FUTURE FISHERIES IMPROVEMENT PROGRAM GRANT APPLICATION

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

I. APPLICANT INFORMATION

A. Applicant Name: Fish, Wildlife & Parks

Mailing Address: PO Box 200701, 1420 E. 6th Ave.

City: Helena State: MT Zip: 59620-0701

Telephone: (406) 444-7319 E-mail: FWPFACB@mtg.gov

B. Contact Person (if different than applicant): Carol Endicott

Address: 6 Church Lane

City: Livingston State: MT Zip: 59047

Telephone: (406) 222-3710 E-mail: cendicott@mt.gov

C. Landowner and/or Lessee Name (if different than applicant): Lower Shields Canal Company (Robert F. Eyman [President] Michael C. Dailey [Sec/Tres.])

Mailing Address: 247 Shields River Road East

City: Livingston State: MT Zip: 59047

Telephone: Mike Dailey 222-0523, Bob Eyman 686-4498 E-mail: mdailey8468@gmail.com

II. PROJECT INFORMATION

A. Project Name: Chadbourne diversion retrofit to block nonnative rainbow trout and conserve Yellowstone cutthroat trout

River, stream, or lake: Shields River

Location: Township: 1N Range: 9E Section: 13

Latitude: 45.82964 Longitude: 45.82964 *within project (decimal degrees)*

County: Park

B. Purpose of Project:

The purpose of this project is to eliminate hydraulics on the Chadbourne diversion that allow rainbow trout to breach the barrier, which threatens a basin-level stronghold of Yellowstone cutthroat trout. A secondary component of the project is to repair an area of work concrete and displaced angle iron on the top of the structure. Conducting such repairs as the need is identified reduces maintenance costs over the long-term.

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

The Chadbourne diversion spans the Shields River about 8 miles from the river's confluence with the Yellowstone River. Built in the early 1900s, the diversion had the unintended benefit of preventing wholesale invasion of rainbow trout, which are abundant downstream of the diversion, into the Shields River watershed. As a result, Yellowstone cutthroat trout remain in most waters in the basin with genetically unaltered and some hybrids being present. Protecting genetically unaltered populations of Yellowstone cutthroat trout and protecting this basin-level stronghold for Yellowstone cutthroat trout is a high conservation priority under range-wide and state conservation plans.

This application is the second request for funding for the Chadbourne diversion. Rainbow trout were using hydraulics and reduced leap height created by a mound of poured concrete on the downstream side of the diversion to gain access over the diversion. This mound was the result of multiple concrete pours to fill a migrating scour hole that threatened to undermine the structure and provided a deeper water upwelling that assisted fish jumping over the diversion. In 2011, while design and fundraising were underway, large slabs of the diversion broke off during spring runoff, and the entire, old structure was at risk of failure. The canal company implemented some interim repairs, but the state of the structure and the ability of rainbow trout to breach it necessitated a long-term solution.

The resulting repair and retrofit removed the mound of concrete, fortified the existing structure, added armor to the bed downstream of the diversion, and placed a curved or ogee front on the diversion. The ogee is an impassable feature, and of the hundreds of attempted leaps observed at the diversion, no rainbow trout have been successful.

A design element of the repair and retrofit has been found to provide a route for rainbow trout to gain access over the Chadbourne diversion, and rainbow trout tagged downstream of the structure have been captured upstream of it. The designs called for an accessible area on the right bank that could accommodate a fish ladder that would allow selective passage of native fishes, while blocking nonnative species. The ability of rainbow trout to gain access at this location has resulted in abandoning the potential for selective fish passage in the future in favor of slowing the progression of hybridization in the watershed.

The solution to block rainbow trout at this vulnerable spot is to build a wingwall and raise the elevation of the front of the diversion by 3 feet. This retrofit would eliminate the hydraulics at the face of the dam and increase the leap height required to breach the dam to an elevation beyond the leaping ability of rainbow trout.

Field inspection while surveying for design identified an area of damage on the top of the face of the diversion structure. A cottonwood gallery forest lines much of the Shields River, and many trees become transported during spring runoff and hang up on the structure, and the river moves a tremendous amount of cobble-sized bed load, which scours concrete. Fixing this minor damage while mobilized for the larger retrofit is a secondary action that will add to the structure's longevity.

