ENVIRONMENTAL ASSESSMENT

AMENDMENT OF LICENSE FOR THE CONSTRUCTION AND OPERATION OF AN UPSTREAM FISH PASSAGE FACILITY AT THE CABINET GORGE DAM

CLARK FORK PROJECT
FERC No. 2058-098
Idaho and Montana

Federal Energy Regulatory Commission
Office of Energy Projects
Division of Hydropower Administration and Compliance
888 First Street, N.E.
Washington, DC 20426

August 2019

TABLE OF CONTENTS

TABLE OF CONTENTS i
LIST OF FIGURES iii
LIST OF TABLES iii
LIST OF ABBREVIATIONS iv
1.0 INTRODUCTION 1
1.1 APPLICATION 1
1.2 PURPOSE OF ACTION 1
1.3 STATUTORY AND REGULATORY REQUIREMENTS 2
1.3.1 Clean Water Act 2
1.3.2 Endangered Species Act 2
1.3.3 National Historic Preservation Act 4
1.4 PUBLIC REVIEW AND COMMENT 5
1.4.1 Background and Pre-filing Consultation 5
1.4.2 Responses to Public Notice 8
2.0 PROPOSED ACTION AND ALTERNATIVES 8
2.1 NO-ACTION ALTERNATIVE 8
2.1.1 Existing Project Facilities 8
2.1.2 Existing Project Operation 9
2.2 PROPOSED ACTION 13
2.2.1 Phase 1 – Initial Site Preparation 17
2.2.2 Phase 2 – Cofferdam Construction 17
2.2.3 Phase 3 – Cabinet Gorge Dam Fishway Construction 18
2.2.4 Phase 4 – Construction Site Demobilization 19
2.2.5 Proposed Environmental Measures 19
2.3 MODIFICATIONS TO APPLICANT'S PROPOSAL – MANDATORY CONDITIONS 21
2.3.1 Water Quality Certificate Conditions 21
2.3.2 Biological Opinion Terms and Conditions 21
2.4 STAFF ALTERNATIVE 22
3.0 ENVIRONMENTAL ANALYSIS 22
3.1 GENERAL DESCRIPTION 25
3.2 SCOPE OF CUMULATIVE EFFECTS ANALYSIS 29
3.3 PROPOSED ACTION 29
3.3.1 Geologic and Soil Resources 29
3.3.2 Water Resources 31
3.3.3 Fisheries and Aquatic Resources 39
3.3.4 Terrestrial and Botanical Resources 58
3.3.5 Threatened and Endangered Species 59
3.4 NO-ACTION ALTERNATIVE 70
3.5 CUMULATIVE EFFECTS ANALYSIS 70
3.5.1 Water Resources 70

3.5.2 Fisheries and Aquatic Resources 71
4.0 CONCLUSIONS AND RECOMMENDATIONS 72
4.1 UNAVOIDABLE ADVERSE IMPACTS 74
4.2 CONSISTENCY WITH COMPREHENSIVE PLANS 74
5.0 FINDING OF NO SIGNIFICANT IMPACT 76
6.0 LITERATURE CITED 77
7.0 LIST OF PREPARERS 82
APPENDIX A: WATER QUALITY CERTIFICATE 83
APPENDIX B: BIOLOGICAL OPINION TERMS AND CONDITIONS 88

LIST OF FIGURES

Figure 1. Cabinet Gorge Dam and Noxon Rapids Dam, Bonner County, Idaho, and Sanders County, Montana. 12
Figure 2. Proposed Cabinet Gorge Dam Fishway – Site Plan, Clark Fork Project, Bonner County, Idaho. 15
Figure 3. Proposed Cabinet Gorge Dam Fishway Entryway – Lower Section, Clark Fork Project, Bonner County, Idaho. 16
Figure 4. The Clark Fork River and Lake Pend Oreille. 27
Figure 5. Lower Clark Fork River and Tributaries. 28
Figure 6. Critical Habitat for Bull Trout, Lower Clark Fork River and Major Tributaries. 63
Figure 7. Critical Habitat for Bull Trout, Lake Pend Oreille and Major Tributaries. 64

LIST OF TABLES

Table 1. Determination of Effect for Federally Protected Species in the Vicinity of the Clark Fork Project 3
Table 2. Scope of Analysis for the Proposed Cabinet Gorge Dam Fishway, Clark Fork Project. 23
Table 3. Mean Annual Discharge, Lower Clark Fork River, Idaho, at USGS Gage #12391950 32
Table 4. Mean Monthly Discharge, Lower Clark Fork River, Idaho, at USGS Gage #12391950 32
Table 5. Monthly Water Temperature, Lower Clark Fork River (2016). 36
Table 6. Monthly Dissolved Oxygen (mg/l) Lower Clark Fork River (2016). 36
Table 7. Designated Critical Habitat for bull trout within the Clark Fork River Basin Critical Habitat Unit 62
Table 8. Applicable Comprehensive Management Plans 74

LIST OF ABBREVIATIONS

µg/l	micrograms per liter
µS/cm	microsiemens per centimeter
BE	Biological Evaluation
BMPs	best management practices
°C	degrees Celsius
cfs	cubic feet per second
CHU	Critical Habitat Unit
Coalition	Clark Fork Coalition
CWA	Clean Water Act
Commission or FERC	Federal Energy Regulatory Commission
Corps	U.S. Army Corps of Engineers
DO	dissolved oxygen
DRT	Design Review Team
EA	Environmental Assessment
EFH	Essential Fish Habitat
EIS	Environmental Impact Statement
ESA	Endangered Species Act
°F	degrees Fahrenheit
Forest Service	U.S. Forest Service
FPA	Federal Power Act
fps	feet per second
FR	Federal Register
FWG	Fisheries Working Group
FWS	U.S. Fish and Wildlife Service
Idaho DEQ	Idaho Department of Environmental Quality
Idaho DFG	Idaho Department of Fish and Game
Idaho Water Board	Idaho Water Resource Board
Interior	Department of the Interior
mg/l	milligrams per liter
mm	millimeter
MOA	Memorandum of Agreement
Montana FWP	Montana Department of Fish, Wildlife & Parks
MW	Megawatt
National Register	National Register of Historic Places
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NSRP	Native Salmonid Restoration Plan
NTU	nephelometric turbidity units
OHW	ordinary high water
PCEs	primary constituent elements
PM&E	protection, mitigation, and enhancement

PUD	Public Utility District
QA/QC	Quality Assurance/Quality Control
Section 7	Section 7 of the Endangered Species Act
Section 106	Section 106 of the National Historic Preservation Act
SHPO	State Historic Preservation Office
TDG	total dissolved gas
USGS	U.S. Geological Survey
Water Council	Tri State Water Quality Council
WQC	Water Quality Certification under Section 401 of the Clean Water Act

1.0 INTRODUCTION

1.1 APPLICATION

On November 13, 2017, as supplemented on March 21, 2018 and February 26, 2019, Avista Corporation (licensee) filed a request to amend the license for the Clark Fork Project No. 2058[1] in order to construct and operate a permanent upstream fish passage facility at the project's Cabinet Gorge development. The Clark Fork Project consists of the Noxon Rapids and Cabinet Gorge developments, and is located on the Clark Fork River in Bonner County, Idaho and Sanders County, Montana. The Noxon Rapids development occupies 913 acres of federal land within the Idaho Panhandle, Lolo, and Kootenai National Forests administered by the U.S. Forest Service (Forest Service). The Cabinet Gorge development occupies 356 acres of federal land within the Idaho Panhandle and Kootenai National Forests administered by the Forest Service.

1.2 PURPOSE OF ACTION

The Commission must decide whether to approve the licensee's proposed fishway at the Clark Fork Project, and what conditions should be in any amendment order issued. In deciding whether to approve the licensee's applications, the Commission must determine that the Proposed Action will be best adapted to a comprehensive plan for improving or developing a waterway. In addition to power and development, the Commission must give equal consideration to the purposes of energy conservation, the protection, mitigation of damage to and enhancement of fish and wildlife (including related spawning grounds and habitat), the protection of recreational opportunities, and the preservation of other aspects of environmental quality.

In accordance with the National Environmental Policy Act (NEPA) of 1969 and the Commission's regulations (18 CFR Part 380), this Environmental Assessment (EA) assesses the effects associated with the construction and operation of the proposed fishway at the project, alternatives to the Proposed Action, and makes recommendations to the Commission on whether to approve the licensee's application, and if so, recommends terms and conditions to become part of any amendment order issued.

In this EA, we assess the environmental effects of the Proposed Action and the No-Action Alternative. Important issues that are addressed include fish passage and threatened and endangered species.

[1] *Avista Corporation*, 90 FERC ¶ 61,167 (2000).

1.3 STATUTORY AND REGULATORY REQUIREMENTS

1.3.1 Clean Water Act

The Clean Water Act (CWA) gives authority to each state to issue a section 401 Water Quality Certification (WQC) for any FERC-licensed project that requires a permit pursuant to section 404 of the CWA. Additionally, an applicant must obtain a WQC for any activity that may result in a new discharge into navigable waters. The WQC is a verification by the state that a proposed project would not violate water quality standards.

On March 5, 2018, the licensee applied to the Idaho DEQ and the Montana Department of Environmental Quality (Montana DEQ) for a 401 water quality certification (WQC) for the proposed action. By letter dated September 10, 2018, the Montana DEQ notified the licensee that, since the fish passage would be constructed in waters outside the jurisdiction of the State of Montana, and the fish passage facility at the Cabinet Gorge development meets the requirement of reasonable assurance of compliance with the CWA, a WQC from Montana DEQ is not needed. On February 22, 2019, the Idaho DEQ issued a WQC for the licensee's permanent amendment request, subject to 35 conditions. A copy of the conditions included in Idaho DEQ's WQC is attached to this EA in Appendix A.

1.3.2 Endangered Species Act

Section 7 of the Endangered Species Act (ESA) requires federal agencies to ensure that their actions are not likely to jeopardize the continued existence of federally listed threatened or endangered species, or result in the destruction or adverse modification of the critical habitat of such species. Several federally listed species are known to or may occur in Bonner County, Idaho, and Sanders County, Montana (Table 1) (FWS, 2017a; FWS, 2017b). The Selkirk Mountains woodland caribou (*Rangifer tarandus caribou*) is listed as endangered, while the bull trout (*Salvelinus confluentus*), grizzly bear (*Ursus arctos horribilis*), Canada lynx (*Lynx canadensis*), and Spalding's campion (*Silene spaldingii*) are listed as threatened. Further, the Lower Clark Fork River includes bull trout critical habitat. One candidate species, the whitebark pine (*Pinus albicaulis*) and one proposed threatened species, the North American wolverine (*Gulo luscus*) are also known to or may occur within the project area.

By letter dated March 28, 2018, Commission staff requested formal consultation with the U.S. Fish and Wildlife Service (FWS) for the proposed fishway at the Clark Fork Project and provided the FWS with its Biological Assessment (BA). As discussed in section 3.3.5 *Threatened and Endangered Species*, we concluded in our BA that construction and operation of the fishway is likely to adversely affect bull trout and bull trout critical habitat. However, the construction and operation of the fishway would have long-term beneficial effects on bull trout migration. Additionally, construction and

operation of the fishway is not likely to adversely affect Canada lynx, Canada lynx critical habitat, and grizzly bear. We further conclude that the proposed fishway would have no effect on Spalding's campion, Selkirk woodland caribou, and North American wolverine.

On February 6, 2019, the FWS filed its Biological Opinion (BO) in response to the Commission's BA. In its BO, the FWS determined that the fishway construction and operation, as proposed and conditioned, is not likely to jeopardize the continued existence of bull trout. The FWS stated that adverse effects to all local populations of bull trout in the Lake Pend Oreille core area are likely. However, the beneficial effects of the proposed action (e.g., increased connectivity, Lake Pend Oreille non-native suppression, and restoration) would address many threats identified in the Final Recovery Plan (FWS, 2015). As a result, the FWS concludes that implementation of the project is not likely to have significant adverse impacts that would jeopardize the continued existence of bull trout.

For critical habitat, the FWS stated that, as proposed, the fishway construction and operation is anticipated to adversely affect designated critical habitat in the Lake Pend Oreille and Lower Clark Fork River by diminishing the function of some of the primary constituent elements. However, FWS concluded in its BO that implementation of the proposed action is not likely to destroy or adversely modify bull trout critical habitat.

A copy of the terms and conditions included in the FWS BO is attached to this EA in Appendix B.

Table 1. Determination of Effect for Federally Protected Species in the Vicinity of the Clark Fork Project

Species	**Status**	**Effects Determination**
Bull trout (*Salvelinus confluentus*)	Threatened	May affect and is likely to adversely affect
Bull trout critical habitat	Includes Lower Clark Fork River	May affect and is likely to adversely affect
Grizzly bear (*Ursus arctos horribilis*)	Threatened	May affect and is not likely to adversely affect
Canada lynx (*Lynx canadensis*)	Threatened	May affect and is not likely to adversely affect
Selkirk Mountains woodland caribou (*Rangifer tarandus caribou*)	Endangered	No effect
Spalding's campion (*Silene spaldingii*)	Threatened	No effect
Whitebark pine (*Pinus albicaulis*)	Candidate	No effect

Species	Status	Effects Determination
North American wolverine (*Gulo luscus*)	Proposed	No effect

1.3.3 National Historic Preservation Act

Under section 106 of the National Historic Preservation Act (NHPA),[2] and its implementing regulations,[3] federal agencies must take into account the effect of any proposed undertaking on properties listed or eligible for listing in the National Register of Historic Places (National Register), and afford the Advisory Council on Historic Preservation a reasonable opportunity to comment on the undertaking. Historic properties are districts, sites, buildings, structures, traditional cultural properties, and objects significant in American history, architecture, engineering, and culture that are eligible for inclusion in the National Register.

In 2005, the licensee proposed an experimental upstream fish passage facility at the Cabinet Gorge dam, a property eligible for inclusion in the National Register. On July 25, 2005, the licensee provided the Idaho State Historic Preservation Office (Idaho SHPO) with site plans, profiles, and a description of the project, and determined that the proposed facility would have an adverse effect to the dam. By letter dated August 12, 2005, the Idaho SHPO determined that, because of the highly visible nature of the alterations and loss of original design, the proposed alterations to the Cabinet Gorge dam would have an adverse effect on the structure. As such, the Idaho SHPO recommended mitigation measures to be included in the development of a Memorandum of Agreement (MOA).

To satisfy the requirements of the NHPA, an MOA was executed between the licensee and Idaho SHPO in September 2005, which set forth reasonable measures to adequately mitigate adverse effects to the historic property. Mitigation measures in the MOA included large format photography of the existing thrust block, to be submitted to Idaho SHPO for review and acceptance. The licensee provided these photographs to the Idaho SHPO in October 2005.

The licensee subsequently updated the fish passage design, and provided the Idaho SHPO with the redesigned project by letter dated April 12, 2013. By letter dated April 22, 2013, the Idaho SHPO determined that the existing MOA and documentation completed in 2005 would serve as mitigation for the redesigned structure.

On February 12, 2018, the licensee provided the Idaho SHPO and Montana SHPO

[2] 54 U.S.C. § 300101 et seq. (2014).

[3] 36 C.F.R. Part 800 (2018).

with the plans for the construction and operation of the currently proposed fishway. By email dated February 12, 2018, the Montana SHPO notified the licensee that, barring any further concern or recommendation not to proceed based on fully implemented mitigation from the Idaho SHPO, the agency agreed with the proposal to proceed. On February 26, 2018, the Idaho SHPO informed the licensee that the completed mitigation in the previous 2005 MOA is sufficient for the proposed redesign. As such, the agency required no additional mitigation. However, in the event that cultural material is inadvertently encountered during the implementation of the project, the Idaho SHPO would require the licensee to stop work in the vicinity of the findings until the material can be inspected and assessed by the appropriate consulting parties.

Given the steep topography and previously disturbed characteristics of the site, previously completed mitigation, and comments from the state agencies, the proposed fishway construction and operation is not expected to adversely affect any historical or archaeological resources.

1.4 PUBLIC REVIEW AND COMMENT

The Commission's regulations (18 CFR section 4.38 and 6.1) require licensees to consult with appropriate resource agencies, tribes, and other entities before filing an application for an amendment of license. Pre-filing consultation must be complete and documented according to the Commission's regulations. The section below describes the public outreach and resource agency consultation conducted by the licensee prior to filing its applications with the Commission.

1.4.1 Background and Pre-filing Consultation

1.4.1.1 Background

The license for the Clark Fork Project includes the terms and conditions of a comprehensive settlement agreement (i.e., the Clark Fork Settlement Agreement, or Settlement Agreement), which was developed by the Clark Fork Relicensing Team in the late 1990s; the Settlement Agreement includes 26 comprehensive programs (i.e., appendices to the Settlement Agreement) developed to protect important cultural and environmental resources. As noted in the project license, because the Settlement Agreement was included in the Water Quality Certificates, Forest Service conditions pursuant to Section 4(e) of the Federal Power Act (FPA), U.S. Department of the Interior's (Interior) Fishway Prescriptions pursuant to Section 18 of the FPA, and the Interior's Biological Opinion (BO) for the relicensing action, the terms of the Settlement Agreement became mandatory conditions.

An overarching goal of the Clark Fork Settlement Agreement was to develop substantial protection, mitigation, and enhancement (PM&E) measures that would be

implemented and adaptively managed for the term of the license to address resource issues related to project operations. Activities implemented under the Clark Fork Settlement Agreement are managed and approved by a Management Committee that meets routinely to approve or modify annual implementation plans. The Management Committee is comprised of one representative of each of the 27 signatories to the Clark Fork Settlement Agreement.[4] The signatories agreed that the Management Committee would have the authority, within the parameters of the Settlement Agreement, to direct and adaptively manage the licensee's implementation of PM&E measures to meet their stated goals. Upon implementation, the success of individual PM&E programs is evaluated, and, based on the results of the evaluation, the Management Committee continues, modifies, or develops new programs.

The Management Committee recently executed Clark Fork Settlement Agreement Amendment No. 1, which memorializes agreements regarding the construction of the Cabinet Gorge dam fishway, a permanent upstream fishway; modification of minimum flows in the Clark Fork River downstream of the Cabinet Gorge dam; conditions for further consideration of a fishway at Noxon Rapids dam; and the construction and operation of up to seven permanent downstream fish passage tributary traps over the term of the license. In addition, the Parties (i.e., the signatories to Settlement Agreement Amendment No.1) reached agreement on transport protocols including pathogen sampling and other operational and funding measures related to fishway operations.

Pursuant to Clark Fork Settlement Agreement Amendment No. 1, the licensee is proposing to amend its license for the Clark Fork Project to authorize the construction and operation of the Cabinet Gorge dam fishway, which has been designed to capture and transport native migratory salmonids, with a focus on bull trout. In accordance with Settlement Agreement Amendment No. 1, the licensee proposes to construct and operate the Cabinet Gorge dam fishway, a permanent upstream fishway facility, consistent with the objective and purpose of the "100% design" approved by the Design Review Team

[4] The Management Committee consists of representatives from the: Alliance for the Wild Rockies, the licensee, Bull River Watershed Council,* Cabinet Resource Group, Coeur d'Alene Tribe, Confederated Salish and Kootenai Tribes, Elk Creek Watershed Council, Green Mountain Conservation District, Idaho DEQ, Idaho DFG, Idaho Department of Parks and Recreation, Idaho Rivers United, Idaho SHPO, Idaho Trout Unlimited, Kalispel Tribe, Kootenai Tribe of Idaho, Lake Pend Oreille-Idaho Club, Montana Bass Federation, Montana Department of Environmental Quality, Montana Department of Natural Resources and Conservation, Montana Department of Fish Wildlife & Parks, Montana SHPO, Noxon-Cabinet Shoreline Coalition, Rock Creek Alliance, Sanders County (Commissioners), Tri-State Water Quality Council (ceased operations in 2012), FWS, and the Forest Service (*In 2000, the Bull River Watershed Council was added as the 28th member of the Management Committee).

(DRT) on January 13, 2013, modified to include a two-chamber trap and siphon water supply conceptually approved by the DRT on May 11, 2017. The Cabinet Gorge dam fishway would allow the licensee to collect target species at the dam, transport them to an existing fish handling and holding facility for processing, and transport them to tributaries in Montana upstream of Cabinet Gorge dam or return them to the Lower Clark Fork River based on genetic assignments or size.[5] The Cabinet Gorge dam fishway is to be located on the south bank of the Clark Fork River, immediately downstream of Cabinet Gorge dam.

On November 13, 2017 the licensee filed an application to amend its license for the Clark Fork Project in order to construct and operate a permanent upstream fish passage facility at the Cabinet Gorge development at the Clark Fork Project. The licensee filed a supplement to the application on March 22, 2018.

In support of the license amendment, the licensee filed a copy of Amendment No. 1 to the Clark Fork Settlement Agreement. In addition to reaching agreement on construction and operation of the Cabinet Gorge dam fishway, the Settlement Agreement includes provisions related to pathogen sampling and upstream transport protocols and monitoring, minimum flows below the project, future construction of tributary traps, deferral of Clark Fork Management Committee decisions on a future upstream fishway at Noxon Rapids dam, and clarification of funding for construction and operation of fishways under the Settlement Agreement.

The licensee also requests Commission approval of Amendment No. 1 of the Settlement Agreement. Terms of Amendment No. 1 are incorporated into the conditions of the Biological Opinion issued by the FWS on February 6, 2019, and will therefore become mandatory conditions of the license.[6]

[5] The licensee constructed the fish handling and holding facility in 2014-2015. The facility is located approximately one mile downstream of the Cabinet Gorge dam to facilitate the processing and handling of bull trout and other fish species collected in the Cabinet Gorge dam fishway.

[6] We reiterate here, as we did in the license, that the Commission cannot enforce conditions of the Settlement Agreement that are outside of its jurisdiction. For example, the Commission cannot enforce provisions concerning the operations of the Management Committee and its technical advisory subcommittees.

1.4.1.2 Pre-Filing Consultation

The Clark Fork Settlement Agreement Amendment No. 1 was approved by vote of the Management Committee at a meeting held on September 26, 2017. This license application was prepared in consultation with members of the Management Committee. A draft of this license amendment was sent to all members of the Clark Fork Management Committee for their review and comment on September 18, 2017.

1.4.2 Responses to Public Notice

On January 22, 2018, the Commission issued a notice that the licensee's application to amend the license was accepted for filing, soliciting motions to intervene and protest, comments, terms and conditions, recommendations, prescriptions on the applications, and stating that the applications were ready for environmental analysis. On March 23, 2018, the State of Idaho, on behalf of the Idaho DEQ, Idaho DFG, and the Idaho Water Board, filed a notice of intervention.

2.0 PROPOSED ACTION AND ALTERNATIVES

2.1 NO-ACTION ALTERNATIVE

Under the No-Action Alternative, the licensee would continue to implement the capture-and-transport program for adult migratory bull trout downstream of the Cabinet Gorge dam through the current fish passage program. The licensee would continue to collect adult bull trout from downstream of the Cabinet Gorge dam via electrofishing angling, from the existing hatchery facility ladder, and weir trapping in Twin Creek. After collection, bull trout would be rapidly processed for genetic assignments, and bull trout of Montana origin would be transported upstream to designated release areas according to the annual transport plans approved by the Management Committee.

2.1.1 Existing Project Facilities

The Commission issued a license for the Clark Fork Project (FERC No. 2058) to Avista Corporation on February 23, 2000, for a term of 45 years.[7] The Clark Fork Project consists of the Cabinet Gorge and Noxon Rapids hydroelectric developments. The Cabinet Gorge and Noxon Rapids developments abut one another on the Clark Fork River in Bonner County, northern Idaho and Sanders County, in northwest Montana, respectively (Figure 1). Both developments provide dependable hydroelectric energy to

[7] The original licenses for the Cabinet Gorge Project and the Noxon Rapids Project were issued on January 9, 1951 (10 FPC 657), and May 12, 1955 (14 FPC 731), respectively. Although the projects had been operated under separate licenses, Avista requested a single new license that would encompass both projects, and renamed the two as the Clark Fork Project. *Avista Corporation*, 90 FERC ¶ 61,167 (2000).

meet regional power demands as they have for over 40 years, since their construction by Washington Water Power (WWP, predecessor to Avista Corporation) in the 1950's.

The Noxon Rapids development, which is the upstream development, consists of: (1) a 6,195-foot-long, 260-foot-high dam with an earthen embankment section, a concrete gravity spillway section and a powerhouse section that is integral with the dam; (2) a 7,940-acre reservoir with a gross storage capacity of 400,000 acre-feet at full pool; (3) five 26-foot-diameter, 170-foot-long steel penstocks built into the intake section of the dam; (4) five Francis turbine generators with a total operating capacity at full turbine flow and full pool of 466 megawatts (MW); (5) a 900-foot-long transmission line; and (6) appurtenant facilities.

Flows from the Noxon Rapids development immediately enter the Cabinet Gorge reservoir. The Cabinet Gorge development was completed in 1952, and consists of: (1) a 395-foot-long, 208-foot-high concrete gravity arch dam; (2) a saddle dam, located in a depression near the south abutment, consisting of a 75-foot-long, 12-foot-high concrete gravity section, buttressed by earth fill on the downstream face; (3) a 3,200-acre reservoir with a gross storage capacity of 105,000 acre-foot at pool elevation of 2,175 feet, and an active storage capacity of 42,780 acre-feet in the top 15 feet of the reservoir (no minimum reservoir elevation is established); (4) four 27-foot-diameter, concrete-lined penstocks ranging in length from 447 feet to 564 feet with the last 110 to 155 feet steel-lined; (5) a 355-foot-long by 106-foot-wide semi-outdoor powerhouse, containing three fixed-blade propeller turbines rated at 70,500 horsepower each, and one Kaplan turbine runner rated at 86,290 horsepower, and generators producing a total of about 231 MW at full turbine capacity and full pool; and (6) appurtenant facilities.

2.1.2 Existing Project Operation

The licensee produces clean, renewable hydroelectricity by operating the Cabinet Gorge and Noxon Rapids developments in tandem to meet regional energy demands. The load-following[8] ability of the Clark Fork Project allows the licensee to accommodate increased demand for power during the day and reduced demand at night. Because customer demand for electricity varies in the Pacific Northwest, the licensee typically releases water stored within the Noxon reservoir to generate electricity during the day, and the reservoir refills in the evening. The Clark Fork Project has a total authorized capacity of 751 MW with an average annual expected generation of approximately 2,830,356 megawatt-hours.

