Thompson Falls Hydroelectric Project
FERC Project No. 1869

Biological Assessment

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List of Abbreviations and Acronyms

~	about or approximately
ºC	degrees Celsius
ºF	degrees Fahrenheit
>	greater than
<	less than
≥	greater than or equal to
≤	less than or equal to
Avista	Avista Corporation
BA	Biological Assessment
BNSF	Burlington Northern Santa Fe
CFD	computational fluid dynamics
cfs	cubic feet per second
CHRU	Columbia Headwater Recovery Unit
CHSU	Critical Habitat Subunit
CHU	Critical Habitat Unit
CSKT	Confederated Salish and Kootenai Tribes
D	Degrade
DEQ	Montana Department of Environmental Quality
ECOS	Environmental Conservation Online System
El.	Elevation
ESA	Endangered Species Act
FA	Functioning Appropriately
FAR	Functioning at Risk
FERC	Federal Energy Regulatory Commission
FMO	foraging, migration, and overwintering
FUR	Functioning at Unacceptable Risk
FWP	Montana Fish, Wildlife and Parks
FWS	U.S. Fish and Wildlife Service
GBT	gas bubble trauma
High Bridge	bridge below the Main Channel Dam

HWY	Montana State Highway
IPaC	Information for Planning and Consultation
Licensee	NorthWestern Energy
LL	Brown Trout
M	Maintain
m	meter
m/s	meters per second
mm	millimeter
WM	megawatt
MDL	Main Dam Left
MDR	Main Dam Right
MNHP	Montana Natural Heritage Program
MPC	Montana Power Company
MRL	Montana Rail Link
MW	megawatts
n=	number equals
NMFS	National Marine Fisheries Service
NorthWestern	NorthWestern Energy
PM&E Plan	Fisheries and Aquatic Resources Protection Mitigation & Enhancement Plan
PCEs	primary constituent elements
PIT	passive integrated transponder
Project	Thompson Falls Hydroelectric Project
R	Restore
SKQ	Seli'š Ksanka Qlispe'
TDG	total dissolved gas
TDG Control Plan	Total Dissolved Gas Control Plan
Thompson Falls Project	Thompson Falls Hydroelectric Project
U.S.	United States
USFS	United States Forest Service
USGS	United States Geological Survey
ZOP	Zone of Passage

1.0 Introduction

1.1 Project Background

The Thompson Falls Hydropower Project P-1869 (Thompson Falls Project or Project) is located on the Clark Fork River in Sanders County, Montana. Preliminary development of the Project began in June 1912, by the Thompson Falls Power Company. Construction commenced in May 1913, and the first generating unit was placed in service on July 1, 1915. By May 1917, an additional generation unit was placed in service bringing the total to six generating units. Montana Power Company (MPC) acquired the Project in 1929. An order amending the License was issued by the Federal Energy Regulatory Commission (Commission or FERC) to MPC in 1990 allowing for construction of an additional powerhouse and generating unit, subsequently completed in 1995, giving the Project a total generating capacity of 92.6 megawatts (MW).

Non-federal hydropower projects in the United States (U.S.) are regulated by FERC under the authority of the Federal Power Act. The original license for the Project was issued effective January 1, 1938, and expired on December 31, 1975. The current FERC License was issued December 28, 1979. A major license amendment was issued April 30, 1990, approving the construction of a new powerhouse and extending the license term to 50 years. The Project was purchased by PPL Montana in 1999 and later purchased by NorthWestern Energy (Northwestern, Licensee) in 2014. With each purchase, the Project's FERC License was transferred to the new owner. FERC approved a Project License amendment necessitated by a U.S. Fish and Wildlife Service (FWS) Biological Opinion (BO) requiring construction and operation of an upstream fish passage facility on February 12, 2009.

The current FERC License expires December 31, 2025. As required by the Federal Power Act and FERC's regulations, on July 1, 2020, NorthWestern filed a Notice of Intent to relicense the Thompson Falls Project using FERC's Integrated Licensing Process.

Federal agencies are required by Section 7(a)(2) of the Endangered Species Act (ESA) to ensure that any action authorized, funded, or carried out by the agency would not jeopardize a federally listed threatened or endangered species or species proposed for listing, or result in the destruction or adverse modification of designated critical habitat. As the lead federal agency responsible for consultation with FWS[1] under Section 7 of the ESA, the FERC is responsible for determining the proposed action's potential effects on protected species or critical habitat(s).

FERC designated NorthWestern as its non-federal representative for ESA consultation for the Project on August 28, 2020 (FERC 2020). NorthWestern prepared this Biological Assessment (BA) to support FERC's ESA consultation.

[1] There are no species regulated by the National Marine Fisheries Service impacted by the Project.

1.2 Methods for Species Analysis

This BA reviews information for each listed species identified by FWS as potentially occurring in the project vicinity. As part of this assessment, site-specific information regarding the action area was compared to the identified species' habitat and range. If their habitat and range were not present in the action area, the species were eliminated from detailed analysis in this BA. In addition, the location of designated or proposed critical habitat was reviewed for each species. The standardized criteria used to determine the potential for occurrence of individual species is outlined in **Section 5.0 – ESA Listed Species and Critical Habitat in Action Area**.

2.0 Project Description

The Thompson Falls Project is located at approximately (~) River Mile 65 on the Clark Fork River in Sanders County, Montana. The Clark Fork River is the largest river in the state of Montana based on flow. The Clark Fork River is ~ 320 miles long with headwaters in southwestern Montana and the terminus at Lake Pend Oreille, Idaho. The Lower Clark Fork River subbasin consists of 180 miles of perennial stream. In general, the ascending limb of the hydrograph in the Lower Clark Fork River begins between mid- and late-March, peaks between late May and mid-June, and descends to base flow levels around mid-August. The Clark Fork River drainage is shown in **Figure 2-1.**

Upstream of the Thompson Falls Project is the Seli'š Ksanka Qlispe' (SKQ) Project (formerly known as Kerr Dam, FERC Project P-5), located on the Flathead River, ~ 100 miles upstream (Figure 2-1). The Flathead River is a tributary to the Clark Fork River. The Confederated Salish and Kootenai Tribes (CSKT) are owners and its wholly owned, federally chartered corporation, Energy Keepers, Inc. is operator of the FERC licensed SKQ Project. The only other major dam in the watershed upstream of the Thompson Falls Project is Hungry Horse Dam on the South Fork of the Flathead River, managed by the U.S. Bureau of Reclamation.

Downstream of the Thompson Falls Project is Avista Corporation's (Avista) Clark Fork River Project (FERC Project P-2058) consisting of Noxon Rapids Dam, located ~ 38 miles downstream of Thompson Falls Project in Montana, and Cabinet Gorge Dam, located ~ 20 miles downstream of Noxon Rapids Dam in Idaho (Figure 2-1).

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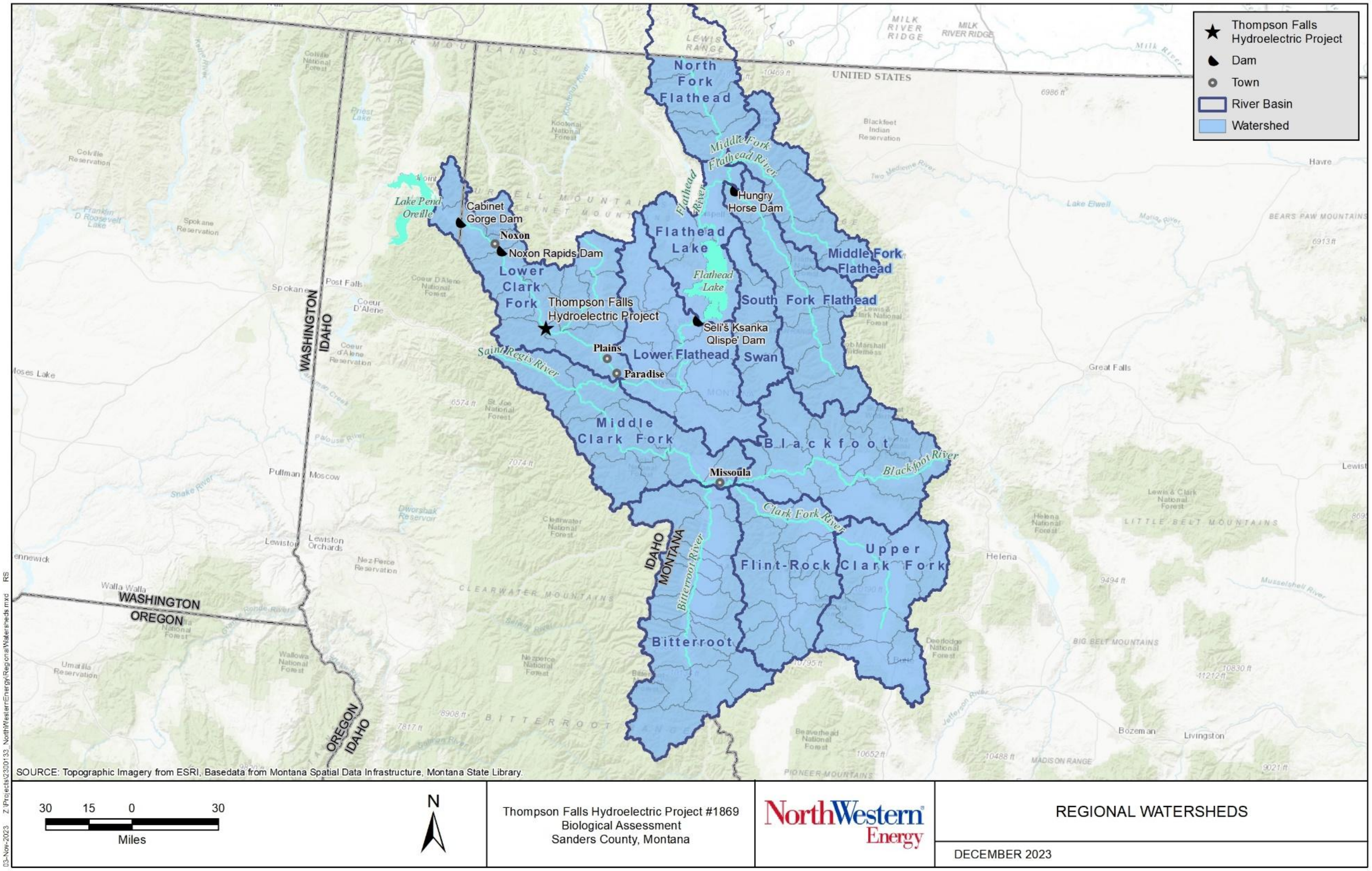
Figure 2-1: Regional Watersheds in the Clark Fork River drainage, and existing dams.



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The existing Thompson Falls Project boundary as defined in the current FERC License is ~ 0.3 mile downstream and 12 miles upstream of the Project (**Figure 2-2**). Thompson Falls Reservoir covers 1,446 acres at a normal pool elevation of 2,396.5 feet. The Project has a perimeter length of about 27 miles.

The primary tributaries of the Clark Fork River within the Project area are the Thompson River and Cherry, Dry, Ashley and Prospect creeks. Prospect Creek flows into the Clark Fork River downstream of the Main Channel Dam and flows eastward into the Clark Fork River from the mountain range separating Idaho and Montana (Figure 2-2). The Thompson River flows into the Clark Fork River ~ 6 miles upstream of the dam. Cherry Creek flows northward and enters Thompson Falls Reservoir ~ 4 miles upstream of the dam. Other streams in the Project area are ephemeral drainages which flow subsurface when they reach the valley alluvium.

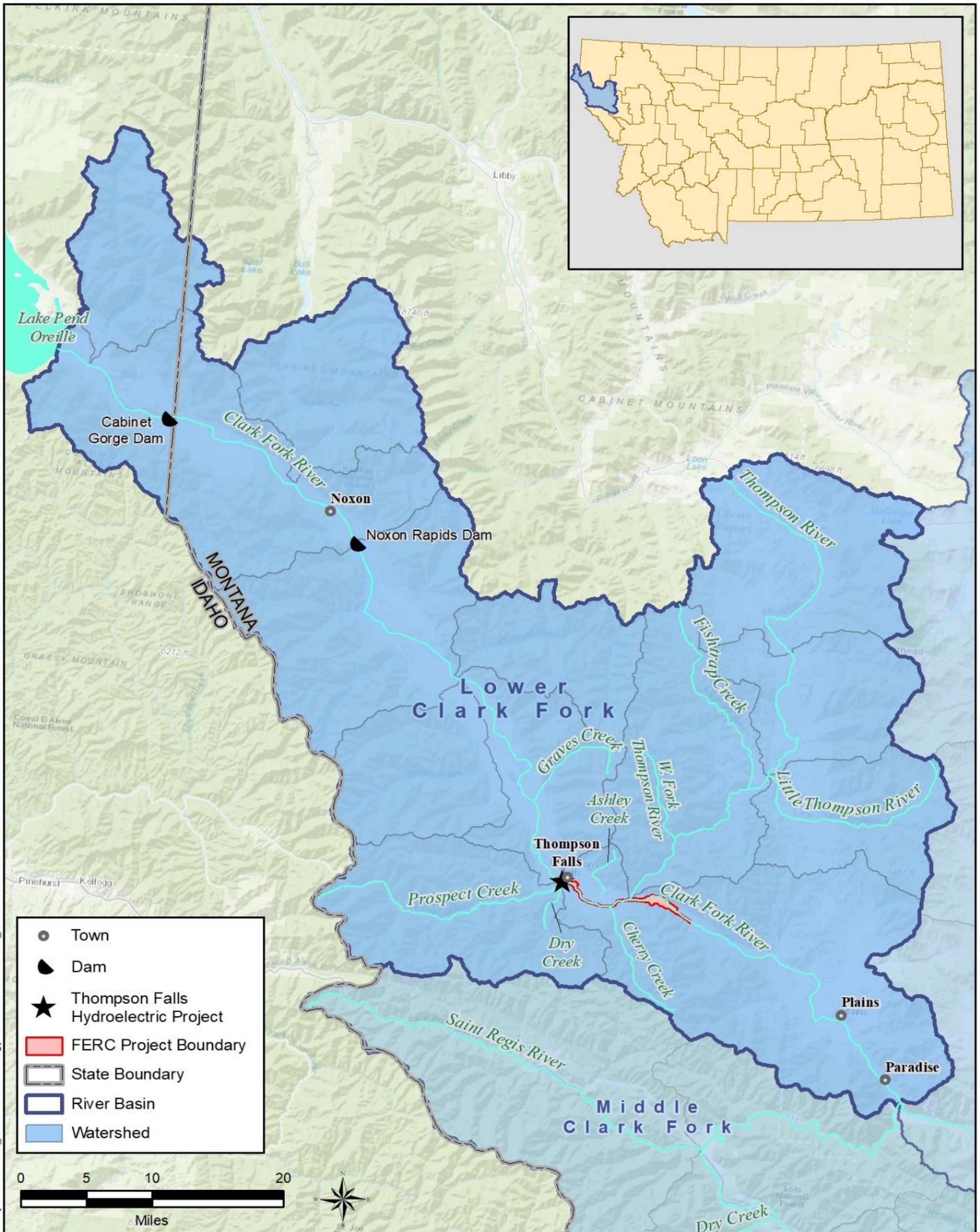
The topography in the Project area consists of a U-shaped river valley at ~ 2,400 feet that is bounded by steep mountainous terrain that exceeds 5,900 feet. The Cabinet Mountains border the north and the Coeur d'Alene Mountains, part of the northernmost extent of the Bitterroot Range, border the south side of the Clark Fork River. The Clark Fork River flows northwest terminating into Lake Pend Oreille.

The Project area can be described as a cold temperate climate with freezing, snowy and mostly cloudy winters and short, clear, warm and dry summers. Average monthly temperatures in the city of Thompson Falls vary from 23°F during the winter to 84°F during the summer, and it is rarely below 6°F or above 92°F (Weather Spark 2022). On average Thompson Falls receives about 23 inches of rain per year and 42 inches of snow per year. The warm season lasts about 2.6 months, June 22 to September 10 while the cold season extends from November 12 to March 1 (Weather Spark 2022).

The 2,001-acre existing Project boundary consists of 1,446 acres of reservoir, and 555 acres of non-reservoir. Lands in the area include about 17 acres of recreation land uses and 538 acres associated with non-recreational land use.

NorthWestern owns ~ 40 acres of the 538 non-recreational acres. The majority of the 40 acres is utilized for Project operations supporting the dams and powerhouse. Private lands represent about 208 acres of non-recreational lands and consist of a mix of large parcels, subdivision lots, and city lots. Many private lands contain residential buildings. The state of Montana's Department of Natural Resources and Conservation manages about 176 acres, which are largely open space. National Forest System lands include about 104 acres, which are largely open space forest lands. Railroad right-of-way and state of Montana lands managed by the Montana Department of Transportation as Montana State Highway (HWY) 200 right-of-way comprise the remaining areas of ~ 17 acres and 2 acres, respectively.

Figure 2-2: Location of Thompson Falls Hydroelectric Project (No. 1869) near the town of Thompson Falls, Montana and the Lower Clark Fork River drainage.



Thompson Falls Hydroelectric Project #1869 Biological Assessment Sanders County, Montana	NorthWestern Energy	Lower Clark Fork River Watershed DECEMBER 2023

2.1 Project Structures

The existing Project structures consist of two curved concrete gravity dams (Dry Channel Dam and Main Channel Dam) with overflow spillways and two powerhouses (original powerhouse and new powerhouse) (**Photograph 2-1**).

The original powerhouse consists of a mass concrete substructure, a masonry rock wall, concrete and structural steel superstructure, concrete floor, and roof slabs supported on steel framing. The total installed capacity of the six Francis turbine-generator units is ~ 40 MWs at a normal water head of 55 feet.

The Unit No. 7 powerhouse (new powerhouse), completed in 1995, is a cast-in-place reinforced concrete gravity structure founded on rock and includes an integral intake and headworks. A substantial portion of the new powerhouse is located below grade.

The turbine is a vertical shaft, double-regulated Kaplan type rated 52.6 MW at 54.5 feet net head and 94.7 revolutions per minute. The range of net head is 40 to 65 feet.

