnow, and sculpin species to have fully repopulated the Silver Bow headwaters basin including German and Brown's Gulch, providing an excellent trout fishery in Butte's backyard with stable flows and good water quality.

4. PROJECT LOCATION AND MAP:

The project location encompasses the headwaters of Silver Bow Creek, from the mouth of German Gulch to the headwaters in Blacktail and Basin Creeks and Brown's Gulch. Please refer to Figure 1. The project includes priority 1 reaches of Silver Bow Creek and Brown's Gulch and Priority 2 Blacktail Creek. While Basin Creek is a priority 3 stream, the presence of Butte-Silver

Bow's Basin Creek Reservoir may provide opportunities as a water source for flow restoration and is included in this project.

5. PROJECT DESCRIPTION:

A decade of remediation and restoration in the Silver Bow Creek watershed has profoundly changed the future for aquatic life in the watershed. Since 2006, when fish were first documented to have reoccupied Silver Bow Creek, a steady improvement in fish abundance and distribution has occurred to the extent that fishing regulations were adopted for the first time in 2012. While the remediation project has already met considerable success, challenges remain to restoring a thriving fishery and diverse aquatic ecosystem to the basin. Limitations of water quality and quantity continue to suppress fish populations and delay full repopulation of Silver Bow Creek by westslope cutthroat trout and other native and wild fishes and aquatic life.

The **Goal** of this project is to create an abundant, diverse and self-sustaining fish community in 10 years that supports native westslope cutthroat trout and a popular recreational fishery for the people of Butte – Silver Bow and Montana by creatively identifying and implementing flow enhancement projects with a broad coalition of irrigators, municipal water users, and conservationists. Our **Objectives** include:

1. Define stream flow limitations in Silver Bow Creek and its major tributaries upstream of German Gulch including Brown's Gulch, Blacktail Creek, and Basin Creek by gathering existing flow and water quality data, identifying and filling informational gaps, and developing a water budget and minimum flow targets to improve water quality and fish habitat in key reaches

2. Survey existing water rights in the basin to identify key partners and opportunities for instream flow restoration.

3. Identify a prioritized set of water right transactions that achieve flow targets for key reaches.

4. Build a funding portfolio and implement water leases, water right acquisitions or water delivery system efficiency improvements with partners and DNRC.

5. Design and implement a water monitoring program to document operations and successes of water transactions.

This project will build on previous projects funded by NRDP including the Lower Browns Gulch Irrigation Water Management Study, which accomplished Objectives 1 and 2 for Brown's Gulch, by identifying potential options to maintain a minimum flow target of 2.0 cfs. The broader project will assess water availability and demand across the headwaters and identify flow targets and opportunities to acquire and protect instream flow as necessary to ensure late summer and winter base flows are adequate to restore fisheries and water quality throughout the upper Silver Bow Creek basin.

Water supply and demand is very complex in the Silver Bow headwaters, but provides opportunities for innovative solutions that are mutually beneficial to diverse collaborators.

Wastewater treatment facilities from both mining operations and municipal wastewater provide potential partnership opportunities that invest in infrastructural improvements that develop water sources for instream flow. Likewise, municipal or domestic water supplies present opportunities for partnerships that might enhance drinking water sources through infrastructure upgrades while increasing efficiency in ways that enhance instream flows. Finally, agricultural operations in the valley may partner to enhance their irrigation systems which can free up water for instream flow.

Trout Unlimited proposes to lead the project through its Montana Water Project, George Grant Chapter and the Montana Council of Trout Unlimited and its Watershed Program. Partners include Montana Fish, Wildlife, and Parks; Clark Fork Coalition; Watershed Restoration Coalition; and the Columbia Basin Water Transfer Program administered by the National Fish and Wildlife Foundation. Potential partnerships include Butte-Silver Bow and Montana Resources and individual agricultural operations.

6. PROJECT SCHEDULE:

Objective	Timeline
Water Balance and Flow Targets Study	April 2014 through June 2015
Water Rights Survey	July 2014 through December 2014
Develop Transaction Proposals	July 2015 through June 2016
Contracts and Change Authorization Process	January 2015 through January 2018

7. GENERAL COST INFORMATION:

These projections estimate project costs based on water acquisition projects across Montana. Please be aware that the estimates provided are coarse figures that fall within broad ranges of costs dependent on various scenarios. We provide these estimates in good faith, but expect that more precise estimates would be presented in more detailed project proposals.

ITEM:	UNIT	QUANTITY	UNIT COST	TOTAL COST	MATCH	NRDP:
Water Acquisition Costs	ac-ft	18000	$25	$450,000	$90,000	$360,000
Water Transaction Costs: Salary Water rights analysis, project development and 10 water right transactions and change applications	hours	1600	$50	$80,000	$20,000	$60,000
Travel: 10 on-site meetings	miles	1600	$0.555	$2664	$2664	$ 0
Communications(2 annual reports, one final report)	copies	60	$20.00	$1200	$ 1200	$ 0
Contracted services (Water Balance Study, Minimum flow studies, and GIS Services)	Projects	3	$15,000	$45,000	$22,500	$22,500
Infrastructure Improvements	Projects	3	$75,000	$225,000	$50,000	$175,000
Totals				**$803,864**	**$186,364**	**$617,500**

Potential matching funds include MT FWP Future Fisheries Program, NFWF Columbia Basin Water Transfer Program, and other state and federal sources. While we have contacted FWP and CBWTP, match remains speculative and unsecured at this time.

Water transaction costs include salaries for TU staff to coordinate the project, including procuring matching funding, conducting water rights analysis, meeting and negotiating with willing entities to contract, purchase or lease water rights, shepherding water transactions through the DNRC administrative processes, and procuring contracting hydrologists and engineers. Water Acquisition costs include the actual costs of payments to willing water right holders who agree to transfer all or a portion of their water rights to instream flow for 10 year periods- the typical instream lease allowed by law – or permanent acquisition by FWP. In Montana, acquisition costs generally range from $2 to $25 per ac-ft depending on whether the transaction is for short-term (10 year) leases or permanent purchases. We applied the maximum typical cost ($25 per ac-ft) due to uncertainties at this conceptual stage, but costs of leases or acquisitions may be lower. Based on preliminary research, a reasonable minimum target flow

for Silver Bow Creek is 10 cfs or 1800 ac-ft per year. Contracting costs include 3 projects including assembling and analyzing existing flow and water quality data, identifying gaps and collecting additional data, and conducting geographic analysis of water sources and availability.

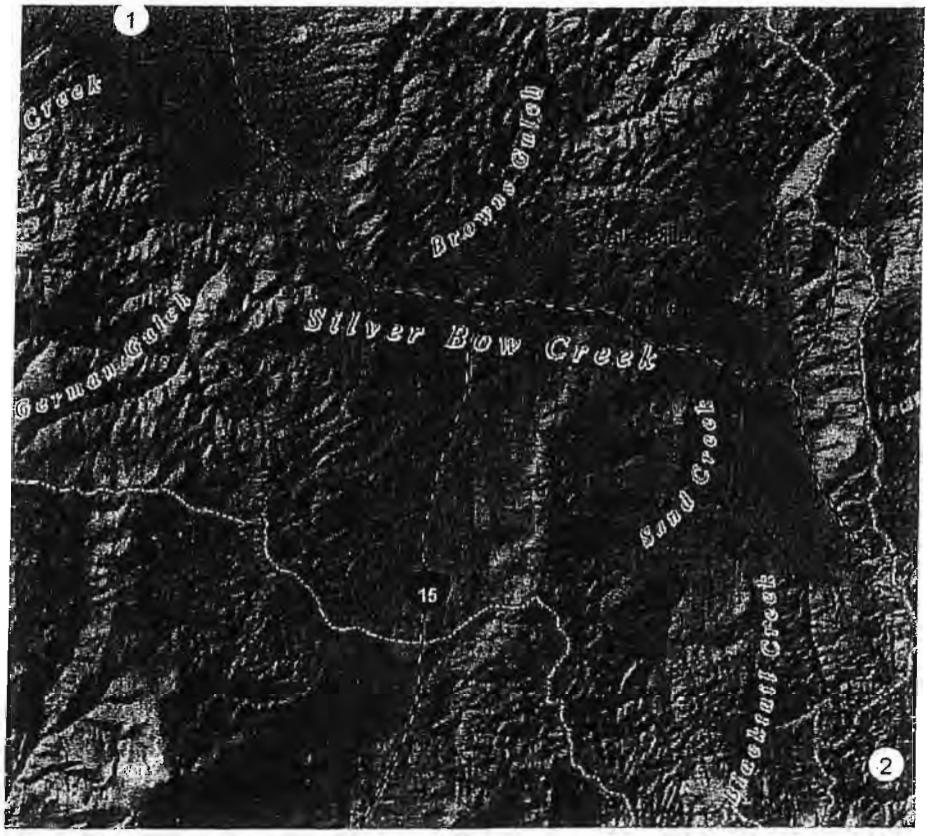


Figure 1. Map of the Silver Bow Creek project area, extending from the confluence of Silver Bow Creek and German Gulch to the headwaters, including Blacktail, Basin, and Brown's Gulch.

5

Natural Resource Damage Program Proposals

In Deer Lodge County

Warm Springs Creek in the upper Clark Fork River basin is a substantial drainage located within the area damaged by 100 years of mining and smelting activity. Warm springs creek and water within the drainage was used for industry but the drainage has remained pretty much an intact fishery with good populations of native fish including westslope cutthroat trout and bull trout along with exotic species such as brown trout and brook trout. This proposal contains 3 separate proposals within the Warm Springs Creek drainage.

The first two proposed projects are both located at the Meyer's dam site where water is diverted from Warm Springs Creek to the Butte industrial complex. The Meyer's dam is owned and operated by Butte Silver Bow and they would have to be part of any of the first two proposals. Meyer's diversion dam is a man-made barrier stopping all upstream fish migration. The third proposal is for an urban fishery and wildlife enhancement project in the Hearst Lake watershed.

Proposal 1 (Cost estimate: $500,000)

In a past a fish ladder was proposed for the Meyer's Dam site but was rejected because undesirable nonnative species would pass undetected. We are proposing that Fish, Wildlife and Parks build and seasonally staff a fish trap that would be operational during spawning runs of both westslope cutthroat trout in the spring and bull trout in the fall.

This trap would allow biologists and fishery technicians to collect scientific data from migrating fish and mark with tags and or telemetry radio transmitters. Important spawning areas can then be identified and further protected to help enhance these native species and help recover these sensitive populations in the Upper Clark Fork River. This Meyer's dam fish trap is a vital control to check on native populations that now move through the Milltown dam removal area and

have access to the upper reaches of the drainage for the first time in over a century. There is also a long term educational component that allows local schools and CFWEP to get involved with the tracking of fish and fish genetics

Proposal 2 (cost estimate $1 million)

Adjacent to the proposed Meyer's dam fish trap site we propose that FWP builds and staffs an upper Clark Fork fish hatchery that would specifically aid in the recovery of native trout species to this area. This facility would be operated as a satellite facility of the existing Washoe Park Trout Hatchery where FWP maintains the only captive westslope cutthroat broodstock. The personnel at this facility are already trained in the artificial propagation of native fish species.

This satellite facility would be supplied with spring water already collected and delivered to site in pipes. Fish raised at this facility would be isolated from other hatchery stock and pose no health threat to any existing fish hatchery.

This facility could be used to speed up and aid in the recovery of native westslope cutthroat trout located within the upper Clark Fork basin. It could also be used in rearing catchable triploid or sterile trout for urban fishery programs located within the basin or to relieve the burden placed on other trout hatcheries that currently supply fish to the basin.

Proposal 3 (cost estimate $1.5 million)

This project would enhance fishery and wildlife value of the lower reservoir located on Ice House gulch adjacent to Anaconda. This project is located on Washington Corporation land and is part of the Hearst Lake water shed which Anaconda has 80 years remaining on a lease on the water and land. We have tried to acquire this land in the past but Washington corp. has no interest in selling. They have indicated they could support projects that would enhance the areas wildlife and fishery.

This proposal would allow FWP to work with ADLC and Washington and create a Block Management area that would control access to Hearst Lake and the proposed lower reservoir fishery.

The Hearst Lake area trail is vital to accessing Hearst Lake which is one of the largest lakes in the Pintler Mountains. The area is critical winter range for elk and has excellent populations of moose, whitetail deer, mule deer, black bear and occasional grizzly bear and many other species.

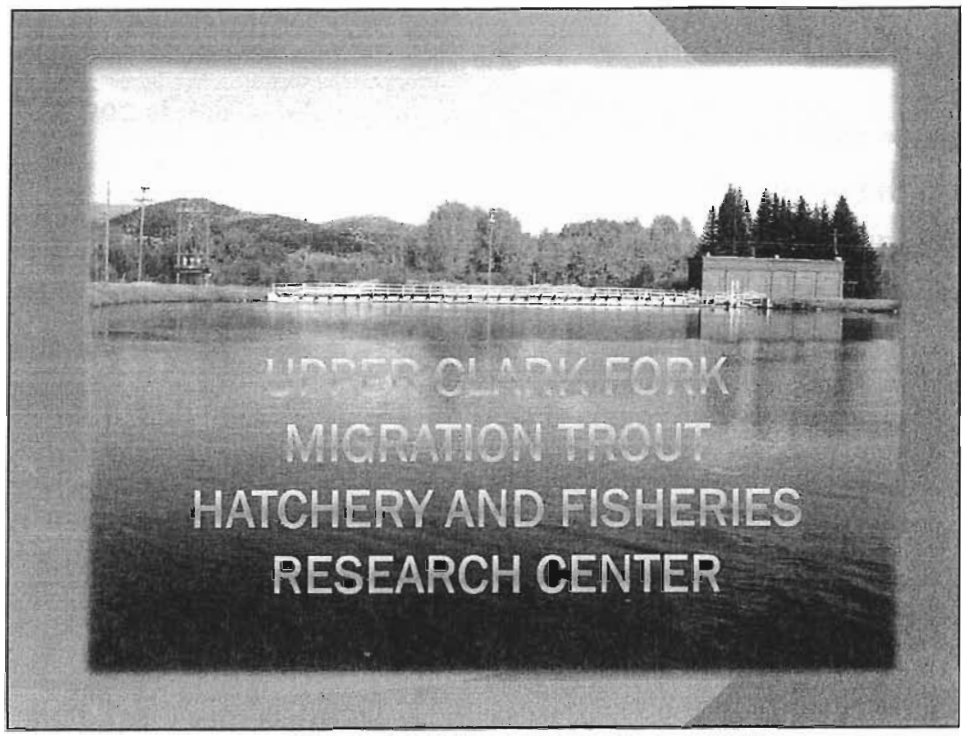
The lower reservoir, when water levels are stable, provide significant habitat for waterfowl, moose, beaver and muskrat populations creating important riparian habitat. This lower reservoir would also create the most beautiful urban fishery in the state within walking distance from a city that was significantly affected by industry.

These three projects all meet the criteria set out by the Upper Clark Fork Natural Resource Damage Program and all would aid the enhancement and recovery within the damaged area and basin.

Sincerely,

Mark Sweeney

ADLC commissioner



Location

- Three miles west of Anaconda, Montana
- Adjacent to Warm Springs Creek

Water Source

- Collected from underground springs
- Captured and delivered by 16" pipe
- 800gpm-2000gpm available
- Owned by Butte Water
- Compatibility of Hatchery and Butte Water

Pre-collected Spring Water

Proposed Fish Hatchery Location

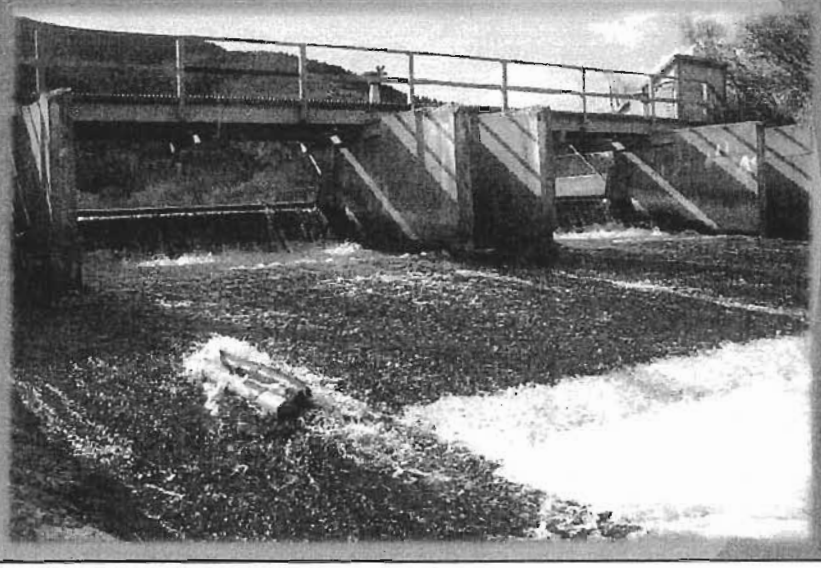
Fish Hatchery Site

- West of Reservoir & Pump House
- Hatchery Building
- Initial rearing tank
- Isolation allowing incubation of wild
- Up to 6 outside raceways
- Discharge into settling basin

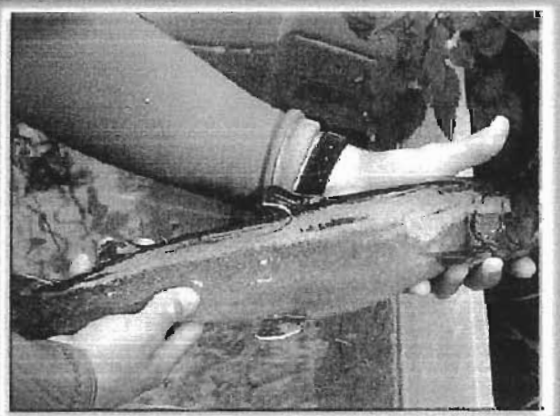
Spring Water

- 47 Degrees
- 800 - 2,000gpm
- Collected and delivered to site
- Fish production: 150,000 to 460,000 westslope cutthroat trout, depending on actual flow

Meyer's Dam Fish Migration Barrier and Trap Site



Bull Trout spawning migrations can be monitored by tagging individual fish.



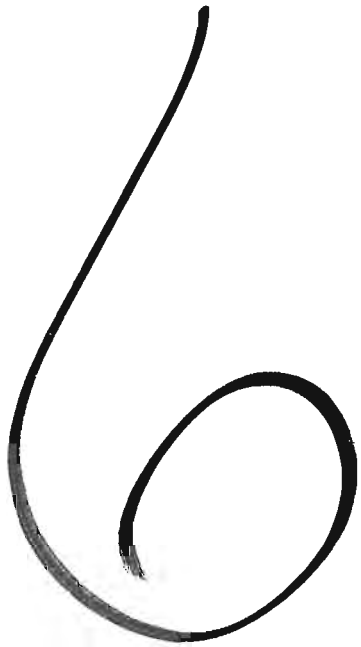
Meyer's Dam Fish Migration Barrier and Trap Site

- Monitor spawning migration
- Allows upstream Bull Trout migration
- Collects data from Brown Trout
- Pit and radio tag Bull Trout to allow monitoring of migration
- Stops upstream migration of undesirable species

Non-native brown trout can be trapped on their spawning runs, marked and released down stream.

In Conclusion

- The Upper Clark Fork Trout Mitigation Hatchery and Fish Trap will provide conservation recovery programs for native westslope cutthroat trout and the threatened native bull trout while limiting upstream migration of non-native species.



RESTORATION CONCEPT ABSTRACT SUMITTAL FORM

1. PROJECT TITLE: Emergency Drought Response Fund

2. ORGANIZATION AND CONTACT:

Contact/Entity	Address:	Phone/Email:
Andy Fischer Project Manager, Clark Fork Coalition	140 S. 4th St. W. #1 PO Box 7593 Missoula, MT 59807	(406) 542-0539 x210 andy@clarkfork.org

3. PROJECT PURPOSE AND BENEFITS:

The purpose of this restoration concept is to sustain the fishery during drought years by securing water to meet minimum biologic flow requirements. During drought years, it may be difficult to sustain healthy fisheries without emergency response funds that will encourage landowners to temporarily reduce irrigation withdrawals from key reaches of the Upper Clark Fork River and its tributaries. The proposed Emergency Drought Response Fund would be based on a "trigger point" or minimum threshold, which would be pre-determined by a committee of experts as either: 1) a percentage of normal spring snowpack conditions at a certain date; and/or 2) the river's flow rate in cubic feet per second (CFS) measured at a specific reach between July to September.

If this trigger point is reached, it would initiate a voluntary program for landowners to sign-up to receive compensation in return for not diverting all or a portion of their irrigation water. These diversion reductions payments would either be based on the value of the landowner's forgone production associated with the irrigation water, or on a set dollar amount per CFS left in-stream which would be pre-determined annually by the oversight committee (similar to an "option agreement"). The program would prevent major fish kills associated with drought conditions, and encourage adaptive management practices among agricultural producers in the Upper Clark Fork. This proposal is also cost-effective in that it only pays for instream flow when is needed most—during drought years through the driest part of the irrigation season.

The benefits to the aquatic resources of the Upper Clark Fork River Basin and to the public's use and enjoyment of those resources include:

- Flow restored for the benefit of the fishery within the Clark Fork River and its tributaries. Projects would target **Priority 1 and 2 areas for instream flow restoration** based upon the *Prioritization of Areas in the Upper Clark Fork River Basin for Fishery Enhancement* (Dec. 2011).

4. PROJECT LOCATION AND MAP:

Specific landowners have not been identified, but the proposed Fund would be targeted to large water users irrigating from streams in the priority 1 and 2 areas recommended by the NRDP for flow enhancement. All projects and participation would be voluntary in nature. Potential drought response projects could be prioritized based on factors such as: the quantity of instream flow contribution and the degree of potential flow limitation in that section of the watershed. For a location map of the priority areas, please refer to page 53 of the *Final Upper Clark Fork River Basin Interim Restoration Process Plan by the NRDP, May 2012*.

5. PROJECT DESCRIPTION:

*** Goals, Objectives:**

This restoration concept would provide a cost-effective, site-specific means of protecting aquatic resources in drought years. The **purpose** of this concept is to offer landowners proactive opportunities to maintain the fishery during drought years by encouraging adaptive irrigation management with fiscal incentives. The **goal** of this concept is to prevent dewatering of key sections of the Clark Fork watershed, and avoid a collapse of the fishery. The **objective** is to work together with landowners and resource managers during difficult water years to balance the needs of agriculture and the health of the river.

***Components/Activities by Goal:**

The following activities (or some variation) would likely need to occur in order to achieve the goal of temporary instream flow restoration:

- *Project Development, Due Diligence and Studies*

  The most critical component of launching this program is to consult with a variety of resource professionals and conduct extensive research in order to determine the trigger for implementing diversion reduction contracts through the Emergency Drought Response Fund. Setting this minimum threshold or trigger will require meetings with professionals, and research into forecasting models and historic snowpack and flow levels. Next, it will be important to create a list of potentially interested landowners, as well as the outreach and "how to" materials that will expedite the process of enhancing instream flow during drought years. In addition, the program will need to establish a framework and flow chart for how and where to implement the Fund, including which priority areas will benefit from a short-term contract that isn't legally protected as an instream flow right.

  An assessment of drought response opportunities will require landowner meetings, water right due diligence and on-the-ground research. Once a project appears viable based on an initial assessment, quantifying potential costs/benefits of a project may require further studies, such as water savings analysis and groundwater studies. It is anticipated, however, that after the first few years of research, many of the same diversion reduction projects will reoccur during drought years, since the program will have determined priority water rights, priority reaches to re-water, and the preferred contract mechanisms for individual landowners.

- *Design*

  Landowner commitments that detail the anticipated terms of agreement (such as a letter of intent) would need to be secured each spring before the start of the irrigation season to allow for adequate drought response planning. Evidence of irrigation from a prior year may be necessary to demonstrate a water right holder is ready, willing and able to irrigate.

- *Financing and Cost Share*

  Cost share from the NRDP would likely be based around two alternatives: 1) the value of lost production associated with reduction an irrigation diversion, or 2) a set amount of compensation pre-determined each spring for individual contracts with each landowner, similar to an option agreement: "If the flow at XX drops to XX between July 1 and Sept 30, 2012, then the landowner agrees to reduce irrigation withdrawl by XX cfs in return for $XX."

- *Implementation*

  Agreements and contracts with individual landowners would need to be in place prior to drought years to ensure enhanced instream flow. Due to the short-term nature of these projects, it would not be feasible to legally protect this instream flow through a DNRC change process. As a result, the program would need to be strategic about where water could be left instream without other appropriators immediately capturing any extra available flow. An

advisory committee comprised of conservation groups and natural resource managers would oversee decisions on priority reaches to re-water, as well as specific contracts.

- *Post-Project Monitoring*

  Monitoring of instream flows would need to occur in order to understand the relative benefit of these investments and to ensure landowners are adhering to the terms of their agreement.

***Progress to date:**

No emergency drought response funds have been developed or implemented to-date in the Upper Clark Fork River. The Blackfoot Challenge has successfully implemented a voluntary drought management plan in the Blackfoot River, which is implemented when the river's reaches specific flow triggers.

***Description of Resource Benefit:**

Emergency drought response funds would be used in **Priority 1 and 2 areas** for NRDP aquatic restoration where **flow augmentation has been identified as one of the encouraged restoration activities** based on the Final Upper Clark Fork River Basin Interim Process Plan (May 2012). Areas of severe dewatering would be targeted, and temporary flow enhancement projects would be used as a way to sustain the fishery during drought years. Projects would provide quantifiable amounts of instream flow and address limiting factors within these tributaries to enhance aquatic resources.

***Lead entity and partners:**

CFC proposes to be the lead entity conducting project identification, development, implementation and monitoring of instream flow, in coordination with NRDP staff and an advisory committee comprised of other agencies and conservation partners. We anticipate working in partnership with a variety of entities including: landowners, FWP, DNRC, Trout Unlimited and community groups.

6. PROJECT SCHEDULE:

Item:	2013, 1st Q	2013, 2nd Q	2013, 3rd Q	2013, 4th Q	2014	2015	2016-2050
Project Development, Due Diligence and Studies	■	■	■	■			
Design		■	■	■	■	■	
Financing/Cost Share			■	■	■	■	
Implementation (agreements and water right apps)				■	■	■	■
Post-Project Monitoring					■	■	■

7. DRAFT BUDGET:

*Item:	Quantity:	Unit Cost:	Total Cost:	NRDP:
Salaries/Benefits (Project Development, Water Right Research, Legal Services, Monitoring):	1,600 hours	$50/hour	$ 200,000	$200,000
Emergency Drought Funds (up to 10 drought years):	TBD cfs	Site Specific	$1,500,000	$1,500,000
Travel:	8,000 mi	$0.555	$4,440	$4,440
Supplies/Equip. (Gages/Flow Monitoring Equip):	Varied	Varied	$20,000	$20,000
Subtotal:			**$1,724,440**	**$1,724,440**
Administration:	3.5	%	$ 60,355	$60,355
Contingency:	10	%	$172,444	$172,444
Total:			**$1,957,239**	**$1,957,239**

*All items are general estimates and subject to change. Salary and benefit estimates are based on the projected cost of project development, legal services and monitoring for multiple projects. Refer to the CFC guidance concept on flow project pricing/valuation as multiple factors will need to be considered to evaluate each project on a case by case basis.

RESTORATION CONCEPT ABSTRACT SUBMITTAL FORM

1. PROJECT TITLE: Clark Fork Meadows Ranch Land and Water Conservation

2. ORGANIZATION AND CONTACT:

Contact/Entity	Address:	Phone/Email:
Andy Fischer Project Manager, Clark Fork Coalition	140 S. 4th St. W. #1 PO Box 7593 Missoula, MT 59807	(406) 542-0539 x210 andy@clarkfork.org
John McNulty, Owner, Clark Fork Meadows Ranch	7806 Cassidy Trail Lolo, MT 59847	Available upon request.

3. PROJECT PURPOSE AND BENEFITS:

The purpose of this abstract is to seek NRDP funding for a conservation outcome on the Clark Fork Meadows Ranch that is currently listed for sale through Clearwater Montana Properties, Inc. Options for this unique 151 acre property encompassing ¾ of a mile of the Upper Clark Fork River and the lower section of Dempsey Creek might include: acquisition by the NRPD and/or the placement of a conservation easement and some conversion of the water rights to support instream flow purposes.

Potential benefits of this project include:

- Riparian habitat protection/enhancement of nearly 70 acres of wetlands
  - The property is located within the **NRDP Terrestrial Restoration Priority 1 area**
- Enhancement of instream flow totaling **2.7 cfs** in Dempsey Creek and the Upper Clark Fork River
  - The Upper Clark Fork River is a **Priority 1** area and Dempsey Creek is a **Priority 2** area for **NRDP Aquatic Restoration** with flow augmentation being one of the encouraged restoration activities
- Improved recreational access for hunting, angling and wildlife viewing

4. PROJECT LOCATION AND MAP:

Refer to the attached property map. The Clark Fork Meadows Ranch is conveniently located 7 miles South of Deer Lodge and 35 miles North of Butte. Access points to the property are located on Sager Lane and West River Road. The 151 acre property encompasses both sides of the Clark Fork River for approximately ¾ of a mile and the lower section of Dempsey Creek.

5. PROJECT DESCRIPTION:

*** Goals, Objectives:**

This concept is being proposed to facilitate the sale of this property (or a portion of the assets) to the State or other conservation entity. The **purpose** of this project is to secure conservation protections and restoration to enhance the riparian and fishery habitat on this property. The **goal** of this project abstract is to protect and enhance habitat conditions for fish and improve the health of the river for future generations. The **objective** is to work towards the purchase of this property and/or secure conservation protections and restoration on the land and water resources.

*Components/Activities by Goal:

The following activities (or some variation) would likely need to occur in order to achieve the goal of riparian habitat protection/enhancement and instream flow restoration of this property:

- *Project Development, Due Diligence and Studies*

  The first step to potentially securing a purchase of this property is to conduct an appraisal. The applicants understand that any potential State purchase of the property would be limited by the appraised price and the seller's willingness to accept that price. Other entities or individuals could purchase this property (regardless of the appraised price) and sell components of the property to the NRDP such as a conservation easement or instream flow enhancement, which could also achieve the restoration goals of this proposal.
- *Financing and Cost Share*

  Submitting grant requests and securing cost share commitments from the NRDP, landowners and other partners will assist in planning for project implementation. Involving other partners and programs will make the best use of limited public resources.
- *Implementation*

  The components necessary to implement the project will vary depending on the nature of the project. Implementing a real-estate transaction would be fairly straight-forward. Ensuring protections of the riparian habitat may require a conservation easement. Enhancement of the fishery would entail filing a water right change for instream flow purposes with the DNRC. Contracts with other entities and/or consultants to execute the work described above may also need to be executed.
- *Post-Project Monitoring*

  Monitoring and reporting of instream flows and other conservation objectives will need to occur to ensure the goals of the project are being met. Instream flow right monitoring is required by the DNRC in order to demonstrate beneficial use of the water rights and to ensure the flows are in fact being left in the river. Depending on the length of the protected reach, monitoring instream flows can require significant time and effort in the initial years and will include working with various water users to develop efficient systems for managing flows. This abstract proposes to fund the associated monitoring for the first three years of the transaction in order to set up the necessary protocols and equipment for efficiently monitoring flows at these sites. After the initial three years, the NRDP will need to assess how to budget for the long term monitoring responsibilities associated with the holding of instream flow rights or requesting other entities to take on this responsibility. Please refer to the separate abstract that provides guidance regarding monitoring protocols, costs and reporting.

***Progress to date:**

Initial site visits, discussions with the landowner and research of the water rights have occurred.

****Description of Resource Benefit:***

The Clark Fork Meadows Ranch has a number of habitat features that make it conducive to supporting robust populations of fish and wildlife. One of the most ecologically valuable areas of the property is a series of springs that supply a sizable flow of water to Dempsey Creek and the Clark Fork River after flowing through a series of wetlands. Based on discussions with the landowner and the lessee these springs flow year round and supply ample amounts of irrigation water to supply the upper 70 acres of the property. Notable wildlife species that inhabit the property in abundance include: whitetail deer, beavers and nesting and migrating waterfowl. Dempsey Creek and the Clark Fork River mainly support brown trout in this area, although FWP has goals to achieve a 10% native fishery component in this section of the river. Protection and enhancement of this wetland area fits squarely within the NRDP priorities for restoration as follows:

Terrestrial Restoration

- With approximately 70 acres of documented wetland/riparian area according to the National Wetland Inventory along the Upper Clark Fork River, acquisition or conservation easement options would qualify this project as a **Priority 1** Area for restoration.

Aquatic Restoration

- Flow augmentation in the Clark Fork River above Deer Lodge is the single encouraged restoration activity for this **Priority 1 Area** for Restoration. Dempsey Creek is a **Priority 2 Area** for flow augmentation. Reducing summer irrigation withdrawals from this spring complex will allow cool, clean water to flow into both of these water ways as well as improve the wetland complex.

***Lead entity and partners:**

The Clark Fork Coalition and/or the Natural Resource Damage Program could be the lead entities in conducting further project development, implementation and monitoring of instream flow for this project. Five Valley's Land Trust is also supportive of this conservation project and could be a potential partner. The landowners are also supportive of this concept proposal and would like to see a conservation outcome for their property.

6. PROJECT SCHEDULE:

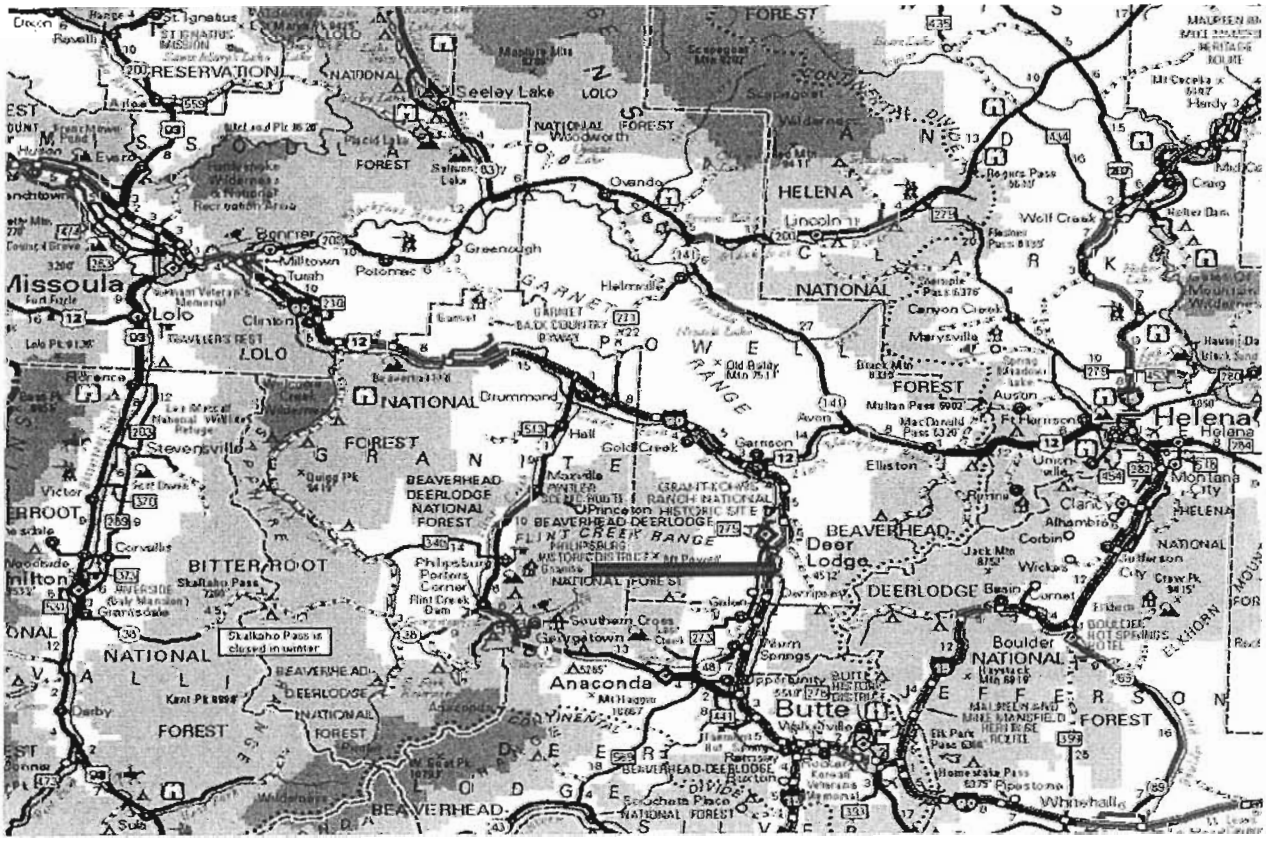
Item:	2012, 3st Q	2012, 4nd Q	2013, 1st Q	2013, 2nd Q	2013, 3rd Q	2013, 4th Q	2014-2016
Project Development, Due Diligence and Studies							
Financing/Cost Share							
Implementation (agreements/water right change apps)							
Post-Project Monitoring							

7. DRAFT BUDGET:

***Item:**	**Quantity:**	**Unit Cost:**	**Total Cost:**	**Anticipated Match:**	**NRDP:**
Salaries/Benefits (Project Development, Water Right App, Legal Services, 3 years Monitoring):	80 days	$400	$ 32,000	$2,000	$30,000
Land/Water Purchase:	151 Acres	$4,603	$695,000	$0	$695,000
Travel:	2,000 mi	$0.555	$1,110	$	$1,110
Supplies/Equip. (Gages/Flow Monitoring Equip):	Varied	Varied	$1,000	$	$1,000
Subtotal:			**$729,110**	**$2,000**	$727,110
Administration:	2	%	$ 14,582	$0	$14,582
Contingency:	5	%	$ 36,456	$0	$36,456
Total:			**$780,148**	**$2,000**	**$778,148**

*All items are general estimates and subject to change based on subsequent information such as land appraisals.

Attachment A: Project Location Maps



RESTORATION CONCEPT ABSTRACT SUMITTAL FORM

1. PROJECT TITLE: Flint Creek Aquatic Habitat Conservation (Upper and Lower)

2. ORGANIZATION AND CONTACT:

Contact/Entity	Address:	Phone/Email:
Granite Headwaters Watershed Group, Chairman, Jim Dinsmore	105 S. Holland PO Box 926 Phillipsburg, MT 59858	(406) 859-3291 Karen.petersen@mt.nacdnet.net
Andy Fischer Project Manager, Clark Fork Coalition	140 S. 4th St. W. #1 PO Box 7593 Missoula, MT 59807	(406) 542-0539 x210 andy@clarkfork.org

3. PROJECT PURPOSE AND BENEFITS:

The purpose of this abstract is to seek opportunities to work with private landowners to implement aquatic projects such as flow augmentation, riparian habitat protections/enhancement, fish passage improvement, ditch screening and channel reconstruction in upper and lower Flint Creek. Few projects of this type have been identified to date in the Flint Creek drainage.

The benefits to the river and public include:

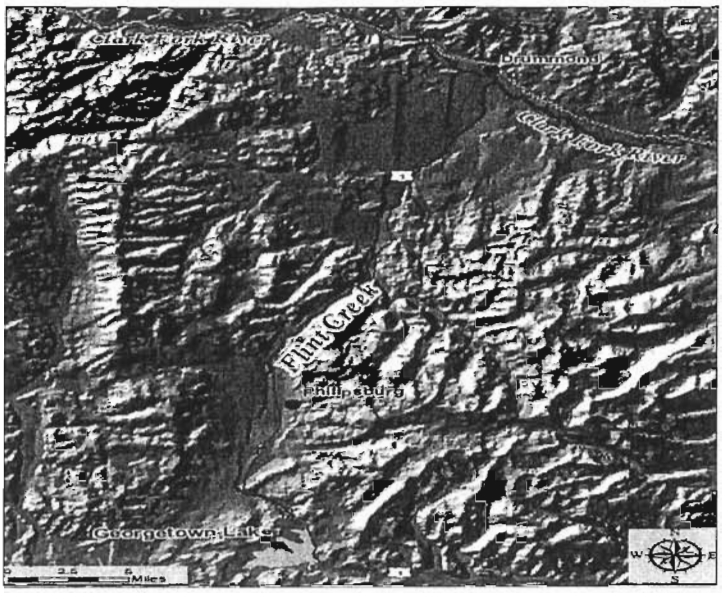
- Flow improvements in Flint Creek to improve fishery habitat.
- Healthy riparian habitat through plantings and protections against overgrazing.
- Improved passage for migrating fish species through modifications to diversion structures.
- Reduced fish entrainment by screening select ditches.

In addition to meeting the NRDP specific priorities for aquatic restoration, potential benefits to landowners and community of these restoration projects include:

- The opportunity to engage in projects that can improve or modernize irrigation infrastructure, lower operational costs, and provide alternatives sources of income. Example projects include: lining or piping ditches, installing stock water wells, improving the application of irrigation water through switches to more efficient sprinkler systems, relocating a point of diversion closer to the intended place of use, and/or leasing water rights.
- Increased land values through healthier riparian areas.
- Cost share towards upgrades to irrigation head gates and diversion structures.

4. PROJECT LOCATION AND MAP:

Flint Creek is one of the largest tributaries to the Upper Clark Fork River and flows from Georgetown Lake to the Drummond (refer to project map to right). Specific aquatic restoration projects within the Flint Creek drainage have not yet been identified. All projects and participation would be voluntary in nature. Landowners possessing land and/or water rights from Flint Creek who have an interest in engaging in the above types of restoration are the target audience.



5. PROJECT PURPOSE and BENEFITS:

*** Goals, Objectives:**

This abstract is being proposed to allow for the development and implementation of potential projects where landowners and partners have yet to be clearly identified. The **purpose** of this concept is to provide the opportunity for landowners to voluntarily engage in projects that result in aquatic restoration benefits to Flint Creek. The **goal** of this restoration abstract is to restore habitat conditions for fish and improve the health of the river for future generations. The **objective** is to work with landowners on projects that balance the needs of agriculture and the health of the creek.

***Components/Activities by Goal:**

The following activities (or some variation) would likely need to occur in order to achieve the goal of aquatic restoration in Flint Creek:

- *Project Development, Due Diligence and Studies*

  To understand the possibilities for restoration in this section of creek it will be important to assess interest and opportunities. This will involve time and investment dedicated to meeting with landowners to understand their irrigation and land management goals and challenges, and to assess areas of mutual interest. There are many tools for achieving aquatic restoration and each project will require an individualized assessment of the possible alternatives and the relative cost/benefit of each option.
- *Design*

  Projects that have strong landowner support and have completed some level of due diligence may require additional design level engineering or planning to refine project budgets or ideas. Some level of landowner commitment that details the anticipated terms of agreement (such as a letter of intent) would need to be secured before pursuing funding for implementation.
- *Financing and Cost Share*

  Submitting grant requests and securing cost share commitments from the NRDP, landowners and other partners will assist in planning for project implementation. Involving other partners and programs will make the best use of limited public resources.
- *Implementation*

The components necessary to implement a project will vary depending on the nature of the project. Grant agreements and contracts with individual landowners would need to be in place to ensure the necessary restoration outcomes.

- *Post-Project Monitoring*

  Monitoring the success of these projects will need to occur in order to ensure the restoration benefits are being realized. This may require data collection or follow-up with landowners over a number of years.

***Progress to date:**

Little progress has been made to date towards planning for specific aquatic restoration that fits within the NRDP encouraged restoration activities for this area. We are aware of the following study analyzed water availability, demand and return flows in the Flint Creek watershed:

- *Flint Creek Return Flow Study, MT Department of Natural Resources and Conservation, December 1997*

Description of Resource Benefit:

Flint Creek (lower and upper) is a **Priority 2 area** for NRDP aquatic restoration **and flow augmentation downstream of the Allendale diversion, ditch screening, fish passage improvements and riparian habitat improvements have been identified as encouraged restoration activities** within this reach according to the Final Upper Clark Fork River Basin Interim Process Plan. The wetted perimeter value for lower Flint Creek is 20 cfs according to the 1986 FWP Water Reservation Application in the Upper Clark Fork River Basin. A combination of integrated restoration activities would assist in addressing limiting factors for fish and facilitating improved habitat conditions for aquatic species. According to FWP reports, Flint Creek contains populations of brown trout (in abundance), rainbow, westslope cutthroat and bull trout.

***Lead entity and partners:**

The Clark Fork Coalition and/or the NRDP could be the lead entities in conducting this project development work in the Flint Creek drainage. The Granite Headwaters Steering Committee is the entity that requested the Coalition draft an abstract for these restoration activities and would likely be a partner in future project development work. Trout Unlimited is also a potential partner in completing these integrated restoration activities and is submitting a complimentary abstract specific to screening and passage within the Flint Creek watershed.

6. PROJECT SCHEDULE:

Item:	2013, 1st Q	2013, 2nd Q	2013, 3rd Q	2013, 4th Q	2014	2015	2016-2018
Project Development, Due Diligence and Studies							
Design							
Financing/Cost Share							
Implementation (agreements/water right change apps)							
Post-Project Monitoring							

7. DRAFT BUDGET:

*Item:	Quantity:	Unit Cost:	Total Cost:	Anticipated Match:	NRDP:
Salaries/Benefits (Project Development, Water Right App, Legal Services, 3 years Monitoring):	200 days	$400	$ 80,000	$5,000	$75,000
Contracted Services—Aquatic Restoration Projects: Flow, Passage, Habitat and Screening	0-10 Projects	Site Specific	$2,000,000	$100,000	$1,900,000
Travel:	4,000 mi	$0.555	$2,220	$0	$2,200
Supplies/Equip.:	Varied	Varied	$2,000	$0	$2,000
Subtotal:			**$2,084,220**	**$105,000**	$1,979,220
Administration:	2.5	%	$ 52,211	$0	$52,211
Contingency:	10	%	$208,422	$0	$200,000
Total:			**$2,334,742**	**$105,000**	**$2,239,742**

*All items are general estimates and subject to change. Salary and benefit estimates are based on the projected cost of project development, legal services and monitoring for multiple projects. Refer to the CFC guidance concept on flow project pricing/valuation as multiple factors will need to be considered to evaluate each project on a case by case basis.

RESTORATION CONCEPT ABSTRACT SUBMITTAL FORM

1. PROJECT TITLE: Helen Johnson Ditch Flow Enhancement Project (Upper Clark Fork River)

2. ORGANIZATION AND CONTACT:

Contact/Entity	Address:	Phone/Email:
Andy Fischer Project Manager, Clark Fork Coalition	140 S. 4th St. W. #1 PO Box 7593 Missoula, MT 59807	(406) 542-0539 x210/ andy@clarkfork.org
Karen Knudsen, Managing Partner, Dry Cottonwood Creek Ranch LLC.	140 S. 4th St. W. #1 PO Box 7593 Missoula, MT 59807	(406) 542-0539 x203 karen@clarkfork.org

3. PROJECT PURPOSE AND BENEFITS:

The purpose of this project is to provide instream flow in the Upper Clark Fork River above Deer Lodge and improve the viability of agriculture. The project proposes to conserve irrigation water through relocating the point of diversion closer to the Dry Cottonwood Creek Ranch (DCCR) and potentially upgrading from flood to sprinkler irrigation. The new pump site and sprinkler system would provide reliable irrigation water to the Dry Cottonwood Ranch and eliminate 3 miles of leaky ditch, which could return up to 5 cfs of instream flow to the Clark Fork River.

The benefits to the river include:

- **Conserving up to 5 cubic feet per second** of irrigation water-- this can be returned and legally protected as instream flow in the **Upper Clark Fork River**.
- Reduced or eliminated risk of fish entrainment through the installation of a fish screen.

In addition to meeting the NRDP specific priorities for aquatic restoration, potential benefits to landowners and community of these restoration projects include:

- Improved irrigation reliability.
- Reduced operations and maintenance costs associated with the irrigation system.

4. PROJECT LOCATION AND MAP:

Please refer to the attached map. The Clark Fork Coalition is part-owner and the managing partner of Dry Cottonwood Creek Ranch, a 2,300 acre working cattle ranch in the Deer Lodge Valley. The ranch is located east of Interstate 90 near Galen, with three miles of Clark Fork River frontage. One of the main sources of irrigation water is from the Helen Johnson Ditch which draws from the Clark Fork River. The Helen Johnson Ditch supplies water to approximately 150 flood irrigated acres on the ranch via a 3 mile long ditch.

The reach of the Upper Clark Fork potentially improved is above (North) of Deer Lodge in a **Priority 1 Area for aquatic restoration** according to the *NRDP Final Upper Clark Fork River Basin Interim Restoration Process Plan*. Instream flow resulting from this project would likely occur from the current Helen Johnson point of diversion and extend downstream for at approximately 3 miles.

5. PROJECT DESCRIPTION:

**** Goals, Objectives:*** The primary goal of this project is to return up to 5 cubic feet per second of instream flow to the Upper Clark Fork River to improve fishery habitat. In order to achieve this

conservation goal, the objective is to relocate where the Dry Cottonwood Creek Ranch draws irrigation from the Clark Fork River and design and implement a more efficient irrigation system. This conservation measure will eliminate the ranch's share of seepage and evaporative losses associated with an earth lined ditch and allow for this water savings to remain in the river as a legally protected water right. In addition, efficiencies in the application of irrigation water could be achieved through switching from flood to sprinkler irrigation. The entrainment of fish via the Ranch's irrigation use could also be decreased or eliminated through screening of the proposed irrigation pump station.

Components/Activities by Goal:

This project is nearly **ready for implementation** and the partners in the Dry Cottowood Creek Ranch are supportive of the advancement of this project. The following activities (or some variation of them) will likely need to occur to progress this project and achieve the goals of instream flow restoration:

- *Project Development*

  Project development activities include: landowner meetings, water rights due diligence, studies quantifying seepage and water usage, and pre-design level engineering have been largely completed over the course of the past 5 years. The neighboring landowners Wayne and Kathy Hadley and Hans and Angel Lampert, whom also hold irrigation rights to the ditch, are interested in participating in any future feasibility studies for water conservation options on the ditch.

- *Design*

  The first component necessary to advance this conservation project is to complete engineering designs for proposed irrigation system and more closely analyze the potential alternatives. This will inform the various parties with more accurate costs associated with the preferred conservation alternative. Some initial designs and budgets have been prepared by Pivots Plus, an irrigation supplier and planner out of Dillon, MT. A final engineering design report will better inform the potential funders and partners of the expected cost associated with the project.

- *Financing and Cost Share*

  In addition to this funding request, the Dry Cottonwood Creek Ranch is also pursuing cost share for the project through the NRCS EQUIP program. There is potential that this program could match NRDP investments. In addition, the Coalition is looking into other potential cost share sources such as the Columbia Basin Water Transactions Program.

- *Project Implementation*

- Securing **written agreements** from all water right holders ensuring they are willing to commit their relative share of the conservation benefit to instream flow. All parties have been informed of the submission of this conceptual proposal and are supportive of moving this project forward.
- **Water rights change processes** should be initiated prior to constructing the project. This will involve the preparation and submission of a change of use application to the DNRC to convert the seepage and evaporative savings of the Dry Cottonwood Creek Ranch Helen Johnson ditch water rights (up to 5 cfs) to instream flow in the Clark Fork River. A point of diversion change application to the DNRC would also be required if the recommended location for a pump station is not located at one of the two authorized points of diversion for the ranch. There are no known intervening water rights, other than the Lampert Ranch (which already has changed to direct points of diversion) that could be impacted by this change. Potential risks and uncertainties of this process can be avoided by early submission of these applications.

- **Continued outreach** with the other water right holders on the ditch to ensure the project does not negatively impact them and potentially includes them in water conservation efforts or leasing on the shared system.
- **Construction:** Once the above activities are initiated and/or completed, the project will advance towards bid solicitation for materials and construction services. Construction would likely occur over the course of one construction season (fall/winter).

➢ *Post-Project Monitoring*

Monitoring and reporting of instream flows will need to occur in order to demonstrate beneficial use of the water rights and to ensure the flows are in fact being left in the river. Depending on the length of the protected reach, monitoring instream flows can require significant time and effort in the initial years and will include working with various water users to develop efficient systems for managing flows. This abstract proposes to fund the associated monitoring for the first three years of each transaction in order to set up the necessary protocols and equipment for efficiently monitoring flows at the project sites. After the initial three years, the NRDP will need to assess how to budget for the long term monitoring responsibilities associated with the holding of instream flow rights or requesting other entities take on this responsibility. Please refer to the separate Clark Fork Coalition abstract that provides guidance regarding long-term monitoring protocols, costs and reporting. Upon completion of the conservation measures, the water right change application would take effect for the protection of instream flow in the Clark Fork River for the life of the conservation measure (~100 years). Monitoring and enforcement of the instream water right would occur through the life of the project.

Progress to date:

The Dry Cottonwood Creek Ranch participated in the following studies in order to advance their conservation project plans:

➢ *2002 Upper Clark Fork Instream Flow Project, by Dennis Workman, Sponsored by the Upper Clark Fork Steering Committee and DNRC*

Summary: This report found that the "greatest and most consistent ditch loss was observed in the Johnson Ditch" of the four Upper Clark Fork ditches surveyed. Losses documented in this report ranged from 2 to 7 cfs depending on the amount of flow in the ditch.

➢ *2010 Investigation of groundwater-surface water interaction, water management, and instream flow potential on the Dry Cottonwood Creek Ranch, by Clark Fork Coalition (and former Montana Water Trust), Sponsored by the NRDP*

Summary: This report looked at ground water flows, irrigation return flows, irrigation usage, seepage and recommendations for instream flow. In summary, the "amount of return flow may be very small, despite the portion of the land adjacent to the river," which may allow for protections of instream flows greater distances down the Clark Fork River. **Seepage losses of 80-100%** of diverted flow or 5-7 cfs were documented through this study.

➢ *2011/2012 Pilot Split-Season Diversion Reduction Agreement, by Clark Fork Coalition, Sponsored by the Columbia Basin Water Transactions Program*

Summary: In 2011 and 2012, the Dry Cottonwood Creek Ranch participated in a diversion reduction to cease their use of irrigation water from July 15-October 31 in exchange for being compensated for lost hay production. In 2012 all water right holders on the ditch are

participating in a diversion reduction to close the headgate after July 15th. As a result of these pilot efforts, approximately 15 cfs of instream flow has returned to the Clark Fork River.

After many years of involvement in a variety of studies sponsored by state and non-profit entities (including NRDP) the Dry Cottonwood Creek Ranch is ready to see their conservation project advance towards implementation. The Hadley and Lampert ranches are also receptive to considering participation in this project and/or similar water conservation measures. Some potential projects these landowners are interested in are further described in the Upper Clark Fork Flow Enhancement concept proposal submitted by CFC.

Description of Resource Benefit:

This combined water conservation project on the Helen Johnson Ditch could provide an instream flow gain of up to **5 cfs** to this critically dewatered section of the Upper Clark Fork River. The Upper Clark Fork River is a **Priority 1 area** for NRDP aquatic restoration **and flow augmentation has been identified as the single encouraged restoration activity** within this reach according to the Final Upper Clark Fork River Basin Interim Process Plan. In order to convert the conserved water to instream flow a change application would need to be submitted to the Montana DNRC for review and authorization. The protectable stream reach for this instream flow would likely extend from the Helen Johnson Ditch head gate near the Galen Road on the Clark Fork River and extend south approximately 3 miles to the Westside Ditch diversion near Racetrack or possibly beyond. The term of the instream flow protection would likely be dependent on the functional life of the conservation measure.

A number of instream flow reports conducted by the Upper Clark Fork Steering Committee have identified the minimum instream flow for the maintenance of fish and other aquatic organisms within the Clark Fork River to be 40 cfs at Galen and 90 cfs at Deer Lodge. This project alone could contribute over 13% towards the recommended flow of 40 cfs. The Dry Cottonwood Creek Ranch water rights are some of the most senior (1875) priority dates on all of the Upper Clark Fork River. This section of river is primarily a brown trout dominated fishery according to reports from FWP. Providing additional clean, cool water in the river could help to improve the sport and native fishery.

Lead entity and partners:

The Clark Fork Coalition (CFC) is the lead entity proposing this project in partnership with the other members of the Dry Cottonwood Creek Ranch. Numerous water user meetings have been held with the partners in the Dry Cottonwood Creek Ranch, the Deer Lodge River Ranch (Hadley) and the Lampert Ranch to develop this conservation project. Funding agencies, including the NRDP and Columbia Basin Water Transactions Program have made investments in the development of this project and we expect there could be further partnerships with these entities and others including the NRCS.

6. PROJECT SCHEDULE:

Item:	2013, 1st Q	2013, 2nd Q	2013, 3rd Q	2013, 4th Q	2014	2015	2016
Project Dev.							
Design							
Financing and Cost Share							
Implementation							
Monitoring							

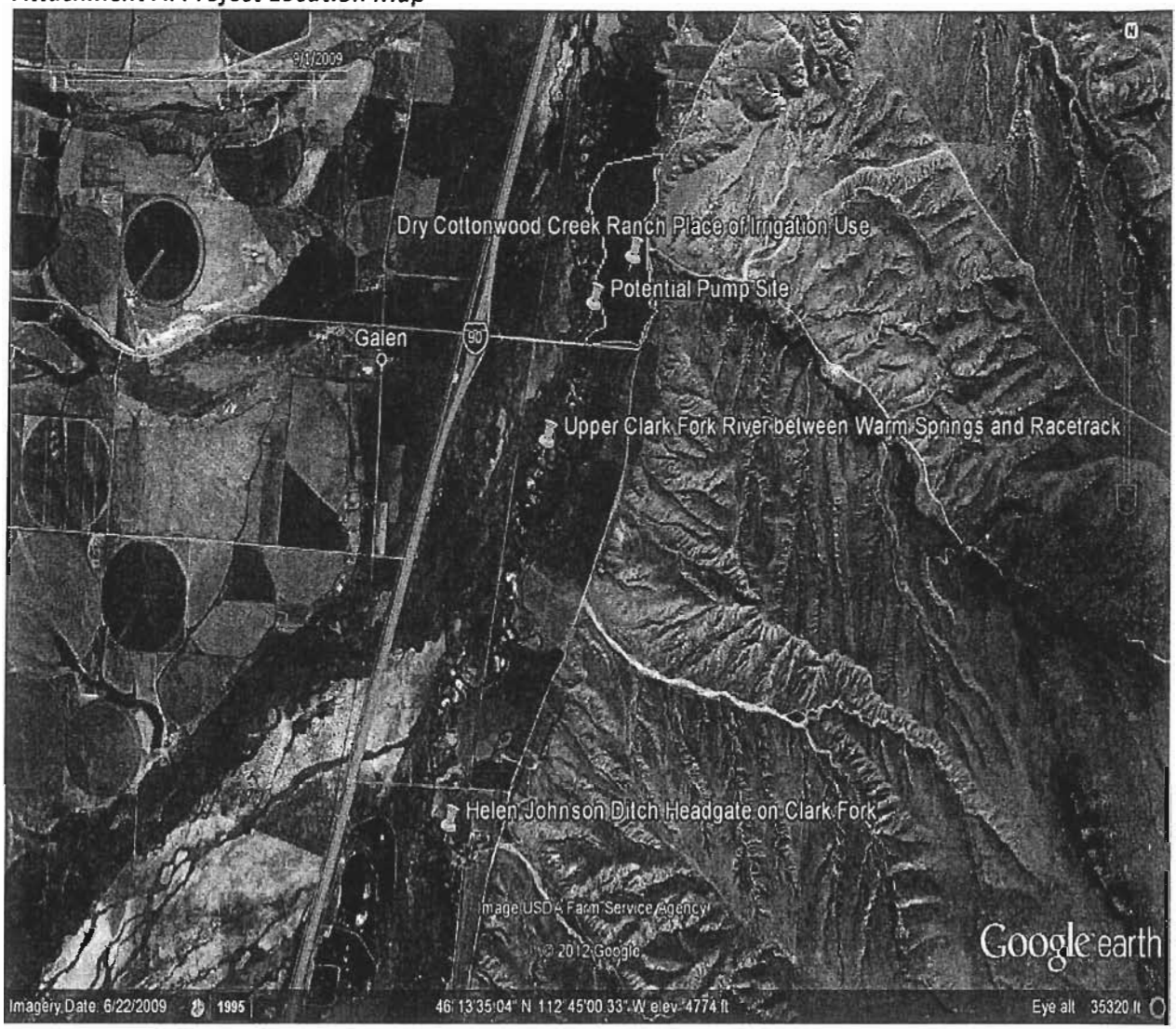
7. DRAFT BUDGET:

Item:	Quantity:	Unit Cost:	Total Cost:	Anticipated Match:	NRDP:
Salaries/Benefits (Water Right App and Legal Services):	800 Hours	$50/Hour	$ 35,000	$5,000	$30,000
Contracted Services:					
Engineering/Const. Mgmt	Varies	Varies	$15,000	$0	$15,000
Pump Station, Piping, Fish Screen, Power hook-ups	Varies	Refer to detailed budget	$153,474	$0	$153,474
Sprinkler System (Pivot/wheel line)	3 Pivots	$66,666	$200,000	$40,000	$160,000
75% Power Costs 20 years	20 years	$3,000	$60,000	$60,000	$90,000
Travel:	3604 mi	$.555	$2,000	$0	$2,000
Supplies/Equipment:			$1,000	$0	$1,000
Subtotal:			**$466,474**	**$105,000**	**$361,474**
Administration:	3.5	%	$16,327	$4,000	$12,327
Contingency:	10	%	$46,647	$0	$46,647
Total:			**$529,448**	**$109,000**	**$420,448**

*All costs are general estimates and are subject to change based upon final engineering designs and subsequent information. Refer to the attached detailed budget for more information of how these costs were determined. Potential sources of anticipated match include: NRCS EQUIP, Columbia Basin Water Transactions Program and other match opportunities that may present themselves.

Index of Attachments:
Attachment A: Project Location Map
Attachment B: Detailed Budgets and Designs

Attachment A: Project Location Map

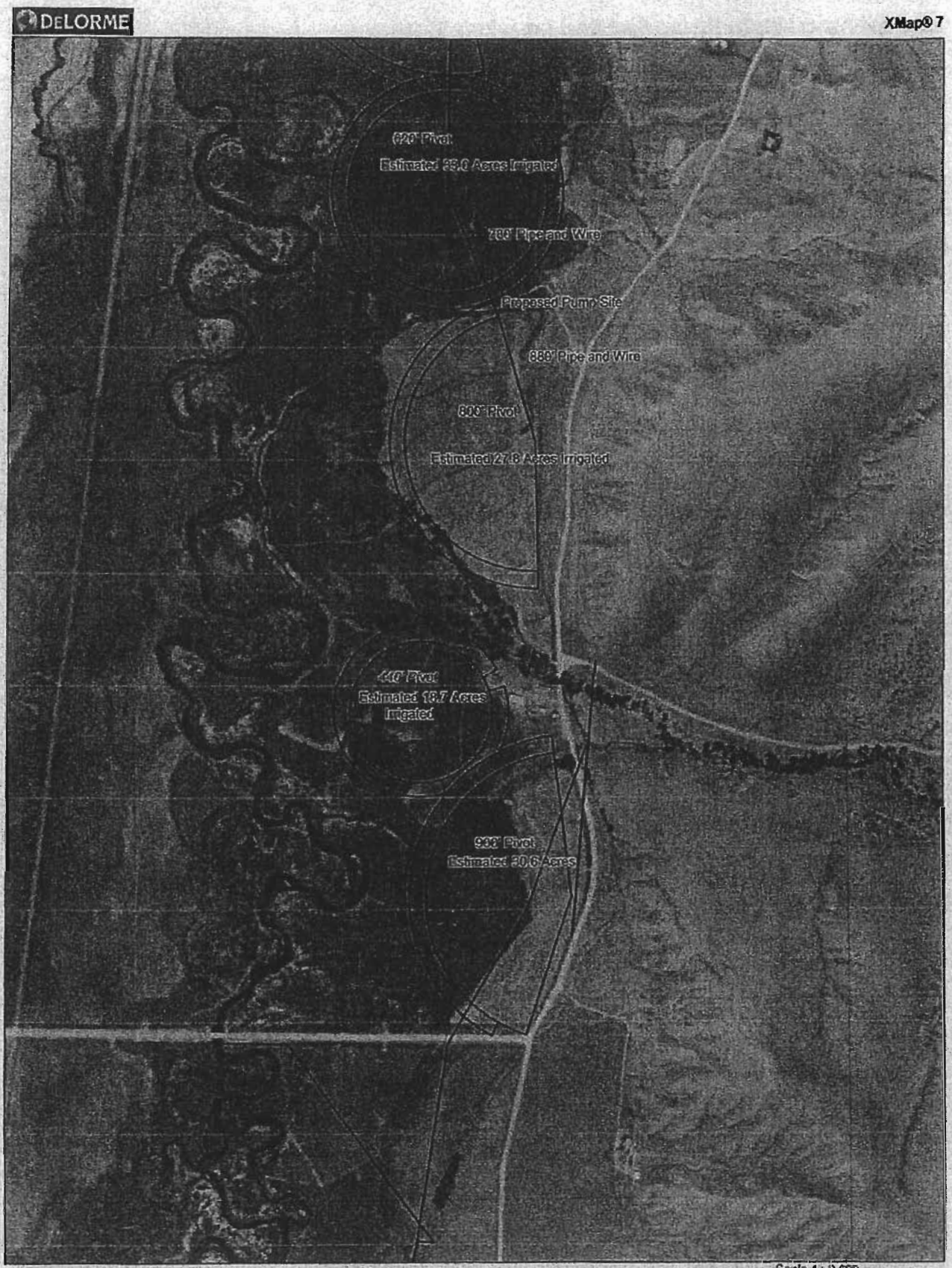


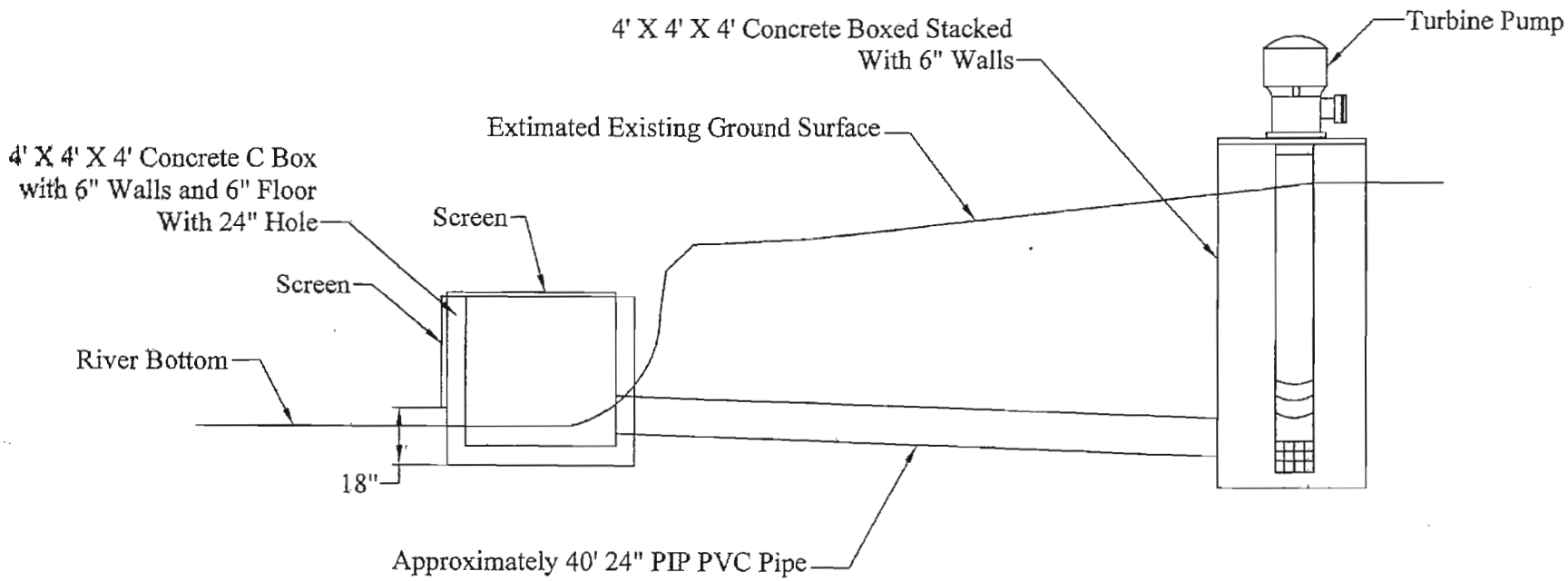
Helen Johnson Ditch- Pump Site and Sprinkler System

Budget Item	Cost	Description
1900 FT 18" Pipe	$ 44,232	Cost of piping from the pump station on the river to existing ditch
Inlet Structure	$ 14,467	Refer to proposed pump station inlet design drawing. Pre-cast concrete structure w/fish screens on top and sides.
Mast, Meter, Pole	$ 1,649	Electrical hardware necessary to connect the pump to a viable power source
60 HP Turbine Pump	$ 8,314	designed to convey up to 7.5 cfs of irrigation water
60HP Variable Speed Drive	$ 6,347	this component controls how much water the pump pulls. Variable speed drives can reduce electrical demands and provide the option to pump more or less water depending on the irrigation needs.
Mainline Starters & Thrust Blo	$ 2,065	Additional piping components. Thrust blocks are used with PVC pipe to ensure that the pipe does not move and potentially crack.
1 Diffusing Station	$ 5,400	Distributes water to the turnouts
Power Interconnection Fee	$ 10,000	NW Energy charges an interconnection fee, which varies based on the availability of an existing power source.
Ditch Removal and Restoratio	$ 20,000	Earth work filling in the existing ditch and seeding as necessary
Flow Meters	$ 1,000	For monitoring water usage and dividing power bill
Engineering /Const. Mgmt.	$ 15,000	Final design and oversight of installation
Additional Piping	$ 40,000	Piping an additional 2,000 ft of the Helen Johnson Ditch to the DCCR turnout
Power Cost (20 years @ $4,50	$ 60,000	75% Annual power costs subsized 20 yrs
Sprinkler System	$ 200,000	Intalled cost of 3 pivots covering roughly 140 acres
Subtotal:	$ 428,474	
Salaries and Benefits	$ 35,000	Project Dev, Water Rights Apps, 3 years Monitoring
Travel	$ 2,000	Meetings, project development, monitoring
Supplies/Equip (Monitoring)	$ 1,000	Flow Monitoring Equip.
Subtotal:	$ 466,474	
Administration	$ 16,327	
Contingency	$ 46,647	
Total:	$ 529,448	

Project Financing Plan

Funder/Entity	Amount:	
NRDP	$ 420,448	
CBWTP/NRCS	$ 109,000	
Total:	$ 529,448	


DeLORME
XMap® 7
620' Pivot
Estimated 28.0 Acres Irrigated
788' Pipe and Wire
Proposed Pump Site
889' Pipe and Wire
600' Pivot
Estimated 27.8 Acres Irrigated
440' Pivot
Estimated 18.7 Acres Irrigated
900' Pivot
Estimated 30.6 Acres
Data use subject to license.
© DeLorme. XMap® 7.
www.delorme.com
Scale 1 : 9,600
1" = 800.0 ft
Data Zoom 14-4



Proposed Pump Station Inlet Design

Note: Not To Scale

Pivots Plus LLC
1045 Selway Drive
Dillon, MT 59725
(406) 683-4418

PROPOSAL, ACCEPTANCE AND SECURITY AGREEMENT

PROPOSAL SUBMITTED TO	PHONE	DATE
Clark Fork Coalition	542-0539	2/14/2012
STREET	JOB NAME	
10802 Eastside Road	Lift Pump	
	SALESMAN	
Deer Lodge, MT	Ben Lucon	

Quantity	Description		Total
1900	18" 80 psi PVC Pipe Installed		$44,232.00
1	Inlet Structure		$14,467.00
1	Mast, Meter, Pole		$1,649.00
1	60 HP Turbine Pump		$8,314.00
1	60 HP VFD		$6,347.00
2	Mainline Starters and Thrust Blocks		$2,065.00
1	Diffusing Station		$5,400.00
	Option:		
	Add for VFD Filter	$3,850	

We Propose hereby to furnish material - complete in accordance with above specifications, for the sum of: ($82,474.00)

Payment to be made as follows: 50% Down payment 50% Upon delivery

Authorized Signature: Ben Lucon

Note: This proposal may be withdrawn by the seller if not accepted within 12 days.

Acceptance of Proposal: The above prices, specifications and conditions are satisfactory and are hereby accepted. Seller is authorized to do the work as specified. Payment will be made as outlined above. Buyer grants a purchase money security interest in all of the material described above including accessions and attachments now or hereafter acquired together with any proceeds thereof to secure the performance and payment of all obligations of buyer to seller under the terms of this contract. Buyer agrees that seller shall have a lien for all services provided. Buyer agrees to sign financing statements upon request of seller. Buyer acknowledges that he has read all of the terms and provisions of this contract and that it constitutes the entire agreement between the parties relative hereto and neither party shall be bound by an agreement, statement or representation not incorporated herein.

Signature: _____

Date: _____

RESTORATION CONCEPT ABSTRACT SUBMITTAL FORM

1. PROJECT TITLE: Lost Creek Flow Enhancement

2. ORGANIZATION AND CONTACT:

Contact/Entity	Address:	Phone/Email:
Andy Fischer Project Manager, Clark Fork Coalition (CFC)	140 S. 4th St. W. #1 PO Box 7593 Missoula, MT 59807	(406) 542-0539 x210 andy@clarkfork.org

3. PROJECT PURPOSE AND BENEFITS:

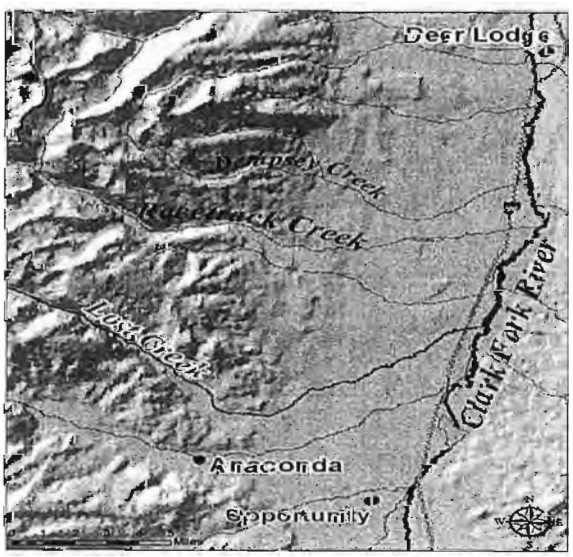
The purpose of this restoration concept is to identify, develop and implement projects with private landowners (such as irrigation efficiency, water leases and purchases, sources switches and point of diversion changes) that enhance flows in lower Lost Creek. While some specific projects of this type have been identified in this reach of the lower Lost Creek and proposed as separate abstracts, to achieve large scale instream flow restoration, it will be necessary for NRDP to fund work to identify, develop and implement additional projects.

Flow augmentation projects will provide benefits to the aquatic resources of the UCFRB and to the public's use and enjoyment of those resources, including **restoring up to 10 to 20 cubic feet per second (cfs) of flow** for the benefit of the fishery within lower Lost Creek. Lower Lost Creek has been identified by NRDP as a **Priority 2 area for flow augmentation** in its *Prioritization of Areas in the Upper Clark Fork River Basin for Fishery Enhancement* (Dec. 2011). Flow augmentation has also been identified as a "encouraged restoration activity" in the lower Lost Creek by NRDP in its *Final Upper Clark Fork River Basin Interim Restoration Process Plan*, Attachment 5-2 (May 2012).

In addition to meeting NRDP's aquatic habitat priorities, flow augmentation projects must also possess a mutual benefit for landowners to incentive their participation. Such incentives can take the form of opportunities to modernize irrigation infrastructure, lower operational costs, and/or provide alternatives sources of income. Example projects include lining or piping ditches, improving the application of irrigation water through switches to more efficient sprinkler systems, relocating a point of diversion closer to the intended place of use, or leasing/selling water rights.

4. PROJECT LOCATION:

Lost Creek is a major East flowing tributary to the Upper Clark Fork River near Warm Springs. Specific projects within this section of the Lost Creek have not yet been identified as part of this concept proposal. All projects and participation would be voluntary in nature. Potential projects could be prioritized based on factors such as: the quantity of instream flow contribution (at least one cfs), relative priority of the associated water rights (length of protectable reach), evidence of historic beneficial use of the water rights (as defined by DNRC) and term of the transaction (at least 20 years with permanent transactions preferred).



5. PROJECT DESCRIPTION:

a. *Goals, Objectives*:

This restoration concept is being proposed to allow for the development and implementation of flow augmentation projects where landowners and partners have yet to be clearly identified. The **purpose** of this concept is to provide the opportunity for landowners to voluntarily engage in projects that result in an instream flow benefit in lower Lost Creek. The **goal** of this concept is to prevent dewatering of this section of lower Lost Creek, improve habitat conditions for fish and improve the health of the creek for future generations. The **objective** is to work together with landowners on projects that balance the needs of agriculture and the health of the creek.

b. *Components/Activities by Goal*:

The following activities (or some variation) would likely need to occur in order to achieve the goal of instream flow restoration in lower Lost Creek:

- *Project Development, Due Diligence and Studies*

  To achieve instream flow restoration in this section of creek it will be important to assess interest and opportunities beyond the projects that are being submitted as separate restoration concepts. This will involve time and investment dedicated to meeting with landowners to understand their irrigation management goals and challenges, and to assess areas of mutual interest. There are many tools for achieving flow augmentation and each project will require an individualized assessment of the possible alternatives and the relative cost/benefit of each option.

  An assessment of these opportunities will require landowner meetings, water right due diligence and on-the-ground research. Once a project appears viable based on an initial assessment, quantifying potential costs/benefits of a project may require further studies, such as water savings analysis, groundwater studies and/or preliminary engineering.

- *Design*

  Projects that have strong landowner support and have completed some level of due diligence may require additional design level engineering or planning to refine project budgets or ideas. Some level of landowner commitment that details the anticipated terms of agreement (such as a letter of intent) would need to be secured before pursuing funding for implementation.

- *Financing and Cost Share*

  Submitting grant requests and securing cost share commitments from the NRDP, landowners and other partners will assist in planning for project implementation. Involving other partners and programs will make the best use of limited public resources.

- *Implementation*

  The components necessary to implement a project will vary depending on the nature of the project type. For water conservation projects this may involve contracting with irrigation suppliers, construction companies and engineers. Other types of flow augmentation projects, such as water leases may require less on-the-ground work and more negotiations, valuations and agreements. Grant agreements and contracts with individual landowners would need to be in place to ensure the necessary instream flow outcomes. In addition, water right change paperwork would need to be prepared and filed with the DNRC to allow legal protection of the instream water. The State, CFC or another to-be-determined entity would need to acquire and hold the water right and be responsible for managing and monitoring the rights instream on behalf of the public.

- *Post-Project Monitoring*

Monitoring and reporting of instream flows needs to occur in order to demonstrate beneficial use of the water rights and to ensure the flows are being left in the creek. Depending on the length of the protectable reach, monitoring instream flows can require significant time and effort in the initial years and will include working with various water users to develop efficient systems for managing flows. This concept proposes to fund the associated monitoring for the first three years of each transaction in order to set up the necessary protocols and equipment for efficiently monitoring flows at these sites. After the initial three years, the NRDP will need to assess how to budget for the long term monitoring responsibilities associated with the holding of instream flow rights or funding other entities to take on this responsibility. Please refer to the separate CFC restoration concept abstract that provides guidance regarding long-term monitoring protocols, costs and reporting.

c. ***Progress to date:***

Some initial conversations with landowners in the area have occurred, although to the applicant's knowledge no flow augmentation projects have occurred to date in Lost Creek. The Dry Cottonwood Creek Ranch holds water rights to lower Lost Creek and would like to investigate water conservation and/or leasing options.

Any efforts NRDP can make to clearly delineate the availability of funding, to clarify the requirements surrounding funding, or to identify timelines for receiving funding approval and contracts would be useful for setting clear and consistent expectations for landowners.

d. ***Description of Resource Benefit:***

Lost Creek is a **Priority 2 area** for NRDP aquatic restoration **and flow augmentation has been identified as encouraged restoration activity** according to the Final Upper Clark Fork River Basin Interim Process Plan. This concept proposal could provide up to **10- 20 cfs instream through the implementation of up to 5 projects**, which will benefits to the fishery by increasing habitat, connectivity between fish populations, and connectivity of spawning habitat in Lost Creek to fish populations in the mainstem of the Clark Fork. Projects that have the ability to protect flow to the creek's confluence with the Clark Fork River would be prioritized.

The Lost Creek stream gage data near Galen indicates significant dewatering within this reach with low flows regularly dipping below 2 cfs in July and August. Dewatering both reduces rearing habitat and isolates fish populations and spawning habitat in upper Lost Creek from the mainstem Clark Fork River. The DFWP 1986 Water Reservation Applications of wetted perimeter data determined that the target instream flows are for 16 cfs for Lost Creek.

An Assessment of Fish Populations and Riparian Habitat in Tributaries of the Upper Clark Fork Basin by Montana Fish Wildlife and Parks, 2009, indicates that primarily brown trout are found in the lower reaches of Lost Creek and brook trout and native westslope cutthroat are found in the upper reaches of the drainage. Dewatering both reduces rearing habitat and isolates fish populations and spawning habitat in upper Lost Creek from the mainstem Clark Fork River. The water left instream under this proposed project will rewater the lower channel, providing habitat for aquatic life in the lower sixteen miles of Lost Creek, and reconnect habitat and fish populations in upper Lost Creek with the mainstem of the Clark Fork River. Achieving **10-20 cfs of flow protection** would provide significant gains towards securing enough clean water to restore the fishery.

e. ***Lead entity and partners:***

Based on years of work in the Upper Clark Fork Basin and flow augmentation expertise, CFC is proposing to be the lead entity in conducting project identification, development, implementation and monitoring of flow augmentation projects in this section of lower Lost Creek in coordination with NRDP staff and potentially other agencies and partners. We anticipate working in partnership with a variety of entities including: landowners, FWP, DNRC, Trout Unlimited, Columbia Basin Water Transaction Program and others within the community.

6. PROJECT SCHEDULE:

Item:	2013, 1st Q	2013, 2nd Q	2013, 3rd Q	2013, 4th Q	2014	2015-2017
Project Development, Due Diligence and Studies						
Design						
Financing/Cost Share						
Implementation (agreements/water right change apps)						
Post-Project Monitoring						

7. DRAFT BUDGET:

*Item:	Quantity:	Unit Cost:	Total Cost:	Anticipated Match:	NRDP:
Salaries/Benefits (Project Dev., Water Right App, Legal Services, 3 years Monitoring)	3,000 hours	$50/hour	**$150,000**	**$10,000**	**$140,000**
Contracted Services/Water Purchase (up to 5 projects)	10-20 cfs	Site Specific	**$1,800,000**	**$100,000**	**$1,700,000**
Travel	4,000 mi	$0.555	**$2,220**	**$220**	**$2,000**
Supplies/Equip. (Gages/Flow Monitoring Equip)	Varies	Varies	**$5,000**	**$0**	**$5,000**
Subtotal:			**$1,957,220**	**$110,220**	**$1,847,000**
Administration:	3.5	%	**$68,503**	**$10,000**	**$58,503**
Contingency:	10	%	**$195,722**	**$0**	**$195,722**
Total:			**$2,221,445**	**$120,220**	**$2,101,225**

*All items are general estimates and subject to change. Salary and benefit estimates are based on the projected cost of project development, water right applications, legal services and three years of monitoring for up to five individual projects. Refer to the CFC concept proposal that provides guidance on flow project pricing/valuation as multiple factors will need to be considered to evaluate each project on a case by case basis. Information above is not intended for pricing on individual projects, simply to provide an estimated range of potential costs/benefits. Match sources for such projects could come from: the Columbia Basin Water Transactions Program, FWP Future Fisheries Grants, NRCS EQUIP Contracts, DNRC Renewable Resource Grants and other yet to be identified sources.

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RESTORATION CONCEPT ABSTRACT SUBMITTAL FORM

1. PROJECT TITLE: Lower Racetrack Creek Flow Enhancement

2. ORGANIZATION AND CONTACT:

Contact/Entity	Address:	Phone/Email:
Andy Fischer Project Manager, Clark Fork Coalition (CFC)	140 S. 4th St. W. #1 PO Box 7593 Missoula, MT 59807	(406) 542-0539 x210 andy@clarkfork.org

3. PROJECT PURPOSE AND BENEFITS:

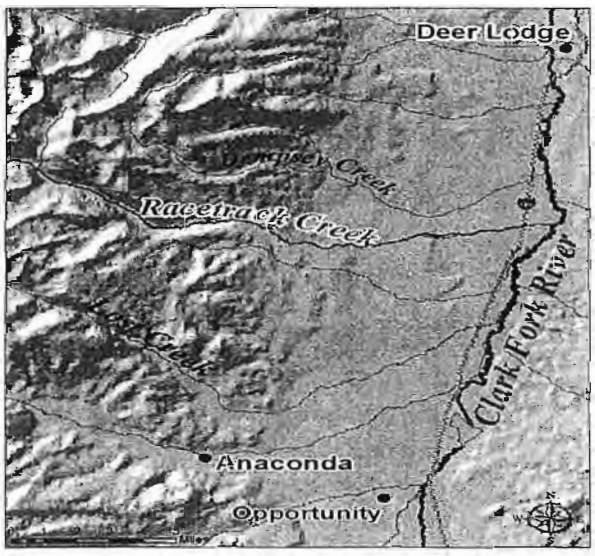
The purpose of this restoration concept is to identify, develop and implement projects with private landowners (such as irrigation efficiency, water leases and purchases, sources switches and point of diversion changes) that enhance flows in lower Racetrack Creek. While some specific projects of this type have been identified in this reach of the lower Racetrack Creek and proposed as separate abstracts, to achieve large scale instream flow restoration, it will be necessary for NRDP to fund work to identify, develop and implement additional projects.

Flow augmentation projects will provide benefits to the aquatic resources of the UCFRB and to the public's use and enjoyment of those resources, including restoring up to 5 to 10 cubic feet per second (cfs) of flow for the benefit of the fishery within lower Racetrack Creek. Lower Racetrack Creek has been identified by NRDP as a **Priority 1 area for flow augmentation** in its *Prioritization of Areas in the Upper Clark Fork River Basin for Fishery Enhancement* (Dec. 2011). Flow augmentation has also been identified as a "encouraged restoration activity" in the lower Racetrack Creek by NRDP in its *Final Upper Clark Fork River Basin Interim Restoration Process Plan*, Attachment 5-2 (May 2012).

In addition to meeting NRDP's aquatic habitat priorities, flow augmentation projects must also possess a mutual benefit for landowners to incentive their participation. Such incentives can take the form of opportunities to modernize irrigation infrastructure, lower operational costs, and/or provide alternatives sources of income. Example projects include lining or piping ditches, improving the application of irrigation water through switches to more efficient sprinkler systems, relocating a point of diversion closer to the intended place of use, or leasing/selling water rights.

4. PROJECT LOCATION:

Specific projects within this section of the Racetrack Creek have not yet been identified as part of this concept proposal. All projects and participation would be voluntary in nature. Landowners possessing water rights to this section of creek or on tributaries that could enhance this section of creek are the target audience. Potential projects could be prioritized based on factors such as: the quantity of instream flow contribution (at least one cfs), relative priority of the associated water rights (length of protectable reach), evidence of historic beneficial use of the water rights (as defined by DNRC) and term of the transaction (at least 20 years with permanent transactions preferred).



5. PROJECT DESCRIPTION:

a. *Goals, Objectives*:

This restoration concept is being proposed to allow for the development and implementation of flow augmentation projects where landowners and partners have yet to be clearly identified. The **purpose** of this concept is to provide the opportunity for landowners to voluntarily engage in projects that result in an instream flow benefit in lower Racetrack Creek. The **goal** of this concept is to prevent dewatering of this section of lower Racetrack Creek, improve habitat conditions for fish and improve the health of the creek for future generations. The **objective** is to work together with landowners on projects that balance the needs of agriculture and the health of the creek.

b. *Components/Activities by Goal*:

The following activities (or some variation) would likely need to occur in order to achieve the goal of instream flow restoration in lower Racetrack Creek:

- *Project Development, Due Diligence and Studies*

  To achieve instream flow restoration in this section of creek it will be important to assess interest and opportunities beyond the projects that are being submitted as separate restoration concepts. This will involve time and investment dedicated to meeting with landowners to understand their irrigation management goals and challenges, and to assess areas of mutual interest. There are many tools for achieving flow augmentation and each project will require an individualized assessment of the possible alternatives and the relative cost/benefit of each option.

  An assessment of these opportunities will require landowner meetings, water right due diligence and on-the-ground research. Once a project appears viable based on an initial assessment, quantifying potential costs/benefits of a project may require further studies, such as water savings analysis, groundwater studies and/or preliminary engineering.

- *Design*

  Projects that have strong landowner support and have completed some level of due diligence may require additional design level engineering or planning to refine project budgets or ideas. Some level of landowner commitment that details the anticipated terms of agreement (such as a letter of intent) would need to be secured before pursuing funding for implementation.

- *Financing and Cost Share*

  Submitting grant requests and securing cost share commitments from the NRDP, landowners and other partners will assist in planning for project implementation. Involving other partners and programs will make the best use of limited public resources.

- *Implementation*

  The components necessary to implement a project will vary depending on the nature of the project type. For water conservation projects this may involve contracting with irrigation suppliers, construction companies and engineers. Other types of flow augmentation projects, such as water leases may require less on-the-ground work and more negotiations, valuations and agreements. Grant agreements and contracts with individual landowners would need to be in place to ensure the necessary instream flow outcomes. In addition, water right change paperwork would need to be prepared and filed with the DNRC to allow legal protection of the instream water. The State, CFC or another to-be-determined entity would need to acquire and hold the water right and be responsible for managing and monitoring the rights instream on behalf of the public.

- *Post-Project Monitoring*

  Monitoring and reporting of instream flows needs to occur in order to demonstrate beneficial use of the water rights and to ensure the flows are being left in the creek. Depending on the length of the protectable reach, monitoring instream flows can require significant time and effort in the initial years and will include working with various water users to develop efficient systems for managing flows. This concept proposes to fund the associated monitoring for the first three years of each transaction in order to set up the necessary protocols and equipment for efficiently monitoring flows at these sites. After the initial three years, the NRDP will need to assess how to budget for the long term monitoring responsibilities associated with the holding of instream flow rights or funding other entities to take on this responsibility. Please refer to the separate CFC restoration concept abstract that provides guidance regarding long-term monitoring protocols, costs and reporting.

c. ***Progress to date:***

A major first step in restoring flows in Racetrack Creek was achieved in 2011 through the NRDP purchase of storage water from Racetrack Lake, although there is still much work to do to fully restore flows in the creek. A separate proposal to pursue a gravity pipeline project could result in instream flow if implemented. To fully restore flows to Racetrack Creek, there may need to be additional opportunity for landowners to consider different types of projects such as source switches, point of diversion changes, water leases and irrigation efficiency upgrades.

Any efforts NRDP can make to clearly delineate the availability of funding, to clarify the requirements surrounding funding, or to identify timelines for receiving funding approval and contracts would be useful for setting clear and consistent expectations for landowners.

d. ***Description of Resource Benefit:***

Racetrack Creek is a **Priority 1 area** for NRDP aquatic restoration **and flow augmentation has been identified as encouraged restoration activity** according to the Final Upper Clark Fork River Basin Interim Process Plan. This concept proposal could provide **5- 10 cfs instream through the implementation of up to 5 projects**, which will benefits to the fishery by increasing habitat, connectivity between fish populations, and connectivity of spawning habitat in Racetrack Creek to fish populations in the mainstem of the Clark Fork. Projects that have the ability to protect flow to the creek's confluence with the Clark Fork River would be prioritized.

An Assessment of Fish Populations and Riparian Habitat in Tributaries of the Upper Clark Fork Basin by Montana Fish Wildlife and Parks, 2008, provides information that Racetrack Creek above the Cement Ditch headgate has healthy populations of trout including native westslope cutthroat trout, and abundant spawning habitat. The report additionally cites that below the Cement Ditch and other diversions Racetrack Creek was completely dry during the survey in August of 2008. According to Jason Lindstrom, the MT Fish Wildlife and Parks Fisheries Biologist, this **dewatering both reduces rearing habitat and isolates fish populations and spawning habitat in upper Racetrack Creek from the mainstem Clark Fork River**. The water left instream under this proposed project will rewater the lower channel, providing habitat for aquatic life in the lower seven miles of Racetrack Creek, and reconnect habitat and fish populations in upper Racetrack Creek with the mainstem of the Clark Fork River. Achieving **5-10 cfs of flow protection** would provide significant gains towards securing enough clean water to restore the fishery.

e. ***Lead entity and partners:***

Based on years of work in the Upper Clark Fork Basin and flow augmentation expertise, CFC is proposing to be the lead entity in conducting project identification, development, implementation and monitoring of flow augmentation projects in this section of lower Racetrack Creek in coordination with NRDP staff and potentially other agencies and partners. We anticipate working in partnership with a variety of entities including: landowners, FWP, DNRC, Trout Unlimited, Columbia Basin Water Transaction Program and others within the community.

6. PROJECT SCHEDULE:

Item:	2013, 1st Q	2013, 2nd Q	2013, 3rd Q	2013, 4th Q	2014	2015-2017
Project Development, Due Diligence and Studies						
Design						
Financing/Cost Share						
Implementation (agreements/water right change apps)						
Post-Project Monitoring						

7. DRAFT BUDGET:

*Item:	Quantity:	Unit Cost:	Total Cost:	Anticipated Match:	NRDP:
Salaries/Benefits (Project Dev., Water Right App, Legal Services, 3 years Monitoring)	3,000 hours	$50/hour	**$125,000**	**$10,000**	**$115,000**
Contracted Services/Water Purchase (up to 5 projects)	5-10 cfs	Site Specific	**$1,000,000**	**$200,000**	**$800,000**
Travel	4,000 mi	$0.56	**$2,220**	**$220**	**$2,000**
Supplies/Equip. (Gages/Flow Monitoring Equip)	Varies	Varies	**$5,000**	**$0**	**$5,000**
Subtotal:			**$1,132,220**	**$210,220**	**$922,000**
Administration:	3.5	%	**$39,628**	**$10,000**	**$29,628**
Contingency:	10	%	**$113,222**	**$0**	**$113,222**
Total:			**$1,285,070**	**$220,220**	**$1,064,850**

*All items are general estimates and subject to change. Salary and benefit estimates are based on the projected cost of project development, water right applications, legal services and three years of monitoring for up to five individual projects. Refer to the separate CFC concept proposal for guidance on flow project pricing/valuation as multiple factors will need to be considered to evaluate each project on a case by case basis. Information above is not intended for pricing on individual projects, simply to provide an estimated range of potential costs/benefits. Match sources for such projects could come from: the Columbia Basin Water Transactions Program, FWP Future Fisheries Grants, NRCS EQUIP Contracts, DNRC Renewable Resource Grants and other yet to be identified sources.

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RESTORATION CONCEPT ABSTRACT SUBMITTAL FORM

1. PROJECT TITLE: Warm Springs Creek Flow Enhancement

2. ORGANIZATION AND CONTACT:

Contact/Entity	Address:	Phone/Email:
Andy Fischer Project Manager, Clark Fork Coalition (CFC)	140 S. 4th St. W. #1 PO Box 7593 Missoula, MT 59807	(406) 542-0539 x210 andy@clarkfork.org

3. PROJECT PURPOSE AND BENEFITS:

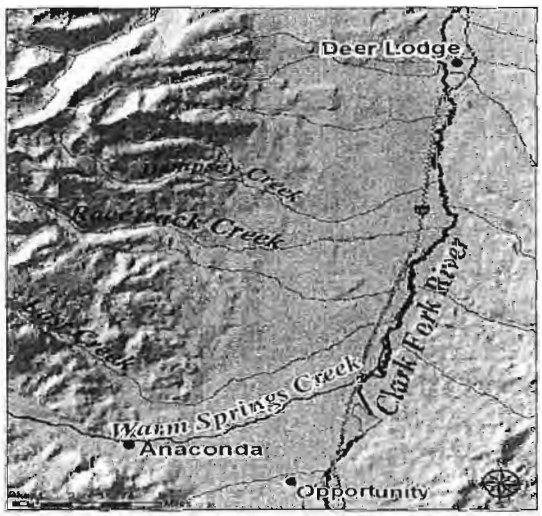
The purpose of this restoration concept is to identify, develop and implement projects with private landowners (such as irrigation efficiency, water leases and purchases, sources switches and point of diversion changes) that enhance flows in lower Warm Springs. While some specific projects of this type have been identified in this reach of the lower Warm Springs Creek and proposed as separate abstracts, to achieve large scale instream flow restoration, it will be necessary for NRDP to fund work to identify, develop and implement additional projects.

Flow augmentation projects will provide benefits to the aquatic resources of the UCFRB and to the public's use and enjoyment of those resources, including restoring up to 10 to 20 cubic feet per second (cfs) of flow for the benefit of the fishery within lower Warm Springs Creek. Lower Warm Springs Creek has been identified by NRDP as a **Priority 1 area for flow augmentation** in its *Prioritization of Areas in the Upper Clark Fork River Basin for Fishery Enhancement* (Dec. 2011). Flow augmentation has also been identified as a "encouraged restoration activity" in the lower Warm Springs Creek by NRDP in its *Final Upper Clark Fork River Basin Interim Restoration Process Plan*, Attachment 5-2 (May 2012).

In addition to meeting NRDP's aquatic habitat priorities, flow augmentation projects must also possess a mutual benefit for landowners to incentive their participation. Such incentives can take the form of opportunities to modernize irrigation infrastructure, lower operational costs, and/or provide alternatives sources of income. Example projects include lining or piping ditches, improving the application of irrigation water through switches to more efficient sprinkler systems, relocating a point of diversion closer to the intended place of use, or leasing/selling water rights.

4. PROJECT LOCATION:

Specific projects within this section of the Warm Springs have not yet been identified as part of this concept proposal. All projects and participation would be voluntary in nature. Landowners possessing water rights to this section of creek or on tributaries that could enhance this section of creek are the target audience. Potential projects could be prioritized based on factors such as: the quantity of instream flow contribution (at least one cfs), relative priority of the associated water rights (length of protectable reach), evidence of historic beneficial use of the water rights (as defined by DNRC) and term of the transaction (at least 20 years with permanent transactions preferred).



5. PROJECT DESCRIPTION:

a. *Goals, Objectives*:

This restoration concept is being proposed to allow for the development and implementation of flow augmentation projects where landowners and partners have yet to be clearly identified. The **purpose** of this concept is to provide the opportunity for landowners to voluntarily engage in projects that result in an instream flow benefit in lower Warm Springs Creek. The **goal** of this concept is to prevent dewatering of this section of lower Warm Springs Creek, improve habitat conditions for fish and improve the health of the creek for future generations. The **objective** is to work together with landowners on projects that balance the needs of agriculture and the health of the creek.

b. *Components/Activities by Goal*:

The following activities (or some variation) would likely need to occur in order to achieve the goal of instream flow restoration in lower Warm Springs Creek:

- *Project Development, Due Diligence and Studies*

  To achieve instream flow restoration in this section of creek it will be important to assess interest and opportunities beyond the projects that are being submitted as separate restoration concepts. This will involve time and investment dedicated to meeting with landowners to understand their irrigation management goals and challenges, and to assess areas of mutual interest. There are many tools for achieving flow augmentation and each project will require an individualized assessment of the possible alternatives and the relative cost/benefit of each option.

  An assessment of these opportunities will require landowner meetings, water right due diligence and on-the-ground research. Once a project appears viable based on an initial assessment, quantifying potential costs/benefits of a project may require further studies, such as water savings analysis, groundwater studies and/or preliminary engineering.
- *Design*

  Projects that have strong landowner support and have completed some level of due diligence may require additional design level engineering or planning to refine project budgets or ideas. Some level of landowner commitment that details the anticipated terms of agreement (such as a letter of intent) would need to be secured before pursuing funding for implementation.
- *Financing and Cost Share*

  Submitting grant requests and securing cost share commitments from the NRDP, landowners and other partners will assist in planning for project implementation. Involving other partners and programs will make the best use of limited public resources.
- *Implementation*

  The components necessary to implement a project will vary depending on the nature of the project type. For water conservation projects this may involve contracting with irrigation suppliers, construction companies and engineers. Other types of flow augmentation projects, such as water leases may require less on-the-ground work and more negotiations, valuations and agreements. Grant agreements and contracts with individual landowners would need to be in place to ensure the necessary instream flow outcomes. In addition, water right change paperwork would need to be prepared and filed with the DNRC to allow legal protection of the instream water. The State, CFC or another to-be-determined entity would need to acquire and hold the water right and be responsible for managing and monitoring the rights instream on behalf of the public.
- *Post-Project Monitoring*

Monitoring and reporting of instream flows needs to occur in order to demonstrate beneficial use of the water rights and to ensure the flows are being left in the creek. Depending on the length of the protectable reach, monitoring instream flows can require significant time and effort in the initial years and will include working with various water users to develop efficient systems for managing flows. This concept proposes to fund the associated monitoring for the first three years of each transaction in order to set up the necessary protocols and equipment for efficiently monitoring flows at these sites. After the initial three years, the NRDP will need to assess how to budget for the long term monitoring responsibilities associated with the holding of instream flow rights or funding other entities to take on this responsibility. Please refer to the separate CFC restoration concept abstract that provides guidance regarding long-term monitoring protocols, costs and reporting.

c. ***Progress to date:***

There has been very little progress towards securing permanent, legally protected instream flow in lower Warm Springs Creek, although there have been some temporary instream flow applications over the years specifically through the management of the Silver Lake storage water. Further review of the history and status of these existing instream flow applications and agreements would be instructive. We are aware of the following studies that support instream flow restoration in Warm Springs Creek:

- In-Stream Flow Augmentation Pilot Demonstration Project 1998-2001 Summary Report, Atlantic Richfield Company, May 2002
- Habitat Benefits of Streamflow Augmentation to Warm Springs Creek, Montana, Summer 2000, Habitech, Inc., October 2000

Any efforts NRDP can make to clearly delineate the availability of funding, to clarify the requirements surrounding funding, or to identify timelines for receiving funding approval and contracts would be useful for setting clear and consistent expectations for landowners.

d. ***Description of Resource Benefit:***

Lower Warm Springs Creek is a **Priority 1 area** for NRDP aquatic restoration **and flow augmentation has been identified as an encouraged restoration activity** within this reach. In order to convert the conserved water to instream flow a change application would need to be submitted to the DNRC for review and authorization. Warm Springs Creek is one of the few tributaries in the Upper Clark Fork basin to contain recently documented (by DFWP fish surveys) bull trout populations and westslope cutthroat trout. Streamflow is one of the major limiting factors for fish populations within these stream reaches. Historical USGS gage data suggests that this reach of the Warm Springs Creek has been entirely dewatered during drought years. The DFWP 1986 Water Reservation Application determined the wetted perimeter flows for 40 cfs in lower Warm Spring Creek.

e. ***Lead entity and partners:***

Based on years of work in the Upper Clark Fork Basin and flow augmentation expertise, CFC is proposing to be the lead entity in conducting project identification, development, implementation and monitoring of flow augmentation projects in this section of lower Warm Spring Creek in coordination with NRDP staff and potentially other agencies and partners. We anticipate working in partnership with a variety of entities including: landowners, FWP, DNRC, Trout Unlimited, Columbia Basin Water Transaction Program and others within the community.

6. PROJECT SCHEDULE:

Item:	2013, 1st Q	2013, 2nd Q	2013, 3rd Q	2013, 4th Q	2014	2015-2017
Project Development, Due Diligence and Studies						
Design						
Financing/Cost Share						
Implementation (agreements/water right change apps)						
Post-Project Monitoring						

7. DRAFT BUDGET:

*Item:	Quantity:	Unit Cost:	Total Cost:	Anticipated Match:	NRDP:
Salaries/Benefits (Project Dev., Water Right App, Legal Services, 3 years Monitoring)	3,000 hours	$50/hour	**$150,000**	**$10,000**	**$140,000**
Contracted Services/Water Purchase (up to 5 projects)	10-20 cfs	Site Specific	**$1,800,000**	**$100,000**	**$1,700,000**
Travel	4,000 mi	$0.56	**$2,220**	**$220**	**$2,000**
Supplies/Equip. (Gages/Flow Monitoring Equip)	Varies	Varies	**$5,000**	**$0**	**$5,000**
Subtotal:			**$1,957,220**	**$110,220**	**$1,847,000**
Administration:	3.5	%	**$68,503**	**$10,000**	**$58,503**
Contingency:	10	%	**$195,722**	**$0**	**$195,722**
Total:			**$2,221,445**	**$120,220**	**$2,101,225**

*All items are general estimates and subject to change. Salary and benefit estimates are based on the projected cost of project development, water right applications, legal services and three years of monitoring for up to five individual projects. Refer to the separate CFC concept proposal for flow project pricing/valuation as multiple factors will need to be considered to evaluate each project on a case by case basis. Information above is not intended for pricing on individual projects, simply to provide an estimated range of potential costs/benefits. Match sources for such projects could come from: the Columbia Basin Water Transactions Program, FWP Future Fisheries Grants, NRCS EQUIP Contracts, DNRC Renewable Resource Grants and other yet to be identified sources.

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RESTORATION CONCEPT ABSTRACT SUBMITTAL FORM

1. PROJECT TITLE: Pauley Ranch Flow Enhancement (Warm Springs/Lost Creek)

2. ORGANIZATION AND CONTACT:

Contact/Entity	Address:	Phone/Email:
Andy Fischer Clark Fork Coalition	140 S. 4th St. W. #1 PO Box 7593 Missoula, MT 59807	(406) 542-0539 x210/ andy@clarkfork.org
Will and Jodi Pauley	12 Upper Racetrack Rd. Deer Lodge, MT 59722	(406) 693-9096

3. PROJECT PURPOSE AND BENEFITS:

The purpose of this abstract is to seek NRDP aquatic restoration funds to acquire approximately 9 cubic feet per second of irrigation water rights for the purpose of instream flow in Warm Spring Creek and Lost Creek. The Pauley Ranch (the water right holder) is a partner in submitting this proposal and has signed the attached letter of intent agreeing to pursue NRDP grant funding for the permanent sale of a portion of their irrigation rights in Warms Springs Creek and Lost Creek. The Pauley Ranch proposes to retain the use of these water rights until July 31st of each year to allow for one cutting of hay on their 255 irrigated acres. If NRDP funds are secured, after July 31st of each year the Pauley Ranch would discontinue their use of irrigation water and dedicate it to instream flow purposes.