D. Length of stream or size of lake that will be treated (project extent): 200 ft^2

Length/size of impact, if larger than project extent (e.g. stream miles opened): 250

E. Project Budget:

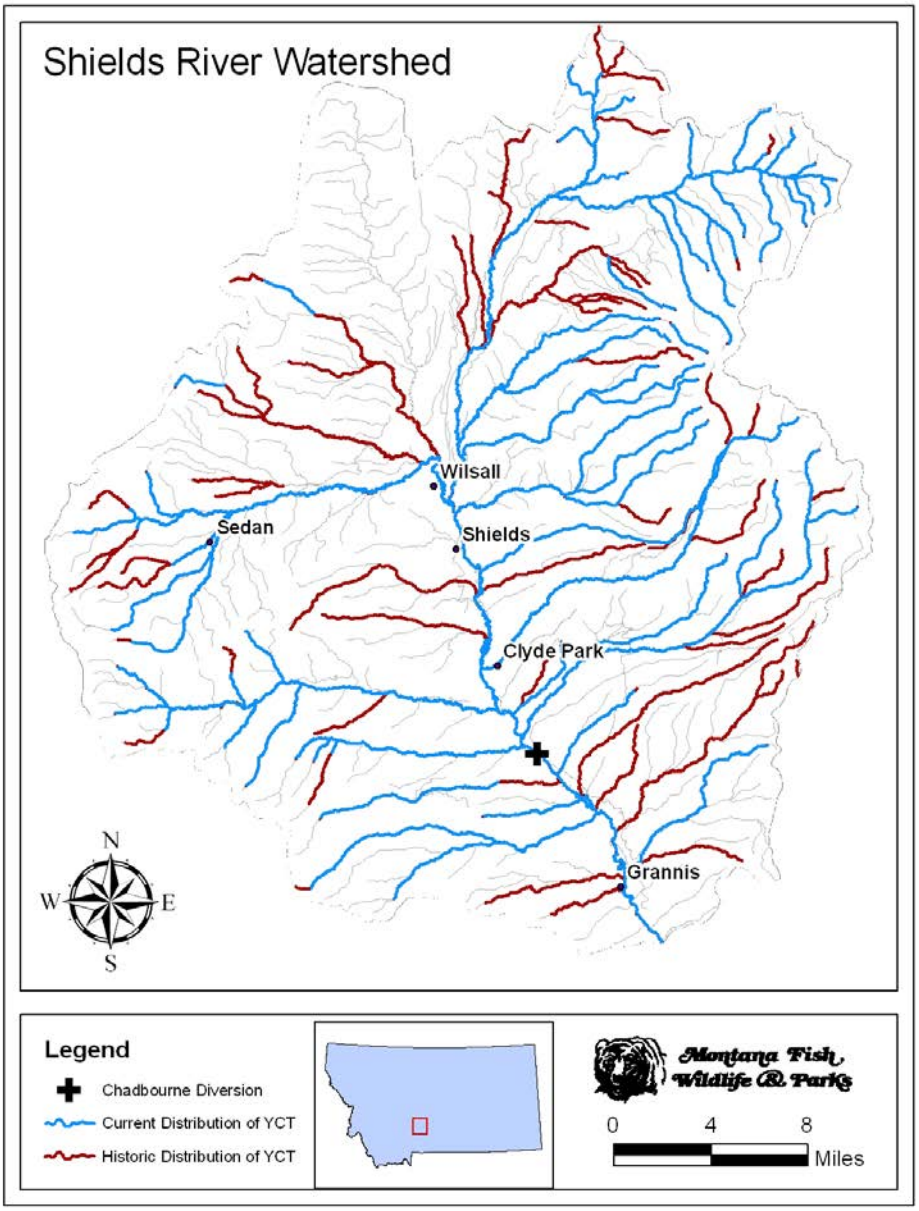
Grant Request (Dollars):	**$**	$ 11,244
Matching Dollars:	**$**	$ 20,881
Matching In-Kind Services:*	**$**	

**salaries of government employees <u>are not</u> considered matching contributions*

Other Contributions (not part of this app)	$	FWP surveyed structure, designed retrofit, and will oversee construction.
Total Project Cost:	$	**$ 32,125**

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

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



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

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

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

Yes [✓] No [ ]

The Lower Shields Canal Company will maintain the structure as part of their regular maintenance activities.