Noxon reservoir is typically drawn down or "drafted" on a weekly cycle, while Cabinet Gorge operations use flows released from Noxon Rapids dam, usually on a daily

[8] The licensee's generation follows customer demand, i.e., during periods of high demand, output is increased.

basis. Load-following patterns typically occur less frequently during the weekends because demand is reduced, which typically relegates operations to baseload conditions during which flows remain relatively steady. Cabinet Gorge is operated using daily storage; daily drawdown fluctuates from 1.5 to 4 feet. The Cabinet Gorge reservoir is limited to a 7-foot weekly drawdown (Avista, 1999). Current drawdown limits at the Noxon Rapids dam include:

- 4-foot maximum weekly drawdowns during the period May 15 – September 30;
- 10-foot maximum weekly drawdowns during the period October 1 – May 14;
- 2-foot maximum daily net drafts (year-round); and,
- 5-foot maximum weekly net drafts (October 1 – May 14).

The licensee's provision of needed energy capacity and load-following capabilities helps maintain system reliability in the Pacific Northwest. The load-following ability of the Clark Fork Project, specifically the ability to draw the reservoirs down, allows the licensee to play a key role in meeting demand and supporting the Pacific Northwest electrical grid system during emergency conditions and unusual weather. In addition, the operational flexibility of the Clark Fork Project provides security against regional maintenance-related outages. Historically, several major outages in the Pacific Northwest have occurred as a result of weather or electrical grid issues. Given its capacity and mode of operation, the Clark Fork Project has the ability to respond quickly (within minutes) to emergency or peak energy demands both locally and regionally. Variable energy resources, such as wind, have been shown to require a substantially greater amount of regulating margin for their integration. The operational flexibility of the Clark Fork Project is an important component of the licensee's ability to integrate variable generation resources.

Water released from the Clark Fork Project (Cabinet Gorge and Noxon Rapids dams) is not only used by the licensee, but also coordinated with downstream facilities for power production pursuant to the Pacific Northwest Coordination Agreement. The 1997 agreement sets the framework for coordinating the operations of the Clark Fork Project amongst other Columbia River Basin hydroelectric projects to help meet regional power demands. Downstream power producers include the U.S. Army Corps of Engineers (Corps), Pend Oreille Public Utility District (PUD), Seattle City Light, British Columbia Hydro, the Bureau of Reclamation, Douglas County PUD, Chelan County PUD, and Grant County PUD (Avista, 1999).

The Clark Fork Project boundary encloses 4,830 acres of lands necessary for its operation and maintenance, recreation, shoreline control, and protection of environmental resources. The licensee is the predominant landowner; other landowners include the Forest Service, the state of Montana, and private individuals and companies. The Clark Fork Project occupies 1,269 acres of federal lands managed by the Forest Service;

however, no federal lands are associated with the proposed Cabinet Gorge dam fishway. No changes to the project boundary are necessary to construct or operate the fishway.

The development and installation of the proposed permanent Cabinet Gorge dam fishway is the culmination of a long-term collaborative process aimed at improving fish passage success for bull trout and other native salmonids in the Lower Clark Fork River. The proposed Cabinet Gorge dam fishway is being implemented as part of the Clark Fork Settlement Agreement.

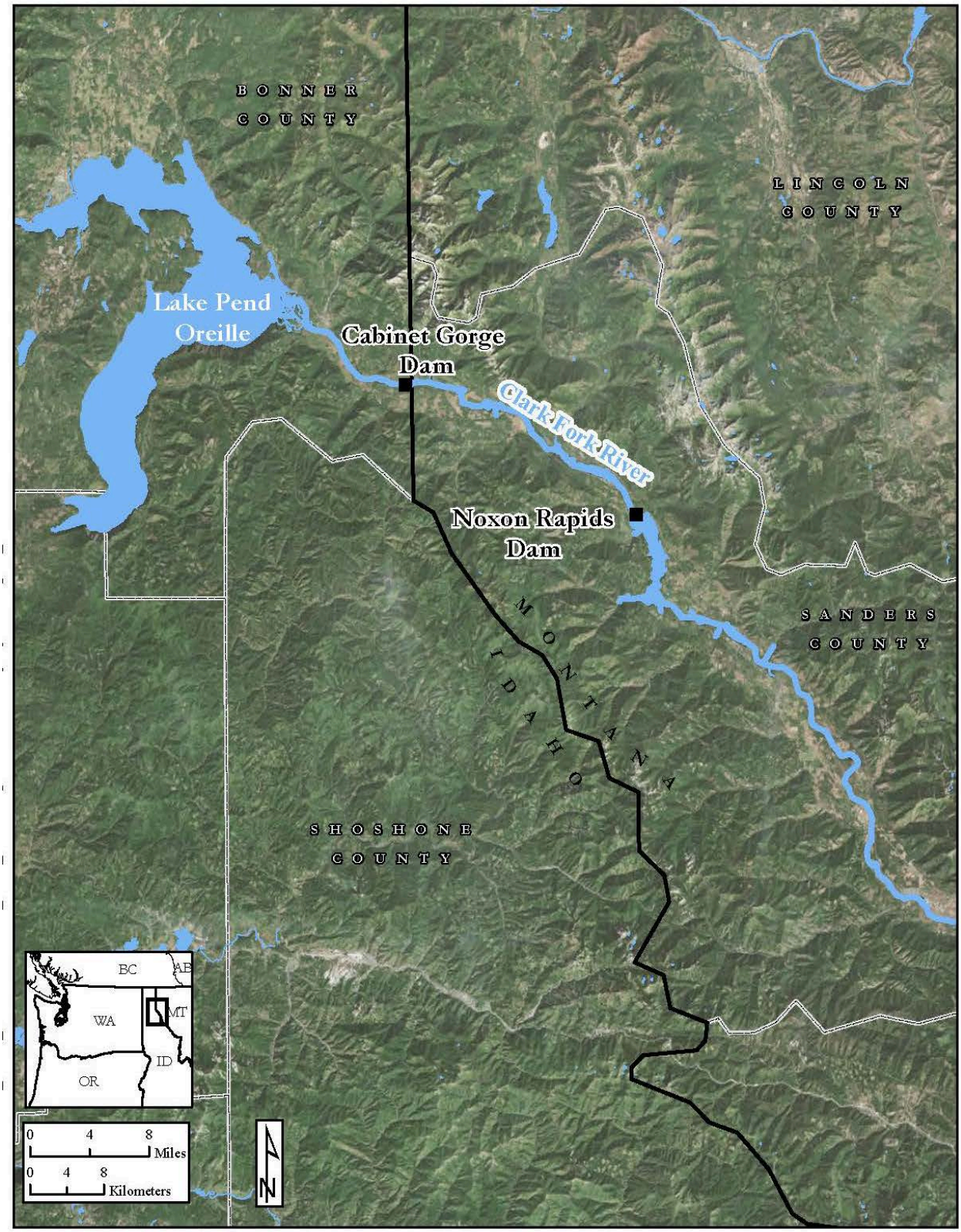

Figure 1. Cabinet Gorge Dam and Noxon Rapids Dam, Bonner County, Idaho, and Sanders County, Montana.

2.2 PROPOSED ACTION

The Management Committee has considered and evaluated several other fishway designs since license issuance (e.g., fish ladder trap with one entrance, floating traps, Braille hopper, staircase ladder structure), but these were not selected for implementation or further analysis in this document because they were previously determined to be infeasible. The licensee has developed several comprehensive projects since license issuance, with the Management Committee's approval, to aid in developing upstream passage for adult bull trout at the Cabinet Gorge dam, including:

- A substantial fish capturing facility (i.e., the moveable fish trap) that was constructed and operated from 2004 to 2006 downstream of the Cabinet Gorge dam. The trap captured 37 fish, although none were bull trout. This was considered a "test platform" to determine what types of entrance configurations and attraction flows would work the best;
- A prototype fish capturing facility (i.e., thrust block waterfall fish trap) that was constructed and operated in 2007 and 2008 at the proposed Cabinet Gorge dam fishway location. The facility attracted and captured westslope cutthroat trout and other salmonid species, but no bull trout;
- Two major fish passage assessment and feasibility reports, including the Cabinet Gorge and Noxon Rapids Upstream Fish Passage/Expert Fish Passage Panel, Findings and Recommendations/Final Report (GEI, 2009), and numerous related technical reports addressing the feasibility of developing more than 100 options for permanent fish passage facilities at both the Cabinet Gorge dam and Noxon Rapids dam; and,
- Upgrades to the existing ladder facility at the Cabinet Gorge Fish Hatchery, including engineering designs

Based on the findings of an Expert Fish Passage Panel developed by the Management Committee, the 2010 Joint Fish Passage Agreement reached with the FWS (FWS and Avista, 2010), and recent input from the DRT and a fish passage engineer from the FWS, the Cabinet Gorge dam fishway design includes an entry pool with six gates located on three different walls, a holding pool with an entrance on the south west side of the entrance pool containing a brail and a hopper, and a dedicated hoist and monorail system that lifts fish into a hopper for transfer into a transport truck (Figure 2 and Figure 3). The Cabinet Gorge dam fishway would be located on the river south bank of the Clark Fork River, immediately downstream of the Cabinet Gorge dam adjacent to the existing geologic thrust block. A fish passage attraction flow of 101 to 120 cubic feet per second (cfs) would be provided into the entrance pool by a siphon system with an intake in the forebay above the dam. The holding pool attraction flow is designed for 6 cfs, with the capacity to be increased to 25 cfs. The total combined minimum fish attraction flow out of the Cabinet Gorge dam fishway entrance pool in the tailwater area would be up to 126 cfs. The combined attraction flow would be sent through one of the

six entrance pool openings. The proposed fishway footprint width ranges from 24 to 47.5 feet, and a maximum length is approximately 44 feet. The Cabinet Gorge dam fishway is designed to operate between 3,000 cfs and 52,000 cfs; the maximum powerhouse generation is 38,500 cfs.

The licensee plans to operate the Cabinet Gorge dam fishway annually from April 1 to October 15, when river flows are within the operational range of the facility. Collected bull trout would be transported approximately 1 mile downstream to the fish handling and holding facility (constructed by the licensee in 2014-2015), processed, held for genetic testing, and transported to their region of origin or returned to the mainstem of the Lower Clark Fork River downstream of Cabinet Gorge dam. All other fish species collected in the Cabinet Gorge dam fishway would be transported to the fish handling and holding facility where they would be sorted by species, returned to the river, or culled pursuant to fishery management objectives identified by the State of Idaho.

Installing the Cabinet Gorge dam fishway would be difficult because the steep canyon topography at the Cabinet Gorge dam constrains access to the river. The approximate elevation difference from staging areas on top of the thrust block to the river bed is 80 feet. Therefore, much of the installation would need to rely on the use of large cranes stationed on the thrust block, smaller cranes and equipment stationed on top of a cofferdam, and floating barges. Divers would also be used during construction.

The construction sequence has four primary components: (1) initial site preparation; (2) cofferdam construction; (3) Cabinet Gorge dam fishway construction; and, (4) and construction site demobilization. Most construction activity would occur below the ordinary high water (OHW) level (equivalent to approximately 36,000 cfs), although some concrete/steel structural work and mechanical installation would occur above the OHW. Some construction would occur on top of the thrust block (e.g., a new jib crane and foundation, the monorail crane support structure, and electrical controls, and storage buildings) and in the forebay area (i.e., the Cabinet Gorge dam fishway auxiliary water supply siphon system).

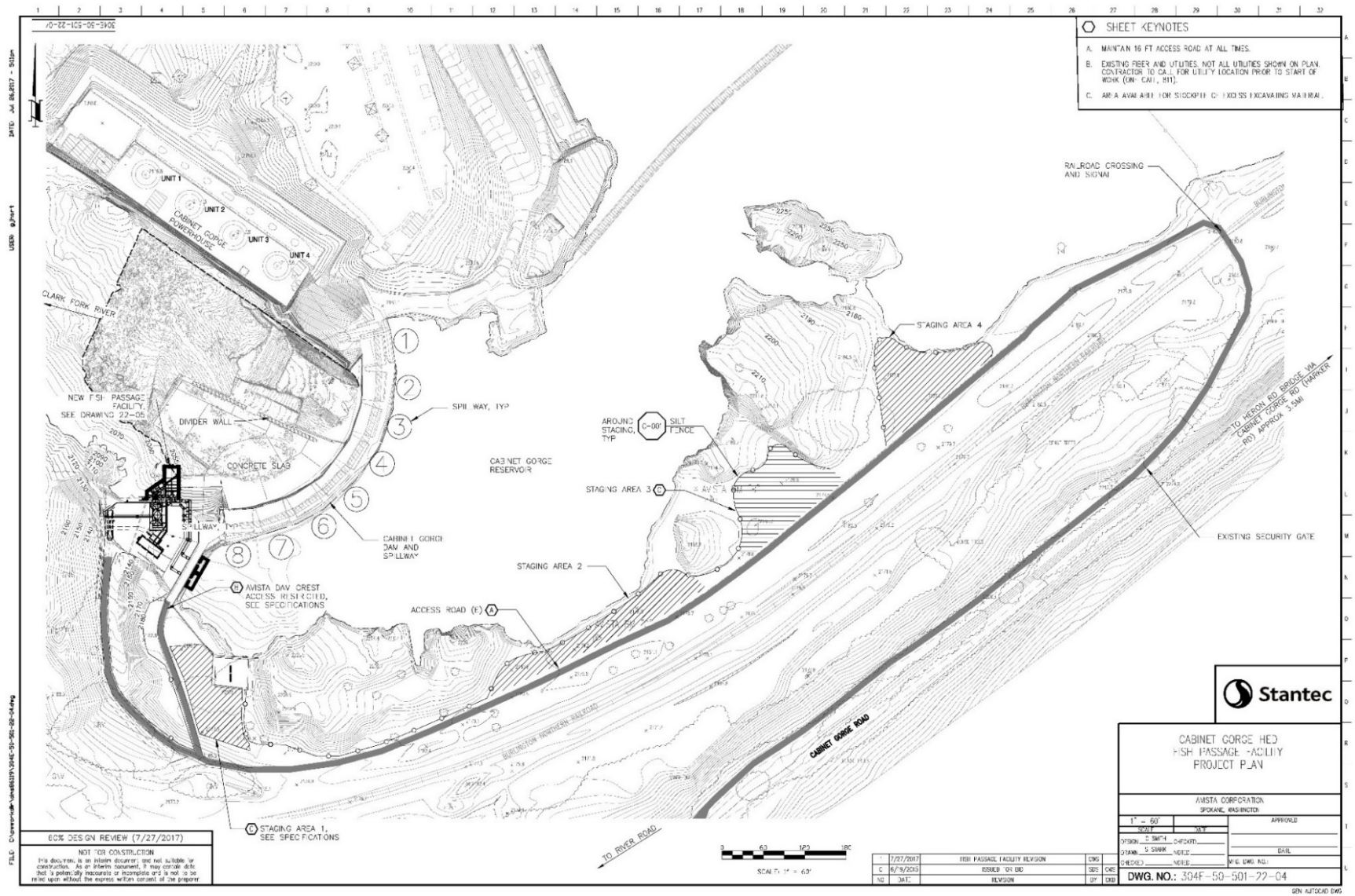

Figure 2. Proposed Cabinet Gorge Dam Fishway – Site Plan, Clark Fork Project, Bonner County, Idaho.

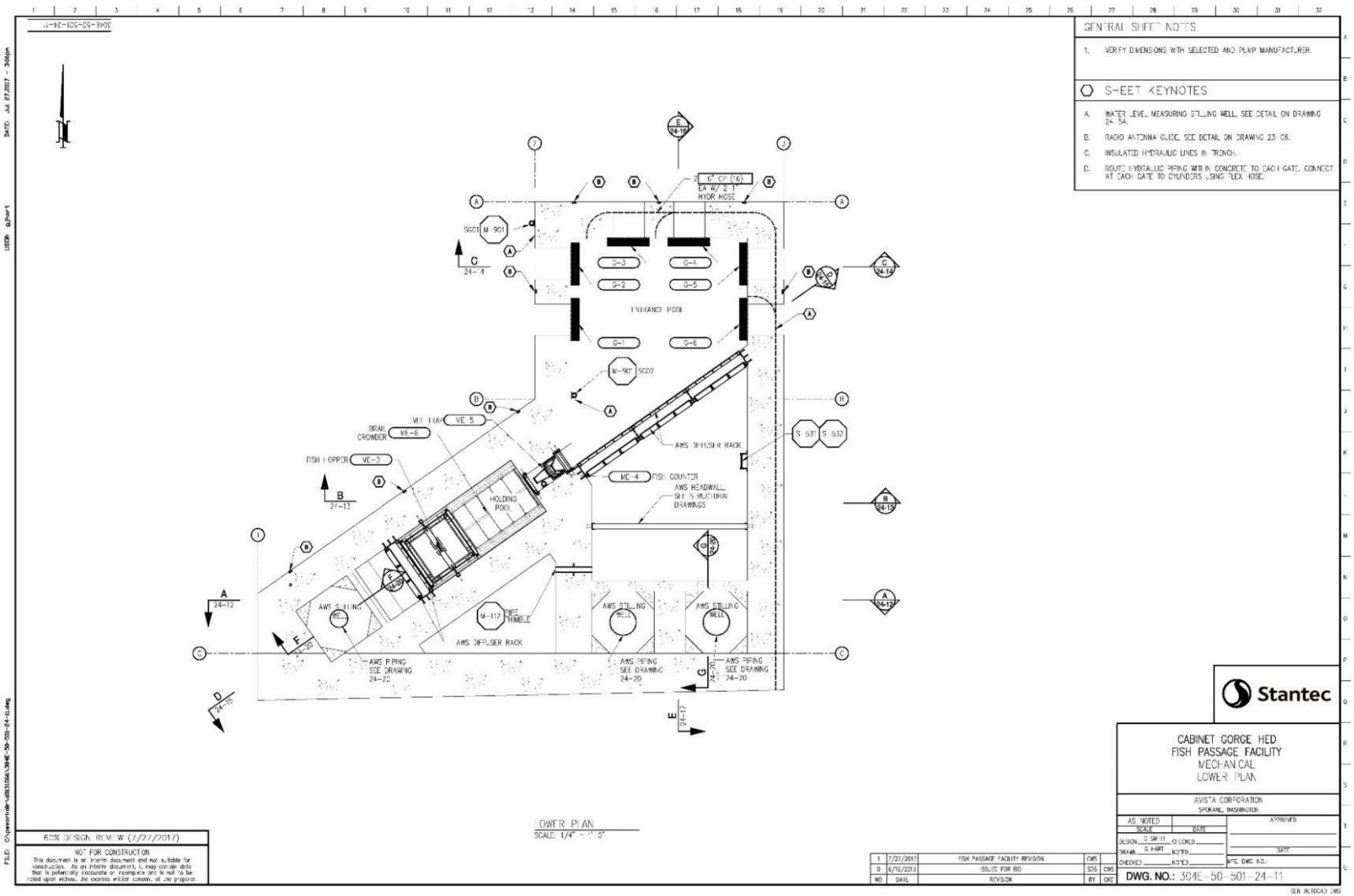

Figure 3. Proposed Cabinet Gorge Dam Fishway Entryway – Lower Section, Clark Fork Project, Bonner County, Idaho.

2.2.1 Phase 1 – Initial Site Preparation

Given previous disturbance at the site associated with dam construction in the 1950s, the licensee anticipates that limited ground-breaking activities would be necessary for site preparation. Construction personnel would make use of existing access roads and parking areas for construction vehicles and equipment. An improved railroad crossing was installed in 2014 on the main access road to safely allow movements of construction crews and the fish transport truck. Temporary construction silt fences would be installed along the access road. Existing cleared grades would be used for construction equipment laydown and for temporary storage of excavated materials. Some limited demolition of the existing parapet wall on top of the thrust block would be necessary for stair tower construction to access the Cabinet Gorge dam fishway site once dewatered. Some removal of remnant material from previous fish passage efforts (e.g., waterfall thrust block trap) would be required, as well as break-up and removal of the existing concrete pad on top of the thrust block. The current fishway design does not require additional excavation (above the OHW). However, if the contractor thinks that it is advantageous for cofferdam construction or access, additional excavation of existing bedrock to the west of the Cabinet Gorge dam fishway may be necessary.

2.2.2 Phase 2 – Cofferdam Construction

The most difficult aspect of Cabinet Gorge dam fishway construction would be the installation of a cofferdam, which is designed to prevent over-topping up to a river flow of approximately 80,000 cfs, equivalent to an average year flood event. A cofferdam would be constructed by installing two parallel rows of sheet pile about 14 feet apart that would be braced against the thrust block.[9] The three-sided cofferdam would be approximately 140 feet long and would be constructed primarily from the top of the thrust block with a large crane. The use of floating barges and divers would also be necessary. Some clearing of existing boulders and other debris in the river channel would be required initially, which would be performed by a crane on the thrust block using a clamshell.

Once the area is cleared, sheet piles would be anchored with a system of up to eight guide piles that would be drilled into the existing river bed bedrock from a barge, from a thrust block crane, or by both methods and grouted in place. Guide piles would require 24-inch-diameter holes to be drilled approximately 12 feet deep into the bedrock generating approximately 1.4 cubic yards of material per hole, or about 11.2 cubic yards

[9] The actual width of the cofferdam would be determined by the contractor. The licensee is proposing a 14-foot cofferdam width as a conservative estimate and assumes the contractor would need to put a small crane or backhoe on the cofferdam. If not, the width may be reduced to 6 to 8 feet.

total of drill castings. Drilling would occur underwater with a down-hole hammer bit. Most of the drilled material would be gravel and sand size material. This material would not be captured and would end up in the river. Drill castings would be easily mobilized by high flows and transported downstream where it would likely settle out in the delta area of Lake Pend Oreille. Grout would be poured into the drilled holes through a tremie tube[10] to isolate concrete grout material from the water column as it is poured. Once the sheet piles are installed, the cofferdam interior would be filled with approximately 435 cubic yards of concrete, 900 cubic yards of loose fill below the OHW, and 1,300 cubic yards of loose fill above the OHW. The loose fill would be made up of a mixture of small gravels, sand, and silt materials. The concrete would prevent seepage along the rock surface under the cofferdam. The cofferdam described herein is a functional concept to be used for planning and for obtaining project approvals and permits. Final cofferdam design would be the contractor's responsibility. Quantities listed herein are likely to decline as the size of the cofferdam would likely be reduced.

The construction area would initially be dewatered through use of commercial-grade sump pumps equipped with fine-mesh screening of 3/8-inch max slot opening and 0.8 feet per second (fps) maximum velocity and return water to the river. Any subsequent dewatering of river water resulting from over-topping, leakage or rainwater accumulation would be done in the same fashion. Water with high levels of suspended sediment would be pumped through a portable storm-waste filtering system stored on-site prior to being discharged back to the river. Construction of the cofferdam is expected to last 4 to 6 months.

2.2.3 Phase 3 – Cabinet Gorge Dam Fishway Construction

Once the cofferdam is completed, construction of the Cabinet Gorge dam fishway proper would begin. Excavation of additional bedrock materials from behind the cofferdam would be done preferentially via drilling and hammering and possibly using chemical fracturing because blasting was not considered as an option for excavation. Chemical rock fracturing involves the use of specific compounds that expand during the hardening process. Excavated materials (rock and hardened fracturing material) would be lifted out of the project site by crane and removed by the contractor for disposal off site. Once excavation is complete, the area would be cleaned, dental concrete would be placed as necessary to prepare the foundation, and the foundation rock anchors would be placed. The concrete foundation slab would then be laid in place.

Once the foundation slab is in place, the structure's concrete walls would be built. All concrete walls and structures would be allowed to cure for a minimum of 30 days prior to being immersed in water. Upon completion of the major concrete work, the mechanical systems and miscellaneous metal work would be completed, including the

[10] A concrete feeder tube.

siphon pipes, siphon self-cleaning fish screens, auxiliary water supply siphon priming equipment and associated piping, entrance gates, grating, access stair tower, jib crane, and monorail hoist support structure. Final work would include minor grading, paving, drainage work at the top of the thrust block, and installation of the pre-engineered metal building for the electrical control equipment and Cabinet Gorge dam fishway personnel work room.

It is estimated that 1,770 cubic yards of material would be removed from the site for construction of the facility (excluding cofferdam fill material). Given the bedrock-dominated topography within Cabinet Gorge, the bulk of this material would consist of bedrock rubble and some large boulders. All excavated materials (except the guide pile drill castings) would be removed and disposed of offsite, though temporary on-site storage may be necessary. Temporary storage of debris or rubble on-site would be done at identified staging areas.

2.2.4 Phase 4 – Construction Site Demobilization

Once the Cabinet Gorge dam fishway is complete, the construction site would be cleaned and watered-up to balance the hydrostatic loads on the sheet piles. This would be followed by the removal of fill materials from the cofferdam by clamshell excavator; removal of supports, bracing and sheet piles; and cut-off of guide piles at the bedrock surface.

2.2.5 Proposed Environmental Measures

In constructing and installing the Cabinet Gorge dam fishway, the licensee would adhere to the operational conditions outlined in Appendix F4 of the Clark Fork Settlement Agreement,[11] which provides for the development and implementation of plans to minimize or eliminate the impact of project related maintenance, construction, and emergency activities to water quality and associated resources of the Lake Pend Oreille-Lower Clark Fork River system. The licensee also has an existing Water Quality Protection and Monitoring Plan for Maintenance, Construction, and Emergency Actions (Water Quality Protection Plan).[12] Clark Fork Settlement Agreement Appendix F4 outlines the following specific best management practices (BMPs) and monitoring measures for protecting water quality and other beneficial uses of project waters during construction or emergency operations, as well as procedures for notifying appropriate agency personnel:

---

[11] Water Quality Protection and Monitoring Plan for Maintenance, Construction, and Emergency Actions.

[12] *Avista Corporation*, 101 FERC ¶ 62,148 (2002) as amended by *Avista Corporation*, 135 FERC ¶ 62,252 (2011).

