



## Future Fisheries Improvement Program Legislative Report | 2023

**Summary of Program activities from November 1, 2020 to March 31, 2022**

Montana Fish, Wildlife and Parks

Habitat Bureau

Fisheries Division

September 2022





# Future Fisheries Improvement Program

The Future Fisheries Improvement Program (FFIP) was enacted in 1995 to provide funding for the improvement of wild fish and aquatic habitats (MCA 87-1-272). For over 20 years, the FFIP has provided biannual funding for habitat improvements across Montana.

## 2021 / 2022 Accomplishments

**32** Projects approved

**\$900,000 in grants awarded**

**Total impact of \$7.4 million**

### COMPLETED PROJECT HIGHLIGHTS



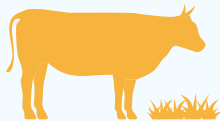
#### **Lake Habitat**

Lake Elmo (Billings) was drained to eradicate Asian clams. Biologists capitalized on the low water level and installed structures to enhance warmwater lake fishing.



#### **Diversion Upgrade**

An irrigation diversion on the Big Hole was upgraded to more accurately meet irrigation demand while also maximizing water savings for Arctic grayling.



#### **Managing Livestock**

A landowner on Big Otter Creek (Raynesford) fenced a portion of stream and installed a culvert to improve vegetation growth and route cattle away from the stream.



#### **Removing Mine Tailings**

Restoration of Ninemile Creek (near Missoula) continued, removing 180,000 cubic yards of abandoned placer mine piles and restoring nearly one mile of stream channel.



#### **Habitat Protection**

A genetically pure population of westslope cutthroat trout in Doolittle Creek (near Wisdom) increased their protected habitat from 1 mile to 11 miles with the installation of a fish barrier.

Find the report at: <https://fwp.mt.gov/legislative-reports> (covers 1.5 years of information due to a shift in reporting)

2021 / 2022 projects were completed by FWP staff and many other critical partners, including private landowners and local contractors. Project leaders included Trout Unlimited (TU), Big Blackfoot Chapter of TU, Big Hole Watershed Committee, City of Missoula, Clark Fork Coalition, FWP, George Grant Chapter of TU, Pat Barnes Chapter of TU, Prickly Pear Land Trust, Placid Lake Association, and the U.S. Forest Service.

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# PROGRAM INFORMATION

## Background and Overview

### LEGISLATION

The Future Fisheries Improvement Program (FFIP) was enacted in 1995 (MCA 87-1-272) to provide funding for the long term enhancement of streams, rivers, and lakes. It replaced the River Restoration Program (authorized in 1989) and expanded opportunities to restore wild fish habitats. The FFIP was supplemented and amended in 1999 when the legislature enacted the Bull Trout and Cutthroat Trout Enhancement Program (MCA 87-1-283), which emphasized the enhancement of habitat for the natural reproduction of bull trout and cutthroat trout. In 2013, the emphasis on native species was amended and expanded to all native fish species (MCA 87-1-283). This expansion of the FFIP, which encompassed all native species (referred to as Native Species Enhancement Program; NSEP), is a component of FFIP, separated by financials and project eligibility.

Legislative statute outlines the procedures and requirements of the FFIP. The Citizen Review Panel (Panel), appointed by the Governor and legislative body, assesses proposed projects independently and makes recommendations for funding. The Fish & Wildlife Commission (commission) is responsible for final funding approval.

Since the FFIP began, over 700 projects have been completed, all of which have a direct, positive effect on fish habitat in Montana. Table 1 shows the cumulative effects of common project types.

*Since 1996, with the help of Future Fisheries, enough riparian fence was installed to stretch from Dillon to Billings, and enough stream channel restored to connect Billings to Bozeman.*

**TABLE 1. IMPACT OF COMMON PROJECT TYPES, SINCE PROGRAM INCEPTION (1996).**

Project Type	Value
Miles of <b>riparian fence</b> installed	248
Miles of <b>channel restored</b>	144
Number of <b>fish screens</b> installed	62
Number of <b>fish passage</b> structures installed, or <b>barriers removed</b>	258
Number of <b>spawning structures</b> placed in a lake or reservoir	13,506
<b>Instream flow</b> saved (cubic feet per second)	373

This report provides updates on Program activities and expenses, project schedules, and anticipated Program expenses for the next 10 years. **Due to the 2021 update of report timelines (MCA 5-11-210), this document covers a shorter period (approximately 1.5 years instead of 2) than previous reports.** Future reports will cover two years of information.

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## PROGRAM GOALS AND FUNDING PRIORITIES

The overall goal of the FFIP (MCA 87-1-272) is to provide for the protection and enhancement of Montana fisheries through voluntary enhancement of spawning streams and other habitats, and to improve natural reproduction and growth of wild fish populations.

The Panel developed specific guidance in 1995, stating that potential projects must accomplish one or more of the following goals to be considered for funding: 1) improve or maintain fish passage; 2) restore or protect naturally functioning stream channels or banks; 3) restore or protect naturally functioning riparian areas; 4) prevent loss of fish into water diversions; 5) restore or protect essential habitats for spawning; 6) enhance stream flow in dewatered stream reaches to improve fisheries; 7) improve or protect genetically pure native fish populations; or 8) improve fishing in a lake or reservoir.

When the NSEP was added to the FFIP, preference shifted to projects that restore, protect, or enhance habitat for native fishes, including those involving mineral reclamation. In 2013, FFIP funding preference expanded into Eastern Montana after all native species became eligible for funding and it was recognized that there were fewer projects completed in Eastern Montana. Currently, the Panel considers the guidance and goals of the FFIP and considers other criteria during the review process, including:

- Evaluation of the cause of degradation and resolution (if possible), including a watershed approach
- Benefit to the public, anglers, and/or native species
- Cost share, public participation, and demonstration value
- Planning and design that includes geomorphic, hydrologic, and biologic principles that promote natural function
- Magnitude of benefit to wild fisheries, including monitoring plans
- Landowner approval and participation

## FUNDING PROCESS & PUBLIC PARTICIPATION

Any entity that proposes a habitat project benefiting wild fish in Montana can be considered for funding under the FFIP. Project applications can be submitted to FWP twice each year and are considered for the subsequent funding period; winter funding cycle applications are due prior to November 15, and summer funding cycle applications are due prior to May 15.

Since the last biennial report, the Panel met to review project proposals three times: December 2020, June 2021, and December 2021. After each meeting, funding recommendations formulated by the



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Panel were forwarded to the commission for final action during their regularly scheduled public meetings held in February and August for the winter and summer funding cycles, respectively.

For each individual funding cycle, there are several avenues for public comment prior to final approval by the commission. All submitted project applications are posted on the FWP website to provide opportunity for public review and comment. Additionally, environmental assessments (EA's) are prepared for all projects approved for funding and include a public comment period, except for projects that fall under categorical exclusion (ARM Rule 12.2.454). If the project is a part of a larger proposed action, or if the project takes place on federal lands, EA's are completed externally through the Montana Environmental Policy Act (MEPA) or National Environmental Policy Act (NEPA). Additional opportunities for public involvement and comment include attending public meetings of the Panel and the commission. Press releases announce each upcoming grant cycle as well as the projects approved by the commission.

## PROGRAM UPDATES

A current focus area of the Program is related to information sharing. Increasing the awareness of the Program both in opportunity and impact is critical. Press releases, social media posts, a radio interview, and other avenues to reach the public have been used. An updated Program brochure was produced and the FFIP webpage was redone (<https://fwp.mt.gov/ffip>).

The Covid-19 pandemic affected the FFIP primarily through travel restrictions and overall precaution, reducing the number of sites visited in 2021. It also required the modification of the Review Panel project tour and a combination of in-person and virtual meetings. This reduced the interaction and education of Panel members, staff, and applicants.

## Staffing and Membership

### FUTURE FISHERIES CITIZEN REVIEW PANEL

The Panel is a critical component of the FFIP, serving as an independent body to review applications and recommend funding. The 14-person Panel meets twice a year (mid-December and mid-June) to discuss proposed projects and is available throughout the year to provide Program guidance. The enabling legislation (MCA 87-1-272, MCA 87-1-283) called for the establishment of the Panel and identified specific categories of representation, including but not limited to the following:

- One member who is a representative of conservation districts;
- One member with expertise in commercial agriculture;
- One member with expertise in irrigated agriculture;

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- One member from the private sector who is a fisheries restoration professional;
- Two members who are licensed Montana anglers;
- One member of the House of Representatives, chosen by the Speaker of the House;
- One member of the Senate, chosen by the Committee on Committees;
- One member with expertise in silviculture;
- One member who is a Montana high school student;
- One member with an expertise in mine reclamation techniques;
- One member with expertise in fisheries; and
- One ex-officio member from the Montana Department of Transportation with experience in highway impact mitigation.

An additional appointee was added by FWP to include a member with expertise in hydrology / geomorphology. Except for legislative appointments, Panel members are selected by the Governor or a Governor's designee. Members serve a voluntary, two-year term and may be re-appointed for additional terms. Members of the Panel serving during the period of this report are in Table 2.

**TABLE 2. REVIEW PANEL MEMBERSHIP (2020-2022).**

CATEGORY	NAME, LOCATION	TERM START	TERM END
Conservation District	Clint Peck, Billings	Reappointed	7/1/2023
Commercial Agriculture	Bill Mytton, Absarokee	Reappointed	7/1/2022
Irrigated Agriculture	Bob Schroeder, Missoula	7/1/2020	7/1/2022
Restoration Professional	Karin Boyd, Bozeman*	Reappointed	7/1/2021
	Ron Pierce, Missoula	7/1/2021	7/1/2023
Licensed Angler (1 of 2)	Bruce Farling, Missoula	7/1/2019	7/1/2021
	Michael Johns, Bozeman	7/1/2021	7/1/2023
Licensed Angler (2 of 2)	Tony Cate, Missoula	7/1/2019	7/1/2021
	David Cope, Ennis	7/1/2021	7/1/2023
Silviculture/Forestry	Terry Chute, Helena	Reappointed	7/1/2021
	Richard Lane, Missoula	7/1/2021	7/1/2023
High School Student	Luca Welle, Kalispell	7/1/2020	7/1/2021
	John Goodwin, Helena	7/1/2021	7/1/2023
Mine Reclamation	Nancy Winslow, Missoula	Reappointed	7/1/2022
Fisheries	William (Bill) Wichers, Hamilton	Reappointed	7/1/2021
	Mike Newton, Glendive	7/1/2021	7/1/2023
MDT ex-officio	Bill Semmens, Helena	Reappointed	7/1/2023
Hydrologist	Chuck Dalby, Helena	Reappointed	7/1/2021
	Karin Boyd, Bozeman*	7/1/2021	7/1/2023
House of Representatives	Rep. Matt Regier, Kalispell	1/1/2017	12/31/2020
	Rep. Brian Putnam, Kalispell	1/1/2021	1/1/2023
Senate	Sen. Jason Ellsworth, Hamilton	1/1/2019	12/31/2020
	No Senator appointed	N/A	N/A

\*Reappointed to the Review Panel, but to a different category

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## FWP EMPLOYEES

### ***Future Fisheries Improvement Program Funding***

The enabling legislation for the FFIP (MCA 81-1-272) authorized the use of Program funds for up to two additional full-time employees. FWP transitioned to base license dollars to fund the FTE's and their operations. Using base license dollars rather than funds allocated to the FFIP allows more Program funds to be used for on-the-ground restoration. There is now one FFIP staff member.

Michelle McGree has been the Future Fisheries Coordinator (FFC) since 2014. The FFC is responsible for compiling and distributing project applications, visiting the sites of proposed projects, acting as FWP staff liaison for the Panel, developing and communicating FWP recommendations to the Panel, developing project agreements, processing and approving payments associated with completed restoration work, monitoring project implementation, effectiveness, and compliance, and maintaining a comprehensive FFIP database. Michelle also develops projects, coordinates with consultants and contractors who design and perform restoration projects, works with landowners and other citizens that need help developing project proposals, and assists with fish screening and fish passage project review.

### ***Native Species Enhancement Program Funding***

MCA 87-1-283 states, "In order to implement (the Program), the department may expend revenue from the Bull Trout and Cutthroat Trout Enhancement Program for one additional FTE and one contractor to assist the review panel." Historically, staff were hired under the NSEP but were then transitioned to base license dollar funding. Now the NSEP operational funding covers only costs to support the Panel meetings and supplemental monitoring activities related to NSEP-funded projects. Operations expenditures associated with the NSEP since the last report period (November 1, 2020 to March 31, 2022) equaled \$7,663 and included three Panel meetings (see Expenditures). The use of base license dollars to support employees for both the NSEP and FFIP allows maximum Program dollars to be used for restoration.

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## Appropriations, Awards, & Expenditures

### PROGRAM APPROPRIATIONS

The FFIP is funded using base license dollars and River Restoration funds (MCA 87-1-257-258), which are derived from a \$0.50 earmark on resident fishing licenses and a \$1.00 earmark on non-resident fishing licenses. The NSEP was funded primarily with Resource Indemnity Trust (RIT) funds (MCA 15-38-202). However, due to sustained declines in the RIT fund, base license dollars have been used to backfill the Program. Additionally, the 2021 legislature passed HB637 to supplement the Program using fees from nonresident big game license preference points. These creative approaches ensure that the FFIP has funding to match the authority approved by the Legislature.

Since the inception of each program, FFIP authority averaged \$611,071 per biennium (over 14 biennia) and \$902,250 per biennium (over 12 biennia), for the FFIP and NSEP funding sources, respectively (Table 3). For the duration of the Program, the average amount of authority granted per biennia is approximately \$1.38 million, and the cumulative total of authority is over \$19 million.

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**TABLE 3. LEGISLATIVE AUTHORITY, BY LEGISLATIVE SESSION**

LEGISLATIVE SESSION	FISCAL YEARS	FUND AND SUBCLASS	AMOUNT
1995	FY 1996, 1997	General License, 26306, E125 (earmarked)	\$510,000.00
		River Restoration, 26301	\$290,000.00
		General License, 02409, ET30	\$220,000.00
		General License, 02409, ET2	\$1,250,000.00
1997	FY 1998, 1999	River Restoration, 02149, 28466	\$70,000.00
		General License, 02409, E131	\$1,310,000.00
1999	FY 2000, 2001	River Restoration, 02149, E190	\$300,000.00
		General License, 02409, E131	\$1,170,000.00
		General License, 02409, 38011 (BT/CT)	\$750,000.00
2001	FY 2002, 2003	River Restoration, 02149, EI115	\$260,000.00
		General License, 02409, EI115	\$750,000.00
		RIT, 02022, EI115 (BT/CT)	\$850,000.00
2003	FY 2004, 2005	River Restoration, 02149, EI131	\$210,000.00
		RIT, 02022, EI131 (BT/CT)	\$700,000.00
2005	FY 2006, 2007	River Restoration, 02149, EI150	\$190,000.00
		RIT, 02022, EI150 (BT/CT)	\$1,000,000.00
2007	FY 2008, 2009	River Restoration, 02149, EI170	\$314,000.00
		RIT, 02022, EI170 (BT/CT)	\$1,000,000.00
2009	FY 2010, 2011	River Restoration, 02149, EI109	\$150,000.00
		RIT, 02022, EI109 (BT/CT)	\$1,000,000.00
2011	FY 2012, 2013	River Restoration, 02149, EI001	\$274,000.00
		RIT, 02022, EI001 (BT/CT)	\$1,000,000.00
2013	FY 2014, 2015	River Restoration, 02149, EI003	\$190,000.00
		RIT, 02022, EI003	\$600,000.00
2015	FY 2016, 2017	River Restoration, 02149, EI005	\$277,000.00
		RIT, 02022, EI005	\$1,000,000.00
2017	FY 2018, 2019	River Restoration, 02149, EI007	\$250,000.00
		RIT, 02022, EI007	\$927,000.00
2019	FY 2020, 2021	River Restoration, 02149, EI009	\$250,000.00
		RIT, 02022, EI009	\$1,000,000.00
2021	FY 2022, 2023	River Restoration, 02149, EI301	\$320,000.00
		RIT, 02022, EI301	\$1,000,000.00
TOTALS		FFIP (License + River Restoration)	\$8,555,000.00
		NSEP (RIT + BT/CT)	\$10,827,000.00
		All Fund Authority	\$19,382,000.00
AVERAGE PER BIENNIUM		FFIP (License + River Restoration)	\$611,071.43
		NSEP (RIT + BT/CT)	\$902,250.00
		All Fund Authority	\$1,384,428.57