The benefit to the Warm Springs Creek would be approximately 8 cfs of legally protected instream flow to restore fishery habitat and resources. Instream flow in the amount of approximately 1 cfs would be provided to Lost Creek after July 31st of each year for fishery restoration purposes. Although there are multiple priority dates associated with these rights, most of the rights are relatively senior and therefore would ensure these instream rights would be served in full during most flow scenarios. The benefit to this local ranching family is that the water right sale will provide them the necessary capital to purchase additional property to expand their agricultural operation.

4. PROJECT LOCATION AND MAP:

Refer to the attached project location map. The irrigation water has historically been diverted off of Warms Springs and Lost Creek and travels through 7-8 miles of the Gardiner Ditch until it reaches 255 center-pivot irrigated acres located near the intersection of MT HWY 273 and Upper Race Track Road, between Anaconda and Deer Lodge. The location of this project is in lower Warm Springs Creek (**NRDP Priority 1 for Aquatic Restoration**) and lower Lost Creek (**NRDP Priority 2 for Aquatic Restoration)**, both of which are major headwater tributaries to the Upper Clark Fork River. The instream water right protections would likely occur at the Gardiner Ditch point of diversion located at river mile 10 on Warm Springs Creek and would extend downstream potentially as far as the confluence with the Clark Fork River, near Warm Springs Ponds (approximately 10 miles). The instream water right protection in Lost Creek would extend from their historic point of diversion on Lost Creek (RM 10) downstream potentially to the mouth of the Clark Fork River (RM 335).

5. PROJECT DESCRIPTION:

**** Goals, Objectives:***

The **purpose** of this proposal is to seek funding from the NRDP for an instream flow acquisition in Warms Springs and Lost Creek. The **goal** of this instream flow restoration abstract is to prevent dewatering of this section of Warm Springs and Lost Creeks and ultimately the Clark Fork River, to

improve habitat conditions for fish and to improve the health of the river for future generations. The **objective** is to secure funding, apply for a water right change to the DNRC and implement the instream flow project.

Components/Activities by Goal:

The following activities (or some variation) would likely need to occur in order to achieve the goal of instream flow restoration in Warms Springs and Lost Creek:

- *Project Development, Due Diligence and Studies*

  Much of the project due diligence has already been completed by the Clark Fork Coalition through meetings with the landowner, site visits and water right research. Additional water right research, pre-project flow measurements and return flow studies could enrich our mutual understanding of the project, although would need to be reasonable in scope.

- *Design*

  Mutually agreed upon terms between the Coalition and the landowner for this water right purchase are outlined in the attached letter of intent. The NRDP may use their discretion to renegotiate or add terms based on further findings and valuations of the project. The Coalition conducted an internal valuation of the water rights based on multiple factors (such as comparable water right sales, irrigated land values and crop production values) to arrive at a proposed purchase price that we believe represents a fair value for the restoration benefits and the landowner.

- *Financing and Cost Share*

  We propose that the NRDP provide 100% of the funding for this project due to the relative importance of instream flow in these priority areas for the program. We may investigate cost share from other sources as needed. In addition to the organizational staff resources already expended to date developing this project, the Coalition may provide up to $5,000 in additional in-kind services towards water right change administration and project management.

- *Implementation*

  If funding for the project is secured, grant agreements and water right purchase agreements will need to be drafted and executed between the parties in order to ensure the transfer of title of the water rights. In addition, the water right change application would need to be submitted to the DNRC to convert the use from irrigation to instream flow. The Coalition may initiate the water right change process on behalf of the landowner early in order to provide more certainty of the instream flow outcomes. The timing of payment would need to be decided and agreed upon.

- *Post-Project Monitoring*

  Monitoring and reporting of instream flows to the DNRC and NRDP needs to occur in order to demonstrate beneficial use of the water rights and to ensure the flows are being left in the river. Depending on the length of the protectable reach, monitoring instream flows can require significant time and effort in the initial years to work with other water users and develop efficient systems for managing those flows. For permanent transactions such as this, the NRDP will need to assess how to budget for the long term monitoring responsibilities associated with holding instream flow rights. From our initial scoping of instream flow monitoring, it appears that there are USGS gaging stations conveniently located above and below the existing points of diversion on both Warm Springs and Lost Creek. These existing gaging stations could greatly reduce future costs associated with monitoring and enforcing these instream flow rights. The Coalition would consider holding and/or monitoring these instream flow rights if adequate (long-term) funding is budgeted for these responsibilities.

Progress to date:

There has been very little progress towards securing permanent, legally protected instream flow in either Warm Springs or Lost Creek, although there have been some temporary instream flow applications over the years specifically through the management of the Silver Lake storage water. Further review of the history and status of these existing instream flow applications and agreements would be instructive. We are aware of the following studies that support instream flow restoration in Warm Springs Creek:

- In-Stream Flow Augmentation Pilot Demonstration Project 1998-2001 Summary Report, Atlantic Richfield Company, May 2002
- Habitat Benefits of Streamflow Augmentation to Warm Springs Creek, Montana, Summer 2000, Habitech, Inc., October 2000

There may have been a ditch seepage study conducted on the Gardiner ditch, although the applicant has been unable to obtain this report or determine if it actually exists.

The Clark Fork Coalition has worked with Jodi and Will Pauley to complete the following project development tasks to date:

- **Landowner meetings**- multiple meetings have been held with the landowners to learn more about their irrigation management goals and discuss the process of engaging in an instream flow project. Site visits of the irrigated acreage and diversion facilities have been conducted.
- **Water right research**- we've reviewed the water rights and claims and have not encountered any major issues. The claimed water rights on Warm Springs Creek (18 cfs) and Lost Creek (2 cfs) are much higher than the DNRC standard for beneficial use of 17 gpm/acre. It is common to encounter water right claims that exceed DNRC standards for beneficial use. Unless subsequent ditch measurements and historical use information can be obtained to substantiate this claimed use, we estimate that the amount of these water right claims that could be changed by the DNRC to instream flow might be closer to 8 cfs of Warms Springs and 1 cfs in Lost Creek.
- **Historical water use analysis**- the water resource survey substantiates the claimed irrigated acreage based on our initial analysis. Measurements of current ditch capacity and usage also substantiate at least 9 cfs available for instream flow. There appears to be consistent beneficial use on the acreage and adequate diversion and conveyance systems for delivering the water.
- **Risk assessment**- our analysis has not indicated or uncovered any unusual risks associated with this project. We do not anticipate any adverse effect or injury to other water users through this instream flow change process.
- **Valuation of the water rights**- the Coalition has conducted an alternatives analysis to estimate the relative value of the water right. This value is cost effective for restoration purposes and is accepted by the landowner as outlined in the attached letter of intent.
- **Letter of intent to proceed with the project**- before filing this application, initial terms of agreement for the timing, quantity and proposed compensation were reached between the landowners and the Coalition (see attached). If approved we understand that NRDP may elect to negotiate their own terms of agreement with the landowner.

Based on the Coalition's initial groundwork, this project is ready to implement. The landowner is extremely interested in seeing this project move forward at an accelerated pace to align with their goals of expansion of their agricultural operation.

Description of Resource Benefit:

Lower Warm Springs Creek is a **Priority 1 area** and lower Lost Creek is a **Priority 2 area** for NRDP aquatic restoration **and flow augmentation has been identified as an encouraged restoration activity** within these reaches according to the Final Upper Clark Fork River Basin Interim Process Plan. Warm Springs Creek is one of the few tributaries in the Upper Clark Fork basin to contain recently documented (by DFWP fish surveys) bull trout populations and westslope cutthroat trout. Streamflow is one of the major limiting factors for fish populations within these stream reaches. Historical USGS gage data suggests that this reach of the Warm Springs Creek has been entirely dewatered during drought years. Lost Creek stream gage data near Galen also indicates significant dewatering within this reach. The DFWP 1986 Water Reservation Applications of wetted perimeter data determined that the target instream flows are for 40 cfs in lower Warm Springs and 16 cfs for Lost Creek. This project will make significant gains in Warms Springs Creek towards meeting the wetted width requirements to sustain aquatic life (20-25%) and ensure permanent protections of fishery habitat.

Lead entity and partners:

The Clark Fork Coalition is proposing to be the lead entity in partnership with the landowners Jodi and Will Pauley in conducting any further project development, implementation and possibly monitoring of this instream flow project. We anticipate working in coordination with NRDP staff and possibly other agencies or partners such as: other water right holders, FWP, DNRC, Trout Unlimited, Columbia Basin Water Transaction Program and others within the community.

6. PROJECT SCHEDULE:

The landowner is interested in seeing this project move forward at an accelerated pace in order to align with their plans for expansion of their agricultural operation. They are in the process of purchasing another ranch and would benefit from having additional capital from this project available as soon as possible.

Item:	2012,	2013, 1st Q	2013, 2nd Q	2013, 3rd Q	2013, 4th Q	2014-?
Project Development, Due Diligence and Studies						
Design						
Financing/Cost Share						
Implementation (agreements and water right change apps)						
Post-Project Monitoring						

7. DRAFT BUDGET:

*Item:	Quantity:	Unit Cost:	Total Cost:	Anticipated Match:	NRDP:
Salaries/Benefits (Project Development, Water Right App, Legal Services, 3 years Monitoring):	125 days	$400	$ 50,000	$5,000	$45,000
Contracted Services (Water Right Purchase)	6-9 cfs	Site Specific	$500,000	$0	$500,000
Travel:	4,000 mi	$0.555	$2,220	$0	$2,200
Supplies/Equip. (Gages/Flow Monitoring Equip):	Varied	Varied	$2,000	$0	$2,000
Subtotal:			**$554,220**	**$5,000**	**$549,220**
Administration:	3.5	%	$ 19,940	$0	$19,940
Contingency:	5	%	$ 27,711	$0	$27,711
Total:			**$601,871**	**$5,000**	**$596,871**

*All items are general estimates and subject to change. Project valuation information is available upon request.

Attachment A: Project Location Map

Letter of Intent for Water Right Purchase and Sale

between

Clark Fork Coalition

and

Will and Jodi Pauley

This letter of intent (this "Letter"), dated as of June 6, 2012, is executed by Clark Fork Coalition, Inc., a Montana nonprofit corporation, 140 S. 4th Street West, Missoula, Montana (the "Coalition"), and William and Jodi Pauley, 12 Upper Racetrack Road, Deer Lodge, Montana (the "Pauleys"). The Coalition and the Pauleys are sometimes referred to herein individually as "Party" and collectively as "Parties."

The purpose of this Letter is to confirm the intent the Parties to enter into a purchase and sale agreement wherein the Coalition would purchase and the Pauleys would sell a portion of their water rights to be used for instream flow purposes in Warm Springs Creek and Lost Creek under the following terms and any additional terms which the Parties negotiate:

1. Water Rights to be Transferred. The water rights to be transferred will include a portion of all of the water rights historically used to irrigate the 255 acre place of use on the Pauley Ranch as set forth in the attached Exhibit A. The Pauleys will retain the use of the water rights until July 31st of each year and the Coalition will purchase the right to use the water rights beginning on August 1 of each year in perpetuity. The Parties understand that the actual amount of water assigned to each Party will be determined through the water right change process through the Montana Department of Natural Resources and Conservation (DNRC).

2. DNRC Application. The Parties understand that, upon execution of a purchase and sale agreement, an application will be made to the DNRC to change the portion of the water rights that will be transferred to the Coalition and applied to an instream use. In addition, the Parties will submit an application to sever the transferred portion of the water rights from the land. The Coalition will be responsible for preparing and filing the applications with the DNRC and will be the primary point of contact for the applications. The Pauleys will cooperate with the Coalition in providing access to the property and other necessary information regarding historic and current water use.

It is anticipated that the DNRC application process will take 12 to 24 months. If substantial objections or delays of more than 2 years are encountered in the change application process, the Parties may mutually elect to terminate the application and lease agreement.

3. Purchase Price. The Coalition will use its best efforts to secure **$500,000** to purchase the water rights (the "Purchase Price"). The Parties acknowledge that the Coalition will be applying to the State of Montana Natural Resource Damage Program Restoration Fund (the "NRDP") to fund the Purchase Price.

4. Conditions to Agreement. Payment of the Purchase Price is contingent upon: (1) successfully securing funding from the NRDP; and (2) DNRC approval of the change of use application for instream flow. If both conditions are met, funding would likely be dispersed in one lump sum within 45 days of receipt of the change authorization.

5. Timeline. The Parties anticipate the following schedule to complete the transaction.

Activity:	Summer 2012	Fall 2012	Winter 2013	Spring 2013	Summer 2013	2014-2017
Funding:	Apply for Grants	Receive preliminary funding recommendations	Final Grant Approval	Grant/water purchase contracts	Distribute Funding?	Distribute Funding?
DNRC Change Application:	Prepare and Submit Application			Receive Change Authorization?		
Monitoring:	Pre-Project Flow Monitoring				Begin required flow monitoring	Monitoring/ Reporting

The Parties understand that the timeline above is a best estimate of the process. The main variables in this timeline are the submission and approval of the DNRC change application. The Coalition intends to move forward with submitting this change application as soon as feasibly possible. If DNRC is able to approve this change without encountering objections or delays the Parties expect that an approved change could be in place by as early as June of 2013.

6. Access. The Parties understand that it will be necessary for the Coalition to collect information on irrigation use, such as ditch capacity, diversion structures, and number of acres irrigated. The Pauleys will allow representatives from the Coalition reasonable access to the property and diversion facilities for the purposes of monitoring instream flow and irrigation use, and the Coalition will provide reasonable notice to the Pauleys for access.

7. Communicating with the state and public about the transaction. The Parties understand that it will be necessary to communicate with the NRDP and the general public about this project in order to gain funding support. The Parties understand that they may be asked to be quoted and/or photographed for the purposes of engaging the public and demonstrating project support, and the Parties will agree to reasonable requests to do so.

8. Superseding Water Right Purchase and Sale Agreement. Upon securing preliminary grant funding approval the Parties will enter into a superseding water right

purchase and sale agreement that includes the general elements described above and any additional elements negotiated between the Parties.

WILL PAULEY

Will Pauley 6-8-12

JODI PAULEY

Jodi L Pauley

CLARK FORK COALITION

By: Karen Knudsen

Karen Knudsen
Executive Director

EXHIBIT A: Pauley Surface Water Rights

Water Right	Priority Date	Src Name	Flow Rate	Acres
76G 30045545	18660415	WARM SPRINGS CREEK	0.21	255
76G 30045547	18660501	WARM SPRINGS CREEK	0.33	255
76G 30045530	18660701	WARM SPRINGS CREEK	0.02	255
76G 30045550	18690501	WARM SPRINGS CREEK	0.41	255
76G 30045566	18691231	WARM SPRINGS CREEK	0.28	255
76G 30045551	18700501	WARM SPRINGS CREEK	0.43	255
76G 30045568	18720630	LOST CREEK	0.41	255
76G 30045540	18730501	WARM SPRINGS CREEK	0.20	255
76G 30045542	18730501	WARM SPRINGS CREEK	0.21	255
76G 30045549	18730515	WARM SPRINGS CREEK	0.41	255
76G 30045567	18740430	LOST CREEK	0.41	255
76G 30045539	18770501	WARM SPRINGS CREEK	0.19	255
76G 30045538	18771001	WARM SPRINGS CREEK	0.17	255
76G 30045560	18780501	WARM SPRINGS CREEK	0.86	255
76G 30045556	18790915	WARM SPRINGS CREEK	0.60	255
76G 30045565	18800331	LOST CREEK	0.19	255
76G 30045546	18800530	WARM SPRINGS CREEK	0.33	255
76G 30045532	18800601	WARM SPRINGS CREEK	0.08	255
76G 30045536	18800701	WARM SPRINGS CREEK	0.10	255
76G 30045548	18801001	WARM SPRINGS CREEK	0.41	255
76G 30045554	18810405	WARM SPRINGS CREEK	0.51	255
76G 30045543	18810701	WARM SPRINGS CREEK	0.04	255
76G 30045544	18820601	WARM SPRINGS CREEK	0.21	255
76G 30045558	18820703	WARM SPRING CREEK	0.62	255
76G 30045559	18830606	WARM SPRINGS CREEK	6.19	255
76G 30045563	18831231	LOST CREEK	0.13	255
76G 30045553	18840601	WARM SPRINGS CREEK	0.51	255
76G 30045533	18850515	WARM SPRINGS CREEK	0.08	255
76G 30045537	18850601	WARM SPRINGS CREEK	0.17	255
76G 30045552	18850701	WARM SPRINGS CREEK	0.48	255
76G 30045535	18860601	WARM SPRINGS CREEK	0.08	255
76G 30045564	18880630	LOST CREEK	0.18	255
76G 30045531	18890415	WARM SPRINGS CREEK	0.06	255
76G 30045534	18890601	WARM SPRINGS CREEK	0.08	255
76G 30045569	18900430	LOST CREEK	0.42	255
76G 30045557	18980601	WARM SPRINGS CREEK	0.62	255
76G 30045541	19020601	WARM SPRINGS CREEK	0.21	255
76G 30045555	19150225	WARM SPRINGS CREEK	0.58	255
76G 30045562	19150225	WARM SPRINGS CREEK	0.41	255
76G 30045561	19150227	WARM SPRINGS CREEK	0.41	255

Total:	Warm Springs	16.5
Total:	Lost Creek	1.74
Total:		18.24

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RESTORATION CONCEPT ABSTRACT SUBMITTAL FORM

1. PROJECT TITLE: Pilot Flow Project Fund

2. ORGANIZATION AND CONTACT:

Contact/Entity	Address:	Phone/Email:
Andy Fischer. Project Manager, Clark Fork Coalition	140 S. 4th St. W. #1 PO Box 7593 Missoula, MT 59807	(406) 542-0539 x210 andy@clarkfork.org

3. PROJECT PURPOSE AND BENEFITS:

The purpose of this restoration concept is to identify, develop and implement pilot flow restoration projects with private landowners in Priority 1 and 2 areas to restore aquatic habitat. These pilot projects would last 1-10 years, with the goal of renewing these flow restoration contracts to secure long-term, permanent flow protection. The intent of a Pilot Flow Project Fund is to introduce instream flow projects to landowners who may have reservations about engaging in permanent transactions. These shorter-term pilot projects will build trust and understanding with participating landowners, and also demonstrate the mutual benefits of flow restoration. Through pilot water projects, landowners and the NRDP can also learn whether a project meets both parties' objectives and is worth continuing into the future.

The objective of this Fund is to prioritize projects that will lead to long-term or permanent flow restoration projects. Pilot flow restoration projects would include irrigation efficiency upgrades, water leases and purchases, sources switches and point of diversion changes. The Upper Clark Fork River and several of the tributaries in Priority Areas 1 and 2 require intensive flow restoration in order to restore watershed health and maintain and improve fisheries. Although several abstracts have been submitted to NRDP for specific flow restoration projects, these projects alone will not meet the instream flow targets that are required to improve the fishery in the Upper Clark Fork. This Fund would allow CFC and partners to engage water users and pursue additional projects that meet long-term aquatic restoration goals.

The benefits to the aquatic resources of the Upper Clark Fork River Basin and to the public's use and enjoyment of those resources include:

- Flow restored for the benefit of the fishery within the Clark Fork River and its tributaries. Projects would target **Priority 1 and 2 areas for instream flow restoration** based upon the *Prioritization of Areas in the Upper Clark Fork River Basin for Fishery Enhancement* (Dec. 2011).

4. PROJECT LOCATION AND MAP:

Specific projects have not been identified, but would encompass priority 1 and 2 areas for flow enhancement. All projects and participation would be voluntary in nature. Potential projects could be prioritized based on factors such as: the quantity of instream flow contribution (at least one cfs), relative priority of the associated water rights (length of protectable reach) and evidence of historic beneficial use of the water rights (as defined by DNRC). For a location map of the priority areas, please refer to page 53 of the *Final Upper Clark Fork River Basin Interim Restoration Process Plan by the NRDP, May 2012*.

5. PROJECT DESCRIPTION:

*** Goals, Objectives:**

This restoration concept will allow for the development and implementation of pilot instream flow projects that develop into permanent water transactions that protect instream flow for the benefit of aquatic resources. The **purpose** of this concept is to provide the opportunity for landowners to voluntarily engage in innovative contracts that result in an instream flow benefit, and to allow them to "test drive" projects to secure their participation in long-term, permanent instream flow transactions. The **goal** of this concept is to temporarily prevent dewatering in key sections of the Clark Fork watershed and pursue projects that lead toward longer-term benefit for fisheries. The **objective** is to work together with landowners on projects that balance the needs of agriculture and the health of the river.

***Components/Activities by Goal:**

The following activities (or some variation) would likely need to occur to implement the Pilot Flow Project Fund:

- *Project Development, Due Diligence and Studies*

  This proposal entails assessing landowner interest in flow projects, and evaluating additional flow restoration opportunities beyond the projects that were submitted as separate abstracts to NRDP. This will require meeting with dozens of landowners to understand their irrigation management goals and challenges, and to assess areas of mutual interest. There are many tools for achieving instream flow restoration, and each project will require an individualized assessment of the possible alternatives and the relative cost/benefit of each option. Assessment methods will include landowner meetings, water right due diligence and on-the-ground research of site-specific water use and dewatered stream sections. Once a project appears viable based on an initial assessment, quantifying potential costs/benefits of a project may require further studies, such as water savings analysis, groundwater studies and/or preliminary engineering designs.

- *Design*

  Projects that have strong landowner support and have completed some level of due diligence may require additional design-level engineering or planning studies to refine project budgets or ideas. Some level of landowner commitment that details the anticipated terms of agreement (such as a letter of intent) would need to be secured before pursuing funding for implementation.

- *Financing and Cost Share*

  Submitting grant requests and securing cost-share commitments from the NRDP, landowners and other partners is a critical step for successful project implementation. Involving other partners and programs will make the best use of limited public resources.

- *Implementation*

  The components necessary to implement a flow restoration project will vary depending on the nature of the project. Grant agreements and contracts with individual landowners would need to be in place to ensure the necessary instream flow outcomes. In addition, water right change paperwork would need to be filed with the DNRC to allow legal protection of the instream water, although there may be some circumstances where filing an instream change is not practical and the same aquatic resource benefits could be achieved through a diversion reduction agreement. The Clark Fork Coalition, the State or another conservation entity would need to acquire or hold the water right in their name and be responsible for enforcing and monitoring the instream rights after the contract is implemented.

Any projects implemented via the Pilot Flow Project Fund would have a contract clause detailing steps and expectations for renewing the project after the water leasing term is complete. The goal is to allocate funds to projects that have a high likelihood of turning into long-term transactions that protect water in-stream permanently.

- *Monitoring*

  Monitoring and reporting of instream flows needs to occur in order to demonstrate beneficial use of the water rights and to ensure the contracted water is left in the river or stream. In addition, the monitoring data is vital for demonstrating the benefits of pilot projects, as the data informs how best to renew the short-term instream flow contracts and structure flow restoration projects in ways that have the biggest benefit for fisheries ands aquatic resources.

  Depending on the length of the protectable reach, monitoring instream flows can require significant time and effort in the initial years and will include working with various water users to develop efficient systems for managing flows. This concept proposes to fund the associated monitoring for the first three years of each transaction in order to set up the necessary protocols and equipment for efficiently monitoring flows at these sites. After the initial three years, the NRDP will need to assess how to budget for the longer term monitoring responsibilities associated with temporarily leasing water rights or requesting other entities to take on this responsibility. *Please refer to the separate Clark Fork Coalition restoration concept abstract that provides guidance regarding monitoring protocols, costs and reporting.*

***Progress to date:**

The applicant is aware of at least 4 previous short-term or pilot instream leases or diversion reduction agreements in the Upper Clark Fork, at least two of which are likely to lead to long-term/permanent projects (Westside Ditch and Helen Johnson Ditch water conservation). The Columbia Basin Water Transaction Program, which is funded through Bonneville Power Administration, has been supporting both short-term and long-term water projects for over 10 years. In the Coalition's experience, temporary water projects can be a way to build trust with landowners and work towards more lasting solutions. They also lead to thoroughly vetted long-term projects, as the monitoring data collected during the short-term lease inform how best to structure a long-term flow restoration project.

***Description of Resource Benefit:**

Temporary projects would occur in **Priority 1 and 2 areas** for NRDP aquatic restoration where **flow augmentation has been identified as one of the encouraged restoration activities** based on the Final Upper Clark Fork River Basin Interim Process Plan (May 2012). Areas of severe dewatering would be targeted and temporary flow enhancement projects would be used as a way to potentially gain increased landowner interest and participation. Projects would provide quantifiable amounts of instream flow and address limiting factors within these tributaries to enhance aquatic resources.

***Lead entity and partners:**

CFC proposes to act as the lead entity in conducting project identification, development, implementation and monitoring of instream flow in coordination with NRDP staff and potentially other agencies and partners. We anticipate working in partnership with a variety of entities including: landowners, FWP, DNRC, Trout Unlimited, Columbia Basin Water Transaction Program and others within the community.

6. PROJECT SCHEDULE:

Item:	2013, 1st Q	2013, 2nd Q	2013, 3rd Q	2013, 4th Q	2014	2015	2016
Project Development, Due Diligence and Studies							
Design							
Financing/Cost Share							
Implementation (agreements and water right apps)							
Post-Project Monitoring							

7. DRAFT BUDGET:

*Item:	Quantity:	Unit Cost:	Total Cost:	Anticipated Match:	NRDP:
Salaries/Benefits (Project Development, Water Right Apps, Legal Services, Up to 3 years Monitoring):	4,000 hours	$50/hour	$ 200,000	$50,000	$150,000
Contracted Services/Water Leases (up to 10 projects):	TBD cfs	Site Specific	$800,000	$100,000	$700,000
Travel:	4,000 mi	$0.555	$2,220	$220	$2,000
Supplies/Equip. (Gages/Flow Monitoring Equip):	Varied	Varied	$5,000	$0	$5,000
Subtotal:			**$1,007,220**	**$150,220**	$857,000
Administration:	3.5	%	$ 35,253	$5,000	$30,253
Contingency:	10	%	$100,722	$0	$100,722
Total:			**$1,143,195**	**$155,220**	**$987,975**

*All items are general estimates and subject to change. Salary and benefit estimates are based on the projected cost of project development, water right applications, legal services and three years of monitoring for up to ten individual projects. Refer to the separate guidance document submitted by CFC on flow project pricing/valuation as multiple factors will need to be considered to evaluate each project on a case by case basis. Match sources for such projects could come from: the Columbia Basin Water Transactions Program, FWP Future Fisheries Grants, NRCS EQUIP Contracts, DNRC Renewable Resource Grants and other yet to be identified sources.

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RESTORATION CONCEPT ABSTRACT SUBMITTAL FORM

1. PROJECT TITLE: Racetrack Water Users Association Irrigation Efficiency and Energy Conservation Project—Phases 1, 2 and 3

2. ORGANIZATION AND CONTACT:

Contact/Entity	Address:	Phone/Email:
Andy Fischer, Project Manager Clark Fork Coalition (CFC)	140 S. 4th St. W. #1 PO Box 7593 Missoula, MT 59807	(406) 542-0539 x210 andy@clarkfork.org
Ted Beck, Chairman Racetrack Water User Association (RWUA)	325 Sun Ridge Road Deer Lodge, MT 59722	Available upon request.

3. PROJECT PURPOSE AND BENEFITS:

The purpose of this abstract is to seek NRDP support and funding to implement a series of irrigation pipeline projects that would benefit agriculture and provide instream flow to Racetrack Creek, improve fish passage and eliminate fish entrainment.

The Racetrack Water Users Association Water Efficiency and Energy Conservation Project – Phases 1, 2 and 3 is a project that will provide tremendous surface water, energy, and fishery habitat benefits with additional benefits to the local economy and overall health of the Racetrack Creek watershed. Racetrack Creek has been identified as chronically dewatered by Montana Fish, Wildlife, and Parks and an aquatic restoration **Priority 1 area** by the Natural Resource Damage Program. The irrigators are seeking solutions to replace their antiquated canal systems and reduce energy costs associated with pumping irrigation water.

This project entails upgrading aged irrigation infrastructure with modern designs resulting in water conservation, the reduction of energy consumption, prevention of fish entrainment in the canal and the return of **up to 20 cfs of in-stream flows into Racetrack Creek**. Conversion of concrete-lined ditches and earth lined ditches to a gravity pressurized pipeline for the Cement and Morrison ditches will improve irrigation infrastructure and water use efficiency. The need for the project is precipitated by aging irrigation infrastructure combined with stakeholder interest in restoring flows and fishery habitat in Racetrack Creek. The Cement Ditch was lined in the 1960's and is in need of serious repair or replacement. Seepage rates on Cement Ditch of approximately 10% have been verified through measurements and will likely increase as the cement continues to crack and degrade.

The benefits to Racetrack Creek and public include:

Phase 1 (Piping Upper and North Branch Sections of Cement Ditch)

- Dedication of approximately 4 cubic feet per second (cfs) to instream flow purposes (refer to attached letter of intent signed by the water users).
- Improved fish passage and elimination of a fish entrainment source
- Annual energy conservation of approximately 327,000 Kilowatt Hours (KWH) annually

Phase 2 (Piping Morrison Ditch)

- Potential instream flow benefit of approximately 5 cfs at low flow conditions to approximately 12 cfs under ditch-full conditions (DNRC Seepage Report) if agreements can be reached between the water right holders.
- Improved fish passage and elimination of a fish entrainment source

- Energy conservation of at least 41,247 KWH annually

Phase 3 (Piping South Branch of Cement Ditch)

- Approximately 4 cfs of water savings that could be converted to instream flow if agreements can be reached with the water rights holders.
- Energy conservation of at least 63,014 KWH annually

In addition to meeting the NRDP specific priorities for aquatic restoration, potential benefits to landowners and community of these restoration projects include:

- Reduced energy costs associated with pumping irrigation water
- Improved and modernized irrigation system
- Secure and reliable source of irrigation water
- Reduced operations and maintenance costs

4. PROJECT LOCATION AND MAP:

Refer to the attached project location maps for Phases 1, 2 and 3. Racetrack Creek is an east flowing tributary to the Upper Clark Fork River located between Deer Lodge and Warm Springs, MT. The Cement and Morrison ditches represent the largest irrigation canals off of Racetrack Creek and services approximately 23 landowners across roughly 4,000 irrigated acres of alfalfa, potatoes, grain and pasture. Irrigation demands during the summer often dry up Racetrack Creek in multiple sections of the lower 7 miles, creating challenging conditions for fish passage and survival.

5. PROJECT DESCRIPTION:

*** Goals, Objectives:**

This abstract is being proposed based on a mutual interest among the Racetrack Water Users and the Coalition in seeking more efficient and reliable means of delivering their irrigation water and improving the health of Racetrack Creek. The **purpose** of this abstract is to secure funding for further planning, engineering and implementation of a gravity irrigation pipeline system off of Racetrack Creek that will result in instream flow improvements. The **goals** of this project are to enhance the viability of agriculture in the area while restoring habitat conditions for fish and improving the health of the creek for future generations. The **objective** is to work in partnership with Racetrack Water Users, NRDP and others to design and implement Phases 1, 2 and 3 of the gravity pipeline project.

***Components/Activities by Goal and Progress to Date:**

Each of the three proposed phases of the projects are in varying stages of development and have completed some of the activities described below. An engineering study sponsored by the Deer Lodge Valley Conservation District progressed project planning and designs significantly in the past year through the issuance of a Preliminary Engineering Report (Phase 1) and a Capital Improvement Plan (Phases 2 and 3). The following activities (or some variation) would likely need to occur in order to achieve successful implementation and the goal of instream flow restoration in Racetrack Creek:

Project Development, Due Diligence and Studies Status:

- ***Phase 1- (Upper Cement Ditch and North Branch):*** Project development is largely complete as a result of the engineering study sponsored by the Deer Lodge Valley Conservation District. Tasks completed to date include: preliminary engineering, multiple water user meetings, flow measurements, water right research, energy savings analysis, pipeline alignment reviews and quantification of the resource benefits (refer to the attached letter of intent signed by the North Branch water users). Preliminary discussions with adjacent property owners have occurred regarding potential piping and possible ditch realignment.

- ***Phase 2 (Morrison Ditch):*** Some level of project development has been completed through the development of the capital improvement plan for the overall irrigation system and multiple meetings have been held with the water users. The majority of water right holders on this ditch have expressed strong support in moving this project forward. Further studies, meetings and agreement among all of the water users regarding their willingness to commit any water savings to instream flow needs to occur.
- ***Phase 3 (South Branch of Cement Ditch):*** Some level of project development has been completed through the development of a capital improvement plan for the overall irrigation system and multiple meetings have been held with the water users. Further studies, seepage measurements, meetings and agreement among all of the water users regarding their willingness to commit any water savings to instream flow needs to occur.

Design Status:

- ***Phase 1- (Upper Cement Ditch and North Branch):*** Engineering designs were completed through the Preliminary Engineering Report conducted by Morrison Maierle, Inc (see attached). Initial terms of agreement are spelled out in the letter of intent signed by the water users. Final engineering and securing easement agreements for any realignment of the ditch will be required to implement the project.
- ***Phase 2 (Morrison Ditch):*** Initial appraisal level designs and costs have been completed as part of the system Capital Improvement Plan conducted by Morrison Maierle, Inc.
- ***Phase 3 (South Branch of Cement Ditch):*** Initial appraisal level designs and costs have been completed as part of the system Capital Improvement Plan conducted by Morrison Maierle, Inc.

Financing and Cost Share

- ***Phase 1- (Upper Cement Ditch and North Branch):*** A detailed financing plan has been developed that includes up to a 25% landowner cost share and 75% grant funding through a variety of sources including the NRDP. A $100,000 grant has already been submitted for consideration to the DNRC Renewable Resource Grant Program.
- ***Phase 2 (Morrison Ditch):*** Cost share is proposed from the NRDP, landowners and others. Further detail to be determined.
- ***Phase 3 (South Branch of Cement Ditch):*** Cost share is proposed from NRDP, landowners and others. Further detail to be determined.

Implementation

- The components necessary to implement the project may involve contracting with irrigation suppliers, construction companies and engineers. Grant agreements and contracts with individual landowners would need to be in place to ensure the necessary instream flow outcomes. In addition, water right change application paperwork would need to be filed with the DNRC for the term of the agreement in order to allow legal protections of the instream water. The Clark Fork Coalition, the State or another conservation entity would need to acquire or hold the water right in their name and would be responsible for enforcing and monitoring the instream rights.

Post-Project Monitoring

- Monitoring and reporting of instream flows will need to occur in order to demonstrate beneficial use of the water rights and to ensure the flows are in fact being left in the river. Since there are 8 major downstream diversions, monitoring instream flows may require significant time and effort in the initial years and will include working with various water users to develop efficient systems for managing flows. This abstract proposes to fund the associated monitoring for the first three years of each transaction in order to set up the necessary protocols and equipment for efficiently monitoring flows at these sites. After the initial three years, the NRDP will need to assess how to budget for the long term monitoring responsibilities associated with

the holding of instream flow rights or requesting other entities to take on this responsibility. Please refer to the separate Clark Fork Coalition abstract that provides guidance regarding long-term monitoring protocols, costs and reporting.

***Description of Resource Benefit:**
Racetrack Creek is a **Priority 1 area** for NRDP aquatic restoration **and flow augmentation, fish passage improvement and ditch screening have been identified as encouraged restoration activities** according to the Final Upper Clark Fork River Basin Interim Process Plan. If fully implemented, this three phase project could provide **approximately 10 cfs instream at times of low flow and up to 20 cfs during high flow periods**, the fishery will benefit from increased habitat, connectivity between fish populations, and connectivity of spawning habitat in Racetrack Creek to fish populations in the mainstem of the Clark Fork. We expect that a significant portion of the flows conserved by this project could be protected to the creek's confluence with the Clark Fork River, although further research and measurements would need to occur to establish the exact quantity. If ditch screening and passage improvements were made as part of these infrastructure projects, additional gains can be made through the **elimination of two fish entrainment sources and improved fish movement and migration**.

An Assessment of Fish Populations and Riparian Habitat in Tributaries of the Upper Clark Fork Basin by Montana Fish Wildlife and Parks, 2008, provides information that Racetrack Creek above the Cement Ditch headgate has healthy populations of trout including native westslope cutthroat trout, and abundant spawning habitat. The report additionally cites that below the Cement Ditch and other diversions Racetrack Creek was completely dry during the survey in August of 2008. A major first step in restoring flows in Racetrack Creek was achieved in 2011 through the NRDP purchase of storage water from Racetrack Lake, although there is still much work to do to fully restore flows in the creek. According to Jason Lindstrom, the MT Fish Wildlife and Parks Fisheries Biologist, this **dewatering both reduces rearing habitat and isolates fish populations and spawning habitat in upper Racetrack Creek from the mainstem Clark Fork River**. The water left instream under this proposed project will rewater the lower channel, providing habitat for aquatic life in the lower seven miles of Racetrack Creek, and reconnect habitat and fish populations in upper Racetrack Creek with the mainstem of the Clark Fork River. Achieving **10-20 cfs of flow protection** would provide significant gains towards securing enough clean water to restore the fishery. In addition, water right holders on the proposed project have indicated that they would likely switch from flood to sprinkler irrigation, which could result in further water savings and additional instream flow.

***Lead entity and partners:**
The Clark Fork Coalition is proposing to be the lead entity on this project in partnership with the Racetrack Water Users Association and Deer Lodge Valley Conservation District. We also anticipate working in coordination with NRDP staff, engineers and potentially other agencies and entities such as the NRCS, NCAT, TU and WRC to implement the project.

6. PROJECT SCHEDULE:
Phase 1 piping on the Upper Cement Ditch and North Branch is nearly **ready for implementation** once final engineering has been completed, new easements are secured and final agreements are executed with the water right holders. With investments in further project development and engineering, subsequent phases could happen in tandem or occur sequentially.

Item:	2013, 1st Q	2013, 2nd Q	2013, 3rd Q	2013, 4th Q	2014	2015	2016	2017
Project Development								
Design								
Financing and Cost Share								
Implementation								
Monitoring								

7. DRAFT BUDGET:

*Item:	Quantity:	Unit Cost:	Total Cost:	Match:	NRDP:
Phase 1- Cement Ditch Piping, Screening and Passage: Upper and North Branch					
Salaries/Benefits:	1,600 hours	$50/hour	$ 80,000	$10,000	$70,000
Contracted Services: Piping	4 cfs	Varied	$2,833,200	$903,000	$1,930,200
Fish Screen/Passage	1 Diversion		$118,700	$0	$118,700
Engineering/Const. Mgmt.			$468,700	$0	$468,700
Travel:	4,000 mi	$0.555	$2,220	$220	$2,000
Supplies/Equip. (Monitoring):	Varied	Varied	$2,200	$200	$2,000
Administration/Overhead:	1.5	%	$52,575	$10,000	$42,575
Subtotal:			**$3,556,329**	**$929,420**	**$2,634,175**
Phase 2- Morrison Ditch Piping and Screening					
Salaries/Benefits:	1,600 hours	$50/hour	$ 80,000	$10,000	$70,000
Contracted Services: Piping	12 cfs	Varied	$2,642,000	$150,000	$2,492,000
Fish Screen/Passage	1 Diversion		$118,700		$118,700
Travel:	4,000 mi	$0.555	$2,220	$220	$2,000
Supplies/Equip. (Monitoring):	Varied	Varied	$2,200	$200	$2,000
Administration/Overhead:	1.5	%	$42,677	$0	$42,677
Subtotal:			**$2,887,797**	**$160,420**	**$2,727,377**
Phase 3- Cement Ditch Piping: South Branch	4 cfs	Varied	$2,000,000	$500,000	$1,500,000
Salaries/Benefits (Project Dev.):	1,600 Hours	$50	$80,000	$10,000	$70,000
Travel:	4,000 mi	$.0555	$2,220	$220	$2,000
Administration/Overhead	1.5	%	$31,233	$0	$31,233
Subtotal:			**$2,113,453**	**$510,220**	**$1,603,233**
Contingency	5	%	**$427,942**	**$0**	**$427,942**
Total: Instream flow, Screening and Passage	**Up to 20 cfs, 2 ditches screened and passable**		**$8,986,788**	**$1,594,060**	**$7,392,728**

*Refer to attachments B and C for detailed construction budgets. All items are estimates and subject to change. Salary estimates are based on the projected cost of project development, water right apps., legal services and three years of monitoring for up to three projects. Match sources for such projects could come from: the Columbia Basin Water Transactions Program, North Western Energy, FWP Future Fisheries, NRCS EQUIP, DNRC Renewable Resource Grants and other yet to be identified sources.

Index of Attachments:

- *A- Project Location Maps*
- *B- Letter of Intent from the Racetrack Water Users (Phase 1) and other letters of support*
- *C- Phase 1- Preliminary Engineering Report, including detailed budgets and designs*
- *D- Capital Improvement Plan, including preliminary engineering and budgets for Phases 2 and 3*

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RESTORATION CONCEPT ABSTRACT SUBMITTAL FORM

1. PROJECT TITLE: Clark Fork River Flow Enhancement (below Deer Lodge)

2. ORGANIZATION AND CONTACT:

Contact/Entity	Address:	Phone/Email:
Andy Fischer Project Manager, Clark Fork Coalition (CFC)	140 S. 4th St. W. #1 PO Box 7593 Missoula, MT 59807	(406) 542-0539 x210 andy@clarkfork.org

3. PROJECT PURPOSE AND BENEFITS:

The purpose of this restoration concept is to identify, develop and implement projects with private landowners (such as irrigation efficiency, water leases and purchases, sources switches and point of diversion changes) that enhance flows in the mainstem Clark Fork River below Deer Lodge. Few (if any) specific projects of this type have been identified to date in the Clark Fork River below Deer Lodge.

Flow augmentation projects will provide benefits to the aquatic resources of the UCFRB and to the public's use and enjoyment of those resources, including restoring up to 10 to 20 cubic feet per second (cfs) of flow for the benefit of the fishery within the Clark Fork River. The Clark Fork River below Deer Lodge has been identified by NRDP as a **Priority 2 area for flow augmentation** in its *Prioritization of Areas in the Upper Clark Fork River Basin for Fishery Enhancement* (Dec. 2011). Flow augmentation has also been identified as the only "encouraged restoration activity" in the Clark Fork River below Deer Lodge by NRDP in its *Final Upper Clark Fork River Basin Interim Restoration Process Plan*, Attachment 5-2 (May 2012).

In addition to meeting NRDP's aquatic habitat priorities, flow augmentation projects must also possess a mutual benefit for landowners to incentive their participation. Such incentives can take the form of opportunities to modernize irrigation infrastructure, lower operational costs, and/or provide alternatives sources of income. Example projects include lining or piping ditches, improving the application of irrigation water through switches to more efficient sprinkler systems, relocating a point of diversion closer to the intended place of use, or leasing/selling water rights.

4. PROJECT LOCATION:

Specific projects within this section of the Clark Fork River below Deer Lodge have not yet been identified, although conversations have been initiated with multiple landowners. All projects and participation would be voluntary in nature. Landowners possessing water rights to this section of river or on tributaries that could enhance this section of river are the target audience. Potential projects could be prioritized based on factors such as: the quantity of instream flow contribution (at least one cfs), relative priority of the associated water rights (length of protectable reach), evidence of historic beneficial use of the water rights (as defined by DNRC) and term of the transaction (at least 20 years with permanent transactions preferred).

5. PROJECT DESCRIPTION:

a. *Goals, Objectives*:

This restoration concept is being proposed to allow for the development and implementation of flow augmentation projects where landowners and partners have yet to be clearly identified. The **purpose** of this concept is to provide the opportunity for landowners to voluntarily engage in projects that result in an instream flow benefit in the Clark Fork River below Deer Lodge. The **goal** of this concept is to prevent dewatering of this section of the Clark Fork River, improve habitat conditions for fish and improve the health of the river for future generations. The **objective** is to work together with landowners on projects that balance the needs of agriculture and the health of the river.

b. *Components/Activities by Goal*:

The following activities (or some variation) would likely need to occur in order to achieve the goal of instream flow restoration in the Clark Fork River below Deer Lodge:

- *Project Development, Due Diligence and Studies*

  To achieve instream flow restoration in this section of river it will be important to assess interest and opportunities beyond the projects that are being submitted as separate restoration concepts. This will involve time and investment dedicated to meeting with landowners to understand their irrigation management goals and challenges, and to assess areas of mutual interest. There are many tools for achieving flow augmentation and each project will require an individualized assessment of the possible alternatives and the relative cost/benefit of each option.

  An assessment of these opportunities will require landowner meetings, water right due diligence and on-the-ground research. Once a project appears viable based on an initial assessment, quantifying potential costs/benefits of a project may require further studies, such as water savings analysis, groundwater studies and/or preliminary engineering.

- *Design*

  Projects that have strong landowner support and have completed some level of due diligence may require additional design level engineering or planning to refine project budgets or ideas. Some level of landowner commitment that details the anticipated terms of agreement (such as a letter of intent) would need to be secured before pursuing funding for implementation.

- *Financing and Cost Share*

  Submitting grant requests and securing cost share commitments from the NRDP, landowners and other partners will assist in planning for project implementation. Involving other partners and programs will make the best use of limited public resources.

- *Implementation*

  The components necessary to implement a project will vary depending on the nature of the project type. For water conservation projects this may involve contracting with irrigation suppliers, construction companies and engineers. Other types of flow augmentation projects, such as water leases may require less on-the-ground work and more negotiations, valuations and agreements. Grant agreements and contracts with individual landowners would need to be in place to ensure the necessary instream flow outcomes. In addition, water right change paperwork would need to be prepared and filed with the DNRC to allow legal protection of the instream water. The State, CFC or another to-be-determined entity would need to acquire and hold the water right and be responsible for managing and monitoring the rights instream on behalf of the public.

- *Post-Project Monitoring*

Monitoring and reporting of instream flows needs to occur in order to demonstrate beneficial use of the water rights and to ensure the flows are being left in the river. Depending on the length of the protectable reach, monitoring instream flows can require significant time and effort in the initial years and will include working with various water users to develop efficient systems for managing flows. This concept proposes to fund the associated monitoring for the first three years of each transaction in order to set up the necessary protocols and equipment for efficiently monitoring flows at these sites. After the initial three years, the NRDP will need to assess how to budget for the long term monitoring responsibilities associated with the holding of instream flow rights or funding other entities to take on this responsibility. Please refer to the separate CFC restoration concept abstract that provides guidance regarding long-term monitoring protocols, costs and reporting.

c. ***Progress to date:***

Although very little progress has been made to date towards permanent instream flow restoration in this reach of the Clark Fork River, there is a wealth of knowledge regarding potential flow projects among landowners, NRDP staff, FWP, DNRC, CFC, Trout Unlimited and other partners in the community. In addition, Dennis Workman conducted a number of reports for the Upper Clark Fork Steering Committee relating to flow studies in this reach of the Clark Fork and assessed ditch seepage losses in a number of major irrigation systems. Future efforts would build off of these and other prior fishery, flow and ditch assessment studies.

Any efforts NRDP can make to clearly delineate the availability of funding, to clarify the requirements surrounding funding, or to identify timelines for receiving funding approval and contracts would be useful for setting clear and consistent expectations for landowners.

d. ***Description of Resource Benefit:***

The Upper Clark Fork River below Deer Lodge is a **Priority 2 area** for NRDP aquatic restoration **and flow augmentation has been identified as the single encouraged restoration activity** within this reach. In order to convert the conserved water to instream flow a change application would need to be submitted to the DNRC for review and authorization. A number of instream flow reports conducted by the Upper Clark Fork Steering Committee have identified the minimum instream flow for the maintenance of fish and other aquatic organisms within the Clark Fork River to be 90 cfs at Deer Lodge with dwindling populations of native fish such as westslope cutthroat trout. This section of river is primarily a brown and rainbow trout dominated fishery with dwindling populations of native fish such as westslope cutthroat trout. Achieving 10-20 cfs of flow protection in addition to efforts higher in the watershed would provide significant gains towards securing enough clean water to restore the fishery.

e. ***Lead entity and partners:***

Based on years of work in the Upper Clark Fork Basin and flow augmentation expertise, CFC is proposing to be the lead entity in conducting project identification, development, implementation and monitoring of flow augmentation projects in this section of the Clark Fork River in coordination with NRDP staff and potentially other agencies and partners. We anticipate working in partnership with a variety of entities including: landowners, FWP, DNRC, Trout Unlimited, Columbia Basin Water Transaction Program and others within the community.

6. PROJECT SCHEDULE:

Item:	2013, 1st Q	2013, 2nd Q	2013, 3rd Q	2013, 4th Q	2014	2015-2017
Project Development, Due Diligence and Studies						
Design						
Financing/Cost Share						
Implementation (agreements/water right change apps)						
Post-Project Monitoring						

7. DRAFT BUDGET:

*Item:	Quantity:	Unit Cost:	Total Cost:	Anticipated Match:	NRDP:
Salaries/Benefits (Project Dev., Water Right App, Legal Services, 3 years Monitoring)	3,000 hours	$50/hour	**$150,000**	**$10,000**	**$140,000**
Contracted Services/Water Purchase (up to 5 projects)	10-20 cfs	Site Specific	**$1,600,000**	**$100,000**	**$1,500,000**
Travel	4,000 mi	$0.555	**$2,220**	**$220**	**$2,000**
Supplies/Equip. (Gages/Flow Monitoring Equip)	Varies	Varies	**$5,000**	**$0**	**$5,000**
Subtotal:			**$1,757,220**	**$110,220**	**$1,647,000**
Administration:	3.5	%	**$61,503**	**$10,000**	**$51,503**
Contingency:	10	%	**$175,722**	**$0**	**$175,722**
Total:			**$1,994,445**	**$120,220**	**$1,874,225**

*All items are general estimates and subject to change. Salary and benefit estimates are based on the projected cost of project development, water right applications, legal services and three years of monitoring for up to five individual projects. Refer to separate CFC abstract that provides guidance on flow project pricing/valuation as multiple factors will need to be considered to evaluate each project on a case by case basis. Information above is not intended for pricing on individual projects, simply to provide an estimated range of potential costs/benefits. Match sources for such projects could come from: the Columbia Basin Water Transactions Program, FWP Future Fisheries Grants, NRCS EQUIP Contracts, DNRC Renewable Resource Grants and other yet to be identified sources.

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PROPOSED RESTORATION CONCEPT ABSTRACT SUBMITTAL FORM

1. PROJECT TITLE: West Side and Whalen Ditch Water Conservation Project

2. ORGANIZATION AND CONTACT:

Contact/Entity	Address:	Phone/Email:
Andy Fischer Project Manager, Clark Fork Coalition	140 S. 4th St. W. #1 PO Box 7593 Missoula, MT 59807	(406) 542-0539 x210/ andy@clarkfork.org
Rick Cline, President, Westside Ditch Company	1644 Greenhouse Rd. Deer Lodge, MT 59722	Available Upon Request
Tom Whalen, Owner, Whalen Ditch	904 Utah Ave. Butte, MT 59701	Available Upon Request

3. PROJECT PURPOSE AND BENEFITS:

The purpose of this project is to provide instream flow in the Upper Clark Fork River and enhance the viability of agriculture in the Deer Lodge Valley. The project proposes to conserve irrigation water through piping the West Side Company main canal and consolidating the Whalen ditch into this single piped system.

The benefits to the river include:

- **Conserving up to 20 cubic feet per second of irrigation water**-- this can be returned and legally protected as instream flow in the most dewatered section of the Clark Fork River.
- Improved fish and recreation passage by eliminating use of the Whalen Ditch diversion structure and ditch system.
- Potential reconnection of Little Modesty Creek to the Clark Fork River.

Benefits to the water users include:

- Improved irrigation reliability.
- Lowered operations and maintenance costs to their irrigation system.

While large and complex, this project presents the biggest opportunity for instream flow restoration in the Upper Clark Fork River.

4. PROJECT LOCATION AND MAP:

Please refer to the attached map. The project is located near Racetrack Creek beginning at the West Side Ditch diversion off of the Upper Clark Fork River (RM 329) and piping will extend North 13 miles to the city of Deer Lodge. The West Side Ditch irrigates 1,900 acres on the west side of Interstate 90 South of Deer Lodge and the Whalen Ditch irrigates 300 acres East of I-90. The **Upper Clark Fork River between Warms Springs Ponds and Deer Lodge is a Priority 1 stream** for fishery restoration as described in the *Prioritization of Areas in the Upper Clark Fork River Basin for Fishery Enhancement* (Dec. 2011). The only encouraged aquatic restoration activity within this section of river is flow augmentation according to *NRDP 2012 Final Upper Clark Fork River Basin Interim Restoration Process Plan*.

5. PROJECT DESCRIPTION:

**** Goals, Objectives:***

The primary goal of this project is to return up to 20 cubic feet per second of instream flow to the Upper Clark Fork River to improve fishery habitat. In order to achieve this conservation goal, the objective is to consolidate the West Side and Whalen Ditches into a single piped ditch in the alignment of the current West Side Ditch Company main canal. This conservation measure will eliminate seepage and

evaporative losses associated with an earth lined ditch and allow for this water savings to remain in the river as a legally protected water right.

Components/Activities by Goal:
Project development activities including: landowner meetings, water rights due diligence, studies quantifying seepage and water usage, a cultural resource report and pre-design level engineering have been largely completed over the course of the past 10 years. The first component necessary to advance this conservation project is to complete a final engineering design for the system. This will inform the various parties with more accurate costs associated with the preferred conservation alternative of piping 13 miles of their main canal. The current appraisal level design report conducted by the Bureau of Reclamation only provided a cursory level of detail regarding the budget items and a significant contingency factor. A final engineering design report will better inform the potential funders and partners of the expected cost associated with these instream flow benefits.

Other crucial components necessary to advance this project to implementation include:

- Securing **written agreements** from all water right holders ensuring they are willing to commit their relative share of the conservation benefit to instream flow. All parties have been informed of the submission of this conceptual proposal and are supportive of moving this project forward.
- Drafting and securing **operational agreements between the Westside Ditch Company and the owner of the Whalen Ditch**. In order to combine the delivery of water rights from the Whalen Ditch system into the pipe Westside Ditch Company, legal operating agreements will need to be drafted and executed to protect the interests of each party.
- **Water rights change processes** should be initiated prior to constructing the project. This will involve the preparation and submission of a change of use application to the DNRC to convert the seepage and evaporation component of the water rights (up to 20 cfs) to instream flow in the Clark Fork River. Potential risks and uncertainties of this process can be avoided by early submission of these applications.
- **Quantification and agreement of potential instream flow** associated with the project will need to occur through measurement and analysis of the Whalen Ditch. The West Side Ditch has been studied extensively and will yield up to 15 cfs of conserved water through piping (according to both Clark Fork Coalition and DNRC studies). No known measurements have been conducted on the Whalen Ditch to quantify seepage and evaporation losses. If the losses are similar to the Westside Ditch within this section of canal they would be in the 10-25% range, which might yield a water savings of 3-5 cfs. A seepage study will need to occur to accurately quantify the benefits of eliminating the Whalen Ditch.
- **Environmental scoping and permitting** will need to occur prior to the initiation of construction.

Once the above activities are initiated and/or completed, the project will advance towards bid solicitation for materials and construction services. Construction would likely occur over the course of two to four winter/construction seasons. Upon completion of the conservation measures, the water right change application would take effect for the protection of instream flow in the Clark Fork River for the life of the conservation measure (~100 years). Monitoring and enforcement of the instream water right would occur through the life of the project.

Progress to date:
The Westside Ditch Company participated in the following studies in order to advance their conservation project plans:

-2002 Upper Clark Fork Instream Flow Project, by Dennis Workman, Sponsored by the Upper Clark Fork Steering Committee

-2009 West Side Ditch Efficiency Report, by DNRC

-2010 West Side Ditch Flow Metering, by Clark Fork Coalition, Sponsored by the NRDP

Summary: The three reports above conducted seepage and evaporative loss studies on the West SideDitch to inform the ditch users and potential funders of the potential water savings associated with conservation measures. In addition, the NRDP provided funding to install water meters on individual turnouts to better understand the on-farm irrigation demand. A number of these reports strongly suggested pursuing water conservation measures to provide instream flow to the Upper Clark Fork River.

-2010 Pilot Split-Season Diversion Reduction Agreement, by Clark Fork Coalition, Sponsored by the Columbia Basin Water Transactions Program

Summary: In 2010, an individual member of the Westside Ditch Company participated in a one year water diversion reduction agreement from July 15-October 15 to provide approximately 15 cfs of instream flow to the Clark Fork River.

-2011 Professional Survey of the Ditch System, by Gateway Engineering, Sponsored by CFC/WSD $7,180

Summary: To inform subsequent engineering studies the Clark Fork Coalition and the Westside Ditch Company jointly invested in a professional engineering survey of the ditch system.

-2011 West Side Ditch Class III Cultural Resource Inventory, by Paleo West, Sponsored by USBOR

Summary: Due to questions about the historic integrity of the West Side Ditch system, USBOR contracted a cultural inventory of the ditch.

-2012 West Side Ditch Modification- Appraisal Design Report, by Bureau of Reclamation

Summary: The Bureau of Reclamation completed an engineering study that investigated potential irrigation system improvements, including: piping, lining, pump stations, groundwater wells, fish screen and diversion improvements. Appraisal level costs were provided for these various conservation measures for review and input from the WSD and CFC. After numerous discussions with both the lead engineer and the water users, the most viable option for long-term conservation that will provide benefits to both the water users and the river appears to be piping. Although initial budgets from the USBOR forecasted $14-$17 Million for piping of the system, subsequent review of the budget indicates piping could be accomplished for as little at $8-$10 Million if favorable backfill and material costs could be secured. A more thorough engineering estimate will be required to provide a more accurate budget estimate.

After many years of involvement in a variety of studies sponsored by state, federal and non-profit entities (including NRDP) the West Side Ditch Company is ready to see their conservation project advance towards implementation. The Whalen Ditch ownership is also receptive to considering participation in these conservation measures and receiving water through a single piped system.

Description of Resource Benefit:

This combined water conservation project is the largest potential instream flow gain (up to 20 cfs) to this critically dewatered section of the Upper Clark Fork River. The Upper Clark Fork River is a **Priority 1 area** for NRDP aquatic restoration **and flow augmentation has been identified as the single encouraged restoration activity** within this reach according to the Draft Upper Clark Fork River Basin Interim Process Plan. In order to convert the conserved water to instream flow a change application would need to be submitted to the Montana DNRC for review and authorization. The protectable stream reach for this instream flow would likely extend from the West Side Ditch head gate near Racetrack on the Clark Fork River and extend south approximately 13 miles to the city of Deer Lodge. The term of the instream flow protection would likely be dependent on the functional life of the conservation measure/piping. Further

analysis of the ditch return flows to the Clark Fork River may need to be conducted to determine the exact quantity of water that could be protected for the entire distance to Deer Lodge.

A number of instream flow reports conducted by the Upper Clark Fork Steering Committee have identified the minimum instream flow for the maintenance of fish and other aquatic organisms within the Clark Fork River to be 40 cfs at Galen and 90 cfs at Deer Lodge. Some of the most sever dewatering of the river has been identified below the West Side Ditch diversion. This section of river is primarily a brown trout dominated fishery according to reports from FWP. Providing additional clean, cool water in the river could help to improve the sport and native fishery. The Westside Ditch and Whalen Ditch hold senior water rights on the Upper Clark Fork River and represent the largest water users within this section of river.

Lead entity and partners:

The Clark Fork Coalition (CFC) is the lead entity proposing this project in partnership with the West Side Ditch Company and the Whalen Ditch. We anticipate working closely with the NRDP and other entities. Numerous water user meetings have been held with members of the West Side Ditch Company to discuss reports and advance the conservation project. West Side Ditch members have reviewed and discussed the engineering report and members have provided input regarding the direction of the project at numerous meetings. All parties are in strong support of this application and would like to see this project advance. Numerous funding agencies, including the NRDP, USBOR and Columbia Basin Water Transactions Program have made investments in the development of this project.

6. PROJECT SCHEDULE:

Item:	2012	2013, 1st Q	2013, 2nd Q	2013, 3rd Q	2013, 4th Q	2014, 1st Q	2014, 2nd Q	2014, 3rd Q	2014, 4th Q
Funding Apps									
Final Design									
Permits/Bids									
Construction									
Water Rights Apps									

7. DRAFT BUDGET:

Item:	**Quantity:**	**Unit Cost:**	**Total Cost:**	**Match:**	**NRDP:**
Salaries/Benefits (Water Right App and Legal Services):	960 Hours	$50/Hour	$ 60,000	$10,000	$50,000
Contracted Services:					
Materials and Construction: (refer to detailed budget)	64,273 LF	$124.46/LF	$8,000,000*	$300,000	$7,700,000
Engineering/Const. Mgmt:	6	%	$500,000		$500,000
Travel:	3700 mi	$.555	$2,054		$2,054
Subtotal:			**$8,562,054**	**$310,000**	**$8,252,054**
Administration:	0.6	%	$ 48,000	$8,000	$40,000
Contingency:	25	%	$2,140,514		$2,140,514
Total:			**$10,750,568**	**$318,000**	**$10,432,568**

*Assumes cost savings beyond the USBOR budget. All costs are general estimates and are subject to change based upon final engineering designs and subsequent information. While the preferred alternative would be fully piping the entire canal system, the parties are open to considering lower cost alternatives that provide long term benefits to both the landowners and the river. Potential sources of anticipated match include: USBOR WaterSmart, Columbia Basin Water Transactions Program, FWP Future Fisheries, the DNRC Renewable Resource Grant Program and any other match opportunities that may present themselves.

Index of Attachments:

Attachment A- Project Location Maps

Attachment B- West Side Ditch Modification- Appraisal Design Report, U.S. Bureau of Reclamation, 2012

Coleman, Kathleen

From: Andy Fischer <andy@clarkfork.org>
Sent: Thursday, June 14, 2012 12:42 PM
To: Natural Resource Damage Program
Cc: Coleman, Kathleen; Andy Fischer
Subject: CFC Abstract 14: West Side and Whalen Ditch Water Conservation Project
Attachments: 14_West Side Ditch NRDP Abstract_6.7.12.docx

Please refer to the attached Proposed Restoration Concept Abstract. Please note that the full concept proposal was submitted in hard copy via mail, including the attachments (which are rather large and cannot be easily sent via email). Attachments can be provided electronically upon request.

Thanks,

Andy

Andy Fischer
Project Manager
Clark Fork Coalition
Email: andy@clarkfork. org
Office Phone: (406) 542-0539 x210

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RESTORATION CONCEPT ABSTRACT SUBMITTAL FORM

1. PROJECT TITLE: Clark Fork River Flow Enhancement (above Deer Lodge)

2. ORGANIZATION AND CONTACT:

Contact/Entity	Address:	Phone/Email:
Andy Fischer Project Manager, Clark Fork Coalition (CFC)	140 S. 4th St. W. #1 PO Box 7593 Missoula, MT 59807	(406) 542-0539 x210 andy@clarkfork.org

3. PROJECT PURPOSE AND BENEFITS:

The purpose of this restoration concept is to identify, develop and implement projects with private landowners (such as irrigation efficiency, water leases and purchases, sources switches and point of diversion changes) that enhance flows in the mainstem Clark Fork River above Deer Lodge. While some specific projects of this type have been identified in this reach of the Clark Fork and proposed as separate abstracts, to achieve large scale instream flow restoration, it will be necessary for NRDP to fund work to identify, develop and implement additional projects.

Flow augmentation projects will provide benefits to the aquatic resources of the UCFRB and to the public's use and enjoyment of those resources, including restoring up to 10 to 20 cubic feet per second (cfs) of flow for the benefit of the fishery within the Clark Fork River. The Clark Fork River above Deer Lodge has been identified by NRDP as a **Priority 1 area for flow augmentation** in its *Prioritization of Areas in the Upper Clark Fork River Basin for Fishery Enhancement* (Dec. 2011). Flow augmentation has also been identified as the only "encouraged restoration activity" in the Clark Fork River above Deer Lodge by NRDP in its *Final Upper Clark Fork River Basin Interim Restoration Process Plan*, Attachment 5-2 (May 2012).

In addition to meeting NRDP's aquatic habitat priorities, flow augmentation projects must also possess a mutual benefit for landowners to incentive their participation. Such incentives can take the form of opportunities to modernize irrigation infrastructure, lower operational costs, and/or provide alternatives sources of income. Example projects include lining or piping ditches, improving the application of irrigation water through switches to more efficient sprinkler systems, relocating a point of diversion closer to the intended place of use, or leasing/selling water rights.

4. PROJECT LOCATION:

Specific projects within this section of the Clark Fork River above Deer Lodge have not yet been identified, although conversations have been initiated with multiple landowners. All projects and participation would be voluntary in nature. Landowners possessing water rights to this section of river or on tributaries that could enhance this section of river are the target audience. Potential projects could be prioritized based on factors such as: the quantity of instream flow contribution (at least one cfs), relative priority of the

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associated water rights (length of protectable reach), evidence of historic beneficial use of the water rights (as defined by DNRC) and term of the transaction (at least 20 years with permanent transactions preferred).

5. PROJECT DESCRIPTION:

a. ***Goals, Objectives*:**

This restoration concept is being proposed to allow for the development and implementation of flow augmentation projects where landowners and partners have yet to be clearly identified. The **purpose** of this concept is to provide the opportunity for landowners to voluntarily engage in projects that result in an instream flow benefit in the Clark Fork River above Deer Lodge. The **goal** of this concept is to prevent dewatering of this section of the Clark Fork River, improve habitat conditions for fish and improve the health of the river for future generations. The **objective** is to work together with landowners on projects that balance the needs of agriculture and the health of the river.

b. ***Components/Activities by Goal*:**

The following activities (or some variation) would likely need to occur in order to achieve the goal of instream flow restoration in the Clark Fork River above Deer Lodge:

- *Project Development, Due Diligence and Studies*

  To achieve instream flow restoration in this section of river it will be important to assess interest and opportunities beyond the projects that are being submitted as separate restoration concepts. This will involve time and investment dedicated to meeting with landowners to understand their irrigation management goals and challenges, and to assess areas of mutual interest. There are many tools for achieving flow augmentation and each project will require an individualized assessment of the possible alternatives and the relative cost/benefit of each option.

  An assessment of these opportunities will require landowner meetings, water right due diligence and on-the-ground research. Once a project appears viable based on an initial assessment, quantifying potential costs/benefits of a project may require further studies, such as water savings analysis, groundwater studies and/or preliminary engineering.
- *Design*

  Projects that have strong landowner support and have completed some level of due diligence may require additional design level engineering or planning to refine project budgets or ideas. Some level of landowner commitment that details the anticipated terms of agreement (such as a letter of intent) would need to be secured before pursuing funding for implementation.
- *Financing and Cost Share*

  Submitting grant requests and securing cost share commitments from the NRDP, landowners and other partners will assist in planning for project implementation. Involving other partners and programs will make the best use of limited public resources.
- *Implementation*

  The components necessary to implement a project will vary depending on the nature of the project type. For water conservation projects this may involve contracting with irrigation suppliers, construction companies and engineers. Other types of flow augmentation projects, such as water leases may require less on-the-ground work and more negotiations, valuations and agreements. Grant agreements and contracts with individual landowners would need to be in place to ensure the necessary instream flow outcomes. In addition, water right change paperwork would need to be prepared and filed with the DNRC to allow legal protection of the instream water. The State, CFC or another to-be-determined entity would need to acquire and

hold the water right and be responsible for managing and monitoring the rights instream on behalf of the public.

- *Post-Project Monitoring*

  Monitoring and reporting of instream flows needs to occur in order to demonstrate beneficial use of the water rights and to ensure the flows are being left in the river. Depending on the length of the protectable reach, monitoring instream flows can require significant time and effort in the initial years and will include working with various water users to develop efficient systems for managing flows. This concept proposes to fund the associated monitoring for the first three years of each transaction in order to set up the necessary protocols and equipment for efficiently monitoring flows at these sites. After the initial three years, the NRDP will need to assess how to budget for the long term monitoring responsibilities associated with the holding of instream flow rights or funding other entities to take on this responsibility. Please refer to the separate CFC restoration concept abstract that provides guidance regarding long-term monitoring protocols, costs and reporting.

c. ***Progress to date:***

Although very little progress has been made to date towards permanent instream flow restoration in this reach of the Clark Fork River, there is a wealth of knowledge regarding potential flow projects among landowners, NRDP staff, FWP, DNRC, CFC, Trout Unlimited and other partners in the community. In addition, Dennis Workman conducted a number of reports for the Upper Clark Fork Steering Committee relating to flow studies in this reach of the Clark Fork and assessed ditch seepage losses in a number of major irrigation systems. Future efforts would build off of these and other prior fishery, flow and ditch assessment studies.

Examples of flow augmentation projects in the early stages of development include opportunities to work with Deer Lodge Valley ranching families, Hans and Angel Lampert and Wayne and Kathy Hadley. The Lamperts have expressed an interest investigating the following types of projects in partnership with the NRDP and CFC:

- **Spring developments** and stock watering facilities that can reduce impacts to sensitive riparian areas and eliminate the need to run stock water through ditches year round.
- **Road realignment** of a particularly dangerous section of the Eastside Road that would allow for a more optimal arrangement of a center pivot and could result in flow augmentation as well as energy savings.
- **Water leasing and conservation** options.

The Hadleys have expressed interest in participating in feasibility studies in partnership with the NRDP and CFC to analyze **water conservation options**, such as split-season water leasing on the Helen Johnson Ditch or efficiency upgrades to their irrigation system.

Any efforts NRDP can make to clearly delineate the availability of funding, to clarify the requirements surrounding funding, or to identify timelines for receiving funding approval and contracts would be useful for setting clear and consistent expectations for landowners.

d. ***Description of Resource Benefit:***

The Upper Clark Fork River is a **Priority 1 area** for NRDP aquatic restoration **and flow augmentation has been identified as the single encouraged restoration activity** within this reach. In order to convert the conserved water to instream flow a change application would need to be submitted to the DNRC for review and authorization. A number of instream flow reports conducted by the Upper

Clark Fork Steering Committee have identified the minimum instream flow for the maintenance of fish and other aquatic organisms within the Clark Fork River to be 40 cfs at Galen and 90 cfs at Deer Lodge. Some of the most sever dewatering has been identified below the West Side Ditch diversion. This section of river is primarily a brown trout dominated fishery according to reports from FWP. Achieving 10-20 cfs of flow protection would provide significant gains towards securing enough clean water to restore the fishery.

e. ***Lead entity and partners:***

Based on years of work in the Upper Clark Fork Basin and flow augmentation expertise, CFC is proposing to be the lead entity in conducting project identification, development, implementation and monitoring of flow augmentation projects in this section of the Clark Fork River in coordination with NRDP staff and potentially other agencies and partners. We anticipate working in partnership with a variety of entities including: landowners, FWP, DNRC, Trout Unlimited, Columbia Basin Water Transaction Program and others within the community.

6. PROJECT SCHEDULE:

Item:	2013, 1st Q	2013, 2nd Q	2013, 3rd Q	2013, 4th Q	2014	2015-2017
Project Dev., Due Diligence and Studies						
Design						
Financing/Cost Share						
Implementation (agreements/water right change apps)						
Post-Project Monitoring						

7. DRAFT BUDGET:

*Item:	Quantity:	Unit Cost:	Total Cost:	Anticipated Match:	NRDP:
Salaries/Benefits (Project Dev., Water Right App, Legal Services, 3 years Monitoring)	3,000 hours	$50/hour	**$150,000**	**$10,000**	**$140,000**
Contracted Services/Water Purchase (up to 5 projects)	10-20 cfs	Site Specific	**$2,000,000**	**$200,000**	**$1,800,000**
Travel	4,000 mi	$0.56	**$2,220**	**$220**	**$2,000**
Supplies/Equip. (Gages/Flow Monitoring Equip)	Varies	Varies	**$5,000**	**$0**	**$5,000**
Subtotal:			**$2,157,220**	**$210,220**	**$1,947,000**
Administration:	3.5	%	**$75,503**	**$10,000**	**$65,503**
Contingency:	10	%	**$215,722**	**$0**	**$215,722**
Total:			**$2,448,445**	**$220,220**	**$2,228,225**

*All items are general estimates and subject to change. Salary and benefit estimates are based on the projected cost of project development, water right applications, legal services and three years of monitoring for up to five individual projects. Refer to the separate CFC concept proposal that provides guidance on flow project pricing/valuation as multiple factors will need to be considered to evaluate each project on a case by case basis. Information above is not intended for pricing on individual projects, simply to provide an estimated range of potential costs/benefits. Match sources for such projects could come from: the Columbia Basin Water Transactions Program, FWP Future Fisheries Grants, NRCS EQUIP Contracts, DNRC Renewable Resource Grants and other yet to be identified sources.

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RESTORATION CONCEPT ABSTRACT SUBMITTAL FORM

1. PROJECT TITLE: Willow Creek Flow Enhancement

2. ORGANIZATION AND CONTACT:

Contact/Entity	Address:	Phone/Email:
Andy Fischer Project Manager, Clark Fork Coalition (CFC)	140 S. 4th St. W. #1 PO Box 7593 Missoula, MT 59807	(406) 542-0539 x210 andy@clarkfork.org

3. PROJECT PURPOSE AND BENEFITS:

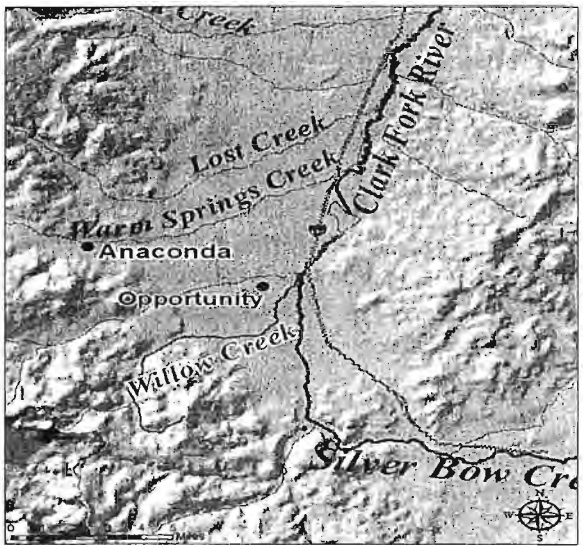
The purpose of this restoration concept is to identify, develop and implement projects with private landowners (such as irrigation efficiency, water leases and purchases, sources switches and point of diversion changes) that enhance flows in lower Willow Creek near Anaconda. Few (if any) specific projects of this type have been identified to date in Willow Creek.

Flow augmentation projects will provide benefits to the aquatic resources of the UCFRB and to the public's use and enjoyment of those resources, including **restoring up to 2 to 4 cubic feet per second (cfs) of flow** for the benefit of the fishery within lower Willow Creek. Lower Willow Creek has been identified by NRDP as a **Priority 2 area for flow augmentation** in its *Prioritization of Areas in the Upper Clark Fork River Basin for Fishery Enhancement* (Dec. 2011). Flow augmentation has also been identified as a "encouraged restoration activity" in the lower Willow Creek by NRDP in its *Final Upper Clark Fork River Basin Interim Restoration Process Plan*, Attachment 5-2 (May 2012).

In addition to meeting NRDP's aquatic habitat priorities, flow augmentation projects must also possess a mutual benefit for landowners to incentive their participation. Such incentives can take the form of opportunities to modernize irrigation infrastructure, lower operational costs, and/or provide alternatives sources of income. Example projects include lining or piping ditches, improving the application of irrigation water through switches to more efficient sprinkler systems, relocating a point of diversion closer to the intended place of use, or leasing/selling water rights.

4. PROJECT LOCATION:

Willow Creek is in the greater Silver Bow watershed and flows northeasterly and joins the Mill-Willow bypass near Opportunity. Specific projects within this section of the Willow Creek have not yet been identified as part of this concept proposal. All projects and participation would be voluntary in nature. Potential projects could be prioritized based on factors such as: the quantity of instream flow contribution (at least one cfs), relative priority of the associated water rights (length of protectable reach), evidence of historic beneficial use of the water rights (as defined by DNRC) and term of the transaction (at least 20 years with permanent transactions preferred).



5. PROJECT DESCRIPTION:

a. *Goals, Objectives*:

This restoration concept is being proposed to allow for the development and implementation of flow augmentation projects where landowners and partners have yet to be clearly identified. The **purpose** of this concept is to provide the opportunity for landowners to voluntarily engage in projects that result in an instream flow benefit in Willow Creek. The **goal** of this concept is to prevent dewatering of this section of Willow Creek, improve habitat conditions for fish and improve the health of the creek for future generations. The **objective** is to work together with landowners on projects that balance the needs of agriculture and the health of the creek.

b. *Components/Activities by Goal*:

The following activities (or some variation) would likely need to occur in order to achieve the goal of instream flow restoration in Willow Creek:

- *Project Development, Due Diligence and Studies*

  To achieve instream flow restoration in this section of creek it will be important to assess interest and opportunities beyond the projects that are being submitted as separate restoration concepts. This will involve time and investment dedicated to meeting with landowners to understand their irrigation management goals and challenges, and to assess areas of mutual interest. There are many tools for achieving flow augmentation and each project will require an individualized assessment of the possible alternatives and the relative cost/benefit of each option.

  An assessment of these opportunities will require landowner meetings, water right due diligence and on-the-ground research. Once a project appears viable based on an initial assessment, quantifying potential costs/benefits of a project may require further studies, such as water savings analysis, groundwater studies and/or preliminary engineering.

- *Design*

  Projects that have strong landowner support and have completed some level of due diligence may require additional design level engineering or planning to refine project budgets or ideas. Some level of landowner commitment that details the anticipated terms of agreement (such as a letter of intent) would need to be secured before pursuing funding for implementation.

- *Financing and Cost Share*

  Submitting grant requests and securing cost share commitments from the NRDP, landowners and other partners will assist in planning for project implementation. Involving other partners and programs will make the best use of limited public resources.

- *Implementation*

  The components necessary to implement a project will vary depending on the nature of the project type. For water conservation projects this may involve contracting with irrigation suppliers, construction companies and engineers. Other types of flow augmentation projects, such as water leases may require less on-the-ground work and more negotiations, valuations and agreements. Grant agreements and contracts with individual landowners would need to be in place to ensure the necessary instream flow outcomes. In addition, water right change paperwork would need to be prepared and filed with the DNRC to allow legal protection of the instream water. The State, CFC or another to-be-determined entity would need to acquire and hold the water right and be responsible for managing and monitoring the rights instream on behalf of the public.

- *Post-Project Monitoring*

Monitoring and reporting of instream flows needs to occur in order to demonstrate beneficial use of the water rights and to ensure the flows are being left in the creek. Depending on the length of the protectable reach, monitoring instream flows can require significant time and effort in the initial years and will include working with various water users to develop efficient systems for managing flows. This concept proposes to fund the associated monitoring for the first three years of each transaction in order to set up the necessary protocols and equipment for efficiently monitoring flows at these sites. After the initial three years, the NRDP will need to assess how to budget for the long term monitoring responsibilities associated with the holding of instream flow rights or funding other entities to take on this responsibility. Please refer to the separate CFC restoration concept abstract that provides guidance regarding long-term monitoring protocols, costs and reporting.

c. ***Progress to date:***

The applicant is not aware of any progress or specific flow restoration projects at this point in the Willow Creek watershed. Outreach among landowners and studies would assist in providing a better perspective of whether there is opportunity to implement any flow projects in this creek.

Any efforts NRDP can make to clearly delineate the availability of funding, to clarify the requirements surrounding funding, or to identify timelines for receiving funding approval and contracts would be useful for setting clear and consistent expectations for landowners.

d. ***Description of Resource Benefit:***

Willow Creek is a **Priority 2 area** for NRDP aquatic restoration **and flow augmentation has been identified as encouraged restoration activity** according to the Final Upper Clark Fork River Basin Interim Process Plan. This concept proposal could provide up to **2- 4 cfs instream through the implementation of up to 2 projects**, which will benefits to the fishery by increasing habitat, connectivity between fish populations, and connectivity of spawning habitat in Willow Creek to fish populations in the mainstem of the Clark Fork. Projects that have the ability to protect flow to the creek's confluence with the Clark Fork River would be prioritized.

The Willow Creek stream gage data near Galen indicates significant dewatering within this reach with low flows regularly dipping below 2 cfs in July and August. Dewatering both reduces rearing habitat and isolates fish populations and spawning habitat in upper Willow Creek from the mainstem Clark Fork River. The DFWP 1986 Water Reservation Applications of wetted perimeter data determined that the target instream flows are for 16 cfs for Willow Creek.

An Assessment of Fish Populations and Riparian Habitat in Tributaries of the Upper Clark Fork Basin by Montana Fish Wildlife and Parks, 2009, indicates that primarily brook and brown trout are found in the lower reaches of Willow Creek and the occasional native westslope cutthroat are found in the upper reaches of the drainage. Willow Creek is classified as experiencing chronic dewatering according to FWP. Dewatering both reduces rearing habitat and isolates fish populations and spawning habitat in upper Willow Creek from the mainstem Clark Fork River. The water left instream under this proposed project will rewater the lower channel, providing habitat for aquatic life in the lower seven miles of Willow Creek, and reconnect habitat and fish populations in upper Willow Creek with the mainstem of the Clark Fork River. Achieving **2-4 cfs of flow protection** would provide significant gains towards securing enough clean water to restore the fishery.

e. ***Lead entity and partners:***

Based on years of work in the Upper Clark Fork Basin and flow augmentation expertise, CFC is proposing to be the lead entity in conducting project identification, development, implementation and monitoring of flow augmentation projects in Willow Creek in coordination with NRDP staff and potentially other agencies and partners. We anticipate working in partnership with a variety of entities including: landowners, FWP, DNRC, Trout Unlimited, Columbia Basin Water Transaction Program and others within the community.

6. PROJECT SCHEDULE:

Item:	2013, 1st Q	2013, 2nd Q	2013, 3rd Q	2013, 4th Q	2014	2015-2017
Project Development, Due Diligence and Studies						
Design						
Financing/Cost Share						
Implementation (agreements/water right change apps)						
Post-Project Monitoring						

7. DRAFT BUDGET:

*Item:	Quantity:	Unit Cost:	Total Cost:	Anticipated Match:	NRDP:
Salaries/Benefits (Project Dev., Water Right App, Legal Services, 3 years Monitoring)	1,200 hours	$50/hour	**$61,200**	**$10,000**	**$51,200**
Contracted Services/Water Purchase (up to 2 projects)	2-4 cfs	Site Specific	**$350,000**	**$50,000**	**$300,000**
Travel	2,000 mi	$0.56	**$1,110**	**$0**	**$1,110**
Supplies/Equip. (Gages/Flow Monitoring Equip)	Varies	Varies	**$5,000**	**$0**	**$5,000**
Subtotal:			**$417,310**	**$60,000**	**$357,310**
Administration:	3.5	%	**$14,606**	**$2,000**	**$12,606**
Contingency:	10	%	**$41,731**	**$0**	**$41,731**
Total:			**$473,647**	**$62,000**	**$411,647**

*All items are general estimates and subject to change. Salary and benefit estimates are based on the projected cost of project development, water right applications, legal services and three years of monitoring for up to five individual projects. Refer to the separate CFC concept proposal that provides guidance on flow project pricing/valuation as multiple factors will need to be considered to evaluate each project on a case by case basis. Information above is not intended for pricing on individual projects, simply to provide an estimated range of potential costs/benefits. Match sources for such projects could come from: the Columbia Basin Water Transactions Program, FWP Future Fisheries Grants, NRCS EQUIP Contracts, DNRC Renewable Resource Grants and other yet to be identified sources.

RESTORATION CONCEPT ABSTRACT SUBMITTAL FORM

1. PROJECT TITLE: Dempsey Creek Flow Enhancement

2. ORGANIZATION AND CONTACT:

Contact/Entity	Address:	Phone/Email:
Andy Fischer Project Manager, Clark Fork Coalition (CFC)	140 S. 4th St. W. #1 PO Box 7593 Missoula, MT 59807	(406) 542-0539 x210 andy@clarkfork.org

3. PROJECT PURPOSE AND BENEFITS:

The purpose of this restoration concept is to identify, develop and implement projects with private landowners (such as irrigation efficiency, water leases and purchases, sources switches and point of diversion changes) that enhance flows in lower Dempsey Creek. Few (if any) specific projects of this type have been identified to date in lower Dempsey Creek. In order to achieve large-scale and integrated streamflow restoration, additional work is needed to identify, develop and implement projects within Dempsey Creek.

Flow augmentation projects will provide benefits to the aquatic resources of the UCFRB and to the public's use and enjoyment of those resources, including **restoring up to 10-20 cubic feet per second (cfs) of flow** for the benefit of the fishery within lower Dempsey Creek. Lower Dempsey Creek has been identified by NRDP as a **Priority 2 area for flow augmentation** in its *Prioritization of Areas in the Upper Clark Fork River Basin for Fishery Enhancement* (Dec. 2011). Flow augmentation has also been identified as a "encouraged restoration activity" in the lower Dempsey Creek by NRDP in its *Final Upper Clark Fork River Basin Interim Restoration Process Plan*, Attachment 5-2 (May 2012).

In addition to meeting NRDP's aquatic habitat priorities, flow augmentation projects must also possess a mutual benefit for landowners to incentive their participation. Such incentives can take the form of opportunities to modernize irrigation infrastructure, lower operational costs, and/or provide alternatives sources of income. Example projects include lining or piping ditches, improving the application of irrigation water through switches to more efficient sprinkler systems, relocating a point of diversion closer to the intended place of use, or leasing/selling water rights.

4. PROJECT LOCATION:

Dempsey Creek is a major East flowing tributary located between Deer Lodge and Warm Springs. Specific projects within this section of the Dempsey Creek have not yet been identified as part of this concept proposal. All projects and participation would be voluntary in nature. Potential projects could be prioritized based on factors such as: the quantity of instream flow contribution (at least one cfs), relative priority of the associated water rights (length of protectable reach), evidence of historic beneficial use of the water rights (as defined by DNRC) and term of the transaction (at least 20 years with permanent transactions preferred).

5. PROJECT DESCRIPTION:

a. *Goals, Objectives*:

This restoration concept is being proposed to allow for the development and implementation of flow augmentation projects where landowners and partners have yet to be clearly identified. The **purpose** of this concept is to provide the opportunity for landowners to voluntarily engage in projects that result in an instream flow benefit in lower Dempsey Creek. The **goal** of this concept is to prevent dewatering of this section of lower Dempsey Creek, improve habitat conditions for fish and improve the health of the creek for future generations. The **objective** is to work together with landowners on projects that balance the needs of agriculture and the health of the creek.

b. *Components/Activities by Goal*:

The following activities (or some variation) would likely need to occur in order to achieve the goal of instream flow restoration in lower Dempsey Creek:

- *Project Development, Due Diligence and Studies*

  To achieve instream flow restoration in this section of creek it will be important to assess interest and opportunities beyond the projects that are being submitted as separate restoration concepts. This will involve time and investment dedicated to meeting with landowners to understand their irrigation management goals and challenges, and to assess areas of mutual interest. There are many tools for achieving flow augmentation and each project will require an individualized assessment of the possible alternatives and the relative cost/benefit of each option.

  An assessment of these opportunities will require landowner meetings, water right due diligence and on-the-ground research. Once a project appears viable based on an initial assessment, quantifying potential costs/benefits of a project may require further studies, such as water savings analysis, groundwater studies and/or preliminary engineering.

- *Design*

  Projects that have strong landowner support and have completed some level of due diligence may require additional design level engineering or planning to refine project budgets or ideas. Some level of landowner commitment that details the anticipated terms of agreement (such as a letter of intent) would need to be secured before pursuing funding for implementation.

- *Financing and Cost Share*

  Submitting grant requests and securing cost share commitments from the NRDP, landowners and other partners will assist in planning for project implementation. Involving other partners and programs will make the best use of limited public resources.

- *Implementation*

  The components necessary to implement a project will vary depending on the nature of the project type. For water conservation projects this may involve contracting with irrigation suppliers, construction companies and engineers. Other types of flow augmentation projects, such as water leases may require less on-the-ground work and more negotiations, valuations and agreements. Grant agreements and contracts with individual landowners would need to be in place to ensure the necessary instream flow outcomes. In addition, water right change paperwork would need to be prepared and filed with the DNRC to allow legal protection of the instream water. The State, CFC or another to-be-determined entity would need to acquire and hold the water right and be responsible for managing and monitoring the rights instream on behalf of the public.

- *Post-Project Monitoring*

Monitoring and reporting of instream flows needs to occur in order to demonstrate beneficial use of the water rights and to ensure the flows are being left in the creek. Depending on the length of the protectable reach, monitoring instream flows can require significant time and effort in the initial years and will include working with various water users to develop efficient systems for managing flows. This concept proposes to fund the associated monitoring for the first three years of each transaction in order to set up the necessary protocols and equipment for efficiently monitoring flows at these sites. After the initial three years, the NRDP will need to assess how to budget for the long term monitoring responsibilities associated with the holding of instream flow rights or funding other entities to take on this responsibility. Please refer to the separate CFC restoration concept abstract that provides guidance regarding long-term monitoring protocols, costs and reporting.

c. ***Progress to date:***

Some initial conversations with landowners in the area have occurred, although to the applicant's knowledge no flow augmentation projects have occurred to date in Dempsey Creek. Dempsey Creek has some relatively complicated and contentious water rights, which may require research and studies to understand water use and return flows in the system. There is an active water commissioner on Dempsey Creek that oversees the management and regulation of water.

Any efforts NRDP can make to clearly delineate the availability of funding, to clarify the requirements surrounding funding, or to identify timelines for receiving funding approval and contracts would be useful for setting clear and consistent expectations for landowners.

d. ***Description of Resource Benefit:***

Dempsey Creek is a **Priority 2 area** for NRDP aquatic restoration **and flow augmentation has been identified as encouraged restoration activity** according to the Final Upper Clark Fork River Basin Interim Process Plan. This concept proposal could provide up to **10- 20 cfs instream through the implementation of up to 5 projects**, which will benefits to the fishery by increasing habitat, connectivity between fish populations, and connectivity of spawning habitat in Dempsey Creek to fish populations in the mainstem of the Clark Fork. Projects that have the ability to protect flow to the creek's confluence with the Clark Fork River would be prioritized.

An Assessment of Fish Populations and Riparian Habitat in Tributaries of the Upper Clark Fork Basin by Montana Fish Wildlife and Parks, 2009, indicates that primarily brown trout are found in the lower reaches of Dempsey Creek and brook trout and native westslope cutthroat are found in the upper reaches of the drainage. The lower 10 miles of the creek flow primarily through private agricultural land and the creek commonly experiences dewatering as a result of irrigation demands. This dewatering both reduces rearing habitat and isolates fish populations and spawning habitat in upper Dempsey Creek from the mainstem Clark Fork River. The water left instream under this proposed project will rewater the lower channel, providing habitat for aquatic life in the lower 10 miles of Dempsey Creek, and reconnect habitat and fish populations in upper Dempsey Creek with the mainstem of the Clark Fork River. Achieving up to **10-20 cfs of flow protection** would provide significant gains towards securing enough clean water to restore the fishery.

e. ***Lead entity and partners:***

Based on years of work in the Upper Clark Fork Basin and flow augmentation expertise, CFC is proposing to be the lead entity in conducting project identification, development, implementation and monitoring of flow augmentation projects in this section of lower Dempsey Creek in coordination with NRDP staff and potentially other agencies and partners. We anticipate working in partnership with a

variety of entities including: landowners, FWP, DNRC, Trout Unlimited, Columbia Basin Water Transaction Program and others within the community.

6. PROJECT SCHEDULE:

Item:	2013, 1st Q	2013, 2nd Q	2013, 3rd Q	2013, 4th Q	2014	2015-2017
Project Development, Due Diligence and Studies						
Design						
Financing/Cost Share						
Implementation (agreements/water right change apps)						
Post-Project Monitoring						

7. DRAFT BUDGET:

*Item:	Quantity:	Unit Cost:	Total Cost:	Anticipated Match:	NRDP:
Salaries/Benefits (Project Dev., Water Right App, Legal Services, 3 years Monitoring)	3,000 hours	$50/hour	**$150,000**	**$10,000**	**$140,000**
Contracted Services/Water Purchase (up to 5 projects)	10-20 cfs	Site Specific	**$1,800,000**	**$100,000**	**$1,700,000**
Travel	4,000 mi	$0.555	**$2,220**	**$220**	**$2,000**
Supplies/Equip. (Gages/Flow Monitoring Equip)	Varies	Varies	**$5,000**	**$0**	**$5,000**
Subtotal:			**$1,957,220**	**$110,220**	**$1,847,000**
Administration:	3.5	%	**$68,503**	**$10,000**	**$58,503**
Contingency:	10	%	**$195,722**	**$0**	**$195,722**
Total:			**$2,221,445**	**$120,220**	**$2,101,225**

*All items are general estimates and subject to change. Salary and benefit estimates are based on the projected cost of project development, water right applications, legal services and three years of monitoring for up to five individual projects. Refer to the separate CFC concept proposal on flow project pricing/valuation as multiple factors will need to be considered to evaluate each project on a case by case basis. Information above is not intended for pricing on individual projects, simply to provide an estimated range of potential costs/benefits. Match sources for such projects could come from: the Columbia Basin Water Transactions Program, FWP Future Fisheries Grants, NRCS EQUIP Contracts, DNRC Renewable Resource Grants and other yet to be identified sources.

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1. PROJECT TITLE: Baggs Creek Habitat and Fish Passage Project

2. ORGANIZATION AND CONTACTS:

Contact:	Address:	Phone:
Ted Dodge, Executive Director, Watershed Restoration Coalition of the UCF (WRC)	1002 Hollenback Rd. Deer Lodge, MT 59722	Tel. 406-579-3762 Tel. 406-856-1703 x4
Will McDowell, Project Coordinator	same	406-396-7716 cell

3. PROJECT PURPOSE AND BENEFITS: The purpose of the Project is to enhance riparian and aquatic habitat, and improve fish passage in a critical reach of Baggs Creek, a tributary to Cottonwood Creek east of Deer Lodge. Baggs Creek is an important westslope cutthroat trout stream, which ranks as a Priority 2 stream for fisheries enhancement with the NRDP/FWP.

PROJECT BENEFITS:
*Improve potential spawning, rearing, and migratory habitat for native and sport fish, and provide downstream and upstream passage for fish using the National Forest tributaries.
*Replace lost trout angling opportunities in the river mainstem, by improving tributary habitat, and help enhance recruitment of native fish (westslope cutthroat trout) from Baggs Creek into the Clark Fork.
*The project will have secondary benefits to wildlife by improving the quality of native riparian/wetland shrub habitat, and benefit water quality by reducing livestock impact.

4. PROJECT LOCATION AND MAP: The project site covers about two miles of channel upstream of the confluence of Baggs Cr. and Cottonwood Creek on private land, and at least two miles of stream on the U.S. Forest Service grazing allotment (see Map). Baggs **Creek is a Priority 2 stream** for fisheries restoration in the Montana Fish Wildlife and Parks (FWP) and Natural Resource Damage Program (NRDP) tributary prioritization for aquatic restoration.

5. PROJECT DESCRIPTION:
Issues: RIPARIAN HABITAT: Lower Baggs Creek riparian corridor on private land was assessed by the WRC in 2010. Four sub-reaches qualified as "sustainable at risk" due to degradation of riparian vegetation, weed infestation, head-cuts and channel bank erosion. Improving riparian habitat conditions will require addressing the grazing regime, access to stock water, etc. on each property. FISH PASSAGE: The 2011 FWP-FRIMA irrigation structure report lists one "medium" priority irrigation diversion for fish passage improvements at river mile 0.4 (above Cottonwood confluence), and the Trout Unlimited irrigation inventory (TU, 2012) notes significant fish passage issues at three irrigation diversions on lower Baggs Creek. Both upstream passage and fish entrainment are issues at all three diversions.

*** Project Goals and Objectives:**
Goal 1: Enhance riparian and aquatic habitat quality in a degraded reach of Baggs Creek.
Objective 1: Work with landowners and lessees on private, state and federal grazing lands to reduce livestock impact on the stream through a combination of off-stream water, fencing and/or other grazing management improvements.
Goal 2: Restore upstream and downstream fish passage, especially for native cutthroat trout, which spawn and rear in Baggs Creek.

Objective 1: Work with irrigators to design and implement improved irrigation structures to enhance upstream passage of native fish and reduce entrainment of trout and other aquatic species.

*Tasks/Activities by Goal:

Goal 1: Enhance riparian and aquatic habitat:

a) Design: The WRC will develop plans for riparian grazing improvements with landowners and lessees on the lower 3 miles of Baggs Creek, and immediately adjacent parcels, including private, state, and U.S. Forest Service lands. These improvements will reduce livestock pressure on stream banks and riparian vegetation in Baggs Creek and possibly other small tributaries (e.g. Fred Burr). If larger structures or off-stream water systems are required to protect stream banks, those will be designed by consultants.

b) Construction: The WRC and the landowner(s), will coordinate the process of selecting an appropriate construction contractor/contractors for fencing, off-stream water and stream bank protection based on contractor lists developed by NRCS for Deer Lodge valley, and/or public advertisements to meet all State procurement requirements.

c) Landowner management agreement and maintenance: Cooperation with landowners for long-term maintenance of conservation investments will be required for maximum positive impact. The WRC will require a long-term (20-year) maintenance agreement with ability to inspect the site.

Goal 2: Restore downstream and upstream fish passage:

a) Design: The fish passage structures require careful design to meet all agricultural, fisheries, and hydraulic criteria required for success. The WRC has an excellent relationship with the key irrigator using these diversions, and close coordination with the irrigator will be critical to success. The WRC will work with its partner Trout Unlimited (TU) to contract an appropriate engineering design firm to develop the designs, which may involve a rock "step" weirs and fish screens. One of the options to be considered in the design process is consolidation of some diversions to allow one fish screen to cover what are today two or more distinct ditches.

b) Construction: The WRC and TU will assist the irrigator to select an experienced construction firm to install fish passage structures. Construction in the off-season (especially fall) is ideal.

c) Landowner management agreement and maintenance: Cooperation with the irrigator for long-term maintenance of conservation investments will be required. The WRC and TU believe that funding to establish a screen maintenance capacity in the conservation community will be essential for long-term success (this is the experience of fish screen programs throughout the western U.S.). The WRC will require a long-term (20-year) maintenance agreement with ability to inspect the site.

Progress to date:

2010: The WRC performed riparian assessment stream walks on the lower two miles of Baggs Creek (and nine miles of Cottonwood Creek), and identified four reaches recommended for conservation practices, particularly in grazing management to reduce streamside impacts.

2011: The U.S. Forest Services releases its East Valley Landscape Stewardship Project EIS, which specifies improvements to fish and riparian habitat in the Baggs Creek corridor as one of their activities.

2011-2012: TU evaluated fish passage at Baggs Cr. diversions in late summer 2011, in coordination with FWP, and reported on recommendations for these structures in January, 2012.

***Lead entity and partners:** The WRC is the project lead, but the landowners, Trout Unlimited, NRCS, the Conservation District, DNRC-State Lands, U.S. Forest Service, and CF Coalition will be partners. At least two private landowners and two public land management agencies will be involved.

6. PROJECT SCHEDULE:

ITEM:	*Quarter 3, 2012*	*Quarter 4, 2012*	*Quarter 1, 2013*	*Quarter 2, 2013*	*Quarter 3, 2013*	*Quarter 4, 2013*	*2014*
Assessment & Design							
Funding Applications							
Permits & Bids							
Construction							
Management:							

If funded, this project would begin immediately and first phases would be constructed in late fall-winter 2013.

7. BUDGET:

ITEM:	***UNIT:***	***QUAN-TITY:***	***UNIT COST:***	***TOTAL COST:***	***MATCH:***	***NRDP:***
Salaries (WRC and TU): Project development & coordin	*days*	*20*	*400*	*8000*	*2000*	*6000*
Contracts: Engineering	*days*	*40*	*800*	*32,000*	*0*	*32,000*
Materials & Construction (installed)				*0*	*0*	*0*
Off-stream water systems (pipeline/tanks)	*system*	*1*	*30,000*	*30,000*	*1000*	*29,000*
Fencing (public/private)	*feet*	*15,000*	*1.75*	*26,250*	*2500*	*23,750*
3 Fish passage structures (diversions/screens)	*Per struct*	*3*	*50,000*	*150,000*	*10,000*	*140,000*
SUBTOTAL:				*246,250*	*15,500*	*230,750*
Administration:	*5%*			*11,800*	*0*	*11,800*
Contingency:	*5-10%*			*20,000*	*0*	*20,000*
TOTALS:				***278,050***	***15,500***	***262,550***

Match funding is a minimum estimate, and is expected to increase significantly as other the project progresses and other sources of funding are secured. A portion of matching funds (in-kind and cash) must come from the landowners/ irrigators. Unsecured sources of match, which may be other state and federal grant programs, are not included in this budget.

The project development salaries are for WRC and TU staff to coordinate various elements of the project including landowner outreach, procure funding, write permits, conduct selection of engineers, selection of construction firm (with landowners), supervise project engineering and construction contracts, and participate in project construction oversight. Projects of this type also require post-construction monitoring and maintenance. Total cost of all these services is approximately 3% of total project budget.

Administration is for processing payments and preparing reports to the NRDP and other funders, at approximately 5% for a project this size. Engineering and construction management is approximately 13% of total project budget, which is reasonable for this size of project and types of construction.

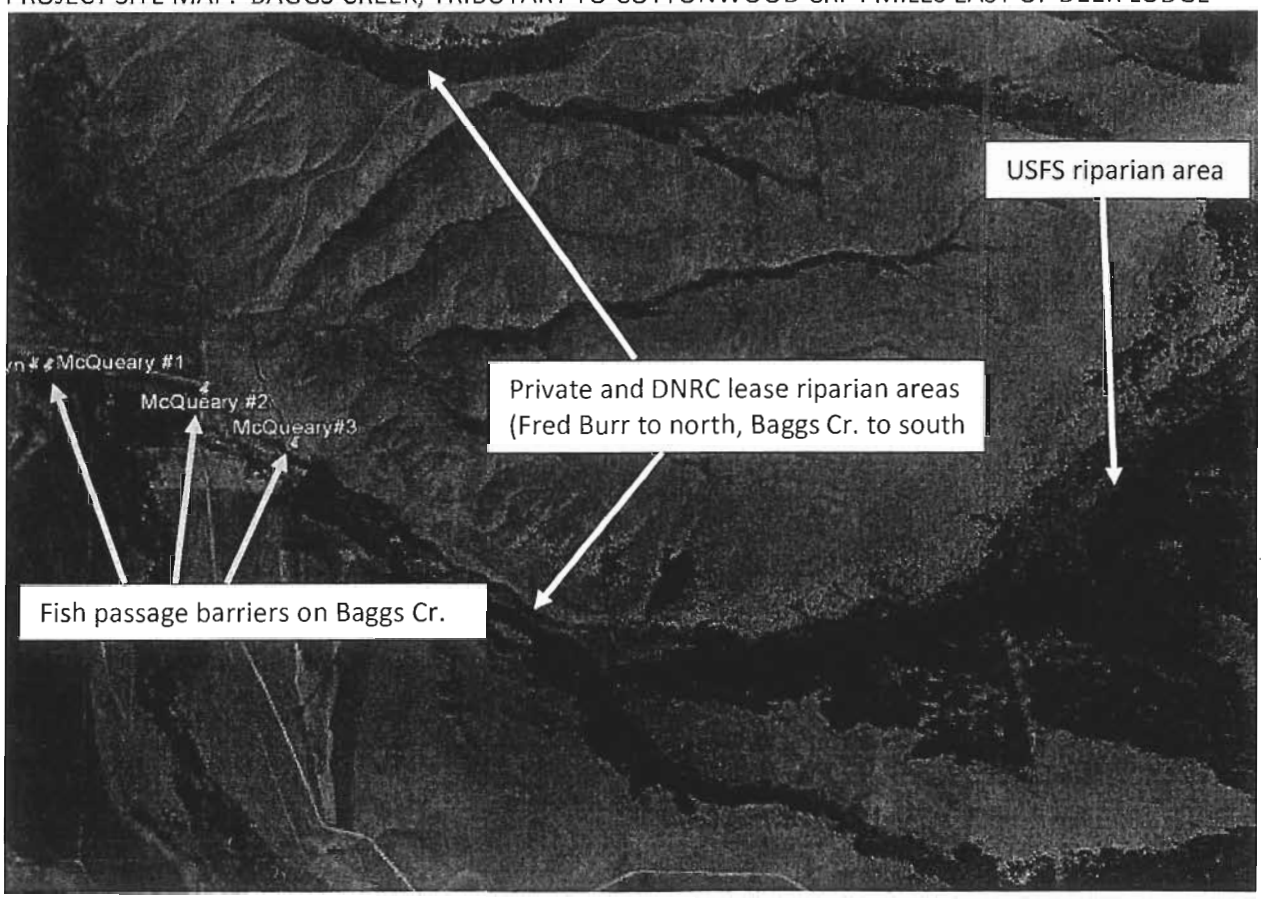
References:

*FWP-FRIMA, 2011, "An Inventory of Irrigation Structures in the Upper Clark Fork River Drainage," Final Report 2011, USFWS Agreement No. 601818J270, by Will Schreck, Ryan Kreiner, Brad Liermann, and Jason Lindstrom.

*Trout Unlimited, 2012, "Upper Clark Fork Diversion Inventory," for Watershed Restoration Coalition, Deer Lodge, MT.

*WRC, 2012, "Upper Clark Fork Tributary Assessment for Restoration Planning: Watershed Health Monitoring Report, " for Montana DEQ, 319 Program, DRAFT, May.

