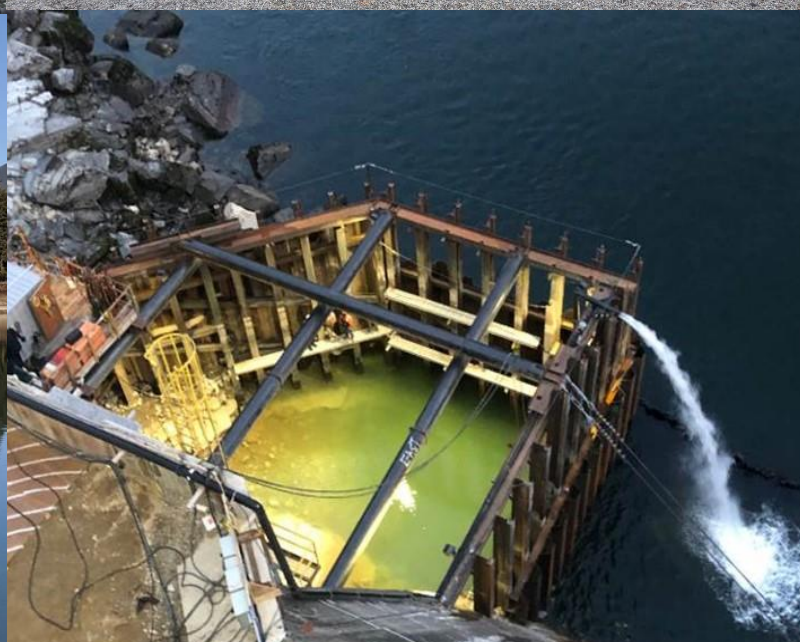
The Clark Fork Project
FERC Project No. 2058

2021 Annual Implementation Plans



As approved by the Management Committee on 3/17/2021

2021 ANNUAL IMPLEMENTATION PLAN SUMMARY – APPENDIX A

Clark Fork Project, FERC No. 2058
Cabinet Gorge and Noxon Rapids Hydroelectric Developments

Title
Idaho Tributary Habitat Acquisition and Fishery Enhancement Program

Implementation Staff Lead
Ken Bouwens, Idaho Department of Fish and Game (IDFG), (208) 769-1414,
ken.bouwens@idfg.idaho.gov

Background
The purpose of this program is to offset the impacts of the power peaking operation of the Cabinet Gorge Project to native salmonids through the restoration and enhancement of lower Clark Fork River and Lake Pend Oreille (LPO) tributary watersheds, fishery monitoring and management support, and a public education and enforcement initiative focused on Bull Trout and their associated habitats in Idaho.

Outlined below is the 2021 annual implementation plan for Idaho Tributary Habitat Acquisition and Enhancement and Fish Resource Monitoring, Enhancement, and Management portions of this program. The public education and enforcement component of this program is described in Appendix D of the Clark Fork Settlement Agreement (CFSA). In addition, other CFSA appendices also support watershed and native salmonid protection, restoration, and enhancement (e.g., Fish Passage/Native Salmonid Restoration Plan, Watershed Council Program), and thereby augment the efforts to be initiated under this program.

2021 Project Plans
Tributary Habitat Acquisition and Enhancement
1. Habitat Restoration Scoping Allocation
2. Habitat Restoration and Acquired Property Maintenance and Monitoring Allocation
3. Priority Native Salmonid Habitat Acquisition and Conservation Allocation
4. Idaho Field Station Construction, Furnishing, and Operation
5. Pack River Watershed Management Plan Addendum
6. Lower Clark Fork River Minimum Flow and Water Temperature Monitoring
7. Trestle Creek Habitat Enhancement Project Phase I

Fishery Resource Monitoring, Enhancement, and Management
8. Fish Resource Monitoring, Enhancement, and Management Plan

Work Products
Habitat Restoration Scoping Allocation
- Annual Work Summary; due December 1, 2021
- Designs and cost estimates for specific projects will be reported in the form of Technical Memoranda or other appropriate documentation

Habitat Restoration and Acquired Property Maintenance and Monitoring Allocation

- Annual Work Summary; due December 1, 2021

Priority Native Salmonid Habitat Acquisition and Conservation Allocation

- Annual Work Summary; due December 1, 2021

Idaho Field Station Construction, Furnishing, and Operation

- All work performed for this project plan in 2021 will be documented in an Annual Work Summary; due December 1, 2021

Pack River Watershed Management Plan Addendum

- Annual Work Summary; due December 1, 2021
- Pack River Native Salmonid Restoration Plan; final due November 1, 2022

Lower Clark Fork River Minimum Flow and Water Temperature Monitoring

- Temperature monitoring data for the two sites; due November 1, 2021
- Annual Work Summary; due December 1, 2021
- Annual Project Update; final due December 1, 2021
- Annual Project Update; final due December 1, 2022
- Annual Project Update; final due December 1, 2023
- Project Completion Report; Five-Year Report, (all data); final due December 1, 2024

Trestle Creek Habitat Enhancement Project Phase I

- Technical memoranda describing project progress at appropriate intervals
- Final stamped design drawings; due date to be determined
- Annual Work Summary; due December 1, 2021

Fish Resource Monitoring, Enhancement, and Management Plan

- Annual Project Update; 2020 tributary monitoring data; final due November 1, 2021
- Annual Project Update; 2020 redd count data; final due November 1, 2021
- Comprehensive Project Report; Lower Clark Fork River salmonid abundance estimates (2014–2018); final due December 1, 2021
- Comprehensive Project Report; report summarizing 2009–2018 tributary monitoring data; final due December 1, 2021
- Annual Work Summary; due December 1, 2021
- Temperature monitoring data for the five sites; due December 1, 2021
- Annual Project Update: 2021 tributary monitoring data; final due November 1, 2022
- Annual Project Update; 2021 Bull Trout redd count data; final due November 1, 2022

Appendix A 2021 Budget

Project	Carryover[1]	2021
Tributary Habitat Acquisition and Enhancement Fund (including GDP inflation rate)		**$589,860**
Unexpended funds w/interest		**$2,777,511**
Transfer to Fish Resource Monitoring, Enhancement, and Management Fund		**-$53,167**
Total Available		**$3,314,204**
Habitat Restoration Scoping Allocation	$0	$25,000
Habitat Restoration and Acquired Property Maintenance and Monitoring Allocation	$0	$20,000
Priority Native Salmonid Habitat Acquisition and Conservation Allocation	$0	$60,000
Idaho Field Station Construction, Furnishing, and Operation	$573,131	$62,650
Pack River Watershed Management Plan Addendum	$0	$5,750
Lower Clark Fork River Minimum Flow and Water Temperature Monitoring	$3,215	$12,000
Trestle Creek Habitat Enhancement Project Phase I	$36,234	$166,400
Total	$612,580	$351,800
	MC Approved Budget	**$964,380**
	Unobligated Funds	$2,349,824

[1] This column denotes estimated carryover of unexpended, approved funds as of January 1.

Project	Carryover[1]	2021
Fish Resource Monitoring, Enhancement, and Management Fund (including GDP inflation rate)		**$50,928**
Unexpended funds w/interest		**$0**
Transfer from Tributary Habitat Acquisition and Enhancement Fund[2]		**$53,167**
Total Available		**$104,095**
Fish Resource Monitoring, Enhancement, and Management Plan	$8,095	$96,000
Total	$8,095	$96,000
	MC Approved Budget	**$104,095**
	Unobligated Funds	$0

[1] This column denotes estimated carryover of unexpended, approved funds as of January 1.

[2] In 2019 the MC approved that the allocation for the Fish Resource Monitoring, Enhancement and Management Plan be permanently increased to $96,000. The funding for this plan will continue to be transferred from the Tributary Habitat Acquisition and Enhancement Program under Appendix A. These transferred funds will revert back to the Tributary Habitat Acquisition and Enhancement Fund if not spent in a given year.

2021 PROJECT PLAN

Habitat Restoration Scoping Allocation

Project Contact
Ken Bouwens, Idaho Department of Fish and Game (IDFG), (208) 769-1414,
ken.bouwens@idfg.idaho.gov

Project History
This project was first approved in 2017. We are requesting continuation of this project in 2021 with changes to the scope and budget. The scope and budget for this project will be reviewed by the Management Committee (MC) annually.

Background
Habitat restoration is an important component of the Appendix A program. Watershed restoration and assessment projects have been completed throughout the Lake Pend Oreille watershed aimed at improving habitat for native salmonid populations. New project development is an involved scoping process requiring the identification and integration of information regarding specific project streams, locations, willing landowners, and associated biological limitations. Often times, technical engineering support is required to develop viable project proposals, including feasibility analyses, preliminary designs, and cost estimates. This allocation is designed to provide limited resources to allow pre-project review and collaboration with qualified fish habitat engineers. It is expected that this scoping will lead to full project proposals for MC review and approval.

Beginning in 2021 we intend to include funding for a third party to help identify, negotiate, and facilitate fish habitat enhancement projects, primarily with willing private landowners. This partnership allows the involvement of an entity who is well versed in prior fish habitat assessments and can begin discussions with willing landowners as appropriate.

This allocation is designed to provide managers with a means to rapidly respond to opportunities and needs as they arise, and to reduce the burden of numerous, low-dollar Consent Mail requests on the MC. As opportunities or needs arise, managers will notify the Aquatic Implementation Team and seek Avista approval prior to expending funds that were not specified within a Project Plan. Given it is an allocation and not related to a specific project, the Appendix A ranking criteria do not apply.

Goal
Provide engineering support to assist with the development of future fish habitat projects.

Objective
1. Provide funding for fish habitat biologists to perform preliminary site visits and review and assist with technical document preparation.

2. Fund a third-party contractor to identify and make initial contacts with willing landowners with the intent of developing future fish habitat projects.

Tasks
Specific tasks will be identified as necessary, but may include conducting initial site visits, providing conceptual design, assessing potential project feasibility, and developing preliminary agreements and cost estimates.

Work Products
- Annual Work Summary; due December 1, 2021
- Designs and cost estimates for specific projects will be reported in the form of Technical Memoranda or other appropriate documentation

Permitting Requirements
Not applicable for the tasks proposed in this project plan.

Endangered Species Act consultation for this project plan is associated with the 2019 Biological Opinion on the effects of continued operation of the Clark Fork Hydroelectric Project on Bull Trout and designated Bull Trout critical habitat (BiOp), and the U.S. Fish and Wildlife Service (USFWS)-Idaho Department of Fish and Game (IDFG) Cooperative Agreement pursuant to Section 6 of the Act. This project plan is consistent with the analysis and conclusions contained in the 2019 BiOp and the USFWS-IDFG Cooperative Agreement, and will adhere to all appropriate Terms and Conditions designed to reduce the extent and effects of incidental take on Bull Trout. No incidental take of Bull Trout is anticipated as a result of this project plan; therefore, no take reporting is required.

Cultural/Historic Resource Review
Not applicable for the tasks proposed in this project plan, there are no ground and/or vegetation disturbing activities, or proposed impacts to cultural/historic resources.

Benefit to the Resource
Projects developed using this allocation will be consistent with the Idaho Tributary Habitat Acquisition and Fishery Enhancement Program (Appendix A of the Clark Fork Settlement Agreement), through enhancement of tributary habitat conditions for native salmonids, including Bull Trout and Westslope Cutthroat Trout. As such, they will also be consistent with goals of the Fish Passage/Native Salmonid Restoration Plan Protection, Mitigation & Enhancement measure (Appendix C). Projects developed using this allocation will also be consistent with the Dissolved Gas Supersaturation Control, Mitigation, and Monitoring Program (Appendix F5) as they will likely identify options for improving spawning, rearing, and migratory habitat for focus species of the Appendix F5 mitigation program.

Tasks conducted under this allocation are also consistent with other established plans including the Lake Pend Oreille Bull Trout Conservation Plan (habitat enhancement; Resource Planning Unlimited 1999) and the IDFG Fisheries Management Plan; (IDFG 2019).

This allocation is designed to assist with the development of full fish habitat restoration/enhancement proposals with the goal of enhancing conditions for native salmonids. Project-specific benefits will be identified as a result of the use of this allocation.

Budget

Item	Estimated Carryover	2021 Budget Request
Engineering support	$0	$15,000
Outreach support	$0	$10,000
Total	$0	$25,000
Anticipated Expenditures		$25,000

Literature Cited

IDFG (Idaho Department of Fish and Game). 2019. Fisheries Management Plan 2019-2024. Boise, Idaho.

Resource Planning Unlimited. 1999. Lake Pend Oreille Bull Trout Conservation Plan. State of Idaho. Boise, Idaho.

2021 PROJECT PLAN

Habitat Restoration and Acquired Property Maintenance and Monitoring Allocation

Project Contact

Ken Bouwens, Idaho Department of Fish and Game (IDFG), (208) 769-1414
ken.bouwens@idfg.idaho.gov

Project History

The Habitat Restoration and Acquired Property Maintenance and Monitoring allocations have been continually approved separately since 2003. They were combined into one project plan in 2018. We request the continuation of this plan in 2021. The scope and budget for this project are reviewed by the Management Committee (MC) annually.

Background

Watershed restoration and assessment projects have been completed throughout the Lake Pend Oreille watershed aimed at improving habitat for native salmonid populations. While a substantial amount of habitat restoration still needs to be completed, ongoing minor maintenance and monitoring of completed restoration projects is also necessary to ensure that completed projects are functioning as intended. This allocation is also designed to provide an ongoing funding source to monitor, perform minor maintenance, and pay ongoing costs (weed control, etc.) associated with acquired properties. These expenses often arise throughout the year and this allocation is designed to be able to address these needs without burdening the MC for approval for each individual transaction.

Monitoring habitat restoration projects is important for both maintaining projects and for learning more about how various restoration techniques succeed. Monitoring under this allocation would be completed at various scales dependent on project magnitude and sensitivity. Lower intensity monitoring would consist of activities such as replicating photo-points or completing a qualitative “walk-through” assessment of the designated project. This scale of monitoring would typically be completed either for lower priority restoration projects or for projects which did not experience substantial changes due to flow conditions. Higher intensity monitoring would be more in-depth post construction surveys to include surveying cross-sections, longitudinal profiles, photo-points, and potentially channel geometry if substantial changes have occurred (e.g., channel avulsions).

Maintenance activities can vary depending on year and project. In general, this allocation is designed to deal with small-scale repairs, generally above the water line, that do not change the design of the original project or require additional engineering. Major repairs that include substantial in-water work or work that would be subject to additional engineering or permitting would generally be proposed as an individual project for MC approval.

This allocation is designed to provide managers with a means to rapidly respond to opportunities and needs as they arise, and to reduce the burden of numerous, low-dollar Consent Mail requests on the MC. As opportunities or needs arise, managers will notify the Aquatic Implementation Team and seek Avista approval prior to expending funds that were not specified within a Project

Plan. Given it is an allocation and not related to a specific project, the Appendix A ranking criteria do not apply.

Goal
Provide a stable funding mechanism to complete minor repairs and maintenance on existing habitat projects and acquired properties.

Objectives
1. Monitor previously completed habitat projects to ensure ongoing functionality and stability.

2. Perform minor maintenance to previously completed habitat projects as necessary.

3. Monitor existing properties for vandalism, etc.

4. Perform minor maintenance to existing properties as necessary.

5. Pay ongoing costs (weed control, etc.) associated with acquired properties.

Tasks
1. In 2021, we are expecting to perform weed control at previously-constructed habitat projects at Johnson Creek and Granite Creek.

Work Products
- Annual Work Summary; due December 1, 2021

Permitting Requirements
Any permits necessary for weed control activities will be acquired by the applicator. If activities are substantial enough to require additional permitting, then the project will be submitted to the MC for individual approval.

Endangered Species Act consultation for this project plan is associated with the 2019 Biological Opinion on the effects of continued operation of the Clark Fork Hydroelectric Project on Bull Trout and designated Bull Trout critical habitat (BiOp), and the U.S. Fish and Wildlife Service (USFWS)-Idaho Department of Fish and Game (IDFG) Cooperative Agreement pursuant to Section 6 of the Act. This project plan is consistent with the analysis and conclusions contained in the 2019 BiOp and the USFWS-IDFG Cooperative Agreement, and will adhere to all appropriate Terms and Conditions designed to reduce the extent and effects of incidental take on Bull Trout. No incidental take of Bull Trout is anticipated as a result of this project plan; therefore, no take reporting is required.

Cultural/Historic Resource Review
Work proposed under this allocation will either: 1) not involve any ground and/or vegetation disturbing activities or impact historic resources, or 2) will be performed under the cultural assessment associated with the original project.

Benefit to the Resource

Habitat projects and properties maintained and monitored using this allocation were found to be consistent with the Idaho Tributary Habitat Acquisition and Fishery Enhancement Program (Appendix A of the Clark Fork Settlement Agreement), through protection of tributary habitat for native salmonids, including Bull Trout and Westslope Cutthroat Trout. As such, they are consistent with goals of the Fish Passage/Native Salmonid Restoration Plan Protection, Mitigation, & Enhancement measure (Appendix C) and with the Dissolved Gas Supersaturation Control, Mitigation, and Monitoring Program (Appendix F5) as they protected spawning, rearing, and/or migratory habitat for focus species of the Appendix F5 mitigation program.

Tasks conducted under this allocation will be consistent with other established plans including the Lake Pend Oreille Bull Trout Conservation Plan (habitat enhancement; Resource Planning Unlimited 1999) and the IDFG (IDFG 2019).

Budget

Item	Estimated Carryover	2021 Budget Request
Task-specific costs	$0	$15,000
Law enforcement monitoring (cost share with Appendix G)	$0	$5,000
Total	$0	$20,000
Anticipated Expenditures		$20,000

Literature Cited

IDFG (Idaho Department of Fish and Game). 2019. Fisheries Management Plan 2019-2024. Boise, Idaho.

Resource Planning Unlimited. 1999. Lake Pend Oreille Bull Trout Conservation Plan. State of Idaho. Boise, Idaho.

2021 PROJECT PLAN

Priority Native Salmonid Habitat Acquisition and Conservation Allocation

Project Contact
Ken Bouwens, Idaho Department of Fish and Game (IDFG), (208) 769-1414,
ken.bouwens@idfg.idaho.gov

Project History
This project has been continually approved since 2003. We are requesting continuation of this project in 2021. The scope and budget for this project are reviewed by the Management Committee (MC) annually.

Background
This allocation was set up to support efforts in Idaho to acquire, protect, and improve the quality of critical native salmonid (Bull Trout and Westslope Cutthroat Trout) tributary habitat in high priority spawning streams. Land will be conserved through fee title purchase or through placement of conservation easements, working only with willing sellers and cooperators. As with the previously approved habitat acquisition proposals, purchases of specific individual parcels or conservation easements will be presented individually for MC approval. This allocation is designed to provide support to investigate potential land conservation opportunities and to perform due diligence (title report, baseline research, survey, appraisal, negotiations, etc.) to ready potential transactions for presentation to the MC.

We intend to continue our partnership with a third party to provide annual funding to help identify, negotiate, and facilitate land conservation actions. This partnership allows the involvement of an entity who is well versed in land conservation and the local markets to monitor the market and can begin discussions with willing landowners as appropriate.

No land acquisitions or conservation easements are currently being evaluated at this time. However, due to the rapid pace associated with the real estate market, having funds on hand to begin discussions and perform due diligence on perspective opportunities is imperative.

This allocation is designed to provide managers a means to rapidly respond to opportunities and needs as they arise, and to reduce the burden of numerous, low-dollar Consent Mail requests on the MC. As opportunities or needs arise, managers will notify the Aquatic Implementation Team and seek Avista approval prior to expending funds that were not specified within the Project Plan.

Goal
Identify and quickly respond to potential land acquisition opportunities.

Objective
1. Continue to provide support to investigate potential land conservation opportunities.

2. Perform due diligence to ready potential transactions for presentation to the MC.

Tasks

1. Fund a third-party contractor to provide outreach support. (Objective 1)

2. Cover due diligence costs (e.g., title report, baseline research, survey, appraisal, negotiations on potential land actions) on potential new acquisitions/easements to ready them for MC approval. (Objective 2)

Work Products

- Annual Work Summary; due December 1, 2021

Permitting Requirements

Not applicable for the tasks proposed in this project plan.

Endangered Species Act consultation for this project plan is associated with the 2019 Biological Opinion on the effects of continued operation of the Clark Fork Hydroelectric Project on Bull Trout and designated Bull Trout critical habitat (BiOp), and the U.S. Fish and Wildlife Service (USFWS)-Idaho Department of Fish and Game (IDFG) Cooperative Agreement pursuant to Section 6 of the Act. This project plan is consistent with the analysis and conclusions contained in the 2019 BiOp and the USFWS-IDFG Cooperative Agreement, and will adhere to all appropriate Terms and Conditions designed to reduce the extent and effects of incidental take on Bull Trout. No incidental take of Bull Trout is anticipated as a result of this project plan; therefore, no take reporting is required.

Cultural/Historic Resource Review

Not applicable for the tasks proposed in this project plan, there are no ground and/or vegetation disturbing activities, or proposed impacts to cultural/historic resources. Avista will review any land acquisitions that result from this project plan to determine if further Cultural/historic resource review is necessary.

Benefit to the Resource

Property conservation actions considered using this allocation would be consistent with the Idaho Tributary Habitat Acquisition and Fishery Enhancement Program (Appendix A of the Clark Fork Settlement Agreement), through protection of tributary habitat for native salmonids, including Bull Trout and Westslope Cutthroat Trout. As such, they would also be consistent with goals of the Fish Passage/Native Salmonid Restoration Plan Protection, Mitigation, and & Enhancement measure (Appendix C), and the Dissolved Gas Supersaturation Control, Mitigation, and Monitoring Program (Appendix F5) as they would protect spawning, rearing, and/or migratory habitat for focus species of the Appendix F5 mitigation program.

This allocation is designed to assist with land acquisitions; therefore, depending on the particular property, the benefitted species and exactly how that land action benefits those species may change. However, priority will be placed upon properties that surround streams that support native salmonids.

Budget

Item	Estimated Carryover	2021 Budget Request
Outreach support	$0	$25,000
Due diligence costs	$0	$35,000
Total	$0	$60,000
Anticipated Expenditures		$60,000

2021 PROJECT PLAN

Idaho Field Station Construction, Furnishing, and Operation

Project Contact

Ken Bouwens, Idaho Department of Fish and Game (IDFG), (208) 769-1414,
ken.bouwens@idfg.idaho.gov

Project History

This is a continuation of the Idaho Field Station project first approved in 2017, with construction expected to be complete in early- to mid-2021. We seek continuation of this project with a name change from "Idaho Field Station Construction" to "Idaho Field Station Construction, Furnishing, and Operation" and changes to scope and budget for 2021. The budget will be a cost share with Appendix F5.

Background

The Idaho Department of Fish and Game (IDFG) opened the Clark Fork Hatchery in the early 1930s. In 1979 Infectious Pancreatic Necrosis (IPN) was documented in the hatchery. Despite efforts to eradicate the virus, the facility was closed as a hatchery in 2000 due to the presence of this pathogen. Since 2000 the facility has been repurposed as a field office for IDFG and Avista staff working on Clark Fork Settlement Agreement (CFSA) projects. However, due to the uncertainty of the ultimate disposition of the facility, only the most essential maintenance has been performed and the buildings have fallen into disrepair.

In 2016 studies were conducted to determine the suitability of maintaining and upgrading the facility to meet CFSA needs into the future. An analysis of the major systems (electrical/plumbing/septic/and structural integrity) indicated that substantial work would be necessary to maintain and modify the current facility to meet current needs (McMillen Jacobs Associates 2016). It was also determined that the cost of performing these upgrades would be greatly inflated by the presence of hazardous materials (lead paint and asbestos) in the existing buildings (URS 2016). Avista and IDFG have jointly determined that the best path forward was to construct a new facility.

In 2020, the MC approved construction of a new field station at Trestle Creek. Construction plans were developed (Figures 1 and 2; H2A 2020a, 2020b), a contractor was hired, and construction began in fall 2020. Unfortunately, final construction costs may exceed the amount approved in 2020. This project plan has been modified to include additional costs associated with construction, to furnish the facility, equip the shop, and to provide funding for ongoing operational costs such as utilities and minor maintenance.

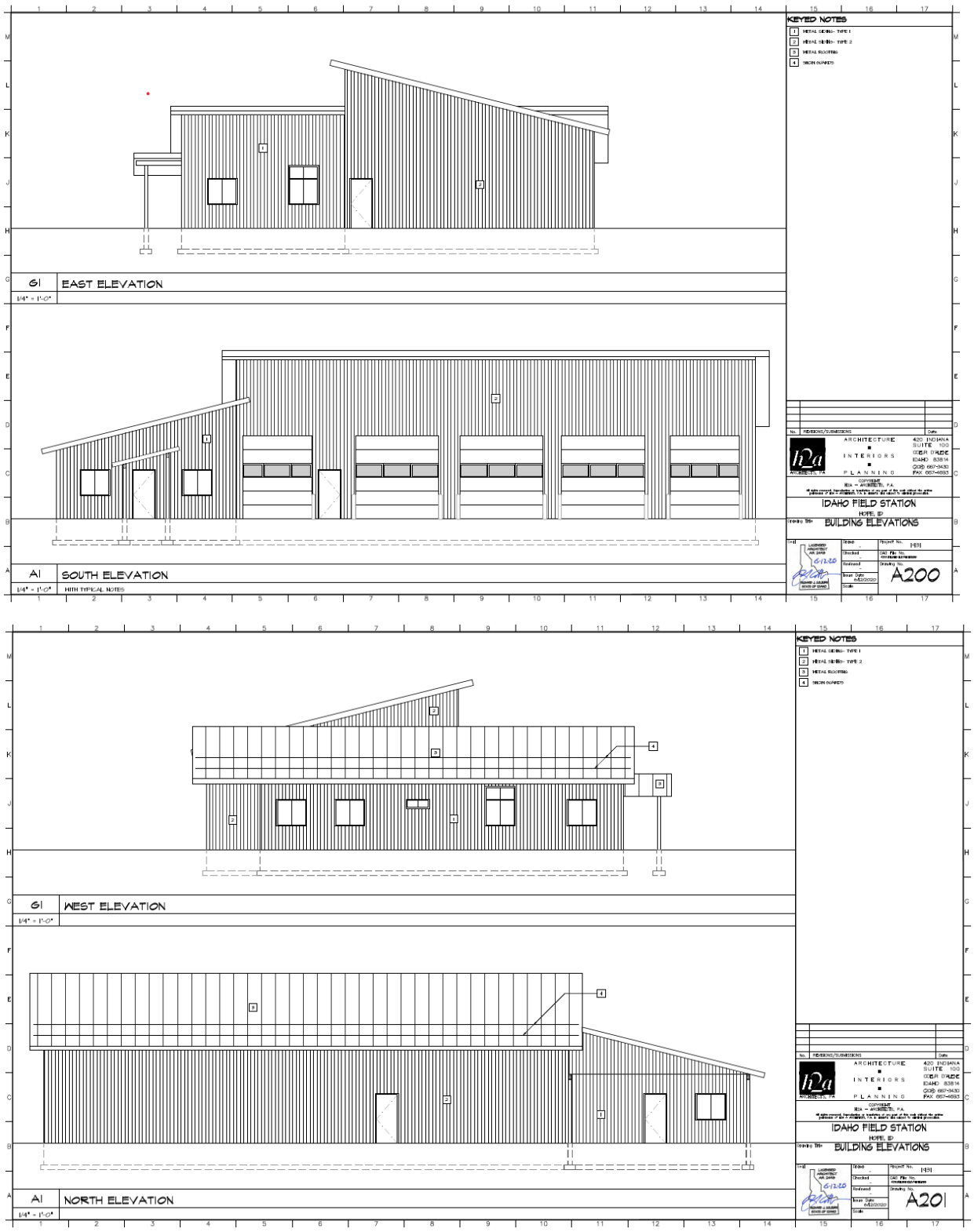


Figure 1. Elevation drawings of the Idaho Field Station.

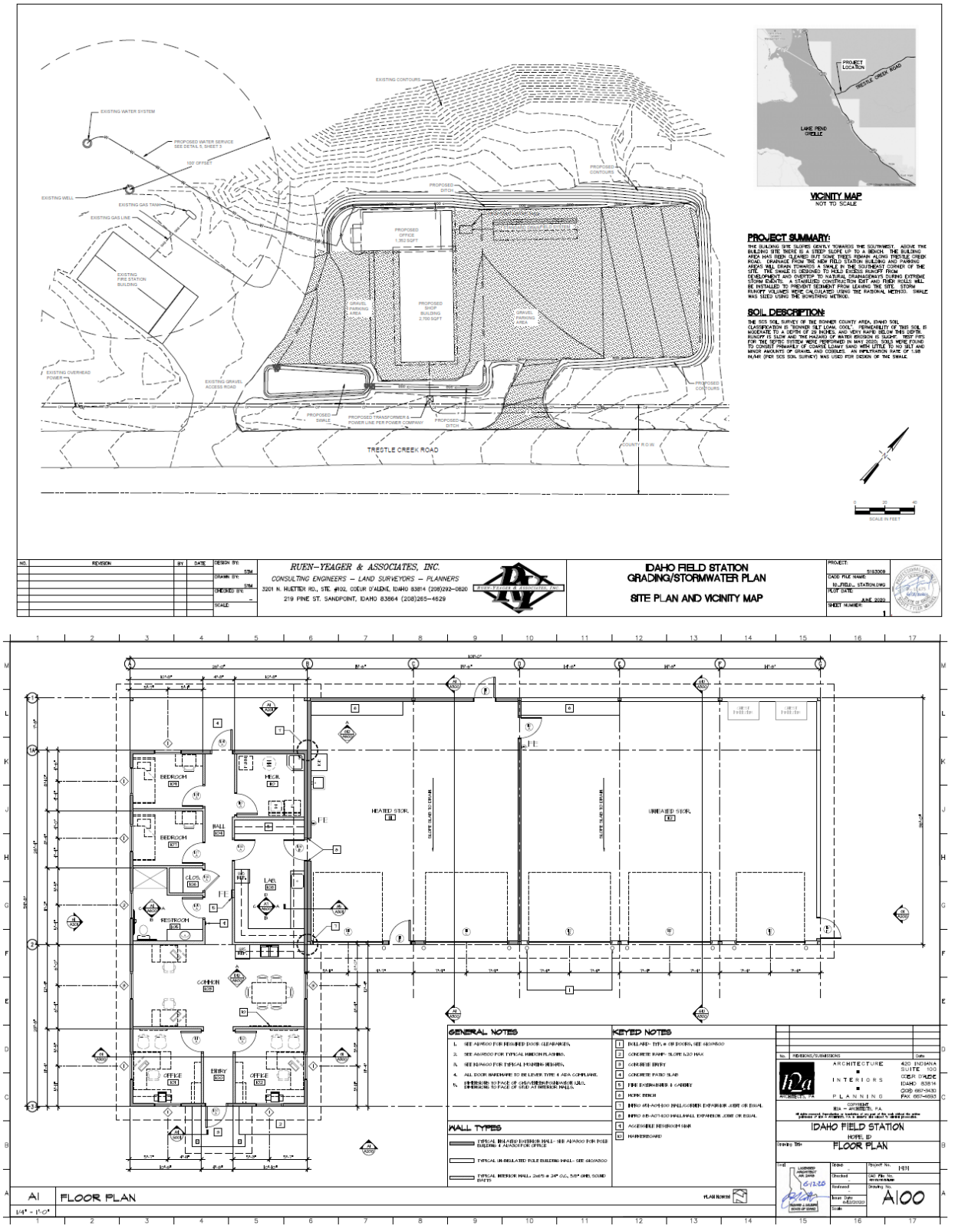


Figure 2. Site and floor plans of the Idaho Field Station.

Goal
Build and operate a new field station from which CFSA activities can be implemented.

Objectives
1. Complete construction of the Idaho Field Station.

2. Furnish and equip the office, lab, and shop.

3. Provide a mechanism to address ongoing utility and operational costs.

Tasks
1. Pay remaining construction contract and construction management costs and receive a notice of occupancy. (Objective 1)

2. Procure appropriate office furniture and appliances. (Objective 2)

3. Procure appropriate lab equipment. (Objective 2)

4. Procure appropriate shop equipment. (Objective 2)

5. Connect and maintain appropriate telecom and electrical services. (Objective 2 and 3)

6. Conduct routine minor maintenance to the facility as necessary. (Objective 3)

Work Products
- All work performed for this project plan in 2021 will be documented in an Annual Work Summary; due December 1, 2021

Permitting Requirements
All permits were obtained by the consultant and Avista in 2020.

Endangered Species Act consultation for this project plan is associated with the 2019 Biological Opinion on the effects of continued operation of the Clark Fork Hydroelectric Project on Bull Trout and designated Bull Trout critical habitat (BiOp), and the U.S. Fish and Wildlife Service (USFWS)-Idaho Department of Fish and Game (IDFG) Cooperative Agreement pursuant to Section 6 of the Act. This project plan is consistent with the analysis and conclusions contained in the 2019 BiOp and the USFWS-IDFG Cooperative Agreement, and will adhere to all appropriate Terms and Conditions designed to reduce the extent and effects of incidental take on Bull Trout. No incidental take of Bull Trout is anticipated as a result of this project plan; therefore, no take reporting is required.

Cultural/Historic Resource Review
Avista received approval from the Idaho State Historic Preservation Office and the Cultural Resource Management Group in 2020 for construction of the field station. The work product for this review is confidential due to the sensitive nature of the content.

Benefit to the Resource
The majority of IDFG- and Avista-supported Appendix A and F5 projects will be conducted from this facility, and therefore this project directly supports and adds to the resource benefits of all those projects.

Budget
The 2020 budget request ($750,000 from Appendix A and F5 combined) may be insufficient to complete construction. Therefore, an additional $20,000 is being requested to complete construction.

Item	Estimated Carryover	2021 Budget Request
Completion of construction and construction management	$573,131*	$20,000
Office Furnishings	$0	$15,650
Lab Equipment and Supplies	$0	$1,500
Shop Equipment and Supplies	$0	$8,500
Avista technician time for moving to the new office (0.1 FTE)	$0	$10,000
Operational (electric, phone, IT, plowing, trash, etc.)	$0	$7,000
Total	$573,131	$62,650
Anticipated Expenditures		$635,781

* This value includes $375,000 transferred from Appendix F5 to Appendix A in 2020.

The construction and operational costs for this project are a cost share with Appendix F5. In addition to the 2021 Appendix A budget request above, there is a request in the amount of $30,000 from Appendix F5 ($20,000 for construction and $10,000 for operational).

Literature Cited
H2A. 2020a. Idaho Field Station 100% Design Drawings. H2A Architects, PA. Coeur d'Alene, Idaho.

H2A. 2020b. Idaho Field Station Technical Specifications. H2A Architects, PA. Coeur d'Alene, Idaho.

McMillen Jacobs Associates. 2016. Clark Fork Hatchery Site Evaluation Technical Memorandum. McMillen Jacobs Associates: Boise, Idaho.

URS. 2016. Asbestos-Containing Building Material and Lead Paint Survey and Assessment Report. DPW Project # 17905. Clark Fork Fish Hatchery Complex. URS: Salt Lake City, Utah.

2021 PROJECT PLAN

Pack River Watershed Management Plan Addendum

Project Contact

Jessica Erickson, Watershed Coordinator, Pack River Watershed Council (PRWC), (208) 255-5545, bluedeleeuw@gmail.com *and*
Ken Bouwens, Idaho Department of Fish and Game (IDFG), (208) 769-1414, ken.bouwens@idfg.idaho.gov

Project History

This is a continuing project for 2021. The Water Resources Technical Advisory Committee ranked this project on January 22, 2019. Changes have been made to the scope and budget of the project.

Background

The Pack River watershed is the second largest tributary system to Lake Pend Oreille. A variety of native and non-native species utilize the Pack River and its tributaries including Bull Trout and Westslope Cutthroat Trout. This watershed is an important area for native fish and as such, portions of the Pack River watershed have been designated as priority habitat for efforts associated with Appendix E and Appendix A of the Clark Fork Settlement Agreement.

The Pack River is currently included on the State of Idaho's list of water quality impaired waterbodies. Cold-water biota, salmonid spawning, and primary and secondary contact recreation are impaired or not fully supported in the Pack River watershed due to excess sediment, temperature, and nutrients.

In 2001, the Pack River Watershed Council (PRWC), formed in response to the Endangered Species Act listing of Bull Trout and concerns about water quality impairments and observed bank erosion. The PRWC formed a collaborative partnership with the Tri-State Water Quality Council, the Bonner Soil and Water Conservation District, and the Natural Resources Conservation Service to recruit a Technical Advisory Committee (TAC) to help create a watershed management plan that would protect the natural resources of the Pack River and its tributaries.

The Pack River Watershed Management Plan and Total Maximum Daily Load (TMDL) Implementation Plan was completed in 2006 (BSWCD 2006).This document provides general strategies for protecting and improving water quality and includes on-the-ground project recommendations divided into several categories including: development/waterfront property, stormwater, transportation/roads, forestry/agriculture, riparian/buffer zone protection and rehabilitation, tributaries, and stream channels.

Since the development of the Pack River Watershed Management Plan and TMDL Implementation Plan, other watershed assessments have been completed in the Pack River Watershed including the Upper Pack River Stressor Identification (TerraGraphics Environmental Engineering 2006a), McCormick Creek Stressor Identification (TerraGraphics Environmental

Engineering 2006b), Grouse Creek Watershed Assessment and Restoration Prioritization Plan (River Design Group 2009), the Pend Oreille Lake and Tributaries TMDL 5-year Review (IDEQ 2017), and the Grouse Creek Reassessment and Prioritization Plan Update (River Design Group 2018). More recently, a habitat evaluation for Caribou and Hellroaring Creeks was completed in 2019 (GeoEngineers 2019) and a similar evaluation for the upper Pack River and McCormick Creek was completed in 2020 (GeoEngineers 2020).

The Pack River Watershed Management Plan and TMDL Implementation Plan needs to be updated to include the recommendations from the most recent assessments. Initially the update was to be in the form of an addendum to the management plan and would identify and prioritize conservation/restoration/enhancement projects by sub-watershed. This would be a user-friendly living document that can be revised annually and will provide updates on project implementation progress.

In July of 2019, the PRWC met with members of the TAC to develop a strategic restoration plan for the Pack River watershed with the goal to identify and prioritize specific projects that benefit native salmonids by enhancing fish habitat and improving watershed function. The TAC decided it would be beneficial to identify projects specific to each sub-watershed and then prioritize sub-watersheds with a top to bottom approach. It was decided that a small working group consisting of representatives from the Idaho Department of Fish and Game (IDFG), Avista, U.S. Forest Service, Natural Resources Conservation Service, and Trout Unlimited would form a core team that would perform the majority of the work, but would report to a broader review team consisting of interested agencies, citizen groups, or other entities.

Implementation of formal meetings and planning was set to kick off in early 2020, but was not conducted due to the Covid-19 pandemic. This proposal requests to extend the timeline of the project by a year to account for this delay. In addition, we request that the plan would a stand-alone document entitled “Pack River Native Salmonid Restoration Plan” instead of an addendum to the existing plan developed by the Idaho Department of Environmental Quality.

Goal
Develop a document that will help stakeholders enhance the quality of the Pack River watershed’s natural resources, increase available habitat, and ensure the success of restoration efforts.

Objective
1. Develop a stand-alone document (previously anticipated to be an addendum) complimentary to the Pack River Watershed Management Plan and TMDL Implementation Plan which includes recommendations and updates from the Pend Oreille Lake and Tributaries TMDL 5-year Review, as well as other Watershed Assessments and Habitat Prioritization Evaluations.

Tasks
1. Summarize existing documentation from assessments conducted in the Pack River watershed, reorganizing it into sub-watersheds.

2. List completed conservation/restoration/enhancement projects by sub-watershed.

3. Identify recommended conservation/restoration/enhancement projects, and organize by sub-watershed.

Work Products

- Annual Work Summary; due December 1, 2021
- Pack River Native Salmonid Restoration Plan; final due November 1, 2022

Permitting Requirements

Not applicable for the tasks proposed in this project plan.

Endangered Species Act consultation for this project plan is associated with the 2019 Biological Opinion on the effects of continued operation of the Clark Fork Hydroelectric Project on Bull Trout and designated Bull Trout critical habitat (BiOp), and the U.S. Fish and Wildlife Service (USFWS)-IDFG Cooperative Agreement pursuant to Section 6 of the Act. This project plan is consistent with the analysis and conclusions contained in the 2019 BiOp and the USFWS-IDFG Cooperative Agreement, and will adhere to all appropriate Terms and Conditions designed to reduce the extent and effects of incidental take on Bull Trout. No incidental take of Bull Trout is anticipated as a result of this project plan; therefore, no take reporting is required.

Cultural/Historic Resource Review

Not applicable for the tasks proposed in this project plan, there are no ground and/or vegetation disturbing activities, or proposed impacts to cultural/historic resources.

Benefit to the Resource

This project is consistent with the Watershed Councils Program (Appendix E), as well as the Idaho Tributary Habitat Acquisition and Fishery Enhancement Program (Appendix A), as updating the Pack River Management Plan and TMDL Implementation Plan, organized by sub-watershed, will provide a clear and concise format to document past projects as well as identify and prioritize future conservation/restoration/enhancement projects. The Pack River is the second largest tributary to Lake Pend Oreille, and is ranked as a high-priority for restoration and protection under the lake's Key Watershed Bull Trout Problem Assessment (PBTAT 1998).

Budget

Item	Estimated Carryover	2021 Budget Request
Report writing (FTE 0.16)	$0	$5,000
Administration fee (15% of expended funds)	$0	$750
Total	$0	$5,750
Anticipated Expenditures		$5,750

Literature Cited

BSWCD (Bonner Soil and Water Conservation District, Pack River Technical Advisory Committee, Pack River Watershed Council). 2006. Pack River Watershed Management Plan and TMDL Implementation Plan. Bonner County, ID.

GeoEngineers. 2019. Habitat Prioritization Evaluation for Caribou and Hellroaring Creeks. Spokane, WA. Prepared for Avista and the Idaho Dept. of Fish and Game.

GeoEngineers. 2020. Habitat Prioritization Evaluation for McCormick Creek and Upper Pack River. Spokane, WA. Prepared for Avista and the Idaho Dept. of Fish and Game.

IDEQ (Idaho Department of Environmental Quality). 2017. Pend Oreille Lake and Tributaries TMDL 5-year Review.

PBTAT (Panhandle Bull Trout Technical Advisory Team). 1998. Lake Pend Oreille Key Watershed Bull Trout Problem Assessment. Prepared for Lake Pend Oreille Watershed Advisory Group and the State of Idaho. Boise, Idaho.

River Design Group. 2009. Grouse Creek Watershed Assessment and Restoration Prioritization Plan Final Report. Whitefish, Montana. Prepared for Avista Corporation. Noxon, Montana.

River Design Group. 2018. Grouse Creek Reassessment and Restoration Prioritization Plan Final Update. Whitefish, Montana. Prepared for Avista Corporation. Noxon, Montana.

TerraGraphics Environmental Engineering. 2006a. Upper Pack River Stressor Identification. Kellogg, ID.

TerraGraphics Environmental Engineering. 2006b. McCormick Creek Stressor Identification. Kellogg, ID.

2021 PROJECT PLAN

Lower Clark Fork River Minimum Flow and Water Temperature Monitoring

Project Contact

Paul Kusnierz, Avista, (406) 847-1274, paul.kusnierz@avistacorp.com *and*
Bob Steed, Idaho Department of Environmental Quality (IDEQ), (208) 769-1422, Robert.steed@deq.idaho.gov

Project History

This is a continuing project for 2021. It is projected to be conducted from 2019–2024. The Water Resources Technical Advisory Committee ranked this project on January 22, 2019. The project was first approved by the Management Committee (MC) in 2019. The scope and budget will be reviewed annually by the MC. The scope and budget for this project in 2021 will remain the same as in 2020.

Background

In the fall of 2017, the parties to the Clark Fork Settlement Agreement (CFSA) agreed to Amendment No. 1 of the CFSA. Section 2.5 of Amendment No. 1 states that "Avista shall implement minimum flow releases of 3,000 cfs below Cabinet Gorge Dam, except for the period of September 15 through October 31 of each year when the minimum flow requirement will be 5,000 cfs below Cabinet Gorge Dam." The 3,000 cfs minimum flow is a reduction from the 5,000 cfs minimum flow identified in Article 429 of the project license issued February 23, 2000. On December 18, 2017, FERC approved this minimum flow change and amended license Article 429 to specify a minimum total project discharge of 3,000 cfs from November 1 to September 14, and 5,000 cfs from September 15 to October 31. On June 11, 2018, the IDEQ submitted a letter to Avista requesting that Avista collaborate with IDEQ through the CFSA to develop and implement a temperature sampling project on the lower Clark Fork River.

Goal

The goal of this project is to determine if discharges from Cabinet Gorge Dam at 3,000 cfs result in temperature changes in the lower Clark Fork River upstream from Lake Pend Oreille influence different than discharges at 5,000 cfs.

Objective

1. Determine the relationship between discharge flow and water temperatures in the Clark Fork River downstream from Cabinet Gorge Dam to evaluate whether discharges from Cabinet Gorge Dam at 3,000 cfs result in changes to temperatures in the lower Clark Fork River upstream from Lake Pend Oreille influence as compared to discharges at 5,000 cfs.

Tasks

1. In consultation with IDEQ, Develop Sampling and Analysis Plan and Quality Assurance Project Plan. (Objective 1; ***Completed in 2019***)

2. Deploy and maintain temperature data loggers (Table 1) and download, and report temperature and flow data for five years. (Objective 1)

3. Collect cross-section temperature data and develop technical memorandum in consultation with IDEQ. (Objective 1; ***Completed in 2019***)

Table 1. Temperature data logger locations in 2021.

Stream	Site name	River Km	Latitude	Longitude
Clark Fork River	Temperature Station 1/Clark Fork River USGS gage	13.0	48.087351	-116.073078
Clark Fork River	Temperature Station 2	4.5	48.126804	-116.159274

Work Products

- Temperature monitoring data for the two sites; due November 1, 2021
- Annual Work Summary; due December 1, 2021
- Annual Project Update; final due December 1, 2021
- Annual Project Update; final due December 1, 2022
- Annual Project Update; final due December 1, 2023
- Project Completion Report; Five-Year Report, (all data); final due December 1, 2024

Permitting Requirements

Not applicable for the tasks proposed in this project plan.

Endangered Species Act consultation for this project plan is associated with the 2019 Biological Opinion on the effects of continued operation of the Clark Fork Hydroelectric Project on Bull Trout and designated Bull Trout critical habitat (BiOp). This project plan is consistent with the analyses and conclusions contained in the 2019 BiOp and will adhere to all appropriate Terms and Conditions designed to reduce the extent and effects of incidental take on Bull Trout. No incidental take of Bull Trout is anticipated as a result of this project plan; therefore, no take reporting is required.

Cultural/Historic Resource Review

Not applicable for the tasks proposed in this project plan, there are no ground and/or vegetation disturbing activities, or proposed impacts to cultural/historic resources.

Benefit to the Resource

The CFSA parties' agreement to the lower minimum flow of 3,000 cfs is based on aquatic habitat and fisheries studies performed under Appendix A over the last decade by the Idaho Department of Fish and Game. This research indicated that when minimum flow was increased to 5,000 cfs there were no trends in abundance of Brown Trout, Mountain Whitefish, Rainbow Trout and Rainbow Trout x Westslope Cutthroat Trout hybrids, and Westslope Cutthroat Trout (Ryan and Jakubowski 2012). However, these studies did not include an evaluation of effects on water quality, specifically, Clark Fork River water temperatures and effects to native salmonids or other cold water aquatic life. The monitoring associated with this project plan will help fill this gap in understanding and assist with the management of fishes that utilize the lower Clark Fork River.

Budget

Item	Estimated Carryover	2021 Budget Request
Technician labor (0.09 FTE)	$3,215	$7,500
Biologist labor (0.02 FTE)	$0	$3,000
Temperature data loggers and deployment equipment	$0	$1,500
Total	$3,215	$12,000
Anticipated Expenditures		$15,215

A match of $2,400 will be provided by IDEQ covering employee time spent reviewing data and reports.

Literature Cited

Ryan, R., and R. Jakubowski. 2012. Lower Clark Fork River Fishery Assessment Project Completion Report. Report to Avista Corporation. Noxon, Montana.

2021 PROJECT PLAN

Trestle Creek Habitat Enhancement Project Phase I

Project Contact

Ken Bouwens, Idaho Department of Fish and Game (IDFG), (208) 769-1414,
ken.bouwens@idfg.idaho.gov

Project History

This project was ranked by the WRTAC on January 21, 2020 and approved by the Management Committee in 2020. The scope and budget have been modified to complete design drawings and begin construction in 2021.

Background

Located approximately three miles northwest of Hope, Idaho, Trestle Creek is a third order watershed that encompasses 14,713 acres and includes several smaller tributaries (Figure 1). Trestle Creek watershed's stream density is 1.56 miles of streams per square mile, and the relatively high drainage density and generally steep slopes lead to rapid flood events. This watershed drops 3,300 feet in elevation from the divide across from Quartz Creek to Lake Pend Oreille (LPO).

FIGURE 1. Map of the Trestle Creek watershed. Cross symbols depict ½ km stream increments.

Trestle Creek is a high priority watershed because of the presence of Bull Trout spawning and rearing habitat. It contains some of the highest quality Bull Trout habitat remaining in the LPO /lower Clark Fork River tributary system (PBTTAT 1998). During the past 20 years of Bull Trout redd counts, Trestle Creek has had the overall highest average number of redds. At 223, it's nearly twice as many redds on average as any other tributary where redds are surveyed annually (Jakubowski and Bouwens 2018). However, the number of Bull Trout redds counted in the watershed has been declining steadily since the mid-2000s (Figure 2) and are declining

disproportionately with respect to the rest of the LPO tributaries (Figure 3; Alta 2019), indicating the problem was likely occurring within Trestle Creek, not LPO.

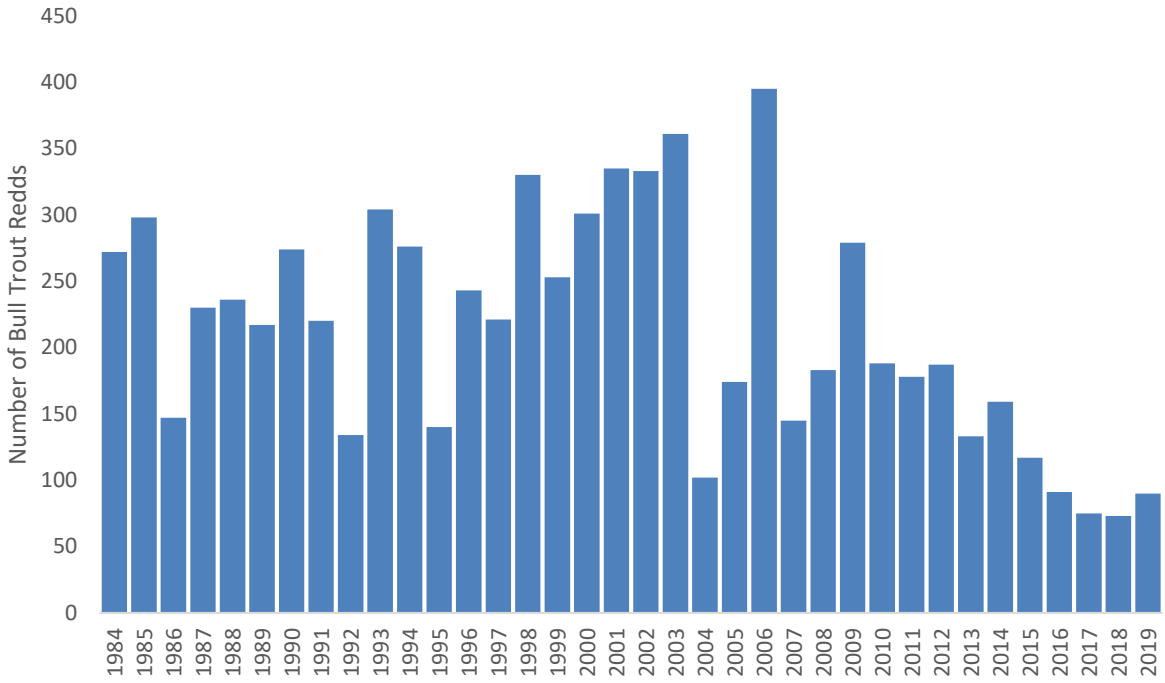


FIGURE 2. Number of Bull Trout redds counted in Trestle Creek, 1984 through 2019.

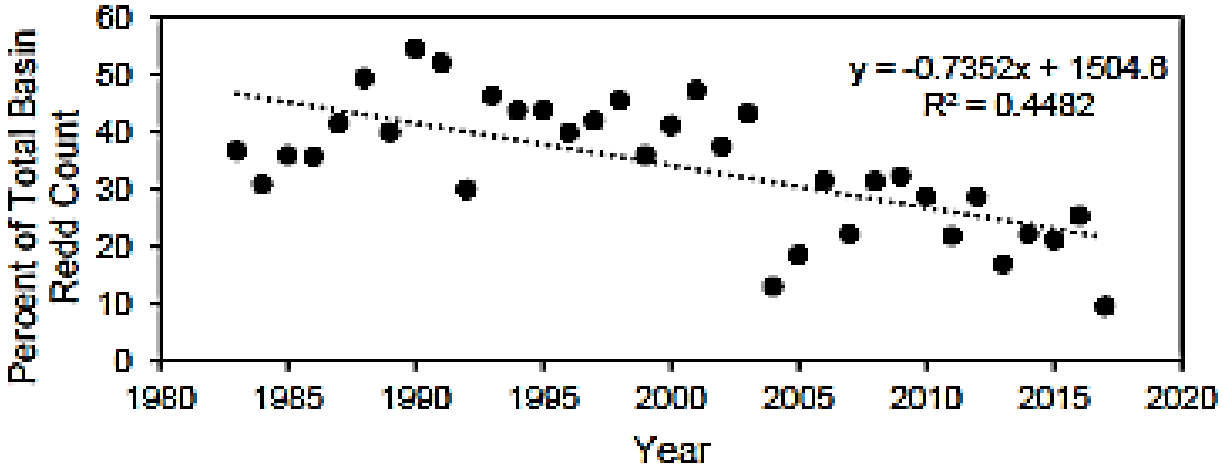


FIGURE 3. Trestle Creek Bull Trout redds as a percentage of the total number of Bull Trout redds counted per year in the LPO basin, 1984–2017. Figure from Alta (2019).

This information inspired the Trestle Creek Habitat Prioritization Evaluation study (Alta 2019). This Clark Fork Settlement Agreement (CFSA)-funded project evaluated Trestle Creek's habitat, geomorphic and riparian condition, and identified areas of degradation and prioritized actions to benefit native salmonids- including Bull Trout. A specific area of impairment was not identified that could account directly for Bull Trout declines. However, numerous areas were identified that

could be improved to increase spawning and rearing conditions for juvenile Bull Trout (Figure 4), and specific projects were proposed to address these impairments. Construction in 2021 will address areas that were identified as severely impaired (Figure 4; Alta 2019).

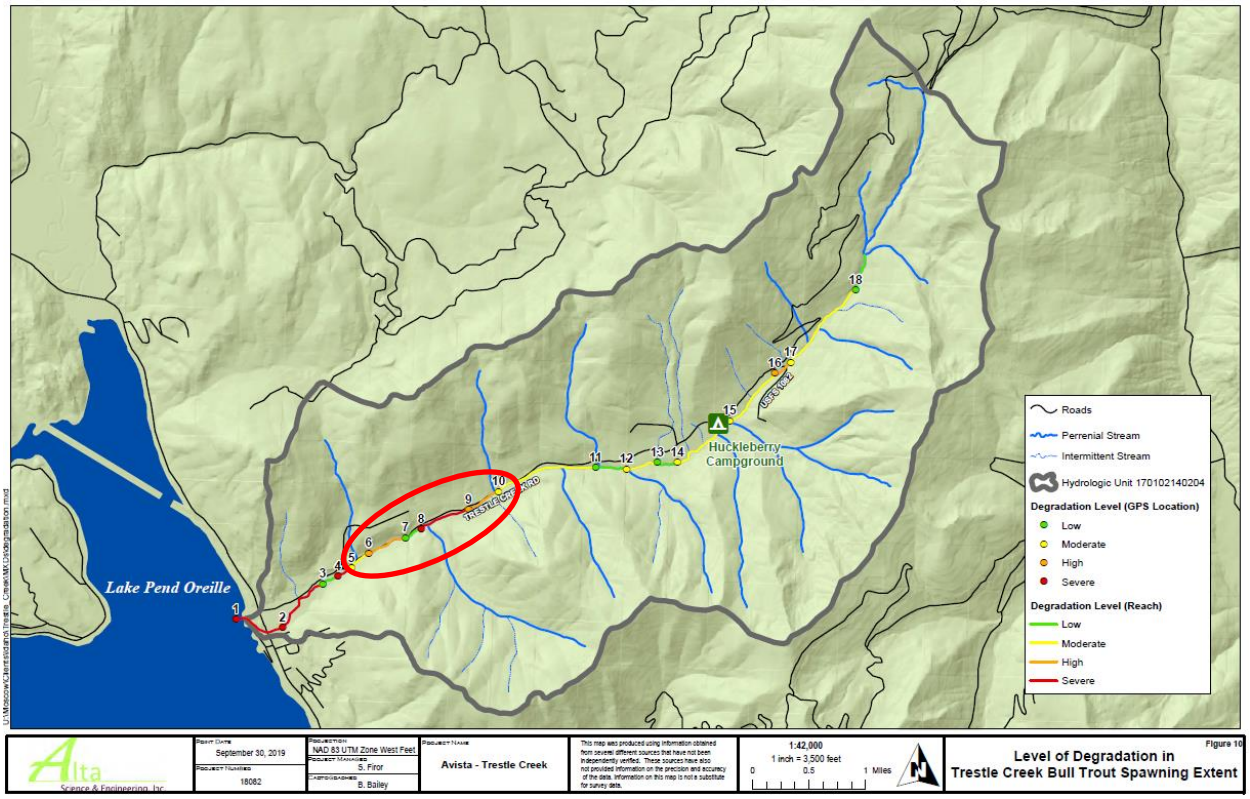


FIGURE 4. Areas of degradation in Trestle Creek. Project area is circled in red. Figure from Alta (2019).

Prioritizing the order to complete these projects can be difficult. In the case of Trestle Creek, an opportunity exists to work with the Federal Highways' Federal Land Access Program (FLAP) and Bonner County to address areas where Trestle Creek Road directly impacts Trestle Creek. The FLAP is designed to provide funding to non-federal entities to increase access to Federal lands. In this case, Trestle Creek Road is owned and maintained by Bonner County. Beginning in 2020, funds prioritized preliminary engineering and topography survey data collection to begin designing habitat rehabilitation as part of the upgrades to Trestle Creek Road. The priority of the road project is to increase the quality of Trestle Creek Road while reducing impacts to Trestle Creek. Drainage will be improved, the road will be widened where possible, and the road will be paved to reduce sedimentation to Trestle Creek and improve drivability. This project will address areas where we can work collaboratively with the FLAP project to provide additional native fish habitat protection and enhancement in coordination with the planned road construction. For example, this project will focus on separating Trestle Creek from the road prism where possible; when not possible, goals include increasing the riparian buffer between the road and the stream (Figure 5). The intent is to partner with the road engineers to blend the FLAP's and the CFSA's priorities into a project beneficial to all. Achieving this goal with the various partners will require additional levels of coordination and engineering collaboration beyond what is typical for a fish habitat project.

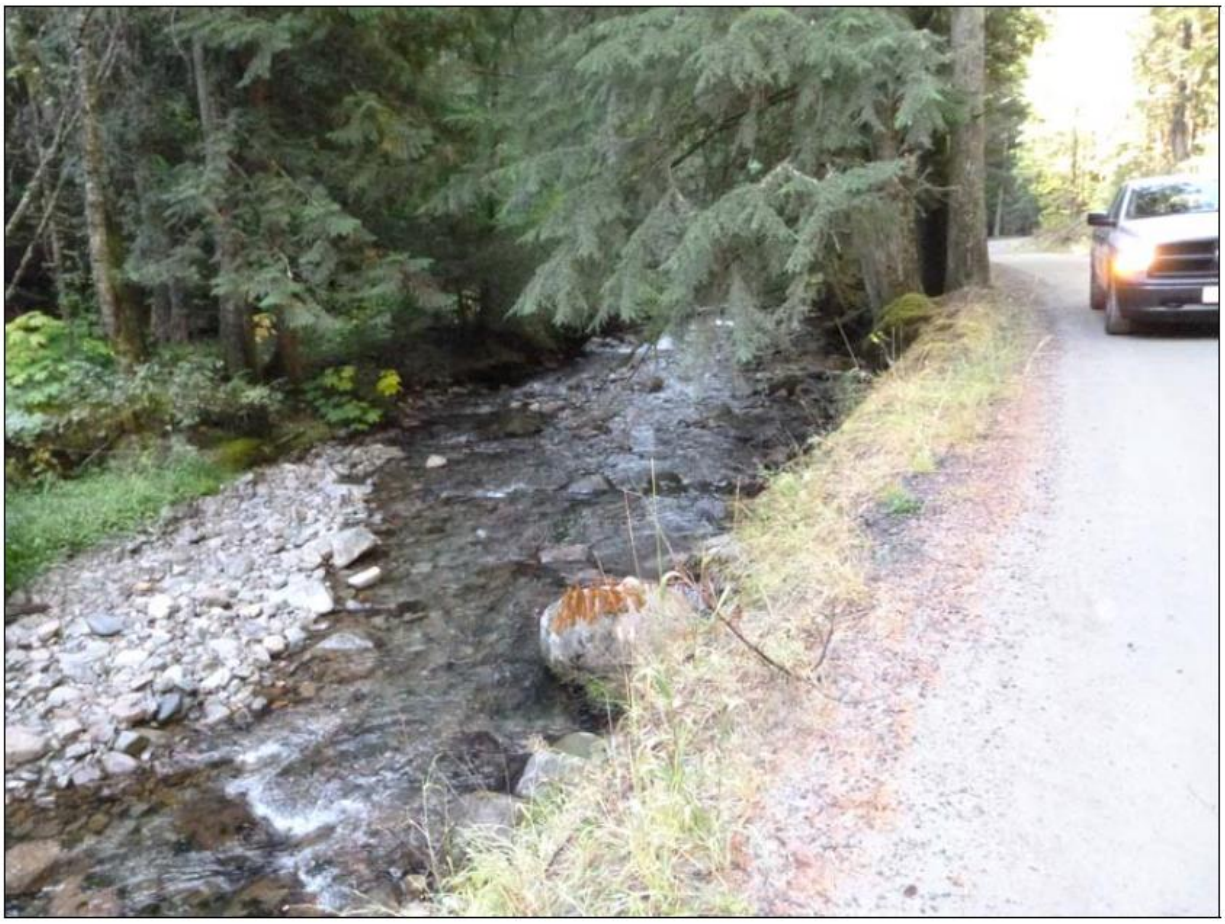


Figure 5. Streambank adjacent to Mile 1.3 of Trestle Creek Road.

This proposed project will require coordination and collaboration between our fisheries/hydraulic engineer with the road design team to ensure protection of critical Bull Trout habitat in Trestle Creek. As the road design advances, our team will ensure consideration of fisheries habitat features. Using natural elements such as large trees and boulders, our hydraulic engineer will work with the road engineers to encourage natural processes that will minimize future road bank erosion. In addition, our design goals will include protection of the stream from further road impacts such as limited riparian or floodplain interaction and sediment inputs. Hydraulic features that encourage Bull Trout habitat, such as deflection barbs and increased pool density, will be used to ensure the roadway design has minimal negative impacts to the adjacent stream. This will involve an iterative and collaborative design process using multiple expertise from the partners. The culmination will be mutually acceptable design drawings and cost estimates for projects to be implemented in 2021 and beyond.

Three specific project areas were identified for construction in 2021 (Figure 6). A common intent in all projects is to use native wood and materials to manipulate the hydraulics and increase pool density and hydraulic roughness. Project 1, the most upstream project, will specifically focus to push water to the left remnant channel and inundate the left floodplain. There is a fork at this

location where the left channel will become the primary channel alleviated hydraulic pressure from the roadbed. Wood will be relocated to the toe of the eroding bank below the road to reduce shear stress and velocities causing scour. The Project 2 area will focus on removing some trees that are blocking the left channel and floodplain and similarly use these to protect from the right losing bank below the road. Large equipment will be used on the left channel through this area to encourage the left channel to become primary, which will effectively move much of the flow away from the road while also creating additional rearing and lateral habitat and floodplain inundation. Project 3 is located at extremely steep sections of roadbed where the County maintains practice of dumping rip rap rock into the channel to protect from erosion. The project intent is to roughen the right bank with native large wood (versus riprap), effectively reducing the ability for downstream transfer of shear stress and creating lateral pockets of habitat for juvenile fish. Wood will be strategically located to deflect the creek away from the road and improve rearing pools and lateral habitat.

Figure 6. Map of 2021 habitat projects in Trestle Creek.

Goal
Restore and improve Bull Trout habitat in Trestle Creek while protecting it from impacts associated with Trestle Creek Road.

Objectives

1. Continue to participate as a member of the FLAP design team to influence decisions that can be beneficial to native salmonids in Trestle Creek.

2. Develop final designs and cost estimates for implementation of these projects in 2021 and beyond.

3. Complete construction of identified and designed projects.

Tasks

1. Contract a fish habitat engineer to work closely with FLAP design team. (Objective 1)

2. Perform initial bathometry surveys, collect and analyze hydrology data, etc., to develop a description of existing conditions. (Objective 1 and 2)

3. Develop final stamped project designs, including CAD drawings and revisions, hydraulic modeling of proposed conditions, stability calculations, technical specifications, etc. (Objective 2)

4. Develop cost estimates of final design. (Objective 2)

5. Hire a contractor to construct the final design. (Objective 3)

6. Construct the project(s). (Objective 3)

Work Products

- Technical memoranda describing project progress at appropriate intervals
- Final stamped design drawings; due date to be determined
- Annual Work Summary; due December 1, 2021

Permitting Requirements

All necessary state, federal and local permits required for construction will be procured by Idaho department of Fish and Game (IDFG). Permission from private landowners in the project area may be necessary for a thorough review of the watershed. If permission is necessary, it will be procured by a contractor.

Endangered Species Act consultation for this project plan is associated with the 2019 Biological Opinion on the effects of continued operation of the Clark Fork Hydroelectric Project on Bull Trout and designated Bull Trout critical habitat (BiOp), and the U.S. Fish and Wildlife Service (USFWS)-IDFG Cooperative Agreement pursuant to Section 6 of the Act. This project plan is consistent with the analysis and conclusions contained in the 2019 BiOp and the USFWS-IDFG Cooperative Agreement, and will adhere to all appropriate Terms and Conditions designed to reduce the extent and effects of incidental take on Bull Trout. Incidental take reporting for this project plan will be included in the annual Biological Opinion report as required by Term and Conditions 15–18 of the 2019 Incidental Take Statement, as well as IDFG's annual Section 6 report to the USFWS.

Cultural/Historic Resource Review
Avista cultural staff will coordinate a cultural/historic survey for the project. Due to the sensitive nature of this survey, all results will remain confidential.

Benefit to the Resource
The project is consistent with the Idaho Tributary Habitat Acquisition and Fishery Enhancement Program (Appendix A of the Settlement Agreement), through enhancement of tributary habitat conditions for native salmonids including Bull Trout and Westslope Cutthroat Trout. It is also consistent with the goals of the Dissolved Gas Supersaturation Control, Mitigation, and Monitoring Program (Appendix F5) as it identifies options for improving rearing habitat for Bull Trout, a species identified as the focus of the Appendix F5 mitigation program. The project is consistent with other established plans including the Lake Pend Oreille Bull Trout Conservation Plan (habitat enhancement; Resource Planning Unlimited 1999) and the IDFG Fisheries Management Plan (conservation and enhancement of Bull Trout; IDFG 2019).

Budget

Item	Estimated Carryover	2021 Budget Request
Design Engineering Contract costs	$36,234	$0
Construction Engineering Contract cost	$0	$18,600
Construction Contract costs	$0	$145,800
Avista employee costs (0.02 FTE; fish removals, etc.)	$0	$2,000
Total	$36,234	$166,400
Anticipated Expenditures		$202,634

Literature Cited
Alta Science and Engineering Inc. 2019. Trestle Creek Habitat Prioritization Evaluation. Report to Avista and Idaho Department of Fish and Game.

IDFG (Idaho Department of Fish and Game). 2019. Fisheries Management Plan 2019-2024. Boise, Idaho.

Jakubowski, R., and K. A. Bouwens. 2018. 2017 Pend Oreille Basin Bull Trout Redd Monitoring Project Update. Report to Avista, Noxon, Montana and the Idaho Department of Fish and Game, Boise, Idaho.

PBTTAT (Panhandle Bull Trout Technical Advisory Team). 1998. Lake Pend Oreille Key Watershed Bull Trout Problem Assessment.

Resource Planning Unlimited. 1999. Lake Pend Oreille Bull Trout Conservation Plan. State of Idaho. Boise, Idaho.

2021 PROJECT PLAN

Fish Resource Monitoring, Enhancement, and Management Plan

Project Contact
Ken Bouwens, Idaho Department of Fish and Game (IDFG), (208) 769-1414
ken.bouwens@idfg.idaho.gov

Project History
This is a continuing project that was originally approved for funding from Appendix A by the Management Committee (MC) in 1999. The scope and budget for this project are reviewed by the MC annually.

Background
Implementation of on-the-ground activities associated with the Clark Fork Settlement Agreement (CFSA) began in 1999. One tenant of the CFSA and the Native Salmonid Restoration Plan is that restoration actions will be monitored to evaluate their effectiveness in achieving the maintenance, enhancement, and restoration of native salmonid populations. This requires some funds be used for research and monitoring to meet this need.

Monitoring of salmonid abundance in 25 Lake Pend Oreille (LPO) spawning and rearing tributaries and annual monitoring of Bull Trout redd abundance in LPO tributaries are long-term projects expected to continue. The information collected in these projects is necessary for evaluating impacts from habitat changes, both as a result of directed fish habitat improvement projects and as a result of natural events such as floods. Abundance monitoring provides valuable information on recruitment trends of juvenile Bull Trout as well as long-term trends in the fish assemblages in tributary streams. Bull Trout redd counts are required monitoring identified in the CFSA and provide a valuable long-term data set for use in evaluating project goals. In addition, this monitoring is valuable for describing abundance and distribution trends of other native and non-native fishes.

In 2009, IDFG began implementing a rotating LPO basin-wide abundance monitoring plan. In this plan each monitored stream throughout the LPO basin would be sampled approximately once every five years. Following the intent of the proposed guidelines for juvenile abundance monitoring, we propose sampling streams last surveyed in 2016 including Caribou Creek, Morris Creek, Trestle Creek, Hellroaring Creek, and McCormick Creek. In addition to this work we will continue to look for opportunities to make new observations by surveying tributaries not previously sampled, and to perform other monitoring or sampling as necessary and as time allows.

Goal
Perform necessary fish resource monitoring to support enhancement and management actions with respect to the CFSA.

Objectives
1. Perform annual tributary monitoring.

2. Summarize 2009–2018 tributary monitoring data.

3. Perform annual redd counts.

Tasks

1. Monitor Caribou Creek, Morris Creek, Trestle Creek, Hellroaring Creek, and McCormick Creek using standardized stream e-fishing methods for salmonid abundance (see Frawley et al., 2020). Sampling will take place over approximately 100 m reaches every km or every other km, depending on stream length, to correspond with reaches last sampled in 2016. A temperature data logger will be deployed near the mouth of each stream in 2021. (Objective 1)

2. Summarize 2020 tributary monitoring data in an annual project update report. (Objective 1)

3. Perform a comprehensive analysis of 2009–2018 tributary monitoring data and summarize long-term trends in species-specific abundance, distribution, size, and relative species composition. (Objective 2)

4. Perform Bull Trout redd counts using standardized methods on 22 tributaries to LPO. (see Ransom et al. 2020; Objective 3)

5. Summarize 2021 Bull Trout redd count data in an annual project update report. (Objective 3)

Table 1. Location of temperature data loggers on Caribou, Morris, Trestle, Hellroaring, and McCormick creeks.

Stream	Site name	River Km	Latitude	Longitude
Caribou Creek	Caribou Creek 1	1.0	48.471261	-116.563720
Morris Creek	Morris Creek 1	1.0	48.219132	-116.107860
Trestle Creek	Trestle Creek 1	1.0	48.284997	-116.341743
Hellroaring Creek	Hellroaring Creek 1	1.0	48.494158	-116.583366
McCormick Creek	McCormick Creek 1	1.0	48.576660	-116.621395

Work Products

- Annual Project Update; 2020 tributary monitoring data; final due November 1, 2021
- Annual Project Update; 2020 redd count data; final due November 1, 2021
- Comprehensive Project Report; Lower Clark Fork River salmonid abundance estimates (2014–2018); final due December 1, 2021
- Comprehensive Project Report; report summarizing 2009–2018 tributary monitoring data; final due December 1, 2021
- Annual Work Summary; due December 1, 2021
- Temperature monitoring data for the five sites; due December 1, 2021
- Annual Project Update: 2021 tributary monitoring data; final due November 1, 2022
- Annual Project Update; 2021 Bull Trout redd count data; final due November 1, 2022

Permitting Requirements
Not applicable for the tasks proposed in this project plan.

Endangered Species Act consultation for this project plan is associated with the 2019 Biological Opinion on the effects of continued operation of the Clark Fork Hydroelectric Project on Bull Trout and designated Bull Trout critical habitat (BiOp), and the U.S. Fish and Wildlife Service (USFWS)-Idaho Department of Fish and Game (IDFG) Cooperative Agreement pursuant to Section 6 of the Act. This project plan is consistent with the analysis and conclusions contained in the 2019 BiOp and the USFWS-IDFG Cooperative Agreement, and will adhere to all appropriate Terms and Conditions designed to reduce the extent and effects of incidental take on Bull Trout. Incidental take reporting for this project plan will be included in the annual Biological Opinion report as required by Term and Conditions 15–18 of the 2019 Incidental Take Statement, as well as IDFG's annual Section 6 report to the USFWS.

Cultural/Historic Resource Review
Not applicable for the tasks proposed in this project plan, there are no ground and/or vegetation disturbing activities, or proposed impacts to cultural/historic resources.

Benefit to the Resource
Ongoing monitoring of LPO tributary native salmonid populations provide a measure of effectiveness of past work (e.g., habitat improvement) and also provide a tool for determining and prioritizing future work priorities. The proposed activities using this fund are consistent with the Idaho Tributary Habitat Acquisition and Fishery Enhancement Program (Appendix A of the Clark Fork Settlement Agreement), through assessment of native salmonid populations, including Bull Trout and Westslope Cutthroat Trout. As such, they are also consistent with goals of the Fish Passage/Native Salmonid Restoration Plan (Appendix C), and the Dissolved Gas Supersaturation Control, Mitigation, and Monitoring Program (Appendix F5) as many of the focus species of the Appendix F5 mitigation program also utilize tributary habitat during part of their life history. Tasks conducted under this fund are also consistent with other established plans including the Lake Pend Oreille Bull Trout Conservation Plan (Resource Planning Unlimited 1999) and the IDFG Fisheries Management Plan (IDFG 2019).

Budget
In recognition of the activities occurring through this project plan and the costs associated with them, in 2019 we requested and the MC approved that the allocation for the Fish Resource Monitoring, Enhancement and Management Plan be permanently increased to $96,000. The funding for this plan will continue to be transferred from the Tributary Habitat and Acquisition and Enhancement Program under Appendix A. These transferred funds will revert back to the Tributary Habitat and Acquisition and Enhancement Program if not spent in a given year.

Item	Estimated Carryover	2021 Budget Request
Avista labor (0.8 FTE)	$8,095	$79,500
Utilities	$0	$2,200
Field gear (waders, raingear, gloves, etc.)	$0	$2,000
Data collection supplies (PIT Tags, vials, dip nets, etc.)	$0	$3,500
Vehicle/boat operation and maintenance	$0	$6,000
Avista technician training and professional development	$0	$2,500
Avista administration	$0	$300
Total	$8,095	$96,000
Anticipated Expenditures		$104,095

Literature Cited

Frawley, S., R. Jakubowski, and K.A. Bouwens. 2020. 2019 Idaho Tributary Salmonid Abundance Monitoring Annual Project Update. Report to Avista and the Idaho Department of Fish and Game.

IDFG (Idaho Department of Fish and Game). 2019. Fisheries Management Plan 2019-2024. Boise, Idaho.

Ransom, A., S. Frawley, R. Jakubowski, and K.A. Bouwens. 2020. 2019 Pend Oreille Basin Bull Trout Redd Monitoring Project Update. Report to Avista and the Idaho Department of Fish and Game.

Resource Planning Unlimited. 1999. Lake Pend Oreille Bull Trout Conservation Plan. State of Idaho. Boise, Idaho.

2021 ANNUAL IMPLEMENTATION PLAN SUMMARY – APPENDIX B

Clark Fork Project, FERC No. 2058
Cabinet Gorge and Noxon Rapids Hydroelectric Developments

Title
Montana Tributary Habitat Acquisition and Recreational Fishery Enhancement Program

Implementation Staff Lead
Jason Blakney, Montana Fish, Wildlife and Parks (MFWP), (406) 382-3033, jblakney@mt.gov

Background
The purpose of this program is to offset the impacts of the power peaking operation of the Cabinet Gorge and Noxon Rapids Projects to native salmonids and recreational fisheries in Montana. This program is a multiple component effort that includes the restoration and enhancement of Clark Fork River tributary watersheds, support of recreational fishery monitoring and management, and evaluation and implementation of recreational fishery enhancement projects. This program is comprised of two primary components: Tributary Habitat Acquisition and Enhancement; and, Fish Resource Monitoring, Enhancement, and Management (including Sub-impoundment Fisheries).

2021 Project Plans
Tributary Habitat Acquisition and Enhancement

1. Habitat Restoration Monitoring and Native Salmonid Abundance Monitoring Plan
2. Redd Surveys in Montana Tributaries (***New***)
3. Sims Meander Stream and Floodplain Restoration Project (***New***)
4. Stream Gage Monitoring
5. Cabinet Ranger District Automated Snow Recording Site Operation and Maintenance 2020-2021
6. Crow Creek Bull Trout Investigation
7. Graves Creek Pilot Habitat Enhancement Project
8. Upper Prospect Creek LWD Project
9. Lower Clark Fork Watershed Group Project Coordination
10. Habitat Restoration Monitoring, Maintenance, and Contingency Allocation
11. Habitat Restoration, Property Acquisition, and Conservation Easement Contingency Allocation
12. East Fork Bull River Morphology, Connectivity, and Habitat Enhancement Project

Recreational Fishery Enhancement

13. Cabinet Gorge and Noxon Reservoir Fisheries Monitoring Plan
14. Pilot Project: Modification of Eurasian Watermilfoil Beds on Noxon Reservoir for Fishery Benefits
15. Mountain Lake Fisheries Monitoring Project
16. Lower Bull River Day Use Boat Access Site Construction
17. Noxon Reservoir Boat Ramp Improvements
18. Managing Aquatic Invasive Plants on Noxon and Cabinet Gorge Reservoirs

19. Dreissenid Mussel Sampling on Noxon and Cabinet Gorge Reservoirs (***New***)

Work Products

Habitat Restoration Monitoring and Native Salmonid Abundance Monitoring Plan

- Annual Project Update; 2019 activities; final due April 1, 2021
- Annual Project Update; 2020 activities; final due October 1, 2021
- Temperature monitoring data for the long-term sites; due December 1, 2021
- Annual Work Summary; due December 1, 2021
- Annual Project Update; 2021 activities; final due October 1, 2022

Redd Surveys in Montana Tributaries

- Annual Project Update; Redd Survey (2020 data); final due April 1, 2021
- Annual Work Summary; due December 1, 2021
- Annual Project Update; Redd Survey (2021 data); final due April 1, 2022

Sims Meander Stream and Floodplain Restoration Project

- Final permits and NEPA decision; expected March 31, 2021
- Finalized design-build contract; expected April 30, 2021
- Quarterly Reports; due to the Appendix B Aquatic Program Leader (APL) by June 30, September 30 and November 15, 2021; and March 31, 2022
- Annual Work Summary; due December 1, 2021
- As-built monitoring report; expected December 2022

Stream Gage Monitoring

- Excel spreadsheet containing 2021 water year temperature and discharge data in 30-minute intervals for each stream (and channel) will be provided to Avista by February 1, 2022
- Excel spreadsheet containing October–November of the 2022 water year temperature and discharge data in 30-minute intervals for Graves Creek and East Fork Bull River will be provided to Avista by February 1, 2022
- 2021 Annual Water Year Data Report for each stream (Bull River, East Fork Bull River, Rock Creek, Trout Creek, Vermilion River, Graves Creek); due January 1, 2022
- 2019 Annual Water Year Data Report for Rock Creek; due February 1, 2021
- Mid-year report; due to Appendix B Aquatic Program Leader (APL) August 2, 2021
- Annual Work Summary; due to APL November 15, 2021

Cabinet Ranger District Automated Snow Recording Site Operation and Maintenance 2020-2021

- Project Completion Report (through 2019 period); final due May 1, 2021
- Mid-year report; due to Appendix B Aquatic Program Leader (APL) August 2, 2021
- Annual Work Summary; due to APL November 15, 2021
- Data is available in real-time via the internet: (https://www.nohrsc.noaa.gov/interactive/html/graph.html?ey=2019&em=12&ed=19&units=0&station=CHIM8)

Crow Creek Bull Trout Investigation

- Project Completion Report; final due July 30, 2021
- Annual Work Summary; due December 1, 2021

Graves Creek Pilot Habitat Enhancement Project

- Mid-year report; due to the Appendix B Aquatic Program Leader (APL) August 2, 2021
- Annual Work Summary; due to the APL November 15, 2021

- Review of substrate changes in a technical memo following two years of spring runoff; due December 15, 2021
- Annual fixed point photo-documentation

Upper Prospect Creek LWD Project

- Mid-year report; due to Appendix B Aquatic Program Leader (APL) August 2, 2021
- Annual Work Summary; due to the APL November 15, 2021
- Review of fisheries and/or physical habitat monitoring efforts two-years post run-off (2022) in technical memo or in Appendix B Native Salmonid Tributary Habitat Restoration Monitoring Update

Lower Clark Fork Watershed Group Project Coordination

- Comprehensive Project Report; Updated Lower Clark Fork Stream Restoration Summary (1995-2020) – review draft; December 31, 2021
- Comprehensive Project Report; Updated Lower Clark Fork Stream Restoration Summary (1995-2020) – final; March 31, 2022
- Quarterly reports; due to Appendix B Aquatic Program Leader (APL) June 30, and September 30, 2021; and March 31, 2022
- Annual Work Summary; due to APL November 15, 2021

Habitat Restoration Monitoring, Maintenance, and Contingency Allocation

- Project Completion Report for Mainstem Bull River Reforestation on Forest Service Lands and NEPA Process (including photo-documentation); final due May 1, 2021
- Mid-year report; due to Appendix B Aquatic Program Leader (APL) August 2, 2021
- Annual Work Summary; due December 1, 2021

Habitat Restoration, Property Acquisition, and Conservation Easement Contingency Allocation

- Annual Work Summary; due December 1, 2021
- Designs for specific projects would be reported in the form of a Technical Memorandum

East Fork Bull River Morphology, Connectivity, and Habitat Enhancement Project

- Beaver management plan (likely memorandum); due September 1, 2021
- Revegetation site plan (likely memorandum); due September 30, 2021
- Flow management assessment and recommendations (likely memorandum); due November 1, 2021
- Annual Work Summary; due to Appendix B Aquatic Program Leader November 15, 2021

Cabinet Gorge and Noxon Reservoir Fisheries Monitoring Plan

- Annual Project Update; 2017 activities; final due June 1, 2021
- Annual Project Update; 2019 activities; final due July 31, 2021
- Annual Project Update; 2020 activities; final due October 31, 2021
- Annual Work Summary; due December 1, 2021

Pilot Project: Modification of Eurasian Watermilfoil Beds on Noxon Reservoir for Fishery Benefits

- Project Completion Report: Eurasian Watermilfoil as Fish Habitat; final due July 1, 2021
- Annual Work Summary; due to Appendix B Aquatic Program Leader November 15, 2021
- Comprehensive Project Report (2021-2023 data); final due May 1, 2024

Mountain Lake Fisheries Monitoring Project

- Annual Work Summary; due December 1, 2021

- Comprehensive Project Report; final due to Avista March 1, 2021

Lower Bull River Day Use Boat Access Site Construction

- Annual Work Summary (of site visitation information); from contractor to Appendix B Aquatic Program Leader (APL) and Avista; due November 15, 2021
- Annual Work Summary; due December 1, 2021

Noxon Reservoir Boat Ramp Improvements

- Technical memorandum or other appropriate work product listing associated development options, including site plan(s) and cost estimates; due June 1, 2021
- Annual Work Summary; due December 1, 2021

Managing Aquatic Invasive Plants on Noxon and Cabinet Gorge Reservoirs

- Mid-year report; due to Appendix B Aquatic Program Leader (APL) August 2, 2021
- Annual Work Summary; due to the APL November 15, 2021
- Annual Project Update; due December 1, 2021

Dreissenid Mussel Sampling on Noxon and Cabinet Gorge Reservoirs

- Sampling status report (likely memorandum); due September 30, 2021
- Annual Work Summary; due to the Appendix B Aquatic Program Leader November 15, 2021

Appendix B 2021 Budget

Project	Carryover[1]	2021
Tributary Habitat Acquisition and Enhancement Fund (including GDP inflation rate)		**$420,276**
Unexpended funds w/interest		**$2,596,912**
Total Available		**$3,017,188**
Habitat Restoration Monitoring and Native Salmonid Abundance Monitoring Plan	$34,500	$99,000
Redd Surveys in Montana Tributaries	$0	$20,500
Sims Meander Stream and Floodplain Restoration Project	$0	$151,520
Stream Gage Monitoring	$0	$0
Cabinet Ranger District Automated Snow Recording Site Operation and Maintenance 2020-2021	$6,700	$0
Crow Creek Bull Trout Investigation	$2,749	$0
Graves Creek Pilot Habitat Enhancement Project	$5,421	$0
Upper Prospect Creek LWD Project	$0	$0
Lower Clark Fork Watershed Group Project Coordination	$0	$21,571
Habitat Restoration Monitoring, Maintenance, and Contingency Allocation	$0	$20,230
Habitat Restoration, Property Acquisition, and Conservation Easement Contingency Allocation	$0	$60,000
East Fork Bull River Morphology, Connectivity, and Habitat Enhancement Project	$22,000	$15,400
Graves Creek land acquisition (5-acre parcel approved during 3/17/2021 MC meeting)	$0	$140,000
Total	$71,370	$528,221
MC Approved Budget		**$599,591**
Unobligated Funds		$2,417,597

[1] *This column denotes estimated carryover of unexpended, approved funds as of January 1.*

Project	Carryover[1]	2021
Recreational Fishery Enhancement Fund (including GDP inflation rate)		**$280,181**
Unexpended funds w/interest		**$1,276,571**
Total Available		**$1,556,752**
Cabinet Gorge and Noxon Reservoir Fisheries Monitoring Plan	$48,550	$30,550
Pilot Project: Modification of Eurasian Watermilfoil Beds on Noxon Reservoir for Fishery Benefits	$39,252	$0
Mountain Lake Fisheries Monitoring Project	$2,566	$0
Lower Bull River Day Use Boat Access Site Construction	$1,935	$2,500
Noxon Reservoir Boat Ramp Improvements	$55,000	$0
Managing Aquatic Invasive Plants on Noxon and Cabinet Gorge Reservoirs	$40,000	$0
Dreissenid Mussel Sampling on Noxon and Cabinet Gorge Reservoirs	$0	$2,140
Total	$187,303	$35,190
MC Approved Budget		**$222,493**
Unobligated Funds		$1,334,259

[1] *This column denotes estimated carryover of unexpended, approved funds as of January 1.*

2021 PROJECT PLAN

Habitat Restoration Monitoring and Native Salmonid Abundance Monitoring Plan

Project Contact
Jason Blakney, Montana Fish, Wildlife and Parks (MFWP), (406) 382-3033, jblakney@mt.gov

Project History
This is a continuing project. Habitat Restoration Monitoring was originally approved by the Management Committee (MC) in 2001 and the addition of Native Salmonid Abundance Monitoring was originally approved in 2003. The scope and budget of this project are reviewed by the MC annually.

Background
The main goal of this project is to monitor the abundance of juvenile and resident salmonids with an emphasis on Bull Trout and Westslope Cutthroat Trout (WCT) in drainages key to the long-term persistence of these species. A secondary goal is to monitor salmonid abundance before and after stream restoration projects. Monitoring stream fish populations is necessary for documenting long-term variation associated with native fish populations and changes in the abundance and distribution of non-native fish species. This long-term monitoring is essential for the planning and implementation of restoration projects and/or management intervention, supplementation, reintroduction of extirpated populations and/or to focus other conservation-based activities.

Stream monitoring activities proposed for 2021 will focus on 1) long-term abundance, habitat restoration monitoring and updating WCT genetic information; 2) Prospect Creek native salmonid salvage; 3) evaluation of baseflow barriers to upstream Bull Trout movement; and 4) upper Vermilion River native salmonid data collection and evaluation.

Long-term abundance and habitat restoration monitoring
Data collection in local native salmonid streams should be tailored to specific restoration and enhancement projects to ensure the best possible biotic and abiotic data is quantified. A one-size-fits-all approach to sampling is not recommended as each stream is unique, as are the challenges they face and the potential suite of projects that may be used to restore or enhance them. In some instances, sampling a stream multiple years in a row may be warranted (e.g., Bull Trout outmigration dynamics in Graves Creek, PIT tagging fish in the Vermilion River or evaluating the impact of restoration and demographic support in Crow Creek). The collection of habitat data such as flow measurements, large woody debris counts, or substrate scoring may also be beneficial in some instances. While sampling priority will be given to Bull Trout streams, streams that are strongholds for WCT will be monitored and genetic data will be updated for population where that information has never collected or if needs to be update (>10 years old).

Monitoring in 2021 will likely occur at sites in the Crow Creek (n=2, new restoration and downstream reference), Upper Graves Creek (n= 3, ~ 50 WCT genetic samples), Deep Creek (n= 2, ~50 WCT genetics), West Fork Trout Creek (n= 4), East Fork Trout Creek (n= 3-4, ~50 WCT genetic samples), lower Vermilion River (n= ~4), upper Vermilion River and tributaries (n= ~8),

Rock Creek (n= 4), and possibly the mainstem Bull River. Generally, two electrofishing sites can be conducted per day and thus there will be approximately 16-18 days of electrofishing efforts. Streams inhabited by WCT may be sampled in September (i.e., upper Graves, Deep, upper Vermilion) and additional WCT samples may be collected in other streams within the project area if recent samples (>10 years) have not been collected.

Beginning in 2019, tributary salmonid abundance monitoring has been conducted solely under the Montana Tributary Habitat Acquisition and Recreational Fishery Enhancement Clark Fork Settlement Agreement (CFSA), Appendix B program; previously, salmonid abundance was also conducted under the Fish Passage/Native Salmonid Restoration Plan (CFSA Appendix C). Appendix C sampling was undertaken, in part, to assess tributary salmonid populations' response to fish passage and other management efforts; therefore, a major component of this combined monitoring will encompass regular and periodic sampling of tributaries or areas of tributaries known to be utilized by native salmonids that have been subject to fish passage efforts. These combined monitoring efforts are generally outlined in TABLE 1 and other streams may be sampled on occasion that are not listed in TABLE 1. The number of monitoring sites and the frequency of sampling in TABLE 1 should be considered a general guideline.

TABLE 1. Stream electrofishing monitoring schedule for select lower Clark Fork River tributaries.

Stream	Target species	Occupied Habitat (miles)	# monitor sites	Year Last Sampled	Freq. (~ years)	Next Sample Date
upper Prospect Cr.	BULL, WCT	~ 4	4	2020	2	2022
Cooper Gulch	BULL, WCT	~ 3	3-4	2020	2	2022
Crow Creek	BULL, WCT	~ 3-4	4	2020	2	2021 (n=2)
lower Graves Cr.	BULL, WCT	~ 3	3-4	2020	2	2022
WF Trout Creek	BULL, WCT	~ 4-5	4	2018	2	2021
lower Vermilion R.	BULL, WCT	~ 9	6-8	2020	2-3	2021 (n = ~4)
upper Vermilion R.	WCT, EB	unknown	~8	2010	TBD	2021 (n =~ 8)
Swamp Cr.	BULL, WCT	~3-5	3	2017	2-3	2022
Rock Cr.	BULL, WCT	~ 3	4	2019	2	2021
East Fork Bull R.	BULL, WCT	~ 8	8	2020	2	2022
upper Graves Cr.	WCT	~ 3-4	3	2017	4+	2021
Deep Cr.	WCT	~ 5	2	2017	4+	2021
East Fork Trout Cr.	WCT	~ 3-4	3	2013	4+	2021
South Fork Bull R.	WCT	~ 4-5	4	2016	4+	2022?
East Fork Blue Cr.	WCT	~ 3	2	2017	4+	2022?
mainstem Bull R.	WCT	many	?	2014	4+	2021 (n= ?)
upper Forks Bull R.	WCT	many	?	2014	4+	2022?
lower Prospect Cr.	EB, LL, RBT	many	2	2016	4+	2022?

Prospect Creek native salmonid salvage
The Prospect Creek drainage is unique in that the lower portion of the drainage is mainly occupied by non-native salmonids, while the upper drainage and its major tributaries are occupied solely by native fish species. This dichotomy is likely facilitated by the geology of the area where large unconsolidated substrate was deposited by Glacial Lake Missoula and underlies portions of the stream causing the mainstem and reaches of its tributaries to go dry during low flow periods each year (Sando and Blasch 2015; M. Lawlor, U.S. Geological Survey, unpublished data). Two lengthy, naturally intermittent sections of stream occur on the mainstem of Prospect Creek. The lower dry reach begins just upstream of Brush Gulch and extends approximately 4 km upstream to above the Daisy Creek confluence. A short perennial section of stream occurs from an area between Daisy Creek and Therriault Gulch to just upstream of the Crow Creek confluence. Above Crow Creek, Prospect Creek again becomes ephemeral for about 6.8 km. The upper portion of Prospect Creek and its tributaries from just upstream of Evans Gulch have perennial flow.

In 2017, Appendix B staff initiated sampling efforts to capture native salmonids in stranded pools within the two ephemeral portions of Prospect Creek. Westslope Cutthroat captured in these areas are moved to lower Prospect Creek near Brush Gulch, while Bull Trout are relocated into the Crow Creek drainage. Crow Creek has low densities of Bull Trout compared to the other two streams occupied by the species in the upper drainage. From 2017 to 2020, a total of 87 Bull Trout (46-328 mm) have been released in Crow Creek through this effort. In 2020 alone, 140 WCT were salvaged (121-285 mm) with all of these fish receiving PIT tags. Since their release near Brush Gulch, several of the salvaged WCT have been detected on the PIT array in lower Prospect Creek (Blakney et al., *In Prep*). No changes in protocol or methods for native salmonid salvage efforts in Prospect Creek are proposed for 2021.

Evaluate baseflow barriers to upstream Bull Trout movement
In recent years, field staff have observed barriers to upstream Bull Trout movement during baseflow periods in late summer and fall. The two most common barriers to upstream migration encountered in local spawning tributaries are debris jams and beaver dams. Debris jams are typical caused by one or more large trees that fall in the stream. In some cases, subsequent runoff events cause aggrading of streambed material which raises the streambed elevation and may cause an impassable barrier to form. Allochthonous material such as trees, branches, leaves, and conifer needles often come to rest in areas where channel spanning wood is located, creating low flow barriers, especially in smaller streams. Debris jams believed to be seasonal barriers in 2019 were observed on redd count walks in numerous lower Clark Fork River Bull Trout spawning tributaries including West Fork Trout Creek, East Fork Crow Creek, West Fork Crow Creek, Cooper Gulch, West Fork Thompson River, Jungle Creek, Beatrice Creek and West Fork Fishtrap Creek. Intuitively, one would think many of these jams would become compromised during spring runoff conditions. Some of these debris jams are compromised each year but often other debris jams form. The same debris jams have been observed multiple years in serval of these streams

Most Bull Trout populations in the lower Clark Fork River drainage in Montana are operating at very low population levels (i.e., less than 50 adults) and therefore it is imperative for these fish to have yearly access to the most possible amount of habitat, especially in areas where they have

previously been documented to use for spawning and rearing. Historically and in present day areas with robust, connected population such seasonal barrier were/are likely not an issue if enough other adequate spawning and rearing habitat exist. However, in small and/or isolated populations each year, each mature adult and every meter of suitable habitat is important. Therefore, in late summer of 2021 efforts will be made to clear debris from these jams (only those believed to be complete barriers to upstream movement) from Bull Trout spawning streams in the Avista project area. In many cases debris jams will become passable if debris and streambed material is moved, with much of this work possible by hand. In more extreme examples, a portion of a channel spanning log would need to be cut to allows passage. An after-the-fact 124 Permit would be submitted to MFWP if the work was deemed to be at the level it would require such a permit. It is estimated that this work would take about a week or two and would occur in late August through September. Modification of a debris jam complexes in 2020 in Cooper Gulch led to multiple redds being found above a jam where they have typically been found in the past. In 2019, no redds were found above the debris jam. Debris jams were also modified by hand in West Fork Trout Creek, East Fork Crow Creek, and West Fork Crow Creek; however, no redds were observed in these streams above where this work took place.

Beaver dams have also been observed to impede upstream movement by Bull Trout on spawning migrations. In recent years, a myriad of beaver dams throughout the Fishtrap Creek drainage (Thompson River) have precluded migratory fish from reaching ideal and previously used spawning and rearing habitats, often many kilometers upstream (MFWP, unpublished data). Multiple beaver dams were observed on the lower portion of the East Fork Bull River, where the stream is braided, in the fall of 2019 (field staff notes suggest beavers have been using the lower East Fork since at least 2006). These channel-spanning dams appear to preclude or at least severely reduce both upstream and downstream movement of Bull Trout (Avista, unpublished data; Avista and MFWP, personal observations). Because these dams are so low in the system, Bull Trout captured below Cabinet Gorge dam in September and October were released above these dams so they could have access to prime spawning habitat much higher in the drainage. These dams also likely hinder outmigration of juvenile Bull Trout in a stream important to Appendix C downstream transport efforts. Beaver have come and gone in various other Bull Trout streams in the area but appear most prevalent and impactful in the two aforementioned drainages. Due to the small population size and isolated nature of most local Bull Trout populations, active management of beavers and their dams is imperative.

The consequences of Bull Trout spawning lower in these systems due to the presence of beaver dams is not completely known but in Fishtrap Creek these less than ideal spawning areas have a much higher proportion of non-native salmonids present which may decrease survival at early life stages through increased competition and predation. Such conditions could cause downstream migrating Bull Trout to leave these systems earlier and at a smaller size which may also increase their risk of being preyed upon in larger waterbodies. Furthermore, spawning in larger downstream portions of tributaries areas could leave redds more suspectable to scour and bedload movement when compared to smaller, more stable spawning reaches in the headwaters and tributary streams. Similar to the proposed actions associated with debris jams, if beaver dams are found to be barriers to movement in late summer and early fall in Bull Trout streams within the Avista project area, they will be altered or removed to allow fish passage. An after-the-fact 310 or 124 permit could then be submitted if the action is deemed to rise to such a level.

However, the Green Mountain Conservation District does not have a current rule on the books that specially states a 310 permit is required to alter or remove a beaver dam. If beavers become a nuisance in a given drainage, MFWP wildlife and enforcement staff will be consulted on actions needed to remove the animals from the area.

Upper Vermilion River native salmonid data collection and evaluation
The Vermilion River can conveniently be divided into three sections based on natural barriers to fish movement and the fish community present. The lower Vermilion River from its mouth upstream to China Gorge is comprised of a mixture of native and non-native fish species including Bull Trout, WCT, Rainbow Trout (RB), WCT x RB hybrids, Brook Trout, Brown Trout and a few Mountain Whitefish on occasion. China Gorge, a series of natural bedrock chutes and cascades, has thus far precluded Brown Trout and Rainbow Trout from colonizing upstream reaches in the Vermilion River. The reach between China Gorge and Vermilion Falls is considered a native species stronghold as the community is comprised of Bull Trout, genetically pure WCT (tested in 2019) and generally low numbers of Brook Trout. Above Vermilion Falls (another series of natural bedrock cascades), which represents the upper natural distribution of Bull Trout, putative WCT and Brook Trout are the only two fish species known to occur.

Because Bull Trout are limited in their distribution below Vermilion Falls, the upper Vermilion drainage has been infrequently sampled. In 2001 and 2010 it was sampled by Appendix C staff conducting drainage-wide surveys (Moran 2002; Moran and Storaasli 2011). The last time the upper drainage was surveyed in 2010, Brook Trout comprised 20-100% of the fish community in the five tributary sections sampled, and 9-79% of the fish community in the four mainstem sections sampled based on linear abundance (i.e., fish/100 m ≥ 75 mm). In 2020, genetic samples were collected from 72 putative WCT at four mainstem sites on the upper Vermilion River, and a pattern of increasing WCT abundance in the upstream direction was generally noted, although population estimates were not conducted as they were in the past. The 2001 and 2010 data does not indicate this same trend of increasing WCT abundance moving up the watershed. Regardless, Brook Trout in the upper drainage pose a long-term threat to native salmonids conservation and recovery throughout the Vermilion River drainage.

There is evidence to suggest Brook Trout are increasing in abundance in the Vermilion River between China Gorge and Vermilion Falls. A statistically significant increase in both Brook Trout linear abundance (fish/100 m) and biomass (g/100 m^2) over time has been observed between 2001 and 2019 (n=10) at a long-term monitoring (site #4) around Grouse Creek, a site within the best and most productive Bull Trout habitat in the drainage (Blakney et al, *In Prep*). In 2020, the two uppermost long-term monitoring sites in the Vermilion River below Vermilion Falls were sampled (site #5 and site #6). These sites occur both a few hundred meters below and above the 2012 Chapel Slide stream restoration and sediment stabilization project. Bull Trout abundance in the drainage has typically been highest in and around these two sections, but abundance was noted to have declined substantially across the drainage based on 2019 sampling when compared to previous years, including in this area. In 2020, Brook Trout abundance estimates at both site #5 and site #6, were about 13 fish/100m (≥ 75 mm), which is by far the highest estimates ever recorded for the species in the section of river between China Gorge and Vermilion Falls. Estimates at site #5 indicated an equal number of Brook Trout and Bull Trout, while more Brook Trout than Bull Trout were observed at site #6. Bull Trout have always greatly

outnumbered Brook Trout in this section of the Vermilion River, which coupled with recent declines in redds numbers and abundance, indicates more than just restoration and upstream/downstream transport might be needed for the long-term conservation native salmonids in this drainage.

The upper Vermilion River, above Vermilion Falls, has the potential to be a native salmonid stronghold for both WCT and potentially Bull Trout. Good numbers of putative WCT were observed in 2020 above Vermilion Falls based on electrofishing surveys and off-the-clock fishing adventures. Habitat conditions including the thermal regime, observed flow conditions and tributary connectivity suggest Bull Trout could likely carry out their life cycle in the upper system. Maximum daily water temperatures in the upper mainstem in 2020 only exceeded 15°C for two days at one site, while the other three sites never reached this mark. Mean daily water temperatures in the upper Vermilion River in 2020 for July and August averaged between 8.3 to 9.4°C at the four upper mainstem sites, and this temperature regime was analogous to temperatures at the three uppermost sites monitored below Vermilion Falls (i.e., Rkm 9.5, Rkm 13.8, and Rkm 17.9) (FIGURE 1). Previous stocking records indicate Golden Trout and possibly Yellowstone Cutthroat Trout have been stocked into the upper drainage and therefore the genetic purity of the WCT that occur above Vermilion Falls is in question. This population will be tested for genetic purity in early 2021.

Additional work is needed in the coming years to evaluate the potential for Brook Trout removal above Vermilion Falls. Temperature data was collected from four mainstem locations and two tributaries in the upper Vermilion in 2020 and this information will again be collected in 2021. Electrofishing surveys will be conducted in the upper Vermilion River drainage to update community composition and abundance information, at or near previously sampled sites. Efforts will also be made to determine the upper distribution of fish in each tributary stream, which is essential in quantifying the potential area to be treated. Baseflow discharge measurements will also be collected longitudinally in the upper mainstem and its major tributaries in September. Temperature, discharge and fish distributional information will be coupled together to formulate a strategy with the primary goal of reclaiming the upper watershed for native fish. Eventually, if the decision is made to move forward with a treatment, the public should be engaged to help with Brook Trout removal, and WCT salvage (if fish are found to be genetically pure).