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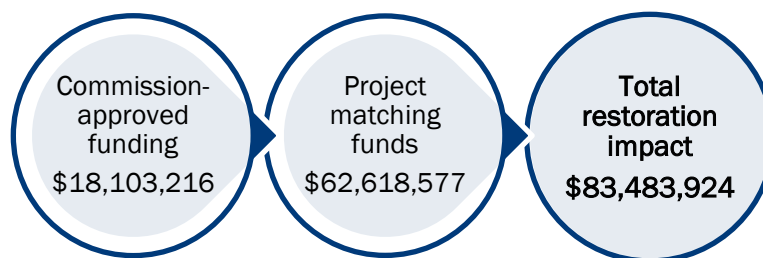
## FUNDING AWARDS

Since implementation of the FFIP in 1996, the commission approved \$18.1 million for restoration projects that are ongoing or completed which, in turn, generated approximately \$62.6 million in available matching funds (Figure 1). Matching funds come from a wide array of sources, including federal agencies, state agencies, sportsman's groups, conservation groups, watershed groups, private foundations, private companies, and landowners. ***With FFIP and match combined, nearly \$84 million of habitat restoration work has been undertaken in Montana since 1996 because of the FFIP.***

In total, the Panel and commission have approved funding requests (full or partial) for 849 restoration projects (Table 4). Of these projects, 698 are completed, 44 are ongoing, and 107 were cancelled. All Program funds previously committed to cancelled projects were subsequently reallocated to fund new habitat projects. The reasons for cancellations vary, but include:

- The applicant used other funding sources to complete the project
- The landowner was unwilling to sign a project agreement. These project agreements apply to all funded projects and are put in place to ensure that there is protection for the investment in restoration (typically 20 years)
- The applicant was unable to secure the matching funds that were identified in the application
- The landowner was not fully on board with the proposed project and backed out after funds were approved
- The scope of the project significantly changed after funding was secured, requiring the applicant to re-apply to the FFIP or seek other sources of funding

In 2021, \$542,626 in FFIP grants was awarded. Together with matching funds, that resulted in \$5.28 million in restoration projects. In the Winter 2022 grant cycle (this report represents only one grant cycle in 2022), \$340,205 in FFIP grants was awarded, resulting in a total restoration impact of \$2.1 million. The second grant cycle of 2022 will be awarded in August 2022.



**FIGURE 1. APPROVED FUNDING, MATCHING FUNDS, AND TOTAL DOLLARS SPENT ON COMPLETED OR ONGOING FUTURE FISHERIES IMPROVEMENT PROGRAM PROJECTS, SINCE 1996.**



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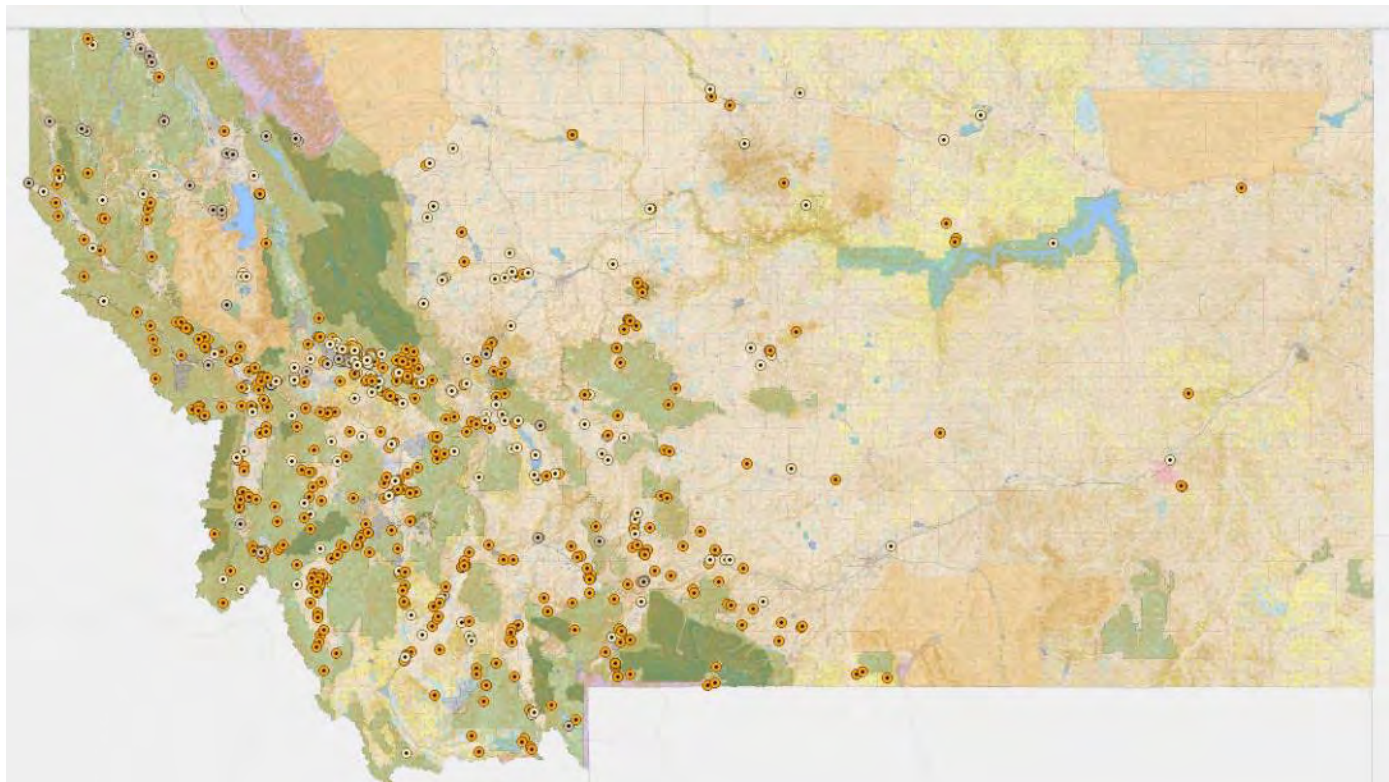
**TABLE 4. STATUS OF FUTURE FISHERIES IMPROVEMENT PROGRAM FUNDED PROJECTS, BY YEAR, THROUGH MARCH 31, 2022.**

Year	Cancelled	Complete	Ongoing	Ongoing maintenance	Expired	Total
1996					47	47
1997					45	45
1998	9	2			37	48
1999	7	4			39	50
2000	8	2			34	44
2001	8	11			16	35
2002	7	27		2	5	41
2003	8	28			4	40
2004	7	30			2	39
2005	3	26			1	30
2006	13	25		2		40
2007	2	34				36
2008	9	17			1	27
2009	3	27			1	31
2010	3	28			2	33
2011	8	22				30
2012	1	17				18
2013		18			1	19
2014	2	17				19
2015	2	33				35
2016	4	19	1			24
2017	3	19	1			23
2018		23	3			26
2019		16	2			18
2020		11	8			19
2021		7	14			21
2022			11			11
<b>Total</b>	<b>107</b>	<b>463</b>	<b>40</b>	<b>4</b>	<b>235</b>	<b>849</b>

Projects have been completed statewide since 1996 (Figure 2). However, fewer projects have been completed in eastern Montana. Because the NSEP funding originally targeted cutthroat trout and bull trout projects, those funds were limited to western Montana. In 2013, NSEP funding was expanded to

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include all native fish, creating opportunities for funding in additional areas. Increasing habitat enhancement in eastern Montana is a Program priority.



**FIGURE 2. COMPLETED FUTURE FISHERIES IMPROVEMENT PROGRAM PROJECTS, 1996-2022. ORANGE DOTS INDICATE COMPLETED, ACTIVE PROJECTS. LIGHT DOTS INDICATE EXPIRED PROJECTS (EXCEEDED 20 YEAR PROJECT AGREEMENT).**

## EXPENDITURES

Table 5 lists all the FFIP projects that expended funds during the report period (November 1, 2020 to March 31, 2022). A total of \$841,552.75 was expended on 36 restoration projects. Of these projects, 3 addressed long-term maintenance, 5 were granted funding prior to 2019, 17 were funded between 2019 and 2020, and 11 were funded in 2021 and 2022. Additionally, \$7,663.22 was expended on Program operations. The operations expenditures were used for project monitoring and to facilitate Panel meetings. Most operations expenditures are absorbed by the FWP budget, which allows maximum FFIP funding to be available for on-the-ground projects.

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**TABLE 5. PROGRAM EXPENDITURES FROM 11-01-2020 TO 03-31-2022, SEPARATED BY PROGRAM (02022, NATIVE SPECIES ENHANCEMENT; 02149, RIVER RESTORATION / FUTURE FISHERIES IMPROVEMENT) AND SPENDING AUTHORITY SUBCLASS (EI007-EI301). TOTAL EXPENDITURES ARE LESS THAN PREVIOUS REPORTS AS THE REPORTING PERIOD CHANGED FOR THIS LEGISLATIVE REPORT (APPROXIMATELY 1.5 INSTEAD OF 2 YEARS).**

			Subclass						Total
			02022 Native MT Fish Species Enhancement				02149 River Restoration (FFIP)		
FFIP#	Description	Status	EI007	EI009	EI067	EI301	EI007	EI009	
73643	Program Operations	N/A		\$7,663.22					\$7,663.22
048-2002	Skalkaho Creek	Ongoing	\$1,956.25	\$795.00					\$2,751.25
039-2006	Skalkaho Creek/Hedge Suppl	Ongoing	\$3,300.00						\$3,300.00
040-2006	Skalkaho Creek/Republican	Ongoing	\$3,300.00						\$3,300.00
002-2017	Big Otter Creek Riparian	Completed					\$2,700.00		\$2,700.00
012-2017	Ninemile Creek Channel Res	Completed		\$20,000.00					\$20,000.00
015-2017	Sauerkraut Creek Instream	Completed	\$10,000.00						\$10,000.00
002-2018	Deep Creek Instream Flow	Ongoing					\$2,029.12		\$2,029.12
008-2018	Monarch Creek culvert repl	Completed	\$18,066.18						\$18,066.18
008-2019	Rattlesnake Creek dam remo	Completed	\$40,000.00						\$40,000.00
010-2019	Selway Creek fish barrier	Completed		\$4,490.26	\$50,412.36				\$54,902.62
012-2019	Beaver Creek Upper Missour	Completed					\$74,499.42	-\$6,000.00	\$68,499.42
016-2019	Lolo Ditch fish screen	Completed		\$61,600.00			\$15,400.00		\$77,000.00
019-2019	Musselshell River McCleary	Completed		\$69,895.35					\$69,895.35
022-2019	Sevenmile Creek restoratio	Completed					\$50,000.00		\$50,000.00
023-2019	West Fork Bitterroot Wilso	Completed	\$15,173.49	\$10,331.51					\$25,505.00
002-2020	Cottonwood Creek fish barr	Completed	\$7,500.00						\$7,500.00
003-2020	Doolittle Creek fish barri	Completed	\$10,000.00						\$10,000.00
005-2020	Lee and West Fork Lolo Cre	Completed	\$30,500.00	-\$27,450.00					\$3,050.00
009-2020	O'Neill Creek culvert repl	Completed	\$15,250.00						\$15,250.00
011-2020	Wall Creek fish barrier su	Ongoing		\$1,377.50					\$1,377.50
014-2020	Flint Creek riparian resto	Completed		\$27,781.77					\$27,781.77
015-2020	Hall Creek fish barrier re	Completed		\$8,240.00					\$8,240.00
018-2020	Long Creek aquatic habitat	Ongoing		\$27,750.00					\$27,750.00
019-2020	Lower French Creek riparia	Completed	\$10,000.00						\$10,000.00
021-2020	Poorman Creek restoration	Completed	\$52,200.00	-\$46,400.00					\$5,800.00
001-2021	Big Hole 40 Bar streambank	Completed					\$15,000.00		\$15,000.00
003-2021	Elk Spring Creek restorati	Completed					\$9,000.00	\$81,000.00	\$90,000.00
004-2021	Lake Elmo fish habitat sup	Ongoing						\$10,715.32	\$10,715.32

# PROGRAM FINANCIALS

			Subclass						Total
			02022 Native MT Fish Species Enhancement				02149 River Restoration (FFIP)		
FFIP#	Description	Status	EI007	EI009	EI067	EI301	EI007	EI009	
006-2021	Poorman Creek culvert repl	Completed					\$31,000.00		\$31,000.00
009-2021	Andrus Creek fish barrier	Completed		\$14,314.00					\$14,314.00
012-2021	Big Hole Spokane Diversion	Ongoing		\$140.00					\$140.00
013-2021	Clark Fork River Flynn-Lown	Completed		\$50,000.00					\$50,000.00
016-2021	Little Park Creek restorat	Completed				\$20,000.00			\$20,000.00
018-2021	Miller Creek Bear Run stre	Completed				\$15,000.00			\$15,000.00
019-2021	Placid Lake outlet barrier	Completed				\$11,022.00			\$11,022.00
021-2021	Trail Creek fish passage	Ongoing		\$12,000.00					\$12,000.00
TOTAL			\$217,245.92	\$242,528.61	\$50,412.36	\$46,022.00	\$199,628.54	\$85,715.32	\$841,552.75

# PROGRAM FINANCIALS

## ANTICIPATED EXPENSES

Total project expenditures for the last three biennia ranged from \$1.32 million and \$1.58 million (Table 6). During this report period (November 1, 2020 to March 31, 2022), Program expenditures were approximately \$841,552.75. This is approximately 65% of the typical expenditure, as the reporting period for the legislative report was shifted and represents approximately 70% of previous report timeframes.

**TABLE 6. GRANT AWARDS AND EXPENDITURES FROM THE LAST FOUR BIENNIA, BY LEGISLATIVE REPORT PERIOD (NOV 1 TO OCT 31 OR MARCH 31). EXPENDITURES ARE TYPICALLY ASSOCIATED WITH PREVIOUS BIENNIUM AWARDS.**

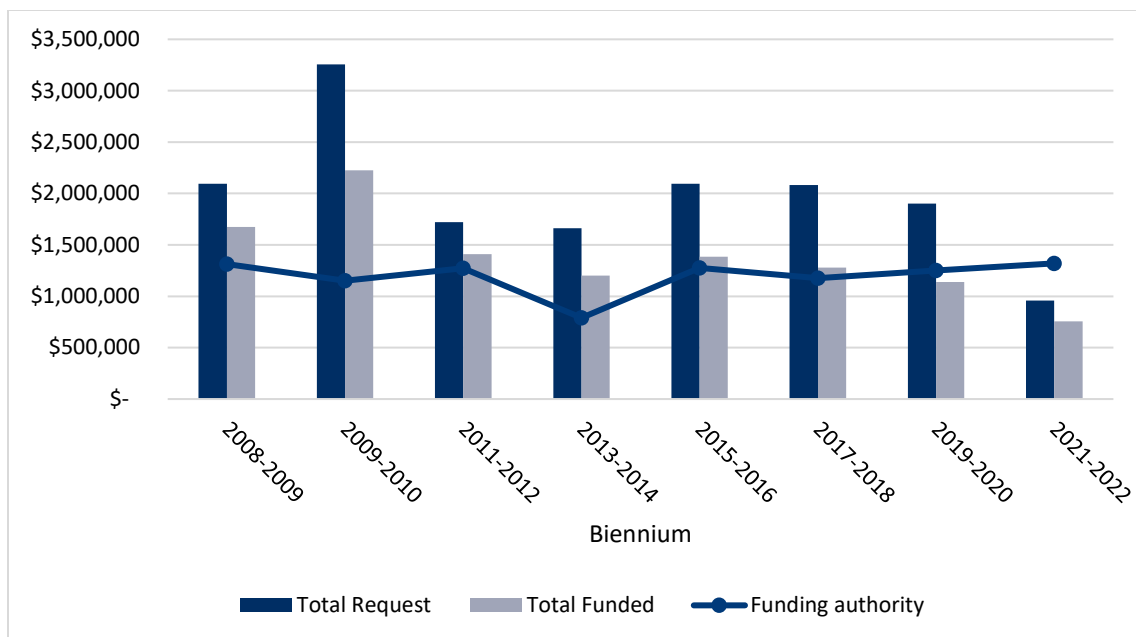
	November 1, 2014 - October 31, 2016	November 1, 2016 - October 31, 2018	November 1, 2018 - October 31, 2020	November 1, 2020 - March 31, 2022*
Awards	\$1.60 million	\$1.19 million	\$1.34 million	\$878,875
Expenditures	\$1.40 million	\$1.58 million	\$1.32 million	\$841,552.75

\*represents 70% the biennium due to shifting reporting deadlines.