PROJECT SITE MAP: BAGGS CREEK, TRIBUTARY TO COTTONWOOD CR. 4 MILES EAST OF DEER LODGE



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1. **PROJECT TITLE:** **Kohrs and Manning Cottonwood Creek Crossing & Fish Screen**

2. ORGANIZATION AND CONTACT:

Contacts:	Address:	Phone:
Ted Dodge, Executive Director	Watershed Restoration Coalition of the UCF 1002 Hollenback Rd. Deer Lodge, MT 59722	Tel. 406-579-3762 406-846-1703 x4
Bill Mosier, landowner representative	Kohrs and Manning Ditch Company	

3. PROJECT PURPOSE AND BENEFITS: The **Purpose** of the project is to enhance both upstream and downstream **fish passage** at the Cottonwood Creek crossing of the Kohrs and Manning canal (K&M) near Deer Lodge, and prevent entrainment of fish in the entire Kohrs and Manning canal system.

PROJECT BENEFITS:

*Improve passage of fluvial fish in upstream migration (especially westslope cutthroat trout) in spring at all stream flow levels (April-June), and in fall (Sept-Oct) will benefit spawning sport fish (brown trout).

*A fish screen will facilitate downstream passage of fry, juveniles and adult fish of all species from Cottonwood Creek and the Clark Fork river, returning those fish to the Clark Fork.

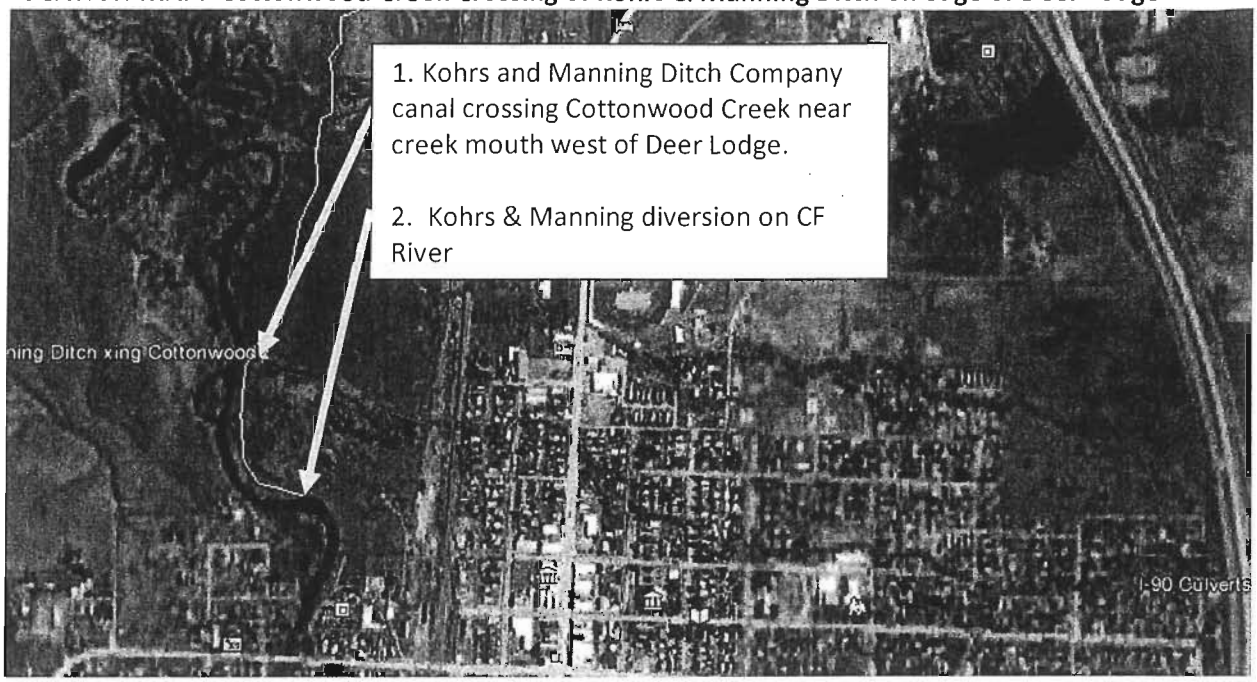
*Significant additional recruitment of native and sport fish from Cottonwood Creek to the Clark Fork river, improve trout populations in the tributary, and particularly aid native westslope cutthroat trout populations in upper Cottonwood Creek to re-establish fluvial runs.

*The project is part of a larger Cottonwood Creek fishery restoration strategy of WRC, CF Coalition, TU and US Forest Service (a USFS "Fish Priority watershed"), among other partners .

4. PROJECT LOCATION AND MAP:

The project is located on lower Cottonwood Creek in southern Powell County, approximately 50 feet upstream of the confluence with the Clark Fork River, on the outskirts of the town of Deer Lodge. **Cottonwood Creek is a Priority 2 stream** for fisheries restoration in Montana Fish Wildlife and Parks (FWP) and Natural Resource Damage Program (NRDP) tributary prioritization for aquatic restoration. The actual location of the structure is on property owned and managed by the U.S. National Park Service, Grant-Kohrs Ranch. The Kohrs and Manning Ditch Company (K&M) canal begins at a diversion on the Clark Fork River approximately 400 feet upstream of the Cottonwood Creek confluence. The K&M canal crosses Cottonwood Creek using a wooden pin and plank structure with removable "figure 4" supports. This structure also serves to divert Cottonwood Creek flows into the canal.

LOCATION MAP: Cottonwood Creek Crossing of Kohrs & Manning Ditch on edge of Deer Lodge



5. PROJECT DESCRIPTION:

Issues: The Kohrs and Manning Ditch entrains fish from the Clark Fork River and from Cottonwood Creek. Entrainment from Cottonwood Creek is particularly problematic because this ditch often diverts nearly 100% of the flow of Cottonwood Creek only about 50 feet before it enters the Clark Fork. The current structure at Cottonwood Creek also impedes upstream passage of all fish except during exceptional high flows. The Kohrs and Manning diversion structure in the Clark Fork River needs annual maintenance, discouraging its use during early season high water if Cottonwood Creek has sufficient flow to satisfy irrigator demand.

Project Goals, Objectives:

Goal 1) The project will enhance the upstream passage of fluvial brown trout and westslope cutthroat trout from the Clark Fork river into Cottonwood Creek.

Objective 1) Design and construct a new canal crossing structure which includes a Denil-type fish ladder, and improved fish access from the river to the crossing site.

Objective 2) Design and construct a new permanent diversion structure on the Clark Fork river which provides more reliable water supply and lessens irrigator's dependence on Cottoonwood Creek.

Goal 2) The project will install a fish screen to enhance survival of downstream migrating fry, juvenile and adult brown trout and westslope cutthroat in Cottonwood Creek and in the Clark Fork river, allowing their successful return to the Clark Fork.

Objective 3) Design and construct a fish screen on the K&M canal which can return fish entrained at both the Clark Fork river diversion and the Cottonwood Creek diversion to the Clark Fork river.

***Tasks/Activities:**

1) **The first goal** of the project is to install a new canal crossing structure with integrated fish ladder. The K&M Ditch Company would like to replace this wooden structure, which was installed in 1975, and has reached the end of its useful life. The current structure is built of wood, with collapsible steel "jacks" in a triangular or "Figure 4" shape mounted on a plank base. The jacks support wooden stop logs

installed by the irrigators during the irrigation season (May-October), and removed during the off-season.

The irrigators divert up to 80 cfs out of Cottonwood Creek during spring flows (May to mid-June), when Cottonwood Creek is their primary source of irrigation water. The K&M Ditch Company has a large, very junior water right out of Cottonwood Creek. As flows decline in Cottonwood Creek, the K&M Ditch opens their headgate on the Clark Fork River, and switches to that Point of Diversion for their primary source of irrigation water. However, under current operation, the structure continues to divert all of the Cottonwood Creek low flows into the K&M Ditch throughout the irrigation season.

The existing structure is elevated approximately three feet vertically over the low-flow water elevation in the Clark Fork river. This threatens to undermine the existing structure, and makes upstream fish passage difficult from the river into Cottonwood Creek, especially in low water.

The proposed solution to the upstream fish passage issue, which will also benefit the K&M Ditch Company, is to design and build: 1) a series of rock weirs between the existing structure location and the Clark Fork river to prevent downcutting and undermining of the structure; 2) a concrete crossing and diversion structure with steel jacks to support boards, in a configuration similar to the existing wooden crossing; 3) a fish ladder (Denil type design) which would be located at a low point within the structure to ensure constant flow, and fish attraction. A siphon was among the options evaluated for this site, but the K&M Ditch Company believes a siphon is a serious hazard at this location due to heavy use by youth floating in this area.

2) The second goal of the project is to install a large volume (60-80 cfs) fish screen which would be located on the K&M Ditch just downstream of the Cottonwood Creek crossing. This location would allow the fish screen to pass downstream migrating fish from Cottonwood Creek, as well as fish entrained in the K&M headgate on the Clark Fork River, back down into the river. Montana FWP's 2010 sampling showed the K&M Ditch downstream of Cottonwood Creek crossing to entrain large numbers of salmonids, particularly brown trout. The FWP also had radio-tracked fluvial westslope cutthroat from the Clark Fork into the Cottonwood Creek drainage, so future fluvial westslope cutthroat use of this site is anticipated. T here is no design yet for the fish screen, although vertical flat-plate screens are used at several similar sites with high flow rates.

3) The third component of the project is a new permanent diversion structure in the Clark Fork River just 100 yds. upstream of Cottonwood Creek. This new diversion structure, which will provide the Ditch Company's senior water rights from the Clark Fork, is an essential project feature because it increases the reliability of adequate irrigation water from the Clark Fork at all times of year, including spring high flows, and thereby provides the Ditch Company more flexibility to incorporate fish passage features at the Cottonwood Creek diversion into their operation.

***Progress to date:**
2011-2012: The K&M Ditch Company, the WRC, and DLV CD have contracted preliminary engineering studies on several items related to this project. A Capital Improvement Plan (CIP) funded by the DNRC has prioritized all the major infrastructure work on K&M Ditch. The Clark Fork river diversion is the #1 priority and the Cottonwood Creek crossing is the #2 ranked structure on the whole system. The engineer has looked at similar projects and begun to lay out the design parameters for the irrigation and fish passage elements. The engineer has developed a rough budget (see below). See references.

***Lead entity and partners:**

The Watershed Restoration Coalition (WRC) is the lead entity on this project, and has contracted the engineering services of Morrison Maierle engineers for concept design. All activities and ideas are vetted by WRC through the three principal shareholders on the K&M Ditch (Bill Mosier, Dave Johnson, Fred Benson). The Grant-Kohrs Ranch has a "right of way" water right of 3 cfs, and one other user has access to a small amount of water, but neither are shareholders on the Ditch Company. Montana DNRC has financed some of the initial engineering work, the National Fish and Wildlife Foundation has contributed funds to this project, and the Grant Kohrs Ranch financed a study of this site to examine issues related to NPS management of historical sites. Montana Fish Wildlife and Parks and Trout Unlimited will be a key stakeholders on fish passage designs.

6 PROJECT SCHEDULE:

The project is expected to take approximately two years to complete. Preliminary engineering is already underway.

ITEM:	Quarter 1, 2012	Quarter 2, 2012	Quarter 3, 2012	Quarter 4, 2012	Quarter 1, 2013	Quarter 2, 2013	Quarter 3, 2019	Quarter 4, 2013
Preliminary Engineering Reports								
Final Design								
Funding Apps								
Permits & Bids								
Construction								

The overall schedule proceeds from a preliminary engineering report with conceptual design alternatives and public and agency discussion in summer and fall 2012. Some design elements and background research can begin in 2012, but final design would require NRDP funding, and so is focused on late winter and spring of 2013. Permits, Construction should be able to begin in late summer 2013, with completion by October or early November, 2013.

7. PROJECT BUDGET:

The proposed budget for the project, including both the crossing structure/fish ladder and the fish screen components, is summarized below:

ITEM:	UNIT:	QUAN-TITY:	UNIT COST:	TOTAL COST:	MATCH:	NRDP:
Salaries (WRC):	days	35	400	$14,000	$4,000	$10,000
Contract: Engineering	days	45	800	$36,000	$6,000	$30,000
Contract: Construction management	days	45	800	$36,000	$2,000	$34,000
Materials 1: crossing/ ladder	CY	40	12,000	$48,000	$4,000	$44,000

2: fish screen	custom	1	330,000	$330,000	$82,500	$247,500
3: River diversion	custom	1	105,000	$105,000	15,000	90,000
Communications:	custom	1	500	$500	0	$500
SUBTOTAL:				$563,625	$113,500	$456,125
Administration:	4%			$22,065	0	$22,065
Contingency:	10%			$56,000	0	$56,000
TOTALS:				**$641,625**	**$107,435**	**$534,190**

Matching funds should come from the MT FWP Future Fisheries Program, or other state and federal sources. Match is unsecured at this time.

The salaries are for WRC staff to coordinate the project , including procure funding, write permits, conduct selection of engineer, assist landowners with selection of construction firm, supervise project engineering and construction contracts, and participate in project construction oversight.

Fish screen cost is estimated at $5,000/cfs, a common rule of thumb in Northwest fish screen design. The river diversion is proposed to be grouted rip-rap, with a cost of approximately $105,000 plus engineering.

Administration is for processing payments and preparing reports to the NRDP and other funders, at approximately 4% for a project this size. Engineering and construction management is approximately 11% of total project budget, which is reasonable for this type of structure.

REFERENCES:

*Morrison Maierle, 2012a, "Kohrs and Manning Ditch Company Capital Improvements Plan," for WRC and Deer Lodge Valley Conservation District, March (includes budgets).

*Morrison Maierle, 2012b, "Kohrs and Manning Ditch Company Infrastructure Improvements," for Deer Lodge Valley Conservation District (RRGL project application), May (this only covers river diversion).

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1. PROJECT TITLE: Cottonwood Creek Applegate Lower Diversion/Fish Screen Project

2. ORGANIZATION AND CONTACTS:

Contact:	Address:	Phone:
Ted Dodge, Executive Director, Watershed Restoration Coalition of the UCF (WRC)	1002 Hollenback Rd. Deer Lodge, MT 59722	Tel. 406-579-3762 Tel. 406-856-1703 x4
Will McDowell, Project Coordinator	same	406-396-7716 cell

3. PROJECT PURPOSE AND BENEFITS: The purpose of the Project is to enhance fish passage in Cottonwood Creek east of Deer Lodge. Cottonwood Creek provides spawning, migratory and rearing habitat for sport fish and native fish, particularly westslope cutthroat trout, which are common in the upper watershed. Applegate lower diversion is an earth/rock "push-up" dam which often forms a barrier to upstream fish movement, and, due to its senior water rights low in the drainage, often diverts 100% of the remaining Cottonwood Creek flow.

PROJECT BENEFITS:
*Restore upstream and downstream fish passage for all fish species in lower Cottonwood Cr.
*Increase trout populations in Cottonwood Creek, to replace lost trout angling opportunities in the river mainstem.
*Connecting tributary habitat to Cottonwood Creek and the Clark Fork, to enhance recruitment of native fish (westslope cutthroat trout) from upper watershed tributaries into the Clark Fork.

4. PROJECT LOCATION AND MAP: The project site is at river mile 3.0 upstream of the mouth of Cottonwood Creek, east of Deer Lodge. **Cottonwood Creek is a Priority 2 stream** for fisheries restoration in the Montana Fish Wildlife and Parks (FWP) and Natural Resource Damage Program (NRDP) tributary prioritization for aquatic restoration.

5. PROJECT DESCRIPTION:
Issues: The 2012 Trout Unlimited report notes that the Applegate lower diversion is an impassable barrier to upstream and downstream passage of fish and aquatic organisms in late summer/fall. It is also a barrier during low flows in early summer. Constructing a permanent rock weir diversion structure to replace the temporary rock/earth "push-up" dam will eliminate the upstream fish passage issue, reduce sediment and streambed disturbance, and reduce overall maintenance. Installing an improved headgate and fish screen in the canal below the diversion will save fish which are entrained in the system.

*** Project Goals and Objectives:**
Goal 1: Provide for upstream and downstream fish passage through the Applegate lower diversion.
Objective 1: Install a new diversion, headgate and fish screen in the system, to enhance upstream fish passage of and reduce entrainment of trout and other species.

***Tasks/Activities by Goal:**
Goal 1: Provide for upstream and downstream fish:
a) Design: The NRDP provided funds for design of a new diversion at this site in the 2010 "Cottonwood Creek Habitat Enhancement Project, Stage I" project. This project will complete the installation process.

b) Construction: The WRC and the landowner(s), will coordinate the process of selecting an appropriate construction contractor/contractors for installation of a new diversion and fish screen based on contractor lists developed by NRCS for Deer Lodge valley, and/or public advertisements to meet all State procurement requirements. Construction in early fall to winter is planned.

c) Landowner management agreement and maintenance: Cooperation with the irrigator for long-term maintenance of conservation investments will be required. The WRC and TU believe that funding to establish a fish screen maintenance capacity in the conservation community will be essential for long-term success (this is the experience of fish screen programs throughout the western U.S.). The WRC will require a long-term (20-year) maintenance agreement with ability to inspect the site.

Progress to date:
2009-2010: The WRC and FWP evaluated diversions in Cottonwood Creek to identify opportunities for enhancing fish passage and in-stream flow.

2010-2011: The WRC wrote a proposal, and in 2011, began implementing the "Cottonwood Creek Habitat Enhancement-Stage I" project with NRDP. Matching funds from the NFWF Bring Back the Natives program was also procured. Construction of the Applegate pipeline, with a fish screen, connected to the Applegate upper diversion, was completed in 2011. Design of a new Applegate upper diversion was also completed in 2011. A local construction firm was selected for installation of the design, but weather prevented the project from going forward. It is planned for summer 2012. TU and FWP evaluated irrigation diversions in 2010-2011.

2011-2012: Design began on the Applegate lower diversion in November, 2011, and conceptual alternatives are now prepared. A final design will begin in early fall, 2012, partly based on experience with the upper Applegate diversion and fish screen.

***Lead entity and partners:** The WRC is the project lead, but the landowner and Trout Unlimited, will be key partners.*

6. PROJECT SCHEDULE:

ITEM:	*Quarter 3, 2012*	*Quarter 4, 2012*	*Quarter 1, 2013*	*Quarter 2, 2013*	*Quarter 3, 2013*	*Quarter 4, 2013*	*2014*
Design							
Secure all funding							
Permits & Bids							
Construction							
Management:							

If funded, this project would begin immediately and first phases would be constructed in late fall-winter 2013.

7. BUDGET:

ITEM:	UNIT:	QUAN-TITY:	UNIT COST:	TOTAL COST:	MATCH:	NRDP:
Salaries (WRC and TU): Project coordination & oversight	*days*	*6*	*400*	*2400*	*800*	*1600*
Contracts: Engineering	*days*	*4*	*800*	*3200*	*0*	*3200*
Materials & Construction (installed)				*0*	*0*	*0*
Diversion, rock weirs	*item*	*1*	*30,000*	*30,000*	*0*	*30,000*
Fish Screen, for 7.5 cfs	*item*		*37,500*	*37,500*	*0*	*37,500*
SUBTOTAL:				*73,100*	*800*	*72,300*
Administration:	*5%*			*3600*	*0*	*3500*
Contingency:	*5-10%*			*7300*	*0*	*7300*
TOTALS:				***$84,000***	***$800***	***$83,200***

Match funding is a minimum estimate, and is expected to increase as the project progresses and other sources of funding are secured. Therefore, unsecured sources of match, which may be other state and federal grant programs, are not included in this budget.

The project development salaries are for WRC and TU staff to coordinate various elements of the project including landowner outreach, procure match funding, write permits, conduct selection of engineers, selection of construction firm (with landowners), supervise project engineering and construction contracts, and participate in project construction oversight. Projects of this type also require post-construction monitoring and maintenance. Total cost of all these services is approximately 3% of total project budget.

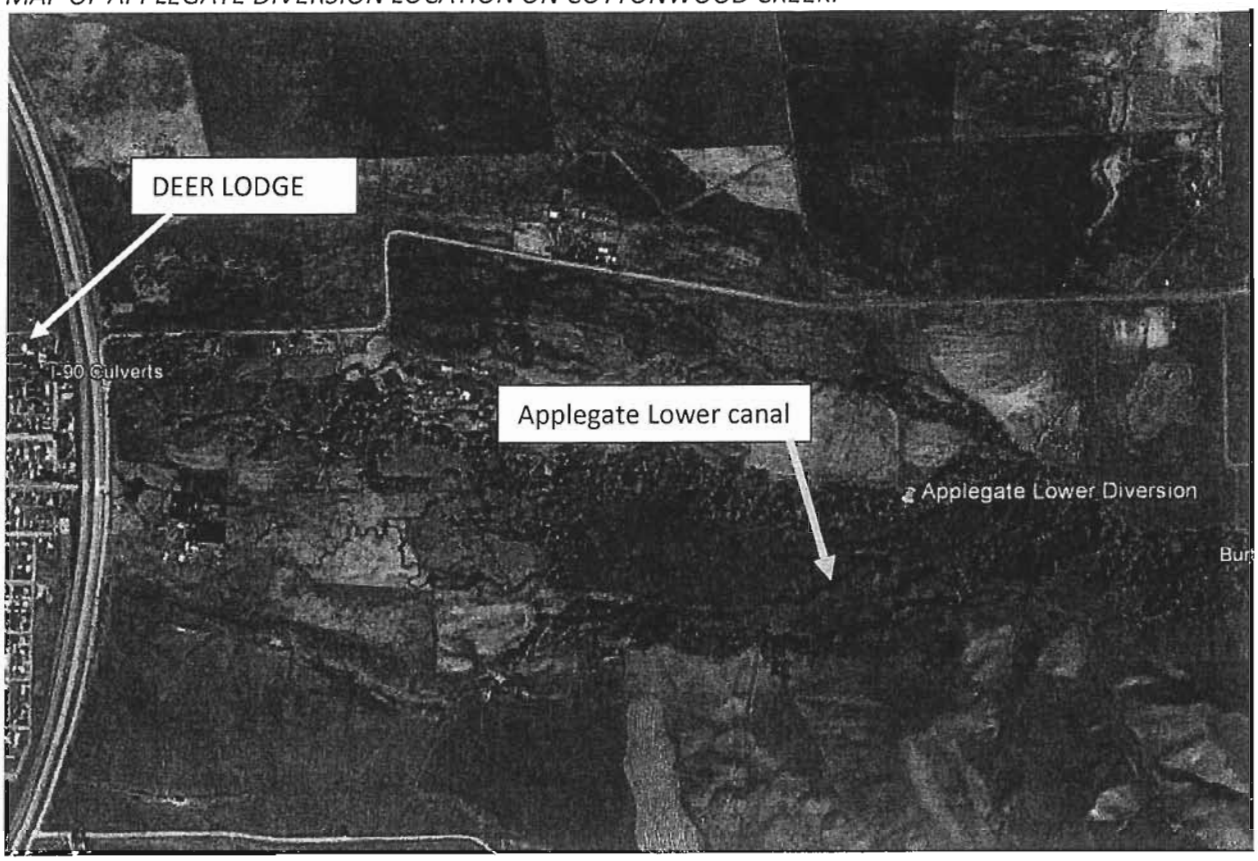
Administration is for processing payments and preparing reports to the NRDP and other funders, at approximately 5% for a project this size. Engineering on this project is budgeted solely for any issues that may remain after the primary design process is finished, particularly in regards to fish screen details. Therefore, the total engineering/ construction management is less than 4% of total project budget, which is reasonable for this size of project and type of construction, which most engineering already funded.

References:

FWP-FRIMA, 2011, "An Inventory of Irrigation Structures in the Upper Clark Fork River Drainage," Final Report 2011, USFWS Agreement No. 601818J270, by Will Schreck, Ryan Kreiner, Brad Liermann, and Jason Lindstrom.

Trout Unlimited, 2012, "Upper Clark Fork Diversion Inventory," for Watershed Restoration Coalition, Deer Lodge, MT.

MAP OF APPLEGATE DIVERSION LOCATION ON COTTONWOOD CREEK:



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1. PROJECT TITLE: Cottonwood Creek Johnson Ranch Habitat Project

2. ORGANIZATION AND CONTACTS:

Contact:	Address:	Phone:
Ted Dodge, Executive Director, Watershed Restoration Coalition of the UCF (WRC)	1002 Hollenback Rd. Deer Lodge, MT 59722	Tel. 406-579-3762 Tel. 406-856-1703 x4
Will McDowell, Project Coordinator	same	406-396-7716 cell
Doug Johnson, landowner	100 Emery Rd. Deer Lodge, MT 59722	Tel. 406-846-3468

3. PROJECT PURPOSE AND BENEFITS: The purpose of the Project is to enhance riparian and aquatic habitat in a critical reach of Cottonwood Creek, just upstream of the town of Deer Lodge, to improve potential spawning, rearing, and migratory habitat for sport fish and native fish.

PROJECT BENEFITS:
*Restore critical aquatic habitat linking upper Cottonwood Creek to the lower reach and Clark Fork river.
*Replace lost trout angling opportunities in the mainstem, by improving fish habitat in this Priority 2 tributary.
*Enhance recruitment of sport fish (brown trout) and native fish (westslope cutthroat trout) from the Cottonwood Creek watershed to the Clark Fork, by providing a better quality migratory corridor.
*The project will have benefits to wildlife by expanding native riparian cottonwood forest habitat, and to water quality by buffering the stream from road and livestock uses.

4. PROJECT LOCATION AND MAP: The project site covers 2200 feet of channel immediately upstream of Interstate 90 culverts on Cottonwood Creek, just east of Deer Lodge. **Cottonwood Creek is a Priority 2 stream** for fisheries restoration in Montana Fish Wildlife and Parks (FWP) and Natural Resource Damage Program (NRDP) tributary prioritization for aquatic restoration.

5. PROJECT DESCRIPTION:
Issues/Justification: The landowner of the approximately 50-acre property on which the majority of the reach is located is Doug Johnson. At the top of the project reach is a cattle corral used for wintering animals by rancher Gene Burt. This reach of Cottonwood Creek was the only significant reach qualified as "unsustainable" by WRC among the entire nine miles of the creek assessed for riparian condition in 2010. The characteristics leading to this low habitat quality rating include historical channelization (low sinuosity) and removal of woody vegetation, poor cover and in-stream habitat, excessive bank erosion, and over-wide channel form. This project would restore the reach to high-quality habitat.

*** Project Goals, Objectives:**
Goal 1: The project will enhance riparian and aquatic habitat quality and habitat diversity in a historically straightened, channelized reach of Cottonwood Creek.
Objective 1: Establish and re-vegetate a channel form, inset floodplain features and aquatic habitat which will result in a naturally stable, diverse 2,200 ft. channel and riparian habitat corridor for fish and wildlife.
Objective 2: Develop a long-term agreement with the landowner for fencing, livestock management, and recreational access which will maximize the value of the improved habitat.

***Tasks/Activities by Goal:**

Goal 1: Enhance riparian and aquatic habitat:

a) Design: The WRC has a conceptual design to renaturalize this reach. The reach was historically channelized with heavy equipment, partly during construction of the Interstate highway, and partly after the 1981 flood. The proposed design will provide the following benefits: a) restore the natural geomorphic features (sinuosity, width-depth ratio, pool-riffle ratio) and functions of Cottonwood Creek channel; b) remove floodplain berms, re-establish a connected floodplain, and revegetate that floodplain; c) provide some enhancement of aquatic habitat with wood and rock pool-forming features; and d) establish and protect a woody riparian forest corridor. The current conceptual design has been stream-lined from its original form, at the recommendation of the FWP fisheries biologist, to minimize large rock habitat features, and let the stream do more of the work of re-establishing pools and riffles, a process which began during the June, 2011 flood.

Given the site location just upstream of urban Deer Lodge, the final design of the project will incorporate further engineering analysis of floodwater and sediment conveyance capacity of the system in extreme events, to minimize the opportunity for large-scale overbank flow and avulsion of the channel towards the north (Johnson Cr.) or south (Milwaukee Ave.). Powell County and the City of Deer Lodge are concerned about these issues due to the flood of 2011. These entities will manage the engineering effort on flood control aspects of the project, and fully fund any features in the larger floodplain outside the channel corridor which have a purely flood control function.

Final design which integrates the habitat and engineering features of the project will be completed in early 2013, under the supervision of WRC and Powell County Planning Department and their engineer.

b) Construction: The WRC, the landowner, and Powell County will coordinate the process of selecting an appropriate contractor/contractors for construction/revegetation. An excavation contractor who has prior experience executing the geomorphic, hydraulic and habitat criteria of the design is required. Construction of inset floodplains, and successful revegetation of floodplains and adjacent terrace features requires specialized contractors as well. Construction will take place in low-water, probably fall or early winter.

c) Landowner management agreement and maintenance: Close cooperation has been established with Doug Johnson, the landowner, but long-term cooperation will be required for success. The landowner has agreed to fence the stream corridor with high-tensile electric fence, except for a bridge and a livestock water gap, and remove all livestock pressure. The WRC will require a long-term (20-year) maintenance agreement with ability to inspect the site. The site is very conspicuous from Interstate 90, and can serve as a useful habitat restoration demonstration.

***Progress to date:**

2010: The WRC performed riparian assessment stream walks on 9 miles of Cottonwood Creek, and identified this site as the lowest scoring (40% out of 100%), most degraded rural reach in the entire lower watershed, and a critical link between degraded urban habitat downstream and high-quality habitat further upstream (WRC, 2012).

2010-2011: The WRC used DNRC 223 funds to contract a conceptual restoration design, which was delivered in late 2011 (WRC, 2011), after considerable consultation with the landowner, and re-analysis of sites disturbed by the large June, 2011 flood on Cottonwood Creek (>50 yr. event). The design

document includes detailed analysis of aquatic habitat features, substrate, profiles, cross-sections, proposed designs and costs (102 pp. report with photos, diagrams, budgets available upon request). 2011-2012: The WRC applied for Future Fisheries funding for the concept design and received a $54,000 grant from FWP to support part of the project.

***Lead entity and partners:** The WRC is the project lead, but the landowner, FWP and Powell County Planning Department are key partners.

6. PROJECT SCHEDULE: Use table with blocked in quarters

ITEM:	Quarter 3, 2012	Quarter 4, 2012	Quarter 1, 2013	Quarter 2, 2013	Quarter 3, 2019	Quarter 4, 2013
Final Design						
Funding Applications						
Permits & Bids						
Construction/Reveg						
Management:						

If funded, this project would begin immediately and be mostly completed in fall of 2013, based on the fact that the conceptual design already done, and some of the funding is already secured.

7. BUDGET:

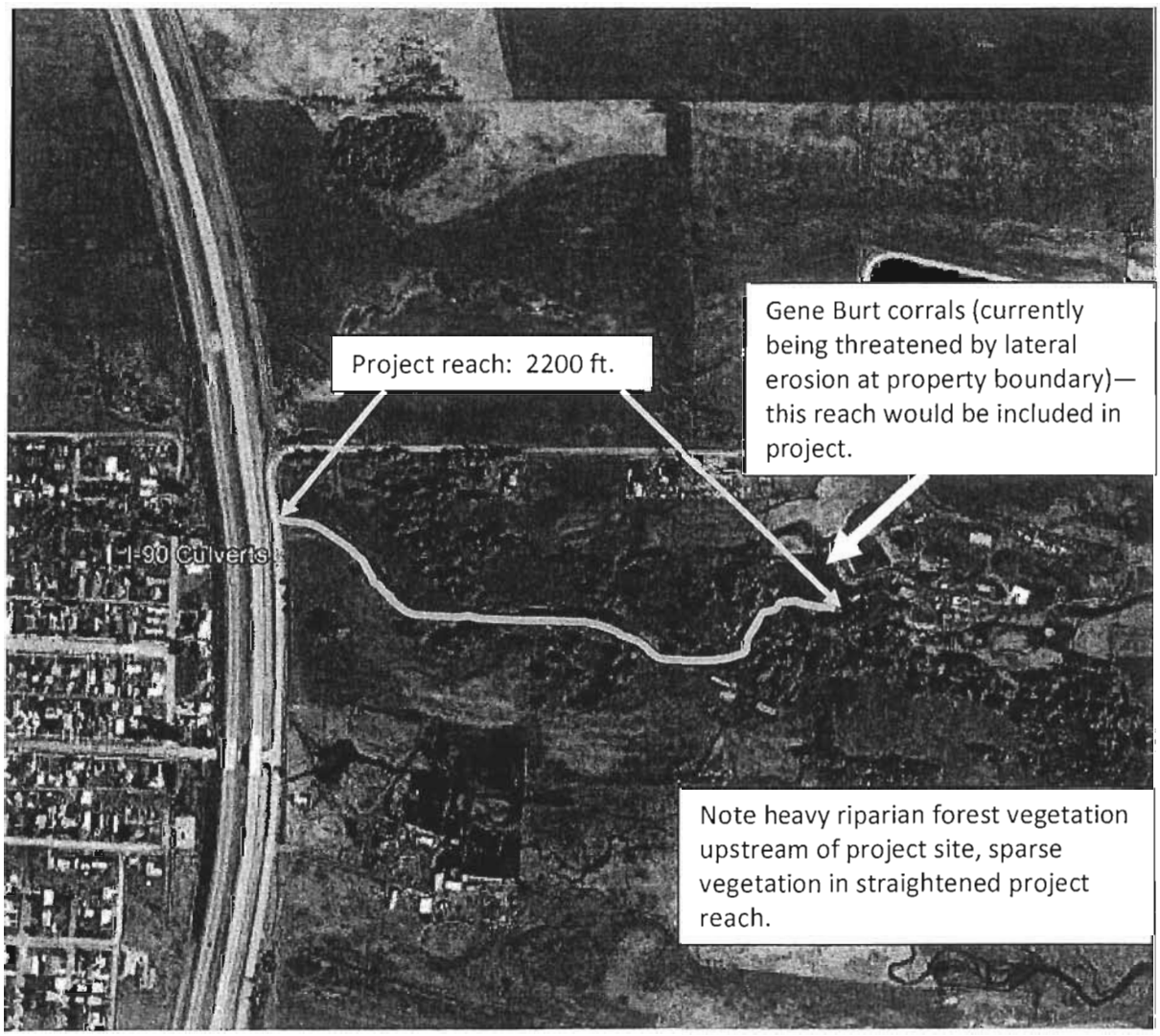
ITEM:	UNIT:	QUAN-TITY:	UNIT COST:	TOTAL COST:	MATCH:	NRDP:
Salaries (WRC):	days	20	400	8,000	5,000	3,000
Contract: Engineering	days	15	800	12,000	9,000	3,000
Contract: Construction mngmt	days	20	800	16,000	8,000	8,000
Materials (installed) 1: earthwork	Linear ft.	1420	40	56,800	30,000	26,800
2: Vegetation	plants	2000	6	12,000	8,000	4,000
3. Flood control structures	ft	1000	25	25,000	25,000	0
4: Fencing	feet	5000	1	5,000	2,500	2,500
Communications:		1	500	500	0	500
SUBTOTAL:				135,300	87,500	47,800
Administration:	5%			6,700	0	6,700
Contingency:	10%			13,500	0	13,500
TOTALS:				**156,800**	**87,500**	**71,000**

Matching funds come from the MT FWP Future Fisheries Program ($54,000 secured in early 2012), and from flood control sources to be obtained by Powell County (match unsecured). Note that no NRDP resources are requested for flood control related functions.

The salaries are for WRC staff to coordinate the project , including procure funding, write permits, conduct selection of engineers, assist landowner with selection of construction firm, supervise project engineering and construction contracts, and participate in project construction oversight.

The figure of 1420 linear feet of channel refers to the inset floodplains to be built, which are often on both sides of the channel, therefore the total length of channel to be re-naturalized is slightly lower than 50% of the whole reach. Stable sub-reaches will be left intact and re-vegetated.

Administration is for processing payments and preparing reports to the NRDP and other funders, at approximately 5% for a project this size. Engineering and construction management is approximately 18% of total project budget, which is reasonable for this size of project and types of construction.



DOUG JOHNSON HABITAT PROJECT ON COTTONWOOD CREEK SITE MAP

References:

*WRC, 2012, "Upper Clark Fork Tributary Assessment for Restoration Planning: Watershed Health Monitoring Report, " for Montana DEQ, 319 Program, DRAFT, May.

*WRC, 2011, "Cottonwood Creek Project Designs," by Alpine Creek Restoration, LLC, Deer Lodge, MT.

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WARMS SPRINGS CREEK RESTORATION

WASHOE PARK & HAFNERS DAM

ANACONDA, MONTANA

CONTACT

project host: Washoe Park Foundation & Anaconda Deer-Lodge County
fiscal partner: Deer Lodge Conservation District.
other partners: There are many business, groups, and committees invested in this project.
landscape architect firm: Bruce Boody Landscape Architect, Inc., Whitefish, MT
land owner: Anaconda-Deer Lodge County
project manager/contact: Jen Titus, Camas Project Solutions
e-mail: jtitus@camasprojectsolutions.com
phone: 406-960-4855
address: PO Box 1, Wise River, Montana 59762

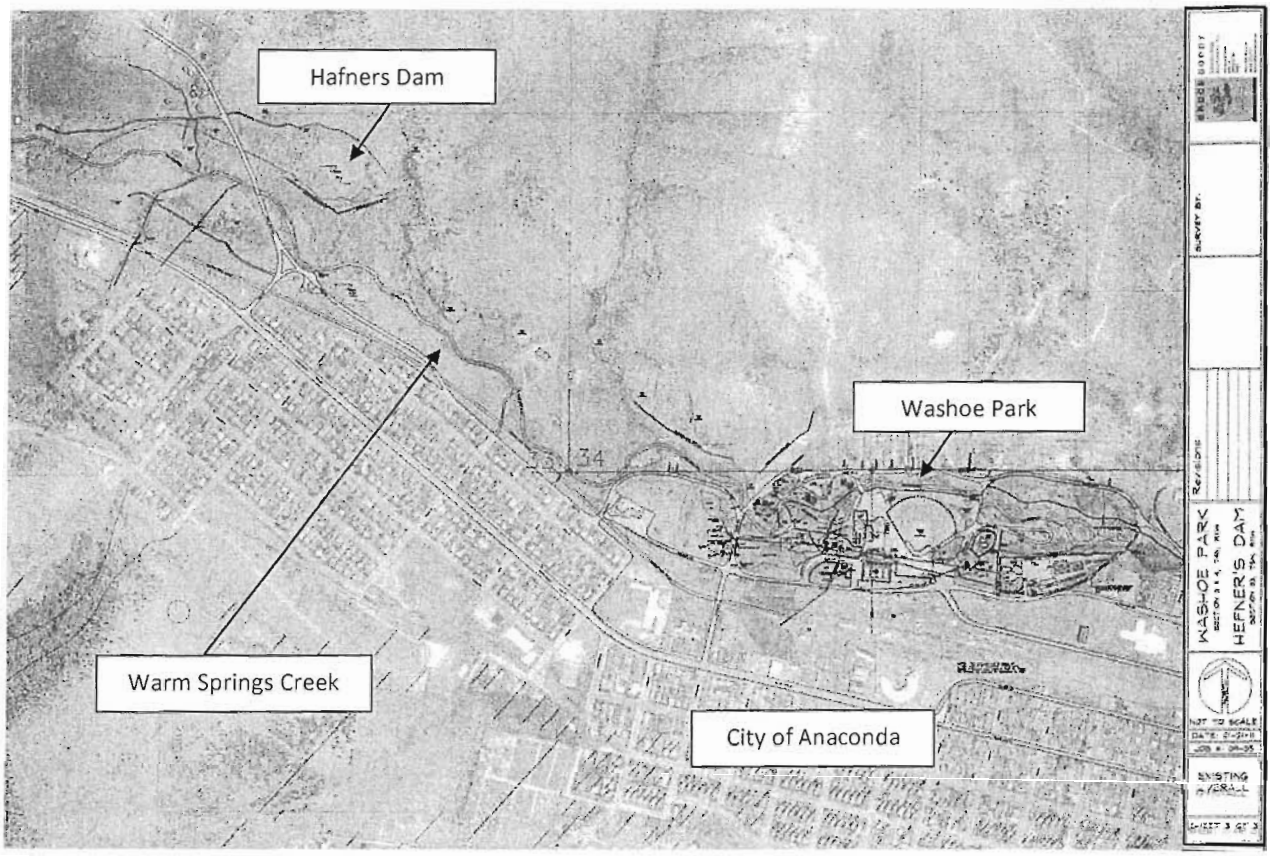
PROJECT PURPOSE & BENEFITS

Restoration of Washoe Park and Hafners Dam and the Warm Springs Creek riparian corridor that runs through both properties will bring long-term, sustainable natural resources, recreation, and economic improvement. The purpose of the project is to identify and restore natural resource function while inviting public recreation for a wide range of user types, maintaining historical elements, and incorporating maintenance sensibility (low maintenance, high quality products and systems, and income sources). Project benefits are lengthy, but include:

- 2.75 miles adequate riparian buffer on Warm Springs Creek and spring (existing buffer = 1.42 miles)
    - *healthy riparian corridor will improve water quality (reduce water temperature, reduce sediment inputs), improve habitat (birds and other riparian wildlife habitat, fish habitat, reduce channel degradation and over widening).*
- 31.75 acres with storm water management (existing = 0 acres)
- 5.86 miles of trail (existing length = 1.42 miles - note all 1.42 miles are in poor condition)
- 2.75 miles + 5.74 acres of recreation natural fishery improvement or protection in temperature habitat improvement and spawning and rearing, additional fishing opportunity (reservoir and duck pond improvement, spring enhancement, fishing access points, invited public access)
- improved human safety (reduced flood hazards, trips and falls on unmaintained trails, etc.),
- reduced human-wildlife conflict (specifically, bear encounters)
- education - outdoor classroom, interpretive ealks

Public support and county support of this project is high. High quality park systems can both protect the most sensitive natural resources while providing positive recreation opportunities and improved quality of life.

PROJECT LOCATION



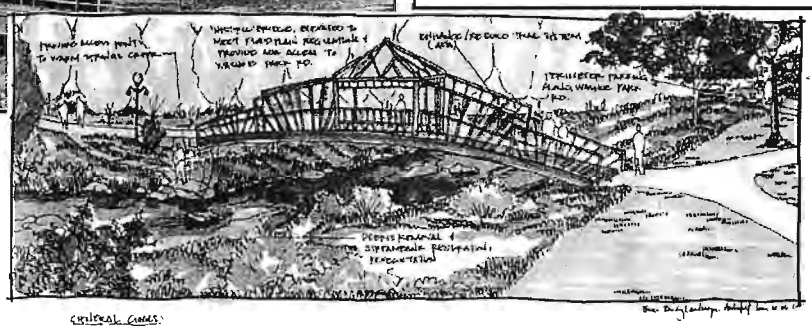
Washoe Park (right) & Hafners Dam (left) are pictured above. The elements shown are the existing condition. Warm Springs Creek runs from west to east at the north end. A spring feeds into the duck pond originating from the southwest across the street. A duck pond is located east of the baseball field. Hafners Dam includes an abandoned reservoir once used as a water source for the Old Works Smelter with water traveling by flume. Most of the riparian corridor is county owned.

PROJECT DESCRIPTION

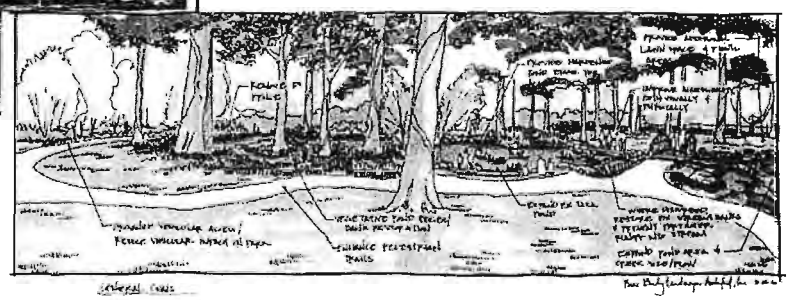
Washoe Park is a 43.88-acre city park located on the north side of the city of Anaconda. Washoe Park was originally constructed in 1890 and became Washoe Park officially in 1906. The Anaconda Company supported the park with personnel and funding until the smelters close. The park since has fallen into disrepair. A spring in the park is a poor source of fish habitat, walking trails have become unsafe and need to be resurfaced or relocated, and the duck pond has lost much of its character and function. A second county owned parcel connects Washoe Park to Hafners Dam and is 11.48 acres. Another piece of county land, Hafners Dam, is an 98.02-acre site west of Washoe Park. An abandoned reservoir was the water source flumed to the Old Work Smelter. The project creates invited public access to the site with trails, fishing access, and fishing pond. There is an opportunity for a trail connection to Washoe Park that creates 2 miles of continuous creek recreation access. All parcels combined creates a 153 acre park system. The project goals are to improve natural resource recreation, fish and wildlife habitat, educational opportunity, human safety, and maintenance costs.

Example Washoe Park Project Elements:

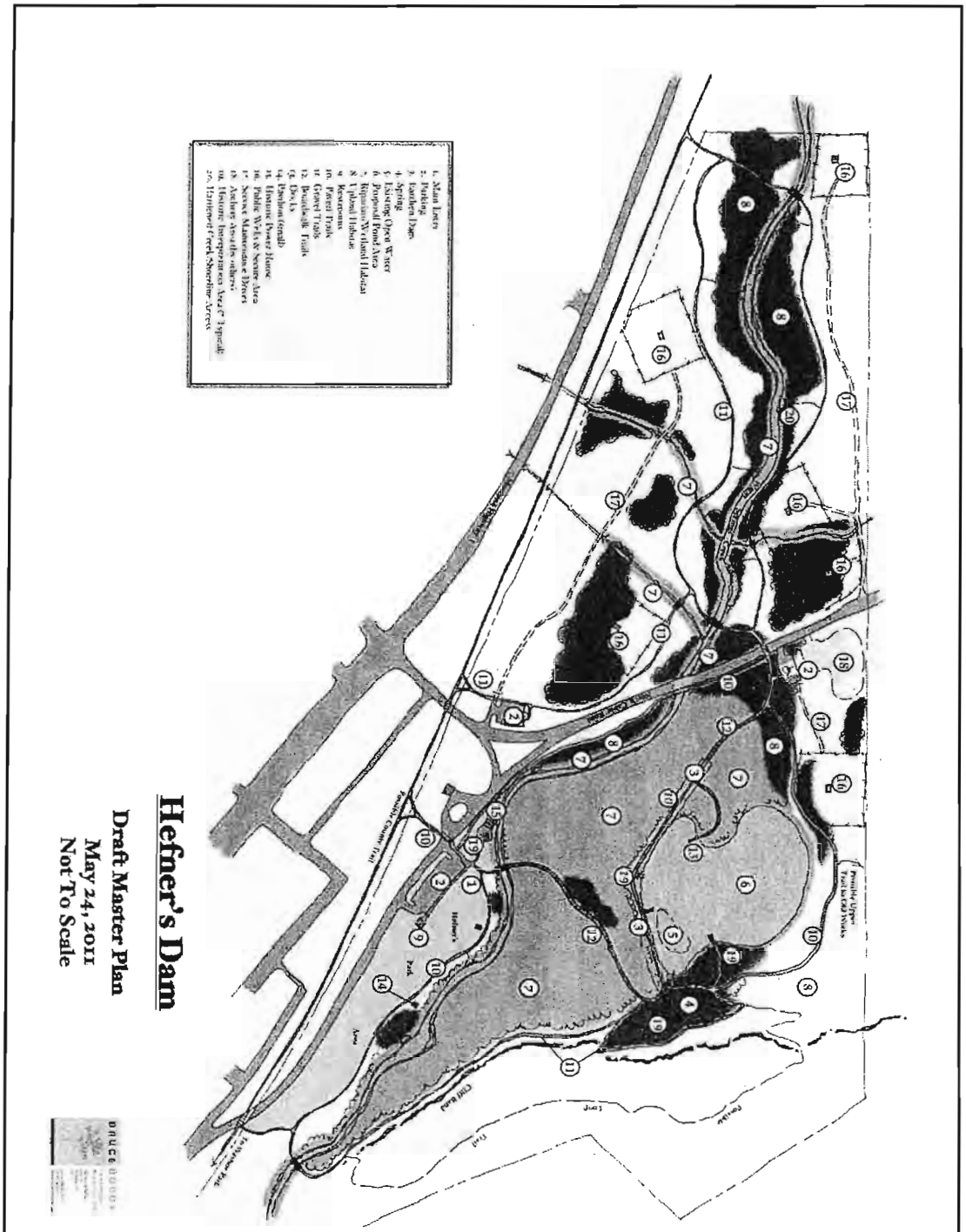
Before & After: New bridge is 100 floodplain approved. Riparian vegetation and relocated trail decreases streamside erosion. Channel is restored.



Before & After: Existing duck pond is a nutrient source, bear attractant, eyesore, and source of heated water. Existing tree roots are exposed. The new pond (right) tree roots are restored, vegetation used in the and to uptake nutrients, and esthetically pleasing. Duck food is removed to reduce bear attractant, pond is deepened to improve natural systems.



This map is the Draft Master Plan for Washoe Park, with restored reaches of Warm Springs Creek, spring and duck pond.



This map is the Draft Master Plan for Hafners Dam (*note spelling change after plan adoption*), with restored reaches of Warm Springs Creek, abandoned reservoir, and trail system.

PROJECT SCHEDULE

2011: ADLC adopts draft master plans for Washoe Park & Hafners Dam. Development funded by NRDP.

2012 - 2013: Technical analysis and final master plan development. Technical analysis includes topographic analysis, LiDar mapping, wetland delineation, hydrologic analysis, title search, geotechnical analysis, superfund investigation and compilation by landscape architect.

2014: Final master plan complete and adopted by ADLC. Final master plan designates project phases. Implementation begins. Depending on final master plan, final costs, and funding opportunities implementation is expected to occur over a 5-10 year period.

COST

Draft master plan development (2011) = $55,500 funding, $100,000 provided in-kind

This task is complete - no funding required

Technical analysis & Final Master Plan Development (2012-2013): $120,000

This task is in process and funding solicited or being solicited. No NRDP funding is requested.

Implementation begins (2014-__) in phases over a 5-10 year period depending on funding and opportunity. Total costs likely between $5 - 10 million.

Abstract is suggesting partial funding of this phase. Implementation is expected to be funded by many partners and sources, one of which could be NRDP. A breakdown on cost categories is not available as the master plan has not been finalized. However, this project is ongoing and occurring on schedule.

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1. PROJECT TITLE: Upper Browns Gulch Habitat and Fish Passage Project

2. ORGANIZATION AND CONTACTS:

Contact:	Address:	Phone:
Ted Dodge, Executive Director, Watershed Restoration Coalition of the UCF (WRC)	1002 Hollenback Rd. Deer Lodge, MT 59722	Tel. 406-579-3762 Tel. 406-856-1703 x4
Will McDowell, Project Coordinator	same	406-396-7716 cell

3. PROJECT PURPOSE AND BENEFITS: The purpose of the Project is to improve riparian and aquatic habitat in upper Browns Gulch, both to enhance resident fisheries and promote reconnection of fluvial fisheries to Silver Bow Creek. The project will address aquatic habitat, riparian habitat and fish passage limitations in this reach, to improve potential spawning, rearing, and migratory habitat for sport fish and native fish, as well as for native western pearlshell mussels—this is the only Upper Clark Fork site for this State species of concern.

PROJECT BENEFITS:
*Improve stream habitat quality and fish population connectivity in upper Browns Gulch.
*Improve fishing in Browns Gulch itself to replace lost trout angling opportunities in the Clark Fork and Silver Bow Creek.
*Enhance recruitment of sport fish (brook trout) and particularly native fish (westslope cutthroat trout) from Browns Gulch to Silver Bow Creek.
*The project will have benefits to wildlife by expanding native riparian habitat, and benefits to water quality by reducing agricultural and livestock impacts on the stream corridor.

4. PROJECT LOCATION AND MAP: The project is located from the Browns Gulch road crossing at RM 7 upstream throughout the watershed, including the Browns Gulch mainstem and tributaries such as Bull Run, Hail Columbia/Sheep Gulch, Meadow Gulch, Telegraph Gulch, Flume Gulch and the National Forest headwaters. Browns Gulch is **a Priority 1 stream** for fisheries restoration in Montana Fish Wildlife and Parks (FWP) and Natural Resource Damage Program (NRDP) tributary prioritization for aquatic restoration.

5. PROJECT DESCRIPTION:
Issues/Justification: The Browns Gulch watershed has several major issues: degradation of stream habitat is widespread throughout the agricultural lands of the watershed, due to historical straightening of the channel, mechanical removal of the willows along the stream, encroachment of agriculture on the stream corridor, all resulting in loss of channel form and function and heavy loads of fine sediment deposited in the stream channel. The TU inventory identified eight irrigation diversions in the Upper Browns Gulch mainstem, all of which appear to impair fish passage to some degree.
*** Project Goals, Objectives:**
Goal 1: The project will enhance riparian and aquatic habitat quality and habitat diversity in straightened reaches of Upper Browns Gulch and its major tributaries.
Objective 1: Establish a stable channel sinuosity, increase the number of pools, and revegetate the floodplain to result in a naturally stable Browns Gulch channel in at least four sites totaling 3000 ft.
Goal 2: Remove or improve all significant fish passage barriers in Upper Browns Gulch.

Objective 2: Assess, design and install fish-friendly permanent diversions and a fish screens on 4 irrigation diversions in upper Browns Gulch.

***Tasks/Activities by Goal:**

Goal 1: Enhance riparian and aquatic habitat:

*Implement two Upper Browns Gulch pilot habitat projects being designed with match funds in 2012-2013.

*Coordinate landowner outreach with NRCS for development of further habitat projects. The WRC and Mile High Conservation District have inventoried over 7 miles of upper Browns Gulch mainstem and identified unstable reaches with excessive bank erosion totaling over 5000 ft. of eroding banks.

*Design habitat improvement projects with qualified engineers or geomorphologists.

*Construction of projects.

*Landowner agreements and maintenance of improved reaches need to be secured for 20-year project life, based on the WRC's standard restoration agreement.

Goal 2: Remove or improve fish passage barriers

a) Design: The fish passage structures require careful design to meet all agricultural, fisheries, and hydraulic criteria required for success. The WRC will work with its partner Trout Unlimited (TU) to select diversions for fish passage work, and make decisions about expensive fish screens using input from FWP.

b) Construction: The WRC and TU will assist the irrigators to install their own fish passage structures, in the case of simple structures. If structures are more complex, WRC and TU will select an experienced construction firm to install designed fish passage structures. Construction in the off-season (especially fall) is ideal.

c) Landowner management agreement and maintenance: Cooperation with the irrigator for long-term maintenance of conservation investments will be required. The WRC and TU believe that funding to establish a screen maintenance capacity in the conservation community will be essential for long-term success (this is the experience of fish screen programs throughout the western U.S.). The WRC will require a long-term (20-year) maintenance agreement with ability to inspect the site.

***Progress to date:**

2010-2011: The WRC and Mile High CD consultants performed bank stability inventory and habitat assessment on over 7 miles of Upper Browns Gulch, and identified degraded reaches. Trout Unlimited coordinated with MFWP to inventory fish passage issues at irrigation diversions on Browns Gulch.

2011-2012: The WRC applied for and is initiating a Browns Gulch Sediment project using MT 319 funds (July 2012). Pilot project design is being done by Mile High CD consultant Oasis Environmental in spring-summer 2012 for two sites totaling approximately 1000 ft. of channel.

***Lead entity and partners:** The WRC is the project lead, and the landowners, Trout Unlimited, NRCS and Mile High Conservation District are key partners. NRCS is working on a special initiative for this area.

6. PROJECT SCHEDULE: Use table with blocked in quarters

ITEM:	2012	2013	2014	2015
Final Design				
Funding Applications				
Permits & Bids				
Construction/Reveg				
Management:				

If funded, the first phases of this project would begin immediately and be completed over 3 years. The first phase conceptual design is already done, and some of the funding is already secured.

7. BUDGET:

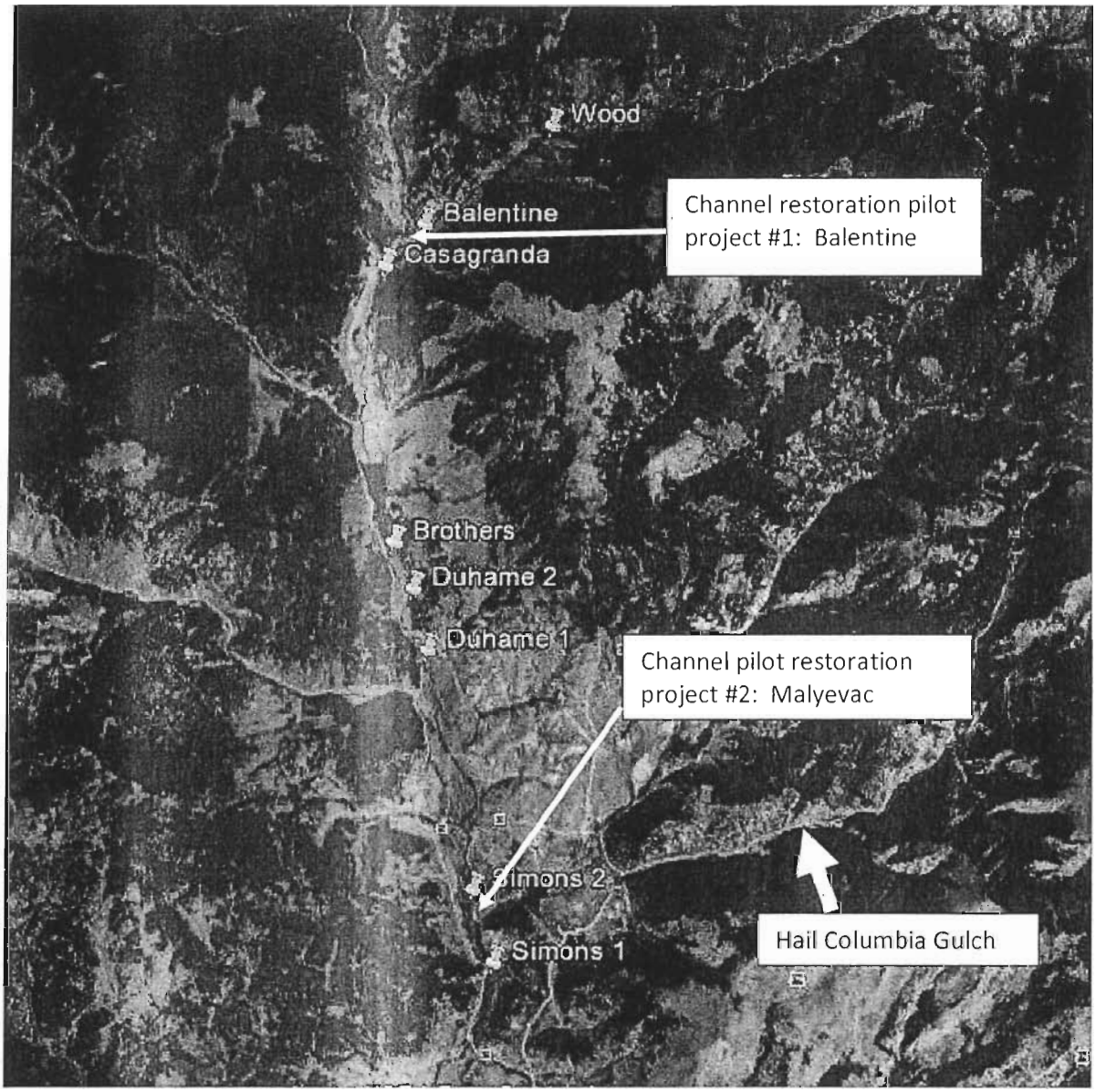
ITEM:	UNIT:	QUAN-TITY:	UNIT COST:	TOTAL COST:	MATCH:	NRDP:
Salaries (WRC/TU):	days	30	400	12,000	4,000	8,000
Contract: Engineering	days	45	800	36,000	15,000	21,000
Construction management	days	20	800	16,000	0	16,000
Materials (installed) 1: channel earthwork	Linear ft.	3000	40	120,000	25,000	95,000
2: Vegetation	plants	1500	10	15,000	0	15,000
3. Fencing	Ft.	8000	1.75	14,000	5000	9000
Fish-friendly diversions (rock)	item	20,000	4	80,000	0	80,000
Fish Screens ($5000/cfs)	item	25,000	1	25,000	0	25,000
SUBTOTAL:				318,000	49,000	269,000
Administration:	5%			15,900	5000	10,900
Contingency:	10%			32,000	0	31,000
TOTALS:				**365,900**	**54,000**	**311,900**

Matching funds from the Montana DEQ 319 program will be available starting in summer-fall 2012. Matching funds from the Montana DNRC 223 program are already in place in spring 2012. Funding from Montana FWP has been sought for the pilot projects in 2012. Further match will be sought from state and federal sources, including match the landowners can provide through the USDA-NRCS with EQIP funds. Match will undoubtedly increase as the project progresses, but unsecured match is not included in the budget at this time.

The salaries are for WRC and TU staff to coordinate the project , including landowner coordination, procure funding, write permits, conduct selection of engineers, assist landowner with selection of construction firms, supervise project engineering and construction contracts, and participate in project construction oversight. The total project development and coordination is about 4% of the project cost.

Engineering, including design and construction management for a medium-scale channel reconfiguration project and the fish passage structures, is about 16-17% of the project budget, which is reasonable for a set of projects of this scale and complexity.

Administration is for processing payments and preparing reports to the NRDP and other funders, at approximately 5% for a project this size. Engineering and construction management is approximately 16% of total project budget, which is reasonable for this size of project and types of construction.



UPPER BROWNS GULCH PROJECT SITE MAP

References:

*Pioneer Technical Services, 2011, "Restoration Study of Browns Gulch: Report Detailing Sediment Source and Habitat Assessment with Suggested Projects," for Mile High CD, Butte, MT.

* Trout Unlimited, 2012, "Upper Clark Fork Diversion Inventory," for Watershed Restoration Coalition, Deer Lodge, MT.

*WRC, 2012, "Upper Clark Fork Tributary Assessment for Restoration Planning: Watershed Health Monitoring Report, " for Montana DEQ, 319 Program, DRAFT, May.

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1. PROJECT TITLE: Lower Browns Gulch Habitat and Fish Passage Project

2. ORGANIZATION AND CONTACTS:

Contact:	Address:	Phone:
Ted Dodge, Executive Director, Watershed Restoration Coalition of the UCF (WRC)	1002 Hollenback Rd. Deer Lodge, MT 59722	Tel. 406-579-3762 Tel. 406-856-1703 x4
Will McDowell, Project Coordinator	same	406-396-7716 cell

3. PROJECT PURPOSE AND BENEFITS: The purpose of the Project is to improve riparian and aquatic habitat in lower Browns Gulch, both to enhance resident fisheries and promote reconnection of fluvial fisheries to Silver Bow Creek. The project will address aquatic habitat, riparian habitat and fish passage limitations in this reach, to improve potential spawning, rearing, and migratory habitat for sport fish and native fish.

PROJECT BENEFITS:
*Improve stream habitat quality and fish population connectivity in lower Browns Gulch.
*Improve fishing in Browns Gulch itself to replace lost trout angling opportunities in the Clark Fork and Silver Bow Creek.
*Enhance recruitment of sport fish (brook trout) and particularly native fish (westslope cutthroat trout) from Browns Gulch to Silver Bow Creek.
*The project will have benefits to wildlife by expanding native riparian habitat, and benefits to water quality by reducing agricultural and livestock impacts on the stream corridor.

4. PROJECT LOCATION AND MAP: The project is located from the Silver Bow Creek confluence to the Browns Gulch road crossing at RM 7. A large percentage of the lower Browns Gulch watershed is owned by Ueland Agra Farms, Inc., which also holds most of the water rights and manages the irrigation diversions. This is **a Priority 1 stream** for fisheries restoration in Montana Fish Wildlife and Parks (FWP) and Natural Resource Damage Program (NRDP) tributary prioritization for aquatic restoration.

5. PROJECT DESCRIPTION:
Issues/Justification: Lower Browns Gulch includes long reaches with severe channel stability and habitat degradation issues, due to historical straightening of the channel, mechanical removal of the willows, encroachment of agriculture on the stream corridor, all resulting in loss of channel form and function and heavy loads of fine sediment deposited in the stream channel and flushed downstream into Silver Bow Creek. HabiTech, a Wyoming fisheries firm hired by Mile High CD in 2011, concluded *"Fine sediments/poor benthic substrate ...likely limits aquatic habitat potential throughout Browns Gulch more than any other single factor.....and there is significant potential to improve substrate quality by reducing sediment load (Pioneer, 2011)."* These two proposed project reaches of Lower Browns Gulch contribute 200-350 tons/mile/year of mostly fine sediments to the system. The TU inventory also identified five irrigation diversions in the Lower Browns Gulch mainstem, all of which appear to impair fish passage to some degree.
*** Project Goals, Objectives:**
Goal 1: The project will enhance aquatic habitat quality in Lower Browns Gulch and Silver Bow Creek by reducing fine sediment inputs to the stream from eroding stream banks.

Objective 1: Establish a stable channel sinuosity, stable banks, and re-vegetate the floodplain at two major sites on lower Browns Gulch (3500 ft. and 5000 ft. in length respectively).
Goal 2: Remove or improve all significant fish passage barriers in Lower Browns Gulch.
Objective 2: Assess specific fish passage issues and install five fish-friendly diversions and at least one fish screen on priority irrigation diversions in Lower Browns Gulch.

***Tasks/Activities by Goal:**
Goal 1: Enhance riparian and aquatic habitat, and reduce on-going habitat degradation:
a) Design: The WRC will work with qualified engineers and geomorphologists to design stable channels which provide high-quality aquatic and riparian habitat in two degraded reaches targeted by this project. The WRC, Mile High Conservation District consultants and landowners are already engaged in a conceptual design for the upper site (Ueland Ranch-Prevost Rd.) including a small pilot project. Final design for this site will require more detailed work by the current consultant or another equally qualified. The second, lower, site is at Ramsay below I-90, near the confluence with Silver Bow Creek. That site is expected to require less earthwork, and more focus on revegetation.
b) Construction: Projects for installation of stable channel reaches with improved habitat will progress as the WRC, Mile High CD and landowners learn and adapt techniques from pilot projects on Browns Gulch. Construction will be contracted out through a competitive bid process. Some of the work may be done by the landowners, who will be responsible for a considerable cost share.
c) Landowner management agreement and maintenance: Landowners will be required to modify land use, particularly livestock grazing and watering, to encourage successful restoration of quality riparian and aquatic habitat. The WRC requires 20-year restoration maintenance agreements from landowners.

Goal 2: Remove or improve fish passage barriers
a) Design: This proposal assumes the five fish ladders (Denil type) will be funded. The diversions need adjustment of downstream water level, and new headgates to optimize performance of structures. At least one fish screen will be installed if proposed TU/FWP fish migration studies show significant entrainment of native fish. Partner organization Trout Unlimited (TU) has already selected five diversions for upstream fish passage work modifications (fish ladders) in lower Browns Gulch.
b) Construction: The WRC and TU will assist the irrigators to install their own fish passage structures, in the case of simple structures. If structures are more complex, WRC and TU will select an experienced construction firm to install designed fish passage structures.
c) Landowner management agreement and maintenance: Cooperation with the irrigator for long-term maintenance of conservation investments will be required, including grazing management. The WRC will require a long-term (20-year) maintenance agreement with ability to inspect the site.

***Progress to date:**
2010-2011: The WRC and Mile High CD consultants performed bank stability inventory and habitat assessment on Lower Browns Gulch, and identified the two degraded reaches highlighted by this project as contributing an order of magnitude more fine sediment to the watershed than almost any other reach sampled. Trout Unlimited coordinated with MFWP to inventory fish passage issues at irrigation diversions on Browns Gulch.
2011-2012: The WRC applied for and is initiating a Browns Gulch Sediment project using MT 319 funds (July 2012). Pilot project design is being done by Mile High CD consultant Oasis Environmental in spring-summer 2012. A proposal to Montana FWP Future Fisheries program for pilot project funding was also submitted in June, 2012.

***Lead entity and partners:** The WRC is the project lead, and the landowners, Trout Unlimited, NRCS and Mile High Conservation District are key partners.

6. PROJECT SCHEDULE: Use table with blocked in quarters

ITEM:	2012		2013	2014	2015
Final Design					
Funding Applications					
Permits & Bids					
Construction/Reveg					
Management:					

If funded, this project would begin in fall of 2013, based on the fact that a conceptual design for one site (Prevost Rd) is already underway, and some of the funding is already secured.

7. BUDGET:

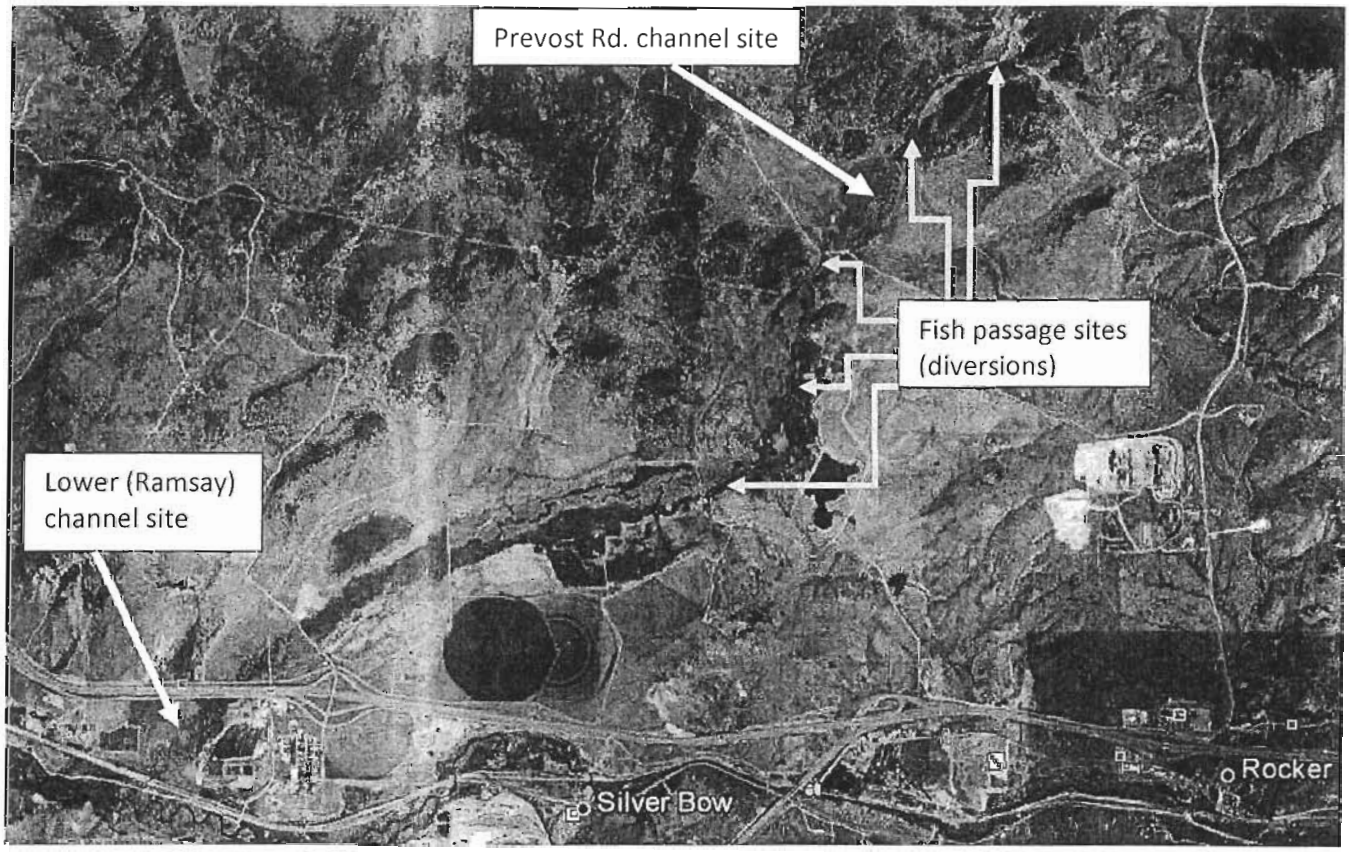
ITEM:	UNIT:	QUAN-TITY:	UNIT COST:	TOTAL COST:	MATCH:	NRDP:
Salaries (WRC/TU):	days	30	400	12,000	4,000	8,000
Contract: Engineering	days	45	800	36,000	15,000	21,000
Construction management	days	20	800	16,000	0	16,000
Materials (installed) 1: channel earthwork	Linear ft.	5000	40	200,000	25,000	175,000
2: Vegetation	plants	4000	10	24,000	0	24,000
3. Fencing	Ft.	10,000	1.75	17,500	5000	22,500
4. Retro-fit diversions (ladders+rock weir + headgates)	item	10,000	4	40,000	22,000	18,000
5. Fish screen	item	30,000	1	30,000	0	30,000
SUBTOTAL:				375,500	71,000	314,500
Administration:	5%			15,600	5,000	10,600
Contingency:	10%			31,000	0	31,000
TOTALS:				**422,100**	**76,000**	**356,100**

Matching funds from the Montana DEQ 319 program will be available starting in summer-fall 2012. Matching funds from the Montana DNRC 223 program are already in place in spring 2012 (conceptual design). Funding from Montana FWP has been sought for the pilot projects in 2012. Further match will be sought from state and federal sources, including match the landowners can provide through the USDA-NRCS with EQIP funds. Match will undoubtedly increase as the project progresses, but unsecured match is not included in the budget at this time.

The salaries are for WRC and TU staff to coordinate the project , including landowner coordination, procure funding, write permits, conduct selection of engineers, assist landowner with selection of construction firms, supervise project engineering and construction contracts, and participate in project construction oversight. The total project development and coordination cost is about 3% of the project .

Engineering, including design and construction management for the medium-scale channel reconfiguration projects and the fish passage structures, is about 14% of the project budget, which is reasonable for a set of projects of this scale and complexity.

Administration is for processing payments and preparing reports to the NRDP and other funders, at approximately 5% for a project this size.



MAP OF LOWER BROWNS GULCH PROPOSED HABITAT AND FISH PASSAGE IMPROVEMENTS

References:

*Pioneer Technical Services, 2011, "Restoration Study of Browns Gulch: Report Detailing Sediment Source and Habitat Assessment with Suggested Projects," for Mile High CD, Butte, MT.

* Trout Unlimited, 2012, "Upper Clark Fork Diversion Inventory," for Watershed Restoration Coalition, Deer Lodge, MT.

*WRC, 2012, "Upper Clark Fork Tributary Assessment for Restoration Planning: Watershed Health Monitoring Report, " for Montana DEQ, 319 Program, DRAFT, May.

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1. PROJECT TITLE: Lower Blacktail Creek Riparian and Aquatic Habitat Project

2. ORGANIZATION AND CONTACTS:

Contact:	Address:	Phone:
Ted Dodge, Executive Director, Watershed Restoration Coalition of the UCF (WRC)	1002 Hollenback Rd. Deer Lodge, MT 59722	Tel. 406-579-3762 Tel. 406-856-1703 x4
Will McDowell, Project Coordinator	same	406-396-7716 cell

3. PROJECT PURPOSE AND BENEFITS: The purpose of the Project is to enhance riparian and aquatic habitat in the lower six miles of Blacktail Creek watershed, a tributary to Silver Bow Creek. Blacktail Creek is an important sport fish and native fish stream (for westslope cutthroat trout), and ranks as a Priority 2 stream for fisheries enhancement with the Natural Resource Damage Program/Fish Wildlife and Parks.

PROJECT BENEFITS: This project will:
*Improve potential spawning, rearing, and migratory habitat for native and sport fish in Blacktail Creek.
*Provide alternative angling opportunities in Blacktail Cr. for lost opportunities in the Clark Fork.
*Improve trout angling opportunities in the river mainstem, by enhancing recruitment of native fish (westslope cutthroat trout) and sport fish from Blacktail Creek into Silver Bow Creek.
*The project will have secondary benefits to wildlife by improving the quality of native riparian/wetland shrub habitat, and benefit water quality by reducing livestock impact.

4. PROJECT LOCATION AND MAP: The project site covers the lower six (6) miles of channel from the I-90 crossing, upstream to Nine Mile on the south side of Butte, MT. This part of Blacktail Creek is almost entirely private land; the creek flows out of the Beaverhead Deer Lodge National Forest just south of Ninemile, at about RM 6.6.

5. PROJECT DESCRIPTION:
Issues/Justification: RIPARIAN AND AQUATIC HABITAT: The Mile High Conservation District commissioned a study to describe the restoration needs of Blacktail Creek (Pioneer, 2009). The project reach passes through low-density suburban developments and a golf course. In both reaches, the stream has been extensively channelized and over-grazed, resulting in heavy load of fine sediments causing poor benthic substrate which "limits aquatic habitat more than any other single factor." Dewatering and fish barriers are recognized issues addressed in complementary proposals from Trout Unlimited. This proposal focuses on the recommendations to improve substrate and riparian habitat through improved grazing, targeted erosion control, riparian planting, and channel relocation, in select reaches. Before projects can be designed, outreach to landowners and is needed.

*** Goals, Objectives:**
Goal 1: The project will enhance riparian and aquatic habitat quality in Blacktail Creek.
Objective 1: Work with landowners and partners to reduce livestock impact on the stream through a combination of off-stream water, fencing and/or other grazing management improvements.
Objective 2: Work with Butte Country Club to develop and install a naturalized Blacktail Cr. channel through the golf course (1 mile), and with residents in BTC reach 7 to return the Creek to its natural channel.

*Tasks/Activities by Goal:

Goal 1: Enhance riparian and aquatic habitat:

*Project Development/landowners: work with Mile High CD and NRCS to develop improved grazing plans for private landowners, including off-stream water, new fences, and other infrastructure as necessary (treatments for eroding banks) to reduce degradation and improve riparian and aquatic habitat along Blacktail Creek .

*Develop long-term maintenance agreements for grazing management improvements. The WRC will require a long-term (20-year) maintenance agreement with ability to inspect the sites.

*Work with Butte Country Club to develop a stream channel renaturalization plan for the one-mile reach through the golf course. The golf course reach includes 7-10 ft. tall vertical eroding banks contributing very large sediment pulses to Blacktail and Silver Bow Creek. The Country Club has included plans for improving Blacktail Creek in its Master Plan, and has had positive discussions with the Conservation District about this project.

*Analyze the feasibility of returning Blacktail Creek to its original channel (still existing) in BTC reach 7.

***Progress to date:**

2009: The Mile High Conservation District hired Pioneer Technical Services to analyze the fisheries restoration potential in lower Blacktail Creek. The report (Pioneer, 2009) details habitat status, recommendations for habitat improvements, and an implementation plan. This proposal would begin implementation of that proposed work. Montana FWP has documented an abundance of brook trout in lower Blacktail Creek, and westslope cutthroat trout in most reaches of the lower Blacktail, becoming more common as you ascend towards the National Forest.

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***Lead entity and partners:** The WRC is the project lead, but the Mile High Conservation District, landowners, Trout Unlimited-George Grant chapter, and perhaps Silver Bow County will be key partners.

6. PROJECT SCHEDULE:

ITEM:	2013	2014	2015	2016
Assessment & Design				
Funding Applications				
Permits & Bids				
Construction				
Management:				

If funded, this project would begin immediately, and would develop gradually over four years.

7. BUDGET:

ITEM:	UNIT:	QUAN-TITY:	UNIT COST:	TOTAL COST:	MATCH:	NRDP:
Salaries (WRC): Project development & coordination	days	40	400	16,000	4,000	12,000
Contracts: engineering for channel projects	days	60	800	48,000	0	48,000
Materials & Construction (installed)				0	0	0
Grazing management (small-scale fence, water systems, etc.)	unit	5	15,000	75,000	0	75,000
Golf Course channel incl. reveg (constructed channel)	feet	7000	50	350,000	90,000	260,000
BTC 7 channel returned to natural channel	feet	6000	10	60,000	0	60,000
Plantings (small-scale)	plant	5000	10	50,000	0	50,000
SUBTOTAL:				599,000	94,000	505,000
Administration:	5%			17,500	0	17,500
Contingency:	10%			58,000	0	58,000
TOTALS:				**674,500**	**94,000**	**580,500**

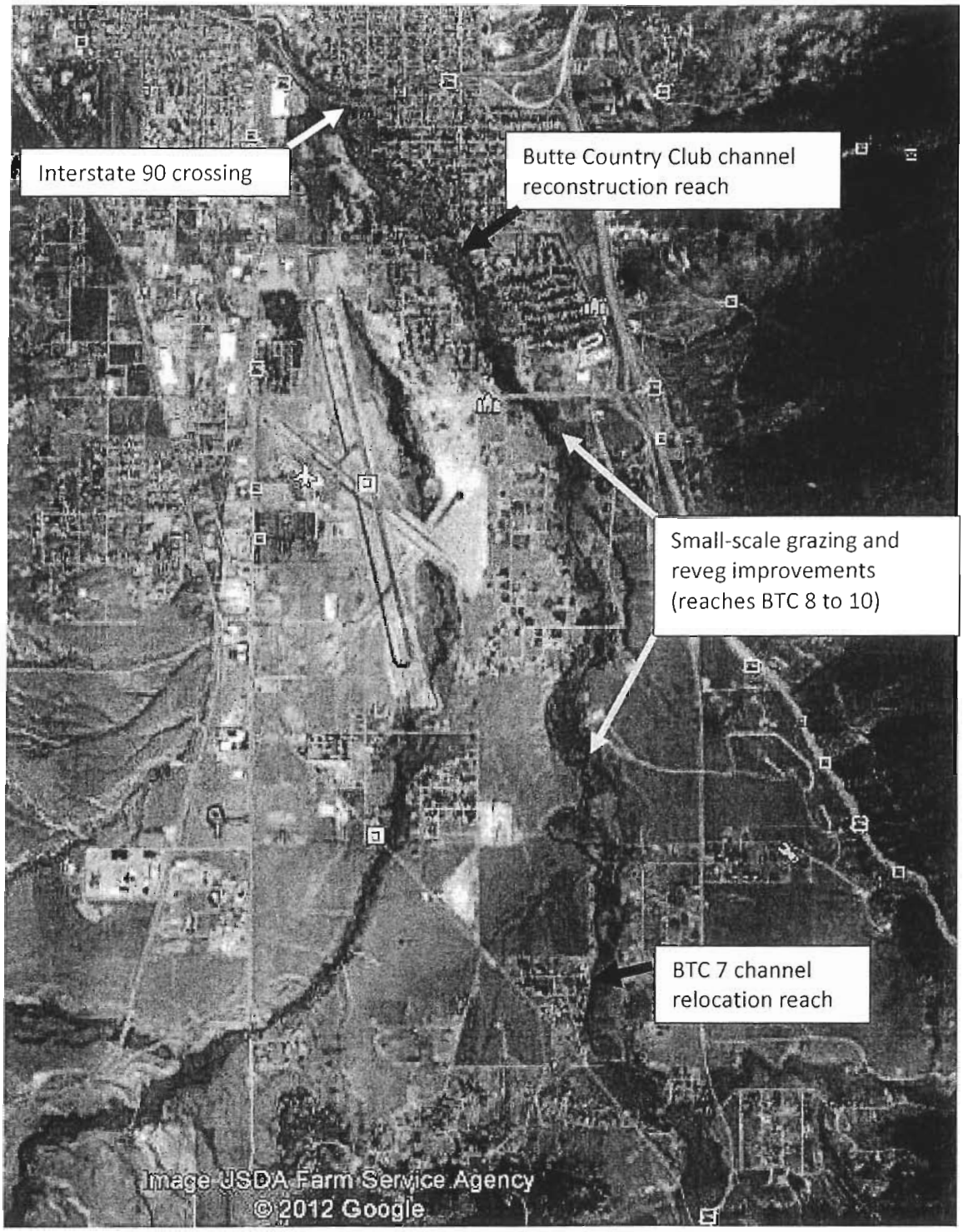
Match funding is a minimum estimate, and is expected to increase significantly as other the project progresses and other sources of funding are secured. A significant portion of matching funds (in-kind and cash) must come from the Butte Country Club for their portion of the work. Other unsecured sources of match, which may be other state and federal grant programs, are not included in this budget.

The project development salaries are for WRC staff to coordinate various elements of the project including assessment, landowner outreach, procure funding, write permits, conduct selection of engineers, selection of construction firm (with landowners), supervise project engineering and construction contracts, and participate in project construction oversight. Projects of this type also require post-construction monitoring and maintenance. Total cost of all these services is approximately 3% of total project budget.

Administration is for processing payments and preparing reports to the NRDP and other funders, at approximately 3% for a project this size. Engineering and construction management is approximately 11% of total project budget, which is reasonable for this size of project and types of construction.

References:

Pioneer Technical Services, 2009, "Restoration Study of Blacktail Creek: Summary Report," for Mile High Conservation District, Butte, MT.



LOWER BLACKTAIL CREEK HABITAT PROJECT MAP

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1. PROJECT TITLE: Lower Spotted Dog Creek Habitat and Fish Passage Project

2. ORGANIZATION AND CONTACTS:

Contact:	Address:	Phone:
Ted Dodge, Executive Director, Watershed Restoration Coalition of the UCF (WRC)	1002 Hollenback Rd. Deer Lodge, MT 59722	Tel. 406-579-3762 Tel. 406-856-1703 x4
Will McDowell, Project Coordinator	same	406-396-7716 cell

3. PROJECT PURPOSE AND BENEFITS: The purpose of the Project is to enhance riparian and aquatic habitat, and improve fish passage in the lower six miles of Spotted Dog Creek, a tributary to the Little Blackfoot River. Spotted Dog Creek is an important westslope cutthroat trout stream, and ranks as a Priority 2 stream for fisheries enhancement with the NRDP/FWP.

PROJECT BENEFITS: This project will:
*Improve potential spawning, rearing, and migratory habitat for native and sport fish in Spotted Dog Cr.
*Provide alternative angling opportunities in Spotted Dog Cr. for lost opportunities in the Clark Fork.
*Improve trout angling opportunities in the river mainstem, by enhancing recruitment of native fish (westslope cutthroat trout) and sport fish from Spotted Dog Creek into the Little Blackfoot River and Clark Fork.
*The project will have secondary benefits to wildlife by improving the quality of native riparian/wetland shrub habitat, and benefit water quality by reducing livestock impact.

4. PROJECT LOCATION AND MAP: The project site covers about 6.6 miles of channel upstream of the confluence with the Little Blackfoot River (NE4 section 28 T10N R8W) on private land. At the upper end of the reach (SE4 section 15 T9N R8W) is an in-stream reservoir. The stream section upstream of this reservoir flows through public land (Spotted Dog Wildlife Management Area) and with the headwaters area originating on U.S. Forest Service lands. The private land ownership of the stream section in question is owned by only two entities.

5. PROJECT DESCRIPTION:
Issues/Justification: RIPARIAN AND AQUATIC HABITAT: The stream section in question can be broken into two basic reaches. The upper reach (approximately 3.3 miles) lies within forested land use and flows north through a steep-sided canyon below the reservoir. The lower reach (approximately 3.3 miles) flows through pasture and irrigated hay land uses. A portion of the riparian corridor on this reach of private land was assessed by the NRCS in 2005 (NRCS Riparian Assessment method), which determined the stream to be at the "Not Sustainable" rating. The low rating was due to degradation of riparian vegetation, head-cuts and channel bank erosion. For a majority of the stream reach, the issues would include headcutting, poor riparian vegetation health and active bank erosion. The long- term goal of improving riparian habitat conditions will require addressing the livestock grazing management and access to off-stream stock water. Structural measures to address the most active bank erosion and fish passage issues may be required in addition to improved management. NRCS is currently working with the majority landowner on grazing management issues and will continue to do so, in coordination with WRC. At the mid-point break between the two reaches is an irrigation diversion structure, which may represent a fish entrainment issue (see complementary TU proposal on fish passage for L.Blkft).

*** Goals, Objectives:**

Goal 1: The project will enhance riparian and aquatic habitat quality in Spotted Dog Creek.

Objective 1: Work with the landowners on private, state and federal grazing lands to reduce livestock impact on the stream through a combination of off-stream water, fencing and/or other grazing management improvements.

Goal 2: Restore upstream and downstream fish passage, especially for native cutthroat trout, which spawn and rear in Spotted Dog Creek.

Objective 2: Work with the landowner that irrigates to design and implement improved irrigation structures to enhance upstream passage of native fish and reduce entrainment of trout and other species.

*Tasks/Activities by Goal:

Goal 1: Enhance riparian and aquatic habitat:

a) Design: The NRCS will continue to work with the principal landowner to design riparian grazing improvements on the lower 6.6 miles of Spotted Dog Creek, and immediately adjacent parcels, including private, state, and U.S. Forest Service lands. These improvements will reduce livestock pressure on stream banks and riparian vegetation. Larger bank stabilization structures or off-stream water systems required to protect eroding stream banks, will be designed by NRCS and/or appropriate consultants.

b) Construction: The WRC and the landowner(s), will coordinate the process of selecting an appropriate construction contractor/contractors for fencing, off-stream water and stream bank protection based on contractor lists developed by NRCS for Deer Lodge valley, and/or public advertisements to meet all State procurement requirements.

c) Landowner management agreement and maintenance: Cooperation with landowners for long-term maintenance of conservation investments will be required for maximum positive impact. The WRC will require a long-term (20-year) maintenance agreement with ability to inspect the site.

Goal 2: Restore downstream and upstream fish passage:

a) Design: The fish passage structures require careful design to meet all agricultural, fisheries, and hydraulic criteria required for success. The NRCS has a good relationship with the key irrigator using the diversion, and close coordination with the irrigator will be critical to success. The WRC and NRCS will work with its partner Trout Unlimited (TU) to address the issues the current irrigation diversion structure poses to aquatic life.

b) Construction: The WRC and TU will assist the irrigator to select an experienced construction firm to install fish passage structures. Construction in the off-season (especially fall) is ideal.

c) Landowner management agreement and maintenance: Cooperation with the irrigator for long-term maintenance of conservation investments will be required. The WRC and TU believe that funding to establish a screen maintenance capacity in the conservation community will be essential for long-term success (this is the experience of fish screen programs throughout the western U.S.). The WRC will require a long-term (20-year) maintenance agreement with ability to inspect the site.

Progress to date:

2011: The WRC has not done assessment work on Spotted Dog Cr., but the NRCS has done a ranch plan and some off-stream water development with one landowner.

***Lead entity and partners:** The WRC is the project lead, but the landowners, NRCS, Trout Unlimited, Deer Lodge Valley Conservation District, will be key partners.*

6. PROJECT SCHEDULE:

ITEM:	2012	2013	2014	2015
Assessment & Design				
Funding Applications				
Permits & Bids				
Construction				
Management:				

If funded, this project would begin immediately and first phases would be constructed in late fall-winter 2013.

7. BUDGET:

ITEM:	UNIT:	QUAN-TITY:	UNIT COST:	TOTAL COST:	MATCH:	NRDP:
Salaries (WRC): Project development & coordin	days	20	400	8000	2000	6000
Contracts: Engineering	days	20	800	16,000	0	16,000
Materials & Construction (installed)				0	0	0
Off-stream water systems (pipeline/tanks)	system	1	40,000	40,000	0	40,000
Fencing (public/private)	feet	15,000	1.75	26,250	0	26,250
Bank stabilization /riparian re-vegetation (estimate)	unit		60,000	60,000	0	60,000
SUBTOTAL:				150,250	2000	148,250
Administration:	5%			7500	0	7500
Contingency:	5-10%			15,000	0	15,000
TOTALS:				**172,750**	**2000**	**170,750**

Match funding is a minimum estimate, and is expected to increase significantly as other the project progresses and other sources of funding are secured. A portion of matching funds (in-kind and cash) must come from the landowners/ irrigators. Unsecured sources of match, which may be other state and federal grant programs, are not included in this budget.

The project development salaries are for WRC staff to coordinate various elements of the project including landowner outreach, procure funding, write permits, conduct selection of engineers, selection of construction firm (with landowners), supervise project engineering and construction contracts, and

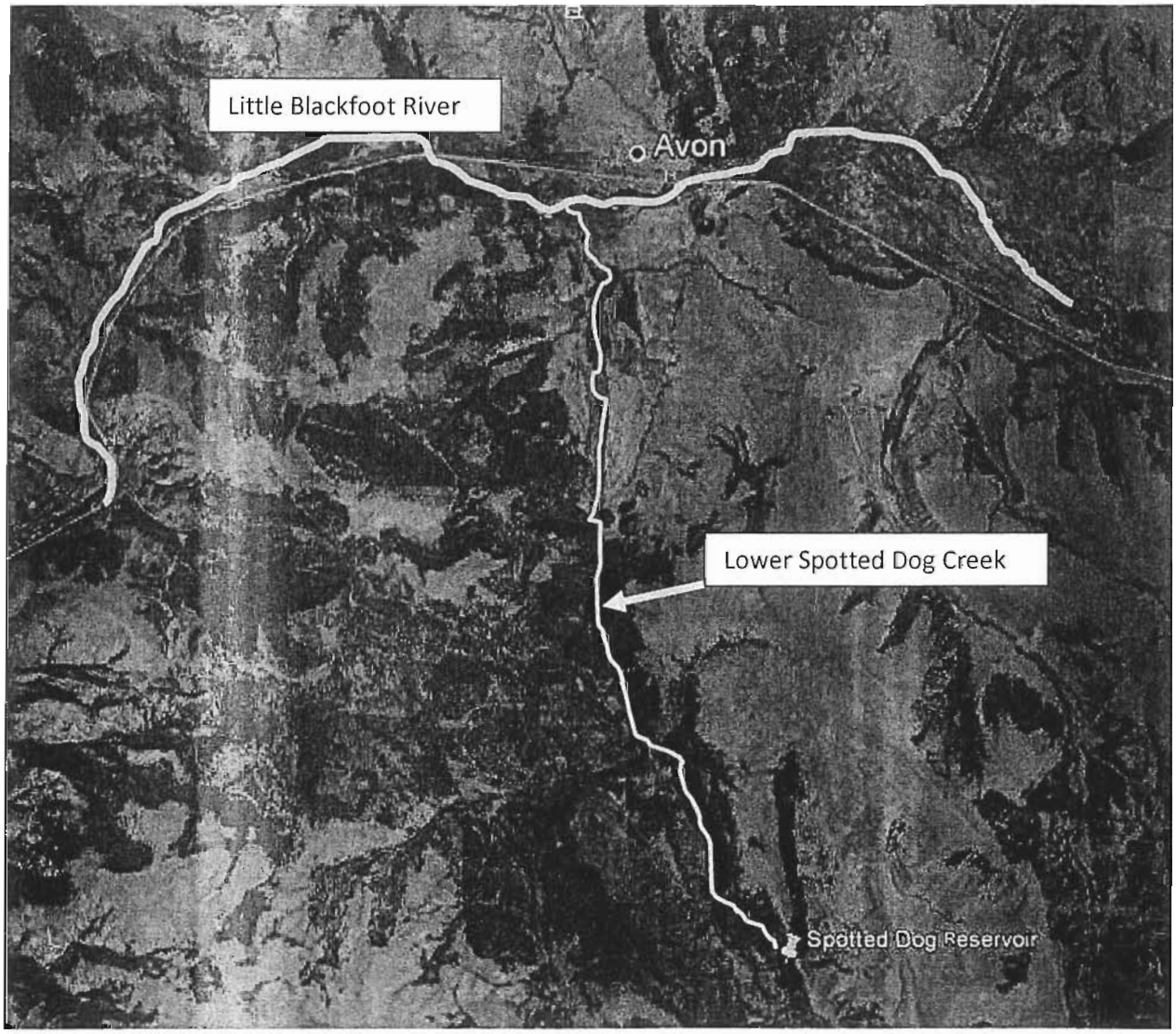
participate in project construction oversight. Projects of this type also require post-construction monitoring and maintenance. Total cost of all these services is approximately 5% of total project budget.

Administration is for processing payments and preparing reports to the NRDP and other funders, at approximately 5% for a project this size. Engineering and construction management is approximately 11% of total project budget, which is reasonable for this size of project and types of construction.

References:

*Glen Green, 2012, personal communication. Glen is the District Conservationist, and has worked in Lower Spotted Dog with private landowners for several years.

SPOTTED DOG CREEK PROJECT AREA MAP



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1. PROJECT TITLE: Little Blackfoot River Habitat Project

2. ORGANIZATION AND CONTACTS:

Contact:	Address:	Phone:
Ted Dodge, Executive Director, Watershed Restoration Coalition of the UCF (WRC)	1002 Hollenback Rd. Deer Lodge, MT 59722	Tel. 406-579-3762 Tel. 406-856-1703 x4
Will McDowell, Project Coordinator	same	406-396-7716 cell

3. PROJECT PURPOSE AND BENEFITS: The purpose of the Project is to enhance riparian and aquatic habitat along the mainstem of the Little Blackfoot River, from Elliston downstream to the Clark Fork. The Little Blackfoot is one of the largest tributaries to the Upper Clark Fork, and provides important migratory and rearing habitat for brown trout and westslope cutthroat trout. The mainstem of the Little Blackfoot provides vital connectivity between its cold-water tributaries, used for spawning by sport and native fish , and the Clark Fork. The lower Little Blackfoot below Elliston ranks as a Priority 1 stream for fisheries enhancement with the Natural Resource Damage Program/Montana Fish Wildlife and Parks, and is a valued resource for local anglers.

PROJECT BENEFITS: This project will:
*Improve rearing, and migratory habitat for native and sport fish in the Little Blackfoot River
*Provide improved alternative angling opportunities in the Little Blackfoot River for lost opportunities in the Clark Fork.
*Improve trout angling opportunities in the river mainstem, by enhancing recruitment of native fish (westslope cutthroat trout, mountain whitefish) and sport fish (brown trout) from Little Blackfoot River into the Clark Fork.
*The project will have secondary benefits to wildlife by improving the quality of native riparian/wetland shrub habitat, and benefit water quality by reducing livestock impact.

4. PROJECT LOCATION AND MAP: The project site covers about 25 miles of Little Blackfoot river corridor upstream of the confluence with the Clark Fork at Garrison to Elliston. Most of the corridor is private agricultural land, with a few state DNRC sections.

5. PROJECT DESCRIPTION:
Issues/Justification: RIPARIAN AND AQUATIC HABITAT: Degraded riparian habitat, dewatering, and fish passage are believed to be primary limitations to the Little Blackfoot fishery. Trout Unlimited is proposing to work on fish passage and dewatering issues, as opportunities present themselves. The WRC would like to examine opportunities to improve riparian habitat in the Little Blackfoot corridor by working with private landowners. A study by the Deer Lodge Valley CD in 2001 documented 30,000 feet of eroding stream banks, and 5,000 feet of critical sediment sources in the lower 32 miles of the Little Blackfoot (PBSJ, 2002). That report says, "A major source of impairment comes from historical stream channel alterations that reduce channel length, restrict the floodplain, increase river gradient , and contribute to channel incisement." The Conservation District continue to process large numbers of 310 permit applications related to in-channel or bank work on the Little Blackfoot River as landowners try to adjust to the instability. This project would like to develop feasible projects to restore more naturally stable conditions along the Little Blackfoot, in selected sites, using better riparian management, and some channel reconstruction, where warranted.

*** Goals, Objectives:**

Goal 1: The project will enhance riparian habitat and aquatic habitat quality in the lower Little Blackfoot River.

Objective 1: Work with the landowners on private and state grazing lands to reduce livestock impact on the stream through a combination of off-stream water, fencing and/or other grazing management improvements.

Objective 2: Select one or more sites where an incised, eroding channel segment can be restored to stability using natural local materials and "soft" techniques which enhance rather than degrade habitat.

***Tasks/Activities by Goal:**

Goal 1: Enhance riparian and aquatic habitat:

*Do outreach to Little Blackfoot landowners for ranch planning assistance which will incorporate riparian management improvements along the L B River. The WRC and Deer Lodge Valley CD will have a conservation planner available to work on this in 2012-2013.

*Develop ranch plans and riparian improvement needs for one or two larger properties.

*Analyze existing data and outreach to identify one or more candidate sites for channel stability improvement pilot projects. One potential site of approximately 1.5 miles in length has already been identified just downstream of Elliston. This site is highly incised and would require channel reconstruction to reconnect the floodplain, raise groundwater levels, and increase sinuosity.

*Develop a detailed design for channel stability improvement pilot project which meets all agency and partner criteria for value and probability of success.

*Implement the pilot project.

****Progress to date:***

2011-2012: The WRC has incorporated a new board member from the Little Blackfoot drainage and has developed capacity for outreach to that area through the conservation planner position.

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****Lead entity and partners:** The WRC is the project lead, but the landowners, NRCS, Deer Lodge Valley Conservation District, and Trout Unlimited (including TU-Pat Barnes chapter, Helena) will be key partners.*

6. PROJECT SCHEDULE:

ITEM:	*2012*	*2013*	*2014*	*2015*
Assessment & Design				
Funding Applications				
Permits & Bids				
Construction				
Management:				

If funded, this project would begin immediately and would develop gradually over three years.

7. BUDGET:

ITEM:	UNIT:	QUAN-TITY:	UNIT COST:	TOTAL COST:	MATCH:	NRDP:
Salaries (WRC-DLVCD): Project development & coordin	days	40	400	16,000	8000	8000
Contracts: Engineering	days	75	800	60,000	0	60,000
Materials & Construction (installed)				0	0	0
Off-stream water tanks	system	2	25,000	50,000	0	50,000
Fencing (public/private)	feet	20,000	1.75	35,000	9000	26,000
Channel stabilization /riparian re-vegetation (estimate)	feet	7500	125	937,500	187,500	750,000
SUBTOTAL:				1,098,500	204,500	894,000
Administration:	3%			32,600	0	32,600
Contingency:	5-10%			108,650	0	108,650
TOTALS:				**1,239,750**		**1,035,250**

Match funding is a minimum estimate, based on what the WRC can provide in in-kind materials for channel stabilization work. Match is expected to increase significantly as the project progresses and other sources of funding are secured. A portion of matching funds (in-kind and cash) must come from the landowners.

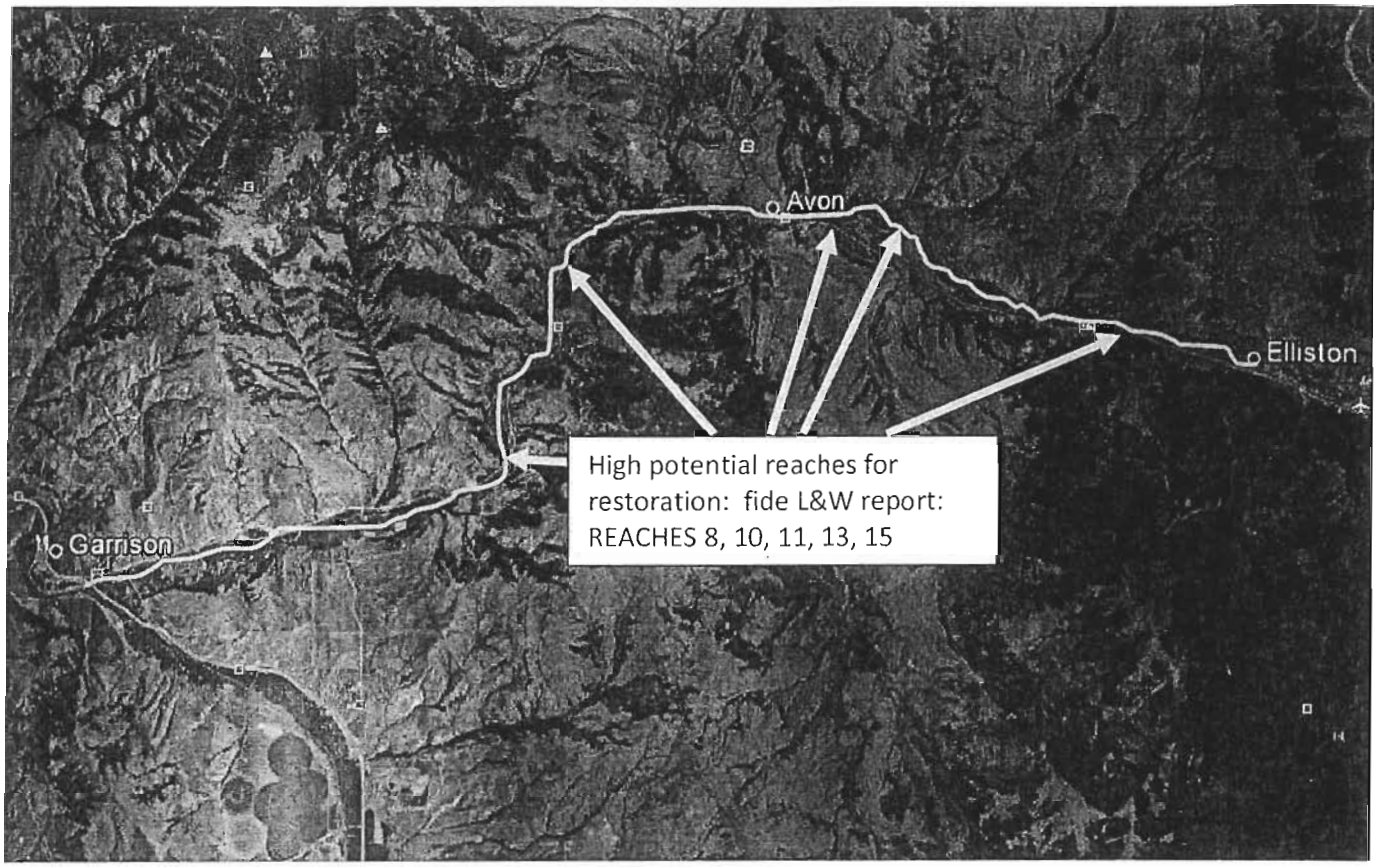
The project development salaries are for WRC and DLV CD staff to coordinate various elements of the project including landowner outreach, procure funding, write permits, conduct selection of engineers, selection of construction firm (with landowners), supervise project engineering and construction contracts, and participate in project construction oversight. Projects of this type also require post-construction monitoring and maintenance. Total cost of all these services is approximately 2% of total project budget.