- All construction contractors shall use all reasonable measures to prevent or minimize the effects of construction activities on all ground and surface waters. These measures include BMPs to control erosion and sedimentation, proper use of chemicals, oil and chemical spill prevention and control, clean-up of surplus construction supplies and other solid wastes, adequate operation and maintenance of sedimentation in ponds, and separation of construction areas from surface waters with bulkheads or similar structures.
- All work should be completed as expeditiously and carefully as possible.
- Whenever possible, schedule work during low flow periods.
- Try to avoid periods of bull trout upstream migration.
- All construction debris and excess material generated from the project must be disposed of above the OHW and not in an area classified as a wetland, and in such a manner that it cannot enter the waterway or cause water quality degradation.
- Work in or near the waterway shall be done so as to minimize turbidity, erosion, other effects on water quality, and deformation of the streambank or streambed.
- If poured concrete is used, no concrete should come in contact with the water until it has cured a minimum of 7 days. No washing of concrete equipment shall be allowed to discharge to surface waters.
- Silt fences, hay bales, or other forms of sediment and erosion control must be used on all disturbed areas to prevent sediment-laden runoff from entering the watercourse.
- All disturbed areas (including any spoils or excess material) shall be shaped; seeded to grass or replanted with native grasses, deep-rooted shrubs, and trees; and lightly mulched to control and prevent infestation with noxious weeds. Existing vegetation shall be preserved to the maximum extent possible.
- Water entering the work-site shall be disposed through an approved system that addresses concerns regarding siltation and petroleum collection, and prevents environmentally harmful substances from entering the water.
- All lumber treated with a protective material shall be completely dry before being used in or near the waterway.

The licensee also proposes to develop and implement the following specific management plans for protecting resources during construction and operation of the Cabinet Gorge dam fishway through best management practices:

- Sedimentation Management and Erosion Control Plan;
- Fish Salvage Plan;
- Invasive Plant Species Management Plan;
- Oils and Lubricant Management Plan; and,
- Aquatic Invasive Species Prevention Plan.

Attachment C of the licensee's amendment application provides drafts of the sedimentation management and erosion control, fish salvage, and invasive plant species management plans. The licensee would require the selected contractor to develop and follow an Oils and Lubricant Management Plan and an Aquatic Invasive Species Management Plan prior to beginning construction.

2.3 MODIFICATIONS TO APPLICANT'S PROPOSAL – MANDATORY CONDITIONS

2.3.1 Water Quality Certificate Conditions

The February 22, 2019 Idaho DEQ WQC is included as Appendix A. The conditions of the WQC for the proposed Cabinet Gorge dam fishway are summarized below:

- Conditions 1 through 7 – General Conditions
- Conditions 8 through 11 – Erosion and Sediment Control
- Conditions 12 through 16 – In-Water Work
- Conditions 17 and 18 – Pollutants/Toxics
- Conditions 19 through 21 – Cofferdam
- Conditions 22 through 25 – Vegetation Protection and Restoration
- Conditions 26 through 34 – Management of Hazardous or Deleterious Materials
- Condition 35 – Mixing Zones

2.3.2 Biological Opinion Terms and Conditions

The BO filed by the FWS with the Commission on February 6, 2019 is consistent with the Settlement Agreement and the WQC. The BO included an Incidental Take Statement with reasonable and prudent measures with twenty-five terms and conditions in order to minimize the take of bull trout and bull trout critical habitat anticipated to result from the construction and operation of the proposed fishway. The BO is included in this EA as Appendix B. The reasonable and prudent measures are summarized below:

- Reasonable and Prudent Measure #1 – Identify bull trout attempting to migrate upstream of Cabinet Gorge and/or Noxon Rapids Dams, and in a manner agreed to by the FWS and consistent with the Clark Fork Settlement Agreement (as amended), provide safe, timely and effective fish passage.
- Reasonable and Prudent Measure #2 – Identify juvenile bull trout attempting to migrate downstream to Lake Pend Oreille, and in a manner agreed to by the FWS and consistent with the Settlement Agreement (as amended), provide safe, timely and effective fish passage.
- Reasonable and Prudent Measure #3 – Implement a dissolved gas supersaturation control, mitigation, and monitoring program

- Reasonable and Prudent Measure #4 – Maintain sufficient in-stream flow downstream of the Cabinet gorge Dam.
- Reasonable and Prudent Measure #5 – Implement a program that manages non-native species in a manner that is beneficial for bull trout.
- Reasonable and Prudent Measure #6 – Implement the Native Salmonid Restoration Plan and Clark Fork Settlement Agreement (as amended) in a manner consistent with the Final Bull Trout Recovery Plan and Columbia Headwaters Recovery Unit Implementation Plan.
- Reasonable and Prudent Measure #7 – Implement reporting and consultation requirements as outline in the terms and conditions to minimize take of bull trout related to implementation of the Native Salmonid Restoration Plan and other fisheries monitoring activities.
- Reasonable and Prudent Measure #8 – Construct and operation the Cabinet Gorge dam fishway consistent with Amendment No. 1 of the Clark Fork Settlement Agreement, and the project license (including amendments).

The FWS included two conservation recommendations in its BO. Conservation recommendations are discretionary activities designed to minimize or avoid effects to listed species or critical habitat, to help implement recovery plans, or to develop information. In summary, the FWS recommends that, where possible, the Commission consider implementation of recovery actions identified in the FWS' Bull Trout Recovery Plan and the associated Columbia River Headwaters Recovery Unit Implementation Plan. The FWS additionally recommends that the licensee continue to cooperate with the Idaho Department of Fish and Game, Montana Department of Fish, Wildlife and Parks and other entities to promote recovery of bull trout and to survey and monitor bull trout populations and habitat in the lower Clark Fork River and Lake Pend Oreille basin.

2.4 STAFF ALTERNATIVE

Staff alternative includes all of the licensee's proposed environmental measures, Idaho DEQ's WQC conditions, and the BO terms and conditions.

3.0 ENVIRONMENTAL ANALYSIS[13]

In this section, we describe the environmental setting for the Proposed Action and the scope of our cumulative effects analysis. We also present our analysis of the

[13] Unless otherwise indicated, our information is taken from the licensee's November 13, 2017 application for amendment to license and supplemental filings made by the licensee on March 21, 2018 and February 26, 2019. We also reviewed Commission staff's Final Environmental Impact Statement issued on March 1, 2000, which analyzed the effects of relicensing the Clark Fork Project as proposed by the licensee in its February 17, 1999 application.

environmental effects of the Proposed Action. Sections are organized by resource area (water resources, threatened and endangered species, etc.). Under each resource area, we first describe the current conditions. The existing condition is the baseline against which the environmental effects of the Proposed Action are compared, including an assessment of the effects of proposed mitigation, protection, and enhancement measures, and any potential cumulative effects. Our conclusions and recommended measures are discussed in Section 4.0, *Conclusions and Recommendations* of the EA.

Resources potentially affected by the proposed Cabinet Gorge dam fishway are geology and soils, water resources, fish and aquatic resources, threatened species, and terrestrial and botanical resources. Detailed descriptions of these resources are provided in the licensee's annual license compliance reports and in material prepared during the relicensing proceedings in the late 1990s. The following sections summarize the affected environment for these resource areas and the reader is referred to previous filings for additional background information, if necessary. Resources that would not be affected by the proposed action, and, therefore are not evaluated further, include: (1) historical and archaeological resources; (2) land use; (3) aesthetics; (4) air quality; (5) traffic and transportation; (6) socioeconomic; (7) recreation; and, (8) noise.

Table 2 summarizes the scope of analysis for each resource area, proposed PM&E measures, and effects on resources that warrant no further analysis.

Table 2. Scope of Analysis for the Proposed Cabinet Gorge Dam Fishway, Clark Fork Project.

Resource Area	**Scope of Analysis, Statement of Effect, and Proposed PM&E Measures**
Geology and Soils	**Analyzed** – The proposed action may result in short-term effects due to excavation and sedimentation during construction. The licensee proposes to implement erosion and sediment control BMPs to reduce the effects of river bed and ground-disturbance. No long-term effects are anticipated.
Water Resources	**Analyzed** – Construction of the proposed Cabinet Gorge dam fishway may affect water quality and water quantity temporarily. The licensee proposes to implement erosion and sediment control BMPs and an Oil and Lubricant Management Plan during construction to address the potential effects on water quality.
Fish and Aquatic Resources	**Analyzed** – The proposed action may directly and indirectly affect fish and aquatic habitats, including both adverse and beneficial effects. The licensee propose to implement standard erosion and sediment control BMPs and a Fish Salvage Plan to minimize potential adverse effects of the proposed action on fish and aquatic resources.

Resource Area	Scope of Analysis, Statement of Effect, and Proposed PM&E Measures
Threatened and Endangered Species	**Analyzed** – The proposed action has the potential to affect bull trout and critical habitat for bull trout. Potential effects include direct but temporary adverse effects of construction; long-term, minor adverse effects of construction, fish holding, sorting, and transport; and immediate and long-term benefits of providing permanent upstream passage for bull trout passage. The licensee has prepared a standalone BE to assess the effects of the proposed action on federally threatened, endangered, proposed, and candidate species.
Terrestrial and Botanical Resources	**Analyzed** – The licensee would implement stated BMPs to avoid the spread of invasive plant species (e.g., equipment cleaning or re-seeding of disturbed areas with native stock). The licensee is also proposing an Aquatic Invasive Species Management Plan that would be developed by the contractor. Several small, non-delineated artificial wetlands are known to exist along the access road to the construction site. The licensee would implement standard BMPs to protect existing wetlands from truck traffic (e.g., installation of silt construction fences along access road).
Historical and Archaeological Resources	**Not evaluated in further detail** – Given the steep topography and previously disturbed characteristics of the site, the proposed action is not expected to adversely affect any historical or archaeological resources.
Traffic and Transportation Resources	**Not evaluated in further detail** – Although truck traffic would increase during the construction phase, the effects of such activity would be intermittent, unavoidable, and short-term, and truck traffic occurs currently as part of the baseline condition.
Recreational Resources	**Not evaluated in further detail** – Recreational activity in the tailrace and area slated for construction is prohibited due to safety considerations; therefore, the proposed construction of the Cabinet Gorge dam fishway would not affect recreation.
Land Use	**Not evaluated in further detail** – Land use in the Clark Fork Project area is primarily mixed residential and federally managed land. The proposed action would not affect landowners or land use practices in the Clark fork Project area.
Aesthetic Resources	**Not evaluated in further detail** – Although construction of the proposed Cabinet Gorge dam fishway would affect aesthetics locally, the effects would be intermittent, unavoidable, and short-term.
Socioeconomic Resources	**Not evaluated in further detail** – The proposed action would not affect the socioeconomics of surrounding population centers or rural communities.

Resource Area	Scope of Analysis, Statement of Effect, and Proposed PM&E Measures
Air Quality	**Not evaluated in further detail** – Although the construction of the proposed Cabinet Gorge dam fishway may affect air quality locally (i.e., increased truck traffic), the effects would be intermittent, unavoidable, and short-term.
Noise	**Not evaluated in further detail** – Although the operation of machinery during construction of the Cabinet Gorge dam fishway would affect noise quality locally, the effects would be intermittent, unavoidable, and short-term.

3.1 GENERAL DESCRIPTION

The Clark Fork River originates as Silver Bow Creek near Butte, Montana, approximately 5 miles west of the continental divide. The river flows generally northwest until it reaches the Lake Pend Oreille in northern Idaho (Figure 4). The Clark Fork is the largest river in Montana and the largest tributary to Lake Pend Oreille, contributing 92 percent of its annual inflow. The Clark Fork watershed includes most of western Montana, covering approximately 22,905 square miles. Major tributaries include the Bitterroot, Blackfoot, St. Regis, Flathead, and Thompson rivers.

The Cabinet Gorge and Noxon Rapids development adjoin each other in Bonner County, Idaho and Sanders County, Montana. The Cabinet Gorge dam is located at river mile 150 (Idaho) and the Noxon Rapids Dam is located at river mile 170 (Montana).[14] Cabinet Gorge dam is the first dam on the Lower Clark Fork River, approximately nine river miles upstream of Lake Pend Oreille and the Clark Fork Delta. Major tributaries entering the Lower Clark Fork River include Lightning Creek, the Bull River, Rock Creek, Swamp Creek, the Vermilion River, Graves Creek, and Prospect Creek. Smaller tributaries include marten Creek, Trout Creek, White Pine Creek, Big Beaver Creek, Little Beaver Creek, and Crow Creek (Figure 5).

The area is characterized by a continental climate that is influenced by moist air masses that originate from the Pacific coast. The weather is characterized by abundant rainfall and snowfall, mild winters, and generally humid, cloudy conditions (Avista, 1999). The majority of precipitation occurs as snow and rain from November through July; average annual precipitation at Cabinet Gorge dam is approximately 32 inches (WRCC, 2017). Average monthly maximum temperatures range from 33°F (0.5°C) in January to 83°F (28.3°C) in July. Average minimum monthly temperatures ranges from 22°F (-5.5°C) in January to 50°F (10°C) in July (WRCC, 2017). The region receives about 68 inches of snow annually at lower elevations (WRCC, 2017). Snow melt

[14] Reference is to river miles of the combined Clark Fork-Pend Oreille Rivers. River mile 0 is the confluence of the Pend Oreille and Columbia rivers.

dominates the hydrology of the Lower Clark Fork River; peak river flows typically occur during and after spring run-off through mid-summer. Other characteristics of the Lower Clark Fork River valley, including land use and development, socioeconomics, population centers, and transportation routes are described in previous filings to the Commission (see the licensee's Land Use Management Plan or Final License Application).

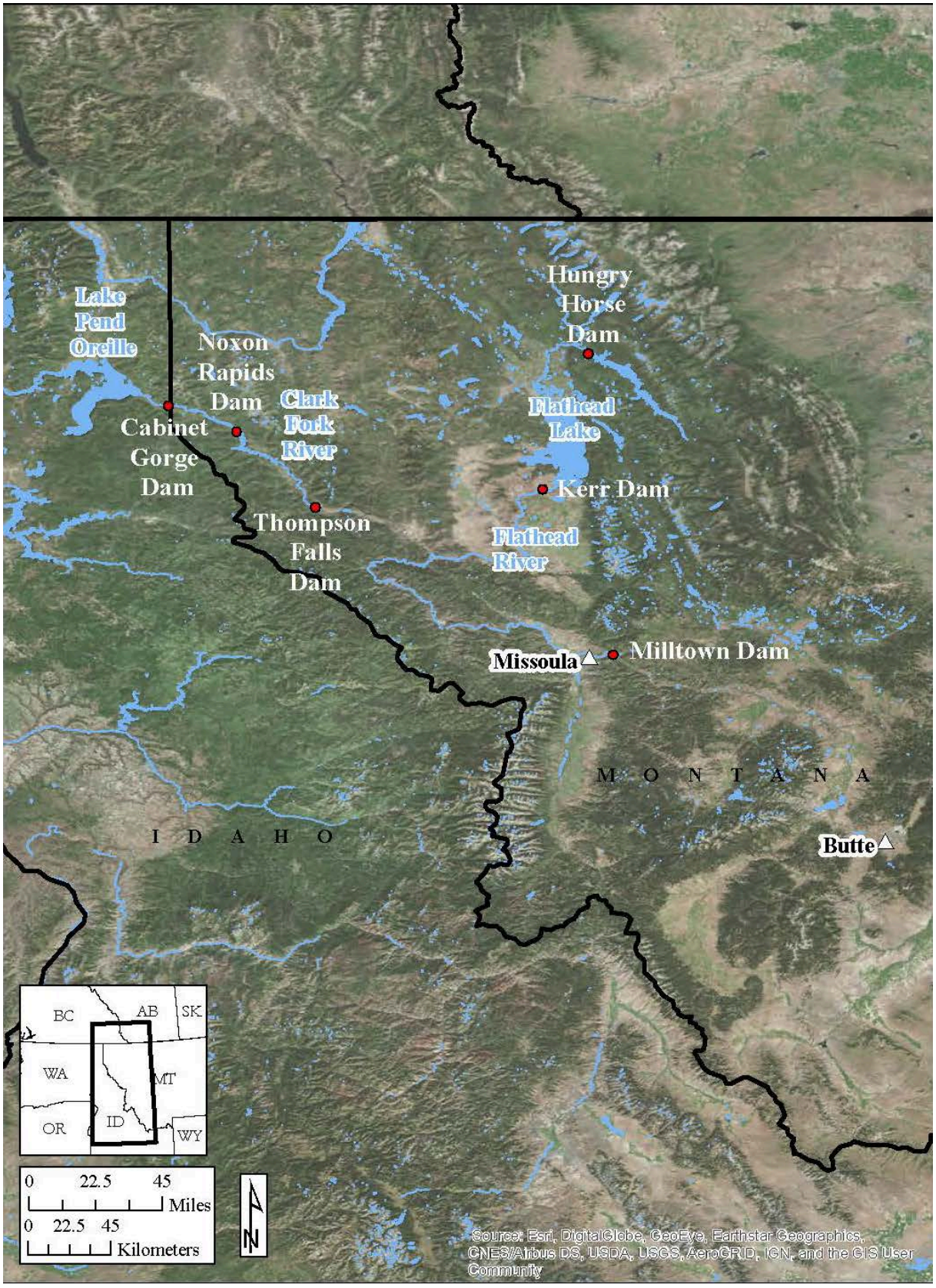

Figure 4. The Clark Fork River and Lake Pend Oreille.

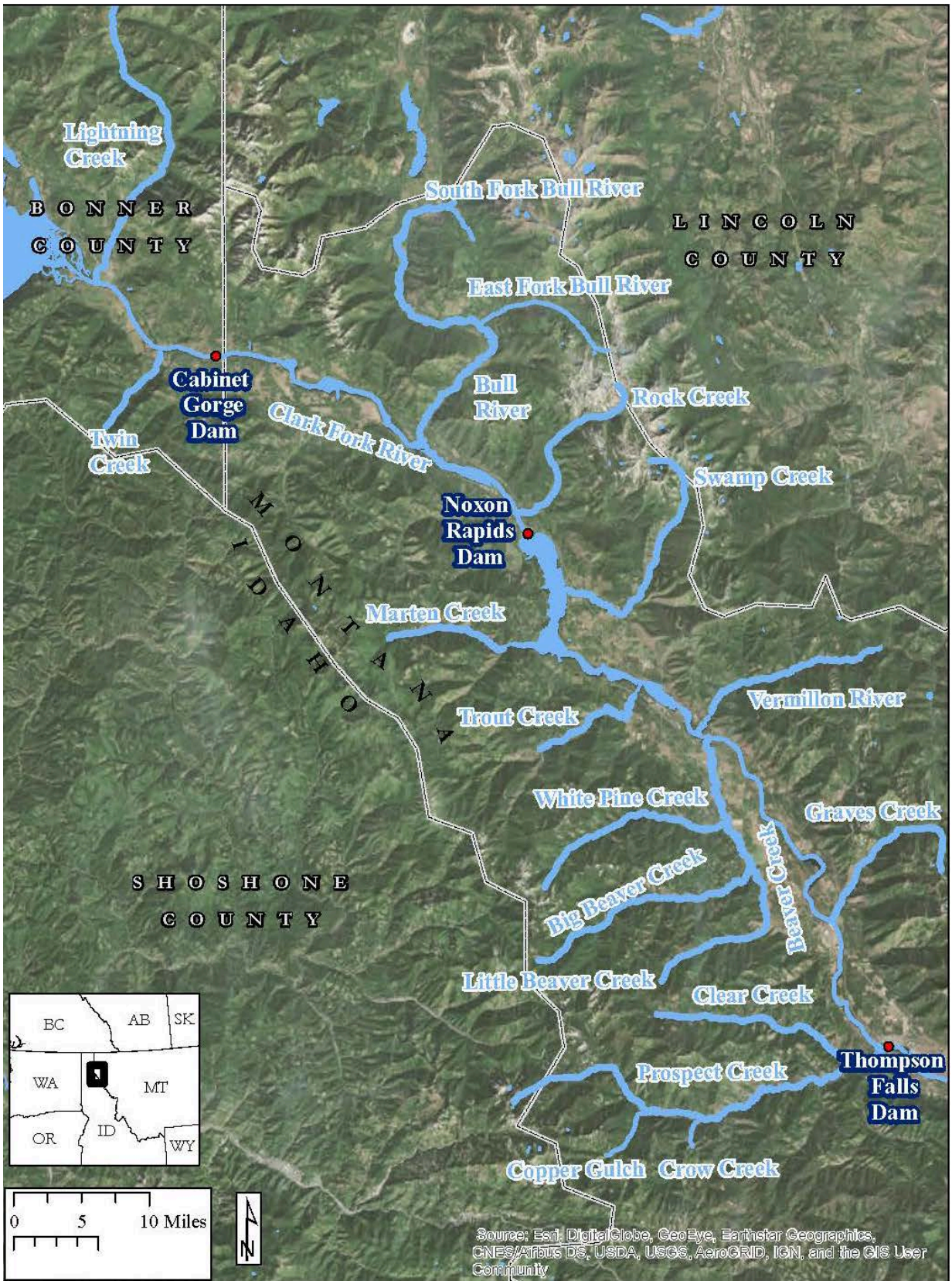

Figure 5. Lower Clark Fork River and Tributaries.

3.2 SCOPE OF CUMULATIVE EFFECTS ANALYSIS

The Council on Environmental Quality's (CEQ) regulations for implementing the National Environmental Policy Act at 40 CFR 1508.7 indicate that an action may cause cumulative impacts on the environment if its effects overlap in space or time with the effects of other past, present, or reasonably foreseeable future actions, regardless of the agency, company, or person undertaking the action. Cumulative effects can result from individually minor, but collectively significant, actions taking place over a period of time.

Cumulative impacts are defined as "the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions" (CEQ, 1997). We have identified fish and aquatic resources, water resources, and threatened and endangered resources as having the potential to be cumulatively impacted by the implementation of the licensee's proposed Cabinet Gorge dam fishway. The geographic scope of the cumulative impacts analysis is focused on the Lower Clark Fork River and Lake Pend Oreille. The temporal scope of the cumulative impacts analysis is focused on the period 2000 through 2045, i.e., the term of the Clark Fork Project license.

3.3 PROPOSED ACTION

3.3.1 Geologic and Soil Resources

AFFECTED ENVIRONMENT

The geologic formations and soil series in the Lower Clark Fork River valley are primarily the result of glacial activity that occurred approximately 12,000 to 20,000 years ago (Avista, 1999). At that point in time, an extensive lobe of glacial ice advanced into northern Idaho, damming the Clark Fork River to form Glacial Lake Missoula. At its maximum, the ice dam was taller than 2,000 feet, forming a lake 3,000 square miles in size. Glacial Lake Missoula drained and reformed several times, reaching a maximum discharge of 750,000,000 cfs, or about 20 times the flow of all rivers on the planet today (ND&T, 1994).

As first described by Stearns (1951), and later by Morlan (1989), the underlying geology at the Cabinet Gorge dam consists of thinly bedded silicious argillite[15] of Precambrian age. Bedrock is well exposed at both abutments at the dam site. The rock is slightly weathered, generally exhibiting iron staining along joints; is hard; and is moderately strong to very strong. The argillite is thinly bedded, ranging in thickness from

[15] Silica-based fine-grained sedimentary rock composed predominantly of clay particles.

1 inch to more than 5 feet. The site is located outside and west of the border of the northernmost portion of the Intermountain Seismic Belt. The nearest cluster of earthquakes is located in the vicinity of Flathead Lake about 78 miles northeast of the Cabinet Gorge dam. This seismic zone was estimated to have a maximum seismic earthquake potential of magnitude 6.0 to 6.5.

The Natural Resource Conservation Service has classified soils within the proposed Cabinet Gorge dam fishway project site as rock outcrop-rubble land complex (NRCS, 2017). This soils complex is defined as steeply sloping with thin soils, and bedrock at or very near the surface. Typical vertical profiles are characterized by 0 to 60 inches of bedrock or, in areas of rubble, 0 to 60 inches of stones and boulders (NRCS, 2017). Soils directly adjacent to the construction area are derived from volcanic ash and loess that are deposited over outwash, granite, schist, or gneiss. These soils are dominated by Bonner silt loam, Pend Oreille silt loam, or rock outcrop-rubble land complex. Bonner silt loam occurs on outwash plains or terraces and is generally well drained. Pend Oreille silt loam is found on steeper footslopes or backslopes and is generally well drained.

ENVIRONMENTAL EFFECTS

The licensee expects to excavate approximately 1,770 cubic yards of soil and bedrock material to construct the Cabinet Gorge dam fishway. This material, consisting primarily of bedrock rubble and boulders would be removed prior to the placement of concrete and rock anchors would be drilled and embedded in the underlying bedrock to couple the concrete structure to the rock mass to prevent sliding and flotation. This material would be produced and removed in the dry, as the installation of a cofferdam and dewatering pumps would limit the amount of water entering the construction area.

No operational modifications or manipulation of reservoir elevations that would adversely affect erosion or sedimentation processes are anticipated during construction activities. Even though limited in volume, any course-grained material (i.e., from bedrock fracturing) that does enter the water would be subject to natural sediment deposition processes downstream of the Cabinet Gorge dam. The licensee would haul all excavated construction material off-site, although the material may be stored on-site temporarily. The licensee anticipates using existing disturbed areas for construction lay-down, and no disturbance of previously undisturbed areas is anticipated. The licensee would also implement a Sedimentation Management and Erosion Control Plan to address short-term effects resulting from ground disturbance during construction activities. The licensee states this plan would outline specific actions to minimize erosion and sedimentation during construction, including the use of silt fencing, rip-rap, and other appropriate BMPs.

Construction of the Cabinet Gorge dam fishway has the potential to introduce sediment to the river during site preparation, excavation, construction, and removal of the cofferdam. Any potential introduction of sediment and removal of excavated materials from construction activities related to earth moving, fracturing, and construction equipment would be localized to the construction footprint and would be temporary. Furthermore, construction of the fishway would take place behind a cofferdam designed to withstand flows up to 80,000 cfs, which would help to dewater the construction area and greatly reduce the possibility of sediment releases.

Implementation of the licensee's proposed measures, its existing Water Quality Protection Plan and compliance with the erosion and sediment control measures outlined in the Idaho DEQ WQC, should minimize any erosion and sedimentation that may be caused by the construction and operation of the proposed fishway. As such, we conclude there would be minimal short term and no long-term effects on geological and soil resources as a result of construction and operation of the Cabinet Gorge dam fishway.