Grant expenditures can be greater than the amount awarded, as some projects are canceled and the turnback funds are awarded in subsequent grant cycles. Additionally, grant awards are typically expended between one and three years after approval, so comparisons within a biennium are not accurate.

Awarded funds are less than requested funds due to the competitive grant process but also because of reduced allocations from the RIT fund (Figure 3). As the cost for restoration continues to increase, it is likely that the FFIP funding level and funding sources will need to be increased to maintain the same level of habitat improvement. In both of the last two biennia, the project prioritization procedure (ARM 12.7.1203) was used to deny the lowest-ranking applications, even though they were recommended for funding by the Panel. These projects were beneficial and likely would have received funding if it were available. The prioritization procedure was not used to determine funding recommendations prior to 2016.

# PROGRAM FINANCIALS



**FIGURE 3. FUTURE FISHERIES IMPROVEMENT PROGRAM TOTAL FUNDING REQUESTS, THE TOTAL AMOUNT FUNDED, AND FUNDING AUTHORITY OVER TIME, BY BIENNIUM. FUNDING FOR THE SUMMER 2022 AND WINTER 2023 GRANT CYCLES HAVE NOT YET BEEN AWARDED, BUT WILL BE LIMITED BY REMAINING FUNDS.**

If funding was not limited, the Program would be expected to spend, at a minimum, an amount comparable to what was expended in the last three biennia, which is estimated to be \$7.1 million in a 10-year period or \$1.4 million per biennium. However, this estimate exceeds the funding and authority currently available. It is likely expenses could be higher than current levels, as the funding awarded is consistently less than the need. Competition for funds is high, and inflation is causing project costs to increase rapidly.

With a 6:1 match (the average of the last two funding cycles), the restoration impact of \$7.1 million in 10 years would generate matching funds of \$42.8 million and an overall expenditure of nearly \$50 million of restoration. These are valuable dollars for fisheries restoration, but also for Montana's recreation economy and the local contractors that complete the project installations.

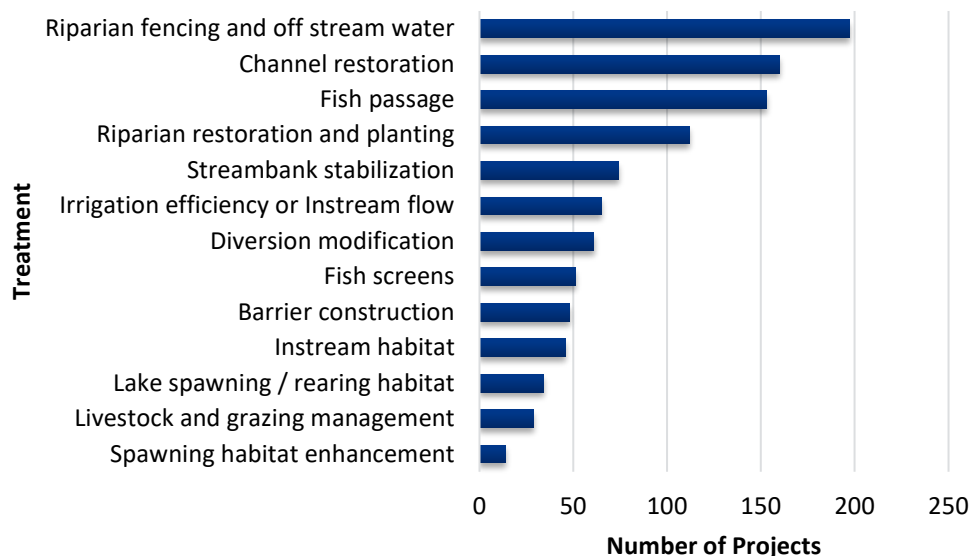


# 2021/2022 FUNDED PROJECTS

## Approved and Completed Projects

### PROGRAM PROJECT TYPES, SINCE INCEPTION

Program funds have been used to complete many types of lake and stream habitat enhancements. Riparian fencing and channel restoration have been the most common treatments funded through FFIP and make up 18% and 15% of all completed projects (Figure 4). Additional prevalent restoration activities include fish passage improvement, riparian restoration, bank stabilization, irrigation efficiency or instream flow, diversion modification, fish screens, barrier construction (native fish protection), instream habitat, lake spawning habitat installation, and spawning enhancement.



**FIGURE 4. PROJECT TYPES, 1996–2022. MANY PROJECTS INCORPORATED MULTIPLE TREATMENTS.**

### 2021-2022 PROJECT TYPES

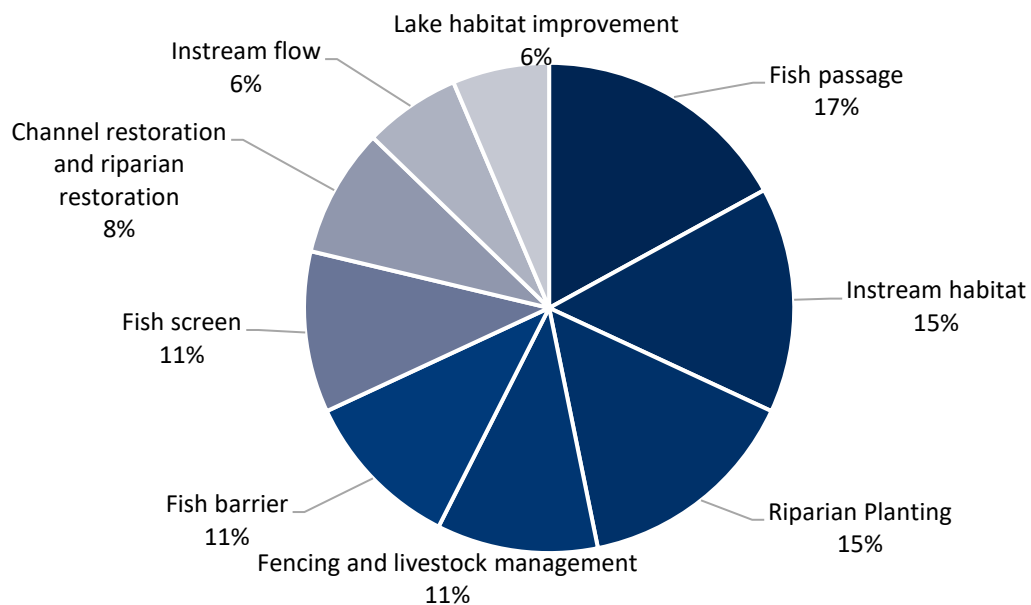
In 2021 and 2022, most of the approved projects involved fish passage and instream habitat, followed by riparian planting, fencing and livestock management, and fish barriers (Figure 5). Other common project activities included fish screens, channel restoration and riparian restoration, instream flow, and lake habitat improvement.

- Fish passage projects improve habitat by removing or replacing an obstruction. Projects typically replace an undersized culvert with a bridge or larger culvert, or remove a culvert

# 2021/2022 FUNDED PROJECTS

completely, to allow movement and reconnect habitats where fish live or reproduce.

- Instream habitat projects involve installation of structure (e.g., wood or log jams) within the channel, often to improve holding or spawning areas.
- Riparian planting projects focus on holding streambanks together with vegetation.
- Riparian fencing and livestock management projects typically create exclosures around the stream and riparian areas or establish a riparian pasture to better control grazing and encourage vegetation growth around the stream.
- Fish barrier projects install structures to isolate habitats for important fish species that require protection due to their limited distribution or population size.
- Fish screen projects separate fish from irrigation water, ensuring that fish remain in the stream and irrigation water is delivered.
- Channel restoration and riparian restoration projects improve a degraded stream by returning it to a natural form and reconnecting it with its floodplain, complemented by revegetation.
- Instream flow projects save streamflow through water leases or purchases or irrigation upgrades.
- Lake habitat improvements typically involve installation of various structures into a waterbody, including real or artificial trees or other materials with crevices and complexity.



**FIGURE 5. PERCENT OF EACH TREATMENT TYPE FOR PROJECTS FUNDED IN 2021 (WINTER AND SUMMER CYCLES) AND 2022 (WINTER CYCLE). MANY PROJECTS INCLUDED SEVERAL TREATMENTS.**

# 2021/2022 FUNDED PROJECTS

## 2021 AND 2022 FUNDED PROJECTS

During the period of this report, the commission approved funding or partial funding for 32 FFIP grant applications totaling \$878,874 (Table 7). These projects derived an additional \$4.8 million in matching funds and in-kind services from outside sources and had a total value of more than \$7.4 million dollars. Narrative descriptions of individual projects can be found in the following section.

**TABLE 7. APPROVED PROJECTS, BY NAME AND PROJECT NUMBER (FFIP #) FOR FUNDING CYCLES WINTER 2021 (W21), SUMMER 2021 (S21), AND WINTER 2022 (W22).**

	FFIP #	Cycle	Project Name	FFIP Grant	Matching	Total Committed
1	001-2021	W21	Big Hole 40 Bar streambank restoration	\$15,000	\$100,337	\$115,337
2	002-2021	W21	East Fork Bitterroot River riparian revegetation	\$9,000	\$65,907	\$767,384
3	003-2021	W21	Elk Springs Creek restoration phase 2	\$29,550	\$35,000	\$64,550
4	004-2021	W21	Lake Elmo fish habitat supplement	\$6,299	\$75,000	\$476,600
5	005-2021	W21	Little Gold Creek culvert replacement supplement	\$10,000	\$40,222	\$79,697
6	006-2021	W21	Poorman Creek culvert replacement	\$31,000	\$273,886	\$304,886
7	007-2021	W21	South Fork Lower Willow Creek fish passage	\$20,900	\$37,380	\$83,485
8	009-2021	S21	Andrus Creek fish barrier	\$18,340	\$11,225	\$69,821
9	010-2021	S21	Beaver Creek restoration phase 2	\$50,000	\$435,938	\$498,211
10	011-2021	S21	Big Hole Daniels Ditch fish screen	\$30,000	\$66,545	\$96,462
11	012-2021	S21	Big Hole Spokane Diversion flow improvement	\$33,360	\$61,955	\$105,316
12	013-2021	S21	Clark Fork River Flynn-Lowney ditch water savings	\$50,000	\$890,000	\$990,000
13	014-2021	S21	Lake Elmo hab enh supplement 2	\$33,700	\$345,000	\$495,506
14	015-2021	S21	Lick Creek culvert replacements	\$50,000	\$159,665	\$209,665
15	016-2021	S21	Little Park Creek restoration and WCT conservation	\$20,000	\$18,000	\$38,100
16	017-2021	S21	Mill Creek fish barrier	\$50,000	\$305,000	\$437,568
17	018-2021	S21	Miller Creek Bear Run stream restoration	\$15,000	\$95,900	\$129,000
18	019-2021	S21	Placid Lake outlet barrier improvement	\$10,020	\$11,800	\$21,820
19	020-2021	S21	SF Dry Cottonwood Creek road 85 fish passage	\$34,000	\$48,000	\$87,636
20	021-2021	S21	Trail Creek fish passage	\$14,300	\$127,478	\$141,778
21	022-2021	S21	Willow Creek fish passage	\$8,200	\$37,098	\$45,298
1	001-2022	W22	Blackfoot River fish screen	\$8,900	\$21,475	\$30,375
2	002-2022	W22	Browns Gulch fish screen	\$20,500	\$23,000	\$54,987

# 2021/2022 FUNDED PROJECTS

	FFIP #	Cycle	Project Name	FFIP Grant	Matching	Total Committed
3	003-2022	W22	East Fork Lolo and Lost Park Creeks instream habitat enhancement	\$33,000	\$61,780	\$104,780
4	004-2022	W22	Flint Creek riparian restoration phase 2	\$37,500	\$53,800	\$296,613
5	006-2022	W22	Johnson Creek fish screen	\$7,750	\$23,331	\$31,081
6	007-2022	W22	Mill Creek 5 Bar 6 restoration project	\$25,002	\$116,500	\$141,502
7	008-2022	W22	Murphy Spring Creek instream flow restoration renewal	\$15,000	\$66,200	\$82,532
8	009-2022	W22	Nevada Creek restoration project phase 5	\$35,000	\$295,641	\$330,641
9	010-2022	W22	Shields River Chadborne Diversion retrofit	\$11,244	\$20,881	\$32,125
10	012-2022	W22	Upper Red Rock Lake overwinter habitat	\$100,000	\$502,956	\$602,956
11	013-2022	W22	Upper Ruby River restoration project phase 2	\$46,309	\$418,948	\$477,089
TOTAL				\$878,874	\$4,845,849	\$7,442,801

## 2021 Funded Project Descriptions

### Big Hole 40 Bar streambank restoration (001-2021)

The Big Hole River (Beaverhead County) is a tributary to the Jefferson River. The project site is near Jackson in the upper Big Hole Valley and contains populations of westslope cutthroat trout, western pearlshell mussel, and Arctic grayling. This project reestablished a functional riparian corridor to improve stream habitat for Arctic grayling, prevented future infrastructure loss for downstream infrastructure, and serves as a demonstration project for potential future restoration. The proposed restoration is part of a larger effort to restore and enhance native fish (including the Candidate Conservation Agreement with Assurances [CCAA] program). The 40 Bar Ranch is not enrolled in the CCAA and is not eligible for funds, but has some of the lowest riparian vegetation scores. Past land use practices and infrastructure (i.e., grazing, haying, roads, bridges) contributed to the impaired habitat and riparian vegetation. The project addressed 1,260 feet of riparian area along three reaches. Streambanks were regraded with a minimum slope of 2:1, mature willow were planted at baseflow and bankfull elevations. Cobble was installed at the toe of the streambanks. Willow stakes and sedge mats were transplanted. Disturbed areas were seeded with native riparian species. Electric fence was installed around each of the restored streambanks to prevent lateral erosion from livestock grazing and trampling and long term grazing management will incorporate long term maintenance.