Administration is for processing payments and preparing reports to the NRDP and other funders, at approximately 3% for a project this size. Engineering and construction management is approximately 5% of total project budget, which is quite reasonable for this size of project and types of construction.

References:

Land and Water Consulting, 2002, "Little Blackfoot River: Physical Features Inventory and Riparian Assessment," for Deer Lodge Valley Conservation District, Deer Lodge, May.

Janke, Jeff, 2012, personal communication. Local landowner and WRC board member.



Little Blackfoot River Habitat Project Map

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1. PROJECT TITLE: Dog Creek Riparian and Aquatic Habitat Project

2. ORGANIZATION AND CONTACTS:

Contact:	Address:	Phone:
Ted Dodge, Executive Director, Watershed Restoration Coalition of the UCF (WRC)	1002 Hollenback Rd. Deer Lodge, MT 59722	Tel. 406-579-3762 Tel. 406-856-1703 x4
Will McDowell, Project Coordinator	same	406-396-7716 cell

3. PROJECT PURPOSE AND BENEFITS: The purpose of the Project is to assess and enhance riparian and aquatic habitat in the sixteen-mile long Dog Creek watershed, a tributary to the Little Blackfoot River. Dog Creek is an important sport fish and native fish stream (for westslope cutthroat trout and mountain whitefish), and ranks as a Priority 2 stream for fisheries enhancement with the Natural Resource Damage Program/Fish Wildlife and Parks.

PROJECT BENEFITS: This project will:
*Improve potential spawning, rearing, and migratory habitat for native and sport fish in Dog Creek.
*Provide alternative angling opportunities in Dog Cr. for lost opportunities in the Clark Fork.
*Improve trout angling opportunities in the river mainstem, by enhancing recruitment of native fish (westslope cutthroat trout and mountain whitefish) and sport fish from Dog Creek watershed into the Little Blackfoot River and Clark Fork.
*The project will have secondary benefits to wildlife by improving the quality of native riparian/wetland shrub habitat, and benefit water quality by reducing livestock impact.

4. PROJECT LOCATION AND MAP: The project site covers about 16 miles of channel upstream of the confluence with the Little Blackfoot River (T9N, R6W, Sec 5) mostly on private and state land north and east of Elliston, MT. The USFS Helena National Forest is a landowner in the extreme upper watershed.

5. PROJECT DESCRIPTION:
Issues/Justification: RIPARIAN AND AQUATIC HABITAT: The Montana Department of Environmental Quality (DEQ) published a TMDL analysis which describes serious erosion/sediment problems and riparian habitat degradation problems in the Dog Creek watershed. Stream bank erosion and roads are the major sources of sediment. Roads and railroads are associated with 42% of the stream bank erosion, and grazing with 25%, according to the DEQ analysis of the watershed—based primarily on aerial photos. Road improvements and grazing management improvements are needed along the stream corridors, but before projects can be designed, outreach to landowners and on-the-ground assessment is needed.

*** Goals, Objectives:**
Goal 1: The project will enhance riparian and aquatic habitat quality in Dog Creek and its tributaries.
Objective 1: Do outreach with private landowners, Powell County, Lewis and Clark County and the State DNRC on to assess on-the-ground impacts to riparian and aquatic health, surveying approximately 10 miles of stream corridor, and 20 miles of roads.
Objective 2: Work with landowners to reduce livestock impact on the stream through a combination of off-stream water, fencing and/or other grazing management improvements.

Objective 3: Work with Powell County, Lewis and Clark County, private landowners, USFS and Montana Rail Link to develop simple road improvement practices on 3 miles of road to reduce sediment input into Dog Creek and its tributaries.

*Tasks/Activities by Goal:
Goal 1: Enhance riparian and aquatic habitat:
*Assessment: The WRC will assess the condition of the riparian corridor, and identify specific project needs along 10 miles of Dog Creek (NRCS Riparian Assessment method), and 20 miles of road (using WEPP analysis).
*Project Development/landowners: work with NRCS to develop improved grazing plans for private landowners, including off-stream water, new fences, and other infrastructure as necessary (treatments for eroding banks) to reduce degradation and improve riparian and aquatic habitat.
*Project Development/agencies: Use the DEQ database on roads analysis and supplementary field work to analyze specific road issues along Dog Creek and its tributaries, including fish passage through culverts and design projects to reduce degradation with drain dips, slash-filter windrows, gravelling and other simple practices to reduce sediment washing off roads directly into Dog Creek and its tributaries. Road analysis may be contracted out to a private consulting firm.
*Develop long-term maintenance agreements for grazing management improvements. The WRC will require a long-term (20-year) maintenance agreement with ability to inspect the sites.

***Progress to date:**
2011: The WRC has not done assessment work on Dog Cr., but the DEQ TMDL analysis and information from the DNRC State Lands Dept. provides a strong basis for outreach and project development.

***Lead entity and partners:** The WRC is the project lead, but the landowners, NRCS, Trout Unlimited, , DNRC State Lands-Anaconda, and the two Count y governments, will be key partners.

6. PROJECT SCHEDULE:

ITEM:	2013	2014	2015
Assessment & Design			
Funding Applications			
Permits & Bids			
Construction			
Management:			

If funded, this project would begin immediately.

7. BUDGET:

ITEM:	UNIT:	QUAN-TITY:	UNIT COST:	TOTAL COST:	MATCH:	NRDP:
Salaries (WRC): Asssessment, project development & coordination	days	25	400	10,000	2000	8000
Contracts: roads	days	20	800	16,000	0	16,000

Materials & Construction (installed)				0	0	0
Grazing management (fence, water systems, etc.)	unit	2	40,000	80,000	0	80,000
Road practices-slash filter windrows on streamside roads	miles	3	25,000	75,000	0	75,000
Road practices-drain dips installed	unit	20	250	5000	0	5000
Road improvements along stream (incl. drainage repair, replace small trib culverts, gravelling, etc.),	miles	2	33,000	66,000	33,000	33,000
SUBTOTAL:				252,000	35,000	217,000
Administration:	5%			12,600	0	12,600
Contingency:	20%			50,000	0	50,000
TOTALS:				**314,600**	**35,000**	**279,600**

Match funding is a minimum estimate, and is expected to increase significantly as other the project progresses and other sources of funding are secured. A portion of matching funds (in-kind and cash) must come from Powell County road department. Unsecured sources of match, which may be other state and federal grant programs, are not included in this budget.

The project development salaries are for WRC staff to coordinate various elements of the project including assessment, landowner outreach, procure funding, write permits, conduct selection of engineers, selection of construction firm (with landowners), supervise project engineering and construction contracts, and participate in project construction oversight. Projects of this type also require post-construction monitoring and maintenance. Total cost of all these services is approximately 4% of total project budget.

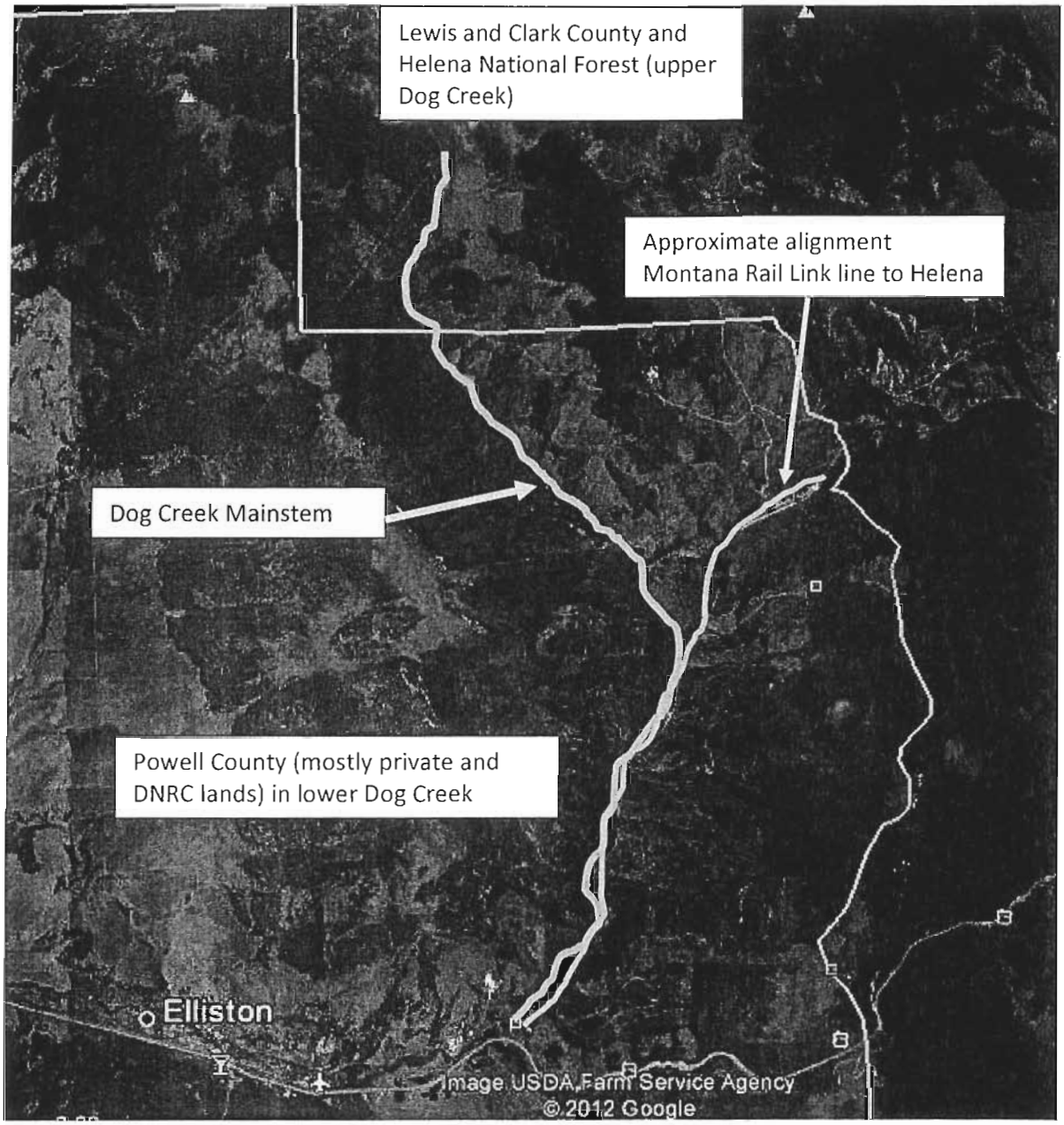
Administration is for processing payments and preparing reports to the NRDP and other funders, at approximately 5% for a project this size. Engineering and construction management is approximately 11% of total project budget, which is reasonable for this size of project and types of construction.

References:

*Montana DEQ, 2011, "Little Blackfoot River Watershed TMDLs and Framework Water Quality Improvement Plan," Helena, MT, November.

*Staedler, Fred, 2012, personal communication. Anaconda DNRC Forestry program leader, DNRC State Lands Dept., Anaconda, MT.

*Harper, Archie, 2012, personal communication. USFS fisheries biologist, Helena NF, Helena, MT.



Dog Creek Project Area Map

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1. PROJECT TITLE: Lower Willow Creek Aquatic Habitat and Fish Passage Project

2. ORGANIZATION AND CONTACTS:

Contact:	Address:	Phone:
Ted Dodge, Executive Director, Watershed Restoration Coalition of the UCF (WRC)	1002 Hollenback Rd. Deer Lodge, MT 59722	Tel. 406-579-3762 Tel. 406-856-1703 x4
Will McDowell, Project Coordinator	same	406-396-7716 cell

3. PROJECT PURPOSE AND BENEFITS: The purpose of the Project is to enhance riparian and aquatic habitat in the lower 6.5 miles of Willow Creek-Opportunity watershed, formerly a tributary to Silver Bow Creek (now feeds the Clark Fork River through Mill-Willow bypass). Willow Creek-Opportunity is an important sport fish and native fish stream (for westslope cutthroat trout), and ranks as a Priority 2 stream for fisheries enhancement with the Natural Resource Damage Program/Fish Wildlife and Parks.

PROJECT BENEFITS: This project will:
*Improve potential spawning, rearing, and migratory habitat for native and sport fish in Willow Creek-Opportunity, by re-connecting the high-quality upper watershed habitat to the Clark Fork system.
*Provide alternative angling opportunities in Willow Creek-Opportunity for lost opportunities in the Clark Fork.
*Improve trout angling opportunities in the river mainstem, by enhancing recruitment of native fish (westslope cutthroat trout) and sport fish from Willow Creek-Opportunity into the Clark Fork.
*The project will have secondary benefits to wildlife by improving the quality of native riparian/wetland shrub habitat, and benefit water quality by reducing livestock impact.

4. PROJECT LOCATION AND MAP: The project site covers the lower 6.5 miles of channel from the confluence with Mill Creek upstream to RM 6.5, just above the railroad spur crossing in T4N, R10W, Sec. 29. This part of Willow Creek-Opportunity is entirely private land; the creek flows out of the Mt. Haggin Wildlife Management Area at about RM 8.6; the private land riparian area between RM 6.5 and 8.6 is in excellent condition.

5. PROJECT DESCRIPTION:
Issues/Justification: RIPARIAN AND AQUATIC HABITAT: The WRC and TU did Riparian Assessment and irrigation diversion inventory work in Willow Creek-Opportunity in 2011 (WRC, 2012; TU, 2012). The riparian and aquatic habitat quality varies from excellent above RM 6.5 to very poor through much of the middle and lower reaches. Issues include channelization of the stream channel (at least two areas), and loss of a functional channel, to removal of riparian vegetation, over-grazing and trampling of stream banks, de-watering and fish passage barriers. The Clark Fork Coalition is addressing dewatering in a complementary proposal. This proposal focuses on the issues identified by WRC and TU, in particular the need to improve aquatic and riparian habitat through improved grazing management, targeted bank erosion control and channel re-naturalization, in select reaches. FISH PASSAGE: The three diversions examined thusfar do not impede upstream fish migration, however some fish are being entrained, and further evaluation of fish passage barriers is warranted. WRC and TU have initiated contact with several key landowners.

*** Goals, Objectives:**

Goal 1: The project will enhance riparian and aquatic habitat quality in Willow Creek-Opportunity.

Objective 1: Work with landowners and partners to reduce livestock impact on the stream through a combination of off-stream water development, fencing and/or other grazing management improvements.

Objective 2: Work with the Ueland Ranch and the lower watershed irrigators to return the Creek to its natural channel at two points where it has been entirely diverted into canals, and restore severely eroded or obliterated channel sites adjacent to these sites.

Goal 2: Improve fish passage and population connectivity in the Willow Creek-Opportunity drainage.

Objective 1: Evaluate the potential for modifying two existing diversions to minimize entrainment of native fish.

***Tasks/Activities by Goal:**

Goal 1: Enhance riparian and aquatic habitat:

*Project Development/landowners: work with NRCS to develop improved grazing plans for private landowners, including off-stream water, new fences, and other infrastructure as necessary (treatments for eroding banks) to reduce degradation and improve riparian and aquatic habitat along Willow Creek-Opportunity .

*Develop long-term maintenance agreements for grazing management improvements. The WRC will require a long-term (20-year) maintenance agreement with ability to inspect the sites.

*Work with Ueland Ranch to develop a stream channel re-naturalization plan for approximately 0.3 mile of stream upstream of Yellow Ditch which has been re-located in a deeply incised ditch on the north bank. This incised ditch is spewing large quantities of fine sediment into Willow Creek—the former (natural) stream channel is adjacent to this site, and could be easily rehabilitated. Downstream of the Yellow Ditch the stream has been manipulated again, channel form is partly obliterated, and the channel's functionality is lost as most of the stream is diverted overland to the north or along a road.

Goal 2: Evaluate two existing diversions to minimize entrainment.

*Sample fish in the irrigation diversions to determine if native fish are being entrained.

*Develop designs for fish screens if native fish are being entrained in significant numbers.

***Progress to date:**

2011-2012: The WRC conducted Riparian Assessments by walking nearly 10 miles of Willow Creek. The WRC contracted TU to do irrigation diversion inventory for fish passage. The WRC and TU met with major landowners to discuss opportunities for improving infrastructure and stream function.

Lead partners: The WRC is the project lead, but the Mile High Conservation District, landowners, Trout Unlimited-George Grant Chapter, NRCS, and perhaps Silver Bow County will be key partners.

6. PROJECT SCHEDULE:

ITEM:	2013	2014	2015	2016
Assessment & Design				
Funding Applications				
Permits & Bids				
Construction				
Management:				

The issues in lower Willow Creek-Opportunity are complex, and will require patient work with landowners to resolve. If funded, this project would begin immediately, and would develop gradually over four years, 2013-2016.

7. BUDGET:

ITEM:	UNIT:	QUAN-TITY:	UNIT COST:	TOTAL COST:	MATCH:	NRDP:
Salaries (WRC and TU): Project development & coordination	days	30	400	12,000	4,000	8,000
Contracts: engineering for channel projects	days	30	800	24,000	0	24,000
Materials & Construction (installed)				0	0	0
Grazing management (riparian fences, water systems, etc.)	unit	3	25,000	75,000	0	75,000
Ueland channel relocation incl. reveg (constructed channel)	feet	3000	15	45,000	5,000	40,000
East Yellow Ditch channel returned to natural channel	feet	6000	10	60,000	0	60,000
Planting on channel sites (installed)	plants	2000	10	20,000	0	20,000
SUBTOTAL:				236,000	0	227,000
Administration:	5%			12,000	0	12,000
Contingency:	10%			24,000	0	24,000
TOTALS:				**272,000**	**9,000**	**263,000**

Match funding is a minimum estimate, and is expected to increase significantly as other the project progresses and other sources of funding are secured. A significant portion of matching funds (in-kind and cash) must come from the Butte Country Club for their portion of the work. Other unsecured sources of match, which may be other state and federal grant programs, are not included in this budget.

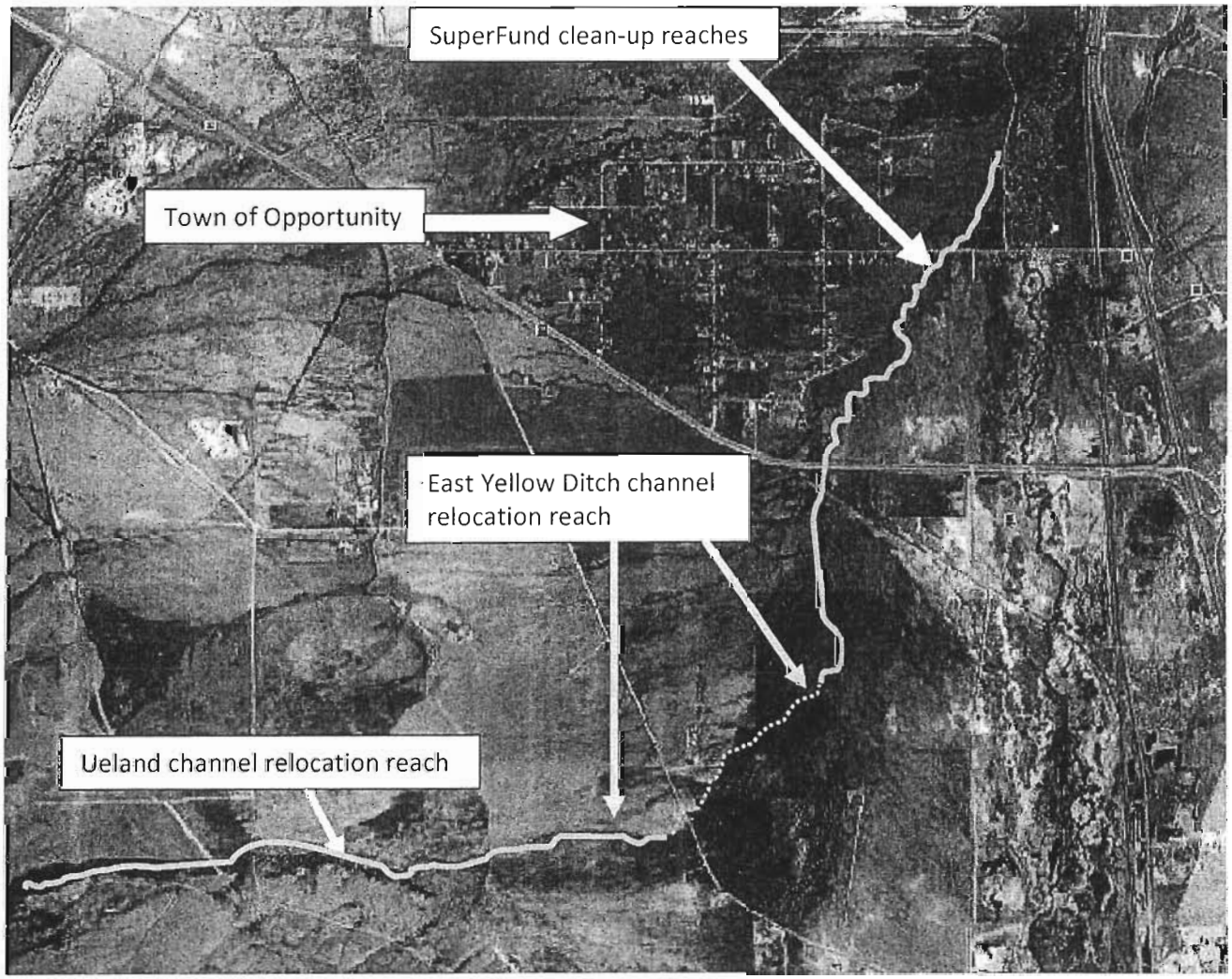
The project development salaries are for WRC and TU staff to coordinate various elements of the project including assessment, landowner outreach, procure funding, write permits, conduct selection of engineers, selection of construction firm (with landowners), supervise project engineering and construction contracts, and participate in project construction oversight. Projects of this type also require post-construction monitoring and maintenance. Total cost of all these services is approximately 5% of total project budget.

Administration is for processing payments and preparing reports to the NRDP and other funders, at approximately 3% for a project this size. Engineering and construction management is approximately 10% of total project budget, which is reasonable for this size of project and types of construction.

References:

*Trout Unlimited, 2012, "Upper Clark Fork Diversion Inventory," for Watershed Restoration Coalition, Deer Lodge, MT.

*WRC, 2012, "Upper Clark Fork Tributary Assessment for Restoration Planning: Watershed Health Monitoring Report, " for Montana DEQ, 319 Program, DRAFT, May.



LOWER WILLOW CREEK-OPPORTUNITY HABITAT PROJECT MAP

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1. PROJECT TITLE: Lower Racetrack Creek Habitat and Fish Passage Project

2. ORGANIZATION AND CONTACTS:

Contact:	Address:	Phone:
Will McDowell, Stream Restoration Director Clark Fork Coalition (CFC)	Box 7593 Missoula, MT 59807	Tel. 406-396-7716 cell

3. PROJECT PURPOSE AND BENEFITS: The purpose of the Project is to enhance riparian and aquatic habitat, and improve fish passage in a critical reach of Racetrack Creek, a major tributary to the Clark Fork river south of Deer Lodge. Racetrack Creek is a large stream, and a Tier 1 priority tributary for fishery restoration according to Montana FWP/Natural Resource Damage Program. This lower mile of Racetrack is a very important fluvial brown trout spawning reach in the Upper Clark Fork.

PROJECT BENEFITS:

*Expand spawning opportunities and reducing livestock interference with brown trout reproduction, resulting in greater recruitment to the river.

*Facilitate migration of sport fish and native fish (<90% pure "cutt-bows") from the middle and upper watershed, to re-establish migratory connections to the Clark Fork as the river is cleaned up.

*Replace lost trout angling opportunities in the river mainstem.

*Improve tributary fish habitat to enhance recruitment of fish (brown trout and cutt-bow trout) from Racetrack Creek into the Clark Fork.

*The project will have secondary benefits to wildlife by improving the quality of native riparian/wetland shrub habitat, and benefit water quality by reducing livestock impact.

4. PROJECT LOCATION AND MAP: The project site covers a mile of channel upstream of the confluence of Racetrack Creek with the Clark Fork River (see Map). Lower Racetrack **is a Priority 1 stream** for fisheries restoration in the Montana Fish Wildlife and Parks (FWP) and Natural Resource Damage Program (NRDP) tributary prioritization for aquatic restoration.

5. PROJECT DESCRIPTION:

Issues: HABITAT: The Lower Racetrack Creek Habitat/Passage project works with three landowners to improve the riparian and aquatic habitat of the stream in a critical brown trout spawning reach, and should expand access to more spawning habitat upstream through improved fish passage during fall. Riparian fences on two properties have been under-cut by bank erosion, and gradually destroyed by flood debris. Livestock are overgrazing these sites and trampling the stream banks and stream bed. At the most upstream site livestock water year-long out of the creek, and have caused major erosion of the stream bank at this site, contributing considerable sediment directly into the brown trout spawning reach. Two canal crossings (Westside Ditch and Whalen Ditch) at the upstream end of this reach have been recently improved so that they no longer disrupt high flows and sediment transport in this reach, making this a good time to invest in habitat improvement.

FISH PASSAGE: A rustic irrigation diversion at RM 1, just below West River Rd., made of concrete debris, fence posts and tarp, is a fish passage barrier at low water (often August through October), brown trout spawning season.

*** Project Goals, Objectives:**

Goal 1: The project will enhance riparian and aquatic habitat quality in a degraded reach of lower Racetrack Creek.

Objective 1: Develop a combination of winterized off-stream water, fencing and other grazing management improvements to dramatically reduce livestock impact on this spawning reach.

Goal 2: Restore upstream and downstream fish passage, especially for fall-spawning brown trout, at one irrigation diversion.

*Components/Activities by Goal:

Goal 1: Enhance riparian and aquatic habitat:

a) Design: The CFC will develop plans for riparian grazing improvements with landowners. These improvements will reduce livestock pressure on stream banks and riparian vegetation. If larger structures or off-stream water systems are required to protect eroding stream banks, those will be designed with assistance from NRCS or by appropriate consultants.

b) Construction: The CFC and the landowner(s), will coordinate the process of selecting an appropriate construction contractor/contractors for fencing, off-stream water and stream bank protection based on contractor lists developed by NRCS for Deer Lodge valley, and/or public advertisements to meet all State procurement requirements.

c) Landowner management agreement and maintenance: Cooperation with landowners for long-term maintenance of conservation investments will be required for maximum positive impact. The CFC will require a long-term (20-year) maintenance agreement with ability to inspect the site.

Goal 2: Restore downstream and upstream fish passage:

a) Design: The fish passage structure requires careful design to meet all agricultural, fisheries, and hydraulic criteria required for success. The CFC will work with its partner Trout Unlimited (TU) to develop the design, which may involve a fish ladder or rock weirs.

b) Construction: The WRC and TU will assist the irrigator to select an experienced construction firm to install fish passage structure. Construction in the off-season (especially fall) is ideal.

c) Landowner management agreement and maintenance: Cooperation with the irrigator for long-term maintenance of conservation investments will be required. The CFC, WRC and TU believe that funding to establish a screen maintenance capacity in the conservation community will be essential for long-term success (this is the experience of fish screen programs throughout the western U.S.). The CFC will require a long-term (20-year) maintenance agreement with ability to inspect the site.

Progress to date:

2010-2011: The WRC performed riparian assessment stream walks on the lower part of Racetrack Creek, identifying multiple problems on three properties. CFC worked on developing in-stream flow projects, like Racetrack Lake, and Westside Ditch, which are complementary to Racetrack habitat issues.

2011-2012 The CFC worked with landowners and applied for a Future Fisheries grant to fund some of this work. The contract was approved by Montana FWP in spring 2012.

***Lead entity and partners:** The CFC is the project lead, but the landowners, Trout Unlimited, NRCS and WRC will be key partners. At least three private landowners will be involved for optimum project results.*

6. PROJECT SCHEDULE:

ITEM:	Quarter 3, 2012	Quarter 4, 2012	Quarter 1, 2013	Quarter 2, 2013	Quarter 3, 2013	Quarter 4, 2013	2014
Assessment & Design							
Funding Applications							
Permits & Bids							
Construction							
Management:							

If funded, this project would begin immediately and first phases would be constructed in late fall-winter 2013.

7. BUDGET:

ITEM:	UNIT:	QUAN-TITY:	UNIT COST:	TOTAL COST:	MATCH:	NRDP:
Salaries (CFC): Project development & coordin	days	10	400	4000	2000	2000
Contracts: Engineering	days	6	800	4800	0	4800
Materials & Construction (installed)				0	0	0
Off-stream water systems (wells/pipeline/tanks)	system	2	15,000	30,000	9500	20,500
Fencing (public/private)	feet	3000	1.75	5250	2300	2950
Stream bank stabiliz	feet	400	35	14,000	0	14,000
1 Fish passage structure (diversion)	Per struct	3	20,000	20,000	12,500	7,500
SUBTOTAL:				83,050	26,300	51,750
Administration:	5%			4100	0	4100
Contingency:	5-10%			5000	0	5000
TOTALS:				**92,150**	**26,300**	**65,850**

Match funding is a minimum estimate, based on an existing Future Fisheries (MFWP) grant , secured in spring, 2012, for portions of this project. A portion of matching funds (in-kind and cash) must come

from the landowners/ irrigators. Unsecured sources of match, which may be other state and federal grant programs, are not included in this budget.

The project development salaries are for CFC staff to coordinate various elements of the project including landowner outreach, procure funding, write permits, conduct selection of engineers, selection of construction firm (with landowners), prepare plans and specs, supervise any project engineering and construction contracts, and participate in project construction oversight. Projects of this type also require post-construction monitoring and maintenance. Total cost of all these services is approximately 5% of total project budget, slightly more than average because CFC will do some engineering tasks that do not require a stamped plan.

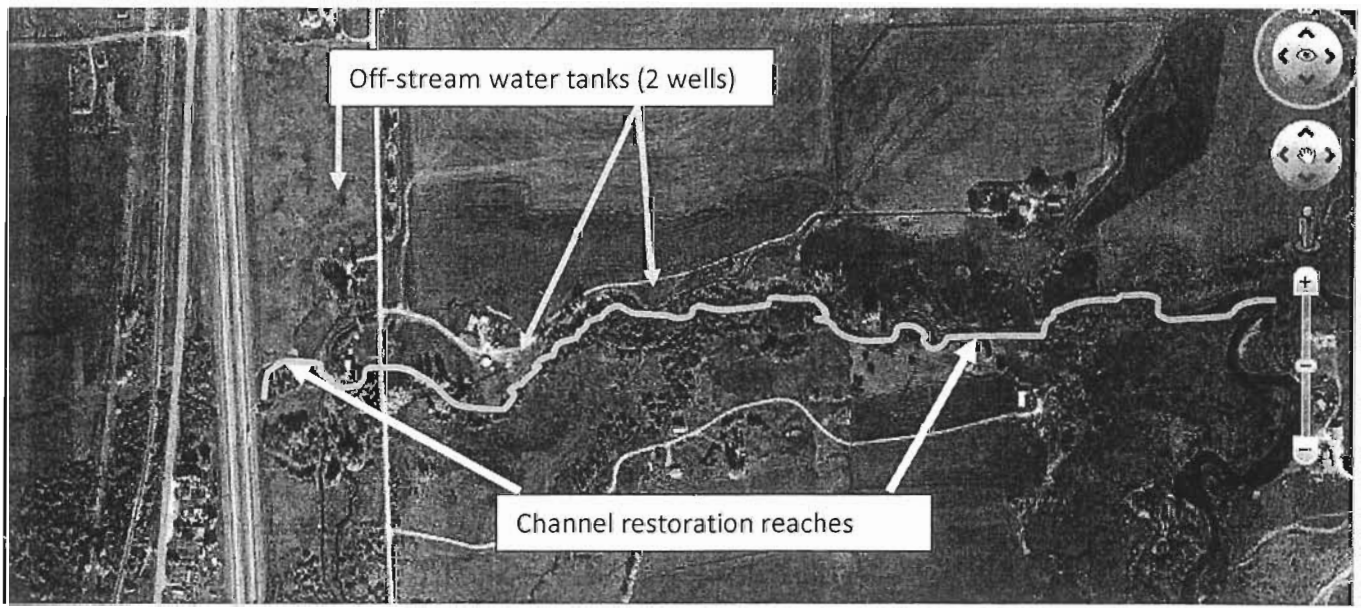
Administration is for processing payments and preparing reports to the NRDP and other funders, at approximately 5% for a project this size. Engineering and construction management is approximately 6% of total project budget, which is small for this size of project and types of construction.

References:

*Trout Unlimited, 2012, "Upper Clark Fork Diversion Inventory," for Watershed Restoration Coalition, Deer Lodge, MT.

*WRC, 2012, "Upper Clark Fork Tributary Assessment for Restoration Planning: Watershed Health Monitoring Report, " for Montana DEQ, 319 Program, DRAFT, May.

LOWER RACETRACK PROJECT AREA MAP:



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1. PROJECT TITLE: Middle Racetrack Creek Habitat and Fish Passage Project

2. ORGANIZATION AND CONTACTS:

Contact:	Address:	Phone:
Ted Dodge, Executive Director, Watershed Restoration Coalition of the UCF (WRC)	1002 Hollenback Rd. Deer Lodge, MT 59722	Tel. 406-579-3762 Tel. 406-856-1703 x4
Will McDowell, Project Coordinator	same	406-396-7716 cell

3. PROJECT PURPOSE AND BENEFITS: The purpose of the Project is to enhance riparian and aquatic habitat in Racetrack Creek, from I-90 for approximately six miles upstream to the Cement Ditch diversion above Upper Racetrack Rd. The project will address both aquatic habitat and fish passage limitations in this reach, to improve potential spawning, rearing, and migratory habitat for sport fish and native fish.

PROJECT BENEFITS:

*Improve stream habitat and connectivity to increase fish populations in middle Racetrack Creek.
*Improve fishing in Racetrack Creek itself to replace lost trout angling opportunities in the mainstem.
*Enhance recruitment of sport fish (brown trout) and native fish (hybridized cutt-bow trout) from the Racetrack watershed to the Clark Fork. T
*The project will have benefits to wildlife by expanding native riparian habitat, and benefits to water quality by reducing livestock impacts on the stream corridor.

4. PROJECT LOCATION AND MAP: The project is located along a six-mile reach of Racetrack Creek, upstream of the Interstate 90 crossing to the Cement Ditch diversion. Other project proposals from conservation partners are addressing lower Racetrack aquatic habitat and fish passage (below I-90 crossing, CFC), and the Cement Ditch/Morrison Ditch diversions and proposed improvements which are approximately 7.5 miles upstream of the mouth of Racetrack Creek (CFC). Almost all of the land in this reach is private agricultural land, except for a small sub-reach in Section 16 owned by Montana DNRC State Lands. **Racetrack Creek is a Priority 1 stream** for fisheries restoration in Montana Fish Wildlife and Parks (FWP) and Natural Resource Damage Program (NRDP) tributary prioritization for aquatic restoration.

5. PROJECT DESCRIPTION:

Issues: The Racetrack watershed has several major issues: seasonal dewatering in the lower six miles, localized degradation of habitat quality, and multiple impediments to fish passage. Ongoing partner projects are addressing the dewatering issue; this project seeks to complement that work by improving habitat and fish passage to maximize biological restoration benefits from any in-stream flow. The WRC survey in 2010 noted generally good aquatic and riparian habitat conditions with the exception of a 4,300 ft. historical channelization project. Trout Unlimited defined six irrigation diversions in this reach, of which four impair upstream passage and/or entrain trout.

*** Goals, Objectives:**

Goal 1: The project will enhance riparian and aquatic habitat quality and habitat diversity in a historically straightened, channelized reach of Racetrack Creek (RM 3.2 to 4.0).

Objective 1: Establish a stable channel sinuosity, increase the number of pools, and revegetate the floodplain to result in a naturally stable, diverse 5,000 ft. channel in a straightened simplified reach with

minimal fish habitat. (over 500 ft. of this channel was renaturalized in 1998, and it has maintained its form and function and provides superior fish habitat to the straightened reach)
Goal 2: Remove or improve all significant fish passage barriers in Middle Racetrack.
Objective 2: Assess, design and install fish-friendly permanent diversions and fish screens on up to four distinct irrigation diversions in the middle reach of Racetrack Creek.

***Tasks/Activities by Goal:**
Goal 1: Enhance riparian and aquatic habitat:
a) Design: The WRC will coordinate with the landowner and contract an experienced stream geomorphology firm to provide a design which: a) restores the natural geomorphic features (sinuosity, width-depth ratio, pool-riffle ratio) and functions of Racetrack Creek channel; b) remove floodplain berms, and revegetate that floodplain; c) provide enhancement of the aquatic habitat (pool habitat, cover, woody debris) ; and d) establish and protect a woody riparian corridor.

b) Construction: The WRC and the landowner will coordinate the process of selecting an appropriate contractor/contractors for construction/revegetation. An excavation contractor who has prior experience executing the geomorphic, hydraulic and habitat criteria of the design is required. Construction of inset floodplains, and successful revegetation of floodplains and adjacent terrace features requires specialized contractors as well. Construction will take place in low-water, probably fall or early winter.

c) Landowner management agreement and maintenance: Initial conversations have occureed with the landowner, but long-term cooperation will be required for success. The WRC will require a long-term (20-year) maintenance agreement with ability to inspect the site.

Goal 2: Remove or improve fish passage barriers
a) Design: The fish passage structures require careful design to meet all agricultural, fisheries, and hydraulic criteria required for success. The WRC will work with its partner Trout Unlimited (TU) to contract an appropriate engineering design firm to develop the designs, which may involve new diversion structures and/or fish screens, etc. Two of the four key diversions in this reach pose upstream fish migration issues. All four diversions (four different irrigators) have verified fish entrainment issues for downstream migration. Making final decisions on which diversions require expensive fish screens will involve input from FWP, which defined two of these diversions as "Medium priority" on the basin-scale for improvement.

b) Construction: The WRC and TU will assist the irrigators to select an experienced construction firm to install designed fish passage structures. Construction in the off-season (especially fall) is ideal.

c) Landowner management agreement and maintenance: Cooperation with the irrigator for long-term maintenance of conservation investments will be required. The WRC and TU believe that funding to establish a screen maintenance capacity in the conservation community will be essential for long-term success (this is the experience of fish screen programs throughout the western U.S.). The WRC will require a long-term (20-year) maintenance agreement with ability to inspect the site.

***Progress to date:**
2010-2011: The WRC performed riparian assessment stream walks on 12 miles of Racetrack Creek, and identified the selected channel improvement site as the most degraded reach in the entire middle

Racetrack watershed. Trout Unlimited coordinated with MFWP to inventory fish passage issues at irrigation diversions on Racetrack.
2011-2012: Partner organization Clark Fork Coalition is involved in securing in-stream flow through several ongoing deals, including Racetrack Lake storage water acquisition, development of the Racetrack pipeline project, and other negotiations with water rights holders on Racetrack.

***Lead entity and partners:** The WRC is the project lead, and the landowners, Trout Unlimited, and Clark Fork Coalition are key partners.

6. PROJECT SCHEDULE: Use table with blocked in quarters

ITEM:	Quarter 3, 2012	Quarter 4, 2012	Quarter 1, 2013	Quarter 2, 2013	Quarter 3, 2019	Quarter 4, 2013
Final Design						
Funding Applications						
Permits & Bids						
Construction/Reveg						
Management:						

If funded, this project would begin immediately and be mostly completed in fall of 2013, based on the fact that the conceptual design already done, and some of the funding is already secured.

7. BUDGET:

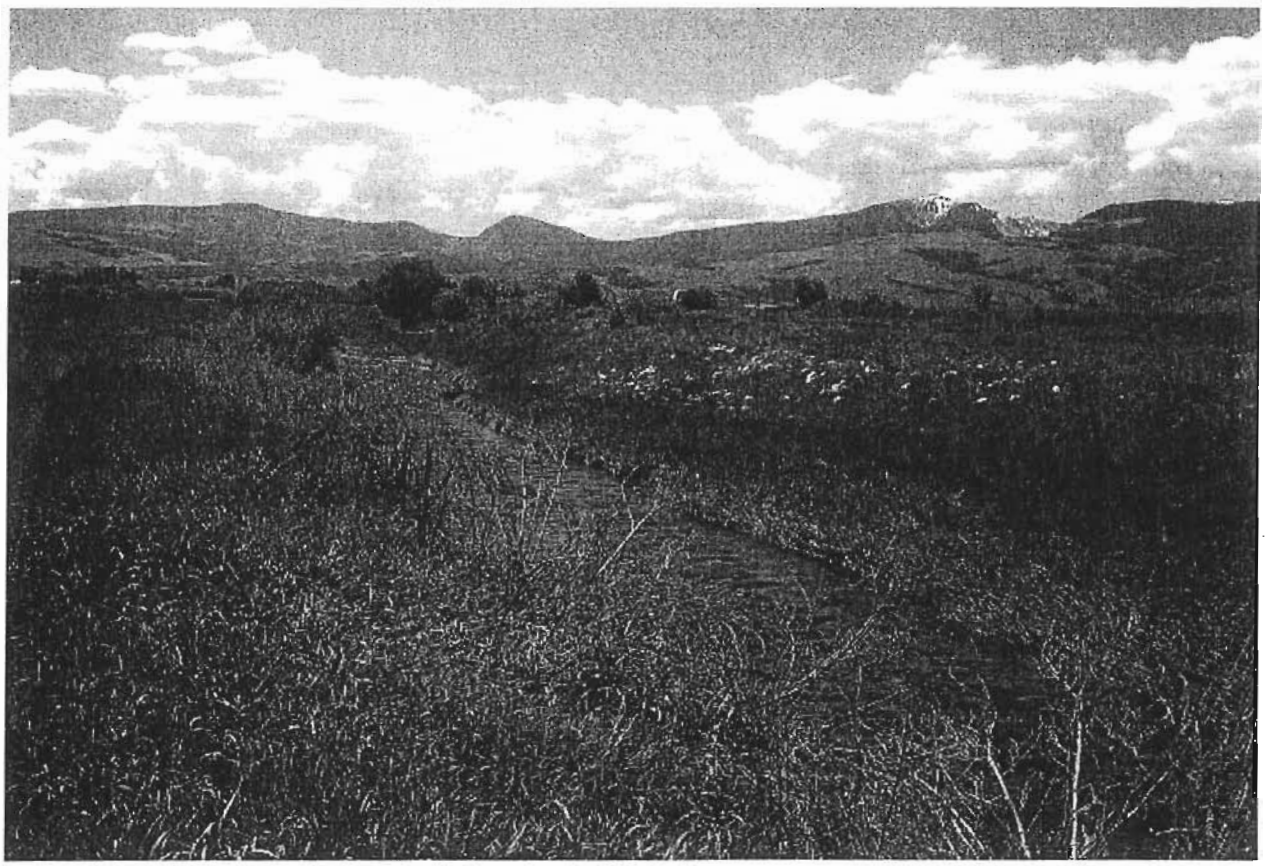
ITEM:	UNIT:	QUAN-TITY:	UNIT COST:	TOTAL COST:	MATCH:	NRDP:
Salaries (WRC/TU):	days	40	400	16,000	4,000	12,000
Contract: Engineering	days	60	800	48,000	0	48,000
Construction management	days	25	800	20,000	0	20,000
Materials (installed) 1: channel earthwork	Linear ft.	5000	40	200,000	0	200,000
2: Vegetation	plants	2000	6	12,000	0	12,000
3. Fencing	Ft.	4000	1.75	7000	2500	4500
Fish-friendly diversions (rock)	item	20,000	4	80,000	0	80,000
Fish Screens ($5000/cfs)	item	40,000	4	160,000	0	160,000
SUBTOTAL:				543,000	6,500	536,500
Administration:	3%			16,000	0	16,000
Contingency:	10%			54,000	0	54,000
TOTALS:				**613,000**	**6500**	**606,500**

Matching funds are being sought from state and federal sources, including match the landowners can provide through the USDA-NRCS with EQIP funds. Match will undoubtedly increase as the project progresses, but unsecured match is not included in the budget at this time.

The salaries are for WRC and TU staff to coordinate the project , including landowner coordination, procure funding, write permits, conduct selection of engineers, assist landowner with selection of construction firms, supervise project engineering and construction contracts, and participate in project construction oversight. The total project development and coordination is about 3% of the project budget.

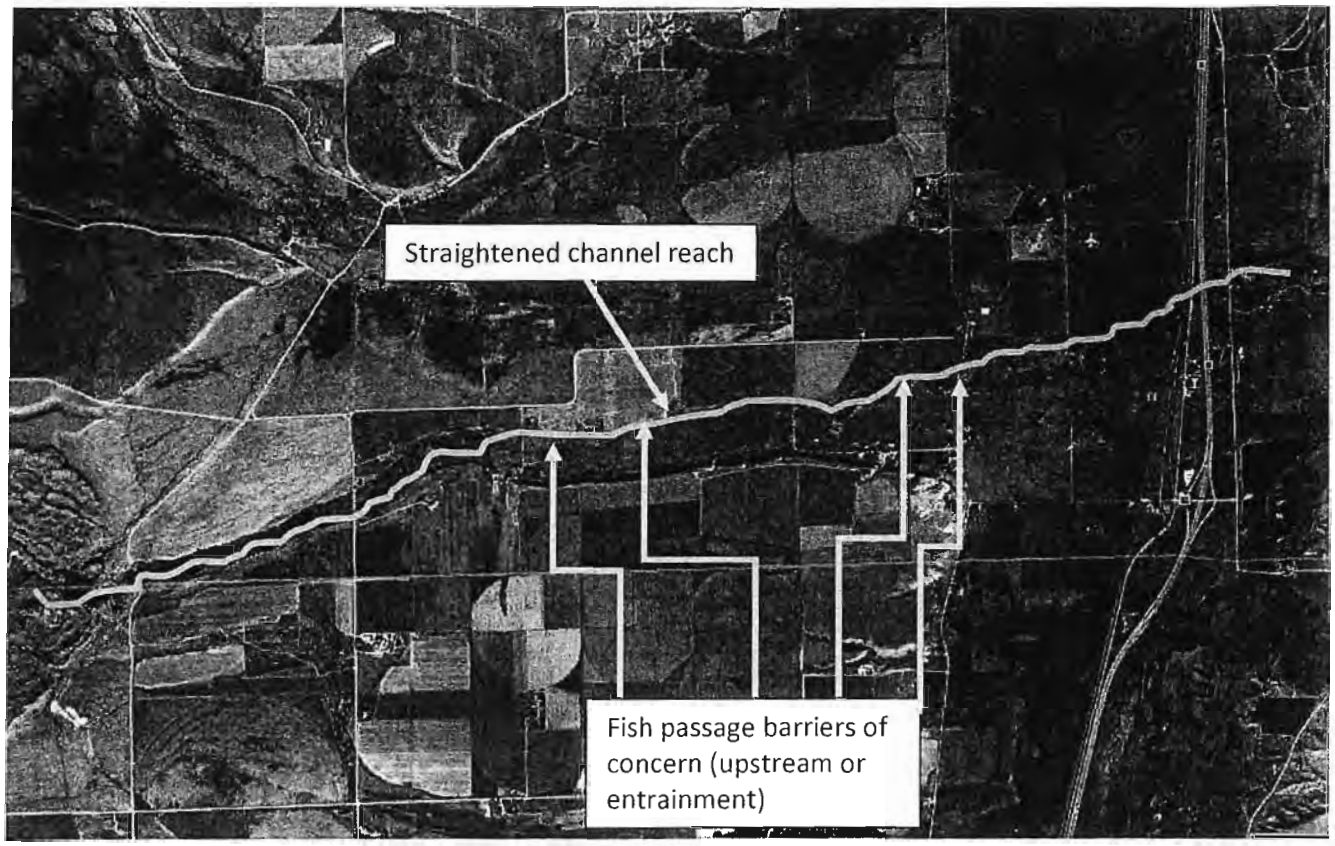
Engineering, including design and construction management for a medium-scale channel reconfiguration project and the fish passage structures, is about 12-13% of the project budget, which is reasonable for a set of projects of this scale and complexity.

Administration is for processing payments and preparing reports to the NRDP and other funders, at approximately 5% for a project this size. Engineering and construction management is approximately 18% of total project budget, which is reasonable for this size of project and types of construction.



Straightened channel reach on middle Racetrack (RM 3.6)

MIDDLE RACETRACK PROJECT MAP



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1. PROJECT TITLE: Lower Dempsey Creek Habitat and Fish Passage Project

2. ORGANIZATION AND CONTACTS:

Contact:	Address:	Phone:
Ted Dodge, Executive Director, Watershed Restoration Coalition of the UCF (WRC) Will McDowell, Project Coordinator	1002 Hollenback Rd. Deer Lodge, MT 59722 same	Tel. 406-579-3762 Tel. 406-856-1703 x4 406-396-7716 cell
Vanisko Ranches, Inc., (and potentially other landowners)	478 Quinlan Rd. Deer Lodge, MT 59722	846-1627

3. PROJECT PURPOSE AND BENEFITS: The purpose of the Project is to enhance riparian and aquatic habitat, and improve fish passage, in a critical reach of Dempsey Creek, from above the Dempsey Lake Road downstream to the confluence with the Clark Fork.

PROJECT BENEFITS:

*Improve potential spawning, rearing, and migratory habitat for sport fish.

*Replace lost trout angling opportunities in the mainstem, by improving habitat in this Priority 2 tributary.

*Enhance recruitment of sport fish (brown trout) and native fish (westslope cutthroat trout) from the Dempsey Creek watershed to the Clark Fork.

*The project will have secondary benefits to wildlife by expanding native riparian/wetland shrub/sedge habitat, and benefit water quality by buffering a livestock corral.

4. PROJECT LOCATION AND MAP: The project site covers about eight miles of channel upstream of the mouth of Dempsey Creek, to approximately the confluence with the North Fork of Dempsey Creek, southwest of Deer Lodge. **Dempsey Creek is a Priority 2 stream** for fisheries restoration in the Montana Fish Wildlife and Parks (FWP) and Natural Resource Damage Program (NRDP) tributary prioritization for aquatic restoration. A key private landowner of approximately one mile of this reach is Vanisko Ranches (Jim Berg), who manages part of his property for irrigated crop production, and part for pasture, and has expressed interested in collaborating with the WRC on habitat improvements.

5. PROJECT DESCRIPTION:

Issues/Justification: This reach of Dempsey Creek included **six sub-reaches qualified as "unsustainable" by WRC during assessment of riparian condition in 2010.** The characteristics leading to this low habitat quality rating include historical channelization (low sinuosity) and removal of woody vegetation, irrigation pivot crossings, excessive bank trampling by livestock and erosion, and over-wide channel. The 2011 FWP-FRIMA report and TU Inventory report recommend three "medium" priority irrigation diversions for fish passage improvements at river mile 1.0, 2.0, and 4.8. on Dempsey Creek.

*** Goals, Objectives:**

Goal 1: The project will enhance riparian and aquatic habitat quality and habitat diversity in a historically straightened, channelized reach of Dempsey Creek.

Objective 1: Re-establish a naturally stable channel plan form, channel cross-section, and floodplain and provide a healthy riparian habitat corridor for fish and wildlife, including adequate upstream and downstream fish passage.

Objective 2: Design and install fish passage structures on three to four diversions, for upstream and downstream passage.

Objective 3: Develop a long-term agreement with the landowner(s) for fencing, off-stream water, livestock management, irrigation diversion and water management improvements and recreational access which will maximize the value of the improved habitat.

*Tasks/Activities by Goal:
Goal 1: Enhance riparian and aquatic habitat:
a) Design: The WRC has a conceptual design to re-naturalize parts of this reach, which was historically channelized and the willows burned. The proposed design will provide the following benefits: a) restore the natural geomorphic features (sinuosity, width-depth ratio, pool-riffle ratio) and functions of Dempsey Creek channel; b) re-establish a connected floodplain, and re-vegetate that floodplain; and c) establish and protect a woody riparian shrub/sedge habitat corridor.

The Montana FWP, in its FRIMA irrigation diversion study, recommended three Dempsey Creek irrigation diversions as medium priorities for replacement with fish friendly structures, at river mile 1.0, 2.0 and 4.8 (Berg, Kramer Barn Box, and Prison Ditch #2). These structure designs need to be developed in coordination with landowner—with engineering of any new or complex structures (e.g. screens). Other Prison Ditch diversions may be able to be modified for low to virtually no cost for upstream fish passage (see TU Inventory Report on Prison Ditch #3, #4).

WRC will do further project development for habitat and fish passage work, with adjoining Dempsey Creek landowners in 2012 and 2013. The design elements will take into account new irrigation diversions and headgates, off-stream livestock water, and creek crossings (bridges) for pivot irrigation sprinklers.

b) Construction: The WRC and the landowner(s), will coordinate the process of selecting an appropriate contractor/contractors for construction/re-vegetation. An excavation contractor who has prior experience executing the geomorphic, hydraulic and habitat criteria of the design is required. Construction of stable channels, and successful re-vegetation of floodplains and adjacent terrace features requires specialized contractors as well. Construction will take place in low-water, probably fall or early winter.

Fish passage structures will be constructed in low-water as well.

c) Landowner management agreement and maintenance: Cooperation has been established with one major landowner, but long-term cooperation with several landowners will be required for maximum positive impact. The WRC will require a long-term (20-year) maintenance agreement with ability to inspect the site.

Progress to date:
2010: The WRC performed riparian assessment stream walks on the lower seven (7) miles of Dempsey Creek, and identified six "unsustainable" sub-reaches in the middle and lower watershed.
2010-2012: The WRC collaborated with the Deer Lodge Valley CD to contract a simple conceptual restoration design, which was delivered in early 2012. This design was reviewed with Vanisko Ranches in May, 2012, and the CD in June, 2012. (see references).
2012: In-stream flow and fish passage will be important complementary project on this reach of Dempsey Creek. The WRC is coordinating with Clark Fork Coalition and Trout Unlimited on development of complementary projects on Dempsey Creek. Further investments in irrigation water conservation, with

complementary in-stream flow work, and further fish passage work is highly desirable due to dewatering in this reach in dry summers due to over-appropriation of surface water to irrigation.

***Lead entity and partners:** The WRC is the project lead, but the landowners,TU, the Deer Lodge Valley Conservation District, Montana State Prison, and CF Coalition and TU will be key partners.*

6. PROJECT SCHEDULE: Use table with blocked in quarters

ITEM:	Quarter 3, 2012	Quarter 4, 2012	Quarter 1, 2013	Quarter 2, 2013	Quarter 3, 2013	Quarter 4, 2013	2014
Design							
Funding Applications							
Permits & Bids							
Construction							
Management:							

If funded, this project would begin immediately and first phases would be constructed in fall-winter 2013.

7. BUDGET:

ITEM:	UNIT:	QUAN-TITY:	UNIT COST:	TOTAL COST:	MATCH:	NRDP:
Salaries (WRC): Project development & coordin	days	40	400	16,000	4,000	12,000
Contracts: Engineering	days	80	800	64,000	0	64,000
Materials & Construction (installed)				0	0	0
Channel reconstruction	Linear ft.	5000	30	150,000	40,000	110,000
Revegetation	plants	2000	12	24,000	0	24,000
New irrigation accessories (pivot bridges, headgates)		item	n/a	20,000	10,000	10,000
Wells, livestock water, electric supply			25,000	25,000	10,000	15,000
Habitat projects with neighboring landowners				150,000	20,000	130,000
3-4 Fish passage structures (diversions/screens)	struct	4	25,000	100,000	10,000	90,000
SUBTOTAL:				549,000	94,000	455,000
Administration:	5%			16,500	0	16,500
Contingency:	5-10%			50,000	0	50,000
TOTALS:				**$615,500**	**$94,000**	**$521,500**

Match funding is a minimum estimate, and is expected to increase as other sources of funding are secured. A portion of matching funds (in-kind and cash) must come from the landowners. Unsecured sources of match, which may be other state and federal grant programs, are not included in this budget.

The project development salaries are for WRC and TU staff to coordinate various elements of the project including landowner outreach, procure funding, write permits, conduct selection of engineers, selection of construction firm (with landowners), supervise project engineering and construction contracts, and participate in project construction oversight. Projects of this type also require post-construction monitoring and maintenance. Total cost of all these services is approximately 3% of total project budget.

Administration is for processing payments and preparing reports to the NRDP and other funders, at approximately 3% for a project this size. Engineering and construction management is approximately 11-12% of total project budget, which is reasonable for this size of project and types of construction.

References:

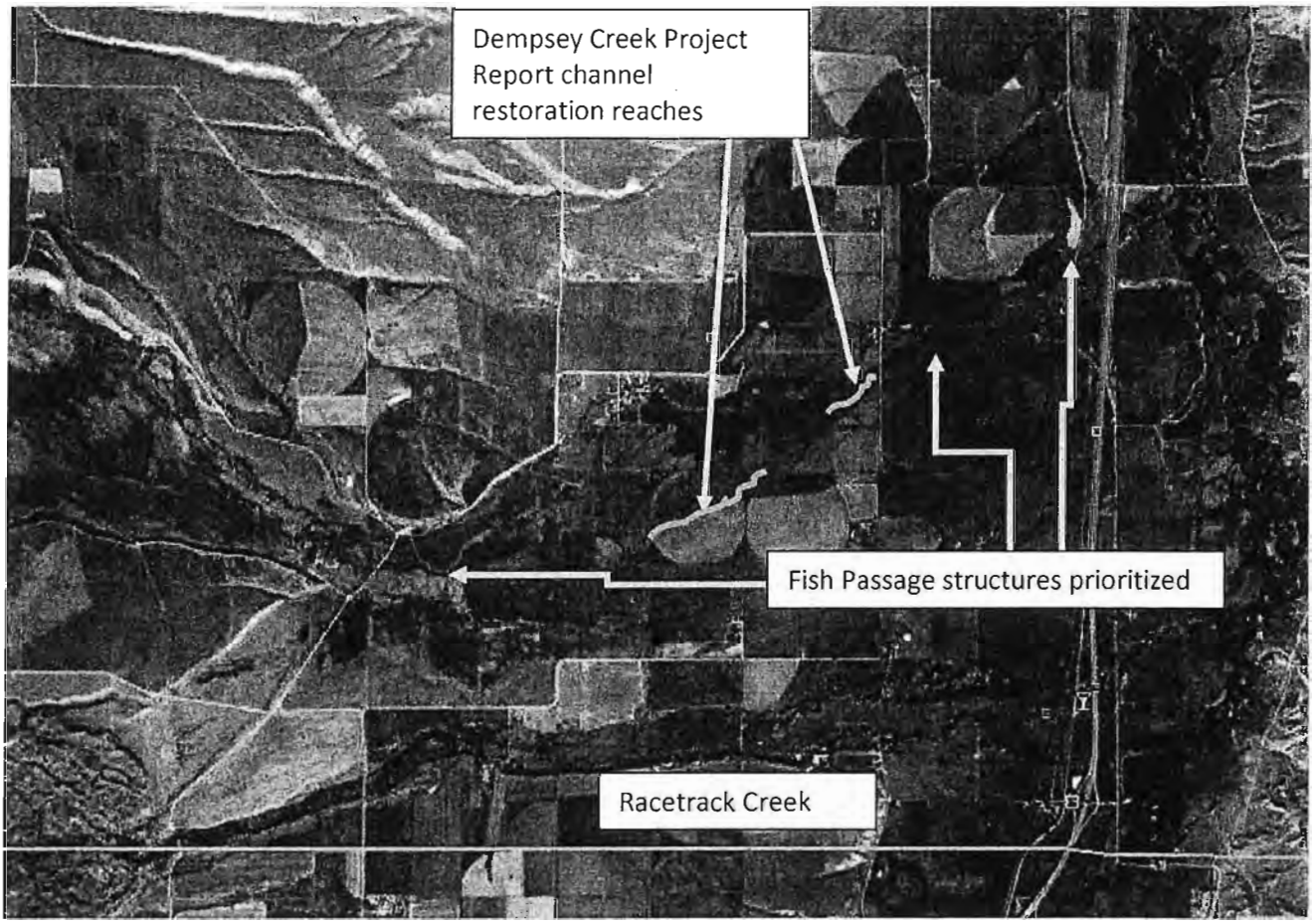
*WRC, 2012, "Dempsey Creek Preliminary Project Report," Alpine Creek Restoration, LLC, Deer Lodge, MT, May.

*WRC, 2012, "DRAFT Watershed Health Survey Report," for Montana DEQ 319 program, Deer Lodge, MT.

*FWP-FRIMA, 2011, "An Inventory of Irrigation Structures in the Upper Clark Fork River Drainage," Final Report 2011, USFWS Agreement No. 601818J270, by Will Schreck, Ryan Kreiner, Brad Liermann, and Jason Lindstrom.

*Trout Unlimited, 2012, "Upper Clark Fork Diversion Inventory," for Watershed Restoration Coalition, Deer Lodge, MT.

DEMPSEY CREEK HABITAT AND PASSAGE PROJECT MAP



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1. PROJECT TITLE: Habitat and Fish Passage Maintenance Program

2. ORGANIZATIONS AND CONTACTS:

Contact:	Address:	Phone:
Ted Dodge, Executive Director, Watershed Restoration Coalition of the UCF (WRC)	1002 Hollenback Rd. Deer Lodge, MT 59722	Tel. 406-579-3762 Tel. 406-856-1703 x4
Will McDowell, Project Coordinator	Same	406-396-7716 cell
Casey Hackathorn, Project manager Trout Unlimited	111 N. Higgins, Suite 511 Missoula, MT 59802	406-546-5680 cell

3. PROJECT PURPOSE AND BENEFITS: The purpose of the Project is to provide long-term maintenance and monitoring support to the agricultural community, to assure the successful adoption of conservation technology for aquatic resource projects. Habitat and fish passage projects entail adoption of new technology, and in some cases new maintenance burdens. Prior experience in Idaho and Montana watershed programs has shown that sponsors of conservation investments need to support agricultural landowners long-term in the maintenance of conservation investments to assure long-term adoption and successful outcomes. This project would provide a small but essential additional capacity to local conservation organizations to provide this service to the agricultural community of the Upper Clark Fork, while protecting the viability of NRDP investments.

PROJECT BENEFITS: This project will:
*Assure compliance with maintenance agreements on investments such as riparian fences, water systems, irrigation upgrades, and fish passage structures.
*Provide support to the agricultural community in operation and maintenance of conservation investments, such as fish screens, which can require mechanical repair beyond the easy reach of the landowner.
*Provide monitoring capacity to document the value and performance of conservation investments, such as range, riparian habitat, or fisheries monitoring.

4. PROJECT LOCATION AND MAP: The project will cover the entire Upper Clark Fork watershed from Missoula to Butte, with particular focus on priority areas with multiple aquatic resource investments, such as the Deer Lodge valley, Little Blackfoot, Flint, and Silver Bow Creek/Warm Springs Creek drainages.

5. PROJECT DESCRIPTION:
Issues/Justification: The Watershed Restoration Coalition (WRC) and Trout Unlimited (TU) have recognized that the long-term success of current and proposed conservation investments will depend on the capacity to regularly monitor completed work. This capacity will reassure landowners that there is continued support for the conservation goals outlined in projects they implement, and assure that maintenance agreements are upheld. The relationship with landowners will be positive. It is based on a clear understanding that local conservation groups like WRC and TU will provide concrete support in adapting and repairing technologies which do not function precisely as planned, due to extreme conditions or other factors beyond their control. All work will be based on long-term maintenance

agreements for grazing, off-stream water, irrigation, and fish passage management improvements which are required by the WRC and TU on all projects , with ability inspect the sites.

The WRC and TU will provide this capacity through staff and seasonal field employees. Seasonal employees will be hired and trained from the local community to link conservation to local jobs. This function is distinct from the specialized monitoring function proposed by the Clark Fork Coalition for flow augmentation projects, which includes an enforcement function linked to DNRC water rights division requirements.

*** Goals, Objectives:**
Goal 1: The project will provide for monitoring and maintenance support for all habitat and fish passage conservation investments in the Upper Clark Fork.
Objective 1: Annual inspection of all conservation investments and agreements.
Objective 2: Provide trained support personnel for maintenance/adaptation of fish screens or other unfamiliar new technology.
Objective 3: Monitor biological performance of particular project investments and to document outcomes, in coordination with responsible state agencies.

*Tasks/Activities by Goal:
Goal 1: Provide monitoring and maintenance support:
*Develop a workplan for gradually increasing capacity as the number of new projects increase.
*Develop protocols for monitoring and reporting project status and outcomes.
*Select and train seasonal field staff
*Manage long-term monitoring and maintenance program.

***Progress to date:**
2011-2012: The WRC currently requires 20-year maintenance agreements on all stream-related conservation investments. Examples include the Applegate irrigation project.

***Lead entity and partners:** The WRC is the project lead, in close coordination with Trout Unlimited, particularly on fish passage projects.

6. PROJECT SCHEDULE:

ITEM:	2013	2014	2015	2016-2022
Development of Workplan & Protocols				
Field test methods				
Select seasonal staff				
Ramp up program				
Long-term implementation:				

If funded, this project would begin in late 2013.

7. LONG-TERM BUDGET:

The budget would ramp up gradually in response to demand as larger numbers of projects are implemented that require monitoring, and particularly maintenance.

ITEM:	UNIT:	QUAN-TITY:	UNIT COST:	ONE YEAR COST:	MATCH:	NRDP:
Salaries (WRC and TU combined):	Days per year	30	400	12,000	3000	9,000
Seasonal employee (starting 2014):	Days per year	75	150	11,250	0	11,250
Travel budget	Miles/year	3000	0.55	1650	0	1650
Materials & Construction (installed)				0	0	0
Materials & repair (equipment and services, general)				20,000	0	20,000
SUBTOTAL:				44,900	3000	41,900
Administration:	5%			2,245	0	2,245
Contingency:	10%			4500	0	4500
TOTALS:				**51,645**	**3000**	**48,645**

Match funding is a minimum estimate, and is expected to increase as the project progresses and other sources of funding are secured.

The salaries are for WRC and TU staff to coordinate various elements of the project, including landowner outreach, monitoring, training, and supervision of maintenance and repair efforts. The first year budget for 2013 would be small (approximately $12,000/year) and would ramp up to the full annual budget in 2014 or 2015, depending on how many projects were due for monitoring and contracting a 40-hr/week seasonal employee.

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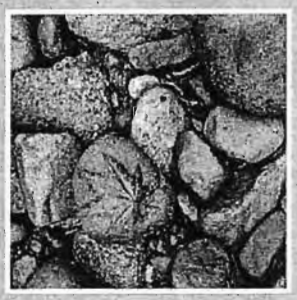
NRDP

Natural Resource Damage Program



Trestle Community Park

Restoration Concept Abstract

Submitted By: Powell County / Great West Engineering

June 15, 2012

COUNTY OF POWELL
DEER LODGE, MONT.

Planning Department

Powell County Planning Department · 409 Missouri Ave., Suite 101 · Deer Lodge, Montana 59722
406.846.9795 / planning@co.powell.mt.us

June 15, 2012

Via E-Mail

Carol Fox
Restoration Program Chief
Natural Resource Damage Program
1301 East Lockey
P.O. Box 201425
Helena, MT 59620-1425

RE: Powell County – NRDP Project Abstract

Ms. Fox:

Powell County welcomes the opportunity to submit the following project abstract for consideration by the Natural Resource Damage Program (NRDP) according to the procedures established in the 2012 Process Plan. The submitted abstract advocates the creation of a community park in Deer Lodge at the site once occupied by the Milwaukee Roundhouse railroad facility and has been derelict for over thirty years. The proposed *Trestle Park*, named in recognition of its railroad past and the park's distinctive landmark will include athletic fields, recreational trails, a fishing overlook, ecological and historical interpretative kiosks, boat launch, and public access to the Clark Fork River phased over several projects and funding partners. The site's eligibility derives from its presence beside the mainstem of the Clark Fork River, a Priority One Stream and the prospect for the State of Montana to advance its restoration with a park emphasizing the health of riparian areas. Officials from both the City of Deer Lodge and Powell County support the formation of a community park to enhance natural elements as well as their functionality through innovative planning and restoration practices. This community park builds on the recent cleanup efforts of DEQ, EPA, and the Coast Guard and establishes an end use while physically linking the history of the Milwaukee Roundhouse site to the Montana State Territorial Prison, the Montana Auto Museum, Frontier Museums, and two Milwaukee locomotives on display across the Clark Fork River. Ultimately, the proposed community park is an attempt to assure local residents and visitors the chance to experience the Clark Fork River in a safe, healthful, ecological sound, and aesthetically enjoyable setting.

Sincerely,

Brian P. Bender, AICP
Planning Director

Planning Department
Powell County Planning Department · 409 Missouri Ave., Suite 101 · Deer Lodge, Montana 59722
406.846.9795 / planning@co.powell.mt.us

June 15, 2012

- **Project Title**
  Trestle Park

- **Organization and Contact**
  Powell County
  Brian P. Bender, AICP
  Planning Director
  409 Missouri Ave., Suite 101
  Deer Lodge, MT 59722
  406.846.9729
  bbender@co.powell.mt.us

- **Project Purpose and Benefits**
  Powell County seeks the support to plan, design, and develop a park on the former Milwaukee Roundhouse site in Deer Lodge. Trestle Park's development will occur on the fourteen-acres owned by Powell County and has great potential of improving the physical and aesthetic qualities of Deer Lodge and eliminating a health risk faced by area residents as the Montana Department of Environmental Quality lists the property as a high priority CECRA site. Since 2005, Powell County secured federal and state grant funds to initiate and sustain a comprehensive cleanup of the site. The cleanup accelerated in the summer of 2011 when EPA removed a 500,000-gallon, underground storage tank (the main vessel for storing heavy tar-like oil used on locomotives) and oil contaminated soils. From this time onwards, the cleanup effort will concentrate on the southern portion of the site helped in part by the installation of two monitoring and collection wells by the EPA. The County has designated an entire phase (Phase Three) of the project to the area's cleanup with the remaining segments of the property being a *clean slate* and available for a community-minded reuse. A public park will also complement the work completed by the Montana Department of Environmental Quality (Clark Fork River Superfund) with the removal of metal contaminated soils along the River, and the restoration process with plantings along the northern half of the site. Importantly, the project has the ability to strengthen the remediation efforts to date by decreasing the amount of debris and pollution from entering the Clark Fork River.

  Essentially, the proposal wants to reintroduce City and County residents to the simple pleasure of enjoying the Clark Fork River as it flows through a small, quant community. Trestle Park's restored landscape with its tapestry interwoven with plants, fish, and animals is critical to the overall success of the Clark Fork River and offers recreational and educational options for Deer Lodge residents and visitors. The Park is an ideal setting for local educators to teach students the importance of the River to Deer Lodge, and the site's unique railroad history. Tree-lined trails will bisect the Park and lead users

down to the River's edge where a boat launch and a fishing pier will accommodate recreational water enthusiasts. Later phases of the project will see the Trestle Park perform as a much-needed trailhead for the numerous trails and bikeways found throughout Deer Lodge as well as the placement of athletic fields for a community devoted to its youth sport leagues.

- **Project Location and Map**

  The site occupies fourteen-acres in the southwestern portion of Deer Lodge and once contained the principal locomotive and rolling stock repair facility for the Chicago – Milwaukee Railroad in western Montana for nearly one hundred years. The site is south of Milwaukee Avenue and lies at the eastern terminus of West College Avenue with Sun Mountain Lumber Mill abutting the property to the south (see the enclosed *Location Map*). The site has a strong riverine character reinforced by the Clark Fork River flowing along its northern segments (there is also a small parcel north of the River) as well as Tin Cup Joe Creek forming most of its western boundary. As a testament to its historic railroad use, an inactive Trestle spans the Clark Fork River at the northern tip of the site and a BNSF rail line runs along the eastern portion of the site.

- **Project Description**

  Trestle Park is an ideal strategy to take underutilized acreage beside the Clark Fork River and reestablish the site's connection with the River. The intent of the park is to serve the recreational needs of local City and County residents as well as attract visitors to Deer Lodge for educational and sporting events. The park will support picnic shelters and tables, baseball fields, recreational trails, a boat ramp, public access to the River, areas for a variety of educational activities, restrooms, and parking lots. Specifically, the northern half of the site focuses on the River and Tin Cup Joe Creek and uses them to help define areas hosting other amenities.

  The design will accent restoration elements throughout the northern portion and employ vegetated buffers ensuring the continued health of the adjacent waterways. In this area, the park encourages the public to interact with the River with a fishing pier, a boat launch, and a shallow bank profile. Renovations to the Trestle will enable it to act as viewing platform above the River and will have informative kiosks and placards describing the heritage of the site and the ongoing restoration of the River.

  After the improvements to the northern portions of the site, Trestle Park will serve as a trailhead for a burgeoning community trail system by linking Arrowstone Park and Johnson Creek Trails. However to achieve maximum functionality as a trailhead, the County will need to route a trail around the BNSF line and identify a suitable means to cross Clark Fork River to link those trails. A designated trailhead will greatly facilitate connectivity throughout the community and allow more residents to take advantage of Trestle Park's features.

  After Powell County completes the ongoing remediation of the southern portion of the site, the final phase of Trestle Park will take place with the placement of athletic fields consisting of two diamond ball fields. These fields will also have the ability to serve as multi-purpose venues to hold play and practice events. The athletic fields enable the community to host regional tournaments and accommodate community youth and adults that heavily participate in sports leagues and programs.

- **Project Schedule**

  Since 2005, Powell County explored the feasibility of placing a community park on either a part of the Milwaukee Roundhouse property or its entirety through the generation of several concept plans. The northern portion is now ready for the creation of a community park because of County efforts to continue the remediation of the site with assistance from partnering agencies (Coast Guard, EPA, DEQ, and the DNRC). The proposed Trestle Park will complement the recent work by the DEQ to remove metal contaminated soils, and serve as a trailhead for the Deer Lodge River Trail – a project gaining statewide recognition through its successful use of local and Treasure State Endowment Program funds.

  Powell County divides the project into four separate phases to oversee the successful installation of Trestle Park. The enclosed *Master Plan* illustrates the components of the individual phases.

  1. **Phase One** – The focus is on the area north of the existing fence and along the Clark Fork River and consists of the various park-like amenities and landscaping.

  2. **Phase Two** – This second phase includes the construction of a pedestrian bridge, boat ramp, and repairs to the Trestle.

  3. **Phase Three** – Comprises the cleanup of the area south of the fence. Powell County submitted a 2012 application to obtain funds through DNRC's Reclamation and Development Grant Program to assist with the task.

  4. **Phase Four** – This phase of the project relates to the introduction of the ball diamonds and the construction of a new access road running along the western edge of the site and looping back towards West College Avenue.

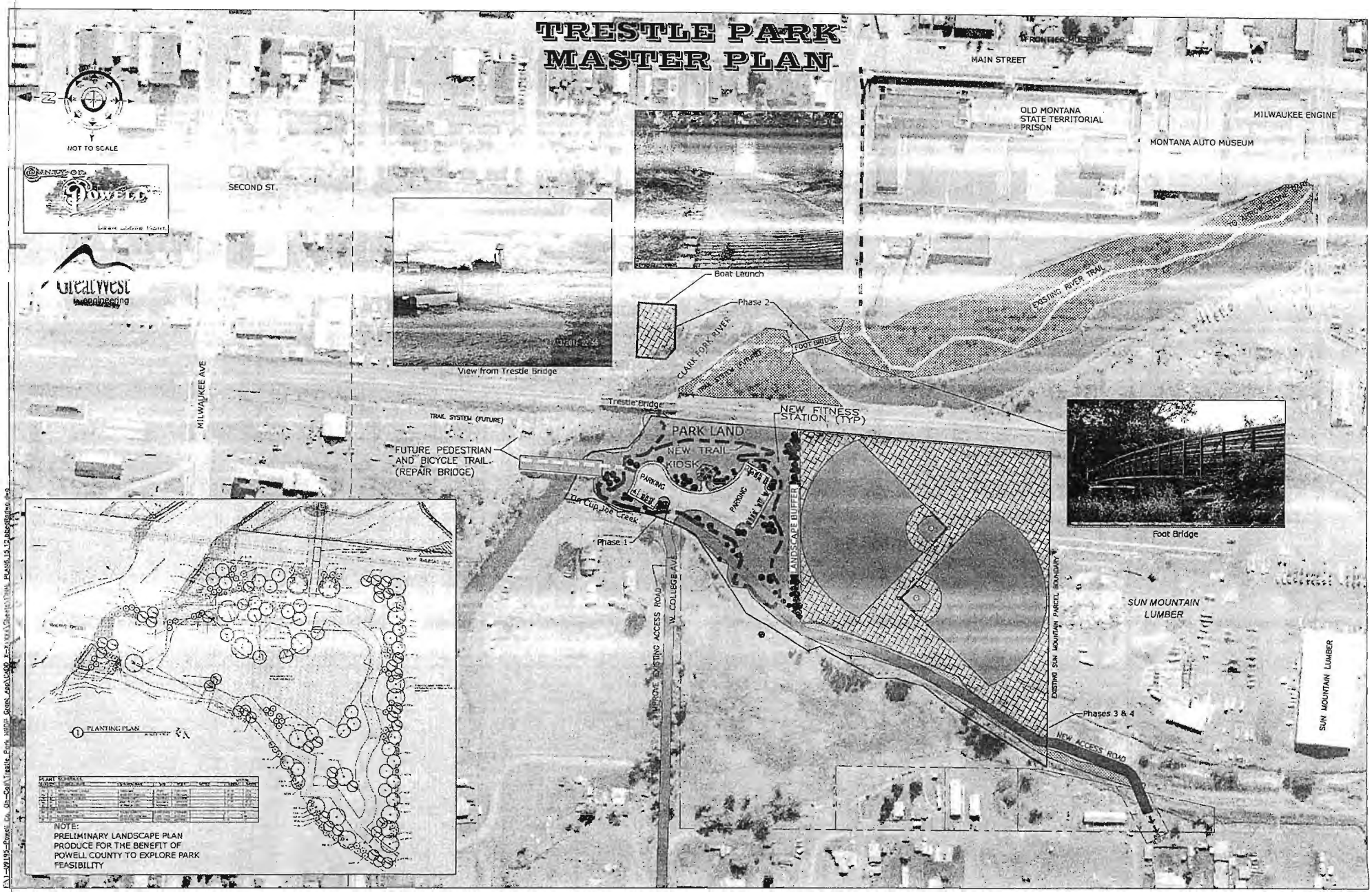
- **General Cost Information**

  Powell County provides the included *Opinion of Probable Cost* for cost information for the proposed Trestle Park.

TRESTLE PARK

LOCATION MAP

TRESTLE PARK MASTER PLAN



OPINION OF PROBABLE COST

Trestle Park Phases 1 & 2

Item No.	Description	Unit	Quantity	Price	Amount
Phase 1 - Trestle Park Area					
1	Mobilization (10%)	LS	1	$78,600	$78,600
2	Install Gravel and Asphalt - Parking Lot	LS	1	$135,000	$135,000
3	Road Improvements to W. College Ave.	LS	1	$120,000	$120,000
4	Solar Powered Lighting	LS	1	$165,000	$165,000
5	Site Grading	LS	1	$30,000	$30,000
6	6" Topsoil	LS	1	$55,000	$55,000
7	Irrigation Installation & Vegetation	LS	1	$40,000	$40,000
8	Paved Trails by Kiosk	LS	1	$64,000	$64,000
9	Main Kiosk Building	LS	1	$35,000	$35,000
10	Vault Toilet	LS	1	$30,000	$30,000
11	Vehicular Gate	LS	1	$3,000	$3,000
12	Interpretive Signage	LS	1	$7,500	$7,500
13	Water (Well & Treated, also used for irrigation)	LS	1	$15,000	$15,000
14	Historic/Ecologic Consultant & Sign Design	LS	1	$7,500	$7,500
	PHASE 1 CONSTRUCTION COST				**$785,600**
	Engineering/Construction Management (22%)				**$172,832**
	Administration (3%)*				**$23,568**
	PHASE 1 TOTAL				**$982,000**
Phase 2 - Pedestrian Bridge, Boat Ramp & Trestle Bridge Repairs					
1	Mobilization (10%)	LS	1	$33,800	$33,800
2	Clark Fork River Boat Ramp w/Approach	LS	1	$20,000	$20,000
3	Clark Fork River - Pedestrian Bridge	LS	1	$220,000	$220,000
4	Pedestrian Bridge Approach Work	LS	1	$5,000	$5,000
5	Trestle Bridge Repairs	LS	1	$45,000	$45,000
6	Off Site Trails (Decomposed Granite)	LS	1	$4,000	$4,000
7	Permit Acquisition Services	LS	1	$1,500	$1,500
8	Geotechnical Investigation	LS	1	$8,000	$8,000
	PHASE 2 CONSTRUCTION COST				**$337,300**
	Engineering/Construction Management (25%)				**$84,325**
	Administration (3%)*				**$10,119**
	PHASE 2 TOTAL				**$431,744**
	PHASE 1 & 2 TOTAL COST				**$1,413,744**

*Administration includes time for the County Planner, Brian Bender for duties including site visits, meetings, correspondence, status reports, etc.

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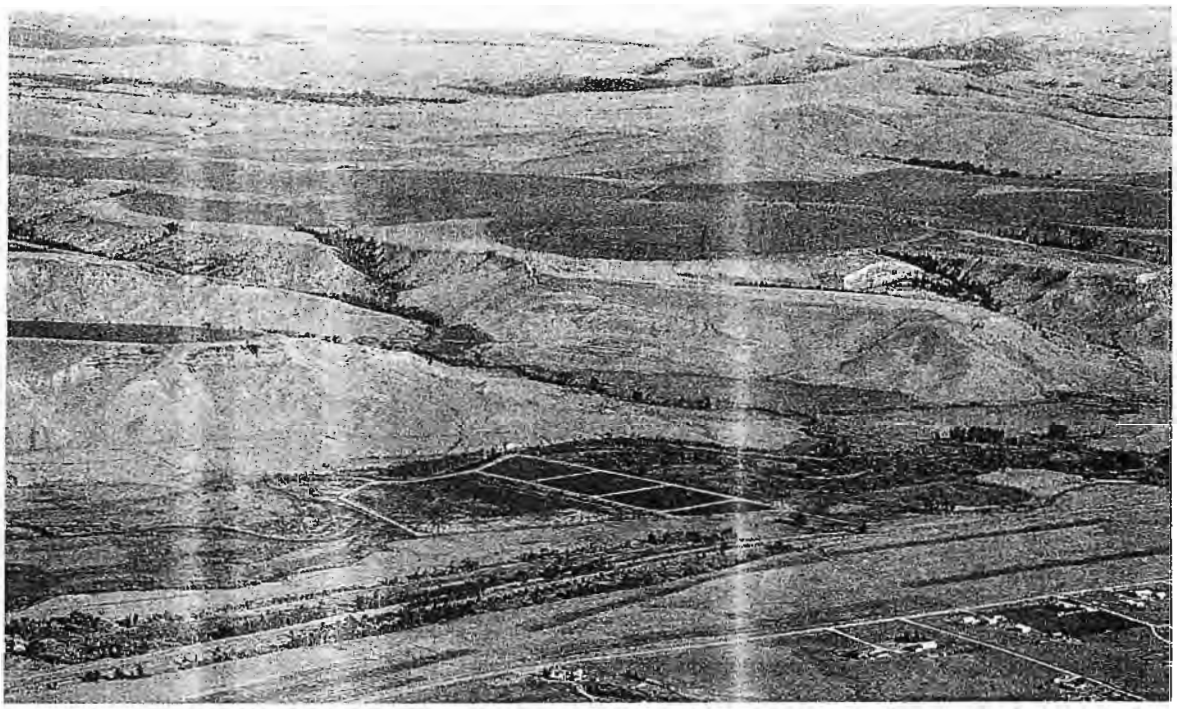
Montana Natural Resource Damage Program
Restoration Concept Abstract

Deer Lodge Wastewater Project



Submitted by: City of Deer Lodge
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June 2012

Montana Natural Resource Damage Program
Restoration Concept Abstract

Deer Lodge Wastewater Project

Project Purpose and Benefits:

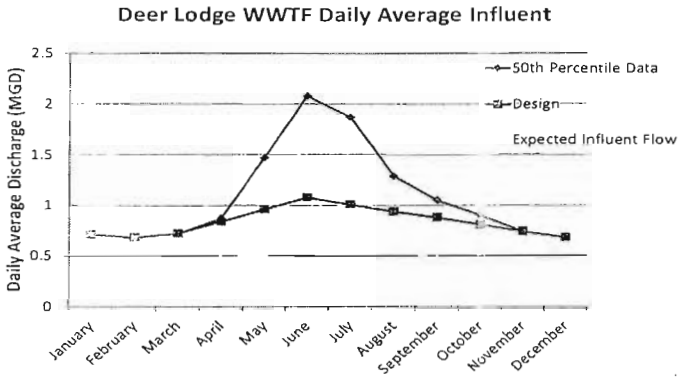
The proposed restoration project is the next phase of Deer Lodge's Wastewater Project, which addresses the most serious and immediate threat to the water quality of the Clark Fork River and the public health and safety of its citizens: lining of the main sewer pipeline from Deer Lodge to the WWTF (WWTF) and replacement of the UV disinfection system. This project represents the city's top priority for improvements of the current wastewater facility. This project will provide immediate and measurable improvement to the water quality of the Clark Fork River. It will reduce the amount of pollutants that are currently being discharged into the river by greatly reducing the amount of groundwater that infiltrates into the city's sewer system, passes through the WWTF, and is discharged into the Clark Fork. Nutrients like nitrogen and phosphorus are a detriment to the river. The Deer Lodge Wastewater Project promises to greatly reduce these types of pollutants as well as reducing biological oxygen demand (BOD) and Total Suspended Solids that enter the Clark Fork. This project represents a great benefit to the resource for the dollars spent.

The immediate goal of the project is to reduce the amount of groundwater that enters the wastewater system. This reduction will greatly help Deer Lodge in efforts to improve the wastewater system to meet state and federal regulations and improve the quality of the discharge that enters the Clark Fork River. Immediate reduction of the influent flow to the WWTF will allow the City to down-size the facilities for the planned WWTF upgrade project scheduled to be constructed in 2014, making it more affordable for the citizens of Deer Lodge.

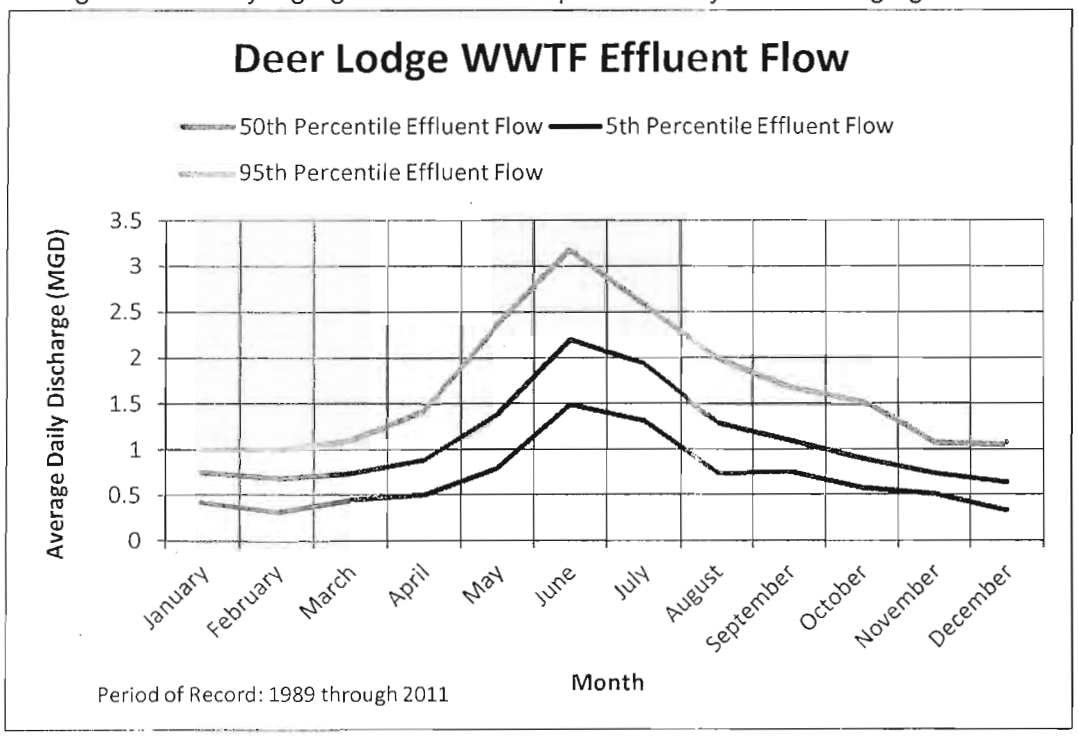
Nutrient reduction in the Clark Fork River has been a goal of the City of Deer Lodge since its work with the Voluntary Nutrient Reduction Program (VNRP) that was created in the 1990's and went into effect in 1998. Deer Lodge instituted an innovative and progressive approach to nutrient reduction by partnering with the National Park Service's Grant – Kohrs Ranch to install an effluent irrigation system that would lead to zero discharge of nutrients into the Clark Fork River during summer months. Grant – Kohrs Ranch and Deer Lodge have operated this irrigation system since 1998 as a result of the VNRP. Deer Lodge's commitment to zero discharge in the summer months is not typical of wastewater systems in Montana. The use of an irrigation system to meet this challenge is an example of Deer Lodge going above and beyond normal wastewater systems to protect the Clark Fork.

However, due to excessive infiltration of groundwater into the sewer system the effluent irrigation system has never been able to handle all of the city's wastewater. The system was designed to handle wastewater flows that did not take into account this excessive infiltration. Deer Lodge Public Works has recorded flows throughout the entire history of the project. Flow

rises dramatically in May shortly after the Kohrs – Manning ditch fills with water. High flow continues until the ditch is taken out of service in August. A portion of the city's sewer pipeline from town to the WWTF runs parallel to the Kohrs – Manning Ditch. This is an unlined irrigation ditch that is leaking water into the ground and impacting the Deer Lodge sewer line. The following chart shows the differences in flow that are a result of groundwater infiltration.



The yellow line represents expected flow from a city the size of Deer Lodge if there was no inflow into the system. The red line represents design based on flow that the city experiences in the winter and fall months. The blue line shows the influence that groundwater infiltration has on the actual flow seen in the system. Infiltration into the system is, on the average about 1 million gallons per day (MGD) during the summer months. However, the city has seen flows over 3 MGD during times of very high groundwater as represented by the following figure:

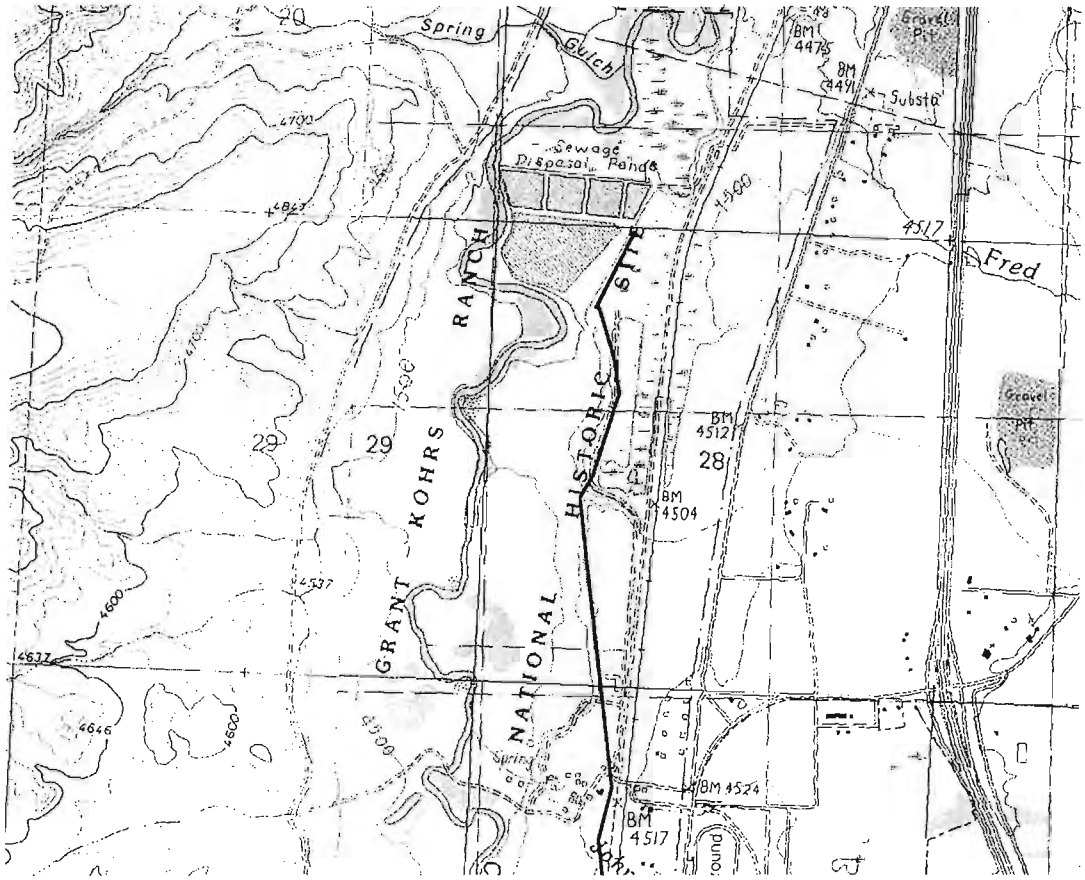


Slip-lining the sewer pipeline from town to the WWTF will greatly reduce the amount of flow into the system. This reduction will help Deer Lodge to meet its current zero discharge during summer months. It will also help design improvements to the wastewater system that will reduce pollutants like ammonia and other nitrogenous nutrients, as well as phosphorus, BOD, and TSS.

Project Location:

The project is located just north of Deer Lodge extending to the WWTF about 1.5 miles north of town.

Aerial photograph showing the project area, sewer trunk main, and WWTF



Topographical map showing project area, sewer trunk main, and WWTF

Project Description:

The project involves slip-lining about 8100-feet of sewer pipeline from Deer Lodge to the WWTF. The pipeline is 27-inches in diameter. Deer Lodge has successfully completed slip-lining projects in the recent past. Many city sewer lines were repaired in this manner in 2009. Slip-lining is a simple technique consisting of inserting a new pipe, normally made of a polymeric, thermoplastic-type material, into a deteriorated pipeline. Liners are inserted into the existing pipeline either by pulling or pushing. After insertion, the annular space between the existing pipe and the new liner is filled with a relatively slow flow rate cementitious grout material. This method of rehabilitating pipelines provides a versatile and cost-effective alternative to traditional excavation and replacement. This process is also much less disruptive than replacement of pipelines through excavation. If installed properly, the slip-lined pipe functions like a new installation.

The city's Ultraviolet (UV) disinfection system is also in need of replacement and will be done during this phase of the project. Installation of a new disinfection system is necessary in order to disinfect discharged wastewater and protect human health. The UV disinfection process targets single celled microorganisms such as viruses, bacteria, and protozoa. In particular, genetic

information contained in the deoxyribonucleic acid (DNA) of the microorganism is rearranged by UV light, destroying its ability to reproduce.

The City's existing ultraviolet disinfection system needs to be replaced to meet the City's MPDES permit. Numerous past evaluations for wastewater disinfection alternatives have consistently pointed to UV disinfection as the preferred alternative.

These proposed improvements will be done as a separate phase ahead of the WWTF upgrades planned for construction in 2014. The WWTF upgrades, which involve construction of an oxidation ditch treatment plant to replace the existing aerated lagoons, are mandated by an Administrative Order on Consent by the Montana Department of Environmental Quality.

TABLE 9-1 (from 2010 PER)
INTERIM TREATMENT FACILITY UPGRADE DESIGN CRITERIA

Equipment/Design Criteria	Value
UV Disinfection	
Type	Low pressure, low intensity
Total Number of Lamps	36
Minimum UV Transmittance	65%
Minimum Design Dose	26,000 μW/cm2/sec
Emergency Generator	
Number	1
Capacity	100 kVA
Type	Trailer-mounted

Partners:

- Deer Lodge has Morrison – Maierle Inc., Helena, MT contracted to design and oversee construction of the project.
- In 2009 Deer Lodge worked with PEC, Inc., Helena, MT in order to slip-line in town sewer lines.
- Deer Lodge is seeking additional funding from USDA – Rural Development. The requested grant will provide 25 percent of the project cost.

Project Schedule:

1. Secure funding through NRDP Process — Spring 2013
2. Design UV disinfection & slip-lining Improvements — Spring- Summer 2013
3. Slip-lining sewer outfall — Fall 2013
4. Construct UV disinfection system — Summer 2014

General Cost Information:

Categories:	Estimated Costs
Salaries/Benefits	$15,000
Supplies and Materials	$2,500
Travel and Communication	$1,500
Equipment	N/A
Contracted Services	
Engineering Design	$176,000
Construction Engineering Services	$264,000
Permitting	$30,000
Construction of slip-lining	$1,578,300
Construction of UV disinfection	$425,000
Contingency (~10%)	$200,000
Total Costs	$2,692,300

Proposed Project Funding and Target Rate

The City of Deer Lodge is in the process of obtaining funding from USDA – Rural Development for a major WWTF upgrade which is scheduled for construction in 2014. The estimated cost of that project is $11.3 million including the cost of the UV disinfection and sewer trunk main slip-lining components. The Rural Development grant portion of the funding is estimated to be 25 percent of the project cost and will be used as a 25 percent match of an NRDP grant for the UV disinfection and sewer trunk main slip-lining project. The project funding and target rates are summarized in the following table.

Total Project Cost	$2,692,300
Total Match (25%) from Deer Lodge Sewer Reserve Fund and RD Grant	$677,200
Remaining Project Cost	$2,015,100.00
Deer Lodge Combined Target Rate	$57.23
Without NRDP funding - Projected Combined Rate after 2014 WWTP improvements	$78.87 (138% of target)
With NRDP funding - Projected Combined Rate after 2014 WWTP improvements	$73.51 (128% of target)

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Natural Resource Damage Program Project Idea

Entity: Butte Country Club
3400 Elizabeth Warren
Butte, MT 59701
(406) 494-2394 (office)

By: Dan Hickman, President
(406) 490-6180 (cell)

Project Location: Sections 29, 32 & 33-T3N-R7W, Basin Creek & Blacktail Creek

Project Background: **Basin Creek** flows under portions of the airport, north through land abutting the Butte Country Club (BCC). The stream meanders through an old hayfield owned and controlled by the Bert Mooney Airport Authority, where it saturates the ground and pools at an old road bed (formerly White Bvd). At that point water from the pool seeps under the road bed and flows onto the BCC. Recent changes to the upstream flows have caused considerable damage to the BCC, where stagnant standing water deprives Basin Creek of its full flow potential, negatively impacting the fishery, and creating a hazardous breeding ground for mosquitoes. Also, with the expected increase in flows from Basin Creek as a result of changes in the domestic water supply, the existing creek bed, culverts, etc. simply do not have capacity to adequately handle the projected flow. This year alone the BCC has spent over $25,000 in drainage projects just to make the course playable. Without this project, essentially one third of the course was unplayable. The BCC does not look at the recent project as a final solution; more construction is needed to insure water flowing through the Basin Creek drainage area is handled in the most prudent manner possible.

Blacktail Creek flows through the BCC. In a 2009 study prepared for the Mile High Conservation District City-County of Butte Silver Bow, Blacktail Creek was identified as 'marginal' in Aquatic Habitat Quality. Summarized in the report, this section of the creek was in the poorest condition of the six reaches of Blacktail Creek studied and "this already degraded condition will only continue to decline unless restoration measures are undertaken". Identified as a Priority 2 in the Upper Clark Fork River Basin Interim Restoration Process Plan, this project directly meets the intent of this restoration process.

Project Description:

<u>Basin Creek</u>
The BCC proposes to take a proactive approach to protect the water quality of Basin Creek (and the downstream waterways), the fishery, and the property of the club.

During periods of high water (whether through mountain snowpack melt or operations of Basin Creek Reservoir), local snow melt, and extended precipitation events, Basin Creek tends to flood Hole #8. Also, rising groundwater tends to pool in the low areas of the course. The BCC proposes to install a drainage system on this hole and extend the other drain systems recently installed.

Knowing significantly increased flows will be expected in Basin Creek, we believe that the creek channel and its banks will need to be altered or protected to avoid what will likely be considerable erosion. Some of the specific actions required would be:

1. Replace existing culvert – existing culvert would be too small to adequately handle increased flows.
2. Remove a sand trap – to avoid increased erosion causing sand, silt, and top soil to be washed down the creek.
3. Add fill, elevating the land surface in the immediate vicinity of Hole #8 green.
4. Add rip rap to certain sections of the creek bank to avoid continual erosion.
5. Install drains.*
6. Enhance existing drains.

   Note * - drains would consist of a ditch with a perforated pipe, covered in gravel and wrapped with a silt screen. The ditch would then be grassed over.

I believe this project to be in the $450,000 range. I acknowledge that more cost refinement is necessary. The BCC would provide 33% cost support for this project. BCC's support would come in the form of manpower, machinery, materials, and cash to reach the 1/3-2/3 split. October 2012 would be an optimum time for this work.

Blacktail Creek

The Blacktail Creek portion of this proposal requires much more review and refinement from experts in the field, however the following is an overview of potential fixes for problems identified in the Mile High Conservation District study. These include stabilizing the existing stream banks where erosion is occurring or may occur, replacement of certain bridges and culverts impacting stream flow, and assessment and modification of BCC irrigation pond and diversion for better stream flow and fish passage.

Because this portion of the project requires more study, the following cost estimates will require much more discussion. Study - $25,000, Permitting - $15,000, Bridge/Culvert Replacement - $60,000, Stream bank/channel Stabilization & Restoration - $250,000, Reconfigure Irrigation Pond/Stream for Adequate Fish Passage - $150,000, Drainage - $150,000. Total of $650,000. BCC would again provide 33% of cost support in the form of manpower, machinery, materials, and cash. October 2012 or March 2013 would be an optimum time for this work.

Project Benefits: These projects have considerable benefits for Basin Creek, Blacktail Creek and the waterways downstream, including Silver Bow Creek and the upper stretches of the Clark Fork River. With the modifications proposed, significant volumes of silt and organic material (top soil, bank debris, etc.) will not flow into the waterways – preserving water quality, spawning habitat, and stream banks. The resident trout population will build and become viable. Avoiding surface water as a result of high ground water tables or flooding will keep water temperatures lower enhancing the biodiversity of the streams. Avoiding the stagnant pooling will minimize the active breeding zones of the mosquitoes. These insects not only are nuisances, they create a health hazard for the residents of nearby subdivisions, the workers and customers frequenting the nearby business district, and the users of the course. And finally, proper drainage and creek control will minimize surface water which may prevent unwanted nitrate loading of Basin Creek, Blacktail Creek, and Silver Bow Creek.

Summary: The BCC understands that upstream projects and/or domestic water management are continuing to evolve and we are reasonably assured those changes will further impact the BCC. The BCC also understands some ideas presented to the Natural Resource Damage Program (NRDP, 2012 Process Plan) will directly impact the BCC if approved. We are confident that the NRDP will consider all projects in a regional perspective and know that if certain projects are approved, impacting the BCC, our proposal would be given adequate consideration.

We believe these proposals to be an important step in restoring the Aquatic and Terrestrial environments of the entire upper Clark Fork region. Thank you for the opportunity to present our proposal.

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Rocker Storm Water System

1. Project Purpose and Benefits:

Provide a storm water system in the town of Rocker, including curb, gutter, drain pipes, and retention ponds. The town of Rocker is an industrial mining town that has been around longer than the town of Butte. It has dirt streets that are lined with old railroad tracks and was once full of industrial mining activity. Rocker is also growing very rapidly, and even the newly developed areas do not appear to have any storm water controls. These dirt streets and residential and commercial lots drain directly into the newly reclaimed Silver Bow Creek. A large area north of Rocker and west of Butte, full of old mine tailings also drains through Rocker and directly into Silver Bow Creek. This project would entail installing possibly 2 to 3 retention ponds. The retention ponds would be fed by a storm water piping system with curb and gutter directing the water into the system, as well as natural drainage ditches. See attached pictures below for potential layout.

2. Project Location:

The project is located in and around the town of Rocker directly adjacent to Silver Bow Creek. According to the aquatics map, this would put it in a priority 2 area. See picture below.

3. Project Description:

There is approximately one mile of total linear distance of main street and side streets that would require curb and gutter down each side. Storm water drains would be required to be buried to drain water from the low points to natural ditches or directly to retention ponds. Retention ponds would be constructed for storm water and sediment control.

This entire area would need to be surveyed and require engineering and design.

This project was also submitted as an idea for Butte Area One funding since it impacts the fishery directly below Butte Area One. To gain efficiencies this project could be shared with Butte area one. It should also be coordinated with the county so they can provide paving to the dirt streets.

4. Project Schedule:

- Surveying ~ 3 months
- Engineering and design ~ 3 months.
- Bidding ~ 2 months.
- Construction ~ 3 months.
- Total ~ 11 months.