As the natural distribution of native salmonids contracts, unoccupied headwater refugia above natural barriers represent the opportunity to expand the distribution of dwindling or extirpated populations. Montana Fish, Wildlife and Parks has completed many of these renovation projects to restore native cutthroat trout and Arctic Grayling populations in recent years, and therefore the skills and technical knowledge base to carry out complex and successful treatments already exists within the agency. Removing Brook Trout from the upper Vermilion River would actively address a source population of a non-native salmonid species that is widely known to have deleterious impacts on both Bull Trout and WCT, through competition, predation and hybridization (with Bull Trout) and these interactions will likely be exacerbated under a changing climate.

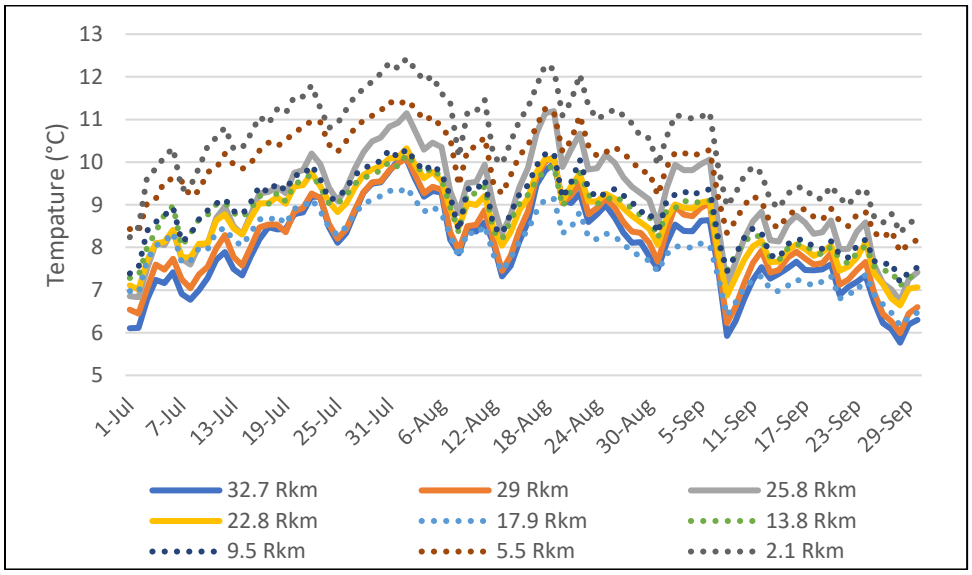


FIGURE 1. Mean daily temperature profile for nine mainstem Vermilion River thermograph locations by river kilometer (Rkm) from July 1 through September 30, 2020. Locations of dashed lines occur downstream of Vermilion Falls and solid lines occur above Vermilion Falls. Thermograph locations include near mouth (2.1 Rkm), between Roe Gulch and Canyon Creek (5.5 Rkm), below Cataract Creek (9.5 Rkm), below Grouse Creek (13.8 Rkm), above Chapel Slide (17.9 Rkm), below Willow Creek (Rkm 22.8), below Charred and Frosty Creeks (Rkm 25.8), below Miller Creek (Rkm 29.0) and Control Creek confluence (Rkm 32.7).

Temperature monitoring

Thermographs will be placed in selected streams to record water temperature as described in TABLE 2. This measurement provides a means to assess a fundamental requirement of native salmonids and provides a needed index to assess success of habitat restoration activities that were undertaken, in part, to address identified state water quality listed impairments.

TABLE 2. Stream thermograph locations for select lower Clark Fork River tributaries.

Stream	Location	~Rkm	Latitude	Longitude
Prospect Creek	17-Mile Bridge	29.3	47.57532	-115.63960
Prospect Creek	below Crow Creek confluence	19.5	47.53792	-115.54430
Cooper Gulch	below Chipmunk Creek	5.5	47.51573	-115.63824
Cooper Gulch	above long-term site #1	3.7	47.52697	-115.62262
Crow Creek	2007 restoration reach	1.8	47.52654	-115.55730
West Fork Crow Creek	2-3 minutes up WF trail	0.6	47.52253	-115.56592
East Fork Crow Creek	just upstream of culvert	2	47.50772	-115.54918
West Fork Trout Creek	below 1st creek crossing	1.4	47.79791	-115.73014
West Fork Trout Creek	above Robin Run	4.9	47.79922	-115.77051
West Fork Trout Creek	below South Branch confluence	7.0	47.78782	-115.79187
Vermilion River	near mouth	2.1	47.83113	-115.53483
Vermilion River	between Roe G. and Canyon Cr.	5.5	47.85102	-115.50986
Canyon Creek	below bridge	0.8	47.85416	-115.50043
Vermilion River	below Cataract Creek	9.5	47.85835	-115.46500
Vermilion River	~1.1 km down from Grouse Cr.	13.8	47.86951	-115.41712
Sims Creek	near mouth access from spur rd.	0.0	47.86984	-115.40367
Vermilion River	above Chapel Slide	17.9	47.87542	-115.37028
Vermilion River	below Willow Creek	22.8	47.87008	-115.31618
Vermilion River	below Frosty/Charred Creeks	25.8	47.85178	-115.29940
Vermilion River	below Miller Creek	29.0	47.82653	-115.29953
Vermilion River	at mouth of Control Creek	32.7	47.79630	-115.30254
Happy Gulch	near mouth	0	47.81109	-115.30100
Miller Creek	near mouth	0.3	47.82551	-115.30341
Graves Creek	above falls	5.5	47.72145	-115.37679
Graves Creek	upstream of 2nd USFS bridge	10.5	47.74743	-115.33042
Graves Creek	at Lawn Lake trailhead	13.4	47.74835	-115.29729
Rock Creek	above West Fork	8.6	48.02432	-115.70541
Rock Creek	upstream of trail bridge	12.4	48.04322	-115.66751
Rock Creek	upper cascade	13.5	48.04305	-115.65551
South Fork Bull	~30 meters above mouth	0.03	48.19279	-115.81584
East Fork Blue Creek	long term site above culvert	1.7	48.10473	-116.01051

Additional thermographs will likely be placed in the upper mainstem Bull River and Deep Creek as per the Appendix F5 *Temperature Monitoring Data Compilation* project plan; however, locations have not been identified. Additional sites will also be monitored in Graves Creek and the East Fork Bull River.

Goal

The goal of this project is to monitor the abundance and distribution native and non-native salmonids to assess the success of past and future restoration and enhancement projects and to inform management decisions in drainages important to the long-term persistence of Bull Trout and Westslope Cutthroat Trout in the lower Clark Fork River drainage, Montana.

Objectives

1. Monitor native salmonid abundance in streams important to the species local persistence and in reaches where stream restoration, habitat improvements or fish passage efforts have taken or will take place.

2. Salvage native salmonids from ephemeral reaches of Prospect Creek.

3. Evaluate baseflow barriers to upstream Bull Trout movement and take actions to make these areas passable to fish for spawning.

4. Collect fisheries, flow and temperature data in the upper Vermilion River drainage to evaluate potential for Brook Trout removal above Vermilion Falls.

5. Evaluate opportunities for restoration, management intervention, supplementation, reintroduction or other conservation focused activities.

Tasks

1. Monitor native salmonid populations at long-term electrofishing sites. Population estimates will be carried out at sampling locations using electrofishing- depletion methodology (Zippin 1958, Carle and Strub 1978). In 2021, sampling will likely occur at sites in the Crow Creek (n=2, new restoration and downstream reference), Upper Graves Creek (n= 3, ~ 50 WCT genetic samples), Deep Creek (n= 2, ~50 WCT genetics), West Fork Trout Creek (n= 4), East Fork Trout Creek (n= 3-4, ~50 WCT genetic samples), lower Vermilion River (n= ~4), upper Vermilion River and tributaries (n= ~8), Rock Creek (n= 4) and possibly the mainstem Bull River. Generally, two electrofishing sites can be conducted per day and thus there will be approximately 18-20 days of electrofishing efforts. Streams inhabited by WCT may be sampled in September (i.e., upper Graves, Deep, upper Vermilion) and additional WCT samples may be collected in other streams within the project area if recent samples (>10 years) have not been collected. (Objectives 1, 3, 4 and 5)

2. Native salmonid rescue efforts utilizing backpack electrofishing will occur throughout the summer and fall of 2021 in portions of the Prospect Creek drainage that experience natural stream intermittency. Efforts may also focus on capturing stranded fish in other portions of the drainage including in the lower reaches of Crow Creek and Cooper Gulch. Stranded Bull Trout captured in mainstem Prospect Creek will again be moved into Crow Creek, while Westslope Cutthroat Trout will be moved to lower Prospect Creek in the vicinity of Brush Gulch. All Bull Trout and Westslope Cutthroat Trout > 99 mm will be PIT tagged to support the evaluation of movement and life-history expression in the drainage (based on PIT array detections and recaptured fish). (Objectives 2, 3 and 5)

3. Bull Trout spawning stream/reaches will be walked in late August through early September to evaluate barriers (i.e., debris jams and beaver dams) that preclude fish from accessing prime spawning habitat. Complete barriers will be altered only enough to allow fish passage and an after-the-fact 310/124 will be submitted if deemed necessary.

4. Thermographs will be placed in the following streams to record water temperature including upper Prospect Creek, Cooper Gulch, Crow Creek, Graves Creek, Vermilion River, West Fork Trout Creek, Rock Creek, Bull River, East Fork Bull River, South Fork Bull River and Blue Creek. Thermographs will be set to record temperature every 30 minutes, are deployed at established sites prior to July 1 and will be retrieved after October 1. (Objectives 1, 4 and 5)

5. Collect and analyze Westslope Cutthroat Trout genetic samples in stream reaches sampled in 2021. Westslope Cutthroat populations that have not been evaluated for hybridization in the last 10 years are appropriate candidates for updating their genetic composition as are drainages where hybrid *Oncorhynchus* have been documented in headwater lakes (data collected from *Mountain Lakes Fisheries Monitoring Project*). Westslope Cutthroat genetic samples will be analyzed at the Conservation Genetics lab at the University of Montana. (Objectives 1, 4 and 5)

Work Products

- Annual Project Update; 2019 activities; final due April 1, 2021
- Annual Project Update; 2020 activities; final due October 1, 2021
- Temperature monitoring data for the long-term sites; due December 1, 2021
- Annual Work Summary; due December 1, 2021
- Annual Project Update; 2021 activities; final due October 1, 2022

Permitting Requirements

The only permit that would need to be filed would be an after-the-fact 124 permit (if done or supervised by MFWP biologist) or 310 permit (if done by a non-government organization). No permits are required for fisheries sampling work as all work will be conducted and/or overseen by MFWP fisheries biologists.

Cultural/Historic Resource Review

No ground disturbance is associated with this project, therefore cultural and historic resources surveys are not required.

Benefit to the Resource

The collection of long-term data for stream fish populations is essential for defining natural variation associated with native salmonid populations, determining changes in the distribution or abundance of non-native fish species, the planning and implementation of restoration/ enhancement projects, management intervention, and/or to focus other conservation-based activities. The proposed work is consistent with the language and spirit of Appendix B of the Clark Fork Settlement Agreement and the goals and objectives of MFWP. The proposed work also supplements efforts conducted under Appendix C of the CFSA.

Budget

Item	Estimated Carryover	2021 Budget Request
Avista Labor (1 technician, 0.42 FTE; 1 technician, 0.25 FTE; 1 technician, 0.17 FTE)	$20,000	$57,000
MFWP short-term worker (Tech 3 level)	$0	$15,000
Waders, wading boots, field gear, etc.	$500	$2,000
PIT tags	$0	$1,000
Fuel	$1,000	$3,000
Repairs, supplies (sampling gear and vehicle maintenance)	$1,000	$6,000
Thermographs	$0	$2,500
WCT Genetic monitoring ($40/sample @ up to 250 samples)	$10,000	$10,000
Training and Professional Development for Avista Technician (AFS, CPR, Software, etc.)	$2,000	$2,500
Total	$34,500	$99,000
Anticipated Expenditures		$133,500

Existing staff will be tasked with otolith preparation and assisting in report preparation; this cost will be split between this project and *Mountain Lake Fisheries Monitoring Project* (up to $2,500 for each).

Literature Cited

Blakney, J., Dukovcic, J. and T. Tholl. *In Prep*. Native Salmonid Abundance and Tributary Habitat Restoration Monitoring. Annual Project Update-2019. Report to Avista Corporation, Noxon, Montana and Montana Fish, Wildlife and Parks, Thompson Falls, Montana.

Carle, F. and M. Strub. 1978. A new method for estimating population size from removal data. Biometrics, 34:621-630.

Moran, S. 2002. Native Fish Abundance Studies: Fisheries Survey of the Vermilion River Drainage, Montana - 2001. Fish Passage/Native Salmonid Restoration Program, Appendix C. Report to Avista Corporation, Noxon, Montana.

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Sando, R. and K. Blasch. 2015. Predicting alpine headwater stream intermittency: a case study in the northern Rocky Mountains. Ecohydrology & Hydrobiology,15:68-80.

Zippin, C. 1958. The removal method of population estimation. Journal of Wildlife Management, 22:82-90.

2021 PROJECT PLAN

Redd Surveys in Montana Tributaries

Project Contact
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Jason Blakney, Montana Fish, Wildlife and Parks (MFWP), (406) 382-3033, jblakney@mt.gov

Project History
From 2000 through 2020, redd surveys were one component of the Fish Abundance Monitoring Program conducted under Appendix C of the Clark Fork Settlement Agreement (CFSA). Beginning in 2019, all electrofishing-based abundance monitoring in Montana streams was implemented through the Montana Tributary Habitat Acquisition and Recreational Fishery Enhancement Program (Appendix B). Similarly, Bull Trout and Brown Trout redd surveys will be conducted through Appendix B beginning in 2021. Due to this change, this project was ranked by the WRTAC on January 20, 2021 and the Evaluation and Ranking Criteria scores are included as the last page of this project plan.

Background
Previously, redd surveys were also conducted under the Fish Passage/Native Salmonid Restoration Plan (CFSA Appendix C). These surveys were undertaken, in part, to assess tributary salmonid populations' response to fish passage and other management efforts, therefore, redd survey of tributaries or areas of tributaries (e.g., Index Reaches) known to be utilized by Bull Trout that have been subject to fish passage efforts will continue to be emphasized. Surveys in other tributaries will also continue as has been done for the past 15 or more years to assess Bull Trout and Brown Trout spawning trends. Commonality of methods used, and replication of areas surveyed will facilitate continuation through Appendix B monitoring. This long term data set helps identify population trends, potential contribution of transported and/or non-transported Bull Trout, critical habitat, potential threats and barriers, and when combined with Brown Trout redd surveys in area tributaries where both species are present, lost spawning potential due to superimposition of Brown Trout redds on Bull Trout redds.

Goal
Monitor the relative abundance of adult Bull Trout and Brown Trout in important Montana tributaries to the lower Clark Fork River.

Objectives
1. Monitor spawning activity of Bull Trout and Brown Trout.

Tasks
1. In conjunction with Appendix C and other Appendix B programs, coordinate and conduct annual Bull Trout and Brown Trout redd counts in tributaries of the Montana portion of Avista Project Area tributaries and the Thompson River drainage. (Objective 1)

2. Continue to sample and genetically analyze eggs from positively identified Brown Trout redds in the East Fork Bull River. (Objective 1)

Work Products

- Annual Project Update; Redd Survey (2020 data); final due April 1, 2021
- Annual Work Summary; due December 1, 2021
- Annual Project Update; Redd Survey (2021 data); final due April 1, 2022

Permitting Requirements

Redd surveys, by themselves are not specified in Montana Scientific Collection Permit; however, data recorded follows state database requirements and is reported.

Endangered Species Act consultation for this project plan is associated with the 2019 Biological Opinion on the effects of continued operation of the Clark Fork Hydroelectric Project on Bull Trout and designated Bull Trout critical habitat (BiOp). This project plan is consistent with the analyses and conclusions contained in the 2019 BiOp and will adhere to all appropriate Terms and Conditions designed to reduce the extent and effects of incidental take on Bull Trout. No incidental take of Bull Trout is anticipated as a result of this project plan; therefore, no take reporting is required.

Cultural/Historic Resource Review

Not applicable for the tasks proposed in this project plan, there are no ground and/or vegetation disturbing activities, or proposed impacts to cultural/historic resources.

Benefit to the Resource

Bull Trout, listed as threatened under the Endangered Species Act, is a primary species identified in the Native Salmonid Restoration Plan (NSRP) for consideration for fish passage and associated Protection Mitigation and Enhancement Efforts (PM&E) measures. The NSRP identified "native fish abundance studies" to measure changes in tributary native salmonid population's distribution and abundance in relation to fish passage and other native fish restoration activities. The Aquatic Implementation Team has determined that implementation of native fish abundance studies including annual Bull Trout and Brown Trout redd counts should proceed in a manner that facilitates long term monitoring. Data provided enables managers to assess the effect of related PM&Es and provides data for state and federal management plans.

Budget

Item	Estimated Carryover	2021 Budget Request
Biologist field work and reporting (<0.10 FTE)	$0	$8,000
Technician field work, data mgmt., and reporting (0.20 FTE)	$0	$10,000
Equipment (waders, etc.)	$0	$500
Vehicle mileage	$0	$1,000
Lab costs for Brown Trout egg samples genetic analysis	$0	$1,000
Total	$0	$20,500
Anticipated Expenditures		$20,500

There is carryover in the amount of $6,500 associated with this project. This carryover will be funded through Appendix C because that is how the MC approved this project in 2020. As a cost share, all dollars for database development have been integrated into Appendix C.

Appendices A and B Tributary Habitat Acquisition and Enhancement Funds Project Evaluation and Ranking Criteria score sheet

As scored by the WRTAC on 1/20/2021

Appendix: B Project Title: Redd Surveys in Montana Tributaries

Criteria	Score			
	3	**2**	**1**	**0**
A. Species to benefit	Bull Trout and Westslope Cutthroat Trout	**Bull Trout or Westslope Cutthroat Trout**	Target species but not Bull Trout or Westslope Cutthroat Trout	None
B. Resource increase	Great (> 25%)	Moderate (10–25%)	Limited (< 10%)	**No increase***
C. Project addresses	Threat to existence of population	**Problem that limits population**	Does not address a problem but enhances population	Not associated with target populations
D. Project effectiveness	Solves primary problem	Partially solves or provides all information to solve primary problem	**Provides some information to address primary problem**	Does not address primary problem
E. Cost/benefit	Benefit exceptional relative to cost	**Benefit high relative to cost**	Benefit consistent with cost	Cost exceeds benefit
F. Outside funding	≥ 50%	25–49%	≤ 24%	**Entirely CFSA funded**

Scoring Instructions:

- When ranking proposals that do not involve on-the-ground implementation but are necessary to the scope of physical projects (e.g., applied research, watershed assessments, NEPA analyses), score them with regard to the "expected" or "average" resultant physical project.
- **A score of "0" in any of the criteria does not necessarily mean the project is ineligible for CFSA funding.** Rather, a score of "0" should be considered an indication that this aspect of the project needs to be thoroughly discussed and considered.
- Although total scores for each proposed project can be summed to get a general idea of the relative strength of each project, **the scoring system should be viewed as an ordinal rather than absolute ranking system.** In light of this and in the interest of maintaining a simple and objective scoring system, only whole numbers will be utilized (e.g., no half points).

2021 PROJECT PLAN

Sims Meander Stream and Floodplain Restoration Project

Project Contact
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Leona Gollen, Green Mountain Conservation District (GMCD), (406) 827-4833, GMCD@blackfoot.net, *and*
Craig Neesvig, Kootenai National Forest (KNF), (406) 827-0734, craig.neesvig@usda.gov

Project History
This is a new project based on information developed during the Vermilion River Sims Reach Restoration Survey and Design project, which was approved in 2017. This new construction phase ranked by the WRTAC on January 20, 2021 and the Evaluation and Ranking Criteria scores are included as the last page of this project plan.

Background
The Sims reach of the Vermilion River provides important Bull Trout and Westslope Cutthroat Trout habitat. The Vermilion River is among the primary Bull Trout spawning areas in the Lower Clark Fork River drainage. Due to its importance to native fish species, the Vermilion River has been the focus of concerted efforts to implement watershed scale restoration.

Montana's 2002 303(d) list classified 22.5 miles of the Vermilion River as impaired and only partially supporting its beneficial uses of aquatic life and cold-water fisheries. In 2005, the Lower Clark Fork River Drainage Habitat Problem Assessment (GEI Consultants, 2005) ranked the Vermilion River as among the top priorities for improving and protecting native fish habitat in the Lower Clark Fork watershed. In 2006, the KNF completed the Vermilion River Watershed Assessment (Neesvig et al. 2007). This assessment included a preliminary restoration plan aimed at addressing identified impairments and habitat deficiencies in the Vermilion River, resulting from historic disturbances such as mining and riparian timber harvest. In 2012, watershed partners began a top-down watershed-scale restoration effort in the drainage with the Chapel Slide Project. This was followed by the Miners Gulch Project in 2016. Post-runoff monitoring completed by the KNF indicates that these projects are performing well (Neesvig 2019).

The Sims reach of the Vermilion River is located approximately 8 miles upstream of the mouth of the Vermilion River (accessed via the Grouse Creek Trailhead) and immediately downstream of the Miners Gulch Project. The proposed Sims Meander Stream and Floodplain Restoration Project will reactivate the floodplain of the Vermilion River that has been disconnected due to past anthropogenic and natural disturbances (Figure 1).

Figure 1. The Vermilion River's floodplain is disconnected throughout much of the Sims Meander Reach. While a narrow border of vegetation thrives at the immediate water's edge, the remaining floodplain is a dry, cobble bar.

Project design alternatives have been developed by the KNF, based on LiDAR data and detailed hydrological surveys, that employ on-the-ground techniques to improve channel dimensions relative to reference conditions, bank stability, in-stream habitat complexity, bedload transport, and riparian and floodplain function. Designs have been reviewed by a group of project stakeholders and will be further evaluated in NEPA consultation expected to be completed over the fall and winter of 2020/2021.

Bull Trout redds have been found in both restoration reaches post-construction, however overall Bull Trout redd numbers have recently declined in the Vermilion River. Therefore, techniques used successfully upstream in the Chapel Slide and Miners Gulch restoration projects will be modified for the Sims Meander Project in response to concerns raised by fisheries biologists (Montana Fish, Wildlife and Parks and Avista). These concerns are focused on the desire to minimize short-term disturbance required to construct instream habitat features in the face of a declining Bull Trout population. Final project designs will be reviewed by project stakeholders in order to minimize impacts and maximize benefits to native fish. Activities are expected to include stabilizing the channel while maintaining proper channel and floodplain dimensions; reshaping of the floodplain; bank protection; installation of large woody debris (LWD) structures, and an aggressive riparian planting program that includes temporary irrigation for maximum success. Disturbed areas will be planted with native species including cottonwood, willow, conifers and a suite of local brush species.

Goal

The overall goal of the Sims Meander Stream and Floodplain Restoration Project is to reconnect the river with its floodplain such that vegetation can be established through planting and natural regeneration and the surrounding area can reach over the long-term by reaching self-sustaining equilibrium.

Objectives

1. Reconnect and recontour the floodplain along 1,500-2,000 feet of stream channel.

2. Install floodplain structures (LWD and/or fascines) to stabilize the stream channel, trap fine sediments and support revegetation efforts.

3. Install in-stream structures for bank protection, grade control, and fish habitat (where and if necessary).

4. Reestablish native trees and shrubs in the floodplain along the stream channel.

5. Develop outreach materials to educate the public about the work in the Vermilion River, the characteristics of healthy streams and rivers, the importance of floodplains, and the habitat needs of native fish.

Tasks

1. NEPA consultation will be completed and necessary permits will be secured by the KNF over the winter and spring of 2021. (Objectives 1, 2, 3, and 4)

2. Funding for project will be secured by March 2021, and contractor selection will be made. (Objectives 1, 2, and 3)

3. Construction will be completed between July 15 and August 31, 2021. (Objectives 1, 2 and 3)

4. Riparian revegetation will be completed in fall of 2021 and/or spring of 2022 and irrigated in subsequent 2-3 years. (Objective 4)

5. Outreach materials (including a 3-5 minute film) will be developed and finalized for distribution by December 31, 2021. (Objective 5)

6. Monitoring: As-built survey and construction documentation data (including sediment reduction) will be monitored in 2021 immediately post-construction. Post-runoff and revegetation monitoring will occur in 2022 and subsequent years. (Objectives 1, 2, 3, and 4)

7. Coordination of project planning, implementation, reporting, and as-needed project support will occur through 2021 and 2022. (Objectives 1-5).

Work Products

- Final permits and NEPA decision; expected March 31, 2021
- Finalized design-build contract; expected April 30, 2021
- Quarterly Reports; due to the Appendix B Aquatic Program Leader (APL) by June 30, September 30, and November 15, 2021; and March 31, 2022
- Annual Work Summary; due December 1, 2021
- As-built monitoring report; expected December 2022

Permitting Requirements

This project will require NEPA consultation, which will include Endangered Species Act consultation, and the following permits/authorizations: 404, 318 and 124. All NEPA consultation and permitting will be completed by the KNF.

Endangered Species Act consultation for this project plan is associated with the 2019 Biological Opinion on the effects of continued operation of the Clark Fork Hydroelectric Project on Bull Trout and designated Bull Trout critical habitat (BiOp). This project plan is consistent with the analysis and conclusions contained in the 2019 BiOp and will adhere to all appropriate Terms and Conditions designed to reduce the extent and effects of incidental take on Bull Trout. Incidental take reporting for this project plan will be included in the annual Biological Opinion report as required by Term and Conditions 15–18 of the 2019 Incidental Take Statement.

Cultural/Historic Resource Review

Cultural and historic resource review will be completed by the KNF as a part of NEPA consultation, expected March 2021.

Benefit to the Resource

This project is consistent with the objectives of Appendix B. Bull Trout and genetically pure Westslope Cutthroat Trout occur within this reach of the Vermilion River. This project will improve native fish habitat by restoring a degraded stream channel and floodplain, regenerating native riparian vegetation, increasing habitat complexity with LWD structures, and improving the stability of the stream channel. Therefore, this project supports state and federally approved management plans for Bull Trout and Westslope Cutthroat Trout. In addition, stream enhancement measures will help address listed state water quality impairments throughout the Vermilion River as well as providing important riparian habitat for wildlife. Therefore, this project provides ancillary benefits to appendices C and K.

Budget

Item	Estimated Carryover	2021 Budget Request
GMCD-sponsored construction contract	$0	$98,000
GMCD Administration fee, 10%	$0	$9,800
USFS-led Revegetation – Labor (USFS staff and crew to oversee and implement revegetation effort)	$0	$18,880
USFS-led Revegetation – Materials (cottonwood, willow, seed, t-posts, fencing, irrigation equipment, herbicide, etc.)	$0	$20,850
USFS-led Revegetation – Travel (mileage only)	$0	$270
LCFWG Project Coordination (including outreach contribution), approx. 120 hours	$0	$3,720
Total	$0	$151,520
Anticipated Expenditures		$151,520

Additional materials already secured and expected to be utilized in this project include:

- Rock leftover from the Miners Gulch Project and cached onsite will be fully utilized in this project; as needed, additional rock will be purchased through the construction contract or local vendor. Sufficient ballast rock will be a necessary component to secure streambank structures that extend into the flow of the Vermilion River.
- Browse protection materials (t-posts and fencing) leftover from the Miners Gulch Project.
- Irrigation equipment, leftover from the Miners Gulch Project, will be utilized for this project. Due to the age of this equipment, the USFS will need to have replacement parts available to maintain irrigation during the dry season.

The construction request (i.e., the $98,000 to GMCD), if approved, will provide a total of $279,000 (in conjunction with $10,000 from the KNF and $171,000 from the Montana Department of Environmental Quality). This amount is conservative based on the estimate provided by the KNF. Expected costs will continue to be revised as design, NEPA, and permitting is approved/finalized, and confirmed with an award of a construction contract, expected in April 2021. The current cost estimate for construction of the current preferred alternative (Alternative 3 – Modified) is $250,850. Our budgeting included in this proposal provides for approximately 10% contingency in unexpected construction costs. Requested funds for construction, along with $40,000 total requested for revegetation and $3,720 requested for project coordination, will also constitute the remaining nonfederal funds needed to meet match requirements associated with the Montana Department of Environmental Quality grant listed below.

This proposal total represents 36% of an estimated $421,620 required for the entire project. Additional match funds already secured include a total $260,100 with another $10,000 expected:
Montana Department of Environmental Quality, $200,000, secured with required non-federal match ($152,750) which will be met by this proposal and additional CFSA funds that have contributed to the development of this project in 2020;
Sanders Count Resource Advisory Committee, $25,000, secured;
Kootenai National Forest (in-kind), $35,100, secured; and
Kootenai National Forest (cash), $10,000, expected.

Literature Cited

GEI Consultants, Inc. 2005. Lower Clark Fork River Drainage Habitat Problem Assessment. Report to Avista Corporation, Spokane, WA.

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Neesvig, C., D. Grupenhoff, and A. Reif, 2007. Vermilion River Watershed Assessment and Preliminary Restoration Plan. U.S. Forest Service Kootenai National Forest, Libby, MT.

Appendices A and B Tributary Habitat Acquisition and Enhancement Funds Project Evaluation and Ranking Criteria score sheet

As scored by the WRTAC on 1/20/2021

Appendix: B **Project Title: Sims Meander Stream and Floodplain Restoration Project**

Criteria	Score			
	3	**2**	**1**	**0**
A. Species to benefit	**Bull Trout and Westslope Cutthroat Trout**	Bull Trout or Westslope Cutthroat Trout	Target species but not Bull Trout or Westslope Cutthroat Trout	None
B. Resource increase	Great (> 25%)	Moderate (10–25%)	**Limited (< 10%)**	No increase
C. Project addresses	Threat to existence of population	Problem that limits population	**Does not address a problem but enhances population**	Not associated with target populations
D. Project effectiveness	Solves primary problem	**Partially solves or provides all information to solve primary problem**	**Provides some information to address primary problem**	Does not address primary problem
E. Cost/benefit	Benefit exceptional relative to cost	Benefit high relative to cost	**Benefit consistent with cost**	Cost exceeds benefit
F. Outside funding	**≥ 50%**	25–49%	≤ 24%	Entirely CFSA funded

Scoring Instructions:

- When ranking proposals that do not involve on-the-ground implementation but are necessary to the scope of physical projects (e.g., applied research, watershed assessments, NEPA analyses), score them with regard to the "expected" or "average" resultant physical project.
- **A score of "0" in any of the criteria does not necessarily mean the project is ineligible for CFSA funding.** Rather, a score of "0" should be considered an indication that this aspect of the project needs to be thoroughly discussed and considered.
- Although total scores for each proposed project can be summed to get a general idea of the relative strength of each project, **the scoring system should be viewed as an ordinal rather than absolute ranking system.** In light of this and in the interest of maintaining a simple and objective scoring system, only whole numbers will be utilized (e.g., no half points).

2021 PROJECT PLAN

Stream Gage Monitoring

Project Contact
Craig Neesvig, U.S. Forest Service (USFS), (406) 827-0734, craig.neesvig@usda.gov

Project History
This Project Plan represents the merger of two interrelated continuing projects. The "Rock and Graves Creek 2016–2020 Stream Gage Maintenance" project was originally approved by the Management Committee (MC) in 2010 and was then renewed as a five-year project in 2016. Thus, the MC has approved the funding for this work through the 2020 water year. The five-year "Stream Gage Replacement and 2017–2021 Maintenance" project was originally approved by the MC in 2017. Thus, the MC has approved the funding for this work through the 2021 water year. Beginning in 2018, these two continuing projects were merged into the "Stream Gage Monitoring" project. Beginning this year, we will propose annual stream gage monitoring in all six tributaries through this project plan (as opposed to proposing in 5-year increments).

Background
Since 2008, automated stream gages have been installed and maintained by the USFS in multiple locations across the Cabinet Ranger District. These autonomous gages record temperature and pressure values which can be used to estimate parameters such as discharge. Thus, stream gages have provided continuous discharge and temperature information since 2008. In addition to informing water forecasting and annual water budgets, information collected through stream gage monitoring provide valuable insights into to multiple aspects of projects implemented under the Clark Fork Settlement Agreement (CFSA) such as fish trap design and performance, fish migration behaviors, design and function of restoration projects, and stream intermittency.

Over the last three years new data loggers with a guaranteed lifespan of 7–10 years were purchased through appendices B and C of the CFSA and installed and maintained by USFS personnel. These new loggers were deployed in the Bull River at the historic U.S. Geological Survey gage house, East Fork Bull River near the historic Ranger Station (one gage in each of the two channels), Trout Creek at the 214 bridge, Vermilion River at the red bridge, Rock Creek near the mouth, and Graves Creek at the permanent weir trap site. These projects also provided funding for the USFS to conduct annual calibration, maintenance, and data compilation and reporting through 2021 in the Bull River, East Fork Bull River, Trout Creek, and Vermilion River, and through 2020 in Rock and Graves creeks.

Extra funding will be required during 2021 to move the Graves Creek monitoring station to an upstream location and develop an associated discharge curve (contingent on identification of a suitable site). This move is required because the Graves Creek permanent weir trap will divert a small amount of flow past the current monitoring station once the enhancements are complete.

Goal
The goal of this project is maintain and operate the current stream gaging network and to provide continuous, accurate streamflow data in selected area tributaries.

Objective

1. Accurately characterize stream discharge and temperature within the Bull River, East Fork Bull River, Trout Creek, Vermilion River, Rock Creek, and Graves Creeks during the 2021 water year.

Tasks

1. Annually, and as needed, calibrate, maintain, and download/process data from all six gages. The maintenance includes repairs to the monitoring station and materials such as staff plates, gage housings, miscellaneous metal, fasteners etc.

2. Utilize known pressure–discharge relationships to estimate gage height and discharge at 30-minute intervals (or less) for each site from April 1, 2021 through March 30, 2022.

3. Move the Graves Creek monitoring station and develop the associated discharge curve. This includes associated supplies to outfit a new single gaging station such as cement, treated lumber, staff plate, gage housing, miscellaneous metal, fasteners etc.

Work Products

- Excel spreadsheet containing 2021 water year temperature and discharge data in 30-minute intervals for each stream (and channel) will be provided to Avista by February 1, 2022
- Excel spreadsheet containing October–November of the 2022 water year temperature and discharge data in 30-minute intervals for Graves Creek and East Fork Bull River will be provided to Avista by February 1, 2022
- 2021 Annual Water Year Data Report for each stream (Bull River, East Fork Bull River, Rock Creek, Trout Creek, Vermilion River, Graves Creek); due January 1, 2022
- 2019 Annual Water Year Data Report for Rock Creek; due February 1, 2021
- Mid-year report; due to Appendix B Aquatic Program Leader (APL) August 2, 2021
- Annual Work Summary; due to APL November 15, 2021

Permitting Requirements

No additional permits are required for this project.

Endangered Species Act consultation for this project plan is associated with the 2019 Biological Opinion on the effects of continued operation of the Clark Fork Hydroelectric Project on Bull Trout and designated Bull Trout critical habitat (BiOp). This project plan is consistent with the analyses and conclusions contained in the 2019 BiOp and will adhere to all appropriate Terms and Conditions designed to reduce the extent and effects of incidental take on Bull Trout. No incidental take of Bull Trout is anticipated as a result of this project plan; therefore, no take reporting is required.

Cultural/Historic Resource Review

Not applicable for the tasks proposed in this project plan, there are no ground and/or vegetation disturbing activities, or proposed impacts to cultural/historic resources.

Benefit to the Resource

The information collected by this project will further enhance the regional hydraulic relationships which are used in channel design and stream restoration, thereby informing decisions and help adaptively manage projects conducted under appendices B and C of the CFSA. Bull Trout and Westslope Cutthroat Trout populations are present within all six of these streams. Information from the Graves Creek, Rock Creek, East Fork Bull River, and Vermilion River gages will help managers understand the relationships between discharge and trap efficiency and juvenile Bull Trout emigrations. Ultimately, this information will be used to inform trapping protocols and improve efficiencies. Discharge information from the Bull River will help explain Westslope Cutthroat Trout post-transport movements.

Budget

The USFS was paid up front for previous stream gage monitoring and sufficient funds remain to complete the 2021 work. Thus, no new request is being made for 2021 and no carryover is shown in the budget table. Estimated 2021 expenditures are $9,787 for USFS labor. In addition, $10,000 are reserved for any required equipment replacement or repairs.

Item	Estimated Carryover	2021 Budget Request
Monitoring, operation and maintenance, periodic downloads, calibration, and reporting (USFS contract)	$0	$0
Faulty equipment replacement contingency	$0	$0
Graves Creek site move and curve development (USFS contract)	$0	$0
Total	$0	$0
Anticipated Expenditures		$0

This project is a 50:50 cost share with Appendix C; thus, one half of the expenditures were paid from each appendix.

2021 PROJECT PLAN

Cabinet Ranger District Automated Snow Recording Site Operation and Maintenance 2020-2021

Project Contact
Craig Neesvig, Kootenai National Forest (KNF), (406) 827-0734, craig.neesvig@usda.gov

Project History
In 2013 a proposal was approved by the Management Committee (MC) for the development and installation of an automated Snow recording site in the Rock Creek basin. Initially this site was thought to be a cooperative SNOTEL site that would be operated, maintained and supported by the Natural Resource Conservation Service (NRCS) snow survey program and Trout Creek USFS offices. Since that time, budget cuts within the NRCS snow survey program have not allowed for the NRCS related support to continue. Without this support, the required yearly operation and maintenance costs that were to be originally covered as an in-kind contribution were non-existent. This proposal is to continue funding for the operation and maintenance of the Cabinet Ranger District snow survey station for the next two years (i.e., through 2021) until the NRCS makes the site compatible to their network and supports the USFS with annual maintenance which is planned to occur as early as 2020.

Background
By nature these sites require a certain amount of maintenance and calibration to sustain consistent and reliable data. The station is located at an approximate elevation of 6000 feet and is subject to adverse weather conditions throughout the year. The initial project was put into effect to establish and initially calibrate the site. This request would be for the ongoing calibration and maintenance of the site over the next two years. In general, yearly calibration is needed due to the high elevation montane location and related effects from adverse weather conditions such as heavy snow, intense winds, and other related natural events.

The USFS is requesting funding to complete the maintenance, and calibration, of the established snow sampling site through 2021, the final year of this project.

The site is located at the Chicago ridge snow sampling station in the Rock Creek drainage. This station has been maintained by the USFS, with Clark Fork Settlement Agreement (CFSA) funding contribution, since its initial installation in 2014. This station is currently on a list to be maintained and operated by the NRCS once patched into the SNOTEL system. The USFS is working in conjunction with the NRCS to facilitate this transition.

Goal
Maintenance of the site, emergency repair, calibration and database reporting are the expected outcomes of this project. The data collected will have great utility in terms of flood forecasting and annual water budgets while augmenting the stream flow data being collected towards the mouth of Rock Creek. One goal is to correlate this snow and climate information with this stream gage to establish runoff curves for the local tributaries and evaluate intermittency based on these curves. The site will monitor short and long term water supply and provide expectation

of runoff trends. This will be useful for predicting peak flow and monitoring rain on snow events. The information collected from this site will also further enhance the regional hydraulic relationships which are directly used in channel design and stream restoration.

Objective

1. Maintain and keep operational the Chicago Ridge Snotel site.

Task

1. Conduct yearly maintenance at SNOTEL site on Chicago Ridge. (Objective 1)

Work Products

- Project Completion Report (through 2019 period); final due May 1, 2021
- Mid-year report; due to Appendix B Aquatic Program Leader (APL) August 2, 2021
- Annual Work Summary; due to APL November 15, 2021
- Data is available in real-time via the internet: (https://www.nohrsc.noaa.gov/interactive/html/graph.html?ey=2019&em=12&ed=19&units=0&station=CHIM8)

Permitting Requirements

Not applicable for the tasks proposed in this project plan.

Endangered Species Act consultation for this project plan is associated with the 2019 Biological Opinion on the effects of continued operation of the Clark Fork Hydroelectric Project on Bull Trout and designated Bull Trout critical habitat (BiOp). This project plan is consistent with the analyses and conclusions contained in the 2019 BiOp and will adhere to all appropriate Terms and Conditions designed to reduce the extent and effects of incidental take on Bull Trout. No incidental take of Bull Trout is anticipated as a result of this project plan; therefore, no take reporting is required.

Cultural/Historic Resource Review

This is a carryover project and the cultural/historic resource review was completed in 2013 by the USFS.

Benefit to the Resource

This project is consistent with the objectives of stream habitat restoration and enhancement efforts enacted under CFSA Appendix B: Montanan Tributary Habitat Acquisition and Recreational Fishery Enhancement Program, and tributary trapping efforts enacted under the Fish Passage/Native Salmonid Restoration Plan (CFSA Appendix C). Bull Trout and Westslope Cutthroat Trout are present in Rock Creek and neighboring drainages; therefore, native salmonid conservation efforts in lower Clark Fork River tributaries can benefit by streamflow projections enabled through the data provided by this project.

Budget

Item	Estimated Carryover	2021 Budget Request
Maintenance, Calibration and database management (for 1 year)	$5,100	$0
Supplies and Vehicle Mileage (for one year)	$1,100	$0
Overhead (8%; for one year)	$500	$0
Total	$6,700	$0
Anticipated expenditures		$6,700

2021 PROJECT PLAN

Crow Creek Bull Trout Investigation

Project Contact
Jason Blakney, Montana Fish, Wildlife and Parks (MFWP), (406) 382-3033, jblakney@mt.gov

Project History
This is a continuing project that was approved by the Management Committee (MC) in 2016. A total funding request of $18,500 was approved in 2016 and no additional funding is requested. It is being requested that the Project Completion Report completion date be extended to July 30, 2021.

Background
Crow Creek is a third order tributary that enters Prospect Creek at river kilometer 19.8. The lower portion of Crow Creek, like many other streams in the lower Clark Fork River drainage, experiences seasonal intermittency associated with the underlying geology of the area (Sando and Blasch 2015). Crow Creek enters Prospect Creek in a small perennial stretch of stream that dried in 2015- the first time since at least 2000. Two mainly resident Bull Trout populations occur upstream of Crow Creek, in upper Prospect Creek and Cooper Gulch. These populations are isolated during base flow conditions by seasonal intermittency but have been shown to exchange migrants (Oldenburg et al. 2015; DeHaan and Bernall 2017). Bull Trout have been found at low abundance in Crow Creek since at least 1996 (WWP 1996; Moran 2004; Horn and Tholl 2011; Moran and Storaasli 2013). At least three age classes of Bull Trout were captured in Crow Creek at long-term monitoring sites in 2014. In the fall of 2015, three larger resident Bull Trout were observed during redd counts in Crow Creek including one individual in a 2007 restoration site. Three bull trout redds have been found in Crow Creek from 2003-2015, two in the East Fork in 2012 (Moran and Storaasli 2013) and one in the lower mainstem in 2014 (Storaasli 2015). Therefore, based on low density Bull Trout observations over multiple years and locations including in both forks of Crow Creek, as well as the occasional occurrence of observable redds in the stream, it does appear to provide suitable habitat for Bull Trout. However, it is unclear if this population is self-sustaining.

Field work for this study was completed in 2016 and 2017. Initial results suggest a small population of Bull Trout does inhabit the Crow Creek drainage as multiple age class of fish were found both years, albeit at low densities. Low levels of natural reproduction did occur in the drainage during the study period as young-of-the year (YOY). Bull Trout were encountered in the West Fork of Crow Creek in both 2016 and 2017. However, no redds have been found in the drainage since 2014. Genetic analyses from fish sampled in Crow Creek in 2016 suggests most fish in the drainage assign to upper Prospect Creek and Cooper Gulch (Adams et al. 2017). Crow Creek was not able to be evaluated to determine if it is genetically distinct population because samples were only collected from 41 individuals, half of which were YOY and likely siblings. Crow Creek, Cooper Gulch and upper Prospect Creek are isolated for a significant portion of the year, but this genetic information adds further evidence of movement and connectivity between the three streams occupied by the species in the Prospect Creek watershed (Oldenburg et al. 2015; DeHaan and Bernall 2017; Adams et al. 2017).

Over the two-year study period, Bull Trout were documented at 14 of 20 sites sampled in Crow Creek and at all 10 sites sampled in Cooper Gulch. Westslope Cutthroat Trout were found at all sites in both streams and Cedar Sculpin were noted at 19 of 20 sites in Crow Creek but were not found to occur in Cooper Gulch. A number of habitat variables were quantified at each electrofishing site along with fish abundance data including stream discharge, substrate, canopy cover, bankfull width, habitat unit classification and measurements (length, widths, and depths), large woody debris and undercut banks. Stream temperature data was recorded at six sites in Crow Creek and five sites in Cooper Gulch. Thermographs have thus far collected two years of winter water temperature data to help assess groundwater influence, which in turn will help better understand spawning potential in both streams. Streambed core samples were collected in late August and early September of 2017 to evaluate levels of fine sediment in spawning gravels.

Goal

The goals of this project are to assess the current status of Bull Trout in Crow Creek, investigate habitat variables that are essential for the species at different portions of their life cycle, determine if the population is self-sustaining or if the stream is capable of supporting an independent population as well as to quantify and compare stream habitat condition in Crow Creek and a neighboring stream with higher Bull Trout abundance, Cooper Gulch. This information will be used to inform future stream restoration, land management, supplementation and other conservation-based actions.

Objective

1. Assess the current status of Bull Trout in Crow Creek and investigate critical habitat variables to determine if the population is self-sustaining or if the stream is capable of supporting an independent population.

Tasks

1. Monitoring Bull Trout at two long-term sample sites and additional locations in the Crow Creek and Cooper Gulch drainages in 2016 and 2017 to assess fish species distribution and abundance using multiple pass electrofishing. (***Completed in 2017***)

2. Conduct genetic assessment tests of Bull Trout captured electrofishing in the Crow Creek drainage to determine population of origin. (***Completed in 2018***)

3. Implant Passive Integrated Transponder (PIT) tags in high proportion of Bull Trout in Crow Creek to evaluate future movements and habitat use in the drainage at electrofishing sites and by walking the stream with a mobile PIT tag scanner. (***Completed in 2018***)

4. Monitoring juvenile rearing habitat quality at electrofishing sites using substrate scoring method (Bjornn et al. 1977; Leathe and Enk 1985; Weaver and Fraley 1991). (***Completed in 2017***)

5. Conduct habitat surveys of low to moderate intensity at the reach scale to quantify variables associated with riffle and pool habitats at low flow periods (Overton et al. 1997). Compare known habitat occupied by Bull Trout in Cooper Gulch. (***Completed in 2017***)

6. Monitor stream temperature and flow in mainstem and both forks by seasonal deployment of temperature loggers throughout Bull Trout occupied areas of the Crow Creek and Cooper Gulch drainages. (***Completed in 2017***)

7. Determine areas of groundwater upwelling that could be potentially used by spawning Bull Trout by visually inspecting streams reaches during very cold periods in the winter. (***Completed in 2017***)

8. Investigate spawning/incubation environment using substrate core samples to determine if fine sediment limits Bull Trout embryo survival (Shepard et al. 1984). Areas chosen in Crow Creek will be based on location of previously known spawning and areas that appear to be influenced by groundwater upwelling. Areas chosen in Cooper Gulch will be those where Bull Trout have been documented spawning in the same location on multiple occasions. (***Completed in 2018***)

9. Continue to conduct redd counts in Crow Creek. Possibly conduct redd counts in mid to late September (versus in October) when fish are actively spawning in hopes of more easily identifying smaller resident-type redds. (***Completed in 2018***)

Work Products

- Project Completion Report; final due July 30, 2021
- Annual Work Summary; due December 1, 2021

Permitting Requirements

No permitting requirements have been identified. Instream sampling associated with this project has been completed; therefore, Endangered Species Act consultation for this project plan is associated with the 2019 Biological Opinion on the effects of continued operation of the Clark Fork Hydroelectric Project on Bull Trout and designated Bull Trout critical habitat (BiOp). This project plan is consistent with the analyses and conclusions contained in the 2019 BiOp and will adhere to all appropriate Terms and Conditions designed to reduce the extent and effects of incidental take on Bull Trout. No incidental take of Bull Trout is anticipated as a result of this project plan; therefore, no take reporting is required.

Cultural/Historic Resource Review

Not applicable for the tasks proposed in this project plan, there are no ground and/or vegetation disturbing activities, or proposed impacts to cultural/historic resources.

Benefit to the Resource

This study will help achieve a better understanding of habitat factors that dictate resident Bull Trout abundance in two neighboring and cosmetically similar streams (temperature, discharge, anthropogenic impacts) in the upper Prospect Creek watershed, Crow Creek and Cooper Gulch.

The upper Prospect Creek watershed is an important resident Bull Trout metapopulation, as it the only lower Clark River drainage where Bull Trout still occur in three streams (with seasonal connectivity documented among populations) and one of only two areas where only native fish species presently occur. While multiple age classes of Bull Trout have been found in Crow Creek over the past 20 years, relatively sparse spatial sampling has shown the species at low abundance and very few redds have been found. In contrast, Bull Trout in Cooper Gulch have been consistently abundant and redds are commonly found every year. By comparing habitat variable measurements between Crow Creek and Cooper Gulch, this study should help determine if habitat limits Bull Trout in Crow Creek and if so, where and how to focus restoration activities. This work will also help determine if the population in Crow Creek is self-sustaining or if it would be feasible to establish a self-sustaining population in Crow Creek. This project is consistent with CFSA Appendices B and C and is line with State of Montana and Federal Fisheries management plans.

Budget

Item	Estimated Carryover	2021 Budget Request
Finalize Project Completion Report	$2,749	$0
Total	$2,749	$0
Anticipated Expenditures		$2,749

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2021 PROJECT PLAN

Graves Creek Pilot Habitat Enhancement Project

Project Contacts
Brita Olson, Lower Clark Fork Watershed Group, (208) 304-3852, brita@lowerclarkforkwatershedgroup.org, *and*
Jason Blakney, Montana Fish, Wildlife and Parks (MFWP), (406) 382-3033, jblakney@mt.gov

Project History
This is a continuing project that was approved by the Management Committee (MC) in 2018. A total funding request of $29,500 was approved in 2018 and no additional funding is requested. A project approved by the MC in 2017 (i.e., "Lolo National Forest Priority Native Salmonid Habitat Restoration Assessment and Planning") provided funding to complete the National Environmental Policy Act (NEPA) process which included the environmental review and design of this project. In February of 2019, the Lolo National Forest (LNF) produced a Decision Memo as a product of the NEPA process which included this work in Graves Creek. The project was implemented in August of 2019 with four large woody debris (LWD) structures built. Pre-runoff monitoring data was collected in 2019 to assess baseline habitat conditions within the treated reach and a control reach. Post-runoff monitoring occurred in the fall of 2020 and will again occur in 2021. The Water Resources Technical Advisory Committee ranked this project in 2018.

Background
The goal of this project is to construct LWD structures that will facilitate localized sorting and deposition of spawning gravel and provide habitat complexity within the portion of Graves Creek managed by the LNF. Graves Creek is a key migratory Bull Trout spawning tributary to Noxon Reservoir. This stream represents a significant component of the upstream and downstream transport programs under Appendix C, focused on reconnecting this tributary with Lake Pend Oreille.

Due to a natural migration barrier, only the lower three miles of Graves Creek is accessible to migratory Bull Trout. Spawning substrate in this reach is limited and the addition of LWD would help increase the localized deposition of smaller spawning sized substrate as well as provide additional cover for migratory fish, increase habitat complexity, and the likelihood of pool formation. Fisheries biologists conducting redd surveys in this reach have long observed migratory redds associated with the few large natural wood structures present. The overhead cover and substrate sorting associated with such structures are important components in where redds are built.

The installation of LWD will occur using a phased approach, in order to monitor the success of such enhancement work. Structures will emulate the existing stable pieces of wood that represent the best microhabitat for spawning and rearing Bull Trout. Because of the importance of this reach to Bull Trout production, a phased methodology that maximizes potential benefits (confirmed through monitoring) and limits disturbance will be taken. Structures installed in 2019 should experience at least two seasons of spring runoff, before additional structures are added to the stream.

Goal
The goal of this project is to install woody debris structures into Graves Creek to facilitate localized deposition of smaller substrate that is more suitable for Bull Trout spawning, as appropriately sized spawning gravel is limited in Graves Creek. This project should also increase habitat complexity that may be used as cover by juvenile and adult Bull Trout and Westslope Cutthroat Trout.

Objectives
1. Initiate localized sorting and deposition of spawning gravel.

2. Increase habitat complexity for juvenile and adult Bull Trout.

Tasks
1. Submit design report to AIT for review. (***Completed in 2019***)

2. Secure necessary permits to install LWD structures in lower Graves Creek. (Objectives 1 and 2) (***Completed in 2019***)

3. Select a contractor to facilitate installation of structures. (Objectives 1 and 2) (***Completed in 2019***)

4. Construct five LWD jams during the summer of 2019. (Objectives 1 and 2) (***Completed in 2019***)

5. Monitor changes in substrate size and distribution in the enhanced reaches. (USFS, MFWP, and/or Lower Clark Fork Watershed Group) (Objectives 1 and 2) (*pre-runoff monitoring:* ***Completed in 2019,*** *first of two post-runoff monitoring:* ***Completed in 2020***)

6. Determine whether or not the addition of future structures is warranted.

Work Products
- Mid-year report; due to the Appendix B Aquatic Program Leader (APL) August 2, 2021
- Annual Work Summary; due to the APL November 15, 2021
- Review of substrate changes in a technical memo following two years of spring runoff; due December 15, 2021
- Annual fixed point photo-documentation

Permitting Requirements
Not applicable for the tasks proposed in this project plan.

Endangered Species Act consultation for this project plan is associated with the 2019 Biological Opinion on the effects of continued operation of the Clark Fork Hydroelectric Project on Bull Trout and designated Bull Trout critical habitat (BiOp). This project plan is consistent with the analyses and conclusions contained in the 2019 BiOp and will adhere to all appropriate Terms and Conditions designed to reduce the extent and effects of incidental take on Bull Trout. No incidental take of Bull Trout is anticipated as a result of this project plan; therefore, no take

reporting is required.

Cultural/Historic Resource Review
This is a carryover or maintenance project and the cultural/historic review for NEPA purposes was completed for this project as part of the NEPA process performed by the USFS.

Benefit to the Resource
Work is targeted within the Bull Trout spawning reach of Graves Creek and is focused on enhancing the limited spawning gravel. Creating a more complex environment using LWD will provide cover and substrate sorting for redd building, and improved rearing and overwintering conditions. This will complement previous habitat restoration lower in the watershed and the ongoing Appendix C adult and juvenile Bull Trout transport programs.

The project fits within the restoration and enhancement of Clark Fork River tributary watersheds to offset power peaking operation of Noxon Rapids Dam to native salmonids. Actions are consistent with the Tributary Habitat Acquisition and Enhancement component of Appendix B. Actions also support the USFWS Recovery Plan for the Coterminous United States Population of Bull Trout, Conservation Strategy for Bull Trout on USFS lands in Western Montana, and MOU and Conservation Agreement for Westslope Cutthroat Trout and Yellowstone Cutthroat Trout in Montana.

Budget

Item	Estimated Carryover	2021 Budget Request
Total remaining for monitoring and reporting	$5,421	$0
Total	$5,421	$0
Anticipated Expenditures		$5,421

2021 PROJECT PLAN

Upper Prospect Creek LWD Project

Project Contacts

Jason Blakney, Montana Fish, Wildlife and Parks (MFWP), (406) 382-3033, jblakney@mt.gov
Brita Olson, Lower Clark Fork Watershed Group, (208) 304-3852, brita@lowerclarkforkwatershedgroup.org, *and*
Christine Brissette, Trout Unlimited, (406) 544-9649, Christine.Brissette@tu.org

Project History

This project was ranked by the WRTAC and approved by Management Committee (MC) in 2020.

Background

The goal of this project is to encourage localized gravel deposition to improve the abundance of suitable sized spawning substrate in a stream only occupied by native salmonids, Bull Trout and Westslope Cutthroat Trout. The proposed project would occur over about 1.5 km of upper Prospect Creek within the Bull Trout redd count index reach (FIGURE 1). Suitable spawning gravel in upper Prospect Creek is limited and is often found along streams margins, areas with little to no flow which are not readily used by Bull Trout for spawning. Much of the gravel deposition within the reach is associated with cobble and boulders, with minimal large woody debris (LWD) present in the system, except in a few large log jams. Visual inspection suggests there is enough of the proper size spawning gravel (up to 50 mm) distributed throughout this reach but not concentrated in many areas. The reach is relatively high gradient and thus needs large trees that would stay in place in order to provide the energy dissipation needed to deposit spawning gravel.

Data amassed over the past two decades suggests the Bull Trout population in upper Prospect Creek may be in peril. No redds were found in 2019, although four adult-sized fish were encountered within the redd count index reach. The lower two miles of upper Prospect Creek, below the redd count index reach before the stream becomes intermittent, has been walked three of the last four years as well but no redds have been found. In fact, only two Bull Trout redds have been documented in upper Prospect Creek since 2015 and while the trend of redds by year has yet to show a statistically significant decline (p=0.18), signs of population decline are beginning to emerge (FIGURE 2). Of the two long-term electrofishing sites in upper Prospect Creek (FIGURE 1), a significant decline in Bull Trout abundance has occurred at the lower monitoring site while a significant decline in Bull Trout biomass has been observed at the upper site (Blakney and Tholl 2019). This project represents a low cost, minimally invasive action to try to provide more adequate spawning gravel and additional cover/habitat complexity to fish in one of the few remaining streams in the lower Clark Fork River drainage in Montana occupied by an entirely native fish assemblage.

Mature trees are not limited along this section of Prospect Creek with dense stands of larger conifers present along most of the reach (FIGURE 3). The plan for this project will be to create 8 to 10 LWD jams consisting of 1 to 5 larger conifers by strategically dropping trees using a

skilled sawyer. Logs will be dropped at varying angles but not directly perpendicular to the current to maximize contact with the bed. Research has suggested that logs longer than the average bankfull width of the stream should be used if the goal of the project it to retain the wood in place (Hilderbrand et al. 1998). Since trees are abundant along this section of the stream and because the reach is located in a narrow mountain valley, additional solar inputs to the stream from tree removal would be very minimal and are unlikely to have a deleterious impact on stream temperature. Trees along the stream banks will not be removed. In most cases trees will be selectively cut from the heavily timbered hillside on the south side of the stream. Project partners assessed the risk of this project to downstream infrastructure and determined that risk is low due to two large log jams that sit between this project and the downstream bridge near Twentyfour Mile Creek. Trees selected for this project will also be large, and left whole, limiting the potential for mobilization.

While the primary goal of the proposed project is to increase sorting and retention of spawning gravel within the redd count index reach, this project may have other ancillary benefits for native salmonids, such as improving overwintering habitat, and the stream ecosystem in which they live. Woody debris in salmonid streams also functions to diversify habitat by influencing and/or changing channel velocity, flow direction and gradient; depth associated with bed scour; habitat complexity essential for spatial isolation and cover; localized retention of organic matter and the distribution of invertebrates that consume such detritus (Meehan 1991). A study was recently conducted to evaluate the influence of stream and riparian habitat variables on Bull Trout and Westslope Cutthroat Trout in the two other streams occupied by both species in the Prospect Creek drainage, Crow Creek and Cooper Gulch (Blakney, *In Prep*). While this study found the amount of LWD did not influence the abundance (fish/100 m, fish caught) or biomass (g/100m^2, g/100m) of either salmonid species at the reach scale in either stream (~100 m), young-of-the-year (YOY) and juvenile Bull Trout were often associated with collections of small woody debris (SWD) and organic material, likely because these areas provide adequate cover and food. Large wood often facilitates the collection of SWD and other allochthonous materials in these low order streams. Fisheries and/or physical habitat monitoring will be incorporated into this project in hopes of better understanding how such habitat enhancement projects may benefit native salmonids and stream habitat.

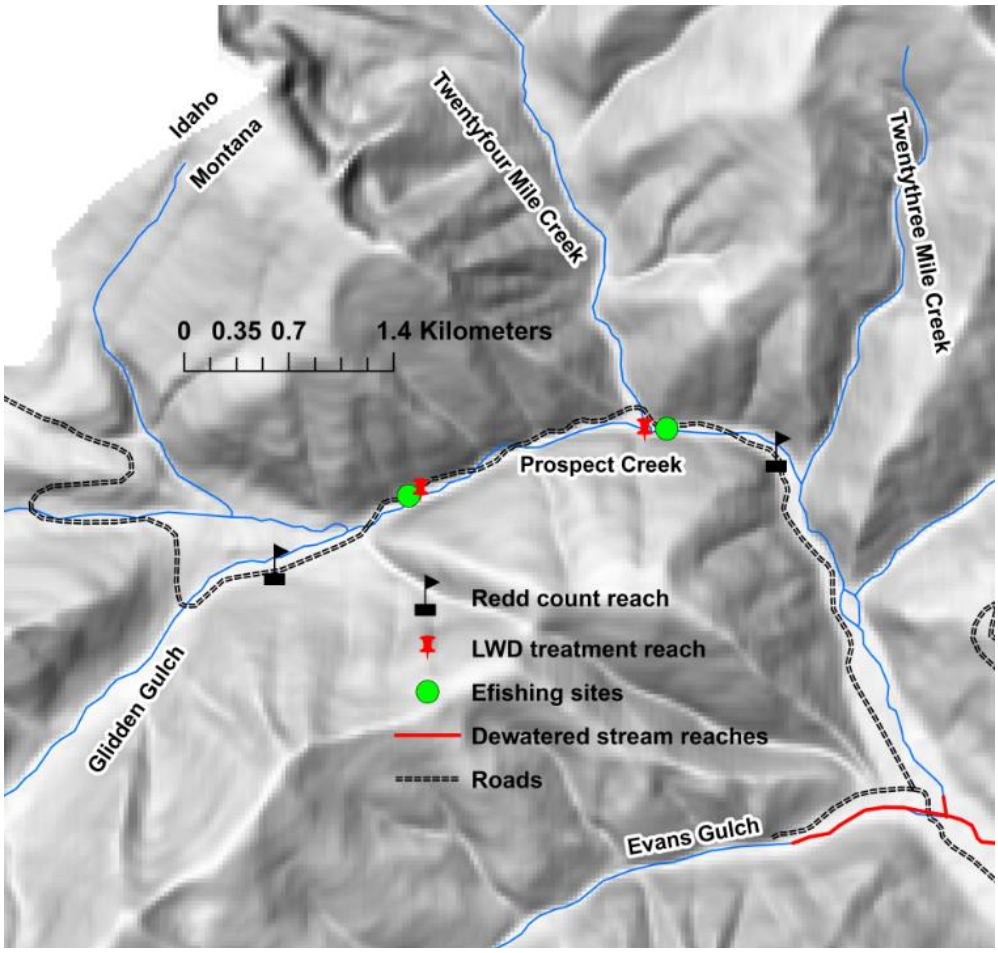

FIGURE 1. Upper Prospect Creek redd count reach (2001-2019), long-term electrofishing sites (1999-20019) and stream reach where selective woody debris addition will occur.

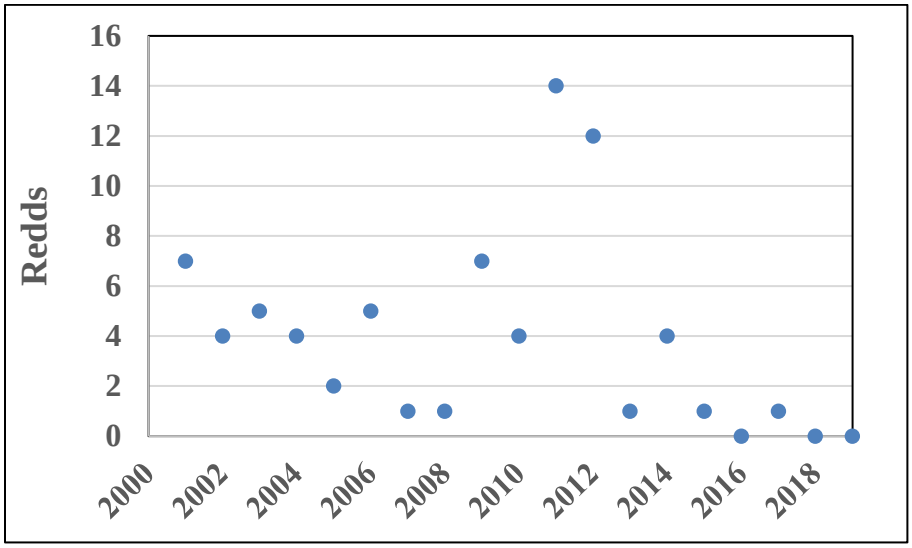

FIGURE 2. Bull Trout redds observed within the index reach in the upper Prospect Creek from 2001 to 2019.

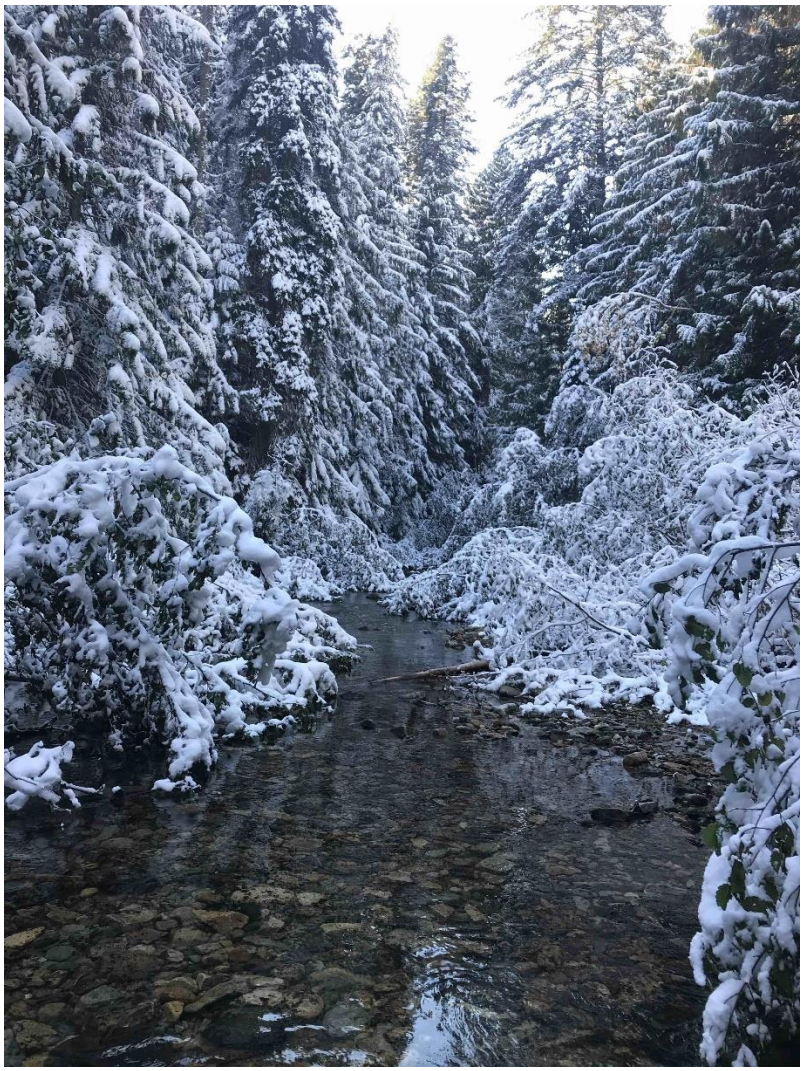

FIGURE 3. Lower gradient section of upper Prospect Creek within the Bull Trout redd count index reach and proposed project area.

Goal

The primary goal of this project is to increase the abundance of suitable sized spawning gravel for Bull Trout within redd count index reach in upper Prospect Creek by selectively felling large conifer trees over approximate 1.5 km of habitat. Secondary benefits to native salmonids and the stream ecosystem from this project may include increased habitat diversity and complexity.

Objectives

1. Increase spawning gravel (up to 50 mm) deposition in the Bull Trout redd count index reach in upper Prospect Creek by selectively felling large conifers trees along up to 1.5km of stream.

2. Monitor physical habitat and/or fisheries response associated with this project.

Tasks

1. Secure any additional permits that may be needed for this project, March-July 2020. (NEPA complete) (Objective 1; ***Completed in 2020***)

2. Fell trees at strategic locations along 1.5km of upper Prospect Creek between July 15 and August 31, 2020. Trees will be dropped at 8 to 10 locations with 1 to 5 large trees (longer than average bankfull width) felled at each location. An engineer from Trout Unlimited and fisheries biologist from MFWP will oversee this work which is expected to take about two days. A skilled sawyer will be hired to fell trees. (Objective 1; ***Completed in 2020***)

3. Evaluate the influence of this project on stream habitat and native trout by collecting fisheries and/or physical habitat data for at least two years following the first run-off event (2021 and 2022). Pre-runoff data was collected in 2020. Project proponents will develop a monitoring plan prior to implementation similar to the *Graves Creek Pilot Habitat Enhancement Project.* (Objective 2)

Work Products

- Mid-year report; due to Appendix B Aquatic Program Leader (APL) August 2, 2021
- Annual Work Summary; due to the APL November 15, 2021
- Review of fisheries and/or physical habitat monitoring efforts two-years post run-off (2022) in technical memo or in Appendix B Native Salmonid Tributary Habitat Restoration Monitoring Update

Permitting Requirements

The NEPA for this project has been completed by a project that was approved by the MC in 2017 "Lolo National Forest Priority Native Salmonid Habitat Restoration Assessment and Planning". Project proponents will look into whether an Army Corp 404 Permit or floodplain permit is required. A 310 or 124 permit will be submitted to Green Mountain Conservation District or MFWP.

Endangered Species Act consultation for this project plan is associated with the 2019 Biological Opinion on the effects of continued operation of the Clark Fork Hydroelectric Project on Bull Trout and designated Bull Trout critical habitat (BiOp), and the USFWS-MFWP Cooperative Agreement pursuant to Section 6 of the Act. This project plan is consistent with the analysis and conclusions contained in the 2019 BiOp and the USFWS-MFWP Cooperative Agreement, and will adhere to all appropriate Terms and Conditions designed to reduce the extent and effects of incidental take on Bull Trout. Incidental take reporting for this project plan will be included in the annual Biological Opinion report as required by Term and Conditions 15–18 of the 2019 Incidental Take Statement, as well as MFWP's annual Section 6 report to the USFWS.

Cultural/Historic Resource Review

The area of this project (upper Prospect Creek) was included in the cultural/historic review that was completed for this and other stream habitat improvements projects completed in 2019 by the Lolo National Forest through the NEPA process.

Benefit to the Resource

This intended goal of this project is to increase the amount of suitable sized spawning substrate available to Bull Trout within the index redd count reach in upper Prospect Creek by selectively felling large conifers along 1.5 km of stream. While appropriately sized gravels occur within the reach, this substrate is not well sorted or is distributed in areas not often used by Bull Trout for spawning (streams margins with little or no flow). Secondary benefits of this project are increased cover, habitat complexity and habitat diversity for Bull Trout, Westslope Cutthroat Trout and other aquatic organisms. Signs of decline, based on long-term data, are becoming evident for a population that occupies about 6.5 km of habitat. This project represents a low-dollar minimally invasive attempt to enhance spawning habitat in a stream comprised solely of native salmonids. The proposed work is consistent with the underpinnings and spirit of Appendix B of the Clark Fork Settlement Agreement and the goals and objectives of MFWP.

Budget

The LCFWG was paid up front and sufficient funds remain to complete the 2021 work. Thus, no new request is being made for 2021 and no carryover is shown in the budget table.

Item	Estimated Carryover	2021 Budget Request
Planning and Site Assessment*	$0	$0
Design, monitoring plan, and permitting** ($50 x 20 hrs.)	$0	$0
LCFWG project management, contracting, and coordination ($28.30 x 24 hrs.)	$0	$0
Sawyer ($60 x 20 hrs.)	$0	$0
Sawyer travel ($0.58 x 200 miles)	$0	$0
TU Oversight ($50 x 25 hrs.)	$0	$0
TU Oversight travel ($0.58 x 300 miles)	$0	$0
Monitoring* ($50 x 40 hrs.)	$0	$0
Project Administration (10%)***	$0	$0
Total	$0	$0
Anticipated Expenditures		$0

* This cost is estimated at $1000 and will be funded by a Bureau of Reclamation (BOR) grant.
**Design needs, fisheries and/or physical monitoring plan, and permitting will be developed by project proponents; labor TBD.
***An additional $100 of project administration will be funded by the BOR grant.

Literature Cited

Blakney, J., and T. Tholl. 2019. Native Salmonid Abundance and Tributary Habitat Restoration Monitoring. Annual Project Update-2017. Report to Avista Corporation, Noxon, Montana and Montana Fish, Wildlife and Parks, Thompson Falls, Montana.

Blakney, J. *In prep*. Factors influencing abundance and biomass of native salmonids in neighboring headwater streams, Crow Creek and Cooper Gulch. Including a synopsis of Bull Trout in the Crow Creek drainage. Montana Fish, Wildlife, and Parks, Thompson Falls, Montana. Report to Avista Corporation, Noxon, Montana and Montana Fish, Wildlife and Parks, Helena, Montana.

Hilderbrand, R., Lemly, A., Dolloff, C., and K. Harpster. 1998. Design considerations for large woody debris placement in stream enhancement projects. North American Journal of Fisheries Management 18:161–167.

Lolo National Forest. 2019. Native Fish Restoration Project Decision Memo. Plains/Thompson Falls Ranger District, Sanders County, Montana.

Meehan, W. 1991. Influences of forest and rangeland management on salmonid fishes and their habitats. American Fisheries Society.

2021 PROJECT PLAN

Lower Clark Fork Watershed Group Project Coordination

Project Contact
Brita Olson, Lower Clark Fork Watershed Group (LCFWG), (208) 304-3852,
brita@lowerclarkforkwatershedgroup.org

Project History
The LCFWG was formed in 2004, and has received continuing support from Clark Fork Settlement Agreement (CFSA) Appendix B in addition to funding under Appendix E as annually approved by the Management Committee.

Background
The LCFWG began as an umbrella group to coordinate watershed projects in the Lower Clark Fork (LCF) watershed and assist the eight watershed councils in the LCF: Elk Creek, Prospect Creek, Rock Creek, Whitepine Creek, Bull River, Trout Creek, Pilgrim Creek and Little Beaver Creek. A significant amount of this work has been associated with habitat restoration in support of CFSA Appendix B, with the primary focus on improving habitat for native salmonids such as Bull Trout and Westslope Cutthroat Trout. Therefore, a majority of the emphasis and work performed under this project relate to facilitating on-the-ground work and maintenance of habitat restoration projects.

The LCFWG helps support Appendix B projects in the LCF watershed in multiple ways: from the development of project ideas and engaging in watershed restoration planning to ensuring the long-term follow-through on past projects. There are many details that must fall in line in order to bring successful projects to fruition, and the LCFWG helps coordinate these details and all necessary stakeholders in the process. These efforts are closely tied to funding received for project implementation from other CFSA Appendix B project plans, and from CFSA Appendix E Watershed Councils Program for the coordination of the LCFWG. Historically, there has been much overlap between these proposals. For example, this project will fund development and ongoing coordination of LCF projects, which is closely related to separate project plans that were funded previously and others that may be developed in future years. This work also involves the coordination of watershed stakeholders funded by Appendix E.

Other 2021 project plans that include funding for LCF Project Coordination include:
- Habitat Restoration Monitoring, Maintenance and Contingency Allocation
- East Fork Bull River Morphology, Connectivity, and Habitat Enhancement Project
- Sims Meander Stream and Floodplain Restoration Project

Additionally, the LCFWG works to leverage other (non-CFSA) resources for restoration work in the LCF watershed, which directly assists CFSA Appendix B projects and often provides ancillary benefits to CFSA Appendices C, E, and K.

Goal
The goal of this project plan is to improve the effectiveness of watershed restoration projects in the LCF through project coordination, assisting with implementation, adaptive management follow through, and planning.

Objectives
1. Complete successful stream enhancement and restoration projects in the LCF through multi-partner planning, prioritizing, and strategizing that leads to on-the-ground project implementation.

2. Adaptively manage projects by providing consistent follow-through; learning from past successes and failures; and guiding watershed work that complements the values of local stakeholders.

Tasks
1. Coordination: Continue coordinating ongoing and upcoming stream enhancement and restoration projects in the LCF watershed and Avista's project area (Objectives 1 and 2). In addition to projects planned (in separate project plans) for implementation in 2021 (Sims Meander Stream and Floodplain Restoration Project and East Fork Bull River Morphology, Connectivity, and Habitat Enhancement Project), upcoming projects "on the radar" and expected to be pursued and/or implemented in 2021 or 2022 (subject to designs, permitting, and funding acquisition) include:

    a. Cooper Gulch restoration/enhancement project (scope/need TBD in consultation with APL)

    b. Crow Creek connectivity project (scope/need TBD in consultation with APL)

    c. Prospect Creek drainage culvert improvements (as guided by the Lolo National Forest, Montana Fish, Wildlife & Parks and other stakeholders)

    d. Additional projects pursued at the discretion of the Appendix B Aquatic Program Leader (APL) and project partners.

2. Project development: Plan, develop, and implement ideas for new projects, in line with priorities of CFSA Appendix B and local stakeholders, and move towards implementation. (Objectives 1 and 2)

    a. Develop five-year strategies for all current revegetation properties in the Bull River drainage. As described below (Task 4c), significant effort is needed to maintain plantings and browse protection on Bull River revegetation efforts. This has been a focus of restoration maintenance efforts over previous years, and as the project moves forward it will be helpful to clearly articulate a plan for the management of revegetation efforts on all properties in order to effectively identify timing and level of funding needs, plan for capacity to complete work, and to confirm approach with landowners and project partners.

b. While ongoing Bull River revegetation efforts require significant ongoing investment, the maintenance burden of existing projects is beginning to wane as projects reach maturity. Furthermore, the benefits of the project are increasingly recognized by adjacent landowners and recreational users of the Bull River. Catalyzed by private landowner outreach and targeted tributary mailings that will be completed in 2021, there may be an opportunity to develop additional projects in the Bull River and continue a watershed scale effort to revegetate the Bull River. These will be informed by conclusions articulated in site plans (above), LCF Stream Restoration Summary (below), and ongoing maintenance efforts (below).

c. Pursue opportunities and priorities identified by the Appendix B Aquatic Program Leader (APL) and project partners.

3. Funding Development: Work with Avista Grant Writer to obtain additional funding to support Appendix B projects and the above tasks. (Objective 1)

4. Documentation and Maintenance: Follow-up with and monitor the success of past projects and help coordinate maintenance as deemed necessary. The Coordinator will work with staff from Montana Fish, Wildlife and Parks (MFWP), the Forest Service (USFS), Natural Resource Conservation Service (NRCS), Avista and other partners to provide continued care for past restoration projects, which will help ensure their success into the future. (Objective 2)

    a. The update of the LCF Stream Restoration Summary (1995-2010), originally written by Chris Horn (MFWP) in 2011, is a continuing effort initiated in 2018. LCFWG Coordinator is taking the lead on an update of the document which will include stream restoration projects completed from 2011-2020, as well as current updates on previous projects from 1995-2010. Appendix B funding supported this effort in 2018 and 2019, but the complete effort is expected to take continued investment through 2021 in order to satisfactorily document the last decade of stream restoration efforts in the LCF as well as meaningfully update prior projects. In 2021, the focus of work will be soliciting input on sections of the draft document from project partners as well as visiting past projects to fill in knowledge gaps. The document is expected to be finalized by December 31, 2021.

    b. In order to be successful, many restoration projects require ongoing maintenance. A good example of this is the ongoing revegetation efforts on private land along the East Fork and mainstem Bull River. These efforts were initiated 10 and 15 or more years ago, but have required ongoing fencing maintenance, browse protection, and, in some cases, mortality replacement plantings. Even though the results of these efforts are now paying off (there are areas within the project where natural regeneration is occurring and some planted vegetation is well upwards of 15 feet tall, providing shade to the stream), this project still requires maintenance to protect the long-term investment made at this site. On some properties, a lot of the ongoing work has been initiated and sustained by the

landowner(s), but this is a unique circumstance among past projects. In many areas, projects are easily neglected as landowners do not live on-site and project partners have limited capacity for exhaustive maintenance tasks and move on to new priorities, affecting not only project outcomes, but also public perceptions and the future potential of engaging with willing landowners to implement priority restoration projects. Project maintenance is difficult to fund, as many funding sources are much more apt to support new – not ongoing – projects, but crucial to long-term resource benefit. Many maintenance tasks are easily accomplished by one person, either early or late in the season, and would either not be worthwhile for mobilizing an entire Montana Conservation Corps (MCC) crew for or be best accomplished outside of the season when crewmembers are available. In 2021, LCFWG Coordinator will accomplish maintenance tasks at past projects with landowners, volunteers, project partners, and additional staff as is required by the specific tasks.

Work Products

- Comprehensive Project Report; Updated Lower Clark Fork Stream Restoration Summary (1995-2020) – review draft; December 31, 2021
- Comprehensive Project Report; Updated Lower Clark Fork Stream Restoration Summary (1995-2020) – final; March 31, 2022
- Quarterly reports; due to Appendix B Aquatic Program Leader (APL) June 30 and September 30, 2021; and March 31, 2022
- Annual Work Summary; due to APL November 15, 2021

Permitting Requirements

No permits are required to implement this project. Permitting efforts for related projects will be covered under project-specific proposals.

Endangered Species Act consultation for this project plan is associated with the 2019 Biological Opinion on the effects of continued operation of the Clark Fork Hydroelectric Project on Bull Trout and designated Bull Trout critical habitat (BiOp). This project plan is consistent with the analyses and conclusions contained in the 2019 BiOp and will adhere to all appropriate Terms and Conditions designed to reduce the extent and effects of incidental take on Bull Trout. No incidental take of Bull Trout is anticipated as a result of this project plan; therefore, no take reporting is required.

Cultural/Historic Resource Review

Not applicable for the tasks proposed in this project plan, there are no ground and/or vegetation disturbing activities, or proposed impacts to cultural/historic resources. Avista will coordinate Cultural Resources Management Group review for those projects associated with coordination tasks described above prior to implementing those specific projects. The work product for those reviews will be confidential due to the sensitive nature of the content.

Benefit to the Resource

This project exists to support stream protection and enhancement projects in the LCF watershed. Engaging and coordinating work with landowners and other stakeholders helps get more projects

off the ground and improves their overall outcome. The LCFWG serves as a point of contact for long-term follow through with landowners and past projects as well as helps leverage resources to maximize the positive impact of CFSA dollars in the watershed. A significant amount of this work has been associated with habitat restoration in support of CFSA Appendix B, with the primary focus on improving habitat for native salmonids such as Bull Trout and Westslope Cutthroat Trout. In addition, stream enhancement projects facilitated by this project also provide benefit to riparian and instream native salmonid habitat and therefore provide ancillary benefits to appendices C and K, and help address listed state water quality impairments in LCF tributaries.

Budget

Item	Estimated Carryover	2021 Budget Request
LCFWG staff time, up to 160 hours (Project Coordination, Task 1)	$0	$4,960
LCFWG staff time, up to 240 hours (Project Development, Task 2) a. Bull River Revegetation Maintenance Plans, approx. 80 hours b. Bull River Revegetation Project Development, approx. 80 hours c. TBD, approx. 80 hours	$0	$7,440
LCFWG staff time, approx. 40 hours (Funding Development, Task 3)	$0	$1,240
LCFWG staff time, approx. 40 hours (Task 4a)	$0	$0
Travel expenses (Tasks 1-4a)	$0	$1,500
LCFWG staff time, up to 120 hours (Task 4b)	$0	$3,720
Travel expenses (Tasks 4b)	$0	$750
Administration, 10%	$0	$1,961
Total	$0	$21,571
Anticipated Expenditures		$21,571

In addition to the watershed coordination and project development work supported through Appendix B, outreach efforts intended to generate the impetus for work on private lands is described in LCFWG's 2021 Project Plan under the Appendix E Watershed Councils Program.

Literature Cited

Horn, C. 2011. Lower Clark Fork Stream Restoration Summary (1995–2010). Montana Tributary Habitat Acquisition and Recreational Fishery Enhancement Program. Report to Avista Corporation, Spokane, Washington. Montana Fish, Wildlife and Parks, Thompson Falls, Montana.

2021 PROJECT PLAN

Habitat Restoration Monitoring, Maintenance, and Contingency Allocation

Project Contacts

Jason Blakney, Montana Fish, Wildlife and Parks (MFWP), (406) 382-3033, jblakney@mt.gov
Brita Olson, Lower Clark Fork Watershed Group (LCFWG), (208) 304-3852, brita@lowerclarkforkwatershedgroup.org

Project History

This is a continuing project originally approved by the Management Committee (MC) in 2015. The scope and budget for this project are reviewed by the MC annually.

Background

Habitat Restoration is an important component of Appendix B in the Clark Fork Settlement Agreement (CFSA). Stream restoration projects are expensive and due to the dynamic nature of the watersheds in this area, future maintenance is often required. Therefore, funding for maintenance of these projects is often crucial for successful implementation. Contingency funds are designed to provide managers a means to rapidly respond to needs as they arise, and to reduce the burden of numerous, low-dollar Consent Mail requests on the MC. As needs arise, managers will notify the Aquatic Implementation Team (AIT) and seek Avista approval prior to expending meaningful funds that were not specified within the Project Plan. Given it is a fund and not related to a specific project, the Appendix B ranking criteria do not apply.

The annual ability to address maintenance and revegetation along native salmonid stream as well as at previous restoration or enhancement projects sites is a cost-effective way to ensure the best performance of such investments. Such projects are consistent with stated goals of Appendix B and E of the CFSA to conserve and improve important tributary habitat as well as having ancillary benefits to Appendices C, and K, state water quality prescriptions, and when located along streams with native salmonids, are consistent with Federal and State of Montana management plans for these species.

These funds will be used if damage to previously funded restoration sites occurs, and maintenance is needed. Implementation and/or planning for smaller-scale revegetation work (at previously funded restoration sites) may also occur under this project plan. Methods for implementing maintenance activities and revegetation efforts will be site specific and depend on the scope of effort needed. The Montana Conservation Corps (MCC) has been used in the past to assist with implementation of revegetation and restoration work and may be hired if needs are great enough that a crew would be occupied for an entire week or more (maximizing benefits relative to the cost of fielding a crew for a week).

Goal

The goal of this project is to provide support to fix or enhance stream restoration sites in the lower Clark Fork River drainage, Montana.

Objective

1. Sustain or enhance previous restoration or enhancement projects through continued maintenance.

Tasks

1. Identify, assess and implement maintenance needs at past stream habitat restoration or enhancement projects performed along area tributaries. Specific methods used for restoration site maintenance are site dependent. (Objective 1)

2. In 2021, funds may also be used to plant additional riparian shrubs and fix any damage sustained to browse protection exclosures at previously completed projects in the lower Clark Fork River drainage, Montana. (Objective 1)

Work Products

- Project Completion Report for Mainstem Bull River Reforestation on Forest Service Lands and NEPA Process (including photo-documentation); final due May 1, 2021
- Mid-year report; due to Appendix B Aquatic Program Leader (APL) August 2, 2021
- Annual Work Summary; due December 1, 2021

Permitting Requirements

No permitting requirements have been identified at this time; however, if required maintenance required stream bank alteration, a 310 or 124 permit will be submitted to Green Mountain Conservation District or MFWP necessary.

Endangered Species Act consultation for this project plan is associated with the 2019 Biological Opinion on the effects of continued operation of the Clark Fork Hydroelectric Project on Bull Trout and designated Bull Trout critical habitat (BiOp). This project plan is consistent with the analyses and conclusions contained in the 2019 BiOp and will adhere to all appropriate Terms and Conditions designed to reduce the extent and effects of incidental take on Bull Trout. No incidental take of Bull Trout is anticipated as a result of this project plan; therefore, no take reporting is required.

Cultural/Historic Resource Review

This is a carryover or maintenance project and the cultural/historic resource review was completed for Bull River revegetation in 2016 by the Cultural Resources Management Group. For activities in other areas, Avista will coordinate Cultural Resources Management Group review for this project prior to implementing the project.

Benefit to the Resource

Conducting maintenance of previously funded restoration and enhancement projects is essential for the long-term success of these projects. A significant portion of maintenance projects Appendix B has dealt with in the past involve streamside vegetation. The general goal of riparian planting projects is to reestablish native vegetation along streams which has a plethora of ecological benefits including improved bank and channel stability, cover for fish, increased stream shading, localized water retention as well as bird and wildlife habitat. As such, this project is also in line with Appendix K as well as State of Montana and Federal fisheries

management plans and water quality objectives.

Budget

Item	Estimated Carryover	2021 Budget Request
Funds to purchase native plants from local nursery, or other materials necessary to implement maintenance or planting activities.	$0	$5,000
Fund to cover unforeseen expenses (MCC crew, labor, fencing materials, etc.) related to maintenance at past stream restoration sites.	$0	$12,000
LCFWG planning, labor, contracting, and coordination ($25 to $31 x 80 hrs)	$0	$2,480
LCFWG staff travel	$0	$750
Total	$0	$20,230
Anticipated Expenditures		$20,230

2021 PROJECT PLAN

Habitat Restoration, Property Acquisition, and Conservation Easement Contingency Allocation

Project Contact

Jason Blakney, Montana Fish, Wildlife and Parks (MFWP), (406) 382-3033, jblakney@mt.gov

Project History

This is a continuing project originally approved by the Management Committee (MC) in 2017. The scope and budget for this project are reviewed by the MC annually.

Background

This proposed project is a fund and not related to a specific project, thus the Appendix B ranking criteria does not apply. This fund is proposed so that quick and timely actions can be made to purchase property and/or conservations easements for recreational or native fisheries as well as to support restoration planning opportunities that may become available. The Aquatic Implementation Team (AIT) will be notified if any substantial expenditures are anticipated under this contingency fund and would confer on appropriateness and whether additional actions were required.

This fund will be set up to support efforts in Montana to acquire, protect, and improve the quality of critical native salmonid (Bull Trout and Westslope Cutthroat Trout) tributary habitat in high priority spawning streams as well areas deemed important to recreational fisheries. Therefore, funding for specific projects will either come from the Tributary Habitat Acquisition and/or Recreational Fisheries Enhancement funds. Purchase of specific individual parcels or conservation easements will be presented individually for MC approval. Land conservation will be through fee title purchase or through placement of conservation easements, working only with willing sellers and cooperators. This fund is designed to provide support to potential land acquisition, conservation opportunities and to perform due diligence (title report, baseline research, survey, appraisal, negotiations, etc.) to ready potential transactions for presentation to the MC.

We intend to continue our partnership with a third party to provide annual funding to help identify, negotiate, and facilitate land conservation actions. This partnership allows the involvement an entity who is well versed in land conservation and the local markets, to monitor the market and begin discussions with willing landowners as appropriate.

Habitat restoration is also an important component of the Appendix B program. New project development is an involved scoping process requiring the identification and integration of information regarding specific project streams, locations, willing landowners, and associated biological limitations. Often times, technical engineering support is required to develop viable project proposals, including feasibility analyses, preliminary designs, and cost estimates. This fund is designed to provide limited resources to allow pre-project review and collaboration with qualified fish habitat engineers and other interested parties. It is expected that this scoping will lead to full project proposals for MC review and approval.

Projects developed using this fund will be consistent with the Montana Tributary Habitat Acquisition and Recreational Fishery Enhancement Program (Appendix B of the Clark Fork Settlement Agreement), through enhancement of tributary habitat conditions for native salmonids and improvements or access for recreational fisheries. Native fisheries or recreational fisheries funds could be used depending on the specific project.

This fund is designed to provide managers with a means to rapidly respond to opportunities and needs as they arise, and to reduce the burden of numerous, low-dollar Consent Mail requests on the MC. As opportunities or needs arise, managers will notify the AIT and seek Avista approval prior to expending funds that were not specified within a Project Plan. Given it is a fund and not related to a specific project, the Appendix B ranking criteria do not apply.

Goal
The goal of this project is to provide the ability for timely investigations associated with engineering support for restoration projects and support to potential land acquisition, conservation opportunities and to perform due diligence (title report, baseline research, survey, appraisal, negotiations, etc.) to ready potential transactions for presentation to the MC.

Objectives
1. Fund a third-party contractor to provide outreach support.

2. Cover due diligence costs (title report, baseline research, survey, appraisal, negotiations on potential land actions) on potential new acquisitions/easements to ready them for MC approval.

3. Provide engineering support to assist with the development of future fish habitat projects.

Tasks
Specific tasks will be identified as necessary, but may include conducting initial site visits, providing conceptual design, assessing potential project feasibility, and developing preliminary cost estimates.

Work Products
- Annual Work Summary; due December 1, 2021
- Designs for specific projects would be reported in the form of a Technical Memorandum

Permitting Requirements
Not applicable for the tasks proposed in this project plan.

Endangered Species Act consultation for this project plan is associated with the 2019 Biological Opinion on the effects of continued operation of the Clark Fork Hydroelectric Project on Bull Trout and designated Bull Trout critical habitat (BiOp). This project plan is consistent with the analyses and conclusions contained in the 2019 BiOp and will adhere to all appropriate Terms and Conditions designed to reduce the extent and effects of incidental take on Bull Trout. No incidental take of Bull Trout is anticipated as a result of this project plan; therefore, no take reporting is required.

Cultural/Historic Resource Review
Not applicable for the tasks proposed in this project plan, there are no ground and/or vegetation disturbing activities, or proposed impacts to cultural/historic resources.

Benefit to the Resource
This fund is designed to: 1) assist with land acquisitions and conservation easements, depending on the particular property, for native or recreational fish species 2) assist with the development of fish habitat restoration/enhancement proposals with the goal of enhancing conditions for native salmonids or recreational fisheries.

Budget

Item	Estimated Carryover	2021 Budget Request
Outreach support	$0	$5,000
Due diligence costs	$0	$35,000
Engineering Support	$0	$20,000
Total	$0	$60,000
Anticipated Expenditures		$60,000

2021 PROJECT PLAN

East Fork Bull River Morphology, Connectivity, and Habitat Enhancement Project

Project Contacts

Jason Blakney, Montana Fish, Wildlife & Parks (MFWP), (406) 382-3033, jblakney@mt.gov
Brita Olson, Lower Clark Fork Watershed Group (LCFWG), (208) 304-3852, brita@lowerclarkforkwatershedgroup.org, *and*
Eric Oldenburg, Avista, (406) 847-1290, eric.oldenburg@avistacorp.com

Project History

This is a continuing project that was first approved by the Management Committee in 2020 and is closely related to numerous past projects that have been implemented, in part, through the Clark Fork Settlement Agreement (CFSA) and CFSA stakeholders. This project was ranked by the WRTAC in 2020. The majority of this project was delayed during 2020 and we are seeking deadline extensions for the associated projects and work products. In addition, additional budget is being requested for the physical implementation of the revegetation effort.

Background

Bob Stein owns the only two private parcels of land along the East Fork Bull River (other than a small parcel right at the Bull River confluence). Much of the Stein property was once dominated by an old growth, closed canopy cedar forest; however, it was heavily logged by a previous owner decades ago (prior to the Streamside Management Zone law of 1991 that would have prevented or penalized such actions). The Stein property is located in a transitional area, where the river leaves confined, stable, and higher gradient reaches of East Fork Bull River and enters a broader, less steep valley. Riparian forests with large trees that provide shade, large woody debris, and strong root networks are crucial elements for providing habitat stability in such transitional areas.

Prior to 1997 (and despite the aforementioned logging), the majority of the East Fork Bull River flowed through a relatively high-quality channel, a portion of which was characterized by mature riparian forest and stable banks on the south side of the valley, with a secondary channel on the north side. In the historically large flood events of 1996/1997, the channel avulsed and sent all of the flow to the north side of the valley. Because this area lacked many mature trees, extreme erosion occurred during the floods, and there was concern that additional erosion would occur during high flow conditions. In the fall of 1997, a few emergency measures were taken to reduce risk of further erosion. In 1998, MFWP devised a plan to install an engineered split in the north channel such that 60% of the base flow would be diverted back to the higher quality south channel and 40% would remain in the north channel. At MFWP's request, Mr. Stein allowed the engineered split to be installed. Additional work (1,200 feet of channel reconstruction) was completed in 2001 to stabilize the north channel and improve fish habitat (Horn 2011). In 2002, a large revegetation effort was also initiated to restore the valley bottom from a monoculture of reed canarygrass to a dark forest community, beginning with first stage successional species (alder, willow, serviceberry, etc.) and following with slower growing (shade tolerant) late successional species (cedar). Many of these efforts have been very successful, in no small part due to Mr. Stein's continued commitment to stewarding this section of the river. In 2019, dozens

of planted cedar trees were 10 to 15 feet tall or more; and naturally regenerated conifers can be observed among the understory which is no longer solely dominated by reed canarygrass.

Figure 1. Cedar tree along the East Fork Bull River threatened by beaver.

Over the last decade, flow within the East Fork Bull River has flipped between the south and north channels and is currently relatively balanced between the two. The north channel (now 18 years post-reconstruction) is relatively stable and well vegetated; however, it has not fully recovered to the desired dark riparian forest dominated by large-diameter trees. Much of the riparian area is still dominated by reed canarygrass and shrub species, and the valley has been populated by a robust community of beavers who favor this habitat. While beavers are in many circumstances positive contributors to watershed health and resiliency, they continue to threaten the mature cedar trees that remain and hinder efforts to restore the riparian area (see Figure 1).

The present-day successional state and associated vegetative community on the Stein property is ideal for beaver colonization as an artifact of the logging that occurred in the late 1980s. A local logger likened this property before it was logged to Ross Creek Cedars and the closed-canopy cedar forest would have generally lacked plant species such as willow, alder, and dogwood that are now sustaining beavers in the area. Beaver dams weren't noticed in the area by Mr. Stein until the early 2000s and were first documented during Bull Trout redd surveys in 2006. While not well documented, beaver and dam densities appear to have remained relatively low until the early 2010s when the number, size, and complexity of beaver dams in the East Fork Bull River increased. In 2019, eight beaver dams were documented within the East Fork Bull River: six in the split-channel reaches on or near the Stein property and two upstream from this location.

In addition to hindering riparian restoration efforts, beavers present a number of documented and purported threats to native salmonids within East Fork Bull River. First, the series of dams likely represent a migratory barrier to adult Bull Trout. In 2019, four fisheries biologists from Avista; MFWP; and the U.S. Forest Service visited the dams during the fall Bull Trout migration period. The biologists unanimously agreed that the dams were likely preventing upstream fish migrations. This assertion was corroborated by observations on the movements of PIT-tagged adult Bull Trout. It is likely that spring-spawning species such as Westslope Cutthroat Trout can navigate past the dams during the spring freshet; however, passage is not likely possible for some fall-spawning fishes, a proportion of which migrate up tributaries following the spring freshet. In addition, it is suspected that the dams present challenges to the downstream outmigrations for both juvenile and adult Bull Trout. Many of these dams have matured to the point where the

upstream face of the dam is completely lined with silt or clay and no through-dam passage routes could be identified. Thus, under base flow conditions, very little water passes through the base of the dams and it does not spill over the top of the dams. Rather, the majority of streamflow passes through a narrow margin of unconsolidated twigs and branches near the top of the dam. We believe fish either do not attempt to pass the dams, or attempt to go over the top of the dams. We speculate there is a high probability that fish attempting to pass over the top of the dam would be strained out by the network of twigs on the downstream face of the dam and not survive. Among the 12 adult Bull Trout transported and released near the St. Paul Lake trailhead prior to the spawn in 2019, only four fish were detected leaving the stream as of December 3 (typically, a high proportion of adult Bull Trout outmigrate immediately following the spawn with a much smaller proportion leaving the following spring).

In addition to connectivity problems, the pools created by the dams may be negatively affecting native salmonids as they likely benefit non-native salmonids (i.e., Brook and Brown trout) disproportionately over native salmonids. This is because they create habitat conditions more closely associated with non-native salmonids and because they generally occur downstream in the reaches predominated by non-native species (Bull Trout densities are greatest upstream from these locations).

Figure 2. Dead fish in the north channel of the East Fork Bull River associated with an overnight dewatering event caused by beaver dams.

Lastly, the direct mortality of hundreds of fish has been caused by the beaver dams. In the fall of 2018 we documented two instances in which the north channel went dry in a matter of hours and numerous "piles" of dead fish were documented in locations where the resultant stranding pools went dry (Figure 2). The dewatering event was caused by two unfortunately located beaver dams. In the north channel, there is a beaver dam directly downstream from the engineered split. A second beaver dam is located in the engineered split. These two dams serve to back up the same pool of water. When beavers actively fortify the dam in the north channel proper, nearly all of the flow is temporarily diverted through the engineered split and back to the south channel. When this happens, the little bit of water that remains within the north channel goes subsurface and the north channel rapidly goes dry.

After much deliberation, we are proposing to aggressively manage beavers and beaver dams in the East Fork Bull River in the interest of enhancing revegetation efforts and ultimately to protect and enhance native salmonid populations in the East Fork Bull River. In addition, if not addressed, flow, or a proportion thereof, is likely to periodically change channels. It may be desirable to maintain a consistent split of flow between the channels to fully utilize the available habitat, optimize downstream fish capture efforts, and ensure infrastructure considerations are

addressed. Additionally, we need to ensure Mr. Stein fully supports any proposed action and that we honor past agreements made in this regard. Thus, we are proposing to work with appropriate agencies and Mr. Stein to develop a long-term plan with regard to flow management within the split channels of the East Fork Bull River.

Goal

The goal of this project is to enhance connectivity and stream conditions for native salmonids in the East Fork Bull River.

Objectives

1. Manage beavers and beaver dams in the interest of maintaining connectivity, protecting riparian vegetation and channel function, and otherwise reducing threats to native salmonids.

2. Develop a site plan and proposal to enhance efforts to (1) promote and establish riparian vegetation and (2) reach the climax successional state (e.g., cedar canopy) as rapidly as is reasonable.

3. Work with the landowner and appropriate stakeholders to develop a long-term strategy (or lack thereof) for managing channel morphology and flows in the split channel reaches of the lower river.

Tasks

1. Ensure communication and collaboration with the landowner and all stakeholders (e.g., Kaniksu Land Trust, U.S. Forest Service, U.S. Fish and Wildlife Service, Green Mountain Conservation District), as appropriate. (Objectives 1–3)

2. Complete due diligence and obtain all necessary permits to remove new beaver dams (and prohibit future dams from being constructed) on the private property. Dams will be partially removed using hand tools. Crews will remove any remaining components following the spring freshet. (Objective 1)

3. Develop a long-term beaver management plan for monitoring future beaver activity and subsequently removing beavers and/or dams. For the remainder of 2021, the project proponents will monitor and immediately address any new activity. A damage permit will be obtained from MFWP for this purpose. (Objective 1)

4. Develop a site plan to enhance riparian vegetation and otherwise promote rapid advancement toward a climax successional community (e.g., dominated by cedar canopy). In addition, an associated long-term monitoring and maintenance plan will be developed. If deemed prudent, a private consultant may be utilized to help with this task. Physical implementation will be proposed as a 2021 consent mail or 2022 project plan; however, we may begin due diligence toward identifying and obtaining any required permits. (Objective 2)

5. Work with the landowner and appropriate stakeholders to develop a long-term plan for

managing channel morphology and flows in the dynamic split channel reaches of the lower river. If necessary, a ground or LiDAR survey may be implemented to inform the plan. A brief assessment will be developed along with a collaboratively developed recommendation regarding active channel management or a lack thereof. (Objective 3)

Work Products

- Beaver management plan (likely memorandum); due September 1, 2021
- Revegetation site plan (likely memorandum); due September 30, 2021
- Flow management assessment and recommendations (likely memorandum); due November 1, 2021
- Annual Work Summary; due to Appendix B Aquatic Program Leader November 15, 2021

Permitting Requirements

With regard to beaver management, it is not clear whether a 310 or SPA 124 will be required to remove beaver dams. The project proponents will work with the Green Mountain Conservation District to make that determination and, if necessary, removal work will not begin unless/until a permit is in place. Project proponents will obtain a MFWP damage permit if beaver removal is necessary. The project proponents will work with the landowner and Kaniksu Land Trust to ensure all proposed work is consistent with the existing conservation easements. With regard to the revegetation and flow management assessment components of this project, physical implementation will be proposed through a future consent mail or subsequent year's project plan. However, it is possible we will pursue permits associated with potential work simultaneous to seeking Management Committee approval. Required permits will be identified once the plans are final.