The Main Channel Dam is a curved gravity ogee spillway section, 913 feet long and an average height of 18 feet above the riverbed (Photograph 2-1). The Main Channel Dam has 30 bays divided by concrete piers or permanent steel frames on 24-foot-wide centers, which support flashboards and removable fixed wheel panels. The Main Channel Dam spillway crest is at elevation (El.) 2,380 feet and the top of the fixed wheel panels establish the normal full pool El. 2,396.5 feet. A concrete apron extends 30 to 50 feet downstream of the entire spillway section.

Two 41-foot-wide by 18-foot-high radial gates are located in Panels 16 and 17. In 2019, NorthWestern completed construction of two new radial gates near the left abutment on the Main Channel Dam. The new radial gates are similar in dimension and configuration to the older radial gates but located in bays 25 through 29. Each radial gate passes ~ 10,000 cubic feet per second (cfs), for a total spillway capacity through the radial gates of 40,000 cfs.

The fixed wheel panels are installed and removed by a crane, which travels along tracks on a 10--foot-wide bridge over the full length of the spillway. In a high flow event, the flashboards can be released by tripping or by torch cutting the bolt that secures the tripping latch and releasing the entire assembly free of the flashboard support structures.

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Photograph 2-1: Aerial photo of the Thompson Falls Project, taken June 2, 2014, with streamflow ~ 78,330 cfs (USGS gage #12389000 Clark Fork River near Plains and Thompson River).

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The Dry Channel Dam is located on a former channel of the river separated from the Main Channel Dam by an island. It is a curved concrete gravity dam and consists of two distinct structures. A non-overflow sluiceway section, 122 feet long and 38 feet high, is located at the right side of the dam. It contains 10, 5- by 6.5-foot sluiceways that were originally controlled by slide gates operated from the crest of the dam. The slide gates were permanently closed about 1942 and in 1990 bulkheads were constructed within each sluiceway. The second part of the dam is an overflow spillway with an ogee crest. It has an overall length of 289 feet and an average height of 17 feet above the riverbed. The overflow spillway contains 12 bays, each with six panels and steel flashboard supports on 24-foot centers. The Dry Channel spillway crest is at El. 2,384 feet, but storage is increased by 4-foot flashboards and 8-foot fixed wheel panels similar to those on the Main Channel Dam, which brings the normal reservoir level to El. 2,396.5 feet.

As with the Main Channel Dam, the flashboards of the Dry Channel Dam can be released by tripping or by torch cutting the bolt that secures the tripping latch and releasing the entire assembly from the flashboard support structures.

2.2 Upstream Fish Passage Facility

The Thompson Falls Upstream Fish Passage Facility was constructed, in coordination with FWS, between 2009 and 2010 to help restore habitat connectivity for adult Bull Trout (*Salvelinus confluentus*) along the Clark Fork River above and below the Project. Bull Trout were listed as a threatened species under the ESA in 1998. The fish passage facility was constructed on the right side (facing downstream) of the Main Channel Dam, adjacent to the non-overflow gravity dam section (*refer to* Photograph 2-1). The Main Channel Dam is the furthest upstream impoundment structure of the Project. The fish passage facility was designed in general accordance with the National Oceanic and Atmospheric Administration Fisheries Criteria (NMFS 2008), which was used by FWS in the design of upstream passage facilities. The location and design of the fish passage facility were collaboratively developed and agreed to between the Licensee at the time and FWS; Montana Fish, Wildlife, and Parks (FWP); and CSKT over the course of multiple years. FERC (2009) approved the final design and construction of the fish passage facility.

The fish passage facility was constructed with a sloping concrete floor, with 48 individual pools created by internal weir plates constructed across the concrete "U" section. Hydraulically, the ladder was designed to induce a 1-foot drop in the hydraulic grade line for each of the 48 pools to allow passage of a diverse population of fish over the Main Channel Dam. Additional details regarding the design of the upstream fish passage facility are found in the **Final License Application Exhibit E Section 2.1.1** (NorthWestern 2023c).

2.3 Thompson Falls Reservoir

Thompson Falls Reservoir formed by the impounded water is about 10 miles long with a maximum width of about 1,800 feet and maximum depth of 90 feet. Active storage capacity of the Thompson Falls Reservoir is ~ 15,000 acre-feet between crest El. 2,380 feet and normal full pool El. 2,396.5 feet. At the normal full pool reservoir El. 2,396.5 feet, the reservoir surface area is ~ 1,092 acres.

2.4 Project and Passage Operations

The Project is operated to provide baseload and flexible generation within the reservoir elevation and minimum flow requirements of the license. Baseflow generation uses the river inflow by matching reservoir outflows to generate electricity while maintaining a stable reservoir elevation. Flexible capacity increases or decreases generation from the baseflow, raising or lowering the reservoir elevation as the flow through the units is changed to support flexible capacity needs. Under the current license, NorthWestern may use the top 4 feet of the reservoir from full pool while maintaining a minimum of 6,000 cfs, or inflows, whichever is less. NorthWestern has typically managed the reservoir within 1.5 feet of full pool, with occasional deeper drawdowns up to 4 feet.

When flow exceeds total powerhouse capacity (23,000 cfs), NorthWestern operates the Project following a Total Dissolved Gas (TDG) Control Plan that was initially developed in 2010 and updated in 2024 (NorthWestern 2024). The TDG Control Plan was developed to improve attraction of fish to the Fish Passage Facility while minimizing the entrainment of dissolved gas in order to reduce potential effects of TDG on aquatic organisms.

The 2024 TDG Control Plan dictates the sequence in which the radial gates and spillway panels are opened during periods of spill at the Project. As runoff increases in excess of the total powerhouse capacity, the 4- by 8- foot spillway panels on the Main Channel Dam are removed for additional spill capacity. As flows increase, more panels are removed to balance flows across the length of the Main Channel Spillway. In most years, when the peak flood discharge is less than 83,000 cfs, spill is restricted to the Main Channel Dam section. If flows exceed 83,000 cfs, there are 72 Dry Channel Dam spill panels (each 4 x 8 foot) available to increase spill capacity.

The Thompson Falls upstream fish passage facility operates annually (since 2011), typically from mid-March to mid-October depending on weather. The operational season ends when a fall freeze is imminent, or for necessary maintenance. Temporary closures may occur during the season due to high spring streamflows and associated debris and sediment accumulation in the lower pools of the ladder. The work station (3 cfs) and fish ladder (6 cfs pool-to-pool), including attractant flows (high velocity jet and auxiliary water system), may utilize between 9 and 83 cfs.

The elevation of Thompson Falls Reservoir has been near full pool (2,396.5 feet) during fish ladder operations, providing 9 cfs (6 cfs down the ladder; 3 cfs through the fish working station) for fish ladder functionality. An optional 20 cfs from the high velocity jet and/or 54 cfs from the auxiliary water system is used to provide fish attractant flows that exit at the bottom of the fish ladder. Currently, NorthWestern operates the ladder using the maximum available attraction flow from these sources of 83 cfs at the ladder entrance. In addition to these flows through the ladder and at the entrance of the ladder, NorthWestern opens one half dam spill gate near the fish ladder to provide an additional fish attractant flow of about 100 to 125 cfs during periods of no spill. Once spill at the main dam begins, NorthWestern implements the 2024 TDG Control Plan to balance dissolved gas abatement and provide for fish attraction flows to the fishway.

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3.0 Description of Proposed Action

3.1 Project Facilities

NorthWestern proposes significant site improvements to Wild Goose Landing Park, a Project recreation site. The proposed improvements include a new boat launch, swimming area, accessible pathways, nature play areas, picnic spaces, and restrooms. Additionally, NorthWestern proposes extensive site updates including modernized utilities, expanded parking, and improved stormwater management using rain gardens and drainage swales. To address shoreline erosion that may be exacerbated by waves from boat traffic at the site, NorthWestern proposes to stabilize the shoreline with habitat-friendly features and install vegetated retaining walls.

3.2 Proposed Operations

NorthWestern proposes to operate the Project to provide baseflow generation and flexible capacity needs in the new license term. Baseflow generation uses the river inflow by matching reservoir inflows to generate electricity while maintaining a stable reservoir elevation. Flexible capacity increases or decreases generation from the baseflow, raising or lowering the reservoir elevation as the flow through the units is changed to support flexible capacity needs. Under normal operations, NorthWestern will maintain the reservoir between El. 2396.5 and 2394 feet (2.5 feet below normal full operating level). In the spring during periods of spill, the reservoir may be operated above El. 2396.5 but is maintained below El. 2397.0. The units may increase or decrease generation during normal operations within the above defined reservoir elevations. Spill gates may be used to maintain reservoir elevation if needed in times of decreased generation. NorthWestern will continue to release a continuous minimum flow of 6,000 cfs or inflow, whichever is less, from the Project.

NorthWestern updated the TDG Control Plan in 2024 to incorporate data collected during TDG studies undertaken during relicensing from 2019 through 2023. The updated plan incorporates the use of the two new radial gates on the Main Channel Dam which went into operation in 2018. The proposed 2024 TDG Control Plan outlines the plan of spill operations to be used under the new License, when issued by FERC. The updated plan endeavors to balance spill operations to attract fish to the Fish Passage Facility while minimizing potential effects on aquatic organisms at the Project. The TDG Control Plan was developed in consultation with the Montana DEQ, and satisfies ARM 17.30.636 (1), which provides that “owners and operators of water impoundments that cause conditions harmful to prescribed beneficial uses of state water shall demonstrate to the satisfaction of the department that continued operations will be done in the best practicable manner to minimize harmful effects.”

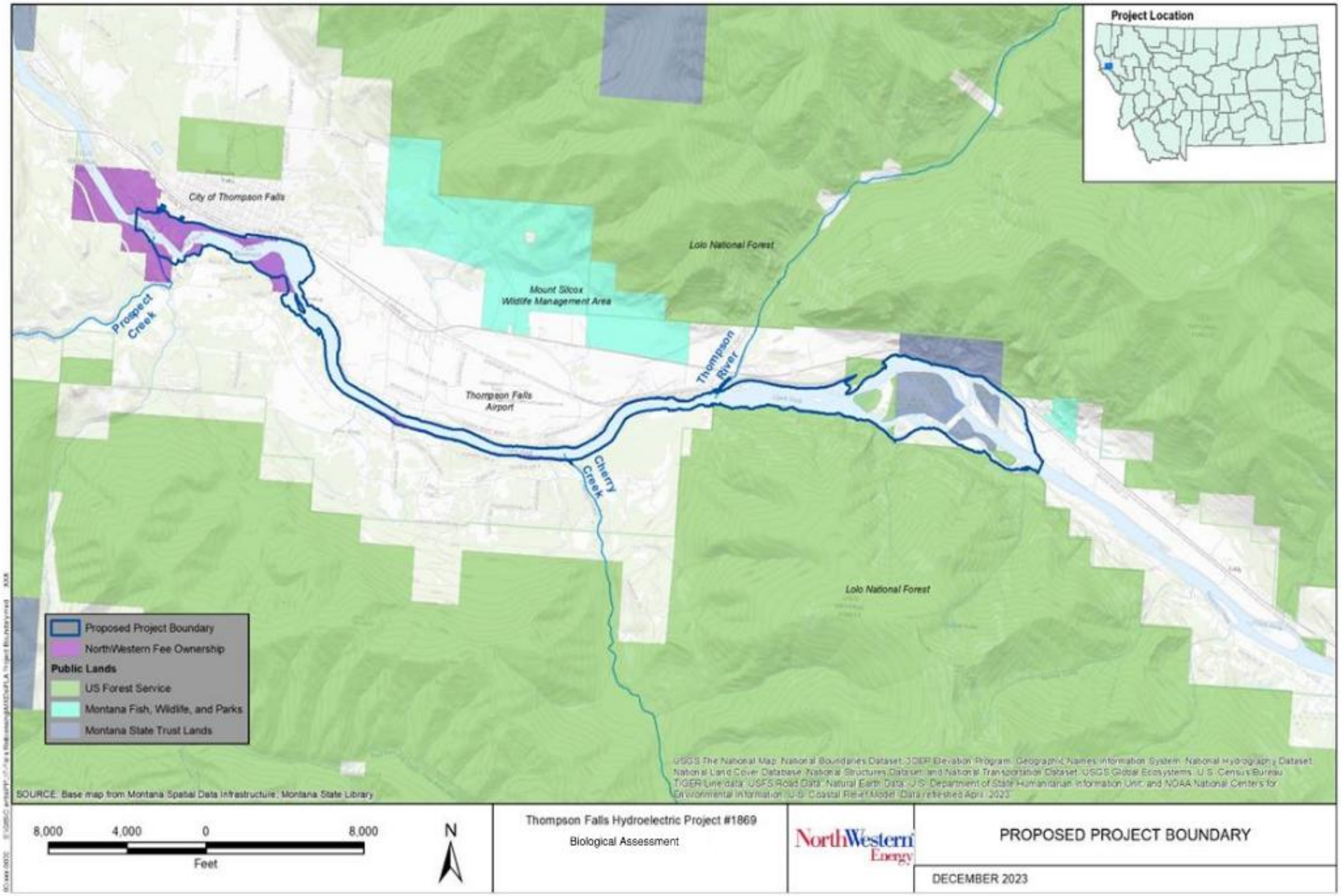
3.3 Proposed Project Boundary

The proposed Project Boundary extends ~ 0.3 mile downstream and 10 miles upstream of the Project's dams (**Figure 3-1)**. The proposed Project Boundary encompasses a total of 1,536 acres, consisting of 1,092 acres of reservoir and 444 acres of non-reservoir. Federal land managed by the U.S. Forest Service (USFS) (National Forest System Lands) includes 66.9 acres, which are largely open space forest lands (**Table 3-1**). The Thompson River, a major tributary to the Clark Fork River, enters the reservoir about 6.2 miles upstream of the dam. Its lower 0.2 mile is included within the proposed Project Boundary. The proposed Project Boundary is a combination of a contour elevation of 2397 feet elevation at the dam (elevation of contour increase proceeding upstream) for most of the reservoir and a metes and bounds description that incorporates areas above the contour elevation to encompass Project facilities, recreation sites and a cultural resource site.

Table 3-1: Thompson Falls Project – Federal Lands Within Proposed Project Boundary.

Township	Range	Section	Subdivision	Acres	Agency
21N	28W	15	Government Lot 1	0.3	USFS
21N	28W	17	Government Lots 5-11	49.7	USFS
21N	28W	18	Government Lots 8-10	4.4	USFS
21N	28W	21	Government Lot 1	1.5	USFS
21N	28W	22	Government Lots 3-4	11.3	USFS
			Total	**67.2**	

Figure 3-1: Proposed Project Boundary.



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4.0 Action Areas

The action areas include the areas affected directly or indirectly by the proposed action. This BA is focused on the action area in which aquatic and terrestrial threatened and endangered species may be present. The following defines an aquatic action area and terrestrial action area.

4.1 Aquatic Resources Action Area

For aquatic species, the action area includes the proposed FERC Project boundary, including the project structures, such as the dams, powerhouse, upstream fish passage facility, and developed infrastructure supporting operations. The action area also includes West Fork Thompson River, Fishtrap Creek, and Lake Pend Oreille, where the proposed juvenile Bull Trout collection and transport activities would occur.

Effects of the Project include modifications of streamflow and water elevation in the Clark Fork River downstream of the Project to Noxon Rapids Reservoir. The Project also impounds and fluctuates water elevations upstream of the Project's dams for 10 miles.

The aquatic analysis will focus on the Lower Clark Fork River and Thompson Falls Reservoir. However, it is understood that NorthWestern is proposing fish collection, transport, and release activities for Bull Trout in the two Thompson River tributaries described above and in Lake Pend Oreille. Further, Bull Trout occur throughout the Clark Fork River watershed and drainage and their tributaries and utilize different habitat areas to complete various life history stages.

4.2 Terrestrial Resources Action Area

For terrestrial species, the action area includes the entire area within the proposed FERC Project boundary. Project effects are limited to the waterbody within the FERC Project boundary. Project operations do not affect any listed upland and terrestrial species or designated critical habitat.

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5.0 ESA Listed Species and Critical Habitat in Action Area

5.1 Listed Species in Action Area

Background material and information on aquatic and terrestrial resources was gathered from NorthWestern, Avista, FWP, Montana Natural Heritage Program (MNHP), CSKT, Montana Department of Environmental Quality (DEQ), FWS, and USFS reports and databases. In addition, an internet search was completed for other reports and data available on ESA species status and distribution in Montana.

On October 24, 2025, NorthWestern submitted a request to FWS through the Environmental Conservation Online System (ECOS) – Information for Planning and Consultation (IPaC) system for a species list that identifies threatened, endangered, and proposed species as well as proposed and final designated critical habitat. The FWS species list identified through ECOS-IPaC is provided in **Table 5-1**. The only designated critical habitat within the FERC Project boundary and action area is for Bull Trout.

Four occurrence categories were applied to each species as reflected in **Table 5-1** and defined below:

- *Known to occur* – The species is documented to occur in the action area or vicinity.
- *May occur* – The action area is within the species' currently known range or distribution, and vegetation communities, habitat, soils, or other biotic and abiotic indicators resemble those known to support the lifecycle requirements of the species.
- *Unlikely to occur* – The action area is within the species' currently known range or distribution. However, vegetation communities, soils, and other biotic and abiotic indicators do not resemble those known to support the lifecycle requirements of the species.
- *Does not occur* – The action area is not within the known range or distribution, and other biotic and abiotic indicators do not resemble those known to support the lifecycle requirements of the species.