5. General Cost Information: Unknown

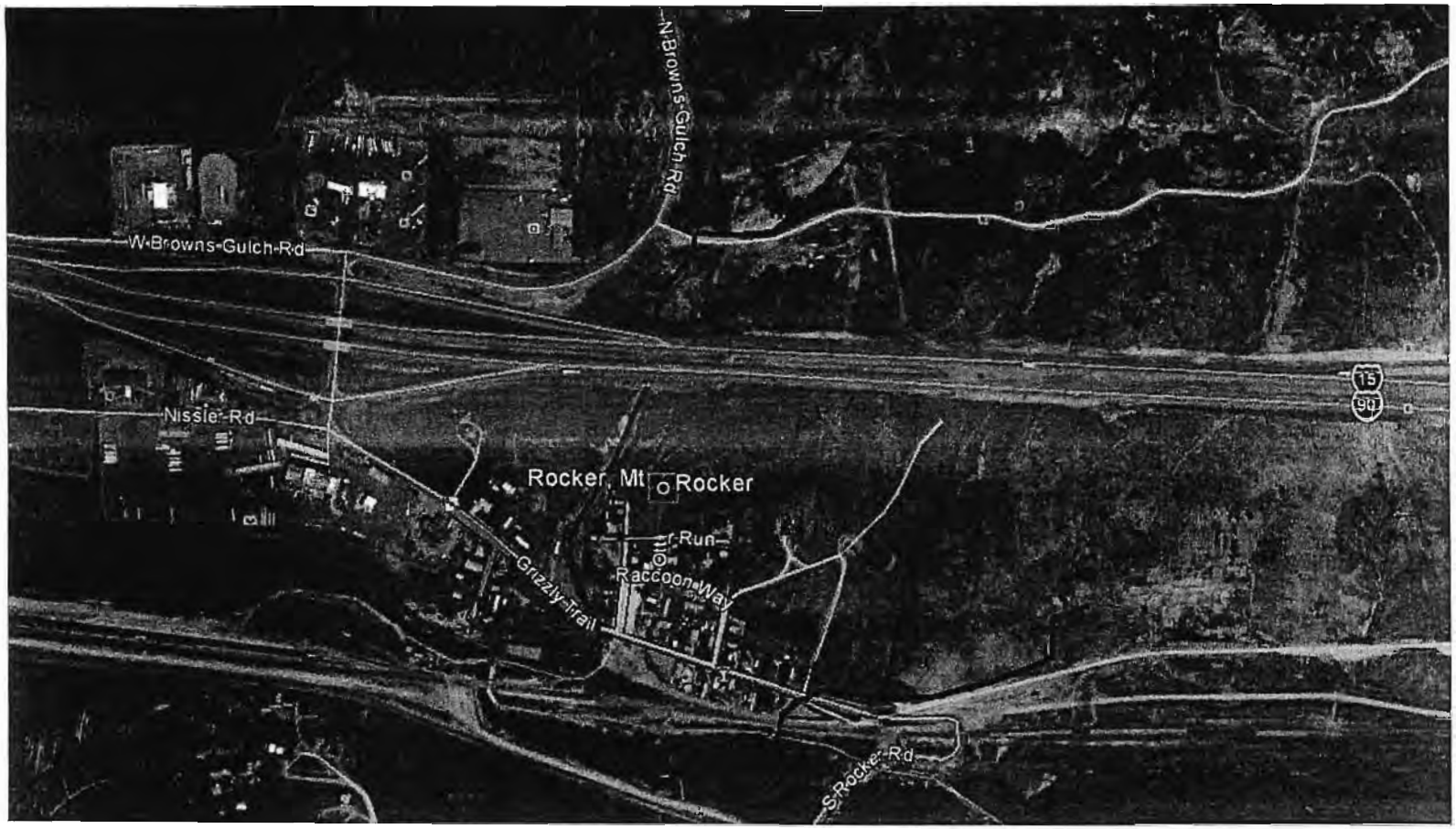
Time and resources to put together in depth project designs and budgets were not available at the time of project submittal. Those details would have to be worked out if this was thought to be a worthwhile project. Since this is so close to Butte Area One, it was also submitted as a project idea for that funding source. Perhaps the two funding sources could share in this project to reduce the impact on each funding source since it appears to qualify under both. It is also of great value to the county, and they perhaps could capitalize on this opportunity to clean up this small old mining town and protect the watershed.

6. Closing:

Please understand when reviewing this, that there was little time to study the process plan in depth. A simple review of the submittal form and guidance on submittal was performed for direction. Time and resources were limited to put together in depth project plans, schedules and budgets. The idea is provided with good intentions and the hope that it will be beneficial and worthwhile.

Thank you for the opportunity for the public to provide input and ideas.

Kind Regards,
Mike Flanick


N Browns Gulch Rd
W Browns Gulch Rd
Nissler Rd
Rocker Mt
Rocker
Run
Raccoon Way
Grizzly Trail
S Rocker Rd
15
90

Grizzly Trail
Lynx Trail
Cougar Ln
Raccoon Way
Otter Run

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North Ramsay Land Acquisition

1. Project Purpose and Benefits:

There are approximately 2,150+/- acres of ranch land available for sale North of Ramsay (see picture below). The proposal is to acquire this property to protect the Clark Fork Basin Fishery, wildlife, and recreational services. In addition there are many other supplementary benefits that could be realized through this acquisition. A more detailed breakout of Purpose and Benefits follow:

1. This property is critical habitat to elk and deer populations, as well as predators such as fox, coyote and mountain lion. This area is not just a winter range, or a summer range for elk and deer, but they inhabit this area all year long. Therefore, it is a valid candidate for protection of wildlife resources. A large portion of this property has been preliminarily approved for a residential development, threatening the local wildlife populations.
2. As indicated above, a large portion of this property has been preliminarily approved for a residential development. This area drains into Browns Gulch Creek and on into the newly reclaimed Silver Bow Creek. None of this development has any storm water controls in place, or planned. Residential developments are often a major contributor of sediment and pollutants to waterways. Acquiring this property to limit the residential development will protect the fishery by protecting the watershed.
3. There are many recreational services that could be protected and made available through the acquisition of this property. This is tremendous elk, deer, and mountain lion habitat that would provide excellent hunting opportunities as this area has done for many years. It was once even part of a commercially viable outfitting business. There are also many camping, hiking, and wildlife viewing opportunities throughout the property including a couple of old cabins that could be enjoyed by the public. There are not a lot of roads across the property, but there are a few old ranch roads that could provide a great opportunity for those wanting to take a ride. This property is in relatively close proximity to the damaged resources and could be readily accessible to the local public. I would strongly urge that this property not be placed under the management of the DNRC, or those recreational services will most likely not be realized after seeing the limited access given to the Spotted Dog Ranch.

In addition to the Eligible Project Purposes and Benefits, this project has additional potential benefits. The ground water in Butte Area One is highly contaminated and will require treatment of some kind. This project was also submitted as part of the Butte Area One resource ideas as a method to provide long term funding for operational costs for water treatment. As such, it would also fall under the groundwater classification of the process plan. Some surface water and ground water in the Butte Area is going to require treatment in perpetuity. Projects like these can help provide funding in perpetuity for

that water treatment in much the same fashion that State lands provide funding for schools. Following are additional Purposes and Benefits:

1. Agriculture and Ranching are often over looked as a lost resource due to the industrial activity in the Upper Clark Fork River Basin. Agriculture and ranching existed in Montana before mining, and they primarily occupied valley bottoms and riparian areas. This property could be utilized to replace this lost resource, and grazing rights could be leased to generate income for the indefinite expenses of ground and surface water.
2. In addition to replacing this injured hunting/trapping resource, This land is a prime replacement from a hunting perspective. This property has been utilized in the past to generate revenue as an outfitting business. As such, it would provide replacement recreation and revenue stream at the same time. A pre-determined number of leases could be offered for each season, and those funds redirected for property maintenance and on-going water treatment expenditures.
3. In support of water treatment, this property could be used as a long term revenue resource to support water treatment in 4 long term renewable and sustainable ways.
    a. Grazing leases as mentioned in number 1.
    b. Hunting/trapping leases as mentioned in number 2.
    c. Camping rentals. There are one or two existing cabins that could be rented out on short term basis, much like the forest service rents out their cabins. Camping spots for tent trailer camping could also be rented out.
    d. Timber harvest. These properties are heavily timbered predominantly with Douglas Fir, a commonly used species in building materials. Its forests have also spread greatly in the last 50 years encroaching on traditionally sagebrush grass lands. Sales could be made at sustainable rates and intervals to provide revenue, protect grasslands, and reduce fire severity, which also further protects the watershed and fishery.

2. Project Location:

The project is located approximately between 1.5 and 4 miles north of the town of Ramsay. It appears to be in the Priority area 4 of the terrestrial map, and priority 1 of the aquatics map, since it feeds directly into Browns Gulch Creek. The property is located on the South end of the Boulder Mountains. The recently acquired Spotted Dog Ranch was located on the North End of this same range.

3. Project Description:

Acquire 2,150 acres north of Ramsay. Ideally this would be accomplished with cooperation from multiple entities and multiple funding sources (See general cost section below). Improve and/or install perimeter fencing on the property. Improve any viable section fences. Establish a management plan to achieve all the goals outlined in section 1, Project Purpose and Benefits. Once improvements have been made, and management plans have been agreed to, transfer ownership to the county of Butte-Silver Bow for management in perpetuity.

This property is listed through Amerimont Realty in Manhattan, Montana.

4. Project Schedule:

Several months for potential various agencies to negotiate with real-estate agent and settle on a price, revenue sources, etc. Twelve months to develop a management plan that all parties agree to and that meets the goals outlined in section 1. Simultaneously 6 months to complete property improvements. Three months to transfer property as one parcel to the county.

A rough estimate of a schedule would be 1.5 to 2 years.

5. General Cost Information:

Current asking price for the 1,250 acres is $5,912,500. Resources from the 2012 Process Plan can be reduced in the following ways.

- Negotiate the purchase price down.
- Grants received from the likes of the Elk Foundation and the Nature Conservancy.
- Share the cost with the Butte Area One funding sources.

Other Costs:

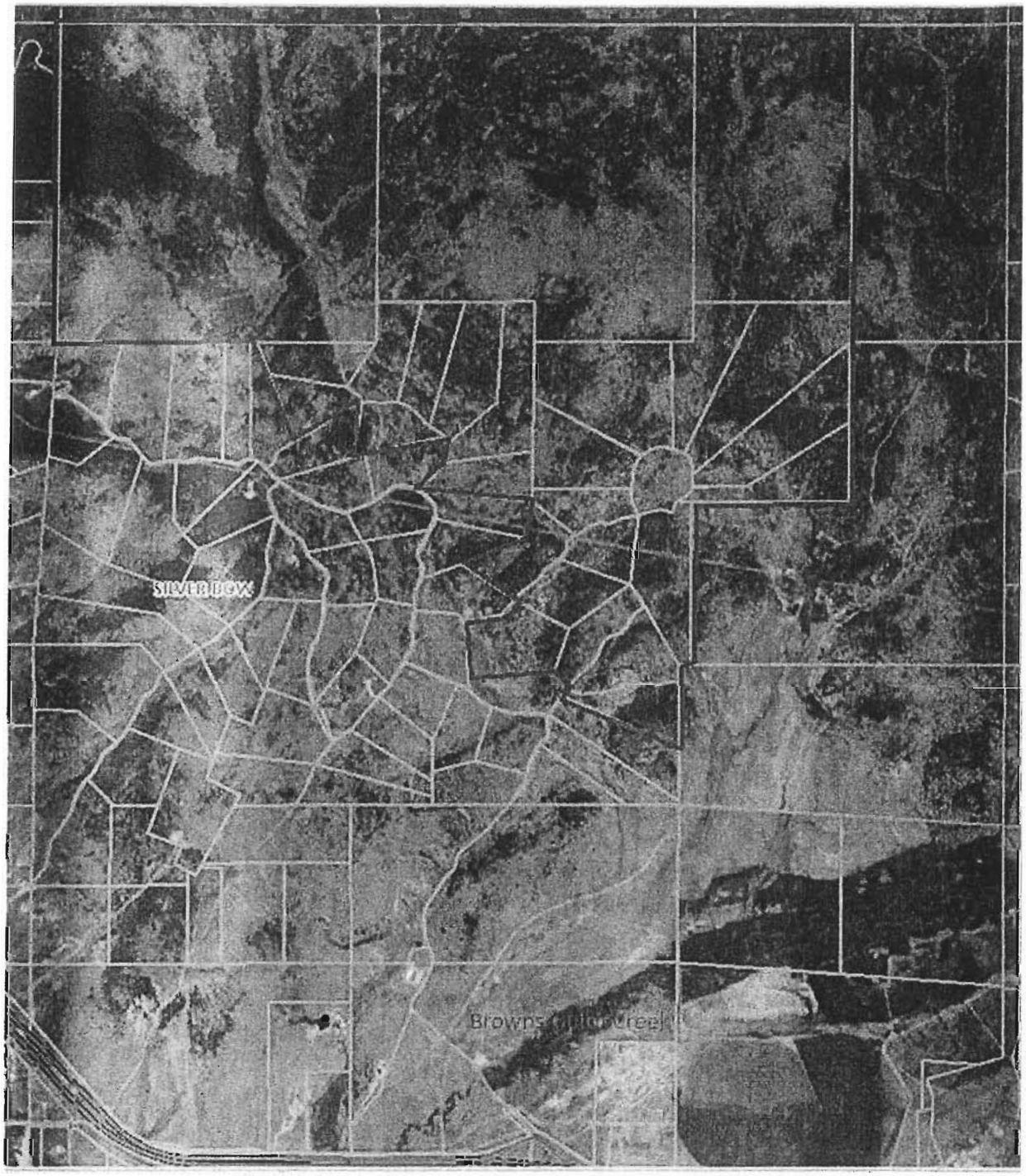
- Improvements – Unknown
- Development of management plan – unknown
- Survey? – unknown
- Purchase costs – unknown.

6. Closing:

Please understand when reviewing this, that there was little time to study the process plan in depth. A simple review of the submittal form and guidance on submittal was performed for direction. Time and resources were limited to put together in depth project plans, schedules and budgets. The idea is provided with good intentions and the hope that it will be beneficial and worthwhile. I was a bit confused about the Eligible Project Locations requirements. It seems as though the terrestrial priority areas are nowhere near the damaged areas and in locations already protected and not in need of protection or restoration.

Thank you for the opportunity for the public to provide input and ideas.

Kind Regards,
Mike Flanick


SILVERBOX

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Pony Express Trail Bridge

1. Project Purpose and Benefits:

The projects purpose is to improve the fishery removing small clogged culverts on Browns Gulch Creek and replacing them with a bridge. There are three culverts at Pony Express Trail with only one containing water much of the year. Replacing these with a bridge will improve fish migration and recruitment from the Browns Gulch tributary into the newly reclaimed Silver Bow Creek..

2. Project Location:

The project is located at the intersection of Browns Gulch Creek and Pony Express Trail about 1 mile north of the town of Ramsay. It appears to be in the Priority area 4 of the terrestrial map, and priority 1 of the aquatics map, since it is located on Browns Gulch Creek. See picture below.

3. Project Description:

Remove three smaller culverts, and replace with a bridge to provide a more natural passage and stream bed for the fish.

4. Project Schedule:

- Engineering and design ~ 3 months.
- Bidding ~ 2 months.
- Construction ~ 2 months.
- Total ~ 7 months.

5. General Cost Information: Unknown

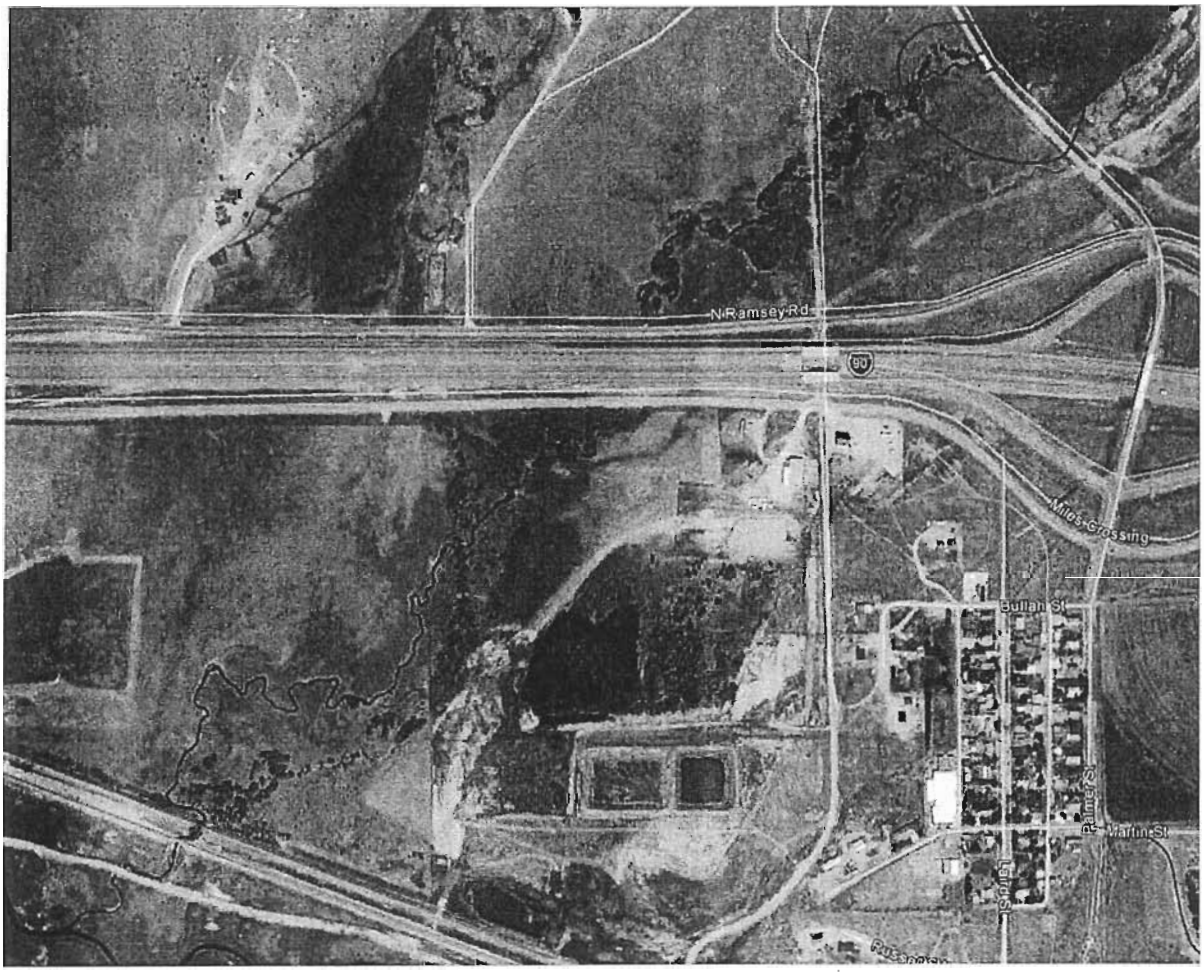
Time and resources to put together in depth project designs and budgets were not available at the time of project submittal. Those details would have to be worked out if this was thought to be a worthwhile project. Since this is so close to Butte Area One, it was also submitted as a project idea for that funding source. Perhaps the two funding sources could share in this project to reduce the impact on each funding source since it appears to qualify under both.

6. Closing:

Please understand when reviewing this, that there was little time to study the process plan in depth. A simple review of the submittal form and guidance on submittal was performed for direction. Time and resources were limited to put together in depth project plans, schedules and budgets. The idea is provided with good intentions and the hope that it will be beneficial and worthwhile.

Thank you for the opportunity for the public to provide input and ideas.

Kind Regards,
Mike Flanick



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Little Blackfoot River Riparian Protection and Enhancement

Submitted by:
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David Genter
Conservation Director
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The Little Blackfoot River and all of its tributaries are classified B-1 by the State of Montana, meaning that water quality is to be maintained as suitable for all of the following uses: drinking and food processing purposes, after conventional treatment; bathing, swimming and recreation; growth and propagation of trout and associated aquatic life; waterfowl and furbearers; as well as for agricultural and industrial water supply (Montana DEQ). Agriculture, fisheries and recreation dominate water uses of the Little Blackfoot drainage.

According to the 2004 303(d) List, the Little Blackfoot River from Dog Creek to the mouth is "not supporting" drinking water, "partially supporting" aquatic life, trout fisheries, and contact recreation, and "fully supporting" agricultural and industrial uses. The likely reasons for impairment in this stretch of the Little Blackfoot River include: sediment, riparian degradation, other habitat alterations, dewatering/flow alteration, metals, and nutrients. Thermal impacts are associated with stream dewatering, channel modifications, and loss of riparian vegetation (shade factor).

Purpose: This project provides for permanent protection of stream banks, riparian vegetation and fisheries habitat as well as mitigate for excessive erosion and sedimentation of the Little Blackfoot River and select tributaries. The *Prioritization of Tributaries in the Upper Clark Fork River Basin for Fishery Enhancement* has identified the lower Little Blackfoot River as a Priority 1 reach; while above Elliston and the principal tributaries, it has been classified as a Priority 2 reach. The primary purpose and objectives of this proposal is to enhance overall river health and function through improved streamside and riparian habitats. In addition, many upland terrestrial species are riparian-dependent for part or all of their lives. The *Upper Clark Fork River Basin Terrestrial Wildlife Resource Prioritization* identified adjacent upland areas to the Little Blackfoot River as Priority 1 and Priority 2 for terrestrial wildlife. The surrounding terrestrial habitats were ranked at the highest priority for every class of evaluation including elk winter range, species richness, connectivity with watersheds and in ranking for relation to size of native habitat patches surrounding the Little Blackfoot River.

Benefits: The project will enhance riparian and aquatic health, contribute to improved water quality and thermal stability, restore complex cottonwood forest communities – benefiting the many wildlife species that are riparian dependent. The project will provide benefits to fisheries, aquatic organisms and many species of terrestrial wildlife in the immediate and downstream areas. Revitalized and mature riparian areas provide a more inviting and enjoyable public experience as well as a healthier and more biologically diverse watershed.

Project Location: The project is focused on private ranch lands along the Little Blackfoot River and its lower tributaries, from the crossing at Highway 12 east of Elliston to the mouth at the Clark Fork River at Garrison Junction. Principal tributaries include Spotted Dog Creek, Snowshoe Creek, and Dog Creek. Project focus is on the verdant riparian corridor and riverine environment that threads the valley. The lower Little Blackfoot River is largely undeveloped and consists of cattle ranches with irrigated hay meadows along the river. Figure 1 shows a satellite view of the narrow but highly significant riparian area and adjacent irrigated fields.

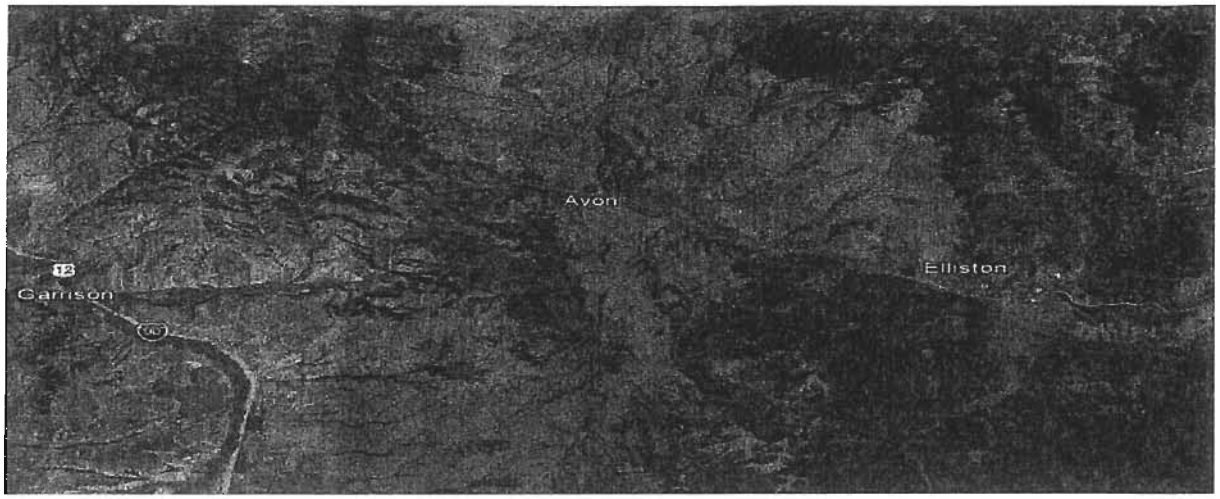

Figure 1. Satellite view of the lower Little Blackfoot River, riparian areas and surrounding uplands.

Project Description: The Little Blackfoot River is a principal tributary to the upper Clark Fork River, providing significant flows and spawning habitat that greatly enhances the fisheries of the upper Clark Fork River. Fisheries studies over the past 3 years by MDFWP show extensive cutthroat and brown trout movements between the Little Blackfoot River (LBF) and its tributaries and the Clark Fork River. The LBF below Elliston was designated a NRD Priority 1 stream, while the upper LBF and 3 primary tributaries are listed as Priority 2 streams. Most of the westslope cutthroat trout in the LBF are genetically pure-strain. Brown trout are prevalent in the lower LBF, along with a mix of other coldwater game fish throughout the watershed including rainbow trout, brook trout and mountain whitefish. The LBF is a popular destination for wade fishermen who enjoy this unique wild trout fishery.

The Little Blackfoot River and its resident fishery are degraded by two persistent challenges: dewatering, particularly during low flow months and years; and habitat alteration, especially in bank erosion and riparian degradation. Cattle grazing in riparian areas for much of the year is a contributing factor to bank destabilization, denuded riparian areas and excessive nitrification to the stream. Extensive flood irrigation on adjacent hay meadows and the erosive flows of returning flood water also degrade and impact the riverine and riparian habitat.

Component Number 1 – Riparian Fencing and Streambank Stabilization: Streamside areas would be identified in coordination with TU, FWP staff and landowners, with discussions on specific objectives of the project, including benefits or impacts to the property and agricultural operations in addition to improvements to the river and for the public. Fencing key areas for habitat protection would be the primary objective. No major stream alterations are planned, although smaller stream and bank stabilization projects may be undertaken on an as-need basis. Streambank stabilization would be implemented through willow planting, placement of large woody debris and assessing any erosive factors, such as return irrigation water to the river. We anticipate significant volunteer participation in these efforts.

Component Number 2 – Implement a Riparian Conservation Easement Program: Targeting areas for fencing of riparian areas to exclude cattle would be accompanied, where possible, by negotiations and implementation of permanent conservation easements along the riparian areas. Landowners willing and interested in working on permanent solutions to riparian protection, including conservation easements, would receive priority focus and funding. Other private and agency funding sources, Congressional appropriations and landowner donations of easements would be used as appropriate, especially where it could expand upon core riparian projects with the addition of upland areas. This collateral benefit would expand the effectiveness of the riparian protection efforts, provide long-term protection to the watershed from development, and leverage project funding, including match requirements for state and federal funding. Efforts to acquire public access would be considered, where feasible, and when consistent with resource protection.

TU has a long standing interest and investment in the Little Blackfoot River and its tributaries. It is one of our Chapter's principal waters for conservation and fisheries enhancement. We have previously partnered with NRDP to assess the watershed's hydrological character, as reported in the *Flow Study on the Little Blackfoot River*. Through that project, significant landowner contacts and relationships were established, along with a more intimate understanding of the challenges and opportunities that exist in conserving the river.

Trout Unlimited has a significant record of conservation initiatives and watershed restoration efforts. TU has worked with other land conservation partners including Fish, Wildlife and Parks, the Conservation Fund, Montana Land Reliance, the Trust for Public Land and others. Funding sources for leveraging the NRDP funds for land conservation are many and varied, including: Land and Water Conservation Fund, Farm and Ranch Lands Protection Program, Wetlands Reserve Program, and several effective conservation programs through the Natural Resource Conservation Service: the Wildlife Habitat Incentives Program, Agricultural Water Enhancement Program, and the Conservation Stewardship Program, among others. More local funding partners that TU has worked with include the Future Fisheries Program, Habitat Montana, the Montana Fish and Wildlife Trust.

Project Schedule:

Objectives	Timeframe	Principals
Identify priority parcels and participating landowners.	May 2013 - September 2016	TU, Landowners, FWP
Negotiations on fencing projects, deeds of conservation easements, public access.	July 2013 - September 2017	TU, Landowners, FWP, NGO easement holder
Identify and secure additional funding as appropriate.	July 2013 - October 2017	TU, Conservation Partners, Private Donors, State & Federal Agencies
Complete fencing; execute agreements; complete baseline reports, appraisals; file easements; develop monitoring protocol.	June 2014 - October 2018	TU, Contractors, Landowner, NGO
Plan and complete streambank revegetation and stabilization work	June 2014 - September 2018	TU, Landowner

General Cost Information: The following table presents the major expense categories and anticipated amounts for each, along with match contributions and request for NRDP funds. The match contributions for salaries, expenses, travel and contracted services will be covered by Trout Unlimited, largely through the PB-MR Chapter funds and volunteer participation. The purchased easements match is for available funding sources that have yet to be committed to the project. We anticipate that NRDP funds committed to this easement program will provide a catalyst and attractive match for other private, foundation, and federal and state funding that would be provided for areas outside of the targeted riparian habitat for conservation easements. We further anticipate that the program could be enhanced with other farm bill funding to cover in-kind costs for implementation. TU will seek these funds when we have an approved project from NRDP and negotiated legal agreements with individual landowners.

Category and Items	Unit	Cost per	Total Cost	Match	NRDP Funds
Salaries & Expenses					
Survey and site evaluations	120 hr	$45/hr	$ 5,400	$ 1,800	$ 3,600
Landowner Negotiations	280 hr	$45/hr	$ 12,600	$ 2,000	$ 10,600
Draft Easements, Legal Docs	180 hr	$160/hr	$ 28,800		$ 28,800
Project Management	320 hr	$45/hr	$ 14,400	$ 4,000	$ 10,400
Contracted Services					
Fencing	42 miles	$6,750/mi	$283,500		$283,500
Streamside Planting/Rehab	260 hrs	$45/hr	$ 11,700	$ 11,700	
Land-Easement Appraisals	5	$9,000/ea	$ 45,000		$ 45,000
Survey and Title work	5	$2,500/ea	$ 12,500		$ 12,500
Purchased Easements*					
Agricultural Easements	300 acres	$ 240/ac	$ 72,000		$ 72,000
Public Access Easements	125 acres	$ 320/ac	$ 40,000		$ 40,000
Upland Easements	200 acres	$ 450/ac	$ 90,000	$ 90,000	
Travel, Communication, other					
Mileage	4,800 mi	$0.56/mi	$ 2,688	$ 560	$ 2,128
Filing Fees	900 pages	$6.50/pg	$ 5,850		$ 5,850
Total			**$ 624,438**	**$110,060**	**$514,378**

* -- FMV for purchased easements are approximate estimates. All final figures will be based on state-reviewed and approved appraisal process and any negotiated bargain sales through landowners.

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Restoration Concept Abstract

Project Title: Little Blackfoot Streamflow Restoration Project

Organization and Contact:

Trout Unlimited's Montana Water Project

Stan Bradshaw
PO Box 412
Helena, MT 596214
Telephone: 406-449-9922
Email; sbradshaw@tu.org.

Project Purpose and Benefits:

Purpose: The purpose of this project is to improve habitat for fish and aquatic life on the Little Blackfoot River and its tributaries by addressing low stream flows where flow depletions are caused by irrigation. Low stream flows exacerbate water quality problems including high water temperatures, low dissolved oxygen, and nutrient concentrations. Low stream flows also hinder fisheries restoration by reducing habitat suitability and survival rates. **The Prioritization of Areas in the Upper Clark Fork for Fishery Enhancement** describes the lower Little Blackfoot as a Priority 1 reach and the upper Little Blackfoot as a Priority 2 reach. In addition, the tributaries to the Little Blackfoot—Dog Creek, Snowshoe Creek, and Spotted Dog Creek—are all listed priority 2 streams and high in fishery Goals 1 and 2.

A 2008 report, **Flow Study on the Little Blackfoot,** identified the connection between late season low flows and irrigation demand on the mainstem Little Blackfoot. That report, however, did not make specific flow target recommendations for the Little Blackfoot.

In addition, the **NRDP Process Plan** for both the upper and lower Little Blackfoot describes flow augmentation as one of the "encouraged restoration activities." On the key tributaries, flow augmentation is given the first priority as an encouraged restoration activity. The process plan also described flow augmentation through a variety of water rights transactional tools for several tributaries to the Little Blackfoot. This project will: analyze existing streamflow data; identify minimum and ideal stream flows necessary to fully restore fisheries and buffer water quality issues; seek out partnerships and opportunities to dedicate existing water rights to instream flow through purchase, lease, or infrastructure upgrades.

Benefits: The benefits of this project include improved streamflows in the Little Blackfoot River and key tributaries, improved water quality, improved fish habitat resulting in

restoration of a recreational native and wild trout fishery, and building community partnerships between agricultural water users and the area fishing and recreational community.

Project location: The project location encompasses the mainstem Little Blackfoot River and several key tributaries, including Dog Creek, Spotted Dog Creek, and Snowshoe Creek. The mainstem Little Blackfoot River runs for approximately 48 miles from the Boulder Mountains to its confluence with the Clark Fork River at Garrison. The entire watershed comprises approximately 265,000 acres.

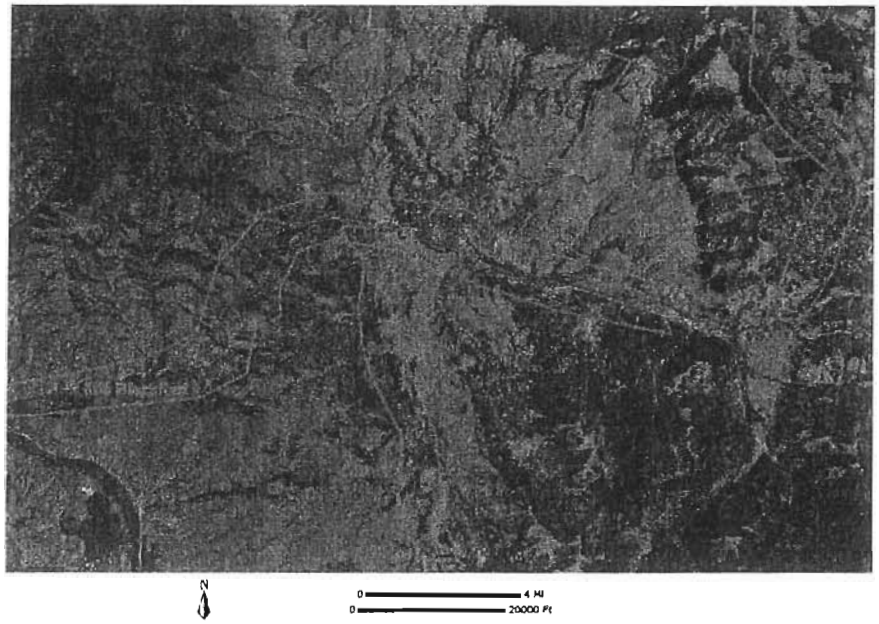

Figure 1. Map of Little Blackfoot Project Area, extending from the confluence with Dog Creek to the mouth and including Dog Creek, Snowshoe Creek and Spotted Dog Creek.

Project description:

The purpose of this project is to improve recruitment of wild and native fish in the mainstem Little Blackfoot River and into the upper Clark Fork River by improving flows on both the Little Blackfoot and in key tributaries, to improve temperatures in the little Blackfoot and in key tributaries.

Goal: The goal of this project is to improve the wild and native components of the Little Blackfoot watershed fishery and the upper Clark Fork mainstem fishery by identifying **and** implementing strategically-located flow enhancement projects with a broad cross-section of irrigators in the watershed.

Objectives: 1. Identify reaches in the Little Blackfoot and its major tributaries Spotted Dog Creek, Dog Creek, and Snowshoe Creek by gathering existing flow and water quality data, identifying and filling informational gaps, and developing minimum flow targets to improve water quality and fish habitat in key reaches.

2. Survey existing water rights in the basin to identify potential key partners and opportunities for instream flow restoration, and initiate contact with potential partners to pursue specific projects.

3. Identify a prioritized set of water right transactions that achieve flow targets for key reaches. An important part of this objective will be to devise strategies that enable irrigators to continue operations while reducing flow depletions in key reaches and tributaries. These strategies will include both infrastructure upgrades and split-season transactions in which irrigation continues for part of the season and then is reduced at either a flow or date trigger.

4. Build a funding portfolio and implement water leases, water right acquisitions or water delivery system efficiency improvements with partners and DNRC.

5. Design and implement a water monitoring program to document operations and successes of water transactions.

Project Schedule:

Objective	**Timeline**
Water Balance and Flow Targets Study	April 2014 through June 2015
Water Rights Survey	July 2014 through December 2014
Negotiation of transactions	January 2014 through June 2015
Develop Transaction Proposals	July 2015 through June 2016
Contracts and Change Authorization Process	January 2015 through January 2018

General Cost Information:

These cost estimates are based on a range of cost of various projects within the state. Please be aware that the estimates provided are coarse figures that fall within broad ranges of costs dependent on various site-specific circumstances. We provide these estimates in good faith, but expect that more precise estimates would be presented in more detailed project proposals.

ITEM:	UNIT:	QUANTITY:	UNIT COST:	TOTAL COST:	MATCH:	NRDP:
Water Acquisition Costs (2 to 4 projects):	ac-ft	6830	$2.00-$25.00	$13,660 to $170,750	$2732 to $34,150	$10,928 to 136,600
Water Transaction Costs (Water rights analysis, project development):	Hours (TU salaries)	1200	$50	$60,000	$15000	$45,000
Travel:	miles	900	$0.555	$500	$500	0
Supplies and Equipment (flow monitoring and survey equipment):	Varied	Varied	$3300	$3300	$660	$2640
Contracted services: Water Balance Study, Minimum flow studies, and GIS Services	Tributary or reach	4	$15000	$60,000	$30,000	$30,000
TOTALS:				$137,460 to $294,550	$48,892 to $80,310	$126,810 to $214,240

Potential sources of matching funds include MT FWP Future Fisheries Program, NFWF Columbia Basin Water Transfer Program, and other state and federal sources. While we have contacted FWP and CBWTP, match remains speculative and unsecured at this time.

Water transaction costs include salaries for TU staff to coordinate the project, including procuring matching funding, conducting water rights analysis, meeting and negotiating with willing entities to contract, purchase or lease water rights, shepherding water transactions through the DNRC administrative processes, and procuring contracting hydrologists and engineers. Water Acquisition costs include the actual costs of payments to willing water right holders who agree to transfer all or a portion of their water rights to instream flow for 10 year periods- the typical instream lease allowed by law – or permanent acquisition by FWP. In Montana, acquisition costs generally range from $2 to $25 per ac-ft depending on whether the transaction is for short-term (10 year) leases or permanent purchases. We applied the maximum typical cost ($25 per ac-ft) due to uncertainties at this conceptual stage, but costs of leases or acquisitions may be lower.

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Montana Natural Resource Damage Program
Restoration Concept Abstract

Cottonwood Creek – Stream Bank Enhancement Project

Submitted by: City of Deer Lodge
300 Main Street
Deer Lodge, MT 59722
(406) 846 – 2238
dlcity@bresnan.net

June 15, 2012

Montana Natural Resource Damage Program
Restoration Concept Abstract

Deer Lodge Cottonwood Creek Stream Bank Enhancement Project

Project Purpose and Benefits:

The project purpose is to construct improvements on properties acquired by the City of Deer Lodge and Powell County by planting trees and other vegetation along the banks of Cottonwood Creek in order to help decrease stream temperature and sedimentation of both Cottonwood Creek and the Clark Fork River. Completed improvements would also minimize stream bank erosion along the acquired properties providing a buffer for surrounding properties from Cottonwood Creek flood events.

In addition to an improved riparian and fisheries habitat, the anticipated improvements along Cottonwood Creek will create areas that are seen as an enhancement to the community rather that a detriment.

Project Location:

Stream bank enhancements would take place on eleven properties located within City limits along Cottonwood Creek. Six of the properties are owned by Powell County (see figure below) and five new properties are being acquired by the City of Deer Lodge.

Aerial photograph showing the properties owned by Powell County along Cottonwood Creek, Deer Lodge, MT

Project Description:

The project would take the recommendations from the Cottonwood Creek Master Plan – Urban Channel regarding the enhancement of City and County owned properties along Cottonwood Creek and complete the engineering design, bidding and construction of improvements. The improvements on the City and County owned properties would incorporate channel and stream bank modification, grading of properties to improve bank stabilization to prevent further erosion, and improving aquatic and terrestrial habitat by planting trees to provide cover along the bank. The project would make improvements on eleven properties, all located within the City limits and adjacent to the urban channel of Cottonwood Creek.

The City of Deer Lodge would act as the lead agency in preparation of design plans and procuring the contractor to complete the work. Close coordination would occur between the City and Powell County since six of the properties proposed to be improved are owned by Powell County. The recently formed Cottonwood Creek Advisory Committee involves members of the City and County who meet on a regular basis. The Committee has worked together over the past four months to coordinate the preparation and submittal of their respective abstracts to NRDP. This is a significant accomplishment which will facilitate partnering on the future management of Cottonwood Creek.

Partners:

- Powell County
- Watershed Restoration Coalition
- Upper Clark Fork Coalition
- Montana Fish Wildlife and Park
- Montana Disaster and Emergency Services
- United States Army Corp of Engineers

Project Schedule:

1.	Secure funding through NRDP Process	Spring 2013
2.	(Complete Master Plan (Separate NRDP Abstract)	Spring 2013–Spring 2014)
3.	Complete Engineering/Landscape Design	Spring- Fall 2014
4.	Complete Permitting	Winter 2015
5.	Procure Contractor	Winter 2015
6.	Complete Construction	Spring 2015-Fall 2015

General Cost Information:

The following table summarizes the total project cost for the Cottonwood Creek Stream bank Enhancement Project.

TOTAL ESTIMATED PROJECT COST

Categories:	**Estimated Costs**
Salaries/Benefits	$10,000
Supplies and Materials	$1,000
Travel and Communication	$1,000
Equipment	N/A
Contracted Services	
Engineering/Landscape Design	$90,000
Construction Engineering Services	$45,000
Permitting	$30,000
Construction	$750,000
Contingency (~10%)	$92,000
Total Costs	$1,019,000

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Montana Natural Resource Damage Program
Restoration Concept Abstract

Cottonwood Creek Master Plan – Urban Channel

Submitted by: City of Deer Lodge
300 Main Street
Deer Lodge, MT 59722
(406) 846 – 2238
dlcity@bresnan.net

June 15, 2012

Montana Natural Resource Damage Program
Restoration Concept Abstract

Deer Lodge Cottonwood Creek Project

Project Purpose and Benefits:

In the spring of 2011, Cottonwood Creek experienced a near 100-year flood event that without quick actions by City and Powell County Staff may have resulted in significant damage occurring to the residents and properties of Deer Lodge than what occurred along the Cottonwood Creek corridor. Damage was sustained to a few homes that were flooded and the cleanup of emergency berms and flood debris was significant, but overall from an event that size, damage was minimal. On June 17, 2011, the President of the United States issued a disaster declaration due to the flooding that was experienced across the State. Federal Emergency Management Agency (FEMA) personnel came to Deer Lodge and performed complete damage assessments for the flooding on Cottonwood Creek. The City of Deer Lodge received some funds to cover the costs for cleanup and repair to the waterline on Center Street that was washed out. The City is also in the process of purchasing five properties along Cottonwood Creek that were damaged by the flooding using FEMA funds.

Cottonwood Creek channels have changed because of the 2011 flood and the City feels it is now time to evaluate the current condition of the urban channel and begin planning for future urban improvements to minimize financial impacts from future flood events from Cottonwood Creek.

Benefits of the Master Plan include (1) providing a detailed urban channel improvement plan with funding strategies for the City to implement stream bank and channel modifications and aquatic and terrestrial improvements (2) completing a Letter of Map Revision (LOMR) to revise the FEMA Floodplain Map based on channel changes and improvements, and (3) amending the City's growth policy to protect Cottonwood Creek from future encroachment and development and begin laying the groundwork for enhancing the urban corridor of Cottonwood Creek with trails, walking paths and other amenities.

The Master Plan document would guide the City in making informed decisions on improvements in the coming years. It would also start the City down the path to begin actively managing the urban Cottonwood Creek corridor so that the Creek enhances the community of Deer Lodge and becomes an amenity to the public.

Project Location:

The Cottonwood Creek Master Plan – Urban Channel will consist of that portion of the Cottonwood Creek channel from the Interstate-90 culverts to the confluence with the Clark Fork River.

Aerial photograph showing the urban channel of Cottonwood Creek, Deer Lodge, MT

Project Description:

The City of Deer Lodge would act as the lead agency in preparation of the Cottonwood Creek Master Plan – Urban Channel. Close coordination would occur between the City of Deer Lodge and Powell County since the County ultimately manages the overall watershed that encompasses Cottonwood Creek. The County is actively pursuing funding for a project that would create a flood storage pond upstream of the Interstate 90 culverts that would capture, store and slowly release flood water from events greater than the 50-year flood and up to the 100-year flood event.

Attenuation of flows or improvements to water quality that occur outside the City limits will have a direct impact on the performance of the urban channel. Therefore, close coordination between these two entities is critical for project success. The recently formed Cottonwood Creek Advisory Committee involves members of the City and County who meet on a regular basis. The Committee has worked together over the past four months to coordinate the preparation and submittal of their respective abstracts to NRDP. This is a significant accomplishment which will facilitate partnering on the future management of Cottonwood Creek.

Deer Lodge's 2008 Growth Policy Plan contains the following Natural Resource Objective: *"The City of Deer Lodge will work with local Upper Clark Fork River basin entities targeting conservation work or lead requests for grant funding that improve fish habitat and passage on Cottonwood Creek and other streams within the donut planning area and encourage native vegetation buffers near waterways."*

It is the City's intent to pursue the preparation of a Cottonwood Creek Master Plan to evaluate the condition and capacity of the existing urban channel from the I-90 culverts to the Clark Fork River. The Master Plan would develop a hydraulic model to evaluate the current condition of Cottonwood Creek's urban channel based on the changes that occurred from the 2011 flood. The Master Plan would evaluate alternatives, develop costs, and recommend improvements to the floodplain and channel. It would analyze impacts of different alternatives for City and County acquired properties on channel flow characteristics and aquatic and terrestrial resources. In addition, the Master Plan would include evaluation of impacts of proposed flow attenuation, and evaluation of a conceptual channel and bridge cross section for passage of the 100-year flood. One of the key outcomes from the Master Plan would be the development of recommended conceptual plans for the City and County acquired properties adjacent to Cottonwood Creek.

Potential recommendations could include additional property acquisition and constructing a flood diversion channel within the urban corridor. The construction of the recommended improvements for the existing acquired properties is the subject of a separately submitted abstract to the Natural Resource Damage Program.

Partners:

- Powell County
- Watershed Restoration Coalition
- Upper Clark Fork Coalition
- Montana Fish Wildlife and Park
- Montana Disaster and Emergency Services
- United States Army Corp of Engineers

Project Schedule:

1. Secure funding through NRDP Process	Spring 2013
2. Complete Draft Master Plan	Spring- Fall 2013
3. Public Meetings	Fall 2013
4. Finalize Master Pan	Winter 2013/2014
5. Prepare and Submit CLOMR/LOMR	Spring 2014-Fall 2014
6. Amend Growth Policy	Spring 2014

General Cost Information:

The following table summarizes the total project cost for the Cottonwood Creek Master Plan – Urban Channel.

TOTAL ESTIMATED PROJECT COST

Categories:	**Estimated Costs**
Salaries/Benefits	$5,000
Supplies and Materials	$1,000
Travel and Communication	$1,000
Equipment	N/A
Contracted Services	
Master Plan	$100,000
Preparation of CLOMR/LOMR	$50,000
Amending the Growth Policy	$25,000
Contingency (~10%)	$18,000
Total Costs	$200,000

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MontanaTech
THE UNIVERSITY OF MONTANA
Department of Biological Sciences

15 June 2012

To: Natural Resource Damage Program

Attached find a summary proposal for incorporation into the 2012 Aquatic and Terrestrial Restoration Plans.

This proposal is for continuation and expansion of the project which was funded in 2008, "Restoring Native Plant Diversity in the Upper Clark Fork Basin." This project has been successful as a demonstration of establishing dispersal islands as a technique for restoring native plant communities. MT Tech would like to expand from demonstration to application and participate in restoration projects along the entire corridor.

At this time we want to thank you for the opportunity to participate in upland restoration in developing this technique of using local native seeds to establish dispersal islands. We are well equipped to continue this project and expand it to become a permanent program eventually supported by MT Tech.

Kriss Douglass, Research Professor

782-9060, 490-0281, samjd@montana.com

MT Tech

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Butte, Mt 59701

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406-496-4450 a Fax: 406-496-4135

Continuation: "Restoring Native Plant Diversity in the upper Clark Fork River Basin Project"; Proposal Summary

Submitted by Kriss Douglass, Research Professor, Mt Tech

Butte MT; 782-9060 (490-0281); samjd@montana.com

15 June 2012

WHY: This project is being proposed because the original project funded by NRDP produced results that are very positive as a demonstration project. At this time, with continued funding, we will:

1) Increase the size of the forb orchard which produces seeds of local plants,
2) Increase the number of shrubs of local plants,
3) Coordinate providing a variety of diverse native species for plant restoration projects along the Silver bow Creek/Clark fork river corridor.
4) Produce dispersal islands that can, over time, restore native plant communities.

This plant material will be available for reconstructing and restoring native plant communities along the entire mining disturbed Silver Bow Creek-Upper Clark Fork River Drainage. We cannot supply seeds and plants for any entire plant community, but the placement of 'dispersal islands' in restoration project areas will increase the rate of establishing native plants.

GOAL: To provide local native plants—seeds and container plants-- for restoration projects along the Silver Bow Creek/Upper Clark Fork River corridor.

OBJECTIVE: To hasten the rate of vegetation restoration and vegetation stabilization which will benefit wildlife, protect fisheries, and provide natural setting for people enjoying the outdoors.

LOCATION: Mt Tech Native Plant Propagation Center. Mt Tech Greenhouse (funded by Rural Indemnity Trust Fund) and the forb orchard established with NRDP funding.

DESCRIPTION: We will increase the size of the orchard and number of species producing seeds from forbs and shrubs; we will increase the size of the "nursery" where shrubs are grown for eventual transplanting to dispersal islands.

Collect native seeds as they ripen; we will collect seeds for particular projects as they are requested for riparian and upland habitats. We will clean the seeds and store, and stratify them appropriately. The seeds can be planted and delivered as tubelings, or potted plants; or planted in forb sods to be planted as a custom plant assemblage as well as directly sowed.

Mt Tech will be the lead entity with Butte Silver Bow as active partner. Over the past four years we have developed the locations, routines and techniques for seed collection, cleaning, storing and stratifying—stratification both in a continuous temperature environmental chamber and outside in fluctuating temperatures. We have established a highly productive orchard producing seeds from 60+

species of local native plants. We have established many dispersal islands which have survived up to three winters.

SCHEDULE: We have seed now stored; the forb and shrub orchard can be expanded by about 4 times early next spring. We have nearly 10,000 potted plants some of which will be planted in the nursery to become stock for later transplanting.

COST: Approx $250,000.00 per year for 10 years: Supervisor salary and one full-time technician salary, 2 part-time student salaries ($200,000.00 per year for salries). Supplies and material, equipment, travel = $50,000.00.

I have submitted the same proposal to the Butte Natural Resource Council for funding. I expect them to fund this project at some level and so I am hoping that the funding sources will cooperatively fund the entire project.

Mt Tech Vice Chancellor Dr. Doug Abbott and Biology Dept. Chair Dr. Amy Kuenzi have agreed to partially fund or eventually fund the position of Supervisor as a Faculty position Restoration Ecologist to be in cooperation with the new Restoration Certification Program.

MATCH: Mt Tech provides costs for running the greenhouse, office space, telephone, computers, lab space, and orchard space. Rick and Kriss Douglass provide professional, management and technical expertise time-match. BSB has provided soil for increasing the forb orchard and nursery area.

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THE CONFLUENCE PROJECT AT ROCK CREEK

Five Valleys Land Trust

Submitted By:
Five Valleys Land Trust
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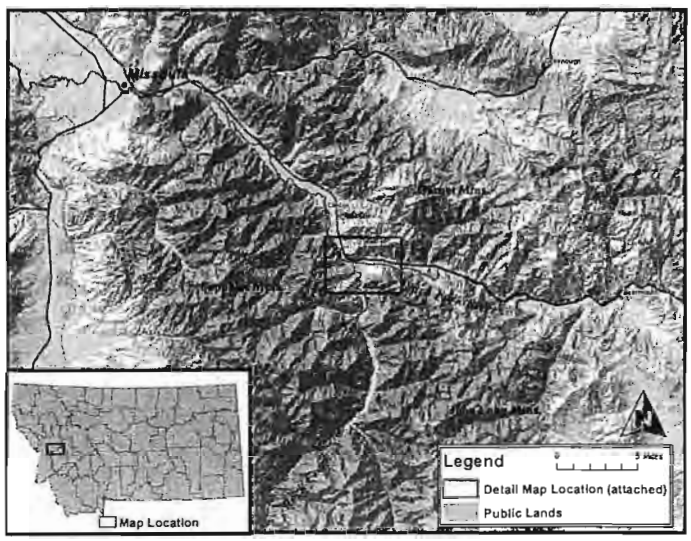
Project Purpose and Benefits:
The purpose of this abstract is to propose $400,000 in NRDP funding for acquisition of the 201-acre LEMB Co, LLC property at the confluence of Rock Creek and the Upper Clark Fork River by Five Valleys Land Trust (Five Valleys). The property includes riparian habitat along both rivers and upland integral to the wildlife value of the riparian corridors and adjacent protected public and private land; it is also the site of a proposed 37-lot subdivision. The primary goal of the proposed acquisition is to protect for future generations the wild character and ecological function of high-priority riparian and associated natural habitats at this iconic location in the Upper Clark Fork River Basin (UCFRB).

Potential project benefits include:

- Habitat improvement and permanent protection for 25 acres of riparian habitat (NRDP Terrestrial Restoration Priority 1) along nearly 1.5 miles of the Upper Clark Fork River below Deer Lodge (a NRDP Priority 2 stream reach).
- Habitat improvement and permanent protection for upland habitats critical for riparian function, including 50 non-riparian acres within the 100-year Clark Fork River floodplain, and over 125 acres of adjacent grassland and conifer forest habitats that buffer and support riparian corridors.

Project Location:
Refer to regional map (at right) and property aerial photo (attached). The Confluence Project area is located southeast of Clinton, at the point where the Sapphire, Garnet, and John Long Mountains come together. The LEMB Co. property is just east of Rock Creek and south of the Clark Fork River, and includes frontage to both.



Project Description:
The LEMB Co property includes extensive cottonwood galleries and mature ponderosa savannah forest within the intact Clark Fork River floodplain, offering habitat for a variety of raptors, passerine

birds, wild turkey and ruffed grouse. Local and landscape-level habitat connectivity afforded by the property serves a variety of species including elk, mule deer, white-tailed deer, black and grizzly bear, moose, bighorn sheep, and many non-game species which utilize the property's riparian corridors and upland buffers to move between large blocks of protected habitat. Rock Creek and the Clark Fork River at the property's west and north borders host wild rainbow and brown trout, as well as important populations of dwindling native fish species such as bull trout and cutthroat trout.

Five Valleys Land Trust is the lead entity for the property acquisition, and will ensure that once purchased the property is permanently protected. Five Valleys is partnering with Trout Unlimited and the Clark Fork Coalition, who would take the lead on post-acquisition habitat enhancement activities. All three partners will collaborate on developing a blueprint for future management of the site. Five Valleys will insure that access to the Clark Fork River is enhanced and managed to protect wildlife resources; the US Forest Service, BLM, and Montana Fish, Wildlife & Parks, may be future partners. Five Valleys has recently secured a purchase agreement on the LEMB Co, LLC property, and in conducting due diligence actions. Five Valleys plans to acquire the property by December, 2012, contingent on sufficient funding.

The proposed acquisition would permanently protect high-priority riparian and associated upland habitats along the Clark Fork River mainstem, enhance wildlife habitat and leverage prior and ongoing conservation efforts on nearby properties for maximum wildlife benefit, and provide opportunities to improve recreational access. Project strategies in support of these objectives are listed below.

Objective 1: Permanently protect important habitat on the 201-acre LEMB Co property at the confluence of Rock Creek and the Clark Fork River.

Strategies:

a. Establish fair market value, obtain purchase option, and conduct due diligence for the 201-acre LEMB Co, LLC property at the confluence of Rock Creek and the Clark Fork River.
b. Acquire the LEMB Co, LLC property at or below appraised fair market value, utilizing a five-year low-interest loan.
c. Secure project funding to repay loan.

Objective 2: Enhance wildlife habitat on and near LEMB Co property.

Strategies:

a. Restore and re-establish vegetation on recent habitat disturbances, including a gravel berm along Rock Creek Road, and a constructed eight-acre pond.
b. Convert a portion of LEMB Co water rights to in-stream flow.
c. Support permanent conservation on adjoining private lands through conservation easements (beginning with a pending 572-acre conservation easement west of and adjacent to the LEMB Co, LLC property).

Objective 3: Enhance recreational access.

Strategies:

a. Work with project partners to develop access/recreation management plan for LEMB Co property.
b. Establish appropriate public access for passive recreation, including on-site fishing access to the Clark Fork River and possible access to nearby hiking trails.
c. Continue to work with adjacent landowners and project partners to manage, protect, and educate the public about the conservation values in the confluence area.

Anticipated project outcomes are consistent with the terrestrial criteria identified and prioritized in the Final UCFRB Interim Restoration Process Plan (the Process Plan) and the 2011 Terrestrial Prioritization Plan. For example:

1. The proposed acquisition will protect at least 25 acres of NRDP Terrestrial Restoration Priority 1 riparian habitat, and nearly 1.5 miles of riparian corridor along the Clark Fork River. The proposed acquisition will also protect 175 acres of native grasslands, cottonwood galleries, conifer forests and floodplain that buffer and enhance the prioritized riparian corridors.
2. The conservation value of the LEMB Co, LLC property is enhanced by its proximity to extensive acreage of US Forest Service and BLM land and over 300 acres of private land permanently protected with conservation easements.
3. The proposed project will result in protection of three habitats targeted by the 2011 Terrestrial Prioritization Plan (riparian, grassland, and conifer forest).
4. The proposed project will allow conversion of water rights of up to 10 cfs to in-stream flow delivered to the Clark Fork River at the mouth of Rock Creek. Conversion of water rights on the LEMB Co property could have valuable in-stream habitat benefits, and fits the NRDP fisheries restoration goal of flow augmentation to the mainstem Clark Fork River below Deer Lodge.
5. The proposed project will result in improved recreation access to the Clark Fork River and US Forest Service lands near the confluence. Project partners will ensure that enhanced access does not negatively impact protected wildlife resources or compromise restoration and enhancement efforts on the LEMB Co property or the Clark Fork River. Acquisition of the property would protect important wildlife habitat at the iconic gateway of western Montana's most famous recreation corridor.
6. The proposed project will facilitate regular monitoring on the LEMB Co property to evaluate effectiveness of habitat restoration and enhancement efforts.
7. The proposed project will provide an important buffer of natural habitat along the Clark Fork River mainstem, reducing encroachment of houses, agricultural fields, and livestock grazing.
8. The proposed project will insure permanent protection for the LEMB Co property while engaging in habitat enhancement activities that should provide wildlife and recreation replacement.
9. The proposed project will serve to maintain habitat connectivity between Rock Creek and the Clark Fork mainstem.
10. The proposed project will facilitate passive regeneration of native riparian vegetation including cottonwood trees, aspen, and willows in the Clark Fork River floodplain, and active restoration where passive regeneration of vegetation is impractical.

Project Schedule:

Table 1. Project Timeline

Action	*Scheduled Completion Date*
Establish fair market value for LEMB Co LLC property	Complete
Acquire purchase option	Complete
Conduct due diligence for property acquisition	Complete
Secure project funding	Ongoing
Acquire LEMB Co LLC property	December, 2012
Habitat restoration and enhancement activities	2013-2014
Convert LEMB Co water rights to in-stream use	2013
Establish managed public access	2014
Project monitoring	2013 -->

General Cost Information:

Estimated NRDP funds required to achieve project objectives: $400,000. The total anticipated project costs for property acquisition are just less than $2,000,000. Cost breakdown is shown in Table 2 below.

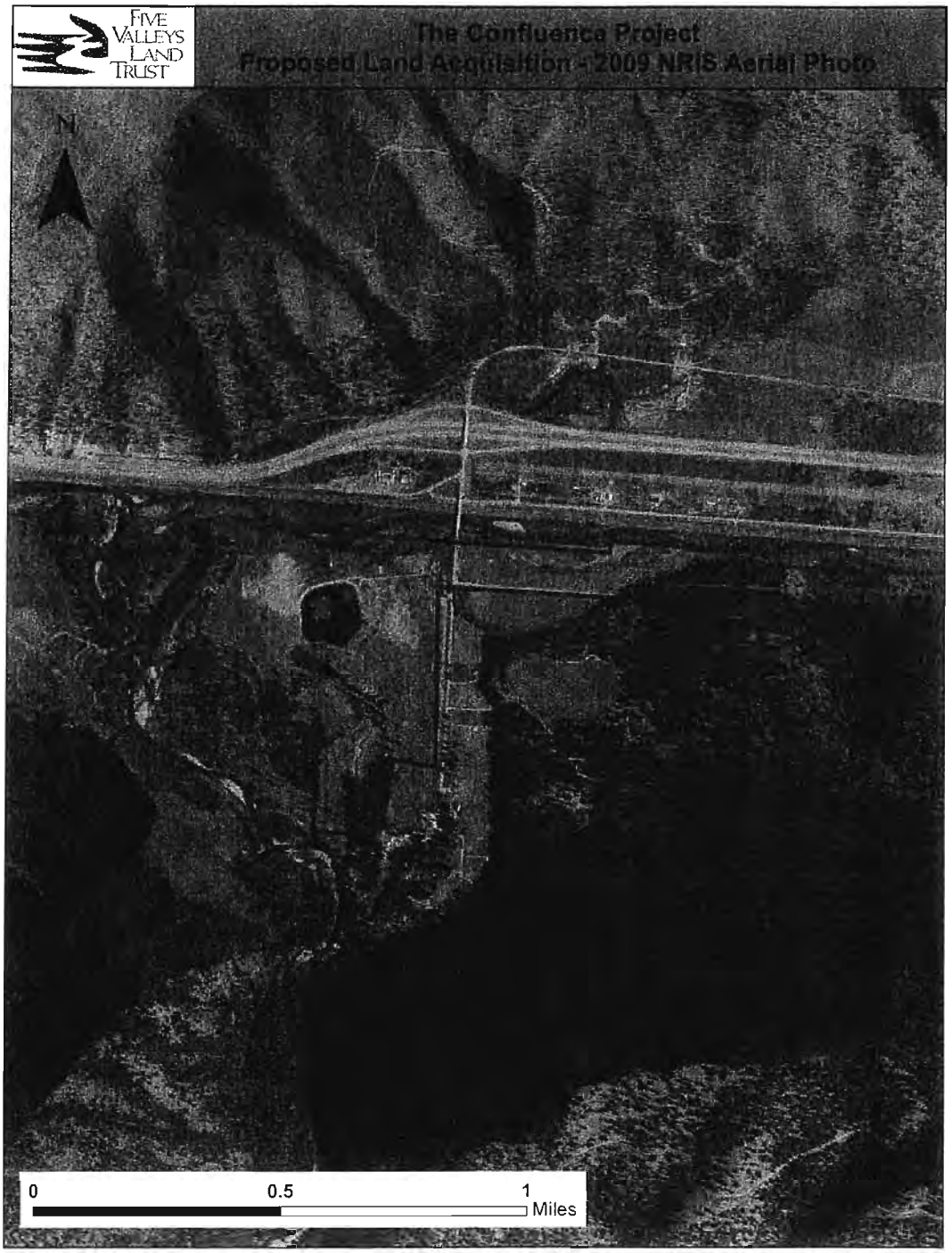
Acquisition Costs assuming 5 year ownership		
Expense	*Amount*	*% Phase I*
LEMB Co Property acquisition	$1,600,000	80%
Bridge Loan (5-year @ 3%)	$185,000	9%
Project Staff & Overhead (5-years)	$150,000	8%
Legal fees	$30,000	2%
Environmental Hazard Assessment	$3,000	0%
Ecological baseline assessment	$2,000	0%
Title Insurance	$9,000	0%
Closing, Escrow, Recording fees	$1,000	0%
Long-term stewardship endowment	$15,000	1%
Total Expenses	**$1,995,000**	100.0%

** Only costs/funding for acquisition of the LEMB Co property are shown here. Costs/funding for habitat and access enhancement projects cannot be fully developed until acquisition is complete. NRD funds requested here are for acquisition only.*

Five Valleys and project partners are requesting $400,000 in NRD funds to complete the acquisition phase of the Confluence Project. NRD funding will be leveraged with $1,600,000 of matching/cooperator contributions toward the acquisition costs. Five Valleys Land Trust will contribute $900,000, anticipated from private partners and bridged through a low-interest loan from the Resources Legacy Fund or similar entity. Five Valleys will also leverage $300,000 from the Rock Creek Trust, and intends to request an additional $300,000 from the Missoula County Open Space Fund. In total, Five Valleys will leverage 80% of the total necessary funds to match the 20% requested from the NRDP.

Table 3. Project Funding (Phase 1)		
Funding Source	*Amount*	*% Total*
Natural Resource Damage Program	$400,000	15.8%
MT Fish & Wildlife Conservation Trust	$100,000	5.3%
Missoula County Open Lands	$300,000	15.8%
Five Valleys Land Trust Rock Creek Trust	$300,000	15.8%
Five Valleys Land Trust (General fundraising/5-year loan)	$895,000	47.4%
Total Project Funds	**$1,995,000**	100.0%

Property Aerial Photo Map



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JOHN LONG MOUNTAINS TERRESTRIAL HABITAT CONSERVATION

Five Valleys Land Trust

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Project Purpose and Benefits:
The purpose of this abstract is to seek opportunities to work with private landowners to implement terrestrial projects such as conservation easements, land acquisitions and exchanges to protect prioritized terrestrial habitat in the John Long Mountains. Five Valleys Land Trust recommends the NRDP consider up to $5,000,000 in Terrestrial Restoration funding to protect an estimated 20,000 acres.

Potential benefits include:

- A small number of projects that provide protection of significant acreages of intact, targeted habitats within the Upper Clark Fork Terrestrial Restoration Priority 1 & 2 areas in the John Long Mountains.
- Protection of high quality native grasslands that provide habitat for elk, bighorn sheep, mule deer, and numerous nongame species linked to these habitats, and contribute to wildlife occurrence and persistence across a large percentage of the Upper Clark Fork Basin.
- Protection of lands and waters that support outstanding recreational and fisheries resources in the upper Rock Creek drainage and fisheries and water quality in the Flint Creek drainage.

Project Location:
Refer to the attached property map. The John Long Mountains are bounded by the Clark Fork River to the north, Flint Creek to the east, and Rock Creek and its headwaters to the west and south. Philipsburg, Hall and Drummond are all situated just east of the range.

Project Description:
This abstract is being proposed to allow for the development and implementation of potential projects where landowners and partners have yet to be clearly identified. Ranch properties in the John Long Mountains contain vast acreages of high-quality terrestrial habitats prioritized by the NRDP, including 51,872 acres within Priority 1 Terrestrial Restoration Areas, 112,708 acres within Priority 2 Terrestrial Restoration Areas, and two Aquatic Restoration Priority 2 streams (Flint Creek and Harvey Creek). Conservation Easements on these ranch properties would afford permanent protection for high priority terrestrial habitats and provide far-reaching conservation benefits for wildlife and fisheries resources throughout the Upper Clark Fork River Basin. Project strategies in support of this objective are listed below.

Objective: Work with private landowners in the John Long Mountains to develop conservation projects that balance the needs of agriculture with protection of critical terrestrial habitats.

Strategies:

a. Assess interest and opportunities for private land conservation projects in the John Long Mountains; engage interested landowners in discussion/negotiation of conservation easement terms and conditions that meet landowner needs and NRDP terrestrial restoration priorities.
b. Negotiate and develop funding strategies for highest-priority projects, including establishment of appraised fair market value for proposed conservation easements.
c. Confirm NRDP interest in providing funding to specific high-priority projects, seek match funding where available.
d. Finalize negotiation of conservation easement terms with individual landowners.
e. Conduct baseline ecological assessments and other due-diligence actions.
f. Secure funding commitments from NRDP, landowners and other project partners.
g. Execute conservation easements on individual ranches.
h. Annual monitoring of conservation easements to insure easement terms/project goals are being met.

Anticipated outcomes are consistent with the terrestrial criteria identified and prioritized in the Final UCFRB Interim Restoration Process Plan (the Process Plan). Prioritized resource benefits likely addressed by conservation projects in the John Long Mountains include:

1. A small number of very large-acre projects, protecting NRDP Terrestrial Restoration Priority 1 & 2 habitats, with low cost-per-area protected and a large landscape footprint.
2. Protection of high-quality natural habitat adjacent to Beaverhead-Deerlodge National Forest lands and existing conservation easements.
3. Protection of all NRDP targeted terrestrial habitats, including riparian, grassland, shrub-steppe and conifer forest habitats, and undeveloped agricultural lands that buffer and support ecological function of nearby targeted habitats.
4. Conservation projects could support or achieve NRDP encouraged restoration activities on Aquatic Restoration Priority 2 streams (Upper and Lower Flint Creek, and Harvey Creek).

Five Valleys Land Trust is confident that significant landowner interest in conservation projects exists in the John Long Mountains. Over the past several years, Five Valleys has discussed potential conservation projects with more than a dozen landowners in the proposed project area, including conservation easements, acquisitions, and land exchanges within Terrestrial Priority Areas. While no projects are active at this time, it is likely that focused outreach and education activities by Five Valleys and other entities will bring high-quality conservation projects to the table in the near future.

Project Schedule:

A sample project timeline is shown below in Table 1. Detailed timelines will be developed upon identification and development of priority projects.

Table 1. Project Timeline

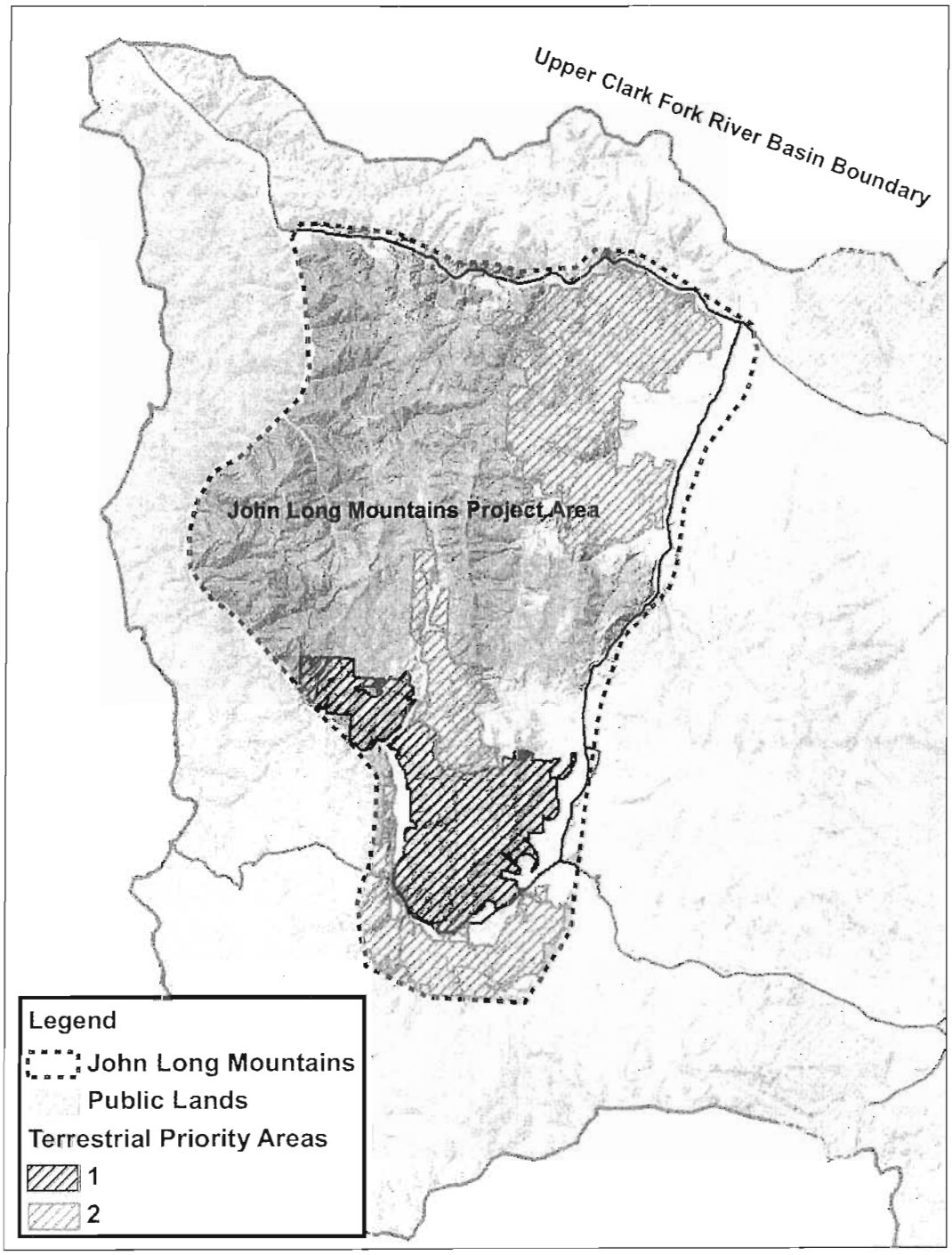
Action	*Scheduled Completion Date*
Assess interest; landowner outreach	Year 1
Develop funding strategies for highest priority / highest feasibility conservation projects	Year 1
Secure funding from NRDP and matching partners	Year 2
Project finalization / due diligence	Year 2
Completion of conservation project	Year 2
Project monitoring	Year 3 -->

General Cost Information:

Estimated NRDP funds required to achieve project objectives: approximately $5 million. A breakdown of *estimated* costs is shown in Table 2 below. Many project-area ranches range from 1,000 to 10,000 acres or more; costs assume protection of 20,000 acres of priority terrestrial habitat under conservation easement, and an average conservation easement value of $300/acre. Certain priority lands in the John Long Mountains would be eligible for significant matching funds from Land and Water Conservation Fund and Federal Farm Bill funding; NRDP restoration funding may be the only funding available for other priority lands. Landowner-donated value could provide some component of cost-share. Estimated costs assume 20% non-NRDP match funding on average.

Table 2: Project Costs

Cost	*Estimate*
Purchased Conservation Easement (20,000 acres)	$6,000,000
Easement Appraisals	$100,000
Project Staff & Overhead	$80,000
Legal fees	$15,000
Ecological assessments	$15,000
Title Insurance	$10,000
Closing, Escrow, Recording fees	$5,000
Long-term monitoring and enforcement costs	$100,000
Total Costs	**$6,325,000**
Estimated match funding (20%)	$1,265,000
Estimated required NRDP funding	**$5,060,000**


Upper Clark Fork River Basin Boundary
John Long Mountains Project Area
Legend
John Long Mountains
Public Lands
Terrestrial Priority Areas
1
2

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GRAVELEY-EAST GARNET MOUNTAINS CONSERVATION PROJECT

Five Valleys Land Trust

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Project Purpose and Benefits:
The purpose of this abstract is to propose $2.0 million in NRDP funding for a conservation easement on the Graveley and Buffa ranches near Garrison, Montana. These properties include extensive, high-quality grassland, shrub-steppe, conifer forest and riparian habitats. The goals of the proposed project are permanent protection for high priority terrestrial habitats in the Upper Clark Fork River Basin, and enhanced public access to the Clark Fork River, private ranch land, and isolated public lands near Garrison.

Potential project benefits include:

- Protection of approximately 8,300 acres in the Garnet Mountains NRDP Terrestrial Restoration Priority 2 Area.
- Riparian habitat protection for 43 acres of NRDP Terrestrial Restoration Priority 1 riparian habitats along the Clark Fork River below Garrison.
- Enhanced recreational access to the Clark Fork River, isolated public lands and private ranchland in the East Garnet Mountains.

Project Location:
The Graveley-Little Warm Springs Creek Project area includes approximately 8,300 acres of property owned by the Graveley and Buffa families in the eastern Garnet Mountains and along the Clark Fork River, just northwest of Garrison and Interstate 90 (see attached map). Project lands along the Clark Fork River are adjacent to the Gold Creek Rest Area.

Project Description:
The Graveley and Buffa ranches include extensive grasslands and sagebrush-juniper scrub forest that dominate the southwest-facing slopes of the project area, and pockets of conifer forests and riparian habitats along Brock Creek, Bear Gulch, and Warm Springs Creek. The project area facilitates wildlife connectivity between BLM lands in the eastern Garnet Mountains and Forest Service land in the Flint Creek Mountains; habitat linkages protected by the project will serve a variety of species including elk, mule deer, antelope, black and grizzly bear, and many non-game species. Warm Springs Creek near Garrison is one of the few tributaries flowing out of the Garnet Range with good connection to the Clark Fork River, and the project will protect over three miles of this NRDP Aquatic Restoration Priority 4 stream.

The 3,100-acre Buffa property is currently listed for sale. The Graveley family proposes to simultaneously purchase this property and place it, along with the Graveley's 5,137-acre property, under conservation easement; the family will also consider selling fee title to approximately 43 acres along the Clark Fork River. The proposed acquisitions would afford permanent protection for high priority terrestrial habitats in the Upper Clark Fork River Basin and facilitate enhanced public access for wildlife-related recreation. Project strategies in support of this objective are listed below.

Objective 1: Protect nearly 8,300 acres in the Garnet Mountains for wildlife habitat and agricultural use.

Strategies:

a. Facilitate purchase of 3,100-acre Buffa property east of Warm Springs Creek by Graveley family.
b. Acquire a conservation easement from the Graveley family on the original 5,137-acre Graveley property west of Warm Springs Creek, plus the newly-acquired (adjacent) 3,100 acres east of Warm Springs Creek.

Objective 2: Provide public recreation opportunities on the Clark Fork River and private land in the Garnets north of Garrison.

Strategies:

a. Mandate enrollment of project ranchlands in FWP's Block Management hunting access program.
b. Acquire 43 acres at Gold Creek Rest Area from Graveley family for FWP fishing access site.

Project outcomes are consistent with the terrestrial criteria identified and prioritized in the Final UCFRB Interim Restoration Process Plan (the Process Plan) and the 2011 Terrestrial Wildlife Resource Prioritization Plan. Prioritized resource benefits addressed by this project include:

1. A single large project providing protection for approximately 8,200 acres of NRDP Terrestrial Restoration Priority 2 wildlife habitat in the Garnet Mountains, and over 40 acres of NRDP Terrestrial Restoration Priority 1 riparian habitat along the Clark Fork River mainstem. Project achieves a low cost-per-area protected and a large landscape footprint.
2. Project lands are adjacent to 1,720 acres of interspersed public land and within one mile of more than 30,000 acres of contiguous public land in the east Garnets, and improve connectivity of protected habitat through the Garnet Mountains into the Blackfoot watershed.
3. The project provides protection for all targeted terrestrial habitats, including riparian, grassland, and shrub-steppe habitats, and smaller patches of conifer forest. Project lands are of high value for wintering elk, mule deer, raptor species and a variety of grassland songbirds.
4. The project would provide encouraged fisheries restoration activities, including riparian habitat protections afforded by the conservation easement (mandated grazing management practices), and would provide permanent protection for potential future stream restoration activities by project partners.
5. The project provides opportunities for enhanced wildlife-related recreation, especially FWP-managed hunting opportunities on private land and access to interspersed, isolated public lands, and the opportunity to establish a FWP fishing access site near Gold Creek (a "Desired Fishing Access Site" for Reach B of the Clark Fork River, identified by the Process Plan).

Five Valleys has been in negotiations with the Graveley family since early 2010, and would be the likely lead entity for conservation easement acquisition on the project properties. Montana Fish, Wildlife & Parks is a probable project partner in management of public access. Montana Fish, Wildlife & Parks and non-profit entities that specialize in stream restoration (such as Trout Unlimited) could have opportunities to engage in habitat enhancement projects along Warm Springs Creek (near Garrison) following conservation easement acquisition. Five Valleys is prepared to move toward conservation easement acquisition in 2013, contingent on project funding.

Project Schedule:
A complete proposed timeline for the project is shown below in Table 1.

Table 1. Project Timeline

Objective	*Action*	*Scheduled Completion Date*
Habitat Protection	USPAP Conservation Easement Appraisal	December, 2012
	Conservation easement purchase option	February, 2013
	Secure NRDP funding, submit match funding request to funding partner(s)	March, 2013
	Finalize conservation easement drafting	October, 2013
	Graveley purchase of Buffa property; acquisition of ~8,300-acre conservation easement & river access site (simultaneous closing)	December, 2013
Public Access	Establish hunting access via mandatory enrollment in FWP Block Management	Summer, 2014
	Develop Clark Fork River fishing access site near Gold Creek Rest Area	Summer, 2014
Habitat Enhancement	Possible active restoration activities on Warm Springs Creek w/ restoration partners	2014

General Cost Information:
Estimated NRDP funds required to achieve project objectives: $2.0 million. Anticipated expenses for conservation easement acquisition on the Graveley and Buffa properties are $2,400,000, and $200,000 for acquisition of lands on the Clark Fork River near the Gold Creek Rest Area. Total project expenses (including transaction costs) are estimated at $2,700,000. Expense breakdown is shown in Table 2 below. Expenses are estimates; a qualified appraisal will be required prior to conservation easement acquisition to establish fair market value.

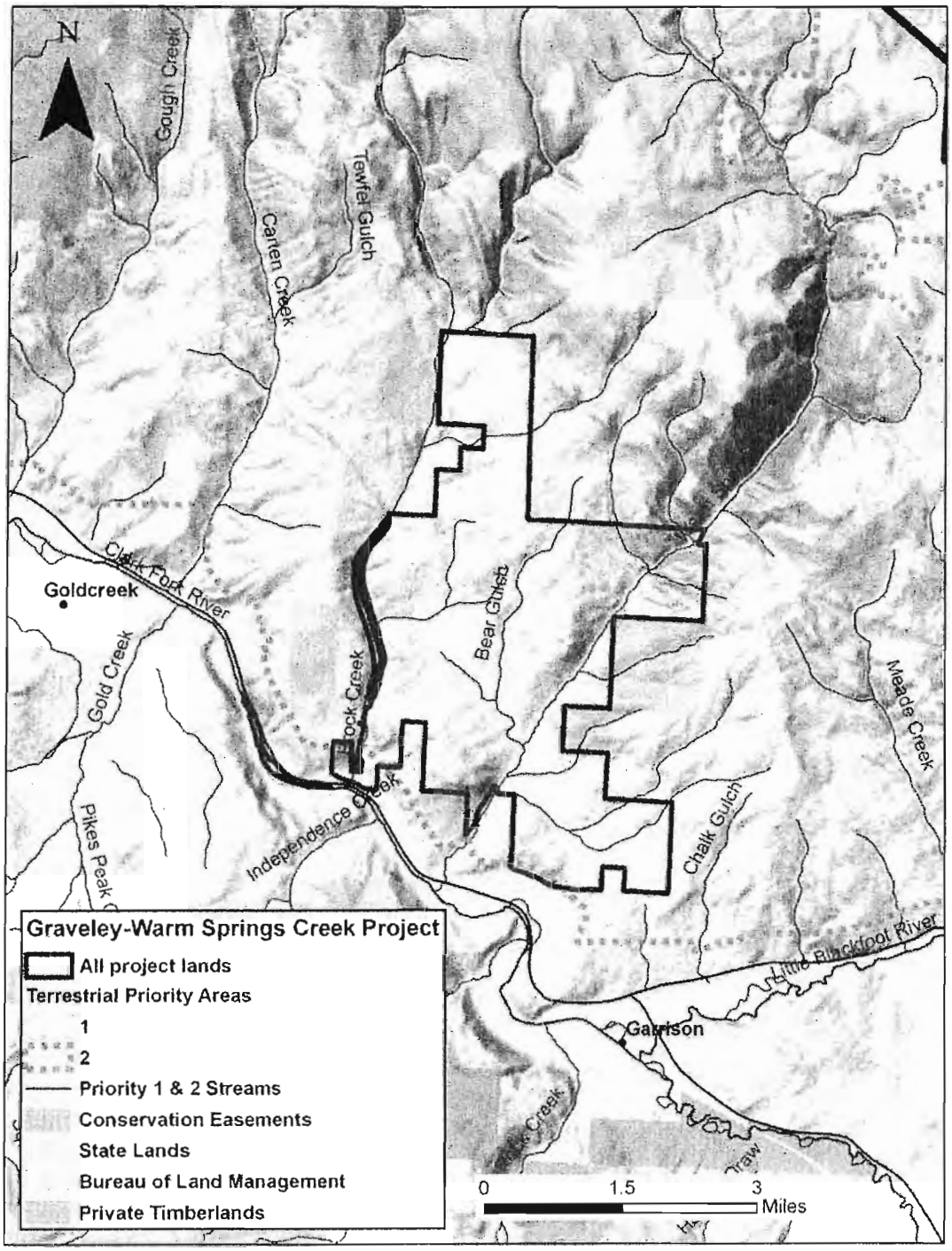
Table 2: Acquistion Phase Project Costs

Expense	*Amount*	*% Total*
Purchased conservation easement	$2,400,000	88.9%
Clark Fork River property	$200,000	7.4%
Property & Easement Appraisals	$20,000	0.7%
Project Staff & Overhead (2 years)	$30,000	1.1%
Legal fees	$15,000	0.6%
Ecological baseline assessment	$5,000	0.2%
Title Insurance	$8,000	0.3%
Closing, Escrow, Recording fees	$2,000	0.1%
Long-term stewardship endowment	$20,000	0.7%
Total Expenses	**$2,700,000**	100.0%

At this time, the NRCS Farm and Ranchland Protection Program (FRPP) is the only potential source of match funding identified for the Graveley-East Garnet Mountains Conservation Project, and only a portion of the proposed conservation easement property may be eligible for FRPP funds. Five Valleys estimates leveraging NRD funding with $500,000 in FRPP matching funds toward the conservation easement acquisition costs, and up to $200,000 in landowner donated value. Matching funds are estimated at 26% of project costs.

Table 3. Project Funding (Acquisition)		
Funding Source	*Amount*	*% Total*
Natural Resource Damage Program	$2,000,000	74.07%
NRCS Farm and Ranchland Protection Program	$500,000	18.52%
Landowner Contribution	$200,000	7.41%
Total Project Funds	**$2,700,000**	100.00%

Project Area Map



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Mentzer Ranch Conservation Easement

Five Valleys Land Trust

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Project Purpose and Benefits:

The Mentzer Ranch Conservation Easement Project (Mentzer Ranch CE) is a multi-phase effort by Five Valleys Land Trust (Five Valleys) and partners with the goal of securing permanent protection of natural habitats, open space and historic ranch values on Flint Creek and Barnes Creek. This 480-acre ranch is predominately flood-irrigated pastureland and wetland habitats and is used for field hay production and cattle grazing. The ranch contains reaches of Flint Creek, Barnes Creek, and springs/wetlands surrounding the creeks. The lower Flint Creek Valley is mostly undeveloped agricultural lands, typical of rural western United States.

The Mentzer Ranch CE will preserve the historic vistas, ranching values and wildlife habitats that have made Montana a destination for vacationing tourists. The Mentzer Ranch is a cow-calf operation that also produces field hay in the Flint Creek Valley. The Mentzer Ranch has senior water rights (pre-1880) from both Flint Creek and Barnes Creek. The Mentzer Ranch has all of the water rights on Barnes Creek, and therefore they control instream flows. The Mentzer Ranch CE will protect 2,600 feet of Flint Creek and 7,900 feet of Barnes Creek, a spawning tributary for Flint Creek fish. Barnes Creek riparian corridor is used as a migratory corridor between the Flint Creek Range and the John Long Mountains.

The property's natural qualities are threatened by increasing development pressure, including surrounding subdivisions. Five Valleys has reached tentative agreement on a conservation easement on this property that will protect the ranch from subdivision and restore the riparian, wetland and upland habitats. Five Valleys and our partners view this as a opportunity to protect the property and ranching values, restore the property's native habitat, and develop instream flows to protect Flint Creek and Barnes Creek. The Mentzer Ranch CE leverages additional proposed private-land conservation easements directly across Flint Creek, which will protect an additional 2,900 feet of Flint Creek and almost 5,400 feet of Lower Willow Creek (See Henderson Ranch Conservation Easement Proposal, also submitted).

The overview of the project objectives are as follows:
Objective 1: Permanently protect a portion of Flint Creek and Barnes Creek.
Objective 2: Provide public fishing access to Flint Creek.
Objective 3: Protect the historic ranching vistas and values of the lower Flint Creek Valley while allowing the public access to Flint Creek.
Objective 4: Restore the fluvial and wetlands conditions on Barnes Creek and a potion of Flint Creek, which will include maintaining instream flows in Barnes Creek.

Expected project outcomes (benefits to aquatic/terrestrial resources and benefit to public use and enjoyment of these resources) are:

1. Eliminate development from encroaching on the agricultural fields adjacent to Barnes Creek and Flint Creek;
2. Combine investment in habitat enhancement with permanent protection to provide wildlife, and their migratory corridors, and recreation replacement by allowing public access;
3. Protection of multiple habitat types (riparian, grassland, and wetlands);
4. Maintain riparian habitat connectivity between Flint Creek and an important tributary, Barnes;
5. Replace injured terrestrial wildlife resources through protection & enhancement of habitats similar to those injured;
6. Encouraging natural regeneration of cottonwood trees and willows to benefit riparian habitat and associated targeted species;
7. Enhancement of fisheries resources through restoration of instream flow to in Barnes Creek;
8. Replace lost fishing, wildlife viewing, bird watching and other wildlife-related outdoor recreational opportunities by enhancing fish and wildlife habitats.

Project Location:

The Mentzer Ranch lies 5-miles south of Drummond, MT (see attached map) on the east side of the Flint Creek Valley on the Old Chicago Road. The ranch contains lands on both sides of Flint Creek and is highly visible from Highway 1. Highway 1 is a popular tourist route and is listed as a scenic highway in Montana. Recreationalists use this route to access upper Rock Creek, Georgetown Lake, Philipsburg, and numerous mountain ranges and wilderness areas. Protecting the rural agricultural lands and Flint Creek Valley aesthetics are critical to maintaining the scenic values of Highway 1.

The 480-acre Mentzer ranch contains reaches of Flint Creek, Barnes Creek, two spring creeks and several wetlands. The Mentzer Ranch has approximately 2,600 feet of Flint Creek and 7,900 feet of Barnes Creek, which is used as a migratory corridor between the Flint Creek Range and the John Long Mountains. The riparian corridors along Flint and Barnes Creeks are typical wetland riparian areas that provide critical wildlife habitats.

Unfortunately, Barnes Creek is degraded on the Mentzer's ranch. Barnes Creek is a free-flowing, third order tributary to Flint Creek. Flint Creek, a fourth order stream, also flows through the ranch. The Flint Creek basin has been well studied due to irrigation issues. While these streams provide benefits for both aquatic and terrestrial life, Barnes and Flint Creeks have been degraded from past land management practices. Flint Creek is a destination trout fishery, that provides spawning and recruitment to the Clark Fork River. Barnes Creek is a spawning tributary for Flint Creek fish.

Project Description:

The Mentzer Ranch CE project will provide public recreational access, permanently protect natural habitats, open space and historic ranch values on Flint Creek and Barnes Creek. The project will restore the degraded riparian corridors along both creeks, while maintaining the traditional ranching values of Montana. The Mentzer Ranch CE project will protect/restore this 480-acre ranch, approximately 2,600 feet of Flint Creek and 7,900 feet of Barnes Creek, two spring creeks and approximately 45 acres of wetlands surrounding Flint Creek.

Flint Creek's habitat is degraded due to historic over-grazing, willow removal, altering of the riparian area's hydrology. Drainage ditches have been dug to "dry-up" the area along Flint Creek for improved grass production. Flint Creek is a slightly over-wide, low gradient, highly sinuous channel ("C3/4b" channel Rosgen classification). Flint Creek's natural patterns and dimensions remain, and by managing the grazing and restoring the wetland hydrology, it would recover without much intervention. The area will need to be extensively planted with woody riparian species and weeds will need to be controlled.

The conservation easement on the Mentzer Ranch will protect the stream channel until the vegetation becomes established (approximately 45 acres). This easement will restore the wetland hydrology, riparian vegetation and manage grazing along the creek. Under the conservation easement, Flint Creek will be fenced, and the Five Valleys will work with the landowners on grazing management.

Barnes Creek is an alluvial system that has been impacted by irrigation withdrawals and land management practices. Barnes Creek should be classified as a Rosgen "E4-channel type", but channelization and the loss of woody vegetation have caused reaches to become over-wide/shallow, incised or in an non-equilibrium state trying to change back to a natural E-type channel. A typical "E-type" channel should have a wide floodprone area, a small width to depth ratio, be highly sinuous, and low gradient channel surrounded by dense, sedge/willow/cottonwood riparian vegetation. Channelization and over-grazing contribute instability and excessive sediment inputs, destroying pool habitats and limiting spawning.

The Mentzer Ranch CE project will restore and protect Barnes Creek habitats. Two undersized culverts will be replaced as well as two diversion headgates. The Barnes Creek channel will be vegetated to protect the streambanks, provide fish and wildlife habitat, and develop a continuous migration corridor. From the initial

surveys, no in-channel construction should be required. Barnes Creek would recover naturally if grazing was managed and the riparian corridor were planted with woody species to mimic a natural channel. The entire area will be protected with a riparian fence.

The conservation easement on the Metnzer Ranch will protect the stream channel until the vegetation becomes established. The conservation easement will restore the wetland hydrology, riparian vegetation and manage grazing along the creek. Barnes Creek will be fenced, and Five Valleys will work with the Mentzer Ranch on the grazing and management of the riparian corridor. Five Valleys will solicit funding to restore the channel and revegetate the riparian corridor.

Objective 1: Permanently protect a portion of Flint Creek and Barnes Creek.

Strategies:

a. Acquire a conservation easement on the 480-acre Mentzer Ranch.
b. Support permanent conservation on adjoining private lands through conservation easements (Henderson Ranch CE).
c. Continue to work with adjacent landowners to manage and protect the conservation values in the Flint Creek Valley.

Objective 2: Provide public fishing access to Flint Creek.

Strategies:

a. Provide public fishing access to an isolated reach of Flint Creek. The fishing access would allow the public access to a 4-mile currently-inaccessible reach of Flint Creek.
b. Provide parking and safe and secure area for the public to park while fishing Flint Creek.
c. Allow the public to enjoy the natural resources of Flint Creek.

Objective 3: Protect the historic ranching vistas and values of the lower Flint Creek Valley while allowing the public access to Flint Creek.

Strategies:

a. Establish conservation easements that retain the valley's rural aesthetics and ranching values.
b. Restore and maintain the historic values of this ranch.
c. Provide the public access to Flint Creek to enjoy the natural resources of Flint Creek Valley.

Objective 4: Restore the fluvial and wetlands conditions on Barnes Creek and a potion of Flint Creek, which will include maintaining instream flows in Barnes Creek.

Strategies:

a. Restore the dredged wetland habitats along Flint Creek by filling in the drainage ditches and vegetate the riparian corridor with native plants.
b. Restore Barnes Creek in the reaches that are unstable and revegetate the riparian corridor with willows, cottonwoods, alders and snowberries.

c. Restore the drained wetlands and springs along Flint Creek and remove the undersized culverts that impairs floodplain function on Barnes Creek.
d. Provide year-round fish passage on Barnes Creek at the two headgates on the Mentzer Ranch to enable spawning fish access to the upstream reaches.

Project Schedule:

Phases 1 and 2 of the Mentzer Ranch CE, the conservation easement and restoration designs, will be complete by the end of 2012. Restoration activities will begin following acquisition of the conservation easement. A complete timeline for the project is shown below in Table 1.

Table 1. Project Timeline

Phase	***Action***	***Scheduled Completion Date***
Phase 1*	Finalize Mentzer Ranch CE negotiations	July 2012
	Fundraising	July 2012-March 2013
	Environmental Assessment	September 2012
	Execute conservation easement	December 2012
Phase 2	Develop terrestrial and aquatic habitat restoration plans (Flint Creek Wetlands & Barnes Creek Design)	June 2012-Decemebr 2012
	Develop the Fishing Access Site	2013
Phase 3	Restore Barnes Creek	2013
	Install Grazing Management Fences	2013
	Restore Flint Creek Wetlands	2013-2014

General Cost Information:

The total anticipated project costs for Phase 1 and 2 are $528,000. Cost breakdown is shown in Table 2 below.

Table 2. Project Costs (Phases 1 & 2)

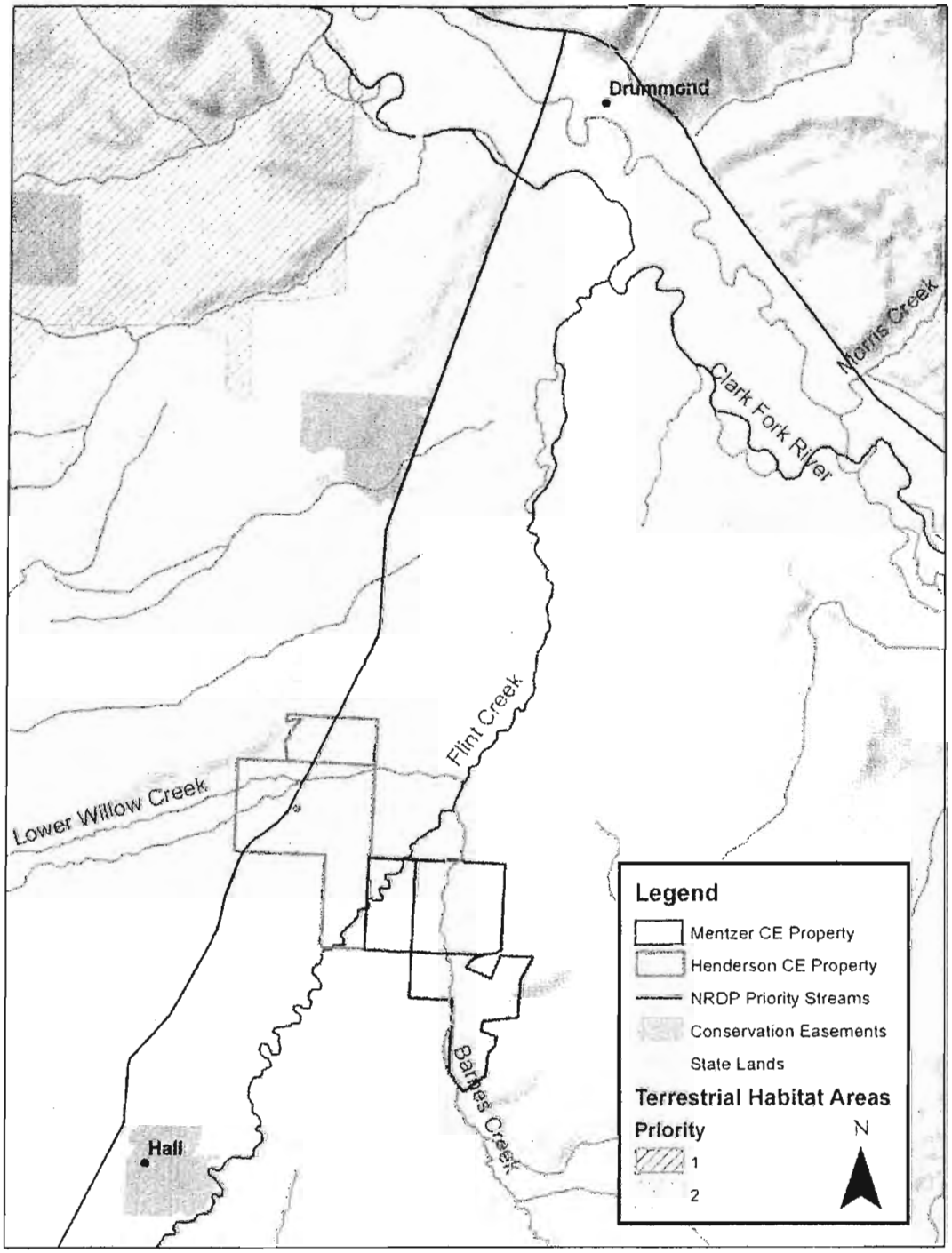
Expense	*Amount*	*% Total*
Mentzer Ranch CE	$576,000	92%
Staff time	$20,000	3%
Legal fees	$5,000	<1%
Environmental Assessment	$2,000	<1%
Recording fees	$1,000	<1%
Flint Creek Restoration Plan	$5,500	<1%
Barnes Creek Restoration Plan	$14,500	2%
Total Expenses	**$624,000**	**100.0%**

** Only costs/funding for Phase 1 & 2 of the Mentzer Ranch CE are shown here. Costs/funding for Phase III cannot be fully developed until Phase 2 is complete. NRD funds requested here are for Phase 1 and 2 only.*

Five Valleys and project partners are requesting $316,000 in NRD funds to complete Phases 1 and 2 of the Mentzer Ranch CE project. NRD funding will be leveraged with $308,000 of matching/cooperator contributions toward Phase 1 and 2 project costs. In total, Five Valleys will leverage 49% of the total necessary funds to match the 51% requested from the NRDP.

Table 3. Project Funding (Phases 1 & 2)		
Funding Source	*Amount*	*% Total*
Natural Resource Damage Program	$316,000	51%
Natural Resource Conservation Service (Farm Bill)	$288,000	45%
Farm Service Agency	$20,000	4%
Total Project Funds	**$624,000**	100.0%

Project Area Map



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DRY COTTONWOOD NEIGHBORS CONSERVATION PROJECTS

Five Valleys Land Trust

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Project Purpose and Benefits:
The purpose of this abstract is to propose $3.0 to $3.8 million in NRDP funding for conservation easements on four adjacent ranches near Warm Springs, Montana. These properties include extensive acreages of grassland, scrub forest, irrigated cropland and riparian floodplain along the Clark Fork River; the goal of the proposed projects is permanent protection for high priority terrestrial habitats in the Upper Clark Fork River Basin (UCFRB).

Potential project benefits include:

- Protection of up to 1,400 acres of riparian habitat within the Upper Clark Fork Terrestrial Injured Resource Area.
- Protection for up to 5,300 acres of habitat within the west Boulder Mountains NRDP Terrestrial Restoration Priority 1 area.
- Riparian habitat protection for up to 7.8 miles of the Clark Fork River above Deer Lodge and 0.7 miles of lower Warm Springs Creek (NRDP Priority 1 streams), and up to 0.9 miles of Lost Creek (NRDP Priority 2 stream).

Project Location:
Refer to the attached property map. The Dry Cottonwood Neighbors Projects include adjoining ranch properties totaling 11,844 acres. Project acres are located primarily on the slope of the Boulder Mountains east of Warm Springs, and along the Clark Fork River below the Opportunity Ponds. Approximately 1,000 project acres are located west of Interstate 90, five miles north of Warm Springs.

Project Description:
The Dry Cottonwood, R Bar N, Lampert and Deer Lodge River Ranches near Warm Springs include nearly 12,000 semi-contiguous acres of private property including extensive grassland and scrub forest, Clark Fork River floodplain, and cultivated riparian buffer. Together, these ranch properties contain vast acreages of terrestrial habitats prioritized by the NRDP, including 6,700 acres within Priority 1 Terrestrial Restoration Areas, and nearly 8 miles of Clark Fork River within the Upper Clark Fork Injured Resource Area, including the lowest reaches of Warm Springs Creek and Lost Creek. Conservation Easements on these ranch properties would afford permanent protection for high priority terrestrial habitats in the Upper Clark Fork River Basin. Project strategies in support of this objective are listed below.

Objective: Protect under conservation easement up to 11, 844 acres of terrestrial wildlife habitat on four private ranches in the UCFRB.

Strategies:

a. Establish general conservation easement terms for the project properties.
b. Obtain conservation easement appraisals on the Dry Cottonwood, R Bar N, Lampert and Deer Lodge River Ranches to establish fair market value.
c. Finalize negotiation of conservation easement terms with individual ranch owners.
d. Conduct baseline ecological assessments and other due-diligence actions.
e. Secure funding commitments from NRDP, landowners and other project partners.
f. Execute conservation easements on individual ranches.
g. Annual monitoring of conservation easements to insure easement terms/project goals are being met.

Anticipated project outcomes are consistent with the terrestrial criteria identified and prioritized in the Final UCFRB Interim Restoration Process Plan (the Process Plan). Prioritized resource benefits addressed by this project include:

1. A few large projects, including 6,700 acres of NRD Terrestrial Restoration Priority 1 habitats, with low cost-per-area protected and a large landscape footprint.
2. Project lands are adjacent to 3,640 acres of state trust land and share 4.5 miles of common boundaries with Helena National Forest lands in the Boulder Mountains.
3. Project provides protection for several targeted habitats, including riparian, grassland, and shrub-steppe habitats, and open cultivated lands that buffer nearby riparian areas.
4. Project achieves fisheries restoration goals, including Encouraged Restoration Activities on Warm Springs Creek (Priority 1 stream) and Lost Creek (Priority 2 stream), via riparian habitat protection on private grazing lands, and sediment reduction/bank stabilization via passive restoration of woody streambank plants.

The Clark Fork Coalition and Five Valleys Land Trust have been involved in ongoing landowner discussions; all landowners involved have indicated their interest in participating in conservation easements. Both could be lead entities in conducting further project development, with Five Valleys Land Trust potentially taking the lead for conservation easement implementation and monitoring.

Project Schedule:

A complete proposed timeline for the project is shown below in Table 1.

