FUTURE FISHERIES IMPROVEMENT PROGRAM

FWP RECOMMENDATIONS TO THE FISH & WILDLIFE COMMISSION SUMMER 2021

1) **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 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 proposes to build a barrier to isolate the WCT population. After the barrier is built, project partners would remove WCT and hold them in a nearby stream in live cages while testing them for hybridization. All remaining fish would be removed using rotenone, and the non-hybridized WCT would be returned to the stream.* This project would isolate approximately 9 miles of stream, including 3 fish-bearing tributary streams, for WCT conservation.

** This project will be contingent on approval to remove fish by the Commission on June 24, 2021.*

<table>
<tr><td>REQUEST</td><td>$22,342</td><td rowspan="5">ITEMS REQUESTED BY APPLICANT</td><td rowspan="5">Construction materials</td></tr>
<tr><td>MATCH</td><td>$73,382</td></tr>
<tr><td>OTHER CONTRIBUTIONS</td><td>$0</td></tr>
<tr><td>% REQUESTED</td><td>23%</td></tr>
<tr><td>TOTAL COST</td><td>$95,724</td></tr>
<tr><td colspan="4">FWP STAFF RECOMMENDATION: We recommend full funding ($22,342) but ask the applicant to address the following: 1) What barrier maintenance will be needed and who will be responsible? 2) What type of streamflows are expected at the barrier location?</td></tr>
<tr><td colspan="4">REVIEW PANEL RECOMMENDATION:</td></tr>
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2) **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.

<table>
<tr><td>REQUEST</td><td>$50,000</td><td rowspan="5">ITEMS REQUESTED BY APPLICANT</td><td rowspan="5">Channel construction</td></tr>
<tr><td>MATCH</td><td>$435,938.36</td></tr>
<tr><td>OTHER CONTRIBUTIONS</td><td>$12,272.40</td></tr>
<tr><td>% REQUESTED</td><td>10%</td></tr>
<tr><td>TOTAL COST</td><td>$498,210.76</td></tr>
<tr><td colspan="4">FWP STAFF RECOMMENDATION: We recommend full funding ($50,000) if the applicant can address the intermittency that occurred after the first phase and the confidence that subsequent phases will not result in intermittent sections. Does the hydrology indicate gaining or losing reaches, and how does that play into project construction? Was the approach or methodology adjusted after the first phase?</td></tr>
<tr><td colspan="4">REVIEW PANEL RECOMMENDATION:</td></tr>
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3) **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 have a tendency 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.

REQUEST	$34,000	ITEMS REQUESTED BY APPLICANT	Corrugated Water Screen
MATCH	$62,462 ($66,545?)		
OTHER CONTRIBUTIONS	$0		
% REQUESTED	35%		
TOTAL COST	$96,462		
FWP STAFF RECOMMENDATION: We recommend partial funding ($30,000) to meet the total project cost, in light of the excess match listed in the application.			
REVIEW PANEL RECOMMENDATION:			

4) **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 more accurately meet irrigation demand and instream flow targets, thereby keeping the correct amount of flow going to irrigators and to instream flow, improving habitat for Arctic grayling and other aquatic species. Two screwgates would be installed and will provide real-time management of flow targets.

REQUEST	$33,360.48	ITEMS REQUESTED BY APPLICANT	Construction materials (riprap, headgates)
MATCH	$61,955.19		
OTHER CONTRIBUTIONS	$10,000		
% REQUESTED	32%		
TOTAL COST	$105,315.67		
FWP STAFF RECOMMENDATION: We recommend full funding ($33,360.48) but ask the applicant to address the following: 1) Confirm that the State Wildlife Grant (SWG) funding is secured, 2) Are there concerns with fish passage at the pin-and-plank structure or entrainment that might be part of a future project? 3) What do the bubble icons indicate on the hydrograph?			

REVIEW PANEL RECOMMENDATION:

5) **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 Valley Irrigation Company. The City of Missoula offered to buy the assets of the irrigation company and allow 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 would 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, redside shiners, and more. Fish entrainment has been difficult to quantify but is considered to be substantial.

REQUEST	$100,000	ITEMS REQUESTED BY APPLICANT	Ditch acquisition
MATCH	$890,000		
OTHER CONTRIBUTIONS	$0		
% REQUESTED	10%		
TOTAL COST	$990,000		

FWP STAFF RECOMMENDATION: We support the project and recommend funding at a level determined by the Review Panel in light of a fully unsecured budget, and with the contingency that the DNRC water right change is successful. We also request that the applicant provide detail on the DNRC water right process and logistics, particularly related to the timeline and the discussions taking place to ensure the project is successful. We note potential complications regarding the change of timing and duration of use of water, new wells and new water rights or transferring rights from the irrigation company to water users. We recognize that instream flow improvements may be hard to predict, but the benefits to entrainment are substantial and highly impactful.
REVIEW PANEL RECOMMENDATION:

6) **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.

REQUEST	$33,700	ITEMS REQUESTED BY APPLICANT	Habitat structures
MATCH	$345,000		
OTHER CONTRIBUTIONS	$114,966.16		
% REQUESTED	7%		
TOTAL COST	$495,506.41		
FWP STAFF RECOMMENDATION: We recommend full funding ($33,700).			
REVIEW PANEL RECOMMENDATION:			

7) **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 culvert) and a bottomless arch 1.8x wider than the bankfull channel (upper culvert), both able to pass a 100-year flood.