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Table 5-1: Summary of ESA listed species identified by FWS ECOS-IPaC (2025)

Species	Scientific Name	FWS Status (Year)	Habitat	Potential to Occur	Habitat Availability in Action Area
Bull Trout	*Salvelinus confluentus*	Threatened (1998) Critical Habitat (2010)	Clear streams, rivers, and lakes west of the Continental Divide Cool, clear, connected, complex stream habitat.	**Known to Occur**	Bull Trout are documented downstream and upstream of Thompson Falls Dam, documented utilizing the Upstream Fish Passage Facility, documented moving downstream through Thompson Falls turbines/spillway. The action area is within designated Bull Trout critical habitat (Federal Register 2010).
Grizzly Bear	*Ursus arctos horribilis*	Threatened (1975)	Variable habitats including meadow, forest and riparian. Requires large tracts of wilderness.	**Unlikely to Occur**	There is no habitat to support the required lifecycle requirements of the species within the action area. There is no denning site within the action area. Forest and riparian areas near and around the FERC Project boundary provide habitat for Grizzly Bear and individuals have been documented in the valley of the Lower Clark Fork River drainage. Potential for transient use of action area. Action area is outside the boundary for the Cabinet Yaak Grizzly Bear Recovery Zone.
Wolverine	*Gulo gulo luscus*	Threatened (2023)	Large tracts of essentially roadless wilderness in high elevation alpine and subalpine terrain. Denning habitat includes caves, rock crevices, crevices/opening under fallen trees, thickets, and or similar type of locations	**Unlikely to Occur**	There is no habitat within the action area. There is no denning site within the action area. Canada lynx protected zone overlap much of the wolverine's habitat in Montana (FWS 2023b). The distribution and presence of Wolverine is strongly related to persistent spring snow (FWS 2023b), restricting the species to high-elevations in the region.
Canada Lynx	*Lynx canadensis*	Threatened (2000)	Subalpine coniferous forests, with a deep winter snowpack, dense understory, and high density of snowshoe hares.	**Unlikely to Occur**	Action area is below typical elevation and does not provide suitable habitat and does not include Canada Lynx critical habitat.
Yellow-billed Cuckoo	*Coccyzus americanus*	Threatened (2014)	Tall, dense, expansive cottonwood and willow riparian forest. Requires habitat patches at least 25 acres (10 ha) in size.	**Unlikely to Occur**	Habitat in the action area does not provide suitable nesting or foraging habitat.

Species	Scientific Name	FWS Status (Year)	Habitat	Potential to Occur	Habitat Availability in Action Area
Spalding's Campion (Spalding's Catchfly)	*Silene spaldingii*	Threatened (2001)	Open, mesic grasslands in the valleys and foothills, in deep, loamy soils along northerly aspects.	**Unlikely to Occur**	Action area is unlikely to provide suitable habitat for species.
Whitebark Pine	*Pinus albicaulis*	Threatened (2023)	Windy, cold, high-elevation or high-latitude environments. Subalpine and krummholz habitats (mostly mountain ranges).	**Does not Occur**	Action area does not provide subalpine habitat and is below 3,000 feet above sea level.

Based on the potential occurrence (i.e., ***unlikely to occur*** and ***does not occur***), lack of habitat availability within the action area, and lack of Project effects, all species listed in **Table 5-1,** except for Bull Trout, were excluded from analysis in this BA. Bull Trout and Bull Trout designated critical habitat were classified as ***known to occur*** within the action area. There is no critical habitat located within the action area for Grizzly Bear, Canada Lynx, Yellow-Billed Cuckoo, Spalding's Campion, Whitebark Pine, or Wolverine and the other species were unlikely to occur in the action area. Therefore, the proposed action would have ***No Effect*** on Grizzly Bear, Canada Lynx, Yellow-Billed Cuckoo, Spalding's Campion, Whitebark Pine, or Wolverine. Bull Trout and Bull Trout designated critical habitat are the only species and critical habitat analyzed in this BA.

5.2 Bull Trout Life History

In 1998, the Bull Trout was listed under the federal ESA as a threatened species (Federal Register 1998). FWS designated critical habitat in 2005 with a revision in 2010 (Federal Register 2005; 2010). In 2015, FWS developed a recovery plan for Bull Trout (FWS 2015). Bull Trout are present within the Clark Fork River drainage and are known to occur within the FERC Project boundary.

Life history characteristics of Bull Trout have been reported by several authors (Pratt 1985 and 1996; Fraley and Shepard 1989; Brown 1992; Thomas 1992; McPhail and Baxter 1996; Nelson et al. 2002). In the Clark Fork River drainage, Bull Trout have three life history patterns: resident, fluvial, and adfluvial. Resident Bull Trout spend their entire lives in the same (or nearby) streams in which they were hatched. Resident Bull Trout adults and juveniles generally confine their migrations to their natal streams. In fluvial and adfluvial populations, the adults spawn in tributary streams where the young rear for 1 to 4 years (Fraley and Shepard 1989). The juvenile Bull Trout then migrate downstream to a larger body of water, either a lake (adfluvial fish) or a river (fluvial fish), where they grow to maturity.

Available information suggests that the Bull Trout's ability to express multiple life history forms is an adaptive mechanism to variable environmental conditions (Nelson et al. 2002). For example, adfluvial and fluvial migration movement to lakes and larger rivers may enable Bull Trout to take advantage of more abundant food sources allowing for greater growth and fecundity (Gross 1987 cited in Nelson et al. 2002). The resident life history form may be an adaptation to the presence of migration barriers/restrictions or where growth opportunities in the headwaters are greater than the cost of migration (Nelson et al. 2002).

In the Lower Clark Fork River drainage, there appears to be a wide season, ~ between April and August, when adult Bull Trout leave Lake Pend Oreille to begin their upstream migrations to headwater streams to spawn (Normandeau Associates 2001). Bull Trout records at the upstream fish passage facility indicate most Bull Trout are moving upstream between April and June with some additional Bull Trout detections in the fish passage facility between August and October (NorthWestern 2019b). Mature adults spawn in headwater streams during the fall (September–October). However, the timing of movement into the tributaries may vary. Radio telemetry data indicate a relatively wide range of time during which Bull Trout move into spawning areas, between the middle of July and the middle of October (Lockard et al. 2002; 2003; 2004).

Bull Trout have more specific habitat requirements compared to other salmonids, requiring clean, cold, complex, and connected habitat. Spawning areas are generally low gradient (< 2%) with a water depth range from 0.1 to 0.6 meters, stream velocity between 0.09 meters per second (m/s) and 0.61 m/s, comprised of gravel/cobble substrate with less than 35 to 40 percent of sediments smaller than 6.35 millimeters (mm) in diameter, and high gravel permeability (MTBRT 2000). In the Lower Clark Fork River drainage, spawning activity peaks in September (Katzman and Hintz 2003; Katzman 2003; Moran 2003) when stream temperatures are generally less than 8°C (McPhail and Baxter 1996; Pratt 1996). Sexually mature adult Bull Trout may spawn in multiple years, although they do not necessarily spawn in consecutive years (Downs et al. 2006).

Rearing habitat requirements for juvenile Bull Trout include cold summer water temperatures (< 15°C) provided by sufficient surface and groundwater flows. Warmer temperatures are associated with lower Bull Trout densities and can increase the risk of invasion by other species that could displace, compete with, or prey on juvenile Bull Trout. Juvenile Bull Trout are generally benthic foragers, rarely stray from cover, and they prefer complex forms of habitat. High sediment levels and substrate embeddedness can result in decreased rearing densities. Unembedded cobble/rubble substrate is preferred for cover and feeding and provides invertebrate production. Highly variable streamflow, reduction in large woody debris, bedload movement, and other forms of channel instability can limit the distribution and abundance of juvenile Bull Trout.

Both migratory and stream-resident Bull Trout move in response to developmental and seasonal habitat requirements. Migratory individuals can move great distances (up to 156 miles) among lakes, rivers, and tributary streams in response to spawning, rearing, and adult habitat needs (MTBRT 2000). Stream-resident Bull Trout migrate within tributary stream networks for spawning purposes, as well as in response to changes in seasonal habitat requirements and conditions. Open migratory corridors, both within and among tributary streams, larger rivers, and lake systems are critical for maintaining Bull Trout populations.

Historically, juvenile adfluvial Bull Trout in the Clark Fork River drainage outmigrated from tributary streams to feed and mature in Lake Pend Oreille. The adults would then migrate upstream from Lake Pend Oreille to the natal streams to spawn. This migration pattern has been disrupted by the construction of Cabinet Gorge Dam, Noxon Rapids Dam, and Thompson Falls Dam. Today, Bull Trout passage in the Lower Clark Fork drainage is, in part, facilitated by Avista's trap and transport program and NorthWestern's upstream fish passage facility. There is no fish passage facility or trap system present at Noxon Rapids Dam (*see* **Section 6.1 – Current Bull Trout Management**).

5.3 Bull Trout Critical Habitat

Critical habitat for Bull Trout has been defined as a habitat unit that can maintain and support viable Bull Trout core areas (Federal Register 2005). The Project is within the Columbia Headwater Recovery Unit (CHRU). Within the CHRU there are 35 Bull Trout core areas that occur within four geographic regions including the Clark Fork River, Flathead Lake, Coeur d'Alene Lake, and Kootenai River (FWS 2015). The Project is within the Lake Pend Oreille core area that includes the former Lower Clark Fork River and Flathead River core areas (2002 designation), representing 35 local Bull Trout populations.

Within the CHRU, FWS identified 32 Critical Habitat Units (CHUs), including the Clark Fork River Basin CHU. The Clark Fork River Basin CHU (Unit 31) includes 3,328 stream miles and 295,587 acres of lakes and reservoirs as critical Bull Trout habitat (Federal Register 2010). The Clark Fork River Basin has 12 subunits including the Lower Clark Fork River Critical Habitat Subunit (CHSU) encompassing the Project, located in Sanders and Missoula counties covering 295 miles of stream and 9,719 acres of surface area as designated Bull Trout habitat (Federal Register 2010).

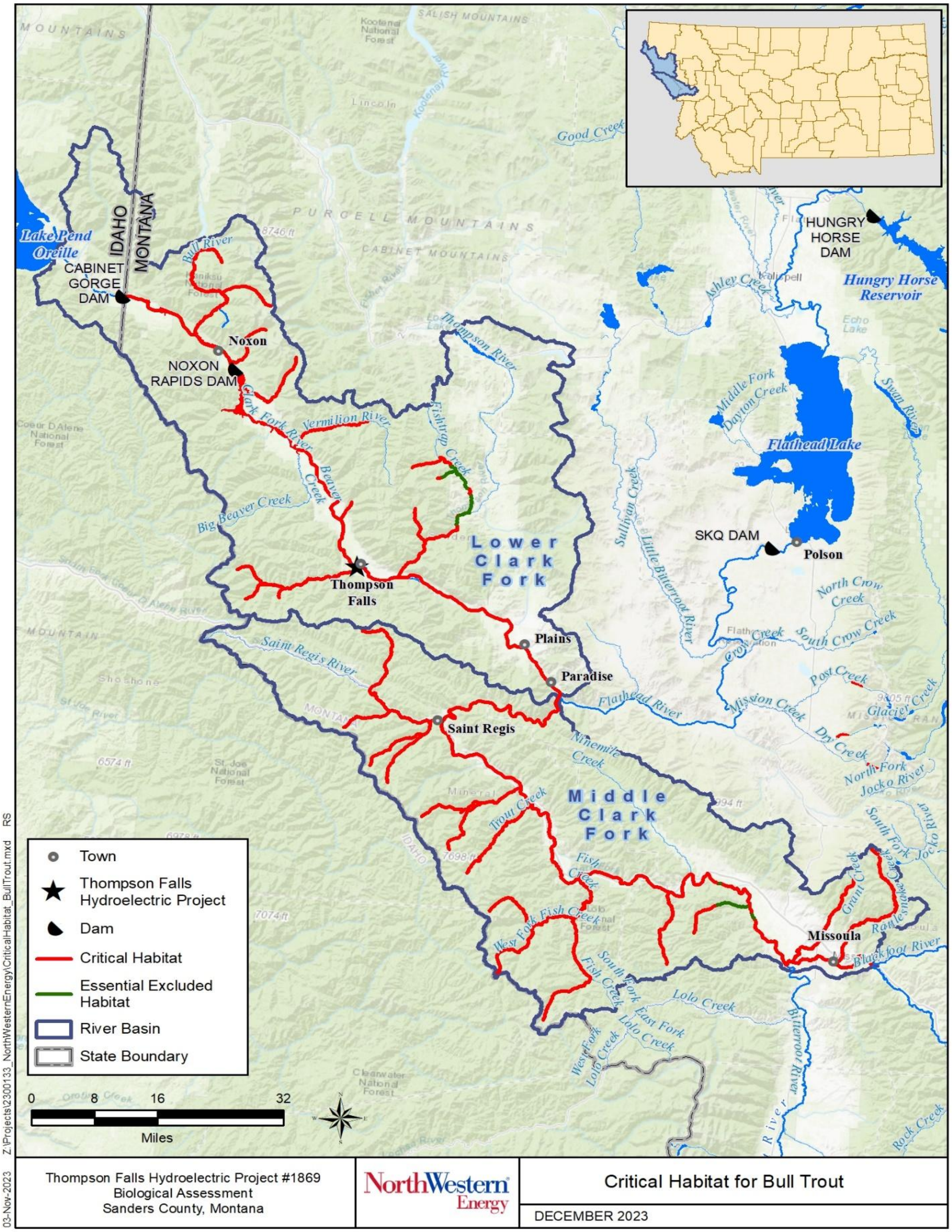
The Lower Clark Fork River CHSU (**Figure 5-1**) provides essential foraging, migration, and overwintering (FMO) habitat for Bull Trout from potentially several local Bull Trout populations and includes designated critical Bull Trout habitat (FWS 2010a). The Project is located within designated critical Bull Trout habitat for the Lower Clark Fork River CHSU. As part of the critical habitat designation, the Thompson Falls Reservoir is considered a stream reach and not a lake due to the lack of reservoir storage capacity (Federal Register 2010). Two tributaries near the Project including Prospect Creek, located immediately downstream of the Main Channel Dam, and the Thompson River, located about 6 miles upstream of the Main Channel Dam, are designated Bull Trout critical habitat. Designated critical habitat in the Lower Clark Fork River and Middle Clark Fork River, representing CHU Unit 31, is shown in **Figure 5-1. Table 5-2** identifies the Lower and Middle Clark Fork River reaches and respective local Bull Trout populations identified by FWS (2015).

Table 5-2: Bull Trout spawning and rearing tributaries to the Lower and Middle Clark Fork rivers and Lower Flathead River.

Upstream or Downstream of Thompson Falls Project	River Reach Description	Bull Trout Spawning and Rearing Tributaries to the Clark Fork River/Flathead River (smaller tributaries)
Downstream	Noxon Rapids Dam upstream to Thompson Falls Dam	Swamp Creek, Vermilion River, Graves Creek, Prospect Creek
Upstream	Lower Clark Fork River - ends at the confluence with the lower Flathead River	Thompson River (West Fork Thompson River, Fishtrap Creek)
Upstream	Lower Flathead River	Jocko River (North Fork and South Fork), Mission Creek, Post Creek, Dry Creek
Upstream	Middle Clark Fork River - starts at the confluence with the lower Flathead River and ends at the confluence with the Blackfoot River	St. Regis River (Little Joe Creek, Ward Creek), Twelvemile Creek, Cedar Creek (Oregon Gulch), Fish Creek (North Fork, West Fork and South Fork, Cache Creek), Petty Creek, Albert Creek, Grant Creek, Rattlesnake Creek

Source: FWS 2015

Figure 5-1: **Map of Bull Trout designated critical habitat (CHSU Unit 31) in the Lower Clark Fork River and Middle Clark Fork River in Montana.**



03-Nov-2023 Z:\Projects\2300133_NorthWesternEnergy\CriticalHabitat_BullTrout.mxd RS

Source: FWS 2010b

In determining which areas to designate as critical habitat for a species, FWS considers those physical and biological attributes that are essential to species conservation (i.e., primary constituent elements [PCEs]). The FWS (Federal Register 2010) has listed nine PCEs including physical and biological features essential to Bull Trout conservation**:**

- Springs, seeps, groundwater sources, and subsurface water connectivity (hyporheic flows) to contribute to water quality and quantity and provide thermal refugia.
- Migratory 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.
- An abundant food base, including terrestrial organisms of riparian origin, aquatic macroinvertebrates, and forage fish.
- 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 substrates, to provide a variety of depths, gradients, velocities, and structure.
- Water temperatures ranging from 2-15°C, with adequate thermal refugia available for temperatures that exceed the upper end of this range. Specific temperatures within this range will depend on Bull Trout life history stage and form; geography; elevation; diurnal and seasonal variation; shade, such as that provided by riparian habitat; stream flow; and local groundwater influence.
- In spawning and rearing areas, substrates of sufficient amount, size, and composition to ensure the 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 substrate, is characteristic of these conditions. The size and amounts of fine sediment suitable to Bull Trout will likely vary from system to system.
- A natural hydrograph, including peak, high, low, and base flows within historical and seasonal ranges or, if flows are controlled, minimal flow departure from a natural hydrograph.
- Sufficient water quality and quantity such that normal reproduction, growth, and survival are not inhibited.
- Sufficiently-low levels of occurrence of nonnative predatory (e.g., Lake Trout [*Salvelinus namaycush*], Walleye [*Sander vitreus*], Northern Pike [*Esox lucius*], Smallmouth Bass [*Micropterus dolomieu]*; interbreeding [e.g., Brook Trout, *Salvelinus fontinalis*]; or competitive [e.g., Brown Trout, *Salmo trutta*] species) that, if present, are adequately, temporally, and spatially isolated from Bull Trout.

6.0 Environmental Baseline and Review

As part of the Lake Pend Oreille core area, the Lower Clark Fork River drainage provides an important portion of the spawning and rearing habitat for Lake Pend Oreille, as well as an essential migratory corridor for Bull Trout from Lake Pend Oreille to be able to access productive watersheds upstream (FWS 2010b).

For over 70 years, three hydroelectric dams have been in operation on the Lower Clark Fork River affecting migratory fish movement extending over 65 river miles near the inlet to Lake Pend Oreille upstream to Thompson Falls, Montana. In addition to the Thompson Falls Project, there are two hydroelectric facilities owned and operated by Avista, Cabinet Gorge Dam (built in 1952) located just downstream of the Idaho and Montana state line and Noxon Rapids Dam (built in 1959) located ~ 28 river miles east of the state line. Upstream fish passage at these facilities has been limited to an adult Bull Trout fish passage program (capture and haul) managed by Avista at Cabinet Gorge Dam since 2001, and the seasonal upstream fish passage facility operated and managed by NorthWestern at Thompson Falls Dam since 2011. The history of the development of the upstream fish passage facility and consultation with agencies is provided in Comprehensive Phase 2 Final Fish Passage Report (NorthWestern 2019b). Construction of a permanent upstream trapping facility at Cabinet Gorge Dam commenced in 2019 and seasonal operations began in spring 2022. No fishway/passage facility is present at Noxon Rapids Dam.