Table 1. Project Timeline

Action	*Scheduled Completion Date*
Conservation easement negotiations	Year 1
Establish appraised fair market value	Year 1
Finalize conservation easement terms	Year 2
Ecological assessment; due diligence	Year 2
Secure project funding	Year 2
Execute conservation easements	Year 2
Perpetual easement monitoring	Year 3 →

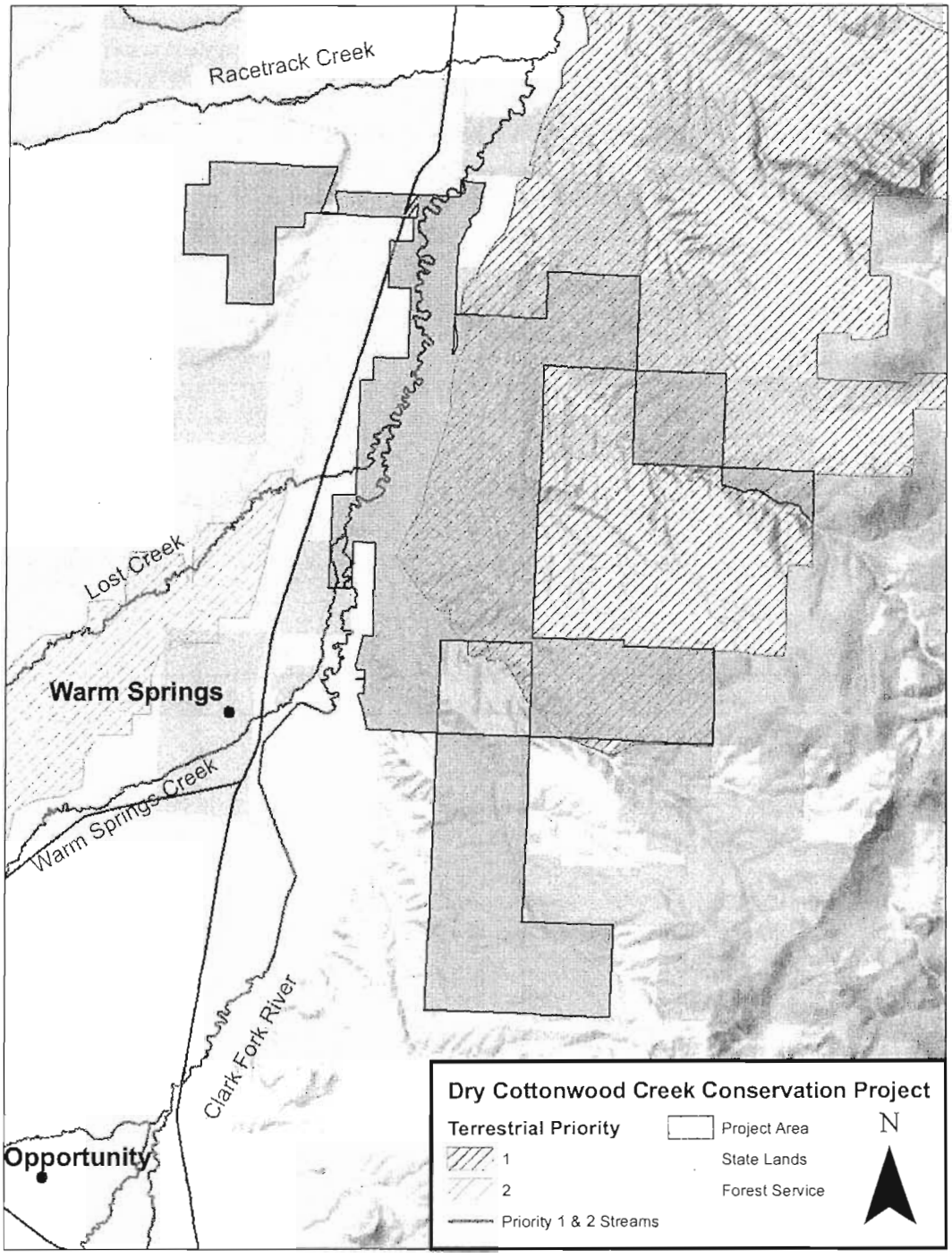
General Cost Information:

Estimated NRDP funds required to achieve project objectives: approximately $3.0 - $3.8 million. A breakdown of projected costs is shown in Table 2 below. Costs assume protection of all project lands; fewer acres protected would reduce project costs. Costs are only estimates and reflect a range of possible values: for example, average conservation easement value is estimated at $240 - $300 per acre. At this time, no promising sources of match funding have been identified for the project area. Landowner-donated value could provide some component of cost-share.

Table 2: Project Costs

Cost	*Lower Estimate*	*Upper Estimate*
Purchased Conservation Easement (~11,800 acres)	$2,832,000	$3,540,000
Property & Easement Appraisals	$50,000	$70,000
Project Staff & Overhead	$40,000	$80,000
Legal fees	$5,000	$15,000
Ecological baseline assessment	$8,000	$12,000
Title Insurance	$5,000	$10,000
Closing, Escrow, Recording fees	$2,000	$4,000
Long-term monitoring and enforcement costs	$40,000	$60,000
Total Required NRDP Funds	**$2,982,000**	**$3,791,000**

Project Map


Racetrack Creek
Lost Creek
Warm Springs
Warm Springs Creek
Clark Fork River
Opportunity
Dry Cottonwood Creek Conservation Project
Terrestrial Priority
1
2
Priority 1 & 2 Streams
Project Area
State Lands
Forest Service
N

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Lower Willow Creek - Henderson Ranch Conservation Easement

Five Valleys Land Trust

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Project Purpose and Benefits:

The Lower Willow Creek - Henderson Ranch Conservation Easement Project (Henderson Ranch CE) is a multi-phase effort by Five Valleys Land Trust (Five Valleys) and project partners, with the goal of securing permanent protection of natural habitats, open space and historic ranch values on Lower Willow Creek and Flint Creek. This 400-acre ranch is predominately flood-irrigated pastureland and wetland habitats and is used for field hay production and cattle grazing. The ranch contains reaches of Flint Creek, Lower Willow Creek, numerous springs and several wetlands, including some open-water wetland areas. The lower Flint Creek Valley is mostly undeveloped agricultural lands, typical of rural western United States.

The Henderson Ranch was homesteaded in 1873 by Jim Henderson's Great-Great Grandfather and has been a cornerstone of the Flint Creek Valley's rural landscape since the founding of the valley. The Henderson Ranch has senior water rights (pre-1878) from both Flint Creek and Lower Willow Creek. The Henderson Ranch has the farthest-downstream legally-usable water rights on Lower Willow Creek, and therefore they control instream flows. The Henderson Ranch also has the last usable artesian well on Lower Willow Creek, which historically provided wintertime water to the Mullan Trail travelers.

The Henderson Ranch CE will preserve the historic vistas, ranching values and wildlife habitats that have made Montana a destination for vacationing tourists. The Henderson Ranch CE will protect 2,900 feet of Flint Creek and almost 5,400 feet of Lower Willow Creek, a critical spawning tributary for Flint Creek fish (3,000 feet upstream and 2,400 feet downstream of Highway 1). The Lower Willow Creek riparian corridor is used as a migratory corridor between the Flint Creek Range and the John Long Mountains.

The property's natural qualities are threatened by increasing development pressure, including surrounding subdivisions. Five Valleys is working towards an agreement on a conservation easement on this property that will protect the ranch from

subdivision and restore the riparian, wetland and upland habitats. Five Valleys and our partners view this as an opportunity to protect the property and ranching values, restore the property's native habitat, and develop instream flows to protect Lower Willow creek and Flint Creek. The Henderson Ranch CE leverages additional proposed private-land conservation easements directly across Flint Creek, which will protect an additional 2,600 feet of Flint Creek and 7,900 feet of Barnes Creek (Mentzer Ranch Conservation Easement Proposal, also submitted).

The overview of the project objectives are as follows:
Objective 1: Permanently protect Lower Willow Creek and a portion of Flint Creek.
Objective 2: Protect the historic ranching vistas and values of the lower Flint Creek Valley.
Objective 3: Restore the fluvial and wetlands conditions on Lower Willow Creek and a potion of Flint Creek, which will include maintaining instream flows in Lower Willow Creek.

Expected project outcomes (benefits to aquatic/terrestrial resources and benefit to public use and enjoyment of these resources) are:

1. Eliminate development from encroaching on the agricultural fields adjacent to Lower Willow Creek and Flint Creek;
2. Combine investment in habitat enhancement with permanent protection to provide wildlife, and their migratory corridors, and recreation replacement;
3. Protection of multiple habitat types (riparian, grassland, and wetlands);
4. Maintain riparian habitat connectivity between Flint Creek and a major tributary, Lower Willow Creek;
5. Replace injured terrestrial wildlife resources through protection & enhancement of habitats similar to those injured;
6. Encouraging natural regeneration of cottonwood trees and willows to benefit riparian habitat and associated targeted species;
7. Enhancement of fisheries resources through restoration of instream flow to in Lower Willow Creek;
8. Replace lost fishing, wildlife viewing, bird watching and other wildlife-related outdoor recreational opportunities by enhancing fish and wildlife habitats.

Project Location:

The Henderson Ranch lies 5-miles south of Drummond, MT (see attached map) on the west side of the Flint Creek Valley along Highway 1. The ranch contains lands on both sides of Highway 1 where Lower Willow Creek crosses under the highway. Highway 1 is a popular tourist route and is listed as a scenic highway in Montana. Recreationalists use this route to access upper Rock Creek, Georgetown Lake, Philipsburg, and numerous mountain ranges and wilderness areas. Protecting the rural agricultural lands and Flint Creek Valley aesthetics are critical to maintaining the scenic values of Highway 1.

The 400-acre Henderson ranch contains reaches of Flint Creek, Lower Willow Creek, numerous springs and several wetlands, including some open-water wetland areas. The Henderson Ranch has approximately 2,900 feet of Flint Creek and almost 5,400 feet of Lower Willow Creek, which is used as a migratory corridor between the Flint Creek Range and the John Long Mountains. At least four springs emerge on the Henderson Ranch, which includes an artesian well. The riparian corridors along Flint and Lower Willow Creeks are typical wetland riparian areas that provide critical wildlife habitats.

Unfortunately, Lower Willow Creek is degraded on the Henderson's ranch. Lower Willow Creek is a dam-controlled, third order tributary to Flint Creek. Flint Creek, a fourth order stream, also flows through the ranch. The Flint Creek basin has been well studied due to irrigation issues. While these streams provide benefits for both aquatic and terrestrial life, Lower Willow and Flint Creeks have been degraded from past land management practices. Flint Creek is a destination trout fishery, that provides spawning and recruitment to the Clark Fork River. Lower Willow Creek is a spawning tributary for both Flint Creek and Clark Fork River fish.

Project Description:

The Henderson Ranch CE project will permanently protect natural habitats, open space and historic ranch values on Flint Creek and Lower Willow Creek. The project will restore the degraded riparian corridors along both creeks, while maintaining the traditional ranching values of Montana. The Henderson Ranch CE project will protect/restore this 400-acre ranch, approximately 2,900 feet of Flint Creek, almost 5,400 feet of Lower Willow Creek, four springs including an artesian well, and approximately 100 acres of wetlands.

Flint Creek's habitat is degraded due to historic over-grazing, willow removal, altering of the riparian area's hydrology. Numerous drainage ditches were dug to "dry-up" the area along Flint Creek for improved grass production. Flint Creek is a slightly over-wide, low gradient, highly sinuous channel ("C3/4b" channel Rosgen classification). Flint Creek's natural patterns and dimensions remain, and by managing the grazing and restoring the wetland hydrology, it would recover without much intervention. The area will need to be extensively planted with woody riparian species and weeds will need to be controlled.

The conservation easement on the Henderson Ranch will facilitate passive restoration of the wetland hydrology and riparian vegetation, and manage grazing along the creek. Drainage ditches will need to be filled and the floodplain berms removed. Flint Creek will be fenced, and Five Valleys will work with the landowners on grazing management.

Lower Willow Creek is a dam controlled, alluvial system that has been impacted by irrigation withdrawals and land management practices. Lower Willow Creek flows either across the extensive alluvial deposits of Flint Creek, or on older deposits that

form elevated benches west of Flint Creek. Lower Willow Creek should be classified as a Rosgen "E4/5-channel type", but channelization and the loss of woody vegetation have caused reaches to become braided, incised or in an non-equilibrium state trying to change back to a natural E-type channel (D-channel and G-channel types, respectively). A typical "E-type" channel should have a wide floodprone area, a small width to depth ratio, be highly sinuous, and low gradient channel surrounded by dense, sedge/willow/cottonwood riparian vegetation. Channelization and over-grazing contribute instability and excessive sediment inputs, destroying pool habitats and limiting spawning.

The Henderson Ranch CE project will restore and protect Lower Willow Creek habitats. Along the reaches upstream of Highway 1, the floodplain berms and undersized bridge will be removed and the drainage ditches filled. The springs will be protected and allowed to either sub-irrigate to riparian corridor or be connected to the main channel with a natural channel. The Lower Willow Creek channel will be vegetated to protect the streambanks, provide fish and wildlife habitat, and develop a continuous migration corridor. Downstream of the highway, the berms along Lower Willow Creek will be removed, sinuosity added in the channelized reaches, streambanks stabilized and the entire riparian corridor panted with woody species to mimic a natural channel. The entire area will be protected with a riparian fence.

The conservation easement will facilitate passive restoration of the wetland hydrology and riparian vegetation, and will manage grazing along the creek. Lower Willow Creek will be fenced, and FSA will work with the Henderson Ranch on the grazing and management of the riparian corridor. Five Valleys will solicit funding to restore the channel and revegetate the riparian corridor.

Objective 1: Permanently protect Lower Willow Creek and a portion of Flint Creek.

Strategies:

a. Acquire a conservation easement on the 400-acre Henderson Ranch.
b. Support permanent conservation on adjoining private lands through conservation easements (Mentzer Ranch CE).
c. Continue to work with adjacent landowners to manage and protect the conservation values in the Flint Creek Valley.

Objective 2: Protect the historic ranching vistas and values of the lower Flint Creek Valley.

Strategies:

a. Establish conservation easements that retain the valley's rural aesthetics and ranching values.
b. Restore and maintain the historic values of this 140-year-old ranch.
c. Protect the artesian well and water source.
d. Maintain an instream flow on Lower Willow Creek .

Objective 3: Restore the fluvial and wetlands conditions on Lower Willow Creek and a potion of Flint Creek, which will include maintaining instream flows in Lower Willow Creek.

Strategies:

a. Restore the dredged wetland habitats along Flint Creek by filling in the drainage ditches and vegetate the riparian corridor with native plants.
b. Remove the berms that were constructed along Lower Willow Creek to reduce flooding.
c. Restore Lower Willow Creek in the reaches that are channelized and stabilize the numerous eroding streambanks. Revegetate the riparian corridor with willows, cottonwoods, alders and snowberries.
d. Restore the drained wetlands and springs along the upper reaches of Lower Willow Creek and remove the old access road that impairs floodplain function.
e. Provide year-round fish passage at the two headgates on the Henderson Ranch to enable spawning fish access to the upstream reaches.

Project Schedule:

Phases 1 and 2 of the Henderson Ranch CE, the conservation easement and restoration designs, will be complete by the end of 2012. Restoration activities will begin following acquisition of the conservation easement. A complete timeline for the project is shown below in Table 1.

Table 1. Project Timeline

Phase	*Action*	*Scheduled Completion Date*
Phase 1*	Finalize Henderson Ranch CE negotiations	July 2012
	Fundraising	July 2012-March 2013
	Environmental Assessment	September 2012
	Agreement In Principle	December 2012
Phase 2	Develop terrestrial and aquatic habitat restoration plans (Flint Creek Wetlands & Lower Willow Creek Design)	June 2012-Decemebr 2012
Phase 3	Restore Lower Willow Creek	2013
	Install Grazing Management Fences	2013
	Restore Flint Creek Wetlands	2013-2014

General Cost Information:
The total anticipated project costs for Phase 1 and 2 are $528,000. Cost breakdown is shown in Table 2 below.

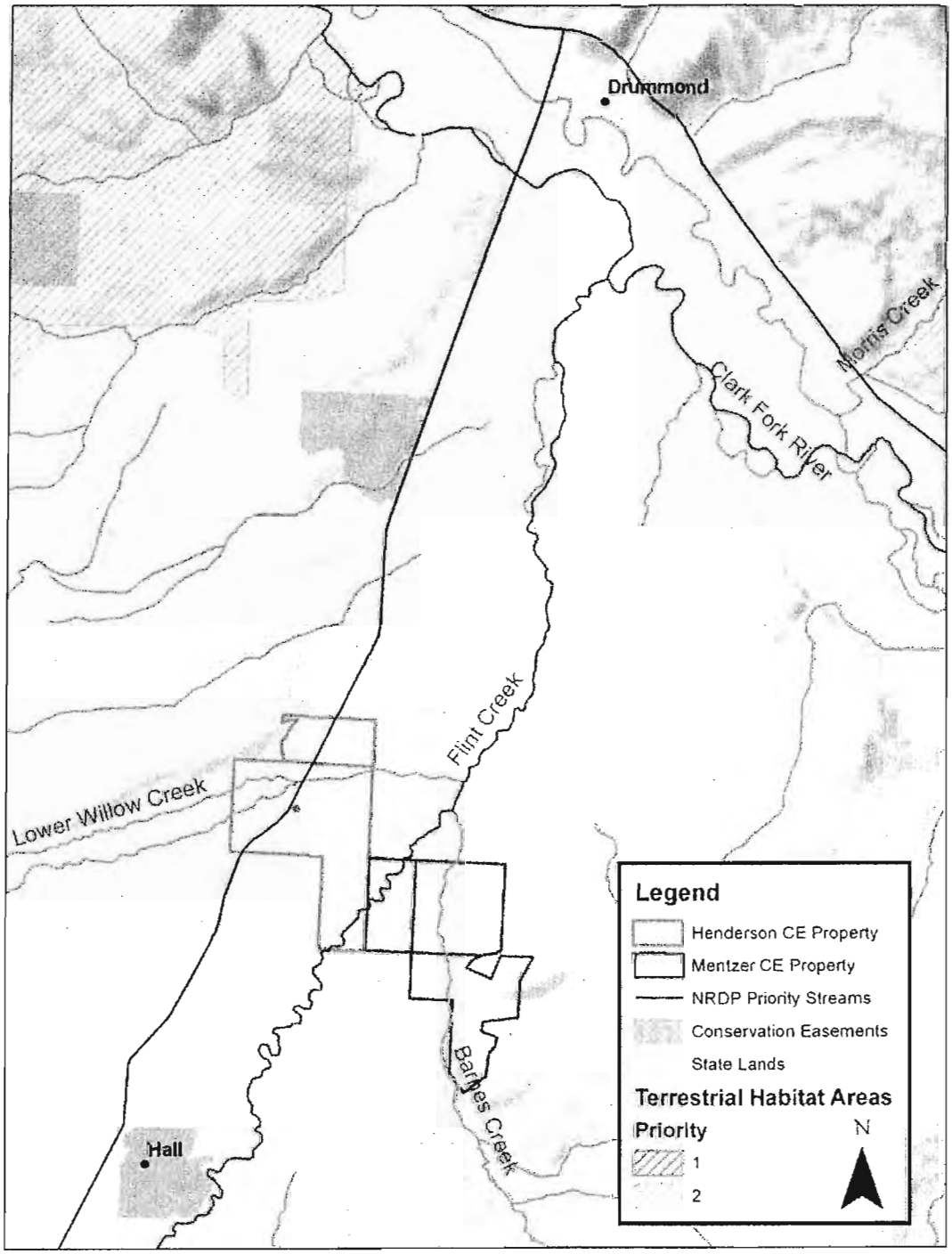
Table 2. Project Costs (Phases 1 & 2)		
Expense	*Amount*	*% Total*
Henderson Ranch CE	$480,000	91%
Staff time	$20,000	4%
Legal fees	$5,000	<1%
Environmental Assessment	$2,000	<1%
Recording fees	$1,000	<1%
Flint Creek Restoration Plan	$5,500	<1%
Barnes Creek Restoration Plan	$14,500	3%
Total Expenses	**$528,000**	**100.0%**

** Only costs/funding for Phase 1 & 2 of the Henderson Ranch CE are shown here. Costs/funding for Phase III cannot be fully developed until Phase 2 is complete. NRD funds requested here are for Phase 1 and 2 only.*

Five Valleys and project partners are requesting $268,000 in NRD funds to complete Phases 1 and 2 of the Henderson Ranch CE project. NRD funding will be leveraged with $260,000 of matching/cooperator contributions toward Phase 1 and 2 project costs. In total, Five Valleys will leverage 49% of the total necessary funds to match the 51% requested from the NRDP.

Table 3. Project Funding (Phases 1 & 2)		
Funding Source	*Amount*	*% Total*
Natural Resource Damage Program	$268,000	51%
Natural Resource Conservation Service (Farm Bill)	$240,000	45%
Farm Service Agency	$20,000	4%
Total Project Funds	**$528,000**	100.0%

Project Area Map



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Abstract: Mapping Suitable Habitat for Passive Restoration of Tributaries of the Upper Clark Fork Basin

Name and Contact Information:

This proposal is being submitted by the Wildlife Conservation Society (WCS) in partnership with Amy Chadwick of Watershed Consulting, LLC.

The points of contact for this proposal are:

Primary:	Secondary:
Amy Chadwick	Jeff Burrell
Watershed Consulting, LLC	Wildlife Conservation Society
P.O. Box 17287	301 N. Willson Ave.
Missoula, MT 59808	Bozeman, MT 59715
(406) 250-4024	(406) 522-9333 ext. 101
amy@watershedconsulting.com	jburrell@wcs.org

Wildlife Conservation Society (WCS) is working in partnership with Amy Chadwick of Watershed Consulting to identify suitable and beneficial habitat restoration sites in the upper Clark Fork watershed. The team will be applying a beaver habitat suitability model developed in the Big Hole watershed to a priority area of the upper Clark Fork River watershed. Stephen Carpenedo of Montana DEQ will serve as a technical advisor for model expansion and calibration.

Amy Chadwick is lead Water Resources Scientist at Watershed Consulting and has been working with WCS in the Big Hole Valley to address landowner conflict with beaver and identify sites suitable for stream restoration using beaver and other passive restoration techniques. She is currently working with WCS and Clark Fork Coalition (CFC) to host hands-on workshops in the Big Hole and Clark Fork watersheds to teach landowners to build flow devices to protect culverts and headgates and prevent flooding from beaver dams.

Project Purpose and Benefits:

The goal of this proposed project is to identify sites most suitable for low-cost restoration within the Reach A /Silverbow Creek Priority Area for fishery enhancement.

This project has several objectives:

1. Map suitable habitat for re-colonization by beaver in tributary headwaters and riparian sites that can readily be restored to provide improved wildlife and fish habitat;
2. Expand the utility and rigor of the beaver habitat suitability model developed by MDEQ;
3. Identify sites where beaver are causing problems for management activities and prescribe solutions;
4. Identify stream reaches most likely to benefit from eventual re-colonization by beaver; and
5. In reaches determined to be high priority or highly feasible for restoration with beaver, document potential conflicts with fish, wildlife, or land management activities.

Expected outcomes of this project include:

A. GIS-based maps and report of results identifying stream reaches most suitable to support beaver populations - in current condition and with additional process-based restoration;

B. A ranking of sites that could receive beaver if moved from areas where they currently cause problems (such as restoration sites on the Clark Fork River and Silverbow Creek); and
C. A prioritized list of sites and solutions for addressing land management conflicts with beaver.

Justification

Re-establishing beaver populations in headwaters areas is among the most cost-effective means of restoring stream flows, wetlands, and quality fish and wildlife habitat in the riparian corridor and floodplain. The habitat suitability model is an efficient way to map habitat suitability at a landscape scale. Ground-truthing efforts will serve not only to calibrate the model but will identify additional areas where flow devices may be needed at current beaver activity sites to protect culverts or prevent flooding of roads or structures. DEQ personnel involved with restoration projects on Silverbow Creek and the Clark Fork River have expressed frustration with beaver causing damage to revegetation projects; this assessment also would locate areas suitable for relocation of beaver from conflict areas to headwater sites where they may provide watershed benefits.

The benefits of beaver to stream corridors, fish, and wildlife, are many. One of the primary benefits is trapping sediment and reducing erosion. Stable beaver complexes reduce sediment loading by trapping sediment in ponds, absorbing the energy of scouring run-off flows, and raising water levels to reduce the amount of exposed bank, thus allowing water to spread out on the floodplain during high flows rather than cutting into exposed streambanks. Raising the water table also allows native floodplain and riparian vegetation to thrive, further stabilizing banks and reducing stream energy during runoff. With the current beaver population estimated at 10-20% of historic levels, the potential for sediment reduction and retention is enormous. For example, a study in Oregon estimated that sediment retention in four beaver ponds, three of which had breached, still retained about 11% of the average annual sediment yield from the watershed (Ringer 1994). Sediment that is retained supports wetland vegetation and forms the foundation of new riparian meadows.

Cases of intermittent streams regaining perennial flow after beaver were restored to headwaters are well-documented in scientific literature. In addition, beaver complexes help raise groundwater levels in the floodplain in high and low flow conditions, sub-irrigating fields and vegetation on the floodplain downstream of the beaver complex (Lowry 1993; Westbrook et al. 2006). In eastern Oregon, groundwater levels in the floodplain near a beaver dam substantially increased as compared to a reach lacking dams, suggesting that dams do help increase water availability to riparian areas at least 50 m from the pond (Lowry 1993). Beaver complexes also moderate spring runoff flows, reducing scouring energy that would potentially cause erosion downstream (Pollock et al. 2003).

Beaver complexes increase fish habitat complexity, which is currently limited on many streams. Increasing occurrence of a variety of habitat types supports multiple age-classes of fish by providing spawning habitat adjacent to refugia, crucial for the persistence of fish in the face of drought or dewatering (White and Rahel 2008). Beaver complexes can provide thermal refugia for coldwater fish, especially for wintering and feeding, often providing deep pool habitat with moderate temperatures or increased groundwater upwelling. McCaffery (2009) found that native cutthroat trout populations displayed increased resiliency to invasive brook charr on streams with beaver as compared to streams with no beaver activity, even though presence of beaver benefits brook charr as well. The issue of beaver activity benefitting brook charr is an important consideration in any activity promoting beaver population expansion and must be considered in a feasibility assessment, with input from FWP and USFWS, and therefore would be a layer of analysis in identifying suitable beaver habitat.

Expected benefits

This analysis will identify opportunities to restore habitat on tributaries to the Clark Fork River and Silver Bow Creek with cost-effective and light-handed techniques, which will allow more complete restoration over a greater area than traditional cost-intensive techniques. This assessment will provide a watershed-scale prioritized map of feasible sites for beaver relocation and passive restoration projects, the benefits of which would include trapping and securing large quantities of sediment, improving biochemical processing of pollutants in wetland habitat, mitigating high runoff flows to reduce energy hitting downstream streambanks, raising the water table in incised streams, improving subirrigation of floodplains, and reducing streambank erosion. As part of the model ground-truthing, sites where beaver threaten land uses will be identified and recommendations provided. Sites identified for habitat improvement and beaver relocation will be in smaller tributaries and headwaters; thus, an added benefit of this project will be identifying sites that can receive problem beaver from restoration projects on the Clark Fork River and Silverbow Creek.

Beaver habitat restoration and eventual establishment of new stable colonies would provide many benefits to aquatic and terrestrial resources, including: improving late season instream flows; providing thermal refugia; improving aquatic habitat complexity; increasing the extent of interior habitat for passerine birds; improving fishing, hunting, birding and other wildlife viewing opportunities; providing more groundwater upwelling sites; and increasing shading and cover on the streambanks and floodplain.

Project Location

The project location is Reach A, Upper Clark Fork and Silver Bow Creek Priority Area, identified in "Prioritization of Tributaries of the Upper Clark Fork Basin for Fishery Enhancement." Reach A is one of three shown on the map in **Figure 1** (following page).

Project Description

This project provides the most cost-effective approach to determining potential for restoring habitat on tributaries using management shifts, passive restoration techniques, and beaver. In many cases beaver do not need to be relocated, but will move into areas as soon as the habitat is suitable. For projects involving beaver relocation (the implementation of which is not part of this proposal) it will be necessary to work with local wildlife managers to complete any required environmental assessment and meet any other requirements. For this reason, this proposal focuses on identifying habitat that could readily be made suitable for beaver recolonization and potential landowner conflicts with beaver activity.

This project would involve the following components and tasks:

1. Meet with project partners (WCS and DEQ) and other interested parties (NRD, USFWS, FWP, Clark Fork Coalition) to review project objectives and approach, and to identify potential project conflicts and opportunities to dovetail objectives;
2. Collect and compile existing GIS data and assessment reports to build the modeling framework;
3. Conduct habitat suitability modeling;
4. Secure landowner access with help from CFC for ground-truthing model, and interview landowners about beaver and land use conflicts;
5. Visit a sampling of predicted conditions and likely sites for beaver activity conflicts with land use;
6. Calibrate model using field data and produce final maps and report for beaver habitat suitability model results and prioritization of passive restoration and beaver management projects. Final prioritization will overlay model results with land management concerns; and
7. Hold local meeting to report results and educate landowners about techniques for protecting culverts and headgates and controlling flooding by beaver.

The lead entity for this project is Wildlife Conservation Society, with Amy Chadwick of Watershed Consulting as the lead investigator and project manager.

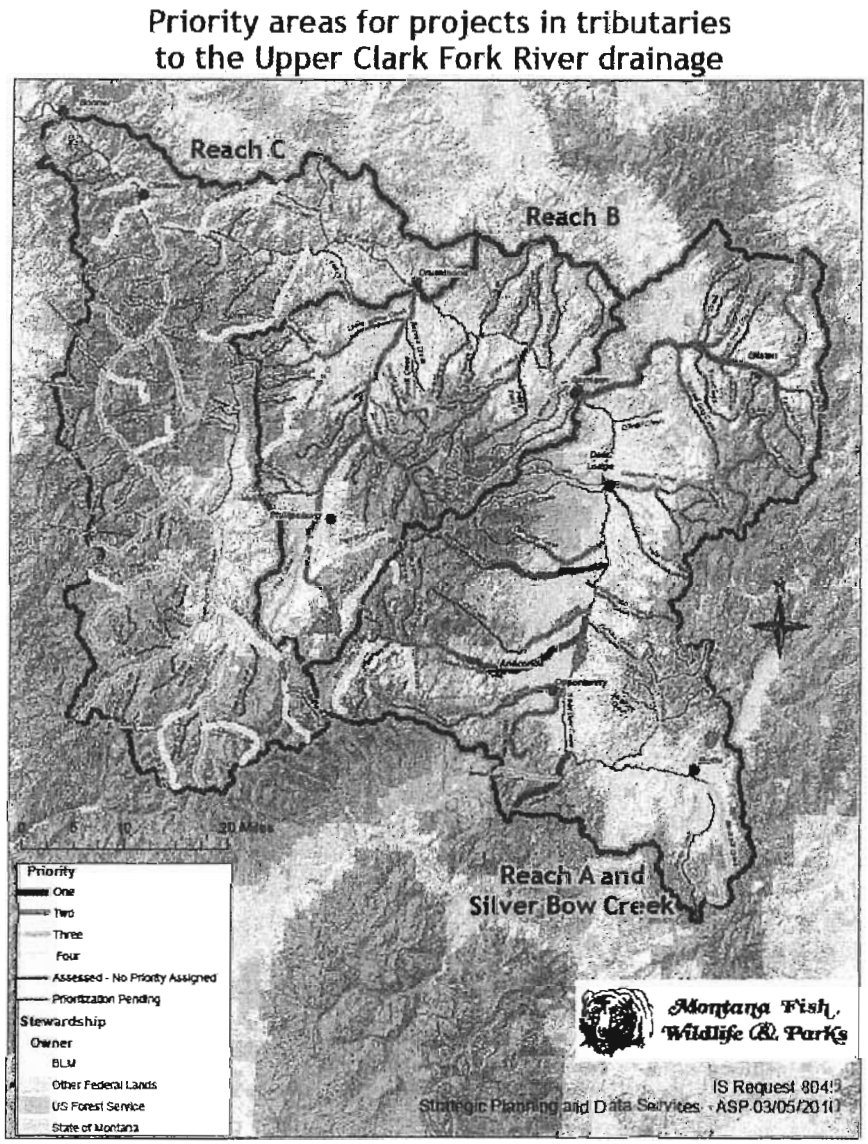

Figure 1. Proposed project area (Reach A and Silver Bow Creek). Map source: http://dnrc.mt.gov/wrd/water_mgmt/clarkfork_steeringcomm/meeting_presentations/prioritization_of_tributaries.pdf

Project Schedule

The project timeline assumes funding is available by spring of 2013.

Compiling GIS data and other information would start directly after funding is made available. Initial modeling and landowner contact would be completed by July of 2013 to allow ground-truthing to occur in late summer. Model calibration and reporting would be completed by the end of November, 2013.

General Cost Information

Project costs are outlined below:

Salaries/benefits $19,000
Travel and communication $2,000
Production/Materials $100
WCS administrative cost at 16.91% = $3,568.01
Total: $24,668.01

Anticipated match is $3600 from Watershed Consulting ($20/hr discount for 120 hours)

References:

Lowry, Michael M. 1993. Groundwater Elevations and Temperature Adjacent to a Beaver Pond in Central Oregon. M.S. Thesis, Oregon State University, Corvallis, Oregon. 121 p.

McCaffery, Magnus. 2009. The influence of an ecosystem engineer on nutrient subsidies and fish invasions in southwestern Montana. PhD dissertation, University of Montana, Missoula, MT. 99 p.

Pollock, Michael M., M. Heim, and D. Werner. 2003. Hydrologic and Geomorphic Effects of Beaver Dams and Their Influence on Fishes. American Fisheries Society Symposium 37, 2003.

Ringer, Gina. 1994. Sedimentation of beaver ponds in an Oregon Coast Range stream . M.S. Thesis, Oregon State University, Corvallis, Oregon. Accessed at: http://ir.library.oregonstate.edu/xmlui/bitstream/handle/1957/9764/Ringer%2c%20Gina%20O_1994_MS.pdf?sequence=1

Westbrook, Cherie, David J. Cooper, and Bruce W. Baker. 2006. Beaver dams and overbank floods influence groundwater–surface water interactions of a Rocky Mountain riparian area. Water Resources Research, Vol. 42, W06404.

White, Seth M. and Frank J. Rahel. 2008. Complementation of Habitats for Bonneville Cutthroat Trout in Watersheds Influenced by Beavers, Livestock, and Drought. Transactions of the American Fisheries Society 137:881–894, 2008

Montana Department of
ENVIRONMENTAL QUALITY
Brian Schweitzer, Governor
P. O. Box 200901 Helena, MT 59620-0901 (406) 444-2544 Website: www.deq.mt.gov

Thursday, June 14, 2012

Natural Resource Damage Program
1301 East Lockey
P.O. Box 201425
Helena, MT 59620-1425

RE: Letter of Support Restoration Concept Abstract
Mapping Suitable Habitat for Passive Restoration of Tributaries of the Upper Clark Fork Basin

To whom it may concern,

As the Wetland Environmental Science Specialist with Montana Department of Environmental Quality Wetland's Program, I want to offer my support for the Wildlife Conservation Societies and Watershed Consulting, LLC's restoration concept abstract titled, "Mapping Suitable Habitat for Passive Restoration of Tributaries of the Upper Clark Fork Basin".

MDEQ's Wetland program views beaver as an innovative and cost-effective restoration tool for the improvement of stream flows, water quality, wetlands, and fish and wildlife habitat. This project would expand on the beaver habitat suitability model that was developed for the Big Hole watershed. Habitat suitability models are commonly used as cost-effective tools to help identify and prioritize sites within large landscapes for conservation and restoration. Applying the beaver habitat suitability model in the Upper Clark Fork Basin will provide a tool and expanded information to more effectively target streams that may be suitable restoration sites and benefit from the re-colonization by beavers.

I believe that Watershed Consulting, LLC is ideally situated to complete this project. I encourage the review committee to fund this important work.

Sincerely,

Stephen M. Carpenedo
(Electronic signature)

Stephen M. Carpenedo
Wetland Environmental Science Specialist
MDEQ Wetland Program
1520 East 6th Ave.
Helena, MT 59601

Email: SCarpenedo2@mt.gov
Phone: 406-444-3527

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1. PROJECT TITLE: **Harvey Creek Integrated Restoration**

2. ORGANIZATION AND CONTACT:

Trout Unlimited
111 N. Higgins Ave, Suite 500
Missoula, MT 59802

Casey Hackathorn, Project Manager
406-541-1194
chackathorn@tu.org

3. PROJECT PURPOSE AND BENEFITS:

The purpose of the Harvey Creek Integrated Restoration Project is to improve recruitment of bull trout and westslope cutthroat trout to the Clark Fork River, protect genetically pure resident fish populations in Harvey Creek and improve the contribution of cold clean water from Harvey Creek to the Clark Fork River. The project will protect instream flow to the mouth of Harvey Creek, protect and restore riparian habitat on private and state lands, and improve native fish populations in both Harvey Creek and the Clark Fork River.

Harvey Creek Westslope Cutthroat Trout

Goals:

- Prevent entrainment of native fish in four irrigation ditches
- Protect instream flow in Harvey Creek through private and state lands to the Clark Fork River
- Improve upstream fish passage at the mouth of Harvey Creek allowing for access to ¼ mile of spawning habitat below the fish barrier for migratory Clark Fork salmonids
- Protect the integrity of the Harvey Creek fish barrier and prevent sedimentation from road erosion during flood events.

Objectives:

- Screen 3 irrigation diversions
- Disconnect Harvey Creek from Clark Fork canal near mouth with a siphon
- Protect up to 5 CFS Harvey Creek for instream flow
- Install 1 mile of riparian fencing

4. PROJECT LOCATION AND MAP:

The project area is on private and state land on the lowermost 2 mile reach of Harvey Creek, approximately 12 miles west of Drummond.

5. PROJECT DESCRIPTION:

Harvey Creek flows 18 miles northeast from the John Long Mountains to its confluence with the Clark Fork River approximately 12 miles west of Drummond, MT. The Harvey Creek watershed is a 42 square mile basin draining more than 60 miles of stream channel. Harvey Creek is listed as an NRDP Priority 2 watershed and is designated Critical Bull Trout Habitat. Improvements to allow for outmigration of juvenile and adult bull trout and westlope cutthroat trout from Harvey Creek to the Clark Fork River as well as to permanently secure existing habitat are critical to conservation and recovery of native fish in the Clark Fork River in this area.

A timber grade control structure maintained at the outlet of a county road culvert ¼ mile upstream from the mouth forms a permanent, year-round fish passage barrier and protects the native fish population upstream from introgression of non-natives. The fish community upstream of the barrier is comprised exculsively of native fish including genetically pure bull trout and westslope cuthroat trout. The Clark Fork River reach fed by Harvey Creek has the lowest fish density in the entire Upper Clark Fork.

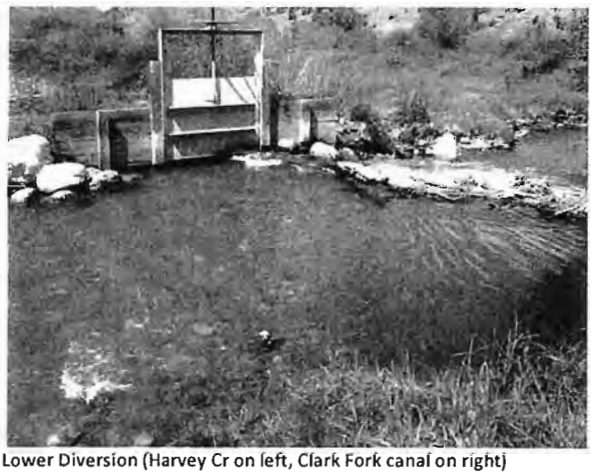
There are five irrigation diversions on Harvey Creek including four open ditches for flood irrigation and one pump to a wheel line. The lowermost diversion located on DNRC property near the mouth of Harvey Creek has been extensively studied and entrainment of both WCT and bull trout has been documented. This structure, maintained by the Weaver Ranch, is used to divert water from Harvey Creek as well as Clark Fork water from an intersecting canal. The result is that the majority of Harvey Creek flow is captured in the ditch and replaced with Clark Fork water under most conditions.

Three more open ditches above the fish barrier on the Harvey Creek Ranch pose additional entrainment risk but have not been evaluated. Irrigation improvements on the Harvey Creek Ranch could result in water savings protectable for instream flow. In 2010, the Harvey Creek Ranch began a riparian fencing project with Future Fisheries and USFW Parnters in Wildlife funding. The project will be completed in 2012 but does not include protection for pastures on the west side of Harvey Creek.

Trout Unlimited is currently engaged in a cooperative trapping study with our West Slope Chapter and Montana Fish, Wildlife and Parks to monitor fish movement in and out of Harvey Creek below the barrier. TU is also monitoring flow and temperature in Harvey Creek over the course of the 2012 irrigation season.

The Harvey Creek culvert under Mullan Road (Granite County maintained) is currently undersized. The road was topped and subsequently repaired during spring runnoff in 2011 and 2012. The culvert sits on top of the timber grade control structure maintained as a fish barrier. The undersized culvert poses significant risk to the integrity of the fish barrier and contributes to sedimentation of the lower reachs of the Harvey Creek during high flow events.

Harvey Creek at Mullan Road
April 2012



Lower Diversion (Harvey Cr on left, Clark Fork canal on right)
May 2012

TU proposes taking a lead role in implementation of the Harvey Creek Integrated Restoration project. TU has initiated project development discussions with both the Weaver Ranch and the Harvey Creek Ranch and has completed preliminary engineering work to determine feasible alternatives for improving fish passage at the Weaver Ranch (see attached technical memo). In addition, TU has coordinated proposed actions and is developing the project with the cooperation and support of multiple state and federal agencies. Future work will entail completing project development with the irrigators and agencies, hiring and coordination of additional engineering and design, and oversight of construction activities. We propose annual monitoring of projects completed under this project for three years to ensure successful implemenation. In addition, funding and implementing a long-term maintenance program for fish passage and screening structures will be critical throughout the Upper Clark Fork and is being submitted in a separate proposal.

Project Tasks:

DNRC Property

- Remove existing diversion near mouth of Harvey Creek
- Design and build fish screen/separate diversion for Harvey Creek and connect to existing ditch
- Design and build a siphon to move Clark Fork canal water under Harvey Creek to existing ditch
- Conduct post project monitoring and maintenance

County Road

- Replace Harvey Creek culvert at Mullan Rd with an appropriately sized culvert or bridge

Harvey Creek Ranch

- Improve two diversions to include improved water control and delivery and install fish screens
- Replace one open ditch and one pumped wheel line with well(s) and sprinkler irrigation
- Complete water right transaction to protect minimum instream flow in Harvey Creek in return for the above irrigation improvements
- Complete riparian fencing on Harvey Creek through the unfenced portions of the ranch
- Conduct post project monitoring and maintenance

Project Partners:

- Westslope Chapter Trout Unlimited
- Montana Water Project of Trout Unlimited
- Montana Trout Unlimited
- Weaver Ranch
- Harvey Creek Ranch
- Granite County
- Montana Fish, Wildlife and Parks
- Montana Department of Natural Resources and Conservation
- U.S. Fish and Wildlife Service
- Lolo National Forest
- Clark Fork Coalition

6. PROJECT SCHEDULE:

The project is expected to take two to three years to complete. Project development with DNRC, Weaver Ranch, Harvey Creek Ranch and Granite County is already underway. Preliminary survey and engineering work is complete for the lowermost diversion and construction could be completed after irrigation season in 2013 or prior to irrigation season in 2014. Additional survey and engineering is required to design the culvert replacement as well as the fish passage and irrigation infrastructure improvements on the Harvey Creek Ranch. Construction of irrigation improvements on the Harvey Creek Ranch could be completed in late 2013 or early 2014. Riparian fencing should be completed after stream projects are completed.

	2012				2013				2014			
	1st QTR	2nd QTR	3rd QTR	4th QTR	1st QTR	2nd QTR	3rd QTR	4th QTR	1st QTR	2nd QTR	3rd QTR	4th QTR
Project Development												
Alternative Analysis (DNRC)												
Conceptual Design (DNRC)												
Fish Passage Study												
Water Right Change Process												
Alternative Analysis (Harvey Cr Ranch)												
Engineering (DNRC and culvert)												
Design (Harvey Cr Ranch)												
Replace Culvert												
Construction (DNRC)												
Construction (Harvey Cr Ranch)												
Monitoring												
Weed Control												
Fencing												

7. PROJECT BUDGET:

ITEM	UNIT	QTY	UNIT COST	TOTAL COST	MATCH	NRDP
Salaries and Expenses:						
Project Development	HR	60	$ 40	$ 2,400	$ 800	$ 1,600
Project Oversight	HR	320	$ 40	$ 12,800	$ 800	$ 12,000
Water Right Transaction	HR	160	$ 50	$ 8,000		$ 8,000
Permitting	HR	12	$ 40	$ 480		$ 480
Post Project Monitoring	HR	16	$ 40	$ 640		$ 640
Study (Volunteer)	HR	400	$ 20	$ 8,000	$ 8,000	$ -
Study (Staff)	HR	300	$ 40	$ 12,000	$ 12,000	$ -
				$ 44,320	**$ 21,600**	**$ 22,720**
Contracted Services:						$ -
Preliminary Engineering	LS	1	$ 10,000	$ 10,000	$ 10,000	$ -
Siphon	EA	1	$170,000	$ 170,000	$ 60,000	$ 110,000
Fish Screens	EA	3	$ 30,000	$ 90,000		$ 90,000
Riparian Fencing	FT	6,000	$ 3	$ 15,600	$ 8,000	$ 7,600
Replace Culvert	LS	1	$ 30,000	$ 30,000		$ 30,000
Install Well and Pivot	LS	1	$145,000	$ 145,000	$ 36,000	$ 109,000
				$ 460,600	**$114,000**	**$ 346,600**
Travel and Communication:						$ -
Mileage	MI	2,160	$ 0.555	$ 1,199		$ 1,199
TOTAL:				**$ 506,119**	**$135,600**	**$ 370,519**

MORRISON MAIERLE, INC.
An Employee-Owned Company

Technical Memorandum

TO: Casey Hackathorn, TU

FROM: Russ Anderson P.E., MMI
Paul Parson P.E., MMI
Boyd Burnett P.E., MMI

RE: Harvey Creek Fish Passage Project: Flow Separation and Fish Screening.

DATE: June 11, 2012

Introduction:

Background

Trout Unlimited (TU) is leading an effort to improve fish protection on Harvey Creek, a tributary to the Clark Fork River west of Drummond, MT. A diversion on the Clark Fork River just upstream of Harvey Creek brings water into an irrigation ditch to convey water for irrigated agricultural land on the south side of the Clark Fork River. The ditch water from the Clark Fork diversion mixes with Harvey Creek at a second diversion structure located on Harvey Creek before continuing on to the place of use. The water rights serving the agricultural land include a total of 18.26 cfs with 14.51 cfs taken from the Clark Fork River (9.7 cfs Weaver Trust; 4.81 cfs Womack and Tripp Trust) and 3.75 taken from Harvey Creek (Weaver Trust).

During most flow conditions, adequate water exists in Harvey Creek to supplement the Clark Fork River water in the irrigation ditch to maintain flow in the section of Harvey Creek between the diversion location and the Clark Fork River. However, there are times during low flow periods when most or all of Harvey Creek is diverted into the irrigation ditch, dewatering the short section of Harvey Creek and creating a fish passage barrier in the reach below the diversion point. Furthermore, fish entrainment from Harvey Creek into the irrigation diversion has been documented and eliminating entrainment is a primary objective of this project.

Morrison-Maierle, Inc.'s (MMI) project team (Russ Anderson, Boyd Burnett, Paul Parson and Mark Waller) visited the Harvey Creek site on April 30th, 2012 to meet with TU (Casey Hackathorn), conduct field investigations, and complete a topographic survey of the project area. The results from the survey and field investigations were used to develop feasible alternatives for the project and allow stakeholders to select a preferred alternative, which is the basis of the conceptual design presented in this technical memorandum.

Purpose

This technical memorandum presents the results of the fish protection and habitat improvement alternative analysis for the Harvey Creek project and a conceptual design for the preferred alternative. The goals of the project are two fold, namely; 1) eliminate or minimize mixing of diverted flows from the Clark Fork with Harvey Creek, and 2) eliminate entrainment of downstream migrants within Harvey Creek to the irrigation ditch. Clark Fork River / Harvey

Creek flow separation alternatives were explored and ranked based upon overall construction costs, separation system performance, and long-term operation and maintenance requirements / costs. Fish Screen alternatives were explored for the Harvey Creek Project and ranked based upon screen performance, overall screen costs, and long-term operation and maintenance (O&M) requirements / costs.

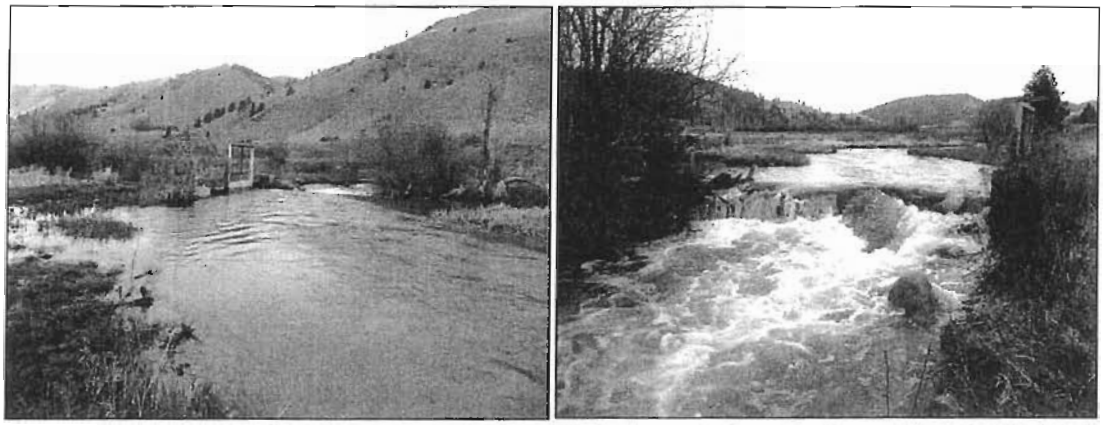


Figure 1. *Downstream (left image) and upstream (right image) view of mixing of Harvey Creek with flows diverted from the Clark Fork River.*

At this time it is not known who will be tasked with operation and maintenance of fish protection facilities. Alternative analysis and costs estimates are weighted heavily to the ease of operation and costs associated with perpetual maintenance for water users. The conceptual design section of this tech memo includes the discussion of preliminary design alternatives, pros and cons of alternatives, as well as discussion of the ranking of alternatives.

Conceptual Design Considerations:

Mixing the flows diverted from the main stem Clark Fork River with Harvey Creek can lead to various adverse conditions for fish species.

The following project alternatives have been identified to address the primary goals of the Harvey Creek Project:

1. **Siphon Clark Fork Ditch under Harvey Creek and Fish Screen Harvey Creek Diversion**: Siphon Clark Fork River water under Harvey Creek to eliminate mixing of flows and provide fish screening on Harvey Creek sized for the 3.75 cfs irrigation water right.
    a. Vertical plate screen in Harvey Creek at existing point of diversion
    b. Coanda effect screen in Harvey Creek at existing point of diversion

2. **Maintain Current Conditions with Fish Screening of Combined Water Rights**: Allow mixing of Clark Fork and Harvey Creek Water similar to current conditions and provide fish screen facilities immediately below the existing Harvey Creek head gate sized for the combination of irrigation water rights from both Harvey Creek and the Clark Fork River of 18.26 cfs (3.75 cfs from Harvey Creek and 14.51 cfs from the Clark Fork River Diversion).
    a. Vertical plate screen in irrigation ditch with fish bypass channel to the Clark Fork River

b. Horizontal flat plate screen (FCA farmers screen) in irrigation ditch with fish bypass channel to the Clark Fork River
c. Rotary drum screen in irrigation ditch with fish bypass channel to the Clark Fork River

3. **Retire Harvey Creek Water Right - Siphon Clark Fork Ditch and Combine Irrigation Rights**: Siphon Clark Fork Water under Harvey Creek to eliminate mixing of flows and combine irrigation water rights into one water right from the Clark Fork River (retire Harvey Creek water right).

4. **Siphon Clark Fork Ditch and Relocate Harvey Creek Point of Diversion**: Siphon Clark Fork Water under Harvey Creek to eliminate mixing of flows and relocate the Harvey Creek point of diversion up to 300 feet upstream in Harvey Creek to allow screening of the Harvey Creek water separately.

Alternative Discriptions:

Alternative 1-- Siphon Clark Fork Ditch under Harvey Creek and Fish Screen Harvey Creek Diversion

The first alternative was analyzed to eliminate mixing of Clark Fork River and Harvey Creek water by installing an approximately 80-ft long siphon conveying Clark Fork River diversion flows under Harvey Creek. Harvey Creek water rights would continue to be diverted at the current point of diversion. Fish entrainment from Harvey Creek into the irrigation system would be eliminated with fish screen facilities built into an improved head gate structure. The screened Harvey Creek flows would be conveyed in closed conduit and discharge into the irrigation ditch below the siphon outlet. Detailed description of siphon conceptual design and preliminary hydraulics are presented below.

Siphon

The preliminary siphon design provides conveyance of the Clark Fork River Diversion ditch flow by gravity beneath the existing Harvey Creek channel. To reduce head loss and prevent ditch channel erosion, concrete inlet and outlet structures should be constructed to provide transitional areas. Typical of many irrigation inlet structures, inverted siphon inlets have the potential to be hazardous in high population areas with uncontrolled access. Given the remote location of the Harvey Creek diversion, safety issues related to the installation of a siphon are considered low. The inverted siphon would require a minimum of 3 feet of cover beneath the thalweg of Harvey Creek to provide scour protection for the siphon piping. The siphon design requires a minimum water velocity of 4 ft/s through the siphon to prevent sedimentation at the sag of the siphon.

The conceptual design for the Clark Fork River diversion siphon includes a concrete inlet in the Clark Fork Diversion ditch approximately 50 feet east of the existing Harvey Creek diversion headgate and a concrete outlet structure approximately 30 feet west of the existing Harvey Creek diversion headgate. The inlet and outlet structures will be located away from the banks of Harvey Creek to facilitate as much natural function of Harvey Creek as possible during annual runoff events. Reconnaissance-level inspection of Harvey Creek and existing infrastructure suggests that Harvey Creek is relatively stable, with no evidence of vertical or lateral instability. Design considerations include protection of existing and infrastructure that would be installed as part of this project. Figures 2 and 3 below show a typical siphon entrance headwall for a road crossing near Deer Lodge, Montana. The proposed Harvey Creek Project siphon would consist of 24-inch HDPE with a total pipe length of approximately 80 feet. HDPE pipe is flexible, which

minimizes the trench depth, total length of required pipe, and enables the pipe to be constructed along the designed alignment with minimal fittings. By minimizing the number of fittings and length of pipe, much of the hydraulic losses associated with pipe materials are reduced. Concrete tie-downs will be installed around the pipe for the length of pipe beneath the Harvey Creek Channel. The tie downs maintain structural stability for the pipe and prevent pipe buoyancy when the siphon is empty.

Installing the inverted siphon beneath Harvey Creek allows abandonment of a short section of the existing Clark Fork Ditch between the siphon inlet structure and the eastern bank of Harvey Creek. Following installation of the siphon, shaping and regrading the ditch will be required, as well as re-establishing the banks and channel shape of Harvey Creek within the vicinity of the siphon construction zone. Revegetation and seeding will need to be implemented to protect the channel, reduce invasive weeds and provide long-term erosion control.

Figure 2. Siphon entrance headwall on the Kohrs & Manning Ditch (capacity of over 100 cfs) near Deer Lodge, Montana.

Figure 3. Side view of siphon entrance headwall on the Korhs & Manning Ditch near Deer Lodge, Montana crossing under an abandoned railroad bed.

To ensure adequate flow and water surface elevation above the siphon intake structure, the Clark Fork Ditch banks may be raised slightly. The intake structure incorporates a headgate to allow flow control through the ditch. A wasteway channel would also be constructed to provide overflow protection for the uncontrolled section of the Clark Fork River ditch from the Clark Fork River to the siphon. The wasteway channel would be located upstream of the proposed headgate and flow towards Harvey Creek and outlet below the existing Harvey Creek diversion. Final design may result in locating flow control headworks (headgate, trash rack, etc.) to the point of diversion on the Clark Fork River.

Fish Protection—Fish Screen

Fish screen facilities under this alternative would require an in-stream design for maximum design flow rate of 3.75-cfs, the current water right for the Harvey Creek diversion. Given the potential for highly fluctuating flows within Harvey Creek throughout the water season, and the inability to control water surface elevations within the creek, the list of viable fish screen types are limited.

Two in-stream fish screen alternatives were determined to be feasible for the Harvey Creek site based upon collected survey data and site investigation. The two alternatives include coanda effect and vertical plate fish screens. Both screen types have been successfully implemented for in-stream screening facilities at diversion flow rates similar to the Harvey Creek water right. Figure 4 shows both an in-stream vertical plate and a coanda effect screen. These screen alternatives provide in-stream fish bypass system that eliminates the need for secondary bypass system maintenance. Diverted flows in both alternatives would be conveyed to the irrigation ditch through closed conduit.

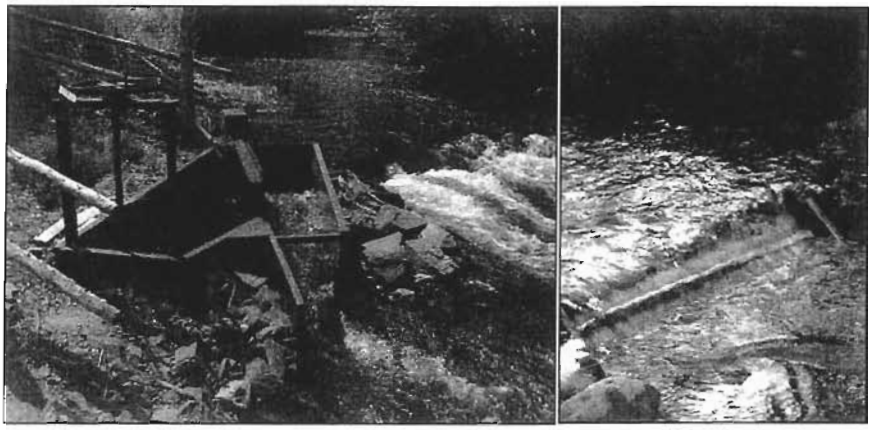


Figure 4. *Left photo*-- In-stream vertical plate fish screen near Challis Idaho, *Right photo*— Coanda effect fish screen installed in Ashby Creek, Montana (Source: Wild Fish Habitat Initiative Website)

Both screen types presented in Figure 4 are well suited for the Harvey Creek diversion with minimal improvements to the existing check structure shown in Figure 1. Upstream fish passage would be accommodated through features provided with final check structure design. With a minimum available head at the existing structure of approximately 2-feet, the required hydraulic conditions exist to easily meet the required diversion flow rate. The biggest challenge for this location would be the connection of the diverted flows back into the irrigation ditch via the proposed siphon. Additional analysis would be required to finalize the design. Advantages and disadvantages of the screen types are presented below.

Coanda-effect Screen (3.75 cfs)

Coanda effect fish screens are well suited for in-stream applications. The screen is installed on the downstream face of a grade control structure - such as the existing rock diversion structure located on Harvey Creek. Coanda effect screens are known for self-cleaning characteristics and the ability to screen relatively high amounts of flow through small screen sections. The diverted flows that pass through the screen are conveyed to the irrigation ditch in a closed conduit pipe below the screen. The screen must be designed with sediment cleaning ability as fine sediments can build up in the bottom of the screen and impede flow into the irrigation ditch. A 'clean-out' feature is included in the conceptual design presented here-in.

Pros

- Well suited for in-stream applications where water surface elevations can fluctuate widely
- Excellent self-cleaning characteristics
- In-stream fish bypass

Cons

- Considered experimental by fisheries agencies
- Some designs may require head drop of several feet

Vertical Plate Screen (3.75 cfs)

Vertical plate fish screens have been successfully applied in Montana over the last 15 years. Small in-stream screens similar to the screen shown in Figure 4, have been successfully installed in remote streams of central Idaho by the Idaho Fish and Game Screen Shop in Salmon, Idaho. These screens require brush cleaning systems to remove debris from the screen face and ensure diversion requirements are met at all times. Brush cleaning systems

have been installed with paddle wheel drive mechanisms as well as electric power and solar power systems.

Pros

- Well suited for in-stream applications where water surface elevations can fluctuate widely
- In-stream fish bypass
- Well accepted by fisheries agencies

Cons

- Moving brush screen cleaning system
- Water surface control adjustment at certain times of the year
- Potential for damage from in stream debris flows

Alternative 2-- Maintain Current Conditions with Fish Screening of Combined Water Rights

The second alternative analyzed was the option of maintaining existing conditions at Harvey Creek (allow the continued mixing of Clark Fork River and Harvey Creek water) and providing fish protection with an in-canal fish screen below the existing Harvey Creek diversion structure. This would require larger fish screening facilities to screen the combined Clark Fork River and Harvey Creek water rights of 18.26 cfs (3.75 cfs from Harvey Creek and 14.51 cfs from the Clark Fork River).

Multiple fish screen alternatives are well suited for this alternative where screen facilities would be placed in the more controlled environment of the ditch system. Flows and associated water surface elevations could be better maintained and managed, allowing for a wider range of screening alternatives. Three screen types were investigated for this preliminary analysis: 1) Rotary Drum, 2) Vertical Plate, and 3) Horizontal Plate screens.

Rotary Drum Screen (18.26 cfs)

Rotary drum screens have been utilized throughout the Pacific Northwest for over 60 years. These screens are designed to meet design criteria established by NOAA Fisheries based on the life history and swimming abilities of migrating fish species. Rotary drums have proven highly effective (up to 98% fish exclusion, WDFW, 2000) when located in locations with fairly consistent water elevations or where water elevations can be controlled. Drum screens are considered one of the more efficient self-cleaning screen designs available. In order to attain high-levels of self-cleaning drum screens must be situated in a location where water level can be controlled.

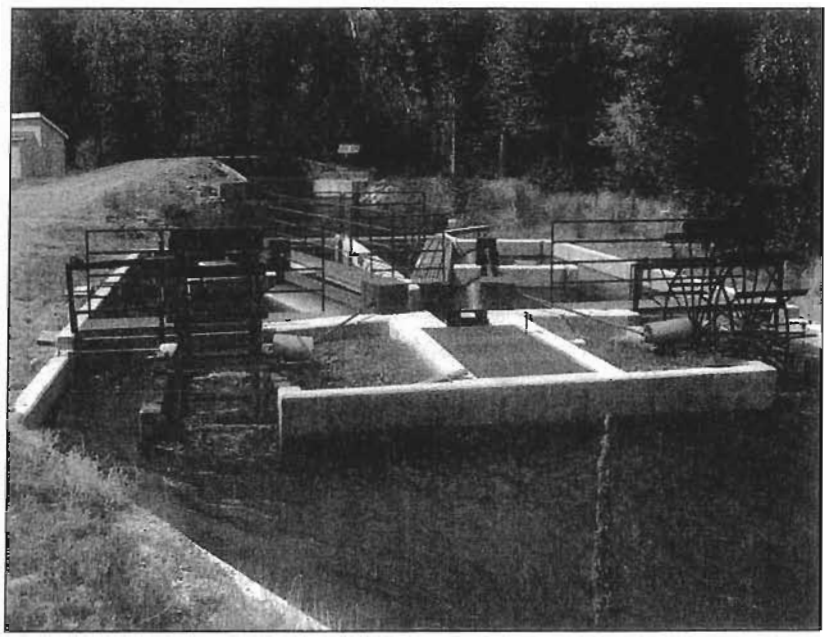


Figure 5. Rotary drum screen installed by the Idaho Fish and Game near Challis, Idaho.

Pros and cons of Rotary Drum Screens (Taken from USBR 2006)

Pros

- Effective in fish exclusion
- Considered self-cleaning with excellent debris handling characteristics
- Proper cleaning is independent of bypass flow
- Widely used in Washington, Oregon, and Idaho and have a strong performance record. Wide acceptance by fishery resource agencies.

Cons

- Complex design which leads to potential higher capital costs
- Suitable to sites with stable (or controllable) water surface elevations (rotary drum screens optimum performance at screen submergences of 65-85%). Head gate control and checking downstream of the screen often required including daily inspection.
- Seals and moving parts require maintenance.
- Continuous rotation is required to maintain self-cleaning.

Vertical Plate Screen (18.26 cfs)

Fixed plate screens represent a design slightly less complex than the rotary drum screen and, therefore, the capital costs tend to be lower than rotary drums. In determining screen location for fixed plate screens, care must be taken to ensure that the approach flow be relatively uniform across the length of the screen face. Screen performance can be hindered if located close to non-uniform flow conditions in the canal or river. Figure 6 below shows a photo of a vertical fixed plate screen installation in the Bitterroot River watershed.

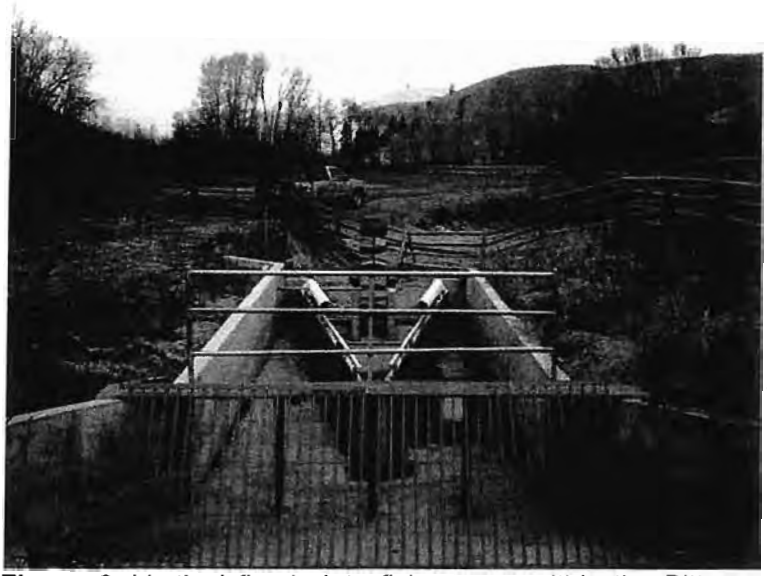


Figure 6. Vertical fixed plate fish screen within the Bitterroot River Basin (Source: Wild Fish Habitat Initiative Website).

Pros and cons of Flat Plate Screens (Taken from USBR 2006)
Pros

- Effective in fish exclusion.
- Stable water surface elevations not as critical as for rotary drums.
- Cleaning capability removes debris from screen face.
- Screen structure has no moving parts reducing overall costs (brush system has moving parts).
- Widely used in Washington, Oregon, California and have a strong performance record. Wide acceptance by fishery resource agencies. Several flat plate screens have been used in Montana within the last 15 years (see Figure 6 above).

Cons

- Mechanical screen cleaners require maintenance and can increase operational costs.
- Low water depths in some canals can require long screen lengths to meet fish exclusion criteria.
- Bypass channel often must convey debris that is removed from the screen face by brush mechanism. Operators must periodically remove accumulated debris that is unable to pass through the fish bypass system.

Horizontal Flat Plate, Farmers Screen (18.26 cfs)

Horizontal flat plate screens utilize the same type of fixed plate configuration as vertical plates described above; only the fixed plate lies horizontal near the bottom of the natural channel as shown in Figure 8. Horizontal flat plate screens can be utilized in areas where low flow depths create difficulties for vertical and rotary drum screens. One major difference in the horizontal flat plat screen is its use of flow velocities over the screen surface for debris removal and self-cleaning. This "no moving parts" characteristic presents a cost effect option with relatively low maintenance. The horizontal flat plat design was originally developed by the Farmers Irrigation District in Hood River, Oregon. The screen is well known as the Farmers Screen and has been patented by the Farmers Irrigation District, requiring a fee for application of the design concept.

Figure 7. Farmers screen installation in German Gulch by the Montana FWP (installed winter 2008-2009).

Pros and cons of Farmers Screens

Pros

- Effective in fish exclusion.
- Cleaning capability performed by water velocity over the screen surface which removes debris from screen face.
- Screen structure has no moving parts reducing overall capital and O&M costs.
- Used in Washington, Oregon, Idaho and recently Montana (See Figure 7 for Montana application).
- Can be equipped with sediment management practices in areas with significant sediment loading.
- Can be installed in a dual configuration to minimize overall screen footprint and accommodate widely varying flow rates.

Cons

- This design utilizes relatively new technologies that have not been tested as long as other screening methods.
- Flows in excess of design rates can cause accelerated rates of screen clogging.
- Bed-load transport within the system can create the need for sediment trap located immediately upstream of the screen structure.
- Still gaining acceptance by fisheries resource agencies.
- Previously, the largest FCA screen installation was for a flow rate of 85 cfs. However, very recently a large 160 cfs FCA screen was installed in fall 2010.

While the goal of any fish exclusion facility is to eliminate fish entrainment into the canal system and minimize the distance from the canal inlet to the screen structure, some hydraulic conditions must govern proper fish screen location criteria. In-canal fish screens must be properly located in the canal system to best attain the following conditions:

- Minimize the length of unscreened canal where fish will be entrained. Screen should be located as close to the canal head gate as possible, while considering canal hydraulics and site constraints.
- Return fish to the river as soon as possible.
- Sufficient drop from the screen bypass to the outfall to generate gravity flow through the fish bypass. Bypass hydraulics, available head for bypass channel, river location for bypass outfall must be elevated.
- Sediment and debris deposition.

- Uniform channel flow approaching the fish screen facility minimizing turbulence, flow velocity gradients, and dead flow zones.
- Backwater effects must not influence ultimate diverted flow requirements.

Fish bypass return represents the biggest challenge for the final design of fish screening alternatives under Alternative 2. Survey data collected for the project site indicates relatively flat channel slopes and minimal elevation drop for the irrigation ditch downstream of the Harvey Creek head gate and water surface elevations in the main stem Clark Fork River surveyed during the relatively high flows during the site visit.

Alternative 3-- Retire Harvey Creek Water Right - Siphon Clark Fork Ditch and Combine Irrigation Rights

The third alternative would eliminate the need for fish screening facilities on Harvey Creek by combining the irrigation water rights for both the Clark Fork and Harvey Creek into one combined water right from the Clark Fork River. This alternative would require the installation of an approximately 80-ft siphon under Harvey Creek as described previously in the Alternative 1 description. The siphon would be sized for the entire combined water right and would eliminate mixing of Harvey Creek and Clark Fork flows prior to the confluence of Harvey Creek with the main stem Clark Fork River.

This alternative would require changes to water user water rights.

Alternative 4-- Siphon Clark Fork Ditch and Relocate Harvey Creek Point of Diversion

The fourth alternative would be identical to Alternative 1 with the exception of re-locating the intake for Harvey Creek water rights up to 300-ft upstream of the existing diversion structure to take advantage of better hydraulic conditions for the fish screening facility. The advantage of this alternative is the increase elevation difference between Harvey Creek and the irrigation ditch allowing for better hydraulic conveyance of diverted flows from the diversion to the ditch downstream of the siphon outlet. Siphon layout and design would be similar to that discussed in the description of Alternative 1 above.

Fish Screen Preliminary Design Considerations:

Introduction

The design of any fish screen requires a significant amount of planning and collaboration to ensure a successful end product which effectively excludes sensitive fish species such as west slope cutthroat trout and bull trout, while ensuring water delivery requirements are met for water users at all times.

Many factors influence proper design of fish screening facilities including but not limited to; screen location, type, level of available maintenance, and debris loading. Given the significant cost associated with the construction of fish screening facilities, care must be taken to ensure a design that meets fisheries goals and objectives for this stream and river system, while providing project sponsors with reasonable levels of initial cost, operation and maintenance.

The following process has been followed as part of the alternative analysis and preliminary conceptual design:

1. Establish a multidiscipline planning and design team
2. Establish project specific fish protection objectives and requirements
3. Collect and identify project specific design data and identify limitations
4. Identify and develop project specific alternative conceptual designs
5. Select the preferred alternative
6. Develop a detailed design of the preferred alternative

Coordination with Montana Trout Unlimited and the Montana Fish and Wildlife and Parks (FWP) has identified the target species for fish exclusion from the Harvey Creek diversion. Furthermore, discussions with TU early in the design stages identified the need to design the fish screen facility to meet NMFS (NOAA Fisheries) fisheries fingerlings criteria for design parameters such as approach velocity and mesh opening limitations. Table 1 presents a summary of the fish exclusion criteria used for the Harvey Creek evaluations. Target fish species for the project include:

- Bull Trout
- Westslope Cutthroat Trout
- Other non-native sport fish

Design Criteria

1. Identify the acceptable fish exclusion requirements
    a. FWP and TU have initially stated that young of the year fish are not a screening priority
2. Identify the feasible sitting alternatives **(in-river, in-canal)**
3. Identify acceptable levels of O&M requirements
    a. Water user and project sponsor expectations
4. Identify operational issues associated with debris, sediment, and ice
    a. Any screen structure located in Harvey Creek will be subject to all of the above operational issues. Design alternatives evaluated avoided structures spanning Harvey Creek
5. Determine what level of capital costs are acceptable
    a. O&M costs to those tasked with maintenance
    b. Cost / benefit analysis
6. Determine the applicable discharge range
    a. Harvey Creek Water Right (3.75 cfs), Clark Fork Water Right (14.51 cfs)

Table 1 was developed to document initial recommendations and criteria for various fish screen design features:

Table 1. Summary table of fish screen criteria for Harvey Creek Fish Screen Project

Design Feature	Variations	Criteria
Approach Velocity		Not to exceed 0.8 ft/s
Sweeping Velocity		Greater than the Approach velocity
Screen Material and Max Opening	Perforated Plate	1/4 " maximum screen opening
Structural features		• Screen orientation up to 45 degrees to flow • Fish directed along screen face and into bypass channel to minimize delay
Bypass	Layout	• Fish must be promptly directed towards bypass entrance • Minimize debris blockage
	Entrance	• Entrance velocity greater than velocity in front of screen (trapping velocity) • Independent flow control capability
	Conduit	• Gravity flow, no hydraulic jumps • 10" min diameter pipe • Pipe bends have radius greater than 5 times the pipe diameter • Pipe Velocity greater than 2 ft/s
	Outfall	• High river velocities at outfall (4ft/s minimum) • Minimize predation at outfall
Operation and Maintenance		• Daily inspection conducted by the Irrigation District • Some manual debris removal required • Automatic screen cleaning (paddle wheel/ self-cleaning) to prevent debris build up

Cost Estimates:

Typical screen applications in the Pacific Northwest have initial capital costs ranging anywhere from $2,000 per cfs up to as high as $15,000 per cfs for extremely large screens.

Costs for the Harvey Creek project alternatives were derived based upon preliminary sizing of both siphon and fish screen structures for the required maximum canal flow rate of 14.51 cfs from the Clark Fork Diversion and 3.75 cfs for the Harvey Creek water right. Target fish screening criteria are delineated above and were utilized to provide preliminary screen sizing used in all cost estimates. It is noted that while approach velocities were to be kept under 0.8 ft/s, preliminary design of screen facilities utilized an approach velocity of 0.6 ft/s. It has been our experience that the design of screen facilities with lower design approach velocities not only provides for a conservative approach, but also increases the overall screen cleaning characteristics of the final design.

At the design flow rate of 3.75 cfs and 18.26 cfs and with the approach velocity of 0.6 ft/s the estimated screen surface was estimated at approximately 7 ft^2 and 33 ft^2 respectively. Based upon an average flow depth the total required screen length was estimated at 4.5 ft for Harvey

Creek screening with a vertical flat plate screen. Coanda effect screens would utilize 6 ft^2 of screen material. For the combined flow rate screen alternative both the rotary drum and flat plate screens would be designed with a minimum of 13-ft screen length based on an estimated average canal depth of 2.5 ft. Discussions with FCA have indicated that a Farmers Screen capable of screening 18.26 cfs would have a footprint of approximately 6 ft x 50 ft. All cost estimates were based upon these preliminary design data.

Table 2 provides the total cost estimates for each of the design alternatives. Detailed cost estimates for each alternative can be found in the Appendix.

Table 2. Screen alternative construction cost estimates.

Siphon of Flows under Harvey Creek	**Construction Total**
Siphon	**$169,800**
Harvey Creek Fish Screen Alternatives	
Coanda Screen (3.75 cfs)	**$18,400***
Vertical Plate Screen (3.75 cfs)	**$28,400***
Combined Flow Fish Screen Alternatives	
Rotary Drum Screen (18.26 cfs)	**$98,000***
FCA Screen (18.26 cfs)	**$90,700***
Vertical Plate Screen (18.26 cfs)	**$77,200***

***Note**: Fish Screen cost estimates do not include Mobilization, General Requirements, or Taxes, Bonds, and Insurance. It is assumed that these costs are included in the cost of the siphon portion of the project.

Screen and Siphon specific Operation and Maintenance costs were not fully developed for each of the Harvey Creek alternatives at this stage in the design process. Detailed Operation and Maintenance costs vary significantly based upon final design of the cleaning mechanisms, bypass channel design, and site specific conditions. Traditionally O&M costs have been the highest for rotary drum screens, as water users would be required to remove the drum screens each fall for storage off-site during winter months. Flat Plate Screens require less maintenance but still require regular greasing and checks due to the many moving parts. The Farmers screen and the Coanda screen have no moving parts and would therefore tend to require the least O&M. Siphon Operation and Maintenance costs are assumed to be similar to other in-canal structures such as head gates, diversion works, and wasteway structures. Regular inspection and periodic removal of debris from the siphon inlet will be required. Final design of the siphon will ensure sufficient velocities through the siphon pipe as to minimize required sediment and debris removal within the siphon.

Summary of Preferred Alternative:

Potential siphon and fish screen design alternatives for the Harvey Creek Fish Protection Project have been presented based on current information collected for the project area and preliminary fisheries resource goals. Project partners have selected Alternative 1, Siphon Clark Fork Ditch and Fish Screen Harvey Creek Water Rights, as the preferred alternative for the Harvey Creek Fish Passage Project. This selection is based upon the ability of the alternative to meet critical project goals including the elimination of fish entrainment into the Harvey Creek Ditch and the separation of Clark Fork diversion flows from Harvey Creek. This option provides future flexibility in water management as other projects are implemented in the watershed and new opportunities present themselves for meeting the objectives of the resource managers in the Upper Clark Fork Watershed.

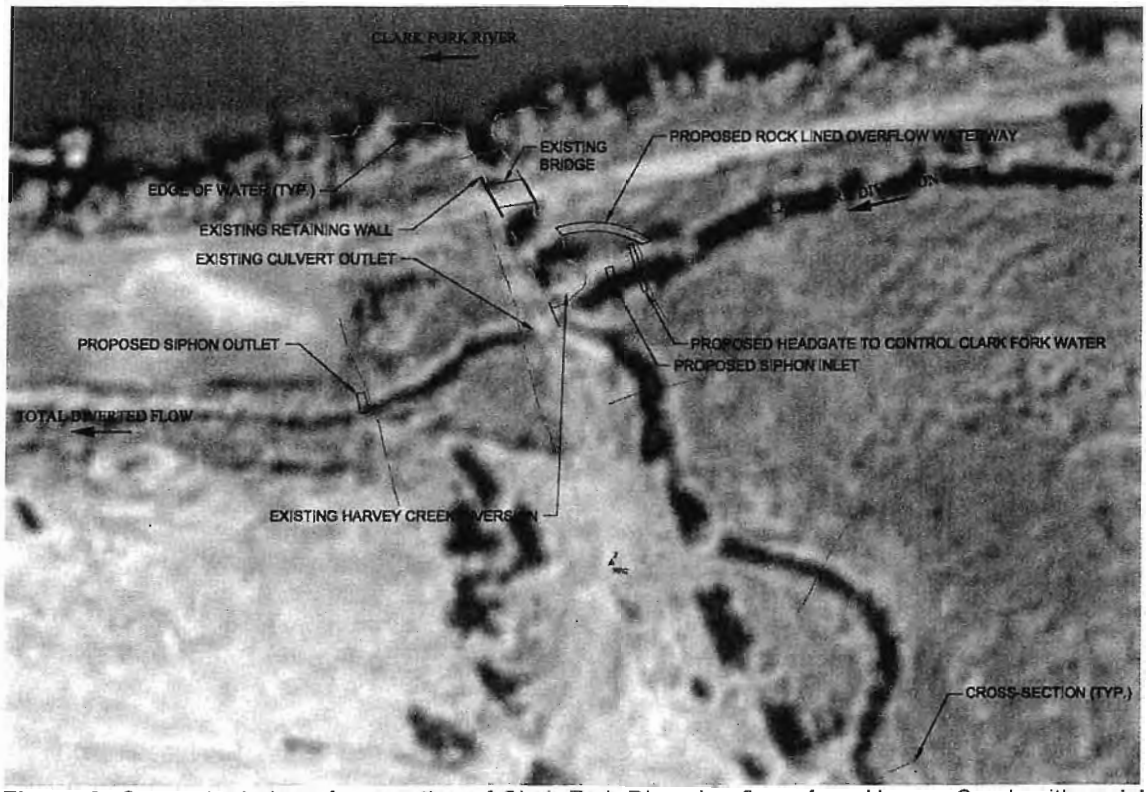


Figure 8. Conceptual plan of separation of Clark Fork Diversion flows from Harvey Creek with a siphon under Harvey Creek.

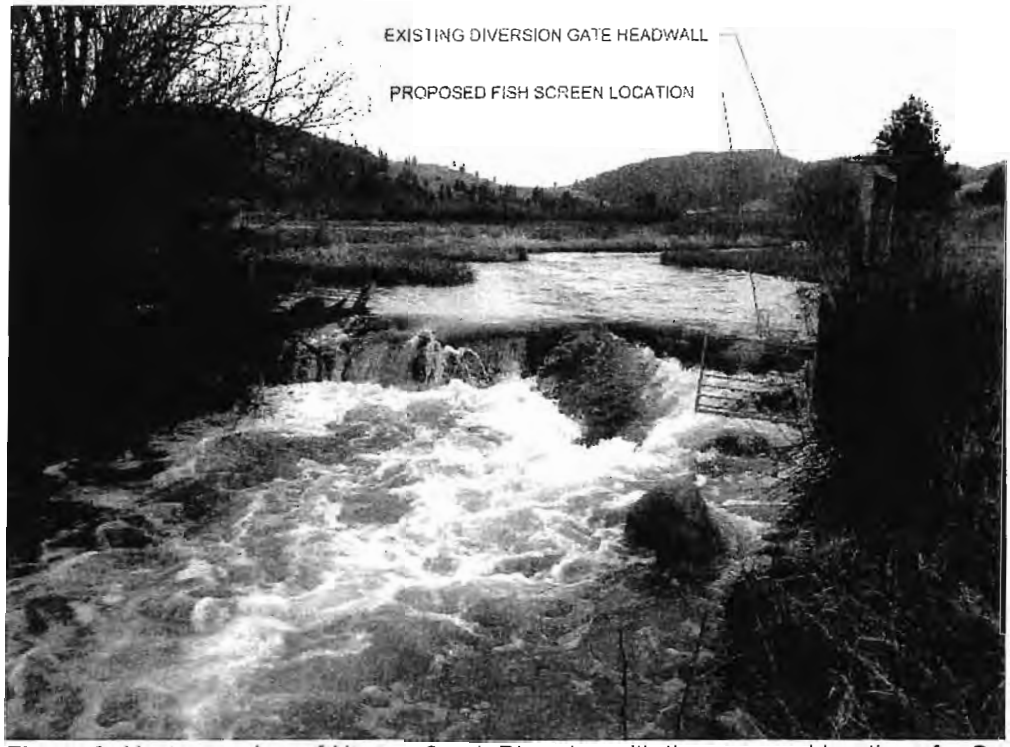


Figure 9. Upstream view of Harvey Creek Diversion with the proposed location of a Coanda fish screen located adjacent to the existing Harvey Creek diversion gate headwall.

References:

Katopodis, C. 1992. Introduction to Fishway Design. Freshwater Institute Central and Arctic Region. Department of Fisheries and Oceans. Winnipeg, Canada.

Northwest Power Services. 2007. Operational Compliance Monitoring Plan. Prepared for Fall River Rural Electric Cooperative, Inc. Ashton, Idaho.

State of Montana, Natural Resource Damage Program. Draft Upper Clark Fork River Basin Interim Restoration Process Plan. Helena, Montana. February 2012

Trout Conservancy of Montana. Trout Entrainment in Montana, Status and Solutions: A Guidebook and Primer. Montana. March 2010.

U.S. Department of the Interior Bureau of Reclamation. Fish Protection at Water Diversions. Denver, Colorado. April 2006.

U.S. Fish & Wildlife Service. Fisheries Restoration and Irrigation Mitigation Program. FY 2002-2004

Wahl, Tony L., R.K. Weir, J.K. Cerise, B. Sauer, and J.Wergin. Labor-Saving Debris and Fish Screens, Water O&M Bulletin, Vol 208, June 2004.

Washington Department of Fish and Wildlife. Fish Protection Screen Guidelines for Washington State "Draft". April 25, 2000.

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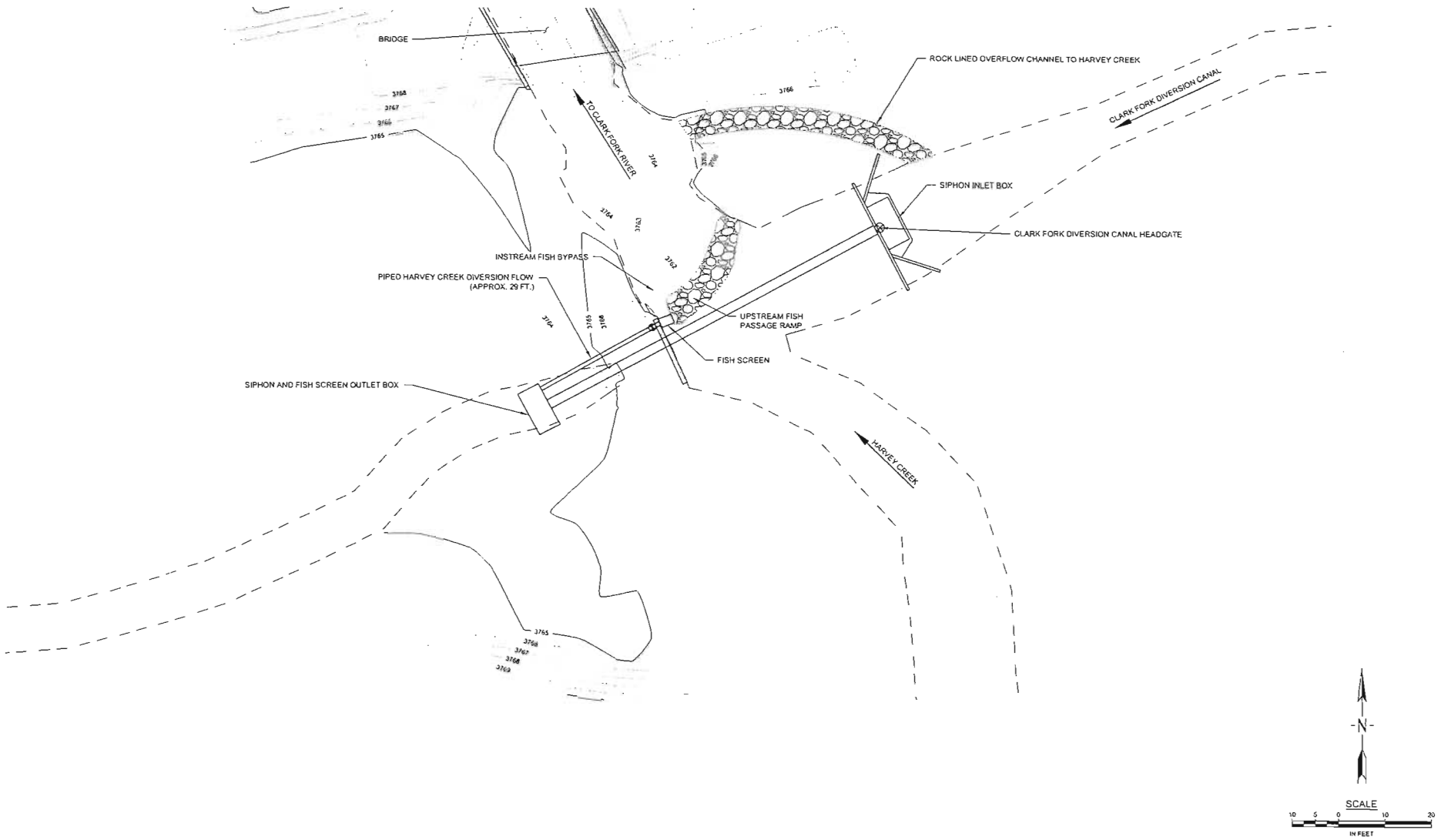
Q.C. REVIEW BY: ...
DATE: ...

HARVEY CREEK FISH PASSAGE PROJECT

GRANITE COUNTY MONTANA

OVERALL SITE PLAN

PROJECT NUMBER 4772.004
SHEET NUMBER 1
DRAWING NUMBER C-1



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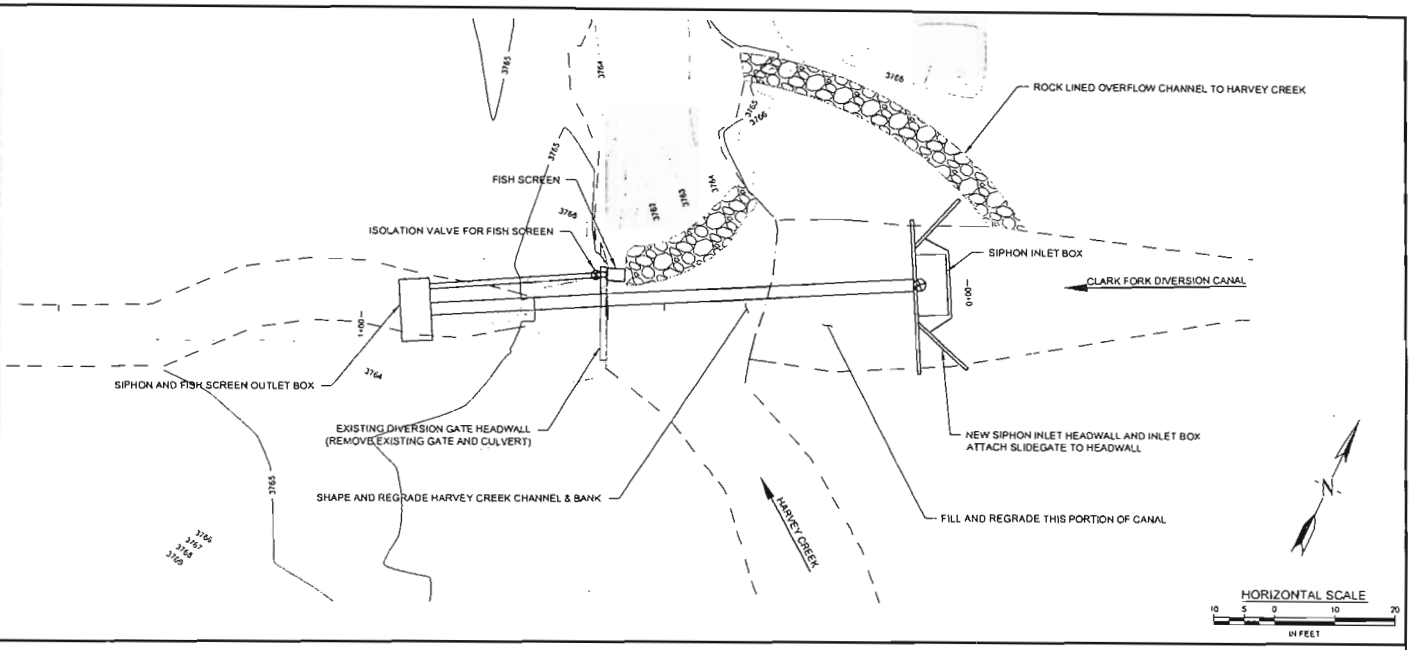
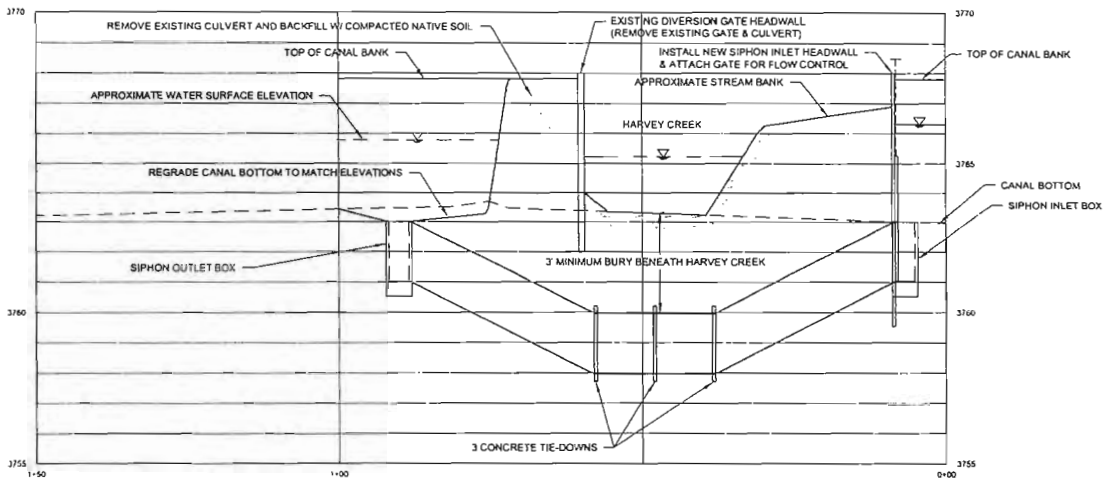
HARVEY CREEK FISH PASSAGE PROJECT
GRANITE COUNTY MONTANA
SIPHON & FISH SCREEN PLAN

PROJECT NUMBER 4772.004
SHEET NUMBER 2
DRAWING NUMBER C-2

INLET HEADWALL AND INLET BOX - TYPICAL





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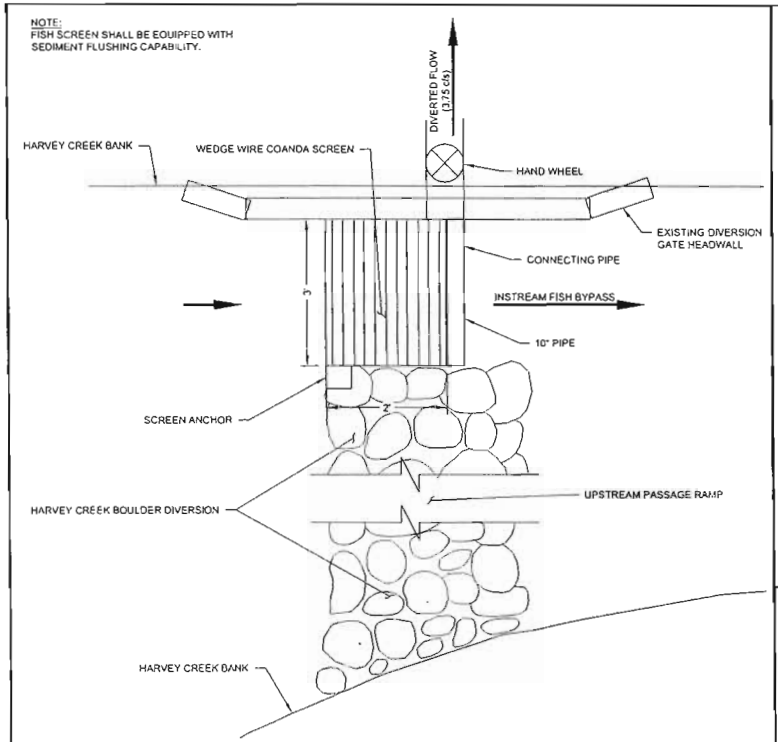
HARVEY CREEK FISH PASSAGE PROJECT
GRANITE COUNTY MONTANA

SIPHON CROSS SECTION

PROJECT NUMBER 4172.004
SHEET NUMBER 3
DRAWING NUMBER C-3

NOTE:
FISH SCREEN SHALL BE EQUIPPED WITH SEDIMENT FLUSHING CAPABILITY.



PLAN VIEW OF COANDA-EFFECT SCREEN INSTALLATION - TYPICAL
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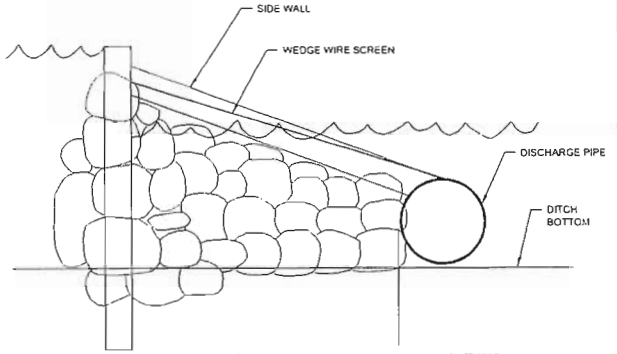

ELEVATION VIEW OF COANDA-EFFECT SCREEN INSTALLATION - TYPICAL
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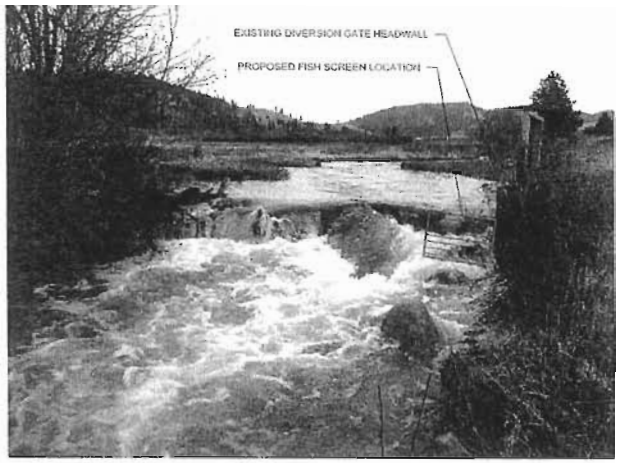

HARVEY CREEK DIVERSION - LOOKING UPSTREAM

HARVEY CREEK DIVERSION - LOOKING DOWNSTREAM

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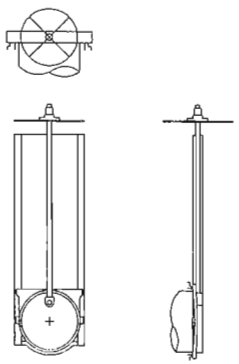
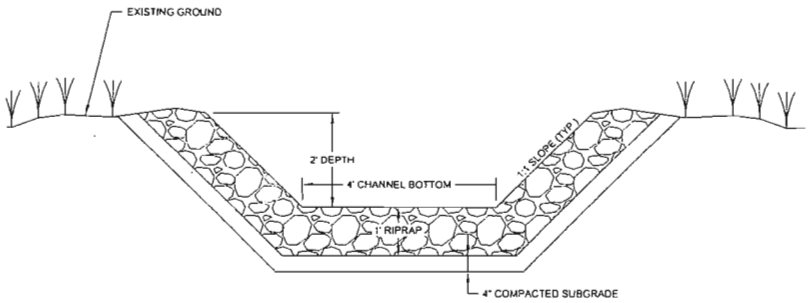
DRAWN BY: CRH
DSGN. BY: PDP
APPR. BY: RJA
DATE: 06/2012
Q.C. REVIEW BY:
DATE:

HARVEY CREEK FISH PASSAGE PROJECT
GRANITE COUNTY MONTANA
FISH SCREEN DETAILS

PROJECT NUMBER 4772.004
SHEET NUMBER 4
DRAWING NUMBER D-1



CANAL GATE DETAIL
SCALE: NOT TO SCALE



SECTION VIEW OF CLARK FORK DITCH WASTEWAY CHANNEL
SCALE: NOT TO SCALE

VERIFY SCALE!
THESE PRINTS MAY BE REDUCED. USE BELOW MEASURES ONLY WHEN ON ORIGINAL DRAWING.
MODIFY SCALE ACCORDINGLY!

REVISIONS			
NO.	DESCRIPTION	DATE	BY

TROUT UNLIMITED

MORRISON MAIERLE, INC.
An Employee-Owned Company
Engineers
Surveyors
Scientists
Planners
1 Engineering Pl.
Helena, MT 59602
Phone: (406) 442-3050
Fax: (406) 442-7862

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DRAWN BY: CRH
DSGN. BY: POP
APPR. BY: RJA
DATE: 05/2012
Q.C. REVIEW BY:
DATE:

HARVEY CREEK FISH PASSAGE PROJECT
GRANITE COUNTY MONTANA
DETAILS

PROJECT NUMBER 4772.004
SHEET NUMBER 5
DRAWING NUMBER D-2

Appendix

MORRISON MAIERLE, INC.
1 Engineering Place
Helena, Montana 59602
Ph: (406) 442-3050
Fax: (406) 442-6233

ENGINEER'S OPINION
OF PROBABLE COST

Date: 6/11/2012
Project #: 4772.004
Project Name: Harvey Creek
Engineer: Boyd Burnett, Paul Parson

HARVEY CREEK/CLARK FORK DITCH SIPHON

Item No.	Description	Estimated Quantity	Unit	Unit Price	Total Cost
101	Mob/Demob	1	LS	$8,000	$8,000
102	General Requirements	1	LS	$5,000	$5,000
103	Taxes, Bond, Insurance	1	LS	$2,500	$2,500
104	Concrete Inlet Structure	5	CY	$1,000	$5,000
105	Head Gate	1	LS	$5,000	$5,000
106	HDPE Pipe - 24 inch (DR 32.5)	85	LF	$185	$15,725
107	HDPE Fittings	4	EA	$500	$2,000
108	HDPE End Piece Appurtenances	2	EA	$2,500	$5,000
109	Pipe Bedding	9	CY	$50	$450
109	Tie-downs	3	EA	$900	$2,700
110	Concrete Outlet Structure	5	CY	$1,000	$5,000
111	Wasteway Channel	1	LS	$10,000	$10,000
112	In-Stream Excavation and Embankment (Pipe Work)	75	CY	$75	$5,625
113	Excavation/Embankment	350	CY	$30	$10,500
114	Harvey Creek Channel Shaping and Grading	1	LS	$12,500	$12,500
114	Erosion Control and Revegetation	1	LS	$5,000	$5,000
115	Dewatering/Bypass Pumping	1	LS	$7,500	$7,500
116	Air Testing	1	LS	$4,000	$4,000

CONSTRUCTION SUB-TOTAL		$111,500
CONTINGENCY	20%	$22,300
CONSTRUCTION TOTAL		**$133,800**
GRANT ADMINISTRATION	1%	$1,300
ENGINEERING DESIGN	10%	$13,400
CONSTRUCTION STAKING	3%	$4,000
PERMITTING	3%	$4,000
BIDDING	1%	$1,300
CONSTRUCTION ADMINISTRATION	9%	$12,000
PROJECT TOTAL		**$169,800**

* This draft estimate is for preliminary planning and informational use only and is not intended for bidding or construction.