**COMPLETED; \$15,000, BIG HOLE WATERSHED COMMITTEE**

# 2021/2022 FUNDED PROJECTS

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**FIGURE 6. THE BIG HOLE 40 BAR PROJECT BEFORE (L) AND AFTER (R) CONSTRUCTION. PHOTOS COURTESY OF THE BIG HOLE WATERSHED COMMITTEE.**

## **East Fork Bitterroot River riparian revegetation (002-2021)**

The East Fork Bitterroot River (Ravalli County) is a tributary to the Bitterroot River and contains bull trout, westslope cutthroat trout, rainbow trout, brown trout, and mountain whitefish. The project area was affected by riparian grazing and road infrastructure adjacent to the stream and currently has less than 25% vegetative cover. Poor water quality due to high sediment loads, elevated water temperatures, and alterations in streamside vegetation have impaired aquatic life. This project would address these issues by planting riparian vegetation along 1.6 miles of the East Fork and by treating two eroded streambanks near Edwards Road. Riparian fencing and grazing management will be incorporated into the bank treatment plan. The goal is to improve aquatic habitat and water quality in the East Fork. This project builds upon previous restoration work and includes opportunities for education, outreach, and developing partnerships. **ONGOING; \$9,000, BITTER ROOT WATER FORUM**

## **Elk Springs Creek restoration phase 2 (003-2021)**

Elk Springs Creek (Beaverhead County) is located in the Centennial Valley and is a tributary to Upper Red Rock Lake. It contains brook trout, white suckers, sculpin, burbot, and Arctic grayling. Historically, it supported one of Montana's most prolific Arctic grayling spawning populations and the location is within the Red Rock Lakes National Wildlife Refuge. In the 1950's, an on-channel pond (MacDonald Pond) was constructed on Elk Springs Creek to increase waterfowl habitat. Elk Springs Creek was subsequently degraded due to sedimentation and the shift from stream to pond habitat. MacDonald Pond was removed in 2009 and in 2016, fifteen hundred feet of the formal stream channel was restored. This project would reconstruct the final 1,750 feet of formerly inundated channel. The channel is currently over widened, shallow, unable to transport the large volumes of lake bed and alluvial deposits that remain, and encourages the growth of macrophytes. The degraded condition holds few resident fish and impedes Arctic grayling from moving upstream. The goal is to complete

# 2021/2022 FUNDED PROJECTS

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restoration of Elk Springs Creek by improving stream function and the Arctic grayling population, as part of the Arctic grayling recovery plan in Montana. The previous phase resulted in dramatic increases in salmonid abundances, decreased water temperature, increased and stabilized dissolved oxygen, and improved fish migrations. **ONGOING; \$29,550, FWP**

## **Lake Elmo fish habitat supplement (004-2021)**

Lake Elmo (Yellowstone County) is part of Lake Elmo State Park in Billings. In 2019, Asian clams were found at Lake Elmo, leading to a decision for a partial and complete draw-down in 2020 and 2021. During draw down, the applicant intends to create complex fish habitat using rock, gravel, and artificial reefs (Christmas trees or other large woody debris) to encourage self-sustaining populations of channel catfish, crappie, bluegill, yellow perch, and bass. Habitat structures will be based on successful installations in other warmwater lakes. The goal is to enhance wild fish populations and angler opportunities at Lake Elmo State Park while capitalizing on a unique opportunity to add habitat during a draw-down. The lake has very high angler use. This project received \$40,000 in the Summer 2020 cycle for the highest priority habitat structures. **COMPLETED; \$6,298.84, FWP (No photographs available)**

## **Little Gold culvert replacement supplement (005-2021)**

Little Gold Creek (Granite County) is a tributary to Boulder Creek (and Flint Creek) northeast of Phillipsburg. It supports populations of westslope cutthroat trout and bull trout. In the project area, an undersized culvert is blocking fish passage at a forest road. The Boulder Creek drainage is the only location within the Flint Creek drainage with viable populations of both bull trout and westslope cutthroat trout. By opening fish passage on Little Gold Creek, two miles of stream could be reconnected to Boulder Creek and then, Flint Creek. The applicant proposes to replace the undersized culvert with an Aquatic Organism Passage (AOP) culvert that installs a natural stream channel within the culvert and can pass a 100-year flow event of 123 cubic feet per second. The goal is to reconnect Little Gold Creek, improve habitat quantity and connectivity, and maintain additional coldwater refugia. This project was fully funded in the Summer 2020 cycle for \$29,475 but a reduction in match funding led to additional funds needed for project completion. This is a supplemental request. **ONGOING; \$10,000, CLARK FORK COALITION**

## **Poorman Creek culvert replacement (006-2021)**

Poorman Creek (Lewis & Clark County) is a tributary to the Blackfoot River and is a critical bull trout habitat stream that supports fluvial bull trout and genetically pure westslope cutthroat trout. Several restoration projects have taken place in Poorman Creek over the last 15 years. This project replaced



# 2021/2022 FUNDED PROJECTS

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an undersized culvert stream crossing with a precast concrete bridge. The design mimics the natural stream channel and establishes aquatic connectivity. Fill slopes and streambanks were restored with sod mats, transplants, and seed mix. The undersized culvert had a diameter of 4 feet; the project improved the bankfull width to 18 feet. The goal of this project was to restore access to the upper three miles of Poorman Creek for populations of fluvial and resident westslope cutthroat trout and bull trout. **COMPLETED; \$31,000, BIG BLACKFOOT CHAPTER OF TROUT UNLIMITED**



**FIGURE 7. POORMAN CREEK CULVERT REPLACEMENT BEFORE (L) AND AFTER (R) CONSTRUCTION. PHOTOS COURTESY OF THE BIG BLACKFOOT CHAPTER OF TROUT UNLIMITED.**

## **South Fork Lower Willow Creek fish passage (007-2021)**

South Fork Lower Willow Creek (Granite County) is located in the Flint Creek watershed and eventually drains into Lower Willow Creek Reservoir. The drainage encompasses approximately 25 miles of westslope cutthroat trout habitat, separated from rainbow trout by the reservoir. The project is intended to build upon recently completed conservation efforts in the basin and fully reconnect fish passage in South Fork Lower Willow Creek. The applicant intends to improve the only irrigation diversion in the drainage above the reservoir, which blocks fish passage during periods of low streamflow and diverts 80% of streamflow. The diversion would be upgraded to a rock vane with a Farmers Conservation Alliance (FCA) fish screen. By improving the diversion and installing a fish screen, the water user can maintain their water right and fish would remain in the stream and have unobstructed movement. The project would eliminate entrainment and reconnect 25 stream miles of habitat for native and wild fish. **ONGOING; \$20,900, TROUT UNLIMITED**

## **Andrus Creek fish barrier (009-2021)**

Andrus Creek is a tributary to Governor Creek in the Big Hole River watershed, approximately 15 miles southeast of Jackson, MT. It contains a native population of westslope cutthroat trout (WCT) that has been recently invaded by rainbow trout. Over ten years ago, Andrus Creek was home to a non-hybridized population of WCT and to brook trout. Hybridization was detected in 2020, making a

# 2021/2022 FUNDED PROJECTS

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barrier more urgent. In the past, a suitable barrier could not be identified. Recently, a private landowner agreed to allow a fish barrier to be built on their property. To protect the population of WCT from hybridization with rainbow trout, the applicant built a barrier to isolate the WCT population. Project partners will now remove WCT and hold them in a nearby stream in live cages while testing them for hybridization. All remaining fish will be removed using rotenone, and the non-hybridized WCT will be returned to the stream. This project will isolate approximately 9 miles of stream, including 3 fish-bearing tributary streams, for WCT conservation. **COMPLETED; \$14,314 (Underexpended by \$4,026), GEORGE GRANT CHAPTER OF TROUT UNLIMITED**



**FIGURE 8. ANDRUS CREEK FISH BARRIER, AFTER COMPLETION.**

## **Beaver Creek Restoration Phase 2 (010-2021)**

Beaver Creek (Lewis & Clark County) is a tributary to the Missouri River below Hauser Reservoir near Helena and primarily supports populations of brown trout and rainbow trout. Historically, Beaver Creek served as a primary spawning tributary for adfluvial trout. Lower Beaver Creek lacked floodplain connectivity, habitat complexity, and a functioning riparian area due to past land use practices. A previous grant (2019) provided \$75,000 in funding to Phase 1, which restored 0.5 miles of the channel and connected the stream to the floodplain. The current application is for Phase 2 and will extend the channel and floodplain restoration downstream. The goals are to improve fish habitat and stream function by restoring Beaver Creek within the remainder of the project area (0.7 miles, 6 floodplain acres). The project would improve connectivity with the Missouri River and restore the channel and floodplain to more natural conditions, thereby improving water quality, habitat complexity, and the amount of instream, riparian, and wetland habitat. Restoration strategies include reconnection of abandoned oxbows, construction of riffle-pool complexes, creation of off-channel wetlands, installation of streambank structures, riparian and upland planting, floodplain reconstruction, placement of large wood material, and installation of wildlife snag pods. **ONGOING; \$50,000, US FOREST SERVICE**

# 2021/2022 FUNDED PROJECTS

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## **Big Hole Daniels Ditch fish screen (011-2021)**

Daniels Ditch is an irrigation canal on the upper Big Hole River. This project builds on a watershed scale restoration effort for Arctic grayling within the Big Hole River through the Candidate Conservation Agreement with Assurances (CCAA) Program, which works with private landowners to address threats and implement conservation measures that benefit Arctic grayling and other native species. Young-of-the-year Arctic grayling are being entrained in Daniels Ditch and using it as predator-free rearing habitat, but do not survive because the ditch does not return to the river and is shut off at the end of the irrigation season. Big Hole Arctic grayling spawn in the spring and fry emerge in mid-May. They are weak swimmers and tend to drift with the flow into the irrigation ditches, where they are trapped (entrained). Preventing entrainment has been challenging and largely unsuccessful. This project would install a corrugated water fish screen on Daniels Ditch in a location that maintains the predator-free rearing habitat but also returns the fish back to the river after they enter the fish screen and move through a fish bypass. Fish will also be able to return to the Big Hole River when irrigation flows are reduced or turned off. A new headgate will be installed at the point of diversion to improve the irrigator's ability to accurately divert flow and use their water right. The goal is to reduce mortality of Arctic grayling in the upper Big Hole River watershed. **ONGOING; \$30,000, FWP**

## **Big Hole Spokane Diversion flow improvement (012-2021)**

The Spokane Diversion is an irrigation diversion in the Upper Big Hole. It is one of the largest diversions in the upper Big Hole and the most senior water right (300 cubic feet per second; cfs). It is located upstream of some of the most critical Arctic grayling spawning and rearing habitat. Water rights and instream flow targets have been difficult to meet due to a pin-and-plank structure that doesn't allow for small adjustments. The result of this structure has been overshooting the instream flow targets and undershooting the irrigation target, or vice versa. This inefficient method of adjusting flow is expected to result in more fishing day closures due to low flow (<20 cfs) and a reduction in critical spawning and rearing habitat downstream. This project would install a new diversion structure to meet irrigation demand and instream flow targets more accurately, thereby keeping the correct amount of flow going to irrigators and to instream flow, improving habitat for Arctic grayling and other aquatic species. Two screw gates would be installed and will provide real-time management of flow targets. **ONGOING; \$33,360.48, FWP**

## **Clark Fork River Flynn-Lowney ditch water savings (013-2021)**

The Flynn-Lowney ditch is an irrigation canal in Missoula near the mouth of Rattlesnake Creek. It has a capacity in excess of 40 cfs and a length of approximately 4.5 miles, and is managed by the Hellgate

# 2021/2022 FUNDED PROJECTS

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Valley Irrigation Company. The City of Missoula bought the assets of the irrigation company and is allowing the irrigation company to use some of the proceeds to provide alternative water sources (e.g., wells) to legal water users in the area and pay other shareholders for giving up their ability to use water. Once wells are in place, the Flynn-Lowney ditch will be decommissioned. The goals of this project are to meet irrigation demand, eliminate the operation and maintenance burden of the irrigation company, keep additional water in stream, and to eliminate fish entrainment. The Clark Fork River contains westslope cutthroat trout, bull trout, rainbow trout, brown trout, mountain whitefish, largescale sucker, longnose sucker, northern pikeminnow, redbreasted sunfish, and more. Fish entrainment has been difficult to quantify but is considered to be substantial. **COMPLETED; \$50,000, CITY OF MISSOULA (No photographs available)**

## **Lake Elmo habitat supplement 2 (014-2021)**

Lake Elmo (Yellowstone County) is part of Lake Elmo State Park in Billings. In 2019, Asian clams were found at Lake Elmo, leading to a decision for a partial and complete draw-down in 2020 and 2021. During drawdown, the applicant intends to create complex fish habitat using rock, gravel, and artificial reefs (Christmas trees or other large woody debris) to encourage self-sustaining populations of channel catfish, crappie, bluegill, yellow perch, and bass. Habitat structures will be based on successful installations in other warmwater lakes. The goal is to enhance wild fish populations and angler opportunities at Lake Elmo State Park while capitalizing on a unique opportunity to add habitat during a draw-down. The lake has very high angler use. This project received \$40,000 in the Summer 2020 cycle for the highest priority habitat structures and \$6,298.84 from the Winter 2021 grant cycle. The Review Panel approved the use of both grants (2020 and 2021) for project design and construction. **COMPLETED; \$33,700, FWP (No photographs available)**

## **Lick Creek culvert replacements (015-2021)**

Lick Creek is a tributary to Moose Creek in the East Fork Bitterroot River drainage. It contains populations of westslope cutthroat trout and bull trout and is an important spawning and rearing tributary. Two culverts currently impede fish movement and fragment the bull trout and westslope cutthroat trout populations in Lick Creek. The culverts are undersized and restrict the bankfull stream width by approximately 50%. The lower culvert is considered a partial barrier due to excessive water velocities during high flow periods and the upper culvert is a complete barrier due to its steep gradient and excessive water velocities. The goal of this project is to restore the stream to its historical condition, where it was available and unobstructed for spawning migratory bull trout and westslope cutthroat trout coming out of the East Fork Bitterroot River via Moose Creek. The project would replace the existing culverts with a larger culvert that is 1.5x wider than the bankfull channel (lower

# 2021/2022 FUNDED PROJECTS

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culvert) and a bottomless arch 1.8x wider than the bankfull channel (upper culvert), both able to pass a 100-year flood. **ONGOING; \$50,000, US FOREST SERVICE**

## **Little Park Creek restoration and WCT conservation (016-2021)**

Little Park Creek is a tributary to Miller Creek, south of Missoula in the Bitterroot River valley. The Miller Creek watershed is an important area for westslope cutthroat trout (WCT) and rainbow trout, but Miller Creek is listed on the DEQ 303(d) list for temperature and sediment impairments. Little Park Creek is one of two tributaries in the upper Miller Creek drainage that contain genetically pure WCT and is a conservation priority. A perched culvert on the lower end of Little Park Creek has created a fish barrier, protecting the WCT from rainbow trout invasion and hybridization. This culvert barrier was not a permanent barrier and was showing signs of instability. This project 1) replaced the culvert barrier with a concrete barrier and ford, preventing rainbow trout from moving upstream while also accommodating a 100-year flood event, and 2) removed an undersized barrier downstream, near the confluence with Miller Creek to improve fish passage and stream function downstream. The goals of this project were to protect the genetically pure WCT population, improve downstream habitat, improve stream function, and address chronic sediment delivery issues and potential culvert failure.