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

The Lower Shields Canal Company conducts regular maintenance on the Chadbourne diversion. The company places checkboards along the face of the structure after spring runoff to divert water to the canal. The boards are removed at the end of the irrigation season. The company regularly maintains the structure, which includes removal of cottonwoods that get hung up during spring runoff. The armoring of the downstream end of the structure installed in 2011 prevents formation of a scour pool, so future repairs will not include pouring concrete at the face of the structure.

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

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

Yellowstone cutthroat trout will benefit from the project, and the Shields River upstream of the Chadbourne diversion has high conservation value as Yellowstone cutthroat trout are present in most streams in the watershed. Some hybridization is present upstream of the diversion, and the retrofit will prevent additional rainbow trout from gaining access to these waters. The Shields River watershed is at high elevation and the northernmost extent of their native range, which increases resilience to climate change.

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

Blocking rainbow trout at the Chadbourne diversion will slow the spread of hybridization of Yellowstone cutthroat trout within the Shields River watershed upstream of the diversion. This project is consistent with the conservation strategy for Yellowstone cutthroat trout in Montana and FWP's fish management strategy.

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

The project will protect opportunities to catch native Yellowstone cutthroat trout in the Shields River watershed. Yellowstone cutthroat trout remain in about 33% of their historical habitat in Montana. In contrast, rainbow trout have been introduced or have spread to nearly 20 million miles of stream in Montana and will continue to provide high quality fishing opportunities in most cold waters in the state. The benefits to the fishery include healthier Yellowstone cutthroat trout, as hybridization decreases fitness and preservation of the option to fish for protected, native Yellowstone cutthroat trout within a cold-water environment

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

The project will not change opportunity for catching wild fish, but it will protect the opportunity to fish for wild and native Yellowstone cutthroat trout.

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

This project does not address habitat degradation but rather addresses protecting an existing, basin-level stronghold of Yellowstone cutthroat trout that is at risk of spreading hybridization. Although the retrofits to the diversion in 2012 secured the structure from failure and made passage along most of the diversion more difficult, a design element to provide a space for a fish ladder in the future created an area of turbulence that allows rainbow trout to leap over the diversion. Constructing a wingwall at this location and raising the elevation of the concrete will cut off this route of invasion.

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

The public benefits include protection of a high conservation value population of Yellowstone cutthroat trout at the northern extent of their historical range. The cumulative benefit of protecting large conservation areas include reduced justification to include Yellowstone cutthroat trout for protection under the Endangered Species Act, which allows landowners and others greater flexibility and promotes voluntary conservation. Anglers will have continued opportunity to fish for native Yellowstone cutthroat trout in a beautiful setting. Agencies will meet their obligations under law and policy.

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

This project will not interfere with water rights. The repair and retrofit completed in 2012 protected water rights holders, as loss of the diversion would have required a multi-million dollar new structure, or water rights holders would need to convert to dry land agriculture or find alternative sources of water in semi-arid desert. The access to the diversion is across private property, and although repairs and work on the diversion are covered under an easement, FWP will work with the landowners to develop a construction agreement that incorporates their concerns and mitigates for disturbance associated with construction such as revegetation and weed control.

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

No.

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

No

Each approved project applicant must enter into a written agreement with Montana Fish, Wildlife & Parks specifying terms and duration of the project. The applicant must obtain all applicable permits prior to project construction. A competitive bid process must be followed when using State funds.

IV. AUTHORIZING STATEMENT

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

Applicant Signature: Cara Peary Date: 11/15/21

Sponsor (if applicable): _____

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

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

Applications may be rejected if this form is modified.