REQUEST	$50,000	ITEMS REQUESTED BY APPLICANT	Equipment and labor
MATCH	$159,664.97		
OTHER CONTRIBUTIONS	$0		
% REQUESTED	24%		
TOTAL COST	$209,664.97		

FWP STAFF RECOMMENDATION: We recommend full funding ($50,000) but request additional budget detail and an update on the likelihood of securing USFS funding.
REVIEW PANEL RECOMMENDATION:

8) **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 is not a permanent barrier and is showing signs of instability. This project would 1) replace 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) remove an undersized barrier downstream, near the confluence with Miller Creek to improve fish passage and stream function downstream. The goals of this project are to protect the genetically pure WCT population, improve downstream habitat, improve stream function, and address chronic sediment delivery issues and potential culvert failure.

REQUEST	$20,000 ($20,100 on budget sheet)	ITEMS REQUESTED BY APPLICANT	Construction materials (fish barrier concrete)
MATCH	$18,000		
OTHER CONTRIBUTIONS	$0		
% REQUESTED	52%		
TOTAL COST	$38,100		
FWP STAFF RECOMMENDATION: We recommend full funding ($20,000).			
REVIEW PANEL RECOMMENDATION:			

9) **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 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.

REQUEST	$100,000	ITEMS REQUESTED BY APPLICANT	Construction materials
MATCH	$305,000		
OTHER CONTRIBUTIONS	$0		
% REQUESTED	23%		
TOTAL COST	$437,568		
FWP STAFF RECOMMENDATION: We support the project and recommend funding at a level determined by the Review Panel, in light of unsecured funds. FFIP funding cannot be used for overhead ($1,596.51). We request that the applicant address the following: 1) Confirm that government salaries are not used as match, 2) What is the timing of construction?			
REVIEW PANEL RECOMMENDATION: We recommend			

10) **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 is a lack of connectivity between the channel and floodplain, fine sediment delivery, reduced aquatic habitat diversity, and reduced riparian vegetation and cover. This project would restore the stream channel and realign it away from eroding banks, re-grade and adjust elevation to connect the channel to the floodplain, install large woody debris and other features to improve habitat complexity, plant riparian vegetation, and install fencing. The project goals are 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.

REQUEST	$39,500	ITEMS REQUESTED BY APPLICANT	Riparian fencing, grading and structures
MATCH	$95,900		
OTHER CONTRIBUTIONS	$0		
% REQUESTED	31%		
TOTAL COST	$129,000		

FWP STAFF RECOMMENDATION: We recommend full funding ($39,500) but request the applicant to address the following: 1) What magnitude of impact do you expect the project to accomplish in terms of addressing the water quality issues? Was a BEHI completed to assess how much sediment has been entering the stream? 2) Was the design created to allow for passive recovery (as a result of riparian fencing) where possible and channel restoration where passive recovery was not sufficient? Please explain your strategy to balance active and passive recovery in this section.
REVIEW PANEL RECOMMENDATION:

11) **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 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 would enhance 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 is 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.

REQUEST	$10,020	ITEMS REQUESTED BY APPLICANT	Concrete forms, concrete, pour
MATCH	$11,800		
OTHER CONTRIBUTIONS	$0		
% REQUESTED	46%		
TOTAL COST	$21,820		
FWP STAFF RECOMMENDATION: We recommend full funding ($10,020) but ask the applicant to confirm that match is secured.			
REVIEW PANEL RECOMMENDATION:			

12) **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).

<table>
<tr><td>REQUEST</td><td>$39,636</td><td rowspan="5">ITEMS REQUESTED BY APPLICANT</td><td rowspan="5">Mileage, construction materials, equipment</td></tr>
<tr><td>MATCH</td><td>$48,000</td></tr>
<tr><td>OTHER CONTRIBUTIONS</td><td>$0</td></tr>
<tr><td>% REQUESTED</td><td>45%</td></tr>
<tr><td>TOTAL COST</td><td>$87,636</td></tr>
<tr><td colspan="4">FWP STAFF RECOMMENDATION: We recommend partial funding ($39,300; travel is not an allowable cost) but ask the applicant to address the following: 1) How close are nonnatives to Dry Cottonwood Creek or South Fork Dry Cottonwood Creek? 2) Is there potential for a fish barrier in the future, and if so, have the project partners considered where a barrier would be placed? In other words, are you confident this culvert would not be a future barrier location?</td></tr>
<tr><td colspan="4">REVIEW PANEL RECOMMENDATION:</td></tr>
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13) **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 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).

REQUEST	$14,300	ITEMS REQUESTED BY APPLICANT	Construction materials, equipment and labor
MATCH	$127,478		
OTHER CONTRIBUTIONS	$0		
% REQUESTED	10%		
TOTAL COST	$141,778		
FWP STAFF RECOMMENDATION: We recommend full funding ($14,300).			
REVIEW PANEL RECOMMENDATION:			

14) **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)

REQUEST	$8,200	ITEMS REQUESTED BY APPLICANT	Construction materials, equipment, labor and mobilization
MATCH	$37,098		
OTHER CONTRIBUTIONS	$0		
% REQUESTED	18%		
TOTAL COST	$45,298		
FWP STAFF RECOMMENDATION: We recommend full funding ($8,200).			
REVIEW PANEL RECOMMENDATION:			