**COMPLETED; \$20,000, CLARK FORK COALITION**



**FIGURE 9. LITTLE PARK CREEK BARRIER BEFORE (L) AND AFTER (R) CONSTRUCTION. PHOTOS COURTESY OF THE CLARK FORK COALITION.**

## **Mill Creek fish barrier (017-2021)**

Mill Creek is a tributary to the Yellowstone River in Paradise Valley. It contains conservation populations of native Yellowstone cutthroat trout (YCT) and is one of the few remaining areas where gene flow potentially occurs between distinct populations of YCT inhabiting most streams throughout the watershed (i.e., a metapopulation). In 1995, a boulder fish barrier was built at the forest boundary to preclude upstream invasion by nonnative species, but rainbow trout were found upstream of the barrier. In 1999, genetic testing confirmed hybridization of rainbow trout and YCT, and in 2019 testing



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indicated that hybridization was spreading up the drainage. Brook trout are also a threat to YCT persistence. This project would construct a fish barrier to secure YCT conservation populations in upper Mill Creek. The barrier would be constructed using cast-in-place concrete with a double drop design and will be designed to accommodate a 100-year flood (750 cfs). Installing a barrier before nonnative invasion expands prevents the need for future nonnative fish removal in Mill Creek. The goals of this project are to maintain the current level of YCT genetic purity and preserve the genetic legacy of this native YCT population. **ONGOING; \$50,000, US FOREST SERVICE**

## **Miller Creek Bear Run stream restoration (018-2021)**

Miller Creek is a tributary to the Bitterroot River south of Missoula. It contains populations of westslope cutthroat trout (WCT) and brook trout. The project location is near the confluence of Bear Run and Miller Creek, on the Wustner Ranch, where the channel is confined and deeply incised, with active lateral erosion. There was a lack of connectivity between the channel and floodplain, fine sediment delivery, reduced aquatic habitat diversity, and reduced riparian vegetation and cover. This project restored the stream channel and realigned it away from eroding banks, re-graded and adjusted elevation to connect the channel to the floodplain, installed large woody debris and other features to improve habitat complexity, planted riparian vegetation, and installed fencing. The project goals were to promote riparian recovery, reconnect the stream channel and floodplain areas, and increase habitat complexity. This project is downstream of a past Future Fisheries project on Miller Creek (2019 grant; Spooner Creek Ranch channel restoration) and the Little Park Creek barrier project. **COMPLETED; \$15,000, CLARK FORK COALITION**



**FIGURE 10. MILLER CREEK BEAR RUN PROJECT BEFORE (L) AND AFTER (R) CONSTRUCTION. PHOTOS COURTESY OF THE CLARK FORK COALITION AND FWP.**

## **Placid Lake outlet barrier improvement (019-2021)**

Placid Lake is a waterbody in the Blackfoot River drainage that is located between Placid Creek and Owl Creek. It is a highly productive natural glacial lake that supports westslope cutthroat trout, bull



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trout, kokanee, introduced brown trout and largemouth bass, and several other aquatic species. The lake has a massive biomass of prey species as well. Invasive species like Northern pike are found below Placid Lake, but the outlet dam served as a barrier until recently. Northern pike are located downstream and have been documented below the Placid Lake outlet and one adult was captured by FWP in Placid Lake above the outlet, likely due to a high flow event that allowed upstream passage. If Northern pike were to become established in Placid Lake, they would undoubtedly explode in number and the current fish assemblage would be decimated. This project enhanced the current fish passage barrier by increasing the vertical height of the barrier, increasing the vertical drop height of the overflow spillway, and enhancing scour protection and stability of the dam. The goal was to protect the quality and integrity of existing fish populations and fisheries, which includes conservation populations of migratory bull trout and westslope cutthroat trout, important sport fisheries (e.g., kokanee), and nongame fish. **COMPLETED; \$11,022 (10% overage due to unexpected costs), PLACID LAKE ASSOCIATION (No photographs available)**

## **South Fork Dry Cottonwood Creek Road 85 fish passage (020-2021)**

South Fork Dry Cottonwood Creek is a tributary to Dry Cottonwood Creek in the Clark Fork River drainage, near Deer Lodge. It contains a conservation population of westslope cutthroat trout that is 95% pure. The drainage contains no brown trout or brook trout, which are highly competitive with westslope cutthroat trout. About four miles of South Fork Dry Cottonwood Creek is cut off from upstream fish movement due to an undersized culvert on Road 85 that is acting as a fish barrier. This is the third passage barrier culvert in the drainage to be addressed; the upstream two were replaced in 2018 and 2020 (one on South Fork Dry Cottonwood Creek was a 2018 Future Fisheries grant). The project would replace the 36-foot pipe arch culvert with a 12-foot structural arch pipe on a pre-cast concrete foundation, accommodating a natural stream bed and rock weirs to accommodate fish passage. Other improvements in the Dry Cottonwood Creek watershed include irrigation efficiency upgrades, fish screens, road improvements, off-stream water for livestock, and riparian fencing. The Future Fisheries Improvement Program funded some of that work, including a riparian fencing project (2010 grant) and habitat enhancement (2018 grant). **ONGOING; \$34,000, CLARK FORK COALITION**

## **Trail Creek fish passage (021-2021)**

Trail Creek is a tributary to Morrell Creek (and the Clearwater River) in the Blackfoot River drainage, near Seeley Lake. The Morrell Creek drainage supports one of the largest adfluvial bull trout populations in the upper Clark Fork Basin and a genetically pure westslope cutthroat trout population in its headwaters. Trail Creek is a high priority tributary that supports adfluvial bull trout as well as migratory and stream resident westslope cutthroat trout populations. This project would address an

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existing stream crossing above the Morrell/Trail creeks confluence that is undersized and perched. The existing culverts (three pipes, each 36") create a fish passage barrier during high periods and impair natural stream function. The undersized culverts would be replaced by a bridge that meets stream simulation criteria and allows uninhibited aquatic organism passage and stream function. This crossing is the last known fish passage barrier on Trail Creek, and considers the shifting of the main stream channel to this crossing. The goal is to enhance stream connectivity to improve natural channel function and enhance habitat for wild trout recruitment and survival. Past FFIP projects in the project area include a fish screen (2015 grant) downstream, and a fish screen downstream on Morrell Creek (2008 grant). **ONGOING; \$14,300, BIG BLACKFOOT CHAPTER OF TROUT UNLIMITED**

## **Willow Creek fish passage (022-2021)**

Willow Creek is a tributary to the upper Blackfoot River. It supports genetically pure westslope cutthroat trout, brown trout, and brook trout. Willow Creek is a high priority tributary of the Blackfoot River. A culvert near stream mile 6.5 is currently undersized and perched, creating a barrier to fish passage at high flow and impairing natural stream function. This project would replace the undersized culvert with a bridge that will result in a stable stream crossing and a correction of road drainage problems, provide fish passage, and restore natural channel morphology. Improved connectivity is expected to improve habitat for fish, including fluvial westslope cutthroat trout. Downstream, a past FFIP project replaced a culvert with a bridge (2012 grant). **ONGOING; \$8,200, BIG BLACKFOOT CHAPTER OF TROUT UNLIMITED**

## 2022 Funded Project Descriptions

### **Blackfoot River fish screen (001-2022)**

The Blackfoot River (Powell County) is one of the most popular rivers in Montana and is home to native bull trout and westslope cutthroat trout. It is designated as critical habitat for these species, and is also a popular fishery for rainbow trout and brown trout. The project area is located within an important migration corridor for native fish. Near river-mile 46, an unscrewed diversion (pump) is entraining fish. This project would be upgraded with a river screen, with the goals to eliminate fish entrainment, support irrigation, and protect the migratory corridor. **ONGOING; \$8,900, BIG BLACKFOOT CHAPTER OF TROUT UNLIMITED**

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## **Browns Gulch fish screen (002-2022)**

Browns Gulch (Silver Bow County) is a tributary to Silver Bow Creek and contains populations of brook trout and genetically pure cutthroat trout. Westslope cutthroat trout are present throughout the drainage but most prevalent in the upper reaches. This project builds upon previous work in the drainage that includes improving fish passage (irrigation diversions and culverts), channel restoration, and riparian improvements. This project would address one of the remaining fish habitat priorities, to remove an irrigation barrier and source of entrainment. The applicant would rebuild the irrigation diversion at Costin Ditch and install a small corrugated water screen. The diversion would be rebuilt with four rock weirs in a step pool design. The goal is to reduce entrainment and improve connectivity of upper Browns Gulch, which will protect and improve habitat for genetically pure westslope cutthroat trout. **ONGOING; \$23,000, CLARK FORK COALITION**

## **East Fork Lolo and Lost Park Creeks instream habitat enhancement (003-2022)**

East Fork Lolo and Lost Park Creeks (Missoula County) are tributaries to Lolo Creek that include designated bull trout habitat. They support high densities of westslope cutthroat trout and remnant bull trout populations. These project areas have been impacted by channelization, stream-side roads, past intensive grazing, and large wood removal. Low habitat complexity and roughness contributed to reduced fish habitat and population sizes. This project would continue previous restoration efforts in the Lolo Creek watershed that improved fish passage and reduced sediment loading through culvert removal and road decommissioning. Large stream spanning log jams would be installed into East Fork Lolo and Lost Park Creeks to dissipate stream energy, trap sediment, and create aquatic habitat diversity such as spawning beds and pools. Smaller jams will also be installed to reduce energy adjacent to road fill. Old channels and floodplains will be activated. The overall goal is to increase native fish populations in the Upper Lolo watershed. **ONGOING; \$33,000, CLARK FORK COALITION**

## **Flint Creek riparian restoration phase 2 (004-2022)**

Flint Creek (Granite County) is a tributary to the Clark Fork River near Hall. Species present include brown trout, bull trout, westslope cutthroat trout, rainbow trout, and mountain whitefish. The project area is a high priority foraging, overwinter habitat, and migration corridor for westslope cutthroat trout and bull trout. This project would address 0.5 mile of stream that has been impaired by past land use practices. The applicant proposes build upon a previous phase and incorporate improvements to grazing management, complete active revegetation, and restore 1200 feet of streambanks using techniques to improve functional channel morphology and improve fish habitat complexity. The goals are to improve and protect riparian and instream habitat that has been

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impaired by past land uses and improve fish populations in Flint Creek and the Clark Fork River.

**ONGOING; \$37,500, TROUT UNLIMITED**

## **Johnson Creek fish screen (006-2022)**

Johnson Creek (Powell County) is a tributary to the lower Blackfoot River and contains pure westslope cutthroat trout, rainbow trout, and brown trout. It serves as a thermal refugia to the mainstem Blackfoot. Previous studies indicated that Johnson Creek is an important tributary for migrations as far as the Clark Fork River near Thompson Falls. Past work in the drainage included culvert upgrades, and this project seeks to improve the last remaining impact to the creek. An unscreened diversion near the mouth entrains trout, and this project would install a headgate and Zinvent fish screen and upgrade the diversion. The goal is to improve fish passage, prevent entrainment, and regulate flow for conservation benefits. **ONGOING; \$7,750, BIG BLACKFOOT CHAPTER OF TROUT UNLIMITED**

## **Mill Creek 5 Bar 6 restoration project (007-2022)**

Mill Creek (Park County) is a tributary to the Yellowstone River in the Paradise Valley. Of the remaining Yellowstone cutthroat trout strongholds, Mill Creek is one of the largest watersheds outside of Yellowstone National Park. Past land management degraded lower Mill Creek, leading to channelization and dikes that cut the stream off from its side channels and floodplain. Lack of large wood and instream habitat complexity indicates that wood was removed, and the channel became simplified. Despite the limitations, the project area is an important spawning and rearing area for migratory Yellowstone cutthroat trout as it is upstream of dewatering in lower Mill Creek. This project would begin restoration on Mill Creek in the upstream section by installing 10-15 engineered log jams and breaching two berms. The goal is to improve spawning, rearing, and overwintering habitat for Yellowstone cutthroat trout and other fish species. **ONGOING; \$25,002.44, TROUT UNLIMITED**

## **Murphy Spring Creek instream flow restoration renewal (008-2022)**

Murphy Spring Creek (Powell County) is a tributary to the North Fork of the Blackfoot River. It is a primary fluvial bull trout spawning tributary and conservation area. The stream supports juvenile bull trout rearing near the mouth and westslope cutthroat trout are present throughout the stream. It is an FWP high priority area for native species. Previous projects in the drainage include removal of fish barriers, improved diversions via new headgates, fish ladders, and fish screens, stream and riparian restoration, and land management changes. This project continued an instream flow agreement that improved streamflows for the last 16 years by renewing it for an additional 10 years. Because of the previous lease, instream flow increased from 0-0.5 cfs below the diversion to 2.2 cfs and fish population data show a steady increase in native fish populations. The overall goal is to continue to

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lease instream flow and protect spawning and rearing habitat for native fish. **COMPLETED; \$15,000, TROUT UNLIMITED (No photographs available)**

## **Nevada Creek restoration project phase 5 (009-2022)**

Nevada Creek (Powell County) is a tributary to the middle Blackfoot River and supports populations of westslope cutthroat trout, rainbow trout, and brown trout. The project area was historically straightened, and a non-functional riparian area caused the channel to erode and downcut. In 2010 and 2017-2020, nearby channel restoration projects improved 24,400 feet of instream and riparian habitat. These projects reduced sediment (>50% reduction), increased stream complexity, improved riparian condition, and created fish habitat that resulted in increased trout abundance (100% increase in abundance). This project is considered phase 5 and would continue the restoration downstream. This project would focus on reducing sediment loading through stream bank treatments, floodplain connectivity, aquatic habitat complexity, and stream function on 9,100 feet of Nevada Creek. Unlike previous phases, planform modifications are not proposed, instead habitat will be improved strategically. The goal is to increase habitat capacity for trout and reduce sediment loading through healthy riparian areas, functional streams, and floodplain connection. The location is in a highly visible reach of Nevada Creek and the previous projects have had important demonstration value. Phase 3A was funded in Winter 2019 at \$49,000, 3B in Summer 2019 at \$69,200 and phase 4 in 2020 at \$66,000. **ONGOING; \$35,000, BIG BLACKFOOT CHAPTER OF TROUT UNLIMITED.**

## **Shields River Chadbourne Diversion retrofit (010-2022)**

The Chadbourne diversion (Park County) is an irrigation structure and fish barrier on the Shields River, a tributary to the Yellowstone River near Clyde Park. The Shields River is a stronghold of Yellowstone cutthroat trout. The diversion is located about 8 miles upstream of the confluence with the Yellowstone and was built in the early 1900s. It prevented the rapid invasion of rainbow trout and as a result, Yellowstone cutthroat remain in most waters of the Shields River. Most of the fish are genetically unaltered and the area is a high conservation priority. In 2011, a project was funded through Future Fisheries to improve the diversion and improve its ability to serve as a barrier. Improvements included removal of concrete in front of the diversion, rebuilding the structure, and creating an ogee front to eliminate backwater and the opportunity for fish to ascend past the diversion. This project improves the diversion to eliminate an area that was going to be used for a selective fish ladder and eliminate a vulnerable spot on the structure. A rebar reinforced wingwall and increase the diversion face height while also maintaining the structure. The goal is to reinforce the diversion as a fish barrier to project Yellowstone cutthroat trout. **ONGOING; \$11,244, FWP**

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## **Upper Red Rock Lake overwinter habitat (012-2022)**

Upper Red Rock Lake (Beaverhead County) is located within Red Rock Lakes National Wildlife Refuge in the Centennial Valley and is home to one of the last aboriginal Arctic grayling populations in the lower 48 states. The majority of the grayling population migrates into and occupies Upper Red Rock Lake for the majority of the winter, but available habitat is limited due to water depth and oxygen. To address a main limiting factor for Arctic grayling, the applicants propose to increase available overwinter habitat. Several alternatives were considered, and a pipeline to deliver oxygenated water to deeper portions of the lake was chosen as the only feasible option. A pipe will deliver oxygenated water from a nearby tributary (Shambow Pond & East Shambow Creek) and deliver it to deeper portions of the lake, and an aeration structure will be installed to increase the dissolved oxygen of water in the pipe. The goal is to improve the population of Arctic grayling by addressing the primary factor driving survival and population dynamics. Yellowstone cutthroat trout will also benefit from this project. **ONGOING; \$100,000, FWP**

## **Upper Ruby River restoration project phase 2 (013-2022)**

The Ruby River (Madison County) is a tributary to the Beaverhead River and supports populations of brown trout, rainbow trout, Arctic grayling, and whitefish. In the project area, the river is a single-thread channel that is actively downcutting and abandoning the floodplain. Removal of beaver and land management led to degradation, loss of vegetation, downcutting, and erosion. The applicants intend to build upon previous work and restore 1.7 miles of the river by installing brush matrix treatments, adding channel length, and improving riparian and aquatic habitat. Bank treatments will be combined with riparian fencing and grazing management to reduce erosion, increase instream habitat diversity, and promote establishment of woody vegetation. Channel length will be added by moving the channel into abandoned meanders. Bed aggradation structures will elevate the water surface elevation and encourage aggradation. The project is expected to increase floodplain connectivity, leading to groundwater infiltration and water storage for late season streamflow. Fish should benefit from increased spawning gravel, pool refugia, and slack water. **ONGOING; \$46,309, RUBY VALLEY CONSERVATION DISTRICT**

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## Implementation Monitoring (Project Completion)

The FFC or other FWP staff monitored 25 sites to ensure they were completed as approved (Table 8, Figure 11), called Implementation Monitoring. The projects were completed between November 1, 2020 and March 31, 2022 and were located within Regions 2-5. Implementation monitoring by the FFC or FWP staff facilitated discussions about technique successes and failures with applicants and landowners. Some of these projects are discussed above in *Approved and Completed Projects* (denoted by asterisks in Table 8). Remaining projects are listed below. All projects were completed successfully.