3.3.2 Water Resources

AFFECTED ENVIRONMENT

Water Quantity

The U.S. Geological Survey (USGS) monitors river flow at USGS Gage No. 12391950, which is located approximately 0.7 miles downstream of the Cabinet Gorge dam. Daily river fluctuations at the gage during non-spill conditions vary on average from the current 5,000 cfs minimum flow to approximately 35,000 cfs depending on the availability of water and demand for electricity. The overall magnitude of change in river stage between baseflow and peak flow averages approximately 7 feet in the Lower Clark Fork River downstream of the Cabinet Gorge dam on a daily basis (USGS Gage No. 12391950). Mean annual discharge has ranged from 16,400 to 31,760 cfs over the last 13 years (Table 3). Average monthly river flow typically ranges from approximately 9,200 cfs in September to over 54,000 cfs in June (Table 4).

Table 3. Mean Annual Discharge, Lower Clark Fork River, Idaho, at USGS Gage No. 12391950

Year	Mean Annual Discharge (cfs)
2004	16,410
2005	17,530
2006	21,490
2007	18,830
2008	22,030
2009	19,290
2010	16,990
2011	31,760
2012	25,100
2013	19,890
2014	24,520
2015	18,010
2016	16,400

Table 4. Mean Monthly Discharge, Lower Clark Fork River, Idaho, at USGS Gage No. 12391950

Month	Mean Discharge (cfs)
January	13,800
February	14,500
March	15,900
April	25,600
May	46,400
June	54,200
July	25,700
August	11,700
September	9,240
October	10,100
November	13,100
December	14,800

Water Quality

Nutrient loading, total dissolved gas (TDG), and metal contamination have been identified as the highest priority concerns related to water quality in the Lake Pend Oreille-Lower Clark Fork River system (Avista, 1999). The purpose of Appendix F1 to the Clark Fork Settlement Agreement is to provide for the systematic long-term monitoring of nutrients and metals that enter, become retained, or pass through the Clark Fork Project. The licensee participated as an active member of the Tri-State Water Quality Council (Water Council)[16] or a member of a standing committee, as time allowed, from 1999 through 2012. In October 2012, the Water Council ceased operations. In December 2012, Montana DEQ, Idaho DEQ, Missoula Wastewater Treatment Facility, University of Montana, and the licensee met to review the Water Council's previous monitoring program and to devise a program for 2013 and beyond. This group continues to meet annually to review sampling efforts of the previous year, 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 (Coalition),[17] the Coalition has taken the lead on the coordination, facilitation, and the production of annual water quality reports. In May 2015, the licensee, Montana DEQ, Idaho DEQ, Missoula Wastewater Lab, the Coalition, and the University of Montana met to review the draft 2014 reports, revise the Sampling and Analysis Plan and Quality Assurance Protection Plan for Clark Fork River Monitoring, and coordinate efforts in the future.

As approved by the Management Committee, water quality monitoring continued in 2016 for the 17th consecutive year. Nutrient sampling was conducted monthly from March through November, at three mainstem Lower Clark Fork River sampling locations in the vicinity of the Clark Fork Project: (1) the Clark Fork River below Thompson Falls; (2) the Clark Fork River at Noxon; and, (3) the Clark Fork River below the Cabinet Gorge dam. The licensee and the Coalition uploaded 2016 water quality monitoring data to the Montana DEQ's website for central archiving, and the Coalition produced a Quality Assurance/Quality Control (QA/QC) report of the annual Clark Fork River monitoring to evaluate documentation associated with sampling and measurement, such as field logbooks and site visit forms, and laboratory analytical results to be sure all QA/QC requirements are met, and to be sure that data are useable for their intended purpose. The Coalition produced a monitoring report in 2014 for the overall program, reporting that the three lower Clark Fork River monitoring sites total phosphorus levels

[16] The states of Idaho, Montana, and Washington.

[17] The Coalition is a non-governmental organization based out of Missoula, Montana whose goal is the restoration and protection of the Clark Fork River Basin.

were generally low and total nitrogen levels were below the state standard.

The Water Council and its partners monitored the following variables monthly at 29 stations throughout the Lake Pend Oreille-Clark Fork River in recent years:

- Total phosphorus
- Soluble reactive phosphorus
- Total nitrogen
- Soluble nitrate + nitrite as nitrogen
- Soluble ammonia nitrogen
- Total recoverable copper
- Total recoverable zinc
- Hardness
- Dissolved cadmium
- Dissolved copper
- Dissolved zinc
- Water temperature
- Dissolved oxygen (DO)
- pH
- Oxidation reduction potential
- Specific conductance
- Total dissolved solids
- Turbidity
- Secchi depth measurements

Four monitoring stations are within the Lower Clark Fork River: (1) the Thompson River near its confluence with the Lower Clark Fork River (Montana); (2) the Clark Fork River below Thompson Falls (Montana); (3) the Clark Fork River at Noxon Bridge (Montana); and, (4) the Clark Fork River below the Cabinet Gorge dam in Idaho (Hydrosolutions, 2012). The following are highlights of monitoring results for the four Lower Clark Fork River stations (Hydrosolutions, 2012):

- Median pH values during monthly samples varied from 7.9 to 8.1;
- Median specific conductance was lowest near the mouth of Thompson River, measuring 160 microsiemens[18] per centimeter (µS/cm). The three other stations had similar median specific conductance measurements ranging between 188 µS/cm and 191 µS/cm;
- Median turbidity values varied from 2.0 nephelometric turbidity units (NTU) to 3.1 NTU;
- The lowest median concentration of total dissolved solids was 103 milligrams per liter (mg/l) near the mouth of Thompson River. The other three stations had nearly equal measurements ranging from 122 mg/l to 124 mg/l;
- The lowest median concentration of total nitrogen was 84 micrograms per liter (µg/l) at the mouth of the Thompson River. The highest median concentration of total nitrogen was 143 µg/l in the Clark Fork River below Thompson Falls. Median total nitrogen concentrations in the Clark Fork River below the Cabinet Gorge dam was 119 µg/l;
- The median concentration of total soluble inorganic nitrogen was lowest at the mouth of Thompson River at a calculated value of 10.7 µg/l. The median

[18] Measure of electrical conductance.

concentrations of total soluble inorganic nitrogen concentrations were similar at the other three stations, varying from 34.8 µg/l to 39.2 µg/l.

- Median concentrations of total phosphorus were similar at all four monitoring stations, ranging from 7.0 µg/l to 9.0 µg/l;
- Soluble reactive phosphorus was monitored at two stations: (1) near the mouth of Thompson River; and, (2) in Clark Fork River below the Cabinet Gorge dam. The highest median concentration was 5.9 µg/l near the mouth of Thompson River. Median concentrations decreased downstream to 2.2 µg/l below the Cabinet Gorge dam;
- Median concentrations of total recoverable copper were 1 µg/l in the Clark Fork River below Thompson Falls, at Noxon Bridge, and at the Cabinet Gorge dam;
- Median concentrations of total recoverable zinc were at or below the laboratory reporting limit of 5 µg/l at each of three stations in the Clark Fork River. No measurements exceeded state of Montana acute and chronic metals toxicity standards; and
- Samples for dissolved cadmium, copper, and zinc were collected in the Clark Fork River below the Cabinet Gorge dam. Median concentrations were at or below the laboratory reporting limits for each of the dissolved metal constituents. No measurements exceeded state of Idaho acute and chronic metals toxicity standards.

Mean water temperatures at the three stations in the Clark Fork Project area during the 2016 monitoring period ranged from 55.3 °F (12.9 °C) downstream of the Thompson Falls dam to 56.4 °F (13.6 °C) below the Noxon Rapids dam (Table 5). Maximum water temperatures ranged from 66.9 °F (19.4 °C) downstream of the Cabinet Gorge dam to 68.4 °F (20.2 °C) downstream of the Thompson Falls dam. Mean DO ranged from 9.6 mg/l downstream of the Noxon Rapids dam to 10.1 mg/l downstream of the Cabinet Gorge dam (Table 6). The lowest DO measurement of 6 mg/l occurred in September downstream of the Noxon Rapids Dam (Table 6). The state of Idaho and Montana DO standards for DO are 3.5 and 4.0 mg/l, respectively, for instantaneous measurements.

Table 5. Monthly Water Temperature, Lower Clark Fork River (2016).

Date	Downstream of Thompson Falls Dam		Downstream of Noxon Rapids Dam		Downstream of Cabinet Gorge Dam	
	Celsius	Fahrenheit	Celsius	Fahrenheit	Celsius	Fahrenheit
3/14/2016	6.2	43.2	5.2	41.4	5.1	41.2
4/11/2016	10.1	50.2	8.7	47.7	8.6	47.5
5/10/2016	12.2	54.	13.1	55.6	12.8	55.0
6/14/2016	16.1	61.0	16.9	62.4	16.7	62.1
7/12/2016	17.5	63.5	18.3	64.9	17.9	64.2
8/8/2016	20.2	68.4	19.5	67.1	19.4	66.9
9/12/2016	15.4	59.7	17.7	63.9	17.4	63.3
10/11/2016	11.5	52.7	13.7	56.7	13.5	56.3
11/7/2016	7.3	45.1	8.9	48.0	8.9	48.0
Mean	***12.9***	***55.3***	***13.6***	***56.4***	***13.4***	***56.1***
Minimum	***6.2***	***43.2***	***5.2***	***41.4***	***5.1***	***41.2***
Maximum	***20.2***	***68.4***	***19.5***	***67.1***	***19.4***	***66.9***

Table 6. Monthly Dissolved Oxygen (mg/l) Lower Clark Fork River (2016).

Date	Downstream of Thompson Falls Dam	Downstream of Noxon Rapids Dam	Downstream of Cabinet Gorge Dam
3/14/2016	11.4	11.7	11.6
4/11/2016	10.0	13.7	13.8
5/10/2016	11.8	10.3	12.4
6/14/2016	9.1	8.8	9.6
7/12/2016	9.7	8.0	8.5
8/8/2016	8.0	7.0	8.3
9/12/2016	9.3	6.0	8.5
10/11/2016	9.9	8.0	8..0
11/7/2016	10.6	13.1	10.1
Mean	***10.0***	***9.6***	***10.1***
Minimum	***8.0***	***6.0***	***8.0***
Maximum	***11.8***	***13.7***	***13.8***

In 2007, the Water Council issued a comprehensive report summarizing water quality data collected in the Lake Pend Oreille-Lower Clark Fork River from 1998 through 2007 (PBS&J, 2009). Concentrations of total phosphorus and nitrogen at riverine stations in the Clark Fork-Pend Oreille watershed either showed no trend or declined during the summer monitoring period, indicating improving water quality. No statistically significant trends are apparent in summer Secchi transparency at stations monitored from 1953 through 2007. This suggests a stable trophic state for the lake. With a handful of exceptions, water quality monitoring in the Clark Fork-Pend Oreille

watershed demonstrated stable or improving conditions with respect to nutrients and attached algae from 1984 through 2007.

During periods of high flow, water may spill over the Cabinet Gorge dam at the rate of 100,000 cfs or more. Rapid movement of such a large volume of water can cause atmospheric gases to become entrained in the water, resulting in supersaturation that can lead to gas bubble disease in fish. During these events, TDG can exceed 140 percent of saturation, which is above the standard established by Idaho and Montana of 110 percent. The licensee has undertaken extensive monitoring and mitigation efforts pursuant to Appendix F5 of the Clark Fork Settlement Agreement to reduce and mitigate large TDG concentrations. The annual Settlement Agreement compliance reports submitted to the Commission provide full descriptions of these efforts. Further, the licensee is engaged in a separate process of developing and installing abatement measures at the Cabinet Gorge dam to reduce TDG levels in the mainstem Lower Clark Fork River.

ENVIRONMENTAL EFFECTS

Water Quantity

Construction of the cofferdam and the Cabinet Gorge dam fishway would affect water flow patterns in the tailrace in the short-term as tailrace flows are re-directed to facilitate construction and in the long-term as new flow patterns develop after installation is complete. However, the fishway is to be sited specifically to take advantage of the hydraulic conditions in the tailrace to improve the potential for capturing native salmonids. The Cabinet Gorge dam fishway would have a holding pool flow of 6 to 25 cfs and attraction flow of 120 cfs for a total flow of up to 126 cfs. Water would be discharged into the tailrace from one of six entrance gates while the fishway is in operation. The attraction plume from the fishway would seasonally alter existing localized flow patterns in the tailrace. Attraction flows generated by the fishway are intended to provide a volume of water great enough to be located by migrating bull trout during flows up to 52,000 cfs. Although existing hydraulic patterns in the tailrace would be altered by the operation of the fishway, the changes would be beneficial to fishery resources as they are designed to attract native salmonids to the fishway. During winter shutdowns of the fishway, there would be no attraction flow present and hydraulics in the tailrace would be similar to pre-existing conditions. Attraction water for the fishway would be siphoned from the forebay area at the dam and water currents in front of the water supply siphon intake screens would be altered when water is drawn in through the intake screens. Changes to water currents from siphoning up to 126 cfs to the fishway would be minor.

Water Quality

Construction of the Cabinet Gorge dam fishway has the potential to introduce sediment to the river during site preparation, excavation, and construction and removal of the cofferdam, which may increase turbidity for a short period of time. Any potential introduction of sediment and removal of excavated materials from construction activities related to earth moving and construction equipment would be localized to the construction footprint and would be temporary. Changes in turbidity resulting from cofferdam construction would be short lived and would not likely affect water quality in the tailrace or in downstream reaches. Once the area behind the cofferdam has been dewatered, any turbidity caused by water moving through the cofferdam would be contained by the cofferdam. Water with high levels of suspended sediment removed from behind the cofferdam would be pumped through a portable storm-waste filtering system prior to being discharged back to the river. Due to the type of materials present at the site, primarily bedrock, boulders, and stones with lesser amounts of silt and sand, the volume of coarse or fine material introduced into the river system and the potential effect on water quality would be limited. The water/grout interface at each sheet pile constructed to install the cofferdam would be a source of concrete leachate while the grout is hardening, though this process would take less than 1 hour. The pH may be slightly elevated in the immediate area of each drill hole, but pH changes in the tailrace would likely be undetectable due to the small amount of concrete grout exposed to the water and the relatively quick hardening time.

The licensee intends to implement a Sediment Management and Erosion Control Plan to minimize construction-related effects on water quality. If necessary, the licensee would alter project operations for construction purposes pursuant to the guidelines established in Appendix F4 and Appendix T of the Clark Fork Settlement Agreement. Project operations could be altered to extend the low-flow period during certain days to allow critical cofferdam construction activities to take place; however, the duration of the extended low-flow period would be a relatively short deviation from existing load-following activities because both Clark Fork Project reservoirs have Commission-approved storage and operating guidelines and limited storage capacities. It is expected that construction and operation of the proposed Cabinet Gorge dam fishway would have no other short-term or long-term effects on water quality.

The WQC sets forth requirements the licensee would follow to minimize water quality effects due to excess sediment (conditions 8 through 11) and hazardous or deleterious materials (conditions 26 through 34). The licensee also plans on developing and utilizing an Oils and Lubricant Management Plan for its contractors in agreement with the WQC conditions. These measures would adequately protect water quality during construction.

3.3.3 Fisheries and Aquatic Resources

AFFECTED ENVIRONMENT

Native Species

Native fish species within the Lower Clark Fork River drainage include bull trout, westslope cutthroat trout, mountain whitefish, Lake Pend Oreille pygmy whitefish, longnose sucker, largescale sucker, northern pikeminnow, peamouth, longnose dace, redside shiner, Columbia slimy sculpin, and rocky mountain sculpin (as cited in the application, Montana FWP, 2014a; Idaho DFG, 2014a). Rehabilitation of bull trout stocks (and other native salmonids) has been a high priority for state and federal fisheries managers for the past several decades. Bull trout, a federally protected species in the Lower Clark Fork River, are discussed in detail in Section 3.3.5 *Threatened and Endangered Species*, and in the licensee's Biological Evaluation (BE), filed concurrently with the amendment application.

Development of Fish Passage and the Native Salmonid Restoration Program (Clark Fork Settlement Agreement, Appendix C)

The purpose of Appendix C to the Clark Fork Settlement Agreement (Fish Passage and the Native Salmonid Restoration Plan (NSRP)) is to mitigate the continuing effects of the Clark Fork 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. This is being accomplished through the licensee's implementation of the programs called for in the NSRP, as developed and recommended for implementation to the Clark Fork Relicensing Team.

Upstream Fish Passage

During the relicensing process and development of the original Clark Fork Settlement Agreement, the licensee and numerous local fisheries experts formed a Fisheries Working Group (FWG)[19] to begin detailed discussions regarding fish passage at the Clark Fork Project. The FWG identified numerous factors that might influence the success of fish passage and restoration efforts in the Lower Clark Fork River, recognizing that an understanding of these factors would be essential to ensuring that fish passage efforts have the desired positive effect for bull trout and other native salmonid populations. The FWG also recognized that fish passage is just one of many tools that could be used for restoring native salmonids and that a structured approach to examining

[19] After relicensing, the Fisheries Working Group became the Water Resources Technical Advisory Committee.

when and how to use fish passage was needed to avoid costly mistakes in terms of fishery resources, time, and financial resources.

In 1998, the FWG produced the NSRP to: (1) determine whether passage at the Cabinet Gorge dam and Noxon Rapids dam would be effective tools for increasing the viability of native salmonid population; and, (2) to assess the possibility of re-establishing connectivity for migratory stocks of native salmonids (Kleinschmidt and Pratt, 1998). Both of these interests are essential components when considering restoration of native salmonids. The NSRP provided the structure for a step-wise examination of issues influencing the planning for fish passage and was designed to function irrespective of species and location. In its simplest form, the NSRP consists of the following program elements:

- An extensive and long-term examination of five major factors that may influence the success of restoration activities: genetics, pathogens, exotic species, native fish distribution, and the suitability of current and potentially available habitat;
- Identification of preferred or appropriate stocks of source fish for passage and restoration programs;
- Development of an experimental fish passage program to determine how to capture and transport native salmonids effectively;
- Establishment of monitoring programs to determine the success of restoration activities; and,
- Ultimately, consideration of permanent fish passage based on the success of implementation of the NSRP.

In 2007, the Management Committee assembled an independent panel of experts to assess fish passage efforts and recommend future upstream passage efforts for Cabinet Gorge and Noxon Rapids dams. The Expert Fish Passage Panel submitted its final findings and recommendations to the Management Committee in February of 2009 (GEI, 2009). With regard to the Cabinet Gorge dam, the Expert Fish Passage Panel recommended that the licensee:

- Develop a minimum target number and percentage of Montana bull trout to move annually upstream of the Cabinet Gorge dam to attain restoration success;
- Determine whether the existing capture and transport program will attain minimum levels of success;
- Initiate preliminary design of a permanent fishway-trap and concurrently initiate measures to optimize the existing capture and transport program;
- If the existing capture and transport program will not result in success, determine whether the existing program can be improved to result in success;
- Proceed with pre-design of a permanent fishway with high and low tailwater fixed slot-orifice entrances, and an attraction flow of 100 to 150 cfs;

- Integrate high velocity jet attraction at the existing geologic thrust block location and determine if construction can be completed in phases so that full fishway attraction flow can be discharged before constructing the entire fishway;
- Incorporate National Marine Fisheries Service's (NMFS, 2008) design criteria;
- Locate the Cabinet Gorge dam fishway on the river left bank of the Clark Fork River, immediately downstream of the Cabinet Gorge dam, adjacent to the existing geologic thrust block;
- Study tailrace hydraulics in greater detail to confirm flow patterns and provide input to design;
- Collect improved bathymetric data immediately west of the thrust block (along the south shoreline) to attain updated velocity data;
- Delay construction of the permanent fishway until performance results are available for the Thompson Falls fishway (a ladder-based fishway located upstream of the Noxon Rapids dam and operated by PPL Montana, FERC No. 1869 – completed in 2010). In the meantime, maximize collection efforts downstream of the Cabinet Gorge dam; and,
- Immediately initiate full coordination between the Cabinet Gorge gas abatement and fish passage technical groups so that improvements each group considers do not conflict with each other.

After reviewing the Expert Fish Passage Panel's recommendations, the Management Committee directed the licensee and the FWS to develop joint recommendations for fish passage elements to be incorporated into a draft 5-year plan to guide fish passage efforts from 2010 through 2014 for the Management Committee's review and approval (FWS and Avista, 2010). The licensee and the FWS worked for more than a year to develop a broad set of recommendations (i.e., the Joint Fish Passage Agreement developed in 2009) to guide the design and schedule for providing upstream and downstream native salmonid fish passage for the Clark Fork Project. Although the draft 5-year plan extended only through 2014, the licensee has honored the agreement since then annually. In 2009, the Management Committee also approved the formation of a fish passage DRT comprised of representatives of the licensee, FWS, Idaho DFG, and Montana Fish, Wildlife, and Parks (Montana FWP). The DRT's role is to: (1) advise the licensee's design consultants on passage criteria for the Cabinet Gorge dam fishway in accordance with annual work plans and subsequent 5-year plans as approved by the Management Committee; and, (2) provide recommendations to the licensee on passage designs prior to the licensee's submission of final designs to the Management Committee for approval.

With the Management Committee's approval and to provide for upstream passage while permanent measures were being evaluated and developed, the licensee has implemented a successful bull trout capture-and-transport program to move adult migratory bull trout from the Lower Clark Fork River to upstream tributary habitats in

Montana or return them to the Lower Clark Fork River based on genetic assignments or size. The primary techniques used to collect adult bull trout for upstream transport have included operating the Cabinet Gorge Fish Hatchery fish ladder, and boat electrofishing and angling in the Lower Clark Fork River downstream of the Cabinet Gorge dam. Since 2010, trapping in Twin Creek, a tributary to the Lower Clark Fork River downstream of the Cabinet Gorge dam, has also been employed to collect upstream migrants for transport. According to the FWS, the licensee's capture and transport program has resulted in "major progress in reconnecting upstream bull trout passage" (FWS, 2006b). The proposed Cabinet Gorge dam fishway at the dam would eliminate the need for electrofishing and angling in the 1-mile reach of the Lower Clark Fork River between the dam and the fish hatchery.

Through the end of 2016, the licensee has collected 858 adult bull trout downstream of the Cabinet Gorge dam, 739 of which were genetically assigned to different regions of the Lower Clark Fork River. In total, through the end of 2016, the licensee has relocated 558 adult bull trout into Montana waters. The remaining adult bull trout were released back into the Lower Clark Fork River downstream of the Cabinet Gorge dam after genetic analyses confirmed that these fish were more similar to bull trout from Lake Pend Oreille and its major tributaries or because the fish were too small to qualify for upstream transport. On average, the licensee's staff captures and handles approximately 54 adult bull trout per year as part of the upstream capture and transport program; approximately 35 adults are transported upstream to Montana waters annually. Researchers have estimated that the licensee transports 39 percent of the available Montana-origin bull trout that return annually to the Cabinet Gorge dam (GEI, 2009). Year-to-year upstream transport has ranged from 19 (2006) to 63 (2014) adults.

The licensee has completed or funded several studies to determine optimal bull trout release sites, which are a minimum of 10 miles upstream of the Cabinet Gorge dam fishway site, making trucking fish an inevitable part of fish passage at the Cabinet Gorge dam. Previous transport and radio-telemetry work completed or funded by the licensee demonstrated that "fall back"[20] can occur when bull trout are released near the dam. The licensee and the Management Committee's Aquatic Implementation Team also developed guidelines to decide which bull trout to transport and where those fish are released. The Management Committee reviews the guidelines annually and revises them if necessary. Until 2010, most bull trout greater than 400 millimeters (mm) (15.7 inches) total length and genetically assigned to an upstream region were transported upstream. Beginning in 2011, the size requirement for transported bull trout was reduced to 350 mm (13.8 inches). Bull trout less than 350 mm long are released back into the Lower Clark Fork River downstream of the Cabinet Gorge dam.

[20] Fall-back occurs when a fish is transported or passed above a dam, but migrates back downstream soon thereafter.

Once collected from downstream of the dam, bull trout are held at the Cabinet Gorge fish handling and holding facility while awaiting genetic assignment. The licensee developed a rapid genetics testing protocol (with the Management Committee's approval) in the early years of the upstream fish passage program that is used to assign captured bull trout to one of four regions in the Lower Clark Fork River. Based on the results of genetic testing, adult bull trout are trucked to their region of origin. In 2014-2015, the licensee constructed a new fish handling and holding facility at the Cabinet Gorge Fish Hatchery, approximately 1 mile downstream of the Cabinet Gorge dam.

The Cabinet Gorge Fish Hatchery is staffed by fisheries professionals 24 hours a day, 7 days a week. This provides additional security and the ability to respond quickly to any issues that arise within the handling and holding facility. The Cabinet Gorge Fish Hatchery also provides additional space; ease of access; proximity to the site of the proposed Cabinet Gorge dam fishway; abundance of natural cold, clean water; and other amenities.

Downstream Fish Passage

The licensee and the Management Committee have implemented a tributary trapping and downstream juvenile bull trout transport program since 2000. The purpose of the program is to provide safe, timely, and effective downstream passage for juvenile bull trout around the licensee's dams and reservoirs. Since the program's inception, trapping has been conducted in many tributaries to the licensee's reservoirs that are important to native fish, especially bull trout. The primary objectives of this component of the NSRP are to re-establish and strengthen the migratory link between the Lake Pend Oreille and Montana populations of bull trout and to assess the relative benefits of transport in providing higher survival to adulthood juvenile bull trout in Montana.

The licensee has staffed and funded the annual operation of up to five rotary screw traps and 18 conventional weir traps in a number of tributaries to both the Cabinet Gorge and Noxon reservoirs over the past 17 years. A permanent trap was built on Graves Creek and became operational in 2013. The number and type of traps utilized and the number of streams sampled has varied from year to year based on the presence of bull trout and capture efficiencies. Trapping efforts have been concentrated in the Bull River, Rock Creek, Vermilion River, Graves Creek, and Prospect Creek drainages. Typical annual operations include the use of screw traps in the spring during periods of high stream flow, with weir traps being installed in late June and operating until ice formation in late November. As of 2016, a total of nine traps; three weir traps, three screw traps, two exclusion weirs (high flow and debris prevented the use of exclusion weirs in 2016) and one permanent trap were utilized to capture downstream migrants for transport.