6.1 Current Bull Trout Management

Juvenile adfluvial Bull Trout that outmigrate from natal tributaries upstream of the Project, can move downstream through the Project and rear in one of the three downstream large water bodies; Noxon Rapids Reservoir, Cabinet Gorge Reservoir, or Lake Pend Oreille. Juvenile Bull Trout that rear in Noxon Rapids Reservoir may migrate upstream as adults to return to their natal streams for spawning using the upstream fish passage facility at the Project. Bull Trout that rear in Cabinet Gorge Reservoir do not have a means to return to their natal stream upstream of the Project.

Therefore, the numbers of Bull Trout available to pass upstream of the Project utilizing the upstream fish passage facility are limited to just those individuals that rear in Noxon Rapids Reservoir. This is only a subset of the total number of adfluvial Bull Trout that pass downstream through the Project. Water temperatures, non-native predators, and habitats within Noxon Rapids Reservoir are not ideal for Bull Trout survival. These poor conditions, and assumed low survival rates, further limit the number of Bull Trout that may be present at the Project. As a result, an average of less than two Bull Trout per year are captured by the upstream fish passage facility at the Project.

Lake Pend Oreille provides preferred conditions for adfluvial Bull Trout survival and growth. Accordingly, Avista has established an upstream Bull Trout fish passage program. Bull Trout that rear in Lake Pend Oreille may be collected by Avista as part of their upstream Bull Trout fish passage program. Once adult Bull Trout begin upstream migrations from Lake Pend Oreille a portion are captured at Avista's Cabinet Gorge Dam by way of electrofishing efforts, the permanent upstream trapping facility at the dam, or a capture facility at a nearby cold water source.

Through a rapid genetic assignment process, captured individuals are then assigned to their natal tributary. Those Bull Trout with natal tributaries to Lake Pend Oreille (Region 1) are not transported upstream. Bull Trout with natal tributaries upstream of either Cabinet Gorge Dam (genetic assignment to Region 2), upstream of Noxon Rapids Dam (genetic assignment to Region 3), or upstream of the Thompson Falls Project (genetic assignment to Region 4) are transported by truck above the appropriate dam. On average, ~ 44 Bull Trout have been transported above Cabinet Gorge Dam per year (2009-2023), and 15 percent (n=7) of these Bull Trout were transported upstream of the Project from Lake Pend Oreille. Through this program, adult Bull Trout bypass the Project and return directly to the area of their natal stream. Avista has operated the adult Bull Trout transport program since 2001. Fish transport upstream of the Project (Region 4) began in 2007.

Occasionally a Bull Trout caught below Cabinet Gorge Dam is genetically assigned to Region 4, but the decision is made to transport the fish to Region 3 because it was previously captured and transported downstream as a juvenile from a Region 3 tributary. Although the genetic assignment tool is very accurate (90% +), it is not 100 percent accurate all the time.

In addition to the upstream transport program, Avista also has a downstream transport program. Avista captures a portion of juvenile Bull Trout within their natal streams that are tributaries to the Clark Fork Project reservoirs, implants them with passive integrated transponder (PIT) tags, and transports them to Lake Pend Oreille. Avista's downstream transport program does not include tributaries upstream of the Project.

6.2 Bull Trout Abundance and Distribution

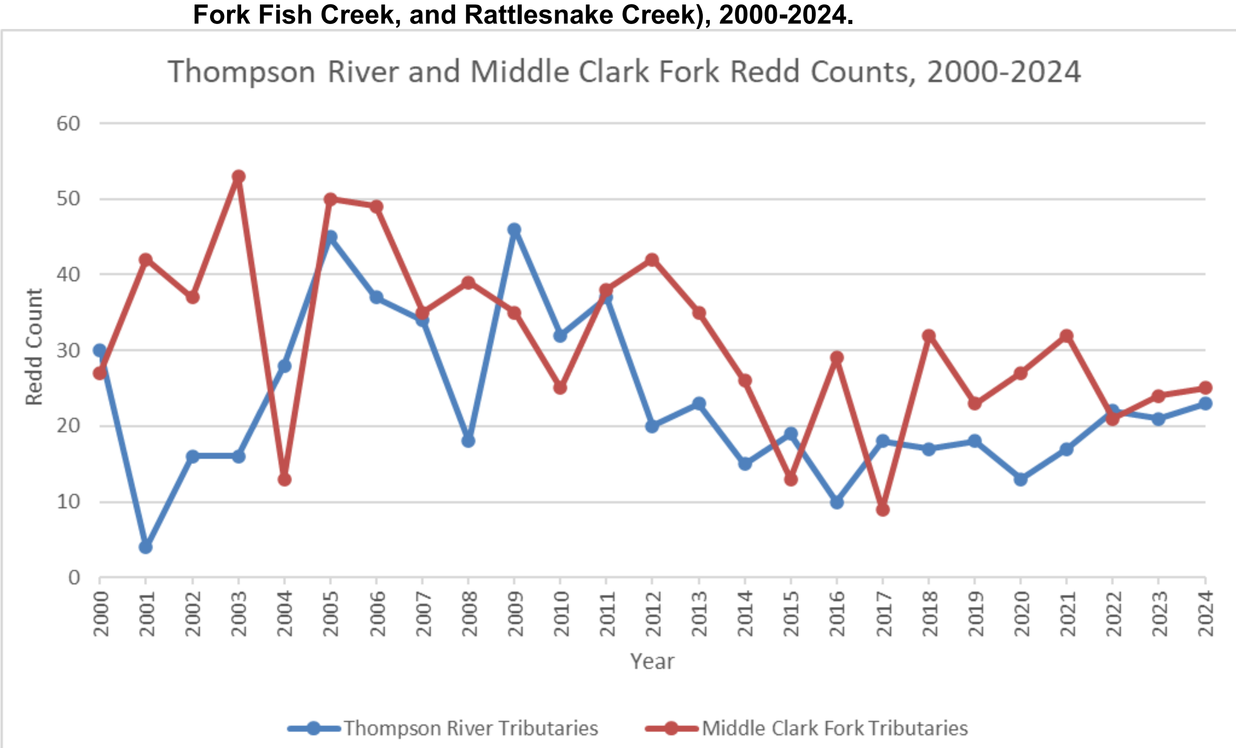
6.2.1 Bull Trout Populations in the Lower and Middle Clark Fork River

Acquiring an accurate population estimate for Bull Trout in the Clark Fork River upstream or directly downstream of the Project, is difficult, primarily because numbers are too low to allow for an accurate count. Within the mainstem Clark Fork River above the facility, electrofishing has estimated ~ one to two Bull Trout per mile (L. Knotek, FWP, personal communication 2023). Large river systems are challenging to effectively sample and likely underestimate total numbers of Bull Trout.

Another Bull Trout population index is based on redd counts. FWP has monitored Bull Trout redds in spawning and rearing tributaries in the Thompson River and tributaries in the Middle Clark Fork River (Cedar Creek, Fish Creek, St. Regis River, Rattlesnake Creek) between 2000 and 2024 (FWP, unpublished data). Not all tributaries were surveyed annually. Some tributaries present a mix of resident and fluvial/adfluvial Bull Trout populations, complicating the interpretation of redd count index data for fluvial/adfluvial Bull Trout populations. However, these are the best available data for known Bull Trout populations upstream of the Project.

Annual Bull Trout redd counts in the Thompson River (Fishtrap Creek and West Fork Thompson River) and in the Middle Clark Fork River (Fish Creek and Rattlesnake Creek) provide the most consistent annual redd count data available since 2000 (**Figure 6-1**). Fishtrap Creek consistently shows the highest number of redds per survey year (peak of 46 redds in 2009) while West Fork Thompson River and Rattlesnake show the lowest number of redds per survey year (≤ 15 redds per a given survey year). Collectively, Thompson River drainage has recorded 13 to 46 redds annually between 2000 and 2024 (FWP, unpublished). Fish Creek drainage (Middle Clark Fork tributary) is represented by West Fork and North Fork Fish creeks combined. Redd counts collectively in Fish Creek have oscillated between 6 and 33 redds per survey year. Regardless of the precision the redd count data provide, these data indicate that the number of fluvial/adfluvial juvenile Bull Trout outmigrating from upstream tributaries into the lower and Middle Clark Fork River is low.

Figure 6-1: Bull Trout redd counts in the Thompson River (Fishtrap Creek and West Fork Thompson River) and Middle Clark Fork River tributaries (North Fork and West Fork Fish Creek, and Rattlesnake Creek), 2000-2024.



Source: FWP, unpublished data.

Bull Trout were historically widely distributed throughout the Lower Clark Fork River drainage via connected habitats that included large lakes such as Lake Pend Oreille and Flathead Lake, and numerous tributaries (MTBRT 2000). Historically abundant fluvial and adfluvial populations of migratory Bull Trout have generally been reduced to resident fish because of mainstem dam construction that blocked upstream migrations and fragmented habitat. The FWS (2002) stated that the likelihood of extinction of a given stock of Bull Trout within the Lower Clark Fork River subbasin increased with the shift from larger, more migratory adfluvial populations present historically to smaller, more isolated resident populations of Bull Trout that are found in this reach of the Clark Fork today (FWS 2002).

After 15 years (2011-2025) of upstream fish ladder operations at the Project, Bull Trout ladder ascents varied from zero to five Bull Trout per year, averaging just under two Bull Trout per year. The annual number of Bull Trout recorded at the ladder, while very low, appears to be reflective of the very low numbers of Bull Trout present between Noxon Rapids Dam and Thompson Falls Dam.

Evidence for this conclusion comes from sampling conducted over a long period in the Project area. For example, the numbers of Bull Trout captured downstream of the Project via multiple sampling methods (angling, electrofishing, and fish trapping) over a 7-year period (1999-2006) resulted in one to seven Bull Trout captured per year (an average of 3.3 Bull Trout per year). Additional seasonal sampling via a small scale Denil fish ladder in the Project Main Channel Dam tailrace in 2001 and 2004 also found few Bull Trout in the area. In 2001 (March 21 – September 28), three Bull Trout out of 4,259 fish were collected in the Denil trap. In 2004 (March 16 – May 10), three Bull Trout out of 195 fish were collected at this trap.

Electrofishing downstream of the Project in the spring of 2011, 2012, and 2014 collectively sampled seven individual Bull Trout out of 2,222 fish handled. Bull Trout represented a small fraction of the fish community sampled each year with three Bull Trout sampled out of 1,109 fish in 2011, one Bull Trout out of 737 fish in 2012, and three Bull Trout out of 376 fish in 2014.

Upstream of the Project, 11 Bull Trout were collected during NorthWestern sampling efforts, 2009 to 2022. Spring electrofishing in Thompson Falls Reservoir captured six Bull Trout, one in the lower section and five in the upper section. Fall electrofishing in the Clark Fork River upstream of the confluence of the Thompson River in the above islands complex and Plains-to-Paradise reach captured five Bull Trout. Annual fall gillnetting in Thompson Falls Reservoir (starting in 2004) has never caught a Bull Trout.

Avista collects Bull Trout upstream of Lake Pend Oreille and downstream of Cabinet Gorge Dam. A fin clip from each Bull Trout is genetically tested to determine their natal stream so they can be transported to (or near) their tributary of origin. In some instances, Bull Trout captured as juveniles in their natal stream are returned to that stream, even if the genetic analysis does not concur. Avista has implemented the adult Bull Trout transport program since 2001. Transport of Bull Trout to Region 4, upstream of Thompson Falls Dam began in 2007. Between 2009 and 2023, Avista has transported an average 44 Bull Trout upstream of Cabinet Gorge Dam annually with an average of about 15 percent (7 Bull Trout) genetically assigned and transported to Region 4 (upstream of Thompson Falls Dam) each year.

Based on the numbers of Bull Trout collected below Cabinet Gorge Dam that are estimated to have outmigrated from Clark Fork River tributaries, it appears that the portion of the adfluvial population of Bull Trout originating from the Clark Fork drainage is relatively small. Between 2000 and 2024, Avista captured 331 adult Bull Trout at the Clark Fork Project that genetic testing identified as originating in tributaries upstream of Thompson Falls Dam. Of the 331 fish assigned to tributaries upstream of the Project, 70% (232/331) originated from the Thompson River, which flows into the Project reservoir. The other 99 adult Bull Trout were assigned to locations farther upstream within the basin as shown in **Table 6-1**. Other factors such as warm water temperatures, predators, and poor habitat conditions likely contribute to these low numbers of adult adfluvial fish below Thompson Falls Dam.

Table 6-1: Abundance and origination of adult Bull Trout collected by Avista at Cabinet Gorge Dam and transported to locations upstream of the Thompson Falls Project

Location	Minimum Distance from Thompson Falls Project (river miles)[a]	Abundance	% of Total
Thompson River	0	232	70%
Jocko River	52.4	38	11%
Middle Clark Fork River Tributaries	52.7	22	7%
Blackfoot River Tributaries	146.6	9	3%
Upper Clark Fork River Tributaries	146.6	30	9%

(Source Avista PIT Tag Database, June 4, 2025)

6.2.2 Bull Trout Collection at the Upstream Fish Passage Facility

Since the upstream fish passage facility at the Project opened in 2011, between one and five Bull Trout ascended the passage facility annually, except in 2018 and 2024 when there were none (NorthWestern 2023). During the 14 years of operation (2011-2024), 23 Bull Trout, representing 21 unique individuals, averaging 501 mm in length (range 285-620 mm), ascended the fish passage facility, an average of 1.6 Bull Trout per year.

Genetic testing of Bull Trout collected at the fish passage facility found that the natal streams for these fish were most likely tributaries upstream of Thompson Falls Dam (Region 4). Approximately 67 percent of the Bull Trout ascending the fish passage facility were genetically assigned to tributaries in the Thompson River drainage, 29 percent assigned to Fish Creek or its tributaries, and one fish assigned to a tributary to the Bitterroot River as their natal stream (**Table 6-2**).

Table 6-2: Summary of genetic assignments of Bull Trout ascending the Thompson Falls fish passage facility, 2011-2025.

Drainage	Most Like Genetic Assignment	Number of Bull Trout Ascend Fish Passage Facility	Year(s) Bull Trout Recorded Ascending Fish Passage Facility
Thompson River	Fishtrap Creek	9	Same fish in 2011 & 2012, 4 in 2013, 2 in 2015, 2016, same fish in 2021 & 2022
	West Fork Thompson River	5	2011, 2017, 2020, 2022, 2023
Fish Creek	Fish Creek	2	2013, 2014
	North Fork Fish Creek	3	2 in 2016, 2023
	West Fork Fish Creek	1	2015
Bitterroot River	Meadow Creek	1	2012

Prior to ascending the fish passage facility, three Bull Trout collected in the fish passage facility were captured and transported by Avista from downstream of Cabinet Gorge Dam upstream to Region 4, as follows:

- 1 Bull Trout was captured below Cabinet Gorge Dam twice (August 2015 & July 2017) and transported upstream to St. Regis (Middle Clark Fork River), before entering and ascending the fish passage facility in June 2019.
- 1 Bull Trout was transported by Avista from below Cabinet Gorge Dam in April 2020 to the Thompson River drainage and subsequently entered and ascended the fish passage facility twice, in May 2021 & April 2022.
- 1 Bull Trout was captured and transported from downstream of Cabinet Gorge Dam by Avista in May 2021 to the Thompson River and subsequently entered and ascended the fish passage facility in June 2022.

None of the other Bull Trout collected at the fish passage facility had a history of being transported from Lake Pend Oreille, but instead migrated from the Clark Fork River, upstream of Noxon Rapids Dam.

A remote PIT tag antenna array system was installed in the mainstem Thompson River in late September 2014 as well as in the tributaries, West Fork Thompson River in 2014 and Fishtrap Creek in 2015 (NorthWestern 2023). Since the installation of the Thompson River and tributary PIT tag antenna array system, 13 Bull Trout were released upstream of Thompson Falls Dam after ascending the ladder (2015-2023) and eight (62%) were subsequently detected in the Thompson River drainage.

Between 2011 and 2024, 13 Bull Trout were detected entering the ladder and did not ascend to the top holding pool. Nine of these fish were genetically assigned to natal tributaries in Region 4, Thompson River drainage (n=7) and South Fork Jocko River (n=1, same fish was detected in both 2023 and 2024). The other four fish were genetically assigned to natal tributaries in Region 3 (upstream of Noxon Rapids Dam and downstream of Thompson Falls Dam).