Endangered Species Act consultation for this project plan is associated with the 2019 Biological Opinion on the effects of continued operation of the Clark Fork Hydroelectric Project on Bull Trout and designated Bull Trout critical habitat. Incidental take reporting for this project plan will be included in the annual Biological Opinion report as required by Term and Conditions 15–18 of the 2019 Incidental Take Statement.

Cultural/Historic Resource Review

If ground disturbing activities are proposed, Avista will coordinate Cultural Resources Management Group review prior to implementing the project. The work product for this review will be confidential due to the sensitive nature of the content.

Benefit to the Resource

One component of Appendix B to the CFSA is to enhance tributaries to the lower Clark Fork River in the interest of benefiting native salmonid populations. Similarly, Appendix C of the CFSA calls for implementation of the Native Salmonid Restoration Plan and associated Five-Year Plan. This project is designed to directly and indirectly benefit native salmonids in the East Fork Bull River by increasing connectivity, enhancing habitat conditions, and eliminating survival threats. In addition, this project is designed to enhance and expedite reforestation in the interest of re-establishing channel stability and a return to a closed canopy community that will likely be naturally devoid of beaver activity.

These efforts are consistent with direction from the U.S. Fish and Wildlife Service through the Bull Trout Recovery Plan, Biological Opinion for the Clark Fork Projects FERC license, and informal consultation through the CFSA process. These actions also align with MFWP management plan in the interest of managing for the recovery of native species.

Budget

Item	Estimated Carryover	2021 Budget Request
LCFWG time (project development, administration, and labor)	$0	$3,720
LCFWG travel	$0	$680
Revegetation consultant (if deemed necessary)	$2,000	$0
Contract labor (if deemed necessary)	$0	$5,000
Plants and materials (nursery plants, matting, fencing, etc.)	$0	$6,000
Hydrologist/geomorphologist consultant (if deemed necessary)	$5,000	$0
LiDAR or ground survey (if deemed necessary)	$15,000	$0
Total	$22,000	$15,400
Anticipated Expenditures		$37,400

Total labor ($8,720), travel ($680), and plants and material ($6,000) needs estimated for the implementation of revegetation efforts along the East Fork Bull River in 2021 totals $15,400. A total of $10,000 of match funds have also been secured from the Trout and Salmon Foundation ($3,000) and Montana Watershed Coordination Council's Watershed Fund ($7,000) for this project. When possible, volunteer and in-kind labor (as described below) and salvaged materials will be used to implement the project. The final cost to the CFSA is likely to be less than the request above (approximately $5,400); however, because the final revegetation plan for all properties involved has not been finalized, contracts for additional funding are not yet finalized, and the availability of salvaged materials and volunteers are not confirmed, this total request is being made as a contingency and will ensure that project proponents have the capacity to complete the entire revegetation component of this project in 2021.

While challenging to quantify a monetary value, Mr. Stein continually invests substantial time, labor, and money addressing the objectives from this study. The Appendix B Lower Clark Fork Watershed Group Projects Coordination project plan also provides support for this project with miscellaneous coordination (landowner, partners, contracting, etc.) for all tasks. Additionally, staff working on the Appendix C Tributary Trapping and Downstream Juvenile Bull Trout Transport Program will provide labor support for this project (~$10,000).

Literature Cited

Horn, C. 2011. Lower Clark Fork Stream Restoration Summary (1995-2010). Montana Tributary Habitat Acquisition and Recreational Fishery Enhancement Program. Report to Avista Corporation, Spokane, Washington. Montana Fish, Wildlife & Parks, Thompson Falls, Montana.

2021 PROJECT PLAN

Cabinet Gorge and Noxon Reservoir Fisheries Monitoring Plan

Project Contacts

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Project History

This is a continuing project originally approved by the Management Committee (MC) in 2000. The scope and budget for this project are reviewed by the MC annually.

Background

Over the past 20 years, monitoring on Noxon and Cabinet Gorge reservoirs has revealed important changes in the fisheries community. For example, eliminations of large water level fluctuations by Avista in the 1980s resulted in successful reproduction of bass species which has translated to an increase in angling pressure (Kreiner and Tholl 2016). Additionally, dramatic shifts in species composition of tournament-caught fish, and increases in Walleye abundance since 2000 have been documented and monitored under this program (Kreiner and Tholl 2016). More recently, focus has been put on identifying year-class strength of Walleye within Noxon Reservoir. Nighttime electrofishing for Walleye will continue in the spring in order to track year class strength, run timing, and relative abundance of spawning Walleye.

Monitoring activities in 2020 were to include fall gillnetting, bass tournament monitoring, and Walleye sampling. However, due to COVID-19 constraints the netting and tournament monitoring were canceled and funding requests for these efforts are included as carryover in the 2012 budget. In 2021, we anticipate continuing these activities and may increase Walleye sampling by setting up to five large mesh gillnets after annual monitoring has concluded in the fall. Finally, we have added a fourth objective which is to promote recreational fishing.

Goal

Accurately monitor species composition, long-term trends in relative abundance, and growth data of fish species in Noxon Reservoir.

Objectives

1. Track the long-term trends in abundance fish populations in Noxon and Cabinet Gorge reservoirs through annual fall gillnetting.

2. Monitor the overall status of the bass fishery in Noxon Reservoir with tournament data.

3. Monitor the population of Walleye in Noxon Reservoir through spring electrofishing, and annual fall gillnetting.

4. Promote recreational fishing in our youth.

Methods
Standardized gill net sets will occur on Noxon and Cabinet Gorge reservoirs in the fall. Select bass tournaments will be monitored to collect length data and species composition of tournament caught fish. Nighttime electrofishing of Noxon Reservoir Walleye will consist of multiple nights sampled during several weeks in April and/or May 2021. For complete details on past methodologies, please refer to Kreiner and Tholl 2016.

Finally, in support of Objective 4, MFWP would like to make $1,000 available for the promotion and operation of two kids fishing days on Triangle Pond and the Thompson Falls State Park Pond.

Work Products
- Annual Project Update; 2017 activities; final due June 1, 2021
- Annual Project Update; 2019 activities; final due July 31, 2021
- Annual Project Update; 2020 activities; final due October 31, 2021
- Annual Work Summary; due December 1, 2021

Permitting Requirements
No permits are required for fisheries sampling work as all work will be conducted and/or overseen by MFWP fisheries biologists.

Endangered Species Act consultation for this project plan is associated with the 2019 Biological Opinion on the effects of continued operation of the Clark Fork Hydroelectric Project on Bull Trout and designated Bull Trout critical habitat (BiOp), and the USFWS-MFWP Cooperative Agreement pursuant to Section 6 of the Act. This project plan is consistent with the analysis and conclusions contained in the 2019 BiOp and the USFWS-MFWP Cooperative Agreement and will adhere to all appropriate Terms and Conditions designed to reduce the extent and effects of incidental take on Bull Trout. Incidental take reporting for this project plan will be included in the annual Biological Opinion report as required by Term and Conditions 15–18 of the 2019 Incidental Take Statement, as well as MFWP's annual Section 6 report to the USFWS.

Cultural/Historic Resource Review
Not applicable for the tasks proposed in this project plan, there are no ground and/or vegetation disturbing activities, or proposed impacts to cultural/historic resources.

Benefit to the Resource
Noxon Reservoir is one of the most popular fisheries in northwest Montana (MFWP 2014). In a recent report, Scarnecchia et al. (2014) cautioned that while the current fishery is functioning at a level in which predators and prey are more balanced than in the past, continued monitoring is necessary. There is potential for one or more species to reach a level which could be detrimental to the quality of angling, either through dramatic increases in one or more predator species, or a depletion of the prey base. The authors encourage additional sampling protocols for all fish, including Walleye and basses, outside of the standard gillnetting. Appendix B of the CFSA states that "[Avista] will support and cooperate with the fishery monitoring, enhancement, and management efforts of MFWP on Noxon and Cabinet Gorge Reservoirs", which includes

"monitoring fish populations".

Budget

Item	Estimated Carryover	2021 Budget Request
Labor (1 technician, 0.6 FTE)	$29,000	$26,000
Technical assistance on the Thompson River	$6,000	$0
Meals (Univ. ID student volunteers)	$4,000	$0
Supplies and maintenance (gill nets, boat repair, daily equip., etc.)	$3,000	$1,000
Fuel	$2,500	$1,500
Walleye otolith extraction and analysis	$450	$550
PIT tags	$2,100	$1,000
Aging Equipment	$500	$500
Kids fishing day costs	$1,000	$0
Total	$48,550	$30,550
Anticipated Expenditures		$79,100

Literature Cited

Blakney, J., Kreiner, R. and T. Tholl. *In prep*. Noxon and Cabinet Gorge Reservoirs Fisheries Monitoring, Progress Update: 2017.

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2021 PROJECT PLAN

Pilot Project: Modification of Eurasian Watermilfoil Beds on Noxon Reservoir for Fishery Benefits

Project Contacts

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Project History

This is a continuing project for 2021. The project was first approved by the Management Committee (MC) in 2020. In 2020 work was initiated to develop a sampling and evaluation plan, make contact with potential contractors to harvest Eurasian watermilfoil (EWM), and begin the development for an Environmental Assessment. The scope and budget will be reviewed and approved by the MC annually. It is anticipated that this project will be implemented for three years beginning in 2021 depending on runoff timing, contractor availability, permitting, etc.

Background

Eurasian watermilfoil was first confirmed in Noxon Reservoir in 2007. In 2008, the Sanders County Commissioners established the Sanders County Aquatic Invasive Plants Task Force (Task Force) to develop and implement an integrated weed management approach to contain and manage infestations of EWM. Widespread herbicide treatment of EWM in Noxon Reservoir occurred from 2012 to 2016. In 2017 no treatment occurred while the Task Force conducted an alternatives analysis for treatment of EWM in the reservoirs (DeBruyckere and Pennington 2017). Based on this analysis and input from stakeholders, treatment of EWM shifted from reservoir-wide to treatment of priority areas near public and private access sites, including public and private boating access sites and shoreline dock areas, and when funding is available, large, high density shallow access areas with significant boat traffic. In recognition of this shift and the low probability that EWM will be extirpated from Noxon Reservoir, there is interest in managing this invasive plant to benefit the reservoir's fishes and fishery. Modifying EWM beds to benefit the fishery is also consistent with the findings of Kusnierz (*In prep*.). This report (Eurasian Watermilfoil as Fish Habitat) was presented to MFWP in July 2020 for review and the finalization of this report is carried forward as a work product under this Project Plan.

Goal

The goal of this project is to determine if EWM beds can be modified to the benefit of the fish populations and fishery in Noxon Reservoir.

Objectives

1. Establish the feasibility of using mechanical harvesting to reduce EWM coverage and create edge habitat for reservoir fishes and access to the interior of EWM beds for anglers.

2. Evaluate the effects of the project as defined by changes in fish use and growth, angler use, and perceived benefits to angler experience.

Tasks

1. Work with the Aquatic Implementation Team to establish an EWM bed modification plan and a monitoring and evaluation plan. (Objective 1)

2. Procure necessary permits to modify EWM beds. (Objective 1)

3. Procure a contractor to modify EWM beds 1-2 times in 2021 and provide oversight of contractor's work. (Objective 2)

4. Monitor the effects of EWM bed modification in Noxon Reservoir to fishes and angler use. Monitor regrowth of EWM in modified areas. (Objective 2)

Work Products

- Project Completion Report: Eurasian Watermilfoil as Fish Habitat; final due July 1, 2021
- Annual Work Summary; due to Appendix B Aquatic Program Leader November 15, 2021
- Comprehensive Project Report (2021-2023 data); final due May 1, 2024

Permitting Requirements

Exact permitting requirements required are unknown at this time and will vary depending on modification measures used. Contractor(s) performing modification of EWM beds have experience in the area and will be responsible for procuring or assisting with procuring necessary permits.

Opinion on the effects of continued operation of the Clark Fork Hydroelectric Project on Bull Trout and designated Bull Trout critical habitat (BiOp). This project plan is consistent with the analyses and conclusions contained in the 2019 BiOp and will adhere to all appropriate Terms and Conditions designed to reduce the extent and effects of incidental take on Bull Trout. No incidental take of Bull Trout is anticipated as a result of this project plan; therefore, no take reporting is required.

Cultural/Historic Resource Review

Not applicable for the tasks proposed in this project plan, there are no ground disturbing activities or proposed impacts to cultural/historic resources.

Benefit to the Resource

This pilot project has the potential to improve the fish community dynamics in Noxon Reservoir by reducing overall EWM coverage and creating edge habitat used by many fish species. It also has the potential to spread anglers over a larger portion of Noxon Reservoir by adding access to previously unavailable fishing locations, thereby improving the angler's experience. The information from this project may help fisheries managers design future aquatic macrophyte modification projects and implement management activities that maintain and improve the high quality fishery that currently exists on Noxon Reservoir. This project is consistent with Appendix B of the Clark Fork Settlement Agreement as it is applied research that can be used for effective management and enhancement of the fish resources affected by the operations of Noxon Rapids Dam. This project is consistent with the "2019-2027 Statewide Fisheries Management Program

and Guide" (MFWP 2019), as it will provide regional fisheries managers with reservoir-specific information that can be used to improve current management strategies and potentially be applied elsewhere in Montana. In addition, modifying EWM beds is consistent with the invasive aquatic plant control adaptive management plan for Noxon and Cabinet Gorge reservoirs (Getsinger et al. 2017) and the alternatives analysis (DeBruyckere and Pennington 2017) because it uses science as the basis for managing EWM in a biologically and recreationally meaningful way.

Budget

Item	Estimated Carryover	2021 Budget Request
Permitting and Mechanical harvesting of EWM (~15 acres)	$28,000	$0
Technician (0.1 FTE)	$7,000	$0
Biologist (0.03 FTE)	$4,252	$0
Total	$39,252	$0
Anticipated Expenditures		$39,252

Literature Cited

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MFWP (Montana Fish, Wildlife and Parks). 2019. 2019-2027 Statewide Fisheries Management Program and Guide. Montana Fish, Wildlife and Parks, Helena, Montana.

2021 PROJECT PLAN

Mountain Lake Fisheries Monitoring Project

Project Contacts

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Project History

This is a continuing project for which the originally intended four-year scope was approved by the Management Committee in 2016. No additional funding or changes to the scope are being requested for this project; although a delay in 2019 sampling due to unrelated injury to personnel resulted in a need to extended sampling of the remaining lakes to 2020, completing the field component of the project. It is being requested that the Comprehensive Project Report completion date be extended from November 30, 2020 to March 1, 2021.

Background

High-mountain lake fisheries represent a unique angling experience in a backcountry setting and are popular summer and fall destinations for many outdoor enthusiasts. The Cabinet and Bitterroot Mountains Ranges located on land administered by the Lolo and Kootenai National forests in northwest Montana offer numerous high-mountain lake angling opportunities with varying levels of access; from remote wilderness lakes that require miles of hiking in steep mountainous terrain to lakes which can be accessed by motor vehicle. Montana Fish, Wildlife and Parks (MFWP) has dedicated considerable resources to stocking these lakes but many of these fisheries have never been evaluated. There is a need to evaluate stocking strategies in these waterbodies as to provide diverse angling experiences based on the potential of a given lake. This evaluation would allow MFWP to develop management objectives (i.e., classification) and adjust stocking strategies for individual lakes according to the findings of the proposed work. Similar high-mountain lakes investigations have been conducted by MFWP staff in Region 2 and will be used as a template for this work. Knotek et al. (2013) provides a comprehensive list of management objectives for high-mountain lakes such as high density/harvested oriented fisheries, quality fisheries, trophy fisheries, self-sustaining fisheries and fishless lakes. Management classifications for individual lakes will be based on size, age structure and condition of fish; catch rates (gill nets and angling); accessibility; angler use; and physical habitat. In turn, these metrics will be used to determine stocking strategies, specifically the number of fish stocked per acre and the frequency of stocking events. Sampling events will also include sub-impoundments fisheries such as the Thompson Falls State Park pond, Frog Pond, Triangle Pond and Quinns Cut.

High-mountain lake fisheries can also present challenges in the management and conservation of native salmonids. Non-native salmonids have been known to invade headwater stream reaches occupied by native salmonids, through downstream dispersal from lake basins which are often located at the upper terminus of stream catchments (Adams 1999; Adams et al. 2001). Brook Trout *Salvelinus fontinalis* in high-mountain lakes are of concern because this species is known to outcompete Cutthroat Trout *Oncorhynchus Clarki spp.* and hybridize with Bull Trout *Salvelinus confluentus*. In many western states including Montana, species and subspecies of the *Oncorhynchus* genus have been stocked in mountain lakes outside of their native distribution. In

western Montana, Yellowstone Cutthroat Trout *Oncorhynchus clarkii bouvieri* were historically stocked in many drainages occupied by native Westslope Cutthroat Trout *Oncorhynchus clarki lewisi.* The identification of non-native salmonids and *Oncorhynchus* hybrids in mountain lakes is an important component of native fish management. Thus, detection of any non-native fish will be useful in identifying potential future removal projects. Genetic analyses to investigate *Oncorhynchus* species hybridization will be conducted at lakes where stocking records indicate non-native species such as Yellowstone Cutthroat Trout were stocked in the past, or where visual inspection reveals unusual phenotypic characteristics. Mountain lakes may also present an opportunity to be used in the future as refugia for Bull Trout populations, whose distribution is predicted to contract with climate-change (Isaak et al. 2015) and the presence of appropriate habitats will be documented.

This plan is supported by the Clark Fork Settlement Agreement (CFSA) which calls for an evaluation of recreational fisheries. This data will provide management direction for high-mountain lakes fisheries and outline possible threats in important native salmonid drainages. Listed below are direct quotes from the CFSA that pertain to the validity of this proposal.

"MFWP will develop recreational fisheries proposals that meet their organization's objectives, while in consultation with the Water Resources Technical Advisory Committee and the Management Committee. The Management Committee's decision to approve funding for these recreational fisheries initiatives will be limited to issues of federal conflict arising between the actions of providing funding under the federal hydropower license, and those of other applicable federal laws (e.g. ESA)." (Avista Corp. 1999, pg. B-10).

"Although the Thompson River is not located in the immediate project vicinity, its proximity to the project area and the limited number of recreational fishery enhancement opportunities in the area make the Thompson River a viable recreation fishery mitigation area." (Avista Corp.1999, pg. B-5).

Goal
The goal of this project is to evaluate species present, relative abundance, size structure and natural reproduction as well as basic physical lake characteristics to inform future stocking strategies and other management activities.

Objectives
1. Summarize historical information for lakes such as stocking history and past surveys (to be summarized in Project Completion Report).

2. Describe current biological status of individual lakes including size structure, growth rates, condition, reproductive success, relative abundance of species present, fish diet composition (qualitative), levels of hybridization, amphibian presence; physical lake attributes such as maximum depth, P.H., dissolved oxygen, surface water temperature, surface acreage, elevation, presence of aquatic vegetation; and relevant recreational information such as accessibility and angling pressure.

3. Create future management objectives (stocking density and frequency) based on findings of these surveys.

4. Determine lakes where non-native species or *Oncorhynchus* hybrid presence could threaten native salmonids and what management actions are appropriate.

Tasks

1. Lakes will be sampled from June through October of each year, weather permitting. Fish populations will be sampled with sinking experimental, monofilament gillnets. Basic water quality and physical measurements will be taken at each fish bearing lake. For some lakes it may be hard to determine if the lake is capable of sustaining fish (and should be sampled) until they are visually inspected. A good portion of the smaller lakes are likely shallow and fishless, and thus only basic information would be collected (presence of amphibians, inlet/outlet, etc.). (Objectives 2-4; ***Completed in 2020***)

Work Products

- Annual Work Summary; due December 1, 2021
- Comprehensive Project Report; final due to Avista March 1, 2021

Permitting Requirements

No permits are required for fisheries sampling work as all work will be conducted and/or overseen by MFWP fisheries biologists.

Endangered Species Act consultation for this project plan is associated with the 2019 Biological Opinion on the effects of continued operation of the Clark Fork Hydroelectric Project on Bull Trout and designated Bull Trout critical habitat (BiOp), and the USFWS-MFWP Cooperative Agreement pursuant to Section 6 of the Act. This project plan is consistent with the analysis and conclusions contained in the 2019 BiOp and the USFWS-MFWP Cooperative Agreement and will adhere to all appropriate Terms and Conditions designed to reduce the extent and effects of incidental take on Bull Trout. Incidental take reporting for this project plan will be included in the annual Biological Opinion report as required by Term and Conditions 15–18 of the 2019 Incidental Take Statement, as well as MFWP's annual Section 6 report to the USFWS.

Cultural/Historic Resource Review

Not applicable for the tasks proposed in this project plan, there are no ground and/or vegetation disturbing activities, or proposed impacts to cultural/historic resources.

Benefit to the Resource

Mountain lakes surveys will allow MFWP to determine the distribution of native and non-native salmonids throughout headwater lakes in the lower Clark Fork River drainage. Such information will in turn be used to formulate strategies for the conservation of native stream dwelling salmonids that occupy particular drainages of importance. Baseline mountain lakes surveys will also allow MFWP to evaluate past stocking strategies based on survey findings and create future management objectives for these recreational fisheries.

Budget

Item	Estimated Carryover	2021 Budget Request
Implement Mountain Lakes Survey reporting, including fish otolith ageing and report preparation	$2,566	$0
Total	$2,566	$0
Anticipated Expenditures		$2,566

Existing staff will be tasked with otolith preparation and aging and assisting in report preparation; this cost will be split between this project and *Habitat Restoration Monitoring and Native Salmonid Abundance Monitoring Plan* (up to $2,500 for each).

Literature Cited

Adams, S. 1999. Mechanisms limiting a vertebrate invasion: brook trout in mountain streams of the northwestern USA. Doctoral dissertation, University of Montana, Missoula, Montana.

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Avista Corporation. 1999. Volume III Settlement Agreement including appended PM&Es and cultural resource programmatic agreement, Cabinet Gorge Hydroelectric Project (FERC No. 2058) and Noxon Rapids Hydroelectric Project (FERC No. 2075). Application for new license submitted to Federal Energy Regulatory Commission, Washington D.C. Avista Corporation, Spokane, Washington.

Isaak, D., Young, M., Nagel, D., Horan, D., and M. Groce. 2015. The cold-water climate shield: delineating refugia for preserving salmonid fishes through the 21st century. Global Change Biology 21:2540–2553.

Knotek, W., Schreck, W., Rashap R., and J. Thabes. 2013. Mountain lake surveys and fisheries management recommendations: Rattlesnake Wilderness lakes. Montana Fish, Wildlife and Parks, Missoula, Montana.

2021 PROJECT PLAN

Lower Bull River Day Use Boat Access Site Construction

Project Contacts

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and
Sean Moran, Avista, (406) 847-1291, sean.moran@avistacorp.com

Project History

This is a continuing Project Plan originally approved in 2019 and incorporating actions that were approved by the Management Committee (MC) during the fall 2018 meeting. This Project Plan is a follow-up to the completed Lower Bull River Day Use Boat Access Plan and Final Design project. In 2017, this property was listed for sale and was acquired through Appendix B following Consent Mail approval of the MC. In 2018, under the Lower Bull River Day Use Boat Access Plan and Final Design project, a site plan was produced by MFWP and design and management considerations were discussed at a meeting with the Bull River Watershed Council. In order to make this site operational as soon as possible, the design was included in a proposal and major construction was completed in the fall of 2018 using funds ($100,000) approved by the MC at the September 25 meeting (Avista 2018). The site management plan was finalized and major construction at the site was completed in 2019. Kiosk and interpretive signs, and picnic tables were were installed, maintenance was performed, and use visitation was recorded in 2020. This project represents a continuation of maintenance and use quantification as well as the installation of approach signage on Highway 56. Quantification of use will be considered and applied to future consideration on whether the installation of vault toilet is needed in light of an unforeseen zoning issue that greatly complicates permitting of such an installation. A porta-potty was installed in the interim and may be sufficient for the foreseeable future.

Background

The Bull River provides an increasingly popular fishery for both native Westslope Cutthroat Trout and non-native salmonids. From 2005 to 2009, angling pressure on the river approximately doubled (MFWP 2009). Due to its location, size (with over 20 miles of floatable channel), and spectacular setting, the Bull River represents a unique recreational opportunity in northwest Montana. Throughout much of its length, the low gradient and sinuous nature of the channel provides for scenic and relaxing floating throughout a variety of flow levels. Because a majority of the channel is too deep to provide wading access, much of the use is by small, non-motorized watercraft. Private land dominates the lower and middle areas of the river and very few public access points existed. This limited access was particularly pronounced along the lower Bull River, in which public access suitable for non-motorized boat launching was limited to the mouth of the East Fork Bull River at approximate river mile 10, and the USFS campground located at Bull River Bay. Not only was access limited, but by having to take out in the bay, floaters were subject to the more hazardous conditions encountered in the lower two miles of the channel.

Accordingly, investigations into the potential purchase of private land along the lower Bull River approximately two river miles upstream from the bay had been investigated under a feasibility

study approved by the MC in 2013. Private disputes between landowners precluded finalizing the purchase of this property until 2017. With the purchase of this property under the Recreational Fishery Enhance Fund (Appendix B) of the Clark Fork Settlement Agreement (CFSA), the site enjoyed its first full season of use in 2020.

Goal
The goal of this project is to complete construction, maintain the site and assess use for the 2021 recreation season.

Objective
1. Complete necessary tasks (Tasks 1 and 2) so that this site will be ready for use by the public by spring of 2021.

2. Quantify use levels to inform future site plan considerations, including need for a vault toilet. (Tasks 2 and 3)

Tasks
1. Complete all sign installation for the Lower Bull River Day Use Boat Access site. (Objective 1)

2. Continuing zoning and permitting due diligence for potential vault toilet installation. (Objectives 1 and 2)

3. Continue to use traffic-counting equipment to assess use levels during the 2021 recreation season. (Objective 2)

Work Products
- Annual Work Summary (of site visitation information); from contractor to Appendix B Aquatic Program Leader (APL) and Avista; due November 15, 2021
- Annual Work Summary; due December 1, 2021

Permitting Requirements
All necessary permitting has been completed for the current development and use of this site. Continued due-diligence as to required zoning and permitting for potential vault toilet installation is ongoing.

Endangered Species Act consultation for this project plan is associated with the 2019 Biological Opinion on the effects of continued operation of the Clark Fork Hydroelectric Project on Bull Trout and designated Bull Trout critical habitat (BiOp). This project plan is consistent with the analyses and conclusions contained in the 2019 BiOp and will adhere to all appropriate Terms and Conditions designed to reduce the extent and effects of incidental take on Bull Trout. No incidental take of Bull Trout is anticipated as a result of this project plan; therefore, no take reporting is required.

Cultural/Historic Resource Review
This is a carryover project and the cultural/historic resource review was completed in 2018 by the Cultural Resources Management Group. Avista will coordinate site monitoring with Confederated Salish and Kootenai Tribe archeologist prior to initiating any of the ground work for this project plan.

Benefit to the Resource
This project is consistent with the Montana Tributary Habitat Acquisition and Recreational Fishery Enhancement Program, both by facilitating access for sampling associated with implementing, maintaining, and assessing stream habitat and riparian revegetation programs (under the Tributary Habitat Fund) and by increasing public recreational fishery access (under the Recreational Fishery Enhancement Fund). The construction of this project is being funded by Appendix B; however, the Passive Integrated Transponder (PIT) tag array installed in 2018 is also consistent with goals of the Fish Passage/ Native Salmonid Restoration Plan (Appendix C). By providing law enforcement access to the Bull River and, depending on input into the development plan that could entail educational facilities, this project is also consistent with the goals of the Bull Trout Protection and Public Education Program (Appendix D of the CFSA). By providing signage on ongoing revegetation efforts floaters are likely to see, this site also provides out-reach to the Watershed Councils Program (Appendix E) and stream restoration efforts conducted under Appendix B.

Budget

Item	Estimated Carryover	2021 Budget Request
Complete kiosks and signage construction, perform cultural survey, continue zoning and permitting due diligence for potential vault toilet installation, install visitation monitoring equipment and reporting.	$1,935	$500
Avista staff maintenance and 8 mo. porta-potty service	$0	$2,000
Total	$1,935	$2,500
Anticipated Expenditures		$4,435

Literature Cited
Avista. 2018. Management Committee meeting minutes from September 25, 2018. Avista document identification number 2018-0349. Avista, Noxon, Montana.

MFWP (Montana Fish, Wildlife and Parks). 2009. Angler Pressure Surveys. www.fwp.mt.gov/fishing/anglingPressureSurveys/

2021 PROJECT PLAN

Noxon Reservoir Boat Ramp Improvements

Project Contacts

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and
Sean Moran, Avista, (406) 847-1291, sean.moran@avistacorp.com

Project History

This is a carryover project that was approved by the Management Committee in 2017. Implementation has been delayed and apart from this delay, no changes in scope or budget are being requested.

Background

In 2015, 2016 and 2018, unseasonably warm early spring weather, combined with increased angler interest in the upper reach of Noxon Reservoir, resulted in a number of angler complaints regarding the lack of boat access. Two boat ramps exist in the upper reach of Noxon Reservoir, Flat Iron Ridge and Thompson Falls State Park. In 2015 and 2016, low snowpack and decreased run-off, combined with Avista's ability to draft Noxon Reservoir up to 10 feet between October 1 and May 14, has limited the ability to a launch motorized boats in the upper reach of Noxon Reservoir.

The current ramp at Thompson Falls State Park does not function at low recreation and non-recreation season pool levels or river flows (FIGURE 1). At low flows and low reservoir elevations, the Flatiron Boat ramp is often unusable as well (FIGURE 2). Compounding the issue, the existing pier creates an eddy over the ramp, which in high flows allows for sediment to settle-out and blocks the ramp. A culvert was installed to utilize current from the main channel in order to flush sediment from the ramp area. However, under the present design, not enough current is directed through the culvert. Currently, the ramp area is dredged every five to eight years to remove sediment and improve access.

Following investigations into potential liability, constraints imposed by the physical attributes of each location, and logistical considerations, representatives from MFWP and Avista met at Thompson Falls State Park and Flatiron boat ramps in October 2020 to discuss a path forward. At this meeting it was decided to extend the Thompson Falls State Park ramp and to continue periodic dredging of the Flatiron site. Preliminary designs and cost estimates for the Thompson Falls State Park ramp will be finalized in 2021, with construction likely to occur in the late summer or fall.

Goal

The goal of this project is to increase boater access to upper Noxon Reservoir during periods of low flow.

FIGURE 1. Thompson Falls State Park boat ramp during April 2016

FIGURE 2. Boat ramp at Flat Iron Ridge Fishing Access Site during low-water in 2016.

Objective

1. Identify most appropriate means of providing suitable deep water boat access in upper Noxon Reservoir.

Tasks

1. Evaluate options for improving boat access at Flat Iron Ridge and/or Thomson Falls State Park. Avista and MFWP, with input from Northwest Energy, will agree upon an improvement potentially including the redesign of the Thompson Falls State Park boat

ramp (FIGURE 3), redesign Flat Iron Ridge boat ramp (Figure 4), design of a new low-water boat ramp at Flatiron Ridge, and/or dredging of Flat Iron Ridge. The evaluation will also consider compliance with the Recreation Resource Management Plan (CFSA Appendix H), need, feasibility, environmental impacts, permitting (including cultural resource survey), cost (both construction and operation and maintenance), as well as legal obligation and liability. (Objective 1; ***Completed 2020***)

2. Once preferred alternative(s) are identified, engineering support may be required to design the ramp modifications. In addition, permits will be required prior to constructing or dredging, and contractors will be required to execute the preferred alternative(s). (Objective 1)

FIGURE 3. Thompson Falls State Park proposed boat ramp improvements.

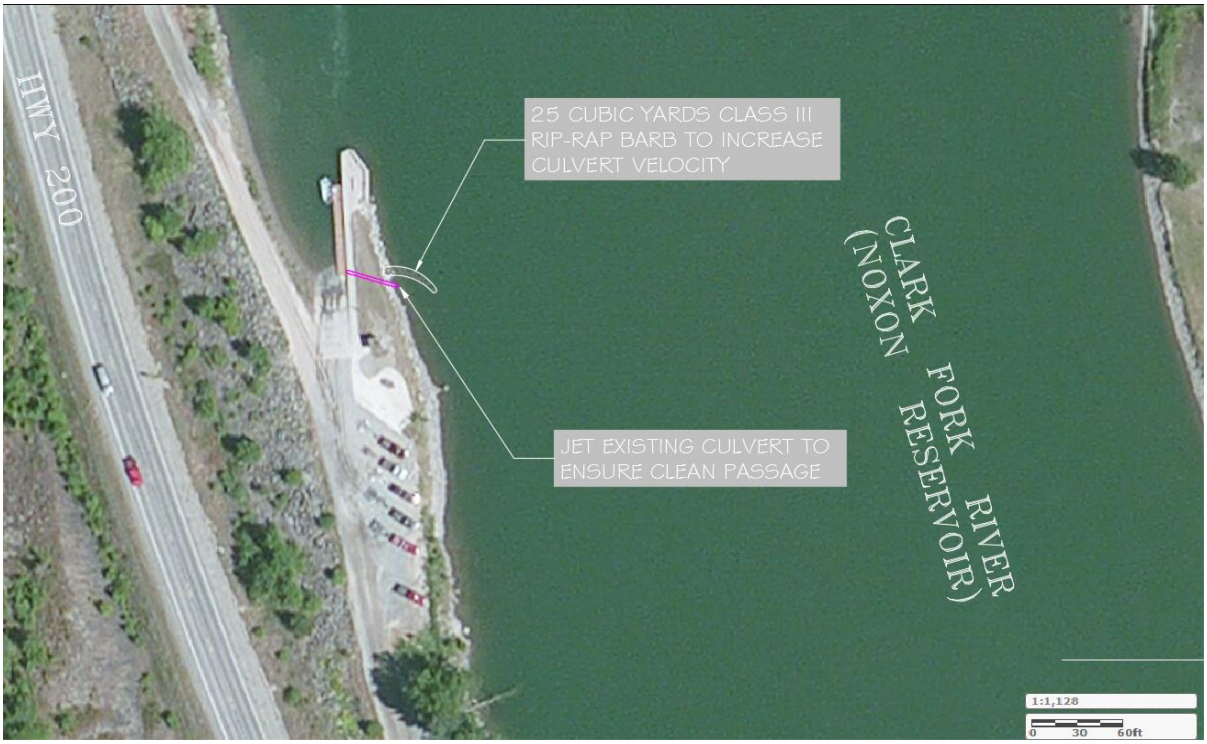

FIGURE 4. Flat Iron Ridge Fishing Access Site proposed ramp improvements.

Work Products

- Technical memorandum or other appropriate work product listing associated development options, including site plan(s) and cost estimates; due June 1, 2021
- Annual Work Summary; due December 1, 2021

Permitting Requirements

Permitting requirements will be determined after preferred alternative(s) are identified and approved. Permitting will likely consist of a U.S. Army Corps of Engineers Joint Aquatic Resource Permit Application ("JARPA").

Provided improvement efforts and/or construction activities are not undertaken in 2020, Endangered Species Act consultation for this project plan is associated with the 2019 Biological Opinion on the effects of continued operation of the Clark Fork Hydroelectric Project on Bull Trout and designated Bull Trout critical habitat (BiOp). This project plan is consistent with the analyses and conclusions contained in the 2019 BiOp and will adhere to all appropriate Terms and Conditions designed to reduce the extent and effects of incidental take on Bull Trout. No incidental take of Bull Trout is anticipated as a result of this project plan; therefore, no take reporting is required.

Cultural/Historic Resource Review

Provided a design is agreed upon and facilitates construction in 2021, Avista will coordinate Cultural Resources Management Group review prior to implementing the project. The work product for this review will be confidential due to the sensitive nature of the content.

Benefit to the Resource

Noxon Reservoir is one of the most popular fisheries in northwest Montana and supports a diverse and dynamic recreational fishery. Assuring access at lower water levels to the upper reservoir not only facilitates recreational enjoyment, but is also consistent with efforts of the Recreational Fisheries component of Appendix B to support fishery monitoring, enhancement, and management efforts of MFWP on Noxon and Cabinet Gorge reservoirs.

Budget

Item	Estimated Carryover	2021 Budget Request
Upper Noxon Reservoir boat ramp improvements; plans and construction	$55,000	$0
Total	$55,000	$0
Anticipated Expenditures		$55,000

2021 PROJECT PLAN

Managing Aquatic Invasive Plants on Noxon and Cabinet Gorge Reservoirs

Project Contact
Kim Bergstrom, Pinnacle Research, (406) 546-2447, pinnacle@blackfoot.net

Project History
This is a continuing project implemented by the Sanders County Aquatic Invasive Plants Task Force (Task Force) to manage the infestation of Eurasian watermilfoil (EWM) in the Noxon and Cabinet Gorge reservoirs. The Management Committee (MC) originally approved this project in 2008 with funding from Appendices G and H. Also in 2008, the MC approved a small amount of funding from Appendix B for reservoir mapping of EWM. The MC first approved funds for treatment of EWM (from Appendix B) in 2014. Following consideration of the Alternatives Analysis in 2017, a change in scope to focus treatment on high use areas and access points was adopted. The Task Force is requesting up to $40,000 from the Appendix B Recreational Fishery Enhancement Program for control of EWM in 2021. The work to control EWM is complemented by monitoring, education and research, which is being funded through other avenues [e.g., Clark Fork Settlement Agreement (CFSA) Appendix G, and Montana Fish, Wildlife and Parks (MFWP)]. This funding was also approved in 2020, but not needed due to low levels of EWM infestation.

Background
Eurasian watermilfoil and curlyleaf pondweed (CLP)[1] were confirmed in Noxon and Cabinet Gorge reservoirs in 2007; this was the first identified infestation of EWM in Montana. Initial studies indicated that EWM covered 247 acres in Noxon and 117 acres in Cabinet.

Eurasian watermilfoil is an aggressive, non-native aquatic weed that poses a serious threat to Montana's rivers and lakes. When introduced into a waterbody, EWM spreads quickly and forms thick beds with dense canopies that crowd out native aquatic plants and threaten fisheries, water quality, drinking and irrigation water supplies and recreational uses. Once established, dense EWM beds can deplete oxygen needed by fish and other aquatic organisms (Madsen 2014). With the exception of bottom barriers, control measures selectively target EWM, thereby maintaining populations of native coontail, elodea, pondweeds and white water buttercup.

The Sanders County Commissioners established the Task Force in 2008 to develop and implement an integrated weed management approach to contain and manage infestations of EWM. The annual program has included the following components:

- Controlling priority areas of invasive milfoil stands through a combination of aquatic herbicide treatments, diver dredging (hand removal) in small, narrow plots where herbicides have proven to be less effective, and the use of bottom barriers at high-use

[1] Although CLP is present in the Lower Clark Fork reservoirs, EWM is the targeted plant species in this project due to: 1) EWM's known impacts to aquatic environments, 2) high risk of its spread to other non-infested water bodies in Montana, and 3) relatively low amount of infested acreage which allows for containment. CLP will only be treated where it exists within beds targeted for EWM control.

docks/ramps (public and private) to reduce the risk of boats transporting weed fragments.

- Conducting pre- and post-treatment monitoring to verify treatment effectiveness on targeted invasive species and re-colonization of native aquatic plant species at treated sites.
- Monitoring littoral zones of Noxon and Cabinet Gorge reservoirs to determine if and how the composition and density of submersed vegetation and the location of invasive plant stands is changing over time.
- Implementing a public awareness and education program about aquatic invasive plants that targets boaters, anglers and the general public and demonstrates specific ways that people can help slow the spread of aquatic weeds.
- Coordinating with MFWP and Idaho Department of Agriculture on mandatory boat check stations to prevent invasive aquatic plants from being transported to non-infested areas.
- Meeting monthly to evaluate program results and guide adaptive management techniques. Technical expertise includes aquatic resource professionals and representatives of federal, state and local government agencies, nonprofits, tribes and others with knowledge in fisheries, aquatic plant ecology, water resources, water quality and aquatic plant management. A Scientific Review Panel was established in 2018 to further assist the Task Force with review of monitoring results and consideration of control options.

Widespread herbicide treatment began as a control measure in the reservoirs in 2012 with the intention of achieving a maintenance level within a few years, when large-scale herbicide treatments would no longer be needed. While treatments in 2012 through 2014 saw measurable improvements, in 2015 there was a resurgence of EWM, with re-expansion into already treated plots and the establishment of several new infestations in Noxon Reservoir.

In 2016, the Task Force received funding from the Montana Department of Natural Resources and Conservation (DNRC) to conduct an alternatives analysis (Analysis of Treatment Alternatives 2017) to examine management methods for reducing infestations. The analysis determined that successful management of EWM in Sanders County would be the containment and control of existing aquatic invasive species (AIS) populations and prevention of new introductions of AIS within the Noxon and Cabinet Gorge reservoirs. The top priority for control was determined to be near public and private access sites, including public and private boating access sites and shoreline dock areas. The second priority for control is large, high density shallow access areas with significant boat traffic.

Control methods for the priority areas are to be determined by a Scientific Advisory Panel and may likely involve a combination of bottom barriers (particularly around private docks), diver dredging and selective herbicide application. The panel will evaluate annual monitoring data and surveys to determine the extent and location of management methods. Beginning in 2018, monitoring of EWM has been conducted by MFWP as an in-kind contribution to the program. MFWP is expected to continue to provide monitoring in 2021.

The Analysis of Treatment Alternatives calls for an adaptive management strategy using a suite of appropriate tools. Since 2018, following completion of this analysis, Sanders County's annual treatments have focused solely on the two priority areas. In 2020, Sanders County treated a total of 46 acres in the two reservoirs, 5.9 acres with Procellacor and 14.5 acres with

Aquastrike at a total cost of $33,764. The source of funding for this work was $10,000 from a state DNRC grant and $23,764 from an Army Corps of Engineers (USACE) Water Resources Development Act Section 595 (WRDA) grant. The county still has $32,000 of WRDA funding remaining and another $10,000 from DNRC and has permission from the funders to expend those funds in 2021.

Funding from Appendix B will ensure that all of the USACE funding can be utilized for treatment and that there are sufficient funds to treat all Priority 1 areas, and high traffic recreation areas in the reservoirs in 2021.

Goal
The goals of this project are to sustain recreational opportunities in the reservoirs as well as native plants and species that rely on riparian and littoral areas and habitats.

Objectives
1. Manage aquatic invasive species according to the Sanders County Aquatic Invasive Plant Management Plan.

2. Improve access to water-based recreational opportunities.

3. Maintain water quality at acceptable levels, considering turbidity, water temperature, and dissolved oxygen, as well as localized and reservoir-wide water exchange.

4. Manage aquatic invasive plant populations in the context of regional natural resources to help sustain local recreation-based economies.

Tasks
1. Based on review of 2020 and 2021 monitoring, surveys, recreation data and reservoir maps, the Scientific Advisory Panel will propose control measures – including type, extent and locations - for the field season in spring 2021. Those measures may include a combination of herbicide treatments, diver dredging, and possibly other methods to be determined as effective through the analysis. Herbicide treatments utilize a variable-depth water injection system to ensure precision treatment, and applications are calibrated with boat speed and plant stand depth for exact delivery to the targeted submersed plant stands. Exact acreages and locations of control measures will be based on information from pre-treatment surveys, with public access and recreation sites taking priority. Quality control and project oversight by the Task Force and professional contractors maintains the scientific integrity of all work performed. (Objectives 1-4)

Work Products
- Mid-year report; due to Appendix B Aquatic Program Leader (APL) August 2, 2021
- Annual Work Summary; due to the APL November 15, 2021
- Annual Project Update; due December 1, 2021

Permitting Requirements
A Montana Pesticide Discharge Permit is required for the use of herbicides to treat aquatic invasive species. Sanders County has a current permit, which is in effect through Oct. 31, 2021.

Potential treatment is limited in scope, and would occur during the mid-to-late summer along shallow warm areas, and herbicides use would quickly degrade; therefore, Endangered Species Act consultation for this project plan is associated with the 2019 Biological Opinion on the effects of continued operation of the Clark Fork Hydroelectric Project on Bull Trout and designated Bull Trout critical habitat (BiOp). This project plan is consistent with the analyses and conclusions contained in the 2019 BiOp and will adhere to all appropriate Terms and Conditions designed to reduce the extent and effects of incidental take on Bull Trout. No incidental take of Bull Trout is anticipated as a result of this project plan; therefore, no take reporting is required.

Cultural/Historic Resource Review
Not applicable for the tasks proposed in this project plan, there are no ground disturbing activities or proposed impacts to cultural/historic resources.

Benefit to the Resource
Key objectives of this project focus on sustaining the reservoirs' recreational fisheries, improving access to water-based recreational opportunities, maintaining or improving aesthetic values, and protecting sensitive and important resources of Noxon and Cabinet reservoirs. As such, this project supports the CFSA Appendix B Recreational Fishery Enhancement Program (recreational fishery management); CFSA Appendix G Implementation of the Land Use Management Plan (protection and maintenance of sensitive resources, including shorelines); and CFSA Appendix H Implementation of the Recreation Resource Management Plan (management and preservation of recreation resources and public access).

Prevention and education, project activities dovetail with aquatic invasive species efforts on-going across Montana, Idaho and regionally. The program is consistent with the Montana Aquatic Nuisance Management Plan, which seeks to minimize the harmful ecological, economic, and social impacts of aquatic nuisance species through prevention and management, population growth, and dispersal into, within, and from Montana (Montana ANS Technical Committee 2002). The program is also consistent with the state's Wildlife Action Plan, which seeks to avoid spread of aquatic invasive species (MFWP 2015) and the state Aquatic Invasive Species Program, which "seeks to minimize the harmful ecological, economic, and social impact of AIS through prevention and management of introduction, population growth and dispersal of AIS …(Analysis of Treatment Alternatives 2017)."

Budget

Item	Estimated Carryover	2021 Budget Request
Herbicide treatments and diver dredging; not to exceed requested amount.	$40,000	$0
Total	$40,000	$0
Anticipated Expenditures		$40,000

Sanders County received a WRDA grant for invasive milfoil management treatment in 2019 and 2020. The county has $32,000 remaining from the WRDA grant (an extension has been authorized through 2021) and $10,000 from the DNRC grant (an extension has been authorized through 2021).

Literature Cited

DeBruyckere, L.A., T. Pennington. 2017. Analysis of Treatment Alternatives for Invasive Watermilfoil in Noxon Rapids and Cabinet Gorge Reservoirs, Sanders County, Montana.

Madsen, J.D. 2014. Eurasian Watermilfoil. *In* Biology and Control of Aquatic Plants, A Best Management Practices Handbook. L.A. Gettys, W.T. Haller, and D.G. Petty, editors. Aquatic Ecosystem Restoration Foundation.

Montana Aquatic Nuisance Species Technical Committee. 2002. Montana Aquatic Nuisance Species (ANS) Management Plan. 142pp.

Montana Fish, Wildlife and Parks (MFWP). 2015. Montana's State Wildlife Action Plan. Helena, MT.

2021 PROJECT PLAN

Dreissenid Mussel Sampling on Noxon and Cabinet Gorge Reservoirs

Project Contacts
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Project History
This is a new project for 2021.

Background
Dreissenid (i.e., zebra and quagga) mussels are a threat to fisheries and infrastructure as they can alter the trophic status and food web of a waterbody (Miehls et al. 2009; Higgins and Zanden 2010; Madenjian et al. 2015), negatively affect fish populations (Hoyle et al. 2008), and clog piping (MacIsaac 1996). Once established, dealing with dreissenid mussels has a substantial economic cost (Strayer 2009; Connelly et al. 2007; Chakraborti et al. 2016; Nelson 2019).

In the fall of 2016, dreissenid mussel veligers were detected in Tibor Reservoir with a "suspect" sample coming from Canyon Ferry Reservoir. Both reservoirs are located east of the Continental Divide in Montana and contain popular fisheries. With this discovery, a concerted effort to prevent further introduction of dreissenid mussels into Montana and to monitor for early detection of any introduction was implemented. This effort has involved expanding days and hours of operation at aquatic invasive species inspection stations, educational programs, and statewide sampling for dreissenid mussels. The statewide mussel sampling includes collection of water samples from Noxon and Cabinet Gorge reservoirs to look for veligers. In 2020, Montana Fish, Wildlife and Parks (MFWP) collected at least eight samples from each reservoir between May and October. In addition, Avista voluntarily collected a sample from the forebay of each reservoir in August after receiving a request from the Whitefish Lake Institute to collect samples that would supplement those collected by MFWP. The purpose of this project plan is to continue supplemental sampling with funds from Appendix B.

Goal
The goal of this project is to provide information about dreissenid (zebra and/or quagga) mussel presence/absence in the event of invasive mussel establishment in the Clark Fork River system.

Objectives
1. Contribute to the dreissenid mussel sampling program being implemented by MFWP.

Task
1. Sample Noxon and Cabinet Gorge reservoirs twice during 2021 (late July and late August), following the protocols found in MFWP (2019a). (Objective 1)

Work Products
- Sampling status report (likely memorandum); due September 30, 2021
- Annual Work Summary; due to the Appendix B Aquatic Program Leader November 15, 2021

Permitting Requirements
Not applicable for the tasks proposed in this project plan.

Endangered Species Act consultation for this project plan is associated with the 2019 Biological Opinion on the effects of continued operation of the Clark Fork Hydroelectric Project on Bull Trout and designated Bull Trout critical habitat (BiOp). This project plan is consistent with the analyses and conclusions contained in the 2019 BiOp and will adhere to all appropriate Terms and Conditions designed to reduce the extent and effects of incidental take on Bull Trout. No incidental take of Bull Trout is anticipated as a result of this project plan; therefore, no take reporting is required.

Cultural/Historic Resource Review
Not applicable for the tasks proposed in this project plan, there are no ground and/or vegetation disturbing activities, or proposed impacts to cultural/historic resources.

Benefit to the Resource
This project is being implemented to help with the early detection of dreissenid mussels in Noxon and/or Cabinet Gorge reservoirs. Early detection will help MFWP develop procedures that will limit the likelihood of these reservoirs serving as sources for invasion to other waterbodies. In addition, early detection may provide the opportunity to implement control efforts that will minimize the impact of a dreissenid mussel invasion on the trophic status and food webs within the reservoirs. This project is consistent with Appendix B of the Clark Fork Settlement Agreement as it provides information that can be used for effective management of the fish resources affected by the operations of Noxon Rapids and Cabinet Gorge dams. This project is also consistent with the "2019-2027 Statewide Fisheries Management Program and Guide" (MFWP 2019b), as it will provide fisheries managers with reservoir-specific information that can be used to improve current aquatic invasive species management strategies and potentially be applied elsewhere in Montana.

Budget

Item	Estimated Carryover	2021 Budget Request
Technician (0.02 FTE)	$0	$1,500
Biologist (0.004 FTE)	$0	$640
Total	$0	$2,140
Anticipated Expenditures		$2,140

Literature Cited
Chakraborti, R. K., S. Madon, and J. Kaur. 2016. Costs for controlling dreissenid mussels affecting drinking water infrastructure: case studies. Journal of the American Water Works Association 108:442–453.

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2021 ANNUAL IMPLEMENTATION PLAN SUMMARY – APPENDIX C

Clark Fork Project, FERC No. 2058
Cabinet Gorge and Noxon Rapids Hydroelectric Developments

Title
Fish Passage/Native Salmonid Restoration Plan

Implementation Staff Lead
Shana Bernall, Avista, (406) 847-1293, Shana.Bernall@avistacorp.com

Background
The purpose of the Fish Passage/Native Salmonid Restoration Plan is "…to mitigate the continuing effects of the project as obstructions to fish passage, and to achieve the goal of increasing the long term population viability of native salmonids in the Lake Pend Oreille-lower Clark Fork River system" (FERC Order, Article 406). This goal is to be accomplished through the aggressive implementation of the Clark Fork River Native Salmonid Restoration Plan (NSRP).

The NSRP addresses a number of issues influencing availability of native fish stocks suitable for fish passage. Genetics, pathogens, exotic fish species, fish abundance and tributary and mainstem habitat are all discussed in the NSRP. Consideration of these factors is important in determining if fish passage is the most effective tool to increase native salmonid populations. A number of projects have been identified as activities needed for implementation in 2020 to achieve the goals of the Fish Passage/Native Salmonid Restoration Plan. The locations where all program components will be implemented are within the Avista project area, located downstream of Thompson Falls Dam, Montana proceeding downstream to Lake Pend Oreille, Idaho.

2021 Project Plans
Annual Operations
1. Upstream Fish Passage Program
2. Graves Creek and East Fork Bull River Genetic Study
3. Tributary Trapping and Downstream Juvenile Bull Trout Transport Program
4. PIT-Monitoring Station Operation and Maintenance
5. Bull Trout Emigration Study
6. Non-Native Fish Suppression Project in the East Fork Bull River
7. Evaluation of Potential Actions for Reducing Non-native Threats to Native Salmonid Populations

Facilities
8. Fish Capture Facilities Operation, Development, and Testing
9. Graves Creek Permanent Weir Trap Enhancements

Work Products
Upstream Fish Passage Program
- Annual Work Summary; due December 1, 2021

- Comprehensive Project Report; Upstream Fish Passage Program (2001 – 2019 data); final due August 2, 2021
- Comprehensive Project Report; Clark Fork River Westslope Cutthroat Trout Experimental Transport Program (2015 – 2018); final due July 1, 2021
- Annual Project Update; Upstream Fish Passage Program (2020 data); final due December 1, 2021
- Annual Project Update; Upstream Fish Passage Program (2021 data); final due December 1, 2022
- Annual Project Update; Abernathy Fish Technology Center Genetics Report (2020 data); final due November 1, 2021
- Annual Project Update; Abernathy Fish Technology Center Genetics Report (2021 data); final due November 1, 2022
- Annual Project Update; Idaho Fish Health Center Pathogen Report (2020 data); final due June 1, 2021
- Annual Project Update; Idaho Fish Health Center Pathogen Report (2021 data); final due June 1, 2022
- Draft lower Clark Fork River fish capture database prepared by April 1, 2022

Graves Creek and East Fork Bull River Genetic Study

- Annual Work Summary; due December 1, 2021
- Project Completion Report; final due October 1, 2021

Tributary Trapping and Downstream Juvenile Bull Trout Transport Program

- Comprehensive Project Report; Downstream Program (2018-2020 data; final due July 1, 2021 and includes Graves Creek permanent weir trap monitoring and evaluation plan report)
- Annual Project Update; Downstream Program (2021 data; final due by October 1, 2022 and includes Graves Creek permanent weir trap monitoring and evaluation plan report)
- Temperature monitoring data for the six long-term sites as well as sites monitored through the Bull Trout Emigration Study; due December 1, 2021
- Annual Work Summary; Downstream Program; due December 31, 2021

PIT-Monitoring Station Operation and Maintenance

- Annual Work Summary; PIT Technology (2021); due December 1, 2021

Bull Trout Emigration Study

- Annual Work Summary; due December 1, 2021
- Master's Thesis; due December 1, 2021

Non-Native Fish Suppression Project in the East Fork Bull River

- Project Completion Report; Non-Native Fish Suppression Project in the East Fork Bull River; (2007–2020 data) final due November 1, 2021
- Annual Work Summary; due December 1, 2021

Evaluation of Potential Actions for Reducing Non-native Threats to Native Salmonid Populations

- Final memorandum; due August 2, 2021
- Annual Work Summary; due December 1, 2021

Fish Capture Facilities Operation, Development, and Testing

- Annual Work Summary; Fish Capture Facilities (2021); due December 1, 2021
- As-built drawings (CGFHF modifications); due October 1, 2021

- CGDF Monitoring and Evaluation Plan; final due October 1, 2021

Graves Creek Permanent Weir Trap Enhancements

- Revegetation site plan (LCFWG; likely memo); due October 1, 2021
- As-built drawings (R2); due November 1, 2021
- Annual Work Summary; due December 1, 2021

Appendix C 2021 Budget

Project	Carryover[1]	2021
Annual Operations Fund (including GDP inflation rate)		**$812,531**
Unexpended funds w/interest		**$1,050,177**
Total Available		**$1,862,708**
Upstream Fish Passage Program	$87,000	$300,000
Graves Creek and East Fork Bull River Genetic Study	$0	$0
Tributary Trapping and Downstream Juvenile Bull Trout Transport Program	$113,708	$428,292
PIT-Monitoring Station Operation and Maintenance	$7,000	$29,842
Bull Trout Emigration Study	$40,670	$0
Non-Native Fish Suppression Project in the East Fork Bull River	$34,500	$4,000
Evaluation of Potential Actions for Reducing Non-native Threats to Native Salmonid Populations	$13,550	$0
Carryover from 2020 Redd Surveys in Montana Tributaries (now an Appendix B project)	$6,500	$0
Total	$302,928	$762,134
MC Approved Budget		**$1,065,062**
Unobligated Funds		$797,646

[1] *This column denotes estimated carryover of unexpended, approved funds as of January 1.*

Project	Carryover[1]	2021
Facilities Fund (including GDP inflation rate)		**$589,862**
Unexpended funds w/interest[2]		**-$18,581,501**
Total Available		**-$17,991,639**
Fish Capture Facilities Operation, Development, and Testing	$5,126,254	$14,635,533
Graves Creek Permanent Weir Trap Enhancements	$539,553	$10,000
Total	$5,665,807	$14,645,533
MC Approved Budget		**$20,311,340**
Unobligated Funds		-$38,302,979

[1] *This column denotes estimated carryover of unexpended, approved funds as of January 1.*

[2] *This negative figure is the amount that Avista has spent in excess of the sum of the annual contributions to date.*

2021 PROJECT PLAN

Upstream Fish Passage Program

Project Contact
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Project History
The Upstream Fish Passage Program is a continuing project that was originally approved by the Management Committee (MC) in 2001. The scope and budget for this project are reviewed by the MC annually. Bull Trout have been transported upstream annually since 2001 and Westslope Cutthroat Trout have been transported upstream annually since 2015.

Background
Bull Trout have been captured downstream of Cabinet Gorge Dam and transported upstream of lower Clark Fork River mainstem dams annually since 2001 as part of the Upstream Fish Passage Program. Bull Trout are transported upstream and released at designated locations based on either a genetic assignment or other approved transport criteria.

Bull Trout were initially transported upstream of Cabinet Gorge Dam as part of an experiment that was conducted from 2001 through 2003. Over 100 adult Bull Trout were transported upstream of Cabinet Gorge Dam with release into Cabinet Gorge Reservoir during this time frame. In 2004, Avista worked closely with a genetics laboratory that was able to use genetic testing to determine a Bull Trout's most likely tributary of origin, and this method has been utilized annually since then to help guide upstream transport decision making (DeHaan et al. 2011). During the early years of experimental transport, radio-tagged Bull Trout were observed migrating into tributaries during the spawning period, providing evidence to continue the transport program. In addition, a genetic study implemented from 2008 through 2010 in two Montana tributaries confirmed the reproductive contribution of Bull Trout following upstream transport (DeHaan and Bernall 2013).

The experimental transport of Westslope Cutthroat Trout upstream of Cabinet Gorge Dam was initiated in 2015 and has been approved annually by the MC since that time. The goal for this program is to reestablish connectivity for Westslope Cutthroat Trout utilizing Lake Pend Oreille, Idaho for growth and rearing and attempting to return to Montana tributaries to spawn. Transported fish were implanted with radio transmitters from 2015 through 2018 to monitor the movements of these fish following upstream transport. The primary indicator of the success of this project was documenting Westslope Cutthroat Trout entering potential spawning tributaries to Cabinet Gorge Reservoir during the spring spawning period. The percentage of Westslope Cutthroat Trout that entered spawning tributaries in the spring, following release from mid-March through June, has ranged from 23 percent in 2015 to 40 percent in 2016 (Bernall and Johnson 2016, 2017, 2018). Based on these results, and evaluations of movements of fish at different release locations and different times of the year, the decision was made to begin moving Westslope Cutthroat Trout upstream of Cabinet Gorge Dam without radio transmitters in 2019. All Westslope Cutthroat Trout released in Cabinet Gorge Reservoir in 2019 and 2020 were implanted with Passive Integrated Transponders (PIT) tags to monitor movement into the Bull

River and fallback downstream of Cabinet Gorge Dam. Seventeen percent in 2019, and 25 percent in 2020, were detected ascending the Bull River during the spawning period following their release (Avista, unpublished data).

The primary methods used to capture Bull Trout downstream of Cabinet Gorge Dam are night electrofishing, the Cabinet Gorge Hatchery ladder trap, and hook-and-line sampling. Only night electrofishing and hook-and-line sampling have been used to capture Westslope Cutthroat Trout.

Pathogen testing of species targeted for upstream transport has occurred annually since 2013. Avista is required to conduct this testing in order to obtain an import permit that allows transport of target fish from the lower Clark Fork River, Idaho upstream into the state of Montana. Bull Trout captured as bycatch during Lake Pend Oreille, Idaho Lake Trout suppression efforts are used annually to fulfill this requirement for Bull Trout transport. Westslope Cutthroat Trout, Rainbow Trout, Westslope Cutthroat Trout and Rainbow Trout hybrids, and up to 30 kokanee are collected annually in the lower Clark Fork River to fulfill the requirement for Westslope Cutthroat Trout transport.

Goal
Reconnect migratory native salmonid populations in the lower Clark Fork River in an effort to increase the viability of these populations (Bull Trout and Westslope Cutthroat Trout) in the lower Clark Fork River, its tributaries, and Lake Pend Oreille.

Objectives
1. Increase the number of adult Bull Trout available to spawn in Montana tributaries by providing fish passage around Cabinet Gorge and Noxon Rapids dams for adult Bull Trout deemed appropriate for upstream transport.

2. Increase the number of migratory Westslope Cutthroat Trout available to spawn in Montana tributaries by providing fish passage around Cabinet Gorge Dam.

3. Quantify Rainbow Trout introgression levels in the group of Westslope Cutthroat Trout transported and released upstream of Cabinet Gorge Dam.

4. Continue to utilize and maintain the Cabinet Gorge Fish Handling Facility.

5. Conduct pathogen testing required for upstream transport of Bull Trout and Westslope Cutthroat Trout in 2022.

6. Maintain a PIT tag database that includes information on all PIT tagged fish in the Avista Project area to allow transfer of information among various Avista programs.

7. Continue to develop a lower Clark Fork River fish capture database.

Tasks
1. Coordinate genetic analysis of fin tissue samples for “rapid response” and other projects with the Abernathy Fish Technology Center (AFTC). Fin tissue samples will be collected

from all Bull Trout captured downstream of Cabinet Gorge Dam and will be sent to AFTC for processing. In addition, approximately 250 juvenile Bull Trout fin tissue samples will be collected and sent to AFTC for annual baseline updates. Fin tissue samples collected from Westslope Cutthroat Trout transported upstream of Cabinet Gorge Dam will also be analyzed. A contract with AFTC for the proposed genetics work along with additional analyzes proposed under this or other Appendices will be developed. (Objectives 1 and 3)

2. Provide upstream passage for appropriate adult Bull Trout captured downstream of Cabinet Gorge Dam. During the late-March to mid-October time frame, dependent on environmental conditions, existing protocols (i.e., electrofishing, hook-and-line sampling, Cabinet Gorge Hatchery ladder trap) implemented at previous levels of intensity (e.g., 2011–2020) will be used to capture adult Bull Trout (≥ 350 mm in length) in the Clark Fork River downstream of Cabinet Gorge Dam. Adult Bull Trout will be held at the Cabinet Gorge Fish Handling Facility located at the Cabinet Gorge Hatchery. Fish that genetically assign to Montana populations, or were previously captured as juveniles in Montana tributaries, or as deemed appropriate, will be transported upstream. Bull Trout transported to Region 2 (Cabinet Gorge Reservoir or tributaries) will be released in Bull River Bay until temperatures exceed 16°C or intermittency issues are a concern. At that time fish will be released into the Bull River, East Fork Bull River or Rock Creek depending on the tributary they genetically assign to and the time of year. Bull Trout transported to Region 3 (Noxon Reservoir tributaries) will be released directly into the tributary they genetically assign to. Transport and release of Bull Trout to Region 4 (upstream of Thompson Falls Dam) will be coordinated with Montana Fish Wildlife and Parks (MFWP). (Objective 1)

3. Bull Trout genetically assigning to Lightning Creek and its tributaries (Region 1) that are captured downstream of Cabinet Gorge Dam during time periods when the mouth of Lightning Creek is dry will be transported and released into the East Fork Bull River. (Objective 1)

4. Westslope Cutthroat Trout (≥ 350 mm in length) captured night electrofishing and hook-and-line sampling downstream of Cabinet Gorge Dam will be transported upstream and released near the Big Eddy boat ramp in Cabinet Gorge Reservoir from late March through June 15, dependent on environmental conditions. These fish will be implanted with a 23 mm Full Duplex (FDX) PIT tag, unless they already have a 12 mm FDX PIT tag. Then they will be implanted with a 23 mm Half Duplex (HDX) PIT tag. All other Westslope Cutthroat Trout captured downstream of Cabinet Gorge Dam will be implanted with a 12 mm FDX PIT tag and will be released near their capture location. A photo will be taken, and a fin tissue sample will be collected from all transported Westslope Cutthroat Trout. Any Westslope Cutthroat Trout that are recaptured downstream of Cabinet Gorge Dam through the June 15 time frame will be transported upstream a maximum of two times in 2021. (Objectives 2 and 3)

5. Continue to utilize and test the Cabinet Gorge Fish Handling Facility by using the facility to hold Bull Trout and Westslope Cutthroat Trout prior to transport. (Objective 4)

6. The required number of fish, of the appropriate species, identified by the Pathogen Technical Subcommittee, will be tested for pathogens in 2021. The results will be used to apply for a MFWP import permit in 2022. (Objective 5)

7. Maintain a PIT tag database and process data requests for all PIT tagged fish in the Avista project area. (Objective 6)

8. Work with outside contractor and internal personnel to continue to develop a database that houses information on all fish capture events in the lower Clark Fork River downstream of Cabinet Gorge Dam (night electrofishing, Cabinet Gorge Hatchery ladder trap, hook-and-line sampling, Twin Creek weir, waterfall trap, mobile trap and other experimental traps). (Objective 7)

Work Products

- Annual Work Summary; due December 1, 2021
- Comprehensive Project Report; Upstream Fish Passage Program (2001 – 2019 data); final due August 2, 2021
- Comprehensive Project Report; Clark Fork River Westslope Cutthroat Trout Experimental Transport Program (2015 – 2018); final due July 1, 2021
- Annual Project Update; Upstream Fish Passage Program (2020 data); final due December 1, 2021
- Annual Project Update; Upstream Fish Passage Program (2021 data); final due December 1, 2022
- Annual Project Update; Abernathy Fish Technology Center Genetics Report (2020 data); final due November 1, 2021
- Annual Project Update; Abernathy Fish Technology Center Genetics Report (2021 data); final due November 1, 2022
- Annual Project Update; Idaho Fish Health Center Pathogen Report (2020 data); final due June 1, 2021
- Annual Project Update; Idaho Fish Health Center Pathogen Report (2021 data); final due June 1, 2022
- Draft lower Clark Fork River fish capture database prepared by April 1, 2022

Permitting Requirements

A MFWP import permit is required to transport Bull Trout and Westslope Cutthroat Trout into Montana. A collection permit and fish transport permit are required from Idaho Department of Fish and Game (IDFG) to target and collect Bull Trout and Westslope Cutthroat Trout downstream of Cabinet Gorge Dam.

Endangered Species Act consultation for this project plan is associated with the 2019 Biological Opinion on the effects of continued operation of the Clark Fork Hydroelectric Project on Bull Trout and designated Bull Trout critical habitat. Incidental take reporting for this project plan will be included in the annual Biological Opinion report as required by Term and Conditions 15–18 of the 2019 Incidental Take Statement.

Cultural/Historic Resource Review
Not applicable for the tasks proposed in this project plan, there are no ground and/or vegetation disturbing activities, or proposed impacts to cultural/historic resources.

Benefit to the Resource
This program aligns with Avista's responsibility in complying with the Clark Fork Settlement Agreement (CFSA) and Native Salmonid Restoration Plan (NSRP) (Kleinschmidt and Pratt 1998). The NSRP identified a need to "establish and maintain connectivity in the Clark Fork Basin for migratory trout" with Bull Trout and Westslope Cutthroat Trout listed as the primary target species (Avista 1999, Kleinschmidt and Pratt 1998). The NSRP also called for conducting experimental upstream passage of adult fish to test the feasibility of larger-scale programs and permanent fish passage facilities. Montana Fish, Wildlife and Parks and IDFG are supportive of Bull Trout and Westslope Cutthroat Trout passage as detailed in their current state-wide management plans (MFWP 2019, IDFG 2019). Additionally, the U. S. Fish and Wildlife Service describes fragmentation of the lower Clark Fork River by mainstem dams as one of the primary threats to Bull Trout under their Columbia Headwaters recovery unit implementation plan (U. S. Fish and Wildlife Service 2015). Bull Trout are listed as "threatened" under the Endangered Species Act and Westslope Cutthroat Trout are a "species of special concern" (MFWP and IDFG designation). Implementation of Bull Trout and Westslope Cutthroat Trout upstream passage programs re-establishes connectivity for migratory populations in the lower Clark Fork River which allows access to quality spawning and rearing habitat in Montana tributaries.

Budget

Item	Estimated Carryover	2021 Budget Request
Fish capture, transport, data analysis, and report writing: Labor (0.7 Biologist FTE and 1.4 Technician FTE)	$53,000	$202,000
Genetic Analysis: contract with AFTC (Bull Trout and Westslope Cutthroat Trout transports and baseline analysis)	$0	$53,000
Database development: contract and labor	$30,000	$0
Pathogen sampling: USFWS contract ($6,500) and Avista time (0.01 technician FTE)	$0	$14,500
Electrical, phone and internet: Cabinet Gorge Fish Handling Facility, Cabinet Gorge Hatchery ladder trap, and PIT monitoring stations	$0	$15,000
Vehicle and boat: maintenance, repair, set up boat with new rectifier, and fuel	$0	$10,000
Equipment: PIT tags, syringes, Aqui-S 20E, waders, rain gear, InReach, etc.	$2,000	$3,000
Meetings and Training	$2,000	$2,500
Total	$87,000	$300,000
Anticipated Expenditures		$387,000

Literature Cited

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2021 PROJECT PLAN

Graves Creek and East Fork Bull River Genetic Study

Project Contact
Shana Bernall, Avista, (406) 847-1293, Shana.Bernall@avistacorp.com

Project History
This is a continuing project first proposed in 2020. The field sampling and data analysis was completed in 2020 and the report is anticipated to be finalized in 2021. No additional funding is needed.

Background
Bull Trout have been captured and transported upstream of mainstem dams on the lower Clark Fork River since 2001. Beginning in 2004, an innovative genetics tool was developed that could be used to assign a Bull Trout back to the tributary it originated from. This tool has been used annually since that time to help guide decisions on where to transport and release Bull Trout captured downstream of Cabinet Gorge Dam.

In the early years of upstream transport, Bull Trout were implanted with radio transmitters to help evaluate the success of the program. A large portion of transported Bull Trout were observed entering tributaries during the known Bull Trout spawning period. To further evaluate the success of transporting adult Bull Trout upstream of the lower Clark Fork River dams, a genetic parentage study was implemented from 2008 through 2010 in the East Fork Bull River and Graves Creek. Genetic samples were collected from juvenile and adult Bull Trout in both tributaries and adults in neighboring tributaries and downstream of Cabinet Gorge Dam. A genetic parentage study was conducted to determine the parents of the juveniles collected in both tributaries. The results showed successful reproduction of transported Bull Trout in both tributaries. Approximately 18 percent of the juvenile Bull Trout collected in the East Fork Bull River had at least one parent that had been transported upstream, and roughly 47 percent of the juveniles collected in Graves Creek had a least one transported adult as a parent (DeHaan and Bernall 2013). Conversely, approximately 99 percent of the juvenile Bull Trout collected in both drainages had a least one parent that had not been transported upstream of Cabinet Gorge Dam.

It has been over 10 years since the previous genetic parentage study was conducted, and a lot has changed since that time. A record number of adult Bull Trout have been transported to Graves Creek in recent years, resulting in record redd counts, and increases in juvenile Bull Trout abundance in that tributary. Biologists believe the increase in the Bull Trout abundance in Graves Creek can be attributed to increases in juvenile Bull Trout being captured and transported to Lake Pend Oreille and subsequently recaptured as adults and transported back to Graves Creek. Anecdotally, we believe numbers of reservoir-type fish have decreased through the last 10 years. This study will quantify contributions from transported Bull Trout as compared to reservoir-type fish.

Efforts are also underway to try to augment the East Fork Bull River Bull Trout population. These efforts include transporting Bull Trout captured downstream of Cabinet Gorge Dam that

genetically assign to tributaries to the Lightning Creek Drainage to the East Fork Bull River (Bernall and Duffy 2019). This method was utilized in 2018 and 2019, and it is important to evaluate the effectiveness of this effort. This genetic parentage analysis will be used to evaluate the reproductive contribution of these Lightning Creek fish as compared to transported fish and reservoir-type fish. The results obtained from this project will provide valuable information that can be used to inform future decisions related to both upstream and downstream Bull Trout transport efforts.

This study will also provide a multitude of information of interest to managers that is not directly related to parentage. For example, through recent analyses we have discovered that returns of adult Bull Trout that were transported from Graves Creek and the East Fork Bull River to Lake Pend Oreille as juveniles are comprised of approximately 50 percent males and 50 percent females. In contrast, returns of adult Bull Trout that presumably migrated to Lake Pend Oreille as juveniles are comprised of a very high proportion of female fish. This study will determine the sex of all of juveniles sampled. Paired with detections on PIT-monitoring stations and captures within tributary traps, we will be able to evaluate sex-specific differences in age, fish length, and time of year of juvenile emigration. These differences may explain the disparity in sex ratios described above, and will inform future decisions regarding juvenile transport. Additionally, one component of the Bull Trout Emigration Study is to develop a length-age key for juvenile Bull Trout in Graves Creek and East Fork Bull River. Results from this study will identify the parents of most of the juveniles sampled. Based on knowledge of which fish were in each system during each year, we will be able to validate the age-length key because some proportion of fish will have parent combinations that were only present during one year.

Goal
Inform the adaptive management of the Bull Trout transport programs through evaluation of the parentage and sex of juvenile Bull Trout in Graves Creek and the East Fork Bull River in the interest of enhancing these local populations.

Objectives

1. Use genetic parentage analysis to estimate relative contributions of transported Bull Trout and reservoir-type/stray Bull Trout in Graves Creek.

2. Use genetic parentage analysis to estimate relative contributions of transported Lightning Creek drainage-origin Bull Trout, transported East Fork Bull River-origin Bull Trout, and reservoir-type/stray Bull Trout in the East Fork Bull River.

3. Evaluate factors that may be associated with relative spawning success (e.g., time of year of upstream transport, sex, fish length).

4. Identify the sex of all juvenile Bull Trout sampled in Graves Creek and the East Fork Bull River.

5. Use parentage assignments and PIT-monitoring station information, to assign ages to each juvenile Bull Trout for which there is only one year where a parent or combination of parents was present within each stream.

Methods
Bull Trout utilized for this study will be captured using a number of methods. Adult Bull Trout captured downstream of Cabinet Gorge Dam and within tributary traps will be used to produce the known-parent pool. Fin tissue samples from these fish will be sent to the Abernathy Fish Technology Center Conservation Genetics Laboratory (Lab) for analysis. In addition, the Lab will utilize fin tissue samples sent in for genetic testing in previous years, including Bull Trout transported upstream, and adult Bull Trout collected in the East Fork Bull River, Graves Creek, and other nearby tributaries that may have spawned in either of those drainages.

Fin tissue samples from juvenile Bull Trout captured in Graves Creek and East Fork Bull River in 2020 will be collected during stream electrofishing efforts during the implementation of the "Bull Trout Emigration Study". A small fin tissue sample will be collected from every juvenile Bull Trout greater than 99 mm in total length. The sample will be stored in 100 percent non-denaturing ethanol until it can be shipped to the Lab. The age of juvenile Bull Trout will be estimated from length frequency distributions. Samples will be analyzed by tributary and by estimated age classes.

Once the Lab receives all the fin tissue samples collected in 2020 it will work with Avista staff to determine other potential parents that should be used in the analysis. The Lab will then conduct the genetic parentage analysis by extracting DNA from all received fin clips using Qiagen DNeasy 96 (Qiagen Inc.) extraction kits following manufacturer's instructions. Extracted DNA from each fish will be amplified and genotyped at 18 microsatellite loci and two genes, SRY and 18S rRNA, to identify the genotypic sex of the sample. Any individuals that fail at four or more loci will be excluded from genetic analysis. Two parent genetic parentage assignments will be determined using the program CERVUS (Marshall et al. 1998; Kalinowski et al. 2007). The analysis methods will follow those used in a previous parentage study from this watershed (DeHaan and Bernall 2013).

Work Products
- Annual Work Summary; due December 1, 2021
- Project Completion Report; final due October 1, 2021

Permitting Requirements
All Bull Trout collection efforts occurred under the Appendix C Upstream Fish Passage Program and Bull Trout Emigration Study; therefore, required permits are described elsewhere.

Endangered Species Act consultation for this project plan is associated with the 2019 Biological Opinion on the effects of continued operation of the Clark Fork Hydroelectric Project on Bull Trout and designated Bull Trout critical habitat. Incidental take reporting for this project plan will be included in the annual Biological Opinion report as required by Term and Conditions 15–18 of the 2019 Incidental Take Statement.

Cultural/Historic Resource Review
Not applicable for the tasks proposed in this project plan, there are no ground and/or vegetation disturbing activities, or proposed impacts to cultural/historic resources.

Benefit to the Resource

This project is primarily being implemented to evaluate the effectiveness of the upstream and downstream transport programs which are major programs implemented under Avista's CFSA Native Salmonid Restoration Plan (Kleinschmidt and Pratt 1998). The goal of the Upstream Fish Passage Program is to establish and maintain connectivity in the Clark Fork River basin for migratory trout and is primarily focused on Bull Trout. Bull Trout are a "threatened" species under the Endangered Species Act, and fragmentation of populations is one of the primary threats that is identified in the Columbia Headwaters recovery unit implementation plan (U.S. Fish and Wildlife Service 2015). Fish passage in the project area is also supported by both the Montana Fish, Wildlife, and Parks (MFWP) and Idaho Department of Fish and Game (IDFG) state-wide management plans (MFWP 2019, IDFG 2019). It is important to evaluate the effectiveness of the Upstream Fish Passage Program to determine if these efforts are helping to alleviate this recognized threat.

Budget

Item	Estimated Carryover	2021 Budget Request
	$0	$0
Total	$0	$0
Anticipated Expenditures		$0

Avista biologist time associated with data analysis and report review for this project will be charged to either the Appendix C Upstream Fish Passage Program or Tributary Trapping and Downstream Juvenile Bull Trout Transport Program.

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2021 PROJECT PLAN

Tributary Trapping and Downstream Juvenile Bull Trout Transport Program

Project Contact
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Project History
The Tributary Trapping and Downstream Juvenile Bull Trout Transport Program (hereafter, "Downstream Program") is a continuing project that was originally approved by the Management Committee (MC) in 2000. The scope and budget for this project are reviewed by the MC annually.

Background
The original goal of the Downstream Program was to test the feasibility of tributary trapping and downstream transport of emigrating juvenile Bull Trout, and subsequently, to assess if such actions resulted in higher returns of adult Bull Trout following maturation in Lake Pend Oreille. Since that time, through annual evaluation of the program and an experimental study, it has been generally agreed upon that the transport and release of juvenile Bull Trout downstream of Cabinet Gorge Dam results in greater adult returns to natal streams (due, in part, to the Upstream Fish Passage Program) when compared to the volitional emigration of juvenile fish out of natal streams. Therefore, in 2012, the MC approved the transport of all trapped, downstream-moving juvenile Bull Trout to the Clark Fork River downstream of Cabinet Gorge Dam.

In 2000, juvenile transport operations were conducted in the Bull River and Rock Creek drainages. The program was expanded to the Vermilion River, Swamp, Pilgrim, and Graves creeks in 2002 and 2003, and to the Prospect Creek drainage in 2005. At present, data suggests the East Fork Bull River, Graves Creek, and Vermilion River are the only Montana tributaries within the Avista project area containing meaningful numbers of Bull Trout that naturally exhibit an adfluvial life history (Oldenburg 2017; Lacy et al. 2016; Oldenburg et al. 2015; Zymonas 2006; hereafter, these three tributaries are collectively referred to as the "Montana adfluvial streams"). Transport operations are currently limited to the Montana adfluvial streams.

Traditionally, tributary trapping has been conducted with temporary weir and screw traps. Following a feasibility investigation, Avista constructed a reinforced, concrete-bedded weir trap (hereafter, "permanent weir") in Graves Creek in 2012. Operation of the permanent weir began in 2013 and was anticipated to facilitate higher capture efficiencies for emigrating juvenile Bull Trout, particularly during periods of high discharge that proved difficult to trap using temporary weir and screw traps. A Graves Creek Monitoring and Evaluation (M&E) Plan was completed in 2013 and updated in 2016 (Oldenburg et al. 2016). The M&E Plan was designed to evaluate the operation and fish capture effectiveness of the permanent weir. Associated monitoring suggested that the permanent weir improved the capture probability for juvenile Bull Trout, but that additional modifications could further enhance the capture probabilities of both juvenile and adult Bull Trout. Thus, the permanent weir has been iteratively evaluated and improved since that time. Among these improvements, a prototype drop-height element was incorporated into the downstream-capture component of the trap during 2016. Monitoring during 2016 and 2017

suggested the prototype was extremely effective for capturing both juvenile and adult downstream-moving Bull Trout. During 2017, the Aquatic Implementation Team (AIT) reviewed the performance of the weir and agreed that the prototype was achieving the desired results. Avista began working with engineers to develop plans to replace the prototype with a more robust engineered version of this concept. Design for the permanent weir trap enhancements was finalized during 2019. During 2020, a contractor was selected and has started fabricating the trap parts. Installation will occur during July and August of 2021. In addition, the Graves Creek Fish Handling Facility is currently under construction and will be operational in early 2021.

East Fork Bull River trapping was conducted using two weir traps and two screw traps during 2020. A drop-height element similar to the permanent weir prototype was integrated into the weir trap at the primary East Fork Bull River trap site (upper south channel) from 2017 through 2020. Results from this experimental trap were inconclusive in 2017 because very few fish were captured in any East Fork Bull River traps suggesting relatively few juvenile fish emigrated during 2017. In 2018, 2019, and 2020 more juvenile Bull Trout were captured in the experimental trap than in any of the previous eight years, despite relatively low abundances of Bull Trout documented upstream of the traps. A more robust entrance for the south channel trap was constructed in 2020 which further increased efficiency. The experimental trap will be fished again during 2021. Additional improvements are being proposed for East Fork Bull River traps in 2021. First, we will have pipe supports fabricated for the south channel trap and the pipe will be modified so that some water can be bled out before reaching the trap box under high flow conditions. These supports will allow us to optimize the slope of the pipe and more effectively move the pipe as needed to accommodate changing flows. Second, new, all-aluminum trap boxes will be fabricated to better prevent mink from entering the trap boxes. Mink predation from trap boxes became a concern during 2020 when we documented mink predation of an estimated 315 juvenile Bull Trout from the Graves Creek trap box.

As in the past few years, the Vermilion River will be electrofished during late October or early November for the purpose of capturing juvenile transports. A new electrofishing unit was purchased for this purpose and first utilized during 2020. The primary goal behind the new unit was to reduce the number of fish injured and killed by stream electrofishing. Despite a new record high number of Bull Trout captured in 2020, no fish were injured or killed. In addition, anecdotally, the new unit appears to have just as great or greater capture probability when compared to the old unit.

The methods used to capture juvenile Bull Trout also capture other juvenile and adult fishes. These data provide important life history information, such as the timing and magnitude of upstream and downstream movements, trends in fish size, condition, and abundance among years, and the verification of movement for fish transported under other programs. The Downstream Program has also assisted in the implementation of the Non-Native Fish Suppression Project in the East Fork Bull River from 2007 through the present time.

Goal
Protect and enhance migratory Bull Trout local populations in the East Fork Bull River, Vermilion River, and Graves Creek by transporting appropriate individuals captured within these

streams downstream to rear and grow in Lake Pend Oreille.

Objectives

1. Capture and transport juvenile Bull Trout and post-spawn adult Bull Trout that were transported under the Upstream Fish Passage Program to the Clark Fork River downstream of Cabinet Gorge Dam.

2. Evaluate and implement the Graves Creek M&E Plan to evaluate and improve permanent weir trap capture and passage probabilities.

3. Provide support to related projects including the Bull Trout Emigration Study; East Fork Bull River Morphology, Connectivity, and Habitat Enhancement Project; Graves Creek Permanent Weir Trap Enhancements; Non-Native Fish Suppression Project in the East Fork Bull River; and, Upstream Fish Passage Program.

Tasks

1. All sites: Procure equipment and acquire necessary permits to install and operate fish traps in Graves Creek and East Fork Bull River, and to electrofish in the Vermilion River. (Objectives 1 and 2)

2. All sites: If deemed necessary, consult statistician for help with varying data analyses. (Objectives 1 and 2)

3. General protocols: Unless otherwise specified, the following general protocols will be followed. All Bull Trout greater than 99 mm in length that are captured through Downstream Program efforts will be implanted with a *full-duplex* PIT tag (unless a previous PIT tag is detected). Those fish less than 350 mm will receive a 12-mm tag. Those fish greater than 349 mm will receive a 23-mm tag. If a greater than 349 mm Bull Trout is captured that only has a 12-mm PIT tag, a 23-mm PIT tag of the opposite technology (i.e., half duplex versus full duplex) will be implanted. Juvenile transports will be held in tanks at the Cabinet Gorge Fish Handling Facility and acclimated to lower Clark Fork River water for about 24 hours prior to release during those times in which the facility is operational. All fish will be scanned prior to release to ensure PIT tags were retained. Adult Bull Trout captured in traps will be released in the appropriate direction depending on their origin (reservoir type or upstream transport), direction of travel, and time of year (pre-spawn or post-spawn). The release location downstream of Cabinet Gorge Dam will be adjacent to the Fish Handling Facility for all transports during all times of the year. All non-Bull Trout fish that are implanted with a PIT tag will also receive an adipose fin clip. (Objectives 1 and 2)

4. Graves Creek: Conduct permanent weir trapping and transport operations in Graves Creek from late March through July 2 and August 30 through November 24 (dates may be slightly modified by the AIT or due to environmental conditions; the AIT may choose to trap the period from November 30 until December 18; traps will be disabled during the Labor Day and Thanksgiving holidays). Also note that if the trap enhancements are not complete on August 30, fall trapping will commence as soon as possible thereafter.

Transport eligible (i.e., 120–250 mm and captured moving downstream) Bull Trout to the Clark Fork River downstream of Cabinet Gorge Dam. With regard to adult upstream transports that are captured in the permanent weir trap following the spawn, the AIT will evaluate data to determine whether these fish should be released on site or transported back to Lake Pend Oreille (the default will be to release half on site and transport half to Lake Pend Oreille). Among fish captured in the permanent weir trap that do not have a PIT tag at the time of capture, all Bull Trout greater than 99 mm and Mountain Whitefish and Westslope Cutthroat Trout greater than 299 mm will be implanted with a full-duplex PIT tag. Avista staff will work with the agencies with regard to offering volitional upstream passage from the initiation of the trapping season through October 6. Likely, a block design will be implemented in the fall in which the trap will be operated with no volitional passage versus volitional upstream passage on alternating weeks. (Objectives 1 and 2)

5. Graves Creek: The AIT will evaluate the Graves Creek M&E Plan during 2021 and modify it (if warranted). Implement the Graves Creek M&E Plan. Collect data to evaluate fish behavior upstream and downstream of the trap and iteratively apply operational or physical design modifications to overcome any documented problems. Operate baited minnow traps within Graves Creek between the permanent weir trap and Graves Creek Falls as the weather allows and as deemed prudent by the management agencies. (Objective 2)

6. Graves Creek: Work with U.S. Forest Service and Biomark to determine feasibility of integrating real-time discharge capabilities into Graves Creek. If feasible, purchase and install equipment. (Objectives 1 and 2)

7. Graves Creek: Provide support for the Graves Creek Permanent Weir Trap Enhancement project. (Objective 3)

8. Graves Creek: Provide support for the Bull Trout Emigration Study. (Objective 3)

9. East Fork Bull River: Conduct trapping operations in the East Fork Bull River from late March through July 2 and August 30 through November 24 (dates may be slightly modified by the AIT or due to environmental conditions; the AIT may choose to trap the period from November 30 until December 18; traps will be disabled during the Labor Day and Thanksgiving holidays). During periods of high discharge, two screw traps will be operated in the south channel. When discharge declines to appropriate levels, the screw traps will be removed and temporary weir traps will be installed and operated within both channels. The experimental weir trap with the drop-height feature will be enhanced and further tested at the upper south channel site. The AIT may elect to slightly move the upper north channel trapping site pursuant to appropriate permits. Rather than run exclusion weir traps at the lower sites in the fall, the weir traps at the upper sites may include additional fortification and more frequent cleaning. All non-native fishes captured in East Fork Bull River traps will be transported to the lower Bull River property. Among fish captured in tributary traps that do not have a PIT tag at the time of capture, all Bull Trout greater than 99 mm and Mountain Whitefish and Westslope

Cutthroat Trout greater than 299 mm will be implanted with a full-duplex PIT tag. All captured post-spawn adult Bull Trout that were formerly upstream transports will be transported back to Lake Pend Oreille. (Objectives 1and 3)

10. East Fork Bull River: Have new trap boxes fabricated in the interest of preventing mink predation. In addition, have pipe supports fabricated to optimize the slope of the pipe and more easily accommodate varying flows.

11. East Fork Bull River: Provide support for the Bull Trout Emigration Study. (Objective 3)

12. East Fork Bull River: Provide support for the East Fork Bull River Morphology, Connectivity, and Habitat Enhancement Project. (Objective 3)

13. Vermilion River: Conduct crawdad stream electrofishing to capture and transport eligible (i.e., 120–250 mm) Bull Trout from the Vermilion River downstream of China Gorge to the confluence with Noxon Reservoir. Electrofishing will be conducted during mid to late October or November following the Bull Trout spawn. Electrofishing will not occur: (1) within 30 yards of Bull Trout redds; (2) if adult Bull Trout are observed in the area; or (3) around complex structures where visibility may be poor (e.g., large logjams or deep undercut banks). Electrofishing will be conducted for 10 days and all eligible Bull Trout will be transported to Idaho. The AIT may or may not elect to implement additional capture effort in the interest of increasing the number of juvenile Bull Trout transported to Lake Pend Oreille. (Objective 1)

14. Monitor water temperature at the PIT-monitoring station sites in Graves Creek (47.685435, 115.405419), Vermilion River (47.827698; 115.533157), East Fork Bull River (2 sites; north channel, 48.111100, 115.781913; south channel, 48.110880, 115.779342), lower Bull River (48.056506, 115.824622) and in the Bull River between the upstream-most beaver activity and forks and between the downstream-most beaver activity and springs.

Work Products

- Comprehensive Project Report; Downstream Program (2018-2020 data; final due July 1, 2021 and includes Graves Creek permanent weir trap monitoring and evaluation plan report)
- Annual Project Update; Downstream Program (2021 data; final due by October 1, 2022 and includes Graves Creek permanent weir trap monitoring and evaluation plan report)
- Temperature monitoring data for the six long-term sites as well as sites monitored through the Bull Trout Emigration Study; due December 1, 2021
- Annual Work Summary; Downstream Program; due December 1, 2021

Permitting Requirements

Several permits are required to implement the Downstream Program. A scientific collection permit is required from MFWP and an import permit is required by Idaho Department of Fish and Game. These applications are submitted annually during January or February. In addition, USFS Special Use Authorizations and Montana Department of Environmental Quality (Green

Mountain Conservation District) 310 permits are maintained for tributary traps and PIT tag array(s).

Endangered Species Act consultation for this project plan is associated with the 2019 Biological Opinion on the effects of continued operation of the Clark Fork Hydroelectric Project on Bull Trout and designated Bull Trout critical habitat. Incidental take reporting for this project plan will be included in the annual Biological Opinion report as required by Term and Conditions 15–18 of the 2019 Incidental Take Statement.

Cultural/Historic Resource Review
It is possible that ground disturbance will be required to install a new piezometer to develop real-time flow capabilities for Graves Creek. If so, Avista will coordinate Cultural Resources Management Group review prior to implementing the project. The work product for this review will be confidential due to the sensitive nature of the content.

Benefit to the Resource
Appendix C of the Clark Fork Settlement Agreement calls for implementation of the Native Salmonid Restoration Plan and associated Five-Year Plan. The Five-Year Plan specifically calls for implementation of the Downstream Program. The capture and downstream transport of juvenile Bull Trout appears to have directly increased the number of adult Bull Trout that return downstream of Cabinet Gorge Dam by reconnecting their historic migratory corridor and increasing survival during migrations through the lower Clark Fork River and into Lake Pend Oreille. In addition to completing the migratory life cycle, downstream transported juvenile Bull Trout that reach Lake Pend Oreille are known to grow at an increased rate, attain larger sizes, and contain more eggs than fish that complete their life cycle within the reservoirs. Continued evaluation and modification of tributary-specific capture techniques has increased the efficacy of these techniques and presumably increased the overall survival among Bull Trout within these systems. The Graves Creek permanent weir trap has increased the period of weir operation and increased the annual number of juvenile Bull Trout captured. Monitoring fish population trends and timing of fish movements throughout the system with tributary traps and PIT arrays allows managers to gain additional information to adaptively manage these populations.

These efforts are consistent with direction from the U.S. Fish and Wildlife Service through the Bull Trout Recovery Plan, Biological Opinion for the Clark Fork Projects FERC license, and informal consultation through the CFSA process. These actions also align with MFWP management plan and dual mission by reducing conflict between managing for the recovery of native species while also managing for popular sport fisheries in Noxon and Cabinet Gorge reservoirs. Increasing the number of sub-adult Bull Trout in Lake Pend Oreille directly supports the Idaho Fish and Game goal of maintaining and enhancing this metapopulation.

Budget

Item	Estimated Carryover	2021 Budget Request
Labor: 0.80 biologist and 2.50 technician FTEs	$70,000	$295,040
0.50 FTE database technician support	$6,708	$38,012
Four professional conferences	$1,000	$3,000
Four professional trainings	$0	$3,000
Crew safety: InReach subscription	$0	$480
Permitting labor and fees	$0	$5,000
Mileage and vehicle maintenance	$1,000	$40,000
Aqui-S (fish anesthesia)	$0	$200
PIT tags (10 pre-load trays)	$0	$2,910
Tributary trap maintenance (e.g., replacement parts)	$0	$5,000
EFBR trap box and pipe support fabrication	$0	$30,000
Acclimation tanks (2; 4’ circular fiberglass)	$10,000	$0
Field gear (e.g., nets, traps, waders, scales, efishing handles)	$0	$5,000
Graves Creek HOA fees	$0	$650
Statistical consultation	$20,000	$0
Real-time flow equipment for Graves Creek	$5,000	$0
Total	$113,708	$428,292
Anticipated Expenditures		$542,000

Staff time budgeted through this project plan will also assist with the four related projects outlined in Objective 3.

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2021 PROJECT PLAN

PIT-Monitoring Station Operation and Maintenance

Project Contact
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Project History
This is a continuing project that was first approved by the Management Committee (MC) in 2019. The scope and budget for this project are reviewed by the MC annually.

Background
Passive Integrated Transponder (PIT) monitoring stations have been installed and operated at a number of locations under various Clark Fork Settlement Agreement (CFSA) programs. These stations are installed for various reasons; although, the primary reason is to passively monitor movements of fish in tributaries. These movements help delineate migration timing for fish and can also be used to evaluate trap capture efficiency by monitoring movements of fish near tributary traps. The operation and maintenance of PIT-monitoring stations includes costs associated with power, fiber, communications, permitting, and operation and maintenance costs. This project plan was developed to compile all costs associated with operation and maintenance of monitoring stations into one project plan. This will eliminate the need to break out charges on invoices to multiple projects and allow for the tracking of costs associated with the use of this technology.

Goal
Monitor movements of PIT-tagged fish in key tributaries to the lower Clark Fork River.

Objectives
1. Operate and maintain PIT-monitoring stations in tributaries to the lower Clark Fork River, in Montana.

Tasks
1. Pay all invoices associated with operation of PIT-monitoring stations in Graves Creek, East Fork Bull River, Bull River, and Vermilion River (i.e., electric use, internet fees, Biomark data service fees, Graves Creek cellular internet fees, and permit fees). The Prospect Creek station was cooperatively purchased with NorthWestern Energy who has paid all associated fees during the first two years. The Biomark data service fee is being proposed through this project plan for 2021. (Objective 1)

2. Repair damage to PIT-monitoring stations, if necessary. (Objective 1)

3. Purchase additional antennas or hardware as needed. (Objective 1)

Work Products
- Annual Work Summary; PIT Technology (2021); due December 1, 2021

Permitting Requirements
If maintenance or repair of a PIT array is required, Avista personnel will determine which, if any, permits are required for the proposed work.

Endangered Species Act consultation for this project plan is associated with the 2019 Biological Opinion on the effects of continued operation of the Clark Fork Hydroelectric Project on Bull Trout and designated Bull Trout critical habitat. Incidental take reporting for this project plan will be included in the annual Biological Opinion report as required by Term and Conditions 15–18 of the 2019 Incidental Take Statement.

Cultural/Historic Resource Review
If maintenance and/or repair of a PIT array will cause ground disturbance, Avista will coordinate Cultural Resources Management Group review prior to implementing the project. The work product for this review will be confidential due to the sensitive nature of the content.

Benefit to the Resource
Restoration of Bull Trout and Westslope Cutthroat Trout populations is an important component of Avista's Native Salmonid Restoration Plan (NSRP) which is an integral part of the CFSA. The NSRP addresses issues affecting native salmonid populations in the lower Clark Fork River, and actions needed to improve their habitat and likelihood of persistence. The NSRP also identifies a need to "establish and maintain connectivity in the Clark Fork Basin for migratory trout" in an effort to increase native salmonid numbers in tributaries to the Clark Fork River. The use of PIT arrays is a valuable tool that allows passive monitoring of movements of fish in the project area. Fish that are tagged and detected at arrays provide information that that can be used to evaluate and improve programs that are currently being implemented under the CFSA. This leads to more effective implementation and more efficient use of funds available for these programs.

Budget

Item	Estimated Carryover	2021 Budget Request
PIT-monitoring station maintenance	$5,000	$15,000
Biomark BioLogic plus cell (Graves; 12 mo. exp. 4/15/2022)	$0	$1,632
Biomark BioLogic (Bull; 12 mo. expires 4/15/2022)	$0	$1,440
Biomark BioLogic (EFBR; 12 mo. expires 4/15/2022)	$0	$1,440
Biomark BioLogic (Vermilion; 12 mo. expires 4/15/2022)	$0	$1,440
Biomark BioLogic plus cell (Prospect; 15 mo. exp. 4/15/2022)	$0	$2,040
Electric use (Northern Lights bills for all sites except Prospect)	$1,000	$3,400
Internet use (Blackfoot bills for Bull, EFBR, and Vermilion)	$1,000	$3,300
Montana DNRC land-use permit annual fee (Bull River)	$0	$150
Total	$7,000	$29,842
Anticipated Expenditures		$36,842

The Prospect Creek PIT-monitoring station was purchased through Appendix B and Northwestern Energy. Thus, operation and maintenance for this station is cost share and Northwestern Energy funded BioLogic and electric use in 2019 and 2020.

2021 PROJECT PLAN

Bull Trout Emigration Study

Project Contacts

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Project History

The Bull Trout Emigration Study is a continuing project. This is the fourth and final year of this study that was originally approved by the Management Committee (MC) in 2018. The entire budget of this study was approved by the MC in 2018. No changes to the scope or budget are being requested.

Background

The Tributary Trapping and Downstream Juvenile Bull Trout Transport Program (hereafter, "Downstream Program") was initiated in 2000 and has been implemented every year thereafter. The goal of the Downstream Program is to capture juvenile Bull Trout emigrating from Montana tributaries to the lower Clark Fork River and safely transport them around Noxon and/or Cabinet Gorge reservoirs and dams to Lake Pend Oreille. The impetus for the Downstream Program is the belief that production will increase if sub-adult adfluvial Bull Trout rear in Lake Pend Oreille rather than Noxon and Cabinet Gorge reservoirs. Specifically, there is evidence that the reservoirs may be predator traps, a certain proportion of juvenile outmigrants may not survive dam passage, and Bull Trout growth rates and fecundity are greater for fish that grow to adulthood in Lake Pend Oreille as opposed to the reservoirs. The streams and sites that have been trapped have changed over the course of the Downstream Program. At present, data suggests the East Fork Bull River, Graves Creek, and Vermilion River are the only Montana tributaries within the Avista project area containing meaningful numbers of Bull Trout that exhibit an adfluvial life history (Oldenburg 2017; Lacy et al. 2016; Oldenburg et al. 2015; Zymonas 2006; hereafter, these three tributaries are collectively referred to as the "Montana adfluvial streams").

Traps have been used to capture juvenile Bull Trout emigrating from the East Fork Bull River during every year since 2000 and Graves Creek and the Vermilion River have been trapped every year since 2002. While the Downstream Program has been adaptively managed, the program has largely been managed on a trial-and-error basis with increased numbers of fish captured being the primary driver. Little emphasis has been placed on using applied research to better understand and enhance the program and its effects. As a result, three basic and interrelated questions with important management implications remain unanswered: (1) what proportion of emigrants are being captured; (2) how many fish emigrate annually and by year class; and, (3) when do fish emigrate? These three questions and the management implications associated with them are discussed in the following paragraphs.

Robust estimates of trap capture efficiencies within the Montana adfluvial streams have not been produced. Developing an understanding of trap capture efficiencies is important for a couple of

reasons. First, it will answer the fundamental question as to whether each stream-specific trapping strategy is adequately efficient, or whether trapping efficacy in certain streams needs to be improved. Second, we need to develop an understanding of capture efficiencies (ideally, season- or discharge-specific capture probabilities) because estimates of this metric are required for estimating total emigrant numbers and emigration-timing distributions.

To date, neither annual numbers of emigrants nor annual numbers of emigrants by year class have been estimated. Developing these estimates is also important for a couple of reasons. First, the total number of emigrants from each year class will be used as the "recruit" metric in future efforts to quantify the stock-recruitment relationships within the Montana adfluvial streams, and ultimately to estimate carrying capacity and identify limiting life stages (i.e., is adult abundance/connectivity limiting or is spawning/rearing habitat limiting?). Second, once annual emigrant numbers and capture efficiencies are understood, managers will be able to estimate the number of emigrants that are not captured and enter the reservoirs. The reservoir-type life history expression (i.e., adfluvial Bull Trout that complete their entire life cycle within the tributary–reservoir systems) sustained the adfluvial component within the Montana adfluvial streams for more than 50 years between dam construction and initiation of the Upstream Transport Program. Currently, the relative contributions of reservoir-type fish versus Lake Pend Oreille-type fish are poorly understood and limited primarily to information from the 2008–2010 "parentage study" (DeHaan and Bernall 2013). Understanding how many juvenile Bull Trout emigrate into the reservoirs annually is one of the pieces of information managers will need to gain a better understanding of the relative success of this life history expression. Ultimately, this information may be used to inform decisions such as whether or not to impose annual downstream transport quotas or "caps" for the Montana adfluvial streams.

Currently, we have a limited and potentially biased understanding of when juvenile Bull Trout emigrate from the Montana adfluvial streams. This understanding is limited to inferences based on the literature (i.e., what has been documented in other systems), preliminary information from direct tributaries to Lake Pend Oreille, and the timing of fish captured in traps in the Montana adfluvial streams. The literature suggests that juvenile Bull Trout emigration timing can be variable, potentially system specific, and potentially influenced by numerous factors. Of particular interest, numerous adfluvial Bull Trout populations exhibit a large spring emigration associated with the freshet and peak flows. The closest and most well-documented evidence for this comes from Trestle Creek which is a direct tributary to Lake Pend Oreille. Downs et al. (2006) documented substantial spring emigration events in Trestle Creek that have never been observed in the Montana adfluvial streams; albeit, the spring events were predominated by age-0 emigrants which purportedly have survival rates approaching zero. Further information is currently being collected in both Trestle Creek and another direct tributary to Lake Pend Oreille, Granite Creek, using passive integrated transponder (PIT) tagged fish and PIT arrays. Preliminary evidence from these two streams suggests there are not meaningful spring emigration events and that nearly all juvenile fish emigrate during the fall and winter (Ken Bouwens, Idaho Department of Fish and Game, personal communication).