Electrofishing was added as a method for capturing juvenile bull trout in some tributaries beginning in 2012. Electrofishing for the purpose of capturing transport fish

may not be used in the future as recent analysis has suggested that juveniles transported during July and August have poor survival rates and July and August are the only months' electrofishing is allowed due to concerns over electrofishing during sensitive life stages of native salmonids. Future efforts in certain streams (e.g., Vermilion River) would likely be comprised of minnow trapping, snorkeling, and dip net capture efforts, and potentially electrofishing outside of the normally allowed window.

Since inception of the program (2000 through 2016), a total of 4,345 juvenile bull trout (>3 inches or 75 mm and <11.8 inches or 300 mm) have been collected in traps or weirs. In addition, electrofishing has been used to capture 195 juvenile bull trout during downstream transport efforts as agreed to by the Management Committee; 74 from Cooper Gulch, 84 from the Vermilion River, and 37 from Prospect Creek. Of the 4,540 juvenile bull trout captured by all methods (in traps and by electrofishing), 2,758 have been transported downstream to Idaho waters (Eric Oldenburg, Fishery Biologist, Avista, as cited in the licensee's application). The licensee, with Management Committee approval, and as codified in the Clark Fork Settlement Agreement Amendment No. 1, plans to continue trapping efforts, including the establishment of up to seven permanent tributary traps.

Westslope Cutthroat Trout

The states of Idaho, Montana, and the FWS have targeted the rehabilitation of westslope cutthroat trout as part of fisheries management objectives in the Lower Clark Fork River. The Idaho DFG strives to perpetuate native trout in numbers adequate to provide fishing opportunities (Idaho DFG, 2014a). Native trout are important to Idaho biologically because they are best adapted to their historical waters, and their presence is an indicator of the overall health of Idaho's waters (Idaho DFG, 2014a). They are also important because Idaho anglers place a high value on native trout (Idaho DFG, 2014a). Westslope cutthroat trout were petitioned for listing under ESA in 2002; however, the FWS determined that federal protection was not warranted (Idaho DFG, 2014a).

The Cabinet Gorge Fish Hatchery, which was built to mitigate the loss of habitat resulting from the construction of the Corps' Albeni Falls dam, holds a captive brood stock of westslope cutthroat trout that supplies eggs for statewide management programs in Idaho. Fish health in hatchery and native stocks is a concern in the Clark Fork watershed. The Idaho DFG, which operates the hatchery, adheres to fish health guidelines set forth by the Pacific Northwest Fish Health Protection Committee and the Integrated Hatcheries Operation Team. The primary goals of the fish health program are to minimize the introduction of new or exotic pathogens to the state of Idaho, to avoid amplifying any pathogens of concern that already occur in hatchery fish or wild fish, to limit the possibility of spreading any specific endemic disease agents through the Idaho DFG 's activities, and to enhance the health of hatchery fish and the quality of smolts to assist in the restoration of salmon and steelhead. The hatchery's fish health program includes extensive disease sampling of anadromous species, modified rearing strategies

to reduce stress, and structural modifications to increase or maintain a high level of fish health (Idaho DFG, 2014a).

The management goals for westslope cutthroat trout in Montana are outlined in a *Memorandum of Understanding and Agreement for Westslope Cutthroat Trout and Yellowstone Cutthroat Trout in Montana* (Montana FWP, 2007). Objective 1 of the memorandum has several components, including "maintaining successful life history strategies by ensuring migratory populations have access to different seasonal and life-stage habitats." The Montana FWP has expressed concern about passing westslope cutthroat trout at the Cabinet Gorge dam, citing the risk of transmitting diseases and introgression[21] (Idaho DFG, 2014a). The Idaho DFG supports passage of westslope cutthroat trout and bull trout to historical habitat and is attempting to address the concerns expressed by Montana FWP (Idaho DFG, 2014a).

In 2006, the licensee proposed an experimental westslope cutthroat trout passage program for the Cabinet Gorge dam. The proposal resulted in several recommendations from Montana FWP to obtain additional information that could be used for management decisions. Since that time several studies have been implemented in an effort to provide more scientific data, including a comprehensive genetic analysis in 2007 of westslope cutthroat trout in tributaries to the Lower Clark Fork River, Lake Pend Oreille and below the Cabinet Gorge dam and Noxon Rapids dam. In addition, as required by Montana FWP, pathogen testing of species targeted for transport has occurred annually at the Cabinet Gorge dam since 2013. More than 200 fish sampled in 2013 were certified to be disease free. Comprehensive pathogen sampling occurred again in 2014, 2015, and 2016; all fish tested were certified to be disease free. No pathogens have been detected in species targeted for transport to date.

Montana FWP, Idaho DFG, FWS, the licensee, and Trout Unlimited formed a committee in 2013 to address how connectivity for native salmonids can be achieved while addressing the risk of transmitting disease to existing fisheries. The licensee would implement the pathogen sampling protocol required for upstream transport of bull trout as agreed to in Clark Fork Settlement Agreement Amendment No. 1, including temporarily or permanently ceasing upstream transport under certain conditions. The FWS's Idaho Fish Health Center, located in Orofino, continues to process the fish tissue samples and report the results.

The Management Committee approved transport of westslope cutthroat trout upstream of the Cabinet Gorge dam in 2015. As such, the licensee moved 50 westslope cutthroat trout collected downstream of the Cabinet Gorge dam into the Cabinet Gorge reservoir. In the spring of 2016, the licensee moved 40 westslope cutthroat trout from the

[21] The transfer of genetic information from one species to another as a result of hybridization.

Lower Clark Fork River to the Cabinet Gorge reservoir. All transported westslope cutthroat trout were implanted with radio transmitters prior to transport and movement information following upstream transport is being used to guide future fish passage decisions. Montana FWP has not approved transport and release of westslope cutthroat trout upstream of the Noxon Rapids dam because of the potential spread of pathogens with particular concern for the spread of Infectious Pancreatic Necrosis, a fish borne pathogen that has been detected in brook trout and mountain whitefish from Spring Creek and Mosquito Creek, tributaries to the Lower Clark Fork River located downstream of the Cabinet Gorge dam (Avista, 2016).

Summary of Other Clark Fork Settlement Agreement Appendices

In addition to the development of fish passage and the NSRP (i.e., Clark Fork Settlement Agreement Appendix C) and with the approval of the Management Committee, the licensee has undertaken extensive efforts to protect and restore populations of native salmonids in the Lower Clark Fork River through implementation of comprehensive PM&E programs as defined in the Clark Fork Settlement Agreement. The following list summarizes the overarching intent of the programs that have directly or indirectly benefited native salmonids and their habitats in the Lower Clark Fork River watershed since initiation of the Clark Fork Settlement Agreement. Additional information about the accomplishments of these programs can be found in the reports and plans for each of the Settlement Agreement appendices filed with the Commission annually.

- **Settlement Agreement Appendix A, Idaho Tributary Habitat Acquisition and Fishery Enhancement Program** – The purpose of this program is to offset the load-following effects of the Clark Fork Project on native salmonid species (i.e. bull trout, westslope cutthroat trout, and mountain whitefish) through watershed restoration and enhancement, fishery monitoring and management support, and a public education and enforcement initiative focused on bull trout in Idaho.

- **Settlement Agreement Appendix B, Montana Tributary Habitat Acquisition and Recreational Fishery Enhancement Program** – The purpose of this program is to offset the load-following and reservoir operational effects of the Clark Fork Project on native salmonids (i.e. bull trout, westslope cutthroat trout, and mountain whitefish) and recreational fisheries through watershed restoration and enhancement and recreational fishery monitoring and management support.

- **Settlement Agreement Appendix D, Bull Trout Protection and Public Education Program** – The purpose of this program is to protect bull trout through a combination of enhanced law enforcement and public education outreach.

- **Settlement Agreement Appendix E, Watershed Council Program** – 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.

- **Settlement Agreement Appendix F1, Support of Clark Fork Water Quality Monitoring Program**[22] – The purpose of this program is to provide for the systemic, long-term monitoring of nutrient and metals that enter, are retained in, and pass the Clark Fork Project.

- **Settlement Agreement Appendix F2, Mobilization of Sediment Trapped Nutrients or Heavy Metals** – The purpose of this program is to provide for monitoring of Noxon Reservoir during periods when reservoir stratification is possible and, if the reservoir stratifies, to initiate more intensive monitoring of nutrient and metal levels.

- **Settlement Agreement Appendix F3, Aquatic Organism Tissue Analysis** – The purpose of this program is to provide a commitment to analyze aquatic organism tissues (e.g., fish, crayfish, macroinvertebrate, etc.) for the presence of toxic substances.

- **Settlement Agreement Appendix F4, Water Quality Protection and Monitoring Plan for Maintenance, Construction, and Emergency Activities** – The purpose of this measure is to provide for the development and implementation of a plan to minimize or eliminate the effects of project-related maintenance, construction, and emergency activities on water quality and associated resources of the Lake Pend Oreille-Lower Clark Fork River system.

- **Settlement Agreement Appendix F5, Dissolved Gas Supersaturation Control, Mitigation, and Monitoring Program** – The purpose of this measure is to provide for the study, control, mitigation, and monitoring of gas supersaturation and the associated effects on biological resources in the Lake Pend Oreille-Lower Clark Fork River system related to spill at the Clark Fork Project. In addition to addressing TDG issues, the flexibility of the Clark Fork Settlement Agreement has allowed for Appendix F5 funding to supplement other programs with Management Committee approval.

- **Settlement Agreement Appendix G, Implementation of the Land Use Management Plan** – The purpose of this measure is to provide for the long-term protection and maintenance of sensitive and important resources on the licensee-

[22] The Management Committee approved renaming this PM&E "Clark Fork River Water Quality Monitoring Program" in 2016.

owned project lands, including the existing rural and semi-remote character of the shoreline through the implementation of a land use management program.

- **Settlement Agreement Appendix H, Implementation of the Recreation Resource Management Plan** – The purpose of this measure is to provide for appropriate and adequate recreational opportunities and facilities associated with the Clark Fork Project through the implementation of the Recreation Resource Management Plan.

- **Settlement Agreement Appendix K, Wildlife Habitat Acquisition, Enhancement, and Management Program** – The purpose of this program is to mitigate for the potential effects on wildlife resources and habitat due to the continued operation of the Clark Fork Project. The program focuses on the types of habitat most significantly affected (i.e., wetland and other riparian areas and habitats that support waterfowl and furbearers, among other species).

- **Settlement Agreement Appendix M, Wetlands Protection and Enhancement Program** – The purpose of this measure is to provide for the protection of wetlands occurring on licensee owned project lands, and for the evaluation and potential enhancement of selected wetland areas. The 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 wetland enhancement.

- **Settlement Agreement Appendix O, Clark Fork Delta Habitat and Protection and Mitigation Program** – The purpose of this PM&E measure is to prevent the loss of wildlife habitat in the Clark Fork Delta, or mitigate that loss, to an extent comparable to the loss of habitat that would result from continued operation of the Clark Fork Project. This PM&E obligation has been completed.

- **Settlement Agreement Appendix S, Erosion Fund and Shoreline Stabilization Guidelines Program** – The primary purpose and goal of this program is to provide funds to ameliorate erosion caused by the continued operation of the Clark Fork Project.

- **Settlement Agreement Appendix T, Project Operations Package** – The purpose of this program is to mitigate the effects of project operations through implementation of measures to achieve the goals of enhancing native salmonids and providing recreational fishery opportunities. This has been accomplished both through changes in the hydraulic operation of the projects and through other non-operational measures that have the greatest likelihood of individually and collectively being successful.

The Clark Fork Settlement Agreement also included the following nine additional comprehensive PM&E programs developed to address other important resource issues, including aesthetics, wildlife, botanical, wetlands, and cultural resources:

- Settlement Agreement Appendix I, Aesthetics Management Plan;
- Settlement Agreement Appendix J, Development and Implementation of Wildlife, Botanical, and Wetland Management Plan;
- Settlement Agreement Appendix L, Black Cottonwood Habitat Protection and Enhancement;
- Settlement Agreement Appendix N1, Bald Eagle Monitoring and Protection (this PM&E obligation has been completed);
- Settlement Agreement Appendix N2, Peregrine Falcon Monitoring and Protection (this PM&E obligation has been completed);
- Settlement Agreement Appendix N3, Common Loon Monitoring and Protection Program (this PM&E obligation has been completed);
- Settlement Agreement Appendix P, Forest Habitat Protection and Enhancement;
- Settlement Agreement Appendix Q, Reservoir Island Protection; and,
- Settlement Agreement Appendix R, Clark Fork Heritage Resource

Non-Native Aquatic Species

Non-native fish have been established in the Lower Clark Fork River through intentional stocking programs, illegal introductions, and natural dispersion over the past 100 years or more (FWS, 2002). Non-native fish include northern pike, walleye, smallmouth bass, largemouth bass, lake trout, brown trout, brook trout, kokanee, yellow perch, black crappie, burbot, pumpkinseed sunfish, yellow bullhead, black bullhead, fathead minnow, central mudminnow, and rainbow trout. Non-native species adversely affect native fish in the Lower Clark Fork River, including bull trout and westslope cutthroat trout, because of predation, competition, redd superimposition, and habitat niche selection/overlap. Redd superimposition occurs when gravel and other substrate particles in a redd are dug and disturbed by the spawning activities of subsequent females; through egg displacement, it has been inferred as a major cause of density-dependent embryo mortality for native salmonids. Where native salmonids overlap with non-native species, the effect has been detrimental for the most part because of increased competition and predation. The introduction of kokanee; however, has benefited bull trout by providing a preferred source of forage that has contributed to increased growth, fecundity, and resiliency for some adfluvial[23] bull trout populations (Videgar, 2000; PBTTAT 1998).

[23] Bull trout that overwinter and mature in large lakes or reservoirs and then

Early management for non-native salmonids in the Clark Fork River by the U.S. Fish Commission[24] included:

- Introduction of lake whitefish into Lake Pend Oreille in the 1890s;
- Introduction of lake trout into Lake Pend Oreille in 1925;
- Introduction of kokanee into Flathead Lake in 1916 and subsequent downstream transfer to Lake Pend Oreille during the winter flood of 1933;
- Widespread introductions of brook trout and brown trout in the early 1900s;
- Introduction of Yellowstone cutthroat trout into some tributary streams and mountain lakes;
- Establishment of rainbow trout in Lake Pend Oreille and some Lower Clark Fork River tributaries; and,
- Introduction of Coho salmon (without successful establishment) into Cabinet Gorge Reservoir in 1953.

In 1966, Mysis shrimp were introduced into Lake Pend Oreille in an effort to enhance forage for kokanee. By 1974, the species was well established (Idaho DFG, 2014b). The forage benefit to kokanee was not realized, but Mysis shrimp did enhance growth and survival of juvenile lake trout, eventually leading to the rapid expansion of the species and the need for an aggressive and successful suppression program in Lake Pend Oreille that the licensee, Bonneville Power Administration, and the Management Committee have implemented since 2006. The accomplishments of this program are described in detail in annual compliance reports that the licensee files with the Commission and in licensee's BE.

The Montana FWP's management strategy for the Lower Clark Fork River reservoirs shifted to warm water species in the 1980s, and that focus continues to this day (Montana FWP, 2014a). Bass fishing is the focus of the recreational fishery in Noxon Reservoir; it is sufficiently popular to support multiple tournaments each year. Because of this, bass fishery enhancement was an original part of the Clark Fork Settlement Agreement, as deemed appropriate by the Management Committee (*see* Clark Fork Settlement Agreement, Appendix B, Montana Tributary Habitat Acquisition and Recreational Fishery Enhancement Program). Shortly after implementation of the Clark Fork Settlement Agreement, the Management Committee agreed to postpone enhancements of the bass fishery because bass are considered a "*potential predator on Bull Trout, and [management for bass] was in conflict with current and proposed efforts to restore and protect Bull Trout*" (Hanson and Tholl, 2007).

---

migrate to small tributaries to reproduce.

[24] The United States Fish Commission was created in 1871 to "investigate, promote, and preserve the fisheries of the United States." It later became the U.S. Bureau of Fisheries, which operated until 1940.

The non-native, warm water species that pose the greatest risk to bull trout and other salmonids are smallmouth bass, northern pike, and walleye. These predatory fish have the potential to grow to large sizes and actively forage on juvenile salmonids. Smallmouth bass were introduced into the Noxon Reservoir in the early 1980s, and the species soon became well established throughout the Lower Clark Fork River reservoirs. Smallmouth bass moved downstream into the Lake Pend Oreille system in the early 1990s and are now present in Lake Pend Oreille and the Pend Oreille River. Creel data between 1991 and 2014 from Lake Pend Oreille showed that smallmouth bass were rare in angler catch in 1991, but were the second most numerous species caught in 2007 (Ryan and Jakubowski, 2009). By 2010, smallmouth bass represented about 19 percent of the species composition in the Pend Oreille River, and Idaho DFG documented a concurrent decrease in the population of northern pikeminnow, a native cyprinid species (Idaho DFG, 2014b). During the 2014 Lake Pend Oreille creel census, smallmouth bass were the second most abundant species caught (estimated catch of over 33,000), but only about 11 percent were harvested by anglers (Bouwens and Jakubowski, 2016).

Northern pike were first documented in the Clark Fork River drainage in 1953 after a transplant occurred from a native population in Lake Sherburne in the Hudson Bay Drainage to Lone Pine Reservoir in the Little Bitterroot River Drainage (tributary to the lower Flathead River) (Jim Vashro, retired Regional Fishery Manager, Montana FWP, as cited in the licensee's application). Northern pike became established in the Thompson River upstream of the Lower Clark Fork River reservoirs and the species is now well established in the Lower Clark Fork River reservoirs (Bernall and Moran, 2005). From 1971 to 2011, northern pike catches in the Noxon Reservoir using gill nets increased significantly (Scarnecchia et al., 2014). Northern pike have occasionally been observed in Lake Pend Oreille and the Pend Oreille River, but their occurrence is rare (Ryan and Jakubowski, 2012a; Jim Fredericks, Regional Fishery Manager, Idaho DFG, as cited in the licensee's application).

Walleye were illegally established in the Lower Clark Fork River in the early 1990s and were first collected in the Clark Fork Project reservoirs during a survey completed by Montana FWP in 2000. Telemetry data from a 4-year (2004-2008) study of walleye life history characteristics and distribution in Noxon reservoir funded by the licensee and performed by Montana FWP indicated that the primary spawning location was the tailwater reach of the Thompson Falls dam (Horn et al., 2009). Walleye were first documented in the Lake Pend Oreille system in 2002 (Downs and Jakubowski, 2003). Walleye in the Pend Oreille River were first documented in 2005 (Schoby et al., 2007). Walleye have been collected annually in Lake Pend Oreille near the Pack River since 2007 (Idaho DFG unpublished data). The Montana population of walleye in the Clark Fork Project reservoirs is believed to be the primary source of walleye in Lake Pend Oreille and the Pend Oreille River. In 2011, a standardized fall walleye index netting protocol (Morgan, 2002) was implemented to better describe walleye distribution,

abundance, and life history characteristics in Lake Pend Oreille and the Pend Oreille River. Results of those efforts suggested that walleye are well distributed throughout Lake Pend Oreille and the Pend Oreille River, but densities are low (Ryan and Jakubowski, 2012a).

Montana fishing regulations in the Lower Clark Fork River reservoirs restrict bass harvest by number and season, allowing a 15-fish daily limit on northern pike (essentially, no limit), and unlimited harvest of walleye. The Idaho DFG's fishing rules in Lake Pend Oreille allow a year-round season and a limit of six smallmouth bass; harvest of northern pike and walleye is unrestricted. Despite liberal limits, Idaho anglers harvest very few of the smallmouth bass they catch (Ryan and Jakubowski, 2009; Bouwens and Jakubowski, 2016). Northern pike recruitment is generally controlled by environmental factors, such as water temperatures, water level fluctuations, and the availability of spawning substrate (Rich, 1992). Angler harvest of northern pike and walleye has not been effective at controlling population abundance because of the high reproductive potential of both species and relatively low angler effort in northwestern Montana and Idaho.

Amphibians, Aquatic Reptiles, and Macroinvertebrates

The licensee has not captured any amphibians or aquatic reptiles in its extensive fish collection and monitoring efforts in the tailrace area of the Cabinet Gorge dam since inception of the Clark Fork Settlement Agreement in the late 1990s. This indicates that the abundance and distribution of these species near the Cabinet Gorge dam is limited. That said, long-toed salamanders, Coeur d'Alene salamanders, and painted turtles have the potential to occur in or near the area slated for the Cabinet Gorge dam fishway construction. Long-toed salamanders often inhabit the edges of rivers, lakes, and ponds. Coeur d'Alene salamanders can be associated with wet spray zones and fractured rock, which are present near the Cabinet Gorge dam fishway construction site. Painted turtles are known to occur in the Lower Clark Fork River.

Although benthic macroinvertebrate data for the tailrace area are limited, the typical stream-dwelling benthic macroinvertebrates that use bedrock and boulder substrates (e.g., stoneflies, mayflies, and midges) are assumed to be present in the Cabinet Gorge dam tailrace. Freshwater mussel diversity in northwest Montana and northeastern Idaho is generally limited. Montana has three native mussels, only one of which, western pearlshell, is native to the west side of the Continental Divide (Montana FWP, 2014b). As part of the relicensing efforts in the 1990s, Western Washington Water Power[25] funded a study in the Lower Clark Fork River to characterize the mollusk community and evaluate the potential effects of continued project operations. Researchers identified one species of freshwater clam and three species of gastropods in

[25] The previous licensee of the Clark Fork Project.

the mainstem Lower Clark Fork River downstream from the Cabinet Gorge dam (Lang, 1998). Western pearlshell were collected only from Lake Pend Oreille and upstream of the Thompson Falls dam (Lang, 1998).

Aquatic Habitat

The tailrace of the Cabinet Gorge dam is riverine habitat dominated by previously disturbed bedrock and rubble. It is subject to regular flow fluctuations resulting from the operational patterns of the Cabinet Gorge dam, and the high-flow events that occur naturally during spring runoff. The tailrace is approximately 1,100 feet long and 350 feet wide (385,000 square feet). Water temperatures in the tailrace generally are warm in the summer months, often exceeding 68 °F (20 °C) (Hydrosolutions, 2012).

Downstream of the dam, the river is fairly narrow, widening somewhat in its lowermost reaches before entering the braided channels of the Lake Pend Oreille delta confluence; year-round inflow of cold groundwater is a significant habitat feature in numerous places. Major tributaries in this reach include Twin Creek, Lightning Creek, and Johnson Creek. Upstream from the influence of Lake Pend Oreille levels, the river tends to be shallow and fast moving. The near-shore areas of the main river channel are dominated by fine and gravel substrates intermixed with boulder and cobble. Boulders are the most common cover feature in the main channel. A side channel complex, found along the lower portion of the reach has primarily large and small gravel substrate with woody debris and aquatic vegetation as the most common cover features.

Pursuant to the Clark Fork Settlement Agreement and project license, the minimum flow release from the Cabinet Gorge dam was increased from 3,000 to 5,000 cfs on February 28, 1999, two years before the expiration of the original Cabinet Gorge dam license. With 800 cfs in accretion, the licensee provides a minimum flow of approximately 5,800 cfs downstream of the Cabinet Gorge dam. The primary benefit of the increased minimum flow was expected to be more stable and suitable shoreline rearing areas for fish, principally fry, and enhanced macroinvertebrate production. Indirect effects resulting from the provision of a higher minimum flow were expected to include increased abundance of target fish, increased proportion of younger age classes of target species, and improved condition of all age classes.

Pursuant to the Clark Fork Settlement Agreement, the benefits of providing the higher minimum flow were evaluated over the first 10 years of the license, using funds from the Lower Clark Fork River and Lake Pend Oreille management and research programs (i.e., Clark Fork Settlement Agreement, Appendix A). Monitoring occurred from 1999 to 2008 in a 4.1 mile reach of the Lower Clark Fork River downstream of the Cabinet Gorge dam. The research was focused on changes in fish abundance, size structure, and condition of fish in the affected area. It was hypothesized by the stakeholders at the time of relicensing that the increased minimum flow would increase

the availability of rearing habitat for fish and improve foraging conditions by providing more stable habitat conditions for aquatic invertebrates (Ryan and Jakubowski, 2012b). Targeted species in the assessment included brown trout, mountain whitefish, rainbow trout, and westslope cutthroat trout. In 2008, Idaho DFG completed data analysis and data interpretation, while researching other comparable studies conducted on rivers similar in size to the Clark Fork (Ryan and Jakubowski, 2012b). A draft report was prepared in 2011 and reviewed/approved by the Clark Fork Settlement Agreement Aquatic Implementation Team in 2012.

The results of the study indicated that:

- No significant changes or trends in relative abundance were detected for any of the target species;
- Native non-game fishes including northern pikeminnow, redside shiner, peamouth chub, and largescale sucker were the most common fishes sampled;
- Trends in structural indices were generally positive except brown trout quality stock density;
- Significant trends were only observed in mountain whitefish proportional stock densities and rainbow trout quality stock densities;
- Mean relative weights of westslope cutthroat trout, rainbow trout, and mountain whitefish were consistently above 80, while brown trout were consistently near or below 80; and,
- No significant linear relationships were observed between year and relative weight.

The Idaho DFG study results suggested that the abundance, size structure, and condition of fish populations in the Lower Clark Fork River were largely unchanged following increases in the minimum flow downstream of the Cabinet Gorge dam (Ryan and Jakubowski, 2012b). Results also suggested fish foraging conditions from increased aquatic invertebrate production were not improved by increased minimum flow as intended. The Idaho DFG recommendation relative to maintaining the 5,000 cfs minimum flow stated that "*Based on this evaluation the 5,000 cfs minimum flow did not appear to be warranted*" (Ryan and Jakubowski, 2012b).

Based on the 10-year-long study effort in the Lower Clark Fork River by the licensee and Idaho DFG, the adaptive management approach outlined in Appendix T of the Clark Fork Settlement Agreement, consultation with the FWS in 2013, and the 1999 BO (Terms and Conditions 4(b)), the Management Committee approved as part of Clark Fork Settlement Agreement Amendment No. 1 a change in the minimum flow downstream of Cabinet Gorge dam from 5,000 cfs to 3,000 cfs at all times of the year except from September 15-October 31 in order to protect juvenile bull trout during their annual downstream outmigration. By order dated December 18, 2017, the Commission amended

Article 429 (1)(b) of the project license, and approved the amendment of minimum flows downstream of the Cabinet Gorge development.[26]

The Lower Clark Fork River and tributaries downstream of the Cabinet Gorge dam are designated as critical habitat for bull trout, which is discussed in Section 3.3.5, *Threatened and Endangered Species*.