**TABLE 8. PROJECTS MONITORED FOR IMPLEMENTATION (PROJECT COMPLETION) SINCE THE LAST LEGISLATIVE REPORT (NOV 1, 2020 – MAR 31, 2022). \* = PROJECT DESCRIPTION IN 'APPROVED AND COMPLETED PROJECTS SECTION' ABOVE.**

FFIP #	Project Name	Region	Completed
009-2021	Andrus Creek fish barrier*	3	2021
012-2019	Beaver Creek Missouri Channel Reconstruction	4	2021
001-2021	Big Hole 40 Bar streambank restoration*	3	2021
002-2017	Big Otter Creek riparian protection & improvement	4	2020
013-2021	Clark Fork River Flynn-Lowney ditch water savings*	2	2021
002-2020	Cottonwood Creek fish barrier	3	2020
003-2020	Doolittle Creek fish barrier	3	2020
004-2020	Eagle Creek YCT connectivity	3	2020
014-2020	Flint Creek riparian restoration	2	2021
015-2020	Hall Creek fish barrier	2	2021
004-2021	Lake Elmo fish habitat supplement*	5	2022
014-2014	Lake Elmo hab enh supplement 2*	5	2022
016-2021	Little Park Creek restoration and WCT conservation*	2	2021
016-2019	Lolo Ditch fish screen	2	2021
019-2020	Lower French Creek riparian restoration	3	2020
018-2021	Miller Creek Bear Run stream restoration*	2	2021
008-2018	Monarch Creek culvert replacement	2	2020
008-2022	Murphy Spring Creek instream flow restoration renewal*	2	2022
019-2019	Musselshell River McCleary channel restoration	5	2020
012-2017	Ninemile Creek channel restoration	2	2021
009-2020	O'Neill Creek culvert replacement	2	2021
019-2021	Placid Lake outlet barrier improvement*	2	2022
006-2021	Poorman Creek culvert replacement*	2	2021
021-2020	Poorman Creek restoration phase 2	2	2021
022-2019	Sevenmile Creek restoration phase 2	4	2021



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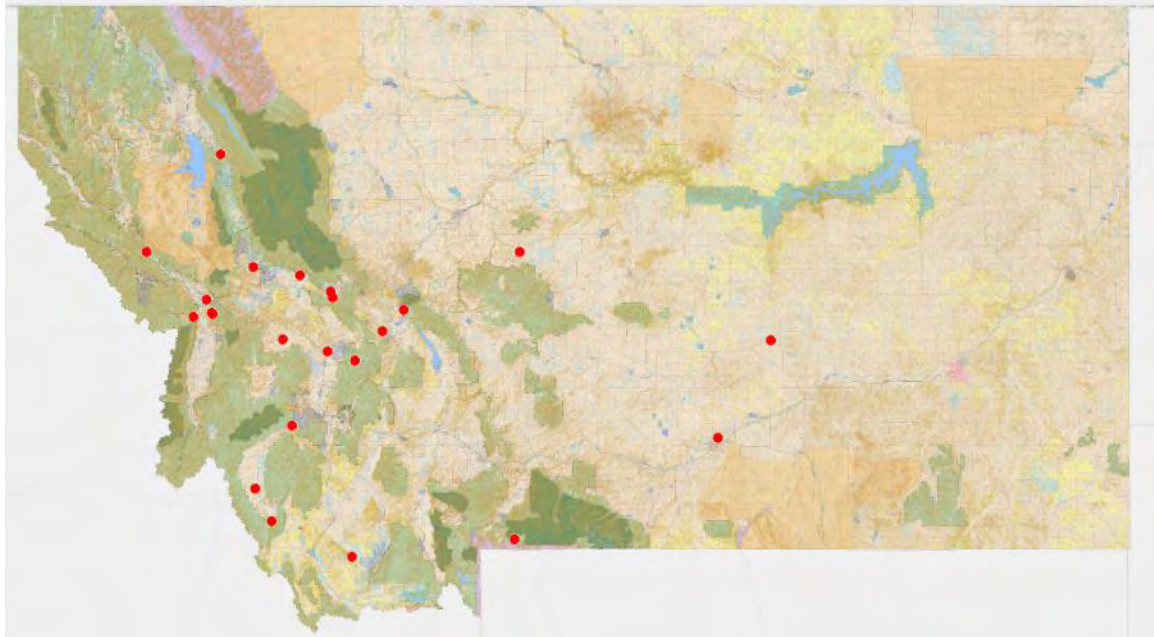


FIGURE 11. COMPLETED PROJECTS BETWEEN NOVEMBER 1, 2020 AND MARCH 31, 2022

## **Beaver Creek Missouri channel reconstruction 012-2019**

Beaver Creek (Lewis & Clark County) is a tributary to the Missouri River below Hauser Reservoir, containing brown and rainbow trout. Historically, the area was a primary spawning tributary for adfluvial trout. The project restored 0.3 miles of the channel and reconnected the stream to the floodplain and abandoned oxbows, created wetlands, installed habitat structures, and planted riparian vegetation. The goals were to restore hydrologic processes, return the channel and riparian area to reference conditions, improve water quality, and increase habitat complexity for spawning and rearing. The construction was done extremely well. However, the creek went sub-surface from the midpoint of the project to the mouth (approx. 1 mi.). Project managers are confident surface flow will resume over time, but they are closely tracking its progress.



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**FIGURE 12. BEAVER CREEK CHANNEL RECONSTRUCTION BEFORE (L) AND AFTER (R) CONSTRUCTION. PHOTOS COURTESY OF THE US FOREST SERVICE AND FWP.**

## **Big Otter Creek riparian protection & improvement 002-2017**

Big Otter Creek (Judith Basin County) is a popular recreational fishery for brown trout, rainbow trout, and brook trout. Cattle congregated at the stream bottom of Big Otter Creek. This project fenced 0.25 mile of stream to encourage vegetation growth and improve stream health and installed a culvert on an ephemeral tributary to provide a better route for livestock movement. The site was visited by the FWP area fish biologist and was completed as proposed.



**FIGURE 13. BIG OTTER CREEK AFTER CONSTRUCTION, CULVERT (L) AND FENCE (R) INSTALLED.**

## **Cottonwood Creek fish barrier 002-2020**

Cottonwood creek (Beaverhead County) is a tributary to Blacktail Deer Creek in the Beaverhead River drainage near Dillon. It contains pure westslope cutthroat trout (WCT) for 0.6 miles above a natural barrier. This population is one of five remaining genetically unaltered populations of WCT in the Beaverhead drainage. This project installed a fish barrier lower in Cottonwood Creek, adding 4.5 miles of habitat. The goal was to secure additional habitat for native WCT and expand the population from approximately 600 fish to 2,500. The site was visited upon completed and was well done.

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**FIGURE 14. COTTONWOOD FISH BARRIER SITE BEFORE CONSTRUCTION (L) AND AFTER COMPLETION (R). PHOTOS COURTESY OF TROUT UNLIMITED AND FWP.**

## **Doolittle Creek fish barrier 003-2020**

Doolittle Creek (Beaverhead County) is a tributary to the Big Hole River, located 9 miles northeast of Wisdom. It is home to a native, 100% pure population of westslope cutthroat trout (WCT) in the upper reaches of the stream, South Fork of Doolittle Creek. Brook trout were present in the Doolittle Creek and eliminated the native WCT in the rest of the drainage. This project installed a barrier on Doolittle Creek, removed the non-native brook trout upstream, and expanded the population of WCT from 1 mile of habitat to 11 miles. The goal of this project was to contribute to the overall goal of restoring 400 miles of stream for WCT in the Big Hole and conserve WCT before they are displaced by brook trout. FWP staff were involved in the project construction; the barrier was completed successfully.



**FIGURE 15. DOOLITTLE CREEK FISH BARRIER AFTER CONSTRUCTION.**

## **Eagle Creek YCT connectivity 004-2020**

Eagle Creek (Park County) is a tributary to the Yellowstone River near Gardiner. An in-channel pond and five road culverts excluded nonnative species but also fragmented Yellowstone cutthroat trout (YCT) along its 6.6 stream miles. The applicant replaced two upstream perched culverts with larger, sunken culverts that can pass aquatic species, increasing secure YCT habitat by an additional 2.8

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stream miles. The goal was to secure additional habitat for YCT while protecting them from non-native species. FWP staff inspected the project and noted that it was completed as proposed.



**FIGURE 16. EAGLE CREEK CULVERT REPLACEMENT BEFORE (L) AND AFTER (R) CONSTRUCTION. PHOTOS COURTESY OF THE US FOREST SERVICE AND FWP.**

## **Flint Creek riparian restoration 014-2020**

Flint Creek (Granite County) is a tributary to the Clark Fork River near Hall. Species present include brown trout, bull trout, westslope cutthroat trout, rainbow trout, and mountain whitefish. The project area is a high priority migration corridor for westslope cutthroat trout and bull trout. This project addressed one mile of stream that was impaired by past land use practices. The applicant implemented grazing management that incorporated fencing for rotational grazing, stock watering, and riparian/wetland buffers. Some streambanks were passively restored and revegetated using containerized native, woody plants, exclusion fencing, and seeding. Other streambanks were restored with active streambank restoration. The goals were to repair the damaged caused by cattle grazing and to improve fish habitat through shade and overhead cover, pool depth, complexity, and reduction of sediment. Overall, the project was installed well. The landowner is conservation minded, and there's a good fence in place, although they probably won't be grazing the riparian pasture.



**FIGURE 17. FLINT CREEK STREAM RESTORATION BEFORE (L) AND AFTER (R) CONSTRUCTION.**



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## Hall Creek fish barrier 015-2020

Hall Creek (Lake County) is a tributary to Swan Lake near the town of Swan Lake. In 1989, a fish barrier was constructed to conserve westslope cutthroat trout and isolate a 2.3-mile reach from brook and rainbow trout invasion. Rotenone was used to remove fish from the stream and cutthroat trout were restocked. The project was unsuccessful and over time the conservation value continued to decrease. The applicant removed the nonfunctional barrier and reconnected aquatic passage between Hall Creek and Swan Lake. The concrete barrier was removed, the streambanks were restored, and rock was placed for grade control. The goal was to remove an old, nonfunctional barrier and support natural stream function and aquatic movement throughout the stream. The project was completed quickly. The lower weir had to be moved down slightly due to a utility line that was found above the barrier. Overall, the project was installed successfully. It is located just above the confluence of Hall Creek and Swan Lake, above a wooden bridge for a neighborhood access.



**FIGURE 18. HALL CREEK FISH BARRIER BEFORE (L) AND AFTER (R) REMOVAL.**

## Lolo Ditch fish screen 016-2019

Lolo Creek (Missoula County) is the third largest drainage in the Bitterroot watershed and its upper tributaries are strongholds for bull trout and westslope cutthroat trout. Brown trout, rainbow trout, and mountain whitefish are also present. The stream was impacted by dewatering and high water temperatures in the lower reaches, and entrainment, sediment, and fish passage are issues in the higher reaches. The Lolo Ditch is the largest irrigation diversion on Lolo Creek and can divert up to 75% of flow in low flow periods. The fish that entered the ditch become entrained and could not return to Lolo Creek. This project installed a fish screen on the Lolo Ditch and kept fish within the Lolo Creek and Clark Fork drainages. The goal was to improve fish populations and enhance fishing opportunities through improved survival. The project was completed as proposed, and after a few adjustments to the screen it is performing well. Sampling in 2022 indicated it was doing a great job of keeping fish out of the Lolo Ditch.

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**FIGURE 19. LOLO DITCH FISH SCREEN AFTER COMPLETION. PHOTO COURTESY OF THE CLARK FORK COALITION.**

## **Lower French Creek riparian restoration 019-2020**

French Creek (Deer Lodge County) is a tributary to Deep Creek west of Wise River. French Creek has been the focus of many past restoration efforts for Arctic grayling and westslope cutthroat, as well as other native species like western pearlshell mussel. This project took place on the Mount Haggin Wildlife Management Area and USFS property and restored over 3,600 feet of streambank that was degraded due to nonnative vegetation and overgrazing. The project graded and re-sloped the perched streambanks with a minimum 3:1 ratio, and mature willows were transplanted to create streambank stabilization. Additionally, old beaver dam side channels were activated to accommodate high flows and to provide greater flooding and connection with the floodplain. The goal was to enhance riparian function and improve instream habitat for Arctic grayling and westslope cutthroat trout in French Creek. FWP staff inspected the project, and noted that construction was done well and as proposed.



**FIGURE 20. LOWER FRENCH CREEK RESTORATION BEFORE (L) AND AFTER (R) CONSTRUCTION.**

## **Monarch Creek culvert replacement 008-2018**

Monarch Creek is a tributary to Ontario Creek (and subsequently the Little Blackfoot River) and supports populations of genetically pure westslope cutthroat trout, sculpin, mountain whitefish, and

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brook trout (Powell County). Bull trout were detected using eDNA in Ontario Creek (downstream). This project replaced a culvert that was a partial fish barrier (at high flows) with a larger pipe-arch culvert. The goal was to improve spawning and rearing habitat for native salmonids and improve connectivity. Together with other passage improvements, approximately five miles of habitat were connected. The culvert was installed well and the floodplain was already seeing water. One log structure directly below the culvert was adjusted during construction and will be monitored over time.



**FIGURE 21. MONARCH CREEK CULVERT REPLACEMENT BEFORE (L) AND AFTER (R). PHOTOS COURTESY OF THE US FOREST SERVICE AND FWP.**

## **Musselshell River McCleary channel restoration 019-2019**

The Musselshell River (Musselshell County) is a tributary to the Missouri River. The Musselshell experienced extensive flooding and channel adjustments recently. In the project area, the channel avulsed in 2018, resulting in a limited ability to access water for irrigation and domestic use. The applicant and landowner restored full connectivity and increased habitat for fish while maintaining a pump site and point of withdrawal for water use. The goal was to improve ecological function and stream health rather than just return irrigation access. The project area supports a variety of native fish including sauger, catfish, sucker, emerald shiner, burbot, and western silvery minnow. Staff noted that the project was installed as planned. There is water present on both sides of the plug, which is considered normal from the engineer. However, the structural integrity of the plug, especially at higher flow, will be closely monitored. Improvements to the structure should not have an effect on stream function as the water has been routed around the structure and into the old channel.



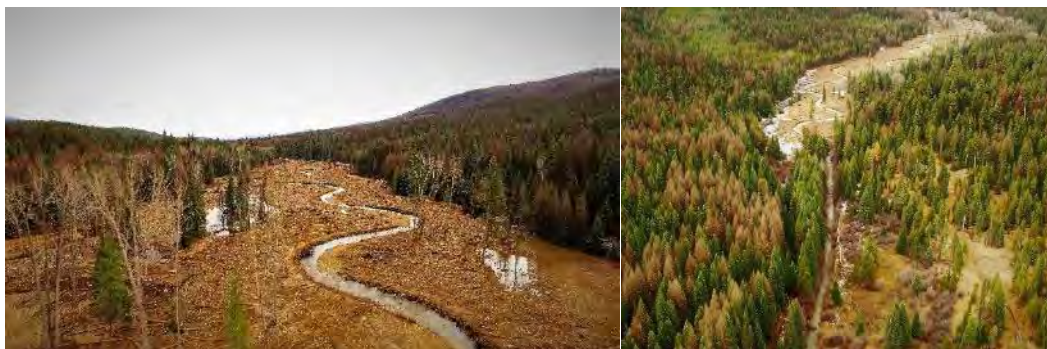
# MONITORING



**FIGURE 22. MUSSELHELL RIVER MCCLEARY CHANNEL RESTORATION AFTER CONSTRUCTION, WHERE THE AVULSION OCCURED (L) AND CHANNEL PLUG (R).**

## **Ninemile Creek channel restoration 012-2017**

Ninemile Creek (Missoula County) is a tributary to the Clark Fork River and supports populations of Westslope Cutthroat Trout, Brook Trout, and Bull Trout. Past placer mining practices and associated activities led to alteration of channel morphology, disconnection from tributaries, eroding banks, and fish passage barriers. This project is one phase of a much larger project that has been systematically restoring the upper Ninemile drainage. Future Fisheries funded projects in many tributaries (e.g., Sawpit, Mattie V, Kennedy Creeks). Fish response, in the form of large spawning redds, was observed in 2016. This project revegetated of the site, re-sloped site topography, and reconstructed the stream channel. Mining spoil piles on Ninemile Creek were removed to decrease sediment sources and establish a natural floodplain. This project exceeded expectations and was done very well, as it used knowledge and expertise from previous phases. As a result of this project, over 180,000 cubic yards of abandoned placer mine piles were moved, 5,000 feet of new Ninemile channel was constructed with pools and riffles, 26 acres of new floodplain and wetlands were constructed, two tributaries were reconnected, and many thousands of plants and willow cuttings were planted.