With regard to when fish are captured in Montana adfluvial stream tributary traps, there is a relatively normal distribution of captures centered in October with meaningful numbers of fish also captured during September and November and very few fish are captured during the spring

(Figure 1). Within these streams, weir traps are fished whenever discharge and debris loads allow and less efficient screw traps are fished at times during which the operation of weir traps is not possible. Thus, screw traps are generally fished during the spring freshet and weir traps are fished during all other times of the year. Therefore, it is possible that we do not capture meaningful numbers of spring emigrants due to discharge- and debris-specific capture probabilities and the inefficiency of screw traps. It is also possible that we do not capture meaningful numbers of fish in the spring simply because fish do not emigrate from the Montana adfluvial streams during this time. While growing evidence suggests the latter is the more plausible scenario, it is important to develop a clear understanding of the emigration-timing distributions within the Montana adfluvial streams so that managers can make informed decisions with regard to capture and transport protocols.

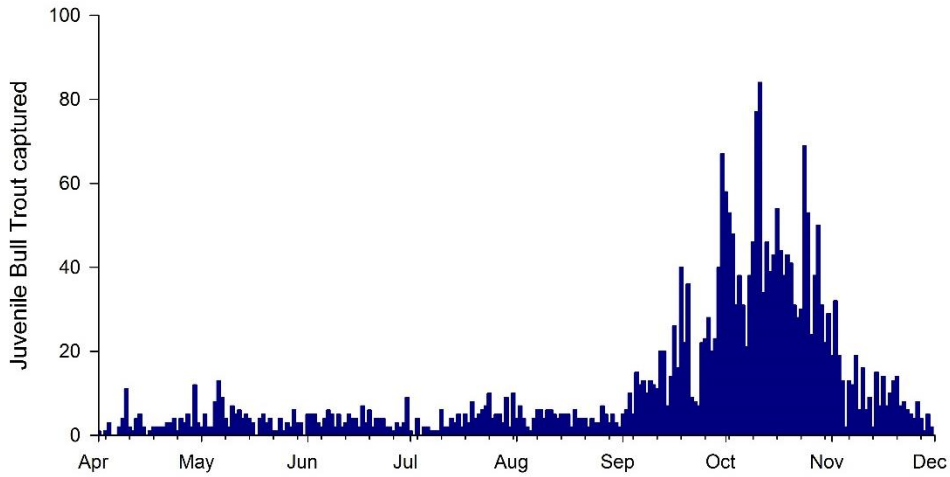

FIGURE 1. Total number of juvenile Bull Trout (i.e., <300 mm) captured moving downstream in East Fork Bull River and Graves Creek traps by day since the inception of the Downstream Program (all years pooled).

Understanding whether or not there is a spring emigration has numerous management implications. First, if it is learned that there is a meaningful spring emigration, efforts could be directed toward learning and increasing capture efficiency during this time of year. Conversely, if there is not a meaningful spring emigration from the Montana adfluvial streams, trap and transport operations could be discontinued during all times of the year except the fall. Under this scenario, the time and money saved would be available to do more prudent activities in the interest of increasing connectivity and otherwise enhancing the adfluvial Bull Trout populations. Developing this understanding will also give managers the information they need to develop design criteria for future traps (e.g., do traps need to be capable of effectively fishing through the spring freshet, or only through flashy fall rain events). This has implications in terms of both cost, and the footprint of future traps.

The primary reason the aforementioned three questions remain unanswered is that necessary tools have not been in place to facilitate studies designed to answer them. Recently, Biomark PIT-tag monitoring stations were installed at the permanent weir location in Graves Creek, in the East Fork Bull River, and in the lower Bull River. These pass-over systems reliably detect tagged fish as they swim by with high efficiency. Utilizing fish previously captured, PIT tagged, and

released upstream of PIT arrays and trap locations will facilitate this proposed research designed to address the previously described questions.

The objectives and general tasks and methods that will be used to address the objectives are described below. However, it is important to recognize that some methods may be altered and more detailed methods will be developed by the MTCFRU in consultation with the Aquatic Implementation Team (AIT).

Goal
The goal of this research is to enhance our understanding of juvenile Bull Trout in Graves Creek and the East Fork Bull River in the interest of informing the adaptive management of the Downstream Program and ultimately to protect and enhance these subpopulations.

Objectives
1. Estimate the capture efficiency of tributary traps in Graves Creek and the East Fork Bull River.

2. Estimate the total number of annual and year-class specific emigrating juvenile Bull Trout from Graves Creek and the East Fork Bull River during 2019 and 2020.

3. Describe the emigration-timing distributions of adfluvial Bull Trout in Graves Creek and the East Fork Bull River, and factors associated with those distributions.

Tasks
1. Graduate student selection: A graduate student was selected during 2018 and began coursework and developing a detailed research proposal in September of that year. (***Complete***)

2. Research proposal: The MTCFRU will develop a research proposal to address the objectives and tasks outlined in this Project Plan. While the tasks in this document outline the general approach to be employed by the study, the MTCFRU will develop a detailed proposal to address the objectives of this study in consultation with the AIT. The AIT will be provided a minimum of one month to review the proposal prior to project implementation. It is mandatory that the primary objectives described above are addressed using reasonable methods as determined by the AIT. For all other matters (including disagreement), the AIT recognizes the role of the student's major professor and graduate committee and will defer to the professional judgement of the major professor (i.e., Dr. Guy). Once the research proposal is final, any proposed changes to the methods described therein will be discussed with the AIT. The draft proposal is due to the AIT by March 1, 2019. (***Complete***)

3. Fish marking: The MTCFRU will work with the AIT to develop a strategy (likely stream electrofishing) to capture and implant juvenile Bull Trout with PIT tags annually (likely during July and/or August). The MTCFRU will work through the AIT to ensure agency concerns are addressed and to obtain collection permits. (***Complete***)

4. Tributary-specific length-based age estimates: The MTCFRU will review existing literature and existing data to determine if length at time of year and recapture of tagged fish can be utilized to develop reasonable estimates of age (year class). If necessary, the MTCFRU may explore the possibility of ageing scales or fin rays to validate or better inform estimates. (Objectives 2 and 3)

5. Trapping and PIT array operation: Avista will operate tributary traps and PIT arrays in accordance with Downstream Program protocols and in consultation with the MTCFRU. If desired, the MTCFRU may coordinate with Avista staff to help with trapping and PIT array operation. Regardless, Avista will provide the MTCFRU with the resulting data. (All Objectives)

6. Estimate capture efficiency: The MTCFRU will develop reasonable analytical methods and estimate trap capture efficiency and describe associated variability. If sample size and variability allow, season- or discharge-specific probabilities will be estimated and/or other factors that could influence capture efficiency may be investigated. (Objective 1)

7. Estimate annual and year-class specific emigrant numbers: The MTCFRU will develop reasonable analytical methods and annually estimate: (1) total numbers of emigrants from each stream; and, (2) total numbers of emigrants from each year class within each stream. (Objective 2)

8. Estimate the emigration-timing distributions and factors associated with those distributions: The MTCFRU will develop reasonable analytical methods and annually estimate the emigration-timing distributions for each stream. In addition, the MTCFRU will identify factors potentially associated with emigration timing distributions and describe these relationships. (Objective 3)

9. Communication and dissemination: The MTCFRU will make reasonable effort to present and discuss information with the AIT, Water Resources Technical Advisory Committee, and/or MC, or representatives thereof, periodically as requested. (All Objectives)

Work Products
Annual Work Summaries will be provided to Avista at the end of each year. The AIT will be provided one month to review and comment on the student's Project Proposal and Master's Thesis. The AIT recognizes the role of the student's major professor and graduate committee and will default to the judgement of the major professor if conflicting comments are received. However, the AIT will ensure reasonable methods are used to address the objectives of the study.

- Annual Work Summary; due December 1, 2021
- Master's Thesis; due December 1, 2021

Permitting Requirements
The majority of permitting requirements for this project will be handled by Avista staff through permitting of the Downstream Program. The only required permit specific to this research will be

annual scientific collection permits for the purpose of capturing juvenile Bull Trout, implanting them with PIT tags, and releasing them on site. The MTCFRU will apply for collection permits annually (Avista staff and/or the AIT may assist).

Endangered Species Act consultation for this project plan is associated with the 2019 Biological Opinion on the effects of continued operation of the Clark Fork Hydroelectric Project on Bull Trout and designated Bull Trout critical habitat. Incidental take reporting for this project plan will be included in the annual Biological Opinion report as required by Term and Conditions 15–18 of the 2019 Incidental Take Statement.

Cultural/Historic Resource Review
Not applicable for the tasks proposed in this project plan, there are no ground and/or vegetation disturbing activities, or proposed impacts to cultural/historic resources.

Benefit to the Resource
This project directly addresses components of the CFSA Native Salmonid Restoration Plan. The knowledge gained through this research will be used to inform numerous management decisions and to help adaptively manage the Fish Passage/Native Salmonid Restoration Plan. Importantly, this research should provide managers with all necessary information to determine when and where to capture juvenile Bull Trout (e.g., do we need to increase capture efficiency through the spring freshet or should we eliminate spring trapping efforts?). In turn, this information will be crucial for informing design criteria if additional permanent weir(s) or other hardened trapping structures are constructed in the future (i.e., do we need to design for effective fishing through the spring freshet or only to accommodate flashy fall rain events?). Also of importance, this research will enable us to estimate the total number of annual juvenile outmigrants, as well as the total number of emigrants from each year class. The latter will be used as the "recruit" metric in future efforts to quantify the stock-recruitment relationships within these three streams, and ultimately to quantify carrying capacity and identify limiting life stages (i.e., is connectivity limiting or is spawning and rearing habitat limiting?). In addition, this study will estimate the number and proportion of emigrating juvenile Bull Trout that are captured and not captured in the permanent weir on an annual basis. This information will be used to better understand reservoir-type contributions and potentially to inform future decisions pertaining to transport quotas. This research is designed to enhance the Downstream Program and connectivity for adfluvial Bull Trout. Ultimately, the goal is to increase adfluvial Bull Trout populations that utilize the Montana adfluvial streams.

These efforts are consistent with direction from the U.S. Fish and Wildlife Service through the Bull Trout Recovery Plan, Biological Opinion for the Clark Fork Projects FERC license, and informal consultation through the CFSA process. These actions also align with Montana Fish, Wildlife & Parks management plan and dual mission by reducing conflict between managing for the recovery of native species while also managing for popular sport fisheries in Noxon and Cabinet Gorge reservoirs. Increasing the number of sub-adult Bull Trout in Lake Pend Oreille directly supports the Idaho Department of Fish and Game goal of maintaining and enhancing the robustness of this metapopulation.

Budget

Item	Estimated Carryover	2021 Budget Request
2020 estimated cost (carryover as of January 1, 2021)	$20,470	$0
2021 estimated cost	$20,200	$0
Total	$40,670	$0
Anticipated Expenditures		$40,670

Avista will provide housing for the student and his or her technician while conducting field work. While there is no official cost-share for this project, much of the required equipment and supplies are provided through normal operations of the Downstream Program (e.g., PIT arrays, PIT tags, trap operation, data) and Appendix B (i.e., Bull River PIT array).

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2021 PROJECT PLAN

Non-Native Fish Suppression Project in the East Fork Bull River

Project Contact
Sean Moran, Avista, (406) 847-1291, sean.moran@avistacorp.com

Project History
The Non-Native Fish Suppression Project in the East Fork Bull River is a continuing project that was originally approved by the Management Committee (MC) in 2007. The scope and budget for this project are reviewed by the MC annually. Previously approved reporting periods had specified that the preliminary assessment (i.e., draft project completion report) and the final project completion report completion dates of April 1 and September 30, 2020. A draft project completion report is currently in preparation and it is being requested to extend completion dates for the draft to September 1, with a final project completion report due date of November 1, 2021.

Background
This 2021 Project Plan represents an extension of the reporting phase of the Non-Native Fish Suppression Project in the East Fork Bull River (EFBR). The period evaluated would be from the initial year of implementation in 2007 through the four-year continuation (i.e., 2015-2018) of the less-intensive non-native fish suppression methods with the addition of subsequent data including electrofishing data collected during sampling for the Bull Trout Emigration Study in 2020. Monitoring data collected from established electrofishing sections conducted over the duration of this project, as well as annual fish trap capture, fish transport, and redd survey data will be used to assess the effectiveness of this effort.

In addition to the evaluation and reporting, we propose continuation of the less-intensive protocols of transporting and releasing all non-native trout captured at fish traps and sub-sampling eggs removed from Brown Trout redds during this evaluation phase extension. These efforts are proposed as tasks under the Tributary Trapping and Downstream Juvenile Bull Trout Transport and Habitat Restoration Monitoring and Native Salmonid Abundance Monitoring Plan projects. This continuation would help to maintain a lower rate of non-native recolonization during the period when potential future actions are considered.

Goal
The goal of this assessment period is to investigate and attempt to identify the effect that this project has had on native salmonids, principally juvenile Bull Trout. This analysis would be used to assess whether continued implementation of a non-native suppression effort is an appropriate management effort to pursue in the EFBR.

Objective
1. Provide a draft report including analysis of the 14-year (i.e., 2007–2020) suppression project to the Aquatic Implementation Team (AIT) by September 1 for finalization by November 1.

Tasks

1. Compile, analyze, and summarize 14 years of data collected during implementation of the Non-Native Fish Suppression Project in the EFBR.

2. Contract consultant for statistical assistance (if necessary). (Objective 1)

Work Products

- Project Completion Report; Non-Native Fish Suppression Project in the East Fork Bull River; (2007–2020 data) final due November 1, 2021
- Annual Work Summary; due December 1, 2021

Permitting Requirements

Not applicable for the tasks proposed in this project plan.

Endangered Species Act consultation for this project plan is associated with the 2019 Biological Opinion on the effects of continued operation of the Clark Fork Hydroelectric Project on Bull Trout and designated Bull Trout critical habitat. Incidental take reporting for this project plan will be included in the annual Biological Opinion report as required by Term and Conditions 15–18 of the 2019 Incidental Take Statement.

Cultural/Historic Resource Review

Not applicable for the tasks proposed in this project plan, there are no ground and/or vegetation disturbing activities, or proposed impacts to cultural/historic resources.

Benefit to the Resource

Bull Trout, listed as threatened under the Endangered Species Act, and Westslope Cutthroat Trout, a "species of special concern" (state designation) are the primary species identified in the Native Salmonid Restoration Plan (NSRP) for consideration for fish passage and associated Protection Mitigation and Enhancement Efforts (PM&E) measures. The NSRP identified "introduced or exotic fish species distribution and control programs" as potentially needed actions in support of fish passage activities. Insight provided by the project completion report for this project is anticipated to support continued native species PM&E activities for the EFBR and may identify areas or aspects that may warrant additional efforts.

Budget

Item	Estimated Carryover	2021 Budget Request
Biologist, report finalization, etc. (0.25 FTE).	$22,000	$4,000
Technician: Assist with report preparation, (0.05 FTE).	$2,500	$0
Analytic Consultation (0.05 FTE)	$10,000	$0
Total	$34,500	$4,000
Anticipated Expenditures		$38,500

2021 PROJECT PLAN

Evaluation of Potential Actions for Reducing Non-native Threats to Native Salmonid Populations

Project Contacts

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Kevin Aceituno, U.S. Fish and Wildlife Service, (406) 758-6871, kevin_aceituno@fws.gov, *and*
Sean Moran, Avista, (406) 847-1291, sean.moran@avistacorp.com

Project History

The Evaluation of Potential Actions for Reducing Non-native Threats to Native Salmonid Populations is a carryover project approved by the Clark Fork Settlement Agreement (CFSA) Management Committee (MC) in 2020. This project was not completed in 2020; instead it will be completed in 2021 with no change in scope and no additional funding requested.

Background

A large component of the CFSA is the Appendix C Fish Passage/Native Salmonid Restoration Plan (NSRP). The goal of the NSRP is to mitigate the continuing effects of Avista's Clark Fork River dams as obstructions to fish passage, and to achieve the goal of increasing the long-term population viability of native salmonids in the Lake Pend Oreille–lower Clark Fork River system. At present, data suggests the East Fork Bull River, Graves Creek, and Vermilion River are the only Montana tributaries to the Clark Fork River within the Avista project area containing meaningful numbers of Bull Trout that exhibit an adfluvial life history (Oldenburg 2017, Lacy et al. 2016; Oldenburg et al. 2015; Zymonas 2006; hereafter, these three tributaries are collectively referred to as the "Montana adfluvial streams"). Therefore, Appendix C Bull Trout enhancement efforts are generally focused on the Montana adfluvial streams.

Non-native salmonids can have deleterious effects on native salmonids in Montana tributaries to the lower Clark Fork River. Past monitoring and sampling of Montana tributaries has documented several of these effects including hybridization and lost spawning potential, competition, and predation. A modeling exercise utilizing CFSA data suggested that one of the more effective management efforts to increase the persistence of migratory Bull Trout would be a large reduction in sympatric tributary populations of non-native salmonids (Peterson et al. 2015). Over the past 20 years, only one non-native suppression project has been implemented in the Montana adfluvial streams in the interest of enhancing native salmonid populations. This mechanical removal project occurred in the East Fork Bull River. Efforts to reduce non-native fish abundances in the East Fork Bull River were very successful (nearly 90% reduction in biomass); however, the desired response of a lasting increase in native salmonid abundances was not realized (Moran and Storaasli 2015).

Unfortunately, at present, we do not fully understand why there was not a response in Bull Trout abundance and/or distribution associated with the non-native reductions in the East Fork Bull River; although reduced spawning input and environmental stochasticity may have played a role (Moran et al. *in prep.*). Some research suggests that Brown Trout colonization into areas once inhabited by Bull Trout represented replacement as opposed to displacement (i.e., changing

habitat conditions caused Bull Trout to decline and Brown Trout subsequently thrived under the new conditions; Al-Chokhachy et al. [2014]). If this is the case within the East Fork Bull River, suppression of non-native species is not likely to benefit Bull Trout. However, it is also possible non-native species were displacing Bull Trout in the East Fork Bull River but other factors (e.g., lack of connectivity, recruitment, or survival during other life stages) limited Bull Trout and prevented a response in abundance and distribution following the suppression project.

Despite the aforementioned uncertainty, it is worthwhile to continue to develop strategies that could potentially be used to enhance native salmonid populations in the future. With regard to the East Fork Bull River, it may be prudent to maintain lower non-native densities as we enhance our understanding of what is limiting native populations within that stream. Similarly, Bull Trout appear to be declining in abundance in the Vermilion River and the cause of decline is unknown. Lastly, the local population of Bull Trout in Graves Creek appears to be increasing. It would be prudent to develop strategies to address non-native species concerns in Graves Creek. This may be particularly important as the climate changes and streams presumably continue to warm.

As opposed to being reactive or opportunistic, the purpose of this project is to identify and evaluate potential actions with regard to non-native species that could benefit native salmonid populations in the Montana adfluvial streams. The first step of this process will be to compile abundance and distribution data for the Montana adfluvial streams and identify threats non-native species may present to native salmonids now, or in the future. The second step will be to identify a suite of potential actions that could be used to reduce such threats. Potential actions could range from simply monitoring distributions to the exclusion, translocation, or suppression of non-native species. The next step will be to evaluate the efficacy of potential actions as well as benefits and concerns with each action. To be clear, no management actions are being proposed through this project. The end result of this project will be a list of potential actions and associated information. This list will be used to facilitate discussions among CFSA stakeholders and help MFWP and the U.S. Fish and Wildlife Service determine which (if any) actions they believe would be consistent with agency policy and directives. Any resultant actions will be proposed through a future CFSA project plan.

Goal
Enhance and protect native salmonid populations in tributaries to the lower Clark Fork River in Montana by addressing threats posed by non-native species.

Objective
1. Develop a prioritized list of potential actions that could be taken to protect and enhance native salmonid populations in tributaries to the lower Clark Fork River in Montana.

Tasks
1. Compile and summarize historic and trend data regarding native and non-native fish distributions in the Montana adfluvial streams and identify potential threats that may be of concern now, or in the future.

2. Identify potential actions that could be used to minimize or eliminate these threats.

3. Evaluate the anticipated efficacy as well as benefits and concerns with each potential action.

4. Develop a memorandum summarizing the findings of Tasks 1–3.

Work Products

- Final memorandum; due August 2, 2021
- Annual Work Summary; due December 1, 2021

Permitting Requirements

Not applicable for the tasks proposed in this project plan.

Endangered Species Act consultation for this project plan is associated with the 2019 Biological Opinion on the effects of continued operation of the Clark Fork Hydroelectric Project on Bull Trout and designated Bull Trout critical habitat (BiOp). This project plan is consistent with the analyses and conclusions contained in the 2019 BiOp and will adhere to all appropriate Terms and Conditions designed to reduce the extent and effects of incidental take on Bull Trout. No incidental take of Bull Trout is anticipated as a result of this project plan; therefore, no take reporting is required.

Cultural/Historic Resource Review

Not applicable for the tasks proposed in this project plan, there are no ground and/or vegetation disturbing activities, or proposed impacts to cultural/historic resources.

Benefit to the Resource

This project is primarily intended to benefit Bull Trout, listed as "Threatened" under the Endangered Species Act, and Westslope Cutthroat Trout, a "Species of Special Concern" (Montana designation). This project is consistent with the goals of both appendices B and C. More specifically, the sections of the NSRP 5-year plan associated with both of these appendices call to, "identify, evaluate, and if appropriate, address non-native species concerns". In addition, this project is consistent with the 2019 Biological Opinion in which one Reasonable and Prudent Measure and two associated Terms and Conditions address managing non-native species in a manner that is beneficial for Bull Trout.

These efforts are consistent with direction from the U.S. Fish and Wildlife Service through the Bull Trout Recovery Plan, 2019 Biological Opinion for the Clark Fork Projects FERC license, and informal consultation through the CFSA process. These actions also align with MFWP management plan and dual mission by reducing conflict between managing for the recovery of native species while also managing for popular sport fisheries in Noxon and Cabinet Gorge reservoirs.

Budget

Item	Estimated Carryover	2021 Budget Request
Biologist: facilitate, data compilation and summarization, reporting, etc. (0.05 FTE)	$6,300	$0
Technician: data compilation and summarization (0.10 FTE)	$7,250	$0
Total	$13,550	$0
Anticipated Expenditures		$13,550

Literature Cited

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2021 PROJECT PLAN

Fish Capture Facilities Operation, Development, and Testing

Project Contact
Shana Bernall, Avista, (406) 847-1293, Shana.Bernall@avistacorp.com

Project History
The Fish Capture Facilities Operation, Development, and Testing is a continuing project. The scope and budget for this project are reviewed by the Management Committee (MC) annually.

Background
The Clark Fork River Native Salmonid Restoration Plan provides an outline for experimenting with adult fish passage techniques, which in turn has led to development and testing of fish capture and transport systems (Kleinschmidt Associates and Pratt 1998). The ultimate outcome of evaluations of these capture and transport systems has been a proposal to develop a permanent adult fish collection facility below Cabinet Gorge Dam. As part of this facility, Avista constructed a fish handling facility near the Cabinet Gorge Fish Hatchery in 2015. The Cabinet Gorge Fish Handling Facility (CGFHF) is used annually to hold Bull Trout and Westslope Cutthroat Trout prior to transport upstream of the Clark Fork River dams. The CGFHF will also be used to process and sort fish captured at the permanent fish collection facility being constructed below Cabinet Gorge Dam. Additional upgrades to the site are needed to prepare the CGFHF for use once a permanent fish collection facility is completed below Cabinet Gorge Dam.

Support for the development of a permanent fish collection facility below Cabinet Gorge Dam was codified in the MC approved Amendment No. 1 to the Clark Fork Settlement Agreement (CFSA) (Amendment) on September 26, 2017 (Avista 2017a). The approval of the Amendment provided stakeholder agreement to move forward with final design, permitting, and construction of a permanent fish collection facility below Cabinet Gorge Dam, referred to as the Cabinet Gorge Dam Fishway (CGDF). Following the approval of the Amendment, Avista submitted an application to the Federal Energy Regulatory Commission (FERC) for a license amendment to construct and operate the CGDF (Avista 2017b). The FERC order amending Avista's License to include construction and operation of the CGDF was issued on August 8, 2019, and includes an amendment of the License to incorporate the updated terms and conditions of the February 6, 2019 Biological Opinion, submitted by the USFWS under section 7 of the Endangered Species Act (FERC 2019).

Construction of the CGDF was initiated in 2019. A contractor was selected for the project and mobilized on site to begin construction in March of 2019. All permits required for construction of the CGDF were received, and construction of the cofferdam for the CGDF was initiated in July of 2019. The cofferdam was complete at the end of 2019. In early 2020, excavation within the cofferdam was halted due to FERC concerns related to the stability of the thrustblock, thrustblock extension, and structure excavation. A new stability analysis was completed, and FERC gave the approval to move forward with excavation, ultimately resulting in a three-month delay to the project. High flows in the spring of 2020 caused damage to the cofferdam,

compounding the delays to the project. The cofferdam was repaired in 2020 and excavation continued in the fall along with pouring of concrete for various components of the fish trap slated to be completed prior to spill in 2021. The new completion date for the CGDF is spring 2022, with commissioning to occur post spill 2022.

The development of a permanent fish collection facility below Noxon Rapids Dam has also been contemplated since the signing of the CFSA. Based on past evaluations, and as codified in the Amendment, the MC has decided that a decision related to the final design and the need to construct a permanent fish collection facility below Noxon Rapids Dam, shall be deferred for an interim period ending no sooner than December 31, 2021. During the interim period, the MC may consider and approve alternative(s) to a permanent fish collection facility. No alternatives are being considered in 2021.

Goal
Develop, operate, and test the feasibility of permanent fish passage facilities as an option for fish passage at Cabinet Gorge and Noxon Rapids dams to provide safe, timely, and efficient upstream passage for native salmonids.

Objectives
1. Construct the CGDF below Cabinet Gorge Dam.

2. Modify the CGFHF, so it is ready for use when the CGDF becomes operational.

Tasks
1. Work with the selected contractor to continue with construction of the CGDF. Primary construction efforts related to this 2021 Project Plan (March 2021 to March 2022) will include finishing concrete pours for the fish trap, installing the monorail system, fish monitoring equipment, brail and hopper, and removal of the cofferdam, with the fish trap being mostly complete by the end of March. It is anticipated that the CGDF will be operational by May of 2022. Avista will provide the MC with quarterly updates on the progress of the project. (Objective 1)

2. Work with appropriate stakeholders to develop a monitoring and evaluation plan and transport protocol for the CGDF, and any other documents that need to be updated in preparation for operation of the CGDF. (Objective 1)

3. Submit monthly construction reports as required by permitting and approval agencies (i.e., FERC Portland Regional Office). (Objective 1)

4. A contractor has been selected to construct modifications to the CGFHF and will have these modifications completed by August 1, 2021. Modifications include adding exterior walls, insulation, heat, additional holding tanks, lighting, dry storage, piping, low water alarms, ability to have spring water use at hose bibs, lower return to river pipe, fix total dissolved gas issues associated with the degassing towers, add office and bathroom, fix dividers in holding tanks, etc. Additional funding is being requested to purchase supplies to furnish the building including a fish work up table. (Objective 2)

5. Provide required permit reporting for construction of modifications to the CGFHF. (Objective 2)

Work Products

- Annual Work Summary; Fish Capture Facilities (2021); due December 1, 2021
- As-built drawings (CGFHF modifications); due October 1, 2021
- CGDF Monitoring and Evaluation Plan; final due October 1, 2021

Permitting Requirements

Avista has acquired the permits and approvals needed for construction of the CGDF and for construction of modifications to the CGFHF. For more information contact the project contact.

Endangered Species Act consultation for this project plan is associated with the 2019 Biological Opinion on the effects of continued operation of the Clark Fork Hydroelectric Project on Bull Trout and designated Bull Trout critical habitat. Incidental take reporting for this project plan will be included in the annual Biological Opinion report as required by Term and Conditions 15–18 of the 2019 Incidental Take Statement.

Cultural/Historic Resource Review

The original design for the CGDF was approved by the Idaho State Historic Preservation Office in 2013 and the revised design was approved by Idaho and Montana State Historic Preservation offices in early 2018.

Avista received approval from the Idaho State Historic Preservation Office and the Cultural Resource Management Group in 2020 to move forward with construction of modifications to the CGFHF. The work product for this review and consultation will be confidential due to the sensitive nature of the content.

Benefit to the Resource

Efforts outlined under this project plan are in line with Avista's requirement under the CFSA to test the feasibility of permanent fish passage facilities as an option for fish passage. Permanent fish passage facilities are proposed to be built in an effort to capture a larger number of fish for upstream transport which is an important part of Avista's Native Salmonid Restoration Plan (Kleinschmidt and Pratt 1998). The target species for fish passage in the lower Clark Fork River are Bull Trout and Westslope Cutthroat Trout. Bull Trout are listed as "threatened" under the Endangered Species Act and Westslope Cutthroat Trout are a "species of special concern" in both Idaho and Montana. Montana Fish, Wildlife and Parks (MFWP) and IDFG are supportive of reconnecting Bull Trout and Westslope Cutthroat Trout populations in their current state-wide management plans (MFWP 2019, IDFG 2019). Additionally, the U. S. Fish and Wildlife Service describes fragmentation of the lower Clark Fork River by mainstem dams as one of the primary threats to Bull Trout under their Columbia Headwaters recovery unit implementation plan (U. S. Fish and Wildlife Service 2015). The capture of a larger number of Bull Trout and Westslope Cutthroat Trout through the operation of the CGDF will result in an increase in the number of fish transported upstream and reconnected to upstream populations. Increasing the number of migratory Bull Trout and Westslope Cutthroat Trout available to spawn in Montana tributaries

will likely increase the abundance of these species in upstream populations and enhance the migratory life-history of these species.

Budget

Item	Estimated Carryover	2021 Budget Request
Construction of CGDF (includes permitting, engineering and project management, construction, and overhead costs)	$4,023,012	$14,575,533*
Construction of CGFHF modifications (includes project coordination, permitting, engineering support, and construction management)	$1,103,242	$60,000
Total	$5,126,254	$14,635,533
Anticipated Expenditures		$19,761,787

*This is an estimated amount for April 2021 – March 2022. An Estimated cost, as defined in Appendix U of the CFSA, states that Avista will pay the actual costs of implementation, as approved by the MC. Due to FERC and cofferdam related delays, some project costs have slipped into the 2022 budget request year. Total cost for construction of the CGDF (2019–2022) is estimated at over $60 million.

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2021 PROJECT PLAN

Graves Creek Permanent Weir Trap Enhancements

Project Contact
Eric Oldenburg, Avista, (406) 847-1290, eric.oldenburg@avistacorp.com

Project History
This is a continuing project that was originally approved through the consent mail process on December 9, 2019. Additionally, the Management Committee (MC) approved funding the design for this project through the 2017 and 2018 Tributary Trapping and Downstream Juvenile Bull Trout Transport Program (hereafter, "Downstream Program") project plans as well as a 2018 consent mail (November 7). Funding for the construction of the Graves Creek Fish Handling Facility was also supplemented through a July 31, 2020 consent mail. The only change proposed in this project plan is an additional $10,000 to outfit the facility with equipment (shelving, fish work-up equipment, extra tanks, chairs, etc.).

Background
A fundamental goal of the Fish Passage/Native Salmonid Restoration Plan [Appendix C of the Clark Fork Settlement Agreement (CFSA)] is to restore mainstem connectivity for local populations of adfluvial Bull Trout for which migrations would otherwise be blocked by Noxon Rapids and Cabinet Gorge dams. Two problems must be addressed to achieve this goal: (1) safely pass returning adult Bull Trout so they can spawn in their natal streams, and (2) safely pass outmigrating juvenile Bull Trout around the dams and reservoirs to Lake Pend Oreille where growth and survival rates are high. The Downstream Program was developed to address the latter.

Traditionally, weir traps and screw traps have been utilized to capture outmigrating juvenile Bull Trout to transport to Lake Pend Oreille. Weir traps are highly effective for capturing fish; however, they cannot be reliably fished through high flow or high debris (e.g., leaves) events. Screw traps float on pontoons and can effectively fish through the aforementioned events; however, they only capture a small proportion of the fish swimming past their location. Thus, weir traps have traditionally been fished before and after spring runoff and screw traps have been fished in the spring and during fall heavy rain events when flow and debris loads are high.

Generally, trapping efforts have begun in late March and continued into December. To date, 83% of all captures have occurred from September through November and the majority of those have been associated with fall rain events and resulting increases in flow and debris loads. Because most fish emigrate in the fall and rain events tend to be the trigger for downstream movements, we have missed substantial numbers of emigrating fish because weir traps were disabled by flow and debris, or, because we were fishing inefficient screw traps. To address this problem in Graves Creek, a permanent weir trap was constructed which became operational in 2013. The permanent weir trap is configured similarly to conventional weir traps except the weir panels are attached to a concrete slab and continue to function through the fall rain events. As a result, more than two and a half times more fish were annually captured in Graves Creek during the first six years of permanent weir trap operation as compared to the six previous years.

While the permanent weir trap has been successful at capturing a greater proportion of outmigrating juvenile Bull Trout, two problems and opportunities to enhance the performance of the trap have been identified. First, the trap has been relatively ineffective at capturing upstream-moving fish. A few adult Bull Trout have been detected within Graves Creek that were not captured and did not otherwise successfully pass upstream of the trap during the time of the spawn (a few redds have been observed downstream from the trap location in generally poor habitat). Initially, it was believed that these fish were exhibiting "trap shy" behavior (i.e., reluctant to approach the trap site). Subsequent research and monitoring has suggested that trap shyness is not a problem, but that retention within the trap box as well as the physical ability of fish to enter the trap box were problems. The trap box retention issue was partially addressed utilizing "one-way gates" within the trap entrance; however, it is possible the one-way gates exacerbate the problem of some fish not successfully getting into the trap box. Currently, upstream moving fish must navigate a short drop (jump) into a "jet" of water into the narrow entrance and push through the one-way gate (or swim around it in the case of juvenile fish). Thus, there remains the need to enhance capture and/or passage efficiencies for upstream-moving fish.

The second opportunity for enhancement is with regard to the capture of downstream-moving fish. Monitoring fish movements using strategically-placed passive integrated transponder (PIT) antennas demonstrated that downstream-moving fish (both adult and juvenile) have also been able to swim in and out of the trap box. This resulted in delaying the transport/migration of some fish, and, has also led to some fish not being captured due to the increased time it takes to capture a fish which increases the likelihood they will find another way past the trap (e.g., passing the trap during the once per week 24-h volitional passage window). We attempted to address this problem using numerous one-way gates; however, these attempts were largely unsuccessful due to flow holding the one-way gates open. In 2016, a new solution to address capture efficiency for downstream-moving fish was developed and a prototype constructed. Rather than being guided to the trap box, downstream-moving fish were guided to a 10-inch diameter pipe. The pipe runs downstream approximately 50 feet where there is a short outfall into a trap box that is situated in the engineered hole. Since that time, we have successfully retained 100% of the downstream-moving fish that have entered the pipe (including adult Bull Trout). Thus, the prototype is extremely efficient; however, it is vulnerable to being disabled by high-flow events.

In 2018, we approached R2 Resource Consultants, Inc. (hereafter, "R2") about designing enhancements to the permanent weir trap (R2 designed the original permanent weir). We presented R2 with numerous design criteria. The first criteria was to address upstream fish passage. Specifically, we wanted to eliminate the drop on the downstream side of the trap box as well as the "jet" of water leaving the entrance by pooling water immediately downstream of the trap box. Associated with enhancing upstream capture efficiency, we also wanted to utilize the entire footprint of the original trap box strictly for capturing upstream-moving fish. Lastly with regard to upstream passage, recognizing the capture and retention of upstream-moving fish may still present challenges, we tasked R2 with integrating the ability for the trap to allow upstream-moving fish to pass volitionally without compromising capture efficiency for downstream-moving fish.

There were several design criteria to address downstream-fish passage. The first was to design a robust version of the prototype pipe (or at least utilize the lessons learned from the pipe). Associated with this, we decided to remove the trap box from the stream and rather, build a shore-based vault to house the trap box. The primary reason for this was to make the trap more robust to high flows (the trap box often gets washed out during high flows). The final major design change came through discussions with R2, the Aquatic Implementation Team, and a U.S. Fish and Wildlife Service engineer. Everyone recognized that it would be desirable to send as much water as possible toward the trap box. Thus, we integrated a flume with two dewatering sections rather than a pipe into the design. This allows a greater proportion of the overall streamflow to be directed down the flume with some of the water being bled from the flume at two locations. As a result, the flume is robust to changes in flow and can pass greater overall flow than could a fixed-diameter pipe.

Three additional enhancements need to be made to the permanent weir trapping site beyond enhancements to the trap itself. First, we will need to modify our PIT-monitoring equipment both to facilitate construction as well as to ensure we are monitoring key areas of the enhanced trap. Second, we are proposing to construct a fish handling facility on the property (i.e., 20 foot by 32 foot building). The most eminent need for this structure is to ensure fish that are captured in the trap are handled safely, efficiently, and with minimal stress. In 2019 and 2020, Bull Trout densities within Graves Creek were the highest ever observed. Similarly, capture rates within the permanent weir trap were nearly three times higher than the previous record. For reference, in one day we captured 71 Bull Trout comprised of 2 adults and 69 juveniles. All evidence suggests that 2019 was not an anomalously high year; rather, the Graves Creek population is growing as a direct result of the permanent weir trap. Thus, we anticipate even greater numbers into the future. Due to the increased number of fish and time it takes to work them all up, we need a greater volume of water in which to hold fish as well as the ability to aerate and/or add flow-through water. Due to the disparity in sizes among fish, we need the ability to segregate fish by size during holding (we have documented adults eating juveniles within holding tanks as well as juveniles [e.g., ages 3 or 4] eating other juveniles [e.g., ages 0 or 1]). Additionally, technicians are now spending multiple hours a day working up fish at Graves Creek. Providing a more controlled environment will allow the crew to continue collecting and recording high-quality data. Thus, within the structure we will install multiple temporary holding tanks, an anesthesia tank, and a fish work-up table. Additionally, we will use the structure to store Graves Creek trapping equipment and we will move our Biomark equipment into the building for increased security and longevity.

The last enhancement we are proposing is to do revegetation work at the trap site. We would like to establish additional riparian vegetation in the area, establish some larger trees in the adjacent areas, as well as plant any areas disturbed by this work with native grasses and vegetation, as appropriate.

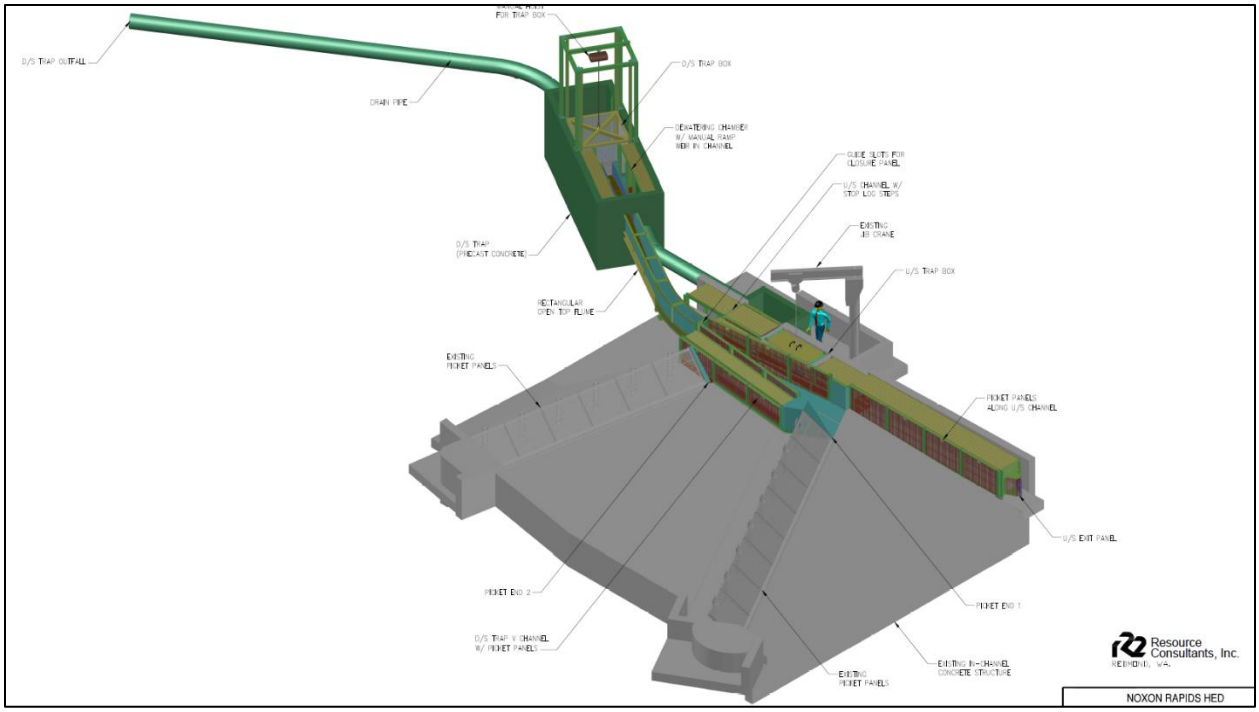

Figure 1. Isometric view of the proposed enhancements to the Graves Creek permanent weir trap.

Goal
The goal of this project is to enhance the effectiveness and efficiency of the Graves Creek permanent weir trap and other infrastructure in the interest of safely capturing, handling, and transporting Bull Trout from Graves Creek to Lake Pend Oreille.

Objectives
1. Construct enhancements to the Graves Creek permanent weir trap.

2. Add and modify existing PIT-monitoring station equipment to facilitate construction and to strategically monitor key areas of the enhanced trap.

3. Construct a fish handling and storage building at the Graves Creek trap site.

4. Enhance riparian and upland vegetation at the Graves Creek trap site.

Tasks
1. Work with R2 to finalize bid-ready design. (***Completed***)

2. Competitively bid and select contractor(s) to construct the permanent weir trap enhancements. (***Completed***, Neal Structural Repair has been selected)

3. Work with Avista permitting and cultural resources specialist to obtain all necessary permits and cultural reviews to construct enhancements to the permanent weir trap, modifications to the PIT-monitoring station, construct the fish handling and storage facility, and complete the revegetation work. Work with Water & Environmental

Technologies (WET) to obtain water rights for each point of diversion (flume and fish handling and storage building). (***Completed***; water rights pending)

4. Neal Structural Repair started the part fabrication process in the fall of 2020 and installation is scheduled to occur in July and August of 2021. (Objective 1)

5. Work with Avista engineer and supporting staff as well as R2 for engineering services during construction (ESDC). Specific tasks include project and budget management, oversight and correspondence with contractor, responding to submittals and requests for information, site visits, and inspections. (Objective 1)

6. Add and modify existing PIT-monitoring station equipment. Purchase and install two new flat plate antennas, one new 10-foot antenna, and two receivers. Temporarily remove antenna 2 as well as cabling to antenna 1 to facilitate construction. Move the Master Controller and associated electronics into the fish handling and storage building. (Objective 2)

7. Construct the fish handling and storage building. Pour a concrete slab and have a 20 foot by 36 foot building constructed. Potentially insulate the building. Have power run to the building. Purchase and install fish holding tanks and plumbing and a fish work-up table as well as associated infrastructure. Move Master Controller and associated equipment into the building. (Objectives 2 and 3)

8. Work with Lower Clark Fork Watershed Group to develop a revegetation site plan. (Objective 4)

9. Implement the revegetation site plan. (Objective 4)

Work Products

- Revegetation site plan (LCFWG; likely memo); due October 1, 2021
- As-built drawings (R2); due November 1, 2021
- Annual Work Summary; due December 1, 2021

Permitting Requirements

Avista has acquired nearly all permits for the project including the Joint Application for Proposed Work in Montana's Streams, Wetlands, Floodplains, and Other Waterbodies (JARPA). The JARPA includes a 310 review with the Green Mountain Conservation District, Section 404 review by the U.S. Army Corps of Engineers, and 318/401 review by Montana Department of Environmental Quality. The site is not in the floodplain; thus, we will not be applying for a floodplain permit. As of November 2020, the Montana Department of Natural Resources and Conservation to determine had deemed both water rights "correct and complete" and are out for public review. Avista acquired all appropriate permissions from the Steep River Ranch Homeowners Association ensuring all activities and structures are consistent with setbacks and other covenants.

Endangered Species Act consultation for this project plan is associated with the 2019 Biological Opinion on the effects of continued operation of the Clark Fork Hydroelectric Project on Bull Trout and designated Bull Trout critical habitat. Incidental take reporting for this project plan will be included in the annual Biological Opinion report as required by Term and Conditions 15–18 of the 2019 Incidental Take Statement.

Cultural/Historic Resource Review
In 2005, the Cultural Resources Management Group reviewed the Graves Creek land acquisition and in 2010 they reviewed the original Graves Creek permanent weir trap design. Avista will coordinate Cultural Resources Management Group review for this project prior to any ground disturbing activities. The work product for these reviews will be confidential due to the sensitive nature of the content.

Benefit to the Resource
Appendix C of the calls for implementation of the Native Salmonid Restoration Plan and associated Five-Year Plan. The Five-Year Plan specifically calls for implementation of the Downstream Program. Additionally, permanent downstream tributary traps, as appropriate, were called for in Amendment No. 1 to the CFSA. The capture and downstream transport of juvenile Bull Trout appears to have directly increased the number of adult Bull Trout that return downstream of Cabinet Gorge Dam by reconnecting their historic migratory corridor and increasing survival during migrations through the lower Clark Fork River and into Lake Pend Oreille. In addition to completing the migratory life cycle, downstream transported juvenile Bull Trout that reach Lake Pend Oreille are known to grow at an increased rate, attain larger sizes, and contain more eggs than fish that complete their life cycle within the reservoirs. Continued evaluation and enhancements to the permanent weir trap have increased the efficacy of the trap and presumably increased the overall survival for this local population of Bull Trout (i.e., the local population is growing). The Graves Creek permanent weir trap has increased the period of weir operation and increased the annual number of juvenile Bull Trout captured.

These efforts are consistent with direction from the U.S. Fish and Wildlife Service through the Bull Trout Recovery Plan, Biological Opinion for the Clark Fork Projects FERC license, and informal consultation through the CFSA process. These actions also align with Montana Fish, Wildlife & Parks management plan and dual mission by reducing conflict between managing for the recovery of native species while also managing for popular sport fisheries in Noxon and Cabinet Gorge reservoirs. Increasing the number of sub-adult Bull Trout in Lake Pend Oreille directly supports the Idaho Fish and Game goal of maintaining and enhancing the robustness of this metapopulation.

Budget

Item	Estimated Carryover	2021 Budget Request
Trap enhancements: construction contract	$311,253	$0
Avista construction management, labor, etc.	$70,000	$0
R2 Engineering Services During Construction (ESDC)	$37,000	$0
Permitting and cultural	$12,000	$0
WET consultation and water right fees	$20,000	$0
PIT-monitoring station: equipment (antennas, nodes, etc.)	$18,000	$0
PIT-monitoring station: Biomark travel and labor	$7,000	$0
Fish Handling Facility: construction contract	$43,000	$0
Fish Handling Facility misc. equipment	$5,000	$10,000
Revegetation site plan development (LCFWG)	$1,300	$0
Revegetation implementation	$15,000	$0
Total	$539,553	$10,000
Anticipated Expenditures		$549,553

There is ambiguity within Amendment No. 1 to the CFSA with regard to how enhancements to an existing permanent trapping facility should be funded (new construction and maintenance are specifically contemplated). Initially, this project was proposed to be funded partially through the Annual Operations Fund and partially through the Facilities Fund. After further consideration, the entire cost of this project will be paid for through the Facilities Fund.

2021 ANNUAL IMPLEMENTATION PLAN SUMMARY – APPENDIX D

Clark Fork Project, FERC No. 2058
Cabinet Gorge and Noxon Rapids Hydroelectric Developments

Title
Bull Trout Protection and Public Education Project

Implementation Staff Lead
Sean Moran, Avista, (406) 847-1291, sean.moran@avistacorp.com

Background
The purpose of this project is to protect Bull Trout, a federally listed species (threatened), through a combination of enhanced law enforcement efforts by the states of Idaho and Montana, coupled with a public education outreach program. This will increase the numbers and population viability of Bull Trout by reducing intentional and incidental illegal harvest and increased public awareness concerning Bull Trout life history, habitat needs, identifying characteristics, and the potential for adverse impacts due to land use and other human activities.

Bull Trout are a key-target resource associated with the Lake Pend Oreille–lower Clark Fork River system. Widespread declines in numbers and distribution resulted in the 1998 listing of the species as threatened under the Endangered Species Act. During the consultation process for the relicensing of the Cabinet Gorge and Noxon Rapids projects, the State of Idaho identified illegal harvest of the highly vulnerable Bull Trout spawning run as a significant threat to the Lake Pend Oreille (LPO) population(s).

Given the immediate and ongoing threat that illegal harvest represented to the LPO Bull Trout populations, Idaho requested and the Clark Fork Relicensing Team agreed that an enhanced and focused law enforcement effort be supported and funded by Avista in 1998, and be considered as a relicensing Protection, Mitigation, and Enhancement (PM&E) measure. Avista subsequently provided Idaho Department of Fish and Game (IDFG) with funding which, along with additional funds provided by other groups, allowed for two years (1998 and 1999) of enhanced law enforcement effort focused on protecting LPO Bull Trout. It was also agreed that a plan should be developed for continuing this enforcement effort on a long-term basis, and it should include a specific public education and outreach component. Therefore, in addition to the second year of enhanced law enforcement effort that IDFG implemented in 1999, Avista also supported the development of a plan for a longer-term Bull Trout Protection and Public Education Project that was approved by the Management Committee (MC) and began implementation in the year 2000.

In 2004, IDFG, Montana Fish, Wildlife and Parks (MFWP), Panhandle Chapter Trout Unlimited (PCTU), and Avista began the revision of the 2000 Implementation Plan for the Bull Trout Protection and Public Education Project while incorporating aspects of the 2000 Cooperative Action Plan for the Bull Trout Protection and Public Education Project in the Lower Clark Fork – Pend Oreille Basin. In March of 2005, 2010, 2015, and again in 2020, the MC approved updated Five-year Implementation Plans for the Bull Trout Protection and Public Education Project.

Previously grouped components of each of the three implementers of the Bull Trout Enforcement and Public Education Project (i.e., MFWP, IDFG, and PCTU) annual Project Plans have been broken-out as individual Project Plans to better account for cost-by-task associated with each and of the Program as a whole. Beginning in 2021, as per the latest MC-approved 5-year implementation plan, a Project Evaluation and Ranking Criteria that has been reviewed and scored by the WRTAC has been added to each Appendix D Project Plan.

2021 Project Plans

1. Idaho Bull Trout Protection and Education Officer Support
2. Montana Bull Trout Education and Communication Support
3. Montana Bull Trout Education Outreach Support
4. Montana Game Warden Support
5. Trout Unlimited Outreach Coordination
6. Pend Oreille Water Festival

Work Products

Idaho Bull Trout Protection and Education Officer Support

- Mid-year report; due to Avista; August 2, 2021
- Annual Work Summary; due to Ken Bouwens, IDFG; November 15, 2021

Montana Bull Trout Education and Communication Support

- Mid-year report; due to Avista; August 2, 2021
- Annual Work Summary; due to Avista; November 15, 2021

Montana Bull Trout Education Outreach Support

- Mid-year report; due to Avista; August 2, 2021
- Annual Work Summary; due to Avista; November 15, 2021

Montana Game Warden Support

- Mid-year report; due to Avista; August 2, 2021
- Annual Work Summary; due to Avista; November 15, 2021

Trout Unlimited Outreach Coordination

- Mid-year report; due to Avista; August 2, 2021
- Annual Work Summary; due to Ken Bouwens, IDFG; November 15, 2021

Pend Oreille Water Festival

- Mid-year report; due to Avista; August 2, 2021
- Annual Work Summary; due to Ken Bouwens, IDFG; November 15, 2021

Appendix D 2021 Budget

Project	Carryover[1]	2021
Bull Trout Protection and Public Education (includes GDP inflation rate)		**$181,875**
Unexpended funds w/interest		**-$2,134**
Total Available		**$179,741**
Idaho Bull Trout Protection and Education Officer Support	$0	$100,450
Montana Bull Trout Education and Communication Support	$0	$5,749
Montana Bull Trout Education Outreach Support	$0	$23,010
Montana Game Warden Support	$10,304	$12,714
Trout Unlimited Outreach Coordination	$8,970	$20,240
Pend Oreille Water Festival	$0	$4,000
January 2021 consent mail transfer from Appendix F5[2]	-$100,000	$0
Total	-$80,726	$166,163
MC Approved Budget		**$85,437**
Unobligated Funds		$94,304

[1] This column denotes estimated carryover of unexpended, approved funds as of January 1.

[2] The negative carryover value reflects the transfer from Appendix F5 to Appendix D.

2021 PROJECT PLAN

Idaho Bull Trout Protection and Education Officer Support

Project Contact
Dustin Masin, Idaho Department of Fish and Game (IDFG), (208) 608-8651; Dustin.Masin@idfg.idaho.gov, *and*
Ken Bouwens IDFG, (208) 769-1414; ken.bouwens@idfg.idaho.gov

Project History
This is a continuing project that was initially developed through the 1999 Clark Fork Settlement Agreement (CFSA). The scope and budget for this project are reviewed by the Management Committee (MC) annually. Beginning with the 2020 project plan, this position is provided under a cost share arrangement with CFSA Appendix F5. This change in funding and scope reflects the changing nature of this position, in which a significant proportion of the officer's time is spent patrolling and contacting anglers pursuing other recreationally important and/or native species in the Lower Clark Fork River – Lake Pend Oreille area. This time still has value for Bull Trout protection and education, but also represents an opportunity for enforcement of other important fisheries regulations and an opportunity to inform the angling public of ongoing CFSA-sponsored management efforts in the area. Beginning in 2021, as per the MC-approved 5-year Implementation Plan, a Project Evaluation and Ranking Criteria has been added to each Appendix D Project Plan. This project was ranked by the WRTAC on January 20, 2021 and the Evaluation and Ranking Criteria scores are included as the last page of this project plan.

Background
The Idaho CFSA Protection and Education (P&E) Officer position was created in 1999 to address illegal Bull Trout harvest through direct law enforcement action taken on Lake Pend Oreille (LPO) and its tributaries. The CFSA recognized that illegal harvest of Bull Trout was a significant threat; specifically, poaching of spawning fish could greatly impact the spawning population of a stream. It was determined that in addition to traditional enforcement action, public education would be an effective approach to reduce illegal and inadvertent harvest of Bull Trout (Avista 1999). Education currently comprises approximately 35% of the annual work performed by the P&E Officer. The evaluation and the adaptive management of this project is outlined in a Five-Year Implementation Plan.

The combination of targeted law enforcement and Bull Trout-specific education has been highly effective in reducing Bull Trout harvest. Although few violations are detected annually, enforcement patrols continue to be an important component of this program. Officer presence in areas known to be poaching hot spots has deterred illegal activities in these areas. Although also difficult to quantify, it is apparent this project has shown a measurable reduction in accidental and illegal Bull Trout harvest through Bull Trout identification education. For example, in 2006 the Lake Trout Angler Incentive Program (AIP) produced 49 Bull Trout that were unwittingly submitted by anglers to the program. Since that time, the total number of anglers submitting Bull Trout to the AIP has dropped to a handful each year, despite angler reports stating that Bull Trout are commonly caught incidentally in the Lake Trout fishery. It is important to continue this highly successful program to maintain the current level of compliance.

Goal
The goal of this project is to reduce the intentional and unintentional harvest of Bull Trout in the Idaho portion of the project area through directed law enforcement and public education.

Objectives
1. Patrol LPO tributaries known to support Bull Trout.

2. Patrol the LPO, Clark Fork River, and Pend Oreille River fisheries in areas where Bull Trout may be encountered by anglers.

3. Increase anglers' knowledge of LPO specific fishing regulations, especially with respect to Bull Trout.

4. Educate the public on the topics relating to Bull Trout such as effective catch and release techniques, distinguishing characteristics from other LPO fishes, and their life history and habitat requirements.

5. Develop educational materials, both physical and electronic, to educate the public on fishery management practices and fish identification.

Tasks
1. Continue to focus enforcement efforts, possibly including undercover and/or plain clothes surveillance patrols, on vulnerable Bull Trout tributary locations such as staging holes and spawning areas. (Objective 1)

2. Place electronic monitoring equipment at locations along tributaries with a known history of Bull Trout poaching activity. Document violations and pursue avenues of locating and charging violators as appropriate. (Objective 1)

3. Continue to conduct enforcement patrols on LPO to monitor regulation compliance, catch rates, and incidental harvest. Focus time and efforts at vulnerable locations for Bull Trout such as near tributary mouths. (Objective 2)

4. Continue to help monitor streams and riparian habitat for unlawful development or alterations. (Objectives 1 and 2)

5. As allowed by CDC guidelines, continue student-focused educational programs in local classrooms, the Pend Oreille and Coeur d'Alene Water Festivals, the Waterlife Discovery Center, and the Trestle Creek Interpretive Site. Include messages regarding Bull Trout identification characteristics, life history of Bull Trout, and catch-and-release methods at these events. (Objective 3 and 4)

6. As allowed by CDC guidelines, attend research efforts, events, or trainings to better understand dynamics of the Pend Oreille fishery, impacts on Bull Trout in the system, and to be more informed when educating the public about Bull Trout. (Objectives 1- 4)

7. Develop electronic and physical media elements for interpretive panels, trailer materials, handouts, swag, online videos, and teacher resources to be made available for area school districts, homeschooled students, and recreaters. (Objective 3, 4, and 5)

8. Purchase a computer and acquire applicable software to produce physical and electronic educational materials. (Objective 3, 4, and 5)

Work Products

- Mid-year report; due to Avista; August 2, 2021
- Annual Work Summary; due to Ken Bouwens, IDFG; November 15, 2021

Permitting Requirements

Not applicable for the tasks proposed in this project plan.

Endangered Species Act consultation for this project plan is associated with the 2019 Biological Opinion on the effects of continued operation of the Clark Fork Hydroelectric Project on Bull Trout and designated Bull Trout critical habitat (BiOp), and the USFWS-IDFG Cooperative Agreement pursuant to Section 6 of the Act. This project plan is consistent with the analysis and conclusions contained in the 2019 BiOp and the USFWS-IDFG Cooperative Agreement and will adhere to all appropriate Terms and Conditions designed to reduce the extent and effects of incidental take on Bull Trout. Incidental take reporting for this project plan will be included in the annual Biological Opinion report as required by Term and Conditions 15–18 of the 2019 Incidental Take Statement, as well as IDFG's annual Section 6 report to the USFWS. No incidental take is expected as part of the implementation of this plan.

Cultural/Historic Resource Review

Not applicable for the tasks proposed in this project plan, there are no ground and/or vegetation disturbing activities, or proposed impacts to cultural/historic resources.

Benefit to the Resource

Reducing Bull Trout mortality by anglers is consistent with the Idaho Tributary Habitat Acquisition and Fishery Enhancement Program (Appendix A of the CFSA). As such, it is also consistent with goals of the Fish Passage/Native Salmonid Restoration Plan Protection Mitigation, and Enhancement measure (Appendix C), and the Dissolved Gas Supersaturation Control, Mitigation, and Monitoring Program (Appendix F5). Providing an enforcement presence in the area also supports programs conducted under the terrestrial portions of the CFSA.

This proposed project is entirely consistent with the Idaho Department of Fish and Game Fisheries Management Plan (IDFG 2019), the Management Plan for the Conservation of Westslope Cutthroat Trout in Idaho (IDFG 2013), Columbia Headwaters Recovery Unit Implementation Plan for Bull Trout (*Salvelinus confluentus*) (USFWS 2015), and the Native Salmonid Restoration Plan (NSRP) (Kleinschmidt and Pratt 1998), as it supports the enforcement and management of the LPO fishery, especially with respect to Bull Trout and Westslope Cutthroat Trout conservation.

Budget

Note that due to a change in invoicing periods, invoices for two years were paid for this project during 2020. The extra payment resulted in expenditures in excess of what was approved by the MC for 2020. This "overspend" was addressed through a one-time transfer of funds from Appendix F5 to Appendix D. This transfer was approved by the MC through a consent mail approved in January 2021. Thus, we are showing a zero balance for carryover associated with this project as opposed to a negative value.

Item	Estimated Carryover	2021 Budget Request
Payroll (0.75 FTE)	$0	$42,510
IDFG (benefits)	$0	$19,613
Payroll and benefits overhead, estimated at 34.65%	$0	$21,526
Communication Services	$0	$1,088
Training	$0	$563
Travel (Hotels, Per Diem, Etc.)	$0	$900
Specific use supplies (gear, education materials, etc.)	$0	$3,750
Renting Operating leases and Maintenance (Boat and vehicle)	$0	$7,500
Avista support (0.05 FTE)	$0	$1,125
Computer Hardware and Software	$0	$1,875
Total	$0	$100,450
Anticipated Expenditures		$100,450

As proposed, it is anticipated that approximately 75% of the Idaho P&E Officer's time will be dedicated to Bull Trout-specific activities (Appendix D) and 25% of their time will be dedicated to broader LPO issues, focusing on those species that are expected to directly benefit from other CFSA-sponsored projects (Appendix F5).

Literature Cited

Avista Corporation. 1999. Settlement Agreement (Clark Fork Settlement Agreement (CFSA)). Volume III, Application for New License, submitted to the Federal Energy Regulatory Commission (FERC). Avista Corporation, Spokane, Washington.

IDFG (Idaho Department of Fish and Game). 2013. Management Plan for the Conservation of Westslope Cutthroat Trout in Idaho. Fisheries Bureau, Boise, ID.

IDFG (Idaho Department of Fish and Game). 2019. Fisheries Management Plan 2019-2024. Boise, ID.

Kleinschmidt Associates and K. L. Pratt. 1998. Clark Fork River Native Salmonid Restoration Plan. Report to Washington Water Power Co., Spokane, Washington.

USFWS (United States Fish and Wildlife Service). 2015. Columbia Headwaters Recovery Unit Implementation Plan for Bull Trout (*Salvelinus confluentus*). Prepared by Montana Ecological Services Office and Northern Idaho Field Office, Portland, Oregon.

Project Evaluation and Ranking Criteria score sheet

As scored by the WRTAC on 1/20/2021

Appendix: D Project Title: Idaho Bull Trout Protection and Education Officer Support

Criteria	Score				
	4	**3**	**2**	**1**	**0**
A. Species to benefit	**Bull Trout and Westslope Cutthroat Trout**	Bull Trout	-	Westslope Cutthroat Trout	-
B. Protection or Education No. of Contacts	**Large No. (>500) individual contacts**	Moderately large No. (200-500) individual contacts	Moderate No. (100-200) individual contacts	Moderately Small No. (50-100) individual contacts	Small No. (<50) individual contacts
C. Protection or Education Information	**All major aspects of native trout id and conservation**	Native trout id and some conservation	Bull Trout id and some conservation	Bull Trout id	Trout catch & release
D. Audience	**in need of immediate enforcement or education contact**	likely to benefit from enforcement or education contact	May benefit from contact in the future	Unlikely to benefit from contact	Not appropriate audience
F. Cost/benefit	Benefit exceptional relative to cost	**Benefit high relative to cost**	Benefit consistent with cost	Difficult to assess benefit	Cost greatly exceeds benefit
G. Outside funding	≥ 50%	25–49%	11- 24%	≤ 10%	**Entirely CFSA funded**

Scoring Instructions:

- When ranking proposals that do not involve on-the-ground implementation but are necessary to the scope of physical projects (e.g., applied research, assessments or analyses), score them with regard to the "expected" or "average" resultant project.
- **A score of "0" in any of the criteria does not necessarily mean the project is ineligible for CFSA funding.** Rather, a score of "0" should be considered an indication that this aspect of the project needs to be thoroughly discussed and considered.
- Although total scores for each proposed project can be summed to get a general idea of the relative strength of each project, **the scoring system should be viewed as an ordinal rather than absolute ranking system.** In light of this and in the interest of maintaining a simple and objective scoring system, only whole numbers will be utilized (e.g., no half points).

2021 PROJECT PLAN

Montana Bull Trout Education and Communication Support

Project Contact

Dillon Tabish, Montana Fish, Wildlife and Parks (MFWP) Regional Information/Education Program Manager, Kalispell (406) 751-4564, dillon.tabish@mt.gov, *and*
Marc Terrazas, MFWP, (406) 382-3034, mterrazas@mt.gov

Project History

This is a component of a continuing project that has been annually reviewed and approved by the Management Committee (MC) since 2001. No changes to the scope or budget are being requested. However, the MC-approved Appendix D 5-year Implementation Plan included the adoption of Project Evaluation and Ranking Criteria that is included in this project plan. This project was ranked by the WRTAC on January 20, 2021 and the Evaluation and Ranking Criteria scores are included as the last page of this project plan.

Background

Public education and outreach are outlined in the Clark Fork Settlement Agreement (CFSA) Appendix D as appropriate Protection, Mitigation and Enhancement (PM&E) efforts. Following adoption of the expanded PM&E in 2001, the MC has approved updated 5-year implementation plans for the Project for Idaho Department of Fish and Game (IDFG), MFWP, and Panhandle Chapter Trout Unlimited (PCTU) in 2005, 2010, 2015 and 2020. As per the original PM&E, these 5-year plans have specified that resources for law enforcement will be distributed between IDFG and MFWP and that no less than 15% of annual funding be dedicated to public education.

This Project Plan is a yearly goal setting document to guide MFWP efforts in public education of Bull Trout through radio announcements, social media ads, and website information. A component of the education and outreach aspect of this project has been the annual purchase of informational radio advertisements from local radio broadcasters.

Goal

The goal of this Education Component Project Plan of the Bull Trout Protection and Public Education Program – MFWP is to increase the areas' knowledge of Bull Trout identification, regulations, proper catch-and-release techniques, and habitat requirements to decrease angler mortality and increase appreciation for this threatened species.

Objective

1. Reduce angler mortality on vulnerable Bull Trout populations by educating the fishing public, students, and others regarding Bull Trout identification, biology, and management. Additionally, continue to bolster youth interest in fishing and the outdoors through angling programs to instill a conservation ethic into younger generations.

Tasks

1. Continue media contacts (radio, television, and newspaper) in Sanders County to keep the restoration efforts before the public.

2. Monitor the Bull Trout identification/testing section on the MFWP website and improve its effectiveness in helping anglers properly identify Bull Trout.

3. Continue consultation and cooperation with Avista, IDFG, and PCTU in public education on Bull Trout and native fish conservation as required in the contractual agreement.

4. Inform and educate anglers through targeted radio spots and social media advertising in spring, summer and fall.

Work Products

- Mid-year report; due to Avista; August 2, 2021
- Annual Work Summary; due to Avista; November 15, 2021

Permitting Requirements

Not applicable for the tasks proposed in this project plan.

Endangered Species Act consultation for this project plan is associated with the 2019 Biological Opinion on the effects of continued operation of the Clark Fork Hydroelectric Project on Bull Trout and designated Bull Trout critical habitat (BiOp). This project plan is consistent with the analyses and conclusions contained in the 2019 BiOp and will adhere to all appropriate Terms and Conditions designed to reduce the extent and effects of incidental take on Bull Trout. No incidental take of Bull Trout is anticipated as a result of this project plan; therefore, no take reporting is required.

Cultural/Historic Resource Review

Not applicable for the tasks proposed in this project plan, there are no ground and/or vegetation disturbing activities, or proposed impacts to cultural/historic resources.

Benefit to the Resource

Enforcement and Education are outlined in Appendix D of the CFSA as appropriate PM&E efforts. This plan also supports native salmonid benefitting actions conducted under appendices B and C and supports State of Montana and U.S Fish and Wildlife Service laws and management plans for Bull Trout and other fish in the area. This project strives to educate the fishing public, students, and others regarding Bull Trout identification, biology and management. Through yearly implementation of the project, a community awareness of the value of Bull Trout conservation is fostered.

Budget

Item	Estimated Carryover	2021 Budget Request
480 radio spots (Bonners Ferry, Sandpoint, Sanders County)	$0	$2,520
312 radio spots (Flathead and Mission Valleys)	$0	$1,113
Social media advertising (targeted Facebook posts, Google ads)	$0	$1,500
Overhead (12%)	$0	$616
Total	$0	$5,749
Anticipated Expenditures		$5,749

This budget request covers the period of April 1, 2021 through March 31, 2022 and is based on 2020 expenditures and future estimates.

As approved by the Management Committee on 3/17/2021

Project Evaluation and Ranking Criteria score sheet

As scored by the WTRAC on 1/20/2021

Appendix: D Project Title: Montana Bull Trout Education and Communication Support

Criteria	Score				
	4	**3**	**2**	**1**	**0**
A. Species to benefit	Bull Trout and Westslope Cutthroat Trout	**Bull Trout**	-	Westslope Cutthroat Trout	-
B. Protection or Education No. of Contacts	**Large No. (>500) individual contacts**	Moderately large No. (200-500) individual contacts	Moderate No. (100-200) individual contacts	Moderately Small No. (50-100) individual contacts	Small No. (<50) individual contacts
C. Protection or Education Information	All major aspects of native trout id and conservation	Native trout id and some conservation	**Bull Trout id and some conservation**	Bull Trout id	Trout catch & release
D. Audience	in need of immediate enforcement or education contact	likely to benefit from enforcement or education contact	**May benefit from contact in the future**	Unlikely to benefit from contact	Not appropriate audience
F. Cost/benefit	**Benefit exceptional relative to cost**	Benefit high relative to cost	Benefit consistent with cost	Difficult to assess benefit	Cost greatly exceeds benefit
G. Outside funding	≥ 50%	25–49%	11- 24%	≤ 10%	**Entirely CFSA funded**

Scoring Instructions:

- When ranking proposals that do not involve on-the-ground implementation but are necessary to the scope of physical projects (e.g., applied research, assessments or analyses), score them with regard to the "expected" or "average" resultant project.
- **A score of "0" in any of the criteria does not necessarily mean the project is ineligible for CFSA funding.** Rather, a score of "0" should be considered an indication that this aspect of the project needs to be thoroughly discussed and considered.
- Although total scores for each proposed project can be summed to get a general idea of the relative strength of each project, **the scoring system should be viewed as an ordinal rather than absolute ranking system.** In light of this and in the interest of maintaining a simple and objective scoring system, only whole numbers will be utilized (e.g., no half points).

2021 PROJECT PLAN

Montana Bull Trout Education Outreach Support

Project Contacts

Marc Terrazas, Montana Fish, Wildlife and Parks (MFWP), (406) 382-3034, mterrazas@mt.gov,
Dillon Tabish, MFWP, (406) 751-4564, dillon.tabish@mt.gov

Project History

This is a continuing project that has been annually reviewed and approved by the Management Committee (MC) since 2001. Periodic evaluation and adjustment of this and the other principal components of this Protection Mitigation and Enhancement (PM&E) measure are outlined in a 5-year plan for this program, the last of which, for the 2020–2024 period, was approved by the MC in March 2020. This 5-year plan included the adoption of Project Evaluation and Ranking Criteria that is included in this project plan. In previous project plans the technician's salary component costs were underestimated; this project plan's request reflects the true cost of this component. This project was ranked by the WRTAC on January 20, 2021 and the Evaluation and Ranking Criteria scores are included as the last page of this project plan.

Background

Enforcement and Enhancement are outlined in the Clark Fork Settlement Agreement (CFSA) Appendix D as appropriate PM&E efforts. Following adoption of the expanded PM&E measure in 2001, the MC has approved updated 5-year implementation plans for the Project for Idaho Department of Fish and Game (IDFG), MFWP, and Panhandle Chapter Trout Unlimited (PCTU) in 2005, 2010, 2015, and 2020. As per the original PM&E measure, these 5-year plans have specified that resources for law enforcement will be distributed between IDFG and MFWP and that no less than 15% of annual funding be dedicated to public education.

This Project Plan for Bull Trout Protection and Public Education is a yearly goal setting document to guide MFWP efforts in public education, restoration, and protection of Bull Trout. A component of the education aspect of this project has been the annual outreach and education to area schoolchildren through classroom visitation and exercises, fishing days, area festival and fair exhibits, and updating Bull Trout identification signage along popular angler access sites in the area. Hooked-on-Fishing dollars are used to provide educational materials in classrooms. Additionally, the Hooked-on-Fishing curriculum presented throughout MFWP Region 1 incorporates Bull Trout education and is complimentary to the educational program of Appendix D. Listed below is the objectives and tasks for the year 2021. Included in the below tasks and budget are additional signs and materials to further educational efforts in the project area.

Goal

The goal of this Project Plan is to increase the areas' schoolchildren and angling public's knowledge of Bull Trout identification, regulations, proper catch-and-release techniques, and habitat requirements to decrease angler mortality of Bull Trout and increase appreciation for this threatened species.

Objective

1. Reduce angler caused mortality to vulnerable Bull Trout populations by educating the fishing public, students, and others regarding Bull Trout identification, biology, and management. Additionally, continue to bolster youth interest in fishing and the outdoors through angling programs to instill a conservation ethic into younger generations.

Tasks

1. Review the educational efforts conducted for Bull Trout in the lower Clark Fork drainage and adjust to improve future educational efforts methods in 2021.

2. Continue consultation and cooperation with Avista, IDFG, and PCTU in public education on Bull Trout and native fish conservation as required in the contractual agreement.

3. Involve a minimum of three public schools in Sanders County in the Hooked-On-Fishing Program in 2021.

4. Make a minimum of six public (or virtual) presentations at schools and/or civic groups in Sanders County, Montana in 2021.

5. Provide public educational outreach in a booth at the Trout Creek Huckleberry Festival 2021, and Sanders County Fair 2021.

6. Work with appropriate landowners to install and maintain "Anglers You're in Bull Trout Country" signs at public access sites (one new in 2021 at Hwy 56 bridge on Bull River).

7. Work with MFWP biologists to post signs on key Bull Trout tributaries alerting anglers to bait and harvest restrictions, as well as the legality of building small dams in the creeks.

8. Continue maintenance and improvements to the Bull Trout Education Trailer (i.e., awnings, banners, trailer graphics, and interior repainting) in 2021, prior to the Huckleberry Festival.

9. Cooperatively with other MFWP, Avista, and USFS staff, hold annual Kid's Fishing Day on a date (to be decided) at Triangle Pond and an additional event at Thompson Falls State Park.

Work Products

- Mid-year report; due to Avista; August 2, 2021
- Annual Work Summary; due to Avista; November 15, 2021

Permitting Requirements

Montana Fish, Wildlife and Parks will acquire all necessary permits for the tasks proposed in this project plan.

Endangered Species Act consultation for this project plan is associated with the 2019 Biological Opinion on the effects of continued operation of the Clark Fork Hydroelectric Project on Bull Trout and designated Bull Trout critical habitat (BiOp). This project plan is consistent with the analyses and conclusions contained in the 2019 BiOp and will adhere to all appropriate Terms and Conditions designed to reduce the extent and effects of incidental take on Bull Trout. No incidental take of Bull Trout is anticipated as a result of this project plan; therefore, no take reporting is required.

Cultural/Historic Resource Review
Montana Fish, Wildlife and Parks will coordinate Montana State Historic Preservation Office review for those tasks that may require ground disturbance prior to implementing the project. The work product for this review will be confidential due to the sensitive nature of the content.

Benefit to the Resource
Enforcement and Enhancement are outlined in Appendix D of the CFSA as appropriate PM&E efforts. This plan also supports native salmonid benefitting actions conducted under appendices B and C and supports State of Montana and U.S Fish and Wildlife Service laws and management plans for Bull Trout and other fish in the area. This project strives to educate the fishing public, students, and others regarding Bull Trout biology and management. Through yearly implementation of the project potential sources of Bull Trout mortality are reduced and a community awareness of the value of Bull Trout conservation is fostered. Additionally, angling programs strive to increase youth involvement and fishing and the outdoors which is necessary to ensure that conservation is a priority of future generations.

Budget

Item	Estimated Carryover	2021 Budget Request
Education Travel: 2,000 miles @ .322/mile + $193.44/monthly base rate	$0	$1,030
624 hours salary and benefits (0.3 FTE, education)	$0	$18,700
Bull Trout Country and swimming hole dams signs	$0	$200
Sign hanging materials/hardware (both)	$0	$100
Huckleberry Festival Event Sponsorship	$0	$200
Outreach booth at Sanders County Fair	$0	$215
Miscellaneous classroom supplies	$0	$100
Overhead (12%)	$0	$2,465
Total	$0	$23,010
Anticipated Expenditures		$23,010

As approved by the Management Committee on 3/17/2021

Project Evaluation and Ranking Criteria score sheet

As scored by the WRTAC on 1/20/2021

Appendix: D Project Title: Montana Bull Trout Education Outreach Support

Criteria	Score				
	4	**3**	**2**	**1**	**0**
A. Species to benefit	**Bull Trout and Westslope Cutthroat Trout**	Bull Trout	-	Westslope Cutthroat Trout	-
B. Protection or Education No. of Contacts	**Large No. (>500) individual contacts**	Moderately large No. (200-500) individual contacts	Moderate No. (100-200) individual contacts	Moderately Small No. (50-100) individual contacts	Small No. (<50) individual contacts
C. Protection or Education Information	All major aspects of native trout id and conservation	**Native trout id and some conservation**	Bull Trout id and some conservation	Bull Trout id	Trout catch & release
D. Audience	in need of immediate enforcement or education contact	**likely to benefit from enforcement or education contact**	May benefit from contact in the future	Unlikely to benefit from contact	Not appropriate audience
F. Cost/benefit	Benefit exceptional relative to cost	**Benefit high relative to cost**	Benefit consistent with cost	Difficult to assess benefit	Cost greatly exceeds benefit
G. Outside funding	≥ 50%	25–49%	11- 24%	≤ 10%	**Entirely CFSA funded**

Scoring Instructions:

- When ranking proposals that do not involve on-the-ground implementation but are necessary to the scope of physical projects (e.g., applied research, assessments or analyses), score them with regard to the "expected" or "average" resultant project.
- **A score of "0" in any of the criteria does not necessarily mean the project is ineligible for CFSA funding.** Rather, a score of "0" should be considered an indication that this aspect of the project needs to be thoroughly discussed and considered.
- Although total scores for each proposed project can be summed to get a general idea of the relative strength of each project, **the scoring system should be viewed as an ordinal rather than absolute ranking system.** In light of this and in the interest of maintaining a simple and objective scoring system, only whole numbers will be utilized (e.g., no half points).

2021 PROJECT PLAN

Montana Game Warden Support

Project Contacts
Morgan Post, Montana Fish, Wildlife and Parks (MFWP), (406) 465-9866, mopost@mt.gov,
Marc Terrazas, MFWP, (406) 382-3034, mterrazas@mt.gov, *and*
Dillon Tabish, MFWP, (406) 751-4564, dillon.tabish@mt.gov

Project History
This is a component of a continuing project that has been annually reviewed and approved by the Management Committee (MC) since 2001. Beginning in 2021, as per the MC-approved 5-year implementation plan, a Project Evaluation and Ranking Criteria has been added to each Appendix D Project Plan. Modifications to the MC-approved budget are being requested and are described in the Background section. This project was ranked by the WRTAC on January 20, 2021 and the Evaluation and Ranking Criteria scores are included as the last page of this project plan.

Background
Public education and outreach are outlined in the Clark Fork Settlement Agreement (CFSA) Appendix D as appropriate Protection, Mitigation and Enhancement (PM&E) efforts. Following adoption of the expanded PM&E measure in 2001, the MC has approved updated 5-year implementation plans for the Project for Idaho Department of Fish and Game (IDFG), MFWP, and Panhandle Chapter Trout Unlimited (PCTU) in 2005, 2010, 2015, and 2020. As per the original PM&E measure, these 5-year plans have specified that resources for law enforcement will be distributed between IDFG and MFWP and that no less than 15% of annual funding be dedicated to public education.

This Project Plan is a yearly goal setting document to guide MFWP efforts in public education and protection of Bull Trout. This Project Plan represents the enforcement component of this project. Enforcement is implemented by committed warden time patrolling area waters by a variety of means with an emphasis on visiting areas and/or patrolling in particular seasons when Bull Trout are known to be particularly susceptible to angling. The budget modifications resulted from updated vehicle mileage rates implemented by MFWP annually. To account for that change, and additional budget modifications, MFWP budgeted for 4,000 fewer miles of travel expenses in 2020 compared to previous years' budgets. An additional budgetary modification was necessary in 2020 due to rising equipment/material costs. This budgetary modification was in response to MFWP-required overhead charges figured on actual expenditures. However, personnel transfer in mid-2020 and a level of uncertainty in costs associated with interim patrolling by an officer from the Hot Springs area resulted in the 2020 budget request being brought forward for 2021.

Goal
The goal of this Project Plan is to decrease intentional and unintentional angler caused mortality of Bull Trout in the Montana waters of the Lower Clark Fork River; while at the same time through angler contact, to increase the angling public's knowledge of Bull Trout identification,

regulations, proper catch-and-release techniques, and habitat requirements.

Objective

1. Reduce angler caused mortality of vulnerable Bull Trout populations and illegal impacts to habitats by targeted enforcement presence throughout the Montana portion of the Avista Project Area.

Tasks

1. Review the 2020 MFWP summary of interim law enforcement actions and make any adjustments necessary to improve future enforcement efforts.

2. Continue coordination with IDFG and MFWP law enforcement as required in the contractual agreement through personal correspondence and shared work time in both states.

3. Conduct uniformed and plain-clothes patrols in the project area by watercraft, truck, four-wheeler, snowmobile, aircraft, horses, and foot.

4. Continue use of specialized remote video/camera surveillance equipment as required. Wardens will continue to work with MFWP and Avista biologists and technicians to keep informed of current Bull Trout movements, staging areas, suspect mortalities, trapping sites and other areas of concern to provide for more effective patrols.

5. Monitor in mid-to-late-summer for "swimming hole" type small-scale dams and investigate other potential illegal activities in Bull Trout drainages.

Work Products

- Mid-year report; due to Avista; August 2, 2021
- Annual Work Summary; due to Avista; November 15, 2021

Permitting Requirements

Not applicable for the tasks proposed in this project plan.

Endangered Species Act consultation for this project plan is associated with the 2019 Biological Opinion on the effects of continued operation of the Clark Fork Hydroelectric Project on Bull Trout and designated Bull Trout critical habitat (BiOp). This project plan is consistent with the analyses and conclusions contained in the 2019 BiOp and will adhere to all appropriate Terms and Conditions designed to reduce the extent and effects of incidental take on Bull Trout. No incidental take of Bull Trout is anticipated as a result of this project plan; therefore, no take reporting is required.

Cultural/Historic Resource Review

Not applicable for the tasks proposed in this project plan, there are no ground and/or vegetation disturbing activities, or proposed impacts to cultural/historic resources.

Benefit to the Resource

Enforcement and Enhancement are outlined in Appendix D of the CFSA as appropriate PM&E efforts. This plan also supports native salmonid benefitting actions conducted under appendices B and C and supports State of Montana and U.S Fish and Wildlife Service laws and management plans for Bull Trout and other fish in the area. Providing an enforcement presence in the area also supports programs conducted under appendices G, H and K of the CFSA. The enforcement portion of the project provides a deterrent to illegal harvest or harassment of Bull Trout. In addition, enforcement provides the option of directly stopping illegal harvest and saving individual Bull Trout, which are highly vulnerable in small spawning streams or in the cool water plumes of tributary mouths.

Budget

Item	Estimated Carryover	2021 Budget Request
Patrols/operations travel: 20,000 miles @ .32/mile + $242.64/monthly base rate	$8,100	$9,352
Boat maintenance	$250	$250
Per diem: Meals	$800	$1,200
Equipment/miscellaneous materials	$50	$550
Overhead (12%)	$1,104	$1,362
Total	$10,304	$12,714
Anticipated Expenditures		$23,018

This budget request covers the period of April 1, 2021 through March 31, 2022 and is based on 2019 expenditures and MFWP estimates for mileage rates. Due to personnel transfer in mid-2020, this 2019 comparison is the most complete estimate. The number of hours spent patrolling in 2021 will likely be lower than in 2019 due to the interim part-time help provided by the Hot Springs-based warden for at least the first portion of the season, but travel cost from the more distant workstation is anticipated to be more. Montana Fish, Wildlife and Parks wardens charge no personnel dollars from the Avista contract; Avista funds are used only for operations. Previous contributions to this project in terms of the warden's time spent implementing Bull Trout protection and education tasks have totaled over $25,000 annually.

Project Evaluation and Ranking Criteria score sheet

As scored by the WRTAC on 1/20/2021

Appendix: D Project Title: Montana Game Warden Support

Criteria	Score				
	4	**3**	**2**	**1**	**0**
A. Species to benefit	**Bull Trout and Westslope Cutthroat Trout**	Bull Trout	-	Westslope Cutthroat Trout	-
B. Protection or Education No. of Contacts	Large No. (>500) individual contacts	**Moderately large No. (200-500) individual contacts**	Moderate No. (100-200) individual contacts	Moderately Small No. (50-100) individual contacts	Small No. (<50) individual contacts
C. Protection or Education Information	**All major aspects of native trout id and conservation**	Native trout id and some conservation	Bull Trout id and some conservation	Bull Trout id	Trout catch & release
D. Audience	**in need of immediate enforcement or education contact**	likely to benefit from enforcement or education contact	May benefit from contact in the future	Unlikely to benefit from contact	Not appropriate audience
F. Cost/benefit	**Benefit exceptional relative to cost**	Benefit high relative to cost	Benefit consistent with cost	Difficult to assess benefit	Cost greatly exceeds benefit
G. Outside funding	**≥ 50%**	25–49%	11- 24%	≤ 10%	Entirely CFSA funded

Scoring Instructions:

- When ranking proposals that do not involve on-the-ground implementation but are necessary to the scope of physical projects (e.g., applied research, assessments or analyses), score them with regard to the "expected" or "average" resultant project.
- **A score of "0" in any of the criteria does not necessarily mean the project is ineligible for CFSA funding.** Rather, a score of "0" should be considered an indication that this aspect of the project needs to be thoroughly discussed and considered.
- Although total scores for each proposed project can be summed to get a general idea of the relative strength of each project, **the scoring system should be viewed as an ordinal rather than absolute ranking system.** In light of this and in the interest of maintaining a simple and objective scoring system, only whole numbers will be utilized (e.g., no half points).

2021 PROJECT PLAN

Trout Unlimited Outreach Coordination

Project Contact
Bill Love, Panhandle Chapter Trout Unlimited (PCTU), (208) 597-1710,
info@panhandlechaptertu.org, *and*
Ken Bouwens, Idaho Department of Fish and Game (IDFG), (208) 769-1414,
ken.bouwens@idfg.idaho.gov

Project History
This is a new project proposal of a continuing effort that has been approved by the Management Committee (MC) since 2001. In the past, one project plan was submitted by each of the primary implementers [i.e., IDFG, Montana Fish, Wildlife and Parks (MFWP) and PCTU] and each project plan typically incorporated numerous projects. Beginning 2019, individual project plans were developed for each project. Beginning this year, PCTU is submitting one project plan for all Bull Trout Education coordination activities, and other projects such as the Trout and About Festival Support have been discontinued. As per the MC-approved 5-year implementation plan, a Project Evaluation and Ranking Criteria has been added to each Appendix D Project Plan. This project was ranked by the WRTAC on January 20, 2021and the Evaluation and Ranking Criteria scores are included as the last page of this project plan.

Background
This project plan is guided by the Implementation Plan for the Bull Trout and Public Education Project 2020-2024 (Avista et al. 2020), which was developed by the primary implementation partners; Avista, IDFG, MFWP and PCTU, and approved by the MC in March 2020. The purpose of this plan is to support the overall education goals of the implementation plan, namely to reduce the incidental harvest of bull trout and increase public awareness concerning the life history, habitat needs, identifying characteristics and potential vulnerability to human activities of bull trout and other native fish. This is done through multipronged and engaging outreach to anglers, students and the general public with information about Bull Trout and Westslope Cutthroat Trout identification efforts, proper catch-and-release techniques, and sound, science-based fisheries management (including ongoing predatory species management) information. This effort augments other programs funded under the Clark Fork Settlement Agreement that are intended to result in greater numbers of Bull Trout in the Lower Clark Fork River and Lake Pend Oreille basin than would otherwise be the case and support other efforts to protect and restore the basin's aquatic resources.

Over the past decade, the PCTU has contracted with a Bull Trout Education Coordinator to organize the Trout and About Festival, organize and staff booths at other events, conduct on-line outreach, and procure promotional materials to help spread educational messages about Bull Trout and native fish habitat. The festival and other in-person outreach activities were suspended during 2020 due to restrictions under state's response to the COVID-19 virus. As a result of the disruption caused by COVID-19, PCTU and other implementation partners have discussed restructuring options. This project reflects a new approach based on partnering with IDFG's Bull Trout Enforcement and Education Officer on the deployment and use of the proposed Native

Fisheries Education Trailer and curriculum development, both for on-line use and for the trailer.

In general, the emphasis will shift from specific events to coordination of field trips at locations such as the Trestle Creek interpretive site and the Waterlife Discovery Center and identifying and staffing opportunities to reach other audiences with the assistance of the teaching tools and materials provided by the Native Fisheries Education Trailer. The education outreach efforts will focus on the areas of emphasis in the latest five-year implementation plan (Avista et al. 2020). The PCTU Bull Trout Education Coordinator will work with the IDFG officer to organize and schedule field trips for student groups, and identify opportunities to reach other target audiences, such as visiting anglers. Visiting anglers have been responsible for recent cases of misidentification of Bull Trout, and therefore are an area of emphasis in the implementation plan (Avista et al. 2020). In addition, the PCTU coordinator will work with the IDFG officer to develop curriculum that can be used on the Idaho Bull Trout website and help spread Bull Trout and native fisheries education messaging through social media and other on-line or printed media outlets. Finally, the PCTU Coordinator will develop and order educational promotional materials and distribute those promotional items during outreach events, or through partner outlets, such as North 40's fly shop, marine shops and boat inspection stations.

To assess the efficacy of this effort, the total number of contacts made at each field trip and outreach event will be recorded and reported. Promotional materials distribution will be tracked, as well. Online metrics will be recorded to determine the level of engagement in social media posts or on-line curricula, such as the Bull Trout Quiz.

Goal
The goal is to increase Bull Trout abundance through decreased angler induced mortality, and to promote advocacy for the species and its habitat, and to create a culture of public awareness that continually supports these efforts.

Objectives
1. Develop a student-oriented strategy/curriculum with a focus on field trips. Coordinate field trips for student groups and assist in instruction.

2. Develop an adult on-line and in-person education strategy/curriculum, with a focus on informing out of town anglers.

3. Incorporate Native Fisheries Education Trailer in overall outreach strategy.

4. Coordinate in-person and on-line outreach with IDFG Bull Trout Education and Enforcement Officer (officer).

5. Develop sustainable outreach plan in partnership with IDFG officer.

6. Provide Take No Bull (or other Bull Trout identification-themed) merchandise (stickers, coozies, and other materials free to public) to further the message of Bull Trout protection.

Tasks

1. Hire new PCTU Bull Trout Education Coordinator. (Objectives 1-6)
2. Regular planning meetings with IDFG Bull Trout Education Officer. (Objectives 4 and 5)
3. Coordinate with schools and IDFG officer to schedule field trips. (Objectives 1, 3 and 4)
4. Develop curriculum for in-person outreach and/or online. (Objectives 1 and 2)
5. Conduct on-line outreach using social media, websites. (Objectives 2 and 4)
6. Develop/order merchandise for outreach. (Objective 6)
7. Administration and reporting. (Objectives 1-6)

Work Products

- Mid-year report; due to Avista; August 2, 2021
- Annual Work Summary; due to Ken Bouwens, IDFG; November 15, 2021

Permitting Requirements

Endangered Species Act consultation for this project plan is associated with the 2019 Biological Opinion on the effects of continued operation of the Clark Fork Hydroelectric Project on Bull Trout and designated Bull Trout critical habitat (BiOp), and the USFWS-IDFG Cooperative Agreement pursuant to Section 6 of the Act. This project plan is consistent with the analysis and conclusions contained in the 2019 BiOp and the USFWS-IDFG Cooperative Agreement and will adhere to all appropriate Terms and Conditions designed to reduce the extent and effects of incidental take on Bull Trout. No incidental take of Bull Trout is anticipated as a result of this project plan; therefore, no take reporting is required.

Cultural/Historic Resource Review

Not applicable for the tasks proposed in this project plan, there are no ground and/or vegetation disturbing activities, or proposed impacts to cultural/historic resources.

Benefit to the Resource

Reducing angler mortality to Bull Trout and instilling the importance of habitat preservation is important to realize the potential of other ongoing CFSA PM&E measures including the Fish Passage/Native Salmonid Restoration Plan (Appendix C) and the Idaho Tributary Habitat Acquisition and Fishery Enhancement Program (Appendix A). The efforts of this continuing program support IDFG and U.S Fish and Wildlife Service (USFWS) management plans for Bull Trout in the Lake Pend Oreille (LPO) area. This project provides direct benefits to conservation of Bull Trout being managed by Avista, MFWP, IDFG, and USFWS by reducing the incidence of unintentional mortality to Bull Trout due to misidentification and/or improper angling and release techniques, and increasing public awareness on the importance of high quality habitat.

Budget

Item	Estimated Carryover	2021 Budget Request
Bull Trout Education Coordination, 620 hours @ $20/hr	$2,800	$12,400
Promotional and Educational materials	$1,000	$4,000
Website maintenance	$4,000	$1,200
Administration & Reporting (15%)	$1,170	$2,640
Total	$8,970	$20,240
Anticipated Expenditures		$29,210

As of November. 1, 2020, PCTU had a membership of 340 in North Idaho. Panhandle Chapter Trout Unlimited is committed to involving members and other volunteers in outreach efforts and estimates contributing 360 hours of volunteer labor, valued at $8,114 over the course of the year. Volunteers would assist with field trips, outreach/trailer events, and oversight and administration.

Literature Cited

Avista; Idaho Department of Fish and Game; Montana Fish, Wildlife and Parks; Panhandle Chapter Trout Unlimited, 2020. Implementation Plan for the Bull Trout Protection and Public Education Project 2020-2024.

Project Evaluation and Ranking Criteria score sheet

As scored by the WRTAC on 1/20/2021

Appendix: D Project Title: Trout Unlimited Outreach Coordination

Criteria	Score				
	4	**3**	**2**	**1**	**0**
A. Species to benefit	**Bull Trout and Westslope Cutthroat Trout**	Bull Trout	-	Westslope Cutthroat Trout	-
B. Protection or Education No. of Contacts	**Large No. (>500) individual contacts**	Moderately large No. (200-500) individual contacts	Moderate No. (100-200) individual contacts	Moderately Small No. (50-100) individual contacts	Small No. (<50) individual contacts
C. Protection or Education Information	**All major aspects of native trout id and conservation**	Native trout id and some conservation	Bull Trout id and some conservation	Bull Trout id	Trout catch & release
D. Audience	in need of immediate enforcement or education contact	**likely to benefit from enforcement or education contact**	May benefit from contact in the future	Unlikely to benefit from contact	Not appropriate audience
F. Cost/benefit	Benefit exceptional relative to cost	**Benefit high relative to cost**	Benefit consistent with cost	Difficult to assess benefit	Cost greatly exceeds benefit
G. Outside funding	≥ 50%	**25–49%**	11- 24%	≤ 10%	Entirely CFSA funded

Scoring Instructions:

- When ranking proposals that do not involve on-the-ground implementation but are necessary to the scope of physical projects (e.g., applied research, assessments or analyses), score them with regard to the "expected" or "average" resultant project.
- **A score of "0" in any of the criteria does not necessarily mean the project is ineligible for CFSA funding.** Rather, a score of "0" should be considered an indication that this aspect of the project needs to be thoroughly discussed and considered.
- Although total scores for each proposed project can be summed to get a general idea of the relative strength of each project, **the scoring system should be viewed as an ordinal rather than absolute ranking system.** In light of this and in the interest of maintaining a simple and objective scoring system, only whole numbers will be utilized (e.g., no half points).

2021 PROJECT PLAN

Pend Oreille Water Festival

Project Contact
Gail Bolin, Bonner Soil & Water Conservation District (BSWCD), (208) 627-3292,
Waterfestival.bonner@gmail.com, *and*
Ken Bouwens, Idaho Department of Fish and Game (IDFG), (208) 769-1414
ken.bouwens@idfg.idaho.gov

Project History
This is a new project proposal; however, the Pend Oreille Water Festival (Water Festival) has received funding from Appendix D as part of the Trout and About Festival and Fly Fishing Film Tour projects in the past. This is the first time the Water Festival has been submitted as a distinct project to the Management Committee (MC). As per the MC-approved 5-year implementation plan, a Project Evaluation and Ranking Criteria has been added to each Appendix D Project Plan. This project was ranked by the WRTAC on January 20, 2021 and the Evaluation and Ranking Criteria scores are included as the last page of this project plan.

Background
The Water Festival is an annual multidisciplinary water resource education program for all fifth-grade students (approximately 450) from private and public schools in Bonner County, Idaho. The Water Festival includes interactive in-class lessons and culminates with a two-day outdoor field trip in mid-May at Riley Creek Recreation Area on the Pend Oreille River.

The first Water Festival in Bonner County was held in May 1996. It was a joint effort between the Pend Oreille Conservation District in Newport, WA, and the BSWCD in Sandpoint, Idaho. The steering committee was organized and coordinated by Ruth Watkins, director of Tri-States Water Quality Council. Later the joint Festival separated into two separate programs, and Tri-States became the lead organization for the Water Festival in Bonner County. Tri-States closed in 2012 and the Water Festival then came under the direction of the Bonner Soil & Water Conservation District.

The Water Festival's unique outdoor classroom provides students the opportunity to gain first-hand experience and creatively think about the dynamic world around them. Approximately 450 fifth-graders (225 each day) from 16 public and private schools engage with about 45 professionals and 58 Sandpoint High School student mentors focusing on water resources and the Clark Fork-Pend Oreille Watershed. The Water Festival gives students the opportunity to learn through hands-on and fun activities that stimulate their thinking and teach them about their watershed as they rotate through six different interactive and instructional stations: Fisheries, Water Quality, Watersheds, Animal Tracks, Fur Trapping Era, and Orienteering. After lunch students learn about the relationship of water quality and abundance of raptors—particularly osprey and eagles presented by Birds of Prey Northwest.

- **Fisheries**: Bull Trout and other fish identification using real fish, migration patterns, habitat needs, life cycles, food and survival requirements.

- **Water Quality**: Using live macroinvertebrates students learn classification methods, the physical, chemical, and biological properties that determine water quality as well as impacts caused by aquatic invasive species.
- **Watersheds**: An EnviroScape model is used to visualize a watershed, pollutants that may be found there, create rain and runoff, and demonstrate erosion and pollution impacts on water quality.
- **Animal Tracks**: Animal gait/track identification, wildlife dependence on water resources, students create a track guide by stamping life-size animal tracks onto bandanas that they take home.
- **Fur Trapping Era**: Explores the lives and impacts of the early fur traders in the Northwest through demonstrations complete with traps, beaver pelts, and an antique musket rifle.
- **Orienteering**: Students learn basic compass skills to navigate through the woods and draw a map much like David Thompson did over 200 years ago.

All students attending the Water Festival live in rural Bonner County where over half of all elementary students qualify for free or reduced lunch. Because this is a low-income community, funding for creative out-of-the classroom science-based education, such as the Water Festival provides is extremely limited. Bonner County is rich in water, and the Water Festival offers dynamic lessons of how to be a good steward of this resource and what actions students and their families might take to protect water quality for current and future generations.

Additionally, the Water Festival provides the framework to generate enthusiasm and spark an interest in the sciences for our area's youth at no cost (to the students or to the school districts). Through exposure to hands-on and fun outdoor science lab experiences, we anticipate that these young students will become interested in pursuing natural resource careers.

Over time, the Water Festival has become a mainstay in the science curriculum of fifth-grade classrooms throughout the county. Teachers appreciate and utilize the diverse lesson plans in the traveling Watershed Education Trunk and value the in-class presentation as well as the Water Festival's unique outdoor classroom. They repeatedly comment that the educational value of the program is exceptional.

A steering committee comprised of representatives from BSWCD, US Army Corps of Engineers, Lakes Commission, and Pack River Watershed Council oversee the project and works with the Water Festival Coordinator to implement the project. The Coordinator's responsibilities include developing a budget, fundraising, coordinating and teaching the in-class lessons, recruiting station instructors, coordinating the logistics of the outdoor classroom as well as grant reporting and post-evaluations.

In order to evaluate the educational effectiveness of the Water Festival, all fifth-grade students are given pre-festival and post-festival tests. Test questions are keyed to correspond with concepts taught during the in-class lessons and the outdoor field trip. All tests are graded. The results from the 2019 Water Festival showed a significant improvement in knowledge.

Pre-test: 25% scored 80% or above
Post-test: 82% scored 80% or above

Additionally, field trip instructors and fifth grade teachers post-evaluate the event's instructional topics, logistics and educational effectiveness. These evaluations are used by the steering committee to make any needed adjustments in the program for the following year.

Goal
To empower children with the knowledge to appreciate, respect and protect our water resources.

Objectives
1. Build knowledge, appreciation and a culture of stewardship of the area's water resources and their benefits.

2. Promote community collaboration by involving a cross-section of natural resource professionals, teachers, students, parents, and community members in a shared environmental educational event.

Tasks
1. Planning, budgeting and securing financial resources to support Water Festival (Objectives 1), October 2020-May 2021.

2. Securing permit for use of Riley Creek Recreation area (Objectives 1 and 2), November 2020.

3. Coordinating/teaching in-classroom presentations (Objectives 1 and 2), March-May, 2021.

4. Recruiting volunteer instructors for Water Festival (Objectives 1 and 2), January-May, 2021.

5. Securing adequate materials and supplies (Objectives 1), January-March, 2021.

6. Coordinating volunteers and schools for Water Festival (Objectives 1 and 2), late January-May, 2021.

7. Post-evaluation documentation and grant reporting (Objectives 1 and 2), May-June, 2021.

Work Products
- Mid-year report; due to Avista; August 2, 2021
- Annual Work Summary; due to Ken Bouwens, IDFG; November 15, 2021

Permitting Requirements
The Water Festival Coordinator will acquire the permit for the use of Riley Creek Campground from the US Army Corps of Engineers.

Endangered Species Act consultation for this project plan is associated with the 2019 Biological Opinion on the effects of continued operation of the Clark Fork Hydroelectric Project on Bull Trout and designated Bull Trout critical habitat (BiOp). This project plan is consistent with the

analyses and conclusions contained in the 2019 BiOp and will adhere to all appropriate Terms and Conditions designed to reduce the extent and effects of incidental take on Bull Trout. No incidental take of Bull Trout is anticipated as a result of this project plan; therefore, no take reporting is required.

Cultural/Historic Resource Review
Not applicable for the tasks proposed in this project plan, there are no ground and/or vegetation disturbing activities, or proposed impacts to cultural/historic resources.

Benefit to the Resource
Reducing angler mortality to Bull Trout and instilling the importance of habitat preservation is important to realize the potential of other ongoing CFSA PM&E measures including the Fish Passage/Native Salmonid Restoration Plan (Appendix C) and the Idaho Tributary Habitat Acquisition and Fishery Enhancement Program (Appendix A). The efforts of this continuing program support IDFG and U.S Fish and Wildlife Service (USFWS) management plans for Bull Trout in the Lake Pend Oreille (LPO) area. This project provides direct benefits to conservation of Bull Trout being managed by Avista, MFWP, IDFG, and USFWS by reducing the incidence of unintentional mortality to Bull Trout due to misidentification and/or improper angling and release techniques, and increasing public awareness on the importance of high quality fish habitat.