ENVIRONMENTAL EFFECTS

Native Species

Operation of a permanent Cabinet Gorge dam fishway is expected to improve overall passage success of bull trout and other native salmonids (i.e., westslope cutthroat trout), which could lead to an increase in the abundance and range of these populations in the Lower Clark Fork River. Implementation of permanent fish passage aligns with current management and recovery objectives for bull trout and westslope cutthroat trout, as outlined in the NSRP, and current management programs being implemented by the states of Montana and Idaho, and the FWS. Environmental effects of Cabinet Gorge dam fishway construction and operation on bull trout is discussed in more detail below in Section 3.3.5 *Threatened and Endangered Species*.

Previous experimental capture efforts (i.e., thrust block waterfall trap) and radio telemetry data demonstrate that westslope cutthroat trout enter the Cabinet Gorge tailrace area and may be attempting to move upstream (Horner et al., 2008). Telemetry and capture data from 2008 demonstrate that westslope cutthroat trout can be captured in technical fishways (e.g., waterfall trap) in the Cabinet Gorge dam tailrace (Horner et al., 2008). Therefore, the licensee anticipates that the Cabinet Gorge dam fishway will be an effective means to capture and transport westslope cutthroat trout to upstream habitat. Recent telemetry studies initiated as part of the Clark Fork River Westslope Cutthroat Trout Experimental Transport Program have indicated that fallback of westslope cutthroat trout may occur following upstream transport and may be related to release location and time of year (Bernall and Johnson, 2016). Therefore, there is evidence that westslope cutthroat trout are present in the tailrace of the Cabinet Gorge dam during both upstream and downstream migrations.

The licensee would continue to implement pathogen testing protocols, identified in the Clark Fork Settlement Agreement Amendment No. 1, to identify the risk and to minimize disease and pathogen transmission into Montana waters from westslope cutthroat trout. Amendment No. 1 to the Settlement Agreement outlines the details for annual collections and testing for Class A and Class B pathogens. Should Class A pathogens be identified, the state of Montana would not issue an importation permit and

[26] *Avista Corporation*, 161 FERC ¶ 62,211 (2017).

all upstream transport from downstream of the Cabinet Gorge dam directly into Montana waters would cease, pending the steps outlined in the Clark Fork Settlement Amendment No. 1.

Direct and indirect effects of construction and operation of the Cabinet Gorge dam fishway on westslope cutthroat trout and other fish species that inhabit the tailrace area seasonally or during migratory phases may include the following:

- Avoidance of the tailrace due to noise and disturbance from underwater rock removal, drilling, hammering, and placing and removing the cofferdam (i.e., concrete and fill material);
- Loss of foraging habitat associated with the area of the tailrace that would be dewatered by the cofferdam;
- Avoidance of the tailrace associated with water pumped from the cofferdam and tainted by residue from grout placed from sheet pile guides, fuel and hydraulic oil residue, and sediment from grilling;
- Changes in migratory and staging behavior in the Lower Clark Fork River below the dam associated with low-flow periods necessary for certain phases of cofferdam construction;
- Entrapment within the confines of the cofferdam either during the construction phase, or if the cofferdam is overtopped. Juvenile fish may be subject to injury or mortality during the dewatering process when water is pumped out, or if fish were not salvaged;
- Potential effects on juvenile fish trapped behind the cofferdam wall would be mitigated by requiring the contractor to use fine-mesh screening (3/8-inch max slot opening and 0.8 fps maximum approach velocity) on all sump pumps used to dewater the construction area; and,
- Potential indirect effects include contaminants and fines generated by construction activities, which would be minor or undetectable.

The proposed Cabinet Gorge dam fishway is expected to be more efficient and result in lower overall mortality than existing methods of capturing migratory westslope cutthroat trout including electrofishing and hook and line sampling. Westslope cutthroat trout would no longer be subject to the handling stress associated with electrofishing. Westslope cutthroat trout would enter the Cabinet Gorge dam fishway of their own volition, potentially reducing the amount of fallback associated with transporting fish that are not prepared to migrate. Westslope cutthroat trout and other fish species would be protected during all phases of the capture and transfer process by minimizing human handling and controlling the physical environment to which fish would be exposed. All fish would be transferred in a water to water environment at all stages of transport from initial capture in the holding pool through transfer to the receiving tank at the fish

handling and holding facility, which would reduce handling-related effects as compared to current methods of capture (i.e., electrofishing).

The potential effects of reduced water levels during Cabinet Gorge dam fishway construction on fish and aquatic resources include: (1) temporary exposure of aquatic vegetation, aquatic insects, and stranded fish in downstream reaches; (2) physical alteration of local aquatic habitat; and, (3) short-term increases in turbidity. Temporary modification of reservoir storage operations would have no adverse effect because the modifications would fall within the normal range of operations prescribed by the license and, therefore, already considered in the previous analyses. If operational changes were to be required during construction of the Cabinet Gorge dam fishway, the licensee would implement measures that were developed and approved pursuant to Appendix F4 of the Clark Fork Settlement Agreement, regarding fish stranding in downstream river reaches and reservoir habitats.

Non-Native Aquatic Species

Capture of non-native fish in the completed, operational fishway would provide an opportunity to cull species known to prey on or compete with bull trout. The licensee is working with state agencies to develop a fish handling plan for the proposed Cabinet Gorge dam fishway, but anticipates culling walleye, lake trout, and northern pike at a minimum, per current Idaho DFG guidelines. Removing these species is likely to exert a minor, positive effect on bull trout and other native fauna in the Lower Clark Fork River by reducing the chance for predation and competition. All fish species collected in the Cabinet Gorge dam fishway would be subjected to handling and transport. Non-target fish would be culled or returned to the river near the Cabinet Gorge fish hatchery.

Amphibians, Aquatic Reptiles, and Macroinvertebrates

The tailrace does not provide a considerable amount of suitable habitat for other aquatic organisms that may occur in the Lower Clark Fork River. High flows within the tailrace may limit the distribution of salamanders and aquatic reptiles to habitats downstream of the Cabinet Gorge dam fishway construction site. Therefore, the proposed action is unlikely to affect these species. Some benthic macroinvertebrates could be affected during excavation of the tailrace during cofferdam construction and installation of pilings; however, any such effects would be short-term and the communities would re-colonize disturbed areas after construction is complete. Given their limited distribution in the Lower Clark Fork River below the dam, the proposed Cabinet Gorge dam fishway is not expected to adversely affect mollusk species.

Aquatic Habitat

Introduction of sediment and habitat modification in the tailrace during the construction period would cause short-term, minor effects on fish species and aquatic habitats. These effects would stem from drilling guide pile holes, preparing an in-water site for cofferdam installation, and removing cofferdam materials upon completion of construction. Fish and other aquatic organisms could become stranded during dewatering of the cofferdam area. However, the licensee proposes to use dewatering techniques that comply with fish protection guidelines (e.g., pump screening of 3/8 inch) and to develop a Fish Salvage Plan to minimize effects on fishery resources. Construction of the Cabinet Gorge dam fishway proper would occur in the dry behind the confines of the cofferdam, thereby limiting the effects of construction on fish and aquatic resources.

3.3.4 Terrestrial and Botanical Resources

AFFECTED ENVIRONMENT

There are limited botanical species in or near the proposed Cabinet Gorge dam fishway site, given the previously disturbed nature of the site and the steep canyon topography. Approximately 26 wetlands occur in the Lower Clark Fork River downstream of the Cabinet Gorge dam. Most wetlands are dominated by emergent vegetation (59 percent), are less than 1 acre in size (69 percent), have a low gradient (63 percent), and include shoreline fringe (50 percent) (Avista, 1999). The most common functions and values provided by these wetlands are wildlife habitat, shoreline and stream bank stabilization, and increased diversity and abundance of aquatic species and habitats (Avista, 1999). Several small non-delineated artificial wetlands are known to exist along the access road to the construction site (Nate Hall, Avista Wildlife Biologist, as cited in the licensee's application). The licensee would implement standard best management practices to protect existing wetlands from construction truck traffic (e.g., installation of silt construction fences along the access road).

ENVIRONMENTAL EFFECTS

The proposed Cabinet Gorge dam fishway would have limited effects on terrestrial and botanical resources given the steep, canyon-like and previously disturbed nature of the site. To minimize any potential adverse effects, the licensee prepared an Invasive Plant Management Plan, which outlines specific protection measures for detecting and avoiding invasive plant species that could be introduced as a result of construction. Proposed measures would include using weed-free materials for erosion prevention and sediment control, employing measures to prevent the transportation of weeds into and out of the project site on construction vehicles, and conducting post-construction surveys to identify and control invasive species in areas disturbed by the proposed Cabinet Gorge dam fishway activities. Further, the licensee is proposing to install and maintain silt

fences or other applicable temporary erosion control devices along the access road, to prevent construction truck traffic from contributing sediment to existing wetland habitat. As required by the Idaho DEQ WQC, if construction of the fishway results in unavoidable vegetative disturbance, riparian and wetland vegetation would be reestablished to function for water quality benefit at pre-project levels, or improved at the completion of authorized work.

3.3.5 Threatened and Endangered Species

AFFECTED ENVIRONMENT

The following ESA-listed species may occur in Bonner County, Idaho, and Sanders County, Montana within the project boundary: bull trout (*Salvelinus confluentus*) (threatened), Canada lynx (*Lynx canadensis*) (threatened), grizzly bear (*Ursus arctos horribilis*) (threatened), Selkirk Mountains woodland caribou (*Rangifer tarandus caribou*) (endangered), Spalding's campion (*Silene spaldingii*) (threatened), North American wolverine (*Gulo luscus*) (proposed), and whitebark pine (*Pinus albicaulis*) (candidate) (FWS, 2017a; FWS, 2017b).

Bull Trout and Bull Trout Critical Habitat

As a result of declining population levels, the FWS listed bull trout as a threatened species in the Klamath and Columbia River basins under the ESA in 1998 (63 FR 31647). Bull trout once occupied approximately 60 percent of the Columbia River basin, but at the time of listing, the species occurred in less than half of its historical range, with populations in Oregon, Washington, Nevada, Idaho, and Montana (FWS, 2002). Pratt and Huston (1993) noted that human development affected the abundance and distribution of bull trout as early as the 1800s and that populations were fragmented because of physical obstructions and habitat degradation.

Construction of dams specifically for hydropower on the Clark Fork River began in 1907 with completion of the Milltown dam, which was just downstream of the confluence of the Blackfoot River, near Missoula, Montana (Figure 5) (FWS, 2008). The construction of Thompson Falls dam (next dam upstream of Noxon Rapids dam) in 1913 prevented migratory fish from Lake Pend Oreille from accessing approximately 21,000 square miles (nearly 95 percent) of the Clark Fork River watershed. Washington Water Power completed the Cabinet Gorge and Noxon Rapids dams in 1952 and 1959. Cabinet Gorge dam isolated an additional 1,100 square miles of the watershed (approximately 5 percent). Kerr dam, constructed on the outlet of Flathead Lake, became operational in 1938 (see Figure 5). The construction of Hungry Horse dam (South Fork Flathead River) was completed in 1953, and the reservoir reached full pool by 1954. Upstream migration of bull trout from Lake Pend Oreille into the Flathead system upstream of Kerr dam was an uncommon occurrence.

The construction of dams and their operations for power production, flood control, and flow augmentation affected the natural hydrograph of the Lower Clark Fork River. These flow modifications affected anadromous and resident fish in the Columbia River and major tributaries (e.g., the Clark Fork River). Kerr dam allowed the level of Flathead Lake to be drawn down in winter and held higher during the summer, creating an additional 1.2 million acre-feet of storage to generate power. Hungry Horse dam has an active storage capacity of 3.16 million acre-feet. Operations from the 1970s through 1990s that used the storage capacity in Hungry Horse reservoir to augment flows for migrating anadromous smolts downstream in the Columbia River were modified in 2001 to reduce effects on resident species (Muhlfeld et al., 2011). Although peak runoff in the Lower Clark Fork River still occurs during spring snow melt in May and June, and low flows occur in late summer, fall, and winter, USGS stream gage data indicate that mean peak flows have declined during the past 50+ years from about 100,000 cfs in 1957 to about 60,000 cfs by 2012. No information is available about how this gradual change influenced travel time and migratory patterns of juvenile and adult bull trout within the migratory corridor of the Lower Clark Fork River.

Milltown dam was breached on March 28, 2008, allowing volitional upstream fish passage for the first time in more than 100 years. With the removal of the dam, native salmonids in the Clark Fork River upstream of Thompson Falls were able to access extensive reaches of mainstem Clark Fork River habitat and associated tributaries (FWS, 2008). Remediation and restoration of the former Milltown reservoir (i.e., removal of contaminated sediments, and removal of the dam) were completed in 2009 as part of an Environmental Protection Agency Superfund cleanup project. Removal of the Milltown dam and the river restoration was officially completed in September 2012.

PPL Montana completed installation of a permanent upstream fish passage facility at the Thompson Falls Project in 2010. The Thompson Falls facility was designed to provide volitional fish passage during non-spill periods; however, it is currently operated "manually" in that all fish are trapped, handled, and sorted because of concern about spreading non-native fish into upstream reaches. Installation of the fish passage facility at the Thompson Falls Project opened more than 650 miles of mainstem migratory river corridors and more than a thousand miles of potentially suitable tributary habitat to bull trout residing in or transported to Noxon Rapids reservoir (FWS, 2008). NorthWestern Energy currently owns and operates the Thompson Falls Project.

Bull trout in the interconnected Lake Pend Oreille watershed are generally considered to be entirely migratory and mostly adfluvial, although some fluvial adults occur. Some fish make extensive spawning migrations into larger tributaries beginning in March and April; a fall migration (August and September) also occurs within the Lower Clark Fork River and other Lake Pend Oreille tributaries. Migratory corridors linking seasonal habitats for bull trout are important in facilitating gene flow among local

populations when individuals from different local populations interbreed or stray to non-natal streams. Bull trout migrants may also reestablish local populations that are extirpated by catastrophic events.

The FWS developed a draft recovery plan for bull trout in 2002 and issued a final recovery plan in 2015. The goal of the bull trout recovery plan is to "*manage threats and ensure sufficient distribution and abundance to improve the status of bull trout throughout their extant range in the coterminous United States so that protection under the Act* [i.e., ESA] *is no longer necessary"* (FWS, 2015). Bull trout within the Clark Fork Project area are within the Columbia Headwater Recovery Unit (FWS, 2015). The FWS's criteria for recovery in the Columbia Headwaters Recovery Unit is that the primary threats to the species (i.e., habitat degradation or modification, overutilization, disease or predation, inadequacy of existing regulatory mechanisms, and other natural or manmade factors such as climate change, competition and hybridization) are effectively managed in 75 percent of simple and complex core areas (FWS, 2015). The combination of core habitat (i.e., habitat that could supply all elements for the long-term security of bull trout) and a core population (a group of one or more local bull trout populations that exist within core habitat) constitutes a core area, the basic unit on which to gauge recovery within a recovery unit (FWS, 2015).

The FWS designated bull trout critical habitat in October 2010. The designation included 5,356.0 km (3,328 miles) of streams and 119,620.1 hectares (295,587 acres) of lakes and reservoirs in northwestern Montana and northern Idaho. Bull trout critical habitat in the Clark Fork Project area is within the Clark Fork River Basin Critical Habitat Unit (CHU) 31 (FWS, 2010). Designated critical habitat for bull trout within the Clark Fork River Basin CHU includes most mainstem and tributary habitats (Table 7, Figure 6, and Figure 7).

Table 7. Designated Critical Habitat for bull trout within the Clark Fork River Basin Critical Habitat Unit

Cabinet Gorge Reservoir and Tributaries
Lower Clark Fork River, including Cabinet Gorge Reservoir
Bull River
East Fork Bull River
North Fork Bull River
South Fork Bull River
Rock Creek
Noxon Reservoir and Tributaries
Lower Clark Fork River, including Noxon Reservoir
Swamp Creek
Vermilion River
Graves Creek
Prospect Creek
Crow Creek
Lake Pend Oreille and Tributaries
Pend Oreille River
Pack River
Grouse Creek
Trestle Creek
Strong Creek
Lightning Creek
Morris Creek
East Fork Lightning Creek
Rattle Creek
Savage Creek
Char Creek
Porcupine Creek
Wellington Creek
Granite Creek
Sullivan Springs
Gold Creek
North Gold Creek
South Gold Creek
West Gold Creek
Clark Fork River
Johnson Creek
Twin Creek

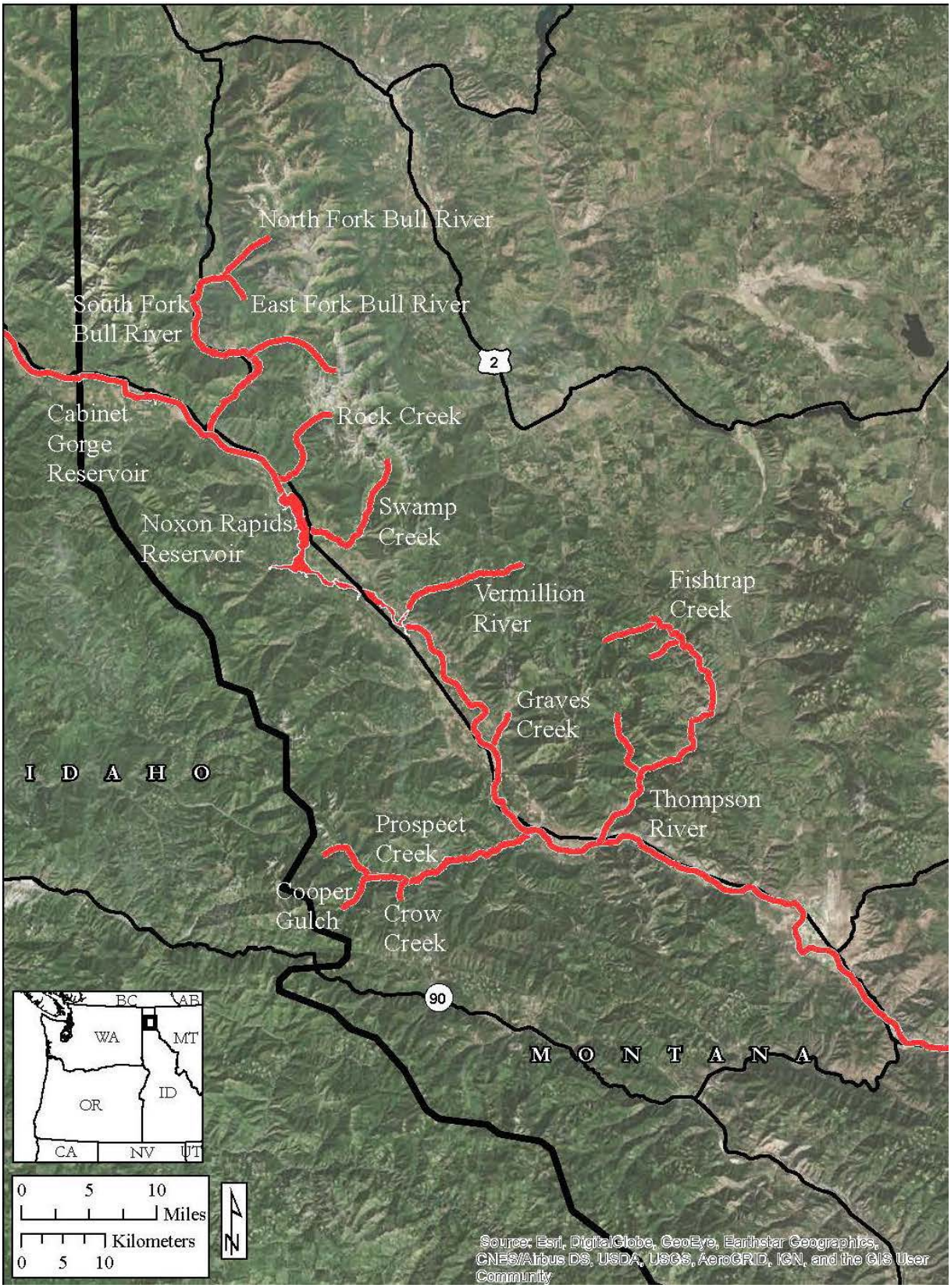

Figure 6. Critical Habitat for Bull Trout, Lower Clark Fork River and Major Tributaries.

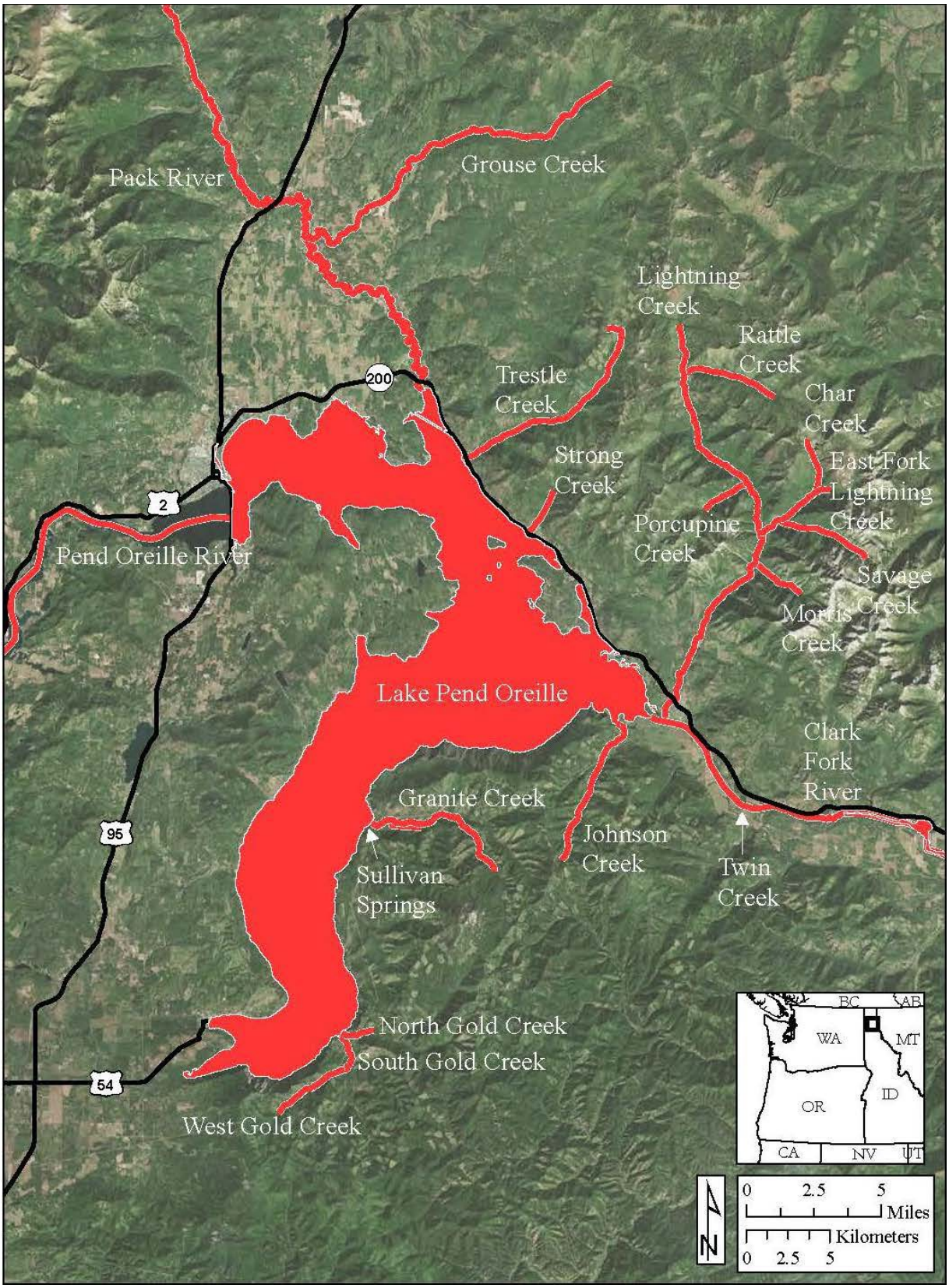

Figure 7. Critical Habitat for Bull Trout, Lake Pend Oreille and Major Tributaries.

The FWS' final rule designating bull trout critical habitat identified the following nine primary constituent elements (PCEs),[27] which may or may not be present in the Clark Fork project area or areas affected by the proposed Cabinet Gorge dam fishway construction and operation:

1. Springs, seeps, groundwater sources, and subsurface water connectivity (hyporheic flows) to contribute to water quality and quantity and provide thermal refugia.
2. Migration habitats with minimal physical, biological, or water quality impediments between spawning, rearing, overwintering, and freshwater and marine foraging habitats, including but not limited to permanent, partial, intermittent, or seasonal barriers.
3. An abundant food base, including terrestrial organisms of riparian origin, aquatic macroinvertebrates, and forage fish.
4. Complex river, stream, lake, reservoir, and marine shoreline aquatic environments, and processes that establish and maintain these aquatic environments, with features such as large wood, side channels, pools, undercut banks and unembedded substrates, to provide a variety of depths, gradients, velocities, and structure.
5. Water temperature ranging from 36 °F to 49 °F (2 °C to 15 °C), with adequate thermal refugia available for temperatures that exceed the upper end of this range. Specific temperatures within this range would depend on bull trout life-history stage and form; geography; elevation; diurnal and seasonal variation; shading, such as that provided by riparian habitat; stream flow; and local groundwater influence.
6. In spawning and rearing areas, substrate of sufficient amount, size, and composition to ensure success of egg and embryo overwinter survival, fry emergence, and young-of-the-year and juvenile survival. A minimal amount of fine sediment, generally ranging in size from silt to coarse sand, embedded in larger substrates, is characteristic of these conditions. The size and amounts of fine sediment suitable for bull trout would be likely to vary from system to system.
7. A natural hydrograph, including peak, high, low, and base flows within historic and seasonal ranges or, if flows are controlled, minimal flow departure from a natural hydrograph.
8. Sufficient water quality and quantity such that normal reproduction, growth, and survival are not inhibited.
9. Sufficiently low levels of occurrence of non-native predatory (e.t., lake trout, walleye, northern pike, smallmouth bass); interbreeding (e.g., brook trout); or

[27] PCEs are specific elements of physical or biological features that provide for a species' life-history processes and are essential to the conservation of the species. The FWS has identified the Clark Fork River, Cabinet Gorge reservoir, and the Noxon rapids reservoir as providing foraging, migration, and overwintering habitat for bull trout.

competing (e.g., brown trout) species that, if present, are adequately temporally and spatially isolated from bull trout.