**FIGURE 23. NINEMILE CREEK AFTER CONSTRUCTION, SHOWING THE FINISHED CHANNEL AND FLOODPLAIN (L) AND THE CONTRAST BETWEEN UPSTREAM COMPLETED AND DOWNSTREAM PROPOSED WORK (R).**



# MONITORING

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## Poorman Creek restoration phase 2 021-2020

Poorman Creek (Lewis & Clark County) is a tributary to the Blackfoot River and supports populations of bull trout, pure westslope cutthroat trout, and brown trout. The stream is listed as critical bull trout habitat. Poorman Creek has been the focus of several previous restoration projects funded through FFIP, including fish passage, fish screening, stream restoration, and water conservation. This project addressed Poorman Creek near its confluence with the Blackfoot River. Approximately 8,400 feet of channel was restored with channel reconstruction or shaping, the creation of step pools, and the use of vegetated wood matrix and woody debris structures. A grazing management plan was incorporated, and a water lease will protect instream flow within the project reach. The overall goal of this project was to restore a high-priority native trout tributary through channel stability, riparian health, and improved aquatic habitat, improving the overall recruitment to the Blackfoot River. The project was completed as proposed. Water has gone subsurface for much of the lower project, but expected to come back. The project took advantage of existing cottonwood trees and root masses and improved only the necessary parts.



**FIGURE 24. POORMAN CREEK BEFORE (L) AND AFTER (R) CONSTRUCTION. PHOTOS COURTESY OF BIG BLACKFOOT CHAPTER OF TROUT UNLIMITED AND FWP.**

## Sevenmile Creek restoration phase 2 022-2019

Sevenmile Creek (Lewis & Clark County) is a tributary to Tenmile Creek that supports populations of brown trout and brook trout. In 2017, the Prickly Pear Land Trust (PPLT) acquired a 350-acre parcel of land in the Helena Valley that included approximately 2.2 miles of Sevenmile Creek. The stream was heavily impacted by riparian clearing, intensive grazing, flow, diversion, and channelization. An initial phase was completed in 2018 that improved fish passage and removed a diversion. This project addressed the final 0.6 miles of restoration to complete 2.2 miles of restoration in Sevenmile Creek by constructing a permanent fish passage structure, reconstructing 2,800 feet of channel to its historical elevation, and constructing an inset floodplain along the lower 200 feet of incised channel. The goal

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was to enhance wild fish habitat by reducing fine sediment inputs, improving habitat complexity, and improving function of the riparian corridor and floodplain. The project was completed as proposed and the area fisheries biologist was monitoring fish population data. A fire affected area in 2020 but the riparian area was left largely intact.



**FIGURE 25. SEVENMILE CREEK BEFORE (L) AND AFTER (R) CONSTRUCTION. PHOTOS COURTESY OF PRICKLY PEAR LAND TRUST.**

# MONITORING

## Effectiveness Monitoring

Effectiveness monitoring addresses the question of how successful a project is, several or many years after completion. In 2021 and 2022, 34 projects were monitored for long term success (Table 9, detailed information below). Photographs were provided by project applicants or taken by FWP staff.

**TABLE 9. PROJECTS MONITORED FOR EFFECTIVENESS BETWEEN NOV 1, 2021 AND MARCH 31, 2022. FFIP # = INDIVIDUAL PROJECT NUMBER.**

FFIP #	Project Name	Type	Region	MONITORDATE
002-2002	Beaver Creek diversion repair	Routine	4	10-Aug-21
037-2001	Boulder River fish ladder	Routine	3	08-Feb-22
003-2010	Cottonwood Creek fish barrier	Routine	4	06-May-21
007-2002	Cottonwood Creek off-stream livestock watering	Routine	2	28-Jul-21
012-2014	Deadmans Basin Diversion Dam Fishway	Routine	5	04-Oct-21
006-2007	Dick Creek fish screen	Routine	2	28-Jul-21
031-2005	Kleinschmidt Creek channel restoration and grazing management	Long Term	2	28-Jul-21
009-2010	Lincoln Spring Creek culvert replacement	Long Term	2	18-Oct-21
010-2005	Little Blackfoot River bank stabilization	Routine	2	16-Aug-21
021-2016	Marias River Sanford Park fish habitat enhancement	Routine	4	01-Sep-21
012-2015	Musselshell River Egge Diversion Removal	Routine	5	04-Oct-21
010-2013	Pearson Creek channel restoration	Routine	2	28-Jul-21
012-2001	Poorman Creek	Long Term	2	18-Oct-21
014-2018	Poorman Creek mining restoration	Routine	2	18-Oct-21
017-2007	Prairie Creek riparian fencing and culvert replacement	Long Term	2	02-Aug-21
015-2018	Prickly Pear Creek Trynan fish passage	Routine	4	05-Feb-21
028-2017	Rattlesnake Creek Cobban fish screen	Routine	2	18-Jun-21
008-2019	Rattlesnake Creek dam removal	Routine	2	19-Jul-21
022-2002	Rattlesnake Creek fish screen	Routine	2	18-Jun-21
022-2002	Rattlesnake Creek fish screen	Routine	2	18-Jun-21
022-2002	Rattlesnake Creek fish screen	Routine	2	18-Jun-21
025-2016	Rattlesnake Creek Williams fish screen	Routine	2	18-Jun-21
023-2013	Redwater River culvert fish passage	Routine	6	15-May-21
035-2007	Rock Creek and Big Lake Creek Denil ladders (3 projects)	Routine	3	15-Jun-21
026-2016	Shanley Creek fish screen & water conservation	Routine	2	28-Jul-21
014-2015	Shanley Creek Restoration	Routine	2	28-Jul-21
023-1999	Smith River and Thompson Creek fencing and off-stream watering	Long Term	4	21-Sep-21
020-2012	Smith River riparian fencing	Routine	4	21-Sep-21
017-2013	South Woodward Creek bridge repair	Routine	1	24-Aug-21
024-2013	Tenmile Creek diversion repair and fish passage	Routine	4	27-Aug-21
031-2004	Uncle George Creek	Routine	2	10-Aug-21
029-2003	Upper Willow Cr channel restoration	Long Term	2	26-Sep-21

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## **Beaver Creek diversion repair 002-2002**

This 2003 project reconnected the bottom end of an irrigation diversion with the Beaver Creek (tributary to the Missouri River) so that water and fish could return to the stream. It was monitored in 2015 and again in 2021. The meeting appears to be functional nearly 20 years later. Water continues to flow and vegetation is established (Figure 26). This project will expire in 2023 and appears to be a successful long-term project.



**FIGURE 26. THE BEAVER CREEK DIVERSION PROJECT AFTER COMPLETION (2003, L) AND IN 2021 (R).**

## **Boulder River 037-2001**

Boulder River (Jefferson County) supports an important spawning run of brown trout from the Jefferson River. Portions of the Boulder were unavailable for spawning because an irrigation diversion dam blocked migration. This project installed a Denil fish ladder to provide passage around the dam. Recent monitoring indicated that the ladder is only partially functional due to flooding damage and constant debris blockage. A new project proposes to remove the structure and provide alternate methods for irrigation to water users.



**FIGURE 27. THE DENIL FISH LADDER, UPON INSTALATION. CURRENTLY THE LADDER IS IN DISREPAIR AND PARTIALLY FUNCTIONAL.**



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## **Cottonwood Creek fish barrier 003-2010**

The Cottonwood Creek barrier is located near Holter Reservoir and was installed to isolate and protect a genetically pure westslope cutthroat trout population. The original barrier was constructed in 2000 but was at risk for passing brook trout and rainbow trout at high flows. It was replaced in 2010 with a more substantial structure (Figure 28). Since 2010, westslope cutthroat trout have been protected. The barrier was repaired in 2021 and blocks were repositioned. The westslope cutthroat trout population continues to do well and are used as donor fish for another nearby population.



**FIGURE 28. THE COTTONWOOD CREEK BARRIER AFTER CONSTRUCTION (2010, L) AND AS IT WAS REPAIRED IN 2021 (R).**

## **Cottonwood Creek off-stream livestock watering 007-2002**

This 2003 project eliminated an unscreened irrigation diversion and installed a screened intake pump on Cottonwood Creek (Blackfoot River drainage). The goal was to prevent fish from being lost to the ditch and leave more water instream. The site location was not inspected in 2021, but from the road the project applicant noted that the water savings had been a success and the infrastructure remain in place. This project will expire in 2023 and appears to have been successful long-term.

## **Deadman's Basin Diversion Dam fishway 012-2014**

This project was built to create fish passage on the Musselshell River at Deadman's Basin Diversion (Figure 29). In 2015, a fishway was constructed to connect 52 miles upstream and 39 miles downstream. The project has been functional since it was completed. In 2021, biologists noted that there is some concern that small-bodied fish may not be able to pass the structure. Future monitoring will investigate this concern, which would provide input on any future structural improvements.

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**FIGURE 29. DEADMAN'S BASIN DIVERSION DAM BEFORE CONSTRUCTION (L) AND IN 2021 (R).**

## **Dick Creek fish screen 006-2007**

This tributary to the North Fork Blackfoot River supports genetically pure cutthroat trout. In 2007, the project installed a headgate and fish screen (in-ditch Coanda screen) on a previously-unregulated irrigation diversion to eliminate entrainment of cutthroat trout and other species (Figure 30). The project was monitored in 2021, and the screen is still working as installed.



**FIGURE 30. DICK CREEK FISH SCREEN IN 2011 (L) AND IN 2021 (R).**

## **Kleinschmidt Creek restoration and grazing management 031-2005**

Kleinschmidt Creek (Blackfoot River drainage) supports bull trout and westslope cutthroat trout as well as brown trout, rainbow trout, and brook trout. In 2006, this project restored 3,000 feet of stream channel through channel shaping, riparian fencing, revegetation, off-stream water for livestock, and removal of streamside grazing and livestock infrastructure (Figure 31). In 2021, the site was monitored and showed a large improvement over time. The local FWP fisheries biologist collected data at this location over time, and the project is considered successful long term.

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**FIGURE 31. KLEINSCHMIDT CREEK BEFORE (2005, L) AND AFTER (2021, R) THE PROJECT WAS COMPLETED.**

## **Lincoln Spring Creek culvert replacement 009-2010**

Lincoln Spring Creek (Blackfoot River drainage) near Lincoln improved a county road crossing that was acting as a partial fish migration barrier. A larger, structural plate bottomless arch culvert was installed (Figure 32) in 2010. In 2021, the project was monitored and is functioning well. The stream is in good condition downstream of the culvert. This project has been successful long term.



**FIGURE 32. LINCOLN SPRING CREEK BEFORE (L) AND AFTER (MIDDLE) CONSTRUCTION, AND IN 2021 (R).**

## **Little Blackfoot River bank stabilization 010-2005**

The Little Blackfoot, near the confluence with the Clark Fork River, was the site of a 325 ft bank stabilization project in 2006. Past land management practices led to erosion and loss of riparian vegetation. The treatment included the installation of three log vanes, riparian fencing, and revegetation of the riparian area. In 2021, aerial photography and inspection of the area indicated that the project mostly failed. The stream meandered into the adjacent field and portions of the fence were lost. Some residual wood was observed. The stream is likely unstable at this location due to the adjacent bridges, and it appears that grazing is now occurring adjacent to the stream (in its current



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position). This project was not successful long term, and there may be limited fishery value to warrant addressing the current configuration.



**FIGURE 33. THE LITTLE BLACKFOOT RIVER PROJECT IN 2021 (L) AND ON AN AERIAL MAP (R), SHOWING THE EXPANSION INTO THE FIELD ON THE LOWER RIGHT.**

## **Marias River Sanford Park fish habitat enhancement 021-2016**

This project was engineered and installed by FWP staff in partnership with the US Bureau of Reclamation. In 2017, the bank was stabilized and improved using a three-tiered willow soil lift, regrading, and two engineered log jams. The site was visited by FWP staff that designed the project and oversaw construction; that the project is holding up well with an increase in vegetation density.



**FIGURE 34. MARIAS RIVER BEFORE CONSTRUCTION (L) AND IN 2021 (R).**

## **Musselshell River Egge Diversion Removal 012-2015**

The Egge Diversion was removed in 2017 after the structure was flanked. The water users switched to pump irrigation and the fish passage barrier was removed. Vegetative soil lifts were installed and a continuous 24-mile reach of stream was opened for fish passage. In 2021, the site was highly revegetated and the streambanks were stabilized. It is considered a success both for the landowner/water user and ecologically.

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**FIGURE 35. THE EGGE DIVERSION BEFORE REMOVAL (L) AND IN 2021 (R).**

## **Pearson Creek channel restoration 010-2013**

Located in the Blackfoot River drainage, Pearson Creek supports slightly hybridized populations of westslope cutthroat trout, brook trout, and longnose sucker. In 2013, this project reconstructed 1,244 of straightened channel, replaced an undersized culvert with a larger culvert, transplanted native shrubs, installed willow cuttings, and fenced the riparian corridor. In 2021, the project was in good condition; photopoints were difficult to find with vegetative growth. Vegetation is abundant and the area does not appear to be grazed.



**FIGURE 36. PEARSON CREEK AFTER CONSTRUCTION (2013) AND IN 2021. THE PHOTO VANTAGE POINT IS SIMILAR BETWEEN PHOTOS.**

## **Poorman Creek 012-2001**

This 2003 project on Poorman Creek (Blackfoot River drainage) continued previous restoration efforts. The focus was irrigation improvements, a fish screen, and vegetative plantings. The irrigation improvements and fish screen installation have been successful, but the plantings were not installed correctly. Non-native species were used. However, the shortcomings of this project led to better management practices concerning vegetation management moving forward. A 2021 project on Poorman Creek complements this work.

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## Poorman Creek mining restoration 014-2018

A 2019 project on Poorman Creek was completed on US Forest Service property and restored a disturbed reach of the creek impacted by mine tailings. The tailings were removed, a new channel was constructed, large wood was installed, and an undersized stream crossing was upgraded to a bridge. In 2021, the stream channel and flood plain were in great shape and recovering nicely. Fisheries data indicated that the fish populations have also improved.



FIGURE 37. POORMAN CREEK BEFORE CONSTRUCTION (L) AND IN 2021 (R).

## Prairie Creek riparian fencing and culvert replacement 017-2007

Prairie and Andrews Creeks (Bitterroot River drainage) support both resident and fluvial westslope cutthroat trout but were impacted by grazing and undersized culverts impeding migration. In 2007, riparian fencing was installed and two culverts were replaced with larger, embedded culverts to improve connectivity. The riparian condition was considered fair in 2013 with high grazing compliance. In 2021, the riparian fence was in disrepair but no indication of recent grazing was observed. Weeds (primarily knapweed) were extensive and a problem in the area. The culvert was in place and appeared functional.



FIGURE 38. ANDREWS CREEK IN 2013 (L) AND IN 2021 (R).



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## **Prickly Pear Creek Tryan fish passage 015-2018**

This project, completed in 2018, improved fish passage on Prickly Pear Creek by removing a diversion dam that was acting as a partial fish barrier. The area is used by migratory rainbow trout and brown trout moving out of Lake Helena. Step-pool structures were installed and a bypass channel was installed. 2021 monitoring indicated that the project has been successful and vegetation is increasing.



**FIGURE 39. THE PRICKLY PEAR TRYAN FISH PASSAGE PROJECT AT PROJECT COMPLETION (TOP) AND IN 2021 (BOTTOM).**

## **Rattlesnake Creek Cobban fish screen 028-2017**

Rattlesnake Creek (Clark Fork River drainage) has been the site of fish screening improvements since 2002. In 2018, the fish screen on the Cobban ditch was upgraded to a vertical plate, paddlewheel-driven fish screen. The goal was to prevent entrainment of fish, including bull trout, westslope cutthroat trout, rainbow trout, and brown trout. In 2021, the project looked very similar to the condition at install. The project is considered successful thus far, and complements other projects in the drainage.