P+A2:I42ROJECT COSTS					CONTRIBUTIONS			
WORK ITEMS (Itemize by Category)	NUMBER OF UNITS	UNIT DESCRIPTION*	COST/UNIT	TOTAL COST	FUTURE FISHERIES REQUEST	MATCH (Cash or Services)**	OTHER (Not part of this application)	TOTAL
Personnel* **								
Survey				$ -		$ -		$ -
Design				$ -		$ -		$ -
Engineering				$ -		$ -		$ -
Permitting	1	EACH	$ 300	$ 300	$ 300	$ -		$ 300
Oversight				$ -		$ -		$ -
				$ -		$ -		$ -
			Sub-Total	$ 300	$ 300	$ -	$ -	$ 300
Travel								
Mileage				$ -				$ -
Per diem				$ -				$ -
			Sub-Total	$ -	$ -	$ -	$ -	$ -
Construction Materials** **								
Concrete	10	CY	$ 173	$ 1,725		$ 1,725		$ 1,725
Fill	50	CY	$ 65	$ 3,250		$ 3,250		$ 3,250
Rip-rap	20	CY	$ 75	$ 1,500		$ 1,500		$ 1,500
				$ -		$ -		$ -
				$ -		$ -		$ -
				$ -		$ -		$ -
				$ -		$ -		$ -
				$ -		$ -		$ -
				$ -		$ -		$ -
			Sub-Total	$ 6,475	$ -	$ 6,475	$ -	$ 6,475
Equipment, Labor, and Mobilization								
Mobilization	1	EACH	$ 3,450	$ 3,450		$ 3,450		$ 3,450
Wall forming and reinforcement	60	FT	$ 145	$ 8,700	$ 8,700	$ -		$ 8,700
Dewatering	1	EACH	$ 5,175	$ 5,175	$ 2,244	$ 2,931		$ 5,175
Weir repair	1	EACH	$ 2,875	$ 2,875		$ 2,875		$ 2,875
Plans and bidding	1	EACH	$ 1,150	$ 1,150		$ 1,150		$ 1,150
Concrete pad	200	SF	$ 20	$ 4,000		$ 4,000		$ 4,000
				$ -		$ -		$ -
				$ -		$ -		$ -
				$ -		$ -		$ -
				$ -		$ -		$ -
				$ -		$ -		$ -
				$ -		$ -		$ -
			Sub-Total	$ 25,350	$ 10,944	$ 14,406	$ -	$ 25,350
			TOTALS	$ 32,125	$ 11,244	$ 20,881	$ -	$ 32,125

Revised July 2021

APPLICATION MATCHING CONTRIBUTIONS				
(do not include requested funds or contributions not associated with the application)				
CONTRIBUTOR	**IN-KIND**	**CASH**	**TOTAL**	**Secured? (Y/N)**
State Wildlife Grant Program (SWG)		$ 20,881		N
	$ -	$ -	$ -	
	$ -	$ -	$ -	
	$ -	$ -	$ -	
	$ -	$ -	$ -	
	$ -	$ -	$ -	
TOTALS	$ -	$ 20,881	$ -	

OTHER CONTRIBUTIONS				
(contributions not associated with the application)				
CONTRIBUTOR	**IN-KIND**	**CASH**	**TOTAL**	**Secured? (Y/N)**
	$ -	$ -	$ -	
	$ -	$ -	$ -	
	$ -	$ -	$ -	
	$ -	$ -	$ -	
	$ -	$ -	$ -	
	$ -	$ -	$ -	
	$ -	$ -	$ -	
	$ -	$ -	$ -	
TOTALS	$ -	$ -	$ -	

Attachment: Project Narrative

The Chadbourne diversion was the subject of a previous Future Fisheries Improvement Program grant. The diversion had prevented rainbow trout from invading a watershed-level stronghold for Yellowstone cutthroat trout; however, modifications to protect the structure and its age and state of disrepair threatened to eliminate the diversion as a barrier for rainbow trout (Figure 1). Primary actions included removal a mound of concrete in front of the diversion, rebuilding the structure to prevent its failure, and installing a curved, or ogee front to the diversion. The ogee front eliminates an area of backwater that forms behind the jet flowing over flat-fronted weirs that allows fish to leap from behind the water flowing over the diversion. A graduate student and others have observed hundreds of attempted leaps over the diversion, with none being successful.

Figure 1. Chadbourne diversion before and after first retrofit and repair.