Although the FWS identified the Clark Fork River, Cabinet Gorge reservoir, and Noxon reservoir as providing feeding, migratory, and overwintering habitat, it did not specifically identify which of the PCEs are present in the Lower Clark Fork River.

Canada Lynx

Lynx prefer boreal forest habitat types, deep snow, and abundant populations of snowshoe hare (65 FR 16052); therefore, Canada lynx is highly unlikely to be present at the proposed site of the Cabinet Gorge dam fishway or within the Clark Fork Project area. Currently, no critical habitat for lynx is designated in Bonner County, Idaho, or Sanders County, Montana.

Grizzly Bear

Grizzly bear distribution has been reduced to five areas in the western United States, including the Cabinet-Yaak Mountains in northern Idaho and northwest Montana. The population of grizzly bear within the 2,600 square-mile Cabinet-Yaak recovery zone is estimated to be 30 to 40 animals (75 FR 14496). Grizzly bears found near Cabinet Gorge dam would be associated with the Cabinet-Yaak population. Currently, no critical habitat for grizzly bear is designated in Bonner County, Idaho and Sanders County, Montana.

North American Wolverine

The current range of North American wolverines is largely concentrated in Canada and Alaska. The FWS considers the current range of wolverines within the contiguous United States to include suitable habitat in the North Cascades of Washington and possibly Oregon, the northern Rocky Mountains of Idaho, Wyoming, and Montana, the southern Rocky Mountains of Colorado, Utah, and Wyoming, and the Sierra Nevada of California. The FWS includes the Sierra Nevada and southern Rocky Mountains in the current range of wolverines despite the probability that functional populations do not exist in these areas. They are included due to the known existence of one individual in each area and the possibility that more, yet undetected, individuals inhabit these areas. The presence of North American wolverine in the Clark Fork Project area is highly unlikely due to their preference for high elevation, near-artic conditions and low population densities.

Selkirk Mountains Woodland Caribou

The Selkirk Mountains Woodland Caribou is not currently present in the Cabinet

Mountains of Northwest Montana. No critical habitat is designated for this species in Bonner County, Idaho or Sanders County, Montana.

Spalding's Campion

The current distribution of Spalding's campion is limited by its very specific habitat requirements, which are found predominantly in the Pacific Northwest bunchgrass grasslands and sagebrush-steppe and occasionally in open-canopy pine stands. Spalding's campion is not known to occur at the Cabinet Gorge dam site in Idaho. A notice of Proposed Critical Habitat Determination was submitted in April 2000 (65 FR 21711), but currently no critical habitat is designated in either Idaho or Montana.

Whitebark Pine

Whitebark pine is found at alpine tree line and subalpine elevations throughout its range (76 FR 42631). Whitebark pine is not known to occur within the Clark Fork Project area. Based on its habitat preferences, the whitebark pine is unlikely to occur near the Cabinet Gorge dam.

ENVIRONMENTAL EFFECTS

The proposed Cabinet Gorge dam fishway is not likely to adversely affect Canada lynx or grizzly bear and would have no effect on Selkirk Mountains woodland caribou or critical habitat, Spalding's campion, the North American wolverine, and whitebark pine.[28] Construction and operation of the fishway is likely to adversely affect bull trout and bull trout critical habitat. However, the proposed action is not expected to jeopardize the continued existence of the species. The remainder of this section summarizes the effects of the proposed Cabinet Gorge dam fishway on bull trout and bull trout critical habitat. The BA provides additional analysis regarding the potential effects of the proposed fishway on protected species.

The design of the proposed Cabinet Gorge dam fishway includes state-of-the-art components that have a history of effective capture performance and operational reliability. If the proposed fishway provides increased capture efficiency, more bull trout may be transported than in the current capture-transport program. Procedures for transporting bull trout from the handling and holding facility into Montana or Idaho waters would follow established upstream transport protocols approved by the Management Committee annually and memorialized in Clark Fork Settlement Agreement Amendment No. 1. Bull trout (and other fish) collected within the Cabinet Gorge dam fishway would be trucked approximately 1 mile downstream to the handling and holding

[28] Critical habitat for Selkirk Mountains woodland caribou has been designated but it does not occur in Bonner County, Idaho, or Sanders County, Montana.

facility for processing and genetic testing before being transported upstream, culled, or released to the Lower Clark Fork River. To minimize concerns related to transmitting disease, a new access road was built to the handling and holding facility to isolate the facility from the existing fish rearing portion of the hatchery.

The Cabinet Gorge dam fishway would improve critical habitat relative to PCE 2 (migration habitats) and PCE 9 (predators). Operation of the fishway would improve conditions in the Lower Clark Fork River relative to PCE 2 by reducing handling and the use of intrusive capture techniques. Furthermore, the ability to sort and cull non-native predatory fish species would improve conditions in the Lower Clark Fork River for bull trout relative to PCE 9. No other direct or indirect effects on the remaining PCEs (1, 3-8) are anticipated to result from construction or operation of the fishway.

The proposed Cabinet Gorge dam fishway is expected to be more efficient and result in lower overall mortality than existing methods of capturing migratory bull trout (i.e., electrofishing and angling). Bull trout would no longer be subject to the handling stress associated with repeated electrofishing and angling, which sometimes results in multiple captures of the same fish.[29] The use of downstream cool water refugia by adult bull trout, which is observed more often in the late summer and fall, may change once the fishway is constructed as bull trout could be captured in the spring and early summer during their first attempt to migrate upstream of the Cabinet Gorge dam. Bull trout would enter the proposed Cabinet Gorge dam fishway of their own volition, potentially reducing the amount of fallback associated with transporting fish that are not prepared to migrate. If volitional capture results in capturing more bull trout early in the season, captured fish would experience less stress because water temperatures would be cooler, and the fish would have more time to seek preferred spawning habitat in their natal streams. Bull trout would be protected during all phases of the capture and transfer process by minimizing human handling and controlling the physical environment to which fish would be exposed. Bull trout would be transferred in a water to water environment at all stages of transport from initial capture in the holding pool through transfer to the receiving tank at the fish handling facility, which would reduce handling-related effects as compared to current methods of capture (i.e., electrofishing).

Construction activities would affect a small footprint that is within critical habitat for bull trout. The effects are expected to be minor or short lived, and construction activities would not adversely affect specific PCEs for bull trout. Installing the Cabinet Gorge dam fishway would result in a permanent loss of approximately 1,555 square feet (0.04 acres) of critical habitat for bull trout in the Cabinet Gorge dam tailrace.

---

[29] Nighttime electrofishing involves shocking both sides of the river for about a mile below the dam, three nights a week, once per night. Bull trout are subject to high-voltage electricity for collection purposes. Once recovered from the electrical current, captured fish are transported from the boat to the handling and holding facility in coolers.

Approximately 7,500 square feet (0.17 acres) of critical habitat or less would be lost temporarily (for approximately two years) while the cofferdam is in place and that part of the tailrace is dewatered. The estimates of lost habitat are based on the maximum extent of the cofferdam and Cabinet Gorge dam fishway footprints. Permanent loss of critical habitat associated with the fishway would be less than one-half of one percent of the total critical habitat in the tailrace, temporary loss associated with the cofferdam would be about two percent. Direct and indirect effects of construction and operation of the fishway on bull trout may include the following:

- Avoidance of the tailrace due to noise and disturbance from underwater rock removal, drilling, hammering, and placing and removing the cofferdam (i.e., concrete and fill material);
- Loss of foraging habitat associated with the area of the tailrace that would be dewatered by the cofferdam;
- Avoidance of the tailrace associated with water pumped from the cofferdam and tainted by residue from grout placed for sheet pile guides, fuel and hydraulic oil residue, and sediment from drilling;
- Changes in migratory and staging behavior in the Lower Clark Fork River below the dam associated with low-flow periods necessary for certain phases of cofferdam construction;
- Adult bull trout not captured by downstream collection activities (i.e., the licensee's implementation of capture-and-transport activities during fishway construction) and making forays to the tailrace could be exposed to stressors associated with constructing the cofferdam and Cabinet Gorge dam fishway;
- During any planned monitoring of the fishway performance, a percentage of bull trout would be tagged. Tagging bull trout poses risks of changes in behavior, possible infection, and mortality of individual fish;
- The greatest potential negative effect on juvenile bull trout would be from inadvertently being trapped within the confines of the cofferdam either during the construction phase, or if the cofferdam is overtopped. Juvenile bull trout would be subject to injury or mortality during the dewatering process when water is pumped out, or if fish were not salvaged;
- Potential effects on juvenile bull trout and other fish trapped behind the cofferdam wall would be mitigated by requiring the contractor to use fine-mesh screening (3/8-inch max slot opening and 0.8 fps maximum approach velocity) on all sump pumps used to dewater the construction area. This screening requirement was developed for siphon intake screens on the Cabinet Gorge dam fishway and was designed to prevent entrainment of juvenile and adult bull trout, but not fry. During the fishway design phase the members of the DRT concurred that entrainment of bull trout fry is not a concern in the forebay of or tailrace below the Cabinet Gorge dam;

- Migrating juvenile bull trout reside in the river for a short time, and flows tend to be high during most of the juvenile downstream migration period, therefore the risk of exposure to potential indirect stressors is low; and
- Potential indirect effects on juvenile bull trout due to contaminants and fines generated by construction activities would be undetectable.

3.4 NO-ACTION ALTERNATIVE

Implementing the no-action alternative would have no effect on existing resources compared to baseline conditions. The licensee would continue to collect adult bull trout from downstream of the Cabinet Gorge dam via electrofishing, angling, from the existing hatchery facility ladder, and weir trapping in Twin Creek. Further, the licensee would continue to process bull trout for genetic assignments, and transport bull trout of Montana origin upstream to designated release areas according to annual transport plans approved by the Management Committee. The licensee would implement all of the Clark Fork Settlement Agreement PM&E measures to foster continued stewardship for important natural and cultural resources.

3.5 CUMULATIVE EFFECTS ANALYSIS

Based on the licensee's pre-filing consultation, request for public comments, comments in the FWS BO, and the Idaho DEQ WQC, Commission staff have identified the following cumulatively affected resources for analysis: (1) water resources, and (2) fisheries and aquatic resources.

3.5.1 Water Resources

Water resources in the Clark Fork River watershed have been impacted by land and water development in the watershed over the past several hundred years. The construction of dams, hydropower operations, mining, forestry practices, climate change, and other land use activities have resulted in alterations of processes related to sedimentation, water quality, and hydrology. Current and recently proposed mining operations also have the potential to affect water quality within the Lower Clark Fork River. In 2006, the FWS addressed a proposed underground copper/silver mine and mill that would produce 10,000 tons of ore a day in the Rock Creek drainage near Noxon (FWS, 2006a). Anticipated adverse effects on habitat included increased concentrations of sediment in the water and degraded water quality (FWS, 2006a). The proposed mine included the development of an adit, a 5.5-year construction period, a 27.5-year operation/production period, and a 2-year reclamation period, for a total period of approximately 35 years (FWS, 2006a). The FWS' BO for the mine estimated that the duration of the effects of the mining operation would last, at a minimum, the life of the mine. Long-term effects could continue indefinitely once the mine closes.

The Montanore mine, located on the east side of the Cabinet Mountains, is a copper/silver mine that has the potential to water quantity and quality in Rock Creek and the East Fork Bull River. Both Rock Creek and the East Fork Bull River are tributaries that enter the Clark Fork River within the project boundary, upstream of the Cabinet Gorge dam. The Montanore mine could result in the removal of an estimated 120 million tons of ore over an anticipated 16 to 19 years that would create voids and result in groundwater drawdown and related changes in stream baseflow to the headwaters of the East Fork Bull River and Rock Creek (Forest Service, 2011). Effects on hydrology are estimated to reach a maximum in 16 to 30 years after the adits are plugged, but the changes in baseflow would decrease, reaching steady state conditions about 1,200 to 1,300 years after mining ends (Forest Service, 2011). The Forest Service's Environmental Impact Statement (EIS) stated that the proposed Montanore mine could result in reduced flows in the East Fork Bull River and Rock Creek, which would adversely affect designated bull trout critical habitat through alteration of water quality and quantity (Forest Service, 2011). The Forest Service issued a Final EIS and draft record of decision in March of 2015 approving construction and operation of the Montanore mine with proposed monitoring and mitigation to offset the effects on bull trout populations and their habitat (Forest Service, 2015a; Forest Service, 2015b).

The cumulative impacts of the proposed Cabinet Gorge dam fishway on water quality and water quantity are expected to be short-term and minor. Cumulative impacts would be minimized by the implementation of the licensee's existing license conditions, proposed plans utilizing BMPs, and conditions required by the WQC.

3.5.2 Fisheries and Aquatic Resources

Fish and aquatic resources in the Lower Clark Fork River have been affected by various land and water development activities in the watershed over the past several hundred years. The construction of dams for hydropower, mining, forestry practices, introduction of non-native species, angling and harvest, climate change, road and railway construction, and other land use activities have resulted in diminished stocks of bull trout and other native salmonids. Developing more effective techniques for capturing and transporting migratory bull trout and westslope cutthroat trout at the Cabinet Gorge dam combined with other past, present, or future federal and non-federal efforts to restore bull trout (i.e., removing the Milltown dam in 2008 and installing an upstream fishway at the Thompson Falls Project in 2010), would exert a net positive cumulative effect on bull trout and other native salmonids in the Clark Fork River. Furthermore, the proposed Cabinet Gorge dam fishway is being developed in tandem with other significant programs emphasizing fisheries conservation and fish passage that stem from the Clark Fork Settlement Agreement and have been implemented since 1999 to offset the effects of the Clark Fork Project. Many other significant measures to promote bull trout recovery and native salmonid conservation in the Lake Pend Oreille-Lower Clark Fork River system are being implemented by FWS, the states of Idaho and Montana, the Forest

Service, local Native American tribes, and local conservation groups. These activities are expected to exert a positive cumulative impact on fish and aquatic resources.

As noted in Section 3.3.3, current and recently proposed mining operations at Rock Creek and the Montanore mine could cumulatively affect fish and aquatic resources within the Lower Clark Fork River. Anticipated adverse effects on habitat would include increasing sediment, degrading water quality and quantity, and altering channel and habitat complexity (FWS, 2006a). The possible temporary addition of sediment resulting from construction of the Cabinet Gorge dam fishway would be an insignificant contribution to cumulative impacts in the context of the potential effects of the mines.

Although aquatic habitat in the Lower Clark Fork River has been affected by historical water development and land use practices in the watershed, we do not anticipate any substantial cumulative impacts because of the proposed Cabinet Gorge dam fishway installation. The fishway would be constructed and installed on a small area of solid bedrock foundation that has limited value as habitat. In addition, the tailrace area was previously impacted by dam construction; therefore, limited changes from existing conditions are anticipated.

4.0 CONCLUSIONS AND RECOMMENDATIONS

The construction and operation of the Cabinet Gorge dam fishway would provide upstream passage for native salmonids at the Cabinet Gorge dam. Since license issuance, the licensee has worked with the Management Committee to develop, design, evaluate, and implement fish passage for bull trout and other native salmonids on the Lower Clark Fork River, while addressing major resource issues associated with fish passage, including pathogens, transport, and funding. The proposed Cabinet Gorge dam fishway and the agreements reached in Amendment No. 1 of the Clark Fork Settlement Agreement would provide improved passage for bull trout on the Lower Clark Fork River.

Although the proposed Cabinet Gorge dam fishway may affect soil and geology, water resources, fish and aquatic resources, threatened and endangered species, terrestrial species, and botanical resources, the effects are expected to be temporary and minor, and would cause a positive effect on bull trout and other native salmonids. The licensee proposes to develop five mitigation plans to minimize both the spatial and temporal extent of the effects of the proposed fishway:

- Fish Salvage Plan
- Invasive Plant Species Management Plan
- Sedimentation Management and Erosion Control Plan
- Oils and Lubricant Management Plan
- Aquatic Invasive Species Prevention Plan

Within the November 13, 2017 amendment application, the licensee provided drafts of an Invasive Plant Species Management Plan and a Sedimentation Management and Erosion Control Plan. The licensee would also require a selected contractor to develop and follow an Oils and Lubricant Management Plan prior to beginning fishway construction that would be consistent with WQC conditions. Commission staff has reviewed the provided plans and agrees that implementation of the Invasive Plant Species Management Plan and Sedimentation Management and Erosion Control Plan, as provided, should minimize adverse effects that may be caused by the construction and operation of the proposed fishway and the licensee should implement those plans. The licensee should also develop and implement with its contractors an Oils and Lubricant Management Plan that is consistent with WQC conditions.

The licensee also filed in its amendment application a Fish Salvage Plan which would allow the licensee to avoid or minimize the effects to fish associated with stranding within the confines of the cofferdam. Within the licensee's draft plan, the licensee proposes to implement a fish salvage operation if it becomes apparent that fish are present inside the cofferdam. However, condition 22 of the BO requires the licensee to complete and receive approval of a Fish Salvage Plan from the FWS prior to the construction of the cofferdam, and it should be in keeping with condition 14 of the WQC. Commission staff is unsure if the licensee has finalized and received approval from the FWS of this plan. Therefore, Commission staff should require the licensee to file, for Commission approval, a Fish Salvage Plan that describes the planned procedures for capturing, handling, and relocating any fish trapped and stranded within the cofferdam during fishway construction, and should be implemented throughout the use of the cofferdam. The licensee must develop the plan with the FWS, and include with the plan documentation of consultation, copies of comments and recommendations on the completed plan after it has been prepared and provided to the FWS, and specific descriptions of how the comments are accommodated by the plan.

The licensee proposes to cull non-native species known to prey on or compete with bull trout. Culling of such species would benefit both bull trout and bull trout critical habitat by removing predatory or competing species from the Lower Clark Fork River. To address aquatic invasive species concerns at the project, the licensee proposes to have a selected contractor develop and follow an Aquatic Invasive Species Management Plan prior to beginning fishway construction. Conditions 12 and 13 of the BO, as well as condition 32 of the WQC require the licensee to develop a non-native fish management program and an aquatic invasive species plan, respectively. Commission staff should require the licensee to file, for Commission approval, an Aquatic Invasive Species Prevention Plan that describes procedures to prevent the transport and introduction of invasive species, such as non-native fish species, as a result of trapping, loading, and unloading of fish. Upon Commission approval, the licensee would be

required to implement this plan. The plan must be consistent with the NSRP and the Clark Fork Settlement Agreement.

Regarding the conservation recommendations included in the BO, in Commission staff's opinion, the conditions of the license and Settlement Agreement require the licensee to work directly with resource agencies, including the FWS and state agencies, to evaluate project impacts through the Management Committee and associated technical subcommittees through the term of the license. This forum offers the opportunity for evaluation of bull trout recovery. The licensee's fish passage plans, which are the subject of this proceeding, are the result of those efforts and Commission staff do not see the need for requiring additional surveying, monitoring, or recovery actions.

Individual and annual activities developed under the Clark Fork Settlement Agreement would continue to be implemented with Management Committee approval to maintain the adaptive management approach inherent to the Clark Fork Settlement Agreement.

4.1 UNAVOIDABLE ADVERSE IMPACTS

Minor amounts of sediment would enter the Lower Clark Fork River as a result of construction, even with implementation of erosion control measures, resulting in possible short-term effects on resident and potentially migratory fish. The construction and installation of the Cabinet Gorge dam fishway would result in minor increase in traffic, noise, and visual disturbance during the construction period. Native salmonids would be subjected to stresses from continuing the current capture-and-transport efforts during construction. However, these actions would be implemented to facilitate bull trout restoration and recovery.

4.2 CONSISTENCY WITH COMPREHENSIVE PLANS

Section 10(a)(2) of the FPA, 16 U.S.C. 803(a)(2)(A), requires the Commission to consider the extent to which a project is consistent with federal or state comprehensive plans for improving, developing, or conserving a waterway or waterways affected by the project. We reviewed 14 comprehensive plans that are applicable to the Clark Fork Project (Table 8). No inconsistencies with these plans were identified.

Table 8. Applicable Comprehensive Management Plans

Author	Title of Plan
Forest Service	Idaho Panhandle National Forests Plan. Coeur d'Alene, Idaho. September 17, 1987.
State of Idaho	Preparing to Meet the Challenge – An Assessment of Invasive Species Management in Idaho (www.fishandgame.idaho.gov, 2012).

State of Idaho	Fisheries Management Plan 2013-2018. Available Online [URL] https://collaboration.idfg.idaho.gov/FisheriesTechnicalReports/Fisheries%20Management%20Plan%202013-2018.pdf.
State of Idaho and the Bonneville Power Administration	Pacific Northwest Rivers Study. Final report: Idaho. Boise, Idaho. 12 pp. 1986.
State of Idaho	Idaho Comprehensive Wildlife Conservation Strategy. Boise, Idaho. September 2005.
State of Idaho	Idaho Water Quality Standards and Wastewater Treatment Requirements. Boise, Idaho. January 1992.
State of Idaho	2006-2010 Idaho Statewide Comprehensive Outdoor Recreation and Tourism Plan (SCORP). Boise, Idaho.
State of Idaho	Idaho State Water Plan. Boise, Idaho. January 1992.
State of Montana	Statewide Fisheries Management Plan 2013-2018. Available Online [URL] http://fwp.mt.gov/fishAndWildlife/management/fisheries/statewidePlan.
National Park Service	The Nationwide Rivers Inventory. Department of the Interior, Washington, D.C. 1993.
Northwest Power and Conservation Council	Northwest Power and Conservation Council. 2014. Columbia River Basin Fish and Wildlife Program. Portland, Oregon.
Northwest Power and Conservation Council	Northwest Power and Conservation Council. 2010. The Seventh Northwest Conservation and Electric Power Plan. Portland, Oregon. Adopted February 2016. Available Online [URL]: https://www.nwcouncil.org/energy/powerplan/7/plan/.
Northwest Power and Conservation Council	Main stem Amendments to the Columbia River Basin Fish and Wildlife Program. Portland, Oregon. Council Document 2003-11.
State of Idaho. State of Oregon. State of Washington. Confederated Tribes of the Warm Springs Reservation of Oregon. Confederated Tribes of the Umatilla Indian Reservation. Nez Perce Tribe. Confederated Tribes and Bands of the Yakima Indian Nation.	Settlement Agreement pursuant to the September 1, 1983, Order of the U.S. District Court for the District of Oregon in Case No. 68-5113. Columbia River fish management plan. Portland, Oregon. November 1987.

5.0 FINDING OF NO SIGNIFICANT IMPACT

The proposed Cabinet Gorge dam fishway at the Clark Fork Project would provide improved, permanent upstream fish passage at the project that would reduce capturing and handling stresses to bull trout compared to existing passage methods and assist with the recovery of the ESA-listed species. On the basis of our independent analysis, we find that the proposed upstream fish passage and license amendment would not constitute a major federal action significantly affecting the quality of the human environment.

6.0 LITERATURE CITED

Avista. 1999. Application for New License, Volume II – Draft Collaboratively Prepared Environmental Assessment. Cabinet Gorge Hydroelectric Project and Noxon Rapids Hydroelectric Project, February 1999.

Avista. 2016. 2016 Clark Fork Annual Implementation Plans and 2015 Clark Fork Annual Report. Submitted to the Federal Energy Regulatory Commission on April 12, 2016.

Bernall, S. and J. Johnson. 2016. Clark Fork River Westslope Cutthroat Trout Experimental Transport Program. Annual Progress Report – 2015. Avista document identification number 2016-0347. Avista, Noxon, Montana.

Bernall, S. and S. Moran. 2005. Cabinet Gorge Reservoir Northern Pike Study Final Report – 2005, Fish Passage/Native Salmonid Program, Appendix C. Report to Avista Corporation, Spokane, Washington. U.S. Fish and Wildlife Service, Creston, Montana and Avista Corporation, Noxon, Montana.

Bouwens, K.A. and R. Jakubowski. 2016. 2014 Lake Pend Oreille Creel Survey. Dissolved Gas Supersaturation Control, Mitigation, and Monitoring. TDG Alternative Mitigation and Monitoring Program. Report to Avista Corporation, Spokane, Washington.

Council on Environmental Quality (CEQ). 1997. Considering Cumulative Effects Under the National Environmental Policy Act. Council on Environmental Quality, Executive Office of the President.

Downs, C.C., and R. Jakubowski. 2003. Lake Pend Oreille/Clark Fork River Fishery Research and Monitoring 2002 Progress Report. Project 2, 2002 Bull Trout Redd Counts; Project 3, 2002 Clark Fork River Fishery Assessment Progress Report; Project 5, 2000-2002 Trestle and Twin Creeks Bull Trout Outmigration and Lake Pend Oreille Survival Study; Project 6, 2002 Johnson and Granite Creeks Bull Trout Trapping; Project 7, 2002 Twin Creek Restoration Monitoring Progress Report. Report to Avista Corporation from the Idaho Department of Fish and Game, Boise, Idaho.

GEI. 2009. Cabinet Gorge and Noxon Rapids upstream fish passage. Expert fish passage panel findings and recommendations – final report. Report to Avista Corporation, Clark Fork License Manger, Noxon, Montana. GEI Project Number 072980, GEI Consultants, Inc. Lake Oswego, Oregon.

Hanson, J.R. and T. Tholl. 2007. Noxon and Cabinet Gorge reservoir fisheries monitoring. Comprehensive Report, 1997-2006. Montana Tributary Habitat Acquisition and Recreational Fishery Enhancement Program, Appendix B. Report to Avista Corporation, Spokane, Washington, Montana Fish Wildlife and Parks, Thompson Falls, Montana, and Avista Corporation, Noxon, Montana.

Horn, C., J. Hanson, T. Tholl, and K. Duffy. 2009. Noxon Reservoir Walleye Life History Study. Montana Tributary Habitat Acquisition and Recreational Fishery Enhancement Program. Avista.