Budget

Item	Estimated Carryover	2021 Budget Request
Festival Coordination ($18/hour for 150 hours)	$0	$2,700
Mileage	$0	$600
Supplies, refreshments	$0	$400
Administration (8%)	$0	$300
Total	$0	$4,000
Anticipated Expenditures		$4,000

The total anticipated expenses for the 2021 Water Festival is $10,875. Other funding is expected from the following sources: Angels Over Sandpoint ($450 pending); Bonner County Sportsmen ($100 pending); Cloudsledge Conservation Trust ($1,000 pending); Cocolalla Lake Association ($100 pending), Community Assistance League ($750 pending); Individual Contributions ($375 pending); Equinox Foundation ($2,300 secured); Idaho Forest Group ($500 pending); Lake Pend Oreille Idaho Club ($500 pending); Northern Lights ($100 pending); Panhandle Alliance for Education ($300 pending); and Selkirk Realtors ($400 pending). The Water Festival also benefits from in-kind contributions with an estimated value of $15,928, from the U.S. Army Corps of Engineers for use of the Riley Creek campground and day use area, donated lunches, and the time of employees and volunteers. Panhandle Alliance for Education covers transportation costs for the school district.

Project Evaluation and Ranking Criteria score sheet

As scored by the WRTAC on 1/20/2021

Appendix: D Project Title: Pend Oreille Water Festival

Criteria	Score				
	4	**3**	**2**	**1**	**0**
A. Species to benefit	**Bull Trout and Westslope Cutthroat Trout**	Bull Trout	-	Westslope Cutthroat Trout	-
B. Protection or Education No. of Contacts	Large No. (>500) individual contacts	**Moderately large No. (200-500) individual contacts**	Moderate No. (100-200) individual contacts	Moderately Small No. (50-100) individual contacts	Small No. (<50) individual contacts
C. Protection or Education Information	All major aspects of native trout id and conservation	**Native trout id and some conservation**	Bull Trout id and some conservation	Bull Trout id	Trout catch & release
D. Audience	in need of immediate enforcement or education contact	**likely to benefit from enforcement or education contact**	May benefit from contact in the future	Unlikely to benefit from contact	Not appropriate audience
F. Cost/benefit	Benefit exceptional relative to cost	**Benefit high relative to cost**	Benefit consistent with cost	Difficult to assess benefit	Cost greatly exceeds benefit
G. Outside funding	**≥ 50%**	25–49%	11- 24%	≤ 10%	Entirely CFSA funded

Scoring Instructions:

- When ranking proposals that do not involve on-the-ground implementation but are necessary to the scope of physical projects (e.g., applied research, assessments or analyses), score them with regard to the "expected" or "average" resultant project.
- **A score of "0" in any of the criteria does not necessarily mean the project is ineligible for CFSA funding.** Rather, a score of "0" should be considered an indication that this aspect of the project needs to be thoroughly discussed and considered.
- Although total scores for each proposed project can be summed to get a general idea of the relative strength of each project, **the scoring system should be viewed as an ordinal rather than absolute ranking system.** In light of this and in the interest of maintaining a simple and objective scoring system, only whole numbers will be utilized (e.g., no half points).

2021 ANNUAL IMPLEMENTATION PLAN SUMMARY – APPENDIX E

Clark Fork Project, FERC No. 2058
Cabinet Gorge and Noxon Rapids Hydroelectric Developments

Title
Watershed Councils Program

Implementation Staff Lead
Sean Moran, Avista, (406) 847-1291, sean.moran@avistacorp.com

Background
The purpose of this program is to facilitate the protection and restoration of tributary stream habitat in the Lake Pend Oreille – lower Clark Fork River watershed. This will improve conditions for aquatic life, including macroinvertebrate communities and the native fish species (i.e., Bull Trout, Westslope Cutthroat Trout, and Mountain Whitefish) most affected by the construction and continued operation of the Clark Fork Projects.

Prior to 1999, two watershed councils (WCs) already existed within the lower Clark Fork River drainage, one in the Elk Creek drainage (tributary to Cabinet Gorge Reservoir) and one in the Prospect Creek drainage (tributary to Noxon Reservoir). The Elk Creek WC had already implemented a number of stream assessment, protection and enhancement measures. The degree of local stakeholder interest and success of this WC was a catalyst for developing and establishing this Watershed Councils Program. The Prospect Creek WC began on-the-ground restoration in 1999, in part through funds from the Montana Tributary Habitat Acquisition and Recreational Fishery Enhancement Program (Appendix B of the Clark Fork Settlement Agreement [CFSA]).

This Watershed Councils Program was initiated in 1999. In the initial year of implementation for this program, efforts focused on developing and disseminating informational materials about WCs and this program, designing a decision-making process for reviewing WC related funding needs and requests and new WC formation. Since 1999, Rock Creek, Whitepine Creek, Trout Creek, Pilgrim Creek, Little Beaver Creek, and the Bull River WCs were formed. Beginning in 2000, Avista entered into an agreement with the Green Mountain Conservation District (GMCD), which allowed GMCD to directly administer these program funds in Montana.

In 2001, the Pack River WC formed in Idaho. Subsequently in 2002, Avista entered into an agreement with Bonner Soil and Water Conservation District (BSWCD), which allowed BSWCD to directly administer these program funds for the Pack River WC.

The Lower Clark Fork Watershed Group (LCFWG, an umbrella and organizational group for the Montana WCs) was officially formed early in 2004 and received its 501-3C status from the IRS in 2005. The LCFWG now facilitates all activities for the Montana WCs, helps coordinate Avista's restoration efforts with other state and/or federal activities, as well as seeking non-CFSA funding for watershed activities.

If needed, developed ranking criteria can be utilized to prioritize providing administrative funding or other support to facilitate the formation and initial development of new WC and to support existing WC.

2021 Project Plans

1. Pack River Watershed Council, Bonner Soil and Water Conservation District
2. Lower Clark Fork Watershed Council Projects

Work Products

Pack River Watershed Council, Bonner Soil and Water Conservation District

- Mid-year report; due to Avista; August 2, 2021
- Annual Newsletter (Summer 2021)
- Annual Work Summary (including financial report); due to Avista; November 15, 2021

Lower Clark Fork Watershed Council Projects

- Mid-year report; due to Avista; August 2, 2021
- Annual Work Summary; due to Avista; November 15, 2021

Appendix E 2021 Budget

Project	Carryover[1]	2021
Watershed Councils Program Fund (including GDP inflation rate)		**$14,549**
Unexpended funds w/interest		**$6,923**
Total Available		**$21,472**
Pack River Watershed Council, Bonner Soil and Water Conservation District	$0	$4,400
Lower Clark Fork Watershed Council Projects	$0	$10,041
Total	$0	$14,441
	MC Approved Budget	**$14,441**
	Unobligated Funds	$7,031

[1] *This column denotes estimated carryover of unexpended, approved funds as of January 1.*

2021 PROJECT PLAN

Pack River Watershed Council, Bonner Soil and Water Conservation District

Project Contact
Sarah Garcia, Bonner Soil and Water Conservation District (BSWCD), (208) 263-5310 ext100, Sarah.Garcia@id.nacdnet.net, *and*
Jessica Erickson, Watershed Coordinator, Pack River Watershed Council (PRWC), (208) 263-5310 bluedeleeuw@gmail.com

Project History
This is a continuing project that, as administered by BSWCD, was originally approved by the Management Committee (MC) in 2002. The scope and budget for this project are reviewed by the MC annually.

Background
The Tri-State Water Quality Council, in conjunction with the BSWCD and the Natural Resources Conservation Service (NRCS), formed the PRWC in the spring of 2001. The PRWC is the only active watershed council in the Lake Pend Oreille area. As such, it provides coordination between private landowners and various agencies towards the continued development of stream habitat improvement and watershed restoration opportunities in this important Lake Pend Oreille tributary. The PRWC received initial grant funding from Environmental Protection Agency (EPA) and the River Network in 2001, and funding from Avista (through Appendix E of the Clark Fork Settlement Agreement) from 2002 through 2020.

We are requesting funding assistance for PRWC in 2021. This year, watershed coordination work will include partnering with the U.S. Forest Service to develop a potential channel restoration project in Grouse Creek. The PRWC will also continue to work closely with the NRCS to connect with willing landowners who would be interested in fisheries habitat enhancement projects. Additional efforts will focus on developing outreach strategies to identify and engage willing landowners in watershed enhancement projects in the Pack River watershed as identified in recent habitat assessments (GeoEngineers 2019, 2020).

Goal
The mission of the PRWC is to improve water quality and riparian habitat in the Pack River watershed for people, fish, and wildlife through education, collaboration, and cooperative projects.

Objectives
1. Address the PRWC management actions identified by the Technical Advisory Council in the Pack River Watershed Management Plan to enhance the quality of the Pack River watershed's natural resources, increase available habitat, and ensure the success of restoration efforts.

2. Engage stakeholders, landowners, and the public in watershed enhancement projects in the Pack River watershed.

3. Coordinate communication, activities, education, and funding between landowners and agencies.

4. Identify available resources to support watershed projects in the Pack River watershed.

Tasks

1. Promote the development and implementation of watershed restoration/enhancement /conservation projects. (Objectives 1, 2, and 3)

2. Promote education on healthy watersheds. (Objectives 1, 2, and 3)

3. Develop community outreach efforts: including an annual newsletter, developing a PRWC website, and maintaining a link on the Bonner Soil and Water Conservation District website. (Objectives 1, 2, and 3)

4. Facilitate meetings between stakeholders and landowners; prepare meeting agendas and compose meeting summaries. (Objectives 1, 2, and 3)

5. Provide general administrative work to support the development and implementation of watershed projects. (Objectives 1, 2, 3, and 4)

6. Collaborate with the Clark Fork Grant writer to leverage funding for watershed projects in the Pack River watershed. (Objective 4)

7. Attend relevant training opportunities, conferences, and meetings to improve the coordinator's ability to complete the above tasks. (Objectives 1, 2, 3, and 4)

Work Products

- Mid-year report; due to Avista; August 2, 2021
- Annual Newsletter (Summer 2021)
- Annual Work Summary (including financial report); due to Avista; November 15, 2021

Permitting Requirements

Not applicable for the tasks proposed in this project plan.

Endangered Species Act consultation for this project plan is associated with the 2019 Biological Opinion on the effects of continued operation of the Clark Fork Hydroelectric Project on Bull Trout and designated Bull Trout critical habitat (BiOp). This project plan is consistent with the analyses and conclusions contained in the 2019 BiOp and will adhere to all appropriate Terms and Conditions designed to reduce the extent and effects of incidental take on Bull Trout. No incidental take of Bull Trout is anticipated as a result of this project plan; therefore, no take reporting is required.

Cultural/Historic Resource Review

Not applicable for the tasks proposed in this project plan, there are no ground and/or vegetation

disturbing activities, or proposed impacts to cultural/historic resources.

Benefit to the Resource

This project is consistent with the Watershed Councils Program (Appendix E), as well as the Idaho Tributary Habitat Acquisition and Fishery Enhancement Program (Appendix A), as education and outreach from this project facilitates the development of tributary habitat enhancement projects and identification of future enhancement opportunities. The Pack River is the second largest tributary to Lake Pend Oreille and is ranked as a high priority for restoration and protection under the lake's Key Watershed Bull Trout Problem Assessment (PBTAT 1998). The assessment also ranks the Pack River as having a high potential to increase Bull Trout numbers. Because the Pack River watershed is impaired and largely in private ownership, maintaining landowner involvement in the PRWC and TMDL implementation process (BSWCD 2006) is critical to successful restoration efforts.

Budget

Item	Estimated Carryover	2021 Budget Request
Watershed Coordination	$0	$3,500
Bulk mail, postage and processing	$0	$400
Meeting supplies; copies	$0	$100
Administration Fee (10%)	$0	$400
Total	$0	$4,400
Anticipated Expenditures		$4,400

Literature Cited

BSWCD (Bonner Soil and Water Conservation District, Pack River Technical Advisory Committee, Pack River Watershed Council). 2006. Pack River Watershed Management Plan and TMDL Implementation Plan.

GeoEngineers. 2019. Habitat Prioritization Evaluation for Caribou and Hellroaring Creeks. Report to IDFG and Avista.

GeoEngineers. 2020. Habitat Prioritization Evaluation for McCormick Creek and Upper Pack River. Report to IDFG and Avista.

PBTAT (Panhandle Bull Trout Technical Advisory Team). 1998. Lake Pend Oreille Key Watershed Bull Trout Problem Assessment. Prepared for Lake Pend Oreille Watershed Advisory Group and the State of Idaho. Boise, Idaho.

2021 PROJECT PLAN

Lower Clark Fork Watershed Council Projects

Project Contact
Brita Olson, Lower Clark Fork Watershed Group (LCFWG), (208) 304-3852, brita@lowerclarkforkwatershedgroup.org

Project History
The LCFWG was formed in 2004, and has received continuing support from Clark Fork Settlement Agreement (CFSA) Appendix E in addition to funding under Appendix B as annually approved by the Management Committee.

Background
The organization began as an umbrella group to assist the eight watershed councils in the Lower Clark Fork (LCF): Elk Creek, Prospect Creek, Rock Creek, Whitepine Creek, Bull River, Trout Creek, Pilgrim Creek and Little Beaver Creek. As local landowner involvement waxes and wanes, the LCFWG provides consistent follow-through and is instrumental in bringing local landowners and other resources to the table to assist Avista Corporation (Avista) and other technical agencies with planning, developing, and implementing fish habitat and watershed restoration projects in the CFSA project area. The LCFWG provides administrative support, coordination, technical assistance, and resources to area landowners and watershed councils, and other stakeholders in the LCF project area.

The work load associated with each task (outlined below) is variable depending on activities in the watershed in a given year. The LCFWG requests that funding for each task is kept flexible in order to maximize the productivity achieved with these dollars. The work of the LCFWG is ongoing, in support of many other projects going on in the LCF watershed. It is most closely tied to funding received from CFSA Appendix B for the coordination of LCF projects. Historically, there has been much overlap between these two proposals, and while effort was made in 2017 to distinguish the proposals, there will inevitably continue to be some overlap. For example, this project will fund some grant writing activities, which are often closely tied to the coordination of LCF projects funded by Appendix B.

Additionally, we work to leverage other resources for our work in the LCF watershed. This allows us to expand our capacity and improve the quality of our work. Outside resources and administration funds will complement the work funded through this project.

Goal
The goal of this project plan is to support the ongoing engagement of LCF watershed stakeholders collaborating in support of the CFSA, leverage additional administrative, technical and financial resources, and increase the effectiveness of LCF projects through greater collaboration.

Objectives
1. Engage stakeholders, landowners, and public in watershed projects in the LCF watershed.

2. Facilitate collaboration by providing a forum for watershed stakeholders to interact, work together and share ideas, experiences, and knowledge.

3. Communicate with stakeholders and partners regarding watershed projects and opportunities in the LCF watershed.

4. Leverage resources for LCF projects.

Tasks

1. Hold quarterly LCFWG meetings, generally in March, June, September, and December. (Objectives 1, 2, and 3)

2. When opportunity arises or impetus exists, coordinate additional stakeholder meetings for partners, landowners, or public. (Objectives 1, 2, and 3)

3. Collaborate with Clark Fork Grant writer to leverage funding to support LCF projects or coordination of LCF activities. (Objective 4)

4. Provide general administrative work in support of LCF watershed projects or watershed council activities. (Objectives 1, 2, 3, and 4)

5. Coordinator will attend appropriate training opportunities, conferences, and meetings to acquire skills to improve her ability to complete the above tasks and to bring knowledge into the LCF watershed to better projects and work products. (Objectives 1, 2, 3, and 4)

6. Develop outreach efforts in the local community: develop press releases on current activities, website updates, mailings, events, or other deliverables as appropriate. (Objectives 1 and 3)

7. Continue supporting and developing a Private Land Stewardship Program, in collaboration with the Green Mountain Conservation District (GMCD), Natural Resource Conservation Service (NRCS), and other stakeholders. An effort was made in 2020 to engage more private landowners through the LCF Watershed in conservation projects on their properties and provide them with access to planning, implementation, and coordination support. Due to COVID-19 related delays and the ongoing needs of sustaining a landowner engagement program, specific activities planned for 2021 include: continuing to develop resources and information on the GMCD and LCFWG websites; developing tributary specific information for and direct mailings to landowners in each major tributary to the LCF River; conducting site visits with interested landowners/contacts (as opportunities arise); and providing support for project development/grant writing for landowners. (Objectives 1, 3, and 4)

Work Products

- Mid-year report; due to Avista; August 2, 2021
- Annual Work Summary; due to Avista; November 15, 2021

Permitting Requirements
Not applicable for the tasks proposed in this project plan.

Endangered Species Act consultation for this project plan is associated with the 2019 Biological Opinion on the effects of continued operation of the Clark Fork Hydroelectric Project on Bull Trout and designated Bull Trout critical habitat (BiOp). This project plan is consistent with the analyses and conclusions contained in the 2019 BiOp and will adhere to all appropriate Terms and Conditions designed to reduce the extent and effects of incidental take on Bull Trout. No incidental take of Bull Trout is anticipated as a result of this project plan; therefore, no take reporting is required.

Cultural/Historic Resource Review
Not applicable for the tasks proposed in this project plan, there are no ground and/or vegetation disturbing activities, or proposed impacts to cultural/historic resources.

Benefit to the Resource
This project is consistent with the Watershed Councils Program (Appendix E), as well as the Montana Tributary Habitat Acquisition and Recreational Fishery Enhancement Program (Appendix B) of the CFSA, as tasks from this project facilitates the development of tributary habitat enhancement projects and identification of future enhancement opportunities. This project exists to support stream protection and enhancement projects in the LCF watershed. The LCFWG serves as a point of contact for long-term follow through with landowners and past projects as well as helps leverage resources to maximize the positive impact of CFSA dollars in the watershed. By facilitating projects that improve riparian and instream habitat, this project also benefits Appendices C and K, state water quality prescriptions, and when located along streams with native salmonids, are consistent with Federal and State of Montana management plans for these species.

Budget

Item	Estimated Carryover	2021 Budget Request
LCFWG staff time, approx. 160 hours (Task 1-5)	$0	$4,960
LCFWG staff time, approx. 48 hours (Task 6)	$0	$1,488
LCFWG staff time, approx. 80 hours (Task 7)	$0	$2,480
Miscellaneous materials and supplies (All tasks)	$0	$200
Administration fee, 10%	$0	$913
Total	$0	$10,041
Anticipated Expenditures		$10,041

In order to fully fund Private Land Stewardship Program, support from Appendix E will be matched by the following sources:

- Montana Department of Natural Resources 223 Program (sponsored by GMCD); $10,000 (approximately $2,500 to be expended in 2021); January 1, 2020 – December 31, 2021
- Soil and Water Conservation Districts of Montana Water Quality Mini-Grant; $1,500; April 21, 2020 – April 30, 2021
- Montana Watershed Fund; $3,000; September 1, 2020 – April 30, 2021

Following the completion of targeted tributary outreach efforts (direct mailings and landowner engagement), Appendix E will provide crucial support in 2021 for following through with landowners and developing on-the-ground conservation activities.

2021 ANNUAL IMPLEMENTATION PLAN SUMMARY– APPENDIX F1

Clark Fork Project, FERC No. 2058
Cabinet Gorge and Noxon Rapids Hydroelectric Developments

Title
Clark Fork River Water Quality Monitoring Program

Implementation Staff Lead
Paul Kusnierz, Avista, (406) 847-1274, paul.kusnierz@avistacorp.com

Background
The purpose of this measure is to provide for the systematic, long-term monitoring of nutrients and metals in the lower Clark Fork River as part of the former Tri-State Water Quality Council (TSWQC) Monitoring Program. Excessive nutrient loading and metals contamination in the middle and upper portions of the Clark Fork River were cause for water quality concerns in the lower Clark Fork River - Lake Pend Oreille (LCFR-LPO) system. Interest in monitoring long-term trends in the quality of water entering and exiting the reservoirs, and a desire for a better understanding of how the reservoirs may be functioning as nutrient or metals "sinks" led to consensus that a systematic, long-term, and coordinated nutrient and metals monitoring program for the lower Clark Fork waters should be implemented.

During the collaborative relicensing process and development of the Settlement Agreement, it was agreed that support and use of the TSWQC program to meet the long-term water quality monitoring needs associated with the Clark Fork projects would facilitate a coordinated approach to long-term water quality monitoring of the LCFR-LPO system.

As part of the overall TSWQC program, Appendix F1 supported data collection, analysis and reporting of nutrient and metals data at three sampling locations on the lower Clark Fork River. This included: monthly sampling above Noxon Reservoir, downstream of Noxon Rapids Dam and downstream of Cabinet Gorge Dam, and additional peak flow sampling (six samples during the peak flow period each year) at the Cabinet Gorge site. This data, along with data generated at 29 other sites on the Clark Fork River, was used to assess the status of and trends in water quality (utilizing concentrations and loads) basin-wide. A monitoring program report was prepared annually that summarizes data collection and analysis for each field season (calendar year), and at every five-year interval an evaluation of the data was conducted to assess water quality trends and the effectiveness of water quality measures in the watershed.

In addition, data collected at the Cabinet Gorge site was used to estimate nutrient loading to Lake Pend Oreille from the Clark Fork (Montana) watershed. The Montana/Idaho Border Nutrient Load Agreement (2002) sets a target for total phosphorus to protect open lake water quality of Lake Pend Oreille and also sets load allocations for Montana and local Idaho sources to meet that target. For the purposes of determining that the allocation for Montana (259,500 kg/year total phosphorus) is not being exceeded, the Agreement sets forth monitoring objectives for evaluating nutrient data from the Clark Fork River at the border (i.e., the Cabinet Gorge site).

Therefore, the samples collected below Cabinet Gorge Dam are integral to achieving key objectives of the Clark Fork-Pend Oreille watershed management plan.

At every five-year interval, a review of data is conducted to evaluate water quality trends and the effectiveness of water quality measures in the watershed. These 'trend reports' were completed in 2004, 2008, 2012, and 2019. These evaluations resulted in an analysis of spatial trends in concentration and load, time series trends, statistical comparisons with applicable water quality targets, and an overall interpretation of the water quality health of the three-state basin. Avista staff participated on the TSWQC Monitoring Committee (since 2012 on the Clark Fork River Water Quality Monitoring Committee; CFRWQMC) and assisted in the design and scope of work of the five-year evaluations to ensure consistency with the long-term water quality monitoring needs of the Clark Fork projects.

Because of past exceedances of water quality standards, Idaho Department of Environmental Quality (DEQ) developed and adopted Total Maximum Daily Loads (TMDL) for the Lower Clark Fork River sub-basin in 2007. In order to support TMDL-related data needs as well as monitor potential impacts of future activities that could impact the water quality of the Lower Clark Fork River, Idaho DEQ and other members of the TSWQC Monitoring Committee, including Avista staff, identified metals of concern as copper, zinc, and cadmium to be included in the 2008–2012 monitoring program. These metals have not been collected since 2012.

In October 2012 TSWQC officially closed its doors. This closure was due in large part to decreasing administrative dollars as well as state and federal grants, and also affected the 2012 monitoring program with no monthly sampling occurring in September through November. Without the coordination and facilitation functions once provided by the TSWQC, it was now incumbent upon those active monitoring participants to continue the three state water quality monitoring activities.

In December 2012, the CFRWQMC consisting of Montana DEQ, Idaho DEQ, Missoula Wastewater Treatment Facility, University of Montana, and Avista met to review the previous monitoring program and to devise a more sustainable program. The Washington Department of Ecology continued to maintain their two monitoring sites on the Pend Oreille River. Plum Creek Timber Company and the U.S. Forest Service no longer contribute funds to the program. This group continues to meet annually to review the previous year's sampling efforts, review annual work products, coordinate the upcoming monitoring season, and plan future activities. Beginning in 2015, through a contractual agreement between Montana DEQ and the Clark Fork Coalition (CFC), the CFC has now taken the lead for the group's coordination, facilitation, and the production of the annual water quality reports.

In recent years, irregularities in the discharge hydrograph have occurred in the lower Clark Fork River at the Montana-Idaho border as measured at U.S. Geological Survey (USGS) Gaging Station 12391950 Clark Fork River below Cabinet Gorge Dam. The irregularities include runoff beginning earlier than historically "normal" and a stunted peak flow. These irregularities have spurred discussion among the group regarding the number and timing of sample collection during peak flow monitoring. In 2016, the group requested the contractor conduct an analysis to review historical data to address concerns and provide recommendations on how to move

forward with the peak flow monitoring. In 2017 the CFRWQMC agreed to the following changes in Avista's sampling plan: 1) water quality sampling downstream of Thompson Falls Dam (site number CFR 28) and Noxon Rapids Dam (site number CFR 29) will only occur July-September, and 2) the annual field quality control review will be discontinued. These changes were implemented in a manner to reduce costs to a level that are congruent to Avista's Appendix F1 obligation without the loss of important water quality data.

2021 Project Plans

1. Clark Fork River Water Quality Monitoring Program

Work Products

Clark Fork River Water Quality Monitoring Program

- Estimate of 2020 nutrient loads from the Clark Fork River into Lake Pend Oreille, technical memorandum; final due June 1, 2021
- Annual Project Update: 2020 monitoring report to be prepared by the Clark Fork Coalition; final due August 1, 2021
- Annual Work Summary; due December 1, 2021

Appendix F1 2021 Budget

Project	Carryover[1]	2021
Clark Fork River Water Quality Monitoring Program (including GDP inflation rate)		**$21,826**
Unexpended funds w/interest		**$11,798**
2023 Funding Obligation (5-year trends analysis)		**$0**
Total Available		**$33,624**
Clark Fork River Water Quality Monitoring Program	$4,300	$29,324
Total	$4,300	$29,324
MC Approved Budget		**$33,624**
Unobligated Funds		$0

[1] *This column denotes estimated carryover of unexpended, approved funds as of January 1.*

2021 PROJECT PLAN

Clark Fork River Water Quality Monitoring Program

Project Contact
Paul Kusnierz, Avista, (406) 847-1274, paul.kusnierz@avistacorp.com

Project History
The Clark Fork River Water Quality Monitoring Program is a continuing project that has been implemented since 1998. The scope and budget for this project are reviewed by the Management Committee (MC) annually.

Background
The purpose of this measure is to provide for the systematic, long-term monitoring of nutrients and metals in the lower Clark Fork River as part of the former Tri-State Water Quality Council Monitoring Program. Excessive nutrient loading and metals contamination in the middle and upper portions of the Clark Fork River were cause for water quality concerns in the lower Clark Fork River - Lake Pend Oreille system. Interest in monitoring long-term trends in the quality of water entering and exiting the reservoirs, and a desire for a better understanding of how the reservoirs may be functioning as nutrient or metals "sinks" led to consensus that a systematic, long-term, and coordinated nutrient and metals monitoring program for the lower Clark Fork waters should be implemented.

Data collected at the Cabinet Gorge site are used to estimate nutrient loading to Lake Pend Oreille from the Clark Fork (Montana) watershed. The 2002 Montana/Idaho Border Nutrient Load Agreement (https://www.deq.idaho.gov/media/468512-_water_data_reports_surface_water_water_bodies_pend_oreille_lake_nutrient_moa.pdf) sets a target for total phosphorus to protect open lake water quality of Lake Pend Oreille and also sets load allocations for Montana and local Idaho sources to meet that target. Therefore, the samples collected below Cabinet Gorge Dam are integral to achieving key objectives of the Clark Fork-Pend Oreille watershed management plan.

At every five-year interval, a review of data is conducted to evaluate water quality trends and the effectiveness of water quality measures in the watershed. These trend reports were completed in 2004, 2008, 2012, and 2019. These evaluations contain analysis of spatial trends in concentration and load, time series trends, statistical comparisons with applicable water quality targets, and an overall interpretation of the water quality health of the three-state basin.

Goal
The goal of this project is to provide for systematic, long-term monitoring of nutrients which enter, are retained in, and which pass the Noxon Rapids and Cabinet Gorge Projects.

Objectives
1. Provide a long-term dataset for nutrients in the lower Clark Fork River.

2. Collect nutrient data that can be used to estimate nutrient loading to Lake Pend Oreille.

Tasks

1. Continue to monitor, in an *ad-hoc* fashion, the overall nutrient monitoring effort. (Objectives 1 and 2)

2. Continue funding and personnel needs for the water quality sampling program which includes monthly March through November sampling and peak flow sampling at CFR Station 30 and monthly July through September sampling at CFR Station 28 and CFR Station 29, QA/QC assistance (contract assistance), sample shipment, and water sample analysis (contract assistance).

Specific methods for this project can be found in MDEQ (2020). (Objectives 1 and 2)

Work Products

- Estimate of 2020 nutrient loads from the Clark Fork River into Lake Pend Oreille, technical memorandum; final due June 1, 2021
- Annual Project Update: 2020 monitoring report to be prepared by the Clark Fork Coalition; final due August 1, 2021
- Annual Work Summary; due December 1, 2021

Permitting Requirements

Not applicable for the tasks proposed in this project plan.

Endangered Species Act consultation for this project plan is associated with the 2019 Biological Opinion on the effects of continued operation of the Clark Fork Hydroelectric Project on Bull Trout and designated Bull Trout critical habitat (BiOp). This project plan is consistent with the analyses and conclusions contained in the 2019 BiOp and will adhere to all appropriate Terms and Conditions designed to reduce the extent and effects of incidental take on Bull Trout. No incidental take of Bull Trout is anticipated as a result of this project plan; therefore, no take reporting is required.

Cultural/Historic Resource Review

Not applicable for the tasks proposed in this project plan, there are no ground and/or vegetation disturbing activities, or proposed impacts to cultural/historic resources.

Benefit to the Resource

This project is the direct implementation of Appendix F1 under the Clark Fork Settlement Agreement (Avista 1999). It also provides data that the states of Montana and Idaho can use in implementation of the Federal Clean Water Act.

Idaho water quality standards are based upon support of beneficial uses, and in particular “Cold Water Aquatic Life.” Continued water quality monitoring is critical to evaluating the health of all native fisheries in the lower Clark Fork River and Lake Pend Oreille.

Budget

Item	Estimated Carryover	2021 Budget Request
Technician (0.04 FTE)	$1,300	$3,696
Biologist (0.01 FTE)	$0	$1,130
Supplies	$0	$1,000
Laboratory Analysis	$0	$10,000
QA/QC, Nutrient Load Evaluation, Meetings and Technical Consultation	$3,000	$13,498
2018–2022 5-year trends analysis	$0	$0
Total	$4,300	$29,324
Anticipated Expenditures		$33,624

Literature Cited

Avista Corporation. 1999. Application for New License, Volume III Settlement Agreement. Avista Corporation. Spokane, Washington.

MDEQ (Montana Department of Environmental Quality). 2020. Clark Fork River-Pend Oreille Watershed Water Quality Monitoring Program from Headwaters to Below Cabinet Gorge Dam – Quality Assurance Project Plan (QAPP), Update for 2018-2022 Sampling Program. Montana Department of Environmental Quality: Helena, Montana.

2021 ANNUAL IMPLEMENTATION PLAN SUMMARY – APPENDIX F2

Clark Fork Project, FERC No. 2058
Cabinet Gorge and Noxon Rapids Hydroelectric Developments

Title
Monitoring of Noxon Reservoir Stratification and Mobilization of Sediment Nutrients/Metals

Implementation Staff Lead
Paul Kusnierz, Avista, (406) 847-1274, paul.kusnierz@avistacorp.com

Background
The purpose of this monitoring effort is to collect data concerning the potential for nutrients or metals deposited in Noxon Reservoir sediments to remobilize back into the water column during periods of reservoir stratification.

Elevated nutrient levels and metals contamination are high-priority water quality concerns within the Clark Fork River – Lake Pend Oreille (CFR-LPO) system. The available information on sediment, nutrient, and metals transport and deposition in the CFR-LPO system indicates that Noxon Reservoir acts as a beneficial sediment, nutrient, and metals "sink" of varying efficiency, limiting the degree to which they are transported downstream into Lake Pend Oreille. The Water Resources Work Group, now known as the Water Resources Technical Advisory Committee (WRTAC), identified an information need related to whether low oxygen conditions in deeper waters of the reservoir during the rare periods of reservoir stratification might allow for the remobilization of nutrients or metals previously deposited and retained in reservoir sediments. Therefore, it was decided that, in conjunction with the Tri-State Water Quality Council (TSWQC) monitoring program, a better understanding of the stratification related limnologic processes in Noxon Reservoir would further improve the overall understanding and management of water quality issues, concerns, and needs in the CFR-LPO system. Appendix F2 called for the monitoring to be conducted three times during the term of the FERC license.

As per this appendix, average daily inflows to Noxon Reservoir are monitored, via the USGS website, during the July 1 through September 30 period. If outflow from Noxon is equal to or less than 8,000 cfs for at least 4 out of 7 consecutive days during the noted time period, water column monitoring will commence. This monitoring "trigger" was first reached on August 22, 2000. Avista contracted with PBS&J, Inc. (formerly Land & Water Consulting, Inc.), the same contractor involved in the overall TSWQC monitoring program, to: a) monitor reservoir stratification, b) develop water sampling protocols, c) perform analytical quality assurance and quality controls, and d) perform data management and reporting. Reservoir water column monitoring continued throughout the month of September 2000. The reservoir did thermally stratify; however, low dissolved oxygen conditions were not detected at depth, the trigger for intensive nutrient and metals sampling.

Based upon the 2000 sampling effort, and considering the low flow situation in 2001, a similar sampling effort began on July 26, 2001, before the predetermined flow trigger was met. This

2001 sampling effort detected both thermal and oxygen stratification, and therefore nutrient and metals samples were taken, and subsequently analyzed (Noxon Rapids Reservoir, Fall 2001 Stratification Monitoring Results, September 2002, Land & Water Consulting, Inc.). Listed below are several of PBS&J's conclusions:

- The potential for widespread mobilization of nutrients or metals from reservoir sediments due to reducing conditions associated with stratification appeared to be low.
- Ongoing monthly surface water monitoring by the Tri-State Water Quality Council will continue to document upstream and downstream differences in nutrient concentrations at the Noxon HED, thus independent summer stratification monitoring by Avista for nutrient components is probably unnecessary.
- Metals mobilization from reservoir sediments did not appear to be an issue of concern in Noxon Rapids HED. Consequently, further sampling for metals does not appear justified and the Avista stratification monitoring for metals effects should be discontinued.

As per this appendix, collection of additional data, concerning the potential for nutrients or metals deposited in Noxon Reservoir sediments to remobilize back into the water column during periods of reservoir stratification, was to occur as many as three different years of stratified reservoir conditions over the term of the new license. Reservoir sampling occurred in 2000 and 2001. In 2021, stratification sampling will occur in Noxon Reservoir if outflow from Noxon Rapids Dam is less than or equal to 8,000 cfs on 2 out of 7 consecutive days when inflow and flow forecasts indicate that the average daily outflow of equal to or less than 8,000 cfs for 4 out of 7 consecutive days will be met. The trigger must be met between July 1 and August 7.

2021 Project Plans

1. Monitoring of Noxon Reservoir Stratification and Mobilization of Sediment Nutrients/Metals

Work Products

Monitoring of Noxon Reservoir Stratification and Mobilization of Sediment Nutrients/Metals

- Annual Work Summary; due December 1, 2021
- Comprehensive Project Report (if stratification sampling occurs); due May 1, 2022

Appendix F2 2021 Budget

Project	Carryover[1]	2021
Monitoring of Noxon Reservoir Stratification and Mobilization of Sediment Nutrients/Metals		**$55,107**
Unexpended funds w/interest		**$0**
Total Available		**$55,107**
Monitoring of Noxon Reservoir Stratification and Mobilization of Sediment Nutrient/Metals	$55,107	$0
Total	$55,107	$0
	MC Approved Budget	**$55,107**
	Unobligated Funds	$0

[1] *This column denotes estimated carryover of unexpended, approved funds as of January 1.*

2021 PROJECT PLAN

Monitoring of Noxon Reservoir Stratification and Mobilization of Sediment Nutrients/Metals

Project Contact

Paul Kusnierz, Avista, (406) 847-1274, paul.kusnierz@avistacorp.com

Project History

This is a continuing project that has been implemented since 1999 with stratification sampling occurring in 2000 and 2001. The scope and budget for this project are reviewed by the Management Committee (MC) annually. We are requesting that the project plan for the stratification sampling be carried forward in 2021. In 2017, Avista contracted with HydroSolutions, Inc to perform the work outlined in this project plan. The quality assurance project plan for the stratification sampling was completed in September of 2017 (Hydrosolutions 2017). The flow trigger was not met by the required time period in any year 2017–2020 and as a result no stratification sampling occurred. The sampling will occur in 2021 if the flow trigger is met.

Background

Appendix F2 of the Clark Fork Settlement Agreement (Avista 1999) called for stratification monitoring of Noxon Reservoir to be conducted three times during the term of FERC license no. 2058. The purpose of this monitoring effort is to collect data concerning the potential for nutrients or metals deposited in Noxon Reservoir sediments to remobilize back into the water column during periods of reservoir stratification. Sampling for this appendix occurred in 2000 and 2001 with the data suggesting that there is low potential for widespread mobilization of nutrients or metals from Noxon Reservoir sediments (Land & Water 2002).

Data collected in 2000 suggested that stratification of Noxon Reservoir occurs prior to the flow trigger (outflow from Noxon Rapids Dam is equal to or less than 8,000 cfs for at least 4 out of 7 consecutive days) being met. In keeping with sampling performed in 2001, when outflow from Noxon Rapids Dam is equal to or less than 8,000 cfs for at least 2 out of 7 consecutive days when inflow and flow forecasts indicate that the average daily outflow of equal to or less than 8,000 cfs for 4 out of 7 consecutive days will be met, reservoir stratification sampling will commence. The outflow value of equal to or less than 8,000 cfs must be due to flow conditions and not due to work at one of the dams or other non-flow-related event. In 2017, the timing requirements for the flow trigger to initiate stratification sampling were changed by the MC via Consent Mail. This change specified that the time period during which the flow trigger must occur to commence stratification sampling will be from July 1 to August 7. If the third stratification sampling event has not occurred within 10 years prior to the FERC license expiring, the Water Resources Technical Advisory Committee will re-evaluate having this constraint placed on the sampling trigger and make change recommendations to the MC.

In 14 of the 20 years since 2001, the flow trigger (outflow from Noxon Rapids Dam equal to or less than 8,000 cfs for at least 4 out of 7 consecutive days during July 1 through September 30) has been reached. This project plan calls for stratification sampling if the flow trigger is expected to be achieved in 2021. If stratification sampling yields a surface to bottom temperature

differential greater than 5 °C and dissolved oxygen concentration less than 4.0 mg/l near the bottom, nutrients and metals sampling will occur as well.

Goal

The goal of this project is to perform the final of the three stratification monitoring events called for in Appendix F2 of the Clark Fork Settlement Agreement.

Objectives

1. Document whether mobilization of nutrients and metals occurs in Noxon Reservoir when low flow, temperature, and dissolved oxygen triggers are achieved.

Methods

Outflow from Noxon Rapids Dam will be monitored from July 1 through September 30. Reservoir stratification sampling will first occur within 7 days of flow being equal to or less than 8,000 cfs for at least 2 out of 7 consecutive days. Stratification sampling will occur every 10-14 days thereafter with no more than 2 sampling events occurring each month. This sampling will continue until Noxon Reservoir average daily outflow increases to greater than 12,000 cfs for 4 out of 7 consecutive days or September 30, whichever comes first. This will result in 0–6 stratification sampling events occurring depending on when and if the flow trigger is reached in 2021.

Sampling will consist of collecting vertical profiles of water temperature, dissolved oxygen, pH, and conductivity and a Secchi disk depth at three sites on Noxon Reservoir in 2021 (T27A, RRxing, and MT Hwy200; Figure 1). These three sites were among five established during reservoir stratification sampling in 2000 (Land & Water 2001) and were sampled again in 2001 (Land & Water 2002). These three sites have been specifically selected for this project because they are the three deepest, had the greatest temperature differentials in 2001 sampling and were the only three to have dissolved oxygen less than 4.0 mg/l in 2001 (Land & Water 2002). This third sampling event will be the final sampling needed to fulfill Avista's mitigation obligation for Clark Fork Settlement Agreement Appendix F2 and FERC License Article 410.

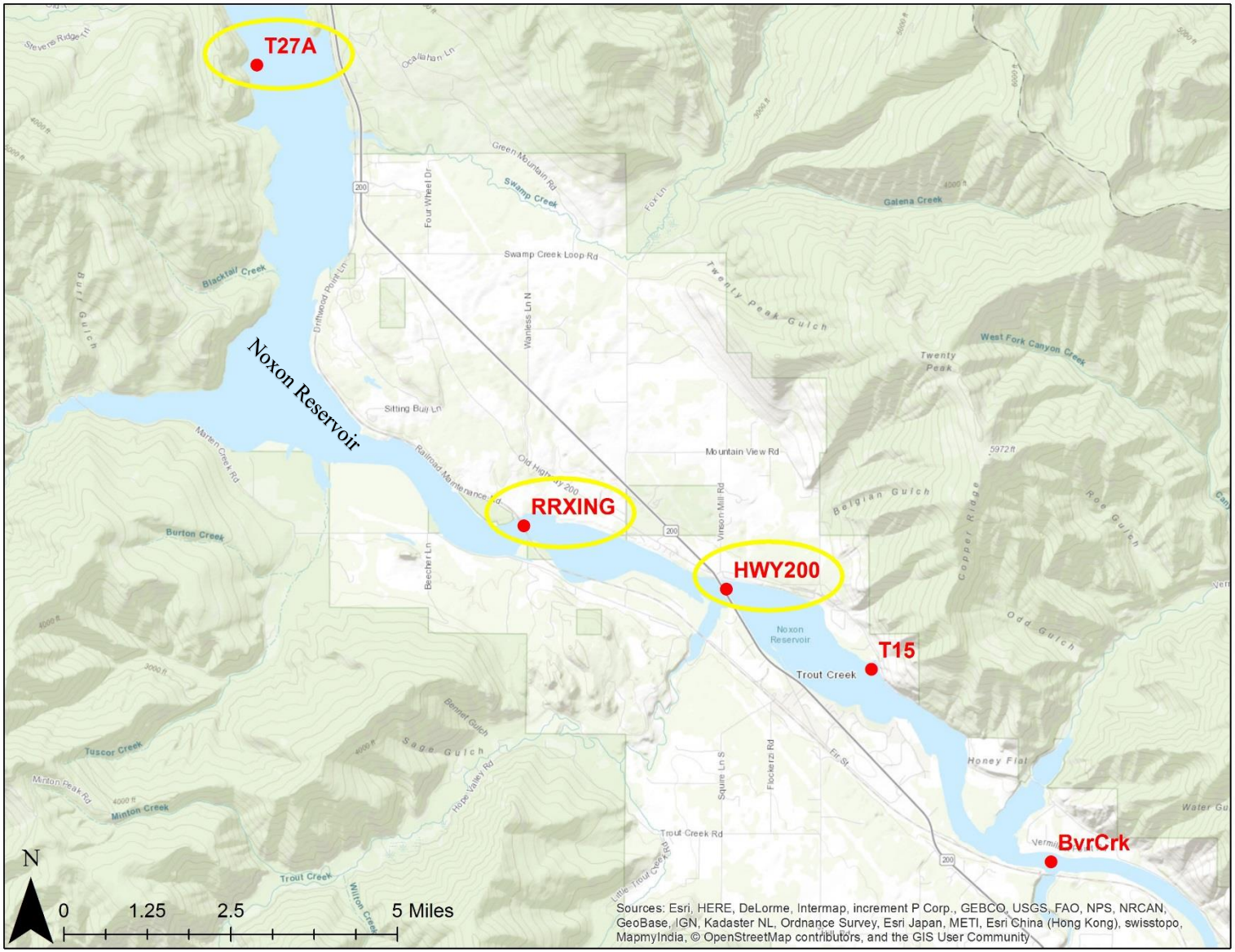

FIGURE 1. Five sites established for reservoir stratification sampling in 2000. The three sites within the yellow ovals are proposed for sampling in 2021 if the flow trigger occurs.

When reservoir stratification monitoring at a site yields a surface to bottom temperature differential greater than 5 °C and dissolved oxygen concentration less than 4.0 mg/l near the bottom, nutrients and metals samples will also be collected. No more than two water sampling efforts will be conducted at a station in the same year.

Nutrients and metals samples (Table 1) will be collected by a contractor from two water depths:

1) A grab sample at 2 m above the bottom; and
2) A composite sample from within the near surface zone equal to twice the observed Secchi depth.

These samples will then be shipped to a laboratory for analysis.

TABLE 1. Proposed analyte list for 2021 nutrient and metals sampling.

Analyte[1]	Method[2]	Required Reporting Limit (µg/l)[3]
Total phosphorus	EPA 365.1	3
Soluble Reactive Phosphorus	EPA 4500-P-G	2
Total Persulfate Nitrogen	SM 4500-N(C)	40
Total Ammonia Nitrogen	EPA 350.1	50
Nitrate + Nitrite-Nitrogen	EPA 353.2	10
Arsenic	EPA 200.8	1
Cadmium	EPA 200.8	0.03
Copper	EPA 200.8	1
Lead	EPA 200.8	0.3
Zinc	EPA 200.7	8
Chlorophyll-a	A 10200H 2	Not listed

[1] Metals samples will be collected for both total recoverable and dissolved fractions.
[2] With the exception of soluble reactive phosphorus these are the preferred methods listed in MDEQ (2012).
[3] With the exception of soluble reactive phosphorus these are the required reporting limits listed in MDEQ (2012).

Work Products

- Annual Work Summary; due December 1, 2021
- Comprehensive Project Report (if stratification sampling occurs); final due May 1, 2022

Permitting Requirements

Not applicable for the tasks proposed in this project plan.

Endangered Species Act consultation for this project plan is associated with the 2019 Biological Opinion on the effects of continued operation of the Clark Fork Hydroelectric Project on Bull Trout and designated Bull Trout critical habitat (BiOp). This project plan is consistent with the analyses and conclusions contained in the 2019 BiOp and will adhere to all appropriate Terms and Conditions designed to reduce the extent and effects of incidental take on Bull Trout. No incidental take of Bull Trout is anticipated as a result of this project plan; therefore, no take reporting is required.

Cultural/Historic Resource Review
Not applicable for the tasks proposed in this project plan, there are no ground and/or vegetation disturbing activities, or proposed impacts to cultural/historic resources.

Benefit to the Resource
This project is the direct implementation of Appendix F2 under the Clark Fork Settlement Agreement (Avista 1999). It also provides data that the states of Montana and Idaho can use in implementation of the Federal Clean Water Act.

Idaho and Montana water quality standards are based upon support of beneficial uses, and in particular "Cold Water Aquatic Life." In addition there are fish consumption advisories for both Noxon and Cabinet Gorge reservoirs related to metals. A third year of stratification sampling in Noxon Reservoir will further clarify whether anoxic conditions resulting from stratification in Noxon Reservoir result in the release of nutrients and metals from reservoir sediments. Understanding the dynamics of this potential occurrence is important to evaluating the health of fishes and other aquatic life in the lower Clark Fork River and Lake Pend Oreille.

Budget

Item	Estimated Carryover	2021 Budget Request
Contractor Stratification Sampling, Laboratory Analysis, and Reporting	$55,107	$0
Total	$55,107	$0
Anticipated Expenditures		$55,107

Literature Cited
Avista Corporation. 1999. Application for New License, Volume III Settlement Agreement. Avista Corporation. Spokane, Washington.

Hydrosolutions. 2017. Noxon Reservoir Stratification Sampling: Sampling and Analysis Plan Quality Assurance Project Plan. Hydrosolutions: Helena, Montana.

Land & Water (Land & Water Consulting, Inc.). 2001. Avista Noxon Reservoir, Fall 2000 Stratification Monitoring Results. Land & Water Consulting, Inc.: Missoula, Montana.

Land & Water (Land & Water Consulting, Inc.). 2002. Noxon Rapids Reservoir, Fall 2001 Stratification Monitoring Results. Land & Water Consulting, Inc.: Missoula, Montana.

MDEQ (Montana Department of Environmental Quality). 2012. Water Quality Planning Bureau Field Procedures Manual for Water Quality Assessment Monitoring. Montana Department of Environmental Quality: Helena, Montana.

2021 ANNUAL IMPLEMENTATION PLAN SUMMARY – APPENDIX F3

Clark Fork Project, FERC No. 2058
Cabinet Gorge and Noxon Rapids Hydroelectric Developments

Title
Aquatic Organism Tissue Analysis

Implementation Staff Lead
Paul Kusnierz, Avista, (406) 847-1274, paul.kusnierz@avistacorp.com

Background
The purpose of this measure is to provide for a commitment on the part of Avista to fund the collection and analysis of fish or other aquatic organism tissue samples from Noxon or Cabinet Gorge reservoirs for the presence of heavy metals or other substances of concern. While the Water Resources Technical Advisory Committee (WRTAC) agreed that tissue analysis was not warranted in reservoir waters on a routine basis, they were interested in seeing metals analysis included in the former Tri-State Water Quality Council's monitoring along the lower Clark Fork River (provided for in Appendix F1). Therefore, this appendix retains a commitment from Avista to fund tissue analysis should public health or other concerns arise in the future.

In 2004, and in response to a previous WRTAC request, an annotated bibliography on Clark Fork River-Lake Pend Oreille bed sediment and fish tissue information was produced and distributed. Information from the state of Montana pertaining to acceptable toxin levels in fish tissue was also made available. Also in 2004, fish were collected during the fall Noxon Reservoir sampling conducted through Appendix B activities and the 2003/2004 experimental trap netting operations on Lake Pend Oreille conducted through Appendix F5 activities. Based upon results (non-Clark Fork Settlement Agreement funded) obtained in 2005, both Montana Fish, Wildlife, and Parks (MFWP) and Idaho Department of Health and Welfare issued fish consumption advisories to the angling public based upon fish tissue mercury and/or PCB levels.

During the fall 2010 reservoir sampling conducted through Appendix B activities, MFWP staff collected fish and crayfish tissue samples from both Noxon and Cabinet Gorge reservoirs for mercury analysis. Based upon results (non-Clark Fork Settlement Agreement funded) obtained in 2011, MFWP updated fish consumption advisories (see: fwp.mt.gov) to the angling public based upon fish and crayfish tissue mercury and/or PCB levels.

During spring 2014, MFWP and Avista staff collected Northern Pike, Walleye, Smallmouth Bass, and Yellow Perch tissue samples from Noxon Reservoir for PCB's dioxin and furan analysis, with a final report produced by MFWP in 2015.

During the spring and fall 2015 reservoir sampling, MFWP and Avista staff again collected Northern Pike, Walleye, Smallmouth Bass and Yellow Perch tissue samples from both Noxon and Cabinet Gorge reservoirs for mercury (Hg) analysis, with a final report being produced in December, 2017.

2021 Project Plans

1. Noxon and Cabinet Gorge Reservoirs Fish Mercury Study

Work Products

Noxon and Cabinet Gorge Reservoirs Fish Mercury Study

- Annual Work Summary; due December 1, 2021
- Lab report on fish tissue analysis; final due May 1, 2022
- Comprehensive Project Report; final due November 1, 2022
- Incorporation of results into Montana's fish consumption guidelines; final due May 1, 2022 (A new online system should be in place sometime in 2022)

Appendix F3 2021 Budget

Project	Carryover[1]	2021
Aquatic Organism Tissue Analysis[2]		**$15,000**
Unexpended funds w/interest		**$0**
Total Available		**$15,000**
Noxon and Cabinet Gorge Reservoirs Fish Mercury Study	$10,000	$0
Total	$10,000	$0

MC Approved Budget	**$10,000**
Unobligated Funds	$5,000

[1] This column denotes estimated carryover of unexpended, approved funds as of January 1.

[2] Avista will pay the actual costs in an amount not to exceed $15,000 during any five-year period, as defined in the CFSA.

As approved by the Management Committee on 3/17/2021

2021 PROJECT PLAN

Noxon and Cabinet Gorge Reservoirs Fish Mercury Study

Project Contacts

Jason Blakney, Montana Fish, Wildlife and Parks (MFWP), (406) 382-3033, jblakney@mt.gov
and
Trevor Selch, MFWP, (406) 444-5686, tselch@mt.gov

Project History

This is a continuing project that has been implemented on a recurring basis with funding approved by the Management Committee (MC) in 2005, 2010, 2014, and 2015. The scope and budget for this project are reviewed by the MC each time the project is submitted. This project was not implemented in 2020 due to COVID-19 concerns preventing gillnetting of Noxon and Cabinet Gorge reservoirs.

Background

The reservoirs on the lower Clark Fork River are "sinks" for contaminants, largely mercury (Hg). Elevated Hg levels found in fish are due to many factors, including the physio-chemical dynamics of the reservoirs, and the food habits and growth rates in fish. Unfortunately, Noxon and Cabinet Gorge reservoirs contain fish with some of the highest Hg concentrations in Montana. Analyses from 2015 found Hg concentrations as high as 2.6 ppm in large Walleye (Selch 2017). Any fish Hg concentration greater than 1.18 ppm is considered unsafe for consumption for women and children.

Sampling waterbodies that contain fish with elevated Hg concentrations routinely is important to understand the risks to human health from fish consumption and assess the variability that occurs between sampling events. Mercury accumulation in fishes is influenced primarily by their diet. As a result, seasonal and ontogenetic changes in diet composition and prey contaminant levels can have an important influence on Hg concentration in predatory fishes. Typically, as young, piscivorous fish switch from small, invertebrate prey to larger, vertebrate prey (e.g., other fishes), their Hg consumption (and accumulation) increases. Some populations of piscivorous fish (e.g., Walleye, bass) rely heavily on benthic sources throughout their life cycle particularly when fish prey are limited. In these cases, Hg concentrations can be variable, depending on prey contaminant levels and consumption rates by the predator.

Seasonal-related variation in Hg concentration of fishes can have important implications for standardized monitoring efforts and fish consumption advisories. Spring-spawning fish allocate the majority of their energy into reproductive growth during the fall and winter months. Mercury consumed during this time period is stored in the muscle tissue (protein) with no dilution occurring through somatic growth, often resulting in elevated spring Hg concentrations compared to summer and fall. Thus, seasonal patterns of Hg in fish can be highly variable between systems and a single annual Hg sample is not representative of the population throughout the year and should be accounted for when classifying and comparing lakes, or when developing standardized sampling protocols.

Noxon Walleye generally had higher Hg concentrations in 2005 and 2015 than in 2010 (Figure 1). However (and based on a smaller sample size), Cabinet Gorge Walleye had higher concentrations in 2010. Northern Pike samples were more consistent over time, although Hg concentrations in the two largest size groups declined in 2015. Additionally, spring and fall samples were collected for the first time in 2015. In 14 of the 17 species/size groups which were compared, between season mean values were higher in the spring (Selch 2017). However, only in four of those groups would more restrictive guidelines have resulted.

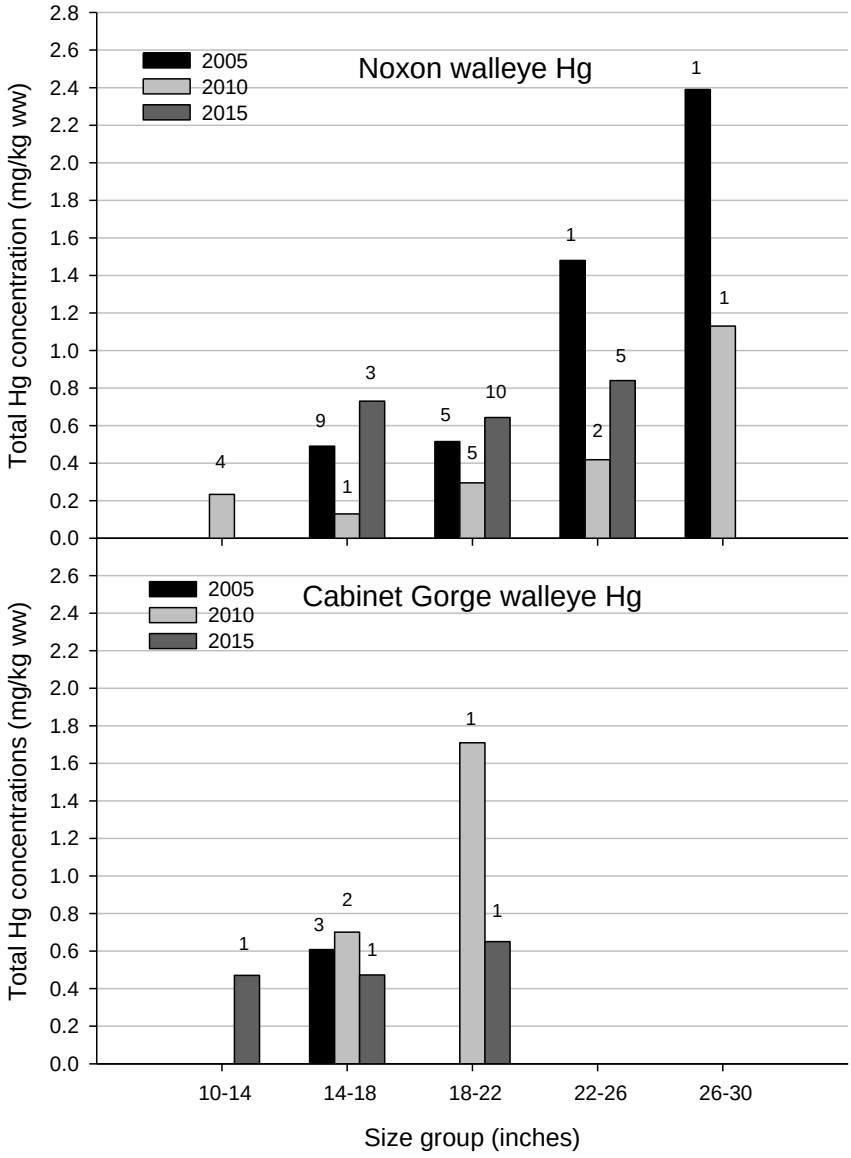

Figure 1. Mean fall total mercury (Hg) concentrations from Noxon (upper) and Cabinet Gorge (lower) reservoirs Walleye for five, four-inch size groups. Numbers above each bar represent the fish sample size.

Goal
The goal of this project is to document Hg concentrations in different size groups of popular sport fish in Noxon and Cabinet Gorge reservoirs.

Objectives
1. Collect fish from Noxon and Cabinet Gorge reservoirs for Hg testing.

Methods
The field season of 2020 represented five-years since the last Hg sample events on Noxon and Cabinet Gorge reservoirs. Sampling all available size groups of Smallmouth Bass, Northern Pike, Walleye, and Yellow Perch in the fall 2021 would allow us to compare changes in fish Hg concentrations over a 15-year period. Most fish will be collected during routine fall gillnetting in both reservoirs. We will also opportunistically collect fish during spring electrofishing to continue to evaluate some seasonal differences.

Specific targets for this project are as follows:
(1) Collect (10–15) Northern Pike from each of 6 size groups, including 10–14, 14–18, 18–22, 22–26, 26–30, and 30+ inches. Within each size group, fish muscle tissues will be excised and composited in groups for analysis (3 composites of 5 fish).
(2) Collect (10–15) Smallmouth Bass from each of 3 size groups, including 10–14, 14–18, and 18–22 inches. Within each size group, fish muscle tissues will be excised and composited in groups for analysis (3 composites of 5 fish).
(3) Collect (10–15) Walleye from each of 5 size groups, including 10–14, 14–18, 18–22, 22–26, 26–30 inches. Within each size group, fish muscle tissues will be excised and composited in groups for analysis (3 composites of 5 fish). Attempts will be made to capture Largemouth Bass of similar size groups to compare between the two species, given their diets are likely not analogous for at least portions of the year. However, attempts to capture an adequate number of Largemouth Bass via electrofishing and using gillnets have be unsuccessful in the past.
(4) Collect (10–15) Yellow Perch from each of 2 size groups, including 6–10, and 10–14 inches. Within each size group, fish muscle tissues will be excised and composited in groups for analysis (3 composites of 5 fish).

Work Products
- Annual Work Summary; due December 1, 2021
- Lab report on fish tissue analysis; final due May 1, 2022
- Comprehensive Project Report; final due November 1, 2022
- Incorporation of results into Montana's fish consumption guidelines; final due May 1, 2022 (A new online system should be in place sometime in 2022)

Permitting Requirements
Not applicable for the tasks proposed in this project plan. Fish will be collected during existing MFWP sampling.

Endangered Species Act consultation for this project plan is associated with the 2019 Biological Opinion on the effects of continued operation of the Clark Fork Hydroelectric Project on Bull

Trout and designated Bull Trout critical habitat (BiOp), and the USFWS-MFWP Cooperative Agreement pursuant to Section 6 of the Act. This project plan is consistent with the analysis and conclusions contained in the 2019 BiOp and the USFWS- MFWP Cooperative Agreement, and will adhere to all appropriate Terms and Conditions designed to reduce the extent and effects of incidental take on Bull Trout. Incidental take reporting for this project plan will be included in the annual Biological Opinion report as required by Term and Conditions 15–18 of the 2019 Incidental Take Statement, as well as MFWP's annual Section 6 report to the USFWS.

Cultural/Historic Resource Review
Not applicable for the tasks proposed in this project plan, there are no ground and/or vegetation disturbing activities, or proposed impacts to cultural/historic resources.

Benefit to the Resource
Sampling waterbodies that contain fish with elevated Hg concentrations recurrently (e.g., every five years) is important to understand the risks to human health from fish consumption and assess the variability that occurs between sampling events. The reservoirs created by Avista's dams have created mercury "sinks" which have exacerbated the concentrations of these contaminants. They have also enhanced habitats for non-native piscivores which are typically sought after for food, but which accumulate contaminants at a high rate. Appendix F3 of the Clark Fork Settlement Agreement was created specifically for this purpose.

Budget
The maximum total cost if all size groups are sampled in the spring and fall would be $10,000. In most years, only about two-thirds of those size groups have been filled, so the actual cost may be less.

Item	Estimated Carryover	2021 Budget Request
Lab analysis of 50–100 composites Yellow Perch, Northern Pike, Walleye, and Smallmouth Bass from Noxon and Cabinet Gorge reservoirs*	$10,000	$0
Total	$10,000	$0
Anticipated Expenditures		$10,000

* Largemouth Bass may also be incorporated into this lab analysis if an adequate sample size can be obtained.

Literature Cited
Selch, T. 2017. Mercury and Selenium Assessment in Fish from Noxon Rapids and Cabinet Gorge Reservoirs. Project Completion Report. Aquatic Organism Tissue Analysis, Appendix F3. Prepared for Avista and Montana Fish, Wildlife and Parks.

2021 ANNUAL IMPLEMENTATION PLAN SUMMARY – APPENDIX F4

Clark Fork Project, FERC No. 2058
Cabinet Gorge and Noxon Rapids Hydroelectric Developments

Title
Water Quality Protection and Monitoring Plan for Maintenance, Construction, and Emergency Activities

Implementation Staff Lead
Eric Oldenburg, Avista, (406) 847-1290, eric.oldenburg@avistacorp.com

Background
In the past, greater than normal reservoir drawdown and/or restricted discharge at the Cabinet Gorge Project have occasionally been required during emergency situations (e.g., drowning or a vehicle in the river) or for maintenance purposes (e.g., tailrace and dam inspections). In discussing the types of activities that have required unusual project operations in the past or that might require them in the future, the WRTAC agreed that a standardized set of policies and procedures for dealing with these activities would help to ensure that impacts to water quality or aquatic resources are minimized or avoided.

The purpose of this measure was to provide for the development and implementation of a Water Quality Protection and Monitoring Plan for Maintenance, Construction, and Emergency Activities (Plan). The goal of the Plan is to minimize or eliminate negative effects associated with project related maintenance, construction, and emergency activities on Clark Fork River water quality and associated resources. The intent was to have clearly defined policies and plans for notification of, and consultation with, resource agencies prior to undertaking planned maintenance or construction activities that require a change from normal project discharge or reservoir levels (i.e., other than as provided for in the General Operating Limits for Noxon Rapids, and Cabinet Gorge, Project Operations Package PM&E, Settlement Agreement Appendix T). The Plan was also to include standardized agency notification guidelines, as well as water quality and resource protection and monitoring actions that will be implemented in the event of unforeseen and sudden changes to project operations due to emergency or other unforeseen circumstances.

After nearly 16 months of work by Avista staff and involved WRTAC members, the Management Committee (MC) approved the final Plan in September of 2001. As part of Avista's required annual reporting process, the MC approved Plan was submitted to FERC on April 15, 2002, which also began Plan implementation.

In 2010, Avista believed it was time to revise the original 2002 Plan and the MC concurred at their March 2010 meeting. At their September 2010 meeting, the WRTAC decided to have the original WRTAC entities (USFS, Kalispel Tribe, IDFG, MFWP, Idaho DEQ, and Montana DEQ) that worked on producing the first plan review the 2010 final draft Plan. The MC approved the revised 2010 Plan via consent mail on December 3, 2010. The FERC approved the 2010 Plan by Order dated June 23, 2011.

Implementation of the Water Quality Protection and Monitoring Plan for Maintenance, Construction, and Emergency Activities is limited to a small number of tasks and all costs are borne by Avista. Thus, all required elements are listed below and a formal Project Plan is not necessary.

2021 Project Plans

- Avista Hydro Generation and Production and Environmental Affairs staff will regularly communicate to review and discuss planned maintenance and/or construction activities that may affect Cabinet Gorge minimum flow and/or reservoir elevation general operating limits.
- Pursuant to USFS 4(e) Condition 6 in Avista's FERC license, Avista will identify those activities which may affect recreational use or access and provide notification no less than 60 days prior to construction activities, 30 days prior to maintenance activities, and as soon as possible for emergency activities. Proper implementation of the Water Quality Protection and Monitoring Plan ensures this condition will be met.
- In the event that standard operating procedures for the Clark Fork Project (minimum flow and/or reservoir elevations) are interrupted, implement the MC approved, Water Quality Protection and Monitoring Plan for Maintenance, Construction, and Emergency Activities at the Cabinet Gorge and Noxon Rapids HEDs, including its protocol for agency notification, monitoring, and Best Management Practices.
- Annually update the designated contacts for the Plan, as needed.

Work Products

- There are no reports or work products associated with the Water Quality Protection and Monitoring Plan for Maintenance, Construction, and Emergency Activities.

Appendix F4 2021 Budget

- Should the Plan need to be implemented in 2021, the total actual costs associated with monitoring and Best Management Practices implementation will be borne by Avista.

Project	Carryover[1]	2021
Water Quality Protection and Monitoring Plan for Maintenance, Construction and Emergency Activities		**$0**
Unexpended funds w/interest		**$0**
Total Available		**$0**
Costs associated with monitoring and best management practices implementation will be borne by Avista with no effect on funding of this program.	$0	$0
Total	$0	$0

MC Approved Budget	**$0**
Unobligated Funds	$0

[1] *This column denotes estimated carryover of unexpended, approved funds as of January 1.*

2021 ANNUAL IMPLEMENTATION PLAN SUMMARY – APPENDIX F5

Clark Fork Project, FERC No. 2058
Cabinet Gorge and Noxon Rapids Hydroelectric Developments

Title
Dissolved Gas Supersaturation Control, Mitigation, and Monitoring

Implementation Staff Leads
Paul Kusnierz, Avista, (406) 847-1274, paul.kusnierz@avistacorp.com *and*
Ken Bouwens, Idaho Department of Fish and Game (IDFG), (208) 770-3766,
ken.bouwens@idfg.idaho.gov

Background
The purpose of this measure is to provide for the study, control, mitigation, and monitoring of gas supersaturation and the associated impacts to biological resources in the lower Clark Fork River-Lake Pend Oreille (LCFR-LPO) system related to spill at the Clark Fork Projects. In 1999, this measure committed Avista to multiple actions and activities for achieving this purpose, including: 1) selective use of specific spillways at both Noxon Rapids and Cabinet Gorge dams, 2) a comprehensive total dissolved gas (TDG) monitoring program, 3) intensive study of the effects of gas supersaturation to fish inhabiting the LCFR-LPO system, 4) a comprehensive feasibility analysis of structural alterations or other engineering alternatives for reducing excessive TDG levels due to spill at Cabinet Gorge Dam, and 5) development and implementation of a Gas Supersaturation and Control Program that addresses the issue of excessive TDG levels downstream of the Cabinet Gorge Dam.

Through 2002, Avista worked with IDFG, Idaho DEQ, Montana DEQ, Idaho Rivers United, the Kalispel Tribe and the USFWS on all aspects of this Program, including physical and biological TDG monitoring efforts and interpretation of results, engineering alternatives and subsequent engineering options, and continued efforts on the finalization of the Gas Supersaturation and Control Program (GSCP). As per the requirements of this Program, in December of 2002 Avista submitted a proposed GSCP to Idaho DEQ for their "… review, modification, and approval." As per other FERC requirements, the proposed GSCP was also submitted to the USFWS and FERC. Per an agreement dated February 10, 2004, Idaho DEQ approved the GSCP, as did the USFWS by letter dated February 25, 2004. Avista began implementation of the GSCP in 2004, even though FERC did not issue the order approving the GSCP until January 1, 2005.

The GSCP included the continued annual TDG monitoring and results reporting at the three permanent TDG monitoring locations, the phased construction of two water conveyance tunnels, and an associated annual mitigation program. The original river bypass tunnels used at the Cabinet Gorge site were planned to be reconstructed into the water conveyance tunnels, thus decreasing the level of spill.

At an August 2007 Workshop at ENSR's labs with the experts from the Project Design Team, the Gas Supersaturation Subcommittee (GSSC) determined by consensus that performance indicators demonstrated that the construction and operation of the bypass tunnel would not meet

the TDG performance levels in the Clark Fork River below Cabinet Gorge Dam anticipated in the GSCP. Design development results indicated there was a 'fatal flaw' in the 'final control and default strategies' and the tunnels should not be reconstructed. The September 2008 final Design Development Report for the Cabinet Gorge Bypass Tunnels Project documented these final results. The Management Committee agreed with the GSSC conclusion that the GSCP needed to be revised and directed the GSSC to amend the GSCP, such that alternatives were selected that incrementally reduced, offset, or otherwise mitigated TDG due to spill at Cabinet Gorge Dam. At their September 2009 meeting, the Management Committee approved the Final 2009 Addendum to the GSCP, with subsequent FERC approval by Order dated February 19, 2010.

The GSCP Addendum abandoned the original concept of reopening the two diversion tunnels and instead requires Avista to evaluate and, if feasible over the next few years, construct a variety of smaller-capacity options to abate TDG. Feasibility studies on the top five abatement alternatives were completed in 2011, and based upon those studies Avista initiated work on the top two alternatives, power generation on the existing bypass tunnels and spillway modifications. An engineering study for the power generation on the existing bypass tunnel was completed in 2013.

The spillway modification project involves modifying gate bays on the spillway by adding precast-concrete roughness elements (baffle blocks) on the spillway ogee downstream of the gate, configured for maximum effectiveness at a fixed gate opening of approximately 6,000 cfs. A five foot long flip bucket extension to the existing crest was also added. In 2013, a field prototype for the spillway 2 modifications was tested and confirmed a positive performance in reducing TDG downstream of the dam. Cavitation repairs were completed on spillway 2 in 2014. Modeling and engineering of refinements to the spillway 2 design were conducted in 2014.

Construction of modifications on spillways 4 and 5 was initiated in 2015 and completed in spring 2016. The performance of spillways 4 and 5 was tested and confirmed a positive performance in 4 reducing TDG downstream of the dam, but the results for 5 were inconclusive. The river depth is substantially shallower below spillway 5 than 1 through 4 and as a result there may be less of a reduction in TDG when there is minimal spill such as what occurred in 2016. Construction of modifications on spillways 1 and 3 was initiated in July 2017 and completed in October 2017. Performance testing of spillways 1 and 3 was completed in July 2018.

2021 Project Plans

Operations

1. There is no project plan for operations; however, Avista will continue to utilize spillway operations at Noxon Rapids and Cabinet Gorge dams as outlined in the GSCP, amended in 2009 to include operation of the Ice and Trash spillways, amended in 2013 to include operation of the modified spillway 2 during spill, amended in 2016 to include use of spillways 4 and 5, and amended in 2018 to include use of spillways 1 and 3. The results of the ongoing TDG monitoring program will be utilized to evaluate the effectiveness of the selective spillway usage for reducing TDG levels, and identify any potential changes in spillway usage.

TDG Monitoring

1. Total Dissolved Gas Monitoring

TDG Mitigation and Monitoring Program

2. Project Scoping Allocation
3. Analysis of Gas Bubble Disease Monitoring Data
4. Lake Pend Oreille Experimental Walleye Angler Incentive Program
5. Lake Pend Oreille/Clark Fork River Walleye Population Assessment
6. Lake Pend Oreille Lake Trout Angler Incentive Program
7. Lake Pend Oreille Lake Trout Netting Program
8. Demography of Adfluvial Bull Trout in Lake Pend Oreille
9. Lake Pend Oreille Bull Trout Survival Study
10. Lake Pend Oreille Bull Trout Population Monitoring and Evaluation (***New***)
11. Lake Pend Oreille Nearshore Index Netting
12. Box Canyon Reservoir Northern Pike Suppression
13. Trophic Monitoring in Lake Pend Oreille and Pend Oreille River Idaho
14. Temperature Monitoring Data Compilation
15. Walleye Geochemistry Study
16. Priest River Coldwater Bypass Limnology Assessment
17. Idaho Protection and Education Officer Support
18. Lake Pend Oreille Tributary PIT-Monitoring Station Installation (***New***)
19. Lake Pend Oreille Tributary PIT-Monitoring Station Operation and Maintenance (***New***)
20. Clark Fork River Population Monitoring (***New***)
21. Lower Clark Fork River PIT-Monitoring Station (***New***)
22. Lightning Creek Delta Connectivity Project (***New***)

GSCP Alternative

23. Gas Supersaturation Control Program Total Dissolved Gas Abatement

Work Products

Operations

- Annual Work Summary; due December 1, 2021

Total Dissolved Gas Monitoring

- Temperature monitoring data for the two sites; due November 1, 2021
- Annual Work Summary; due December 1, 2021
- Annual Project Update; final due March 1, 2022

Project Scoping Allocation

- Annual Work Summary; due December 1, 2021

Analysis of Gas Bubble Disease Monitoring Data

- Annual Work Summary; due December 1, 2021
- Annual Project Update – 2021; final due April 1, 2022

Lake Pend Oreille Experimental Walleye Angler Incentive Program

- Annual Project Update – 2020; final due November 1, 2021
- Annual Work Summary; due December 1, 2021
- Annual Project Update – 2021; final due November 1, 2022

Lake Pend Oreille/Clark Fork River Walleye Population Assessment
- Annual Project Update – 2020; final due November 1, 2021
- Annual Work Summary; due December 1, 2021
- Annual Project Update – 2021; final due November 1, 2022

Lake Pend Oreille Lake Trout Angler Incentive Program
- Annual Project Update – 2020; final due November 1, 2021
- Annual Work Summary; due December 1, 2021
- Annual Project Update – 2021; final due November 1, 2022

Lake Pend Oreille Lake Trout Netting Program
- Annual Project Update – 2020; final due November 1, 2021
- Annual Work Summary; due December 1, 2021
- Annual Project Update – 2021; final due November 1, 2022

Demography of Adfluvial Bull Trout in Lake Pend Oreille
- Project Completion Report outlining the findings for Objectives 1-3; final due August 1, 2021
- Publication of model and results in peer reviewed literature; submission due December 1, 2021
- Annual Work Summary; due December 1, 2021

Lake Pend Oreille Bull Trout Survival Study
- Project Completion Report (with data through 2019); final due November 1, 2021
- Annual Work Summary; due December 1, 2021

Lake Pend Oreille Bull Trout Population Monitoring and Evaluation
- Annual Work Summary; due December 1, 2021
- Annual Project Update; final due November 1, 2022

Lake Pend Oreille Nearshore Index Netting
- Project Completion Report; final due December 1, 2021
- Annual Work Summary; due December 1, 2021

Box Canyon Reservoir Northern Pike Suppression
- Annual Project Update; final due November 1, 2021
- Annual Work Summary; due November 15, 2021
- Comprehensive Project Report 2012–2021; final due November 1, 2021

Trophic Monitoring in Lake Pend Oreille and Pend Oreille River Idaho
- Annual Work Summary; due November 1, 2021

Temperature Monitoring Data Compilation
- Updated database (1999–2020); final due December 1, 2021
- Annual Work Summary; due December 1, 2021

Walleye Geochemistry Study
- Annual Work Summary; due December 1, 2021
- Project Completion Report or manuscript for publication; final due July 1, 2021

Priest River Coldwater Bypass Limnology Assessment
- Temperature monitoring data for the sites; due December 1, 2021
- Limnology assessment report written by consultant; final due November 1, 2021
- Annual Work Summary; due December 1, 2021

Idaho Protection and Education Officer Support

- Mid-year report; due to Avista; August 2, 2021
- Annual Work Summary; due to Ken Bouwens, IDFG; November 15, 2021

Lake Pend Oreille Tributary PIT-Monitoring Station Installation

- Annual Work Summary; due December 1, 2021

Lake Pend Oreille Tributary PIT-Monitoring Station Operation and Maintenance

- Temperature monitoring data for the three sites; due December 1, 2021
- Annual Work Summary; due December 1, 2021

Clark Fork River Population Monitoring

- Comprehensive Project Report; Lower Clark Fork River Population Monitoring (through 2018); final due November 1, 2021
- Annual Work Summary; due December 1, 2021
- Annual Project Update; 2021 Lower Clark Fork River Population monitoring data; final due November 1, 2022

Lower Clark Fork River PIT-Monitoring Station

- Annual Work Summary; due December 1, 2021

Lightning Creek Delta Connectivity Project

- Technical memoranda describing project progress at appropriate intervals
- Design submittals at 30%, 60%, and 90% review. The 60% submittal will include hydraulic model results and will be used to initiate the permitting process; due date to be determined
- Final stamped design drawings for channel construction to occur in 2022; due date to be determined
- Final gravel mining plan; due date to be determined
- Annual Work Summary; due December 1, 2021

Gas Supersaturation Control Program Total Dissolved Gas Abatement

- Annual Work Summary; due December 1, 2021

Appendix F5 2021 Budget

Project	Carryover	2021
Total Dissolved Gas Monitoring		**$0**
Unexpended funds w/interest		**$0**
Total Available		**$0**
Total Dissolved Gas Monitoring	$17,587	$31,400
Total	$17,587	$31,400

MC Approved Budget	**$48,987**
Unobligated Funds	$0

Appendix F5 2021 Budget (continued)

Project	Carryover[1]	2021
Mitigation and Monitoring (including GDP inflation rate)		**$880,785**
Unexpended funds w/interest		**$2,109,682**
Total Available		**$2,990,467**
Project Scoping Allocation	$0	$10,000
Analysis of Gas Bubble Disease Monitoring Data	$2,000	$16,900
Lake Pend Oreille Experimental Walleye Angler Incentive Program	$10,000	$92,750
Lake Pend Oreille/Clark Fork River Walleye Population Assessment	$0	$118,439
Lake Pend Oreille Lake Trout Angler Incentive Program	$10,000	$138,000
Lake Pend Oreille Lake Trout Netting Program	$0	$420,317
Demography of Adfluvial Bull Trout in Lake Pend Oreille	$459	$0
Lake Pend Oreille Bull Trout Survival Study	$4,855	$0
Lake Pend Oreille Bull Trout Population Monitoring and Evaluation	$0	$70,000
Lake Pend Oreille Nearshore Index Netting	$11,618	$0
Box Canyon Reservoir Northern Pike Suppression	$48,024	$22,755
Trophic Monitoring in Lake Pend Oreille and Pend Oreille River Idaho	$0	$9,450
Temperature Monitoring Data Compilation	$25	$12,800
Walleye Geochemistry Study	$115,789	$0
Priest River Coldwater Bypass Limnology Assessment	$106,730	$0
Idaho Protection and Education Officer Support	$13,171	$32,860
Lake Pend Oreille Tributary PIT-Monitoring Station Installation	$0	$227,000
Lake Pend Oreille Tributary PIT-Monitoring Station Operation and Maintenance	$0	$36,350
Clark Fork River Population Monitoring	$0	$70,300
Lower Clark Fork River PIT-Monitoring Station	$0	$3,000
Lightning Creek Delta Connectivity Project	$0	$28,491
Idaho Field Station (cost share; see Appendix A Project Plan)	$0	$30,000
January 2021 consent mail transfer to Appendix D	$100,000	$0
Total	$422,671	$1,339,412
MC Approved Budget		**$1,762,083**
Unobligated Funds		$1,228,384

[1] This column denotes estimated carryover of unexpended, approved project funds as of January 1.

Project	Carryover	2021
GSCP Alternative		**$0**
Unexpended funds w/interest		**$0**
Total Available		**$0**
Gas Supersaturation Control Program Total Dissolved Gas Abatement	$0	$88,000
Total	$0	$88,000
MC Approved Budget		**$88,000**
Unobligated Funds		$0

2021 PROJECT PLAN

Total Dissolved Gas Monitoring

Project Contact
Paul Kusnierz, Avista, (406) 847-1274, paul.kusnierz@avistacorp.com

Project History
Total dissolved gas (TDG) monitoring in the lower Clark Fork River during the spring runoff season is a required activity under FERC License No. 2058. This project is a continuation of work that has occurred in the Clark Fork River since 1996 (Latona 2014). The 2004 Gas Supersaturation Control Program (GSCP; Avista 2004) and 2009 GSCP Addendum (Avista 2009) identify the fixed-station TDG monitoring as separate from other aspects of the program (i.e., construction and implementation, mitigation). As such this monitoring has its own fund. The scope and budget for this project are reviewed by the Management Committee annually.

Background
During the spring runoff season, flow in the lower Clark Fork River can exceed the hydraulic capacity of Cabinet Gorge Dam. When this occurs, it is necessary to spill water over the dam. The physical characteristics of Cabinet Gorge Dam, in particular the deep (about 70 ft) plunge pool and the way in which spill aerates water released from the powerhouse, can lead to TDG supersaturation. Implementation of the TDG monitoring program provides data that informs Avista and Clark Fork Settlement Agreement (CFSA) stakeholders of the circumstances that lead to high TDG and verifies the effectiveness of spillway modifications for TDG reduction.

Goal
The goal of this project is to monitor total dissolved gas in the Lake Pend Oreille-lower Clark Fork River system to inform the study, control, and mitigation of gas supersaturation and associated biological resource effects.

Objective
1. Track the TDG conditions throughout the spring runoff season at Cabinet Gorge Dam and collect data that can be used to evaluate modifications made to the Cabinet Gorge Dam spillways and minimize TDG production at Cabinet Gorge Dam.

Tasks
1. Continue to monitor, in an *ad-hoc* fashion, TDG (temperature is also collected) in the Cabinet Gorge Dam forebay and about one mile downstream of Cabinet Gorge Dam[1] (Table 1) during the spill season (approximately April through July). (Objective 1)

2. Monitor TDG during tests of modified Cabinet Gorge Dam spillways. (Objective 1)

[1] The monitoring equipment formerly located at the Noxon Rapids Dam forebay has been located about one mile downstream of Cabinet Gorge Dam and providing duplicative data at this site since 2015 as per DosSantos (2014).

Table 1. Sampling locations for TDG in 2021.

Stream	Site name	River Km	Latitude	Longitude
Clark Fork River	Cabinet Gorge Dam Forebay	14.5	48.087813	-116.056333
Clark Fork River	Downstream Cabinet Gorge	12.5	48.086621	-116.079265

A brief synopsis of the type of monitoring equipment used for this project and TDG probe placement can be found in Latona (2014). In addition, a protocol for sampling under high flow conditions can be found in Kusnierz (2018).

Work Products

- Temperature monitoring data for the two sites; due November 1, 2021
- Annual Work Summary; due December 1, 2021
- Annual Project Update; final due March 1, 2022

Permitting Requirements

Not applicable for the tasks proposed in this project plan.

Endangered Species Act consultation for this project plan is associated with the 2019 Biological Opinion on the effects of continued operation of the Clark Fork Hydroelectric Project on Bull Trout and designated Bull Trout critical habitat (BiOp). This project plan is consistent with the analyses and conclusions contained in the 2019 BiOp and will adhere to all appropriate Terms and Conditions designed to reduce the extent and effects of incidental take on Bull Trout. No incidental take of Bull Trout is anticipated as a result of this project plan; therefore, no take reporting is required.

Cultural/Historic Resource Review

Not applicable for the tasks proposed in this project plan, there are no ground and/or vegetation disturbing activities, or proposed impacts to cultural/historic resources.

Benefit to the Resource

This project is the direct implementation of a portion of Appendix F5 under the CFSA (Avista 1999). It also provides data that can be used to guide operation of Cabinet Gorge Dam so that exceedances of the TDG water quality standard are minimized.

Idaho water quality standards are based upon support of beneficial uses, and in particular “Cold Water Aquatic Life.” Continued TDG monitoring is critical to evaluating the health of all native fisheries in the lower Clark Fork River and Lake Pend Oreille.

Budget

Item	Estimated Carryover	2021 Budget Request
Technician labor (0.13 FTE)	$0	$11,400
Supplies	$4,000	$10,000
Annual Project Update and professional consultation	$0	$10,000
Carryover from 2019 consent mail for real-time station	$13,587	$0
Total	$17,587	$31,400
Anticipated Expenditures		$48,987

Literature Cited

Avista Corporation. 1999. Application for New License, Volume III Settlement Agreement. Avista Corporation. Spokane, Washington.

Avista Corporation. 2004. Final Gas Supersaturation Control Program for the Clark Fork Project. Avista Corporation. Spokane, Washington.

Avista Corporation. 2009. Final 2009 Addendum Final Gas Supersaturation Control Program for the Clark Fork Project. Avista Corporation. Spokane, Washington.

DosSantos, J. 2014. TDG Monitoring Program – Proposed 2015 Changes. Memorandum to the Gas Supersaturation Subcommittee, December 30, 2014.

Kusnierz, P. 2018. Proposed total dissolved gas monitoring protocol during high flow conditions. Memorandum to the Gas Supersaturation Subcommittee, October 3, 2018.

Latona (Latona Consulting Services, LLC). 2014. Final Report Total Dissolved Gas Monitoring 2014 Cabinet Gorge and Noxon Rapids Dams. Latona Consulting Services, LLC: Seattle, Washington.

2021 PROJECT PLAN

Project Scoping Allocation

Project Contact
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Project History
This is a continuing project for 2021. This project was originally ranked by the WRTAC on January 21, 2020. The project was first approved by the Management Committee (MC) in 2020. The scope and budget for this project will be reviewed by the MC annually.

Background
The Appendix F5 mitigation program is "focused on the protection and enhancement of the fishery resources that might be affected by the future occurrence of elevated total dissolved gas levels downstream of the Cabinet Gorge HED (Hydroelectric Development)" (Avista 2004). New project development is an involved scoping process requiring the identification and integration of information regarding management concerns, associated biological limitations, and study design. This allocation will be used to develop full project proposals for MC review and approval.

Goal
Provide assistance with the development of future Appendix F5 mitigation program projects.

Objective
1. Provide funding for an Avista fisheries biologist to develop Appendix F5 mitigation program project plans.

Tasks
Specific tasks will be identified as necessary, but will be performed as part of project plan development.

Work Products
- Annual Work Summary; due December 1, 2021

Permitting Requirements
Not applicable for the tasks proposed in this project plan.

Endangered Species Act consultation for this project plan is associated with the 2019 Biological Opinion on the effects of continued operation of the Clark Fork Hydroelectric Project on Bull Trout and designated Bull Trout critical habitat (BiOp). This project plan is consistent with the analyses and conclusions contained in the 2019 BiOp and will adhere to all appropriate Terms and Conditions designed to reduce the extent and effects of incidental take on Bull Trout. No incidental take of Bull Trout is anticipated as a result of this project plan; therefore, no take reporting is required.

Cultural/Historic Resource Review
Not applicable for the tasks proposed in this project plan, there are no ground and/or vegetation disturbing activities, or proposed impacts to cultural/historic resources.

Benefit to the Resource
Projects developed using this allocation will benefit the fishes (specifically migratory Bull and Westslope Cutthroat trout) inhabiting Lake Pend Oreille and the lower Clark Fork River. This project plan is appropriate under the Clark Fork Settlement Agreement because it assists in the development of projects that will benefit fishes exposed to elevated total dissolved gas. As such, these projects will also be consistent with goals of the Native Salmonid Restoration Plan (AIT 2018) to restore and enhance migratory forms of native salmonids.

Tasks conducted under this allocation will also be consistent with other established plans including the Lake Pend Oreille Bull Trout Conservation Plan (Resource Planning Unlimited 1999), the USFWS Bull Trout recovery plan (USFWS 2015), and the Idaho Department of Fish and Game Fisheries Management Plan 2019-2024 (IDFG 2019).

Project plan-specific benefits will be identified as a result of the use of this allocation.

Budget

Item	Estimated Carryover	2021 Budget Request
Biologist labor (0.06 FTE)	$0	$10,000
Total	$0	$10,000
Anticipated Expenditures		$10,000

Literature Cited

AIT (Aquatic Implementation Team). 2018. Clark Fork River native salmonid restoration plan five-year plan (2019–2023). Prepared for the Clark Fork Management Committee. 40 pages + appendices.

Avista. 2004. Final Gas Supersaturation Control Program for the Clark Fork Project. Avista Corporation: Spokane, Washington. 90 pages + appendices.

IDFG (Idaho Department of Fish and Game). 2019. Fisheries Management Plan 2019-2024. Boise, Idaho.

Resource Planning Unlimited. 1999. Lake Pend Oreille Bull Trout Conservation Plan. State of Idaho. Boise, Idaho.

USFWS (U.S. Fish and Wildlife Service). 2015. Recovery plan for the coterminous United States population of bull trout (*Salvelinus confluentus*). Portland, Oregon. xii + 179 pages.

2021 PROJECT PLAN

Analysis of Gas Bubble Disease Monitoring Data

Project Contact
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Project History
This is a continuing project for 2021. Gas bubble disease (GBD) data have been collected from the lower Clark Fork River during ten spill seasons since 1997 (1997-2000, 2006, 2008, and 2017–2020). The Water Resources Technical Advisory Committee scored this project in 2018 on January 23. The scope and budget for this project are reviewed annually by the Management Committee. The 2021 budget and scope are the same as in 2020.

Background
Gas bubble disease occurs in fish when water becomes supersaturated with gases. This disease causes damage to tissues when gas bubbles form in gills, fins, and eyes. It can lead to death if tissue damage becomes too severe. Gas bubble disease is a concern on the Clark Fork River downstream of Cabinet Gorge Dam because during periods of substantial spill (i.e., high spring flows) the river becomes supersaturated and total dissolved gas (TDG) levels can be in excess of 120% saturation. More than a decade ago Weitkamp et al. (2003a) published a journal article reporting the incidence of GBD in the lower Clark Fork River. In this study they found that the occurrence of GBD in fish collected from the lower Clark Fork River was lower than expected given the TDG levels observed. The authors hypothesized that fish were spending time at depths that can compensate for the effects of GBD and noted the presence of refugia from high TDG levels in tributaries of the lower Clark Fork River and Lake Pend Oreille (Weitkamp et al. 2003a; 2003b).

In 2006, 2008, 2017, and 2018 additional GBD data were collected from fish captured by means of electrofishing in the lower Clark Fork River. In 2018, GBD data from the lower Clark Fork River downstream of Cabinet Gorge Dam in 1997–2000 were combined with data collected in 2006, 2008, 2017, and 2018 into a single spreadsheet. In 2018, these data were combined and used in whole to describe the incidence of GDB in the lower Clark Fork River (Kusnierz 2019). This project plan will provide funding to continue GBD data collection as part of night electrofishing activities (as has been done annually since 2017) and Lake Pend Oreille sampling as opportunities arise, annually update the GBD database, and perform updated analyses.

Goal
The goal of this project is to provide a means to evaluate the health effects of high TDG on fish in the lower Clark Fork River and Lake Pend Oreille and examine whether the relationship between spill, TDG, and GBD incidence has changed over time.

Objective
1. Maintain lower Clark Fork River GBD data collection, organization, and analysis.

Tasks

1. Collect GBD data as part of night electrofishing activities (Upstream Fish Passage Program) and Lake Pend Oreille sampling as opportunities arise. (Objective 1)

2. Update GBD database annually. (Objective 1)

3. Produce a report that updates the analysis in Kusnierz (2019) for GBD data collected as part of the Upstream Fish Passage Program. (Objective 1)

Work Products

- Annual Work Summary; due December 1, 2021
- Annual Project Update – 2021; final due April 1, 2022

Permitting Requirements

An Idaho Department of Fish and Game collection permit is required for sampling fish in the lower Clark Fork River. This permit will be obtained as part of the Upstream Fish Passage Program permitting requirements.

Endangered Species Act consultation for this project plan is associated with the 2019 Biological Opinion on the effects of continued operation of the Clark Fork Hydroelectric Project on Bull Trout and designated Bull Trout critical habitat. Incidental take reporting for this project plan will be included in the annual Biological Opinion report as required by Term and Conditions 15–18 of the 2019 Incidental Take Statement.

Cultural/Historic Resource Review

Not applicable for the tasks proposed in this project plan, there are no ground and/or vegetation disturbing activities, or proposed impacts to cultural/historic resources.

Benefit to the Resource

This project compliments the required monitoring of TDG on the lower Clark Fork River as described in Appendix F5 under the CFSA (Avista 1999) and is consistent with the use of the "TDG Alternative Mitigation Fund" described in Section 4.3.2 of the Gas Supersaturation Control Plan (Avista 2004). This project will provide a means to evaluate the health effects of high TDG on fish in the lower Clark Fork River and examine whether the relationship between spill, TDG, and GBD incidence has changed over time. It will also result in a single dataset for GDB incidence in fish captured via electrofishing in the lower Clark Fork River that can be updated annually as data are collected and used to help provide guidance on how Appendix F5 mitigation dollars can be best utilized to benefit the fisheries resources affected by high TDG.

Budget

Item	Estimated Carryover	2021 Budget Request
Technician labor (0.1 FTE)	$0	$10,000
Data compilation, analysis, and summary report (0.03 FTE)	$2,000	$4,500
One professional conference	$0	$2,400
Total	$2,000	$16,900
Anticipated Expenditures		$18,900

Literature Cited

Avista Corporation. 1999. Application for New License, Volume III Settlement Agreement. Avista Corporation. Spokane, Washington.

Avista Corporation. 2004. Final Gas Supersaturation Control Program for the Clark Fork Project. Avista Corporation. Spokane, Washington.

Kusnierz, P. 2019. Analysis of gas bubble disease Monitoring data. Annual project update. Avista, Noxon, Montana.

Weitkamp, D. E., R. D. Sullivan. T. Swant, and J. DosSantos. 2003a. Gas bubble disease in resident fish of the lower Clark Fork River. Transactions of the American Fisheries Society 132:865–876.

Weitkamp, D. E., R. D. Sullivan. T. Swant, and J. DosSantos. 2003b. Behavior of resident fish relative to total dissolved gas supersaturation in the lower Clark Fork River. Transactions of the American Fisheries Society 132:856–864.

2021 PROJECT PLAN

Lake Pend Oreille Experimental Walleye Angler Incentive Program

Project Contact

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Andy Dux, IDFG, (208) 769-1414, andy.dux@idfg.idaho.gov

Project History

This is an ongoing project originally approved through consent mail on December 3, 2018. It was also approved by the Management Committee in 2019 and 2020. The scope and budget for this project is reviewed by the Management Committee annually.

Background

Suppression of pisciverous fishes, including Lake Trout and Rainbow Trout, has been the focus of Lake Pend Oreille (LPO) fishery management since 2006. Previous suppression programs have included incentivized angler harvest of Rainbow Trout (ended in 2013) and Lake Trout (ongoing), as well as commercial trap net and gillnet operations targeting Lake Trout. Through previous research, the Idaho Department of Fish and Game (IDFG) established that reduced kokanee production in LPO, in concert with an over-abundance of upper trophic level predators had created a predator pit that would have likely led to a complete collapse of kokanee in the system (Hansen et al. 2010). The Lake Trout suppression program has been a major success and the kokanee population has responded positively.

Walleye, which were illegally introduced into Noxon Reservoir approximately 30 years ago, have become well-established throughout Noxon and Cabinet Gorge reservoirs. These reservoirs have provided suitable spawning and rearing habitat for Walleye and it is believed that downstream drift has led to subsequent invasions into the Idaho portion of the Clark Fork River, LPO and the Pend Oreille River. These fish appeared to exist in LPO at low densities in localized habitats but the densities have nearly doubled every three years from 2011 to 2017 during fall Walleye index netting. Additionally, increasing numbers of Walleye are incidentally being caught in Lake Trout netting efforts throughout the northern and southern basins of the lake.

An expanding Walleye population has the potential to put several fish populations in LPO at risk through direct predation and competition. Walleye are prolific piscivores and their establishment in other western lentic systems has led to significant fishery management challenges, particularly where they overlap with salmonid fisheries (MFWP 2016). Lake Pend Oreille represents a critical stronghold for Bull Trout within their native range. Westslope Cutthroat Trout populations in LPO are depressed relative to historic abundances, but they appear to be reasonably ubiquitous, thus providing some diversity to the sport fishery as well as life history diversity and conservation value. Rainbow Trout in LPO provide a popular world-class trophy fishery that largely depends on abundant kokanee for forage. Kokanee themselves provide a popular yield fishery on the lake and represent a forage base for adfluvial Bull Trout. Like we are currently observing with Walleye, Lake Trout existed at low abundance in LPO for many years before they became a predation concern. Lake Trout suppression programs were instituted to

reduce predation risk when we began to observe rapid population increases, as we are now seeing with Walleye. Should Walleye abundance continue to increase and the scope of their niche expand to include ecologically significant predation on kokanee, Westslope Cutthroat Trout, and juvenile Bull and Rainbow trout, some of the conservation advancement made through previous suppression programs may be at risk.

A Walleye population assessment project is currently being funded through Appendix F5 and includes monitoring, telemetry, and experimental netting. One of the goals of the population assessment project is to evaluate the feasibility of Walleye suppression as a management tool. To supplement this work, this project incentivizes angler harvest of Walleye to determine if this is an effective suppression method. This experimental program is intended to serve several purposes. First, it promotes angler harvest of Walleye in the LPO system, thus reinforcing via management that Walleye are a threat to the existing fishery. Second, it increases the potential for angling to serve as a tool for managing the Walleye threat, which is a common request from anglers. Finally, it will provide an opportunity to evaluate the effect of incentivized harvest on angler exploitation rate. Exploitation will be estimated and compared to previous estimates to assess the influence of incentivized harvest. Ultimately, this information will be useful for evaluating the role that angler harvest can play in the management of Walleye in LPO, particularly with respect to suppression feasibility.

The program is designed to provide rewards for a subset of the heads turned in in contrast to a direct per-fish bounty. A number of Walleye are tagged in the head using coded wire tags that are not visible externally. Tags are uniquely numbered and each has a reward value of $1,000. Heads are collected throughout the year and scanned for coded wire tags. If a tag is present, the angler receives a $1,000 reward. Additionally, anglers have their name entered into a monthly drawing for each head turned in that is not tagged. Each month a random drawing is conducted and ten winners receive a $100 reward. If less than 10 heads are turned in during a given month, then the number of drawing payouts is limited to the number of heads turned in that month.

The Walleye Angler Incentive program began in March 2019. During its first year of implementation a total of 785 Walleye were removed by 234 unique anglers. No tagged Walleye were turned in during 2019. In 2020, a total of 860 heads were turned in by 249 anglers (Table 1). In addition, a total of 10 tagged Walleye (1.2% of the number of heads turned in) were submitted for the $1,000 payment.

Table 1. Number of Walleye removed and unique anglers participating in the LPO Walleye Angler Incentive Program, by month, 2019-2020.

	2019		2020	
	Heads	Anglers	Heads	Anglers
January			12	4
February			17	5
March	26	14	60	12
April	89	31	53	15
May	79	28	71	23
June	154	43	121	39
July	156	53	137	47
August	171	42	206	43
September	76	17	130	40
October	18	5	25	12
November	9	4	14	5
December	7	1	14	4
Total	785	234	860	249

Goal

To implement an experimental angler incentive program targeting Walleye in LPO, thereby reducing the threat they pose to native and recreationally important species.

Objectives

1. Promote angler harvest of Walleye and increase the potential for angling to serve as a tool for regulating Walleye abundance.

2. Evaluate the utility of angler harvest for regulating Walleye population abundance in the LPO system.

Tasks

1. Conduct public outreach to make anglers aware of this new experimental program. (Objective 1)

2. Fish head freezer drop off locations around the lake will continue to be emptied, at least weekly, and maintained. Submitted fish heads will be processed. (Objective 1)

3. Tag additional Walleye in 2021 to maintain a similar tag return rate to 2020 based on estimates of annual mortality and angler exploitation rates. (Objective 1)

4. Pay anglers $1,000 for each coded wire-tagged Walleye caught in the LPO system. (Objective 1)

5. Conduct random monthly drawings and award ten $100 rewards per month to program participants. (Objective 1)

6. Summarized catch data will be submitted to a contractor for disbursement of reward tag payouts and facilitation of monthly random drawings and associated payouts. (Objective 2)

Work Products

- Annual Project Update – 2020; final due November 1, 2021
- Annual Work Summary; due December 1, 2021
- Annual Project Update – 2021; final due November 1, 2022

Permitting Requirements

Not applicable for the tasks proposed in this project plan.

Endangered Species Act consultation for this project plan is associated with the 2019 Biological Opinion on the effects of continued operation of the Clark Fork Hydroelectric Project on Bull Trout and designated Bull Trout critical habitat (BiOp), and the U.S. Fish and Wildlife Service (USFWS)-IDFG Cooperative Agreement pursuant to Section 6 of the Act. This project plan is consistent with the analysis and conclusions contained in the 2019 BiOp and the USFWS-IDFG Cooperative Agreement, and will adhere to all appropriate Terms and Conditions designed to reduce the extent and effects of incidental take on Bull Trout. Incidental take reporting for this project plan will be included in the annual Biological Opinion report as required by Term and Conditions 15–18 of the 2019 Incidental Take Statement, as well as IDFG's annual Section 6 report to the USFWS.

Cultural/Historic Resource Review

Not applicable for the tasks proposed in this project plan, there are no ground and/or vegetation disturbing activities, or proposed impacts to cultural/historic resources.

Benefit to the Resource

Bull Trout, Westslope Cutthroat Trout, kokanee, and Rainbow Trout are all target species that are potentially negatively impacted by operations at Cabinet Gorge Dam that lead to gas supersaturation. The Appendix F5 TDG Alternative Mitigation Program is "focused on the protection and enhancement of the fishery resources that might be affected by the future occurrence of elevated TDG levels downstream of the Cabinet Gorge HED" (Avista 2004). The goal of this project is to evaluate the feasibility of suppression of the burgeoning Walleye population downstream of Cabinet Gorge Dam as alternative mitigation to potential adverse effects of TDG supersaturation. Further, Walleye have the potential to offset some of the gains in predation management that have been made in the *LPO Lake Trout Netting Program*, which has been the major focus of the CFSA Appendix F5 Alternative Mitigation Program.

This approach is consistent with the Avista Native Salmonid Recovery Plan (NSRP, Appendix C of the CFSA) to restore and enhance migratory forms of native salmonids, and also with the USFWS Bull Trout recovery plan (USFWS 2015). This approach is also consistent with the management objectives outlined for the Clark Fork River and LPO in the Idaho Department of Fish and Game Fisheries Management Plan 2019-2024 (IDFG 2019).

Budget

Item	Estimated Carryover	2021 Budget Request
Signage, flyers, and misc. outreach materials	$0	$250
Coded wire tag rewards	$3,000	$50,000
Monthly drawing rewards (10 @ $100 each)	$3,000	$12,000
Avista labor (0.25 FTE)	$4,000	$25,000
Vehicle operating costs	$0	$2,500
Supplies (freezers, freezer parts, bags, etc.)	$0	$1,000
Contractor cost to administer payments	$0	$2,000
Total	$10,000	$92,750
Anticipated Expenditures		$102,750

NOTE: Although $50,000 was requested for coded wire tag rewards, our best estimate of angler exploitation and natural mortality suggests ≤10 of the tagged fish will be caught and submitted for the $1,000 payment. Thus, the actual angler payout will likely be approximately ≤$10,000 for tagged fish, making the actual cost to implement the program for one year closer to $52,000.

A match of approximately $5,000 of IDFG funds will be allocated towards this project for general administration, public outreach, data analysis, etc.

Literature Cited

Avista. 2004. Final Gas Supersaturation Control Program for the Clark for Project. Avista Corporation: Spokane, Washington. 90 pages + appendices.

Hansen, M. J., D. Schill, J. Fredericks, and A. Dux. 2010. Salmonid predator-prey dynamics in Lake Pend Oreille, Idaho, USA. Hydrobiologia 650:85-100.

IDFG (Idaho Department of Fish and Game). 2019. Fisheries Management Plan 2019-2024. Boise, ID.