Seven Bull Trout that did not ascend the fish passage facility were previously captured downstream of Cabinet Gorge Dam by Avista, and transported to their respective stream assignment and Region, four tributaries in Region 3 (Graves and Prospect creeks) and Region 4 (Thompson River and South Fork Jocko River). A summary of these fish is provided in **Table 6-3.**

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Table 6-3: **Bull Trout detected entering Thompson Falls fish passage facility 2011-2024 but did not ascend.**

2011-2024	Bull Trout enter fish passage facility, not ascend	Count	Genetic Assignment	Year and Location of Transport from Below Cabinet Gorge Dam	Comment
2015	May	2	Thompson River (R4)	None	
		1	Thompson River (R4)	2013, Thompson River	
	June	1	Graves Creek (R3)	2015, Graves Creek	
		1	Rock Creek (R2) - but juvenile captured in Prospect Creek (R3)	2013, Prospect Creek	
2016	May & June	1	West Fork Thompson River (R4)	2014, Thompson River	
	September	1	Graves Creek (R3)	2013 and 2014, Graves Creek	
	October	1	Fishtrap Creek (R4)	None	**Ascended Ladder in April 2016,** returned downstream and entered ladder in October of the same year
2021	June	1	Graves Creek (R3)	2021, Graves Creek	
2023	June & September	1	South Fork Jocko River (R4)	2021, South Fork Jocko River	Detected in Prospect Creek July – Sep/Oct 2022 and 2023.
2024	May & June	1	Fishtrap Creek (R4)	2022, Thompson River	
	June	1	West Fork Thompson (R4)	2022. Thompson River	
	May & June	1	South Fork Jocko River (R4)	2021, South Fork Jocko River	Also detected in ladder entrance in 2023

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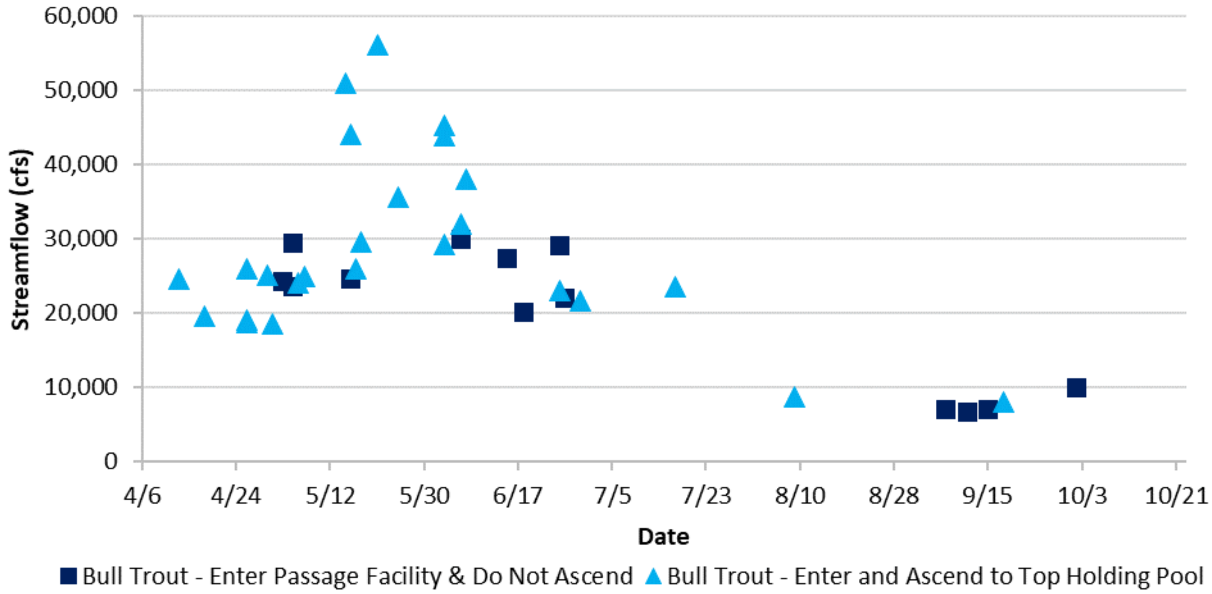
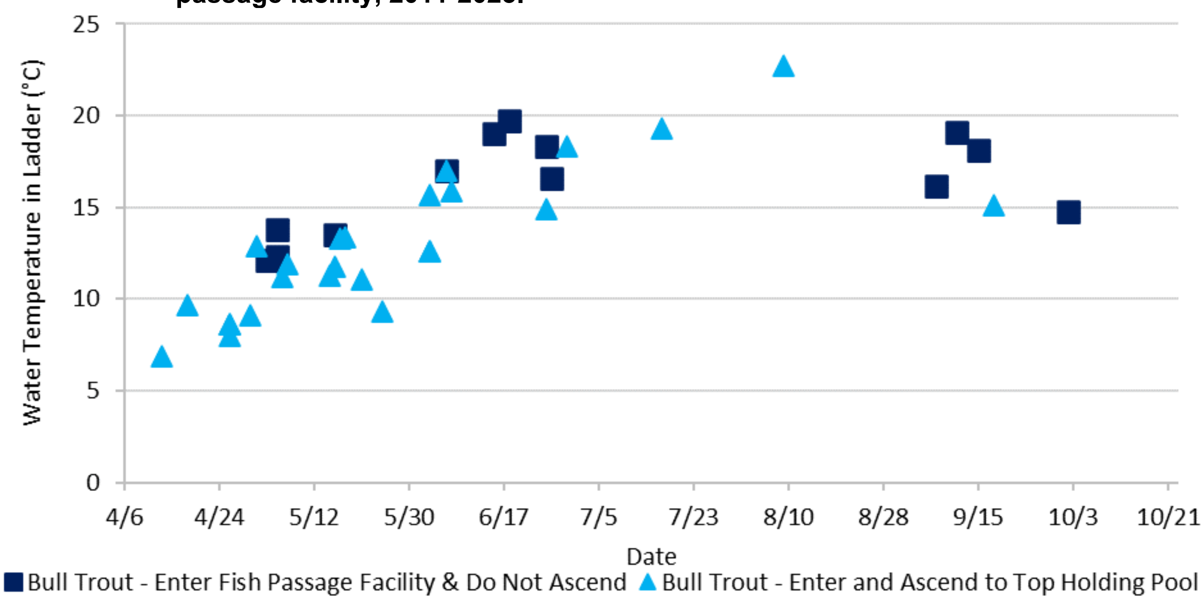
Since 2011, Bull Trout were documented entering the fish passage facility with river discharge ranging from 6,600 to 56,100 cfs and water temperatures ranging from ~ 6.9 to 22.7ºC. **Figure 6-2** and **Figure 6-3** show streamflow and water temperature data corresponding to when Bull Trout ascended to ladder and reached the holding pool (triangles) and when Bull Trout only entered the fish passage facility (detected in the lower pools or entrance) and did not ascend to the top. Note that some Bull Trout entered the ladder on multiple dates, thus the symbols in Figures 6-2 and 6-3 do not represent unique fish.

Figure 6-2: Mean daily Clark Fork River streamflow (USGS gage #12389000) corresponding to when Bull Trout were detected in the fish passage facility, 2011-2023.



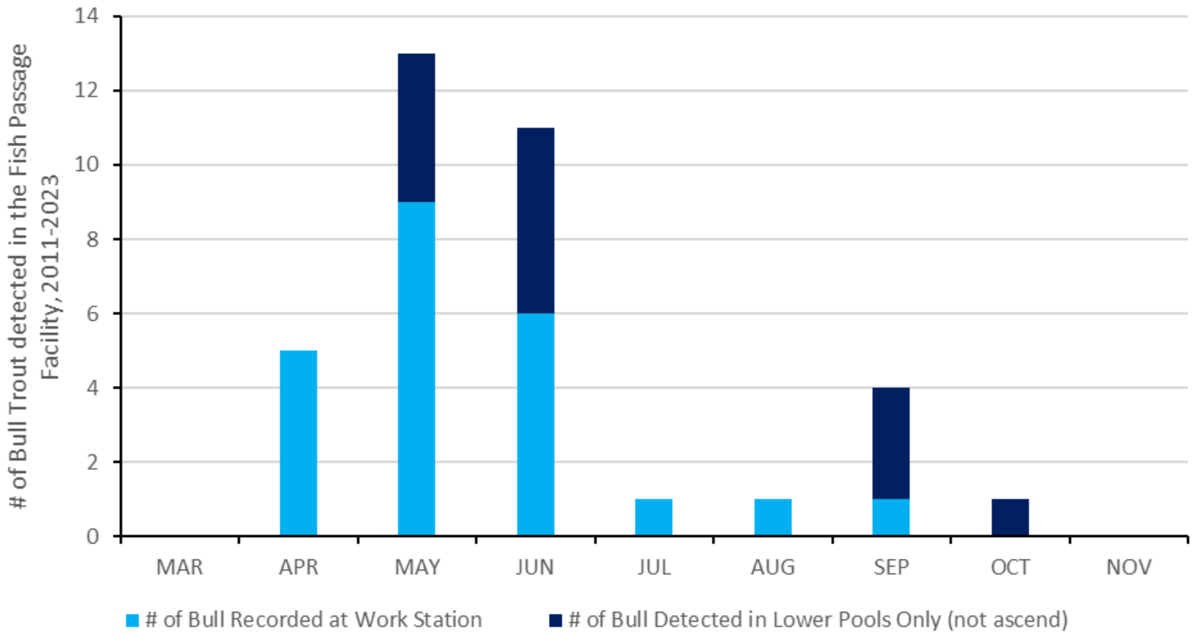
Note: USGS = U.S. Geological Survey

Figure 6-3: Water temperature in the ladder on dates when Bull Trout were detected in the fish passage facility, 2011-2023.



Based on data collected at the fish passage facility, the peak use by Bull Trout occurred between April and June (20 of 23 ascents). Streamflows were between 18,600 and 56,100 cfs, and water temperature ranged from 6.9 to 18.3°C. The majority of Bull Trout (17) ascended the fish passage facility during spill at the Main Channel Dam (streamflow > 23,000 cfs). Bull Trout were also recorded entering and ascending the fish passage facility once in July, August, and September. **Figure 6-4** summarizes the number of Bull Trout (with PIT tags) detected in the fish passage facility, 2011-2023.

Figure 6-4: Number of Bull Trout detected in the Thompson Falls ladder by month, 2011-2023.



6.3 Reservoir Habitat

Water temperature data collected in Thompson Falls Reservoir indicate that the reservoir does not stratify and is generally thermally homogeneous (NorthWestern 2019b). The cool water influence of the Thompson River only extends downstream in Thompson Falls Reservoir a short distance, ~ 100 meters (m) downstream of the Thompson River confluence and 15.2 m from the right bank. Additional water temperature data indicate there may also be some cool water potentially from groundwater inflow, near Cherry Creek, ~ 3.2 kilometers downstream from the Thompson River. However, these small areas of cool water do not extend throughout the reservoir but appear to be highly localized. It does not appear that there are large cool water zones in Thompson Falls Reservoir that could be used by Bull Trout as a migratory corridor through the reservoir upstream to Thompson River (NorthWestern 2019b). Discrete locations at the mouths of Cherry Creek and Thompson River have been identified as small areas where these cold-water inputs likely provide refuge as Bull Trout move throughout the reservoir. However, these appear to be small areas that do not have much influence on overall temperatures within the reservoir.

The data also indicate that Thompson Falls Reservoir has a short retention time (~8 hours) (PPL Montana 2011). This is consistent with the finding that the reservoir does not stratify. The habitat in the reservoir is intermediate between lentic and lotic habitat type.

Fall gillnetting sampling collected annually since 2004 have recorded 16 species in the Thompson Falls Reservoir (NorthWestern 2023). The number of salmonids found in Thompson Falls Reservoir in general is quite low. Rainbow Trout have been found more commonly than Brown or Westslope Cutthroat Trout, but Rainbow Trout were still very uncommon, averaging 0.1 fish per net (NorthWestern 2023, 2019b). On average the most common species in Thompson Falls Reservoir (2004-2022) are Black Bullhead (average 3.1 fish per net) and Northern Pike (average 2.7 fish per net) (NorthWestern 2023). The reservoir is primarily habitat for native non-game species and non-native species.

Bull Trout appear to use Thompson Falls Reservoir as a migratory corridor, but no specific migratory pathway has been defined due to the lack of data and few fish. No Bull Trout were sampled during fall gillnetting, but one Bull Trout was sampled during a spring sampling event in 2009 during a Northern Pike study (PPL Montana 2010). A juvenile Bull Trout was found in a Northern Pike (captured in the Island Complex area) stomach during a 2009 food habits study indicating that there is some risk of non-native species predation on juvenile Bull Trout (PPL Montana 2010). However, a multi-year study in 2014-2015 on outmigration of juvenile Bull Trout out of the Thompson River drainage and into the Thompson Reservoir did not identify non-native predation as a critical limiting factor (Glaid 2017). Therefore, NorthWestern has not implemented any non-native species suppression measures in Thompson Falls Reservoir because the efficacy of such a program for the purpose of Bull Trout restoration seems unlikely.

6.4 Bull Trout Downstream Migration

Outmigration of subadult Bull Trout from tributary streams has been commonly reported to have a bimodal (spring and fall) pattern (Lacy et al. 2016; Downs et al. 2006; Muhlfeld and Marotz, 2005). Avista (Lacy et al. 2016) documented juvenile Bull Trout downstream movement out of Graves Creek occurring primarily in the fall (September – November) with a second smaller movement recorded in early May. Downs et al. (2006) studied juvenile Bull Trout movement in Trestle Creek, Idaho and found that outmigration of juveniles occurred in two pulses, one in spring that was associated with snowmelt runoff and increasing water temperatures and a second in fall as stream temperatures dropped and fall rains began. This trend was also documented in the Upper Flathead River system by Muhlfeld and Marotz (2005).

In the Thompson River drainage, juvenile Bull Trout were found to outmigrate in the fall (Glaid 2017). In the Thompson River, weir traps placed in Fishtrap Creek, tributary of the Thompson River, found peak catch of downstream moving Bull Trout (≤ 300 mm) occurred during October. In the West Fork Thompson River, peak catch of downstream moving Bull Trout (≤ 300 mm) in weir traps also occurred primarily during October (Kreiner and Terrazas 2018). However, weir traps are difficult to maintain in high flow conditions, and weir trapping efforts were limited during spring runoff (Liermann 2003; Liermann et al., 2003).

Glaid (2017) found few subadult Bull Trout emigrated from the tributaries into the mainstem Thompson River or from the tributaries to Thompson Falls Reservoir. Glaid (2017) tracked 14 radio-tagged Bull Trout for 78 days between September 24 and December 22, 2015. None of the radio-tagged fish were documented leaving the Thompson River drainage and only one was recorded at the remote array station on the mainstem Thompson River near the confluence with the Clark Fork River. Radio-tagged Bull Trout from Fishtrap Creek and West Fork Thompson River did not intermix and four of the radio-tagged fish were casualties of mink predation.

The majority of Bull Trout outmigration from the tributaries occurred at night between 9:00 PM and 8:00 AM (Glaid 2017). Bull Trout movement out of the tributaries peaked in October and outmigration of the Thompson River peaked in December. Size of Bull Trout tagged in the tributaries were not a strong predictor of outmigration and abiotic factors were weakly associated with outmigration.

Glaid's (2017) study found sub-adult Bull Trout spend prolonged periods in the mainstem Thompson River and shows the importance of the mainstem Thompson River for overwintering habitat and potentially prolonged residency (Glaid 2017). The study also identified mink predation as a potential risk to Bull Trout. Monitoring data show there was the lack of intermixing between Fishtrap Creek and West Fork Thompson River sub-adult Bull Trout in the mainstem Thompson River and Glaid (2017) questioned if potential "habitat bottlenecks" are associated with predation and/or human-instigated habitat degradation.

Of the 746 subadult Bull Trout that have been tagged in tributaries to the Thompson River between 2014 and 2018, 51 (6.8%) have been detected at the mainstem Thompson River PIT tag array. A higher percentage of West Fork Thompson River subadult Bull Trout have been detected at the Thompson River PIT tag array (11.3 %) than Fishtrap Creek subadult Bull Trout (4.7%).

The 2008 FWS BO for the Thompson Falls Project estimated that at least 10 percent and perhaps as much as 25 percent of juvenile Bull Trout in the Thompson River drainage outmigrate to the Thompson Falls Reservoir and pass downstream of the project. Based on this estimated percentage of outmigration, the 2008 BO estimated that between 234 and 585 juvenile Bull Trout from the Thompson River migrate downstream through Thompson Falls Dam. Recent data collection from 2014 through June 2019 (Glaid 2017; Kreiner and Terrazas 2018) indicate that the adfluvial life history form is currently less abundant than expected. To date, based on recent tagging studies, the percentage of juvenile Bull Trout found to outmigrate from the Thompson River drainage is less than 7 percent (NorthWestern 2019b).

Kreiner and Terrazas (2018) noted in their report that,

> The proportions of Bull Trout detected leaving the tributaries and the mainstem indicates that conservation actions intended to benefit reservoir-utilizing Bull Trout (e.g., Northern Pike suppression, trap and transport) would only benefit a small percentage of Bull Trout in the Thompson River. Instead, conservation actions intended to benefit Thompson River Bull Trout should focus first on perceived problems within the Thompson River basin, before actions downstream are considered. An adfluvial form of Bull Trout was perhaps more common prior to dam construction, as migratory life histories can be suppressed due to man-made barrier construction (Nelson et al. 2002, Schmetterling 2003). However, given the current physical habitat limitations in the Clark Fork River, focus should be placed on conserving populations and improving conditions within vital tributary networks such as the Thompson River.

6.5 Downstream Survival

6.5.1 Non-native Species Predation

Bull Trout appear to use Thompson Falls Reservoir as a migratory corridor, but no specific migratory pathway has been defined due to the lack of data on these rare fish. The number of salmonids found in Thompson Falls Reservoir in general is quite low (NorthWestern 2023). The Reservoir is primarily habitat for native non-game species and non-native species including Black Bullhead and Northern Pike.

A juvenile Bull Trout was found in a Northern Pike (captured in the Island Complex area) stomach during a 2009 food habits study indicating that there is some risk of non-native species predation on juvenile Bull Trout (PPL Montana 2010). However, a multi-year study (2014-2015) on outmigration of juvenile Bull Trout out of the Thompson River drainage and into the Thompson Reservoir did not identify non-native predation as a critical limiting factor (Glaid 2017). Therefore, NorthWestern has not implemented any measures to attempt to suppress non-native species in Thompson Falls Reservoir because the efficacy of such a program for the purpose of Bull Trout restoration seems unlikely.

6.5.2 Fallback

There is little consistency with fallback reporting in literature (Frank et al. 2009). The type of movement associated with fallback, the temporal time frame when fallback occurs, and species evaluated vary greatly in the literature. The concerns and causations of fallback also vary and can range from adverse effects to fish movement and behavior related to the fishway experience, post-tagging issues, location of a fishway exit, etc. (Frank et al. 2009; Boggs et al. 2004; Reischel and Bjornn 2003). The Biological Opinion for the Project, issued in 2008, included a requirement to monitor the number of Bull Trout fallback after their passage upstream.