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**FIGURE 40. THE RATTLESNAKE COBBAN FISH SCREEN IN 2018 (L) AND 2021 (R).**

## **Rattlesnake Creek dam removal 008-2019**

The Rattlesnake Dam was constructed in 1901 as the primary water source for Missoula. The water source was shifted to groundwater wells in the 19080's but the dam remained. A fish ladder was installed in 2003, but the dam was finally removed in 2020. This project removed the last remaining migration barrier on Rattlesnake Creek with the goal of improving habitat and migratory corridors for trout. In 2021, the project site was visited by the Future Fisheries Review Panel. Vegetation was increasing and the stream channel was in great condition.



**FIGURE 41. RATTLESNAKE DAM PRIOR TO REMOVAL (L) AND IN 2021 (R).**

## **Rattlesnake Creek fish screen 022-2002**

Brencaill style fish screens were installed at three irrigation ditches in 2002. Two of the fish screens have been replaced in recent years, but one remains on the Hamilton Day location. The screen was visited in 2021 and is not functional. The Brencaill style screen is not an effective design and requires frequent cleaning, which does not occur in this location.

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**FIGURE 42. THE HAMILTON DAY FISH SCREEN IN 2015 (L) AND IN 2021 (R).**

## **Rattlesnake Creek Williams fish screen 025-2016**

The Williams fish screen on Rattlesnake Creek was installed in 2017, and a Coanda-type was used. The project site was visited in 2021 and appeared to be in great condition. The screen is a great improvement to the previous fish screen and has not changed structurally in four years. Adjacent vegetation has increased.



**FIGURE 43. RATTLESNAKE CREEK WILLIAMS DITCH FISH SCREEN IN 2017 (L) AND 2021 (R).**

## **Redwater River culvert fish passage 023-2013**

In 2016, a series of box culverts replaced four, 24-inch diameter concrete culverts. These improvements at the Nickwall Crossing (near Wolf Point) allowed for stream function and resting areas for slower swimming fish species. The site was visited in 2021. Overall, the project has been successful in allowing the high stream flows and fish to pass. However, high flows led to some erosion around one of the wingwalls. The concrete repair was planned for summer 2021.



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**FIGURE 44. THE REDWATER RIVER NICKWALL CROSSING AFTER CONSTRUCTION (2016, L) AND IN 2021 (MIDDLE, R). NOTE THE EROSION OF THE WINGWALL TO BE REPAIRED IN 2021 (R).**

## **Rock Creek and Big Lake Creek Denil ladders 035-2007**

Rock Creek and Big Lake Creek are tributaries to the Big Hole River in the Wisdom area. Irrigation diversions located on these streams are presently acting as migration barriers to fluvial arctic grayling as well as other fishes. This project involves installation of Denil type fish ladders on three diversions. Recent monitoring by local fisheries staff indicated that the fish ladders intact and passing fish.



**FIGURE 45. PHOTOS OF SEVERAL OF THE IRRIGATION DIVERSIONS WITH DENIL FISH LADDERS.**

## **Shanley Creek fish screen & water conservation 026-2016**

In 2016, a vertical flat plate paddlewheel screen was installed on Shanley Creek (Blackfoot River drainage). It replaced a fish screen that was no longer functional and was intended to improve control of diverted streamflow and reduce entrainment of bull trout and pure populations of westslope cutthroat trout. Several other projects were completed on Shanley Creek and this project built upon those successes. In 2021, the project was in good condition and functional. The landowner expressed concern that the grass grows so much it clogs the bypass, but it is a minor issue. Livestock are excluded from the area by an electric fence.



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FIGURE 46. SHANLEY CREEK FISH SCREEN AFTER CONSTRUCTION (2016, L) AND IN 2021 (MIDDLE, R).

## Shanley Creek restoration 014-2015

This project relocated nearly one mile of road outside of the Shanley Creek floodplain, replaced two undersized culverts with a single crossing (able to pass a 100-year flood), upgraded a ford with a short-span bridge, and removed a third culvert. It was completed in 2015. The goal as to correct the road damage problems, eliminate sources of excessive sediment, provide fish passage, and restore natural channel morphology at the crossing sites. In 2021, the project was monitored and found to be in good shape. The rock of the abutment had to be grouted as high water was undermining some of the footers, but the problem was fixed and the project is considered successful.



FIGURE 47. SHANLEY CREEK CROSSING BEFORE CONSTRUCTION (L) AND IN 2021 (R).

## Smith River and Thompson Creek fencing and off-stream watering 023-1999

In 2001, riparian fencing and off stream water was installed at this property on the Smith River to improve riparian and stream health along 2.5 miles of stream (Smith River and Thompson Creek). In 2004, the riparian condition was considered fair with high grazing. The site was visited in 2021 and found that all of the off-stream water installations were functional and fencing was being used as well. The landowner was positive about the project and its impact. Overall, the riparian buffers could have

# MONITORING

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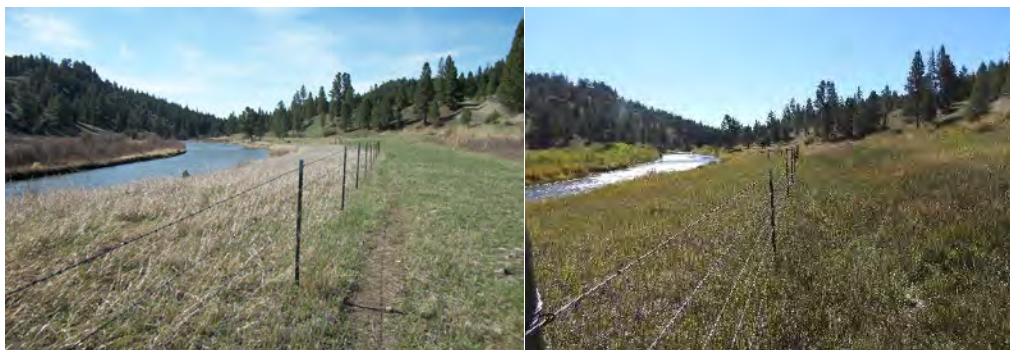
been larger in some places but the cattle have been kept off the stream and vegetation has expanded. The project is now expired, but the hope is that the willow will continue to expand. The landowner plans to continue using the fence and off-stream water.



**FIGURE 48. THE SMITH RIVER PROJECT IN 2002 (L) AND IN 2021 (R).**

## **Smith River riparian fencing 020-2012**

This project installed about 4.5 miles of fence associated with six pasture/hay fields along the river and on Sheep Creek. Off stream water and water gaps were also installed. The project was completed in 2015. In 2021, the project was monitored and was found to be in good condition. The landowner is very interested in keeping the stream in a healthy condition. Grazing is considered light to absent and the fencing is in good condition.



**FIGURE 49. THE SMITH RIVER ROCKING C PROJECT IN 2015 (L) AND 2021 (R).**

## **South Woodward Creek bridge repair 017-2013**

The South Woodward Creek bridge (Swan River drainage) was repaired in 2013 to address failing wingwalls. The location is an important spawning and rearing area for Swan Lake bull trout population. In 2021, the DNRC fisheries biologist noted that the bridge was reevaluated in 2016 and

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determined that the project was successful at eliminating sediment inputs, retained its structure, and met forestry best management practices.



**FIGURE 50. SOUTH WOODWARD BRIDGE REPAIR, DURING CONSTRUCTION (2013).**

## **Tenmile Creek diversion repair and fish passage 024-2013**

In 2016, a project was completed on Tenmile Creek (Helena Valley) to improve 1,100 feet of eroding streambank by installing 5,300 feet of riparian fencing and constructing a hardened crossing. Channel improvements, including rock vanes and root wads, were proposed initially but were not completed due to floodplain permitting complications. In 2021, the landowner alerted FWP staff to an issue with the project, as the stream migrated into the field and intercepted the fence. Upon visiting the site, it became clear that the project was noncompliant due to overgrazing and a nonfunctional (cut) riparian fence. FWP staff initiated conversations with the landowner and leasee to bring the project back into compliance. It will be monitored closely for the next several years and FWP will discuss the potential of willow plantings with the conservation district.



**FIGURE 51. TENMILE CREEK BEFORE CONSTRUCTION (L), IN 2021 WHEN THE FENCE WAS MOVED (MIDDLE) AND THE CURRENT WATER GAP/BANK CONDITION (R). STREAM AND RIPARIAN CONDITION WILL BE CLOSELY MONITORED IN 2022 AND FUTURE YEARS.**



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## Uncle George Creek 031-2004

Located on the Lewis and Clark National Forest, this project was completed in 2004 and installed 1,320 feet of riparian fencing and one offsite water trough. The stream is small and the benefit to the westslope cutthroat fishery is unknown. The riparian area was fair in 2005 and good by 2016. In 2021, the fence was broken and grazing was occurring in the riparian area. US Forest Service was contacted and repaired the fence before livestock had a significant impact on the stream and riparian area. This project will expire in 2024.



**FIGURE 52. UNCLE GEORGE CREEK FENCE AND RIPARIAN AREA IN 2016 (L) AND 2021 (MIDDLE). THE FENCE WAS IN DISREPAIR IN 2021 (R) BUT FIXED BY THE US FOREST SERVICE.**

## Upper Willow Creek channel restoration 029-2003

Upper Willow Creek (Rock Creek drainage) was the site of a long-term Future Fisheries monitoring effort, in part due to the requirements of a Department of Environmental Quality 319 grant. The project reconstructed 6,500 feet of stream and installed riparian plantings in 2005. Between 2005 and 2021, the project was monitored for fishery response, stream dimensions, substrate, vegetation, and water temperature. The project was successful in improving channel dimension and substrate. Better sediment transport appeared to improve the area suitable for redds. Some channel adjustment occurred, creating a more naturally functioning stream. However, the riparian plantings didn't survive well (planted in the heat of the summer) so grasses dominate. Due to the grasses and failure of woody plantings, the overhead cover is minimal. Water temperature didn't have significant changes due to the project. One of the project goals was to improve suitable habitat for bull trout and westslope cutthroat trout with lower water temperatures, but that goal was not achieved. However, the project area drastically improved due to the work completed and maintained. It will expire in 2025.

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**FIGURE 53. UPPER WILLOW CREEK AFTER CONSTRUCTION (2005, L) AND IN 2021 (R).**

## OVERALL CONCLUSIONS

In 2021 and early 2022, monitoring efforts were a combination of opportunistic monitoring (i.e., visiting sites when in a close proximity due to work-related travel), long-term monitoring efforts, and an effort to visit projects that are 5+ years old. In general, monitoring found successful projects. A few projects had problems to be addressed or treatments that were not successful. Unsuccessful treatments are typically due to installation technique or bad luck due to environmental conditions (e.g., weather, drought). However, both unsuccessful and successful projects provide valuable information to the FFIP and will help guide future funding recommendations. The greatest benefit from effectiveness and implementation monitoring is to learn what works, what doesn't, and why. Much has been learned from the FFIP since 1996, making project review by FWP staff, the Review Panel, and the commission a constantly improving process.

Overall, project applicants tend to be in compliance with their project agreements. Some project components were addressed for compliance, mostly due to miscommunication, but intent of the project was discussed to bring it into compliance. The success of the FFIP is clear; a substantial positive impact was, and is, made on the waters of Montana and its anglers due to the Program and its partners.



# EXPIRED PROJECTS

## Expired Projects

Project agreements are developed with an anticipated project life of 20 years. There can be exceptions, however, as is the case for certain types of projects like instream flow leases or lake habitat enhancement (e.g., Christmas trees begin to degrade upon installation). Unless a shorter duration agreement is approved, projects are expected to be maintained for 20 years and the applicant or landowner must agree to those terms to receive funding.

The first FFIP projects were initiated in 1996; therefore, certain projects began to reach their 20-year commitment in 2016. The 20-year commitment begins upon project completion. Each year there are more projects that will reach the end of their contractual life. Projects that expired in 2021 and 2022 are listed below (Table 10).

Once a project is expired, the status is updated in the database and the project file is kept for an additional five years. After five years has passed, the files are uploaded electronically, and the hard copy paperwork is moved to record storage for destruction, ensuring historical projects are archived.

**TABLE 10. FFIP PROJECTS THAT WERE COMPLETED IN 2001 AND 2002, AND THEREFORE EXPIRED IN 2021 OR 2022.**

PROJID	Project Name	Application Year	Completed
007-1997	Camp Creek	1997	2001
014-1998	Kleinschmidt Creek	1998	2001
034-1998	Nevada Creek fish ladder	1998	2001
035-1998	Nevada Creek fish friendly diversion	1998	2001
059-1998	Thompson Lake, Lower Woody Structures	1998	2001
002-1999	Big Hole River flow enhancement	1999	2001
010-1999	Douglas Creek fish passage	1999	2001
014-1999	Horseshoe Lake Boulder Clusters	1999	2001
023-1999	Smith River and Thompson Creek fencing and off-stream watering	1999	2001
037-1999	Cottonwood Creek	1999	2001
038-1999	Cottonwood Creek fish passage and grazing management	1999	2001
042-1999	Grave Creek diversion repair and fish screen	1999	2001
047-1999	Lost Creek	1999	2001
053-1999	Prospect Creek	1999	2001
060-1999	Shields River	1999	2001
061-1999	South Fork Smith River off site water and fence	1999	2001
063-1999	Spring Creek fish barrier	1999	2001
002-2000	Basin Creek	2000	2001
004-2000	Big Hole River	2000	2001
009-2000	Cottonwood Creek channel restoration	2000	2001
010-2000	Cottonwood Creek fish barrier	2000	2001
013-2000	East Fork Bull River	2000	2001

# EXPIRED PROJECTS

PROJID	Project Name	Application Year	Completed
015-2000	Flint Creek	2000	2001
023-2000	Prickly Pear Creek	2000	2001
024-2000	Prospect Creek	2000	2001
036-2000	Warren Creek	2000	2001
038-2000	Yellowstone River riparian demonstration	2000	2001
041-2000	Big Creek fish screen	2000	2001
044-2000	Canyon Ferry Lake perch spawning habitat structures	2000	2001
052-2000	Poorman Creek	2000	2001
053-2000	Silver Butte Fisher River bank stabilization	2000	2001
056-2000	Tongue River	2000	2001
058-2000	Wolf Creek fish passage	2000	2001
005-2001	Dunkleberg Creek restoration	2001	2001
006-2001	Elk Creek Channel Restoration	2001	2001
007-2001	Hauser Reservoir spawning habitat	2001	2001
008-2001	Marshall Creek. Marshall and Deer creeks fish screens.	2001	2001
010-2001	Missouri River riparian restoration	2001	2001
011-2001	Pintler Creek flow enhancement	2001	2001
014-2001	Rock Creek channel restoration	2001	2001
015-2001	Rock Creek	2001	2001
020-2001	Teton River	2001	2001
023-2001	Non-native removal - 5 streams in R-3 and R-4	2001	2001
024-2001	Big Hole River	2001	2001
025-2001	Blackfoot River	2001	2001
028-2001	Locke Creek irrigation conversion and lease	2001	2001
039-2001	Dunham Creek channel restoration	2001	2001
060-1998	Tiber Reservoir	1998	2002
033-1999	Big Coulee	1999	2002
050-1999	Ninemile Creek restoration and fencing	1999	2002
018-2000	McCabe Creek	2000	2002
028-2000	South Fork Musselshell River	2000	2002
031-2000	Sun River	2000	2002
046-2000	Kolb Spring Creek	2000	2002
051-2000	O'Brien Creek riparian fencing	2000	2002
013-2001	Rattlesnake Creek	2001	2002
017-2001	Sixmile Creek diversion repair	2001	2002
022-2001	White Pine Creek stabilization	2001	2002
031-2001	Antelope Creek	2001	2002
034-2001	Bitterroot River Riparian Fencing	2001	2002
005-2002	Canyon Ferry Lake Perch-Spawning Habitat	2002	2002
008-2002	East Boulder River	2002	2002
011-2002	Esp Spring Creek	2002	2002

# EXPIRED PROJECTS

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PROJID	Project Name	Application Year	Completed
013-2002	Hauser Reservoir	2002	2002
015-2002	Madison Spring Creek	2002	2002
022-2002	Rattlesnake Creek fish screen	2002	2002
027-2002	Stone Creek channel restoration	2002	2002
028-2002	Ninemile Creek riparian fencing	2002	2002
030-2002	Creeklyn Ditch and Jefferson Canal	2002	2002
041-2002	Locke Creek	2002	2002
043-2002	Marshall Creek woody debris	2002	2002