MFWP (Montana Fish, Wildlife, and Parks). 2016. Ecology and Management of Montana Walleye Fisheries. Avista document identification number 2016-0449. Montana Cooperative Fishery Research Unit, Montana State University, Bozeman, Montana, and Montana Fish, Wildlife and Parks, Helena, Montana.

USFWS (U.S. Fish and Wildlife Service). 2015. Recovery plan for the coterminous United States population of bull trout (Salvelinus confluentus). Portland, Oregon. xii + 179 pages.

2021 PROJECT PLAN

Lake Pend Oreille/Clark Fork River Walleye Population Assessment

Project Contact

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Project History

This is a continuing project first approved in 2018. The scope and budget for this project are reviewed by the Management Committee annually.

Background

Suppression of piscivorous fishes, including Lake Trout and Rainbow Trout, has been the focus of the Lake Pend Oreille (LPO) fishery recovery since 2006. Previous suppression programs have included incentivized sport harvest of Rainbow Trout (ended in 2013) and Lake Trout (ongoing) as well as commercial trap net and gillnet operations targeting Lake Trout. Through previous research, we had established that reduced kokanee productivity in LPO, in concert with an over-abundance of upper trophic level predators had created a predator pit that would have likely led to a complete collapse of kokanee in the system (Hansen et al. 2010). The predator suppression program has been a major success and the kokanee population has responded positively.

Walleye, which were illegally introduced into Noxon Reservoir approximately 30 years ago, have become well established throughout Noxon and Cabinet Gorge reservoirs. These reservoirs have provided suitable spawning and rearing habitat for Walleye and downstream drift has led to subsequent invasions into the Idaho portion of the Clark Fork River, LPO and the Pend Oreille River. These fish appeared to exist in LPO at low densities in localized habitats but the densities have nearly doubled every three years from 2011 to 2017 during fall Walleye index netting. Walleye catch rates during targeted Lake Trout netting have generally remained low since 2006, but Walleye catch rates are increasing during Lake Trout netting efforts throughout the northern and southern basins of the lake.

An expanding Walleye population has the potential to put several fish populations in LPO at risk through direct predation and competition. Walleye are prolific piscivores and their establishment in other western lentic systems has led to significant fishery management challenges, particularly where they overlap with salmonid fisheries (MFWP 2016). Lake Pend Oreille represents a critical stronghold for Bull Trout within their native range. Westslope Cutthroat Trout populations in LPO are depressed relative to historic abundances, but they appear to be reasonably ubiquitous, thus providing some diversity to the sport fishery as well as life history diversity and conservation value. Rainbow Trout in LPO provide a popular world-class trophy fishery that largely depends on abundant kokanee for forage. Kokanee themselves often provide a popular yield fishery on the lake and represent a forage base for adfluvial Bull Trout. Like we are currently observing with Walleye, Lake Trout existed at low abundances in LPO for many years before they became a predation concern. Lake Trout suppression programs were instituted

to reduce predation risk when we began to observe rapid population increases, as we are now seeing with Walleye. Should Walleye abundances continue to increase and the scope of their niche expand to include ecologically significant predation on kokanee, Westslope Cutthroat Trout, and juvenile Bull and Rainbow trout, some of the conservation advancements made through previous suppression programs may be at risk.

This project proposes to gather fundamental information to help us assess the current status of the Walleye population, to evaluate the opportunities for management (suppression), and estimate the likely scope of their influence on the current fish community in LPO. We will accomplish this by implementing a test fishery approach that increases the scope and resolution of current management tools. We will implement a strategic acoustic telemetry program that will allow us to evaluate the number, location, and spatial extent of spawning aggregations, and we will then attempt to target one or several aggregations using various gear types to collect biological data and assess our fishing power. Finally, we will continue to evaluate Walleye diet and trophic status in order to determine the scope of their predator interactions. There will be synergy among these approaches that will improve their success. For example, identification of spawning aggregations will not only help clarify opportunities for suppression, but will facilitate our understanding of current distribution and life history of Walleye in Lake Pend Oreille.

The Fall Walleye Index Netting Project (FWIN) is completed on a three year rotation. It is a robust tool that is used to monitor the relative size of the Walleye population in LPO using a randomized netting design to assess and track the relative size of the Walleye population via catch per unit effort estimates (Morgan 2002). Results from the 2020 FWIN broadly suggest that Walleye catch rates in Lake Pend Oreille have decreased since 2017 (Figure 1). Lake Pend Oreille was divided into four zones to compare changes in Walleye catch rates over time among the different regions in the Lake Pend Oreille system that met the FWIN sampling criteria (Morgan 2002, Ryan et al. *In review*). Three of the four zones showed relatively consistent catch rates compared to 2017, but the Pend Oreille river zone has continued to show increases in catch rate since 2011 (Ryan et al. *In review*). Suppression netting conducted since 2018 coupled with the Walleye AIP program (beginning in 2019) may be partially responsible for the decreased catch rates overall, but suppression netting has focused in the north basin of the lake and most of the Walleye (heads) returned during the AIP suggest angling has focused on the north basin of the lake as well. To continue reducing Walleye densities in general and in the Pend Oreille River specifically, we plan to refine our telemetry methods in the Pend Oreille River to better evaluate residency, movements, and areas where Walleye concentrate for potential suppression and to help increase angler exploitation in the river. This may include the addition of more telemetry receivers and equipment to improve the timeliness and efficiency of the data flow from the field to the anglers or netters.

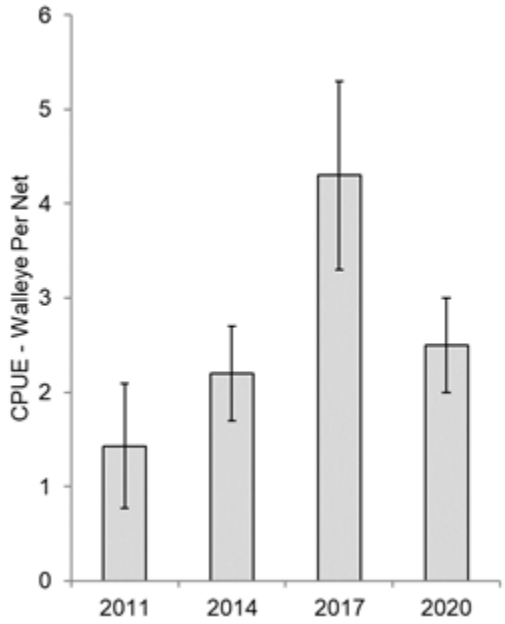

Figure 1. FWIN catch rates, 2011–2020.

Ultimately, this information will be used to establish tolerable management thresholds for Walleye densities and help identify a range of potential management options. Given burgeoning Walleye populations have a track record of negative fishery consequences in western waters, we will be focusing this project on the efficacy of suppression tools, including physical removal and use of emerging suppression technologies including Trojan Y-chromosome hatchery fish (e.g., Schill et al. 2016).

After three years of implementation, we have identified additional opportunities to make the program more efficient. It is necessary to expand staffing levels to increase the frequency that fixed telemetry receivers are downloaded as well as increase the frequency of active tracking. These data also need to be compiled, analyzed, and disseminated to both the public and to netting crews in a timelier fashion to direct effort on areas where Walleye are concentrated. We have also learned that, although extremely efficient during the spawn in certain locations, commercial netting effectiveness is limited during other times and locations. It is necessary to increase field staffing availability to locate fish and try different capture techniques in areas and during times that large-scale gillnetting is not feasible.

Goal
Assess and evaluate opportunities for Walleye population management in the LPO watershed.

Objectives

1. Locate Walleye concentrations and determine their general movement patterns to focus netting and angler effort on areas with high Walleye density to maximize catch rates and exploitation.

2. Evaluate our ability to capture Walleye in various locations during different times using different gear types.

3. Collect biological data from captured Walleye to learn about their growth, diet, origin, and other population parameters.

4. Evaluate our ability to regulate the abundance of the LPO Walleye population.

Tasks

1. Implant acoustic tags in 35 additional Walleye to add to the 48 fish that are already tagged. (Objective 1)

2. Deploy, maintain, and download 40 fixed acoustic receivers throughout LPO, the Clark Fork River, and the Pend Oreille River to determine seasonal movement patterns. (Objective 1)

3. Weekly, actively track tagged Walleye to provide real-time data to inform both targeted netting and angler effort. (Objective 1)

4. Provide timely updates on Walleye locations to the public to increase angler exploitation. (Objective 1)

5. Contract with Hickey Brothers Research, LLC in the spring to use commercial gill netting techniques to target Walleye spawning concentrations. (Objective 2)

6. Experiment with various gear types (gill nets, trap nets, e-fishing) to target Walleye in areas and during times where commercial scale netting is not feasible. (Objective 2)

7. Collect necessary biosamples to facilitate trophic and diet studies, as well as otolith microchemistry to determine sources of recruitment above or below Cabinet Gorge Dam. Because trophic and microchemistry studies are outside the scope of this project, samples will be archived for later processing. (Objectives 2 and 3)

8. Compile and evaluate tracking, catch, and biological data to elucidate trends and direct future efforts. (Objective 4)

9. Purchase a GIS-grade depth finder to create detailed bathymetric maps of the Clark Fork River, the Clark Fork Delta, and other areas where Walleye are known to concentrate. (Objective 1 and 2)

10. Use the bathymetric maps to facilitate targeted removal. (Objective 2)

Work Products

- Annual Project Update – 2020; final due November 1, 2021
- Annual Work Summary; due December 1, 2021
- Annual Project Update – 2021; final due November 1, 2022

Permitting Requirements
Not applicable for the tasks proposed in this project plan. Any necessary Endangered Species Act consultation or take reporting will be conducted under Idaho Department of Fish and Game's (IDFG) Section 6 Agreement. Endangered Species Act consultation for this project plan is associated with the 2019 Biological Opinion on the effects of continued operation of the Clark Fork Hydroelectric Project on Bull Trout and designated Bull Trout critical habitat (BiOp), and the U.S. Fish and Wildlife Service (USFWS)-IDFG Cooperative Agreement pursuant to Section 6 of the Act. This project plan is consistent with the analysis and conclusions contained in the 2019 BiOp and the USFWS-IDFG Cooperative Agreement, and will adhere to all appropriate Terms and Conditions designed to reduce the extent and effects of incidental take on Bull Trout. Incidental take reporting for this project plan will be included in the annual Biological Opinion report as required by Term and Conditions 15–18 of the 2019 Incidental Take Statement, as well as IDFG's annual Section 6 report to the USFWS.

Cultural/Historic Resource Review
Not applicable for the tasks proposed in this project plan, there are no ground and/or vegetation disturbing activities, or proposed impacts to cultural/historic resources.

Benefit to the Resource
Bull Trout, Westslope Cutthroat Trout, kokanee, and Rainbow Trout are all target species that are negatively impacted by operations at Cabinet Gorge Dam that lead to gas supersaturation. The Appendix F5 total dissolved gas (TDG) Alternative Mitigation program is "focused on the protection and enhancement of the fishery resources that might be affected by the future occurrence of elevated TDG levels downstream of the Cabinet Gorge HED [Hydroelectric Development]" (Avista 2004). The goal of this project is to evaluate the potential risk and feasibility of suppression of the burgeoning Walleye population downstream of Cabinet Gorge Dam as alternative mitigation to potential adverse effects of TDG supersaturation. Further, Walleye have the potential to offset some of the gains in predation management that have been made in the *LPO Lake Trout Netting Program* (also funded through Appendix F5 of the CFSA).

Our approach is consistent with the Avista Native Salmonid Restoration Plan (Appendix C of the CFSA) to restore and enhance migratory forms of native salmonids, and also with the USFWS Bull Trout recovery plan (USFWS 2015). This approach is also consistent with the management objectives outlined for the Clark Fork River and Lake Pend Oreille in the Idaho Department of Fish and Game Fisheries Management Plan 2019-2024 (IDFG 2019).

Budget

Item	Estimated Carryover	2021 Budget Request
Contract with Hickey Bros. LLC for up to three weeks of targeted Walleye netting	$0	$45,000
Side-scan depth finder	$0	$1,500
Full Time (8-month) IDFG Technician Rate 18.72/hr.	$0	$27,955
Temporary Data Technician (8-month) -11.42/hr. – non-benefitted	$0	$18,984
Avista staff time (0.25 FTE)	$0	$25,000
Total	$0	$118,439
Anticipated Expenditures		$118,439

Idaho Department of Fish and Game, using Bonneville Power Administration (BPA) funds, recently purchased acoustic tags and receivers (~$60,000) for this project. Idaho Department of Fish and Game anticipates purchasing additional receivers and telemetry equipment during 2021 ($50,000). This project will be administered and implemented by IDFG fisheries research staff payed with BPA funds, including Pete Rust (6 mos, ~$48,000) and Matthew Corsi (2 mo, ~$16,000). All additional operating costs (boat, fleet rentals, fuel, etc.) including personnel costs (1 Temporary Senior Technician – 8-month ~$9,292, and 1 Bio-aide – 8-month ~$6,328) will be covered by IDFG using BPA funds (~$50,000).

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Avista. 2004. Final Gas Supersaturation Control Program for the Clark for Project. Avista Corporation: Spokane, Washington. 90 pages + appendices.

Hansen, M. J., D. Schill, J. Fredericks, and A. Dux. 2010. Salmonid predator-prey dynamics in Lake Pend Oreille, Idaho, USA. Hydrobiologia 650:85–100.

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Ryan, R., M. Corsi, and P. Rust. *In review*. Expansion of an Introduced Walleye Population in Lake Pend Oreille, Idaho.

Schill, D. J., J. A. Heindel, M. R. Campbell, K. A. Meyer, and E. R. J. M. Mamer. 2016. Production of a YY male Brook Trout broodstock for potential eradication of undesired

brook trout populations. North American Journal of Aquaculture 78:72–83.

USFWS (U.S. Fish and Wildlife Service). 2015. Recovery plan for the coterminous United States population of bull trout (*Salvelinus confluentus*). Portland, Oregon. xii + 179 pages.

2021 PROJECT PLAN

Lake Pend Oreille Lake Trout Angler Incentive Program

Project Contact
Ken Bouwens, Idaho Department of Fish and Game (IDFG), (208) 769-1414,
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Project History
This is a continuing project that was originally approved by the Management Committee (MC) in 2007. The scope and budget for this project are reviewed by the MC annually.

Background
The kokanee population of Lake Pend Oreille (LPO) declined dramatically from historic levels due to a variety of habitat and ecological impacts. Historically, the adult population of around five million kokanee supported a sport and commercial fishery averaging one million fish per year. Predation was the primary factor limiting kokanee population recovery. Lake level management, restricted fish passage, and floods have also contributed to the decline of kokanee.

In 2000, the kokanee fishery was closed to increase spawning escapement and limits on Rainbow and Lake trout were liberalized to encourage harvest of Lake Trout and reduce predation on young kokanee. Despite liberalized harvest opportunity, angler exploitation was not keeping up with an expanding Lake Trout population. Non-native Lake Trout were not only recognized as a threat to the kokanee population and the trophy Rainbow Trout fishery, but case studies throughout the intermountain west have clearly demonstrated that Lake Trout also threaten the persistence of Bull Trout.

To address kokanee predation issues in LPO, predator removal using a large-scale netting program and an Angler Incentive Program (AIP) was implemented beginning in 2006. The goal of both the netting and angler harvest programs is to suppress Lake Trout and subsequently increase kokanee survival. The AIP additionally had the goal of reducing Rainbow Trout abundance; however, this component of the program was discontinued in 2013 because of limited success and increased resiliency of the kokanee population.

The responses observed to date suggest that suppression of Lake Trout can be achieved and provide benefits for both kokanee and Bull Trout. A positive response by kokanee has been observed corresponding to a reduction in the Lake Trout population, and kokanee abundance estimates have continued along an increasing trajectory. Bull Trout abundance has also shown some signs of improvement, as standardized trap net catch rates for Bull Trout have approximately doubled since 2007. However, high exploitation of Lake Trout needs to be sustained.

The combined predator removal programs in LPO continue to demonstrate progress (Figure 1). Idaho Department of Fish and Game returned to trophy management of the Rainbow Trout fishery in 2013 and discontinued Rainbow Trout reward payments as part of the AIP. Idaho Department of Fish and Game (IDFG) opened a kokanee harvest fishery in 2013, and in 2014

daily kokanee limits were raised from six to 15 fish. Despite these signs of success, continued pressure on Lake Trout is necessary to insure long-term suppression of the population.

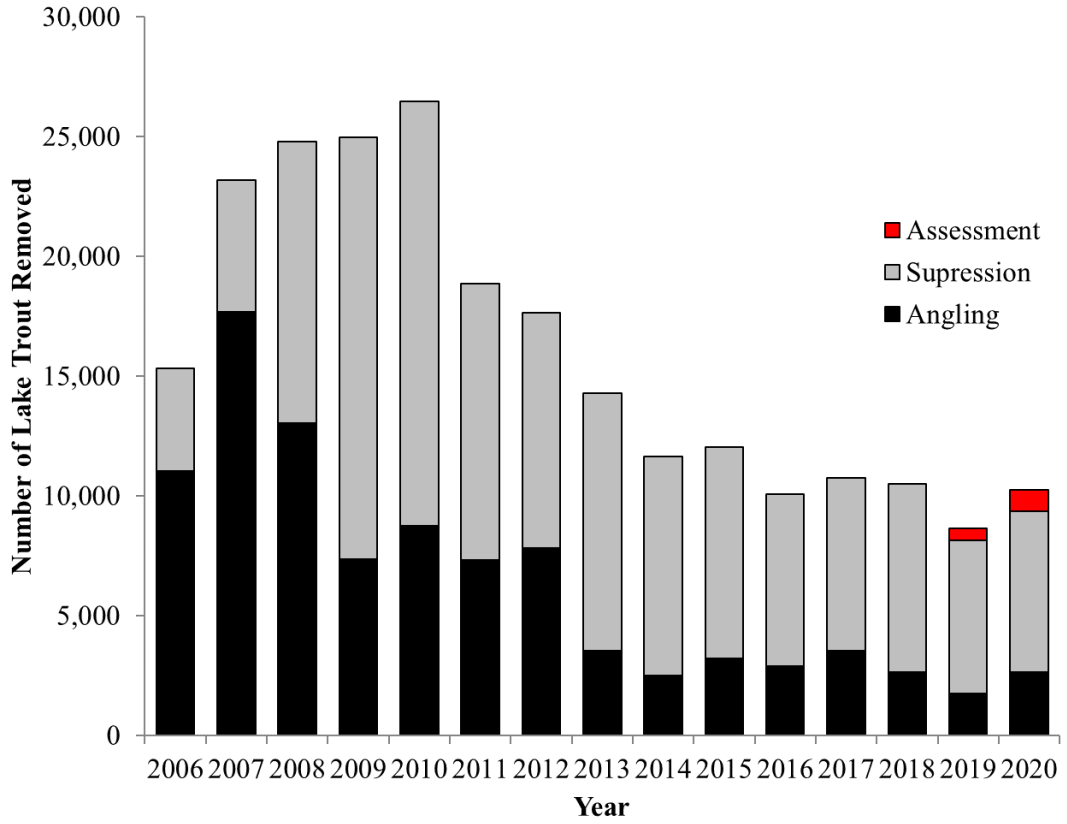

FIGURE 1. Lake Trout harvested and removed from Lake Pend Oreille, Idaho by year and collection method.

Anglers continue to play a necessary role in maintaining high exploitation rates. The efficiency of predator removal has remained at high levels under the combined effort of both netting and angling. Anglers continue to catch intermediate sized Lake Trout that are less vulnerable to netting gear during much of the sampling period as well as significant numbers of other size classes.

Goal

Improve and maintain favorable forage base for Gerrard Rainbow Trout and Bull Trout in Lake Pend Oreille by reducing Lake Trout abundance to increase kokanee survival.

Objective

1. Maintain high angling mortality on Lake Trout.

Tasks

1. Continue paying a $15/fish bounty on angler caught Lake Trout from LPO. (Objective 1)

2. Fish head freezer drop off locations around the lake will continue to be emptied, at least weekly, and maintained. Submitted fish heads will be processed at the IDFG Field Station. (Objective 1)

3. Summarized catch data will be submitted to a contractor for payment. (Objective 1)

4. All illegally harvested Bull Trout turned in through the program incidentally will be genetically assessed for stream of origin. (Objective 1)

5. Make available up to $16,000 dollars ($2,000 per derby maximum) to be used to sponsor LPO angling derbies. (Objective 1)

Work Products

- Annual Project Update – 2020; final due November 1, 2021
- Annual Work Summary; due December 1, 2021
- Annual Project Update – 2021; final due November 1, 2022

Permitting Requirements

Not applicable for the tasks proposed in this project plan.

Endangered Species Act consultation for this project plan is associated with the 2019 Biological Opinion on the effects of continued operation of the Clark Fork Hydroelectric Project on Bull Trout and designated Bull Trout critical habitat (BiOp), and the U.S. Fish and Wildlife Service (USFWS)-IDFG Cooperative Agreement pursuant to Section 6 of the Act. This project plan is consistent with the analysis and conclusions contained in the 2019 BiOp and the USFWS-IDFG Cooperative Agreement, and will adhere to all appropriate Terms and Conditions designed to reduce the extent and effects of incidental take on Bull Trout. Incidental take reporting for this project plan will be included in the annual Biological Opinion report as required by Term and Conditions 15–18 of the 2019 Incidental Take Statement, as well as IDFG's annual Section 6 report to the USFWS.

Cultural/Historic Resource Review

Not applicable for the tasks proposed in this project plan, there are no ground and/or vegetation disturbing activities, or proposed impacts to cultural/historic resources.

Benefit to the Resource

This project is consistent with the IDFG 2019-2024 Fish Management Plan (IDFG 2019). This project will meet the objectives of the Clark Fork Settlement Agreement Appendices A and F5 mitigation programs by directly reducing predation on kokanee and competition with Bull Trout. The project will also likely result in reduction of predation on Bull Trout and Westslope Cutthroat Trout in LPO to further benefit these species. Our approach is also consistent with the Avista Native Salmonid Restoration Plan (Appendix C) to restore and enhance migratory forms of native salmonids, and also with the USFWS Bull Trout Recovery Plan (USFWS 2015). This project is also consistent with Appendix N1 (Bald Eagle Monitoring and Protection) through enhancement of kokanee, an important food source for wintering eagles. This project provides direct, on-the-ground benefits to resources potentially adversely impacted by elevated TDG

levels in the Clark Fork River and LPO, as well as those impacted by degraded tributary habitat, by reducing competition and predation on kokanee, Bull Trout and Westslope Cutthroat Trout in LPO.

Budget

Item	Estimated Carryover	2021 Budget Request
Angler incentive award (4,000 fish @ $15 each)	$5,000	$60,000
Avista labor (0.4 FTE)	$4,000	$40,000
Vehicle operating costs	$0	$10,000
Supplies (freezers, freezer parts, bags, etc.)	$0	$2,000
Contractor costs to administer payments	$1,000	$6,000
Genetic analysis (10 fish)	$0	$4,000
Derby sponsorship	$0	$16,000
Total	$10,000	$138,000
Anticipated Expenditures		$148,000

Idaho Department of Fish and Game contributes in-kind cost share to this project for logistics and planning at an estimated cost of approximately $10,000 annually.

Literature Cited

IDFG (Idaho Department of Fish and Game). 2019. Fisheries Management Plan 2019-2024. Boise, ID.

USFWS (U.S. Fish and Wildlife Service). 2015. Recovery plan for the coterminous United States population of bull trout (Salvelinus confluentus). Portland, Oregon. xii + 179 pages.

2021 PROJECT PLAN

Lake Pend Oreille Lake Trout Netting Program

Project Contact

Matthew Corsi, Idaho Department of Fish and Game (IDFG), (208) 769-1414, matthew.corsi@idfg.idaho.gov *and*
Ken Bouwens, IDFG, (208) 769-1414, ken.bouwens@idfg.idaho.gov

Project History

This is a continuing project originally approved by the Management Committee (MC) in 2007. The scope and budget for this project are reviewed by the MC annually (budgets for the subsequent two years are reviewed annually).

Background

The kokanee population of Lake Pend Oreille (LPO) declined dramatically from historic levels due to a variety of habitat and ecological impacts. Historically, the adult population of around five million kokanee supported a sport and commercial fishery averaging one million fish per year. Predation was the primary factor limiting kokanee population recovery. Lake level management, restricted fish passage, and floods have also contributed to the decline of kokanee.

In 2000, the kokanee fishery was closed to increase spawning escapement and limits on Rainbow and Lake trout were liberalized to encourage harvest on Lake Trout and reduce predation on young kokanee. Despite liberalized harvest opportunity, angler exploitation was not keeping up with an expanding Lake Trout population. Non-native Lake Trout were not only recognized as a threat to the kokanee population and the trophy Rainbow Trout fishery, but case studies throughout the intermountain west have clearly demonstrated that Lake Trout also threaten the persistence of Bull Trout.

To address kokanee predation issues in LPO, predator removal using a large-scale netting program and an Angler Incentive Program (AIP) was implemented beginning in 2006. The goal of both the netting and angler harvest programs is to suppress Lake Trout and subsequently increase kokanee survival. The AIP additionally had the goal of reducing Rainbow Trout abundance; however, this component of the program was discontinued in 2013 because of limited success and increased resiliency of the kokanee population.

The responses observed to date suggest that suppression of Lake Trout can be achieved and provide benefits for both kokanee and Bull Trout. A positive response by kokanee has been observed corresponding to a reduction in the Lake Trout population, and kokanee abundance estimates have continued along an increasing trajectory. Bull Trout abundance has also shown some signs of improvement, as standardized trap net catch rates for Bull Trout have approximately doubled since 2007. However, recent analyses suggest high exploitation of Lake Trout needs to be sustained for a period of approximately 10 more years to achieve Lake Trout suppression to late 1990's abundances.

The combined predator removal programs in LPO continue to demonstrate progress. The Idaho Department of Fish and Game (IDFG) returned to trophy management of the Rainbow Trout fishery in 2013 and discontinued Rainbow Trout reward payments as part of the AIP. Idaho Department of Fish and Game opened a kokanee harvest fishery in 2013, and in 2014 daily kokanee limits were raised from six to 15 fish. Despite these signs of success, continued pressure on Lake Trout is necessary to insure long-term suppression of the population.

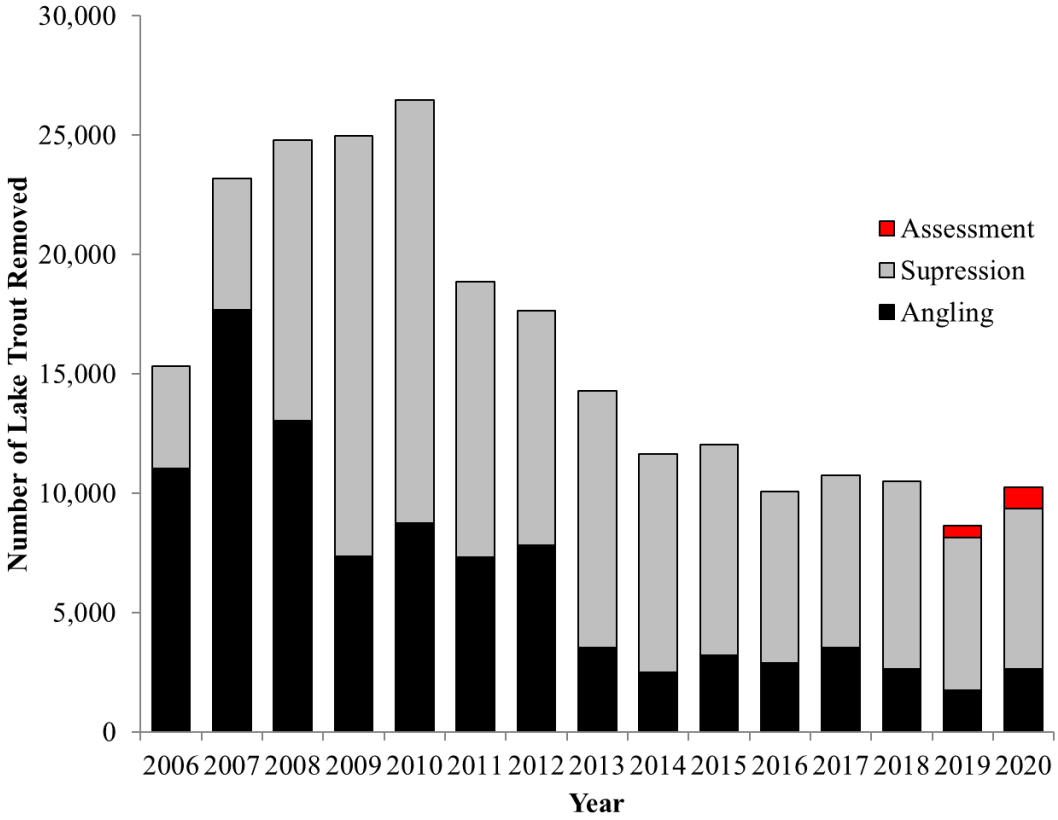

FIGURE 1. Lake Trout harvested and removed from Lake Pend Oreille, Idaho by year and collection method.

Fishing effort will remain high as efforts continue to target juvenile and spawning adult Lake Trout. However, we will continue to modify netting strategies in an attempt to improve catch efficiency and reduce bycatch mortality. We discontinued trap nets for spring fishing in 2010 following a continued decline in trap net efficiency, presumably due to declining adult Lake Trout abundance. We had maintained standardized trap net effort in the fall as a tool for monitoring relative adult Lake Trout and Bull Trout abundance, but we discontinued this effort in 2018 as we have developed improved Lake Trout monitoring tools using gillnets. We intend to continue gill netting efforts that target mature Lake Trout during the fall at spawning sites. Also, we will target juvenile Lake Trout during winter and early spring to capitalize on expected high catch rates. This also acts to focus netting when Bull Trout bycatch and mortality has been low relative to other time periods.

The long-term goal of the Lake Trout suppression program is to reduce fishing effort and transition into a maintenance suppression program that will keep Lake Trout at low density once target densities are achieved. Benefits will include an easier program to implement and reduced costs. Results from Lake Trout population models (Hansen et al. 2019) developed by Dr. Michael Hansen (USGS, Hammond Bay Biological Station) and IDFG personnel suggest approximately 10 more years of high effort netting will be required to achieve late 1990's abundances. Once management targets are achieved, these models indicate a greatly reduced gillnet effort (~40% of peak gillnet effort) will maintain abundances at or below targets and eventually drive the Lake Trout population to extinction.

Dr. Hansen has also consulted with IDFG on the formulation of a robust monitoring program for Lake Trout in LPO using data collected from gillnets and the AIP program. Using harvest data and age frequencies from an annual age sample, we will employ a cohort analysis approach (virtual population analysis) to annually estimate abundances of Lake Trout in LPO. This will allow robust monitoring of the suppression program at a reduced cost, because it does not rely on continued collection of trap net data.

Lake Trout netting methods will closely follow those described in Rust et al. (2020). Hickey Brothers Research, LLC will be contracted to remove Lake Trout from Lake Pend Oreille using gill nets during 14 weeks in the winter/spring netting season and 14 weeks in the fall netting season. We will be conducting standardized assessment during three of these weeks at the end of the fall season. In prior years, trap net catch rates were utilized as an index of Lake Trout and Bull Trout abundance. Trap netting was discontinued in 2018 and replaced with the random assessment netting protocol based upon an analysis by Hansen et al. (2019). Data from this program will be utilized to conduct a cohort analysis for Lake Trout, which will provide an annual age-specific abundance estimate.

Bottom-set gill nets with stretch mesh sizes ranging from 3.8 to 14 cm will be used. Each net is 274 m long and several will be tied together to form a gang that is generally set in a serpentine pattern parallel to shore. Gill nets will be set around dawn and retrieved in the late-morning (typically 4–6 hour sets). See Rust et al. (2020) for a more detailed explanation of netting methods.

With the exception of Lake Whitefish *Coregonus clupeaformis* all game fish captured in gill nets will be enumerated. Because of high catch rates, Lake Whitefish will be enumerated from a stratified random subset of standardized assessment netting locations. Catch rates will be calculated as the number of fish of a particular species captured per 274 m net (box). A time component is not included in these catch rates because Lake Trout catch has typically not increased with the duration of net sets (IDFG, unpublished data).

All captured individuals of target species (e.g., Lake Trout, Northern Pike *Esox lucius*, and Walleye) will be measured for total length and, with few exceptions (i.e., those tagged for research purposes), removed from the population and donated to local food banks or raptor rehabilitation facilities. Sex and maturity will be determined for most of the Lake Trout captured throughout the spawning period (September–November). Otoliths will be removed from a subset of Lake Trout during the fall (late September–December) for ageing purposes. All Bull Trout will be measured for total length, a genetic sample will be taken, and scanned for PIT tags.

Previously unmarked Bull Trout will be implanted with a 12-mm half duplex PIT tag, revived in an oxygenated tank if necessary, assigned a condition score, and released. Head length and body depth will be measured, sex and maturity level determined, otoliths, scales, and fin rays will be collected, pathogen samples taken, and stomach contents will be described from all Bull Trout mortalities.

We budgeted within this proposal for collection and analysis of genetics samples from incidental Bull Trout mortalities. Genetics results will allow continued monitoring of bycatch effects on various Bull Trout stocks.

At the spring 2020 MC meeting, approval was granted for funding of the 2021 LPO Lake Trout Netting Program. We request funding one year in advance because it provides some level of certainty in the contracting which allows for continued capital investment by Hickey Brothers Research, LLC to improve the efficiency and effectiveness of the project. Like in past years, Bonneville Power Administration (BPA) will cover a portion of the costs for 2021. The IDFG intends to implement the LPO Lake Trout Netting Program in 2022. To date, approval for 2022 BPA funds has not been secured; therefore, we are maintaining our request for full Avista funding for 2022. The likelihood of approval on cost sharing in 2022 is high.

Goal
Improve and maintain favorable forage base for Gerrard Rainbow Trout and Bull Trout in Lake Pend Oreille by reducing Lake Trout abundance to increase kokanee survival.

Objective
1. Maintain high netting mortality on LPO lake Trout.

2. Collect information from incidentally-caught Bull Trout.

Tasks
1. Contract Hickey Brothers Research LLC to provide 28 weeks of netting. (Objective 1)

2. PIT-tag and collect genetics samples from incidentally-caught Bull Trout. (Objective 2)

3. Collect biological and genetics samples from incidentally-caught Bull Trout mortalities. (Objective 2)

4. Provide Avista Technician support to assist with the collection of Bull Trout Pathology samples and to collect biological data from all incidentally-caught Bull Trout mortalities. (Objective 2)

Work Products
- Annual Project Update – 2020; final due November 1, 2021
- Annual Work Summary; due December 1, 2021
- Annual Project Update – 2021; final due November 1, 2022

Permitting Requirements
Not applicable for the tasks proposed in this project plan.

Endangered Species Act consultation for this project plan is associated with the 2019 Biological Opinion on the effects of continued operation of the Clark Fork Hydroelectric Project on Bull Trout and designated Bull Trout critical habitat (BiOp), and the U.S. Fish and Wildlife Service (USFWS)-IDFG Cooperative Agreement pursuant to Section 6 of the Act. This project plan is consistent with the analysis and conclusions contained in the 2019 BiOp and the USFWS-IDFG Cooperative Agreement, and will adhere to all appropriate Terms and Conditions designed to reduce the extent and effects of incidental take on Bull Trout. Incidental take reporting for this project plan will be included in the annual Biological Opinion report as required by Term and Conditions 15–18 of the 2019 Incidental Take Statement, as well as IDFG's annual Section 6 report to the USFWS.

Cultural/Historic Resource Review
Not applicable for the tasks proposed in this project plan, there are no ground and/or vegetation disturbing activities, or proposed impacts to cultural/historic resources.

Benefit to the Resource
This project is consistent with the IDFG 2019–2024 Fish Management Plan (IDFG 2019). This project will meet the objectives of the Clark Fork Settlement Agreement Appendices A and F5 mitigation programs by directly reducing predation on kokanee and competition with Bull Trout. The project will also likely result in reduction of predation on Bull Trout and Westslope Cutthroat Trout in LPO to further benefit these species. Our approach is also consistent with the Avista Native Salmonid Restoration Plan (Appendix C of the Clark Fork Settlement Agreement) to restore and enhance migratory forms of native salmonids, and also with the USFWS Bull Trout Recovery Plan (USFWS 2015). This project is also consistent with Appendix N1 (Bald Eagle Monitoring and Protection) through enhancement of kokanee, an important food source for wintering eagles. This project provides direct, on-the-ground benefits to resources potentially adversely impacted by elevated TDG levels in the Clark Fork River and LPO, as well as those impacted by degraded tributary habitat, by reducing competition and predation on kokanee, Bull Trout and Westslope Cutthroat Trout in LPO.

2021 Budget

Item	Estimated Carryover	2021 Budget Request
Hickey Bros. contract Avista cost share	$0	$338,317
Avista labor (0.25 FTE)	$0	$25,000
PIT tags	$0	$2,000
Genetic analysis	$0	$55,000
Total	$0	$420,317
Anticipated Expenditures		$420,317

In 2021, total project cost is expected to be $584,687. We will again be cost sharing the *LPO Lake Trout Netting Program* with BPA funds. BPA will provide $164,370. Therefore, we do not intend to use the full amount approved in 2020 ($524,000).

2022 Budget

Item	Estimated Carryover	2022 Budget Request
Hickey Bros. contract	$0	$503,000
Avista labor (0.25 FTE)	$0	$25,000
PIT tags	$0	$2,000
Genetic analysis	$0	$55,000
Total	$0	$585,000
Anticipated Expenditures		$585,000

Literature Cited

Hansen, M. J., Corsi, M. P., and A. M. Dux. 2019. Long-term suppression of the Lake Trout (*Salvelinus namaycush*) population in Lake Pend Oreille, Idaho. Hydrobiologia 840:335–349.

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2021 PROJECT PLAN

Demography of Adfluvial Bull Trout in Lake Pend Oreille

Project Contact
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Project History
This is a continuing project that was approved by the Management Committee (MC) in 2017. It was ranked by the Water Resources Technical Advisory Committee in January, 2017. This is year three of the three-year study and no changes to the budget are being requested. We are asking for minor changes to extend the reporting deadlines.

Background
Lake Trout suppression has been a fundamental component of the Lake Pend Oreille (LPO) fishery recovery effort since 2006. Suppression efforts have included incentivized angler harvest in addition to commercial gillnet and trap net operations. Bull Trout, which are listed as Threatened under the Endangered Species Act, are frequently encountered during netting operations and bycatch mortality is an important concern for the success of the suppression program. This is especially the case because the Bull Trout population is intended to be a primary beneficiary of the *Lake Pend Oreille Lake Trout Netting Program*. Total abundance estimates for Bull Trout in LPO were completed in 1998 (Vidergar 2000) and 2008 (McCubbins et al. 2016). The abundance estimate completed in 1998 was 12,134 total Bull Trout, and the 2008 estimate was 12,513 Bull Trout larger than 400mm, demonstrating stability in the LPO Bull Trout population during that time. There had been two years of Lake Trout suppression when the 2008 estimate was made, but there have been additional years of active suppression since then. However, extensive standardized trap net and redd count data have suggested that Bull Trout have remained stable throughout the netting program. In spite of bycatch, the suppression program has been beneficial to the Bull Trout population. Population metrics have suggested stability, and the reduction of Lake Trout to approximately 25% of their 2006 abundance has led to a resurgence of kokanee, a primary forage species for Bull Trout in the system. Improved understanding of Bull Trout population dynamics would provide timely information to further evaluate the direct benefits of suppression programs on the LPO Bull Trout population as we transition that program into maintenance mode.

Most Bull Trout caught incidentally during netting operations are released alive. Bull Trout bycatch in the netting program provides an opportunity to apply passive integrated transponder (PIT) tags to fish released alive. The tags can then be interrogated when that fish is encountered again, whether in the netting program, during fishery surveys, or at tributary PIT tag arrays. The Idaho Department of Fish and Game (IDFG), with funding from the Clark Fork Settlement Agreement (CFSA) and other sources, has been collecting PIT tag interrogation data on Bull Trout in LPO and tributaries since 2011, resulting in a substantial dataset of capture, mark, and recapture (CMR) data. While these data are currently available for analyses to address questions about abundance and population dynamics, the approaches required are quantitatively intensive.

In addition, access to multiple corroborative datasets (e.g., redd counts, trap net data) provide an opportunity to build integrated population demographic models (IPMs, see Schaub and Abadi 2011 for a review) that yield improved estimates of vital rates (such as survival) and population growth rates. Improved understanding of population dynamics using these tools would allow us to not only better evaluate the success of the netting program, but also to develop the quantitative basis to evaluate the feasibility of limited Bull Trout harvest opportunity to anglers, a topic of longstanding interest to many Idaho anglers and IDFG.

Due to the technical complexity of this type of analysis, we are developing a team of IDFG staff to include a project biologist, IDFG's recently hired biometrician and other IDFG expertise from IDFG Wildlife Bureau Research staff that have extensive experience with IPMs. Once these tools are developed, they may be employed on a more regular or possibly annual basis. The intent of this program is to fully leverage all relevant Bull Trout datasets and appropriately incorporate uncertainty in estimates of abundance and population trajectory. In addition, this study will help IDFG, Avista, and other agencies evaluate and, if necessary, modify and improve current predator suppression and Bull Trout monitoring programs in LPO through the CFSA process.

Goal
To develop a Bull Trout population model to evaluate netting and management strategies in Lake Pend Oreille.

Objectives
1. Quantify the effects of netting bycatch on Bull Trout survival and growth.

2. Estimate abundance of Bull Trout in Lake Pend Oreille.

3. Develop optimal sampling and statistical methodologies, as well as an IPM to be used for future Bull Trout monitoring. This IPM will likely incorporate redd count data along with information from the CMR modeling. Identify and rectify any data gaps associated with full development of the IPM.

Tasks
1. Convene IDFG team to develop model type and structure, evaluate current datasets, identify potential data gaps/solutions and establish individual roles and timelines. Team will consist of Matthew Corsi (project coordinator), TBD Pacific States Marine Fisheries Commission Biologist (PSMFC, project technical lead), Josh McCormick (statistical/programming oversight), and Mark Hurley (statistical/programming oversight). Timeline: June 2017 – September 2017. (Objectives 1-3) (***Completed in 2017)***

2. Team will parameterize model(s) and use it to evaluate current demographic characteristics of LPO Bull Trout, evaluate influence of netting programs on survival and abundance, and critically evaluate current Bull Trout monitoring programs to determine if and how to shift monitoring resources. Develop and run fishery scenarios under various netting regimes. Timeline: September 2017 – May 2019. (Objectives 1-3) (***Completed in 2019)***

3. Project coordinator and technical lead will work with IDFG biometrician to streamline programming and develop sufficient metadata to ensure IPM can be used and modified by IDFG staff indefinitely for continued monitoring of Bull Trout status and trends in LPO. Timeline: Product delivered by December 2019. (Objectives 1-3) (***Completed 2019)***

Work Products

- Project Completion Report outlining the findings for Objectives 1-3; final due August 1, 2021
- Publication of model and results in peer reviewed literature; submission due December 1, 2021
- Annual Work Summary; due December 1, 2021

Permitting Requirements

Not applicable for the tasks proposed in this project plan.

Endangered Species Act consultation for this project plan is associated with the 2019 Biological Opinion on the effects of continued operation of the Clark Fork Hydroelectric Project on Bull Trout and designated Bull Trout critical habitat (BiOp), and the U.S. Fish and Wildlife Service (USFWS)-IDFG Cooperative Agreement pursuant to Section 6 of the Act. This project plan is consistent with the analysis and conclusions contained in the 2019 BiOp and the USFWS-IDFG Cooperative Agreement, and will adhere to all appropriate Terms and Conditions designed to reduce the extent and effects of incidental take on Bull Trout. Incidental take is not expected for this project; however, if it does occur it will be included in the annual Biological Opinion report as required by Term and Conditions 15–18 of the 2019 Incidental Take Statement, as well as IDFG's annual Section 6 report to the USFWS.

Cultural/Historic Resource Review

Not applicable for the tasks proposed in this project plan, there are no ground and/or vegetation disturbing activities, or proposed impacts to cultural/historic resources.

Benefit to the Resource

This project provides a means to explicitly evaluate the role of the *Lake Pend Oreille Lake Trout Netting Program* on Bull Trout demography. This program contributes to the completion of objectives of the CFSA Appendices A and F5 mitigation programs by explicitly evaluating the population responses of Bull Trout to the Lake Trout Trap and Gill Net Program. This important program has resulted in measured responses from kokanee populations, but evaluation of Lake Trout suppression on Bull Trout will be enhanced by development of these CMR tools. Our approach is also consistent with the Avista Native Salmonid Restoration Plan (NSRP, Appendix C of the CFSA) to restore and enhance migratory forms of native salmonids, and also with the USFWS Bull Trout recovery plan. It provides IDFG and Avista with the means to appropriately assess current mitigation programs, as well as fully exploit the datasets already being collected by these programs. Results from this program will used by IDFG to monitor current and future status of Bull Trout in Lake Pend Oreille. Bull Trout conservation is one of the primary goals of the Lake Pend Oreille Trap and Gill Net Program. It will provide an improved understanding of

Bull Trout abundance and will assist IDFG in managing a complex fishery with three apex predators (including Lake Trout and Rainbow Trout). The development of integrated population model for Bull Trout will allow IDFG to evaluate scenarios involving recreational fisheries harvest, varying levels of Lake Trout suppression, and techniques to modify Bull Trout bycatch as netting efforts evolve.

Budget

Item	Estimated Carryover	2021 Budget Request
Avista cost share for this project	$459	$0
Total	$459	$0
Anticipated Expenditures		$459

Literature Cited

McCubbins, J.L., Hansen, M.J., DosSantos, J.M. and Dux, A.M., 2016. Demographic characteristics of an adfluvial bull trout population in Lake Pend Oreille, Idaho. North American Journal of Fisheries Management 36(6):1269-1277.

Schaub, M., and F. Abadi. 2011. Integrated population models: a novel analysis framework for deeper insights into population dynamics. Journal of Ornithology 152: S227-S237.

Vidergar, D. T. 2000. Population estimates, food habits and estimates of consumption of selected predatory fishes in Lake Pend Oreille, Idaho. Master's thesis. University of Idaho, Moscow, ID.

2021 PROJECT PLAN

Lake Pend Oreille Bull Trout Survival Study

Project Contact
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Project History
This is a continuing project that was originally approved by the Management Committee (MC) in 2011. The scope and budget for this project are reviewed by the MC annually. In 2021, antenna maintenance and operation is expected to occur under a separate project plan. Thus, this plan is being extended with no additional funds requested to finalize the Project Completion Report.

Background
Non-native Lake Trout are recognized as a threat to the Lake Pend Oreille (LPO) kokanee population. Case studies throughout the intermountain west have clearly demonstrated that introduced Lake Trout also threaten the persistence of native fish assemblages including Bull Trout and Westslope Cutthroat Trout (Donald and Alger 1993; Fredenberg 2002; Martinez et al. 2009). However, the mechanisms of impact on native fish are not completely understood.

Two predator suppression programs have been implemented on LPO since 2006 in an effort to reverse the impacts of an unbalanced predator population on both kokanee and native fish assemblages. The *LPO Lake Trout Netting Program* and the *LPO Angler Incentive Program* work jointly to remove non-native predatory fish in LPO. The successes of these programs, as they relate to kokanee recovery, are primarily monitored through annual estimates of kokanee survival. Bull Trout response to predator removal is largely monitored through annual redd counts. Long-term data sets are available for Bull Trout redd counts in many LPO tributaries. However, redd surveys do not necessarily reflect the impacts of in-lake conditions alone, but rather reflect the cumulative impacts of tributary habitat conditions, annual weather events, and in-lake conditions. In addition, redd counts are highly variable by nature and do not provide accurate annual evaluation of abundance, but rather elucidate long-term trends.

In-lake survival of juvenile Bull Trout in LPO was previously estimated for Trestle Creek out migrants from 2000, 2001, and 2002. Estimated survival from juvenile outmigration to adult return ranged from 8.9% to 15.5% (Jakubowski and Ryan 2009). These survival estimates were representative of in-lake conditions just prior to peak Lake Trout abundance in LPO and during a period of exponential Lake Trout population growth. Lake Trout abundance has subsequently declined following implementation of predator removal programs. Survival of Bull Trout juvenile out migrants to adult return has the potential to change under these conditions. Kokanee survival has increased with declining Lake Trout abundance as anticipated (Rust et al. *in prep).*

Reductions in Lake Trout abundance due to predator removal programs are expected to result in improved conditions for Bull Trout in LPO. Additional quantification of Bull Trout outmigrant survival to adult return could provide a monitoring tool to describe the impact of ongoing predator management efforts in LPO on these fish. In addition, monitoring of in-lake survival

would provide further insight into the role the lake environment plays in regulating Bull Trout abundance throughout the LPO system.

Passive Integrated Transponder (PIT) antenna arrays were installed on Trestle and Granite creeks in 2011, and have been continuously maintained. Existing antenna arrays associated with this project have also been used to follow Westslope Cutthroat Trout movements. In coordination with the Panhandle Chapter of Trout Unlimited, Westslope Cutthroat Trout were tagged with 12 mm HDX PIT tags in both streams in 2012 and 2013. Additional Westslope Cutthroat Trout were tagged in 2014. Much like with Bull Trout, information gathered will be used to estimate survival from juvenile outmigration to adult return. These data will also help provide some understanding of Westslope Cutthroat Trout migratory patterns in these systems.

Concurrent with this project, the LPO Lake Trout Netting Program has become an additional interrogation point for PIT tag recovery, and data from this project has become integral to the LPO Bull Trout Demography Project. Bull Trout originally tagged in LPO from the net boat are being regularly detected on the arrays from this project.

Goal
Calculate juvenile to adult survival of Bull Trout and Westslope Cutthroat Trout emigrating from Trestle and Granite creeks.

Objective
1. Document Bull Trout and Westslope Cutthroat Trout emigration and immigration out of and back into Trestle and Granite creeks.

Tasks
1. Summarize and report fish movement data.

Work Products
- Project Completion Report (with data through 2019); final due November 1, 2021
- Annual Work Summary; due December 1, 2021

Permitting Requirements
Not applicable for the tasks proposed in this project plan.

Endangered Species Act consultation for this project plan is associated with the 2019 Biological Opinion on the effects of continued operation of the Clark Fork Hydroelectric Project on Bull Trout and designated Bull Trout critical habitat (BiOp), and the U.S. Fish and Wildlife Service-Idaho Department of Fish and Game (IDFG) Cooperative Agreement pursuant to Section 6 of the Act. This project plan is consistent with the analysis and conclusions contained in the 2019 BiOp and the USFWS-IDFG Cooperative Agreement, and will adhere to all appropriate Terms and Conditions designed to reduce the extent and effects of incidental take on Bull Trout. Incidental take reporting for this project plan will be included in the annual Biological Opinion report as required by Term and Conditions 15–18 of the 2019 Incidental Take Statement, as well as IDFG's annual Section 6 report to the USFWS.

Cultural/Historic Resource Review
Not applicable for the tasks proposed in this project plan, there are no ground and/or vegetation disturbing activities, or proposed impacts to cultural/historic resources.

Benefit to the Resource
The proposed project is entirely consistent with the Dissolved Gas Mitigation and Monitoring Program (Appendix F5, CFSA), through the monitoring of ongoing dissolved gas mitigation efforts funded under this appendix. As such, it is also consistent with goals of the Fish Passage/Native Salmonid Restoration Plan (Appendix C). The project also relates to Appendix A by complimenting ongoing tributary monitoring efforts related to maintenance of habitat for native fish in Lake Pend Oreille tributaries. It is also entirely consistent with the IDFG Fisheries Management Plan (IDFG 2019) as it supports the restoration of Bull Trout and suppression of kokanee predators in the LPO system. This project proposal is also consistent with the Lake Pend Oreille Bull Trout Conservation Plan (Resource Planning Unlimited 1999) that provides similar direction for the conservation of Bull Trout in the system.

Budget

Item	Estimated Carryover	2021 Budget Request
Technician labor (0.33 FTE)	$4,855	$0
Maintenance of antenna/reader equipment	$0	$0
Total	$4,855	$0
Anticipated Expenditures		$4,855

Literature Cited
Donald, D. B., and D. J. Alger. 1993. Geographic distribution, species displacement, and niche overlap for lake trout and bull trout in mountain lakes. Canadian Journal of Zoology 71:238-247.

Fredenberg, W. 2002. Further evidence that lake trout displace bull trout in mountain lakes. Intermountain Journal of Sciences 8(3):143-152.

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Jakubowski, R. and R. Ryan. 2009. Clark Fork Settlement Agreement, Appendix A, 2008 Native Salmonid Research and Monitoring Progress Update. Report submitted to Avista Corporation. Spokane, Washington.

Martinez, P. J., P. E. Bigelow, M. A. Deleray, W. A. Fredenberg, B. S. Hansen, N. J. Horner, S. K. Lehr, R. W. Schneidervin, S. A. Tolentino, and A. E. Viola. 2009. Western lake trout woes. Fisheries 34:424-442.

Pend Oreille Bull Trout Advisory Team (PBTAT). 1998. Lake Pend Oreille Key Watershed Problem Assessment. State of Idaho. Boise, Idaho.

Resource Planning Unlimited. 1999. Lake Pend Oreille Bull Trout Conservation Plan. Report Prepared for the Lake Pend Oreille Bull Trout Watershed Advisory Group.

Rust, P., N. Graham, M. Corsi, W.J. Ament, and W. Harryman. *In prep*. Lake Pend Oreille Research, 2016. Annual Report to Bonneville Power Administration. Portland, Oregon.

2021 PROJECT PLAN

Lake Pend Oreille Bull Trout Population Monitoring and Evaluation

Project Contact

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Project History

This is a new project for 2021, although it combines components of other previously approved project plans (e.g., Lake Pend Oreille Bull Trout Survival Study). It is expected to be an ongoing project to monitor the Lake Pend Oreille (LPO) Bull Trout population over time. The scope and budget for this project will be reviewed annually by the Management Committee. This project was ranked by the WRTAC on January 20, 2021 and the Evaluation and Ranking Criteria scores are included as the last page of this project plan.

Background

This project will provide a mechanism to combine the unique and valuable data that has been collected through the Clark Fork Settlement Agreement (CFSA) over the last 20 years through separate projects into one integrated monitoring program. Many of these data have been collected through previous CFSA-supported projects but also include data collected via other funding mechanisms. Specifically, Bull Trout-specific data collected from the Lake Pend Oreille (LPO) netting programs (Lake Trout and Walleye), angler incentive programs, tributary monitoring, and redd counts will be evaluated together in this project. These data will be utilized together to evaluate the LPO Bull Trout metapopulation, primarily using the model developed through the *Demography of Adfluvial Bull Trout in Lake Pend Oreille* project plan.

Two predator suppression programs (Lake Trout and Walleye) have been implemented on LPO in an effort to reverse the impacts of an unbalanced predator population on both kokanee and native fish assemblages. However, an average of about 300 (range: ~100–550) Bull Trout have been removed annually as incidental bycatch as part of these efforts since 2006. Every effort was made to collect as much data as possible from these fish. Data collected include total length, head length, body depth, stomach content descriptions, as well as sex, maturity level, and fecundity. Otoliths, scales, fin rays, genetic and pathogen samples were also taken. The majority of these data and samples have been archived with limited analysis to date. In addition, an average of approximately 1,100 (range: ~550–1,500) Bull Trout were released alive annually, with length data collected from and PIT tags implanted in a majority of these fish. The netting programs and tributary-based PIT arrays serve as interrogation points for these PIT-marked fish. Over the years, marked fish have been re-located almost 2,000 times. These mark-recapture data, in conjunction with annual redd count data, were used to develop an Integrated Population Model (IPM) that will be utilized, updated, and improved to track the overall population trajectory within LPO. This is important to evaluate the overall health of the LPO metapopulation, evaluate the impact of ongoing predator management, and inform future management decisions including a possible harvest fishery. A more complete analysis of these data can be used further inform the IPM by updating our understanding of LPO-specific Bull

Trout life history, age and growth, mortality, and recruitment.

These collective data comprise a large and complicated dataset. Idaho Department of Fish and Game (IDFG) has developed a comprehensive database to handle all Lake Pend Oreille monitoring and evaluation data, including those data described above. It is important for these datasets to be comprehensive and coordinated, in part, because there are numerous opportunities for Bull Trout recaptures across IDFG regional and research programs. One of the IDFG requirements for the development of this database was that it be compatible with, and able to be queried by, IDFG's statewide Lakes and Streams database. The development of this database is nearing completion, but the nearly year-round nature of data entry and collection requires regular database support and management. As this database matures, it will likely represent the most robust Bull Trout life history dataset in the world. Further, these data support management of other CFSA programs, especially Lake Trout suppression, Walleye suppression, Angler Incentive Program, and Fall Walleye Index Netting.

Goal
Monitor and evaluate the LPO Bull Trout metapopulation.

Objectives
1. Compile and organize existing LPO Bull Trout data.

2. Evaluate Bull Trout population life history, age and growth, mortality, and recruitment parameters.

3. Annually update and parameterize the LPO Bull Trout IPM.

Tasks
1. Enter and organize existing data in a relational LPO-wide database. (Objective 1)

2. Provide database consultant support as necessary. (Objective 1).

3. Age archived Bull Trout structures. (Objective 2)

4. Evaluate and summarize archived biodata (length, weight, fecundity, diet, etc.). (Objectives 2 and 3)

5. Collect and summarize PIT recapture data from both the suppression netting projects and tributary arrays. (Objectives 2 and 3)

6. Combine available biological, genetic, and PIT data to investigate Bull Trout tributary stray rates, growth, mortality, recruitment, state-based survival, migration timing, and spawning frequency. (Objectives 2 and 3)

7. Annually update and run the IPM. (Objective 3)

Work Products

- Annual Work Summary; due December 1, 2021
- Annual Project Update; final due November 1, 2022

Permitting Requirements

Not applicable for the tasks proposed in this project plan.

Endangered Species Act consultation for this project plan is associated with the 2019 Biological Opinion on the effects of continued operation of the Clark Fork Hydroelectric Project on Bull Trout and designated Bull Trout critical habitat (BiOp), and the U.S. Fish and Wildlife Service (USFWS)-IDFG Cooperative Agreement pursuant to Section 6 of the Act. This project plan is consistent with the analysis and conclusions contained in the 2019 BiOp and the USFWS-IDFG Cooperative Agreement, and will adhere to all appropriate Terms and Conditions designed to reduce the extent and effects of incidental take on Bull Trout. Incidental take reporting for this project plan will be included in the annual Biological Opinion report as required by Term and Conditions 15–18 of the 2019 Incidental Take Statement, as well as IDFG's annual Section 6 report to the USFWS.

Cultural/Historic Resource Review

Not applicable for the tasks proposed in this project plan, there are no ground and/or vegetation disturbing activities, or proposed impacts to cultural/historic resources.

Benefit to the Resource

The proposed project is entirely consistent with the Dissolved Gas Supersaturation Control, Mitigation, and Monitoring Program (Appendix F5, CFSA), through the monitoring of ongoing dissolved gas mitigation efforts funded under this appendix. As such, it is also consistent with goals of the Fish Passage/Native Salmonid Restoration Plan (Appendix C). The project also relates to Appendix A by complimenting ongoing tributary monitoring efforts in Lake Pend Oreille tributaries. It is also entirely consistent with the IDFG Fisheries Management Plan (IDFG 2019) as it supports the restoration of Bull Trout and suppression of kokanee predators in the LPO system. This project proposal is also consistent with the Lake Pend Oreille Bull Trout Conservation Plan (Resource Planning Unlimited 1999) that provides similar direction for the conservation of Bull Trout in the system.

Budget

Item	Estimated Carryover	2021 Budget Request
Avista labor (0.5 FTE)	$0	$50,000
Contract database consultant	$0	$20,000
Total	$0	$70,000
Anticipated Expenditures		$70,000

This project will be a combined effort between IDFG/Bonneville Power Administration-funded research staff and Avista staff. Thus, we expect an approximately 50% cost share for this project.

Literature Cited

IDFG (Idaho Department of Fish and Game). 2019. Fisheries Management Plan 2019-2024. Boise, ID.

Resource Planning Unlimited. 1999. Lake Pend Oreille Bull Trout Conservation Plan. State of Idaho. Boise, Idaho.

Appendix F5 Mitigation Fund
Project Evaluation and Ranking Criteria score sheet

As scored by the WRTAC on 1/20/2021

Project Title: Lake Pend Oreille Bull Trout Population Monitoring and Evaluation

Criteria	Score			
	3	**2**	**1**	**0**
A. Population exposure	**Routinely in LPO or LCFR**	Routinely from Dover to Box Canyon	Intermittently or occasionally	Population not exposed
B. Species to benefit	**Bull Trout and Westslope Cutthroat Trout**	Bull Trout or Westslope Cutthroat Trout	Target species but not Bull Trout or Westslope Cutthroat Trout	None
C. Mitigate or evaluate	Mitigates	**Evaluates**	NA	Not applied to resources affected by TDG
D. Project effectiveness	Solves primary problem	Partially solves or provides all information	**Provides some information**	Does not address primary problem
E. Cost/benefit	Benefit exceptional relative to cost	Benefit high relative to cost	**Benefit consistent with cost**	Cost exceeds benefit
F. Outside funding	≥ 50%	**25–49%**	≤ 24%	Entirely CFSA funded

Scoring Instructions:

- When ranking proposals that do not involve on-the-ground implementation but are necessary to the scope of physical projects (e.g., applied research, watershed assessments, NEPA analyses), score them with regard to the "expected" or "average" resultant physical project.
- **A score of "0" in any of the criteria does not necessarily mean the project is ineligible for CFSA funding.** Rather, a score of "0" should be considered an indication that this aspect of the project needs to be thoroughly discussed and considered.
- Although total scores for each proposed project can be summed to get a general idea of the relative strength of each project, **the scoring system should be viewed as an ordinal rather than absolute ranking system**. In light of this and in the interest of maintaining a simple and objective scoring system, only whole numbers will be utilized (e.g., no half points).

2021 PROJECT PLAN

Lake Pend Oreille Nearshore Index Netting

Project Contact
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Project History
This is a continuing project first approved by the Management Committee (MC) in 2015, and again approved in 2018. The project was not completed in 2018 due to staffing issues and conflicts with other projects. Fieldwork was completed in 2019, and we are requesting a continuation in 2021 for data analysis and report writing, with no additional budget requested.

Background
Native trout population abundance and growth parameters are being monitored long-term on Lake Pend Oreille (LPO) tributaries (Bouwens and Jakubowski 2017a). Fish assemblage and abundance index data are also periodically being collected targeting Walleye and other demersal species in LPO (Ryan and Fredericks 2012; Watkins et al. 2015). However, prior to this project, little data describing Westslope Cutthroat Trout (WCT) population levels or growth characteristics in LPO have been collected. Experimental passage of WCT over Cabinet Gorge Dam has occurred since 2015, and it is hoped that passage of WCT to historic upstream spawning grounds will bolster adfluvial populations both in the spawning reaches and in LPO. In addition, case studies throughout the intermountain west have clearly demonstrated that introduced Lake Trout have threatened the persistence of native fish assemblages including Bull Trout and WCT (Donald and Alger 1993; Fredenberg 2002; Martinez et al. 2009). The *LPO Lake Trout Netting Program* and the *LPO Angler Incentive Program* have worked jointly to remove non-native predatory fish from LPO since 2006, greatly changing the conditions in LPO in a relatively short period of time. The effects of predator management on WCT in LPO are unknown. A program to monitor the success of these projects with respect to WCT in LPO is needed.

This project is a tool to monitor WCT abundance and growth conditions within LPO. Repeated (every 3 years) sampling using standardized floating gillnet gear targeting WCT is planned. Resultant catch rates will provide an index of relative abundance. Age, weight, and length data can provide useful information regarding growing conditions. Data from this sampling event will be compared to data collected in 2015 (Bouwens and Jakubowski 2017b). This project will provide baseline and ongoing monitoring of relative WCT abundance and growth conditions with respect to transport over Cabinet Gorge Dam and LPO predator management.

It is proposed that the timing of the netting effort be changed from the spring to the fall in 2019 and beyond. It is recognized that there may be some loss in data comparability between the 2015 event and subsequent events, but migration timing data in Trestle and Granite creeks (Bouwens and Jakubowski 2017a) suggest that some WCT may still be in tributaries in early June when the spring sampling was implemented and that fall sampling of spring spawning fish is more appropriate.

Goal
Maintain an ongoing monitoring program assessing the LPO WCT population.

Objective
1. Monitor LPO surface-oriented nearshore fish assemblage, particularly WCT, relative abundance, growth, and origin.

Tasks
1. Generally following methods outlined in Bouwens and Jakubowski (2017b), deploy 60 net/nights of standardized gillnet gear in LPO at randomly chosen near-shore locations. (***Completed in 2019)***

2. Identify, count, and collect age/weight/length data from all salmonids captured. ***(Completed in 2019)***

3. Collect otoliths for age analysis and future microchemistry processing from all WCT. ***(Completed in 2019)***

4. Analyze and summarize data in a report.

Work Products
- Project Completion Report; final due December 1, 2021
- Annual Work Summary; due December 1, 2021

Permitting Requirements
Not applicable for the tasks proposed in this project plan.

Endangered Species Act consultation for this project plan is associated with the 2019 Biological Opinion on the effects of continued operation of the Clark Fork Hydroelectric Project on Bull Trout and designated Bull Trout critical habitat (BiOp), and the U.S. Fish and Wildlife Service (USFWS)-Idaho Department of Fish and Game (IDFG) Cooperative Agreement pursuant to Section 6 of the Act. This project plan is consistent with the analysis and conclusions contained in the 2019 BiOp and the USFWS-IDFG Cooperative Agreement, and will adhere to all appropriate Terms and Conditions designed to reduce the extent and effects of incidental take on Bull Trout. Incidental take reporting for this project plan will be included in the annual Biological Opinion report as required by Term and Conditions 15–18 of the 2019 Incidental Take Statement, as well as IDFG's annual Section 6 report to the USFWS.

Cultural/Historic Resource Review
Not applicable for the tasks proposed in this project plan, there are no ground and/or vegetation disturbing activities, or proposed impacts to cultural/historic resources.

Benefit to the Resource
The proposed project is entirely consistent with the Dissolved Gas Mitigation and Monitoring Program (Appendix F5, CFSA), through the monitoring of ongoing dissolved gas mitigation efforts funded under this appendix. As such, it is also consistent with goals of the Fish

Passage/Native Salmonid Restoration Plan (Appendix C). The project also relates to Appendix A by complimenting ongoing tributary monitoring efforts related to maintenance of habitat for native fish in Lake Pend Oreille tributaries. This proposed project is entirely consistent with the Idaho Department of Fish and Game Fisheries Management Plan (IDFG 2019) as it supports the restoration of WCT and suppression of kokanee predators in the LPO system. This project proposal is also consistent with Native Salmonid Restoration Plan (NSRP) (Kleinshmidt and Pratt 1998). This project would provide a mechanism for evaluation of ongoing efforts in Appendices A, C, and F5 that benefit WCT in LPO and associated tributary streams. This project would also provide additional insight into the role the lake environment plays in regulating WCT abundance throughout the LPO system.

Budget

Item	Estimated Carryover	2021 Budget Request
Supplies	$0	$0
Technician labor (0.33 FTE)	$11,618	$0
Total	$11,618	$0
Anticipated Expenditures		$11,618

Literature Cited

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2021 PROJECT PLAN

Box Canyon Reservoir Northern Pike Suppression

Project Contact

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Project History

The Box Canyon Reservoir (BCR) Northern Pike (NP) Suppression Project was originally approved by the Management Committee in 2012 and has since been annually approved and funded through the Clark Fork Settlement Agreement (CFSA) Appendix F5 program. Initially the project was ranked as a three-year effort and was therefore not ranked 2013–2014. With a reduced scale of activities proposed, it was approved but not ranked by the Water Resources Technical Advisory Committee in 2015−2020. Due to the 2020 COVID-19 pandemic and associated mandatory quarantine, the spring 2020 project effort was suspended after two weeks, during which alternative cost share funding was used, leaving the 2020 approved CFSA funding untouched. Therefore, in addition to the 2021 budget request below, a carryover of the full 2020 budget is also listed. The scope of the project remains consistent, except an extension of the number of weeks proposed for 2021 NP netting effort, as described under the background and tasks sections below.

Background

For the purpose of brevity in this proposed Project Plan, background information on NP biology, status in BCR, and management in Washington State are only briefly summarized. For a more complete background and project description see the initial 2012 proposal for this project and subsequent annual reports submitted (2012−2019; 2020 forthcoming) to Avista.

Northern Pike have been widely distributed outside their native range in the western US, including illegal introduction to the Clark Fork River, Montana (Vashro 2011). They migrated further downstream and become firmly established in BCR, a 55-mile long impoundment of the Pend Oreille River, Washington. First detected in 2004, the BCR population of NP had expanded exponentially from less than 400 individuals in 2006 to over 5,500 individuals in 2010 between Pioneer Park and Riverbend; it was estimated that in excess of 10,000 adult pike existed in the reservoir in 2011(Connor et al. *in prep*). Northern Pike expanded their range within BCR and have continued to expand downstream to Boundary Reservoir, the Pend Oreille River, the upper Columbia River in British Columbia (BC), and Lake Roosevelt (Columbia River) in Washington. Population growth and geographical expansion threatens native species conservation and recovery in the Pend Oreille watershed and the entire Columbia River ecosystem.

In BCR, relative abundance of most other native and non-native fish species declined in the presence of NP. Northern Pike pose threats to Bull Trout (BT) and Westslope Cutthroat Trout (WCT) entrained at Albeni Falls Dam (AFD). No permanent fish passage structure exists at AFD, so temporary upstream passage has been provided since 2007. Northern Pike threaten the survival of these species due to a high degree of habitat overlap, especially when native salmonids seek thermal refuge within the littoral zones. Extensive efforts to increase relative

abundance of native salmonids in the lower Pend Oreille through mainstem fish passage projects, tributary restoration, and conservation aquaculture are seriously compromised by NP.

Given the potential impacts of NP, Kalispel Tribe of Indians Natural Resources Department (KNRD) and Washington Department of Fish and Wildlife (WDFW) developed a management position to:

1. Minimize the impacts of NP to native species.
2. Reduce the number of NP in BCR.
3. Reduce the spread of NP downstream and prevent further illegal introduction.

Kalispel Tribe of Indians Natural Resources Department and WDFW developed and implemented measures designed to drastically reduce NP abundance in BCR including: removal of NP as a gamefish in WA, maintaining their designation as a prohibited species, harvest-oriented fishing contests, and implementation of large-scale mechanical suppression projects. WDFW also produced a webpage (https://wdfw.wa.gov/species-habitats/invasive/esox-lucius#invasive) to share information on the impacts of NP, the management position, and mechanical suppression/survey results. Thus far mechanical suppression (implemented 2012−2020) has been the primary measure leading to the significant reduction of NP in BCR.

In total, more than 18,000 NP have been removed in the over 5,000 gillnet sets during the nine years of suppression in BCR. Given the decline observed in the catch-per-unit-effort (CPUE) from 2012−2020 Spring Pike Index Netting (SPIN) surveys, the NP population appears to have been largely suppressed in BCR. The adult population south of Riverbend (including sloughs) has been reduced by as much as 93% when compared to pre-suppression levels. However, failure to maintain a depressed population has been shown to increase the recruitment level from an exploited NP population (Colby et al. 1987; Wydoski and Whitney 1999). Reducing the predation risk and competition for available resources has the potential to increase survival rates for juvenile NP. Although the BCR population is now considered depressed, an increase in total catch from the prior year was observed in 2019 and due to the restricted netting season in 2020, it is unknown what the total catch or population response would have been if fully implemented.

Monitoring and mechanical suppression of NP is also occurring in the Pend Oreille and Columbia Rivers in BC (AMEC 2017) and Lake Roosevelt (Brent Nichols pers. comm.). Localized spread in disconnected water bodies is also a concern. The WDFW has received several reports of lakes containing NP (Randy Osborn and Bill Baker pers. comm.); so far two lakes with NP have been treated with piscicide (Fish Lake in Spokane Co. and Upper/Lower Lead King Lakes in Pend Oreille County). This issue has moved from a localized population problem to a significant regional and international management concern for native and sport fisheries in the Columbia River Basin above Chief Joseph Dam and anadromous salmon and steelhead fisheries downstream.

Mechanical suppression of NP, using gillnets, is a well-established management tool (see previous proposals and reports on this project for details). Mechanical suppression of the BCR population of NP began in 2012, with an objective to reduce abundance of the adult population by 87% at the end of 2014. This would occur by reducing the population from 13.2 NP/net night

to <1.73 NP/net night in southern ½ of BCR and from 2.9 NP/net night to <0.5 NP/net night in northern ½ of BCR, in the SPIN survey. Although the initial objective was the reduction in NP abundance, a continued effort would be necessary (2015 – on) to prevent a population rebound to pre-suppression levels.

With the population of NP in BCR currently in a depressed state, sexually mature individuals available to spawn will be limited. If a compensatory response exists, as demonstrated by a high survival rate of their progeny, it should be detected by examining the percentage of NP ≤350 mm in the catch or substantially more present overall than anticipated, based on historical catch. Spawning condition and timing changes will also support an evaluation of a compensatory response, as evidenced by a shift in maturity (i.e., fish maturing earlier) or spawn timing (i.e., earlier spawn-out date). Interannual variation in abundance (e.g., increases observed in 2019-2020) is expected periodically, as complete eradication is unlikely in this system. Small increases in abundance can lead to potential re-establishment of the population if adequate annual suppression effort is not applied. As such, the level of suppression is modified annually to reflect observed changes in the population or a planned or unexpected decrease in effort, as was the case in the 2020 netting season. Due to an observed increase in NP capture in 2019, and the abruptly shortened 2020 season with notable catch, it is critical to continue BCR Northern Pike suppression in 2021 at an increased level of effort. This effort will also continue to inform any compensatory response in the population, which if observed, may require further in-year or out-year adaptations (e.g., timing, overall effort).

Goal

The goal of the BCR NP Suppression Project is to protect and increase native fish species in the reservoir and adjoining habitats by decreasing predation through the continued implementation of NP suppression.

Objectives

1. Mechanically suppress the BCR NP population to maintain an abundance of <1.7 NP/night in the core area between Pioneer Park and Riverbend (including all sloughs) and <0.5 NP/night north of Riverbend, as evaluated during the SPIN survey.

2. Monitor any evidence of a NP compensatory response (increased juvenile survival/early indication of spawning) to avoid rapid population expansion.

Tasks

1. Obtain necessary permits from WDFW and U.S. Fish and Wildlife Service (USFWS). This process will occur outside of the timeframe and funding of this proposed Project Plan but is an integral part of the project. (Objectives 1 and 2)

2. Obtain/prepare equipment: gillnets, buoys/anchors, safety equipment, etc. Gillnets are custom built and along with other equipment will be purchased prior to initiating suppression (Objectives 1 and 2)

3. Staff primary field personnel. Two field crews will be required to implement this project. Field crews consist of a vessel (boat) operator (either Biologist II or Technician III) and two deck crewmen (technicians). (Objectives 1 and 2)

4. Implement mechanical suppression 4 days/week with two 3-person crews for a total of 8 weeks (up from the 5 planned weeks in 2020). Mechanical suppression will consist of the deployment of up to 40 gill nets daily (24-hr sets) from vessels specifically outfitted for gillnetting; nets will have the same specifications as previous years. Beginning at ice-out of sloughs (early March), netting will occur on a weekly schedule; suppression netting is scheduled for March 1 through April 29, 2021. Ideally a minimum of two complete passes through all known spawning locations will be completed, with a minimum of 2 nets set at each location to assess variability and depletion level. Timing and duration of suppression, location targeting, and netting saturation will be at the discretion of the biologists and field staff on the project. (Objectives 1 and 2)

5. Complete SPIN survey to monitor effectiveness of suppression effort. To determine if target abundances of NP have been maintained, A SPIN survey will be implemented May 3-7, 2021; this is an integral component of this project, but not directly funded through the CFSA. (Objectives 1 and 2)

6. All NP caught during suppression and SPIN will be selected for biological data collection. Data collection will include total length (mm), weight (g), sex and maturity. Data will be recorded in the field, then be entered, QA/QC performed, analyzed, and interpreted. All catches will be monitored for an abnormally high percentage of younger (i.e., <350 mm) individuals or changes in maturation. (Objective 1 and 2)

Work Products

- Annual Project Update; final due November 1, 2021
- Annual Work Summary; due November 15, 2021
- Comprehensive Project Report 2012–2021; final due November 1, 2021

Permitting Requirements

Kalispel Tribe Natural Resources Department will submit an application for the WDFW Scientific Collection permit on December 1, 2020 and will be obtained by the end of February 2021.

Endangered Species Act consultation for this project plan is associated with the 2019 Biological Opinion on the effects of continued operation of the Clark Fork Hydroelectric Project on Bull Trout and designated Bull Trout critical habitat (BiOp), and the Kalispel Tribe's existing permit pursuant to Section 10 of the Act. This project plan is consistent with the analyses and conclusions contained in the 2019 BiOp and the Kalispel Tribe's Section 10 permit, and will adhere to all appropriate Terms and Conditions designed to reduce the extent and effects of incidental take on Bull Trout. Incidental take reporting for this project plan will be included in the annual Biological Opinion report as required by Term and Conditions 15–18 of the 2019 Incidental Take Statement, as well as the Kalispel Tribe's annual Section 10 report to the USFWS.

Cultural/Historic Resource Review
Not applicable for the tasks proposed in this project plan, there are no ground and/or vegetation disturbing activities, or proposed impacts to cultural/historic resources.

Benefit to the Resource
This project is consistent with Clark Fork Settlement Agreement, Appendix F5 Gas Saturation Control, Mitigation, and Monitoring Program measures: "The purpose of this measure is to provide for the study, control, mitigation, and monitoring of gas supersaturation and the associated impacts to biological resources in the lower Clark Fork-Lake Pend Oreille (LCFR-LPO) system related to spill at the Clark Fork Projects." Furthermore, it aligns with other mitigation projects currently funded through the Appendix F5 Program (e.g., Lake Pend Oreille Lake Trout trap netting, gill netting, and angler incentive projects). The project is also consistent with Appendix C "to achieve the goal of increasing the long-term population viability of native salmonids in the Lake Pend Oreille-lower Clark Fork River system". Component (3) of Appendix C addresses similar threats to native salmonids by implementing the "Non-Native Fish Suppression Project in the East Fork Bull River". Outside of the CFSA, this project is further supported by the 2009 Bonneville Power Administration (BPA) Fish and Wildlife Program basin-wide strategies for non-natives (see 2012 proposal for this project). The Intermountain Province Subbasin Plan also clearly supports this project (also see 2012 proposal). This project is also supported by downriver interests (Tribes, WA, OR, BC) and five BPA funded projects sponsored by the Kalispel Tribe.

This project provides direct benefits to recovery and conservation of BT, WCT, Mountain Whitefish, and native minnows, suckers, and gamefish in BCR being managed by KNRD, WDFW, and Idaho Department of Fish and Game by reducing predation and competition by NP. Reducing the predatory impact of NP on BT will increase the probability that entrained fish are collected and transported upstream of Albeni Falls Dam to complete their life history and contribute genetic diversity to depressed upstream populations. Reducing the abundance of NP in BCR demonstrates risk management and abatement for future efforts to increase the relative abundance of native salmonids in the lower Pend Oreille through mainstem fish passage projects, tributary restoration, and conservation aquaculture.

Budget

Item	Estimated Carryover	2021 Budget Request
Vehicle/Boat O&M	$6,000	$3,600
Gillnets, Field Supplies/Equipment, and Personal Protective Equipment X 50%	$5,733	$0
Personnel: 1 Biologist III (0.10 FTE), 1 Biologist II (0.25 FTE), 5 Technicians (0.17 FTE each) X 50%	$30,818	$16,607
Indirect Costs (12.61% of direct costs)	$5,473	$2,548
Total	$48,024	$22,755
Anticipated Expenditures		$70,779

Implementation of this project will be cost shared by a minimum of $70,672 (~50% of total) through a KNRD contract with BPA (Non-Native Fish Suppression). An additional BPA-funded

KNRD project (Joint Stock Assessment Project) will contribute approximately $35,000 in permitting, study design, and monitoring of the NP population with the SPIN survey. The WDFW also annually contributes $20,000-$30,000 in-kind toward the SPIN survey, outreach, management, technical support, and assistance with data analysis and reporting. It should be noted that the Tribes' portion of the permitting (i.e., USFWS, WDFW) and monitoring component (SPIN) will be 100% funded outside of this request.

Literature Cited

AMEC. 2017. Northern Pike Suppression in the Columbia River System. Prepared for Columbia Basin Trust and British Columbia Ministry of Forest, Lands and Natural Resource Operations. Prepared by AMEC Foster Wheeler Environment & Infrastructure, Nelson, BC. 19 pp + 2 App.

Colby, P. J., P. A. Ryan, D. H. Schupp, and S. L. Serns. 1987. Interactions in north-temperate lake fish communities. Canadian Journal of Fisheries and Aquatic Sciences 44 (Supplement 2):104–128.

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Wydoski, R. S., and R. W. Whitney. 1999. Management of undesirable fish species. In: C. C. Kohler, and W. A. Hubert (eds) Inland Fisheries Management in North America, 2nd edn. Bethesda, MD: American Fisheries Society, pp. 403–430.

2021 PROJECT PLAN

Trophic Monitoring in Lake Pend Oreille and Pend Oreille River Idaho

Project Contact

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Kristin.Lowell@deq.idaho.gov

Project History

Trophic monitoring on Lake Pend Oreille (LPO) and Pend Oreille River is a continuing project that has been performed regularly since 2005. This project was ranked by the WRTAC and first approved by the Management Committee (MC) in 2013. It was subsequently approved by the MC 2014–2017. Due to other Lake Pend Oreille monitoring priorities, trophic monitoring was not conducted in 2018. To maintain continuity in this monitoring program, the project was again proposed in 2019 and 2020 and approved by the MC. The scope and budget for this project are reviewed by the Management Committee (MC) annually. Modifications to the MC-approved scope/budget are being requested and are described in the Background section.

Background

Existing data suggests that the trophic status of the nearshore areas of the northern region of LPO are progressing to eutrophic conditions more rapidly than the nearshore water in the mid/southern region and open waters and of the lake. The regional trend analysis in the mid- and southern region of the lake shows total phosphorus concentrations and trophic conditions have not changed significantly over time (DEQ 2015a).

The *Total Maximum Daily Load (TMDL) for Nutrients for the Nearshore Waters of the Pend Oreille Lake, Idaho* (Nearshore TMDL) is a prescription for the lake for water quality conditions to support aquatic life (DEQ, 2002). The Nearshore TMDL set an average total phosphorus target of 9.0 µg/L for aquatic life use support. It also set an action threshold target of 12 µg/L that represents an instantaneous total phosphorus concentration to direct future monitoring and to evaluate potential impairment of the monitoring site. A study suggests the TMDL target has not been met in the northern region of the lake but is being met in the southern end of the lake (DEQ 2015a).

For the 2021 field season, the Idaho Department of Environmental Quality (DEQ) will collect water quality data necessary for evaluation of the status and trend in trophic conditions in the mid- and southern nearshore regions of Lake Pend Oreille. These data will be compared to data collected in previous years in the northern region of the lake. One long-term open water site in the north will be monitored, also for comparison purposes. The DEQ will also collect data from four sites on the Pend Oreille River in response to results of water quality monitoring by the Lake Pend Oreille Waterkeeper (sites 4, 5, 6, and 9; Figure 1). Their data indicate nutrient concentrations are increasing in the river. The trophic indices will be determined by the Carlson's Trophic Index (Carlson 1977), which is based on concentrations of nutrients, chlorophyll-a, and water clarity. Results of this ongoing investigation will guide implementation of nutrient reduction projects and future National Pollution Discharge Elimination System permitting. Changes in trophic status can have implications for the LPO foodweb and have the potential to affect fisheries management in the lake.

In 2020, data did not meet data quality objectives for the first two sampling events. This was due to laboratory error. Therefore, DEQ did not continue monitoring. Modifications of the 2021 scope/budget is reflective of additional Pend Oreille River sites being monitored and the possibility of using a different analytical laboratory.

Reference	Station_Name	Latitude_WGS84	Longitude_WGS84
1	Idywilde Bay	47.954167	-116.561667
2	Lakeview	47.9725	-116.458889
3	Bayview Nearshore	47.981389	-116.543333
4	Laclede	48.16141	-116.746
5	Upstream Priest River	48.17136	-116.887
6	Albeni Falls Forebay	48.175556	-116.983333
7	Garfield Bay	48.179722	-116.430833
8	Glengary Bay	48.223611	-116.369444
9	Downstream Springy Point	48.242222	-116.595556
10	Pend Oreille North	48.266056	-116.378517

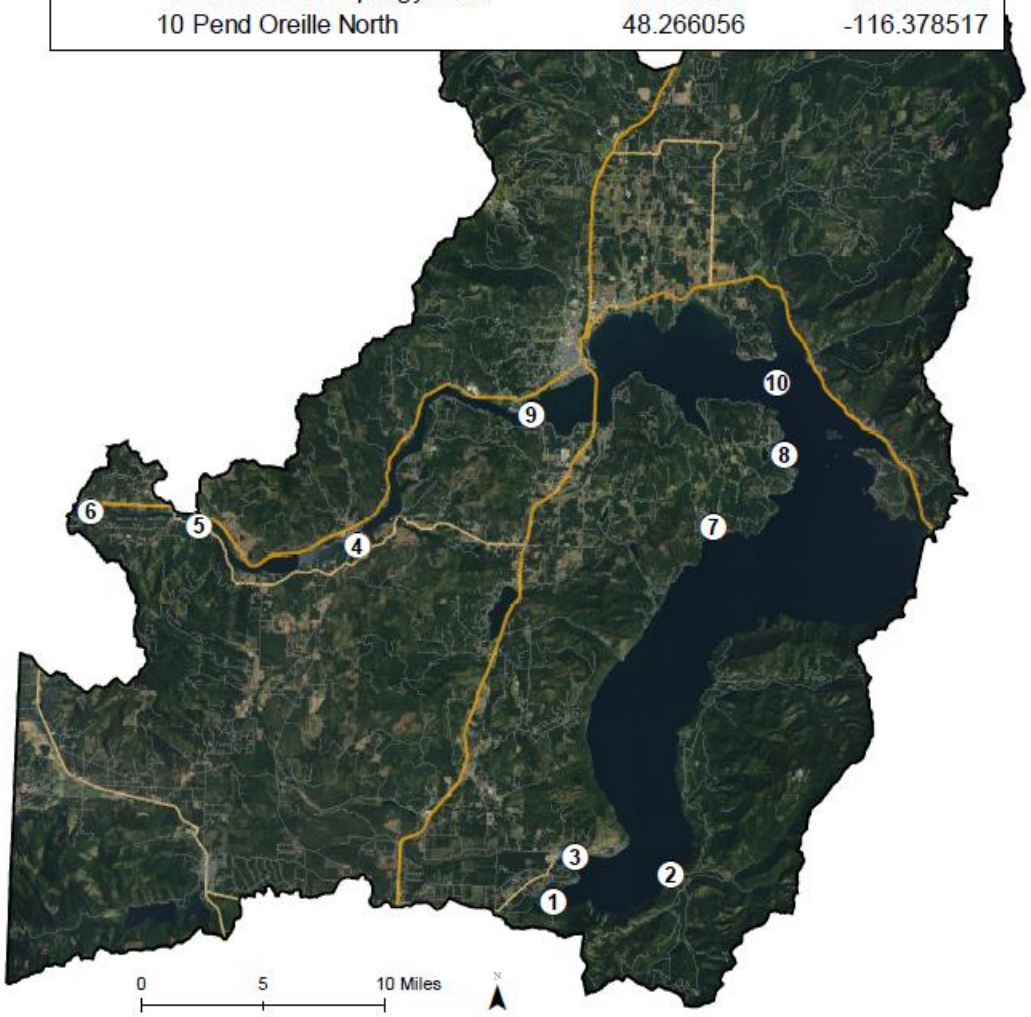

Figure 1. Map of 2021 monitoring sites.

Goal
The goal of this project is to better understand the relationship between nutrients and trophic status and their variability across regions in Lake Pend Oreille and Pend Oreille River.

Objectives
1. Collect routine chemical and physical data in mid- and southern lake regions and in the Pend Oreille River.

2. Collect water quality data to understand nutrient speciation and trophic conditions in mid-lake and southern regions of the lake.

3. Collect routine chemical and physical and water quality data from one open water site in the north for a relative comparison between the regions of the lake.

4. Compare conditions in the northern region of the lake with the mid and southern regions of the lake.

5. Collect water quality data on the Pend Oreille River sites for a closer evaluation of nutrient and trophic trends in the River.

Methods
Monitoring conducted by DEQ follows directives outlined in the LPO and River Trophic Monitoring Quality Assurance Project Plan (DEQ 2015b).

Water Quality Monitoring
DEQ's 2021 monitoring will include five nearshore stations, one open water station, and four Pend Oreille River stations during each sampling month. Monitoring will take place once a month in July–September 2021. Monitoring events will be at least 15 days apart. The monitoring sites are shown in Figure 1.

The following is a list of water quality data collected under the routine trophic monitoring program:
- Profiles through the water column of chemical and physical parameters including water temperature, pH, dissolved oxygen, conductivity, and Secchi depth.

- A composite of either five samples taken from equal-depth intervals or depth integrated with a peristaltic pump from the lake surface to a depth as directed by stratification of the station and the depth of the photic zone. Samples are taken to the analytical laboratory for analysis of total phosphorus, chlorophyll-a, total kjeldahl nitrogen, and nitrate + nitrite (as N). Additionally, the Idaho Department of Fish and Game has asked for analysis of total dissolved phosphorus be added as it will allow them to evaluate overall lake productivity and provide insight to trophic interactions that affect kokanee.

- If the station is stratified, grab sample at ½ the depth between the hypolimnion knee and the lake bottom. Samples are taken to the analytical laboratory for analysis of total phosphorus, total kjeldahl nitrogen, nitrate + nitrite, and total dissolved phosphorus.

Work Products

- Annual Work Summary; due November 1, 2021

Permitting Requirements

Not applicable for the tasks proposed in this project plan.

Endangered Species Act consultation for this project plan is associated with the 2019 Biological Opinion on the effects of continued operation of the Clark Fork Hydroelectric Project on Bull Trout and designated Bull Trout critical habitat (BiOp). This project plan is consistent with the analyses and conclusions contained in the 2019 BiOp and will adhere to all appropriate Terms and Conditions designed to reduce the extent and effects of incidental take on Bull Trout. No incidental take of Bull Trout is anticipated as a result of this project plan; therefore, no take reporting is required.

Cultural/Historic Resource Review

Not applicable for the tasks proposed in this project plan. There are no ground and/or vegetation disturbing activities, or proposed impacts to cultural/historic resources.

Benefit to the Resource

Fish species that are expected to benefit from the project include Bull Trout, Westslope Cutthroat Trout and kokanee salmon. This project evaluates the water quality status of habitat affected by elevated total dissolved gas and further develops baseline data against which cumulative impacts can be evaluated. Results from this project could be used to evaluate synergy of trophic status and total dissolved gas on the fish community. Characterizing water quality over time to identify trends helps ensure that project implemented under this protection, mitigation and enhancement measure are optimized for longevity and effectiveness. Water quality monitoring will dovetail with past efforts to track trophic status, nutrient loading, and metals loading from sampling previously approved by the Management Committee. Water quality data will improve interpretation of success of fishery recovery plans.

Budget

Nutrients: Lab Analysis

Total Events: 3 (one event each month from July–September)
Total Stations: 10 stations with 3 events = 30 stations

It is anticipated that 21 stations of the 30 during the monitoring season will be iso-thermal.
It is anticipated that 9 stations of the 30 during the monitoring season will be stratified.

The following analyses will be performed on water quality samples collected at each station (Stratified stations have two samples collected for total phosphorus, nitrate + nitrite, total kjeldahl nitrogen and total dissolved phosphorus):

Analysis:
Total phosphorus (method 4500 PE) = $45
Nitrate + Nitrite (as N) = $35
Total Kjeldahl Nitrogen = $45

Total dissolved phosphorus (method 4500 PE) = $45
Chlorophyll-a = $50

Lab Analysis Cost: iso-thermal stations = $220
Total cost for 21 iso-thermal stations = $4,620

Lab Analysis Cost: stratified stations = $390
Total cost for 9 stratified stations = $3,510

Quality Assurance Lab Analysis
Duplicates = 1 each event
Total cost for duplicates x 3 events = $660

Blanks = 1 each event
Total cost per blank x 3 events = $660

Total cost for quality assurance = $1,320

Total Season Lab Costs
21 iso-thermal Stations = $4,620
9 stratified Stations = $3,510
Quality Assurance = $1,320

Grand Total Cost Lab Analysis: $9,450

Item	Estimated Carryover	2021 Budget Request
Nutrient lab analysis	$0	$8,130
Nutrient quality assurance lab analysis	$0	$1,320
Total	$0	$9,450
Anticipated Expenditures		$9,450

A match of $10,000 will be provided by DEQ covering employee time spent sampling and writing a summary report as well as the cost of 3-days use of the boat used for sampling.

Literature Cited

Carlson, R. E. 1977. A Trophic State Index for Lakes. Limnology and Oceanography 22(2):461–369.

DEQ (Idaho Department of Environmental Quality). 2002. *Total Maximum Daily Load (TMDL) for Nutrients for the Nearshore Waters of the Pend Oreille Lake, Idaho*

DEQ (Idaho Department of Environmental Quality). 2015a. *Nutrient TMDL for the Nearshore Waters of Lake Pend Oreille, Idaho TMDL Five-Year Review.*

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2021 PROJECT PLAN

Temperature Monitoring Data Compilation

Project Contact
Paul Kusnierz, Avista, (406) 847-1274, paul.kusnierz@avistacorp.com

Project History
This is a continuing project for 2021. The Water Resources Technical Advisory Committee ranked this project on January 22, 2019. The project was first approved by the Management Committee (MC) in 2019. The scope and budget will be reviewed annually by the MC. The 2021 scope is the same as in 2020, but the budget is increased to ensure that all data can be entered in a timely manner. The temperature database described in this project plan was constructed in 2020; however, it is not yet updated with data through 2020. As a result, we are asking for an extension on the due date for updating the temperature database to December 1, 2021.

Background
Continuous temperature data have been collected as part of projects funded by the Clark Fork Settlement Agreement (CFSA; Avista Corporation 1999) since implementation began in 1999. These data have been collected as part of electrofishing and reservoir sampling data collection in Montana, fish movement and temperature studies in Idaho, and total dissolved gas monitoring downstream of Cabinet Gorge Dam. Up to now, these data have not been housed in a single database, there has been no standard protocol for collecting temperature data using data loggers, and no suite of long-term temperature monitoring sites has been defined. The work in the project plan is proposed to be performed in consultation with the Aquatic Implementation Team (AIT) to ensure that all appropriate datasets are incorporated into a single database and can be effectively accessed. Table 1, found at the end of this project plan contains a list of all sites where temperature monitoring will occur in 2021, the project plan title associated with the site, and the due date for these data to be available for database entry.

Goal
The goal of this effort is to ensure quality and meaningful data are collected, stored, and readily available to inform restoration and fisheries research and management activities in the lower Clark Fork River and Lake Pend Oreille watershed.

Objectives
1. Compile historical CFSA-associated temperature data and place them in a single Access database and update the database annually.

Tasks
1. Complete the updated temperature database. (Objective 1)

2. Enter 1999–2020 data into the updated database. (Objective 1)

Work Products
- Updated database (1999–2020); final due December 1, 2021

- Annual Work Summary; due December 1, 2021

Permitting Requirements
Not applicable for the tasks proposed in this project plan.

Endangered Species Act consultation for this project plan is associated with the 2019 Biological Opinion on the effects of continued operation of the Clark Fork Hydroelectric Project on Bull Trout and designated Bull Trout critical habitat (BiOp). This project plan is consistent with the analyses and conclusions contained in the 2019 BiOp and will adhere to all appropriate Terms and Conditions designed to reduce the extent and effects of incidental take on Bull Trout. No incidental take of Bull Trout is anticipated as a result of this project plan; therefore, no take reporting is required.

Cultural/Historic Resource Review
Not applicable for the tasks proposed in this project plan, there are no ground and/or vegetation disturbing activities, or proposed impacts to cultural/historic resources.

Benefit to the Resource
This project will involve compiling data collected by at least four Appendices of the CFSA and storing it in a single database where it can be updated annually. These data will be easily queried and linked to appropriate metadata describing general sampling techniques and QA/QC performed. The final database will allow CFSA implementers to more easily identify and obtain temperature data. This will increase the ability to use the data to identify locations that could benefit from stream restoration or preservation as well as evaluate the relationships between stream temperature and the fisheries resources of the lower Clark Fork River watershed.

Budget

Item	Estimated Carryover	2021 Budget Request
Technician labor (0.10 FTE)	$25	$9,400
Biologist labor (0.02 FTE)	$0	$3,400
Total	$25	$12,800
Anticipated Expenditures		$12,825

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Avista Corporation. 1999. Application for New License, Volume III Settlement Agreement. Avista Corporation. Spokane, Washington.

Table 1. Temperature monitoring site name, site type, project plan title, and data due date for 2021.

Stream and site name	Site type	Project Plan title	Data due date
Prospect Creek 17-mile	Long-term	Habitat Restoration Monitoring and Native Salmonid Abundance Monitoring Plan	December 1, 2021
Prospect Creek below Crow	Long-term	Habitat Restoration Monitoring and Native Salmonid Abundance Monitoring Plan	December 1, 2021
Cooper Gulch below Chipmunk	Long-term	Habitat Restoration Monitoring and Native Salmonid Abundance Monitoring Plan	December 1, 2021
Cooper Gulch above long-term site #1	Long-term	Habitat Restoration Monitoring and Native Salmonid Abundance Monitoring Plan	December 1, 2021
Crow Creek below confluence at 2007 restoration reach	Long-term	Habitat Restoration Monitoring and Native Salmonid Abundance Monitoring Plan	December 1, 2021
West Fork Crow Creek 2-3 minutes up WF trail	Long-term	Habitat Restoration Monitoring and Native Salmonid Abundance Monitoring Plan	December 1, 2021
East Fork Crow Creek just upstream of culvert	Project	Habitat Restoration Monitoring and Native Salmonid Abundance Monitoring Plan	December 1, 2021
West Fork Trout Creek lower below 1st creek crossing	Long-term	Habitat Restoration Monitoring and Native Salmonid Abundance Monitoring Plan	December 1, 2021
West Fork Trout Creek middle above Robin Run	Long-term	Habitat Restoration Monitoring and Native Salmonid Abundance Monitoring Plan	December 1, 2021
West Fork Trout Creek upper below South Branch confluence	Long-term	Habitat Restoration Monitoring and Native Salmonid Abundance Monitoring Plan	December 1, 2021
Vermilion River near mouth	Long-term	Habitat Restoration Monitoring and Native Salmonid Abundance Monitoring Plan	December 1, 2021
Vermilion River PIT array	Long-term	Tributary Trapping and Downstream Juvenile Bull Trout Transport Program	December 1, 2021
Vermilion River between Roe Gulch and Canyon Creek	Project	Habitat Restoration Monitoring and Native Salmonid Abundance Monitoring Plan	December 1, 2021
Canyon Creek below bridge	Project	Habitat Restoration Monitoring and Native Salmonid Abundance Monitoring Plan	December 1, 2021
Vermilion River below Cataract Creek	Long-term	Habitat Restoration Monitoring and Native Salmonid Abundance Monitoring Plan	December 1, 2021
Vermilion River ~1.1 km down from Grouse Creek	Project	Habitat Restoration Monitoring and Native Salmonid Abundance Monitoring Plan	December 1, 2021
Sims Creek near mouth access from spur road	Project	Habitat Restoration Monitoring and Native Salmonid Abundance Monitoring Plan	December 1, 2021
Vermilion River above Chapel Slide	Long-term	Habitat Restoration Monitoring and Native Salmonid Abundance Monitoring Plan	December 1, 2021
Vermilion River below Willow Creek	Project	Habitat Restoration Monitoring and Native Salmonid Abundance Monitoring Plan	December 1, 2021
Vermilion River below Frosty/Charred creeks	Project	Habitat Restoration Monitoring and Native Salmonid Abundance Monitoring Plan	December 1, 2021
Vermilion River below Miller Creek	Project	Habitat Restoration Monitoring and Native Salmonid Abundance Monitoring Plan	December 1, 2021
Vermilion River at mouth of Control Creek	Project	Habitat Restoration Monitoring and Native Salmonid Abundance Monitoring Plan	December 1, 2021
Happy Gulch near mouth	Project	Habitat Restoration Monitoring and Native Salmonid Abundance Monitoring Plan	December 1, 2021

Stream and site name	Site type	Project Plan title	Data due date
Miller Creek near mouth	Project	Habitat Restoration Monitoring and Native Salmonid Abundance Monitoring Plan	December 1, 2021
Graves Creek PIT array	Long-term	Tributary Trapping and Downstream Juvenile Bull Trout Transport Program	December 1, 2021
Graves Creek above falls	Long-term	Habitat Restoration Monitoring and Native Salmonid Abundance Monitoring Plan	December 1, 2021
Graves Creek upstream of 2nd USFS bridge	Project	Habitat Restoration Monitoring and Native Salmonid Abundance Monitoring Plan	December 1, 2021
Graves Creek at Lawn Lake trailhead	Project	Habitat Restoration Monitoring and Native Salmonid Abundance Monitoring Plan	December 1, 2021
Rock Creek above West Fork	Long-term	Habitat Restoration Monitoring and Native Salmonid Abundance Monitoring Plan	December 1, 2021
Rock Creek upstream of trail bridge	Long-term	Habitat Restoration Monitoring and Native Salmonid Abundance Monitoring Plan	December 1, 2021
Rock Creek upper cascade		Habitat Restoration Monitoring and Native Salmonid Abundance Monitoring Plan	December 1, 2021
Bull River PIT array	Long-term	Tributary Trapping and Downstream Juvenile Bull Trout Transport Program	December 1, 2021
Bull River downstream of forks	Long-term	Tributary Trapping and Downstream Juvenile Bull Trout Transport Program	December 1, 2021
Bull River upstream of springs	Long-term	Tributary Trapping and Downstream Juvenile Bull Trout Transport Program	December 1, 2021
East Fork Bull River North Channel PIT array	Long-term	Tributary Trapping and Downstream Juvenile Bull Trout Transport Program	December 1, 2021
East Fork Bull River South Channel PIT array	Long-term	Tributary Trapping and Downstream Juvenile Bull Trout Transport Program	December 1, 2021
South Fork Bull ~30 m above mouth	Long-term	Habitat Restoration Monitoring and Native Salmonid Abundance Monitoring Plan	December 1, 2021
East Fork Blue Creek	Long-term	Habitat Restoration Monitoring and Native Salmonid Abundance Monitoring Plan	December 1, 2021
Deep Creek?	Long-term	Habitat Restoration Monitoring and Native Salmonid Abundance Monitoring Plan	December 1, 2021
Caribou Creek	Project	Fish Resource Monitoring, Enhancement, and Management Plan	December 1, 2021
Morris Creek	Project	Fish Resource Monitoring, Enhancement, and Management Plan	December 1, 2021
Trestle Creek	Project	Fish Resource Monitoring, Enhancement, and Management Plan	December 1, 2021
Hellroaring Creek	Project	Fish Resource Monitoring, Enhancement, and Management Plan	December 1, 2021
McCormick Creek	Project	Fish Resource Monitoring, Enhancement, and Management Plan	December 1, 2021
Trestle Creek PIT array	Long-term	Lake Pend Oreille PIT-Monitoring Station Operation and Maintenance	December 1, 2021
Granite Creek PIT array	Long-term	Lake Pend Oreille PIT-Monitoring Station Operation and Maintenance	December 1, 2021
South Gold Creek PIT array	Long-term	Lake Pend Oreille PIT-Monitoring Station Operation and Maintenance	December 1, 2021
Clark Fork River USGS gage	Long-term	Lower Clark Fork River Minimum Flow and Water Temperature Monitoring	December 1, 2021
Cabinet Gorge Dam forebay	Project	Total Dissolved Gas Monitoring	December 1, 2021

Stream and site name	Site type	Project Plan title	Data due date
Clark Fork River downstream of Foster Side Channel	Project	Lower Clark Fork River Minimum Flow and Water Temperature Monitoring	December 1, 2021
Clark Fork River hatchery boat ramp	Project	Total Dissolved Gas Monitoring	December 1, 2021
Priest River at outlet USGS gauging station	Long-term	Priest River Coldwater Bypass Limnology Assessment	December 1, 2021

2021 PROJECT PLAN

Walleye Geochemistry Study

Project Contacts

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Project History

The Walleye Geochemistry Study is a continuing project that was originally approved by the Management Committee (MC) during the 2019 fall meeting. This project was ranked by the Water Resources Technical Advisory Committee (WRTAC) during the fall 2019 meeting. No budget changes are being proposed for 2021; however, we are requesting a seven-month extension on the reporting deadline.