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1 Engineering Place
Helena, Montana 59602
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Fax: (406) 442-6233

ENGINEER'S OPINION
OF PROBABLE COST*

Date: 6/11/2012
Project #: 4772.004
Project Name: Harvey Creek Fish Passage Project
Engineer: B. Burnett

FISH PROTECTION ALTERNATIVE 1a - Vertical Flat Plate Fish Screen (3.75 cfs)

Item No.	Description	Estimated Quantity	Unit	Unit Price***	Total Cost
101	Earthwork	15	C.Y.	$20	$300
102	Structural Concrete, wall Screen Structure	1	C.Y.	$1,000	$1,000
103	Screen Panels	7	S.F.	$195	$1,365
104	Structural Steel and Galvanizing	0.5	TON	$10,000	$5,000
105	Paddle Wheel drive system	1	L.S.	$5,000	$5,000
106	Bypass Channel pipe	30	L.F.	$25	$750
107	Brush Cleaning Sysem	1	L.S.	$2,500	$2,500
108	Site Grading	75	C.Y.	$10	$750
109	Site Restoration and Seeding	0.5	AC	$5,000.0	$2,500

CONSTRUCTION SUB-TOTAL		$19,200
CONTINGENCY	20%	$3,800
CONSTRUCTION TOTAL		**$23,000**
SURVEY	0.5%	$100
ENGINEERING DESIGN	10%	$2,300
PERMITTING	3%	$700
BIDDING	1%	$200
CONSTRUCTION ADMINISTRATION	9%	$2,100
PROJECT TOTAL		**$28,400**

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Fax: (406) 442-6233

ENGINEER'S OPINION
OF PROBABLE COST*

Date: 6/11/2012
Project #: 4772.004
Project Name: Harvey Creek Fish Passage Project
Engineer: B. Burnett

FISH PROTECTION ALTERNATIVE 1b - Coanda Effect Screen (3.75 cfs)

Item No.	Description	Estimated Quantity	Unit	Unit Price	Total Cost
101	Earthwork	15	C.Y.	$20	$300
102	Hydroscreen Coanda effect screen	1	LS	$2,500	$2,500
103	Screen Install	1	LS	$5,000	$5,000
104	Bypass Channel pipe	30	L.F.	$25	$750
105	Controllable Headgate/ Sediment sluice	1	LS	$1,000	$1,000
106	Site Grading	20	C.Y.	$10	$200
107	Site Restoration and Seeding	0.5	AC	$5,000.0	$2,500

	CONSTRUCTION SUB-TOTAL		$12,300
	CONTINGENCY	20%	$2,500
	CONSTRUCTION TOTAL		**$14,800**
	SURVEY	0.5%	$100
	ENGINEERING DESIGN	10%	$1,500
	PERMITTING	3%	$400
	BIDDING	1%	$100
	CONSTRUCTION ADMINISTRATION	10%	$1,500
	PROJECT TOTAL		**$18,400**

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ENGINEER'S OPINION
OF PROBABLE COST*

Date: 6/11/2012
Project #: 4772.004
Project Name: Harvey Creek Fish Passage Project
Engineer: B. Burnett

FISH PROTECTION ALTERNATIVE 2a - Vertical Flat Plate Fish Screen (18.26 cfs)

Item No.	Description	Estimated Quantity	Unit	Unit Price***	Total Cost
104	Earthwork	20	C.Y.	$20	$400
105	Concrete Base Slabs Screen Structure	15	C.Y.	$450	$6,750
106	Structural Concrete, wall Screen Structure	5	C.Y.	$1,000	$5,000
107	Screen Panels	33	S.F.	$195	$6,435
108	Structural Steel and Galvanizing	0.50	TON	$10,000	$5,000
109	Paddle Wheel drive system	1	L.S.	$15,000	$15,000
110	Bypass Channel pipe	75	L.F.	$25	$1,875
111	Brush Cleaning Sysem	1	L.S.	$10,000	$10,000
112	Site Grading	75	C.Y.	$10	$750
113	Site Restoration and Seeding	0.5	AC	$1,000.0	$500

CONSTRUCTION SUB-TOTAL		$51,700
CONTINGENCY	20%	$10,300
CONSTRUCTION TOTAL		**$62,000**
SURVEY	0.5%	$300
ENGINEERING DESIGN	10%	$6,200
PERMITTING	3%	$1,900
BIDDING	1%	$600
CONSTRUCTION ADMINISTRATION	10%	$6,200
PROJECT TOTAL		**$77,200**

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ENGINEER'S OPINION
OF PROBABLE COST*

Date: 6/11/2012
Project #: 4772.004
Project Name: Harvey Creek Fish Passage Project
Engineer: B. Burnett

FISH PROTECTION ALTERNATIVE 2b - Farmers Fish Screen (18.26 cfs)

Item No.	Description	Estimated Quantity	Unit	Unit Price	Total Cost
104	Earthwork	20	C.Y.	$20	$400
106	Structural Concrete, wall Screen Structure	1	C.Y.	$1,000	$1,000
108	FCA screen system	1	L.S.	$57,500	$57,500
109	Bypass.Channel pipe	75	L.F.	$25	$1,875
111	Site Grading	75	C.Y.	$10	$1,000
112	Site Restoration and Seeding	0.5	AC	$5,000.0	$2,500

CONSTRUCTION SUB-TOTAL		$64,300
CONTINGENCY	20%	$12,900
CONSTRUCTION TOTAL		**$77,200**
SURVEY	0.5%	$400
ENGINEERING DESIGN	3%	$2,300
PERMITTING	3%	$2,300
BIDDING	1%	$800
CONSTRUCTION ADMINISTRATION	10%	$7,700
PROJECT TOTAL		**$90,700**

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ENGINEER'S OPINION
OF PROBABLE COST*

Date: 6/11/2012
Project #: 4772.004
Project Name: Harvey Creek Fish Passage Project
Engineer: B. Burnett

FISH PROTECTION ALTERNATIVE 2c - Rotary Drum Fish Screen (18.26 cfs)

Item No.	Description	Estimated Quantity	Unit	Unit Price	Total Cost
104	Earthwork	20	C.Y.	$20	$400
105	Concrete Base Slabs Screen Structure	20	C.Y.	$450	$9,000
106	Structural Concrete, wall Screen Structure	3	C.Y.	$1,000	$3,000
107	Screen Material	40	S.F.	$75	$3,000
108	Rotary Drum screen system (gears, paddle wheel)	1	L.S.	$35,000	$35,000
108	Structural Steel and Galvanizing	1.00	TON	$10,000	$10,000
109	Bypass Channel pipe	75	L.F.	$25	$1,875
111	Site Grading	75	C.Y.	$10	$750
112	Site Restoration and Seeding	0.5	AC	$5,000.0	$2,500
	CONSTRUCTION SUB-TOTAL				$65,500
	CONTINGENCY		20%		$13,100
	CONSTRUCTION TOTAL				**$78,600**
	SURVEY		0.5%		$400
	ENGINEERING DESIGN		10%		$7,900
	PERMITTING		3%		$2,400
	BIDDING		1%		$800
	CONSTRUCTION ADMINISTRATION		10%		$7,900
	PROJECT TOTAL				**$98,000**

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Harvey Creek Fish Screen Design, near Drummond, MT

Introduction/Assumptions :

The total required flowrate (Q) through the screen must be determined along with the agency established allowable approach velocity(V_a). For the Harvey Creek project a total of 3 water rights exist with, 9.7cfs and 4.81cfs being diverted from the Clark Fork River upstream of Harvey Creek and 3.75 cfs being diverted from Harvey Creek at the intersection of the Clark Fork ditch and Harvey Creek. Fish screen sizing is estimated below based upon preliminary conceptual level design coupled with recently collected survey data of the project site. Two conceptual level fish screen alternatives are:

1. Minimize screen size requirements by screening only Harvey Creek Water right of 3.75 cfs.
2. Eliminate all fish entrainment into Harvey ditch by screening combination of Clark Fork diversion and Harvey Creek for a design flow of 18.26 cfs (3.75 from Harvey creek and 14.51 cfs from the Clark Fork Diversion.

References :

Discussion :

Primary Design Parameters for Harvey Creek Diversion Only :

Maximum Design Flow (Water Right):	$Q := 3.75 \frac{ft^3}{s}$
Approach velocity (fish design criteria):	$V_a := .6 \frac{ft}{s}$
Basic canal design velocity:	$V_{creek} := 2 \frac{ft}{s}$
Screen size based on design criteria:	$d_{scr} := \frac{3}{32} in$
Flow depth of the creek :	$h_d := 1.5 ft$

Fishery Information

Bull Trout, Rainbow, Cutthroat, and Brown Trout

- Fry, Fingerlings and adults
- Downstream Migration -- timeing is species dependent
- Spawning -- late summer to early fall and emerge in spring (varies by species)
- Swimming -- Fry generally drift with current, fingerlings good swimming ability, adults are strong swimmers.

The required screen area can then be determined (A).

$$A := \frac{Q}{V_a} \qquad A = 6.3 \cdot ft^2$$

Then to account for area lost to submerged structural components in the screen the design screen area (A_d) is increased by 5-10%.

$$A_d := A \cdot 1.07 \qquad \boxed{A_d = 6.7 \cdot ft^2}$$

The Length of screen required for a vertical plate screen is then determined based on the water depth within the creek (h_d).

$$h_d = 1.5 \cdot ft \qquad L_d := \frac{A_d}{h_d} \qquad \boxed{L_d = 4.5 \cdot ft}$$

Primary Design Parameters for Total Diverted Flow:

Maximum Design Flow (Water Right): $Q := 18.26 \frac{ft^3}{s}$

Approach velocity (fish design criteria): $V_a := .6 \frac{ft}{s}$

Basic canal design velocity: $V_{creek} := 2 \frac{ft}{s}$

Screen size based on design criteria: $d_{scr} := \frac{3}{32} in$

Flow depth of the canal : $h_d := 2.5ft$

The required screen area can then be determined (A).

$A := \frac{Q}{V_a}$ $\quad A = 30.4 \cdot ft^2$

Then to account for area lost to submerged structural components in the screen the design screen area (A_d) is increased by 5-10%.

$A_d := A \cdot 1.07$ $\quad \boxed{A_d = 32.6 \cdot ft^2}$

The Length of screen required for a vertical plate screen is then determined based on the water depth within the canal (h_d).

$h_d = 2.5 \cdot ft$ $\quad L_d := \frac{A_d}{h_d}$ $\quad \boxed{L_d = 13 \cdot ft}$

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1. **PROJECT TITLE: Flint Creek Watershed Fish Passage**

2. ORGANIZATION AND CONTACT:

Trout Unlimited
111 N. Higgins Ave, Suite 500
Missoula, MT 59802

Casey Hackathorn, Project Manager
406-541-1194
chackathorn@tu.org

3. PROJECT PURPOSE AND BENEFITS:

The purpose of this project is to identify and implement fish passage and screening projects in the Flint Creek watershed for migratory bull trout and westslope cutthroat trout. The project is intended to improve fish populations in Flint Creek, its tributaries, and the Clark Fork River as well as reduce maintenance and improve infrastructure for irrigators.

Goals:

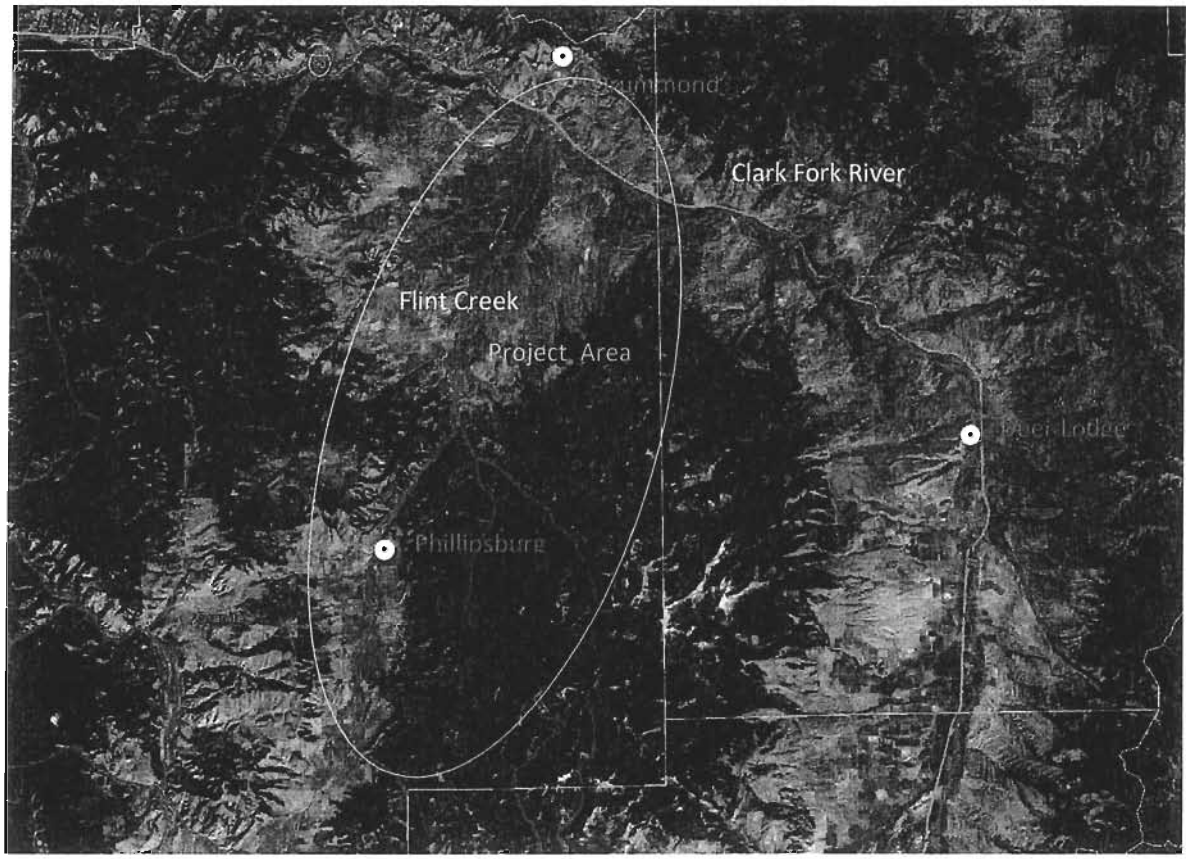
- Improve upstream fish passage and reduce entrainment of adult fluvial bull trout, westslope cutthroat trout, and non-native game fish
- Reduce entrainment of outmigrating juvenile bull trout and cutthroat trout
- Improve fish populations in Flint Creek, its tributaries and the Clark Fork River
- Reduce maintenance and improve function of irrigation infrastructure for irrigators

Objectives:

- Evaluate 30 to 40 irrigation diversions for fish passage and entrainment risk
- Prioritize up to 20 diversion replacement and 15 screening projects
- Develop and implement 15 diversion replacement and 10 screening projects

4. PROJECT LOCATION AND MAP:

The Flint Creek fish passage project will focus on mainstem Flint Creek from its headwaters at Georgetown Lake along its entire 35 mile length to its confluence with the Clark Fork River at Drummond, MT. It will also include the lower reaches of Boulder Creek.



5. PROJECT DESCRIPTION:

Flint Creek and Boulder Creek are listed as NRDP Priority 2 Tribuataries. Flint Creek, Boulder Creek and South Fork Boulder Creek are also designated Critical Bull Trout Habitat. Telemetry data has shown Flint Creek as a migration corridor for fluvial bull trout from the Clark Fork River. Preliminary investigation indicates there are as more than 30 irrigation diversions on Flint Creek including 17 from the Clark Fork River to the mouth of Boulder Creek. There is little entrainment data available and upstream fish passage has not been evaluated on Flint Creek and Boulder Creek irrigation diversions. Improving fish passage from the Clark Fork to Boulder Creek and reducing entrainment in irrigation ditches in the Flint Creek watershed will improve connectivity for migratory fish in the Clark Fork River and are critical steps for bull trout conservation in the Upper Clark Fork.

Trout Unlimited proposes taking a lead role in all phases of the project including assessment, project development and oversight of engineering and construction. We propose annual monitoring of projects for three years after completion to ensure successful implemenation. In addition, funding and implementing a long-term maintenance program for fish passage and screening structures will be critical

throughout the Upper Clark Fork and is being submitted in a separate proposal by the Watershed Restoration Coalition.

Typical TU Diversion Replacement Project for Fish Passage

Project Tasks:

- Evaluate fish passage at irrigation diversions and road culverts on Flint and Boulder Creeks
- Evaluate entrainment risk in associated irrigation ditches and canals
- Update Upper Clark Fork Diversion Inventory to include the Flint Creek watershed
- Identify and prioritize diversion and culvert replacement and improvement projects
- Develop priority projects in coordination with private landowners, state and federal agencies, and other project partners
- Implement projects as they are funded

Project Partners:

- West Slope Chapter Trout Unlimited
- Montana Fish, Wildlife and Parks
- NRCS
- Beaverhead-Deer Lodge National Forest
- U.S. Fish and Wildlife Service

6. PROJECT SCHEDULE:

This project is expected to take three to five years to complete. One field season will be required to evaluate upstream fish passage, entrainment risk, and relative need for irrigation infrastructure improvements. Project development with private landowners and irrigators will take one to two years to complete. Engineering, design and construction will take one to two years to complete following project development.

Task	Projected Completion
Diversion and Culvert Survey and Evaluation	2013
Update Diversion Inventory	2013
Project Development	2013-2014
Engineering and Design	2014-2015
Diversion Replacement/Upgrade	2014-2016
Fish Screen Installation	2014-2016
Monitoring	2014-2019

7. ESTIMTATED PROJECT BUDGET:

ITEM	UNIT	QTY	UNIT COST	TOTAL COST	MATCH	NRDP
Salaries and Expenses:						
Survey and Evaluation	HR	160	$ 40	$ 6,400		$ 6,400
Survey Tech (intern)	HR	120	$ 12.50	$ 1,500		$ 1,500
Project Development	HR	160	$ 40	$ 6,400		$ 6,400
Project Management	HR	400	$ 40	$ 16,000		$ 16,000
				$ 30,300	**$ -**	**$ 30,300**
Contracted Services:						
Fish Screens	CFS	300	$ 5,000	$ 1,500,000	$ 600,000	$ 900,000
Diversion Replacement	EA	15	$20,000	$ 300,000	$ 150,000	$ 150,000
				$ 1,800,000	**$ 750,000**	$ 1,050,000
Travel and Communication:						
Mileage	MI	3600	$ 0.555	$ 1,998		$ 1,998
				$ 1,998	$ -	**$ 1,998**
TOTALS:				**$ 1,832,298**	**$ 750,000**	$ 1,082,298

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Restoration Concept Abstract

Flow Augmentation Basin-Wide Program Proposal
Submitted by the Clark Fork Coalition to the Natural Resource Damage Program
June 15, 2012

Name and Contact Information

Clark Fork Coalition
140 S 4th Street West, Unit 1
Missoula, MT 59802
406-542-0539

Andy Fischer, Project Manager
andy@clarkfork.org

Barbara Hall, Legal Director
barbara@clarkfork.org

Project Purpose and Benefits

The Clark Fork Coalition (CFC) submits this proposed restoration concept to complement flow augmentation concepts that have been proposed for incorporation in the restoration plans for the Upper Clark Fork River Basin (UCFRB). Flow augmentation has been identified as either the first or second "encouraged restoration activity" by the NRDP in 9 out of 11 of the Priority 1 Areas for aquatic restoration. (*Final Upper Clark Fork River Basin Interim Restoration Process Plan*, Attachment 5-2 (May 2012) (the "Process Plan").) Guidance provided by NRDP also indicates, "[p]rotecting and augmenting flows and riparian habitat as well as improving fish passage are the most important factors to consider." (Attachment 5-2.) In response, CFC and other stakeholders have submitted many restoration concepts that specifically focus on flow augmentation. Please refer also to two additional abstracts related to flow augmentation submitted by CFC: Flow Augmentation Basin-Wide Programmatic Monitoring Program Proposal and Water Right Transaction Pricing and Valuation Proposal.

The purpose of this concept is to propose a framework for establishing a flow augmentation program within the NRDP. Unlike other types of restoration work, the legal, hydrological, and sociological dynamics at play in flow augmentation projects introduce layers of complexity that can undermine the effectiveness of well-intentioned projects. However, despite this complexity, water right transactions for flow augmentation can be very effective at achieving desired ecological outcomes. Establishing clear policies and guidance at the outset is the primary way to mitigate the uncertainty and risk that could plague a poorly-executed flow augmentation strategy.

CFC (and formerly the Montana Water Trust) is a member of the Columbia Basin Water Transactions Program (CBWTP). The CBWTP is a program of the National Fish and Wildlife Foundation (NFWF), funded by Bonneville Power Administration, which provides financial and technical support for a partnership of non-profits, state water agencies and tribes for restoring water to streams across the Columbia Basin. NFWF has recently established its Western Water Program, and one of its activities is increasing capacity for flow augmentation across the West.

While any flow augmentation program developed by NRDP will necessarily be unique to the program, this proposal borrows from the expertise we have gained through

working with the CBWTP for the past 10 years. We believe that NRDP is well-positioned to establish the protocols and standards needed to ensure that flow augmentation is achieved in the UCFRB in the most cost-effective, timely and ecologically sound manner.

Project Description

Once NRDP incorporates flow augmentation concepts into the final restoration plans, we propose that NRDP begin laying the foundation for a flow augmentation program. We see three phases to this project. In Phase 1 a working group of state and regional experts should be convened to advise the NRDP and establish standards. Phase 2 will involve establishing a technical review committee and program coordinator to review individual project proposals. Phase 3 will involve the long-term operation of the program, including the monitoring component. Following is a brief description of the three phases.

Phase 1. The foundation establishing this program is convening a panel of experts to advise NRDP. We suggest including representatives from the following stakeholder groups (and any others identified by NRDP): NRDP, landowners, Department of Fish, Wildlife and Parks (DFWP), Department of Natural Resources and Conservation (DNRC), NFWF Western Water Program, non-profit conservation organizations (CFC, Trout Unlimited, Watershed Restoration Coalition), the U.S. Forest Service, the Confederated Salish and Kootenai Tribes, conservation districts, the Natural Resources Conservation Service (NRCS), and an economist/water right valuation expert.

The working group would be charged with establishing protocols, standards and guidance for flow augmentation projects. One goal of the program will be to institutionalize these standards so that flow augmentation projects are designed, implemented and monitored consistently across the UCFRB. Deliverables from this working group could include establishing formal guidance on water right transaction pricing and valuation, a flow augmentation proposal checklist (see, e.g., the CBWTP Transaction Checklist attached to this proposal), guidance for navigating the DNRC water right change process, water right lease and acquisition contract templates, water right due diligence guidance, identifying any needed studies and information, such as economic valuations, flow targets, hydrologic studies, etc. We recommend that a web-based application be utilized to project proposals, reporting, and entering and accessing monitoring data. While it will be necessary for the program to incorporate adaptive management and a certain level of flexibility as lessons are learned over the years, NRDP and applicants alike will benefit from the articulation of clear standards at the outset of this endeavor.

Phase 2. We see the next logical step as the working group selecting a technical review committee that will measure individual flow augmentation projects against the criteria and standards established by the working group and make recommendations to the NRDP for funding the proposals. It will likely be necessary to hire a coordinator for the program that will serve as a liaison between the technical review committee and NRDP and who will oversee program management.

Phase 3. The last phase will involve both management and monitoring of existing projects and review of new proposals by the coordinator and technical review committee, respectively. The technical review committee will be charged with performing periodic reviews of the program to measure ecological outcomes, identify needed actions, and propose revisions to certain policies and procedures as needed. The committee will ensure that the monitoring program is being implemented properly and will receive reports from the water commissioner on an annual basis.

Project Schedule

Item:	2013	2014	2015	2016	2017	2018-2048
Convene working group (Phase 1)						
Publish guidance and set up web-based tools (Phase 1)						
Conduct any identified studies and information gathering (Phase 1)						
Convene technical review committee and hire a coordinator (Phase 2)						
Long-term program oversight (Phase 3)						

Project Budget *

Item:	**Quantity:**	**Unit Cost:**	**Total Cost:**	**Anticipated Match:**	**NRDP:**
Contracted Services: Working Group (up to 12 members at 200 hours each)	2,400 hours	$50	$120,000	$50,000	$70,000
Contracted Services: designing and setting up web-based tools	250 hours	$100	$25,000		$25,000
Salaries/Benefits: Program Coordinator	.75 FTE for 30 years	$50,000	$1,125,000		$1,125,000
Travel costs	2,000 mi	$0.555	$ 1,110		$1,110
Subtotal:			**$1,271,110**	**$50,000**	**$1,221,110**
Administration:	3.5	%	$ 44,489	$1,750	$42,739
Total:			**$1,315,599**	**$51,750**	**$1,263,849**

* Note: funding for any identified studies or information gathering activities is not included in the budget.

Transaction Proposal Form

for Specific Water Right Transactions to Increase Tributary Flows

Instructions: The local entity should complete the following checklist as completely as possible when proposing a specific water transaction to the Columbia Basin Water Transactions Program (CBWTP). Upon transaction completion, the checklist should be updated to reflect any changes to the transaction and a final version should be submitted to the CBWTP.

Name of Transaction: Example
CBWTP Transaction Number:
Local Entity Proposing Transaction: Clark Fork Coalition
Entity Contact Person on Transaction:
Date Transaction Proposal Submitted to the CBWTP: 09/06/2011
Total Cost of the Water to be Acquired: $0.00
Amount of Total Cost of Water Requested from the CBWTP: $0.00
Checklist Complete and Ready for CBWTP Consideration:
Yes [ ] No [X]
Has this transaction been previously funded by CBWTP:
Yes [ ] No [X]
Please Notify CBWTP When Making Significant Changes to a Completed Checklist and Record Date(s) of Changes:
Provide a summary of the transaction:

ACCOUNTABILITY CRITERIA

1. **Have the following documents been uploaded to the CBWTP database as part of the proposal?**
   a. **If a signed contract has not been uploaded, please comment on the status of negotiations with the landowner and provide a date by which the agreement is expected.**
   Yes [ ] No [ ]
   Comments:

   b. **Water right certificate(s) included in the transaction.**
   Yes [ ] No [ ]
   Comments:

   c. **Application(s) submitted to the state water agency for transfer of the water right(s) to instream flow (if applicable).**
   Yes [ ] No [ ]
   Comments:

   d. **Approval order from the state water agency required to affect the transfer and change of use.**

Phase 3. The last phase will involve both management and monitoring of existing projects and review of new proposals by the coordinator and technical review committee, respectively. The technical review committee will be charged with performing periodic reviews of the program to measure ecological outcomes, identify needed actions, and propose revisions to certain policies and procedures as needed. The committee will ensure that the monitoring program is being implemented properly and will receive reports from the water commissioner on an annual basis.

Project Schedule

Item:	2013	2014	2015	2016	2017	2018-2048
Convene working group (Phase 1)						
Publish guidance and set up web-based tools (Phase 1)						
Conduct any identified studies and information gathering (Phase 1)						
Convene technical review committee and hire a coordinator (Phase 2)						
Long-term program oversight (Phase 3)						

Project Budget *

Item:	**Quantity:**	**Unit Cost:**	**Total Cost:**	**Anticipated Match:**	**NRDP:**
Contracted Services: Working Group (up to 12 members at 200 hours each)	2,400 hours	$50	$120,000	$50,000	$70,000
Contracted Services: designing and setting up web-based tools	250 hours	$100	$25,000		$25,000
Salaries/Benefits: Program Coordinator	.75 FTE for 30 years	$50,000	$1,125,000		$1,125,000
Travel costs	2,000 mi	$0.555	$ 1,110		$1,110
Subtotal:			**$1,271,110**	**$50,000**	**$1,221,110**
Administration:	3.5	%	$ 44,489	$1,750	$42,739
Total:			**$1,315,599**	**$51,750**	**$1,263,849**

* Note: funding for any identified studies or information gathering activities is not included in the budget.

working with the CBWTP for the past 10 years. We believe that NRDP is well-positioned to establish the protocols and standards needed to ensure that flow augmentation is achieved in the UCFRB in the most cost-effective, timely and ecologically sound manner.

Project Description

Once NRDP incorporates flow augmentation concepts into the final restoration plans, we propose that NRDP begin laying the foundation for a flow augmentation program. We see three phases to this project. In Phase 1 a working group of state and regional experts should be convened to advise the NRDP and establish standards. Phase 2 will involve establishing a technical review committee and program coordinator to review individual project proposals. Phase 3 will involve the long-term operation of the program, including the monitoring component. Following is a brief description of the three phases.

Phase 1. The foundation establishing this program is convening a panel of experts to advise NRDP. We suggest including representatives from the following stakeholder groups (and any others identified by NRDP): NRDP, landowners, Department of Fish, Wildlife and Parks (DFWP), Department of Natural Resources and Conservation (DNRC), NFWF Western Water Program, non-profit conservation organizations (CFC, Trout Unlimited, Watershed Restoration Coalition), the U.S. Forest Service, the Confederated Salish and Kootenai Tribes, conservation districts, the Natural Resources Conservation Service (NRCS), and an economist/water right valuation expert.

The working group would be charged with establishing protocols, standards and guidance for flow augmentation projects. One goal of the program will be to institutionalize these standards so that flow augmentation projects are designed, implemented and monitored consistently across the UCFRB. Deliverables from this working group could include establishing formal guidance on water right transaction pricing and valuation, a flow augmentation proposal checklist (see, e.g., the CBWTP Transaction Checklist attached to this proposal), guidance for navigating the DNRC water right change process, water right lease and acquisition contract templates, water right due diligence guidance, identifying any needed studies and information, such as economic valuations, flow targets, hydrologic studies, etc. We recommend that a web-based application be utilized to project proposals, reporting, and entering and accessing monitoring data. While it will be necessary for the program to incorporate adaptive management and a certain level of flexibility as lessons are learned over the years, NRDP and applicants alike will benefit from the articulation of clear standards at the outset of this endeavor.

Phase 2. We see the next logical step as the working group selecting a technical review committee that will measure individual flow augmentation projects against the criteria and standards established by the working group and make recommendations to the NRDP for funding the proposals. It will likely be necessary to hire a coordinator for the program that will serve as a liaison between the technical review committee and NRDP and who will oversee program management.

Restoration Concept Abstract

Flow Augmentation Basin-Wide Program Proposal
Submitted by the Clark Fork Coalition to the Natural Resource Damage Program
June 15, 2012

Name and Contact Information

Clark Fork Coalition
140 S 4th Street West, Unit 1
Missoula, MT 59802
406-542-0539

Andy Fischer, Project Manager
andy@clarkfork.org

Barbara Hall, Legal Director
barbara@clarkfork.org

Project Purpose and Benefits

The Clark Fork Coalition (CFC) submits this proposed restoration concept to complement flow augmentation concepts that have been proposed for incorporation in the restoration plans for the Upper Clark Fork River Basin (UCFRB). Flow augmentation has been identified as either the first or second "encouraged restoration activity" by the NRDP in 9 out of 11 of the Priority 1 Areas for aquatic restoration. (*Final Upper Clark Fork River Basin Interim Restoration Process Plan*, Attachment 5-2 (May 2012) (the "Process Plan").) Guidance provided by NRDP also indicates, "[p]rotecting and augmenting flows and riparian habitat as well as improving fish passage are the most important factors to consider." (Attachment 5-2.) In response, CFC and other stakeholders have submitted many restoration concepts that specifically focus on flow augmentation. Please refer also to two additional abstracts related to flow augmentation submitted by CFC: Flow Augmentation Basin-Wide Programmatic Monitoring Program Proposal and Water Right Transaction Pricing and Valuation Proposal.

The purpose of this concept is to propose a framework for establishing a flow augmentation program within the NRDP. Unlike other types of restoration work, the legal, hydrological, and sociological dynamics at play in flow augmentation projects introduce layers of complexity that can undermine the effectiveness of well-intentioned projects. However, despite this complexity, water right transactions for flow augmentation can be very effective at achieving desired ecological outcomes. Establishing clear policies and guidance at the outset is the primary way to mitigate the uncertainty and risk that could plague a poorly-executed flow augmentation strategy.

CFC (and formerly the Montana Water Trust) is a member of the Columbia Basin Water Transactions Program (CBWTP). The CBWTP is a program of the National Fish and Wildlife Foundation (NFWF), funded by Bonneville Power Administration, which provides financial and technical support for a partnership of non-profits, state water agencies and tribes for restoring water to streams across the Columbia Basin. NFWF has recently established its Western Water Program, and one of its activities is increasing capacity for flow augmentation across the West.

While any flow augmentation program developed by NRDP will necessarily be unique to the program, this proposal borrows from the expertise we have gained through

Yes [ ] No [ ]
Comments:

e. **If the deal doesn't require state agency approval, an explanation as to how the water right(s) will be protected instream without agency approval.**
Yes [ ] No [ ]
Comments:

f. **Photos. Please include photos of systematically located sites in the reach(es), with a listing of the approximate river mile(s). When possible provide photos that show the stream in the larger context of the landscape; the specific area of interest before and after the transaction; and, the landowner or another person doing something of interest on or near the stream.**
Yes [ ] No [X]
Comments:

g. **A copy of a signed release indicating the water right holder is willing to be photographed and quoted (If this transaction is significant for purposes of engaging the public).**
Yes [ ] No [X]
Comments:

h. **Any other important documents that describe and record the transaction.**
Yes [ ] No [ ]
Comments:

i. Have you completed a logic model for this transaction? If so, please upload into database.
Yes [ ] No [X]

2. **What other information may assist the CBWTP in evaluating this transaction or similar transactions in the future?**

ADMINISTRATIVE CRITERIA

3. **When was the application for the transfer of the water right(s) to instream flow submitted to the applicable state agency (or other authority)?**

a. If the application has not yet been filed, what is the projected application submission date?

b. When is the state agency expected to approve the transfer and finalize the amount of water that will be allocated to instream flow?

c. What is the lease/transfer number assigned to this transaction by the state?

4. Who will hold the water right(s) once the water is secured for instream flow?

Comments:

HYDROLOGIC CRITERIA

5. *What is the name of the stream(s) that will have increased instream flows as a result of the transaction?(If only one stream is involved in this transaction, please input reach data in question 7. If more than one stream is involved in this transaction please input reach data for each stream under question 5.)*
Comments:

6. *In what subbasin and watershed HUC is the stream(s) located? Please provide the NPCC Province and Subbasin name and Watershed 4th (8 digit) and 5th Field (10 digit) HUC numbers.*
NPCC Province:
Subbasin:
Fourth Field Huc(s):

Fifth Field Huc(s):

7. *What is the reach of river that will benefit? (Please provide the approximate river mile of the upper and lower ends of the instream reach and the Global Positioning System (GPS) coordinates of the existing point of diversion. If there is more than one point of diversion, use the point of diversion farthest upstream.)*

PRIMARY REACH:
Total River Miles:
Approximate Upper End River Mile:
Upper End River Mile GPS Coordinates (ddd° mm' ss.s"):
Coordinate 1:
Coordinate 2:

Approximate Lower End River Mile:
Lower End River Mile GPS Coordinates (ddd° mm' ss.s"):
Coordinate 1:
Coordinate 2:

SECONDARY REACH:
Total River Miles:
Approximate Upper End River Mile:
Upper End River Mile GPS Coordinates (ddd° mm' ss.s"):
Coordinate 1:
Coordinate 2:

Approximate Lower End River Mile:
Lower End River Mile GPS Coordinates (ddd° mm' ss.s"):
Coordinate 1:
Coordinate 2:

8. *For what term will the transaction secure water for instream flow (e.g., two years, ten years, permanent - any term longer than 99 years is considered permanent.)?*

Transaction term in calendar year (i.e. 2000 - 2002):

Water Right(s) of Record:

9. What is the maximum authorized diversion rate and annual volume for the existing water right(s) (or portion therein) affected by this transaction?
   0.00 AF
   0.00 CFS

10. To how many acres of land is the existing water right(s) (or portion therein) that is to be acquired appurtanent?

11. How did the water right holder use the water before the transaction?

Comments:

a. Is there evidence that water right(s) to be acquired was put to beneficial use during the relevant time period set forth by your states abandonment statute?
Yes [ ] No [ ]

b. Will the land owner retain partial use of the water right(s)?
Yes [ ] No [ ]

12. What is/are the relative priority date(s) of the water right(s)?
a. What is the senior most priority date for all water rights on this stream? Where is the diversion point for this water right in relation to the instream reach(es) described in question 7?
b. Are there senior water rights in the instream reach(es) described in question 7? If so, what is the total combined maximum authorized diversion rate and volume for all senior water rights on this stream?
Yes [ ] No [ ]
c. What is the authorized period of use for the existing water right(s)? (If the transaction has more than one water right with different periods of use, enter the earliest and latest dates of authorized use)

d. Is the water right(s) typically satisfied to the maximum rate and duty during the entire authorized period of use?
Yes [ ] No [ ]

e. If not, what is the typical period of use before the water right(s) is/are restricted, either partially or totally?

Instream Water Right(s):

13. What is the period of use that the instream right(s) will be in effect each year under the transaction (e.g., 04/1-9/30)?

a. What is the period of time during which the benefits of the instream use are most ecologically significant (e.g. 8/1 to 9/5) in addressing the key limiting factors identified in questions 18 and 19?

b. Why is the instream use most ecologically significant during this period (i.e., what limiting factor(s) identified in questions 18 and 19 will be addressed during this

period)?

14. ***What is the maximum rate of water (in CFS) that will be legally protected instream during the term of the transaction in the primary reach and secondary reach (if applicable)? (The amount may be different from the maximum rate available under the water right(s) of record as described in question 9.)***

    0.00 CFS (Primary Reach)
    0.00 CFS (Secondary Reach)

    a. **Will the maximum rate established under the transaction vary during the instream period of use?**
       Yes [ ] No [ ]

    b. **If so, describe (in CFS) the amount(s) by which the established instream rate will vary in the primary reach and/or secondary reach (if applicable) and the time and reason for the varied rate.**

15. ***What is the total maximum volume of water (in acre feet) that will be legally protected instream during the entire term of the transaction (i.e., maximum annual instream volume in either primary or secondary reach from question 14a x years of transaction from question 8)?***

    0.00 acre-feet

    a. ***What is the maximum annual volume of water (in acre feet) that will be legally protected instream in the primary reach and secondary reach (if applicable) during each year of the transaction? (The amount may be different from the maximum annual volume legally available under the water right(s) of record as described in question 9.)***
       0.00 acre-feet (Primary Reach)
       0.00 acre-feet (Secondary Reach)

    b. **Will the maximum annual volume established under the transaction vary during the instream period of use?**
       Yes [ ] No [ ]

    c. **If so, describe the amount(s) and timing by which the established maximum annual instream volume will vary in the primary reach and/or secondary reach (if applicable) and the reason for the varied volume.**

16. ***What is the established flow target, if any, for each month during the instream period of use?***

a. What percentage of the target will be reached, including previous deals, during the period of use?

b. *What entity established the flow target for the affected reach(es)? Please provide any available information on the basis of the established flow target (method used, etc.)*

17. Is the anticipated increase in streamflow sufficiently great to alter the physical shape of stream beds and floodplains?
Yes [ ] No [ ]

a. If so, have factors such as bank erosion, flooding, and other effects of streamflow change been taken into account for both their positive and negative impacts for fish and wildlife and related water uses?
Yes [ ] No [ ]

BIOLOGICAL CRITERIA

18. What are the species name and Endangered Species Act status (e.g., endangered, threatened) of the anadromous fish, specifically Evolutionary Significant Units (ESUs), present in the stream reach? What life stage(s) of these species is limited in the affected reach(es)?

ESU:
MPG:
Population:
ESA:
Life Stage(s):

Please provide any other relevant information regarding the anadromous fish species (and life stages) present in the affected reach(es):

19. What resident fish species are present in the affected reach(es)?

What life stage(s) of these species is limited in the affected reach(es)?

Please provide any other relevant information regarding the other species (and life stages) present In the affected reach(es):

What wildlife species(one per line) utilize the affected reach(es)?

How do they utilize the stream reach?

20. **How is water quality limited in the stream reach and is it a limiting factor for one or more of the species listed above?**

b. **What is the current condition of the riparian zone and stream channel habitat in the affected reach(es)?**

21. ***Are flows identified as a factor limiting one or more of the species and life stage(s) described above in the affected reach(es)?***
Yes [ ] No [ ]

a. ***If so, please thoroughly describe what effect increasing flows in the affected reach will have in addressing flows as a factor limiting one or more of the species and life stage(s) described above in the affected reach(es).***

b. **Does the riparian zone and stream channel have potential to provide high quality fish habitat?**
Yes [ ] No [ ]

c. **If high quality habitat is not immediately available, what are the other limiting factors (e.g. passage, stream temperature, lack of cover for fish, etc.)?**

d. **Is the stream reach fenced or are there other exclusions in place to create a riparian buffer to exclude livestock grazing?**
Yes [ ] No [ ]

e. **What are the provisions to maintain the fences or other exclusions and for what period of time?**

22. ***Are the ecological benefits anticipated from the completed water transaction part of or tied to other habitat improvement efforts designed to address the other limiting factors (question 21.c) in the watershed?***
Yes [ ] No [ ]

a. ***If so, briefly list and describe the projects currently implemented or planned that are necessary to achieve the habitat goals associated with restoring instream***

flows. Please describe the relationship between this proposal and the habitat restoration activities addressing other limiting factors.

INNOVATION CRITERIA

23. Name what tool(s) and method(s) were used in developing this transaction?

Comments:

a. Explain what new information, if any, has been learned by use of these tool(s) and/or strategies?

24. What is the:

a. *total cost of the water to be acquired?*
   $0.00(USD)
b. *total amount paid to the water right holder from all funding sources?*
   $0.00(USD)
c. *amount of total cost of water requested through the CBWTP?*
   $0.00(USD)
d. *amount of total cost of water donated by landowner?*
   $0.00(USD)
e. *amount of total cost of water provided by other funding sources?*
   $0.00(USD)
   name of other source(s):
f. *estimated transaction costs related to this transaction?*
   $0.00(USD)
   amount of these costs requested through the CBWTP?
   $0.00(USD)
g. *total cost of the transaction (water cost and transaction costs)?*
   $0.00(USD)
   amount of this total cost requested from CBWTP?
   $0.00(USD)

25. What method(s) was used for determining the value of the water right(s)?

26. What incentive(s) (economic and/or other) motivated the water right holder to enter into the transaction?

MONITORING CRITERIA

27. a. How will the increases in flow be documented, monitored and enforced?

b. Please briefly outline your plan for compliance monitoring.

28. How will benefits to fish and/or wildlife be documented and monitored?

29. How will increases in water quality be documented and monitored?

a. Describe where the monitoring data and metadata (descriptive information about the origin, context, quality and condition, method used to collect, or characteristics of the data) will be stored, electronically if possible, and decision makers and the public can access the data.

b. Will the data and metadata be made available to the STREAMNET public database? Yes [ ] No [ ]

c. How often will reports be issued giving an analysis of the data?

d. Who is responsible for analyzing the data and issuing reports?

e. Please provide key contact information if another agency, program, or individual will be collecting, storing, and evaluating the flow, biological and water quality data.

WATERSHED CONTEXT

30. What is the name of the Northwest Power and Conservation Council's relevant subbasin plan?

a. What does the Subbasin Plan state regarding restoration of instream flows in the watershed and water right transactions as an appropriate flow restoration tool?

b. What are the priority habitat limiting factors identified in the plan that will be addressed by the water transaction?

31. Is there a NOAA recovery plan and/orwater resource planning effort, watershed assessment or comprehensive planning effort in place to help justify the transaction?

Yes [ ] No [ ]

a. If so, please describe the assessment(s) and/or effort(s) and what it states regarding restoration of instream flows in the watershed and water right transactions as an appropriate flow restoration tool

32. Have the projected impacts of climate change on stream flow been assessed in this watershed/basin?

Yes [ ] No [ ]

If so, please state how this transaction is projected to be impacted by climate change.

33. Has the state implemented restrictions/limitations on existing users and new appropriations (i.e., has the basin been closed to new appropriations)?

a. Are those efforts attempting to address instream flows?

Yes [ ] No [ ]

APPENDIX C.

Additional Photos

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Restoration Concept Abstract

Flow Augmentation Basin-Wide Programmatic Monitoring Program Proposal
Submitted by the Clark Fork Coalition to the Natural Resource Damage Program
June 15, 2012

Name and Contact Information

Clark Fork Coalition
140 S 4th Street West, Unit 1
Missoula, MT 59802
406-542-0539

Andy Fischer, Project Manager
andy@clarkfork.org

Barbara Hall, Legal Director
barbara@clarkfork.org

Project Purpose and Benefits

The Clark Fork Coalition (CFC) submits this proposed restoration concept to complement flow augmentation concepts that have been proposed for incorporation in the restoration plans for the Upper Clark Fork River Basin (UCFRB). Flow augmentation has been identified as either the first or second "encouraged restoration activity" by the NRDP in 9 out of 11 of the Priority 1 Areas for aquatic restoration. (*Final Upper Clark Fork River Basin Interim Restoration Process Plan*, Attachment 5-2 (May 2012) (the "Process Plan").) Guidance provided by NRDP also indicates, "[p]rotecting and augmenting flows and riparian habitat as well as improving fish passage are the most important factors to consider." (Attachment 5-2.) In response, CFC and other stakeholders have submitted many restoration concepts that specifically focus on flow augmentation.

A key consideration in developing, implementing and budgeting for flow augmentation projects is the associated monitoring and management of instream water rights that will be required for each project. In the Process Plan, NRDP has identified that "monitoring will be needed to ensure that projects achieve the desired restoration results" and that the "State will identify basin-wide monitoring needs in the restoration plans." (Process Plan, 19.)

Flow augmentation projects are accompanied by unique monitoring and management needs that are dictated not only by NRDP requirements, but also by the Montana Water Use Act. Under state law, applications submitted to the Montana Department of Natural Resources and Conservation (DNRC) to change the use of water rights to instream flow pursuant to MCA §§ 85-2- 408 and 85-2-436 must provide a detailed streamflow measurement plan. DNRC requires an annual monitoring report for each instream water right.

Generally, flow augmentation projects will involve converting all or a portion of irrigation water rights to an instream use. Once authorized by the DNRC for change, the instream water rights are legally protectable within a designated stream reach beginning at the historic point of diversion and continuing downstream to the end of the dewatered stream reach. Ensuring that restoration results are achieved for flow augmentation

projects will mean conducting active water right management to ensure the instream water rights are managed in priority under the prior appropriation doctrine and protected from appropriation by downstream water users. In short, instream water rights must be managed and monitored much like diversionary irrigation water rights. Depending on the term of a flow augmentation project, monitoring obligations could extend in perpetuity.

For each of its flow augmentation concepts, CFC incorporated 3 years of monitoring in the proposed budget. The thought is that 3 years is a sufficient amount of time to design, establish, implement and adjust a monitoring plan for a specific project. The purpose of this concept is for NRDP to incorporate a basin-wide monitoring program for flow augmentation projects into the restoration plans to ensure that these projects produce the desired lasting restoration benefit.

Project Description

We propose that NRDP budget for the long-term monitoring and management expense of flow augmentation projects in the restoration plans. The first step in establishing the monitoring program would be drafting a detailed monitoring plan to complement the flow augmentation projects NRDP ultimately includes in the restoration plans. The monitoring plan would identify streamflow gauging locations and other monitoring sites in the reaches identified for flow augmentation. The plan would also include a list and budget of needed equipment and supplies.

Monitoring sites and protocol will be identified in the design phase for each flow augmentation project and incorporated in the monitoring plan. Once the project is implemented, monitoring sites should be established and actively monitored. Based on our experience designing, implementing and monitoring flow augmentation projects in the UCFRB, CFC is in a good position to be lead entity in this first phase of establishing the basin-wide monitoring program.

After 3 to 5 years of actively monitoring flow augmentation projects and adjusting individual monitoring plans as needed, we suggest that the State hire a water commissioner strictly for managing and monitoring the instream water rights secured as a result of the restoration plans. This proposal budgets for such a position to be housed and funded by NRDP for up to 30 years, with the assumption that the position would become a permanent one at the State.

Project Schedule

Item:	2013	2014	2015	2016	2017	2018-2048
Draft monitoring plan						
Identify gauge locations and monitoring sites						
Purchase equipment						

Establish monitoring sites						
Advertise for basin-wide water commissioner						
Hire and train water commissioner						
Water Commissioner manages flow augmentation projects						

Project Budget

Item:	Quantity:	Unit Cost:	Total Cost:	Anticipated Match:	NRDP:
Salaries/Benefits: Water Commissioner	1 FTE for 30 years	$50,000	$1,500,000		$1,500,000
Contracted Services/CFC staff time for drafting monitoring plan and training Water Commissioner	1040 hours	$50	$104,000	$20,000	$84,000
Travel - CFC	4,000 mi	$0.555	$ 2,220		$2,220
Supplies/Equip.					
Telemetry Stations	30	$2,500	$75,000		$75,000
Tru-Tracks	100	$600	$6,000		$6,000
Staff Gauges	100	$60	$600		$600
Marsh McBirney Flow Meter	4	$1,200	$4,800		$4,800
Subtotal:			**$1,692,620**	**$20,000**	$1,672,620
Administration:	3.5	%	$ 59,241	$700	$58,542
Contingency:	10	%	$169,262	$2,000	$167,262
Total:			**$1,921,123**	**$22,700**	**$1,898,424**

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Restoration Concept Abstract

Water Right Transaction Pricing and Valuation Framework Proposal
Submitted by the Clark Fork Coalition to the Natural Resource Damage Program
June 15, 2012

Name and Contact Information
Clark Fork Coalition
140 S 4th Street West, Unit 1
Missoula, MT 59802
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Andy Fischer, Project Manager
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Barbara Hall, Legal Director
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Purpose and Benefits

The Clark Fork Coalition (CFC) is submitting this proposed water right transaction pricing and valuation concept for the Natural Resource Damage Program (NRDP) to consider when evaluating the cost-effectiveness of flow augmentation projects that have been proposed for incorporation in the restoration plans for the Upper Clark Fork River Basin (UCFRB). We hope this proposal can serve as a starting point for NRDP to develop more comprehensive guidance for project proponents and landowners to better understand how specific transactions will be evaluated. We believe the public will benefit from NRDP guidance on water right valuation for flow augmentation projects as well as guidance on when and what level of water right valuations are required to meet NRDP's legal obligations.

Factors to Consider in Valuing Water Rights

There are many legal and factual nuances and site-specific determinations that go into arriving at a negotiated cost for particular water right transactions. Flow augmentation projects are typically compared and represented in a volume (acre-foot) protected instream on an annual basis ($/AF). Sometimes flow rates (cubic feet per second) are also represented when equating projects to biological flow targets ($/CFS).

Some common considerations that greatly influence the relative value of a water right for flow augmentation include:

- Location within the watershed
- Water right seniority
- Volume restored
- Validity of the water right claims
- Term of the transaction
- Length of the protected reach and the point of return flows
- Restoration priority
- Monitoring requirements

Once the above mentioned factors have been taken into consideration and a project is considered a priority for the program, a valuation analysis should be conducted to ensure that the negotiated transaction terms are reflective of market values or other verifiable economic bases that represent a fair and reasonable price for both the buyer

(NRDP) and the seller (water right holder). We agree that NRDP's cost-effectiveness analysis should apply to flow augmentation projects: a project should accomplish its goals in the least costly way possible, or a better alternative should be implemented.

Appraisal Standards

The challenge to water right valuations is that no specific standards have been established by any professional appraisal organizations, nor do professional organizations or certifications exist for firms performing water right valuations. It is therefore difficult to establish a firm fair market value for water rights to be acquired or leased as part of a flow augmentation project. The Bureau of Reclamation (BOR) has established some basic guidelines for appraisal of water right acquisitions and leases (See *Reclamation Manual*, LND 05-01, ¶ 8 (July 12, 2007) available at http://www.usbr.gov/recman/lnd/lnd05-01.pdf). The following discussion borrows from those BOR guidelines. Despite the lack of certified appraisers, the Coalition possesses significant experience valuating and negotiating transactions and internally tracks market conditions for water right purchases. Contracting third parties to conduct water right appraisals can be costly, but necessary in some circumstances when significant public investments are being considered for a project.

Common Appraisal Methods

(1) Before and After Comparable Sales/Land Price Differential – used to appraise the contributory value of water rights by looking at the difference in value of irrigated versus dry land sales. Obtaining comparable and current land sales information can be challenging in some circumstances.

(2) Income Capitalization/ Farm Crop Budget Analysis – used to make a determination of the water right's contribution to net income of the agricultural operation. This method requires an in-depth evaluation of the annual crop production value and associated inputs necessary to achieve a profit.

(3) Replacement Cost/ Development Cost/Least Cost – used when the relative costs of obtaining replacement water from alternatives sources is compared. The value would be indicated by the least cost alternative for obtaining a water supply similar in legal and hydrological terms as the subject water right. This methodology also considers comparable water right transactions.

Typically, the lowest cost appraisal method represents the preferred valuation method. For water right **leases**, the BOR Manual suggests that the appraised value should be based on recent comparable leases. In situations where a lease is based on fallowed land, or where land fallowing would serve as a reasonable alternative to a lease, the lease value should not exceed the cost of leasing the land and water rights.

Discussion/Recommendations

In general, the valuation method selected will depend on the characteristics of a particular water right and the availability and quality of information. We recommend that the NRDP consider adopting guidance for applicants and entities to ensure to that flow augmentation projects are considered consistently. We recognize the unique challenges

in determining whether a particular flow augmentation proposal is cost-effective and offer the following recommendations:

- Develop **clear and consistent processes** for evaluating flow augmentation projects. Engaging with landowners and participating entities in flow projects early may alleviate future complications associated with price expectations.
- Consider developing a **basin-wide valuation report** that provides ranges in costs for acquiring water rights and factors to consider. This may assist in project planning and valuation standards for smaller projects.
- Develop **threshold standards** for triggering different scale valuations. Third party valuations can be costly, time consuming and may require varying levels of detail. For example, different thresholds of valuation standards and rigor might be applied to projects under $500,000.
- Recognize that **valuing water is not a perfect science** and that different research methods and entities may arrive at slightly different values.
- There are other funding entities that have long track records of implementing flow augmentation projects. We **recommend you consider examples** of how these other entities deal with valuation and pricing. We have included the Columbia Basin Water Transactions Program Water Valuation Policy as an example.

General Cost Information

CFC recommends that NRDP consider budgeting for (1) a UCFRB water right valuation analysis that will result in a range of values for water right acquisitions and leases for flow augmentation in the basin; and (2) valuations for specific flow augmentation projects that are ultimately included in the Restoration Plan. We understand that a basin-specific valuation analysis would cost between $35,000 and $50,000, while individual valuations will likely run between $5,000 and $25,000. We recommend allocating up to $100,000 for water right valuations associated with flow augmentation projects.

Conclusion

CFC strongly supports the NRDP restoration priorities focused at augmenting flows to benefit the aquatic resources of the UCFRB. We also believe that water right transactions for flow augmentation can be successfully and cost-effectively developed and implemented with appropriate guidance from the NRDP.

COLUMBIA BASIN WATER TRANSACTIONS PROGRAM
WATER VALUATION POLICY

I. PURPOSE

The purpose of this memo is to outline the Columbia Basin Water Transaction Program (CBWTP) policy for valuation of transactions funded by the Program.

II. STRATEGIC OBJECTIVE

To ensure a prudent and fiscally responsible allocation of funds, CBWTP shall evaluate price and terms of all transactions funded, in part or in full, by the program. The objective of the valuation review is to ensure that water right holders are fairly compensated and that transaction terms are reflective of market values or other verifiable economic basis that represent fair and reasonable compensation.

III. VALUATION POLICY AND PARAMETERS

A. Engagement and Request of Valuation

i. A valuation analysis is required for all transactions partially or wholly funded through the program.

ii. One of three levels of analysis is required, depending on the funding request and specific circumstances of the proposed transaction:
   1. Full Valuation Report
   2. Basin Specific Valuation Report
   3. QLE Price Documentation

iii. The following applies to all transactions requesting funding from the CBWTP for FY2012 and beyond.

B. Full Valuation Report:

i. Value Requirement: Unless otherwise determined, CBWTP will require a Full Valuation Report for all transactions with a requested total funding amount of **$500,000 or greater**. CBWTP may require a Full Valuation Report for transactions less than $500,000 at its discretion.

ii. Definition: A Full Valuation Report will provide an independent assessment of fair market value of the subject water right(s). The analysis will utilize a minimum of two valuation approaches and will assess current regional water supply and demand conditions

and alternative market opportunities for the subject water rights through a highest and best use analysis. The valuation report will evaluate the depth, or lack thereof, of a market for the subject water right, develop a profile of the most likely buyers, and an analysis of pricing issues under the identified market conditions. If appropriate, price adjustment premiums and discounts shall be analyzed and supported which address issues such as seniority, marketability, location, and other relevant factors. Market participant interviews, published data, and other research documents shall be used to assess market conditions, prospective buyer profiles, and regional water supply and demand conditions. All sources will be documented and referenced appropriately in a comprehensive valuation report.

iii. Report Engagement: The QLE will be responsible for engaging a qualified valuation firm to conduct a full valuation report. The qualified valuation firm will identify and select the appropriate valuation approach based on the terms of the proposed transaction, market conditions and characteristics of the subject water right. Costs incurred may be reimbursable through the CBWTP on a case-by-case basis.

iv. Timing: For transaction requests of $500,000 or more, the Full Valuation Report is required as part of a complete transaction funding application, and must be submitted prior to TAC review. In the event that CBWTP requests a Full Valuation Report for transaction funding requests of less at $500,000, the Report must be submitted prior to CBWTP submission of the transaction to the Council and BPA for funding.

C. Basin Specific Valuation Report:

i. Value Requirement: Unless otherwise determined, CBWTP will require a Basin Specific Valuation Report for all transactions with a requested funding amount of greater than **$100,000** but less than **$500,000**.

ii. Definition: A Basin Specific Valuation Report will provide an independent assessment of value of water rights in the particular basin. The analysis will support a value range rather than a single value. In addition, the report will be provided in summary format and provide limited detail and documentation on data and analysis.

iii. Timing: For transaction requests greater than $100,000 but less than $500,000, the Basin Specific Valuation Report is required as

part of a complete transaction funding application, and must be submitted prior to TAC review.

iv. Report Engagement: CBWTP will be responsible for ordering and engaging WestWater Research or other qualified valuation firm to conduct the Basin Specific Valuation Report. In basins where such a report is not yet available, the QLE must provide a QLE Price Documentation Report as described below.

D. QLE Price Documentation Report:

i. Value Requirement: All transactions requesting funding but not otherwise required to provide a Full or Basin Specific Valuation Report will provide a QLE Price Documentation Report.

ii. Definition: A QLE Price Documentation Report is an internal evaluation developed by the QLE requesting transaction funding from CBWTP. The Price Evaluation Report will include a summary analysis that supports and justifies the transaction price. The valuation analysis will be presented in summary form and provide summary data and a description of the analytical framework used by the QLE to derive the transaction price.

iii. Report Engagement: A QLE Price Evaluation Report shall be conducted by the QLE requesting transaction funding from CBWTP.

E. Valuation Policy

i. Upon satisfactory review of the valuation analysis, the CBWTP will undertake the following actions:

1. For transactions subject to the Full Valuation Report, CBWTP will recommend to BPA the full funding request (less cost-share, if any) if the valuation analysis demonstrates that the negotiated transaction prices is within 15% the estimated fair market value for transactions under $500,000 or within 10% for transactions over $500,000; or

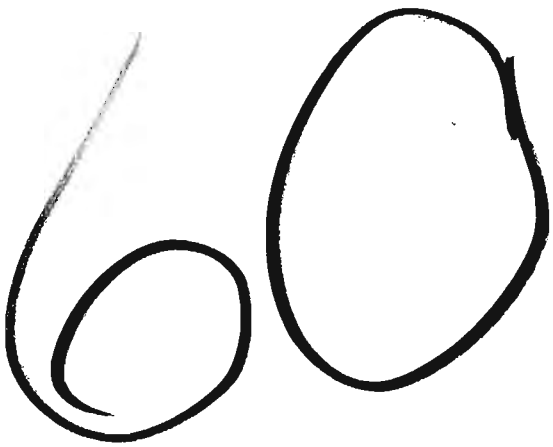
2. For transactions subject to the Basin Specific Valuation Report, CBWTP will recommend to BPA the full funding request (less cost-share, if any) if the valuation analysis demonstrates that the negotiated transaction price is within the range presented by the Basin Specific Valuation Report.

3. The CBWTP is unable to recommend to BPA the full funding request of transactions where the negotiated transaction price significantly exceeds the supporting valuation analysis.

ii. In the event of a valuation dispute, the QLE, at its own expense, may obtain a second independent valuation from a third party. The third party may not be furnished with the original valuation report prior to completing their analysis.

1. If the second valuation does not differ by more than 10% from the initial valuation then the average of the two reports shall be considered the market value of the subject water right.

2. If the second valuation differs by more than 10% from the initial valuation, CBWTP will have final determination of the fair market value for the valuation dispute and the amount it recommends to BPA for transaction funding. CBWTP may seek additional written comment from each valuation team to provide clarification on significant points of departure between the two valuations before making a funding recommendation to BPA.



1. PROJECT TITLE: **Cottonwood Creek Fish Passage and Monitoring**

2. ORGANIZATION AND CONTACT:

Trout Unlimited
111 N. Higgins Ave, Suite 500
Missoula, MT 59802

Casey Hackathorn, Project Manager
406-541-1194
chackathorn@tu.org

3. PROJECT PURPOSE AND BENEFITS:

The Cottonwood Creek Fish Passage and Monitoring Project will improve trout populations in the Clark Fork River, Cottonwood Creek and its tributaries and focuses primarily on improving fluvial westslope cutthroat trout populations. The project seeks to improve upstream fish passage from the Clark Fork River through Cottonwood Creek to its tributaries. The project will replace or retrofit irrigation diversions for upstream fish passage, identify and implement screening projects on priority ditches and monitor fish populations for potential change. Additional benefits of the project will be improvement to irrigation infrastructure, reduced sediment inputs from reduced diversion maintenance, and improved recreational angling opportunity.

Project Goals:

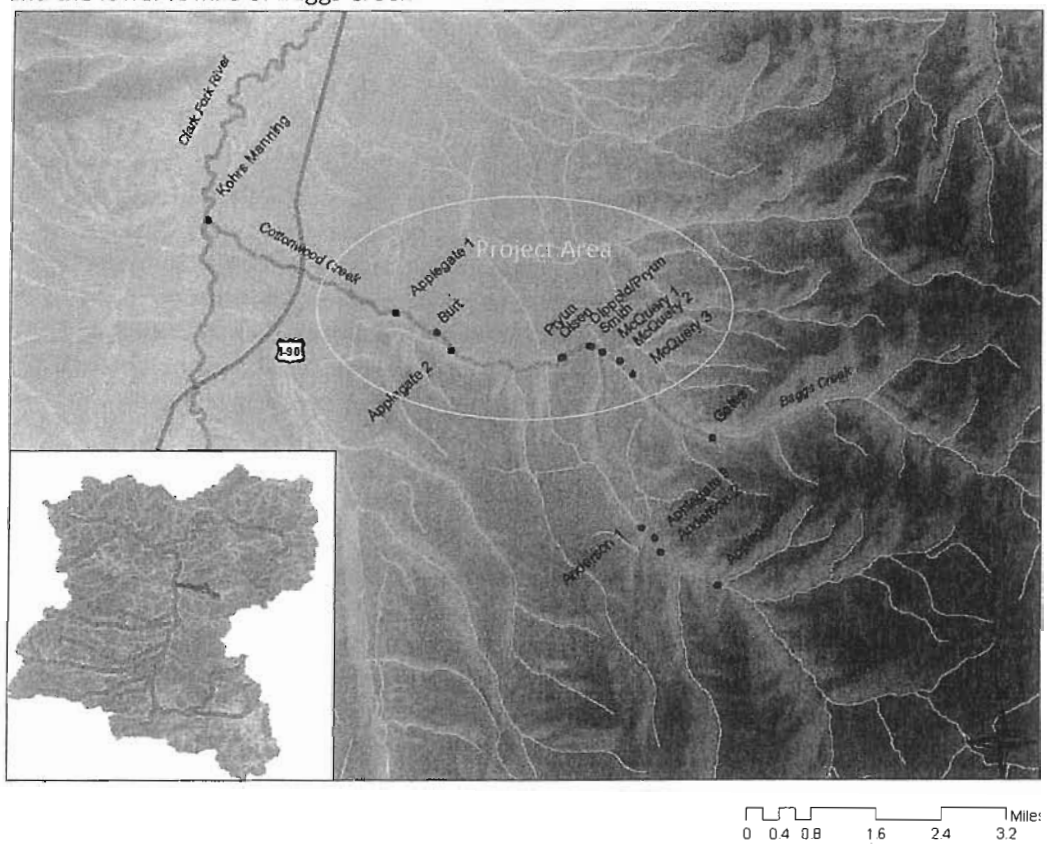
- Improve fish populations in Cottonwood Creek, its tributaries, and the Clark Fork River
- Restore fluvial populations of westslope cutthroat trout in the Clark Fork River
- Improve angling opportunity in Cottonwood Creek and the Clark Fork River
- Reduce maintenance of irrigation diversions and resulting sediment inputs

Objectives:

- Replace or upgrade six irrigation diversions for fish passage
- Identify priority irrigation ditches and install fish screens
- Collect data on fish populations and movement to apply to inform future projects

4. PROJECT LOCATION AND MAP:

Cottonwood Creek flows for nine miles off the west slope of the Boulder Mountians to the Clark Fork River at Deer Lodge. The Cottonwood Creek Fish Passage Project focuses on improving fish passage through the approximately four mile reach of Cottonwood Creek above I-90 upstream to Baggs Creek and the lower ½ mile of Baggs Creek.



5. PROJECT DESCRIPTION:

Cottonwood Creek drains an approximately 55 square mile basin including over 60 miles of stream channel. Major tributaries of Cottonwood Creek include Baggs Creek as well as the North, Middle and South Forks of Cottonwood Creek—all of which host genetically pure populations of westslope cutthroat trout. Cottonwood and Baggs Creeks are designated as Priority 2 tributaries by the NRD Program.

In addition to WCT, the Cottonwood Creek trout community also includes brown trout and brook trout. Brown and brook trout dominate in the lower reaches below Baggs Creek. Trout species found above Baggs Creek and in the tributaries are exclusively westslope cutthroat and brook trout. Westlope cutthroat trout are the only trout species found above a waterfall five miles up Baggs Creek and in the Middle and South Forks of Cottonwood Creek. In 2010, a radio-tagged westslope cutthroat from the Clark Fork River successfully migrated up Cottonwood Creek into Baggs Creek where it is presumed to have spawned before becoming entrained in an irrigation ditch and consumed by a great blue herron. Given the genetic data and connected tributary systems in the watershed, Cottonwood Creek has a high

potential for native fishery restoration. Cottonwood Creek also appears to have strong potential to contribute to a fluvial cutthroat population in the Clark Fork River.

In 2010 and 2011, Trout Unlimited surveyed 13 irrigation diversions on mainstem Cottonwood Creek and 4 on Baggs Creek under contract to the Watershed Resoration Coalition (WRC). These evaluations are documented in the 2011 Upper Clark Fork Diversion Inventory. We identified 11 potential upstream fish passage diversion improvement projects, including one that was completed in 2011 and another that was completed in 2012. The WRC has plans to complete two more diversion replacements in 2012. In addition, the WRC is planning a replacement of the Kohrs-Manning diversion at the mouth of Cottonwood Creek under a separate proposal. This project will focus on the remaining six diversion improvements.

In addition to improving upstream passage, a comprehensive screening program for the Cottonwood Creek watershed would be necessary to eliminate native fish entrainment loss in the system. A minimum of eight fish screen projects would be necessary to accomplish this goal. Entrainment has been documented in six of these ditches. Additional sampling during irrigation season is necessary to document entrainment risk in the remaining ditches.

Montana Fish, Wildlife and Parks has determined that the I-90 culverts should me left unimproved to act as a partial barrier to upstream migration of brown trout during late season low water conditions. Additional montitoring is necessary to ensure that these culverts to not impede upstream migration of westslope cutthroat during spring conditions.

Cottonwood Creek offers a unique opportunity to study the results of reconnecting upstream and downstream fish passage to the Clark Fork River for a genetically pure westslope cutthroat trout population. TU proposes engaging in a multi-year study of fish movement and population dynamics in cooperation with FWP. Data produced from this study could be used to improve future efforts for westslope cutthroat restoration and conservation throughout the watershed and may guide future decision-making for fish passage projects—particularly around the issues asssociated with native and non-native species population dynamics.

Trout Unlimited proposes taking a lead role in some phases of the project in cooperation with the Watershed Restoration Coalition (WRC) including assessment, project development and oversight of engineering and construction. The WRC has engaged in project development work with landowners on Cottonwood Creek and Baggs Creek for several years and is a key partner in developing and implementing projects in this area. Specific roles should be determined on a project by project basis. In addition we propose annual monitoring for three years of all completed projects to ensure successful implemenation. In addition, funding and implementing a long-term maintenance program for fish passage and screening structures will be critical throughout the Upper Clark Fork and is being submitted in a separate WRC proposal.

Project Tasks:

- Work with irrigators to replace or upgrade diversions to improve upstream fish passage
- Prioritize, develop and implement screening projects in conjunction with diversion projects
- Monitor fish passage and population impacts of project work

Project Parnters:

- Watershed Restoration Coalition of Deer Lodge
- George Grant Chapter Trout Unlimited
- Clark Fork Coalition
- Deer Lodge Conseration District
- Beaverhead-Deer Lodge National Forest
- Montana Fish, Wildlife and Parks

6. PROJECT SCHEDULE:

Project development work is underway in 2012 and can be completed within one to two years. Survey, engineering, and construction can be completed in one to two years following project development. Monitoring of fish populations and passage should begin in 2013 and should continue for at least two years after project completion.

Task	Projected Completion
Project Development	2013-2014
Engineering and Design	2014-2015
Diversion Replacement/Upgrade	2014-2015
Fish Screen Installation	2014-2015
Monitoring	2015-2018
Study	2013-2016

7. PROJECT BUDGET:

ITEM	UNIT	QTY	UNIT COST	TOTAL COST	MATCH	NRDP
Salaries and Benefits:						
Project Development	HR	40	$ 40	$ 1,600		$ 1,600
Project Oversight	HR	200	$ 40	$ 8,000		$ 8,000
Permitting	HR	40	$ 40	$ 1,600		$ 1,600
Study Technician (intern)	HR	720	$ 12.50	$ 9,000		$ 9,000
Project Monitoring	HR	320	$ 40	$ 12,800		$ 12,800
				$ 33,000	**$ -**	$ 33,000
Contracted Services:						
Survey and Engineering	LS	8	$10,000	$ 80,000	$ -	$ 80,000
Fish Screens	CFS	80	$ 5,000	$ 400,000	$ 100,000	$ 300,000
Diversion Replacement	EA	6	$20,000	$ 120,000	$ 60,000	$ 60,000
				$ 520,000	**$ 160,000**	$ 360,000
Equipment:						
PIT Tags and Monitoring Equipment	LS	1	$10,000	$ 10,000		$ 10,000
				$ 10,000	**$ -**	**$ 10,000**
Travel and Communication:						
Travel	MI	6400	$ 0.555	$ 3,552		$ 3,552
				$ 3,552	**$ -**	**$ 3,552**
TOTAL:				**$ 566,552**	**$ 160,000**	**$ 406,552**

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1. **PROJECT TITLE: Little Blackfoot Fish Passage**

2. ORGANIZATION AND CONTACT:

Trout Unlimited
111 N. Higgins Ave, Suite 500
Missoula, MT 59802

Casey Hackathorn, Project Manager
406-541-1194
chackathorn@tu.org

3. PROJECT PURPOSE AND BENEFITS:

The Little Blackfoot Fish Passage project seeks to improve fish populations in the Little Blackfoot River, its tributaries, and the Clark Fork River through fish passage and screening projects for migratory westslope cutthroat trout and other fish species. The long term outcome of the project will be connected aquatic habitat from the Little Blackfoot headwaters to the mouth including key spawning tributaries, maximizing potential for migratory fish production in this key watershed.

Goals:

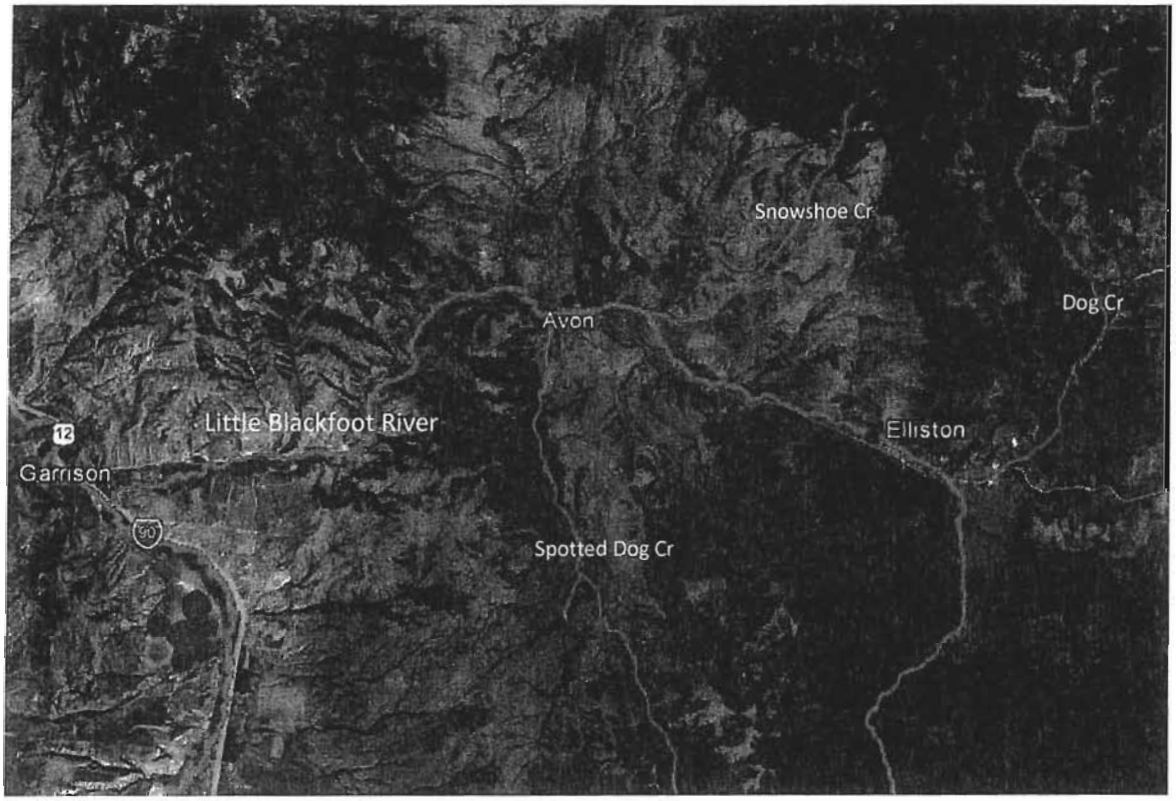
- Improve upstream fish passage and reduce entrainment of adult fluvial westslope cutthroat trout and other species
- Reduce entrainment of outmigrating juvenile westlope cutthroat trout
- Improve fish populations in the Little Blackfoot River, its tributaries and the Clark Fork River
- Improve angling opportunity in the Little Blackfoot and Clark Fork Rivers
- Reduce maintenance and improve function of irrigation infrastructure for irrigators
- Reduce sediment inputs by reducing instream maintenance of diversion dams

Objectives:

- Evaluate up to 30 irrigation diversions for fish passage and entrainment risk
- Prioritize up to 15 diversion replacement and 10 screening projects
- Develop and implement up to 10 diversion replacement and 5 screening projects

4. PROJECT LOCATION AND MAP:

The project will focus on private land in the Little Blackfoot watershed including the Little Blackfoot River from Garrison to above Elliston as well as Spotted Dog, Snowshoe, and Dog Creeks.



5. PROJECT DESCRIPTION:

The Little Blackfoot River is a large tributary of the Clark Fork River that flows a distance of 47 miles from its headwaters in the Boulder Mountains to the Clark Fork River near Garrison, MT. The Little Blackfoot watershed drains 413 square miles, including 534 miles of stream channel. The lower Little Blackfoot River is listed as an NRD Priority 1 stream while the upper Little Blackfoot, Spotted Dog Creek, Snowshoe Creek, and Dog Creek are listed as Priority 2 streams. The Little Blackfoot River has its own TMDL including the mainstem and 14 tributaries listed for sediment, nutrients, and metals impairments.

The Little Blackfoot trout community consists almost exclusively of brown trout in the lower reaches. Telemetry data shows that both migratory westslope cutthroat and brown trout from the Clark Fork River spawn in the Little Blackfoot watershed. Westslope cutthroat and brook trout are present above Avon and are the predominant species above Elliston. Genetic sampling of Westslope cutthroat trout populations in the Little Blackfoot River and most of its tributaries show pure or nearly pure populations.

Westslope Cutthroat Trout

Trout Unlimited surveyed two diversions on the Little Blackfoot River in 2011. Preliminary research indicates that there are more than 30 irrigation diversions in the Little Blackfoot watershed. Given the high native fish restoration potential of this watershed, high priority should be given to completing fish passage improvement projects on all structures that impede fish passage. Projects that reduce sedimentation by reducing annual maintenance of diversions should also be considered.

Trout Unlimited proposes taking a lead role in all phases of the project including assessment, project development and oversight of engineering and construction. We propose to conduct annual monitoring of projects for three years after completion to ensure successful implemenation of project goals. In addition, funding and implementing a long-term maintenance program for fish passage and screening structures will be critical throughout the Upper Clark Fork and is being submitted in a separate proposal from the Watershed Restoration Coalition.

Typical TU Diversion Replacement Project for Fish Passage

Cottonwood Creek Before

Cottonwood Creek After

Project Tasks:

- Evaluate fish passage and entrainment at diversions and road culverts on the Little Blackfoot River, Spotted Dog Creek, Snowshoe Creek and Dog Creek
- Update Upper Clark Fork Diversion Inventory to include the Little Blackfoot River watershed
- Develop priority projects in coordination with private landowners, state and federal agencies, and other project partners
- Contract and coordinate project design
- Contract and oversee project construction

Project Partners:

- Pat Barnes Missouri River Chapter Trout Unlimited
- Montana Fish, Wildlife and Parks
- Deer Lodge Conservation District
- Helena National Forest
- Watershed Restoration Coalition of Deer Lodge

6. PROJECT SCHEDULE:

This project is expected to take three to five years to complete. One field season will be required to evaluate upstream fish passage, entrainment risk, and need for irrigation infrastructure improvements. Project development with private landowners and irrigators will take two to three years to complete. Engineering, design and construction of projects will take approximately one year to complete following project development.

Task	Projected Completion
Diversion and Culvert Survey and Evaluation	2013
Update Diversion Inventory	2013
Project Development	2013-2015
Engineering and Design	2014-2015
Diversion Replacement/Upgrade	2014-2016
Fish Screen Installation	2014-2016
Monitoring	2015-2019

7. PROJECT BUDGET:

ITEM	UNIT	QTY	UNIT COST	TOTAL COST	MATCH	NRDP
Salaries and Expenses:						
Survey and Evaluation	HR	130	$ 40	$ 5,200		$ 5,200
Survey Tech (intern)	HR	100	$ 12.50	$ 1,250		$ 1,250
Project Development	HR	200	$ 40	$ 8,000		$ 8,000
Project Oversight	HR	400	$ 40	$ 16,000		$ 16,000
				$ 30,450	**$ -**	**$ 30,450**
Contracted Services:						
Fish Screens	CFS	50	$ 5,000	$ 250,000	$ 100,000	$ 150,000
Diversion Replacement	EA	10	$20,000	$ 200,000	$ 100,000	$ 100,000
				$ 450,000	**$ 200,000**	**$ 250,000**
Travel and Communication:						
Mileage	MI	4500	$ 0.555	$ 2,498		$ 2,498
				$ 2,498	**$ -**	**$ 2,498**
TOTALS:				**$ 482,948**	**$ 200,000**	**$ 282,948**

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1. PROJECT TITLE: **Warm Springs Creek Fish Passage**

2. ORGANIZATION AND CONTACT:

Trout Unlimited
111 N. Higgins Ave, Suite 500
Missoula, MT 59802

Casey Hackathorn, Project Manager
406-541-1194
chackathorn@tu.org

3. PROJECT PURPOSE AND BENEFITS:

The purpose of the Warm Springs Creek fish passage project is to connect upstream and downstream migration corridors for bull trout, westslope cutthroat trout, and other migratory fish species. The project seeks to protect and restore the remaining population of bull trout in the Warm Springs Creek watershed as well as protect other fish species from entrainment in irrigation ditches.

Goals:

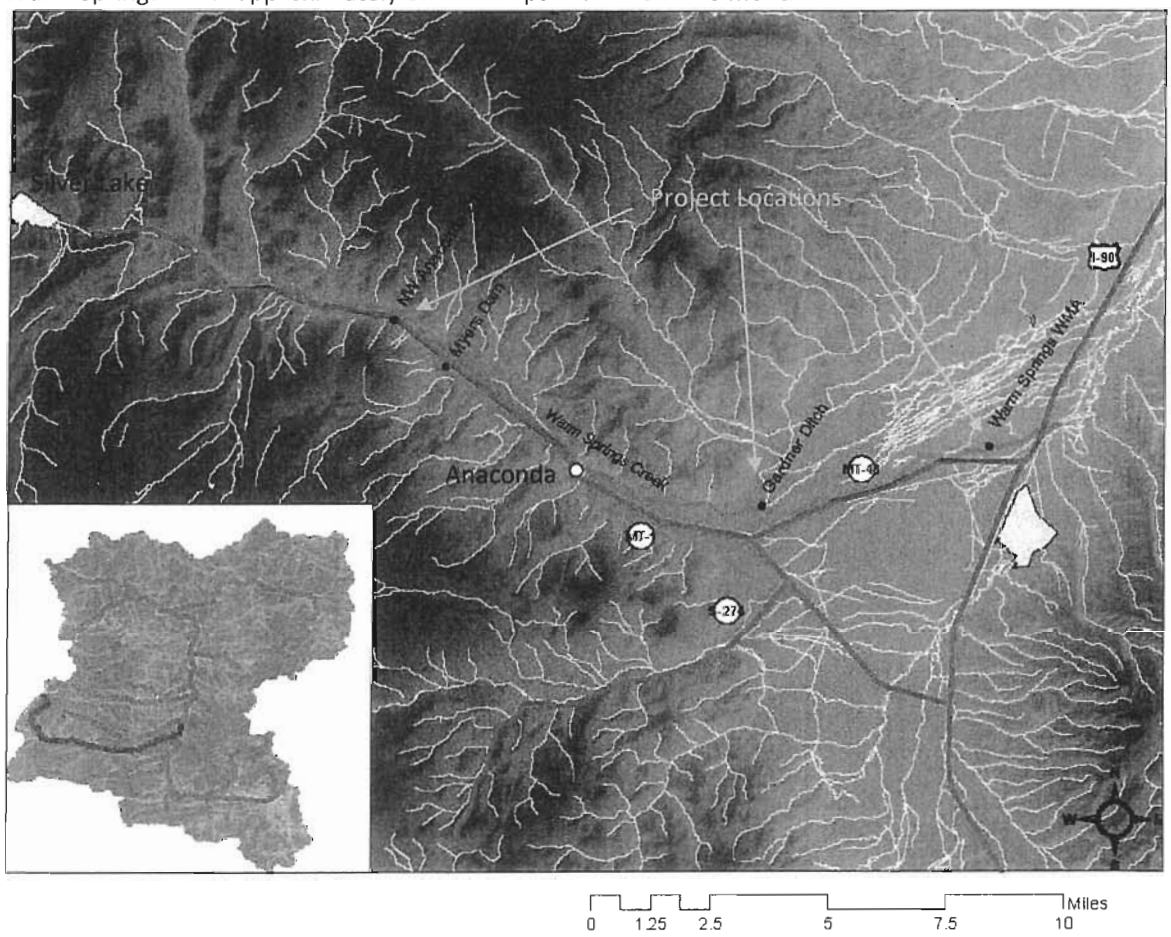
- Reduce entrainment of bull trout and other fish species in irrigation canals
- Improve resident and migratory fish populations in the Clark Fork River and Warm Springs Creek
- Improve angling opportunity in Warm Springs Creek and the Clark Fork River
- Improve irrigation infrastructure and reduce maintenance

Objectives:

- Install fish screens on 3 irrigation diversions
- Improve 3 diversions for function, flow regulation, fish passage and reduced mainenance

4. PROJECT LOCATION AND MAP:

The project focuses on three diversion structures on Warm Springs Creek near Anaconda. One is located west of Anaconda approximately ½ mile upstream of the Stump Town Road Bridge. The second is located east of Anaconda immediately upstream of the Galen Road Bridge. The third is located on the Warm Springs WMA approximately one mile upstream from the mouth.



5. PROJECT DESCRIPTION:

Warm Springs Creek is one of the largest headwater tributaries in the Upper Clark Fork watershed, draining a 100 square mile basin with 118 miles of stream channel. Warms Springs Creek, Barker Creek, Twin Lakes Creek, and Storm Lake Creek are listed as NRDP Priority 1 tributaries and Foster Creek is listed as Priority 2.

The Warm Springs Creek watershed contains the furthest upstream population of bull trout in the Upper Clark Fork and is designated as Critical Bull Trout Habitat. In addition to bull trout and westslope cutthroat trout, the Warm Springs Creek fishery also includes rainbow trout, brown trout, brook trout, and mountain whitefish. FWP data indicates some hybridization of westslope cutthroat trout in the Warm Springs Creek watershed although cutthroat in the upper reaches and upper tributaries remain

pure or nearly pure. Bull trout genetic data in Warm Springs Creek show the presence of genetically pure bull trout as well as bull trout-brook trout hybrids.

In 2010 and 2011, Trout Unlimited surveyed four active diversion dams on Warm Springs Creek. Evaluations of these structures are documented in the 2011 Upper Clark Fork Diversion Inventory. Of the four, Myers Dam is the only year-round upstream fish passage barrier although it is suspected that some fish are able to pass Myers Dam during flood conditions. All four diversions are likely to entrain fish, but fish are probably able escape back to Warm Springs Creek from the settling pond associated with the Myers Dam diversion. Fish entrainment has been documented at the Gardner diversion in 2010 (including a bull trout) and the Warm Springs WMA diversion in 2011. Screening projects should be completed at all Warm Springs Creek diversions due to the high importance of Warm Springs Creek for native fish recovery in the Upper Clark Fork watershed, particularly for bull trout.

In addition to the diversions on Warm Springs Creek, diversions on Twin Lakes Creek and Storm Lake Creek associated with the Silver Lake storage system are known to impact fish passage in the Warm Springs watershed. The Butte-Silver Bow County government is engaged in planning efforts to replace infrastructure at Myers Dam, Silver Lake, Twin Lakes Creek and Storm Lake Creek. A coordinated effort with county, state, and federal agencies will be necessary to mitigate the impacts of these structures on fish passage and ensure recovery of native fishes in the Warm Springs Creek watershed. This proposal assumes and supports that future improvement to Myers dam, the Twin Lakes Creek diversion, and Storm Lake Creek diversion will include selective upstream fish passage and a fish screens per FWP recommendations.

This project seeks to develop and implement screening projects on the remaining three diversions on Warm Springs Creek. Trout Unlimited proposes taking a lead role in all phases of this project including assessment, project development, and oversight of engineering and construction. Trout Unlimited will identify and meet with water users for three diversion structures and negotiate diversion structure improvements at each to include improvements to upstream fish passage, headgate installation, flow measuring devices, fish screens, and structural improvements as necessary. TU will hire an engineering firm to design improvements as negotiated and a construction contractor to complete the installation. TU will oversee design and construction and conduct post-project monitoring.

Survey and evaluation for fish passage was completed at all four diversion structures on Warm Springs Creek in 2010 and 2011. Limited project development work has been completed to date. We propose annual monitoring of projects completed for three years to ensure successful implemenation. In addition, funding and implementing a long-term maintenance program for fish passage and screening structures will be critical throughout the Upper Clark Fork and is being submitted in a separate proposal.

Tasks:

- Coordinate with irrigators at three Warm Springs Creek diversions to develop screening projects
- Collect entrainment data at uppermost diversion west of Anaconda
- Design and build/upgrade diversion structures and fish screens at three ditches

Parnters:

- George Grant Chapter Trout Unlimited
- Montana Trout Unlimited
- Montana Fish, Wildlife and Parks

- Beaverhead-Deer Lodge National Forest
- U.S. Fish and Wildlife Service

6. PROJECT SCHEDULE: The Warm Springs Creek fish passage project can be completed in 2 to 3 years from the start of the project. Monitoring will continue for 3 years after project completion.

Task	Projected Completion
Project Development	2013-2014
Engineering and Design	2014
Diversion Replacement/Upgrade	2014-2015
Fish Screen Installation	2014-2015
Monitoring	2015-2018

7. PROJECT BUDGET:

ITEM	UNIT	QTY	UNIT COST	TOTAL COST	MATCH	NRDP
Salaries and Benefits:						
Survey and Evaluation	HR	16	$ 40	$ 640	$ 640	$ -
Diversion Inventory	HR	8	$ 40	$ 320	$ 3,200	$ -
Project Development	HR	32	$ 40	$ 1,280		$ 1,280
Project Oversight	HR	160	$ 40	$ 6,400		$ 6,400
Permitting	HR	24	$ 40	$ 960		$ 960
Monitoring	HR	48	$ 40	$ 1,920		$ 1,920
				$ 11,520	**$ 3,840**	**$ 10,560**
Contracted Services:						
Survey and Evaluation	HR	16	$ 20	$ 320	$ 320	$ -
Engineering and Design	LS	1	$30,000	$ 30,000		$ 30,000
Fish Screens	CFS	73	$ 5,000	$365,000	$150,000	$ 215,000
Diversion Improvements	EA	3	$20,000	$ 60,000	$ 20,000	$ 40,000
				$455,320	**$170,320**	**$ 285,000**
Travel and Communication:						
Travel	MI	4200	$ 0.555	$ 2,331	$ 600	$ 1,731
				$ 2,331	**$ 600**	**$ 1,731**
TOTAL:				**$469,171**	**$174,760**	**$ 297,291**

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1. PROJECT TITLE: **Upper Warm Springs Creek Habitat Project**

2. ORGANIZATION AND CONTACT:

Trout Unlimited
111 N. Higgins Ave, Suite 500
Missoula, MT 59802

Casey Hackathorn
406-541-1194
chackathorn@tu.org

3. PROJECT PURPOSE AND BENEFITS:

The Upper Warm Springs Creek Habitat Project seeks to improve bull trout and westslope cutthroat trout populations in the Warm Springs Creek watershed through habitat improvements in upper mainstem Warm Springs Creek and key tributaries.

Goals:

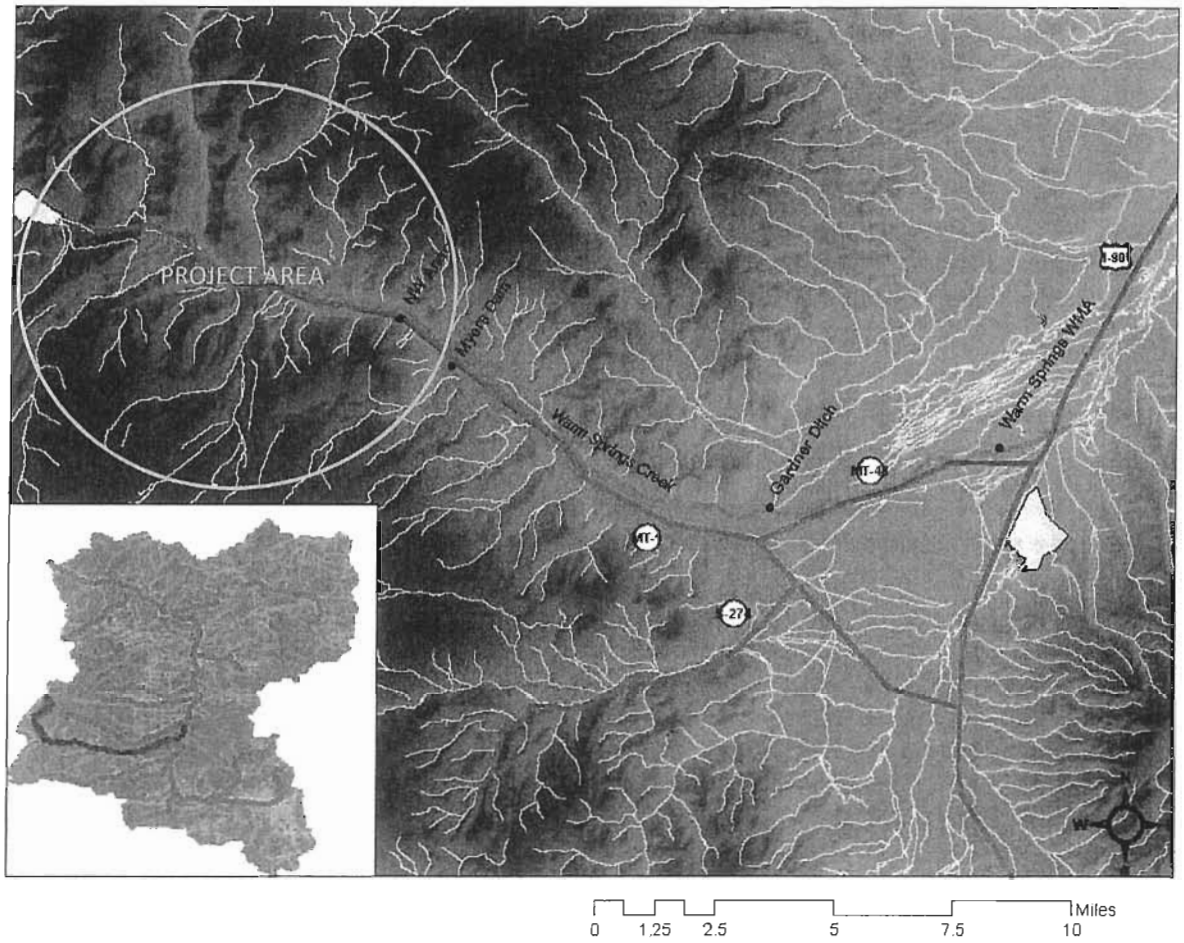
- Improve habitat for native fish including bull trout and westslope cutthroat trout
- Improve native fish populations including bull trout and westslope cutthroat trout
- Improve angling opportunity in Warm Springs Creek

Objectives:

- Improve fish habitat with large woody debris in 6 miles of upper Warm Springs Creek
- Improve conditions for bull trout migration through in 1 mile of the Storm Lake Creek diversion ditch from Silver Lake to Storm Lake Creek
- Improve bull trout habitat on private land on approximately ½ mile of stream channel near the mouths of Twin Lakes Creek, Barker Creek and Foster Creek

4. PROJECT LOCATION AND MAP:

This project is focused on the upper Warm Springs Creek watershed above Myers Dam west of Anaconda.



5. PROJECT DESCRIPTION:

Warm Springs Creek is one of the largest headwater tributaries in the Upper Clark Fork watershed. The Upper Warm Springs Creek watershed NRDP Priority 1 areas include mainstem Warm Springs Creek, Barker Creek, Storm Lake Creek, and Twin Lakes Creek. Foster Creek is listed as a Priority 2 tributary. Warm Springs Creek is TMDL listed for metals impairment. Storm Lake Creek and Cable Creek are TMDL listed for sediment impairment.

The Warm Springs Creek watershed contains the furthest upstream population of bull trout in the Clark Fork River basin and is designated as Critical Bull Trout Habitat. Westslope cutthroat trout (WCT) and bull trout are the predominant fish species in the upper reaches with some brown trout, rainbow trout, and brook trout also present. Warm Springs Creek has high potential for native fish recovery in the Upper Clark Fork watershed, particularly for bull trout.

One of the factors limiting fish populations in the Warm Springs Creek watershed is impaired habitat. Mainstem Warm Springs Creek is starved for large woody debris, likely the result of past logging practices associated with smelting operations in Anaconda as well as channelization during highway construction. Adult adfluvial bull trout from Silver Lake migrate up a diversion ditch from Silver Lake to Storm Lake Creek to spawn. It is unclear at this point if habitat and or hydraulic conditions in this ditch are limiting factors affecting success of bull trout migration. FWP is currently planning monitoring efforts to determine need for improvements in this reach. Riparian habitat near the mouths of Foster, Twin Lakes, and Barker Creeks are impacted by development on private land.

Trout Unlimited proposes to improve habitat conditions on mainstem Warm Springs Creek through placement of large woody debris. This relatively low cost approach may yield significant habitat improvements in this reach of stream. In addition we propose working with private landowners to restore riparian buffers on the lower reaches of three priority tributaries through riparian planting projects with volunteer labor.

Trout Unlimited proposes taking a lead role in all phases of the project in coordination with FWP and federal agencies including project development and implemenation. TU plans to engage volunteer labor in cooperation with our George Grant Chapter to implement the riparian planting planned on Warm Springs Creek tributaries. We propose annual monitoring of projects completed for three years to ensure successful implemenation.

Tasks:

- Coordinate with landowners on the lower reaches of Barker and Twin Lakes Creek to develop riparian protection and improvement projects including planting native woody shrubs
- Coordinate with George Grant Chapter and oversee riparian improvement projects on the lower reaches of Barker and Twin Lakes Creeks with volunteer labor
- Coordinate with FWP and Butte-Silver Bow County to investigate opportunity to improve conditions for bull trout migration on the lower 1 mile of diversion channel from Storm Lake Creek to Silver Lake
- Coordinate and implement Storm Lake Creek diversion channel project if warranted
- Coordinate with FWP, Beaverhead-Deer Lodge National Forest and private landowners on Warm Springs Creek to develop and design large woody debris placement projects on the 6 mile reach above Myers Dam in the Highway 1 corridor
- Hire operator and oversee implementation of large woody debris habitat improvement project on upper Warm Springs Creek

Parnters:

- George Grant Chapter Trout Unlimited
- Montana Trout Unlimited
- Montana Fish, Wildlife and Parks
- Beaverhead-Deerlodge National Forest
- U.S. Fish and Wildlife Service

6. PROJECT SCHEDULE:

Project development will require 1 to 2 years to complete. Project implementation will require an additional 1 to 2 years.

Task	Projected Completion
Project Development	2013-2014
Project Design and Coordination	2014
Project Implementation	2014-2015
Monitoring	2015-2018

7. PROJECT BUDGET:

ITEM	UNIT	QTY	UNIT COST	TOTAL COST	MATCH	NRDP
Salaries and Benefits:						
Project Development	HR	60	$ 40	$ 2,400		$ 2,400
Project Oversight	HR	320	$ 40	$ 12,800		$ 12,800
Permitting	HR	40	$ 40	$ 1,600		$ 1,600
Monitoring	HR	24	$ 40	$ 960		$ 960
Volunteer Labor	HR	300	$ 20	$ 6,000	$ 6,000	$ -
				$ 23,760	**$ 6,000**	**$ 17,760**
Contracted Services:						
Excavator and Operator (WSC LWD)	Day	25	$ 1,000	$ 25,000	$ 10,000	$ 15,000
Mini Excavator and Operator (Storm)	Day	10	$ 800	$ 8,000		$ 8,000
Survey and Engineering (Storm)	LS	1	$10,000	$ 10,000		$ 10,000
				$ 43,000	**$ 10,000**	**$ 33,000**
Supplies and Materials:						
Native Shrub Container Stock	EA	1000	$ 1.50	$ 1,500		$ 1,500
				$ 1,500	**$ -**	**$ 1,500**
Travel and Communication:						
Travel	MI	5000	$ 0.555	$ 2,775		$ 2,775
				$ 2,775	**$ -**	**$ 2,775**
TOTAL:				**$ 71,035**	**$ 16,000**	**$ 55,035**

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1. PROJECT TITLE: **German Gulch Habitat Restoration**

2. ORGANIZATION AND CONTACT:

Trout Unlimited
111 N. Higgins Ave, Suite 500
Missoula, MT 59802

Casey Hackathorn, Project Manager
406-541-1194
chackathorn@tu.org

3. PROJECT PURPOSE AND BENEFITS:

The purpose of the project is to protect and restore the recovering fluvial westslope cutthroat population in Silver Bow Creek by protecting and improving riparian habitat on the critical spawning and rearing tributaries, German Gulch and Beefstraight Creek. In addition, the project will improve water quality by reducing sediment and metals inputs.

Goals:

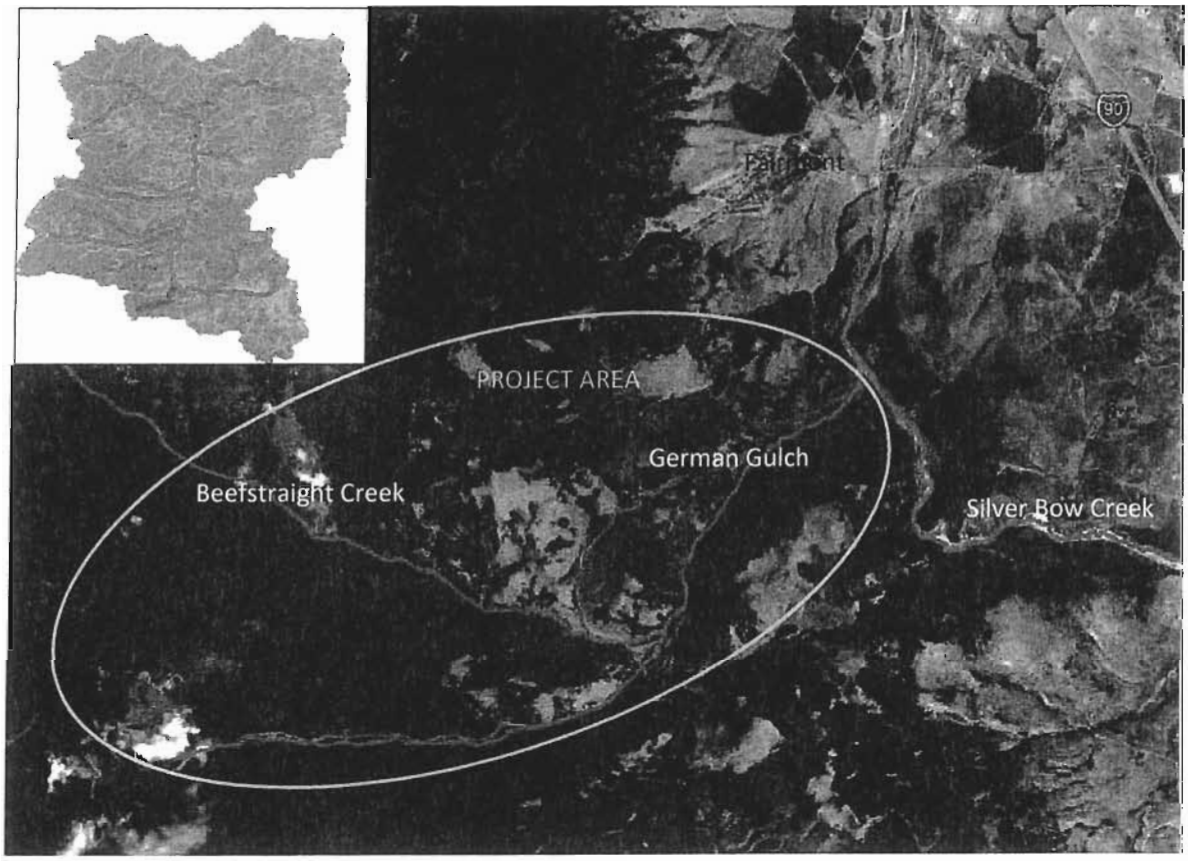
- Protect riparian areas on public land adjacent to German Gulch and Beefstraight Creek
- Recuce metals inputs from streamside tailings to German Gulch
- Improve and protect fluvial westlope cutthroat populations in the Silver Bow Creek watershed

Objectives:

- Install riparian fencing on up to 4 miles of riparian habitat with water gaps or off-stream watering
- Remove approximately 7,000 cubic yards of streamside tailings

4. PROJECT LOCATION AND MAP:

The project will focus on German Gulch and Beefstraight Creek riparian areas on State of Montana WMA and Beaverhead-Deerlodge National Forest grazing allotments.



5. PROJECT DESCRIPTION:

German Gulch is a tributary to Silver Bow Creek located approximately 6 miles south of Opportunity, MT. The stream has a drainage area of approximately 41 square miles and contains the most productive westslope cutthroat trout fishery in the Silver Bow Creek drainage. German Gulch is approximately 8.4 miles in length with 56 miles of stream channel in the watershed. German Gulch is listed as an NRD Priority 1 tributary and Beefstraight Creek is listed as Priority 2. Both streams are TMDL listed for metals impairments.

Westslope cutthroat trout (WCT) from German Gulch have re-colonized Silver Bow Creek in recent years and have maintained near 100% genetic purity. Recent FWP telemetry work has shown that fluvial WCT from Silver Bow Creek return to spawn in German Gulch and Beefstraight Creek. Protecting and

improving habitat on both streams are key goals to the long-term recovery of the species in the Silver Bow Creek watershed.

Colonization of other invading species such as rainbow trout and brown trout from the Warm Springs Ponds into German Gulch has been largely prevented by the toxicity of Silver Bow Creek in the past. As remediation of Silver Bow Creek metals contamination nears completion, planning is underway to install a fish barrier on Silver Bow Creek downstream of German Gulch to maintain the genetic purity of westslope cutthroat trout in the watershed. George Grant Chapter TU had previously planned to install a fish barrier in German Gulch under a previous NRDP grant. We recommend the funding previously allocated to the German Gulch barrier project be re-allocated to the Silver Bow Creek barrier project.

Also included in the GGTU German Gulch NRDP grant was a plan to remove approximately 7,000 cubic yards of streamside tailings along the lower reaches of German Gulch. Planning efforts under this grant have been underway for several years to have Montana Department of Environmental Quality (DEQ) manage removal of these tailings during removal of similar material along Silver Bow Creek during remediation and restoration activities planned for 2013. We recommend re-allocating funding set aside under the GGTU grant directly to DEQ for removal of the German Gulch tailings.

Protecting riparian habitat is crucial for the long-term health of the German Gulch watershed and Silver Bow Creek. This project seeks to improve and protect riparian habitat on German Gulch and Beefstraight Creek from the impacts of grazing through riparian fencing.

Trout Unlimited proposes taking a lead role in all phases of the project in coordination with FWP and federal agencies including project development and implemenation. We propose annual monitoring of projects completed for three years to ensure successful implemenation. TU will employ volunteer labor in coordination with GGTU to implement the riparian planting aspects of the project.

Tasks:

- Coordinate with FWP and Beaverhead-Deerlodge National Forest to identify priority riparian areas for potential fencing projects
- Develop riparian fencing projects with off-stream water and or engineered crossings
- Contract and oversee fencing projects in cooperation with GGTU volunteers
- NRDP coordinate with DEQ to fund and incorporate German Gulch tailings removal with Silver Bow Creek remediation and restoration planning activities
- DEQ remove German Gulch streamside tailings in conjuction with Silver Bow Creek remediation and restoration

Parnters:

- George Grant Chapter Trout Unlimited
- Montana Department of Environmental Quality
- Montana Fish, Wildlife and Parks
- Beaverhead-Deerlodge National Forest

6. PROJECT SCHEDULE:

Task	Projected Completion
Tailings Removal	2013
Fencing Project Development	2013-2014
Install Fencing	2014
Weed Control	2014-2015
Planting	2014
Monitoring	2015-2018

7. PROJECT BUDGET:

ITEM	UNIT	QTY	UNIT COST	TOTAL COST	MATCH	NRDP
Salaries and Benefits:						
Project Development	HR	80	$ 40	$ 3,200		$ 3,200
Project Oversight	HR	120	$ 40	$ 4,800		$ 4,800
Volunteer Labor	HR	800	$ 20	$ 16,000	$ 16,000	$ -
Monitoring	HR	48	$ 40	$ 1,920		$ 1,920
				$ 25,920	**$ 16,000**	**$ 9,920**
Contracted Services:						
Fencing with water gaps	FT	42240	$ 2.00	$ 84,480		$ 84,480
Tailings Removal*	CU YD	7000	$ 30	$ 210,000		$ 210,000
Weed Control	LS	1	$ 20,000	$ 20,000		$ 20,000
				$ 314,480	**$ -**	**$ 314,480**
Supplies and Materials:						
Native containerized shrubs	EA	2000	$ 1.5	$ 3,000		$ 3,000
				$ 3,000	**$ -**	**$ 3,000**
Travel and Communication:						
Travel	MI	3200	$ 0.555	$ 1,776		$ 1,776
				$ 1,776	**$ -**	**$ 1,776**
TOTAL:				**$ 345,176**	**$ 16,000**	**$ 329,176**

*$170,000 previously allocated to GGTU grant for this activity

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1. PROJECT TITLE: **Browns Gulch Fish Passage**

2. ORGANIZATION AND CONTACT:

Trout Unlimited
111 N. Higgins Ave, Suite 500
Missoula, MT 59802

Casey Hackathorn
406-541-1194
chackathorn@tu.org

3. PROJECT PURPOSE AND BENEFITS:

The Browns Gulch fish passage project is intended to open lower Browns Gulch to upstream fish passage for westslope cutthroat trout (WCT) from Silver Bow Creek in an attempt to re-establish a migratory population of cutthroat in Browns Gulch. Improving recruitment to Silver Bow Creek and reconnecting tributary habitat is essential for the long-term success of the recovering Silver Bow Creek WCT population.