Data for Bull Trout following release upstream of the dam is limited to PIT tag array detections. The ability to determine fallback of Bull Trout is limited to whether a Bull Trout is recaptured (e.g., angling, array detection) downstream. Available data indicate concerns about Bull Trout being swept downstream or disoriented after released upstream is not common. Following the installation of the Thompson River PIT Tag array system (late-September 2014), 13 Bull Trout were recorded ascending the ladder and released upstream (2015-2023). Over half (8 fish) were later detected in the Thompson River with six fish genetically assigned to the Thompson River and the other two assigned to North Fork Fish Creek, located about 100 river miles upstream of Thompson Falls Dam.

Movements following release upstream from the dam indicate Bull Trout are able to make deliberate upstream and downstream migrations and fallback has not been identified as an issue or common occurrence. For example, two Bull Trout were detected entering the Thompson River drainage and tributary Fishtrap Creek in 2 consecutive years. One Bull Trout remained upstream of Thompson Falls Dam for the 2 years (2017-2018) and the second Bull Trout ascended the ladder 2 consecutive years (2021-2022) (NorthWestern 2019b, 2023). Another example was a Bull Trout that ascended the ladder in May 2016 (genetically assigned to North Fork Fish Creek) and was later detected the same year in the Thompson River in September. This individual was detected 1-year later (in September 2017) ~ 8 miles downstream of Thompson Falls Dam in Graves Creek.

At this time, fallback evaluated over a 30-day period does not appear to be an issue at Thompson Falls Dam (NorthWestern 2019b). Bull Trout (or other species) are not immediately swept downstream (from disorientation or energy use) after their release upstream. There is no evidence that fallback is impeding the successful passage of Bull Trout. Disorientation after fish ascend the ladder and are released upstream of Thompson Falls Dam does not appear to be an issue.

6.6 Limiting Factors for Bull Trout

The primary limiting factors for Bull Trout are disconnected habitat (e.g., large dams, diversion structures), elevated stream temperatures, impaired and channelized stream channels (reduced habitat complexity and stability), and competition and negative interactions with nonnative species (FWS 2015). The adfluvial migratory Bull Trout life history in the Clark Fork River basin was significantly affected by the development of the three dams on the Lower Clark Fork River. Connected habitat from Lake Pend Oreille, Idaho upstream to the Clark Fork River drainage and lower Flathead River was disconnected for migratory Bull Trout with the construction of Thompson Falls Dam in 1915, Cabinet Gorge Dam in 1952 and Noxon Rapids Dam in 1959. Upstream fish passage at these dams has been limited until recent times.

Avista Corporation (Avista) owns and operates Cabinet Gorge and Noxon Rapids dams and facilitates an adult Bull Trout transport program at Cabinet Gorge Dam (started in the early 2000s). Avista finished construction of a new fish trap facility below Cabinet Gorge Dam in 2022 that is designed to operate from the first of April through mid-October and at Lower Clark Fork River flows of 52,000 cfs or less (Bernall and Cabinet Gorge Dam Fish Passage Facility Subgroup 2021). The goal of the fish trap facility is to attract and capture Bull Trout and Westslope Cutthroat Trout that meet upstream transport criteria (Bernall and Cabinet Gorge Dam Fish Passage Facility Subgroup 2021). However, no fish passage occurs at Noxon Rapids Dam. NorthWestern's Thompson Falls upstream fish passage facility began annual seasonal (March – October) operation in 2011.

Summer stream temperatures in the mainstem Lower Clark Fork River exceed 15°C, creating suboptimal conditions for Bull Trout. FWS (2015) indicates the high summer water temperatures in the Lower Clark Fork River are due in part to the discharge of warm water into the lower Flathead River below SKQ Dam. However, the Middle Clark Fork River water temperatures also exceed preferred temperatures annually during July and August for Bull Trout (CH2M Hill and The Clark Fork and Blackfoot, LLC 2004). During periods of high-water temperatures, Bull Trout are found in the Middle Clark Fork River in thermal plumes of cold-water tributaries or groundwater inflow areas (Swanberg 1997, Peters 1983).

Fragmented habitat, elevated stream temperatures during the summer months, and introduction of nonnative species adversely affect Bull Trout in much of the Clark Fork River basin. Many nonnative species present in the Lower Clark Fork River (e.g., Smallmouth Bass, Largemouth Bass [*Micropterus salmoides*], Northern Pike, and Brown Trout) are piscivorous and likely prey upon juvenile Bull Trout (FWS 2015). Other nonnative species such as Brown Trout and Brook Trout *(Salvelinus fontinalis*) compete with Bull Trout for resources and space, adversely affecting Bull Trout fitness and reproductivity. Brook Trout specifically threaten Bull Trout through hybridization (FWS 2015).

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7.0 Effects of the Proposed Action

7.1 Bull Trout Direct and Indirect Effects

Anticipated direct and indirect effects to Bull Trout from proposed changes to operations are analyzed in the following text.

7.1.1 Proposed Project Operations

Thompson Falls Reservoir Habitat

Thompson Falls Reservoir serves as a migratory corridor for adult Bull Trout moving upstream to spawning and rearing tributaries and for juvenile/subadult and adult Bull Trout outmigrating downstream to rearing habitats. Data from the PIT tag arrays show fish generally move upstream and out of the reservoir within about 1 day following release upstream of the dam (after ascending the ladder). Fish surveys indicate salmonids and Bull Trout do not spend much time in the reservoir.

The proposed action includes in-water work as part of significant site improvements at Wild Goose Landing Park. Upgrades to the boat launch and bank stabilization measures could have minor, short term effects on reservoir habitat during construction. NorthWestern will obtain all required state and federal permits and authorizations and implement applicable best management practices related to erosion and sediment control.

Water Temperature

In 2019 and 2021, NorthWestern measured water temperature throughout the Project area to characterize the existing thermal regime of the reservoir, its inputs and outputs (*refer to* Exhibit E Section 6.7.3 for more details, NorthWestern 2023c). The temperature evaluation found water temperature is consistent from upstream to downstream of the Project (NorthWestern 2022c). The evaluation also found that while the Clark Fork River temperatures remained relatively stable among upstream and downstream sites, the Thompson River was significantly cooler than the Clark Fork River. The cool water influence of the Thompson River extends downstream in Thompson Falls Reservoir a short distance, ~ 328 feet downstream of the Thompson River confluence and 50 feet from the right bank. The salmonid fishery in Thompson Falls Reservoir appears to be concentrated at the mouths of the Thompson River and Cherry Creek, as reported by anglers (Terrazas and Kreiner 2017). These confluence areas have cooler water temperatures from the inflow of the cool tributaries and are thus more conducive to summer use by salmonids.

Summer water temperature in the Clark Fork River often exceeds the optimal threshold of 15°C for Bull Trout (Fraley and Shepard 1989). The habitat in the reservoir is more conducive to nonnative species tolerant of warmer water temperatures and slower moving water. The proposed operations allowing for the Thompson Falls Reservoir to fluctuate 2.5 feet below full pool is not anticipated to modify water temperatures in the Project area, nor alter cool water refugia provided at the confluence of Thompson River or Cherry Creek.

Stranding

The proposed action is to operate the Project to provide baseload and flexible generation, limited to the top 2.5 feet of the reservoir from full pool, under normal operations. An Operations Study conducted in 2021 and 2022 to evaluate the potential effect of flexible generation did not observe any adverse effects to Bull Trout or Bull Trout critical habitat. Some fish stranding in the reservoir of Black Bullhead, Largemouth Bass, Smallmouth Bass, Yellow Perch, Northern Pikeminnow, and Pumpkinseed was observed during the 2021 study when reservoir elevations were 2,395.0 feet or less (NorthWestern 2022b). No fish stranding was observed during the Operations Study in 2022, when reservoir elevations were 2,395.7 to 2,395.8 feet. No stranded salmonids were observed at any of the elevations tested during the Operations Study (NorthWestern 2023b).

Tributary Access

The Thompson River, a key Bull Trout spawning and rearing tributary, remains connected and accessible to fish during all proposed operation reservoir levels (NorthWestern 2022b, 2023b). Prospect Creek, a Bull Trout spawning and rearing tributary located immediately downstream of Main Channel Dam remains accessible during all proposed operation levels.

Total Dissolved Gas

Total Dissolved Gas (TDG) upstream of the Thompson Falls Project, measured in the forebay, is generally between 100 and 108 percent of saturation regardless of river flow (NorthWestern 2019a and NorthWestern 2023). During the time periods when the spillways are not in use, TDG as measured at the Birdland Bay Bridge is generally equal to or slightly less than the TDG measured above the dams (PPL Montana 2010).

When river discharge exceeds the capacity of the powerhouses, flow passes over the spillways, then passes over the natural falls, adding TDG at both points. During peak discharge time periods, when spill over the Project’s dams exceeds 60,000 cfs, TDG exceeds 120 percent at the High Bridge, which is downstream of the Main Channel Dam but upstream of the powerhouses’ tailrace channels.

TDG dissipates downstream of the High Bridge. In addition, low TDG water from the powerhouses mixes with higher TDG water that has passed over the spillways and falls. Therefore, TDG is lower at the Birdland Bay Bridge than it is at the High Bridge.

During times of spill, NorthWestern operates the Project as outlined in the TDG Control Plan. The TDG control plan balances operations to attract fish to the Fish Passage Facility while minimizing the entrainment of dissolved gas in order to minimize impacts to aquatic organisms downstream.

The previous licensee initially developed the TDG Control Plan in 2010 and NorthWestern updated the plan in 2024 to incorporate data from TDG relicensing studies undertaken between 2019 and 2023. The studies focused on conditions following the installation of two new radial gates on the Main Channel Dam in 2018. Operation of the two new radial gates reduces downstream TDG by increasing spill capacity at the Main Channel Dam. This reduces the frequency of stanchion trip events during periods of high spring runoff. Following these events, NorthWestern has found that TDG entrained at the Project increases by 5% following the tripping of stanchions due to the increased orifice area through the spill bays (NorthWestern 2024).

Previous investigations in 2008, 2009, 2011, 2012, and 2014 sampled 2,080 fish and identified Gas Bubble Trauma (GBT) in 0.4 to 9 percent of fish sampled per year. Results found little GBT symptoms at any discharges in adult fish. Furthermore, fish captured at the upstream fish passage facility have not exhibited signs or symptoms of GBT during the 15 years of operation.

The proposed action will benefit the management of TDG production at the Project by incorporating the two new radial gates into the operational sequence resulting in the reduced frequency of tripping stanchions and associated elevated TDG entrained at the Project. In effect, this will limit any increase of GBT on fish, including Bull Trout, downstream of the dams or powerhouse.

7.1.2 Upstream Migration

Since 2011, the Thompson Falls Upstream Fish Passage Facility provides seasonal fish passage between March and October. During high flows (exceeding ~ 56,000 cfs), the ladder is temporarily shut down until flows decline, debris can be removed, and the ladder is safe to operate again. Bull Trout entering and ascending the passage facility most often are detected during the spring and during higher flows when the facility is operating at its upper limits or closed due to flows/debris. During spring flows, the facility has not consistently operated thus potentially preventing access for upstream migrating Bull Trout.

The 9-year Comprehensive Phase 2 Report (NorthWestern 2019b) did not find evidence indicating adult migrating fish are delayed in their migration through the Thompson Fall Reservoir. Approximately 25 percent of 638 PIT-tagged fish between 2014 and 2018 (635 salmonids, 3 non-salmonids) released upstream from Thompson Falls Dam (after ascending the passage facility) migrated upstream and were detected in the Thompson River within 24 hours, 62 percent took less than 10 days to make the journey.

Upstream fish passage averages 1.6 Bull Trout per year at the Thompson Falls Project (2011-2024) and is likely not attracting all potential Bull Trout in the Zone of Passage (ZOP). Assuming NorthWestern's 2021-2023 radio telemetry study using Rainbow and Brown trout as a surrogate species for Bull Trout to represent the efficiency to attract Bull Trout to the fish passage facility entrance, an estimated 29 to 41 percent of the potential four to six individual Bull Trout in the ZOP enter the facility.

Proposed operations of the reservoir are unlikely to impact the ability of Bull Trout to utilize the fish passage facility. NorthWestern plans to engineer a solution to mitigate any potential operational limitations of the facility when reservoir levels are less than 2,394.2 feet (≥ 2.3 feet from full pool). NorthWestern does not propose to utilize the full 2.5 feet of reservoir elevation in its proposed flexible generation during the operating season for the upstream fish passage facility until the engineered solution has been constructed and put into operation.

7.1.3 Effectiveness of the Fish Passage Facility

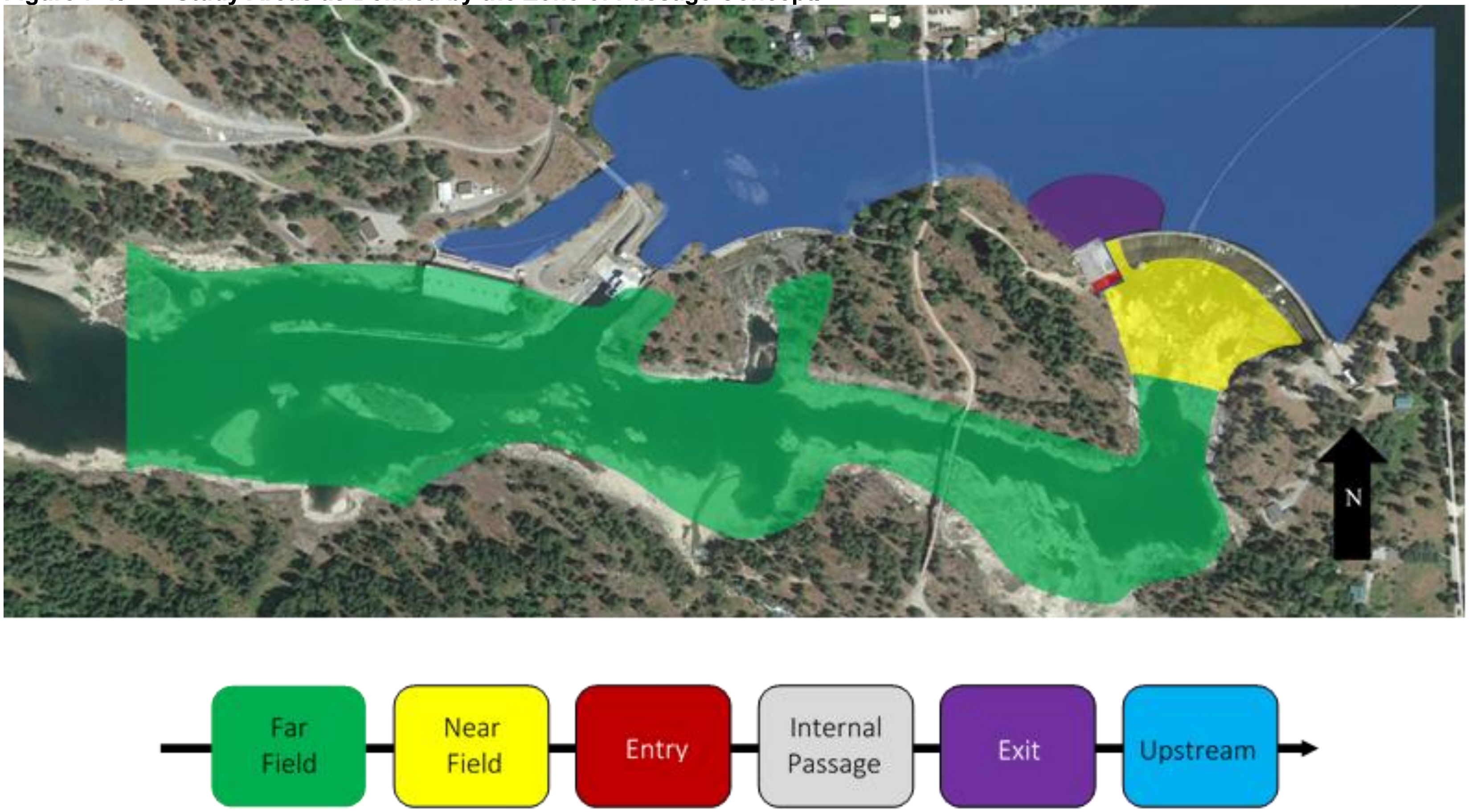
A radio telemetry study using Rainbow (*Onchorhynchus mykiss*) and Brown trout as surrogates for Bull Trout was completed in 2021, 2022, and 2023 (NorthWestern 2022a, 2023a, 2023d). Rainbow Trout are spring spawners migrating upstream during the spring months, which overlaps the same period when Bull Trout have been observed entering fish passage facility or known to start moving upstream to spawning tributaries. Brown Trout are fall spawners migrating upstream during the fall months, another period when Bull Trout have been observed moving upstream. Rainbow Trout provide insight to movement during spring conditions compared to movement and fish behavior of Brown Trout during fall conditions. The two trout species are available for sampling and provide a method to better understand upstream fish passage efficacy as a surrogate for movement timing related to Bull Trout.

The 3-year study focused on the movement of radio-tagged fish from the Thompson Falls original powerhouse upstream to the fish passage facility entrance at the Main Channel Dam, a 0.75--mile section of the Clark Fork River. The study evaluated upstream fish movement *via* radio telemetry[2] through the Project's Zone of Influence[3] which is defined by the ZOP concept (FWS 2017). The ZOP concept defines discrete areas for analysis of the pathway fish use to move through the influence of the Project. These areas include far field, near field, entry, internal fish passage facility, exit, and upstream (**Figure 7-1**).

[2] Radio telemetry uses individually coded tags which transmit radio waves which can be detected with receivers mounted on shore.

[3] Zone of Influence means an area within which there are positive or negative effects as a result of the Project.

Figure 7-1. Study Areas as Defined by the Zone of Passage Concept.



Notes:
Figure not to scale.
Far Field = Downstream of fish passage facility/dam where the Powerhouse and spill serve as primary attraction to migrating fish.
Near Field =In proximity to fish passage facility where fish passage facility attraction flow may lure fish to entrance.
Entry = Immediately downstream of entrance channel/gate where fish passage facility discharge dominates hydraulics/velocity field/fish behavior.
Internal Passage = Hydraulics, structure, and fish movement with the fish passage facility (i.e., entrance channel, pools, trap, exit channel).
Exit = Immediate upstream of the fish passage facility exit gate/exit channel where inflow into fish passage facility dominates hydraulics/velocity field/fish behavior.
Upstream = Beyond the influence of the fish passage facility into the reservoir/impoundment.
Source: Scientific Panel 2020.