The need and concept for this study were cooperatively identified and developed by IDFG and Avista staff. The project was competitively bid through a request for proposal process. Mainstem Fish Research (MFR; contractor) and the Pacific Northwest National Laboratory (PNNL; subcontractor) were tentatively selected to conduct this research (tentative based on MC approval). Subsequent negotiations between Clark Fork Settlement Agreement (CFSA), MFR, and PNNL staff informed the development of this project plan.

Background

Walleye were illegally introduced into Noxon Reservoir around 1990 and are now well-established within both Noxon and Cabinet Gorge reservoirs. The reservoirs have provided suitable spawning and rearing habitat for Walleye, and it is believed that downstream drift has led to subsequent invasions of Walleye into the Idaho reaches of the Clark Fork River, Lake Pend Oreille (LPO), and the Pend Oreille River. Walleye were first detected in the Pend Oreille River in 2005 and in LPO in 2006, and were initially only observed at low densities in localized habitats. However, the relative abundance of Walleye observed through fall index netting appears to be doubling every three years. These results suggest that the LPO Walleye population is currently experiencing rapid (e.g., exponential) growth.

The expanding Walleye population has the potential to put several fish populations (e.g., Bull Trout, Westslope Cutthroat Trout, kokanee) in LPO at risk through direct predation and competition. Thus, the IDFG is evaluating whether or not Walleye suppression would be a feasible, prudent, and desirable management action, and is currently leading the Appendix F5 "Lake Pend Oreille/Clark Fork River Walleye Population Assessment" and "Lake Pend Oreille Experimental Walleye Angler Incentive Program" projects.

One important knowledge gap exists that has the potential to influence how feasible it may or may not be to suppress Walleye in LPO in the interest of maintaining desirable population abundances. Currently, there is little information regarding the proportion of LPO Walleye hatched within LPO (or waters directly connected to LPO), versus Walleye that hatched in

Noxon or Cabinet Gorge reservoirs and subsequently drifted or swam downstream to LPO. If the majority of LPO Walleye are being produced within LPO, it might be feasible to suppress this population to desirable levels. Alternatively, if a high proportion of LPO Walleye were produced upstream of Cabinet Gorge Dam in Montana, it may not be feasible to effectively control this population through management actions in LPO alone.

This study proposes to identify geochemical markers than can be used to reliably discern between Walleye with provenance upstream versus downstream of Cabinet Gorge Dam. The potential for use of geochemical signatures in bone, scales and otoliths to determine natal origins of fish is well established (Kerr and Campana 2014). These signatures typically include both isotopic (e.g., $^{87}Sr/^{86}Sr$, $\delta^{18}O$, $\delta^{13}C$) and elemental markers (e.g., Sr, Ba). Combinations of elemental markers have been successfully used to identify the origins of Walleye in Arkansas and Missouri (Bickford and Hannigan 2005) and in Missouri River reservoirs in North and South Dakota (Carlson et al. 2016). Assignment accuracy for these studies ranged from 89-94% and 83-93%, respectively. Bigrigg (2008) similarly used Sr to determine natal sites of adult Walleye in Lake Erie and found that homing fidelity ranged from 37-92%. More recently, Chen et al. (2016) showed that natal stream variation in Sr/Ca can be detected in the otoliths of larval Walleye as young as two days old. These studies suggest that elemental markers can serve as useful predictors of natal origins in Walleye, but the probabilities of correct assignment can vary widely. By comparison, isotopic markers such as $^{87}Sr/^{86}Sr$ and $\delta^{18}O$ have also been used extensively to establish provenance in fish because they tend to be more environmentally stable than elemental concentrations and there is typically a strong correlation between the water and otolith ratios (Barnett-Johnson et al. 2008; Zeigler and Whitledge 2010). However, we are not aware of their application to determine natal origins in Walleye. Nevertheless, $^{87}Sr/^{86}Sr$ differs considerably between the Pack River (0.711045–0.713066), the Clark Fork Reservoirs (~0.72541) and north LPO (0.72417) and may thus add a second level of discrimination among these locations (Frawley et al. 2019). The basis for this variation is due, in part, to the surface geology of the Clark Fork River and LPO (Figure 1). The lower Clark Fork River drains primarily from Proterozoic metamorphic rock (2500 to 540 Ma) compared to the mostly Quaternary – Tertiary fluvial deposits around the Pack River (66 Ma to present). These age differences contribute to a higher abundance of radiogenic ^{87}Sr in the older rock and thus a higher $^{87}Sr/^{86}Sr$ ratios. We also anticipate potential variation in oxygen and carbon ($\delta^{18}O$ and $\delta^{13}C$) among the sites because of differences in stream hydrology and land use patterns, respectively, and possibly lead (Pb) as a result of the legacy mining and smelting activities upstream of the reservoirs (Unruh et al. 2000) near Butte and Anaconda, MT.

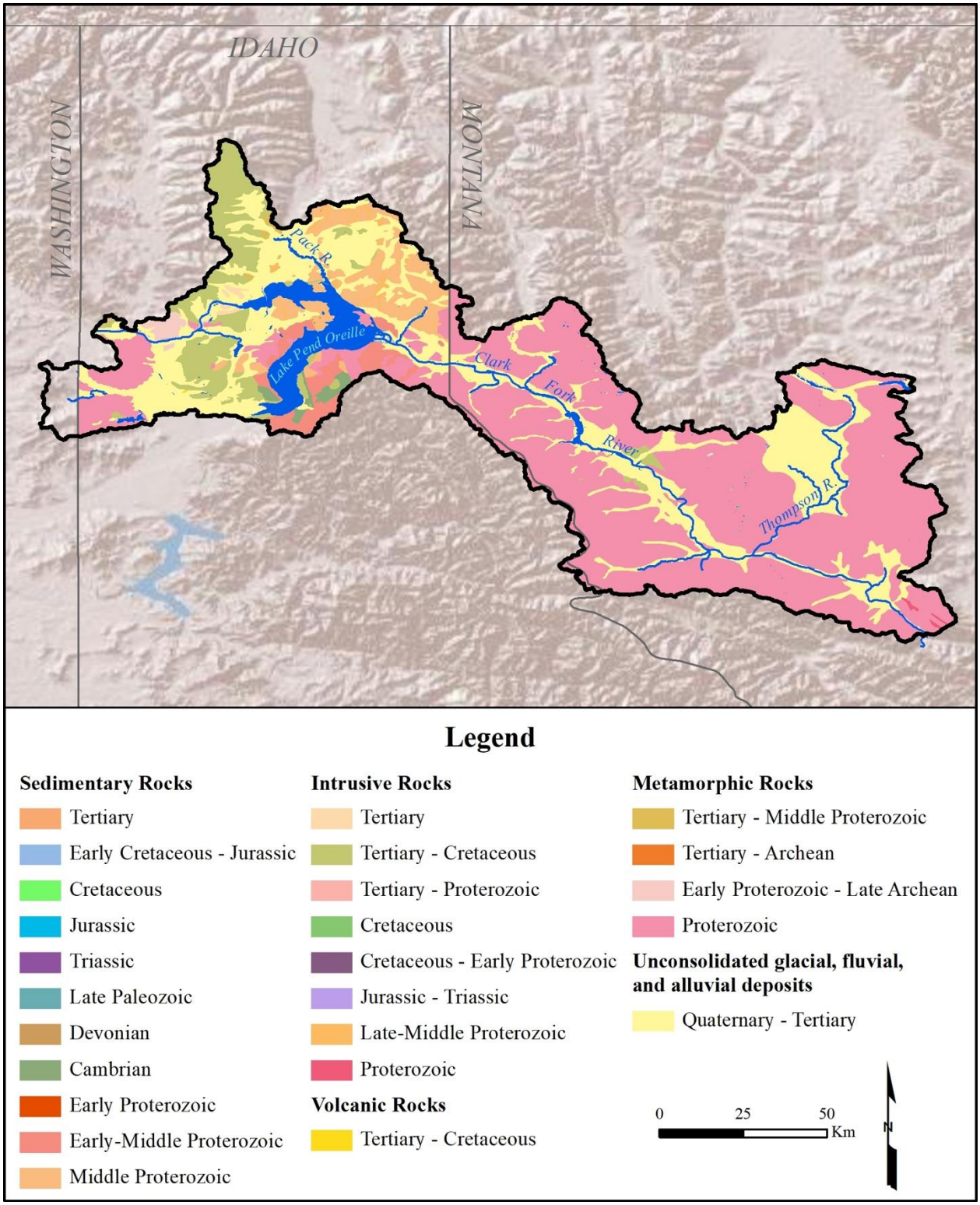

Figure 1. Surface geology of the lower Clark Fork River, Pack River and Lake Pend Oreille.

Goal

The goal of this research is to develop a geochemical marker or suite of markers than can be used to reliably discern between Walleye that hatched in the reservoirs and those that hatched downstream of Cabinet Gorge Dam. A secondary goal that would be favorable but which is not a strict requirement of the project is to develop markers that would allow discernment of provenance at more discrete geographic scales such as fish that hatched in Noxon Reservoir, Cabinet Gorge Reservoir, the Pend Oreille River, or specific areas within LPO (e.g., the lower Clark Fork River and associated delta area versus the Pack River delta/Sunnyside area).

Objectives

1. Evaluate otolith and water samples to quantify the spatial variation of isotopic ($^{87}Sr/^{86}Sr$) and element/Ca markers. (***Complete***)

2. Review data from Objective 1 and meet with CFSA staff to determine if additional markers need to be evaluated to achieve the desired level of discernibility. (***Complete***)

3. Pending the outcome of Objective 2, evaluate otoliths, water samples, and/or opercula bones for additional isotopic and/or element/Ca markers (e.g., $\delta^{18}O$, $\delta^{13}C$, $^{206}Pb/^{204}Pb$, $^{207}Pb/^{204}Pb$, $^{208}Pb/^{204}Pb$, Pb/Ca).

4. Develop an analytical model for discerning provenance among LPO Walleye and summarize findings in technical report and/or manuscript for publication.

Methods

A phased approach will be utilized to identify and develop a suite of markers than can be used to reliably discern provenance among LPO Walleye. The first phase will be analyzing a standard suite of potential markers in the otoliths of up to 100 fish and up to six water samples (Objective 1). Elemental/Ca ratios (e.g., Sr/Ca) that have been shown to effectively discriminate Walleye of different natal origin will be analyzed. The strontium isotopic ratio (i.e., $^{87}Sr/^{86}Sr$) will also be analyzed because of the known difference in the ratio among the presumptive natal sites and its well documented utility as an indicator of provenance and movement in many species of fish. Once the first phase is complete, MFR and PNNL will meet with CFSA personnel to evaluate the data and determine whether or not this suite of potential markers alone will provide adequate discriminatory ability (Objective 2). If so, MFR and PNNL will develop a Project Completion Report or a manuscript for publication (Objective 4).

If it is determined that the desired level of discriminatory ability was not achieved with the first suite of markers, MFR, PNNL, and CFSA personnel will develop a new suite of markers for which a subsample of the original fish structures and/or water samples will be re-analyzed (Objective 3). Potential markers to be analyzed during this phase may include $\delta^{18}O$, $\delta^{13}C$, $^{206}Pb/^{204}Pb$, $^{207}Pb/^{204}Pb$, $^{208}Pb/^{204}Pb$ and Pb/Ca in bone (opercula). The isotopic ratio of oxygen in otoliths has emerged as an effective technique to retrospectively characterize thermal life history because it fractionates in direct relation to water temperature (Thorrold et al. 1997; Høie et al. 2004). Thus, differences in water temperature even among waters of similar oxygen isotopic composition may produce distinct otolith $\delta^{18}O$ signatures. Carbon ($\delta^{13}C$) could provide similar discrimination among watersheds due to variable C sources in the food web (e.g. relative

abundance of C3 and C4 plants) (Ramsay et al. 2012) and fractionation differences in aquatic plants between riverine and lake environments (France 1995). By contrast, we suggest lead could provide discriminatory value because of mining and smelting waste that entered the Clark Fork River from Butte and Anaconda MT in the early 1900's. The lead isotopic composition from these activities are well established (Unruh et al. 2000) and lead is readily taken up by bone (Hodson et al.1982).

Specific analytical procedures (e.g., laser ablation, inductively coupled mass spectrometry; thermal ionization mass spectrometry; laser absorption spectroscopy) and data analysis methods can be provided upon request.

Work Products

- Annual Work Summary; due December 1, 2021
- Project Completion Report or manuscript for publication; final due July 1, 2021

Permitting Requirements

Biological samples will be obtained through the collection authority of IDFG and Montana Fish, Wildlife & Parks. No other permits are required.

Endangered Species Act consultation for this project plan is associated with the 2019 Biological Opinion on the effects of continued operation of the Clark Fork Hydroelectric Project on Bull Trout and designated Bull Trout critical habitat (BiOp). This project plan is consistent with the analyses and conclusions contained in the 2019 BiOp and will adhere to all appropriate Terms and Conditions designed to reduce the extent and effects of incidental take on Bull Trout. No incidental take of Bull Trout is anticipated as a result of this project plan; therefore, no take reporting is required.

Cultural/Historic Resource Review

Not applicable to this project. No ground and/or vegetation disturbing activities that could affect cultural or historic resources are proposed.

Benefit to the Resource

The ultimate goal, and applied use of the information obtained by this study is to help IDFG effectively manage Walleye in the interest of protecting and enhancing populations of kokanee, Bull Trout, Westslope Cutthroat Trout, and other desirable gamefish species as determined by IDFG. All of these species have the potential to be exposed to elevated levels of total dissolved gas produced at Cabinet Gorge Dam which is the priority of Appendix F5 mitigation efforts. This effort is consistent with and complimentary to numerous Appendix F5 projects including the experimental Walleye angler incentive program, Walleye population assessment, Lake Trout angler incentive program, and the netting program. This project is also consistent with the intent of the Appendix C Fish Passage/Native Salmonid Restoration Plan. This research will support efforts to enhance native salmonid populations within LPO and direct tributaries thereto. Additionally, these efforts should enhance the effectiveness of the juvenile Bull Trout downstream transport program and lead to increased numbers of mature Bull Trout being returned to Montana through upstream capture and transport efforts. Lastly, the markers identified through this research will likely be useful to numerous appendices A, B, C, and F5

applied research studies that may be proposed in the near future. For example, geochemistry can likely be used to determine natal streams of Westslope Cutthroat Trout. Additionally, this information may be used to evaluate the accuracy of Bull Trout genetic assignment, and, in concert with genetic information, used to estimate and better understand straying rates among Bull Trout.

This project directly supports IDFG's efforts to understand and effectively manage the Lake Pend Oreille fishery consistent with the management objectives outlined in the Fisheries Management Plan (2019-2024). This project is also consistent with Endangered Species Act direction from the U.S. Fish and Wildlife Service through the Bull Trout Recovery Plan, Biological Opinion for the Clark Fork projects, and informal consultation through the CFSA process.

Budget

Item	Estimated Carryover	2021 Budget Request
MFR contract to complete Objectives 1, 2, and 4	$44,999	$0
MFR contract to complete Objective 3 (if necessary)	$63,290	$0
CFSA staff time, meetings, and travel	$7,500	$0
Total	$115,789	$0
Anticipated Expenditures		$115,789

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2021 PROJECT PLAN

Priest River Coldwater Bypass Limnology Assessment

Project Contact

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Project History

This is a continuing project for 2021. The Water Resources Technical Advisory Committee ranked this project on January 21, 2020. The project was first approved by the Management Committee (MC) in 2020. We are requesting changes in scope to extend the timeline for project completion. No additional budget is requested.

The first phase of the project, contracted by the Kalispel Tribe with Bonneville Power Administration funding, and completed in 2014, resulted in a stream temperature and flow model developed by the Water Quality Research Group at Portland State University (Berger et al. 2014). This hydrodynamic model predicted that replacing a portion of the epilimnetic water released from the Priest Lake Outlet Dam with cold water from the hypolimion would result in up to a 10°C decrease in late summer stream temperatures. Temperature reductions would primarily benefit the most stenothermic native salmonids in the Priest and Pend Oreille systems, like migratory Bull Trout and Westslope Cutthroat Trout which also inhabit Lake Pend Oreille.

An alternatives assessment evaluating 11 alternatives to deliver cold water to Priest River was completed in May of 2019 by McMillian Jacobs Associates out of Boise, Idaho. The assessment concluded that a gravity feed system was the preferred alternative based on installation costs, maintenance costs, efficiency, and public input. The assessment was presented to the Lakes Commission and a public meeting was held in Priest River to allow public comment on the assessment. While there are still some public concerns to address, support for the project has been increasing.

In the late summer of 2019 McMillian Jacobs Associates performed a geological assessment of the area to address some concerns that there was bedrock in the area and that burying pipes would be costly and difficult. This was done to address concerns from the public about the aesthetics and navigation concerns of an above ground pipe. They found that the area geology would be suitable for burying pipes. McMillian Jacobs is currently working to narrow installation costs of the gravity system.

Background

Lower Priest River begins at the outlet of Priest Lake in northern Idaho. The stream flows 45 miles south to its confluence with the Pend Oreille River, upstream from Albeni Falls Dam (Figure 1). Priest River is hydrologically connected to Lake Pend Oreille with no barriers to fish movement, and like a number of other Idaho tributaries to the system, provides spawning and early rearing habitat for Lake Pend Oreille Bull Trout. Native Westslope Cutthroat Trout also inhabit Lower Priest River.

Streamflow in Lower Priest River is regulated by the Priest Lake Outlet Dam, installed in 1950 and operated by the Idaho Department of Water Resources. This low-head dam is operated to maintain lake levels at 3.0 ft during summer recreation season (USGS gage no. 12393000) in accordance with Idaho Code §70-507. Dam operations target a discharge of at least 60 cfs to Lower Priest River during the recreation season.

Lower Priest River is characterized by high-quality structural fish habitat, consisting of a desirable balance of large wood, pools, and riffles. The entire 45-mile length is federally listed as critical habitat for Bull Trout. Furthermore, ample spawning and rearing habitat for native salmonids exists in the Priest River tributaries. Nonetheless, a comprehensive survey of the mainstem river found lower-than-expected salmonid densities given the habitat available (Fredericks et al. 2011). Average salmonid densities were less than one-tenth of the densities observed in the Coeur d'Alene River, a river of similar size and habitat complexity.

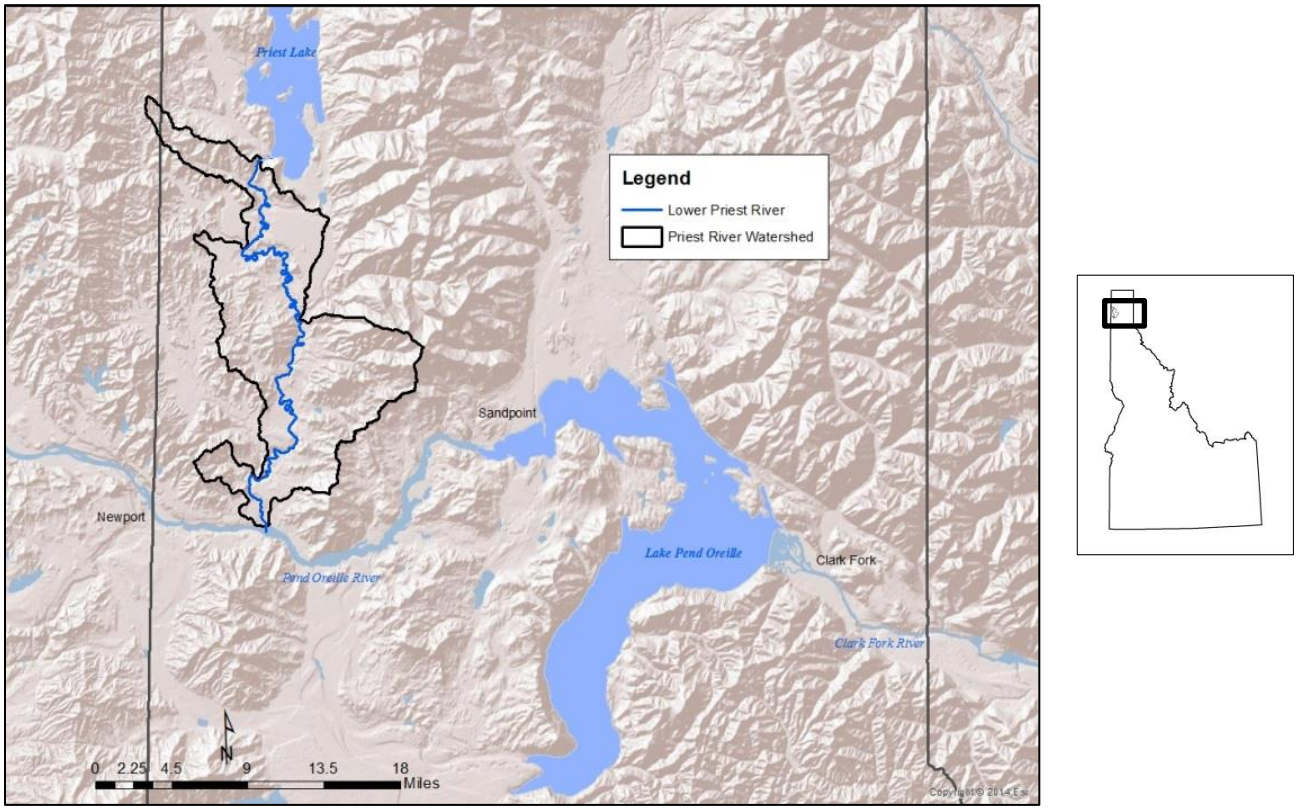

Figure 1. Lower Priest River watershed in context with the Idaho portion of the Pend Oreille Basin.

Coldwater habitat is maintained in the Lower Priest basin's high elevation tributaries draining the Selkirk Mountains, as evidenced by consistent Bull Trout occupancy in the East River. However, the surface waters of Priest Lake, and particularly Outlet Bay, typically result in elevated stream temperatures for extended periods (multiple weeks) each summer. Lower Priest River is currently designated as "water quality impaired" by Idaho Department of Environmental Quality due to temperature and sediment pollutants. While a Total Maximum Daily Load (TMDL) has been developed for sediment (Rothrock 2003), no TMDL for temperature exists. Seasonal high temperatures are recognized as the limiting factor to Lower Priest River supporting healthy populations of Bull Trout, Westslope Cutthroat Trout, and other cold water

biota (Rothrock 2003).

The IDFG currently manages Lower Priest River as a coldwater fishery, with catch-and-release only of Westslope Cutthroat Trout and Bull Trout. In the most recent survey, Mountain Whitefish were the most abundant game species in the mainstem river (Fredericks et al. 2011). Other species included Westslope Cutthroat Trout, Rainbow Trout, Bull Trout, Brook Trout, Largescale Sucker, Brown Trout, Smallmouth Bass, Northern Pikeminnow, Peamouth Chub, Longnose Dace, and Redside Shiner. Low trout densities have been consistently observed since at least the 1970's (Irizarry 1974).

Elevated stream temperatures can negatively affect fish, particularly cold water-adapted, native salmonids like Westslope Cutthroat Trout and Bull Trout. Fish residing in water outside their optimum temperature range are more prone to physiological stress, parasites, and disease. Under extreme conditions, individual fish and even populations may be negatively affected when temperatures are consistently warmer and access to coldwater refugia is not available. Studies have found lethal temperatures for Bull Trout occur above 20°C (Selong et al. 2001) while Westslope Cutthroat Trout incipient lethal temperature is 22°C (Bear et al. 2005). The US EPA recommends a maximum seven day average no greater than 18°C for salmonid migration and non-core juvenile rearing, which encompasses the Lower Priest River (EPA 2003). Preferred temperatures for Bull Trout and Westslope Cutthroat Trout are documented to be even cooler, between 6-16°C depending on species, life stage, and duration of exposure (see EPA 2003). Average daily August and September water temperatures in Lower Priest River ranged from 17-22°C (Berger et al. 2014, Isaak et al. 2017).

Common methods to improve temperature regimes in coldwater fish habitat include increased riparian shading, flow augmentation, and increased groundwater connectivity. Unlike a smaller first or second order stream, the relative width of Lower Priest River and its floodplain limit the ability of riparian trees to completely shade the stream. The Priest River Temperature Model (Berget et al. 2014) predicted the upper third of the river to have some of the warmest water in the river during August and September (Figure 2), despite intact and mature riparian tree stocking on what is primarily state and federal timberland. Furthermore, Lower Priest River has a primarily southerly aspect which also limits the potential for using improved shade as a tool. Summer temperatures are warmest in the upper reaches due to the epilimnetic inputs at the Outlet Dam. This makes flow augmentation a less viable option for decreasing river temperatures, as inputs would come from the heated, upper layer of the lake as they do now.

Improved groundwater connectivity has been explored in large systems such as the Willamette River, Oregon (Seedang et al. 2008) and small, local systems such as Hughes Creek, in the Upper Priest River watershed. While legacy effects from land use practices have degraded short reaches of the Lower Priest River stream channel to some degree (Rothrock 2001), the floodplain and riparian areas are largely intact. Significant straightening, channelization, and floodplain disconnection are not ubiquitous to this system. The unique hydrology, land, and water management governing Priest River limits more traditional options for reducing temperature loads. A coldwater bypass has the potential to bring immediate improvements to over 30 miles of impaired salmonid habitat.

Cold water release systems have been successfully developed for hatcheries and tailwater fisheries below dams for many years. One example is found within the Pend Oreille watershed at Sullivan Lake, Washington. In this system, a 54" pipe collects cold water from the bottom of Sullivan Lake and routes the water through a dam similar in size to the Outlet Dam on Priest Lake. The total cost for this project was $4.1 million.

Water temperature modeling by Portland State University in 2014 predicted biologically-relevant temperature reductions were possible in Lower Priest River (Berger et al. 2014). The model examined scenarios from July 1 to September 24, when summer water temperatures have been observed at their highest in the river. Tributary contributions and stream flows were consistent with existing conditions for the 2013 water year and Priest Lake water levels remained at the three feet gage height at the outlet. The Priest Lake summer thermocline has been observed at a depth between 10 to 20 m and water temperatures at or below 8°C (Rothrock and Mosier 1997). The amount of hypolimnetic water was varied from 25%, 50%, and 75%. The model predicted that replacing a portion of the epilimnetic water released from the Priest Lake Outlet Dam with cold water from the hypolimion would result in up to a 10°C decrease in late-summer stream temperatures (Figure 2). Improving the thermal regime in the Lower Priest River by replacing warm water outflow from Priest Lake with cold water outflow sould substantially improve cold water habitat and would be expected to significantly increase native salmonid abundance.

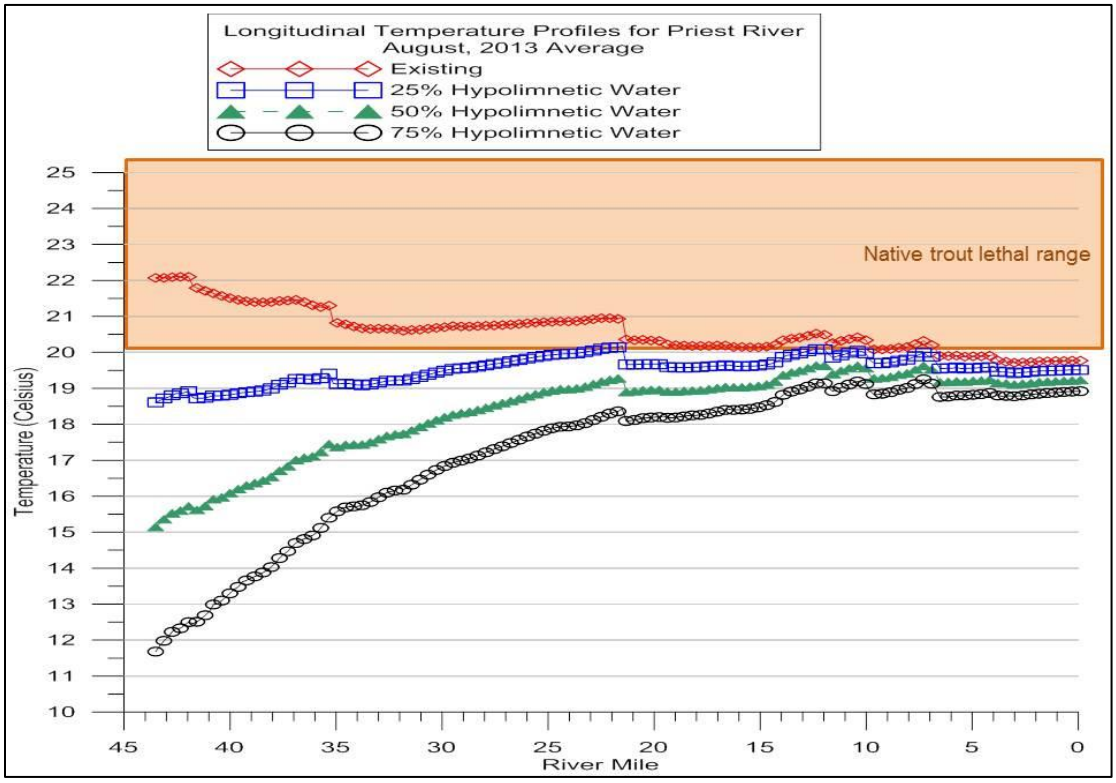

Figure 2. Priest River Model with existing temperatures (red) and three cold water bypass scenarios (blue, green, black) (Berger et al. 2014). Incipient lethal temperature maxima range is depicted in orange for Bull Trout (Selong et al. 2001) and Westslope Cutthroat Trout (Bear et al. 2005).

Improvements to the coldwater fishery would offer economic as well as social and ecological benefits. Recreational fishing attracts tourism dollars, as documented in Priest Lake, Lake Pend Oreille, Coeur d'Alene River, and St. Joe River. Hotels, gas stations, restaurants, grocery stores and sporting good retail stores all directly benefit from productive trout fisheries. In 2003, IDFG estimated the economic value of sport fishing on the similar sized Coeur d'Alene and St. Joe Rivers to be $3.1 million and $4.1 million respectively. We anticipate a restored/enhanced cold water fishery on Priest River would approach similar economic activity as that observed on the Coeur d'Alene and St. Joe rivers, given Priest River's proximity to the urban centers of Spokane and Coeur d'Alene, and the area's draw for tourism. A cost-benefit analysis of a coldwater bypass is needed to compare the up-front cost of construction with the expected annual benefits of a productive fishery.

One concern expressed during initial discussion of the project is the potential impact on the limnology of Priest Lake and Outlet Bay of replacing surface water discharge with hypolimnetic water. Specifically, there is concern that removing water from depth may impact the thermal regime and dissolved oxygen (DO) profiles of Priest Lake and decreased flows through Outlet Bay may impact water quality in that area. This project is proposed to evaluate these concerns.

Goal
Continue to explore the possibility of increasing amount and quality of the Upper Priest River's coldwater salmonid habitat.

Objectives
1. Obtain limnological assessment (temperature, DO, nutrients) of current conditions of Priest Lake, including Outlet Bay

2. Model potential impacts of a gravity feed system on the water quality of Priest Lake.

3. Evaluate the results from this project and propose a next step.

Tasks
1. Develop a Request for Proposals (RFP) to perform assessment. (Objectives 1–3) (***Completed in 2020)***

2. Hire consultant to perform work described in RFP. (Objectives 1–3) (***Completed in 2020)***

3. Conduct fieldwork and collect temperature data. (Table 1). (Objective 1) (***Completed in 2020)***

4. Evaluate results of assessment. (Objectives 2 and 3)

5. Determine if moving forward with the project is feasible from a water quality perspective. (Objective 3)

Table 1. Temperature sampling location in 2020.

Stream	Site name	River Km	Latitude	Longitude
Priest River	At outlet USGS gauging station	67	48.490399	-116.904359

Work Products

- Temperature monitoring data for the sites; due December 1, 2021
- Limnology assessment report written by consultant; final due November 1, 2021
- Annual Work Summary; due December 1, 2021

Permitting Requirements

Not applicable for the tasks proposed in this project plan.

Endangered Species Act consultation for this project plan is associated with the 2019 Biological Opinion on the effects of continued operation of the Clark Fork Hydroelectric Project on Bull Trout and designated Bull Trout critical habitat (BiOp). This project plan is consistent with the analyses and conclusions contained in the 2019 BiOp and will adhere to all appropriate Terms and Conditions designed to reduce the extent and effects of incidental take on Bull Trout. No incidental take of Bull Trout is anticipated as a result of this project plan; therefore, no take reporting is required.

Cultural/Historic Resource Review

Not applicable for the tasks proposed in this project plan, there are no ground and/or vegetation disturbing activities, or proposed impacts to cultural/historic resources.

Benefit to the Resource

The primary focus of fisheries protection, mitigation, and enhancement measures associated with the Clark Fork Settlement Agreement (CFSA) are maintenance and improvement of native migratory salmonid fish populations, principally Bull and Westslope Cutthroat trout, in the Lake Pend Oreille/lower Clark Fork River system. Both Bull Trout and Westslope Cutthroat Trout are focus species of the Dissolved Gas Mitigation and Monitoring Program (Appendix F5 of the CFSA). Like other Idaho tributaries in this system (e.g. Trestle Creek), Lower Priest River and its tributaries contribute to the long-term population viability of the Lake Pend Oreille native fish populations. With no barrier at the mouth of Lower Priest River, fluvial and adfluvial migrants of both Bull and Westslope Cutthroat trout move between the Priest River and Pend Oreille systems. Dupont et al. (2007) observed adult Bull Trout moving 36 miles between the East River in the Lower Priest River watershed into Lake Pend Oreille upstream of the Long Bridge. Additionally, 36 Westslope Cutthroat Trout and one Bull Trout that were PIT-tagged by Avista staff in the Clark Fork River were detected in Priest River tributaries by the Kalispel Tribe during a 2018 study.

Decreasing summer stream temperatures in Lower Priest River is expected to improve occupancy and connectivity between tributaries and the Pend Oreille River, allowing fish to move and exploit a wider range of habitats. Improved connectivity and coldwater habitat availability is expected to enhance genetic diversity and resilience of salmonid stocks impacted by altered regimes and a changing climate (Haak et al. 2010). A coldwater bypass will ultimately contribute to the long-term maintenance of the migratory Lake Pend Oreille native fisheries

populations, the primary focus of fisheries protection, mitigation and enhancement measures associated with the CFSA.

This proposal supports the following federal and state management plans by addressing limiting factors to coldwater fish populations:

- *Columbia Headwaters Recovery Unit Implementation Plan for Bull Trout* (USFWS 2015)
    - LPO-B Conservation Recommendation 1.3.3. Maintain and supplement sources of cold water
- *Statewide Fisheries Management Plan 2013-2018* (IDFG 2012)
- *Management Plan for the Conservation of Westslope Cutthroat Trout in Idaho* (IDFG 2013), Conservation actions for WCT in Priest River-Lakes GMU

Budget

Item	Estimated Carryover	2021 Budget Request
Contract to complete Objectives 1, 2, and 3	$106,730	$0
Total	$106,730	$0
Anticipated Expenditures		$106,730

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2021 PROJECT PLAN

Idaho Protection and Education Officer Support

Project Contacts

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Ken Bouwens IDFG, (208) 769-1414, ken.bouwens@idfg.idaho.gov

Project History

This is a continuing project for 2021. The Water Resources Technical Advisory Committee ranked this project on January 21, 2020. The project was first approved by the Management Committee (MC) in 2020. The scope and budget will be reviewed annually by the MC. This project plan represents the Clark Fork Settlement Agreement (CFSA) Appendix F5 component of a cost share arrangement with Appendix D to fund this position. This cost share reflects the changing nature of this position, in which a significant proportion of the officer's time is spent patrolling and contacting anglers pursuing other recreationally important and/or native species in the lower Clark Fork River – Lake Pend Oreille area.

Background

The Idaho CFSA Protection and Education Officer position was created in 1999 to address illegal Bull Trout harvest through direct law enforcement action taken on Lake Pend Oreille (LPO) and its tributaries. The CFSA recognized that illegal harvest of Bull Trout was a significant threat; specifically, poaching of spawning fish could greatly impact the spawning population of a stream. It was determined that in addition to traditional enforcement action, public education would be an effective approach to reduce illegal and inadvertent harvest of Bull Trout (Avista 1999).

The focus of Appendix D of the CFSA is Bull Trout conservation. The CFSA, specifically through Appendix F5, has invested millions of dollars into projects intended to directly benefit the suite of fishery resources of LPO beyond Bull Trout. It was recognized that the introduced Lake Trout and Walleye populations in LPO directly threaten both native salmonids and desirable non-native species such as kokanee and Gerrard Rainbow Trout, and intensive predator suppression projects have been implemented through the CFSA to address these threats. In addition, Westslope Cutthroat Trout conservation in Idaho is a priority of the CFSA and the Idaho Department of Fish and Game (IDFG), but is not a species addressed directly under Appendix D.

Giving the Idaho Protection and Education (P&E) Officer the ability to patrol and educate the public on the CFSA's broader objectives will provide both conservation benefits and promote a greater public understanding of the issues surrounding LPO management. For example, much like with Bull Trout, harvest of Westslope Cutthroat Trout is not allowed in the LPO watershed in Idaho and there is a need to educate the public on Westslope Cutthroat Trout identification. Incidental native salmonid harvest, especially of Bull Trout and Westslope Cutthroat Trout, has been associated with the expanding fishery targeting bass and Walleye. This fishery primarily takes place on the northwestern end of LPO near Sandpoint, an area not frequently patrolled by

the P&E Officer in the past. In addition, the springtime fishery in the Clark Fork River targeting Gerrard Rainbow Trout is expanding in response to successful LPO predator management and providing the P&E Officer the ability to interact with this fishery is important.

Goal
The goal of this project is to expand the scope of the Idaho P&E Officer to provide enforcement and education services with respect to all native and desirable non-native species conservation.

Objectives
1. Patrol LPO tributaries known to support Westslope Cutthroat Trout, kokanee, and Rainbow Trout.

2. Patrol the LPO, Clark Fork River, and Pend Oreille River fisheries.

3. Educate anglers regarding LPO specific fishing regulations.

4. Educate public on the basic ecology of LPO, including predator management objectives, distinguishing characteristics of LPO species including Westslope Cutthroat Trout, and proper catch and release techniques.

5. Develop educational materials, both physical and electronic, to educate the public on fishery management practices and fish identification.

Tasks
1. Conduct enforcement efforts, possibly including undercover and/or plain clothes surveillance patrols, on tributaries of LPO to monitor regulation compliance, catch rates, and incidental harvest. (Objective 1)

2. Utilize remote cameras to monitor popular fishing locations and drainages to note heavy use times to better focus patrol efforts. (Objective 1)

3. Conduct boat patrols, possibly including undercover and/or plain clothes surveillance patrols, on the lake to monitor regulation compliance, catch rates, and incidental harvest. (Objective 2)

4. Direct more enforcement and boating attention to shallower portions of LPO and the Pend Oreille River, especially in the spring when water temperatures are colder and native salmonids are more likely to be found among warmwater fishes. (Objective 2)

5. Monitor streams and riparian habitat for unlawful development or alterations. (Objectives 1 and 2)

6. As allowed by CDC guidelines, continue student-focused educational programs, the Pend Oreille and Coeur d'Alene Water Festivals, the WDC, and the Trestle Creek Interpretive Site. Include messages regarding fish identification and life history requirements, and catch-and-release methods at these events. (Objective 3 and 4)

7. As allowed by CDC guidelines, attend research efforts, events, or trainings to better understand dynamics of the Pend Oreille fishery to be more informed when educating the public. (Objectives 1-4)

8. Develop electronic and physical media elements for interpretive panels, trailer materials, handouts, swag, online videos, and teacher resources to be made available for area schools districts, homeschooled students, and recreators. (Objective 3, 4, and 5)

Work Products

- Mid-year report; due to Avista; August 2, 2021
- Annual Work Summary; due to Ken Bouwens, IDFG; November 15, 2021

Permitting Requirements

Endangered Species Act consultation for this project plan is associated with the 2019 Biological Opinion on the effects of continued operation of the Clark Fork Hydroelectric Project on Bull Trout and designated Bull Trout critical habitat (BiOp), and the U.S. Fish and Wildlife Service (USFWS)-IDFG Cooperative Agreement pursuant to Section 6 of the Act. This project plan is consistent with the analysis and conclusions contained in the 2019 BiOp and the USFWS-IDFG Cooperative Agreement, and will adhere to all appropriate Terms and Conditions designed to reduce the extent and effects of incidental take on Bull Trout. Incidental take reporting for this project plan will be included in the annual Biological Opinion report as required by Term and Conditions 15–18 of the 2019 Incidental Take Statement, as well as IDFG's annual Section 6 report to the USFWS.

Cultural/Historic Resource Review

Not applicable for the tasks proposed in this project plan, there are no ground and/or vegetation disturbing activities, or proposed impacts to cultural/historic resources.

Benefit to the Resource

This project will provide conservation benefits to native salmonids (Bull Trout and Westslope Cutthroat Trout) and other fish. Appendix F5 of the CFSA is designed to mitigate for the potential impacts of high levels of total dissolved gas (TDG) associated with spill at Noxon Rapids and Cabinet Gorge dams. High TDG can impact all fish species. It is recognized that it is difficult to mitigate directly for TDG impacts, and alternative mitigation is an appropriate use of Appendix F5 funds.

This proposed project is entirely consistent with the IDFG Fisheries Management Plan (IDFG 2019) the Management Plan for the Conservation of Westslope Cutthroat Trout in Idaho (IDFG 2013), Columbia Headwaters Recovery Unit Implementation Plan for Bull Trout (*Salvelinus confluentus*) (USFWS 2015), and the Native Salmonid Restoration Plan (Kleinschmidt and Pratt 1998), as it supports the enforcement and management of the LPO fishery, especially with respect to Bull Trout and Westslope Cutthroat Trout conservation.

Budget

Item	Estimated Carryover	2021 Budget Request
Payroll (0.25 FTE)	$13,171	$14,170
IDFG (benefits)	$0	$6,538
Overhead (34.65% of personnel costs)	$0	$7,176
Communication Services	$0	$363
Training	$0	$188
Travel (Hotels, Per Diem, Etc.)	$0	$300
Specific use supplies (gear, education materials, etc.)	$0	$1,250
Renting Operating leases and Maintenance (Boat and vehicle)	$0	$2,500
Avista support (0.05 FTE)	$0	$375
Total	$13,171	$32,860
Anticipated Expenditures		$46,031

As proposed, it is anticipated that approximately 75% of the Idaho P&E Officer's time will be dedicated to Bull Trout-specific activities (Appendix D) and 25% of their time will be dedicated to broader LPO issues, focusing on those species that are expected to directly benefit from other CFSA-sponsored projects (Appendix F5).

Literature Cited

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2021 PROJECT PLAN

Lake Pend Oreille Tributary PIT-Monitoring Station Installation

Project Contact
Ken Bouwens, Idaho Department of Fish and Game (IDFG), (208) 769-1414,
ken.bouwens@idfg.idaho.gov

Project History
This is a new project for 2021. This project was ranked by the WRTAC on January 20, 2021 and the Evaluation and Ranking Criteria scores are included as the last page of this project plan.

Background
Passive Integrated Transponder (PIT) monitoring stations have been installed and operated at a number of locations in Idaho under various Clark Fork Settlement Agreement (CFSA) programs. The arrays in Trestle and Granite creeks were originally installed with the intent of estimating in-lake survival of Bull and Westslope Cutthroat trout using Lake Pend Oreille (LPO). This project has come to completion (Ransom et al. *In prep.*). Concurrent with this project, the LPO Lake Trout Netting Program has become an additional tagging interrogation point for PIT tag recovery, and data from these arrays become integral to the LPO Bull Trout Demography model, which we intend to use to annually to evaluate the LPO Bull Trout metapopulation. Expanding our arrays will provide increased precision in our model while simultaneously allowing us to evaluate stream-specific questions like juvenile survival and straying rates. The current Oregon RFID arrays were originally installed in 2011. The current technology is outdated and has aged to a point where it is no longer repairable. The current arrays located in Trestle and Granite creeks will be replaced with Biomark arrays this summer, as well as a new array that will be installed in South Gold Creek.

Goal
Monitor movements of PIT-tagged fish in key tributaries to LPO.

Objectives
1. Replace existing outdated PIT arrays in Trestle and Granite creeks.

2. Install a new PIT array on South Gold Creek.

Tasks
1. Evaluate current array locations in Trestle and Granite creeks to determine their appropriateness for the new technology. (Objective 1)

2. Determine an appropriate location for an array in South Gold Creek. (Objective 2)

3. Gain landowner permission for array installation in South Gold Creek. (Objective 2)

4. Determine appropriate power/telecom sources for all three arrays. (Objective 1 and 2)

5. Acquire appropriate permits, as necessary. (Objective 1 and 2)

6. Install new arrays. (Objective 1 and 2)

Work Products

- Annual Work Summary; due December 1, 2021

Permitting Requirements

Avista and Idaho Department of Fish and Game (IDFG) personnel will determine and acquire which, if any, permits are required for the proposed work.

Endangered Species Act consultation for this project plan is associated with the 2019 Biological Opinion on the effects of continued operation of the Clark Fork Hydroelectric Project on Bull Trout and designated Bull Trout critical habitat (BiOp), and the U.S. Fish and Wildlife Service (USFWS)-IDFG Cooperative Agreement pursuant to Section 6 of the Act. This project plan is consistent with the analysis and conclusions contained in the 2019 BiOp and the USFWS-IDFG Cooperative Agreement, and will adhere to all appropriate Terms and Conditions designed to reduce the extent and effects of incidental take on Bull Trout. Incidental take is not expected for this project; however, if it does occur it will be included in the annual Biological Opinion report as required by Term and Conditions 15–18 of the 2019 Incidental Take Statement, as well as IDFG's annual Section 6 report to the USFWS.

Cultural/Historic Resource Review

Avista will coordinate with the Cultural Resources Management Group review prior to implementing the project. The work product for this review will be confidential due to the sensitive nature of the content.

Benefit to the Resource

Restoration and enhancement of Bull Trout and Westslope Cutthroat Trout populations as well as other species potentially impacted by dissolved gas supersaturation is an important component of appendices A and F5 of the CFSA. The use of PIT arrays is a valuable tool that allows passive monitoring of movements of fish in the project area. Fish that are tagged and detected at arrays provide information that that can be used to evaluate and improve programs that are currently being implemented under the CFSA. This leads to more effective implementation and more efficient use of funds available for these programs.

Budget

Item	Estimated Carryover	2021 Budget Request
Avista labor (0.05 FTE)	$0	$5,000
Equipment (3 systems @ $45K each)	$0	$135,000
Biomark Installation Labor (3@ $20K each)	$0	$60,000
Other expenses (Power, telecom, cultural/historic resource review, etc.)	$0	$27,000
Total	$0	$227,000
Anticipated Expenditures		$227,000

Literature Cited

Ransom, A., Jakubowski, R., and Bowens, K. *In Prep*. 2011-2019 Lake Pend Oreille Bull Trout Survival Study Project Completion Report. Avista, Noxon, Montana and Idaho Department of Fish and Game, Coeur d'Alene, Idaho.

Appendix F5 Mitigation Fund
Project Evaluation and Ranking Criteria score sheet

As scored by the WRTAC on 1/20/2021

Project Title: Lake Pend Oreille Tributary PIT-Monitoring Station Installation

Criteria	Score			
	3	**2**	**1**	**0**
A. Population exposure	**Routinely in LPO or LCFR**	Routinely from Dover to Box Canyon	Intermittently or occasionally	Population not exposed
B. Species to benefit	**Bull Trout and Westslope Cutthroat Trout**	Bull Trout or Westslope Cutthroat Trout	Target species but not Bull Trout or Westslope Cutthroat Trout	None
C. Mitigate or evaluate	Mitigates	**Evaluates**	NA	Not applied to resources affected by TDG
D. Project effectiveness	Solves primary problem	Partially solves or provides all information	**Provides some information**	Does not address primary problem
E. Cost/benefit	Benefit exceptional relative to cost	Benefit high relative to cost	**Benefit consistent with cost**	Cost exceeds benefit
F. Outside funding	≥ 50%	25–49%	≤ 24%	**Entirely CFSA funded**

Scoring Instructions:

- When ranking proposals that do not involve on-the-ground implementation but are necessary to the scope of physical projects (e.g., applied research, watershed assessments, NEPA analyses), score them with regard to the "expected" or "average" resultant physical project.
- **A score of "0" in any of the criteria does not necessarily mean the project is ineligible for CFSA funding.** Rather, a score of "0" should be considered an indication that this aspect of the project needs to be thoroughly discussed and considered.
- Although total scores for each proposed project can be summed to get a general idea of the relative strength of each project, **the scoring system should be viewed as an ordinal rather than absolute ranking system**. In light of this and in the interest of maintaining a simple and objective scoring system, only whole numbers will be utilized (e.g., no half points).

2021 PROJECT PLAN

Lake Pend Oreille Tributary PIT-Monitoring Station Operation and Maintenance

Project Contact
Ken Bouwens, Idaho Department of Fish and Game (IDFG), (208) 769-1414,
ken.bouwens@idfg.idaho.gov

Project History
This is a new project for 2021. It is intended to become an ongoing project with the scope and budget reviewed by the Management Committee annually. This project was ranked by the WRTAC on January 20, 2021 and the Evaluation and Ranking Criteria scores are included as the last page of this project plan.

Background
Passive Integrated Transponder (PIT) monitoring stations have been installed and operated at a number of locations in Idaho under various Clark Fork Settlement Agreement (CFSA) programs. The current arrays located in Trestle and Granite creeks will be replaced with Biomark arrays this summer, as well as a new array that will be installed in South Gold Creek. These stations are installed for various reasons; although, the primary reason is to passively monitor movements of tagged fish in tributaries. These movements help delineate migration timing for fish and can also be used to evaluate survival and trap efficiency. The operation and maintenance of PIT-monitoring stations includes costs associated with power, fiber, communications, permitting, and operation and maintenance costs. This project plan was developed to compile all costs associated with operation and maintenance of monitoring stations into one project plan. This will eliminate the need to break out charges on invoices to multiple projects and allow for the tracking of costs associated with the use of this technology.

Goal
Monitor movements of PIT-tagged fish in key tributaries to Lake Pend Oreille.

Objectives
1. Operate PIT-monitoring stations in tributaries to Lake Pend Oreille

2. Perform maintenance as needed to PIT-monitoring stations in tributaries to Lake Pend Oreille.

Tasks
1. Pay all invoices associated with operation of PIT-monitoring stations in Trestle Creek, Granite Creek, and South Gold Creek, Idaho (i.e., electric use, internet fees, Biomark data service fees, cellular internet fees, permit fees, etc.). (Objective 1)

2. A temperature data logger will be deployed at each array in Trestle, Granite, and South Gold creeks in 2021. (Objective 1)

3. Repair damage to PIT-monitoring stations, if necessary. (Objective 2)

4. Purchase additional antennas or hardware as needed. (Objectives 1 and 2)

Table 1. Location of temperature data loggers at PIT antennas on Trestle, Granite, and South Gold creeks.

Stream	Site name	River Km	Latitude	Longitude
Trestle Creek	PIT array	0.5	48.285094	-116.342002
Granite Creek	PIT array	0.5	48.084050	-116.422041
South Gold Creek*	PIT array	0.25	47.970490	-116.452493

* River Km, Latitude, and Longitude for South Gold Creek are estimated until the array is installed

Work Products

- Temperature monitoring data for the three sites; due December 1, 2021
- Annual Work Summary; due December 1, 2021

Permitting Requirements

If maintenance or repair of a PIT array is required, Avista and Idaho Department of Fish and Game (IDFG) personnel will determine and acquire which, if any, permits are required for the proposed work.

Endangered Species Act consultation for this project plan is associated with the 2019 Biological Opinion on the effects of continued operation of the Clark Fork Hydroelectric Project on Bull Trout and designated Bull Trout critical habitat (BiOp), and the U.S. Fish and Wildlife Service (USFWS)-IDFG Cooperative Agreement pursuant to Section 6 of the Act. This project plan is consistent with the analysis and conclusions contained in the 2019 BiOp and the USFWS-IDFG Cooperative Agreement, and will adhere to all appropriate Terms and Conditions designed to reduce the extent and effects of incidental take on Bull Trout. Incidental take is not expected for this project; however, if it does occur it will be included in the annual Biological Opinion report as required by Term and Conditions 15–18 of the 2019 Incidental Take Statement, as well as IDFG's annual Section 6 report to the USFWS.

Cultural/Historic Resource Review

If maintenance and/or repair of a PIT array will cause ground or vegetation disturbance, Avista will coordinate with the Cultural Resources Management Group for review prior to implementing the project. The work product for this review will be confidential due to the sensitive nature of the content.

Benefit to the Resource

Restoration and enhancement of Bull Trout and Westslope Cutthroat Trout populations as well as other species potentially impacted by dissolved gas supersaturation is an important component of Appendix A and F5 of the CFSA. The use of PIT arrays is a valuable tool that allows passive monitoring of movements of fish in the project area. Fish that are tagged and detected at arrays provide information that that can be used to evaluate and improve programs that are currently being implemented under the CFSA. This leads to more effective implementation and more efficient use of funds available for these programs.

Budget

Item	Estimated Carryover	2021 Budget Request
PIT-monitoring station maintenance	$0	$20,000
Avista labor (0.05 FTE)	$0	$5,000
Biomark BioLogic plus cell (Granite; 12 mo.)	$0	$1,500
Biomark BioLogic plus cell (Gold; 12 mo.)	$0	$1,500
Biomark BioLogic plus cell (Trestle; 12 mo.)	$0	$1,500
Electric use	$0	$2,250
Internet use	$0	$3,300
Other expenses (e.g., temperature data loggers)	$0	$1,300
Total	$0	$36,350
Anticipated Expenditures		$36,350

Appendix F5 Mitigation Fund
Project Evaluation and Ranking Criteria score sheet

As scored by the WRTAC on 1/20/2021

Project Title: Lake Pend Oreille Tributary PIT-Monitoring Station Operation and Maintenance

Criteria	Score			
	3	**2**	**1**	**0**
A. Population exposure	**Routinely in LPO or LCFR**	Routinely from Dover to Box Canyon	Intermittently or occasionally	Population not exposed
B. Species to benefit	**Bull Trout and Westslope Cutthroat Trout**	Bull Trout or Westslope Cutthroat Trout	Target species but not Bull Trout or Westslope Cutthroat Trout	None
C. Mitigate or evaluate	Mitigates	**Evaluates**	NA	Not applied to resources affected by TDG
D. Project effectiveness	Solves primary problem	Partially solves or provides all information	**Provides some information**	Does not address primary problem
E. Cost/benefit	Benefit exceptional relative to cost	Benefit high relative to cost	**Benefit consistent with cost**	Cost exceeds benefit
F. Outside funding	≥ 50%	25–49%	≤ 24%	**Entirely CFSA funded**

Scoring Instructions:

- When ranking proposals that do not involve on-the-ground implementation but are necessary to the scope of physical projects (e.g., applied research, watershed assessments, NEPA analyses), score them with regard to the "expected" or "average" resultant physical project.
- **A score of "0" in any of the criteria does not necessarily mean the project is ineligible for CFSA funding.** Rather, a score of "0" should be considered an indication that this aspect of the project needs to be thoroughly discussed and considered.
- Although total scores for each proposed project can be summed to get a general idea of the relative strength of each project, **the scoring system should be viewed as an ordinal rather than absolute ranking system**. In light of this and in the interest of maintaining a simple and objective scoring system, only whole numbers will be utilized (e.g., no half points).

2021 PROJECT PLAN

Clark Fork River Population Monitoring

Project Contact
Ken Bouwens, Idaho Department of Fish and Game (IDFG), (208) 769-1414
ken.bouwens@idfg.idaho.gov

Project History
This project represents a transfer of a portion of the activities in the *Fish Resource Monitoring, Enhancement, and Management Plan* from Appendix A to Appendix F5. This work has been approved for funding from Appendix A by the Management Committee intermittently since 1999. We now propose it be funded through Appendix F5 with changes to the scope and budget. This project was ranked by the WRTAC on January 20, 2021 and the Evaluation and Ranking Criteria scores are included as the last page of this project plan.

Background
Continued periodic monitoring of fish abundance in the Clark Fork River was recommended following a 10-year study (1999–2008) describing the abundance of Brown Trout, Mountain Whitefish, Rainbow Trout, and Westslope Cutthroat Trout in the lower Clark Fork River, resulting from a change in minimum flow requirements from 3,000 cfs to 5,000 cfs at Cabinet Gorge Dam. No significant changes or trends in relative abundance were detected during this monitoring period (Ryan and Jakubowski 2012). However, follow-up surveys were conducted in 2014, 2015, and again in 2017 and results suggested increases in trout abundance over past estimates (Bouwens and Jakubowski 2017, Baker et al. 2018). Regardless, an agreement was made to return to the prior minimum flow requirement of 3,000 cfs beginning in 2018 (i.e., Amendment No. 1 of the CFSA).

A comprehensive review of the last 20 year's data (including 2018 data that has yet to be analyzed) is planned for 2021. In addition to changes in abundance over time, we intend to also review other population dynamics metrics including growth, recruitment, and mortality and relate them to environmental variable including absolute minimum flow, ramping rates, hydrograph variation, total dissolved gas (TDG) production, and other variables. One analysis will be calculating incremental growth on Mountain Whitefish and relating it to environmental factors after Watkins et al. (2017).

We plan to continue periodic sampling on a three-year rotational basis, with the next estimates scheduled for 2021. However, prior to implementation we will review our existing methods and evaluate if any changes to our methods are required and if any additional data collection is warranted. Some minor boat maintenance and equipment replacement will be necessary to complete these surveys. The existing boat steering and controls are aging and in need of replacement. In addition, the Coffelt e-fishing rectifying unit used for this survey is over 20 years old and also needs replacing.

Goal
Perform necessary fish resource population monitoring in the Clark Fork River downstream of Cabinet Gorge Dam to assess potential changes with respect to minimum flow, TDG, and other environmental variables.

Objectives
1. Perform a comprehensive analysis of 2014–2018 Clark Fork River salmonid monitoring data and summarize long-term trends in species-specific abundance, distribution, and size, growth, as well as relative species composition.

2. Review and implement a long-term monitoring plan in the Clark Fork River downstream of Cabinet Gorge Dam.

Tasks
1. Catalog and organize existing data and samples. (Objective 1)

2. Age sufficient structures from Brown Trout, Mountain Whitefish, Rainbow Trout, and Westslope Cutthroat Trout to perform a length at age analysis, develop von Bertalanffy growth curves, as well as develop catch curves to estimate mortality for all years that sufficient samples exist for these species. (Objective 1)

3. Measure and back calculate incremental growth on Mountain Whitefish scales as a proxy for growth conditions in the Clark Fork River since 1999. (Objective 1)

4. Work with the Aquatic Implementation Team to establish analysis methods and interpret the results of the comprehensive review of the last 20 year's data. (Objective 1)

5. Summarize pre-2018 data in a comprehensive report. (Objective 1)

6. Confirm the sampling plan prior to collecting data in 2021. (Objective 2)

7. Perform surveys in the spring of 2021 targeting fall spawners and in the fall targeting spring spawners. (Objective 2)

8. Summarize 2021 data in an annual project update. (Objective 2)

Work Products
- Comprehensive Project Report; Lower Clark Fork River Population Monitoring (through 2018); final due November 1, 2021
- Annual Work Summary; due December 1, 2021
- Annual Project Update; 2021 Lower Clark Fork River Population monitoring data; final due November 1, 2022

Permitting Requirements
Not applicable for the tasks proposed in this project plan.

Endangered Species Act consultation for this project plan is associated with the 2019 Biological Opinion on the effects of continued operation of the Clark Fork Hydroelectric Project on Bull Trout and designated Bull Trout critical habitat (BiOp), and the U.S. Fish and Wildlife Service (USFWS)-Idaho Department of Fish and Game (IDFG) Cooperative Agreement pursuant to Section 6 of the Act. This project plan is consistent with the analysis and conclusions contained in the 2019 BiOp and the USFWS-IDFG Cooperative Agreement, and will adhere to all appropriate Terms and Conditions designed to reduce the extent and effects of incidental take on Bull Trout. Incidental take reporting for this project plan will be included in the annual Biological Opinion report as required by Term and Conditions 15–18 of the 2019 Incidental Take Statement, as well as IDFG's annual Section 6 report to the USFWS.

Cultural/Historic Resource Review
Not applicable for the tasks proposed in this project plan, there are no ground and/or vegetation disturbing activities, or proposed impacts to cultural/historic resources.

Benefit to the Resource
The proposed activities are consistent with the Dissolved Gas Supersaturation Control, Mitigation, and Monitoring Program (Appendix F5) as they are focused on fish species that are exposed to elevated total dissolved gas levels when spill occurs at Cabinet Gorge Dam. They are also consistent with goals of the Fish Passage/Native Salmonid Restoration Plan (Appendix C), and the Idaho Tributary Habitat Acquisition and Fishery Enhancement Program (Appendix A), through assessment of native salmonid populations, including Bull Trout and Westslope Cutthroat Trout. Tasks conducted under this fund are also consistent with other established plans including the Lake Pend Oreille Bull Trout Conservation Plan (Resource Planning Unlimited 1999) and the IDFG Fisheries Management Plan (IDFG 2019).

Budget

Item	Estimated Carryover	2021 Budget Request
Avista labor (0.5 FTE)	$0	$50,000
Field gear (waders, raingear, gloves, etc.)	$0	$1,000
Biological collection supplies (PIT tags, vials, dip nets, etc.)	$0	$1,000
Vehicle/boat operation and maintenance	$0	$2,500
Midwest Shock Box	$0	$15,500
Avista administration	$0	$300
Total	$0	$70,300
Anticipated Expenditures		$70,300

Literature Cited

Baker, W. D., Bouwens, K. A., and R. Jakubowski. 2018. 2017 Lower Clark Fork River Salmonid Abundance Monitoring Project Update. Report to Avista, Noxon, Montana and the Idaho Department of Fish and Game, Boise, Idaho.

Bouwens, K.A. and R. Jakubowski. 2017. 2014-2015 Lower Clark Fork River Fishery Assessment Project Update. Report to Avista Corporation, Noxon, Montana and the Idaho Department of Fish and Game, Boise, Idaho.

IDFG (Idaho Department of Fish and Game). 2019. Fisheries Management Plan 2019-2024. Boise, Idaho.

Resource Planning Unlimited. 1999. Lake Pend Oreille Bull Trout Conservation Plan. State of Idaho. Boise, Idaho.

Ryan, R., and R. Jakubowski. 2012. Lower Clark Fork River Fishery Assessment Project Completion Report. Report to Avista Corporation. Noxon, Montana.

Watkins, C.J., T.J. Ross, M.C. Quist, and R. S. Hardy. 2017. Response of Fish Population Dynamics to Mitigation Activities in a Large Regulated River. Transactions of the American Fisheries Society 146:703-715.

Appendix F5 Mitigation Fund
Project Evaluation and Ranking Criteria score sheet

As scored by the WRTAC on 1/20/2021

Project Title: Clark Fork River Population Monitoring

Criteria	Score			
	3	**2**	**1**	**0**
A. Population exposure	**Routinely in LPO or LCFR**	Routinely from Dover to Box Canyon	Intermittently or occasionally	Population not exposed
B. Species to benefit	**Bull Trout and Westslope Cutthroat Trout**	Bull Trout or Westslope Cutthroat Trout	Target species but not Bull Trout or Westslope Cutthroat Trout	None
C. Mitigate or evaluate	Mitigates	**Evaluates**	NA	Not applied to resources affected by TDG
D. Project effectiveness	Solves primary problem	Partially solves or provides all information	**Provides some information**	Does not address primary problem
E. Cost/benefit	Benefit exceptional relative to cost	Benefit high relative to cost	**Benefit consistent with cost**	Cost exceeds benefit
F. Outside funding	≥ 50%	25–49%	≤ 24%	**Entirely CFSA funded**

Scoring Instructions:

- When ranking proposals that do not involve on-the-ground implementation but are necessary to the scope of physical projects (e.g., applied research, watershed assessments, NEPA analyses), score them with regard to the "expected" or "average" resultant physical project.
- **A score of "0" in any of the criteria does not necessarily mean the project is ineligible for CFSA funding.** Rather, a score of "0" should be considered an indication that this aspect of the project needs to be thoroughly discussed and considered.
- Although total scores for each proposed project can be summed to get a general idea of the relative strength of each project, **the scoring system should be viewed as an ordinal rather than absolute ranking system**. In light of this and in the interest of maintaining a simple and objective scoring system, only whole numbers will be utilized (e.g., no half points).

2021 PROJECT PLAN

Lower Clark Fork River PIT-Monitoring Station

Project Contact
Shana Bernall, Avista, (406) 847-1293, Shana.Bernall@avistacorp.com
Ken Bouwens, Idaho Department of Fish and Game (IDFG), (208) 769-1414
ken.bouwens@idfg.idaho.gov

Project History
This is a new project for 2021. This project was ranked by the WRTAC on January 20, 2021 and the Evaluation and Ranking Criteria scores are included as the last page of this project plan.

Background
Fish movements downstream of Cabinet Gorge Dam in the lower Clark have been monitored in the past using radio or acoustic transmitters that are implanted in the fish. The information obtained during these studies has been valuable, but telemetry studies can be expensive and are often discouraged when Endangered Species Act (ESA) listed species are being considered. Passive Integrated Technology (PIT) technology is another technique used to monitor movements of fish. Although the initial purchase of equipment to install a PIT-monitoring station can be expensive, abundant data can be collected on a large number of fish using a less intrusive method as PIT tags are small microchips that are easily inserted in the body of a fish and will stay in the fish for its entire life.

Adult Bull Trout are captured downstream of Cabinet Gorge Dam annually and transported upstream of mainstem Clark Fork River dams as part of the Appendix C Upstream Fish Passage Program (Bernall and Duffy 2019). Many of these fish have been previously handled during the implementation of other Clark Fork Settlement Agreement (CFSA) projects and have been implanted with a PIT tag. These fish are targeted annually for upstream transport using several methods including night electrofishing, hook and line sampling, and a fish ladder trap. And a new fish trap is currently under construction at the base of Cabinet Gorge Dam. This structure, the Cabinet Gorge Dam Fishway (CGDF) is being constructed to increase the capture of Bull Trout and Westslope Cutthroat Trout attempting to migrate upstream of Cabinet Gorge Dam. Avista, Idaho Department of Fish and Game (IDFG), Montana Fish, Wildlife and Parks (MFWP), and the U. S. Fish and Wildlife Service (USFWS) are working with collaborators through the CFSA to develop a monitoring and evaluation (M&E) plan for the CGDF which will be operational in 2022. Although the M&E plan is in the early stages of development, one important factor that would help in the evaluation of the CGDF is the ability to determine the number of Bull Trout and Westslope Cutthroat Trout that are present in the lower Clark Fork River and; therefore, have the opportunity to utilize the CGDF.

Adult Bull are known to frequent the area near the Cabinet Gorge Hatchery spawning shelf (approximately one mile downstream of Cabinet Gorge Dam) as there is an abundance of cold spring water that enters the river in this area which attracts Bull Trout when the Clark Fork River water temperatures warm. This area could be a good location for installation of a PIT-monitoring station; although there would be additional benefits if a channel spawning PIT-monitoring station

could be utilized. If the PIT-monitoring station was located further downstream closer to Lake Pend Oreille if may benefit a larger number of projects and be used to monitor movements of several species that utilize the lower river. The objective of this Project Plan is to investigate potential locations for installation of a PIT-monitoring station in the lower Clark Fork River to determine which location is most feasible and which location would provide the most benefit to projects being implemented through the CFSA.

Goal
Increase our understanding of the presence and movements of fish species in the lower Clark Fork River to inform current and future projects.

Objectives
1. If feasible and determined to be applicable, identify a location in the lower Clark Fork River for the installation of a PIT-monitoring station.

Tasks
1. Utilize available data including bathometry, past fish movements, and personnel experience to help define the best location for a PIT-monitoring station.

2. If deemed necessary, contact Biomark and schedule a site visit to scope the feasibility and cost of installation of PIT-monitoring stations at locations that are identified.

Work Products
- Annual Work Summary; due December 1, 2021

Permitting Requirements
No permits are required for this scoping project.

Endangered Species Act consultation for this project plan is associated with the 2019 Biological Opinion on the effects of continued operation of the Clark Fork Hydroelectric Project on Bull Trout and designated Bull Trout critical habitat (BiOp), and the USFWS-IDFG Cooperative Agreement pursuant to Section 6 of the Act. This project plan is consistent with the analysis and conclusions contained in the 2019 BiOp and the USFWS-IDFG Cooperative Agreement and will adhere to all appropriate Terms and Conditions designed to reduce the extent and effects of incidental take on Bull Trout. Incidental take reporting for this project plan will be included in the annual Biological Opinion report as required by Term and Conditions 15–18 of the 2019 Incidental Take Statement, as well as IDFG's annual Section 6 report to the USFWS.

Cultural/Historic Resource Review
Not applicable for the tasks proposed in this project plan, there are no ground and/or vegetation disturbing activities, or proposed impacts to cultural/historic resources.

Benefit to the Resource
This project is consistent with the Dissolved Gas Mitigation and Monitoring Program (Appendix F5, CFSA), as Bull Trout, Westslope Cutthroat Trout and other species ascending the Clark Fork River in the spring are exposed to high TDG levels. This project also aligns with Avista's

responsibility in complying with the Native Salmonid Restoration Plan (NSRP) (Kleinschmidt and Pratt 1998). The NSRP identifies a need to "establish and maintain connectivity in the Clark Fork Basin for migratory trout" with Bull Trout and Westslope Cutthroat Trout listed as the primary target species (Avista 1999, Kleinschmidt and Pratt 1998). The NSRP also called for conducting experimental upstream passage of adult fish to test the feasibility of larger-scale programs and permanent fish passage facilities. Montana Fish, Wildlife and Parks and IDFG are supportive of Bull Trout and Westslope Cutthroat Trout passage as detailed in their current state-wide management plans (MFWP 2019, IDFG 2019). Additionally, the USFWS describes fragmentation of the lower Clark Fork River by mainstem dams as one of the primary threats to Bull Trout under their Columbia Headwaters recovery unit implementation plan (U. S. Fish and Wildlife Service 2015). Bull Trout are listed as "threatened" under the Endangered Species Act and Westslope Cutthroat Trout are a "species of special concern" (MFWP and IDFG designation). Implementation of Bull Trout and Westslope Cutthroat Trout upstream passage programs re-establishes connectivity for migratory populations in the lower Clark Fork River which allows access to quality spawning and rearing habitat in Montana tributaries. Installation of a PIT-monitoring station in the lower Clark Fork River will help evaluate fish movements downstream of Cabinet Gorge Dam as part of the Basic Monitoring Plan for the Cabinet Gorge Dam Fishway, as defined in Amendment No. 1 to the CFSA.

Budget

Item	Estimated Carryover	2021 Budget Request
Due diligence	$0	$3,000
Total	$0	$3,000
Anticipated Expenditures		$3,000

Avista personnel time to investigate potential locations for installation of a PIT-monitoring station will be covered under the Appendix C Upstream Fish Passage Program Project Plan.

Literature Cited

Avista Corporation. 1999. Application for New License, Volume III Settlement Agreement, Cabinet Gorge and Noxon Rapids Hydroelectric Projects. Submitted to the Federal Energy Regulatory Commission, Washington, D. C.

Bernall, S., and K. Duffy. 2019. Upstream Fish Passage Program – Bull Trout - Annual Project Update – 2018, Fish Passage/Native Salmonid Restoration Plan, Appendix C. Avista, Noxon, Montana.

Idaho Department of Fish and Game. 2019. Fisheries Management Plan 2019 – 2024. A Comprehensive Guide to Managing Idaho's Fisheries Resources: https://idfg.idaho.gov/fish/plans

Kleinschmidt Associates, and K. L. Pratt. 1998. Clark Fork River Native Salmonid Restoration Plan. Prepared for Avista Corporation, Spokane, Washington

Montana Fish, Wildlife and Parks. 2019. Montana Statewide Fisheries Management Plan 2019 – 2027. http://fwp.mt.gov/fishAndWildlife/management/fisheries/statewidePlan/

U.S. Fish and Wildlife Service. 2015. Columbia Headwaters Recovery Unit Implementation Plan for Bull Trout (*Salvelinus confluentus*).

Appendix F5 Mitigation Fund
Project Evaluation and Ranking Criteria score sheet

As scored by the WRTAC on 1/20/2021

Project Title: Lower Clark Fork River PIT-Monitoring Station

Criteria	Score			
	3	**2**	**1**	**0**
A. Population exposure	**Routinely in LPO or LCFR**	Routinely from Dover to Box Canyon	Intermittently or occasionally	Population not exposed
B. Species to benefit	**Bull Trout and Westslope Cutthroat Trout**	Bull Trout or Westslope Cutthroat Trout	Target species but not Bull Trout or Westslope Cutthroat Trout	None
C. Mitigate or evaluate	Mitigates	**Evaluates**	NA	Not applied to resources affected by TDG
D. Project effectiveness	Solves primary problem	Partially solves or provides all information	**Provides some information**	Does not address primary problem
E. Cost/benefit	Benefit exceptional relative to cost	Benefit high relative to cost	**Benefit consistent with cost**	Cost exceeds benefit
F. Outside funding	≥ 50%	25–49%	≤ 24%	**Entirely CFSA funded**

Scoring Instructions:

- When ranking proposals that do not involve on-the-ground implementation but are necessary to the scope of physical projects (e.g., applied research, watershed assessments, NEPA analyses), score them with regard to the "expected" or "average" resultant physical project.
- **A score of "0" in any of the criteria does not necessarily mean the project is ineligible for CFSA funding.** Rather, a score of "0" should be considered an indication that this aspect of the project needs to be thoroughly discussed and considered.
- Although total scores for each proposed project can be summed to get a general idea of the relative strength of each project, **the scoring system should be viewed as an ordinal rather than absolute ranking system**. In light of this and in the interest of maintaining a simple and objective scoring system, only whole numbers will be utilized (e.g., no half points).

2021 PROJECT PLAN

Lightning Creek Delta Connectivity Project

Project Contact
Ken Bouwens, Idaho Department of Fish and Game (IDFG), (208) 769-1414,
ken.bouwens@idfg.idaho.gov

Project History
This is a new project for 2021. This project was ranked by the WRTAC on January 20, 2021 and the Evaluation and Ranking Criteria scores are included as the last page of this project plan.

Background
Lightning Creek is an extremely flashy river located in Idaho's wettest mountain range. It receives an average of 90 inches of precipitation a year and experiences frequent flood events, with a Q-100 of 8,400 cfs ─ often associated with rain on snow events (PWA 2004). In contrast, at lower discharge periods (typical of summertime) the downstream reaches of Lightning Creek frequently goes subsurface with disconnected channel threads, typically when flows drop below about 100 CFS (as measured at the USGS gauge directly upstream of the Highway 200 bridge).

Lightning Creek enters the Clark Fork River and Lake Pend Oreille (LPO) through a dynamic cobble/sand alluvial fan. It has an extremely high sediment transport rate during large flow events. As the river becomes less confined with less gradient at its mouth, the mobile bedload settles into wide depositional zones. The surface flow at the mouth typically has split into two primary channels: an eastern channel that empties directly into the Clark Fork River, and a western branch that bypasses the mainstem Clark Fork River and empties more directly into LPO (PWA 2004). In 2006, a major flood threatened both the railroad and Highway 200 bridge, spurring an emergency wood removal project in 2007 in the lower reaches of Lightning Creek and ongoing dredging at the railroad bridge. Since then, flows have shifted to the western branch. Flows through the eastern branch have diminished to the point that it is only wetted during the highest flows (Figure 1).

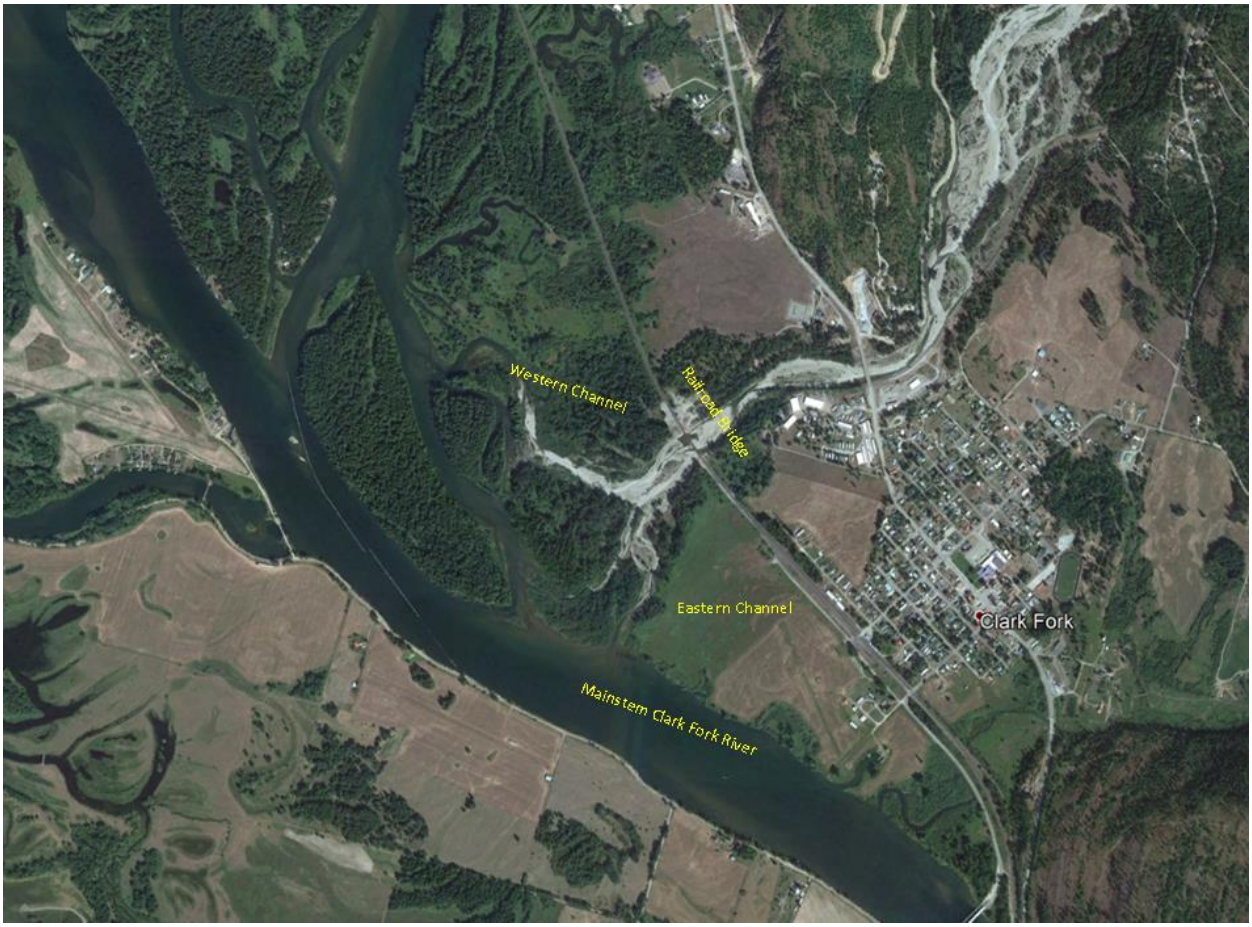

Figure 1. Aerial photo of the mouth of Lightning Creek in 2019.

Lightning Creek supports a springtime spawning migration of adfluvial Rainbow Trout and Westslope Cutthroat Trout. Although fish likely ascend Lightning Creek through both channels, a targeted fishery takes place in the mainstem Clark Fork River (Bouwens and Jakubowski 2020) and fish appear to attract to the mouth of the eastern channel even if no surface flows are available. In addition to fish passage through the eastern channel being completely blocked at times, certain power peaking flow scenarios from Cabinet Gorge Dam likely exacerbates incidents of fish stranding in the extreme lower end of the eastern channel as the flow rapidly recedes into the alluvium. Bull Trout also ascend Lightning Creek to spawn. Although they are fall spawners, in most years they must pass upstream of the lower reaches of Lightning Creek before surface flows diminish mid-summer. It is unknown if limited surface flows in the eastern channel impedes the spawning migration for these fish.

An initial site visit was made with an engineer during 2020 (RIVHAB 2020). It was noted that Lightning Creek is confined underneath the highway bridge and through the railroad bridge. The eastern and western channels begin to form directly downstream of the confinement at the railroad bridge. Light gravel mining/dredging occurs near the railroad bridge from the western bank that has significantly altered the natural elevation and is influencing the flow direction towards scouring a larger western channel. A digital elevation terrain model (DEM) was developed using existing (USACE 2010) LIDAR data (Figure 2).

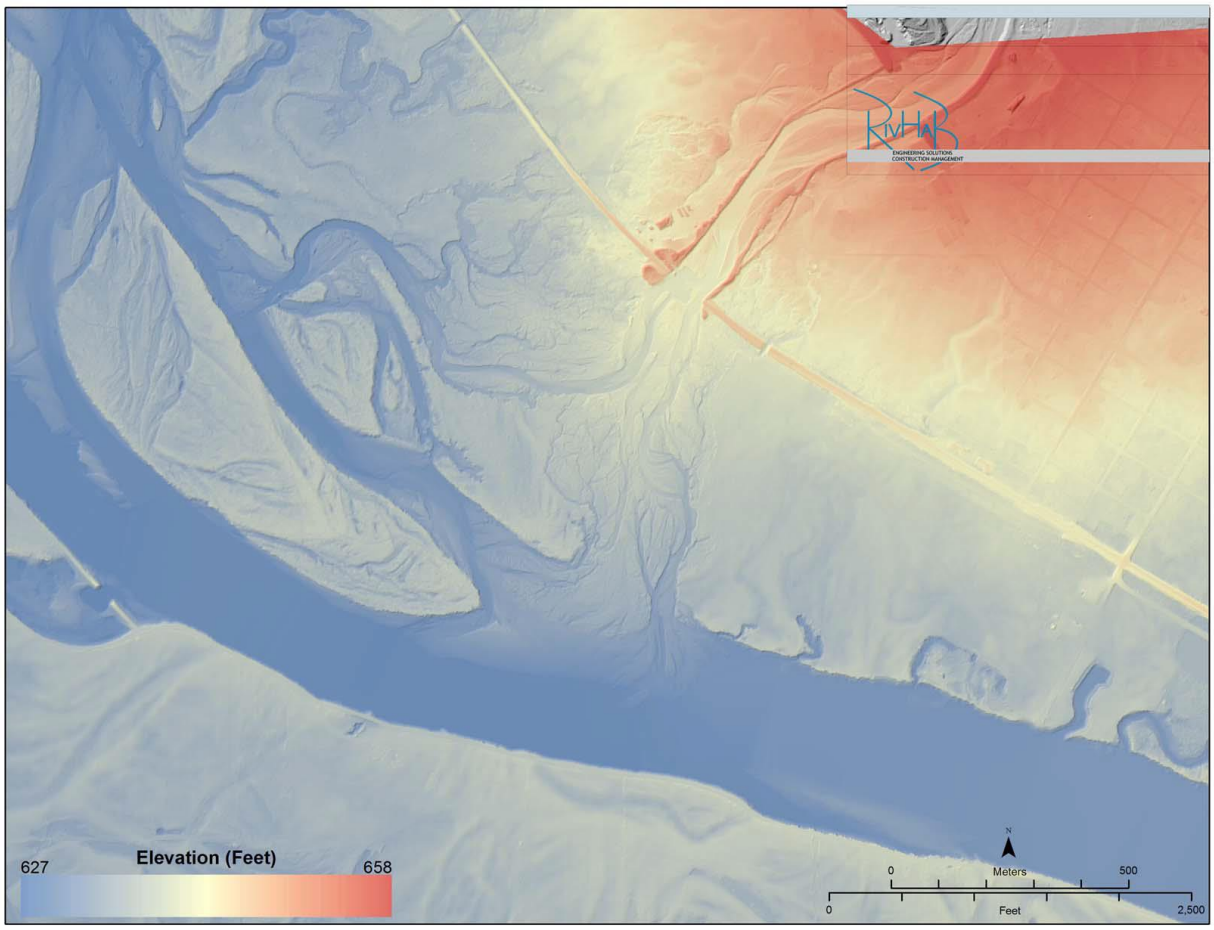

Figure 2. DEM of the project area based on 2010 LIDAR elevations. Stream channel elevations will be updated in 2021 post-runoff.

The purpose of this project is to determine if there is a feasible construction project that could facilitate flow thorough the eastern channel maintaining connectivity and facilitating fish passage during the times when fish are actively migrating into Lightning Creek.

Goal

Provide connectivity and fish passage between the mainstem Clark Fork River and Lightning Creek during periods when lower Lightning Creek is actively flowing on the surface.

Objectives

1. Determine appropriate channel dimensions necessary to maintain flow through the eastern channel during the springtime fish migration period.

2. Determine the amount of material that would need to be removed to provide the necessary channel dimensions to maintain surface flow in the eastern channel at the design flows.

3. Develop a construction plan to remove the necessary amount of material.

4. Develop a long-term strategic gravel mining plan to maintain flows in both channels.

Tasks

1. Update existing terrain model with current stream channel bathymetry survey data following 2021 spring peak runoff. (Objective 1)

2. Determine realistic design flow based on historic flow conditions using the updated model. (Objective 1)

3. Design channel plan and profile dimensions. Design submittals shall be reviewed at the 30%, 60%, and 90% stages to ensure Avista collaboration and landowner/stakeholder discussions. (Objective 1)

4. Calculate the amount of material for initial removal (2022) required to construct the channel. (Objective 2)

5. Develop a strategic gravel mining plan to be implemented annually to sustain passage within the eastern channel. (Objective 3)

6. Determine who will implement the plan. (Objective 4)

7. Assist with permitting for the mining plan. (Objective 4)

Work Products

- Technical memoranda describing project progress at appropriate intervals
- Design submittals at 30%, 60%, and 90% review. The 60% submittal will include hydraulic model results and will be used to initiate the permitting process; due date to be determined
- Final stamped design drawings for channel construction to occur in 2022; due date to be determined
- Final gravel mining plan; due date to be determined
- Annual Work Summary; due December 1, 2021

Permitting Requirements

All necessary state, federal and local permits required for construction will be procured by Idaho Department of Fish and Game (IDFG) and the project implementer. Permission from private landowners in the project area may be necessary for a thorough review of the watershed. If permission is necessary, it will be procured by IDFG and the contractor.

Endangered Species Act consultation for this project plan is associated with the 2019 Biological Opinion on the effects of continued operation of the Clark Fork Hydroelectric Project on Bull Trout and designated Bull Trout critical habitat (BiOp), and the U.S. Fish and Wildlife Service (USFWS)-IDFG Cooperative Agreement pursuant to Section 6 of the Act. This project plan is consistent with the analysis and conclusions contained in the 2019 BiOp and the USFWS-IDFG Cooperative Agreement, and will adhere to all appropriate Terms and Conditions designed to reduce the extent and effects of incidental take on Bull Trout. No Bull Trout take is expected to

implement this project plan.

Cultural/Historic Resource Review
Not applicable for the tasks proposed in this project plan, there are no ground and/or vegetation disturbing activities, or proposed impacts to cultural/historic resources as this is design only.

Benefit to the Resource
The project is consistent with the Dissolved Gas Supersaturation Control, Mitigation, and Monitoring Program (Appendix F5) as it identifies options for improving stream connectivity for Westslope Cutthroat Trout, Rainbow Trout, and Bull Trout, all species identified as the focus of the Appendix F5 mitigation program. It is also consistent with the goals of the Idaho Tributary Habitat Acquisition and Fishery Enhancement Program (Appendix A of the Settlement Agreement), through enhancement of tributary habitat conditions for native salmonids including Bull Trout and Westslope Cutthroat Trout. The project is consistent with other established plans including the Lake Pend Oreille Bull Trout Conservation Plan (habitat enhancement; Resource Planning Unlimited 1999) and the IDFG Fisheries Management Plan (IDFG 2019).

Budget

Item	Estimated Carryover	2021 Budget Request
Engineering contract costs	$0	$28,491
Total	$0	$28,491
Anticipated Expenditures		$28,491

The engineering budget is based upon an estimated amount of time necessary to complete all tasks plus a contingency. The actual cost may be less.

Literature Cited
Bouwens, K.A. and R. Jakubowski. 2020. 2018 Lake Pend Oreille Tributary Creek Survey. Report to Avista and Idaho Dept. of Fish and Game. Noxon, MT and Boise, ID.

IDFG (Idaho Department of Fish and Game). 2019. Fisheries Management Plan 2019-2024. Boise, Idaho.

PWA. 2004. Lightning Creek Watershed Assessment. Prepared for the Avista Corporation and Lightning Creek Technical Committee. Philip Williams & Associates, Ltd. 250 pages.

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Appendix F5 Mitigation Fund
Project Evaluation and Ranking Criteria score sheet

As scored by the WRTAC on 1/20/2021

Project Title: Lightning Creek Delta Connectivity Project

Criteria	Score			
	3	**2**	**1**	**0**
A. Population exposure	**Routinely in LPO or LCFR**	Routinely from Dover to Box Canyon	Intermittently or occasionally	Population not exposed
B. Species to benefit	**Bull Trout and Westslope Cutthroat Trout**	Bull Trout or Westslope Cutthroat Trout	Target species but not Bull Trout or Westslope Cutthroat Trout	None
C. Mitigate or evaluate	**Mitigates**	Evaluates	NA	Not applied to resources affected by TDG
D. Project effectiveness	Solves primary problem	**Partially solves or provides all information**	Provides some information	Does not address primary problem
E. Cost/benefit	Benefit exceptional relative to cost	Benefit high relative to cost	**Benefit consistent with cost**	Cost exceeds benefit
F. Outside funding	≥ 50%	25–49%	≤ 24%	**Entirely CFSA funded**

Scoring Instructions:

- When ranking proposals that do not involve on-the-ground implementation but are necessary to the scope of physical projects (e.g., applied research, watershed assessments, NEPA analyses), score them with regard to the "expected" or "average" resultant physical project.
- **A score of "0" in any of the criteria does not necessarily mean the project is ineligible for CFSA funding.** Rather, a score of "0" should be considered an indication that this aspect of the project needs to be thoroughly discussed and considered.
- Although total scores for each proposed project can be summed to get a general idea of the relative strength of each project, **the scoring system should be viewed as an ordinal rather than absolute ranking system**. In light of this and in the interest of maintaining a simple and objective scoring system, only whole numbers will be utilized (e.g., no half points).

2021 PROJECT PLAN

Gas Supersaturation Control Program Total Dissolved Gas Abatement

Project Contact
Paul Kusnierz, Avista, (406) 847-1274, paul.kusnierz@avistacorp.com

Project History
Total dissolved gas (TDG) abatement in the lower Clark Fork River during the spring runoff season is a required activity under FERC License No. 2058. The original Gas Supersaturation Control Program (GSCP) was approved by all pertinent stakeholders in 2004 (Avista 2004) and FERC issued an order approving the GSCP on January 1, 2005. An addendum to the 2004 GSCP was approved by the Management Committee (MC) in 2009 (Avista 2009). The GSCP Addendum specifies that up to $5,000,000 may be spent on engineering and evaluation and up to $25,000,000 may be spent on construction and implementation of TDG reduction measures. Unspent funds for these actions may be applied to annual mitigation when implementation of TDG reduction measures is complete. However, this is dependent on the flows at which the interim target of 120% saturation are met. This project is a continuation of work that has occurred at Cabinet Gorge Dam since 2004. The scope and budget for this plan are reviewed by the MC annually.

Background
During the spring runoff season, flow in the lower Clark Fork River can exceed the hydraulic capacity of Cabinet Gorge powerhouse facility. When this occurs, it is necessary to spill water over the dam's spillway. The physical characteristics of the Cabinet Gorge Dam spillway, in particular the deep (about 70 ft) plunge pool and the way in which spill aerates water released through the powerhouse, can lead to TDG supersaturation. Implementation of the TDG abatement program involves construction of spillway modifications for TDG reduction. The MC was directed by the 2009 Addendum to only approve TDG reduction measures "for which performance evaluations predict passage of a specified capacity of excess flows past Cabinet Gorge Dam which meet the interim TDG Target" (Avista 2009). The TDG reduction measures ultimately approved by the MC consist of adding roughness elements to the spillways (Avista 2012; 2013a; 2013b; 2014). To date, five spillway bays have been modified and TDG monitoring has shown that the modifications of the spillway bays have resulted in reduction of TDG released downstream of the dam.

Goal
The goal of this project is the implementation of TDG reduction measures as described in the GSCP Addendum in the areas of "Engineering & Evaluation" and "Construction & Implementation."

Objectives
1. Meet with the Gas Supersaturation Subcommittee (GSSC), to transition into Phase III of the GSCP Addendum and consider other options to further reduce TDG released downstream of the dam during spring runoff.

2. Conduct ongoing evaluation to address impacts of the use of the modified spillway crests on the powerhouse and on employee safety.

Tasks

1. Convene the GSSC to transition into Phase III of the GSCP Addendum and evaluate any potential TDG reduction measures. (Objective 1)

2. Identify and evaluate the issues resulting from spray created by the use of the modified spillway crests on the powerhouse and on employee safety (e.g., residue buildup on transformers, ice formation on the deck), and propose fixes. (Objective 2)

3. Select and implement fixes to the identified issues. (Objective 2)

Work Products

- Annual Work Summary; due December 1, 2021

Permitting Requirements

Not applicable for the tasks proposed in this project plan.

Endangered Species Act consultation for this project plan is associated with the 2019 Biological Opinion on the effects of continued operation of the Clark Fork Hydroelectric Project on Bull Trout and designated Bull Trout critical habitat (BiOp). This project plan is consistent with the analyses and conclusions contained in the 2019 BiOp and will adhere to all appropriate Terms and Conditions designed to reduce the extent and effects of incidental take on Bull Trout. No incidental take of Bull Trout is anticipated as a result of this project plan; therefore, no take reporting is required.

Cultural/Historic Resource Review

Avista will coordinate cultural/historic resource review for this project prior to implementing the fixes for this project plan. The work product for this review will be confidential due to the sensitive nature of the content.

Benefit to the Resource

This project is the direct implementation of a portion of Appendix F5 under the CFSA (Avista 1999).

Idaho water quality standards are based upon support of beneficial uses, and in particular “Cold Water Aquatic Life.” Continued TDG abatement is critical to maintaining the health of all native fisheries in the lower Clark Fork River and Lake Pend Oreille.

Budget

Item	Estimated Carryover	2021 Budget Request
Biologist labor (0.03 FTE)	$0	$5,000
Consultant	$0	$10,000
Contractor	$0	$45,000
Cultural/Historic Resource Review	$0	$5,000
Scaffolding and protection of spare transformer	$0	$23,000
Total	$0	$88,000
Anticipated Expenditures		$88,000

Literature Cited

Avista Corporation. 1999. Application for New License, Volume III Settlement Agreement. Avista Corporation. Spokane, Washington.

Avista Corporation. 2004. Final Gas Supersaturation Control Program for the Clark Fork Project. Avista Corporation. Spokane, WA.

Avista Corporation. 2009. Final 2009 Addendum Final Gas Supersaturation Control Program for the Clark Fork Project. Avista Corporation. Spokane, WA.

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Avista Corporation. 2013a. Clark Fork Settlement Agreement FINAL Management Committee Meeting Summary March 13, 2013. Avista Corporation. Spokane, WA.

Avista Corporation. 2013b. Clark Fork Settlement Agreement FINAL Management Committee Meeting Summary October 1, 2013. Avista Corporation. Spokane, WA.

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2021 ANNUAL IMPLEMENTATION PLAN SUMMARY – APPENDIX G

Clark Fork Project, FERC No. 2058
Cabinet Gorge and Noxon Rapids Hydroelectric Developments

Title
Implementation of Land Use Management Plan (LUMP)

Implementation Staff Lead
Arthur D. Potts, Avista, (406) 847-1283, arthur.potts@avistacorp.com

Background
The purpose of this measure is to provide for the long-term protection and maintenance of sensitive and important resources on Avista owned project lands, including the existing rural and semi-remote character of the shoreline, through implementation of the Land Use Management Plan (LUMP). Avista project lands will be managed to protect these qualities while still allowing for reasonable public access and other compatible uses.

Year 2021 work efforts are a continuation of past efforts and remain focused on implementing the three distinct components of the LUMP:

2021 Project Plans
1. Administration of the Land Use Management Plan (LUMP)
2. Monitoring Associated with the Land Use Management Plan (LUMP)
3. Enforcement Associated with the Land Use Management Plan (LUMP**)**

Work Products
Administration of the Land Use Management Plan
- Unless a specific document is created for a task, all work associated with this Project Plan will be documented in the 2021 Terrestrial Resources Annual Work Summary. Due Date: December 1, 2021.
- Develop annual pesticide and herbicide report to be included in the 2021 Annual Work Summary. Due Date: December 1, 2021.
- Quarterly reports from the Sanders County Aquatic Invasive Plants Task Force (AIPTF) will be provided, including a specific breakdown of the coordinator's activities. Due Dates: March 31; June 30; September 30; December 1, 2021.

Managing Aquatic Invasive Plants on Noxon and Cabinet Gorge Reservoirs
- Quarterly Reports (Due the first full week following the end of each quarter).
- Annual Report (Due the first full week following the end of the year).
- Comprehensive Project Report (December 1, 2021).

Monitoring Associated with the Land Use Management Plan
- All work associated with this Project Plan will be documented in the 2021 Annual Work Summary. Due Date: December 1, 2021.

Enforcement Associated with the Land Use Management Plan
- All work associated with this Project Plan will be documented in the 2021 Annual Work Summary. Due Date: December 1, 2021.

- Quarterly reports from Montana Fish, Wildlife and Parks will be provided per the MOU agreement. Due Dates: March 31; June 30; September 30; December 1, 2021.
- Annual reports from Idaho Fish and Game will be provided per the MOU agreement. Due Dates: December 1, 2021.

Appendix G 2021 Budget

Item	Carryover[1]	2021
Land Use Management Plan (Estimate)[2]		**$187,500**
Unexpended funds w/interest		**$0**
Total Available		**$187,500**
Administration of the Land Use Management Plan (LUMP)	$0	$112,500
Monitoring Associated with the Land Use Management Plan (LUMP)	$0	$10,000
Enforcement Associated with the Land Use Management Plan (LUMP)	$0	$65,000
Total	$0	$187,500
MC Approved Budget		**$187,500**
Unobligated Funds		$0

[1]This column denotes estimated carryover of unexpended, approved funds as of January 1.
[2] Estimated costs are projections made now however; Avista will pay the actual costs as approved by the Management Committee. The amount needed to implement this PM&E may vary greatly by year depending upon legal/survey needs to address issues related to the management of Avista owned Project lands.

As approved by the Management Committee on 3/17/2021

2021 PROJECT PLAN

Administration of the Land Use Management Plan (LUMP)

Project Contact
Arthur D. Potts, Avista, (406) 847-1283, arthur.potts@avistacorp.com

Project History
This is a continuing project that has been approved annually by the Management Committee (MC).

Background
The Land Use Management Plan (LUMP) establishes appropriated land use classifications and management guidelines to protect identified natural, aesthetic, and cultural resources that occur on Avista owned project lands. It also provides opportunity for public and some private access to project lands and waters where appropriate. The Administration component of this PM&E is in place to ensure that staff and budget are in place to coordinate and implement the following objective. This project is part of the direct implementation of Clark Fork Settlement Agreement Appendix G.

Goal
The Administration component of this PM&E is in place to ensure that staff and budget are in place to coordinate and implement the following objective.

Objective
1. The overall goal of the LUMP is to protect sensitive and important resources on Avista owned project lands, including the existing character or the shoreline.

Tasks
1. Continue to implement the Private Recreation Permit Program
2. Continue to address property ownership/trespass issues as they arise.
3. Continue to process requests for leases/easements of Avista Project property.
4. If a request is received, review and process Rock Creek Mine request to place discharge pipe across Project lands.
5. Ongoing coordination of land use management program among Terrestrial Resource Technical Advisory Committee, Sanders County, and Green Mountain Conservation District, and the cultural resources, wildlife, recreation, aesthetics, and erosion programs.
6. Continue implementation of the Pesticide and Herbicide Use Plan in consultation with the MC. See the attached document outlining 2021 planned pesticide and herbicide use on Avista project property.
7. The Land Use Subgroup and other interested parties will complete the 5-year review and update of the LUMP, incorporating information included in the competed Recreation Resource Management Plan update.
8. The Special Uses Subgroup and other interested parties will evaluate new requests for special use permits by private, and for-profit rental companies to use Avista owned and managed recreation areas as needed.

9. Replace identification for recreation permit sites throughout Project.
10. Continue to participate on the Sanders County AIPTF to implement an Integrated Eurasian watermilfoil (EWM) Management Plan.
    a. Fund an individual to serve as a coordinator for the AIPTF. This effort helps ensure effective communication among the members, maintaining timelines for deliverables, and improving overall coordination.
    b. Fund educational efforts of the AIPTF that include maintaining informational signage and/or having a person interviewing recreational boaters at the various recreation sites during the peak recreational season.
    c. Funding available for special meeting/coordination with agency or other personnel related to EWM control efforts on Noxon and Cabinet reservoirs.

Work Products

- Unless a specific document is created for a task, all work associated with this Project Plan will be documented in the 2021 Terrestrial Resources Annual Work Summary. Due Date: December 1, 2021.
- Develop annual pesticide and herbicide report to be included in the 2021 Annual Work Summary. Due Date: December 1, 2021.
- Quarterly reports from the Sanders County Aquatic Invasive Plants Task Force (AIPTF) will be provided, including a specific breakdown of the coordinator's activities. Due Dates: March 31; June 30; September 30; December 1, 2021.

Cultural/Historic Resource Review

Work proposed under this Project Plan will either: 1) not involve any ground disturbing activities or impact historic resources, or 2) will be performed under the cultural assessment associated with the specific proposed project.

Benefit to the Resource

Provide protection for sensitive and important resources on Avista owned project lands, including the existing character or the shoreline, while providing opportunity for public and some private access to project lands and waters where appropriate.

Budget

Item	Estimated Carryover	2021 Budget Request
Tasks 1-9: Labor and materials	$0	$85,000
Task 10 a: Labor for Sanders County AIPTF Coordinator	$0	$19,500
Task 10 b: EWM Education efforts – Labor and materials	$0	$3,000
Task 10 c: Funding for special meetings/coordination	$0	$5,000
Total	$0	$112,500
Anticipated Expenditures		$112,500

2021 Pesticide and Herbicide Application Plan

This plan provides a list of known sites that may be treated in any given year depending on infestation rates and overall weather conditions. Additional sites may be treated when a "new" invasive noxious plant species is discovered, and treatment is needed.

Pesticide Use on Project Property
Pesticides as defined for the purpose of this document are insecticides, fungicides, and rodenticides.

The only application currently occurring under this category is the annual fall application of fungicide (PHNB) on the greens and tee boxes of Thompson Falls Golf Course. The greens keeper employed by the golf course conducts this application.

Herbicide Use on Project Property

- *Earthen portion of Noxon Rapids Dam:*
  This area is spot treated on an annual basis utilizing an Avista employee who is a licensed applicator. The primary focus of this effort is to treat rush skeleton weed, Dalmatian toadflax, Saint John's wort, and knapweed. Spot treatment will continue as long as needed to prevent any further establishment or spread of these noxious weeds.

- *Road Right-of-Ways:*
  Road rights-of-way leading into both dams and associated facilities are treated annually utilizing an Avista employee who is a licensed applicator. This is done to help prevent the spread of Dalmatian toadflax, knapweed, and Saint John's wort from these traffic areas.

- *Switchyards:*
  Switchyards associated with both Noxon Rapids and Cabinet Gorge dams are treated with a soil sterilant on an annual basis, utilizing an Avista employee. Switchyards must be kept free of all vegetation in order to operate in a safe and reliable manner.