Goals:

- Improve or re-establish WCT populations in the Browns Gulch watershed
- Improve fluvial WCT trout populations in Silver Bow Creek

Objectives:

- Retrofit 5 irrigation diversions with Denil fish ladders
- Monitor WCT trout movements in Browns Gulch to determine success

4. PROJECT LOCATION AND MAP:

The first phase of the Browns Gulch fish passage project will focus on the lowermost seven miles of Browns Gulch from the mouth near Ramsay upstream to the mouth of Hail Columbia Gulch. Subsequent phases will move up the creek if the first phase is successful.

5. PROJECT DESCRIPTION:

Browns Gulch is a tributary to Silver Bow Creek with its mouth near Ramsay. Browns Gulch is listed as an NRDP Priority 1 tributary. Several Browns Gulch tributaries host remnant populations of genetically pure resident westslope cutthroat trout including Hail Columbia Gulch, Meadow Gulch, Flume Gulch, Alaska Gulch, and Telegraph Gulch. Adult cutthroat tagged in Silver Bow Creek have been observed moving in and out of Browns Gulch but the potential to restore a migratory population here remains unclear.

In 2011, Trout Unlimited surveyed 14 irrigation diversions in Browns Gulch under contract with the Watershed Restoration Coalition (WRC). Our evaluations are summarized in the 2011 Upper Clark Fork Diversion Inventory. Significant impairment to upstream fish passage was identified at 9 of the 14 diversions we evaluated. All of the diversions identified presented some risk for entrainment. Browns Gulch suffers from significant dewatering, sedimentation, and habitat loss. Fish passage may not presently be the factor limiting native fish recovery in this watershed. Due to the significant expense in addressing all of the fish passage issues on Browns Gulch, we recommended a phased approach that would allow evaluation of the effectiveness of fish passage improvement measures before proceeding with additional work.

For the first phase, we propose retrofitting the five lowermost active diversions on Browns Gulch for upstream fish passage along with continued monitoring to determine effects on fish populations and

movement through the reach. This would allow for fish passage from Silver Bow Creek up Browns Gulch to Hail Columbia Gulch, the lowermost tributary in the watershed with a remnant westslope cutthroat population. If reconnecting the lower reaches of Browns Gulch to Hail Columbia gulch proves successful, additional planning will be necessary to determine the appropriate next steps which will likely entail replacement of up to nine irrigation diversions to allow unimpeded upstream fish passage and consideration of screening at some diversions.

Trout Unlimited proposes taking a lead role in all phases of the project in coordination with FWP and federal agencies including project development and implemenation. We propose annual monitoring of projects completed for three years to ensure successful implemenation. In addition, successful evaluation of this project will require FWP to continue monitoring fish population and movement through the lower reaches of Browns Gulch during the monitoring period.

Tasks:

- Install Denil fish ladders on 5 irrigation diversions
- Monitor projects and WCT movement for 1-3 years

Parnters:

- George Grant Chapter Trout Unlimited
- Montana Trout Unlimited
- Watershed Restoration Coalition of Deer Lodge
- Mile High Conservation District
- Beaverhead-Deer Lodge National Forrest
- Montana Fish, Wildlife and Parks

6. PROJECT SCHEDULE:

Project development is underway and installation of fish ladders can be completed in spring of 2013. Monitoring would continue for 1-3 years to determine WCT utilization of this reach of Browns Gulch. If the first phase of the project is successful additional planning and project development will be necessary to determine the next steps.

Task	Projected Completion
Install Fish Ladders	2013
Monitoring	2013-2015

7. PROJECT BUDGET:

ITEM	UNIT	QTY	UNIT COST	TOTAL COST	MATCH	NRDP
Salaries and Benefits:						
Project Development	HR	8	$ 40	$ 320		$ 320
Project Management	HR	80	$ 40	$ 3,200		$ 3,200
Monitoring	HR	80	$ 40	$ 3,200		$ 3,200
				$ 6,720	**$ -**	**$ 6,720**
Contracted Services:						
Excavator and Operator	Day	5	$ 900	$ 4,500		$ 4,500
Delivery	LS	1	$ 1,000	$ 1,000		$ 1,000
				$ -		$ -
				$ 5,500	**$ -**	**$ 5,500**
Supplies and Materials:						
Denil Fish Ladder	EA	5	$ 2,480	$ 12,400	$ 2,000	$ 10,400
Installation Hardware	EA	5	$ 200	$ 1,000		$ 1,000
				$ 13,400	**$ 2,000**	**$ 11,400**
Travel and Communication:						
Travel	MI	900	$ 0.555	$ 500		$ 500
				$ 500		**$ 500**
						$ -
TOTAL:				**$ 26,120**	**$ 2,000**	**$ 24,120**

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1. PROJECT TITLE: **Mill Creek Fish Passage and Flow Restoration Project**

2. ORGANIZATION AND CONTACT:

Trout Unlimited
111 N. Higgins Ave, Suite 500
Missoula, MT 59802

Casey Hackathorn, Project Manager
406-541-1194
chackathorn@tu.org

3. PROJECT PURPOSE AND BENEFITS:

The Mill Creek Fish Passage and Flow Restoration Project will improve fish populations in Mill Creek and the Clark Fork River through reductions in fish entrainment in irrigation ditches and improvements in instream flow. The project will also provide water users with improved infrastructure with reduced maintenance of diversion structures and improved control over water delivery.

Goals:

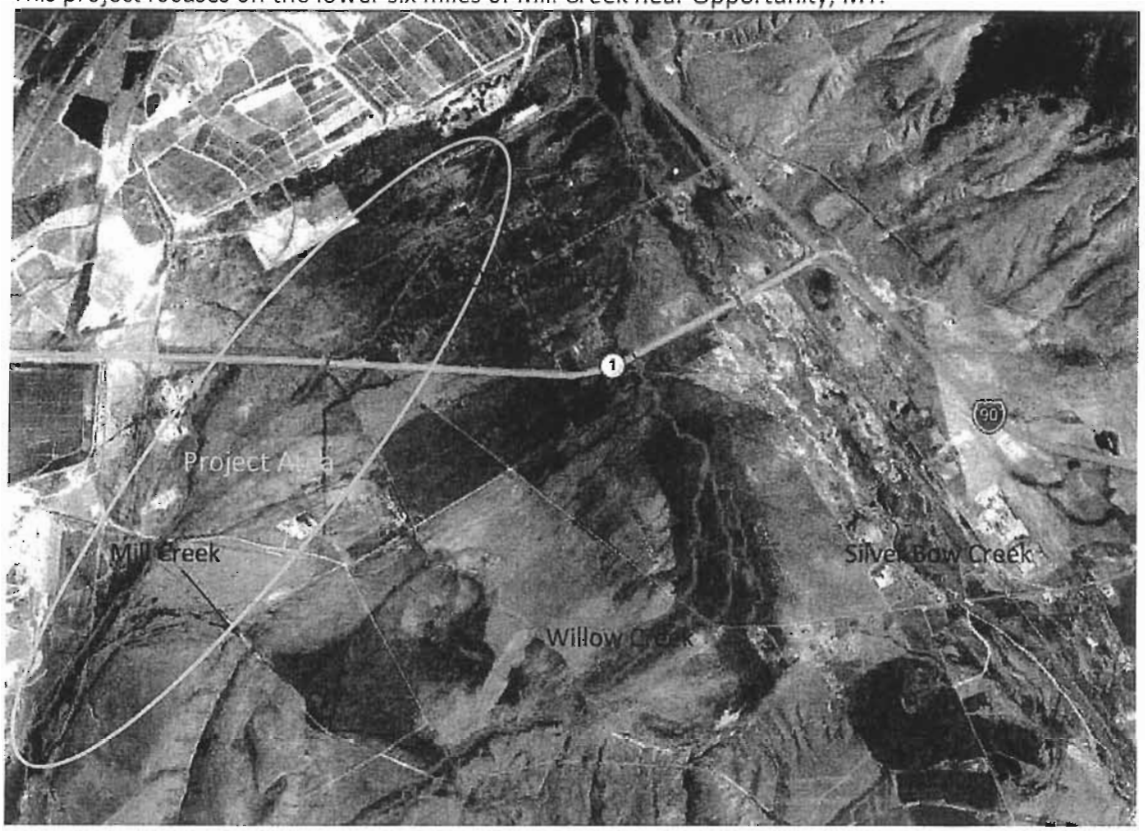
- Improve fish populations in Mill Creek and the Clark Fork River
- Restore a fluvial component to the westslope cutthroat trout population in Mill Creek
- Reduce entrainment of fish in Mill Creek irrigation ditches
- Improve angling opportunity in Mill Creek and the Clark Fork River
- Improve instream flow in Mill Creek and the Clark Fork River

Objectives:

- Install fish screens on 3 irrigation ditches
- Improve structures, install headgates and install flow measuring devices on 7 diversions
- Protect minimum instream flow on lower Mill Creek to the Clark Fork River

4. PROJECT LOCATION AND MAP:

This project focuses on the lower six miles of Mill Creek near Opportunity, MT.



5. PROJECT DESCRIPTION:

Mill Creek flows east for approximately 20 miles from near the Continental Divide into the Mill-Willow Bypass near the town of Opportunity. Mill Creek drains a 49 square mile watershed with headwaters in the Anaconda Range that includes 57 miles of stream channel. Atlantic Ritchfield (ARCO) owns a large portion of the watershed surrounding the town of Opportunity that continues to undergo remedial activites. Mill Creek is listed as an NRD Priority 2 tributary and is a TMDL listed stream for metals impairment.

The Mill Creek trout community includes brown trout, brook trout, and westslope cutthroat trout. Relative abundance of cutthroat increase and brown trout decrease moving upstream in the watershed. A small natural waterfall at RM 11.0 is likely an upstream barrier to fish movement and sampling indicates a fish community comprised entirely of westslope cutthroat trout upstream of the barrier. Recent sampling has shown 100% genetic purity of the westslope cutthroat trout population in Mill Creek.

In 2011, Trout Unlimited located and surveyed seven diversions on Mill Creek, none of which presented a physical barrier to upstream fish passage. While we did not encounter dewatering during our survey, landowner accounts indicate that during some water years, Mill Creek is completely dewatered by irrigation diversions posing a likely seasonal barrier to upstream fish passage. All seven diversions

appear to pose some entrainment risk while in use. Three larger diversions upstream of Highway 1 appear to pose the largest relative risk. Further evaluation of entrainment during likely periods of cutthroat outmigration may be necessary to prioritize potential screening projects on Mill Creek.

The project proposes to develop and implement screening projects on the three largest diversions that pose the greatest entrainment risk on Mill Creek due the proportion of streamflow they divert. In addition we proposed to investigate potential realigment of a four mile long irrigation ditch that could yield significant water savings and reduce maintenance for irrigators. Successful implementation could afford the opportunity to protect minimum instream flow through a seasonally dewatered reach of Mill Creek.

Trout Unlimited proposes taking a lead role in all phases of the project including assessment, project development, water rights transactions and oversight of engineering and construction. We propose annual monitoring of projects completed for three years to ensure successful implemenation. In addition, funding and implementing a long-term maintenance program for fish passage and screening structures will be critical throughout the Upper Clark Fork and is being submitted in a separate proposal.

Tasks:

- Coordinate with water users to develop diversion improvement projects on all Mill Creek diversions
- Coordinate with water users to develop fish screening projects on the 3 largest diversions on Mill Creek
- Investigate opportunity for an irrigation ditch realignment project or irrigation efficiency improvements to protect minumum instream flow in Mill Creek
- Coordinate with water users to develop flow restoration project for Mill Creek
- Contract and oversee design and construction of diversion improvement and screening projects
- Contract and oversee design and contstruction of irrigation efficiency or conveyance projects to protect minimum instream flow in Mill Creek
- Complete necessary water right transactions and changes of use to protect minimum instream flow in Mill Creek
- Montitor fish populations and movement for three years following project completion

Parnters:

- George Grant Chapter Trout Unlimited
- Montana Water Project of Trout Unlimited
- Montana Fish, Wildlife and Parks
- Beaverhead-Deer Lodge National Forest

6. PROJECT SCHEDULE:

Project development will take one to three years to complete. Design and construction will take one to two years following project development and funding.

Task	Projected Completion
Project Development	2013-2015
Engineering and Design	2014-2016
Diversion Replacement/Upgrade	2014-2016
Fish Screen Installation	2014-2016
Irrigation Improvements	2014-2016
Water Right Transactions	2014-2016
Monitoring	2015-2019

7. PROJECT BUDGET:

ITEM	UNIT	QTY	UNIT COST	TOTAL COST	MATCH	NRDP
Salaries and Benefits:						
Survey and Evaluation	HR	24	$ 40	$ 960	$ 960	$ -
Diversion Inventory	HR	12	$ 40	$ 480	$ 480	$ -
Project Development	HR	160	$ 40	$ 6,400		$ 6,400
Project Oversight	HR	300	$ 40	$ 12,000		$ 12,000
Water Right Transaction	HR	240	$ 60	$ 14,400		
Permitting	HR	40	$ 40	$ 1,600		$ 1,600
Monitoring	HR	48	$ 40	$ 1,920		$ 1,920
				$ 37,760	**$ 1,440**	**$ 36,320**
Contracted Services:						
Diversion Survey	HR	24	$ 20	$ 480	$ 480	$ -
Fish Screens	CFS	30	$ 5,000	$ 150,000	$ 50,000	$ 100,000
Diversion Improvements	EA	7	$ 15,000	$ 105,000	$ 50,000	$ 55,000
Survey and Engineering	LS	1	$ 50,000	$ 50,000		$ 50,000
Irrigation Improvements	LS	1	$300,000	$ 300,000	$ 75,000	
				$ 605,480	**$ 175,480**	**$ 430,000**
Travel and Communication:						
Travel	MI	6000	$ 0.555	$ 3,330	$ 333	$ 2,997
				$ 3,330	**$ 333**	**$ 2,997**
TOTAL:				**$ 646,570**	**$ 177,253**	**$ 469,317**

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GRANITE HEADWATERS

C/O Granite Conservation District
P.O. Box 926 Philipsburg, MT 59858

June 13, 2012

Carol Fox
Natural Resource Damage Program
P.O. Box 20145
Helena, MT 59620-1425

Dear Carol:

The Granite Headwaters Watershed Group (GHWG) in collaboration with two University of Montana researchers, Dr. Heiko Langner, Geosciences, and Dr. Craig Stafford, Forestry, hereby submits an abstract for a proposal aimed at providing the needed information to guide effective restoration of mercury contaminated aquatic resources in the Flint Creek drainage, which is identified as a Priority 2 area. GHWG's interest in this topic stems from the Montana Department of Environmental Quality's (DEQ's) development of a Total Maximum Daily Load (TMDL) for Flint Creek. DEQ's TMDL report documented exceedances of the human health standard for mercury at various locations in the Flint Creek watershed. While we do not fully understand the significance of these standard exceedances, we intend to press for restoration to eliminate these exceedances as soon as possible. The enclosed restoration concept abstract proposal provides the contact information, project goals, objectives, and benefits, project location, project description, project schedule, and general cost information.

Thank you for considering this abstract proposal.

Sincerely,

Jim Dinsmore
President
GHWG

"The mission of Granite Headwaters is to promote the responsible use of the watershed's natural, human and socio-economic resources to protect and enhance the rural lifestyles valued by our communities."

TITLE: Mercury Levels in the Flint Creek Drainage of the Upper Clark Fork Basin

1. Name and Contact Information

Principle Investigator:

Dr. Heiko Langner, Geosciences - U of MT, 32 Campus Dr, Missoula, MT 59812

Phone: 406 243-6553, E-mail: heiko.langner@umontana.edu

Co Principle Investigator:

Dr. Craig Stafford, Forestry - U of MT, 32 Campus Dr, Missoula, MT 59812

Phone: 406 546-5345, E-mail: craig.stafford@mso.umt.edu

Granite Headwaters Watershed Group:

Jim Dinsmore - C/O Granite Conservation District, P.O. Box 926 Philipsburg, MT 59858,

Phone: 406 859-3291, E-mail: Karen.Petersen@mt.nacdnet.net

2. Project Purpose and Benefits

(goals, objectives, outcomes, aquatic or terrestrial benefit and/or public's enjoyment)

Goals:

- Provide comprehensive mercury data for sediments and biota in the Flint Creek watershed to identify major contamination sources for future restoration efforts.
- Create a baseline of mercury in sediments and biota throughout the watershed to evaluate the success of future restoration efforts.
-Provide mercury levels in fish throughout the watershed so that fish health consumption advisories can be developed.

Objectives:

-Measure mercury in sediments and aquatic insects at the confluences of Flint Creek and its major tributaries. Duplicate sediment and single composite aquatic insect samples will be taken in Flint Creek above and below each confluence as well as in the terminal reach of each tributary.
-Determine mercury in fish at three sites on Flint Creek. Samples will be taken from the upper, middle, and lower reaches on the study area. Mercury levels will be quantified in 10 brown trout and 10 other fish of varied species (primarily cutthroat trout, rainbow trout, and or Rocky Mountain whitefish).
-Quantify mercury in sediments over the length of the Flint Creek tributaries that have high mercury levels in their terminal reach. Collections will be focused above and below historic mining areas to facilitate identification of metal(s) sources.
-Determine mercury in fish from tributaries that had high sediment mercury levels in their terminal reach. A collection of 10 fish will be made from each tributary downstream of major mining activity.

Benefits:

The proposed research will provide the needed information to guide effective restoration by systematically sampling the Flint Creek drainage for mercury. Sediment mercury levels in the Clark Fork River increase six fold below the mouth of Flint Creek (Langner et al. 2012), demonstrating both that Flint Creek is severely polluted and the major source of mercury contamination to the Clark Fork. Recent TMDL efforts based on sediment and water data show extensive exceedances for mercury throughout the Flint Creek watershed, but this sampling effort was not designed for source identification (DEQ 2012).

The proposed research will provide comprehensive baseline data on mercury in the sediments and biota to judge the success of future remediation efforts. Existing water and sediment mercury data from the DEQ, while useful, are limited in extent. Existing fish data are dated, limited in extent, and do not include the size of the fish (Van Meter 1974) which is particularly problematic as mercury contamination increases as fish get bigger. Mercury data in aquatic insects currently is lacking, but these data will be useful because insects are relatively sedentary (unlike fish) and thus are well suited for assessing site-specific contamination in the biota.

The proposed research will provide fish mercury data to develop fish consumption advisories in the Flint Creek drainage. Based on historical data (Van Meter) fish consumption advisories appear to be warranted, however no advisories currently are in place.

3. **Project Location**
(description and map)

The project is located in the Flint Creek watershed, between Georgetown Lake and the town of Drummond. Samples will be obtained from the Flint Creek main stem and from tributaries draining into Flint Creek.

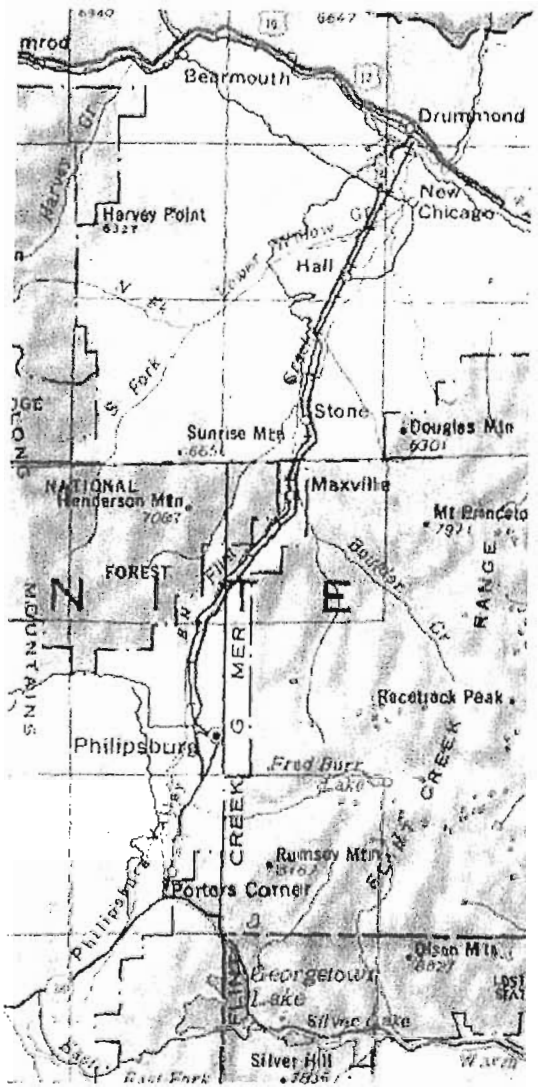


Figure 1. Location map of the lower Flint Creek watershed.

4. Project Description

(Implementation, lead entity, partners, progress to date)

Dr. Heiko Langner will serve as the project principle investigator and will serve the roles of primary administrator, analytical expert, report writer, and will also assist with some field work. Dr. Stafford will assist Dr. Langner at all levels, and he will also be in charge of field activities including the supervision of the technician. Through its meetings, the Granite Headwaters Watershed Group will facilitate communication about this research with residents of the Flint Creek watershed, and members of the Group's Steering Committee will assist in gaining access to private lands for data collection. Brad Lierman from Montana Fish Wildlife Parks will help fish collections.

5. **Project Schedule**

Summer 2013:

Sample Flint Creek and terminal reaches of tributaries for sediments, biota, and fish.

Analyze samples for metals.

Identify tributaries with high levels of mercury contamination for 2014 tributary sampling.

Summer 2014:

Sample tributaries with high levels of contamination for fish and sediments.

Analyze samples for metals.

Fall 2014

Analyze data and prepare final report.

Project completion date: December 31, 2014.

6. **General Cost Information**

Personal Services (Salary, Fringe, and Insurance for Langner, Stafford, and technician)	$39,000
Contracted Services (30 methyl mercury analyses @ $175 each)	$5,250
Total mercury analyses (300 sediment/fish analyses @ $40 each)	$12,000
Supplies/Equipment	$2,000
Communications	$500
Travel	$3,000
Subtotal	$61,750
Indirect @ 5%	$3,088
Total Project Cost	**$64,838**

Note: additional metals of concern in the sediments could be analyzed in conjugation with this work for and additional $11,025 (150 samples X $70/sample X 5% indirect).

References

Langner HW, Greene E, Domenech R, Staats MF. 2012. Mercury and other mining-related contaminants in ospreys along the upper Clark Fork River, Montana, USA. Arch Environ Contam Toxicol 62:681-695.

Montana DEQ (2012) Draft Flint Creek Planning Area Sediment and Metals TMDLs and Framework Water Quality Improvement Plan. Helena, MT, Montana Department of Environmental Quality.

Van Meter, WP. 1974. Heavy metal concentration in fish tissue of the upper Clark Fork River. Montana University Joint Water Resources Research Center, Bozeman, Montana, Projects A-044 MONT and A-053 MONT.

68

Restore Flint Creek Stream Channel and Weir Pond below the Power House

1. **Name and Contact Information**

Dan Lucas, Granite County Extension Agent, P.O. Box 665, Philipsburg, MT 59858
Email dlucas@co.granite.mt.us

2. **Project Purpose and Benefits**

This project is designed to achieve long term goals of aquatic restoration to enhance habitat through proven restoration strategies. Specifically, the weir pond accumulates an excessive sediment load from road erosion that impacts habitat quality and requires repeated mechanical disturbance (dredging) to adjust the stream to accommodate deposition and prevent flooding of the county road. This project would (1) remove the weir or replace it with a fish-friendly structure, and (2) replace the culvert below the weir which is also a fish barrier and appears to be undersized, (3) streambank restoration to minimize sediment loading to the stream. Further analysis and coordination among agency partners would be necessary to determine the best solution.

Benefits include road drainage improvements, sediment removal, reduced sediment delivery to the stream, fish passage, and streambank restoration including both stabilization and vegetation enhancement. The project would minimize sediment load from the road by creating a vegetated buffer strip. The pond area would provide better habitat for fish if the weir were removed or replaced with a fish friendly structure, and fish passage would be improved if the culvert were replaced.

The public is often seen fishing in this location and would likely benefit from restoration. The publicwill continue to have access to this area with the campground and the perpetual lease, in addition the county road serves both the campground and the Flint Creek Project Powerhouse.

3. **Project Location**

See attached Google Map.
The bulk of the proposed area is a high use small USFS campground, which is generally open year round. The property contains the weir pond with a USGS gaging station, used to make a critical water measurement for Flint Creek. The upper end of the property is owned by Granite County, the middle portion is the campground, which is a perpetual lease on a mining claim owned privately. The lower portion of the property is a small subdivision and is in private owner ship.

4. **Project Description**

Implementation could begin anytime. Partners would presumably include the USFS Beaverhead-Deerlodge who has been in close cooperation with Granite County in this area. Other interested parties could include MT FWP, USGS, private landowners, and Granite County.Since the site

currently hosts a USGS gaging station (Flint Creek at Southern Cross), the station would likely need to be reconfigured or relocated.

Lead entity could be determined in the future, although Granite County would have a high interest in the project.

Work to date includes repeated dredging of the weir pond and removal of bed load material, some spraying of weeds, seeding around the weir pond area and an attempt at willow plantings for stream bank restoration.

5. **Project Schedule**

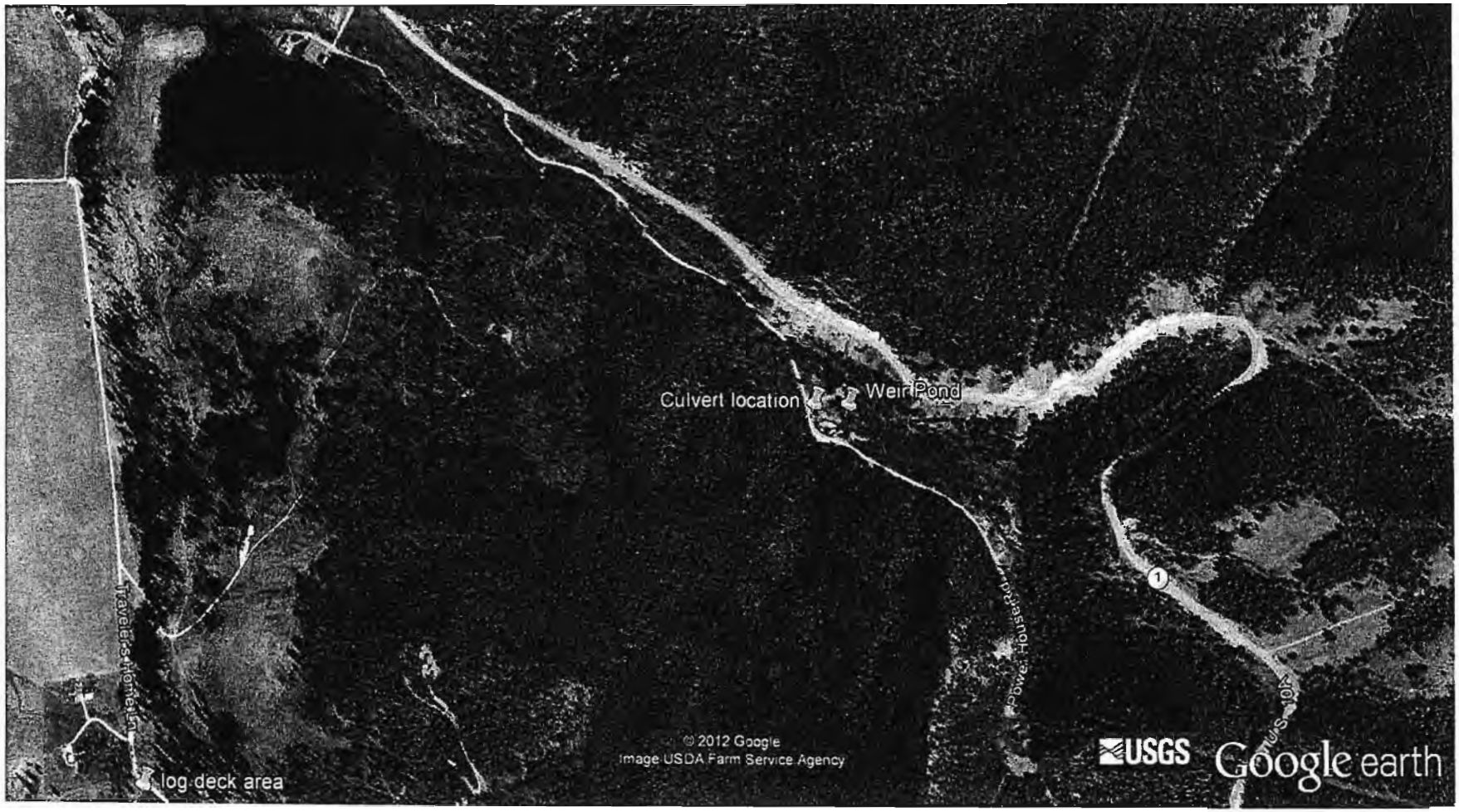
Implementation could begin as soon as funding was obligated, and would begin with a team forming from interested agencies to develop a specific plan. Work could likely begin in fall of 2013, if permitted. All of the mechanical work would be completed relatively quickly to mitigate disruption on the campers, with following year, 2014 focused on vegetative reconstruction and any weir replacement, although there may be cost advantages to doing that all at once.

6. **General Cost Information**

Due to the importance of accurate water measurement in the Flint Creek sub basin of the Upper Clark Fork, consideration has to be given to modern and appropriate measurement devices. Some of these devices are quite costly, for example a very large Parshall Flume coupled with automated measurements. A robust examination of the alternatives available would be necessary, along with approval from USGS and the County.

Restoration costs of the stream channel are unknown. We request assistance from NRDP to help determine the cost.

Some cost sharing or match is expected on this project due to the importance and high profile of the Flint Creek water, the fisheries benefits, as well as any subsequent recreational benefits.


Culvert location
Weir Pond
Traveler's Home Ln
Power House Rd
1
log deck area
© 2012 Google
Image USDA Farm Service Agency
USGS
Google earth

69

From: Ternes-Daniels, Connie
Sent: Friday, June 15, 2012 3:43 PM
To: Fox, Carolyn A.
Subject: ADLC NRD Project Ideas

Carol,
Attached are some ideas for project development for NRD funds. While these ideas are far from developed, Anaconda-Deer Lodge County would like to have some time to prepare abstracts for them. Unlike Butte and Missoula, we do not have the staff to prepare all of this – which puts us at a disadvantage. We are requesting a place holder and additional time.
Thanks
Connie TD

Connie Ternes Daniels
Interim CEO
Anaconda-Deer Lodge County
800 S. Main Street
Anaconda, MT 59711
406-563-4000 Office
406-560-3137 Cell

- funding for storm water infrastructure reporting to Warm Springs Creek
- vegetative upgrades in upper Willow and Mill
- stream channel restoration projects on any of the creeks
- Stream channel restoration thru Washoe Park or Near Golf Course
- Instream flow to WSC (Butte is talking about this one, but definitely would require coordination)
- Sunnyside inlet re-directs (Grove Gulch) stream under city with outflow to WSC – much loss along the way, cross connection with storm water and possibly sewer, possible project there
- Possible storm water projects to upgrade to MS-4 standards to protect WSC

70

Proposed Restoration Concept Abstract Submittal Form

Name and Contact Information: Butte-Silver Bow Consolidated City-County Government
155 W. Granite
Butte, Montana 59701
planning@bsb.mt.gov

Project Purpose and Benefits:

Project
Timber Butte Open Space Area

Purpose
This project is a replacement project to acquire, preserve, protect and maintain a native landscape and terrestrial habitat within the Silver Bow Creek Watershed and Upper Clark Fork River Basin. The acquisition of 225 acres of land on Timber Butte will replace resources lost or damaged due to mining or smelting activity in the Silver Bow Creek Watershed.

Goal
The goal of this proposal is to replace lost terrestrial habitat in the Silver Bow Creek Watershed. Securing public ownership of Timber Butte will protect the uninjured resource from urban encroachment and thereby preserve the site, which serves as habitat to many native wildlife species, grasses, and forest. Securing public ownership will allow the applicant to protect the site and improve terrestrial species diversity in a location adjacent to the continental divide and therefore contribute to the overall ecological health and function of the Upper Clark Fork River Basin. Preservation of this habitat will provide a community open space area where the public will have access to areas where recreation such as wildlife viewing and bird watching opportunities are present.

Objectives
Objectives in acquiring Timber Butte will be:

a. Securing public ownership by acquisition
b. Protecting the uninjured resource from further development and preserve native terrestrial habitat.

Anticipated Outcome
The primary outcome of the acquisition of Timber Butte is the preservation of a viable terrestrial habitat. Unlike much of the land in the Silver Bow Creek watershed, Timber Butte is an uninjured resource with viable habitat and vegetation. Protection of Timber Butte provides viable habitat to species within the Upper Clark Fork River Basin directly impacting the ecological health and restoration at its headwaters. Proper public management of this site will extend benefits beyond the ecological viability of an environment undergoing restoration, but replace recreational opportunities lost as a result of mining and smelting. Timber Butte's location southeast of Copper Mountain Sports Complex and east of Butte's network of city parks is an opportunity to enhance connectivity among the varieties of parks, trails and open space available in the urban area.

Project Location:

The subject property is comprised of 225 acres located in Township 3 North, Range 8 West, Section 36 in the uplands of the Silver Bow Creek Watershed. This area contains Timber Butte,

a prominent hill in the south-central portion of the City of Butte (figure 1, attached). Timber Butte is one of the most heavily forested portions of the urban area, an unusual site in the area. Recently, the area has seen increased residential development to the North, East and West. In 2008, Butte-Silver Bow residents declared this area an important open space area and the Growth Policy Update designated the area as an open space.

Project Description:
This project will secure public ownership of Timber Butte through the acquisition of 225 acres of land located on Timber Butte in the city of Butte. The applicant and proposed lead entity is the consolidated City-County government of Butte-Silver Bow. Butte-Silver Bow County will partner with the State of Montana and local entities to procure land and mange the site.

Implementation objectives include, but are not limited to, acquisition of privately held land, creation and designation of a trail system that minimizes disturbances to the natural environment, including native vegetation and animal life, while providing opportunities for hiking, wildlife viewing, bird watching, and other low-impact recreational activities. This recreation includes connections with adjacent parks, trails, and recreation areas. These activities will require a comprehensive Operations & Maintenance plan that outlines the proper public management of this resource. Furthermore agreement from the Planning Board and resident's of Butte is necessary.

Conversations with private land owners have begun and the response has been positive indicating the project's potential for success. Similar restoration projects in Butte have been quite successful in recent years concurrently protecting native landscape and habitat while providing recreation opportunities to area residents. The City-County government's expanded understanding and finesse in managing restoration projects of this nature contribute to the Timber Butte project's viability.

Project Schedule:
The anticipated timeline for initiation, implementation and completion of this project is two years. This timeline is based upon similar projects in Butte-Silver Bow including Council of Commissioner's acceptance of the proposal, property acquisition, site planning and construction, and completion of the operations plan.

General Cost Information:
The projected cost of this project is expected to be $500,000. The majority of this project's cost is associated with the acquisition of land on Timber Butte ($300,000) and administrative costs associated with acquisition including title insurance, surveys, and real estate fees, etc. ($100,000). Sixteen parcels on Timber Butte are proposed for acquisition and this cost projection reflects current market value for 2012. Project management, design, construction and other professional services will be provided as an in-kind match to the project ($100,000).

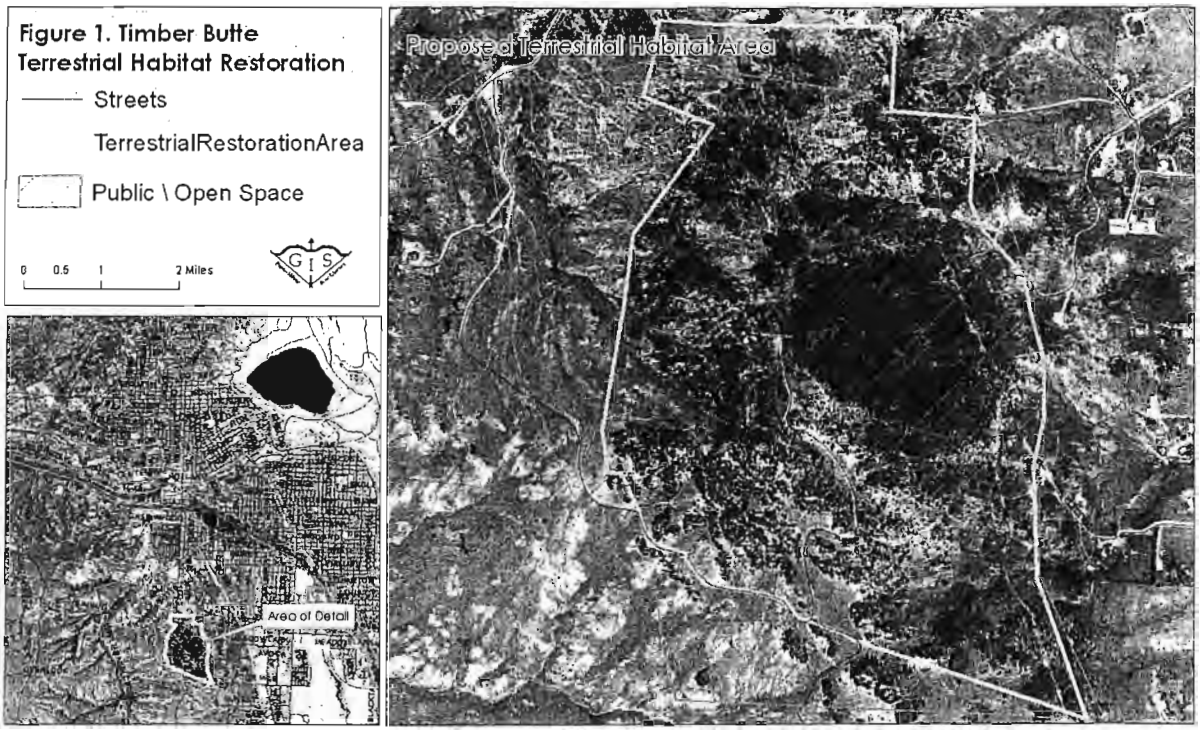


Figure 1. Timber Butte
Terrestrial Habitat Restoration
Streets
TerrestrialRestorationArea
Public \ Open Space
0 0.5 1 2 Miles
G I S
Area of Detail
Propose d Terrestrial Habitat Area

Proposed Restoration Concept Abstract Submittal Form

Name and Contact Information: Butte-Silver Bow Consolidated City-County Government
155 W. Granite
Butte, Montana 59701
planning@bsb.mt.gov

Project Purpose and Benefits:

Project:
Storm Water Management

Purpose:
Historic drainage of storm water from the Butte hill so severely degraded Silver Bow Creek that it could not sustain life. In recent years, Superfund reclamation efforts corrected many of these problems restoring the riparian environment. Existing drainage areas have been re-built and improved, new systems of drainage corridors, ditches, and sediment basins have been installed, and certain underground storm water infrastructure has been repaired. In addition, significant improvements have been made to the sanitary sewer treatment system.

These improvements have contributed to the ongoing restoration of the entire Upper Clark Fork River Basin. Ultimately, however, additional improvements to the municipal storm water management system and sanitary sewer collection and treatment system will be needed to achieve higher restoration standards than what may be required under the Superfund remedy. Due to limitations of Superfund law (i.e., risk management), efforts to restore and protect the aquatic resources of Silver Bow Creek and the alluvial ground water aquifer will be compromised if additional efforts are not integrated with remedial actions.

Goal:
The goal of this proposal is to utilize aquatic restoration funding to make improvements in storm water management that will protect remediation investments and restoration projects in Silver Bow Creek and watershed.

Objective:
Identify and Select Appropriate Improvements. In the context of the comprehensive analysis being done under the Priority Soils remedial action and completed implementation to date, for example, the Best Management Practices (and City-County investments on its municipal infrastructure) to better manage storm water containing heavy metals and other constituents of concern (COCs) from reaching Silver Bow Creek, the proposed NRD project would start where the Superfund remedy ends and the capacity of the municipal investments is exhausted.

Anticipated Outcome:
The primary outcome of this proposal is reduction of contaminates reaching Silver Bow Creek and continued restoration of the Upper Clark Fork River Basin through improved flows, survival and passage of aquatic life forms, and maintenance of the improved riparian condition.

Project Location: Butte Priority Soils Operable Unit area, and associated drainages map.

Project Description: Over the past 20 years, significant progress has been made to improve storm water management on the Butte Hill. By orders of magnitude, less heavy metals are reaching Silver Bow Creek now than in the past. Much of the improvement is associated with the Butte Priority Soils Operable Unit cleanup; for example, a series of sediment basins and ditches have been installed in the four main drainages coming off the Butte Hill. Additionally, Butte-Silver Bow has started to implement its Municipal Storm Water Improvement Plan (2008); since 2010, thousands of linear feet of main municipal trunk lines have been slip-lined with new pipe in those drainages, e.g., Anaconda Road Gulch and Buffalo Gulch.

At some point, actions required under the Superfund remedy will be complete, and Butte-Silver Bow will have exhausted its financial capacity to make improvements. However, in order to protect and fully restore the Silver Bow Creek watershed, additional efforts may be needed. Potential uses of NRD funds would include but not be limited to:

1) Additional slip-lining of main municipal storm water trunk lines;
2) Additional replacements of catch basins and lateral storm water lines;
3) Additional treatment of sanitary discharge effluent to remove heavy metals and nutrients (TMDL's);
4) Additional replacement of sanitary sewer collection lines (which are saturated with storm water that has heavy metals); and
5) Improvements to facilitate the beneficial re-use of treated water.

Project Schedule:

It is expected that the improvements would be implemented over a 20-year period.

General Cost Information:

It is expected that the cost of the investments could be as much as $30 million, and the amount is directly dependent upon the improvements completed under remedy.

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Abstract for Bridge 91 Floodplain Connectivity

A Proposed Restoration Project on the Upper Clark Fork River

Submitted by:

Nicholas Bailey, P.E.
Montana Rail Link
PO Box 16930
Missoula, MT 59808
nbailey@mtrail.com

Project Purpose and Benefits:

The purpose of this project is to provide an alternative channel for medium and high discharge flows and provide "J-hook" style energy dissipation in a channelized section of the Clark Fork River.

The benefits of this project include the following: (1) Restores both "length" and "sinuousity" to the river that was removed during channelization, (2) Provides opportunity for additional aquatic and wildlife habitat along the alternative channel, (3) Reduces the shear stress along the railroad embankment, (4) Gives a better angle for the flow under the railroad bridge.

Both parts of the project will provide better aquatic and terrestrial habitat. Currently, the main river channel runs virtually straight along the railroad embankment. As a consequence, a point bar has developed on the north side of the channel. An alternative channel that allows medium to high flows through the point bar will reduce the overall flow velocity in the main channel and along the railroad embankment. At the same time, the alternative channel length will receive more regular and consistent flows thereby allowing growth for aquatic species and terrestrial habitat growth along the banks. The "J-hook" structures reduce the shear stress along embankments, keeping soil in place and giving more time for vegetation growth.

Project Location:

The project is located in the N1/2, Section 17, Township 10 North, Range 15 West, P.M.M., Granite County, Montana. The project area is upstream from Railroad Bridge 91, 3rd Subdivision, near Nimrod station. Latitude: 46°42'40"N, Longitude: 113°31'00"W. See attached location map.

Project Description:

In the project area, the Clark Fork River flows in a channelized manner between the railroad embankment and Interstate 90 as a consequence of railroad and interstate highway construction. Over the past couple of decades, the channel of the river has moved up against the railroad embankment causing stability problems and causing the flow to pass under the railroad Bridge 91 at a skew angle to the abutments and piers. It is infeasible to move either the railroad or the interstate highway, so this project was conceived as a means to make better a compromised situation.

The project will include constructing a channel through the point bar at approximately the five-year recurrence interval (Q_5) and placement of "J-hook" structures at strategic points along the reach. Attached are project concept sketches showing the proposed changes. Specific locations and sizes of structures would require a detailed design.

It is anticipated that Montana Rail Link would be the lead entity for the project. Montana Rail Link would utilize professional services firms and a construction contractor as project partners.

Project Schedule:

Design and permitting would require approximately six (6) months. The project would require construction at lowest river flows. August is the month with historically lowest flows on the Clark Fork River. Construction is estimated to take up to two (2) weeks.

Cost Estimate:

As of now, no funds have been committed for this project.

The total estimated cost of the project is $60,620. The estimated cost breakdown is as follows:

Cost Estimate, Cont.:

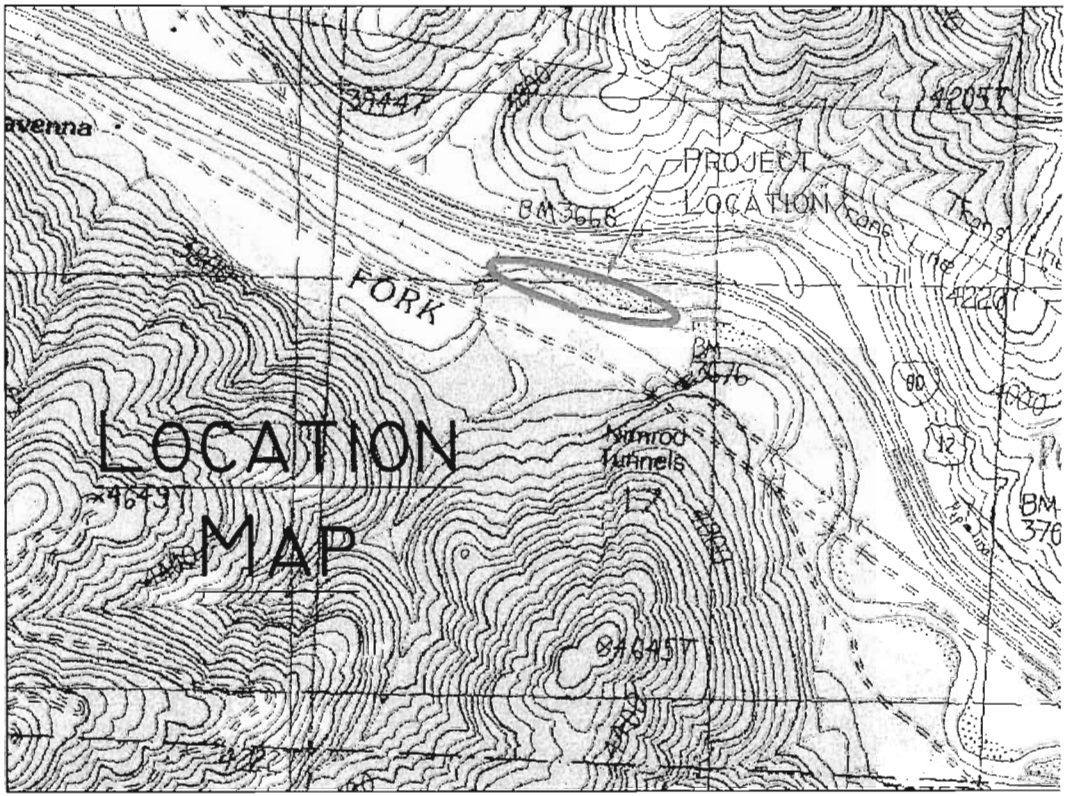
Services:

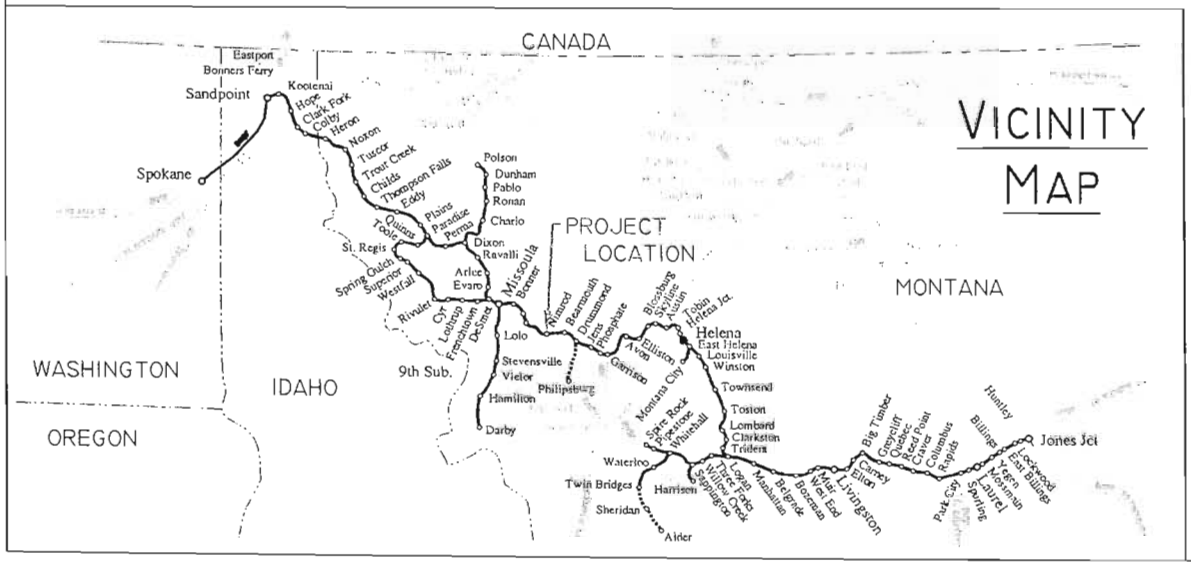
Engineering survey	$ 4,980
Floodplain study	$ 3,100
Engineering design	$ 8,600
Biological Assessment	$ 7,500
Obtaining permits	$ 2,200
Engineering equipment and materials	$ 1,480
Construction Layout	$ 2,700
Subtotal	**$30,560**

Construction:

Mobilization/demobilization (@ 20% of work items)	$ 5,010
Excavation of connectivity channel (25 HR @ $155/HR)	$ 3,875
Removal of excavated material (25 HR @ $145/HR)	$ 3,625
Class V rock provide and place in J-Hooks (195 CY @ $90/CY)	$17,550
Subtotal	**$30,060**

Total **$60,620**





BRIDGE 91 FLOODPLAIN CONNECTIVITY
GRANITE COUNTY, MONTANA
VICINITY AND PROJECT LOCATION MAP

STATION: NIMROD	SCALE: NONE
DRAWN: JUNE 14, 2012	REVISED:
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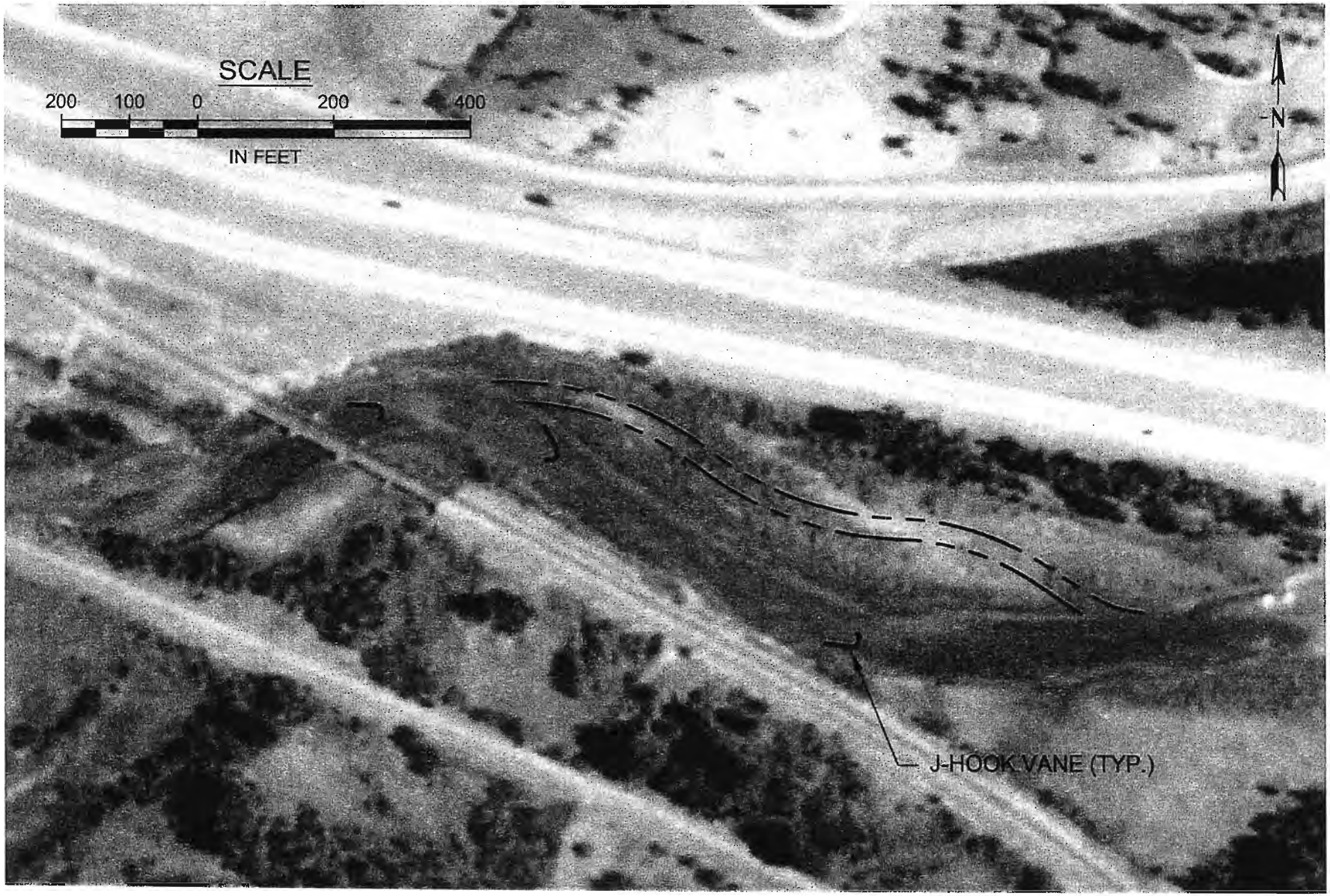

VERIFY SCALE!

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MODIFY SCALE ACCORDINGLY!

MORRISON MAIERLE, INC.
An Employee-Owned Company
Engineers
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3011 Palmer St.
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Fax: (406) 542-4801

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DRAWN BY: CRH
DSGN. BY:
APPR. BY: PDP
DATE: 06/2011

Q.C. REVIEW
BY:
DATE:

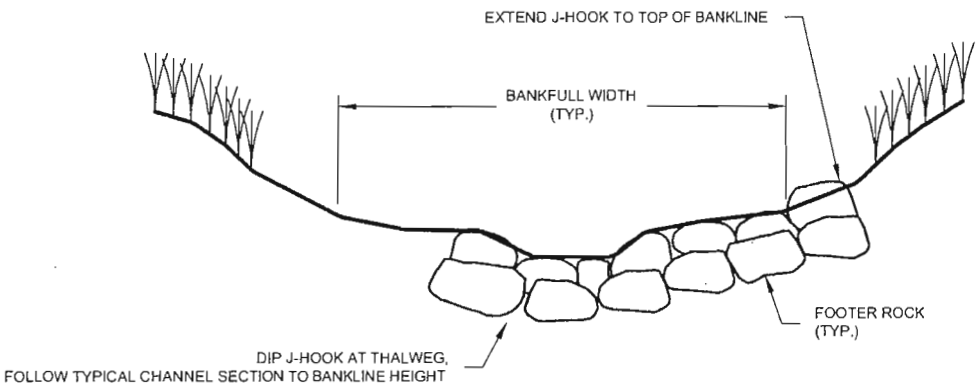
MONTANA RAIL LINK

MP 91, 3RD SUB

FLOODPLAIN CONNECTIVITY CHANNEL

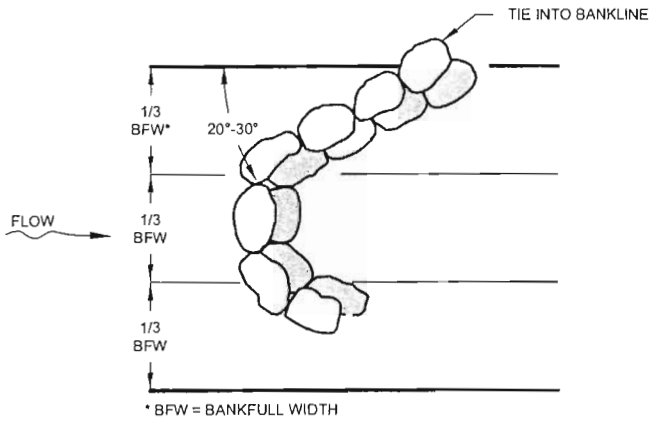
GRANITE COUNTY MONTANA

PROJECT NUMBER: 4857.002



J-HOOK - SECTION VIEW

SCALE: N.T.S.



J-HOOK - PLAN VIEW

SCALE: N.T.S.

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DRAWN BY: CRH
DSGN. BY:
APPR. BY: PDP
DATE: 07/2011

Q.C. REVIEW
BY:
DATE:

J-HOOK DETAIL

PROJECT NUMBER:

M:\4857\002\ACAD\EXHIBITS\J-HOOK EXHIBIT.DWG PLOTTED BY:CHRISTOPHER HAWKINS ON Jul/05/2011

#72 RECEIVED

JUN 18 2012

NATURAL RESOURCE DAMAGE PROGRAM

Montana Rail Link

Montana Rail Link, Inc.
101 International Drive
Post Office Box 16390
Missoula, Montana
USA 59808

(406) 523-1500
(406) 523-1498 fax
www.montanarail.com

June 15, 2012

Natural Resource Damage Program
1301 East Lockey
P.O. Box 201425
Helena, MT 59620-1425

Subject: Submission of Abstract

Attached is an abstract for a restoration project on the Upper Clark Fork River. Montana Rail Link appreciates the opportunity to apply for funding for this worthwhile project.

Thank you for your patience and willingness to help us complete this permit. Please contact me at 406-523-1440 or by email at nbailey@mtrail.com if you have any questions.

Best regards,

MONTANA RAIL LINK

Nicholas W. "Nick" Bailey, P.E.
Field Engineer

NWB:tjm

Enclosure – Abstract (6 pages)

NB/C-108....Riprap/2010 – Milepost 91.1, 3rd Sub

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RECEIVED

JUN 18 2012

NATURAL RESOURCE
DAMAGE PROGRAM

Natural Resource Damage Program
1301 East Lockey
PO Box 201425
Helena, MT 59620-1425

Please accept these comments on behalf of the Anaconda Sportsmen's Club as our Restoration Concept Abstract.

Our club has represented the interests of outdoor recreationist, mostly hunters and fishers, in the Anaconda area for more than 60 years. From the initiation of legal proceedings which produced the NRD funds from ARCO we were active supporters and provided legislative testimony to support funding of the lawsuit. Our members provided testimonials to quantify the actual losses in wildlife and riparian resources as well as associated recreation. These losses were the majority of documented losses for which monetary compensation was received to provide funding for what is now the NRD Program.

It has been our expectation that the recently adopted Framework for allocating the remaining fund balance would protect and insure appropriate funds for the various Restoration Plans. Specifically we expect the estimated $43.3 million for aquatic resources and $18.4 million for terrestrial resources will be available for identified priority areas. Funding is not sufficient to obtain all priority projects but we expect to work with FWP and conservation organizations to pursue those projects as opportunities are identified and available.

While we don't have the resources to develop actual projects we support the Priority area projects as proposed. These represent our initial Restoration Concept Abstract. In addition to those listed we would ask for fishing access sites on the Clark Fork River, especially above Drummond. We can't identify specific sites or a quantity of sites but it is important that sufficient public access is provided so the public can enjoy the benefits of a restored river system. This will require negotiation with private parties to find willing sellers as fee title or easements in appropriate locations.

In addition we have supported the development of a reservoir in the Fifer Gulch area on the Southwest corner of Anaconda for the purposes of an urban fishery designed for youth. These lands are under long term lease by Deer Lodge county from Mountain Lion Corporation (Dennis Washington).

For Terrestrial Restoration plans we submit the Big Easy, a large block of wildlife habitat east of the Warm Springs Ponds. Negotiations with the owner were suspended this past year when it was determined there were too many risks to presenting a project for this year. We would like to pursue this opportunity again.

In addition there is a 600 acre property know as the Brickley lands as well as the Hearst Lake property owned by Mountain Lion Corporation, noted above. Both are adjacent to

the Watershed lands owned by FWP in the Hearst Lake drainage. This is valuable winter range for our local elk herd and we support protecting these wildlife values and providing additional access to adjacent public lands. Protecting both of these habitats is critical to achieving the full wildlife and recreational values of the public lands in the larger Watershed landscape.

We recommend the Letica property, 11,000 acres between Lost Creek State Park and the Racetrack drainage. This property is critical habitat for a number of wildlife species including Bighorn sheep, Mule deer, and a large number of elk. Again these lands are vital to maintaining wildlife values on existing public landscape.

We appreciate the opportunity to develop these additional proposals as well as work with appropriate parties to move the existing priority projects forward. We don't have a preference for fee title purchase or easements. Our preference is to replace and enhance habitats and access depleted by the activities which were the basis of the NRD lawsuit. Our expectation is that the remaining funds will be used to provide the best restoration opportunities with the greatest long term benefit for the public in the damaged Clark Fork watershed.

We look forward to working with the NRD staff and advisory councils to develop these projects.

Anaconda Sportsmen's Club
2 Cherry St.
Anaconda MT. 59711

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GRANITE HEADWATERS

C/O Granite Conservation District
P.O. Box 926 Philipsburg, MT 59858

June 15, 2012

Carol Fox
Natural Resource Damage Program
P.O. Box 20145
Helena, MT 59620-1425

Dear Carol:

The Granite Headwaters Watershed Group (GHWG) Steering Committee submits the attached abstract for a proposal designed to enhance wildlife winter range habitat for Priority 1 and Priority 2 areas within Granite County, Montana. Winter habitat is recognized as a critical component to maintain and improve native plant communities and healthy populations of native wild ungulates. Restoration of appropriate balances between summer and winter habitats with native wild ungulate populations is of great importance to not only residents of Granite County, but all those interested in the health and historic use of Montana's rich natural resources.

Thank you for this important opportunity and your consideration of this abstract proposal.

Sincerely,

Dan Lucas
for
GHWG Steering Committee

"The mission of Granite Headwaters is to promote the responsible use of the watershed's natural, human and socio-economic resources to protect and enhance the rural lifestyles valued by our communities."

Granite County Wildlife Winter Range Replacement Proposal

1. **Name and Contact Information**

Dan Lucas
Granite Headwaters Steering Committee
P.O. Box 665
Philipsburg, Montana 59858

406-859-3304

dlucas@co.granite.mt.us

2. **Project Purpose and Benefits**

This project is designed to achieve long term goals of enhanced wildlife/winter habitat interaction through proven vegetation management strategies. Specifically, conifer encroachment on historic winter range, and enhancement of native plant communities through reduction of invasive plant species populations will provide incremental objectives.

The anticipated impact from successful implementation of this proposal is a long term balance in wild ungulate populations with winter habitat requirements. Currently limited winter habitat places constraints on management alternatives for effective wildlife management. This proposal will improve the balance between summer and winter habitat availability.

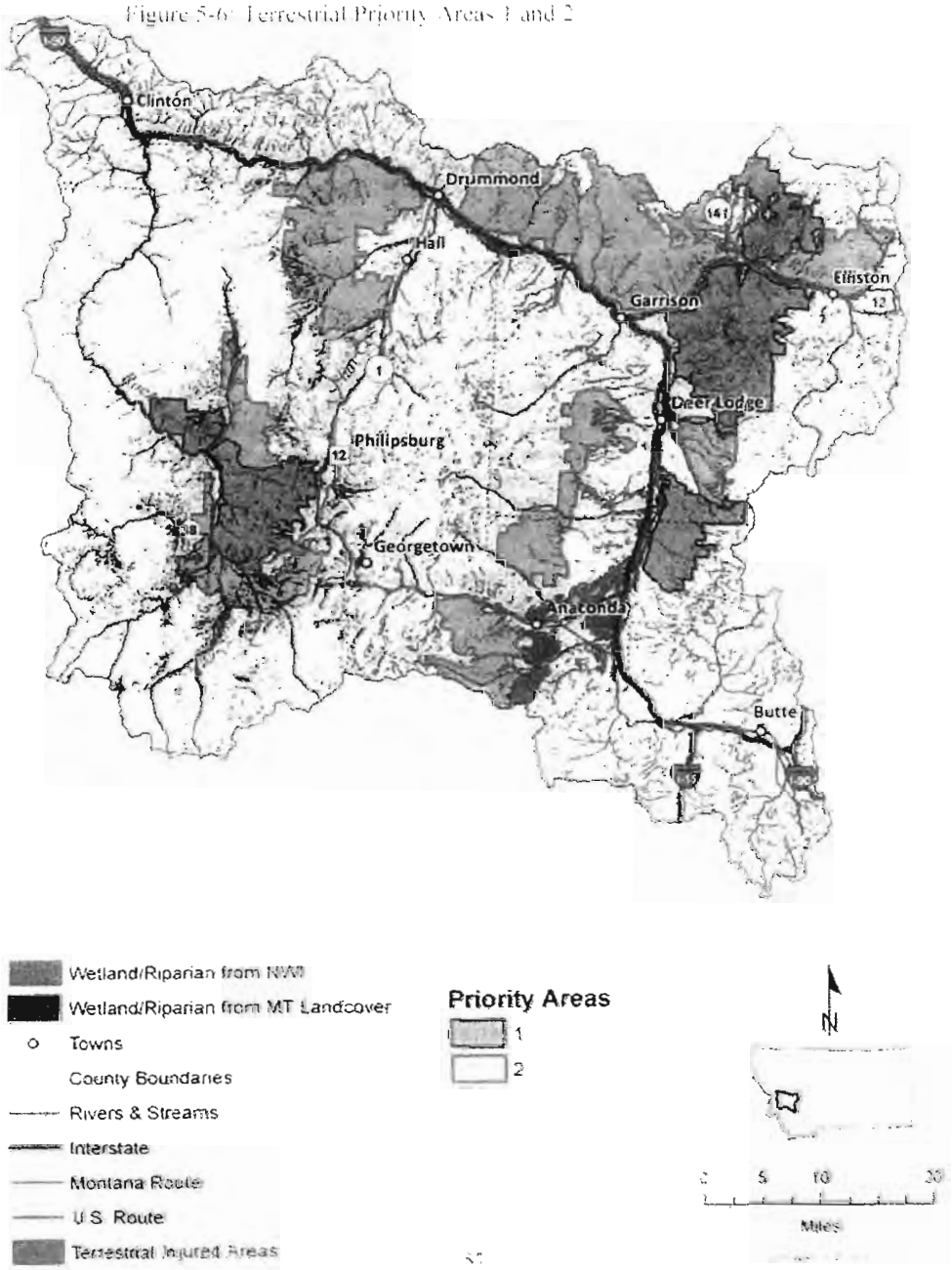
Terrestrial habitats will benefit by increased dispersal of winter use. Providing increased opportunities for winter grazing will reduce pressure on current resources resulting in increased plant vigor and improved plant community resiliency. Additional benefit will be realized as improved health of wild ungulate populations.

A collateral riparian benefit will also be realized as dispersed winter range use will reduce concentration of winter riparian vegetation use resulting in healthier riparian plant communities. Current concentration of winter use results in heavy browsing of desirable native shrubby species.

3. **Project Location**

This proposal will be applied across all Priority 1 and Priority 2 areas located in Granite County as shown on page 57 of the Final Upper Clark Fork River Basin Interim Restoration Process Plan with appropriate winter range habitat components. See map below.

Figure 5-6: Terrestrial Priority Areas 1 and 2



4. **Project Description**

Granite Headwaters Steering committee will provide leadership for this effort in partnership with Granite County and Montana State University Extension.

Specific management actions will include mechanical removal of encroaching conifer species including Rocky Mountain juniper and Douglas fir from historic winter range habitats. Treated areas are anticipated to be approximately 5,000 acres. It is not anticipated that treated areas will require seeding as native herbaceous species are sufficiently present to provide desired habitat improvement.

Invasive species population reduction will be accomplished through specific herbicide applications designed to enhance native herbaceous plant communities on approximately 12,000 acres. Specific herbicides, rates and timing of application will be implemented to achieve optimal conditions for native plant community enhancement.

Landowners have been pursuing these management practices for several years with excellent habitat response. However additional financial resource will be required to realize the full potential of this proposal.

5. **Project Schedule**

The proposed schedule for this proposal is as follows:

Winter and early spring 2013 – Mechanical removal of encroaching conifers on 2,500 acres

Summer and early fall 2013 – Herbicide applications on 6,000 acres of infested winter range

Winter and early spring 2014 – Mechanical removal of encroaching conifers on 2,500 acres

Summer and early fall 2014 – Herbicide applications on 6,000 acres of infested winter range

6. **General Cost Information**

It is anticipated that costs associated with mechanical removal of encroaching conifers will be $200.00 per acre. Therefore:

5,000 acres @ $200/acre = $1,000,000

Additionally, 12,000 acres of herbicide application is anticipated to cost $25.00 per acre including chemical and application costs. Therefore:

12,000 acres @ $25.00/acre = $300,000

Total costs: $1,300,000

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Our conviction is to provide long term protection and stewardship of the restored Upper Clark Fork River Basin so that Montana can proudly showcase its "Lasting Legacy"

UCFRB LASTING LEGACY CONCEPT ABSTRACT

Don McGee 3613 Hartford Ave Butte, MT
(406)490-4537 montana_mcgee@yahoo.com

Our concept abstract is intended to maximize and enhance the tremendous restoration efforts accomplished in the Upper Clark Fork River Basin. With adequate long range planning and stewardship, all Montanans can ultimately take pride in the continual and incredible transformation happening in this historic portion of our great State. Our experience assisting since 2005 and witnessing the remarkable changes during this unprecedented undertaking demands that we help ensure its perpetual protection. To offer anything less, seems a tragic disservice to all those involved in the restoration processes and each person and creature whom could enjoy the fruits of these multiple labors.

We intend to help fulfill the lofty and attainable goal of protecting and enhancing the collective restoration efforts in perpetuity by the following seven distinct, yet symbiotic strategies:

First, we will form the Upper Clark Fork River Basin (UCFRB) Land Trust as a Montana non-profit organization with our almost single-minded mission to create, protect, maintain, and manage a wildlife corridor through restored lands, the Warm Springs WMA, ultimately connecting to the Deerlodge National Forest from the Flint Creek Mountains to east and beyond the Continental Divide. Administrative costs to form the UCFRB Land Trust are estimated to be $87,750.

Second, the UCFRB Land Trust will secure strategic conservation easements on Priority Areas 1 and 2 as determined by the MTFW&P's Aquatic and Terrestrial Prioritization Plans and summarized on the attached map. Since 2008, a tremendous opportunity has existed to establish a western wildlife corridor from the Flint Creek Range through the 1,038 acre Modesty Creek Conservation Easement, approximately 2,300 acres of reclaimed ARCO uplands, the Dutchman Creek Slough, the repository and the Warm Springs WMA (WSWMA). Securing approximately 2,000 additional acres of critical foothill habitat is what remains to be protected with tentative agreements currently existing for 1,520 of those acres. An additional 3,500 acres of valley floor land is necessary to link the foothill habitat with the Dutchman Creek Slough, repository and WSWMA which will complete the western portion of a 10 mile wildlife corridor. Acquiring conservation easements (CE) on the 2,000 foothill acres is estimated to cost $2,000,000. The valley conservation easement acres will most likely cost between $1,500,000 and $4,500,000 depending if the ranchers want to sell only their subdivision rights or their entire properties.

We have multiple years of photographic evidence documenting increasing elk use of the ARCO West Galen Expansion Area where restoration efforts concluded in 2009. Although no forest cover exists, we have observed hundreds of elk calving on these prairie type lands at least one mile from adjacent roadways since 2010. Proving that elk, like bison, were once plains animals and do prefer this arrangement if adequate food and security exist. Unfortunately, we've observed only three elk to date this spring as cows have begun grazing and noxious weeds spread inside this increasingly fertile yet now increasingly marginalized elk habitat.

An estimated 35 sections of Priority 1 private lands would complete an expansive eastern portion of the wildlife corridor from the WSWMA through the USFS to the Continental Divide. The likelihood of securing this much private land is remote at best, but it is our understanding that current conservation easement discussions for the nearly 5,000 acre Vanisko property hold promise. The Vanisko property is one of the largest in the eastern Priority 1 area and if officially protected would be an excellent start and potential catalyst to secure multiple CE in the future. NRDP and MTFW&P are much more able to estimate the costs and probability of securing CEs in Priority 1 lands at this time. Eventually, the UCFRB Land Trust will garner the experience and expertise to determine the best and most logistical approach to protecting the east foothills of the upper Clark Fork River Valley fully aware that these protections do not happen overnight.

Although concentrating our past CE efforts west of the upper Clark Fork River Valley, we will not rest until an intact contiguous wildlife corridor connecting the Deerlodge National Forest exists after garnering the necessary financial support of the NRDP.

In an effort to piece together a contiguous wildlife corridor, it is necessary that ARCO lands become integral components of this master plan. Although it may take years and ample angst to accomplish, we will negotiate with ARCO to have them donate all of their EPA approved reclaimed lands for permanent protection via conservation easements with zero provisions for any structures, livestock grazing, or public motorized vehicle access. This will help limit future liabilities as wildlife has yet to file any lawsuits known to man. We will attempt to require that the UCFRB Land Trust receive immunity from any liabilities associated with acquiring, protecting, maintaining, and managing former ARCO restored lands. Additionally, we will negotiate an O&M budget donation. Although currently pie-in-the-sky, all the acres ARCO donates and any funding can be used to enhance the cost:benefit relationship and cost-effectiveness of the UCFRB Land Trust's Restoration Project Proposal. Hiring attorneys to facilitate this critical process could cost $250,000 or more, as if I had a crystal ball.

Also, the UCFRB Land Trust will be responsible for protecting and maintaining the CE and all lands associated with the wildlife corridor. While formerly trying to protect a portion of the west side corridor in 2008, I encountered unexpected resistance from some MTFW&P personnel. Initially, I was flabbergasted that Montana's largest and loudest champion of wildlife and habitat protection wouldn't whole-heartedly support another CE especially with the nearly 2,300 acres gifted by ARCO. In time, I've learned that the MTFW&P does not have the means to maintain the lands under their jurisdiction as evidenced by the numerous weed infestations associated with many of their parcels throughout Montana. Not to mention, their understandable skittishness about potentially accepting future liability associated with the restored ARCO properties. Therefore, the UCFRB Land Trust will not function like most land

trusts by only ensuring perpetual habitat protection from subdivision, but will maintain and manage all restored lands and CE associated with the wildlife corridor.

Third, we will install wildlife friendly fencing compatible with all adjoining ranchland's livestock upon formal protection of each parcel. Current fencing costs are $10,000 per mile, removing unnecessary or dilapidated fencing are estimated at $2,500/mile, and annual fence maintenance is estimated at $45,000 for the wildlife corridor.

Fourth, weed control will be the largest and most important maintenance and management task to ensure long-term quality wildlife habitat. Weed infestations are second only to subdivisions in their ability to render prime wildlife habitat useless. Hence, diligent noxious weed control is critical. The UCFRB Land Trust will provide helicopter spraying to the uplands' noxious weed infestations during early spring and late fall when native or desirable broadleaf plants are dormant. Extensive herbicide application experiments at the Modesty Creek Conservation Easement since 1997 have proven that blanket herbicide application strictly at these two time frames produce the most efficient control because collateral damage is minimized compared to spraying in between. This provides native and desirable plants the opportunity to increase and fill open topsoil which limits the competiveness of weeds.

The capital needed for purchasing a Hugh's MD-500 turbine helicopter and support vehicle that will contain jet fuel and herbicide tank **strictly dedicated for maintaining the wildlife corridor and any other restored lands** will cost $1,100,000. Annual O&M for operating the helicopter are estimated at $125,000 or approximately $500/hour. The helicopter will be on call for any other project in the Superfund restored area after completing scheduled wildlife corridor work.

Riparian zone weed control is best and most safely performed by backpack spot application. We have successfully performed this procedure for DEQ along Silver Bow Creek since 2005 and the Clark Fork River since 2010. Our backpack rate for weed control along riparian zones is established in current DEQ task orders. Long term weed control mandates the release of approved and effective biological controls throughout the wildlife corridor and neighboring infestations as it is the best bet for sustainable weed control. Unfortunately, not all noxious weeds have an USA approved predator. Prices for biological control vary greatly each year.

Fifth, we will constantly research and improve the aquatic resources within the wildlife corridor that include portions of Racetrack Creek, Modesty Creek, Lost Creek, Warm Springs Creek, Dutchman Creek Slough, Dry Cottonwood Creek, etc. We will place major emphasis on purchasing or leasing water rights to improve stream flows for fish and macroinvertebrates. Enhancing overgrazed wetlands and riparian zones may necessitate hand reseeding with native plants as well as selective backpack weed control.

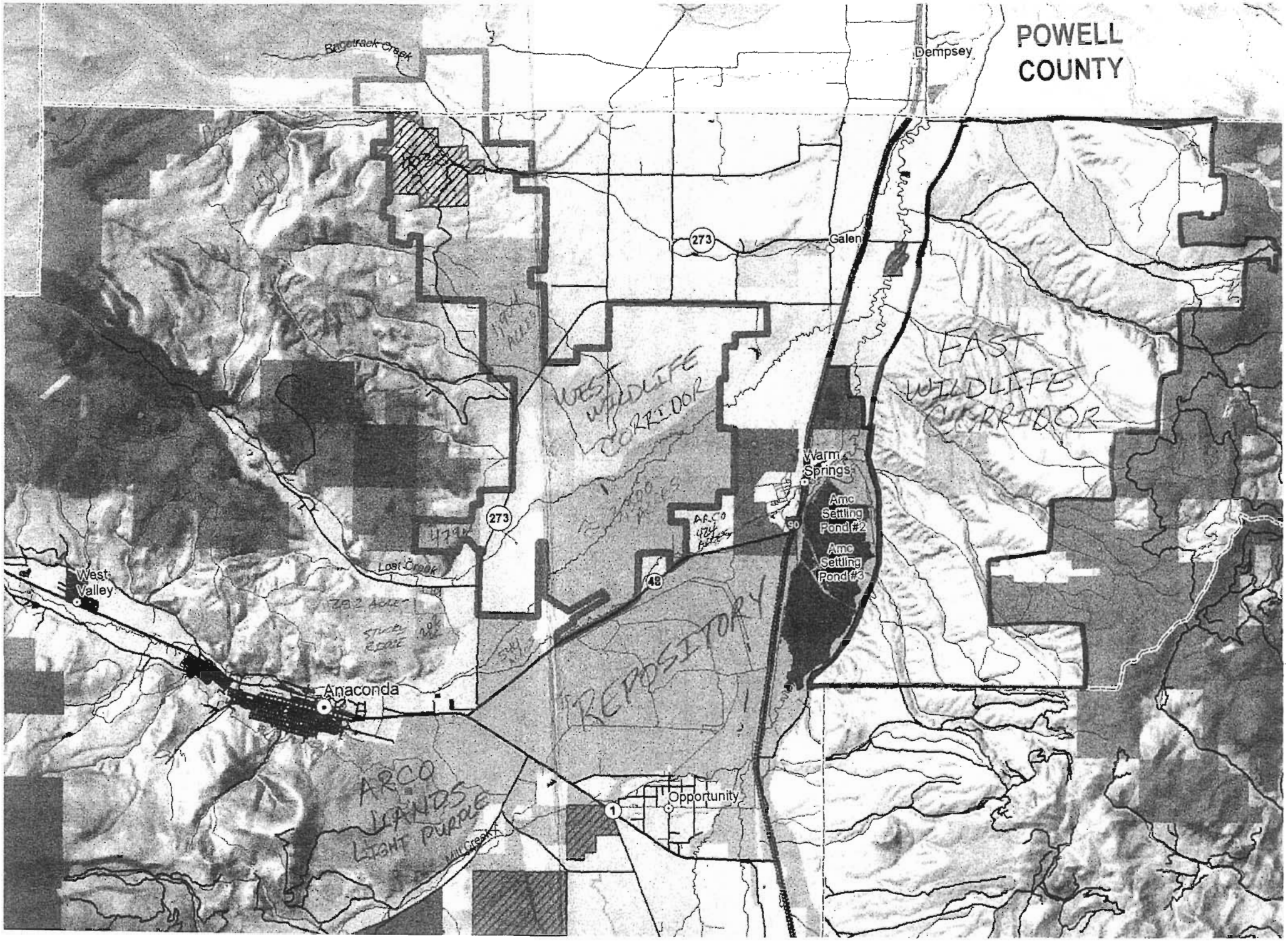
Sixth, the UCFRB Land Trust will provide natural resource-based recreational services such as fishing, hunting, wildlife viewing, and hiking. However, access will be considered secondary to wildlife habitat security. Access points to the wildlife corridor will be conspicuous and consistent throughout and designed to minimize natural resource impacts. No new public roads will be constructed and public motorized vehicle access will be limited to some existing roads and during seasons only when wildlife impacts can be minimized. For example, motorized access will be prohibited during elk calving and during the rut in applicable areas.

Finally, we will monitor the wildlife corridor to determine maintenance effectiveness while continually striving for habitat improvement. Monitoring efforts will include plants, mammals, fish, birds, insects, stream flows, water quality, residual herbicides, etc. Annual monitoring is expected to range between $175,000 and $225,000 depending on the quantity and type of monitoring needed in any particular year.

Take it from an environmental engineer born, raised, and educated in Butte, who at the age of eight or nine bicycled downstream of the packing plant to fish Silver Bow Creek with his brother only to discover a funky colored Martian-like landscape that was eerily lifeless. Fast forward to 2002; then, imagine my perplexity when asked by my good friend and DEQ's plant ecologist consultant Rich Prodgers to help place temporary cages around recently planted trees to prevent wildlife damage??? Since 2005, Prodgers provided me the unique privilege and experience of carrying a backpack almost daily from May through October along Silver Bow Creek targeting noxious weeds while stepping over newborn mule deer fawns, witnessing the antelope population increase 20 fold, observing large clutches of duck and geese eggs under three to six feet tall rubber rabbitbrush, multiple shorebirds, jumping trout, moose, elk, and osprey diving for their supper. To say that Silver Bow Creek has undergone a relatively rapid and unprecedented metamorphosis is perhaps the understatement of this new century.

Therefore, Montana's ultimate and paramount obligation must showcase the intensive restoration efforts of NRDP, DEQ, ARCO, EPA, and their numerous consultants, whom have collectively and perhaps some unwittingly, transformed this once mine ravaged region into a continually increasing wildlife mecca. It is our passion, privilege, and honor to help ensure this "Lasting Legacy" for Montana's wildlife and people. We must not let these spectacular transformative efforts become yet another tragedy of the commons doomed to fade into relative obscurity. In other words, let's use this rare and fleeting opportunity to do the right thing and keep this beautiful new jewel perpetually shining.

http://www.youtube.com/embed/nA3LtXnNIto?feature=player_embedded


POWELL COUNTY
Dempsey
Galen
273
Warm Springs
Amc Settling Pond #2
Amc Settling Pond #3
WEST WILDLIFE CORRIDOR
EAST WILDLIFE CORRIDOR
REPOSITORY
ARCO LANDS LIGHT PURPLE
273
48
1
West Valley
Anaconda
Opportunity
Lost Creek

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1. PROJECT TITLE: **Blacktail Creek Habitat and Fish Passage**

2. ORGANIZATION AND CONTACT:

Trout Unlimited
111 N. Higgins Ave, Suite 500
Missoula, MT 59802

Casey Hackathorn
406-541-1194
chackathorn@tu.org

3. PROJECT PURPOSE AND BENEFITS:

The purpose of the project is to restore riparian habitat, improve fish passage and increase native fish populations as well as angling opportunity in Blacktail and Silver Bow Creeks.

Goals:

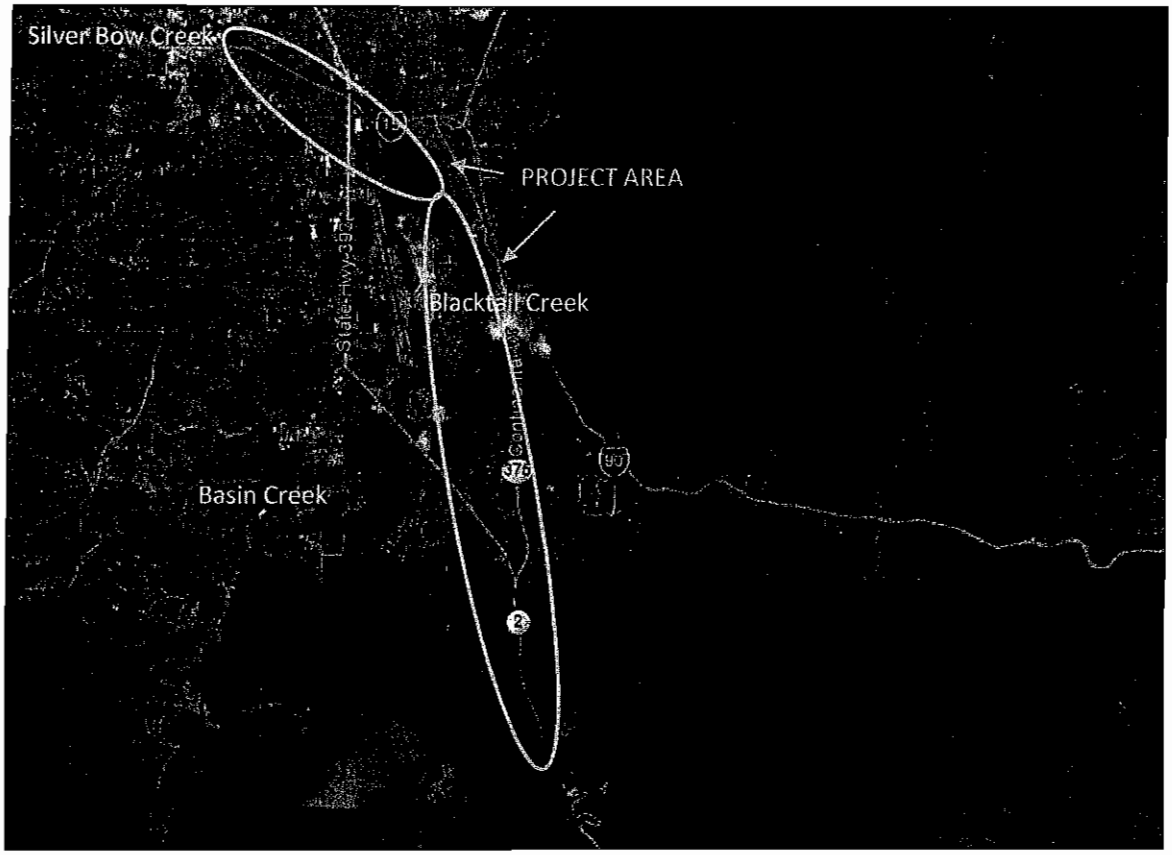
- Improve westslope cutthroat trout populations in Blacktail and Silver Bow Creeks
- Restore fluvial population of westlope trout in Blacktail and Silver Bow Creeks
- Improve angling opportunity in Blacktail an Silver Bow Creeks
- Reduce sediment inputs and improve water quality in Blacktail Creek

Objectives:

- Improve or replace up to 5 irrigation diversions and water controls structures for upstream fish passage and function
- Improve or replace up to 6 culverts for fish passage
- Improve up riparian habitat along lower 6 miles of Blacktail Creek

4. PROJECT LOCATION AND MAP:

The project focuses on Blacktail Creek from its headwaters near Pipestone Pass to its confluence with Silver Bow Creek in Butte.



5. PROJECT DESCRIPTION:

The Blacktail Creek flows off the west slope of the continental divide in the Highland Mountains and flows northward to Silver Bow Creek in Butte. The Blacktail Creek trout fishery is composed of westslope cutthroat trout (WCT) and brook trout. Brook trout predominate in the lower reaches diminishing upstream where cutthroat become more prevalent. Genetic sampling indicates a 100% pure WCT population that would add genetic diversity and increase populations in Silver Bow Creek if the habitat was improved and connected. USFS personnel consider Blacktail Creek a high priority area for aquatic restoration of national forest lands in the Silver Bow Creek watershed. Blacktail Creek is listed as an NRDP Priority 2 Area.

Intensive remediation and restoration effort has allowed for the recolonization of westslope cutthroat trout in Silver Bow Creek largely from German Gulch. Reconnecting and restoring Silver Bow Creek tributaries is essential for the recovery of westslope cutthroat populations in the watershed. Blacktail Creek offers a unique opportunity to restore an additional source of westslope cutthroat trout recruitment to Silver Bow Creek at its headwaters.

Trout Unlimited proposes taking a lead role in all phases of the project in coordination with FWP and federal agencies including project development and implemenation. We propose annual monitoring of projects completed for three years to ensure successful implemenation. TU will employ volunteer labor in coordination with GGTU to implement the riparian planting aspects of the project.

Tasks:

- Identify, survey and evaluate irrigation diversion, water control structures and culverts for fish passage
- Update Upper Clark Fork Diversion Inventory to include Blacktail Creek
- Coordinate with water users to develop diversion replacement or improvement projects for improved fish passage, function, and water control
- Coordinate with private landowners to develop riparian protection, grazing management, and revegetion projects on Blacktail Creek
- Contract and oversee construction of diversion replacement projects
- Contract and oversee construction of culvert replacement projects
- Monitor project effectivenes for three years following completion

Parnters:

- George Grant Chapter Trout Unlimited
- Beaverhead-Deer Lodge National Forest
- Montana Fish, Wildlife and Parks

6. PROJECT SCHEDULE:

The Blacktail Creek Habitat and Fish Project will take approximately five years to complete. Assessment work can be completed in one year with project development taking up to one additional year. Implementation with design, construction, and revegetation will take approximately two years to complete.

Task	Projected Completion
Diversion and Culvert Survey and Evaluation	2013
Update Diversion Inventory	2013
Project Development	2013-2014
Install Fencing	2014-2015
Planting	2014-2015
Diversion Replacement	2014-2015
Culvert Replacement	2014-2015
Monitoring	2015-2018

7. PROJECT BUDGET:

ITEM	UNIT	QTY	UNIT COST	TOTAL COST	MATCH	NRDP
Salaries and Benefits:						
Survey and Evaluation	HR	100	$ 40	$ 4,000		$ 4,000
Survey Tech (intern)	HR	80	$ 12.50	$ 1,000		$ 1,000
Project Development	HR	160	$ 40	$ 6,400		$ 6,400
Project Oversight	HR	240	$ 40	$ 9,600		$ 9,600
Permitting	HR	80	$ 40	$ 3,200		$ 3,200
Monitoring	HR	48	$ 40	$ 1,920		$ 1,920
Volunteer Labor	HR	800	$ 20	$ 16,000	$ 16,000	$ -
				$ 42,120	**$ 16,000**	**$ 26,120**
Contracted Services:						
Engineering and Design	LS	1	$50,000	$ 50,000		$ 50,000
Diversion Replacement	EA	5	$15,000	$ 75,000	$ 50,000	$ 25,000
Culvert Replacement	EA	6	$40,000	$ 240,000	$ 50,000	$ 190,000
Riparian Fencing	FT	20000	$ 2.60	$ 52,000		$ 52,000
				$ 417,000	**$ 100,000**	**$ 317,000**
Supplies and Materials:						
Native Shrubs - Containerized	EA	2500	$ 1.50	$ 3,750		$ 3,750
				$ 3,750	**$ -**	**$ 3,750**
Travel and Communication:						
Travel	MI	6600	$ 0.555	$ 3,663		$ 3,663
				$ 3,663	**$ -**	**$ 3,663**
Equipment:						
						$ -
TOTAL:				**$ 466,533**	**$ 116,000**	**$ 350,533**

From: Casey Hackathorn [mailto:CHackathorn@tu.org]
Sent: Friday, June 15, 2012 3:46 PM
To: Mostad, Tom
Subject: TU Blacktail Creek Fish Passage and Habitat Abstract

Casey Hackathorn | Upper Clark Fork Coordinator

TROUT UNLIMITED

406.541.1194 | 406.546.5680 c | www.tu.org

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Kadrmas
Lee &
Jackson
Engineers Surveyors
Planners

June 15, 2012

Carol Fox
Natural Resources Damage Program
1301 East Lockey
P.O. Box 201425
Helena, MT 59620-1425

Re: Natural Resource Damage Program - Restoration Concept Abstract Submittal
Drummond Sewage Lagoon Upgrade

Dear Carol:

Please reference the attached Restoration Concept Abstract Submittal for proposed improvements to the Drummond sewage lagoon. The lagoon is located directly adjacent to the Clark Fork River and the proposed project will address leakage issues and improve treatment capabilities of the lagoon.

Please call Mayor Leeper at (406)288-3231 or myself at (406)449-7764 if you have any questions.

Sincerely,

Kadrmas, Lee & Jackson, Inc.

Brad Koon

Brad Koon, P.E.

c: Mayor Leeper

Encl: Restoration Concept Abstract Submittal

406 449 7764
2969 Airport Road, Suite 1B
PO Box 1567
Helena, MT 59624-1567
Fax 406 443 6611
kljeng.com

Drummond Sewage Lagoon Upgrade

The Town of Drummond is requesting $1,037,000 from the Natural Resource Damage Program to fund an upgrade of its sewage lagoon.

1. **Name and Contact Information**

Gail Leeper, Mayor
Town of Drummond

Address: 114 A Street
Drummond, MT 59832
Email: townofdrummond@blackfoot.net
Phone: (406) 288-3231
Fax: (406) 288-3104

2. **Project Purpose and Benefits** (goals, objectives, outcomes, aquatic benefit)

The **goal** of this project is to improve water quality in the Clark Fork River downstream of Drummond, and thereby protect public health and safety from wastewater pathogens and protect the river ecosystem from harmful nutrients.

The Drummond facility currently consists of a single-cell 7.73 acre lagoon with a design depth of 8 feet and is designed to discharge to the Clark Fork River. Currently, however, no treated effluent is directly discharged to the river due to significant leakage from the lagoon. Since its construction in 1961, the town's 8-acre wastewater lagoon has not undertaken any significant alterations or improvements. Studies completed in 1998 and 2003 concluded that the lagoon was leaking in excess of 10-inches per year, which is significantly more than the current standard of 6-inches per year currently allowed by DEQ. In addition to the lagoon leakage issue, there are also concerns with the treatment facility's ability to meet future regulations. In addition, the ability of the existing single cell lagoon to even meet current standards on a regular basis is in question as result of sludge accumulation and configuration of the lagoon cells.

To achieve our goal, the primary **objective** of this proposal consists of bringing the existing facultative lagoon up to current standards as well as constructing modifications so that the existing lagoon can store effluent between June 21 and September 21 when discharge to the Clark Fork is not allowed. In order to bring the existing facility up to current standards and have a controlled discharge, the proposed modifications and improvements to the leaking single-cell lagoon include removing accumulated sludge, adding a synthetic liner to minimize leakage and constructing berms to create two additional cells. This will take place within the boundaries of the existing lagoon. The improved lagoon will include two primary cells and one secondary cell in accordance with DEQ Circular 2 (DEQ, 1999). A minimum of 180-days of detention will need to be provided, requiring a total lagoon volume of 6.9 MG. The additional berms required to divide the single cell into three cells would eliminate approximately 2 MG of storage, reducing the existing capacity from 9.3 MG to 7.3 MG. Therefore, it is feasible to modify the existing lagoon without having to add additional storage outside of the present-day treatment facility footprint. In addition, U.V. disinfection will be constructed as part of the improvements.

The **outcomes** of the proposed upgrade include: a properly functioning system with controlled discharge of treated effluent to the Clark Fork River, attainment of current secondary water quality requirements, and improved public health and safety for boating, fishing, swimming and irrigation in the Clark Fork River. The **aquatic benefit** of this project includes reducing nitrate and phosphate pollutant discharge to the Clark Fork River. Decreased nutrient loading to the river would likely decrease the growth of nuisance algae that is deleterious to the river ecosystem.

3. Project Location

The sewage lagoon is located about 1.5 miles west of the town of Drummond, MT, in Granite County, on the north side of the Clark Fork River and just south of Interstate 90.

4. Project Description (Implementation, lead entity, partners, progress to date)

The lead entity is the Town of Drummond. To date, they have retained an engineering firm, Kadrmas Lee & Jackson, to prepare a Preliminary Engineering Report (PER), completed in May 2012. The PER contains a description of the history and current condition of the wastewater system, an analysis of alternatives, the selection of a preferred alternative, an environmental analysis checklist, a cost estimate, and an implementation and funding plan. The information in this abstract is drawn from the PER and that document should be consulted for further information.

To address deficiencies in the wastewater treatment facility, several treatment and disposal alternatives were evaluated. Currently, the town operates under a general surface water discharge permit (MTG580002) that expired in 2004 but has been extended by administrative order. Given that a new permit has not been issued for the town, the alternatives analysis included different disposal options in the event that the water quality restrictions become too stringent for the town to continue discharging to the Clark Fork. Generally, the effluent disposal improvements include land application via an irrigation system or a controlled discharge to the river, which is the existing method. Each alternative also addresses the lagoon leakage by installing an impermeable liner. The alternatives are fully described in the PER.

The future potential requirements of a new MPDES permit are unknown at this time and very little guidance has been provided by DEQ in this regard. The notion that the previous permit will likely change was taken into consideration during the alternatives analysis (see Preliminary Engineering Report, Kadrmas Lee & Jackson, 2012), but design is based on the existing permit limits. Land application disposal options were developed in the event that future permit limits prevent the use of lagoon-based treatment technology. If the future MPDES permit is more stringent and lagoon-based technology is not sufficient for surface water discharge, the next highest ranked alternative can be implemented. Regardless, improvements made for the preferred alternative will not be wasted should spray irrigation be required at some point in the future.

Before the project can be implemented, the funding must be secured. The preferred funding strategy is for the town to utilize TSEP, CDBG, DNRC, RD and NRDP grant funds. The grant applications for the TSEP and DNRC Renewable Grant Program were submitted in May of 2012. The CDBG and RD grant applications will be submitted in fiscal year (FY) 2013, likely in February or March. Rural Development and SRF funds are available on an open schedule and do not have a strict deadline. The Town would likely not know prior to the fall of 2012 if their project has been funded by TSEP or DNRC. Upon obtaining funding, the project start-up for the grant program is anticipated to be approximately two months.

The following table provides a summary of the implementation schedule. Note that if insufficient grant funds are acquired, the town will need to apply for a loan which will prolong the implementation schedule.

5. Project Schedule

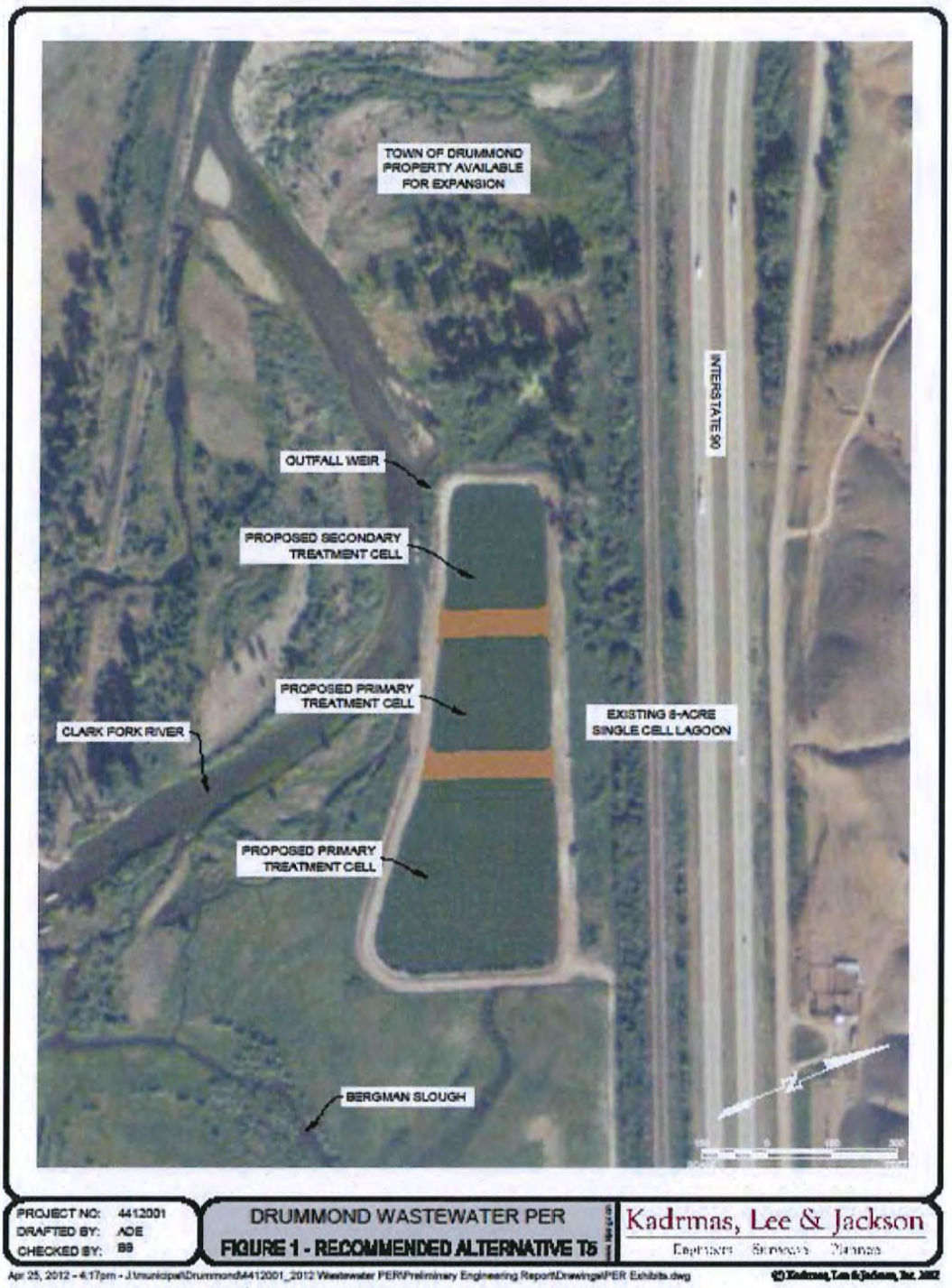
Action	Date	Funding	Notes
Submit TSEP and DNRC Grant Applications	May 2012	Town Reserves	
Results of Grant Applications Known	Nov 2012		Analyze loan alternatives
Sign Funding Contracts	Jan 2013		
Submit CDBG and RD Grant Applications	Mar 2013	Town Reserves	
Results of Grant Applications Known	Sep 2013		Analyze loan options if needed
Sign Funding Contracts	Nov 2013		
Select Engineer & Sign Agreement	Dec 2013		
Begin Design Phase	Jan 2014	DNRC	
Submit Plans to DEQ	Mar 2014		
DEQ Approval	May 2014		Allow 2-3 months
Advertise and Bid	May 2014	DNRC	
Construction	Jun – Oct 2014	RD, TSEP, CDBG	Allows adequate time for completion of the work
Final Walk-Through	Oct 2014		
Final Completion	Nov 2014		Begin warranty period
Audit	Jan 2015	DNRC, RD, TSEP, CDBG	Require single act audit due to number of funding agencies
Funding Agency Closeout	Mar 2015		
One-Year Walk-Through	Sep 2015		

6. General Cost Information

Capital construction costs were estimated assuming a 2014 implementation timeframe to allow for acquisition of adequate funding and are projected to be $2,302,000. Including administrative and finance expenses, the total project cost is estimated at approximately $2,342,000. The Town of Drummond is requesting $1,037,000 from the Natural Resource Damage Program to fund a portion of this project.

Cost Estimate

Item	*Quantity*	*Unit*	*Unit Cost*	*Total Cost*
Mobilization/Demobilization	1	LS	$100,000.00	$100,000
Taxes, Bonds & Insurance	1	LS	$125,000.00	$125,000
General Requirements	1	LS	$35,000.00	$35,000
Lift Station Flow Meter	1	LS	$15,000.00	$15,000
Embankment (Inside Dikes)	10,000	CY	$15.00	$150,000
Embankment (Outside Dikes)	15,000	CY	$10.00	$150,000
Remove and Dispose of Existing Inlet Structure	1	LS	$5,000.00	$5,000
Influent Structure	1	LS	$15,000.00	$15,000
Intra-Lagoon Flow Control Structure	2	LS	$35,000.00	$70,000
Remove & Dispose of Existing Effluent Structure	1	LS	$5,000.00	$5,000
Effluent Flow Control Structure	1	LS	$30,000.00	$30,000
Lagoon Piping	2,400	LF	$55.00	$132,000
Emergency Overflow Piping	150	LF	$55.00	$8,250
Concrete Splash Pads	3	EA	$2,000.00	$6,000
Lagoon Liner	366,000	SF	$1.20	$439,200
Liner Vent System	35,000	LF	$2.00	$70,000
Vent Piping	50	EA	$150.00	$7,500
Sludge Removal & Disposal	12,300	CY	$20.00	$246,000
UV Disinfection	1	LS	$50,000.00	$50,000
Seeding & Restoration	1	LS	$10,000.00	$10,000
Subtotal of Construction Costs				**$1,668,950**
Subtotal of Direct Construction Costs (2014)				***$1,744,000***
Contingency	10	%		$174,000
Total Construction Costs				***$1,918,000***
Engineering & Const. Admin.	20	%		$384,000
Total Capital Project Costs				***$2,302,000***
Change in Yearly O&M Cost	20	Year	$1,500	$30,000
Present Worth of O&M Difference Over 20 Years (6% Discount Rate)				$14,590
Total 20 Year Project Cost				**$2,346,590**

Several funding strategies were developed for this project. The preferred funding alternative includes acquiring grants from the Treasure State Endowment Program, Department of Natural Resources Renewable Grant Program, the United States Department of Agriculture Rural Development Program and the Montana Natural Resource Damage Program.

If all of these funding sources are procured, it is estimated that the project will be funded with $2,082,000 in grants, $10,000 in local resources and $250,000 will be financed through a USDA Rural Development loan. The current monthly rate to the system users is $20.88. After completing the recommended improvements, the town's rate will be approximately $25.02.