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A total of 100 trout (Rainbow and Brown) were tagged over the 3 years of study. In 2021, 16 trout were tagged: seven Rainbow Trout and six Brown Trout in June, and three Brown Trout in late September and early October. In 2022, 54 trout were tagged: 29 Rainbow Trout and eight Brown Trout in March, and 17 Brown Trout in September. In 2023, 30 Rainbow Trout were tagged in March and April, and their movements were monitored through July 31, 2023.

Over the 3 years of study, 95 percent of fish collected, tagged, and transported downstream for release at Flatiron FAS were later detected in the far field. This includes fish collected and tagged in March, June, September, and October; fish of both species (Rainbow and Brown trout); and fish collected by electrofishing and at the fish passage facility. These data indicate that handling or tagging mortality was low or none during the study. The data also support the assumption that tagged fish were motivated, at some level, to move upstream. The study methodology was effective in generating information on fish movement in the study area.

A summary of the fish studied in 2021, 2022, and 2023, including the month and year of tagging, species, total number radio tagged, percentage and number of radio-tagged fish detected in the far field, near field, and fish passage facility entrance, is provided in **Table 7-1**.

Table 7-1: Summary of the Rainbow and Brown Trout Detected in 2021, 2022, and 2023.

Collection Time	Spp.	Total Tagged	% (#) in Far Field	% (#) in Near Field	% (#) Ladder Entrance	% (#) Ladder Ascent
Jun '21	RB	7	100 (7)	14 (1)	-	-
	LL	6	100 (6)	50 (3)	33 (2)	17 (1)
Sep/Oct '21	LL	3	100 (3)	33 (1)	33 (1)	33 (1)
2021 Total RB & LL		**16**	**100 (16)**	**31 (5)**	**19 (3)**	**13 (2)**
Mar '22	RB	29	100 (29)	86 (25)	48 (14)	45 (13)
	LL	8	100 (8)	88 (7)	38 (3)	25 (2)
Sep '22	LL	17	94 (16)	35 (6)	24 (4)	12 (2)
2022 Total RB & LL		**54**	**98 (53)**	**70 (38)**	**39 (21)**	**31 (17)**
Mar & Apr '23	RB	30	87 (26)	63 (19)	43 (13)	37 (11)
2021-2023	**RB**	**66**	**94 (62)**	**68 (45)**	**41 (27)**	**36 (24)**
2021-2022	**LL**	**34**	**97 (33)**	**50 (17)**	**29 (10)**	**18 (6)**
Total ALL Years RB & LL		**100**	**95 (95)**	**62 (62)**	**37 (37)**	**30 (30)**

Notes: % = percentage; # = number of fish detected; LL = Brown Trout; RB = Rainbow Trout.

The results of the study indicate fish are motivated to move upstream and readily, unimpeded, and quickly access the ZOP following release. Rainbow Trout data represents three seasons (2021-2023), and Brown Trout data represents two seasons (2021-2022). Of the 66 radio tagged Rainbow Trout, 62 (94%) were later detected in the far field. Of the 34-radio tagged Brown Trout, 33 (97%) were later detected in the far field.

However, not all fish detected in the far field proceeded to the near field. Of the 95 fish that were detected in the far field, 73 percent of the radio-tagged Rainbow Trout (45 fish) and 52 percent of radio-tagged Brown Trout (17 fish) made a foray to the near field. The proportion of radio-tagged Rainbow Trout continuing to make the foray to the near field was greater in 2022 (86%) than in 2023 (73%) and in 2021 (14%). The time of fish collection may have been a factor in the proportion of fish that moved upstream into the near field. In contrast to 2021, when Rainbow Trout were tagged and transported in June and only one (of 7 fish) was detected in the near field, 75 percent of the 59 Rainbow Trout radio-tagged in March/April in 2022 and 2023 were detected in the near field.

Of the 45 Rainbow Trout that were detected in the near field in 2021, 2022 and 2023, 27 (60%) were detected in the fish passage facility entrance. Brown Trout results from 2021 and 2022 recorded 59 percent of the fish detected in the near field entering the fish passage facility. Annually, the percentage of Rainbow Trout detected in the near field continuing into the fish passage entrance was 0 percent in 2021, 56 percent in 2022, 68 percent in 2023. Annually, the percentage of Brown Trout detected in the near field continuing into the fish passage entrance was 75 percent in 2021 and 54 percent in 2022.

In total, over the 3-year study, 27 (41%) of the 66 radio tagged Rainbow Trout and 10 (29%) of 34 radio-tagged Brown Trout were detected at the fish passage facility entrance. Detections of Rainbow Trout at the fish passage facility entrance were similar in 2022 and 2023 (when fish collection occurred in March/April), 48 and 43 percent, respectively compared to 2021 when no Rainbow Trout entered the fish passage facility entrance. Detections of Brown Trout at the fish passage facility entrance were similar in 2021 and 2022, 33 and 28 percent, respectively.

The two areas where Brown and Rainbow trout congregated the most were near the mouth of Prospect Creek and along the right side of the Main Channel Dam, near the upstream fish passage facility. Most fish moved up the main section of the channel and did not concentrate near the Original Powerhouse or the New Powerhouse, although some fish were detected for short periods of time in these locations before moving further upstream.

Rainbow Trout were observed utilizing many locations in the ZOP; however, in the near field, Rainbow Trout concentrated within the Main Channel Dam Right (MDR) zone near the fish passage facility entrance during March and April. Rainbow Trout utilization of the Main Channel Dam area showed three Rainbow Trout in the Main Channel Dam Left (MDL) zone prior to moving to the MDR zone and greater use of the MDL zone prior to spill in 2023 than in 2022. Rainbow Trout presence in the ZOP was greatest during the spring months in both the far and near field before tapering off rapidly when runoff occurred in May and June and then with few detections into the summer and fall months.

There was no consistent holding area observed for Brown Trout in the ZOP during the spring and summer months. Peak activity in the ZOP and upstream movement into the fish passage facility occurred in the fall.

Additional investigations using submersible PIT antenna were conducted during the 2024 and 2025 fishway operation season. The objective of this study was to gain further insight into fine-scale fish movements and enhance the findings of the radio telemetry work described above. Using PIT tags allows for a larger sample size of fish and greatly reduces impacts on fish behavior that may be caused by more intrusive surgery of implanting radio tags.

One six-foot antenna and three 3-foot antennas were purchased and deployed downstream of the Main Channel Dam in multiple locations. The circular antennas are operated on a battery and detect PIT tagged fish within approximately 2-3 feet from the antenna. Antennas are placed on the river bottom and tethered with a buoy or to the shore for retrieval. The two seasons of operating the submersible antennas have shown promise in the technique to evaluate fish movement in the far field, near field, and within the fishway. Exact locations of submersible antennas continue to be refined to maximize fish detections in the far and near fields and determine when antennas must be removed during periods of spill at the Project. Final reports for the two years are in draft form, but data tables presented here are final (**Table 7-2** and **7-3**).

Table 7-2: 2024 Detections of PIT tagged fish in submersible array study.

Species	Total Detections at any PIT Array	% (#) in Far Field	% (#) in Near Field	% (#) Ladder Entrance	% (#) Lower Pools	% (#) Ascend Ladder
BULL	**3**	100% (3)	33% (1)	100% (3)	33% (1)	33% (1)
LL	**4**	25% (1)	-	75% (3)	50% (2)	50% (2)
LN SU	**2**	-	100% (2)	-	-	-
LS SU	**69**	29% (20)	61% (42)	71% (49)	30% (21)	29% (20)
N PMN	**2**	-	100% (2)	50% (1)	-	-
RB	**1**	100% (1)	-	-	-	-
WCT	**1**	-	100% (1)	-	-	-
Total	**82**	30% (25)	59% (48)	68% (56)	29% (24)	28% (23)

Table 7-3: 2025 Detections of PIT tagged fish in submersible array study.

Species	Total Detections at any PIT Array	% (#) in Far Field	% (#) in Near Field	% (#) Ladder Entrance	% (#) Lower Pools	% (#) Ascend Ladder
BULL	1	100% (1)	100% (1)	100% (1)	100% (1)	-
LL	39	36% (14)	87% (34)	69% (27)	56% (22)	41% (16)
LN SU	4	50% (2)	-	50% (2)	-	-
LS SU	90	44% (40)	51% (46)	84% (76)	61% (55)	34% (31)
MWF	1	100% (1)	-	-	-	-
N PMN	10	50% (5)	70% (7)	60% (6)	30% (3)	30% (3)
RB	33	36% (12)	64% (21)	76% (25)	64% (21)	64% (21)
WCT	2	50% (1)	100% (2)	100% (2)	100% (2)	50% (1)
Total	**180**	**42% (76)**	**62% (111)**	**77% (139)**	**58% (104)**	**40% (72)**

Comparing fish movement results from the telemetry study to the initial submersible PIT study may not be appropriate. The total number of radio-tagged rainbow and brown trout were known in the telemetry study whereas the number of PIT tagged fish in the far and near fields was not known for the submersible study. Only those fish detected by any one of the submersible antennas were known to be in the near or far field areas. The greatest value in comparing radio telemetry data to PIT tag data is the proportion of fish at the ladder entrance and those that ascended the ladder. The submersible PIT array study shows a greater percentage of Brown and Rainbow Trout detected at the fishway entrance and ascending the fishway (**Table 7-2 and 7-3**) compared to the telemetry study.

Additional insight into other species is also presented in **Table 7-2 and 7-3**. As sample sizes increase, confidence in results will further the knowledge in how fish are behaving in the far and near fields and within the fishway.

The telemetry data, and the computational fluid dynamics (CFD) modeling data, provide insight into fish passage conditions at flows at or exceeding the high design streamflow (48,000 cfs) for the fish passage facility. The data indicate that, during spill at the Main Channel Dam, the detection of fish in the ZOP was limited to a few individuals. Rainbow Trout were very active in the ZOP from March through May, prior to the start of high flow. Fixed station receivers, both in the far and near field areas had over 2 million detections (post-processing) as Rainbow Trout moved upstream into the ZOP and between sites. Of the 59-tagged Rainbow Trout in 2022 and 2023, 75 percent of the Rainbow Trout moved upstream into the near field in the spring and about half entered the upstream fish passage facility. However, no Rainbow Trout were detected in the near field after mid-May. Rainbow Trout were essentially absent from the ZOP once spill started at the Main Channel Dam, and for the remainder of the season. Brown Trout present in the ZOP during the spring, appeared to leave the ZOP during spill, and then returned in the fall.

As records and data collected from fish ascending the fish passage facility, manual fish tracking, and 3D model results support, velocities in much of the river often exceed swimming ability (>14 feet per second) for most fish during spring flows and likely limit access upstream for fish in the ZOP and to the near field. The CFD model confirms that there is limited available area with suitable velocities at higher spill quantities for fish to navigate through the High Bridge and falls locations.

While the past (early 2000s) and more recent (2021-2023) telemetry data indicate that many fish leave the study area during high flow, a few fish remain and manage to find the fish passage facility. Fish are known to ascend the fish passage facility when spill is exceeding design capacity (>25,000 cfs spill). Records at the fish passage facility indicate 61 fish recorded at the fish passage facility at flows exceeding the design capacity from 2011 through 2022 (NorthWestern, unpublished data). The fish include 32 salmonids (21 Rainbow Trout, 5 Bull Trout, 3 Brown Trout, 3 Westslope Cutthroat Trout [*Onchorhynchus clarkii lewisi*]) and 29 non-salmonids (25 Largescale Sucker [*Catostomus macrocheilus*], 4 Northern Pikeminnow [*Ptychocheilus oregonensis*]).

Peak Rainbow Trout counts at the fish passage facility occur prior to, and after spill. Peak Rainbow Trout counts at the ladder occur in, descending order July, April, September, August, and then March. Peak Brown Trout counts occur at the fish passage facility post spill in July and fall months. In contrast to Rainbow and Brown trout, 78 percent of Bull Trout ascending the fish passage facility were documented between the onset of spill to ~ 33,000 cfs spill.

During spill at the Main Channel Dam, the telemetry and CFD modeling results indicate velocity obstacles may exist in the ZOP, specifically at the falls where the channel is constricted by boulders and rock. The CFD model indicates the falls would be a particularly challenging area for slower swimming non-salmonids to navigate. Another area with high velocities, at and above 25,000 cfs spill, is immediately downstream of the High Bridge where the channel constricts again. Both constricted areas (at the falls and High Bridge) are natural features of the Clark Fork River. During spill, the area accessible for various fish species to move upstream declines and is limited to the margins of the wetted channel and near the bottom of the channel depending on the roughness and available topography.

The CFD modeling indicates velocities near the fish passage entrance are within fish swimming abilities at all flow scenarios. There are no apparent velocity barriers near the fish passage facility entrance that would discourage fish from finding or entering the fish passage facility.

When looking at flow path streamlines it appears that at modeled spill flows of 200 cfs there remains a distinguishable level of attraction flow near the fish passage facility entrance that flows downstream and through the falls. As flows increase to 2,000 cfs spill, the flow path streamlines remain distinguishable near the fish passage facility entrance although as it reaches the falls area it begins mixing with the flow paths from spill at the radial gates. As total spill increases and reaches 25,000 and 37,000 cfs, flow path streamlines from the fish passage facility entrance area are not as distinct and appear to be overwhelmed from flows at the radial gates and flow over the Main Channel Dam. These data may indicate that attraction flow may be insufficient at some flows to provide the velocity clues that upstream migrating fish require to readily find the fish passage facility entrance.

Internal Ladder Efficiency and Ascent Times

Internal ladder efficiency is calculated as the proportion of the fish that enter the ladder and ascend the ladder (detected in holding pool). The ladder has a PIT tag antenna system that provides detection date and time. The system has antennas set up in the lower pools 7 and 8 and at the holding pool. The ascent time is calculated by the duration between detections in the lower pool and holding pool.

In 2021, antennas were set up in the entrances (upper and lower). This allowed for additional analysis of how many fish that enter the ladder continue to the lower pools and holding pool (top of ladder). It also allowed for ascent time to be calculated from the ladder entrance.

In 2013, the maximum number of Bull Trout recorded at the top of the ladder was five. The maximum number of Bull Trout detected either entering the lower pools or ascending to the top in a given year was seven (in 2015). These are minimum values because all fish detections require the fish to either ascend to the top and be handled at the work station, or for the fish to already have a PIT-tag prior to entering the upstream fish passage facility

Since 2011, an estimated 70 percent (21 of 30) of Bull Trout ascended the ladder after entering the ladder (**Table 7-4**). The majority of Bull Trout (15 individuals) ascending the ladder were not previously PIT-tagged. Ascent data for Bull Trout are limited to six fish that entered the ladder with a PIT tag. All Bull Trout were recorded ascending the ladder in orifice mode.

Table 7-4. Number of Bull Trout entering Pools 7/8, and the number ascending to the holding pool, 2011-2022.

Year	Known Number of Bull Trout Detected in the Ladder, 2011-2022	
	Enter Ladder	Ascend to Top of Ladder
2011	2	2
2012	2	2
2013	5	5
2014	1	1
2015	7	2
2016	6	3
2017	1	1
2018	-	-
2019	1	1
2020	1	1
2021	2	1
2022	2	2
Total	**30**	**21**

Ascent time information for salmonids entering the ladder and ascending the ladder has been recorded since 2011. Prior to 2021, the ascent time was calculated based on the time between the last detection in the lower pools (7/8) and the holding pool. In 2021, a PIT tag array was installed in the entrance of the ladder. Fish movement indicates travel duration between the entrance and lower pools can be within a few minutes. Bull Trout ascent times were between 2.0 to 3.3 hours with the exception of one fish taking 7.0 hours in 2019. This is comparable to the ascent times for other salmonid species (NorthWestern 2023).

Internal fish passage efficiency and ascent times are presented in each Thompson Falls Project, Fish Passage Annual Report. In general salmonids appear to be more capable of ascending the ladder than non-salmonids. Over the years, internal fish passage efficiency for salmonids has been around 70 to 75 percent. These data have been primarily based on PIT tag detections from the lower pools 7 and 8 *versus* the entrance. Detections in the entrance started in 2021. Internal fish passage efficiency for salmonids was 75 percent in 2021 compared to 69 percent of 101 fish in 2022.

Implementation of the Fisheries and Aquatic Resources PM&E Plan (PM&E Plan), as filed with FERC, will have beneficial effects to upstream passage for Bull Trout (NorthWestern 2025). Improving effectiveness of upstream passage at the Project will allow more adult Bull Trout to access their natal spawning and rearing habitats. Fish captured in the fishway will be handled and PIT tagged which will have adverse short term effects by inducing stress on individuals. Following standard fish handling procedures will limit effects to being short term. Bull Trout will be released as appropriate quickly after tagging. Implementation of Tier 3 upstream passage PM&E measures (year 26+) includes targeted electrofishing and angling in likely fish holding spots in the bypassed reach (e.g., Prospect Creek confluence) to capture Bull Trout and immediately transport them upstream of the dam. Electrofishing and associated handling of Bull Trout could have minor, short-term effects on individuals. The handled fish would then be passed upstream of the dam, reducing upstream migration delay, and allowing for other behavioral needs such as spawning, foraging, and overwintering.

7.1.4 Downstream Migration

When water is spilling over or through the dams at the Thompson Falls Project, fish can migrate downstream *via* the spillways, outlet works, or through the turbines. During non-spill periods, the primary means of downstream passage is through the turbines. In 2007, the previous Licensee (PPL Montana) prepared a *Literature Review of Downstream Fish Passage Issues at Thompson Falls Hydroelectric Project* (GEI 2007) which included specific consideration of federally listed Bull Trout and Westslope Cutthroat Trout, a sensitive species, and Montana Species of Special Concern (GEI 2007).