- *Treatment of Leafy Spurge:*
  Avista has treated leafy spurge on the upper end of the Clark Fork Project for over ten years. The goal of this treatment is to limit the spread of leafy spurge to downstream sites. These areas are spot sprayed one to two times a year by a licensed applicator. Primary sites of treatment are at Sandy Beaches Estates, Thompson Falls State Park and Trail, State Trust Lands adjacent to Thompson Falls State Park, Thompson Falls Golf Course and limited spot spraying downstream to Finley Flats as needed.

- *Treatment of Japanese Knotweed:*
  Follow-up monitoring and treatment, if needed, of two infestations of Japanese knotweed growing along Cabinet Gorge Reservoir near Noxon, Montana and a smaller patch near Trestle Creek (Idaho).

- *Thompson Falls Golf Course:*
  The fairways on Thompson Falls Golf Course are treated one to two times a year. No application of pesticide is allowed within 30 yards of the river. The golf course greens keeper will apply these treatments.

- *Pilgrim Creek Park:*
  Avista will continue to take measures to control noxious weeds on the 5-acre grass point. These measures include spraying, mowing, and irrigating the point to decrease the abundance of noxious weeds. A licensed applicator will be utilized to treat these areas as well as the dirt infields of the two baseball fields and the stone dust American Disability Act (ADA) paths to prevent vegetation from growing in these areas. Approval from the CRMG has been obtained for this work (2002).

- *Avista Property Associated with Island Park Subdivision Private Recreation Lease:*
  Activity will include survey of the ten-acre parcel and treatment of any infested areas as needed.

- *Clark Fork Access Site:*
  This recreation site is along the lower Clark Fork River two miles downstream of the Montana – Idaho border. A licensed applicator will be utilized to treat the stone dust ADA paths to prevent vegetation from growing in the trails. There may also be spot treatments for tansy, knapweed, and poison ivy at this site as needed.

- *Heron Boat Ramp:*
  A licensed applicator will treat the site (approximately 2.5 acres) for knapweed as needed.

- *Weed Species of Special Concern to Sanders County, Montana:*
  The Sanders County Weed District is currently attempting to detect and eradicate all rush skeleton weed in the county. Rush skeleton weed has been found on Avista Project Property located on the face of the earthen portion of Noxon Rapids Dam, Pilgrim Creek Park (2015), and the parking area associated with the boat ramp in the town of Noxon. These sites are treated and monitored annually by Avista and Sanders County weed specialist.

  Avista will continue control efforts of scotch broom on Avista property. Scotch broom has been detected on Avista property near the Big Eddy and Frog Pond recreation sites, where the plant has invaded from adjacent landowners.

  Based on direction from Sanders County Weed District and others, Avista may treat specific populations of yellow flag iris along the reservoirs.

- *Treatment of USFS lands by the USFS:*
  The USFS currently applies herbicides on a limited basis at the USFS-owned and operated recreations sites within the Project Boundary. As part of this Plan, the USFS will provide Avista a summary of herbicides used at these sites to be included in the Clark Fork Project Annual Report. An Avista licensed applicator or a contracted licensed applicator will also treat as needed.

- *Treatment of MFWP sites by MFWP:*
  Montana Fish, Wildlife and Parks currently applies herbicides on a limited basis at Thompson Falls State Park and Flat Iron Fishing Access Site as part of ongoing operations and maintenance. As part of this Plan, MFWP will provide Avista a summary of herbicides used at these sites to be included in the Clark Fork Annual Report. An Avista licensed applicator or a contracted licensed applicator will also treat as needed.

- *Treatment on Bull River Properties:*
  These properties include the Bull River Wildlife Management Area and Wood Duck properties. Although these properties are not Project lands, the acquisition and management are associated with the CFSA. These areas will be treated as needed by MFWP, Avista or contracted licensed applicator.

- *Treatment of Cultural Sites:*
  There may be a need to treat sites that contain culturally significant plants to protect these areas from invasive noxious weeds. The treatment of these sites will be at the direction of the CRMG, and specific locations will not be disclosed to protect them from vandalism or other damage.

- *Treatment of Dispersed Recreation Sites and Private Recreation Permit Sites:*
  A licensed applicator will treat many of the dispersed recreation sites as time and conditions allow.

  Knapweed control may also be needed at some Private Recreation Permit sites. Avista will work with adjoining landowners to control knapweed as appropriate.

- *Treatment of EWM:*
  The AIPTF may continue implementation of limited treatment of EWM on Noxon and Cabinet Gorge reservoirs along public access sites and shoreline dock areas. Herbicide use will only be implemented after the AIPTF has received all necessary permits and satisfied other applicable requirements (public notification, MEPA, etc.), with locations based on pretreatment monitoring of both reservoirs. This is only one facet of an Integrated Management Plan, which may also utilize bottom barriers, hand removal and education components.

2021 PROJECT PLAN

Managing Aquatic Invasive Plants on Noxon and Cabinet Gorge Reservoirs

Project Contacts

Larry Lack, Chair, Sanders County Aquatic Invasive Plants Task Force
Email: grizzlyadams_mt@yahoo.com

Kim Bergstrom, Sanders County Aquatic Invasive Plants Task Force Facilitator
Phone: 406-546-2447
Email: pinnacle@blackfoot.net

Project History

This is a continuing project, directed and managed by the Sanders County Aquatic Invasive Plants Task Force (Task Force) to monitor and address the infestation of Eurasian watermilfoil (EWM) in Noxon and Cabinet Gorge reservoirs, and to educate the public about aquatic invasive species. The Management Committee originally began funding this program in 2008 with funding from Appendix G and H. In 2008, the Management Committee approved a small amount of funding from Appendix B for reservoir mapping of EWM. The Management Committee first approved funds for treatment of EWM (from Appendix B) in 2014. Funding for the EWM management and treatment is reviewed and approved annually by the Management Committee.

Background

Eurasian watermilfoil and curlyleaf pondweed (CLP) were confirmed in Noxon and Cabinet Gorge reservoirs in 2007; this was the first identified infestation of EWM in Montana. Initial studies indicated that EWM covered 247 acres in Noxon and 117 acres in Cabinet and spread at a rate of about 9.8% annually in the reservoirs.

Eurasian watermilfoil is an aggressive, non-native aquatic weed that poses a serious threat to Montana's rivers and lakes. When introduced into a waterbody, EWM spreads quickly and forms thick beds with dense canopies that crowd out native aquatic plants and threaten fisheries, water quality, drinking and irrigation water supplies and recreational uses. Once established, dense EWM beds can deplete oxygen needed by fish and other aquatic organisms (Madsen 2014). With the exception of bottom barriers, control measures selectively target EWM, thereby maintaining populations of native coontail, elodea, pondweeds and whitewater buttercup.

The Sanders County Commissioners established the Task Force in 2008 to develop and implement an integrated weed management approach to contain and manage infestations of EWM. The annual program has included the following components:

- Controlling priority areas of invasive milfoil stands through a combination of aquatic herbicide treatments, diver dredging (hand removal) in small, narrow plots where herbicides have proven to be less effective or adequate application is problematic, and the use of bottom barriers at high-use docks/ramps (public and private) to reduce the risk of boats transporting weed fragments.

- Conducting annual pre- and post-treatment monitoring to verify treatment effectiveness on targeted invasive species and re-colonization of native aquatic plant species at treated sites. Monitoring services were provided by Montana Fish Wildlife and Parks in 2019 at no cost to Sanders County.
- Monitoring littoral zones of Noxon and Cabinet Gorge reservoirs to determine if and how the composition and density of submersed vegetation and the location of invasive plant stands is changing over time.
- Implementing an education program to raise awareness about aquatic invasive plants and the importance of preventing the spread of aquatic invasive species. The Task Force is currently exploring new ways to conduct outreach after saturating the recreating public with direct outreach at boat launches for nearly ten consecutive years.
- Coordinating with Montana Fish, Wildlife & Parks and Idaho Department of Agriculture on mandatory boat check stations to prevent invasive aquatic plants from being transported to non-infested areas.
- Meeting monthly to evaluate program results and guide adaptive management techniques. Technical expertise includes aquatic resource professionals and representatives of federal, state and local government agencies, nonprofits, tribes and others with knowledge in fisheries, aquatic plant ecology, water resources, water quality and aquatic plant management. A Scientific Review Panel was established in 2018 to further assist the Task Force with review of monitoring results and consideration of control options.

In 2016, the Task Force received funding from the Montana Department of Natural Resources and Conservation (DNRC) to conduct an alternatives analysis (Analysis of Treatment Alternatives 2017) to examine management methods for reducing infestations. The analysis determined that successful management of EWM in Sanders County would contain and control existing aquatic invasive species (AIS) populations and prevention new introductions of AIS within the Noxon and Cabinet Gorge reservoirs. Through this analysis process, the top priority for control was determined to be near public and private access sites, including public and private boating access sites and shoreline dock areas. The second priority for control is large, high density shallow access areas with significant boat traffic.

Control methods for priority areas are determined by the Scientific Advisory Panel prior to each field season. Control includes a combination of bottom barriers (particularly around private docks), diver dredging and selective herbicide application. In fall of 2018, Sanders County was awarded a grant from the U. S. Corps of Engineers Water Resources Development Act (WRDA) program. These funds are available for treatment through 2020. The WRDA grant funds and a Montana Department of Natural Resources Aquatic Invasive Species grant were used for EWM treatment in 2020. However, Sanders County will need to secure additional dollars for treatment in 2021 in order to have sufficient match funding to use the remainder of the WRDA funds.

Monitoring in 2021 is expected to be conducted again by Montana Fish, Wildlife and Parks as an in-kind contribution to the project, so no CFSA funds will be needed for monitoring in 2020.

Goal
The goals of this project are to sustain recreational fisheries as well as native plants and species that rely on riparian and littoral areas and habitats; improve access to water-based recreational

opportunities; maintain or improve aesthetic values; and protect hydropower infrastructure and investment.

Objectives

1. Manage aquatic invasive species according to the Sanders County Aquatic Invasive Plant Management Plan.
2. Educate the public and landowners about the need to control and contain aquatic invasive species and keep them informed of the management activities of Sanders County.
3. Ensure that Sanders County interests are represented in the overall statewide management of aquatic invasive species, including the prevention of zebra and quagga mussels through watercraft inspection stations.
4. Monitor the extent and spread of EWM in the Cabinet Gorge and Noxon reservoirs, as well as the effectiveness of control measures.

Tasks

Task 1. Control Measures

Up to 30,000 sq. ft. of bottom barriers will be installed at public and private high-use docks and ramps to reduce the spread of plant fragments by boats. Shoreline landowners with docks will be permitted to rake milfoil to remove it. Exact acreages and locations of control measures will be based on information from pre-treatment surveys, with public access and recreation sites taking priority. (Objectives 1, 2, 4)

Task 2. Education and Outreach

The Task Force conducts public education and outreach programs that target boaters, anglers, recreationists, and the general public. The specific activities will be determined by the Task Force and may include creation and distribution of educational materials with information about ways to reduce the spread of aquatic invasive species. The Task Force also updates the public annually about aquatic invasive species management activities. (Objective 2)

Task 3: Program Management

With assistance from the Task Force Facilitator, the Task Force holds monthly meetings to manage all aspects of the annual program. The group works closely with the Scientific Advisory Panel to implement recommendations and advises Sanders County on the selection of any contractor(s), contract development and contractor oversight. Working with its technical advisors, the Task Force evaluates project results and reports those results to funders. Task Force participants include Montana State University Extension Office/Sanders County; Avista; Montana Fish, Wildlife & Parks; Noxon-Cabinet Shoreline Coalition (NCSC); Green Mountain Conservation District; Sanders County Weed District; U.S. Forest Service; Confederated Salish & Kootenai Tribes; NorthWestern Energy; Montana BASS Federation; private industry; and community members. Task Force members provide in-kind support valued at $40,000 annually to implement the project. (Objectives 1-4)

Work Products

- Quarterly Reports (Due the first full week following the end of each quarter).
- Annual Report (Due the first full week following the end of the year).
- Comprehensive Project Report (December 1, 2021).

Permitting Requirements
A Montana 310 Permit is required for the placement of bottom barriers on the bed of the reservoir, and the Noxon Cabinet Shoreline Coalition has the 310 Permit for this purpose.

A Montana Pesticide Discharge Permit is required for the use of herbicides to treat aquatic invasive species. Sanders County has a current permit, which is in effect through Oct. 31, 2021.

Cultural/Historic Resource Review
None. When the Environmental Assessment was scoped for EWM herbicide treatments, it was determined that treatments would not involve any new disturbance, therefore no cultural resource surveys were required.

Benefit to the Resource
Key objectives of this project focus on sustaining the reservoirs' recreational fisheries, improving access to water-based recreational opportunities, maintaining or improving aesthetic values, and protecting sensitive and important resources of Noxon and Cabinet reservoirs. As such, this project supports the CFSA Appendix B Recreational Fishery Enhancement Program (recreational fishery management); CFSA Appendix G Implementation of the Land Use Management Plan (protection and maintenance of sensitive resources, including shorelines); and CFSA Appendix H Implementation of the Recreation Resource Management Plan (management and preservation of recreation resources and public access).

With a focus on control, prevention and education, project activities dovetail with aquatic invasive species efforts on-going across Montana, Idaho and regionally. The program is consistent with the Montana Aquatic Nuisance Management Plan, which seeks to minimize the harmful ecological, economic, and social impacts of aquatic nuisance species through prevention and management, population growth, and dispersal into, within, and from Montana (Montana ANS Technical Committee 2002). The program is also consistent with the state's Wildlife Action Plan, which seeks to avoid spread of aquatic invasive species (Montana Fish, Wildlife & Parks 2015), and the state Aquatic Invasive Species Program, which "seeks to minimize the harmful ecological, economic, and social impact of AIS through prevention and management of introduction, population growth and dispersal of AIS…" (Analysis of Treatment Alternatives 2017).

Budget

Item	Estimated Carryover	2021 Budget Request
Education & Outreach	$0	$3,000
Task Force Facilitation	$0	$19,500
Miscellaneous (conferences, training, mileage, permits, meeting expenses)	$0	$5,000
Total	$0	$27,500
Anticipated Expenditures		$27,500

The Noxon-Cabinet Shoreline Coalition provides an annual $2,600 in-kind support from its members for the bottom barrier program. As described above, the county's Task Force members

provide in-kind support valued at $40,000 annually to direct and implement all aspects of the EWM management project. In addition, the Task Force is considering applying to the Montana DNRC under a new AIS funding program for $25,000 to use for EWM control measures. Of that, $2,500 may be eligible to cover administrative costs, which could offset the Task Force Facilitation, reducing Avista's contribution to $17,000 in that line item. Grant awards are expected in the spring of 2021.

Literature Cited

DeBruyckere, L.A., T. Pennington. 2017. Analysis of Treatment Alternatives for Invasive Watermilfoil in Noxon Rapids and Cabinet Gorge Reservoirs, Sanders County, Montana.

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As approved by the Management Committee on 3/17/2021

2021 PROJECT PLAN

Monitoring Associated with the Land Use Management Plan (LUMP)

Project Contact
Arthur D. Potts, Avista, (406) 847-1283, arthur.potts@avistacorp.com

Project History
This is a continuing project that has been approved annually by the Management Committee since 1999.

Background
The Land Use Management Plan (LUMP) establishes appropriated land use classifications and management guidelines to protect identified natural, aesthetic, and cultural resources that occur on Avista owned project lands. It also provides opportunity for public and some private access to project lands and waters where appropriate.

Goal
The Monitoring component of this PM&E is in place to ensure that staff and budget are in place to coordinate and implement the following objective. This project is part of the direct implementation of Clark Fork Settlement Agreement Appendix G.

Objective
1. The overall goal of the LUMP is to protect sensitive and important resources on Avista owned project lands, including the existing character or the shoreline.

Task
1. Continue annual inspections of Avista project lands to assure compliance with permit and lease conditions and assure compliance with acceptable land uses and restrictions as defined by Land Use Classifications.

Work Product
- All work associated with this Project Plan will be documented in the 2021 Annual Work Summary. Due Date: December 1, 2021.

Cultural/Historic Resource Review
May be needed on a case by case basis and will coordinate with Avista Cultural Resource Specialist.

Benefit to the Resource
Provide protection for sensitive and important resources on Avista owned project lands, including the existing character or the shoreline, while providing opportunity for public and some private access to project lands and waters where appropriate.

Budget

Item	Estimated Carryover	2021 Budget Request
Labor and equipment	$0	$10,000
Total	$0	$10,000
Anticipated Expenditures		$10,000

2021 PROJECT PLAN

Enforcement Associated with the Land Use Management Plan (LUMP)

Project Contact
Arthur D. Potts, Avista, (406) 847-1283, arthur.potts@avistacorp.com

Project History
This is a continuing project that has been approved annually by the Management Committee.

Background
The Land Use Management Plan (LUMP) establishes appropriated land use classifications and management guidelines to protect identified natural, aesthetic, and cultural resources that occur on Avista owned project lands. It also provides opportunity for public and some private access to project lands and waters where appropriate.

Goal
The Enforcement component of this PM&E is in place to ensure that staff and budget are in place to coordinate and implement the following objective. This project is part of the direct implementation of Clark Fork Settlement Agreement Appendix G.

Objective
1. Continue enforcement to prevent and when appropriate prosecute violations of the law, permit and lease conditions, and other unauthorized uses of project lands and waters. These activities will be coordinated with Avista real-estate, legal, land survey personnel, Montana Fish, Wildlife and Parks (MFWP), Idaho Fish and Game (IDFG), United State Forest Service (USFS), or other law enforcement agencies.

Tasks
1. Continue to provide funding for Montana Fish, Wildlife and Parks enforcement personnel to assist in the prevention and when appropriate prosecute violations of the law, permit and lease conditions and other unauthorized uses of project lands and waters.
2. Continue to provide funding for Idaho Fish and Game enforcement personnel to assist in the prevention and when appropriate prosecute violations of the law, permit and lease conditions and other unauthorized uses of project lands and waters.
3. Continue to provide funding for Avista real-estate, legal, land survey, and cultural personnel to assist in the prevention and when appropriate prosecute violations of the law, permit and lease conditions and other unauthorized uses of project lands and waters.

Work Products
- All work associated with this Project Plan will be documented in the 2021 Annual Work Summary. Due Date: December 1, 2021.
- Quarterly reports from Montana Fish, Wildlife and Parks will be provided per the MOU agreement. Due Dates: March 31; June 30; September 30; December 1, 2021.
- Annual reports from Idaho Fish and Game will be provided per the MOU agreement. Due Dates: December 1, 2021.

Cultural/Historic Resource Review
Work proposed under this fund will either: 1) not involve any ground disturbing activities or impact historic resources, or 2) will be performed under the cultural assessment associated with the original project.

Benefit to the Resource
Provide protection for sensitive and important resources on Avista owned project lands, including the existing character or the shoreline, while providing opportunity for public and some private access to project lands and waters where appropriate.

Budget

Item	Estimated Carryover	2021 Budget Request
Montana Enforcement MOU with Montana Fish, Wildlife and Parks	$0	$20,000
Idaho Enforcement MOU with Idaho Fish and Game	$0	$5,000
Avista and contract real-estate, legal, land survey, and cultural personnel	$0	$40,000
Total	$0	$65,000
Anticipated Expenditures		$65,000

2021 ANNUAL IMPLEMENTATION PLAN SUMMARY – APPENDIX H

Clark Fork Project, FERC No. 2058
Cabinet Gorge and Noxon Rapids Hydroelectric Developments

Title: Implementation of the Recreation Resource Management Plan (RRMP)

Implementation Staff Lead:
Arthur D. Potts, Avista, (406) 847-1283, arthur.potts@avistacorp.com

Background: The purpose of this measure is to provide for appropriate and adequate recreational opportunities and facilities associated with the Clark Fork Project through implementation of the Recreation Resource Management Plan (RRMP). Seven goals to be met through its implementation include:

1. Manage existing recreation resource needs.
2. Manage future recreation resource needs.
3. Provide adequate and safe public access.
4. Preserve recreation resources.
5. Coordinate recreation planning and needs.
6. Provide cost-effective and desirable recreation opportunities.
7. Provide compatible recreation opportunities.

Year 2021 work efforts are a continuation past efforts and remain focused on implementing the five distinct components of the RRMP:

2021 Project Plans

1. RRMP – Administration and Resource Integration
2. RRMP – Recreation Facility Development
3. RRMP – Monitoring
4. RRMP – Operation and Maintenance of Recreation Facilities
5. RRMP – Interpretation and Education Program

Work Products

RRMP – Administration and Resource Integration

- Unless a specific document is created for a task, all work associated with this Project Plan will be documented in the 2021 Annual Work Summary. Due Date: December 1, 2021.

RRMP – Recreation Facility Development

- All work associated with this Project Plan will be documented in the 2021 Annual Work Summary. Due Date: December 1, 2021.

RRMP – Monitoring

- Unless a specific document is created for a task, all work associated with this Project Plan will be documented in the 2021 Annual Work Summary. Due Date: December 1, 2021.
- Report summarizing data from up to 21 automated traffic counters to measure use at various developed and dispersed recreation sites and trails. *January 2022*

- Summary maps showing dispersed recreation areas along the projects and permitted dock locations (showing dock densities per 0.5-mile segments of shoreline). *January 2022*

RRMP – Operation and Maintenance

- All work associated with this Project Plan will be documented in the 2021 Annual Work Summary. Due Date: December 1, 2021.

RRMP – Interpretation and Education

- All work associated with this Project Plan will be documented in the 2021 Annual Work Summary. Due Date: December 1, 2021.

Appendix H 2021 Budget

Item	Carryover[1]	2021
Recreation Resource Management Plan (Estimate)[2]		**$229,500**
Unexpended funds w/interest		**$0**
Total Available		**$229,500**
RRMP Administration and Resource Integration	$0	$0
RRMP Monitoring	$0	$10,000
Operation and Maintenance of recreation facilities		
Avista Sites	$0	$165,000
USFS Sites[3]	$0	$32,000
MFWP - Flat Iron FAS and Thompson Falls State Park	$0	$17,000
Interpretation & Education	$0	$5,500
Total	$0	$229,500
MC Approved Budget		**$229,500**
Unobligated Funds		$0

Item	Carryover[1]	2021
Facilities Fund (including GDP inflation rate)		**$224,956**
Unexpended funds w/interest		**$374,328**
Total Available		**$599,284**
RRMP Recreation Facility Development[4]		$439,000
Total	$0	$439,000
MC Approved Budget		**$439,000**
Unobligated Funds		$160,284

[1]This column denotes estimated carryover of unexpended, approved funds as of January 1.
[2]Estimated costs are projections made now however; Avista will pay the actual costs as approved by the Management Committee.
[3]Annual contribution is adjusted by percentage of change of the Gross Domestic Product-Implicit Price Deflator.
[4]More projects are listed than will be completed in 2021. This provides for flexibility as projects are delayed due to permitting or other constraints. Projects have also been ranked as primary and secondary in terms of priority. The Recreation Resource Subgroup will evaluate project status on an ongoing basis to adapt implementation as needed.

As approved by the Management Committee on 3/17/2021

2021 PROJECT PLAN

Recreation Resource Management Plan (RRMP) - Administration and Resource Integration

Project Contact
Arthur D. Potts, Avista, (406) 847-1283, arthur.potts@avistacorp.com

Project History
This is a continuing project that has been approved annually by the Management Committee since 1999.

Background
The purpose of the administration and resource integration of the Recreation Resource Management Plan (RRMP) is to ensure coordination of the activities of this program with those of other recreation provides, and will be integrated with Avista's Land Use Management Plan, Cultural Resources, Wildlife, Fisheries, Aesthetics, Erosion, and Americans with Disabilities Act Compliance. Avista will administer this project using a recreation specialist along with clerical, consultant, and technical support as needed.

Objective
Ensure the coordination of the implementation of the RRMP with other resource programs and recreation resource providers along the Clark Fork Project.

Tasks
1. Administer the RRMP with Recreational Specialist, clerical, consultant, and technical support.
2. Integrate RRMP programs and projects with land use, cultural resources, wildlife, fisheries, aesthetics, and erosion control programs.

Work Products
- Unless a specific document is created for a task, all work associated with this Project Plan will be documented in the 2021 Annual Work Summary. Due Date: December 1, 2021.

Cultural/Historic Resource Review
No ground disturbing activities or impact to historic resources will occur as part of implementing this part of the RRMP.

Benefit to the Resource
Ensures the coordination of the implementation of the RRMP with other resource programs and recreation resource providers along the Clark Fork Project.

Budget

Item	Estimated Carryover	2021 Budget Request
Costs associated with this project plan will be covered under the other components of this PM&E	$0	$0
Total	$0	$0
Anticipated Expenditures		$0

As approved by the Management Committee on 3/17/2021

2021 PROJECT PLAN

Recreation Resource Management Plan (RRMP) - Recreation Facility Development

Project Contact
Arthur D. Potts, Avista, (406) 847-1283, arthur.potts@avistacorp.com

Project History
This is a continuing project that has been approved annually by the Management Committee since 1999.

Background
The purpose of this project plan is to address both immediate and long-term modification, improvement, expansion, and repair of existing sites and facilities.

Objective
Provide for appropriate and adequate recreational opportunities and facilities associated with the Clark Fork project.

Tasks
1. See attached spreadsheet identifying all potential facility development projects for 2021. Also note that more projects are listed than time would allow, which provides for flexibility as projects are delayed due to permitting or other constraints. Projects have also been ranked as primary and secondary in terms of priority.

Work Products
- All work associated with this Project Plan will be documented in the 2021 Annual Work Summary. Due Date: December 1, 2021.

Cultural/Historic Resource Review
Each project will be evaluated individually to determine if cultural surveys are needed and the responsible agency, or group, to ensure that compliance is met.

Benefit to the Resource
Provide for appropriate and adequate recreational opportunities and facilities associated with the Clark Fork project.

Budget

Item	Estimated Carryover	2021 Budget Request
Design, permitting, labor and materials	$0	$439,000
Total	$0	$439,000
Anticipated Expenditures		$439,000

2021 Recreation Resource Facility Development Plan

Recreation Sites	Identified Opportunities	Parties Involved	Action/Needs	Est. Cost	Notes/Permits	Project Leader	Ownership
Annual Activity							
Corridor Wide	General clean up, open facilities, end of year cleaning, projects, etc.	Avista/Sanders County/USFS/MFWP	Hire Montana Conservation Corp to work within the Clark Fork Project area (all sites as needed) for one week in the spring.	$11,000	Time will be split among State, USFS, Sanders County, and Avista sites as needed.	Arthur Potts	Avista/MFWP/USFS/Sanders County
Corridor Wide	Noxious Weed Management/Recreation Sites	Avista/Sanders County/USFS/MFWP	Hire a licensed contractor to assist with weed management/spraying throughout the Clark Fork Project at designated recreation sites.	$10,000	N/A	Arthur Potts	Avista/MFWP/USFS/Sanders County
Corridor Wide - boat ramps/docks	Invasive Eurasian watermilfoil control	Avista/Sanders County/USFS/MFWP	Control invasive Eurasian watermilfoil at public boat ramps as needed using bottom barriers.	$6,000	Part of a larger project with Sanders County, MFWP, Montana DNRC, and others.	Arthur Potts	Avista/MFWP/USFS/Sanders County
Corridor Wide	Receive assistance in the removal/installation of docks	Avista	Hire a contractor to install the boat docks in the springs and remove docks in the fall. This would also involve installing/removing 2 swimming areas.	$3,500	N/A	Nate Hall/Arthur Potts	Avista/Sanders County
Finley Flats, Two Rivers RV Park & Campground	Dust control needed	Avista	Apply magnesium chloride or other dust control agent after spring rains.	$6,500	Work with MFWP / USFS/ Sanders County to choose dust control agent and contractor.	Nate Hall/Arthur Potts	Avista
Flat Iron Recreation Area	Dredge boat ramp area	Avista	Have permits and contract in place to take advantage of extended low water levels as they occur.	$10,000	Permits are in place, when low water occurs we can move forward.	Nate Hall/Arthur Potts	Avista/MFWP
Primary Recreation Projects							
Big Eddy Campground	Address access road improvements	Avista/USFS	Lengthen paved apron at access point to Highway 200 and improve interior access road.	$50,000	Cultural Survey	Les Raynor/Arthur Potts	Avista/USFS
Flat Iron Recreation Area	Access road	Avista/Sanders County	Add sand to the chip sealed road to absorb excess oil.	$4,000	N/A	Arthur Potts	Avista
Avista/FS/MT FWP recreation sites	Finish Replacing 15 year old kiosks	Avista/MFWP/USFS	Finish installing kiosks at 3 Idaho sites. Continuation of replacement/new installation at 24 Avista/FS/FWP sites.	$15,000	Cultural Survey	Arthur Potts	Avista/MFWP/USFS/Sanders County
Trout Creek Swim Platform	Replace aging/damaged deck on swim platform	Avista	Replace decking with low maintenance, durable plastic decking on 16" centers; new rub rails and corners; repaint steel structure.	$12,000	N/A	Arthur Potts	Avista
Vermillion Boat Launch	ADA upgrades for vault toilet	Avista/USFS	Address ADA access issues by installing a crushed granite ramp for improved access. Includes $1,500 of RAC funding from USFS.	$3,000	Cultural Survey	Arthur Potts	Avista/USFS
Bull River Campground	Address sedimentation issue with potable water tank	Avista/USFS	Evaluate existing tank and determine appropriate actions to address sedimentation issue. Tanks needs to be dug up and reinstalled.	$30,000	Cultural Survey	Les Raynor/Arthur Potts	Avista/USFS
Bull River Campground	Signage for campground	Avista/USFS	Replace highway signs and install Vacancy/Campground Full signs.	$3,000	Cultural Survey	Les Raynor/Arthur Potts	Avista/USFS
Kirby Gulch Boat Ramp	Improve/expand parking lot	Avista	Expand parking lot.	$10,000	Joint Aquatic Resource Permit Application and Cultural Survey	Nate Hall/Arthur Potts	Sanders County
North Shore Campground	Address paving needs for North Shore Parking lot, day use, campground area	USFS, Avista	Repair and pave several areas at North Shore Campground and day use area. Existing roads, entrance to vault toilets, overflow parking, fee site, and kiosk sign.	$40,000	Cultural Survey	Les Raynor	USFS/Avista

2021 Recreation Resource Facility Development Plan

Recreation Sites	Identified Opportunities	Parties Involved	Action/Needs	Est. Cost	Notes/Permits	Project Leader	Ownership
Triangle Pond	Implement master site plan developed in 2019	Avista, USFS	Road work, traffic control structures, parking, picnic tables and fire rings, carry-in launch for kayaks and small water craft, replace existing picnic shelter, 4 small shade structures near beach area, informational signage, concrete sidewalk to ADA restroom. Includes $30,000 in GAOA funding.	$100,000	NEPA	Les Raynor	USFS
Pilgrim Creek Park	Replace 20+ year old playground equipment	Avista	Replace old and deteriorating playground equipment. Include adding suitable fall protection material to the ground surface in the playground area.	$50,000	Cultural Survey	Arthur Potts	
Pilgrim Creek Park	Repair baseball field fences	Avista	Repair all fences surrounding baseball fields.	$10,000	N/A	Arthur Potts	Avista
Noxon/Bicentennial Park	Improve boat ramp	Avista	Grout gaps on boat ramp.	$5,000	MT 310 Maintenance Permit covers the work	Arthur Potts	Avista
Secondary Recreation Projects							
Noxon and Cabinet Gorge Reservoirs	Work with Appendix B to investigate opportunities for low water boat launch opportunities	MFWP, USFS, Avista and Sanders County	Combination of low water events and increased interest in early spring fishing is creating an increased demand for boat ramps that are accessible during low water periods.	$5,000	Joint Aquatic Resource Permit Application and Cultural Survey	Arthur Potts	MFWP, USFS, Avista and, Sanders County
North Shore Campground	Land purchase to expand parking	MFWP, USFS, Avista and Sanders County	Due diligence for potential land purchase (appraisal, survey work, negotiations, etc.). Looking at least 2 acres up to 10 acres.	$10,000	Once a proposal is firmed up, including commitment from landowner, proposal will be sent to the TRTAC, CRMG, and MC for review and approval.	Arthur Potts	USFS/Avista
Corridor Wide	Evaluate access roads previously blocked off; add boulders as needed	Avista	Identify areas that were previously blocked off from vehicle access and address by bringing in larger boulders or replacing boulders that have been moved.	$10,000	N/A	Arthur Potts	Avista
Corridor Wide	Replace recreation permit markers	Avista	Replace aging, damaged, and missing permit markers on both reservoirs.	$10,000	N/A	Arthur Potts	Avista
Heron, Centennial, and South Shore Boat Launches	Address bulkhead approaches at docks	Avista and Sanders County	Create more accessible approach onto bulkhead/dock by bringing in gravel and grading.	$2,000	N/A	Arthur Potts	Avista and Sanders County
Clark Fork Access Site	Entrance and launch ramp grading	Avista	Grade entrance/parking road and boat launch to improve accessibility. Bring in additional material if necessary.	$1,500	N/A	Arthur Potts	Avista
North Shore Boat Launch	Extend boat ramp	Avista and USFS	Add extension to existing dock to enable use of dock during low water levels.	$10,000	MT 310 Permit	Arthur Potts	Avista
South Shore Recreation Site	Access road	Avista	Regrade access road and repair rut damage around mud holes; bring in additional road material if necessary.	$1,500	N/A	Arthur Potts	Avista
Antelope Lake	Access road	Avista	Regrade and repair access road which has significant washout and rutting issues.	$10,000	Cultural Survey	Arthur Potts	Avista
			EST Available $599,284	**$439,000.00**	**TOTAL**		

Also note that more projects are listed than possibly time would allow, this provides for flexibility as projects are delayed due to permitting or other constraints. Projects have also been ranked as annual, primary and secondary in terms of priority. The Recreation Resource Subgroup will evaluate project status on an ongoing basis to adapt implementation as needed.

As approved by the Management Committee on 3/17/2021

2021 PROJECT PLAN

Recreation Resource Management Plan (RRMP) - Monitoring

Project Contact
Arthur D. Potts, Avista, (406) 847-1283, arthur.potts@avistacorp.com

Project History
This is a continuing project that has been approved annually by the Management Committee since 1999.

Background
The purpose of this project plan is to monitor use at developed and undeveloped sites to document trends of overall use and identify potential management needs. Monitoring will occur at two levels:

1. Annual monitoring utilizing data collected during routine management of recreation resources, and
2. More detailed recreation survey work to occur as needed every five to ten years. Based upon annual monitoring we do not believe use has changed enough to warrant a more in-depth survey at this time.

Objective
Through monitoring the use management can be modified if needed to ensure that providing the appropriate and adequate recreational opportunities and facilities associated with the Clark Fork project.

Tasks
1. Work with the recreation subgroup to continue to implement electronic recreation site evaluations developed as part of the 2017 Recreation Resource Management Plan update.
2. Continue to utilize up to 21 automated traffic counters to measure use at various developed and dispersed recreation sites and trails.
3. Continue utilizing standardized reporting for recreation use at Thompson Falls State Park, North Shore Recreation Area, and Bull River Recreation Area.
4. Summarize 2021 recreational use data from Bull River and North Shore campgrounds, MFWP, Thompson Falls State Park, and the Cabinet Gorge Dam and Noxon Rapids Dam viewpoints.
5. Develop maps showing dispersed recreation areas along the projects and permitted dock locations (showing dock densities per 0.5-mile segments of shoreline).

Work Products
- Unless a specific document is created for a task, all work associated with this Project Plan will be documented in the 2021 Annual Work Summary. Due Date: December 1, 2021.
- Report summarizing data from up to 21 automated traffic counters to measure use at various developed and dispersed recreation sites and trails. *January 2022*

- Summary maps showing dispersed recreation areas along the projects and permitted dock locations (showing dock densities per 0.5-mile segments of shoreline). *January 2022*

Cultural/Historic Resources Review
No cultural resource surveys will be needed for this project plan.

Benefit to the Resource
Through monitoring the use management can be modified if needed to ensure that providing the appropriate and adequate recreational opportunities and facilities associated with the Clark Fork project.

Budget

Item	Estimated Carryover	2021 Budget Request
Labor and Materials	$0	$10,000
Total	$0	$10,000
Anticipated Expenditures		$10,000

As approved by the Management Committee on 3/17/2021

2021 PROJECT PLAN

Recreation Resource Management Plan (RRMP) – Operation and Maintenance

Project Contact
Arthur D. Potts, Avista, (406) 847-1283, arthur.potts@avistacorp.com

Project History
This is a continuing project that has been approved annually by the management committee since 1999.

Background
The purpose of this project plan is to ensure adequate funding is available to meet the annual operation and maintenance needs associated with the recreation resources and facilities associated with the Clark Fork Project.

Objective
Ensure that recreation opportunities and facilities are operated and maintained in a manner to provide for appropriate, adequate and safe use.

Tasks
1. Maintain Avista controlled recreation facilities and undeveloped recreation sites on Avista lands.
2. Assist USFS with the maintenance of Finley Flats Recreation Area, North Shore Recreation Area, Marten Creek Recreation Area, Triangle Pond, Bull River Recreation Area, Quinn's Cut Recreation Area, and Big Eddy Recreation Area.
3. Assist MFWP with the maintenance of Thompson Falls State Park and Flat Iron Ridge Fishing Access Site.
4. Provide low cost leases or permits to the community or civic groups providing recreation opportunities. (i.e., Thompson Falls Golf Course)

Work Products
- All work associated with this Project Plan will be documented in the 2021 Annual Work Summary. Due Date: December 1, 2021.

Cultural/Historic Resource Review
If a work specific proposal is developed, Avista will coordinate Cultural Resources Management Group review prior to implementing the project. The work product for this review will be confidential due to the sensitive nature of the content.

Benefit to the Resource
Providing for the operation and maintenance of recreation opportunities and facilities along the Clark Fork Project will help ensure the appropriate and safe use by the public.

Budget

Item	Estimated Carryover	2021 Budget Request
Operations & Maintenance – Avista sites	$0	$165,000
Operations & Maintenance - USFS sites	$0	$32,000
Operations & Maintenance – MFWP – Flat Iron FAS and Thompson Falls State Park	$0	$17,000
Provide low cost permits or leases	$0	$0
Total	$0	$214,000
Anticipated Expenditures		$214,000

As approved by the Management Committee on 3/17/2021

2021 PROJECT PLAN

Recreation Resource Management Plan (RRMP) – Interpretation and Education

Project Contact
Arthur D. Potts, Avista, (406) 847-1283, arthur.potts@avistacorp.com

Project History
This is a continuing project that has been approved annually by the Management Committee since 1999.

Background
The purpose of this project plan is to provide funding for the maintenance of existing information and education materials for the recreation resources and facilities associated with the Clark Fork Project.

Objective
Ensure that the existing information and education materials associated with the Clark Fork Project recreation resources and facilities are maintained.

Tasks

1. Implementation of Interpretation and Education Program will be integrated with the measures developed and approved by the CRMG in 2008. The Interpretation and Education Program is funded through the facility development program. Maintenance dollars will be used to inventory, standardize, and maintain informational kiosks and EWM signs throughout the project.

Work Products

- All work associated with this Project Plan will be documented in the 2021 Annual Work Summary. Due Date: December 1, 2021.

Cultural/Historic Resource Review
If a work specific proposal is developed, Avista will coordinate Cultural Resources Management Group review prior to implementing the project. The work product for this review will be confidential due to the sensitive nature of the content

Benefit to the Resource
Provide information and education materials to the public that recreate on the Clark Fork Project.

Budget

Item	Estimated Carryover	2021 Budget Request
Labor and materials	$0	$5,500
Total	$0	$5,500
Anticipated Expenditures		$5,500

2021 ANNUAL IMPLEMENTATION PLAN - APPENDIX I

Clark Fork Project, FERC No. 2058
Cabinet Gorge and Noxon Rapids Hydroelectric Developments

Title
Implementation of the Aesthetics Management Plan

Implementation Staff Lead
Arthur D. Potts, Avista, (406) 847-1283, arthur.potts@avistacorp.com

Project History
This is a continuing project that has been approved annually by the Management Committee.

Background
The purpose of this measure is to provide for the protection and enhancement of aesthetic resources associated with Avista's Clark Fork Projects and to mitigate for project related impacts to those resources through the implementation of the Aesthetics Management Plan (AMP). Aesthetic guidelines and considerations of the AMP are implemented by permit standards and land use classifications of the Land Use Management Plan, site design and monitoring in the Recreation Resource Management Plan, and shoreline stabilization guidelines of the Shoreline Stabilization Guidelines Program. Ongoing coordination with other interest groups and agencies will occur as described for in the AMP.

2021 Project Plans
1. Monitor recreation, land management, erosion, and facility construction programs to ensure AMP guidelines are considered.
2. Continue to investigate measures to restore views and remove vegetation as needed, also addressing any identified issue from the 2018 re-inventory of 41 key viewpoints. Sites will be revisited again in 2023 to take photos to compare to past inventories.

Work Products
- Unless a specific document is created for a task, all work associated with this Project Plan will be documented in the 2021 Annual Work Summary. Due Date: December 1, 2021.

Cultural/Historic Resource Review
If a work specific proposal is developed, Avista will coordinate Cultural Resources Management Group review prior to implementing the project. The work product for this review will be confidential due to the sensitive nature of the content.

Benefit to the Resource
Protect the rural and rustic character of the Clark Fork Project shoreline.

As approved by the Management Committee on 3/17/2021

Appendix I 2021 Budget

Item	Carryover[1]	2021
Aesthetics Management Plan (Estimate)[2]		**$7,000**
Unexpended funds w/interest		**$0**
Total Available		**$7,000**
Monitoring construction programs for AMP guidelines	$0	$0
Vegetation management at various viewpoints	$0	$7,000
Total	$0	$7,000
MC Approved Budget		**$7,000**
Unobligated Funds		$0

[1]This column denotes estimated carryover of unexpended, approved funds as of January 1.

[2] Estimated costs are projections made now; however, Avista will pay the actual costs as approved by the Management Committee.

2021 ANNUAL IMPLEMENTATION PLAN APPENDIX J

Clark Fork Project, FERC No. 2058
Cabinet Gorge and Noxon Rapids Hydroelectric Developments

Title: Implementation of the Wildlife, Botanical and Wetland Management Plan

Implementation Staff Lead:
Arthur D. Potts, Avista, (406) 847-1283, arthur.potts@avistacorp.com

Project History
This is a continuing project that has been approved annually by the Management Committee.

Background
The purpose of this resource protection, mitigation, and enhancement measure is to provide for the organization and presentation of the various wildlife, botanical and wetland management activities and site-specific plans within a single, comprehensive management plan document. The goal is to have a dynamic reference document that the in-field staff, technical advisory committees, and Management Committee (MC) can utilize and refer to for guidance in implementing the required PM&Es and overall wildlife, botanical, and wetland resource management program for the Clark Fork Project. When the management plan was developed, it did not fully account for the detailed annual reports that are developed for each of the PM&E's. As a result, the update to the plan has changed direction in primarily being a summary of accomplishments related to habitat protection. These updates will be made available to the various committees and Management Committee as they are completed. Also, with the removal of Appendix N1-N3, it was approved by the Management Committee in 2016 that observations of bald eagles, peregrine falcons and common loons would be included in the annual summary associated with this PM&E.

2021 Project Plans
- Utilize the Wildlife, Botanical and Wetland Management Plan to help guide implementation of Wildlife, Botanical, and Wetland Protection, Mitigation, and Enhancement programs.
- Continue to update the habitat protection spreadsheet as acquisitions are completed.
- As approved by the Management Committee at their March 15, 2016 meeting, observations regarding bald eagles, peregrine falcons, and common loons will be reported here annually.

Work Products
- Update and provide copies of Habitat Protection Spreadsheet at annual fall Management Committee meeting. Includes discussion of future management of any parcel owned by Avista for more than 10 years, and if continues in Avista ownership after that, each parcel will be revisited every five years after that.
- Unless a specific document is created for a task, all work associated with this Project Plan will be documented in the 2021 Annual Work Summary. Due Date: December 1, 2021.

Cultural/Historic Resource Review
If a work specific proposal is developed, Avista will coordinate Cultural Resources Management Group review prior to implementing the project. The work product for this review will be confidential due to the sensitive nature of the content.

Resource Benefit
Provide the Management Committee an ongoing list of properties protected through the implementation of the CFSA so they can make informed decisions as to ongoing management and final disposition of these properties.

Appendix J 2021 Budget

Item	Carryover[1]	2021
Wildlife, Botanical and Wetland Management Plan (Estimate)[2]		**$5,000**
Unexpended funds w/interest		**$0**
Total Available		**$5,000**
Update Habitat Protection Spreadsheet and provide updates on Bald Eagles, Peregrine Falcon, and Common Loon nesting activity.	$0	$5,000
Total	$0	$5,000
MC Approved Budget		**$5,000**
Unobligated Funds		$0

[1] *This column denotes estimated carryover of unexpended, approved funds as of January 1.*

[2] *Estimated costs are projections made now; however, Avista will pay the actual costs as approved by the Management Committee.*

2021 ANNUAL IMPLEMENTATION PLAN SUMMARY– APPENDIX K

Clark Fork Project, FERC No. 2058
Cabinet Gorge and Noxon Rapids Hydroelectric Developments

Title
Wildlife Habitat Acquisition, Enhancement and Management Program

Implementation Staff Lead
Arthur D. Potts, Avista, (406) 847-1281, arthur.potts@avistacorp.com

Project History
This is a continuing project that has been approved annually by the Management Committee.

Background
The purpose of this program is to mitigate for the potential effects to wildlife resources and habitat due to the continued operation of the Clark Fork Project. The program will focus on the types of habitat most significantly affected, such as wetland and riparian habitat.

Goal
Provide a continuing source of financial resources that will be used to acquire, protect, enhance, and/or manage important wildlife habitat in the vicinity of the projects.

2021 Project Plans
1. Operation and Maintenance of Acquired Property and Contingency Fund.
2. Habitat Acquisition and Conservation and Contingency Fund.

Work Products
Operation and Maintenance of Acquired Property and Contingency Fund
- All work associated with this Project Plan will be documented in the 2021 Annual Work Summary. Due Date: December 1, 2021.

Wood Duck Property Re-Vegetation Maintenance
- Annual Work Summary (2021); due to Avista by November 15, 2021.

Habitat Acquisition and Conservation and Contingency Fund
- All work associated with this Project Plan will be documented in the 2021 Annual Work Summary. Due Date: December 1, 2021.

Cultural/Historic Resource Review
If a work specific proposal is developed, Avista will coordinate Cultural Resources Management Group review prior to implementing the project. The work product for this review will be confidential due to the sensitive nature of the content.

Benefit to the Resource
Provide protection to those habitats most significantly affected by the continued operation of the Clark Fork Project, such as wetland and riparian habitat.

Appendix K 2021 Budget

Item	Carryover[1]	2021
Wildlife Habitat Acquisition and Enhancement Plan (including GDP inflation rate)		**$293,042**
Unexpended funds w/interest[2]		**$741,353**
Total Available		**$1,034,396**
Operation and Maintenance of Acquired Property and Contingency Fund	$0	$48,100
Habitat Acquisition and Conservation and Contingency Fund	$0	$60,000
Total	$0	$108,100
MC Approved Budget		**$108,100**
Unobligated Funds		$926,296

[1]*This column denotes estimated carryover of unexpended, approved funds as of January 1.*

[2]*Includes $100,000 from Trestle Creek timber revenue.*

2021 PROJECT PLAN

Operation and Maintenance of Acquired Property and Contingency Fund

Project Contact
Arthur D. Potts, Avista, (406) 847-1281, arthur.potts@avistacorp.com

Project History
This is a continuing project that has been approved annually by the Management Committee.

Background
This program is in recognition of the long-term commitment required for the operation and maintenance that comes with purchasing and protecting habitat. These activities include monitoring, weed control, development of infrastructure (roads, parking areas, and fences), vegetation management, enforcement, etc. Without these activities it is possible that the properties would no longer provide the habitat benefits for which the properties were originally protected for.

Objectives
1. Provide a funding source for operation and maintenance to ensure that habitat properties continue to provide the resource benefits that the properties were originally protected for.

Tasks
1. Operation and maintenance, including fence/gate maintenance, noxious weed treatment, forest management plan development and implementation, public information and management, and taxes on Avista owned and managed habitat protection properties. Specific projects include:
    a. Twin Creek – Continue to develop site plan and install infrastructure that will allow public use of this property that was acquired in 2016. Work will include noxious weed control, enforcement, and development of revegetation/wetland enhancement plans for the property.
    b. South Fork Bull River Wildlife Management Area complex – Activities include monitoring, weed control, development of infrastructure (roads, parking areas, fences), development of timber management plan, enforcement, etc.
    c. Monitoring of other Avista owned habitat properties and implementing management measures as needed.
    d. Wood Duck Property Re-Vegetation Maintenance.

Work Products
- All work associated with this Project Plan will be documented in the 2021 Annual Work Summary. Due Date: December 1, 2021.

Cultural Resource Survey Needs
Work proposed under this Project Plan will either: 1) not involve any ground disturbing activities or impact historic resources, or 2) will be performed under the cultural assessment associated with the specific proposed project.

Benefit to the Resource
Helps ensure that habitat properties held by Avista continue to provide the resource benefits for which they were originally protected for.

Budget

Item	Estimated Carryover	2021 Budget Request
Contract/Avista Labor and materials	$0	$30,000
Contract/Avista Labor and materials	$0	$5,000
Avista Labor and materials	$0	$5,000
Contract/Avista Labor and materials	$0	$8,100
Total	$0	$48,100
Anticipated Expenditures		$48,100

2021 PROJECT PLAN

Wood Duck Property Re-Vegetation Maintenance

Project Contact

Brita Olson, Lower Clark Fork Watershed Group (LCFWG), (208) 304-3852, brita@lowerclarkforkwatershedgroup.org and,
Arthur D. Potts, Avista, (406) 847-1283, arthur.potts@avistacorp.com

Project History

This project is part of a continuing effort to improve the riparian area and habitat quality on Avista's Wood Duck property. After the Wood Duck property was purchased in 2004, wetland improvements (plugging drainage ditches) and re-vegetation work was initiated in 2010 and fully implemented in 2012. Ongoing maintenance of revegetation efforts has been completed in the years since with support from Appendix K and Appendix B.

Background

The original re-vegetation effort consisted of installing 13 large exclosures built of weed matting meant to suppress reed canary and other pasture grasses and metal fencing (in 2010). After two years (in 2012), the exclosures were planted with native tree and shrub species. In 2016 and 2017, extensive maintenance was completed throughout the project area to fix damaged fencing, remove failing exclosures (located in the sedge wetland that is inundated late into the summer and not conducive to becoming a willow nursery as the contractor who designed the project had intended), and plant additional trees and shrubs in exclosures that had seen heavy browse or low initial survival. The project now consists of 11 exclosures that are well established and quite robust (Figure 1).

Next year (2021) will be the vegetation's 10th growing season and time for the exclosures to be "released". Already, many of the shrub species are growing through the fencing, and it is important to remove the fencing before it causes a hinderance to continued growth. Because much of the vegetation is now well-established shrubs species, such as alder, willow and red osier dogwood, and well above the height of existing fences (>6 feet), it should be resilient to ungulate browse. Should beaver utilize the area, this is now likely to stimulate, rather than inhibit growth for beaver-adapted shrub species like those listed above. In order to reduce pressure on any individual exclosures, all will be removed in a short time frame (1-2 weeks during spring of 2021). Because tree species (cottonwood, conifers, etc.) may still be vulnerable to browse, as exclosures are removed materials will be repurposed to provide protection for select tree species that project partners would like to persist in the riparian corridor over the long-term (50-100 years or more).

Monitoring (photo points, vegetation survival – method TBD) will be completed as exclosures are removed and at least 1 year after (2022), in order to quantify any impacts from browse. It may be repeated in future years, as desired, in order to inform adaptive management of revegetation efforts throughout the drainage.

Figure 1. A robust hedge of riparian vegetation now lines the Bull River on the Wood Duck property.

Following the completion of the above tasks, it is expected that the established vegetation will require considerably less ongoing maintenance in the future – only annual or biennial monitoring/maintenance of individually protected trees will be needed. This invites the opportunity to consider any additional opportunities on the property and long-term management goals for habitat and vegetation. In 2021, LCFWG Coordinator will also work with Arthur Potts (Avista) to evaluate habitat restoration opportunities to inform a long-term management strategy for the property.

Goal

Enhance riparian habitat along the mainstem Bull River, for the long-term benefit of native salmonids, birds, and other wildlife species.

Objectives

1. Maintain existing revegetation project on the Wood Duck property in order to promote its long-term sustainability and maximize the benefit it provides to fish and wildlife.
2. Inform the development of a property management plan for the Wood Duck property.

Tasks

1. Remove 11 metal fenced exclosures from established vegetation along the riparian area on the Wood Duck property. (Objective 1)
2. Use salvaged material to protect individual trees (5-10 per exclosure) throughout the project area. (Objective 1)
3. Cache salvage material for future use and dispose of or recycle waste materials – likely bent and unusable t-posts and mangled welded wire fencing. (Objective 1 and, possibly, Objective 2)
4. Finalize monitoring methods and collect "baseline" data as exclosures are removed. Monitoring will include, at minimum, photo points and a measure of plant survival. (Objective 1 and 2)
5. Develop priorities for long-term habitat restoration and enhancement on the Wood Duck property in consultation with Arthur Potts (Avista) and other stakeholders, such as Kaniksu Land Trust and Montana Fish, Wildlife & Parks. (Objective 2)

Work Products

- Annual Work Summary (2021); due to Avista by November 15, 2021.

Permitting Requirements

Not applicable for the tasks proposed in this project plan.

Cultural/Historic Resource Review

This is a maintenance project and the cultural/historic resource review was completed in 2010 by the Cultural Resources Management Group.

Benefit to the Resource

The project will help to restore native vegetation (including large woody vegetation) to the riparian area and replace some of the non-native reed canarygrass that dominates much of the Bull River banks. While woody species may eventually provide improved habitat for fish in the river, the more diverse regime of native plants will also provide improved riparian habitat for wildlife species such as birds, ungulates and beaver. This is one of many re-vegetation projects in the Bull River of similar design. Collectively, the conversion of grassy riverbanks to woody shrubs and trees with more extensive and diverse root structures could contribute to improved water quality along the Bull River. The river is impaired for sediment, which comes largely from bank erosion, and this project will ideally be helping meet the Bull River's TMDL for sediment, increase bank stabilization, improve riparian health and the overall function of this river system.

Located on one of the CFSA's first habitat acquisitions, this project is in line with the goals of Appendix K. It also supports the habitat enhancement goals of Appendix B.

Budget

Item	Estimated Carryover	2021 Budget Request
Contract labor (Montana Conservation Corps crew), 1 week of 4-6 person fully equipped crew. Additional labor (if-needed) will be recruited from volunteers and in-kind contributions from partners.	$0	$5,000
LCFWG staff time, approx. 80 hours (crew and volunteer oversight, project coord, and long-term planning)	$0	$2,480
LCFWG travel (crew and volunteer oversight, site visit with property stakeholders, etc.)	$0	$500
Miscellaneous tools and materials (post-puller, wire snips, etc.)	$0	$120
Total	$0	$8,100
Anticipated 2021 Expenditures		$8,100

2021 PROJECT PLAN

Habitat Acquisition and Conservation and Contingency Fund

Project Contact
Arthur D. Potts, Avista, (406) 847-1283, arthur.potts@avistacorp.com

Project History
This is a continuing project that has been approved annually by the Management Committee.

Background
This program is focused on protecting habitat associated with the Clark Fork Project, with a focus on those areas that provide riparian and wetland resource values.

Objectives
1. Provide a funding source for due diligence on potential habitat protection projects in order to provide a detailed proposal for Management Committee consideration.
2. Once approved by the Management Committee, provide funding to acquire and protect habitat properties.

Tasks
1. Funding is available to conduct due diligence (landowner discussions, property inspection, habitat information, title search, and appraisal), in order to provide the Management Committee a detailed proposal for their consideration. Includes working with partners such as Kaniksu Land Trust on identifying and vetting potential projects.

Work Products
- All work associated with this Project Plan will be documented in the 2021 Annual Work Summary. Due Date: December 1, 2021.

Cultural Resource Survey Needs
Work proposed under this Project Plan will either: 1) not involve any ground disturbing activities or impact historic resources, or 2) will be performed under the cultural assessment associated with the specific proposed project.

Benefit to the Resource
Provides mechanism to fully evaluate habitat protection opportunities to ensure that resource benefits are aligned with Clark Fork Settlement Agreement goals and priorities.

Budget

Item	Estimated Carryover	2021 Budget Request
Contract/Avista Labor	$0	$60,000
Total	$0	$60,000
Anticipated Expenditures		$60,000

2021 ANNUAL IMPLEMENTATION PLAN SUMMARY– APPENDIX L

Clark Fork Project, FERC No. 2058
Cabinet Gorge and Noxon Rapids Hydroelectric Developments

Title
Black Cottonwood Habitat Protection and Enhancement

Implementation Staff Lead
Arthur D. Potts, Avista, (406) 847-1283, arthur.potts@avistacorp.com

Project History
This work is a continuation of work previously approved by the Management Committee.

Background
The purpose of this measure is to provide for the protection of black cottonwood trees and stands on Avista owned project lands through the development of site-specific management and enhancement plans for three specific cottonwood sites identified by the Wildlife, Botanical, and Wetlands Work Group. Additionally, existing stands and trees will be protected through the implementation of land use classifications in the Land Use Management Plan (LUMP).

Site-specific management plans were developed in 2000. Efforts in 2021 will focus on the continued protection of black cottonwood stands and trees through the implementation of land use classifications in the LUMP. The site-specific enhancement efforts at Hereford Slough (completed in early 2003 and treated again in 2007) will continue to be monitored to determine response and implement additional management efforts as needed.

An 80 x 80-foot woven wire exclosure was built in the spring of 2015 and a 160 x 160-foot exclosure in December 2020 in the Hereford Slough cottonwood stand. Regeneration occurs from exposed roots, cutoff stumps and seed germination. Efforts in 2021 will include continued monitoring of the exclosures and conduct any needed maintenance to the fence that is needed.

2021 Project Plans
- Continue to protect black cottonwood stands along the Clark Fork Project through the implementation of the Land Use Management Plan.
- Continue to monitor and maintain the exclosures at Hereford Slough.

Work Products
- All work associated with this Project Plan will be documented in the 202 Annual Work Summary. Due Date: December 1, 2021.

Cultural/Historic Resource Review
Ground and vegetation disturbance will take place in an area previously surveyed for the original enclosure construction in 2015. Therefore, no additional cultural resource surveys will be required.

Benefit to the Resource

Benefits are protecting and managing existing black cottonwood stands. These stands provide high wildlife value but are relatively limited in distribution along the Clark Fork Project.

Appendix L 2021 Budget

Item	Carryover[1]	2021
Black Cottonwood Habitat & Enhancement Fund		**$7,147**
Unexpended funds w/interest		**$89,555**
Total Available		**$96,702**
Monitor and maintain Hereford and Noxon Slough stands and exclosures	$15,000	$0
Total	$15,000	$0
MC Approved Budget		**$15,000**
Unobligated Funds		$81,703

[1]This column denotes estimated carryover of unexpended, approved funds as of January 1.

2021 ANNUAL IMPLEMENTATION PLAN SUMMARY– APPENDIX M

Clark Fork Project, FERC No. 2058
Cabinet Gorge and Noxon Rapids Hydroelectric Developments

Title
Wetland Protection and Enhancement Program

Implementation Staff Lead
Arthur D. Potts, Avista, (406) 847-1283, arthur.potts@avistacorp.com

Project History
This is a continuation of work previously approved by the Management Committee (MC).

Background
The purpose of this measure is to provide for the protection of wetlands occurring on Avista owned project lands, and for the evaluation and potential enhancement of selected wetland areas. The overall goal is to ensure no net loss of wetlands, or of wetland function and values in certain high-priority wetland areas while also evaluating opportunities for enhancements.

2021 Project Plans
- Continue to develop wetland enhancement plan for the 2016 Twin Creek acquisition.
- Monitor enhancements previously completed at Hereford Slough, McKay Creek, Finley Flats, and Blacktail Bay/Islands.

Work Products
- All work associated with this Project Plan will be documented in the 2021 Annual Work Summary. Due Date: December 1, 2021.
- If it appears either project is feasible, a specific proposal will be developed for MC review.

Cultural/Historic Resource Review
No ground or vegetation disturbance is planned for 2021, therefore no cultural resource surveys will be required.

Benefit to the Resource
Benefits are preserving or enhancing of certain high value wetland habitat, including their function and values.

As approved by the Management Committee on 3/17/2021

Appendix M 2021 Budget

Item	Carryover[1]	2021
Wetlands on Avista Property		**$0**
Unexpended funds w/interest		**$135,900**
Total Available		**$135,900**
Continue to develop Twin Creek wetland enhancement plan	$10,000	$0
Monitoring previously completed enhancement projects	$0	$0
Total	$10,000	$0
MC Approved Budget		**$10,000**
Unobligated Funds		$125,900

[1]*This column denotes estimated carryover of unexpended, approved funds as of January 1.*

2021 ANNUAL IMPLEMENTATION PLAN SUMMARY– APPENDIX P

Clark Fork Project, FERC No. 2058
Cabinet Gorge and Noxon Rapids Hydroelectric Developments

Title
Forest Habitat Protection and Enhancement

Implementation Staff Lead
Arthur D. Potts, Avista, (406) 847-1283, arthur.potts@avistacorp.com

Project History
This is a continuation of work previously approved by the Management Committee.

Background
The purpose of this measure is to provide for the protection and enhancement of specific forest habitat parcels of Avista project land along the reservoirs. The Wildlife, Botanical, and Wetland Work Group identified these parcels as having significant wildlife habitat value.

2021 Project Plans
1. Continue to manage those areas that have been classified as Conservation 1, and as such are afforded the maximum protection provided through the Land Use Management Plan.
2. Honey Flats is being managed to minimize impacts to the site (e.g., no motorized vehicles, no timber harvest, and minimize human use of site). The Confederated Salish and Kootenai Tribe and CRMG have expressed an interest in having this site managed for traditional plants and uses. Continue to work with the Confederated Salish and Kootenai Tribe to define management options.
3. Continue to monitor and enforce the road closure to Stevens Creek Point (closure was instituted in 2001).
4. Continue to prohibit motorized use of Finley Flats Point.
5. Continue to utilize the Montana Fish Wildlife and Parks Block Management Program to provide hunter access to the Tuscor, South Fork Bull River, and Wood Duck properties.
6. Continue weekly patrols of the forested lands surrounding the State Shop property and continue to reduce the amount of disturbance and litter in this area.
7. Initiate timber stand improvement efforts in stands that have disease (beetle kill, root rot, mistletoe, etc.), high fire danger or other problems. This work will be evaluated on a case by case basis and specific proposals will be presented to the TRTAC and MC as they are developed.

Work Products
- All work associated with this Project Plan will be documented in the 2021 Annual Work Summary. Due Date: December 1, 2021.

Cultural/Historic Resource Review
If a specific proposal is developed in 2021, it will be evaluated by CRMG to determine cultural resource survey needs.

Benefit to the Resource
Benefits include the protection, and where appropriate, enhancement of timber stands on specific Avista owned project lands.

Appendix P 2021 Budget

Item	Carryover[1]	2021
Forest Habitat for Selected Avista Lands Annual Fund (Periodic)[2]		**$5,000**
Unexpended funds w/interest		**$0**
Total Available		**$5,000**
Monitoring and ongoing management activities	$0	$5,000
Total	$0	$5,000
MC Approved Budget		**$5,000**
Unobligated Funds		$0

Item	Carryover[1]	2021
Timber Revenue[3]		**$0**
Unexpended funds		**$226,818**
Total Available		**$226,818**
Total	$0	$0
MC Approved Budget		**$0**
Unobligated Funds		$226,818

[1]This column denotes estimated carryover of unexpended, approved funds as of January 1.
[2] Periodic costs are one-time costs. Avista will pay the actual costs as approved by the Management Committee.
[3] Any costs associated with implementing these projects will be covered by the revenue of the sale.

2021 ANNUAL IMPLEMENTATION PLAN SUMMARY– APPENDIX Q

Clark Fork Project, FERC No. 2058
Cabinet Gorge and Noxon Rapids Hydroelectric Developments

Title
Reservoir Island Protection

Implementation Staff Lead
Arthur D. Potts, Avista, (406) 847-1283, arthur.potts@avistacorp.com

Project History
This is a continuation of work previously approved by the Management Committee.

Background
The purpose of this measure is to provide for the protection of islands owned by Avista in the project reservoirs. The goal is to maintain the unique and high-quality wildlife habitat functions and values of these islands.

2021 Project Plans
- Continue to ensure restrictions developed for the protection of these areas utilizing the land use classifications described in the Land Use Management Plan.

Work Products
- All work associated with this Project Plan will be documented in the 2021 Annual Work Summary. Due Date: December 1, 2021.

Cultural/Historic Resource Review
No cultural resource surveys will be needed for this Protection, Mitigation, and Enhancement measure.

Benefit to the Resource
Protect and maintain the unique and high-quality wildlife habitat functions and values of these islands.

As approved by the Management Committee on 3/17/2021

Appendix Q 2021 Budget

Costs covered through implementation of Appendix G.

Item	Carryover[1]	2021
Reservoir Island Protection (Periodic)[2]		**$0**
Unexpended funds w/interest		**$0**
Total Available		**$0**
Costs for this measure are covered in the implementation of the Land Use Management Plan (Appendix G)	$0	$0
Total	$0	$0
MC Approved Budget		**$0**
Unobligated Funds		$0

[1]This column denotes estimated carryover of unexpended, approved funds as of January 1.

[2] Periodic costs are one-time costs, Avista will pay the actual costs as approved by the Management Committee.

As approved by the Management Committee on 3/17/2021

2021 ANNUAL IMPLEMENTATION PLAN SUMMARY – APPENDIX R

Clark Fork Project, FERC No. 2058
Cabinet Gorge and Noxon Rapids Hydroelectric Developments

Title
Clark Fork Heritage Resource Program

Implementation Staff Lead
Lisa Vollertsen, Avista, (406) 847-1288, lisa.vollertsen@avistacorp.com

Background
The Clark Fork Heritage Resource Program was an interim program developed in collaboration with the Cultural Resources Management Group (CRMG) during the Clark Fork relicensing process. The program emphasized specific cooperative stewardship strategies for the management of cultural and historic resources, to be implemented by the CRMG following the development of the Clark Fork Heritage Resource Management Plan (HRMP). In 2000, the CRMG developed the HRMP in accordance with the Clark Fork Heritage Resource Program, Clark Fork Settlement Agreement (CFSA), and Programmatic Agreement, to guide the management and mitigation of effects to historic and/or cultural resources associated with the Clark Fork Project. The HRMP was developed to ensure coordination of the protection, mitigation, and enhancement (PM&E) measures associated with the Clark Fork Project with representatives from Coeur d'Alene, Kootenai, Confederated Salish and Kootenai, and Kalispel Tribes, Idaho and Montana State Historic Preservation offices, U.S. Forest Service, and Avista, which collectively make up the CRMG.

2021 Project Plans
1. Clark Fork Heritage Resource Program

Work Products
- Annual Work Summary*; due December 1, 2021
  **Due to potential confidentiality issues associated with cultural resources, some or all of the information collected may not be available to the Management Committee and/or the general public.*

Appendix R 2021 Budget

Project	Carryover[1]	2021
Clark Fork Heritage Resource Program (Estimate)[2]		**$65,000**
Unexpended funds w/interest		**$0**
Total Available		**$65,000**
Clark Fork Heritage Resource Program	$25,000	$40,000
Total	$25,000	$40,000
MC Approved Budget		**$65,000**
Unobligated Funds		$0

[1] *This column denotes estimated carryover of unexpended, approved funds as of January 1.*

[2] *Estimated costs are projections made now; however, Avista will pay the actual costs as approved by the Management Committee.*

2021 PROJECT PLAN

Clark Fork Heritage Resource Program

Project Contact
Lisa Vollertsen, Avista, (406) 847-1288, lisa.vollertsen@avistacorp.com

Project History
This is a continuing project. In 2000, the Cultural Resources Management Group (CRMG) developed the Clark Fork Heritage Resource Management Plan (HRMP) in accordance with the Clark Fork Heritage Resource Program, Clark Fork Settlement Agreement (CFSA), and Programmatic Agreement, to guide the management and mitigation of effects to historic and/or cultural resources associated with the Clark Fork Project. The scope and budget for this project are reviewed by the Management Committee annually.

Background
The Clark Fork Heritage Resource Program was an interim program developed in collaboration with the CRMG during the Clark Fork relicensing process. The program emphasized specific cooperative stewardship strategies for the management of cultural and historic resources, to be implemented by the CRMG following the development of a Programmatic Agreement and the HRMP. The HRMP was developed to ensure coordination of the protection, mitigation, and enhancement (PM&E) measures associated with the Clark Fork Project with representatives from Coeur d'Alene, Kootenai, Confederated Salish and Kootenai, and Kalispel Tribes, Idaho and Montana State Historic Preservation offices, U.S. Forest Service, and Avista, which collectively make up the CRMG.

Goal
The goal of this program is to provide cooperative, long-term, and flexible management of eligible historic and prehistoric resources on Avista project lands.

Objectives
1. Protect and preserve culturally and historically sensitive areas within the Avista Clark Fork project area.

2. Increase public awareness of the historic evolution to provide future generations the opportunities to better understand and respect the past.

3. Meet legal regulatory obligations and responsibilities of the Programmatic Agreement and CFSA.

Tasks
1. Schedule and host CRMG meeting(s). Review project plans for aquatic and terrestrial resources that have the potential to impact historic or cultural resources to determine if additional survey or documentation is necessary prior to the initiation of the project. (Objectives 1 and 3)

2. Continue annual monitoring of culturally-sensitive sites as determined by the CRMG. (Objectives 1 and 3)

3. Continue implementation of the Cultural Interpretation and Education Plan (i.e., camas interpretive display at Cabinet Gorge). (Objectives 2 and 3)

4. Continue working on the Honey Flats Botanical Assessment. (Objectives 1 and 2)

5. Conduct site-specific surveys and/or monitoring for projects, as needed (i.e., projects with proposed ground-disturbing activities, land transactions, and land use requests). Review, assess, and mitigate potential impacts of maintenance and upgrade of Avista's Clark Fork Project historic properties. (Objectives 1 and 3)

Work Products

- Annual Work Summary*; due December 1, 2021
  **Due to potential confidentiality issues associated with cultural resources, some or all of the information collected may not be available to the Management Committee and/or the general public.*

Permitting Requirements

Not applicable for the tasks proposed in this project plan.

Cultural/Historic Resource Review

Not applicable for the tasks proposed in this project plan, there are no ground disturbing activities or proposed impacts to cultural/historic resources.

Benefit to the Resource

The CRMG was developed as a result of CFSA Appendix R Clark Fork Heritage Resource Program, and corresponds to the FERC License Article 427 for the Clark Fork Project No. 2058 and Programmatic Agreement. Implementation of the Clark Fork Heritage Resource Program, HRMP, and Programmatic Agreement satisfies Section 106 of the National Historic Preservation Act for the Cabinet Gorge and Noxon Rapids projects.

Budget

Item	Estimated Carryover	2021 Budget Request
Meeting(s)	$0	$15,000
Annual Site Monitoring	$0	$25,000
Cultural Interpretation and Education Plan	$12,500	$0
Honey Flats Botanical Assessment	$12,500	$0
Total	$25,000	$40,000
Anticipated Expenditures		$65,000

Site-specific surveys and/or monitoring for projects as needed are funded through individual project plans.

2021 ANNUAL IMPLEMENTATION PLAN SUMMARY– APPENDIX S

Clark Fork Project, FERC No. 2058
Cabinet Gorge and Noxon Rapids Hydroelectric Developments

Title
Erosion Fund and Shoreline Stabilization Guidelines Program

Implementation Staff Lead
Arthur D. Potts, Avista, (406) 847-1283, arthur.potts@avistacorp.com

Project History
This is a continuation of work previously approved by the Management Committee.

Background
The purpose of this measure is to provide funds to ameliorate adverse impacts to resources of interest caused by the continued operation of the Clark Fork Projects. Resources of interest include important cultural or natural resources, and private or public property not covered by applicable easement. The PM&E measure also calls for the distribution of the Erosion Control Guidelines Manual, developed in 2000, to interested individuals.

A geotechnical firm will be retained for review of proposals Avista receives from adjacent landowners for erosion control projects.

2021 Project Plans
- Address erosion concerns identified by the Cultural Resources Management Group (CRMG).
- Continue to evaluate and provide technical assistance for an erosion control project being undertaken by an adjacent landowner on Noxon Reservoir (Vermilion Point Area). This is a continuation of a 2017 project. The ability to complete this project will depend upon the adjacent landowner's availability.
- Utilize a geotechnical contractor to assist with evaluating erosion control proposals received by Avista.

Work Products
- Due to the confidential nature of cultural sites, CRMG directed work will not be reported on as part of the public reporting process.
- Work with the adjacent landowner on Noxon Reservoir to complete the project, although completion of this project will be based on the landowner's availability to do the work. November 1, 2021.
- All work associated with this Project Plan will be documented in the 2021 Annual Work Summary. Due Date: December 1, 2021.

Cultural/Historic Resource Review
Work proposed under this fund will be addressed by the CRMG for each project as they are identified.

Benefit to the Resource

Benefits are provided by addressing impacts to resources of interest caused by erosion attributed to the continued operation of the Clark Fork Project. Resources of interest include important cultural or natural resources, and private or public property not covered by applicable easement.

Appendix S 2021 Budget

Item	Carryover[1]	2021
Erosion Fund and Shoreline Stabilization Annual Fund (Fund with Cap)[2]		**$0**
Unexpended funds w/interest		**$200,000**
Total Available		**$200,000**
Address erosion concerns identified by CRMG	$0	$50,000
Geotechnical support and working with adjacent landowner on Noxon Reservoir	$8,000	$0
Total	$8,000	$50,000
MC Approved Budget		**$58,000**
Unobligated Funds		$142,000

[1]This column denotes estimated carryover of unexpended, approved funds as of January 1.

[2] Funds are dollars made available annually (up to $40,000 per year until reaching a cap of $200,000).

2021 ANNUAL IMPLEMENTATION PLAN SUMMARY – APPENDIX T

Clark Fork Project, FERC No. 2058
Cabinet Gorge and Noxon Rapids Hydroelectric Developments

Title
Project Operations Package

Implementation Staff Lead
Eric Oldenburg, Avista, (406) 847-1290, eric.oldenburg@avistacorp.com

Background
The Project Operations Package outlines the General Operating Limits (minimum flow below the Cabinet Gorge Dam and water level fluctuation limits in both project reservoirs) that were agreed to in the Clark Fork Settlement Agreement (CFSA). Within these limits, Avista utilizes peaking operations at Noxon Rapids and Cabinet Gorge dams. Mitigation for any negative effects of peaking operations within the General Operating Limits is carried out within other Protection, Mitigation, and Enhancement (PM&E) programs (e.g., the Montana and Idaho tributary enhancement programs, the Bull Trout Protection and Public Education Project, and the Watershed Council Program). Therefore, historically, the Project Operations Package has only encompassed maintenance of the General Operating Limits and the requirement to coordinate project operations with the operators of the Albeni Falls Project.

Prior to the CFSA, the minimum discharge requirement through Cabinet Gorge Dam was 3,000 cubic feet per second (cfs). Through the CFSA, this minimum discharge requirement was increased to 5,000 cfs. However, the CFSA also defined a 10-year period of study to evaluate any effects of the change in minimum flow. This evaluation was completed in 2011 and concluded that the increased minimum discharge requirement provided no measurable benefit to fish populations in the lower Clark Fork River when compared to the previous minimum flow of 3,000 cfs (Ryan and Jakubowski 2012). Thus in 2017, as part of the first amendment to the CFSA, the Management Committee (MC) agreed to reinstate the 3,000 cfs minimum flow requirement for Cabinet Gorge Dam from November 1 through September 14 and the minimum flow will remain at 5,000 cfs from September 15 to October 31. An order issued by FERC on December 18, 2017 approved the new minimum flows which are now effective. Along with this agreement, Avista made an additional funding commitment to address any remaining uncertainty over any question of potential effects of the reduced minimum flow. The funding commitment was a one-time addition of $1,000,000 (not subject to escalation) to the CFSA Appendix T fund, which Avista holds in trust. Use of these dollars is restricted to capital projects and may not be used for operations or maintenance of existing or new sites or facilities. Further, any use of these funds shall be approved by the MC pursuant to the Annual Implementation Plan process.

2021 Project Plans
1. Project Operations and Coordination
2. Cabinet Gorge Fish Hatchery Spring Water Collection System Upgrade
3. Clark Fork River (Derr Island) Boating Access Site Improvement (***New***)

Work Products

Project Operations and Coordination

- Annual Work Summary; due December 1, 2021

Cabinet Gorge Fish Hatchery Spring Water Collection System Upgrade

- Bid-ready design; due September 30, 2021
- As-built drawings (for development of wet well); due December 1, 2021
- Annual Work Summary; due December 1, 2021

Clark Fork River (Derr Island) Boating Access Site Improvement

- Annual Work Summary; due December 1, 2021

Appendix T 2021 Budget

Project	Carryover[1]	2021
Project Operations Package[2]		**$0**
Unexpended funds		**$684,767**
Total Available		**$684,767**
Project Operations and Coordination	$0	$0
Cabinet Gorge Fish Hatchery Spring Water Collection System Upgrade	$159,000	$0
Clark Fork River (Derr Island) Boating Access Site Improvement	$0	$18,380
Total	$159,000	$18,380
	MC Approved Budget	**$177,380**
	Unobligated Funds	$507,387

[1] This column denotes estimated carryover of unexpended, approved funds as January 1.

[2] A one-time $1 million allocation made available beginning in 2018 and not subject to interest.

2021 PROJECT PLAN

Project Operations and Coordination

Project Contact
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Project History
This is a continuing project that has been implemented since the Clark Fork Settlement Agreement (CFSA) became effective; however, this is the fourth year Project Operations and Coordination have been outlined in a Project Plan.

Background
Prior to 2018, project operations and coordination were the only activities conducted under Appendix T. In light of this, and because all associated costs are borne by Avista, these activities were simply described in the Annual Implementation Plan Summary. Now that additional funding has been added and additional projects proposed within Appendix T, the project operations and coordination information has been removed from the Summary and transferred to this Project Plan.

The General Operating Limits for Noxon Rapids (Table 1) and Cabinet Gorge (Table 2) dams were defined in the CFSA and Amendment No. 1 to the CFSA. Any deviations from the General Operating Limits will be conducted in accordance with the Appendix F4 Water Quality Protection and Monitoring Plan. Note the General Operating Limit for Cabinet Gorge Dam minimum discharge was changed from 5,000 cubic feet per second (cfs) to 3,000 cfs in accordance with Amendment No. 1 to the CFSA; however, minimum discharge remains at 5,000 cfs during the "Bull Trout window" from September 15 through October 31.

TABLE 1. Noxon Rapids Dam General Operating Limits

Operation	General Operating Limit
Maximum forebay elevation (feet)	2,331.0
Minimum forebay elevation (feet)	2,327.0 (May 15–Sept. 30)
	2,321.0 (Oct. 1–May 14)
Maximum forebay draft rate	2 feet per day (net)
	5 feet per week (net)

TABLE 2. Cabinet Gorge Dam General Operating Limits

Operation	General Operating Limit
Maximum forebay elevation (feet)	2,175.0
Minimum forebay elevation (feet)	2,168.0
Minimum discharge (cfs)	3,000 (Nov. 1–Sept. 14)
	5,000 (Sept. 15–Oct. 31)

Goal
Ensure appropriate operations at Noxon Rapids and Cabinet Gorge dams in the interest of protecting the natural resources and access to those resources.

Objective

1. Ensure appropriate project operations and coordination at Noxon Rapids and Cabinet Gorge dams.

Tasks

1. Maintain operating procedures for Cabinet Gorge Dam that will ensure compliance with the minimum flow (i.e., discharge) General Operating Limit. Ensure that the specified minimum flow was maintained, either through discharge or operational data available at the dam and/or utilizing the USGS Clark Fork River below Cabinet Gorge Dam gaging station data (located approximately ¼ mile downstream of dam). In the event that these operating procedures are interrupted, implement the Water Quality Protection and Monitoring Plan as identified in CFSA Appendix F4.

2. Maintain operating procedures for the Cabinet Gorge and Noxon Rapids dam that will ensure that the reservoir (i.e., forebay) water level fluctuation limitations, as outlined in the General Operating Limits tables above, are maintained. Maintain appropriate documentation of forebay water levels utilizing data available at the dam/powerhouse control room. In the event that these operating procedures are interrupted, implement the Water Quality Protection and Monitoring Plan as identified in CFSA Appendix F4.

3. Continue to provide daily discharge forecasts for Cabinet Gorge to the Albeni Falls (USACE) Project, per a January 7, 1999 Letter of Agreement.

Work Products

- Annual Work Summary; due December 1, 2021

Permitting Requirements

Not applicable for the tasks proposed in this project plan.

Endangered Species Act consultation for this project plan is associated with the 2019 Biological Opinion on the effects of continued operation of the Clark Fork Hydroelectric Project on Bull Trout and designated Bull Trout critical habitat. Incidental take reporting for this project plan will be included in the annual Biological Opinion report as required by Term and Conditions 15–18 of the 2019 Incidental Take Statement.

Cultural/Historic Resource Review

Not applicable for the tasks proposed in this project plan, there are no ground and/or vegetation disturbing activities, or proposed impacts to cultural/historic resources.

Benefit to the Resource

The General Operating Limits and coordination protocols are requirements of the CFSA. The General Operating Limits are designed to minimize negative effects of project operations on fisheries and other natural resources as well as recreational interests.

Budget

- All costs associated with this Project Plan are borne by Avista and are not part of any PM&E funds.
- The cost of maintenance of all General Operating Limits and accurate FERC reporting are borne by Avista as part of general project administration and operation costs and are not part of any PM&E funds.
- The costs of developing coordination protocols and providing the daily discharge forecasts for Cabinet Gorge Dam will be borne by Avista as part of general project administration and operation costs and are not part of any PM&E funds.

2021 PROJECT PLAN

Cabinet Gorge Fish Hatchery Spring Water Collection System Upgrade

Project Contact
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Ken Bouwens, Idaho Department of Fish and Game (IDFG), (208) 769-1414,
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Project History
This is a carryover project that was originally approved in 2018. No additional funding is being requested for 2021, but the funding approved in 2020 is being reallocated.

Background
The Cabinet Gorge Fish Hatchery (hatchery) is in Idaho, approximately one mile downstream of Cabinet Gorge Dam, and is operated by IDFG. The hatchery utilizes wells and a spring collection system to supply water for hatchery fish production. The spring collection system is also utilized by Avista to operate a fish ladder trap near the hatchery from August through mid-October for the purpose of capturing Bull Trout. The spring water is also used for holding adult Bull Trout and Westslope Cutthroat Trout at the Cabinet Gorge Fish Handling Facility (CGFHF) prior to upstream transport which occurs from late-March through mid-October (Bernall and Duffy 2019) and for acclimating transported Montana subadult Bull Trout to Clark Fork River temperatures prior to release (March through November).

The water supply from the spring collection system has been sufficient for all activities when minimum flows in the Clark Fork River downstream of Cabinet Gorge Dam are 5,000 cubic feet per second (cfs). In the fall of 2017, the Management Committee (MC) approved the Clark Fork Settlement Agreement amendment modifying the minimum flows below Cabinet Gorge Dam to 3,000 cfs, except for a minimum flow requirement of 5,000 cfs between September 15 and October 31. This change in minimum flow has the potential to affect the water level in the spring collection system, especially in years of drought. This could ultimately reduce the amount of spring water available when the hatchery is in operation and the CGFHF and fish ladder trap are being operated.

The spring water supply to these facilities is monitored closely during low flow conditions to better define what, if any, scenarios lead to issues with the current water supply system. To date, there have been a few instances where spring water supply to the facilities has been limited resulting in a suboptimal amount of water being available to operate the fish ladder trap. One occurrence took place in 2015. Clark Fork River incoming flows were lower than 5,000 cfs and the amount of spring water available to meet the needs of all three facilities was limited. Another occurrence took place in 2019. From mid-August through mid-September flows in the lower Clark Fork River were near the minimum flow requirement of 3,000 cfs for a 12-hour period during construction of the Cabinet Gorge Dam Fishway cofferdam. During this time period the amount of spring water available in the collection basin was limited, and to compensate for the lack of available water the flows used to operate the fish ladder trap were decreased to 25% of normal. These low flows were not effective at attracting Bull Trout into the ladder trap. No Bull

Trout were captured in the ladder trap until flows were increased to normal operation in mid-September. There have been other instances when one of the hatchery spring water pumps have failed resulting in a limited supply of spring water.

The 2019 spring water supply monitoring results have highlighted the need to fix this problem soon and develop a solution to increase the spring water that is available for use at the hatchery, CGFHF, and fish ladder trap. An investigation was led in 2002 to evaluate options for making additional water available at the hatchery. This evaluation provided recommendations to increase spring water available at the site (Land & Water Consulting, Inc, 2002). The first recommendation was to rehabilitate the collection gallery and spring box by installing a drain curtain or deepening the collection gallery to intercept a thicker saturated portion of the water table aquifer.

Avista and IDFG selected an engineer (RivHab) in early 2020 to assist with the project. To get a better understanding of the substrate at the project site, a test pit was dug to the west of the current spring collection system in a location where spring water had been observed exiting the bank in recent years. One of the objectives of this Project Plan is to develop a back-up water supply for the CGFHF. The project team decided to develop the test pit that was dug in late July of 2020 into a wet well that could eventually be developed into a spring water supply for the CGFHF. Pump drawdown tests at the site produced consistent flow ranging up to 100 gpm during 3,000 cfs minimum flows in September. The engineer on the project will be working on design drawings for the pump and piping needed to develop the wet well over the 2020/2021 winter to be constructed in the spring of 2021.

At the same time the project team has decided to plan to completely redo the current spring collection system that supplies water to the hatchery, CGFHF, and fish ladder trap. The construction window needed for this project is likely a few months; therefore, IDFG is developing a plan to move fish off site, so the construction can occur hopefully in the summer of 2022. IDFG and Avista will be working with the engineer to develop design drawings for the project and to come up with a project timeline.

There is still potential for a water shortage in the fall of 2021, if drought conditions occur, so IDFG and Avista will be working together to come up with a plan for water use over the short-term, until the larger spring system upgrade can take place. This project plan describes the funding needed to develop the wet well as a water source for the CGFHF and to develop drawings and come up with a plan to construct upgrades to the current spring collection system at the hatchery.

Goal
Maintain a reliable and redundant source of spring water for use at the hatchery, CGFHF and fish ladder.

Objective
1. Construct enhancements to the current hatchery spring water collection system to increase spring water available for use at the hatchery, CGFHF, and fish ladder trap.

Tasks

1. Continue to monitor hatchery spring water availability and operation of pumps that supply spring water during low flows.

2. Develop wet well as spring water supply for CGFHF.

3. Work with design consultant and stakeholders to finalize the design drawings for enhancements to the hatchery spring water collection system.

4. Procure permits and approvals needed for construction of enhancements to the hatchery spring water collection system.

Work Products

- Bid-ready design; due September 30, 2021
- As-built drawings (for development of wet well); due December 1, 2021
- Annual Work Summary; due December 1, 2021

Permitting Requirements

The engineer hired for this project will assist Avista and IDFG personnel in obtaining the required permits.

Endangered Species Act consultation for this project plan is associated with the 2019 Biological Opinion on the effects of continued operation of the Clark Fork Hydroelectric Project on Bull Trout and designated Bull Trout critical habitat (BiOp). This project plan is consistent with the analyses and conclusions contained in the 2019 BiOp and will adhere to all appropriate Terms and Conditions designed to reduce the extent and effects of incidental take on Bull Trout. No incidental take of Bull Trout is anticipated as a result of this project plan; therefore, no take reporting is required.

Cultural/Historic Resource Review

Avista will coordinate Cultural Resources Management Group review for this project prior to implementing the project. The work product for this review will be confidential due to the sensitive nature of the content.

Benefit to the Resource

Kokanee are reared at the hatchery for stocking in Lake Pend Oreille to assist in restoration of the species, which is important as a prey species for Bull Trout. These efforts are part of the IDFG management plan and continuing to optimize the water supply to the hatchery is essential for continuation of this program (IDFG 2019). The spring collection system is also being utilized at the fish ladder trap to capture Bull Trout and at the CGFHF to provide cold water for Bull Trout and Westslope Cutthroat Trout that are held prior to upstream transport. The Native Salmonid Restoration Plan (NSRP) is part of the Clark Fork Settlement Agreement (CFSA) and identifies a need to “establish and maintain connectivity in the Clark Fork Basin for migratory trout” (Avista 1999, Kleinschmidt and Pratt 1998). Montana Fish, Wildlife and Parks (MFWP) and IDFG also support reconnecting native salmonid populations in the lower Clark Fork River through fish passage as detailed in their current state-wide management plans (MFWP 2019,

IDFG 2019). The U.S. Fish and Wildlife Service describes fragmentation as a threat to Bull Trout recovery, further emphasizing the importance of improving Bull Trout capture and holding conditions in the project area (U.S. Fish and Wildlife Service 2015). This project plan lays out a plan to improve the amount of spring water available to the CGFHF and ladder trap, which will ultimately improve conditions for capture and holding of Bull Trout prior to upstream transport. The funds set aside in Appendix T are to address any remaining uncertainty over effects of the change of minimum flow to 3,000 cfs. This project will directly address one of these potential effects.

Budget

Item	Estimated Carryover	2021 Budget Request
Engineering: design of enhancements to spring water system	$55,000	$0
Development of wet well: design/construction	$50,000	$0
Project coordination, planning, permitting and cultural/historic review	$54,000	$0
Total	$159,000	$0
Anticipated Expenditures		$159,000

Literature Cited

Avista Corporation. 1999. Application for New License, Volume III Settlement Agreement, Cabinet Gorge and Noxon Rapids Hydroelectric Projects. Submitted to the Federal Energy Regulatory Commission, Washington, D.C.

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Kleinschmidt Associates, and K. L. Pratt. 1998. Clark Fork River Native Salmonid Restoration Plan. Prepared for Avista Corporation, Spokane, Washington.

Land & Water Consulting, Inc. 2002. Engineering Review and Alternative Source-Water Evaluation for Cabinet Gorge Fish Hatchery, Bonner County, Idaho. Prepared for Avista Corporation, Noxon, Montana.

Montana Fish, Wildlife and Parks. 2019. Montana Statewide Fisheries Management Plan 2019 – 2027. http://fwp.mt.gov/fishAndWildlife/management/fisheries/statewidePlan/

U.S. Fish and Wildlife Service. 2015. Columbia Headwaters Recovery Unit Implementation Plan for Bull Trout (*Salvelinus confluentus*).

2021 PROJECT PLAN

Clark Fork River (Derr Island) Boating Access Site Improvement

Project Contact
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andy.dux@idfg.idaho.gov *and*
Nathan Demmons, Bonner County Parks and Waterways (BCPW), (208) 255-5681 Ext. 4,
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Project History
This is a new project that for 2021. A first phase of improvements at this site were completed in 2020 using IDFG funding sources. The requested funding would allow remaining upgrades to be completed.

Background
The Clark Fork River has increased in popularity with anglers in recent years in response to better fishing. Increased angler interest has created a need for improved boating access to the river, which has been somewhat limited. Prior to 2020, the only developed access sites on the river were located at Johnson Creek and the Clark Fork Driftyard. Both of these sites provide good access when the lake is at summer pool, but are difficult to use during winter pool conditions.

Anglers have increasingly used an unimproved boat launch off of the Johnson Creek Road at the Derr Island bridge to access lower reaches of the river during winter pool conditions. The site is located on Bonner County (County) property and parking has occurred along the Johnson Creek Road. During times of high use, this results in congestion along the roadway and at times has blocked access to the adjacent private hayfield. Boat launching has been done by driving onto a gravel bar that is accessible from the Johnson Creek Road. Further complicating use at this site is a gravel bar located between the launch site and the mainstem Clark Fork River. At low river flows, boaters cannot navigate across the gravel bar. The site is not a managed access site and with higher amounts of use the potential for issues is higher.

In an effort to improve access to the river and address the unmanaged use of the Derr Island site, Idaho Department of Fish and Game (IDFG) and the County cooperated on a first phase of access improvements that were completed in 2020. During construction activities associated with the Clark Fork Delta Restoration Project, IDFG was able to coordinate with contractors to build a gravel access road and boat launch from the Johnson Creek Road to the river channel. This facilitates boat launching at all water levels. The work was done without added cost since a temporary haul road needed to be built in this location for the restoration work to occur. Idaho Department of Fish and Game did provide $5,000 from the statewide Fishing and Boating Access Program to dredge a channel that allows boats to pass from the boat launch into the mainstem Clark Fork River at low river flows. Overall, the work completed in 2020 allowed for much easier boating access and numerous positive comments were received from anglers.

Idaho Department of Fish and Game and the County are proposing additional improvements in 2021 that would allow the site to be managed as a formal access site. These improvements would include widening 350 feet of the Johnson Creek Road to allow for safer parking of boats and trailers, installing signage (i.e., rules of use, define parking area boundaries) and seasonally having a portable toilet on site. As part of this, IDFG and the County are in the process of developing an agreement that defines the roles of each agency as they relate to operation and maintenance of the site. Although not yet formally defined, we anticipate that IDFG will provide routine maintenance at the site as part of the Fishing and Boating Access Program. The County will likely handle any road and parking area maintenance needs. Both agencies are planning to cost-share the annual portable toilet expenses and the cost of installing necessary signage. We are requesting funding to complete the road widening work, which would be contracted out to a construction company.

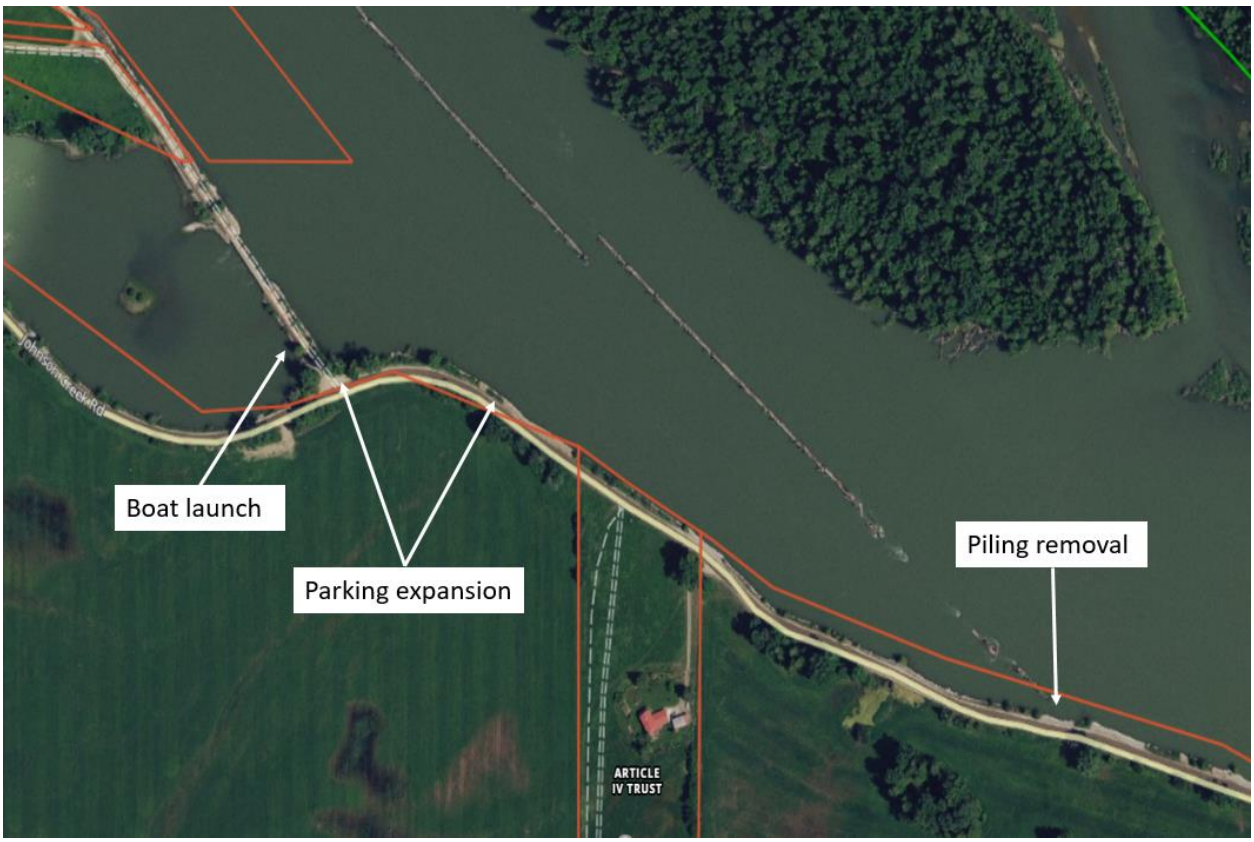

FIGURE 1. Map of the Clark Fork River – Derr Island access site and Clark Fork log boom.

FIGURE 2. Photo of Derr Island bridge and improved access road and boat launch entering from Johnson Creek Road. These upgrades were completed in 2020.

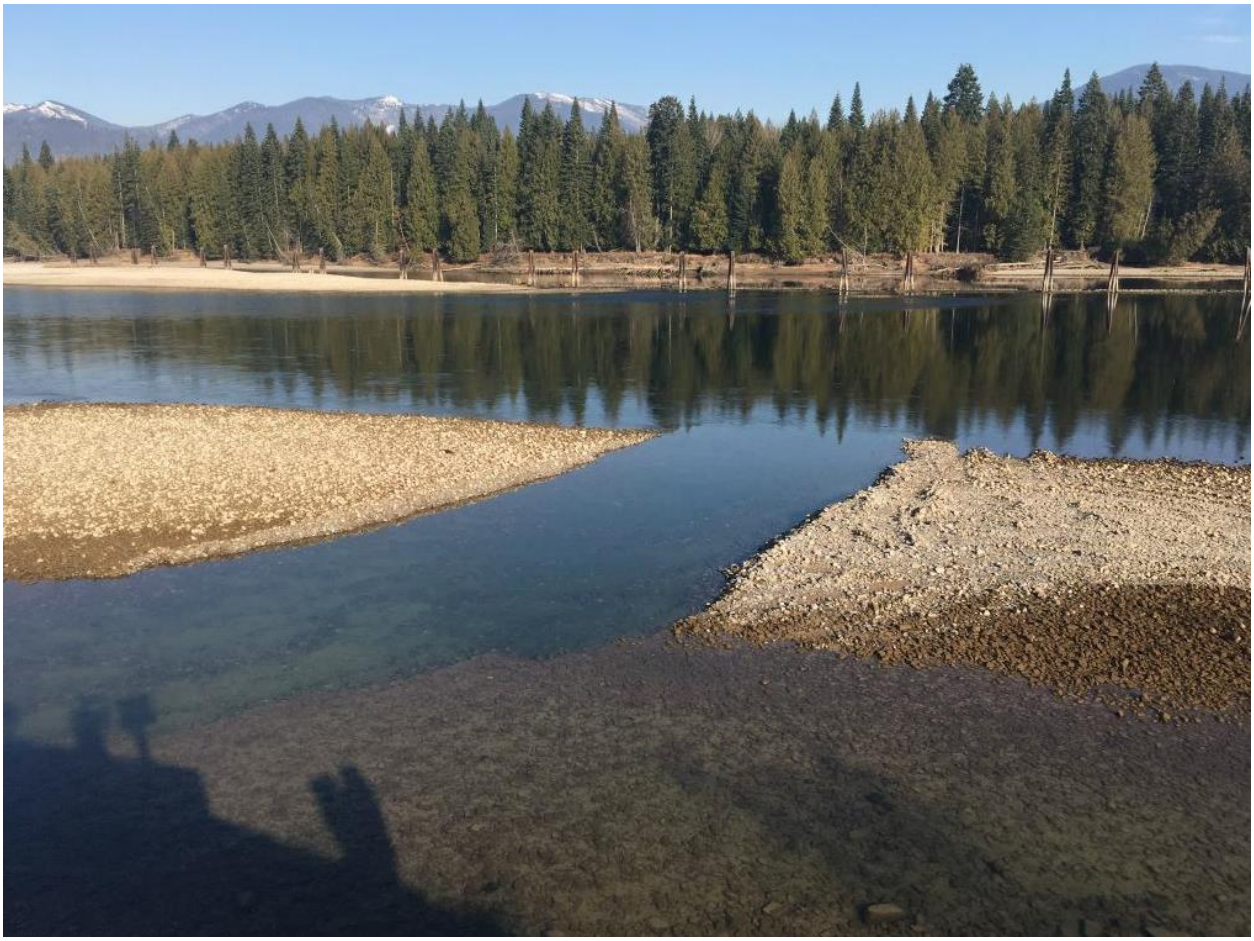

FIGURE 3. Dredged channel that provides low-water access for boats entering the Clark Fork River from the Derr Island access site.

In 2020, Avista opened a boating access site located about two miles downstream of Cabinet Gorge Dam. This site historically provided boating access, but was closed for many years. Re-opening of this site will improve access to the upper reaches of the Clark Fork River and provide a launch site for floating boats that currently does not exist. In order for float boaters to take advantage of this new access site, there is a need for a suitable downstream take-out. Development of the Derr Island access site will provide this; however, it requires boaters to negotiate the log boom that stretches across the channel just upstream of the take-out. This is very difficult to do at times when the river is free flowing. The easiest passage past the log boom is on the upstream end of the structure adjacent to the Johnson Creek Road. However, a group of three old log pilings presents a navigation hazard. These pilings also pose a hazard to motorized boaters who often use this area to pass upstream of the log boom. We are requesting funding to hire a contractor to remove these log pilings. This will remove a navigation hazard for boaters and open up safe float boat access during times of year that it is currently not available.

FIGURE 4. Clark Fork log boom structure and wood pilings proposed for removal. After piling removal, navigation past the log boom by float and motorized boats will be much easier and safer.

Goal

Improve boating access and navigation on the Clark Fork River.

Objectives

1. Complete remaining upgrades to a partially developed access site adjacent to Johnson Creek Road and the Derr Island bridge.

2. Remove old wood pilings at the upstream end of the Clark Fork log boom that currently poses a navigation hazard to boaters.

3. Complete construction/piling removal activities during 2021.

Tasks

1. Finalize agreement between IDFG and the County that defines roles of each agency as they relate to long-term operation and maintenance of the Clark Fork – Derr Island access site.

2. The County will conduct site prep work (i.e., vegetation pruning/removal in advance of road widening by contractor.

3. Receive bids/hire contractors to widen the roadway and remove log pilings.

4. Construct the project(s) during summer 2021.

Work Products

- Annual Work Summary; due December 1, 2021

Permitting Requirements

There are minimal permitting requirements associated with the proposed project. Idaho Department of Fish and Game has already received authorization from the U.S. Army Corps of Engineers to remove the pilings in the Clark Fork River adjacent to the log boom. This is the only proposed activity that requires any permitting beyond the County level. Because the County is involved in the project, they will be able to authorize any work that is contracted out. Both IDFG and the County have met on-site with the adjacent landowner to inform him of the proposed access site developments. While the work does not require landowner permission, this step was taken to avoid any potential conflict associated with perceived ownership and property boundaries. The landowner was supportive of the proposed work.

Cultural/Historic Resource Review

Not applicable for the tasks proposed in this project plan. All construction activities will occur on County property and within the County road right-of-way. There are no proposed impacts to cultural/historic resources.

Benefit to the Resource

The Clark Fork River supports a diverse and dynamic fishery and is limited by both low-water and floating access. Providing access for anglers on the Clark Fork River is one component of a negotiated agreement associated with the 2019 amendment to the Clark Fork Settlement Agreement.

Budget

Item	Estimated Carryover	2021 Budget Request
Flaggers (one day)	$0	$700
Excavator (one day)	$0	$1,500
Dump truck (one day)	$0	$1,000
Compaction/roller (one day)	$0	$1,000
Finish work (labor; $240 x 4 people)	$0	$960
Filter fabric	$0	$600
Fill ¾" minus (506 yards with delivery)	$0	$10,120
Piling removal equipment and labor	$0	$2,500
Total	$0	$18,380
Anticipated Expenditures		$18,380

In addition to the cost-share provided via the first phase of development in 2020 (~$7,000), IDFG and the County each plan to provide $1,000–2,000 in labor cost-share in 2021. This will include project planning and implementation by IDFG and County staff and vegetation pruning/removal by the County to prepare for the road widening. Additionally, IDFG and the County will be taking on costs associated with the long-term operation and maintenance of this site (estimated at $3,000 annually).