A design element at the right side of the diversion allow rainbow trout to leap over the diversion. The original concept of providing selective fish passage at diversion was infeasible during the design of phase of the repair and retrofit, but the designs left a space where a ladder could be installed in the future (Figure 2). This location with relatively low height, complex hydraulics, and no protective ogee provides access to leaping rainbow trout. The proposed alteration is to raise the elevation of the concrete at this location to eliminate this vulnerable spot on the structure and add a rebar reinforced wingwall and increase the height of the face of the diversion where the ogee connects to the new wingwall (Figure 3). The proposed retrofit would tie into the elevation of the wingwall on the opposite bank (Figure 4).

Figure 2. Location intended for fish ladder that allows fish to breach the structure.

Figure 3. Conceptual approach of retrofit planned to block passage of rainbow trout.

Figure 4. Wing wall on opposite side of diversion showing elevation of planned retrofit.

Inspection of the diversion shows it has withstood the substantial amount of wood and bedload conveyed over it relatively well, although an area of spalling and displaced angle iron was present at the top of the diversion (Figure 5). Repairing this damage while mobilized for the larger retrofit is a common sense action that will extend the longevity of the structure.

Figure 5. Spalling concrete and twisted angle iron on top of diversion.

FWP.MT.GOV

THE **OUTSIDE** IS IN US ALL.

MT Fish, Wildlife & Parks
Region 3 Headquarters
1400 S 19th Avenue
Bozeman, MT 59718

November 10, 2021

Michelle McGree
Future Fisheries Program
1420 E. Sixth Avenue
Helena, MT 59620

RE: Chadbourne Diversion Retrofit Project

To Ms. McGree,

Montana Fish, Wildlife & Parks (FWP) appreciates the opportunity to comment on this project. We offer this letter of support for the grant application being administered by Carol Endicott, FWP, for the Chadbourne Diversion Retrofit Project.

The Shields River is a stronghold for native Yellowstone cutthroat trout in both Montana and across its multi-state historic range. The Chadbourne Diversion was modified in 2013 to prevent further invasion of Yellowstone cutthroat trout habitat by non-native rainbow and brown trout. The initial design included a selective passage structure to allow for the passage of Yellowstone cutthroat trout. This part of the project has since been abandoned. The diversion as it exists today appears to allow for limited passage of trout over the structure. The proposed project will address the passage issue and repair minor damage that the structure has incurred over time. This project will ensure protection of the Yellowstone cutthroat trout upstream of the diversion from further invasion by nonnative trout and secure the Shields River Basin above the diversion.

We support the undertaking of this important project to help conserve Yellowstone cutthroat in the upper Shields River and strongly encourage your approval.

For further questions or concerns, please feel free to reach out to Scott Opitz at 406-223-3951 or sopitz@mt.gov.

Sincerely,

Marina Yoshioka
Region Three Supervisor

Montana Water Project

Michelle Magree
Future Fisheries Improvement Program
Montana Fish, Wildlife, and Parks
1420 East Sixth Ave.
Helena, MT 59620

November 3, 2021

Dear Michelle,

It is our pleasure to continue to support Carol Endicott's application for Future Fisheries funding to update the Chadbourne Diversion on the Shields River to protect and conserve Yellowstone cutthroat trout in the Shields basin. For many years, FWP biologists have seen Chadbourne as a linchpin in long-term cutthroat conservation efforts. The diversion was rebuilt as a passage barrier preventing rainbow trout from getting established in the basin, but the fish ladder designed to enable selective passage appears to be a weakness in preventing rainbow trout encroachment. into the upper basin.

Trout Unlimited has long been engaged in Yellowstone Cutthroat Trout conservation in the Shields Valley through our local chapters and our Montana Water and Habitat Program. We invest time and resources in securing streamflows and restoring habitats in tributaries of the Shields in Chadbourne area, because we know the importance of these tributaries with cold, clean water and healthy habitat in the long-term persistence of Yellowstone Cutthroat Trout. The Chadbourne project is an important link between our efforts and those of your capable FWP biologists.

We hope the Citizens Panel and FWP will support this project, which clearly demonstrates that conservation can be mutually beneficial to agriculture, water users, and to fisheries. TU is proud to offer our support and matching funding to this worthy project. Please feel free to contact me if you have any questions. Best Wishes.

Sincerely,

Connor Parrish

Connor Parrish
Restoration Project Manager

Trout Unlimited: America's Leading Coldwater Fisheries Conservation Organization
321 East Main Street, Suite 411, Bozeman, MT 59715
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