Horner, N., S. Moran, and S. Bernall. Thrust Block Waterfall Trap Summary Report. 2008.

Hydrosolutions, Inc. 2002. Tri-State water quality council monitoring report. 2011 Clark Fork-Pend Oreille watershed water quality monitoring program. June 18, 2012.

Idaho DFG (Idaho Department of Fish and Game). 2014a. Fisheries management plans 2013-2018. A comprehensive guide to managing Idaho's fisheries resources. Available online: [URL] https://collaboration.idfg.idaho.gov/FisheriesTechnicalReports/Fisheries%20Management%20Plan%202013-2018.pdf. Accessed on June 17, 2014.

Idaho DFG. 2014b. Preparing to meet the challenge – An assessment of invasive species management in Idaho. Available online: [URL] https://static1.squarespace.com/static/564b8c9ae4b0459b2b8187a3/t/56c38ec7a3360cf585199e97/1455656655568/Idaho+Assessment.pdf. Accessed on April 19, 2014.

Kleinschmidt and Pratt. 1998. Clark Fork River native salmonid restoration plan. Report to Washington Water Power. Spokane, Washington. Kleinschmidt Energy and Water Resource Consultants, 33 West Main Street, Strasburg, Pennsylvania.

Lang, B.Z. 1998. Lower Clark Fork River Mollusc Community Assessment. Prepared for the Washington Water Power Company, Spokane, Washington.

Montana FWP (Montana, Fish, Wildlife & Parks). 2007. Memorandum of understanding and conservation agreement for Westslope Cutthroat Trout and Yellowstone Cutthroat Trout in Montana. Helena, Montana, Montana Department of Fish, Wildlife and Parks.

Montana FWP. 2014a. Final FWP statewide fisheries management plan. Available online: [URL] http://fwp.mt.gov/fishAndWildlife/management/fisheries/statewidePlan. Accessed on January 17, 2014.

Montana FWP. 2014b. Freshwater mussels of Montana. Available online: [URL] https://archive.org/details/Fa088ea0-bcf4-4547-9816-e496cc105be6. Accessed on January 22, 2013.

Morgan, G.E. 2002. Manual of instructions – fall Walleye index netting (FWIN). Percid community synthesis, diagnostics, and sampling standards working group. Cooperative Freshwater Ecology Unit. Sudbury, Ontario.

Morlan, L.E. 1989. Concrete and rock mass characterization of Cabinet Gorge Dam. Prepared for Washington Water Power Company, December 1989.

Muhlfeld, C.C., L. Jones, D. Kotter W.J. Miller, D. Geise, J. Tohtz, and B. Marotz. 2011. Assessing the impacts of river regulation on native Bull Trout (*Salvelinus confluentus*) and Westslope Cutthroat Trout (*Oncorhynchus clarkii lewisi*) habitats in the upper Flathead River, Montana, USA. In: River Research and Applications, John Wiley & Sons, Inc.

ND&T (Northrop, Devine, and Tarbell). 1994. Clark Fork River 1993 Shoreline erosion study. Washington Water Power, Spokane, WA.

NMFS (National Marine Fisheries Service). 2008. Anadromous salmonid passage facility design. NMFS, Northwest Region, Portland, Oregon.

NRCS (Natural Resource Conservation Service), U.S. Department of Agriculture. 2017. Web Soil Survey. Available online: [URL] http://websoilsurvey.nrcs.usda.gov/. Accessed on July 10, 2017.

PBS&J. 2009. Final Report on Water Quality Status and Trends in the Clark-For-Pend Oreille Watershed. Time Trends Analysis for the 1984-2007 Period. Clark Fork/Pend Oreille Watershed. Prepared for the Tri-State Water Quality Council.

PBTTAT (Panhandle Bull Trout Technical Advisory Team). 1998. Lake Pend Oreille Key Watershed Bull Trout Problem Assessment. Report of Lake Pend Oreille Watershed Advisory Group and the State of Idaho.

Pratt, K.L., and J.E. Huston. 1993. Status of Bull Trout (*Salvelina confluentus*) in Lake Pend Oreille and the Lower Clark Fork River. Draft. Prepared for Avista Corporation, Spokane, Washington.

Rich, B.A. 1992. Population dynamics, food habits, movement and habitat use of Northern Pike in the Coeur d'Alene Lake system, Idaho. Completion Report, F-73-R-14, Sub-project No. VI, Study No. 3, Idaho Department of Fish and Game, Boise, Idaho.

Ryan, R. and R. Jakubowski. 2009. Native salmonid research and monitoring progress update, 2008. Report to Avista Corporation, Spokane, Washington.

Ryan, R. and R. Jakubowski. 2012a. Pend Oreille Walleye monitoring 2011. Avista Corporation, Spokane, WA.

Ryan, R. and R. Jakubowski. 2012b. Lower Clark Fork River fishery assessment. Project Completion Report, Idaho Tributary Habitat Acquisition and Enhancement Program, Avista Corporation, Spokane, Washington.

Scarnecchia, D.L., Y. Lim, S.P. Moran, T.D. Tholl, J.M. DosSantos, and K. Breidinger. 2014. Novel Fish Communities: Native and Non-Native Species Trends in Two Run-of-the-River Reservoirs, Clark Fork River, Montana. Reviews in Fisheries Science & Aquaculture, 22(a): 97-111.

Schoby, G.P.T.P. Bassista, and M.A. Maiolie. 2007. Effects of higher winter water levels on the Pend Oreille River fish community, Lake Pend Oreille Fishery Recovery Project. Report 07-15. Idaho Department of Fish and Game, Boise.

Stearns, H.T., 1951. Geology of the Cabinet Gorge Dam site near Clark Fork, Idaho. Prepared for Washington Water Power Company. February 1951.

Forest Service (U.S. Forest Service). 2011. Biological Assessment for Threatened and Endangered Species on the Montanore Minerals Corporation, Montanore Project. Kootenai National Forest.

Forest Service. 2015a. Final Environmental Impact Statement for the Montanore Project, Volumes 1, 2, and 3, March 2015. Kootenai National Forest.

Forest Service. 2015b. Draft Record of Decision for the Montanore Project, March 2015, Kootenai National Forest.

FWS (U.S. Fish and Wildlife Service). 2002. Bull Trout (*Salvelinus confluentus*) Draft Recovery Plan. Introduction. Available online: [URL] http://www.fws.gov/pacific/bulltrout/RP/Chapter_1_Introductory.pdf. Accessed April 5, 2014.

FWS. 2006a. Biological Opinion for the Rock Creek Mine. U.S. Fish and Wildlife Service, Region 6. Helena, Montana.

FWS. 2006b. Memorandum to the Assistant Regional Director, Ecological Services, Region 1, Portland, Oregon, from the FWS Montana Field Office, Helena, Montana, Subject – Consolidation of Bull Trout Core Areas on the Lower Clark Fork River (Dated July 14, 2006).

FWS. 2008. Biological Opinion for the Thompson Falls Hydroelectric Project – Bull Trout Consultation. Prepared by the U.S. Fish and Wildlife Service, Montana Ecological Services Field Office, Helena, Montana.

FWS. 2010. Revised Designation of Critical Habitat for Bull Trout in the Coterminous U.S. 78 FT 63898. Issued October 18, 2010.

FWS. 2015. Recovery plan for the coterminous United States population of bull trout (*Salvelinus confluentus*). Portland, Oregon xii. 179 pages. September 2015.

FWS. 2017a. Endangered, Threatened, Proposed, and Candidate Species with Associated Proposed and Critical Habitats in Idaho. Available online: [URL] https://www.fws.gov/idaho/promo.cfm?id=177175746. Accessed on July 7, 2017.

FWS. 2017b. Endangered, Threatened, Proposed, and Candidate Species, Montana Counties. Available online: [URL] http://www.fws.gov/montanafieldoffice/Endangered Species/Listed Species/countylist.pdf. Accessed on July 7, 2017.

FWS and Avista Corporation. 2010. Joint Fish Passage Proposed Recommendations. March 2010.

Vidergar, D.T. 2000. Population Estimates, Food Habitats and Estimates of Consumption of Selected Predatory Fishes in Lake Pend Oreille, Idaho. Master's thesis. University of Idaho, Moscow, Idaho.

WRCC (Western Regional Climate Center). 2017. Climate summary for Cabinet Gorge, Idaho. Available online: [URL] http://www.wrcc.dri.edu/cgibin/cliMAIN.pl?idcabi. Accessed on July 10, 2017.

7.0 LIST OF PREPARERS

Marybeth Gay, M.S. – Project Coordinator; Fisheries and Aquatic Resources; Terrestrial and Botanical Resources; Threatened and Endangered Species (Fish Biologist)

Jennifer Ambler, Ph.D. – Fisheries and Aquatic Resources; Threatened and Endangered Species (Fish Biologist)

Steven Sachs, P.E. – Geologic and Soil Resources; Water Resources (Civil Engineer)

APPENDIX A:
WATER QUALITY CERTIFICATE
IDAHO DEPARTMENT OF ENVIRONMENTAL QUALITY
Water Quality Certificate Conditions for the License Amendment of the Clark Fork Project (P-2058)

Issued by the Idaho Department of Environmental Quality on February 22, 2019

General Conditions

1. Avista shall notify DEQ of any change in the design, construction (e.g., BMPs, work windows, etc.), or operation of the fish passage facility from what is described in the Application. Avista shall obtain DEQ's review and approval before undertaking any change, including but limited to changes to fish passage facility structure, construction, or operations that may potentially affect water quality.

2. DEQ reserves the right to modify, amend, or revoke this certification if DEQ determines that, due to changes in relevant circumstances—including without limitation, changes in project activities, the characteristics of the receiving water bodies, or state WQS—there is no longer reasonable assurance of compliance with WQS or other appropriate requirements of state law.

3. If ownership of the project changes, the certification holder shall notify DEQ, in writing, upon transferring this ownership or responsibility for compliance with these conditions to another person or party. The new owner/operator shall request, in writing, the transfer of this water quality certification to the new owner's name.

4. A copy of this certification must be kept on the job site and readily available for review by any contractor working on the project and any federal, state, or local government personnel.

5. Avista shall provide escorted access to the project site upon request by DEQ personnel for site inspections, monitoring, and/or to ensure that conditions of this certification are being met.

6. Avista is responsible for all work done by contractors and must ensure the contractors are informed of and follow all the conditions described in this certification.

7. If Avista does not obtain coverage under the National Pollutant Discharge Elimination System General Permit for Discharges from Construction Activities for the Fish Passage Facility construction, Avista shall notify DEQ by calling

208-666-4605 to determine if the certification requires revision. Leaving a message is acceptable.

Erosion and Sediment Control

8. Permanent erosion and sediment control measures shall be installed in a manner that will provide long-term sediment and erosion control to prevent excess sediment from entering waters of the state. Permanent erosion control measures shall include, without limitation, measures to control erosion from water spillage during fish transfer activities on staging area and haul road in vicinity of the river.

9. Permanent erosion and sediment control measures shall be installed at the earliest practicable time consistent with good construction practices and shall be maintained as necessary throughout project operation.

10. All construction debris shall be properly disposed of so it cannot enter waters of the state or cause water quality degradation.

11. Disturbed areas suitable for vegetation shall be seeded or revegetated to prevent subsequent soil erosion.

In-water Work

12. Work in open water is to be kept at a minimum and conducted only when necessary.

13. Measures shall be taken to prevent wet concrete from spilling into waters of the state.

14. All stranded fish found in the cofferdam shall be removed and released downstream in good condition.

15. Silt curtain(s) shall be properly installed and maintained to minimize the area of turbidity and meet WQS. The bottom of the curtain shall not rest on the bed of the river or drag back and forth along the bottom of the river due to current or wave action. Silt curtains shall hang so the material is smooth and allows the sediment to slide down its face rather than becoming trapped in folds. The purpose of using a silt curtain is to reduce the area in the reservoir that becomes turbid. The curtain also functions to slide the enclosed sediment down the inside of the curtain. Once sediment reaches the bottom of the curtain it flows out into the waterbody near the riverbed. This minimizes impacts to swimming and floating aquatic life. It also encourages sediment to quickly settle on the bottom, reducing impacts to aquatic life that live in and on the riverbed. For this project the goal is to reduce turbidity

in the water column, not total containment.

16. Accidentally dropped construction materials and demolition debris (manmade materials) that sink and are not expected to be moved by the current shall be removed from the river by the end of the work day. Materials and debris that floats or will move with the current must be promptly removed from the river.

Pollutants/Toxics

17. All reasonable measures shall be taken to prevent introduction of chemicals into waters of the state.

18. The C-flume shall be protected from pollutants associated with construction and operation of the Fish Passage Facility. Return water from cofferdam dewatering is authorized for discharge into the C-flume if it meets WQS.

Cofferdam

19. Return water from cofferdam dewatering activities shall meet the following turbidity requirements pursuant to IDAPA 58.01.02.250.02.e: *Turbidity, below any applicable mixing zone set by the Department, shall not exceed background turbidity by more than fifty (50) NTU instantaneously or more than twenty-five (25) NTU for more than ten (10) consecutive days*. Turbidity shall be measured using a properly and regularly calibrated turbidimeter is required. The turbidimeter shall be set to measure NTUs in whole numbers and not use estimates (need actual turbidity). The turbidity, location, date, and time must be recorded for each sample. Sampling frequency shall be sufficient to ensure that WQS are being met. This turbidity monitoring is in addition to the turbidity monitoring specified in the WQC of the 2017 NWPs.

20. Pursuant to IDAPA 58.01.02.250.01.a, return water from cofferdam dewatering activities shall meet the following WQS for pH: hydrogen ion concentration values within the range of 6.5 to 9.0.

21. Background turbidity levels of the river shall be sampled during each monitoring event. The background sampling location shall not be influenced by turbidity from project activities.

Vegetation Protection and Restoration

22. To the maximum extent practical, staging areas and access points should be placed in open, upland areas.

23. Fencing and other barriers shall be used to mark the construction areas.

24. If authorized work results in unavoidable vegetative disturbance, riparian and wetland vegetation shall be successfully reestablished to function for water quality benefit at pre-project levels or improved at the completion of authorized work.

25. Upland disposal of construction debris and demolition waste must be done in a manner that prevents the material from entering waters of the state and consistent with Idaho Solid Waste Management Rules.

Management of Hazardous of Deleterious Materials

26. Petroleum products and hazardous, toxic, and/or deleterious materials shall be stored, disposed of, or accumulated adjacent to or in the immediate vicinity of waters of the state. Adequate measures and controls must be in place to ensure that those materials will not enter waters of the state as a result of high water, precipitation runoff, wind, storage facility failure, accidents in operation, or unauthorized third-party activities.

27. Avista shall update and certify its Spill Prevention, Control, and Countermeasure (SPCC) Plan to reflect this license amendment and the entire SPCC Plan shall be reviewed and where necessary, updated.

28. Inlet drains on the thrust block shall be covered for the duration of the Fish Passage Facility construction project to prevent spilled petroleum products or lubricants from entering drains that discharge into the river.

29. Vegetable-based hydraulic fluid shall, if available, be used on equipment operating in or adjacent to waters of the state.

30. Daily inspections of all fluid systems on equipment to be used in or adjacent to waters of the state shall be done to ensure no leaks or potential leaks exist prior to equipment use. These inspections shall be described in a logbook that is kept on site and provided to DEQ upon request.

31. Prior to operating in or adjacent to waters of the states, equipment and machinery that will operate in, over, or adjacent to waters of the state shall be steam cleaned of oils and grease in an upland location or staging area with appropriate wastewater controls and treatment. Boats and barges shall be cleaned sufficiently to remove all life stages of invasive aquatic species before entering waters of the state. Barges hall not discharge oily bilge water that creates a sheen on the water. Any wastewater or wash water shall not be allowed to enter a water of the state.

32. Avista shall develop, provide to DEQ, and implement a plan to prevent the transport and introduction of invasive species as a result of trapping, loading and unloading of fish. The plan shall include fish transport employees/contractor education on identification of invasive aquatic species and an annual visual examination of the fish trap area by a qualified person to identify the presence of any aquatic invasive species. Avista shall provide the plan to DEQ prior to the start of Fish Passage Facility operation.

33. During construction and operation of the fish passage facility, Avista shall ensure that emergency spill procedures shall be in place and that spill response kits (e.g., oil absorbent booms or other appropriate equipment) are stationed at river level and top of dam.

34. In accordance with IDAPA 58.01.02.850, in the event of an unauthorized release of hazardous material to state waters or to land such that there is a likelihood that it will enter state waters, the "responsible persons in charge" (as defined in IDAPA 58.01.02.010.86) must:
    a. Make every reasonable effort to abate and stop a continuing spill.
    b. Make every reasonable effort to contain spilled material in such a manner that it will not reach surface or ground waters of the state.
    c. Call 911 if immediate assistance is required to control, contain, or clean up the spill. If no assistance is needed in cleaning up the spill, contact the appropriate DEQ regional office during normal working hours or Idaho State Communications Center after normal working hours (1-800-632-8000). If the spilled volume is above the federal reportable quantities, contact the National Response Center (1-800-424-8802).
        - Coeur d'Alene Regional Office: 208-769-1422/877-370-0017
    d. Collect, remove, and dispose of the spilled material in a manner approved by DEQ.

Mixing Zones

35. A mixing zone for turbidity arising from sediment disturbance is authorized for the area within the confines of silt curtain(s) used during the construction of the cofferdam associated with the construction of the Fish Passage Facility.

APPENDIX B:
BIOLOGICAL OPINION TERMS AND CONDITIONS

Reasonable and Prudent Measures and Terms and Conditions included in the U.S. Fish and Wildlife Service's Biological Opinion for the Clark Fork Project No. 2058

Filed February 6, 2019

REASONABLE AND PRUDENT MEASURES

The Service concludes that the following reasonable and prudent measures are necessary and appropriate to minimize impacts or incidental take of bull trout caused by the proposed action:

1. Identify adult bull trout attempting to migrate upstream of Cabinet Gorge and/or Noxon Rapids Dams, and in a manner agreed to by the Service and consistent with the Clark Fork Settlement Agreement (as amended), provide safe, timely and effective fish passage

2. Identify juvenile bull trout attempting to migrate downstream to Lake Pend Oreille, and in a manner agreed to by the Service and consistent with the Clark Fork Settlement Agreement (as amended), provide safe, timely and effective fish passage.

3. Implement a dissolved gas supersaturation control, mitigation, and monitoring program.

4. Maintain sufficient in-stream flow downstream of Cabinet Gorge Dam.

5. Implement a program that manages non-native species in a manner that is beneficial for bull trout.

6. Implement the Native Salmonid Restoration Plan and Clark Fork Settlement Agreement (as amended) in a manner consistent with the Final Bull Trout Recovery Plan and Columbia Headwaters Recovery Unit Implementation Plan.

7. Implement reporting and consultation requirements as outlined in the terms and conditions below in order to minimize take of bull trout related to implementation of the Native Salmonid Restoration Plan and other fisheries monitoring activities.

8. Construct and operate the CGDF consistent with Amendment #1 of the Clark Fork Settlement Agreement, and the Clark Fork Project License (including amendments).

TERMS AND CONDITIONS

To fulfill Reasonable and Prudent Measure #1 (upstream fish passage) and Reasonable and Prudent Measure #6 (consistency with the bull trout recovery plan), the following terms and conditions shall be implemented:

1. The likely natal origin of adult bull trout captured downstream of Cabinet Gorge Dam shall be determined using genetic testing, or other methods deemed appropriate by the Service.

2. A permanent fish tagging system shall be implemented for all bull trout handled during monitoring and other fisheries investigation activities in the project area. The tagging system shall have the capability to positively identify bull trout originating from spawning tributaries above the Cabinet Gorge and/or Noxon Rapids Dams.

3. A program to capture and transport adult bull trout originating from tributaries above Cabinet Gorge and/or Noxon Rapids Dams shall be implemented to provide safe, timely and effective upstream fish passage, and shall be implemented in a manner consistent with the Native Salmonid Restoration Plan and the Clark Fork Settlement Agreement (as amended).

4. The upstream capture and transport program shall be adaptively managed, with approval from the Service, in a manner that places priority on maintaining and restoring adfluvial bull trout local populations above Cabinet Gorge and/or Noxon Rapids Dams.

To fulfill Reasonable and Prudent Measure #2 (downstream fish passage) and Reasonable and Prudent Measure #6 (consistency with the bull trout recovery plan), the following terms and conditions shall be implemented:

5. A program to trap and transport juvenile bull trout from tributaries above Cabinet Gorge and/or Noxon Rapids Dams shall be implemented to provide safe, timely and effective downstream fish passage, and shall be implemented in a manner consistent with the Native Salmonid Restoration Plan and the Clark Fork Settlement Agreement (as amended).

6. The downstream trap and transport program shall be adaptively managed, with approval from the Service, in a manner that places priority on maintaining and restoring adfluvial bull trout local populations above Cabinet Gorge and/or Noxon Rapids Dams.

To fulfill Reasonable and Prudent Measure #3 (gas supersaturation), the following terms and conditions shall be implemented:

7. The Gas Supersaturation and Control Program (and 2009 Addendum), shall be implemented in a manner consistent with the Clark Fork Settlement Agreement (as amended).

8. High-flow spill protocols shall be finalized and implemented to address total dissolved gas production, and shall be consistent with the Clark Fork Settlement Agreement (as amended).

9. Total dissolved gas monitoring shall be done at established sites, and shall be conducted in a manner that is consistent with the Gas Supersaturation and Control Program (and 2009 Addendum), and the Clark Fork Settlement Agreement (as amended).

To fulfill Reasonable and Prudent Measure #4 (minimum in-stream flow), the following terms and conditions shall be implemented:

10. From September 15 through October 31, the instantaneous minimum flow below Cabinet Gorge Dam shall be maintained at 5,000 cubic feet per second or greater.

11. From November 1 through September 14, the instantaneous minimum flow below Cabinet Gorge Dam shall be maintained at 3,000 cubic feet per second or greater.

To fulfill Reasonable and Prudent Measure #5 (non-native fish species) and Reasonable and Prudent Measure #6 (consistency with the bull trout recovery plan), the following terms and conditions shall be implemented:

12. Non-native fish management programs shall be implemented in the Clark Fork Project action area for the benefit of bull trout, and shall be implemented in a manner consistent with the Native Salmonid Restoration Plan and the Clark Fork Settlement Agreement (as amended).

13. Non-native fish management programs shall be adaptively managed, with approval from the Service, in a manner that places priority on maintaining and restoring adfluvial bull trout local populations with the Lake Pend Oreille Core Area.

To fulfill Reasonable and Prudent Measure #6 (consistency with the bull trout recovery plan), the following term and condition shall be implemented:

14. Tributary enhancement programs shall be adaptively managed, with approval from

the Service, in a manner that places priority on maintaining and restoring adfluvial bull trout local populations within the Lake Pend Oreille Core Area.

To fulfill Reasonable and Prudent Measure #7 (reporting), the following terms and conditions shall be implemented:

15. An annual assessment of bull trout populations in the Lake Pend Oreille Core Area shall be prepared and submitted to the Service. The assessment shall be conducted in a manner consistent with the Clark Fork Settlement Agreement (as amended), and use the best available information (e.g., tributary redd counts).

16. An annual assessment of Lake Pend Oreille prey base population trends shall be prepared and submitted to the Service. The assessment shall be conducted in a manner consistent with the Clark Fork Settlement Agreement (as amended), be based on the best available information, and evaluate the need for measures to benefit bull trout prey species in Lake Pend Oreille.

17. An annual report shall be submitted to the Service indicating the actual number of bull trout taken, if any, as well as any relevant biological/habitat data or other pertinent information on bull trout that was collected. This report shall be submitted to the Service by March 31st each year.

18. An annual report shall be prepared and submitted to the Service that details the next year's proposed activities under the Native Salmonid Restoration Plan and other fisheries monitoring that may result in intentional as well as incidental take of bull trout. The report shall quantify the number of bull trout proposed to be intentionally "taken" by each activity and summarize the extent of intentional take from all previous year's activities. This report shall be submitted to the Service by March 31st each year.

19. During project implementation the FERC or licensee shall promptly notify the Service of any emergency or unanticipated situations arising that may be detrimental for bull trout relative to the proposed activity.

20. Upon locating dead or injured bull trout, or upon observing destruction of bull trout redds, the FERC or licensee shall notify the Service within 24 hours. The FERC or licensee shall record information relative to the date, time, and location of dead or injured bull trout when found, and possible cause of injury or death of each fish and provide this information to the Service.

To fulfill Reasonable and Prudent Measure #8 (construction and operation of the Cabinet Gorge Dam Fishway), the following terms and conditions shall be implemented:

21. The FERC or licensee shall ensure that construction, operation, and maintenance of the Cabinet Gorge Dam Fishway remain consistent with the proposed action describe in the final Biological Assessment. The Service shall be promptly notified of any changes to construction, operations or maintenance activities.

22. The fish salvage plan shall be completed and approved by the Service prior to construction of the coffer dam.

23. The FERC or licensee shall provide an annual report to the Service detailing the progress of Cabinet Gorge Dam Fishway construction. This report shall be submitted to the Service by March 31st each year.

24. The FERC or licensee shall provide an annual report to the Service detailing the past year's operation of the Cabinet Gorge Dam Fishway, including the number of bull trout that interacted with the Cabinet Gorge Dam Fishway and any mortality. This information can be included in the annual report required under Term and Condition 17 above, and shall be submitted to the Service by March 31st each year.

25. Any shut-downs of the Cabinet Gorge Dam Fishway during normal operating conditions, as agreed to in the Clark Fork Settlement Agreement (as amended), shall be reported within 24 hours to the Service.

CONSERVATION RECOMMENDATIONS

1. Where possible, the FERC should consider implementation of recovery actions identified in the Service's Bull Trout Recovery Plan and the associated Columbia River Headwaters Recovery Unit Implementation Plan (U.S. Fish and Wildlife Service 2015, 2015b).

2. Continue to cooperate with the Idaho Fish and Game, Montana Fish, Wildlife, and Parks and other entities to promote recovery of bull trout, and to survey and monitor bull trout populations and habitat in the lower Clark Fork River and Lake Pend Oreille basin.

In order for the Service to be kept informed of actions minimizing or avoiding adverse effects or benefiting listed species or their habitats, the Service requests notification of the implementation of any conservation recommendations.