Studies done on anadromous fishes have generally indicated that passage *via* spill poses less risk than *via* turbine (Muir et al. 2001). Fish mortality is typically 0 to 2 percent for standard spill bays and 5 to 15 percent for turbine passage, with Kaplan turbines generally at the lower end of this mortality range and Francis turbines generally greater (Whitney et al. 1997). However, mortality at a specific facility can vary depending on the specific configuration of the turbines and spillways and type and timing of fish being passed.

The 2007 Literature Review estimated that survival estimates at the Project are 94 percent through the new powerhouse (Kaplan turbine), 85 percent through the original powerhouse (Francis turbines), and 98 percent through the spillway. Combined survival estimates for trout measuring greater than 100 mm were estimated to be 91 to 94 percent. The Biological Opinion (FWS 2008) issued by the FWS October 28, 2008, concurred with the survival estimate in the 2007 Literature Review.

In 2022, NorthWestern prepared an Updated Literature Review (NorthWestern 2022d). The 2022 literature review provided updates, as available, to estimates of downstream passage survival of various size classes of fish, with respect to current Project configuration and operations. The 2022 literature review results were consistent with the 2007 literature review. No additional scientific literature was identified that would measurably change these existing estimates of downstream survival at the Project.

The Licensee has documented downstream fish movement through the Project since the construction and operation of the Thompson Falls Upstream Fish Passage facility (fish passage facility) commenced in 2011. Salmonids, and some non-salmonids, which are passed upstream are tagged with a PIT tag. Subsequent recaptures of tagged fish have demonstrated that adult salmonids can survive downstream passage at the Project. From 2011 to 2018, PIT-tag data collected at the fish passage facility indicate a minimum of 10 percent of the PIT-tagged fish released upstream of the dam (264 out of 2,644 tagged-fish) returned and ascended the fish passage facility as many as six times. These 264 fish include one Bull Trout, 164 Rainbow Trout, 73 Brown Trout, 12 Westslope Cutthroat Trout, six Rainbow x Westslope Cutthroat hybrids, four Mountain Whitefish (*Prosopium williamsoni*), three Northern Pikeminnow, and one Largescale Sucker (NorthWestern 2019b).

On an annual basis, an average of 8 percent (3-13.5%) of the salmonids PIT-tagged each year return to the fish passage facility the following year.

PIT tagged adult and juvenile Bull Trout have been detected in tributaries both upstream and downstream of the Project (NorthWestern 2019a; 2019b), indicating that the fish survived downstream passage through the Project.

Determining whether a fish moved downstream over the spillway or through the turbines depends on streamflow conditions. The combined capacity of the seven generating units at the Project is ~ 23,000 cfs. When river inflows exceed this capacity, spill is initiated at the Main Channel Dam spillway. Therefore, when streamflows are less than 23,000 cfs, it is assumed that all downstream fish passage is through turbines. When streamflows are above 23,000 cfs, fish can pass downstream through the turbines or over the spillway. Data indicate Rainbow and Brown trout, as well Largescale Sucker have survived migrating downstream through the turbines. Additional detection data collected from 12 years of fish passage facility operations indicate Bull Trout, and a host of other species, all successfully migrated downstream of Thompson Falls Dam, either through the turbines or over the spillway.

The available data demonstrate that fish are successfully passing both upstream and downstream of the Project, and that some fish make the trip multiple times.

Operations will continue to pass the river flows through turbines at the Project or over the dam either through spill gates or flashboard panels. Bull Trout will use these same pathways to travel downstream over the Project as they have in the past. There will be continued mortality due to downstream factors including entrainment mortality.

Implementation of the PM&E Plan will have beneficial effects on downstream passage for adfluvial Bull Trout by providing safe passage around the Project and Avista's two downstream hydroelectric developments. This will reduce injury and mortality from passage through the generating facilities and predation by non-native species in the three reservoirs. Annually in the fall, NorthWestern will conduct backpack electrofishing to capture out-migrating juvenile Bull Trout from the West Fork Thompson River and Fishtrap Creek. From mid-October to early November, NorthWestern will conduct five days of electrofishing in each tributary. Northwestern will collect genetic samples and implant PIT tags in all sampled Bull Trout to provide information on the location of origination, parentage, and to aid in evaluating the effectiveness of the downstream passage program. Electrofishing and PIT tagging juvenile Bull Trout could cause minor, short-term effects such as physiological stress and disorientation. Electrofishing will be completed by individuals with appropriate training and will follow all state and federal requirements for fish safety. Backpack electrofishing is generally safe for salmonids but given the duration and intensity of sampling it is possible that some juveniles will die, albeit a small quantity (1-4 per year). Individuals will be transported by truck in an aerated tank to Lake Pend Oreille where they will be released.

Previous literature review efforts in 2007 (*Literature Review of Downstream Fish Passage Issues at Thompson Falls Hydroelectric Project* [GEI 2007]) and the 2022 Updated Literature Review Study Report indicate relatively high survival estimates at the Project with 94 percent through the new powerhouse (Kaplan turbine), 85 percent through the original powerhouse (Francis turbines), and 98 percent through the spillway. Combined survival estimates for trout measuring greater than 100 mm were estimated to likely be 91 to 94 percent. PIT tagging and T-bar tagging efforts have also documented downstream survival of adults through or over the facility (NorthWestern 2019b).

7.1.5 Matrix of Pathway Indicators

The action area focuses on the Clark Fork River, which serves as a migratory corridor for Bull Trout. Spawning and rearing habitat are located in tributaries to the Clark Fork River. The matrix of pathway indicators is typically used to assess habitat indicators in spawning and rearing habitats, thus applying it to the mainstem Clark Fork River was not the intent of the analysis. With that said, NorthWestern believes the matrix analysis provides a useful tool to provide a general context of habitat indicators in the action area.

In the matrix analysis, each of the 19 habitat indicators were designated as Functioning Appropriately (FA), Functioning at Risk (FAR), or Functioning at Unacceptable Risk (FUR). There were no indicators designated as FA, thus this category is not shown in **Table 7-5.** For each habitat indicator, major and minor effects were analyzed (USDI 1998). Major effects are defined as an action that results in a change in one level of baseline conditions (e.g., FA to FAR or FUR to FAR). Minor effects are defined as actions that may result in an incremental or cumulative effect, but they do not result in a functional change to the system. For each indicator the major and minor effects are identified as M (Maintain), R (Restore) or D (Degrade). The matrix of pathway indicators provides an analysis of the existing baseline condition and potential effects to Bull Trout and their critical habitat (**Table 7-5**).

Table 7-5: **Matrix of Pathway Indicators.**

Thompson Falls Relicensing Project – Biological Assessment	Environmental Baseline		Proposed Action		Comments
Pathways: Indicators	**FAR**	**FUR**	**Major Effects**	**Minor Effects**	
Characteristics Subpopulations					
Subpopulation Size		FUR	M	M	Bull Trout are rare in the Lower Clark Fork River. The Lower Clark Fork River provides Bull Trout critical habitat for foraging, migration, and overwintering (FWS 2010a, 2010b). Most of the Bull Trout recorded at the fish passage facility are genetically assigned to the Thompson River drainage. The closest migratory Bull Trout populations to the Project are found in the Thompson River drainage, West Fork Thompson River and Fishtrap Creek. These Bull Tout subpopulations remain at high risk. The Project will not affect spawning or rearing habitat. Upstream fish passage provides Bull Trout opportunities to reach spawning grounds upstream of Thompson Falls Dam. The number of Bull Trout recorded annually at the fish passage facility remains low, 1 to 5 per year. The fish passage facility helps facilitate the migratory life history, but the occurrence of Bull Trout at the fish passage facility and in Region 3 is currently very low. Improving upstream passage with current numbers will likely have minimal effect on population size in upstream tributaries (e.g., Thompson River drainage, Jocko River drainage, Fish Creek drainage, Rattlesnake drainage).
Growth & Survival		FUR	M	M	
Life History Diversity & Isolation		FUR	M	R	
Persistence and Genetic Integrity		FUR	M	R	
Water Quality					
Temperature		FUR	M	M	River temperatures entering the Project area often exceed 15°C during the summer months (July and August) creating unsuitable habitat for Bull Trout (PPL Montana 2008, 2014; NorthWestern 2022c). Thompson Falls Reservoir does not stratify, water temperature leaving the Project area is not affected by the Project. The Project is not anticipated to change stream temperatures. Water temperature remained stable throughout changes in reservoir water levels during the operations study in 2022 and showed no relationship to fluctuations in reservoir operations (NorthWestern 2023b).

Thompson Falls Relicensing Project – Biological Assessment	Environmental Baseline		Proposed Action		Comments
Pathways: Indicators	**FAR**	**FUR**	**Major Effects**	**Minor Effects**	
Characteristics Subpopulations					
Sediment/Turbidity	FAR		M	D	Bull Trout use this area as a migratory corridor (FWS 2002). This section of the river is not suitable spawning habitat, so sediment in the Project area is not a limiting factor. Turbidity downstream of the Project was evaluated during the Operations Study and there was no relationship observed between fluctuations in reservoir level and turbidity downstream. There could be minor, short-term effects to turbidity from in-water work associated with the Wild Goose Landing Park improvements.
Chemical Contamination/Nutrients	FAR		M	M	No change anticipated to watershed inputs in area. NorthWestern's (2022c) water quality report from data collected in 2019-2021 indicates conditions are good in the Project area. Water chemistry changes very little across the Project from upstream to downstream. This is mostly due to the very short residence time of the reservoir (3-17 hours). Nutrient concentrations remain low. Metals concentrations were generally low. Specific conductivity, pH, and turbidity remain relatively consistent. Sediment chemistry samples collected in the lower portion of Thompson Falls Reservoir showed TCLP metals and PCBs were all at non-detectable concentrations. The proposed action is not anticipated to have any effects to chemical contamination/nutrients.
Habitat Access					
Physical Barriers	FAR		R	R	Thompson Falls Dam is a physical barrier that provides seasonal upstream fish passage annually, March – October. Further evaluation and improvements to upstream passage for Bull Trout will help improve connectivity in the Lower Clark Fork River.
Habitat Elements					
Substrate Embeddedness	FAR		M	M	The action area is designated FMO and not suitable for spawning or rearing. The project will not affect substrate embeddedness.

Thompson Falls Relicensing Project – Biological Assessment	Environmental Baseline		Proposed Action		Comments
Pathways: Indicators	**FAR**	**FUR**	**Major Effects**	**Minor Effects**	
Characteristics Subpopulations					
Large Woody Debris		FUR	M	M	The mainstem Clark Fork River has very little LWD. LWD that accumulates in the spring along the Thompson Falls Dam will continue to be passed downstream. The project will not affect LWD.
Pool Frequency	FAR		M	M	The project will not affect in-channel features.
Pool Quality	FAR		M	M	
Off-Channel Habitat		FUR	M	M	
Refugia		FUR	M	M	
Channel Condition and Dynamics					
Width/Depth Ratio		FUR	M	M	With few exceptions, the shoreline monitoring (for the reservoir) data from the 2022 Operations Study indicates no changes in the amount, type, or cause of erosion related to reservoir fluctuations (NorthWestern 2023b). When changes did occur, the most common causes are use-based impacts such as human or wildlife footpaths, or natural events such as spring runoff, runoff in response to rain events, or wind-toppled trees. This is similar to the conclusions of the first study season (NorthWestern 2022b). There are no anticipated changes to streambank erosion.
Streambank Condition	FAR		M	M	
Floodplain Connectivity		FUR	M	M	Operations at Thompson Falls Project will maintain the existing floodplain. Many portions of the mainstem Clark Fork River and reservoir are confined in places by HWY 200 and Montana Rail Link rail line that often constrict the channel in places and reduce connectivity to historic riparian areas. The project will not affect floodplain connectivity.
Flow/Hydrology					

Thompson Falls Relicensing Project – Biological Assessment	Environmental Baseline		Proposed Action		Comments
Pathways: Indicators	**FAR**	**FUR**	**Major Effects**	**Minor Effects**	
Characteristics Subpopulations					
Peak/Base Flows	FAR		M	M	Thompson Falls Dam is a run-of-the-river facility, the dam changes the natural hydrograph during occasional peaking operations or drawdown. Dams upstream in the Flathead Drainage (Hungry Horse, SKQ) provide flood control and have some hydrologic influence on the lower Flathead River and the Lower Clark Fork River. The project will release continuous minimum flows and not affect river hydrology.
Drainage Network Increase	FAR		M	M	The project will not change the drainage network.
Watershed Conditions					
Road Density & Location		FUR	M	M	HWY 200 and Montana Rail Link are parallel to the Clark Fork River and are constructed on a floodplain terrace (Dames and Moore 1997). Powerlines and the Yellowstone Pipeline corridor are also located along the river and over the river channel. There is residential development also adjacent to the river channel. The project will not change road density in the area.
Disturbance History		FUR	M	M	The analysis area is not a pristine environment and as a result of dam construction, road construction, rail line construction, power line construction, pipeline construction, and development in the area. The proposed project does not include any additional disturbance or major construction activities.
Riparian Conservation Areas	FAR		M	M	There are no riparian habitat conservation areas within the project area.
Disturbance Regime		FUR	M	M	As a result of road construction, rail line construction, power line construction, pipeline construction, and development, resiliency of habitat to recover from environmental disturbances is moderate.

Thompson Falls Relicensing Project – Biological Assessment	Environmental Baseline		Proposed Action		Comments
Pathways: Indicators	**FAR**	**FUR**	**Major Effects**	**Minor Effects**	
Characteristics Subpopulations					
Integration of Species and & Habitat Condition		**FUR**	M	R	The action area is designated critical habitat for Bull Trout providing FMO habitat (Federal Register 2010). However, the presence of Bull Trout in the analysis area is rare. NorthWestern has recorded 23 Bull Trout at the upstream fish passage facility 2011-2025, 1 to 5 fish a year. Bull Trout abundance and occurrence at the upstream fish passage facility and area remain low, but likely is higher than what is currently captured and passed upstream. The Project provides upstream fish passage opportunity for Bull Trout during their migration period but limits upstream passage when the facility is closed during the winter months. Implementing the upstream PM&E Plan will increase upstream passage effectiveness. The Project provides downstream passage through the spillway, through the turbines, and by implementing the downstream PM&E Plan to capture and transport juveniles to Lake Pend Oreille.

Notes: °C = degrees Celsius; D = Degrade; FAR= Functioning at Risk; FUR= Functioning at Unacceptable Risk; M = Maintain; R = Restore TCLP = Toxicity Characteristic Leaching Procedure; LWD = large woody debris

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7.2 Effects on Bull Trout Critical Habitat

The Lower Clark Fork River is designated critical habitat for FMO between Thompson Falls Dam and Flathead River (FWS 2010a, 2010b). FMO habitat is typically downstream from spawning and rearing habitat and contains all the physical elements to meet critical overwintering, spawning migration, and subadult and adult rearing needs (FWS 2010a, 2010b). Although use of FMO habitat by Bull Trout may be seasonal or very brief (as in some migratory corridors), it is a critical habitat component.

The action area includes designated critical FMO habitat for Bull Trout. The action area defined for this report provides a migratory corridor for Bull Trout to access the middle and/or upper Clark Fork River. Upstream of the dam, the closest spawning and rearing tributary is ~ 6 miles upstream of the dam, the Thompson River drainage.

The presence of Thompson Falls Dam affects upstream and downstream fish passage. Downstream fish passage includes migration over the spillway when streamflow exceeds 23,000 cfs or migration through the turbines. Upstream fish passage is available seasonally between March and October, weather and river conditions permitting. Bull Trout upstream migration has been documented throughout the spring months, including times during spill. Not all fish that enter the fish passage facility ascend the ladder. Implementing the PM&E Plan will improve connectivity for adfluvial Bull Trout. Habitat upstream and downstream of the project will be able to be utilized further by carrying out measures to increase passage effectiveness for Bull Trout. Downstream actions to capture and transport juvenile Bull Trout around the reservoir and release them in Lake Pend Oreille will improve survival, bypassing reservoir habitats that favor non-native predators.

There could be minor, short-term effects on turbidity from in-water work associated with the proposed improvements to Wild Goose Landing Park. In-water construction is expected to take less than one month and would occur during low water times of the year. To address shoreline erosion related to recreation use of the site, NorthWestern proposes to stabilize the shoreline with habitat-friendly natural features and install vegetated retaining walls. The proposed habitat-friendly features would improve current site conditions by replacing the current rock lined bank. NorthWestern will obtain all necessary permits, abide by all regulatory requirements, and adopt appropriate best management practices to address temporary environmental effects of construction activities.

The proposed action would continue to provide upstream passage and make incremental improvements for migratory Bull Trout. The proposed action would maintain existing habitat features of the tailrace and improve the reservoir bank at Wild Goose Recreation site. (**Table 7-6**).

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Table 7-6: **Summary of PCE descriptions, associated habitat indicators, baseline conditions, and effects of the proposed action.**

#	PCE Description (October 18, 2010, Final Rule)	Associated Habitat Indicators	Baseline FA/FAR/ FUR	Effects of Action R/M/D	Comments
1	Springs, seeps, groundwater sources, and subsurface water connectivity (hyporheic flows) to contribute to water quality and quantity and provide thermal refugia.	Chemical Contaminants & Nutrients; Physical Barriers; Substrate Embeddedness; Streambank Condition, Floodplain Connectivity; Flow/Hydrology; Road Density and Location; Riparian Conservation Areas	FAR	M	Cool water enters the Clark Fork River at the confluence with Prospect Creek and Thompson River. However, the Clark Fork River temperature often exceeds 15°C during the summer months (PPL Montana 2010, NorthWestern 2022c). The proposed action will have no effect on subsurface water connectivity, water quality or quantity, or the presence of 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.	Water Quality; Physical Barriers; Refugia; Wetted Width/Maximum Depth Ratio; Changes in Peak/Base Flow	FUR	R	The proposed action will improve upstream passage at Thompson Falls Dam. Downstream capture and transport to Lake Pend Oreille will reduce juvenile mortality through the reservoir and project facilities.
3	An abundant food base, including terrestrial organisms of riparian origin, aquatic macroinvertebrates, and forage fish.	Water Quality; Physical Barriers; Substrate Embeddedness; Pool Frequency and Quality; Floodplain Connectivity; Riparian Conservation Areas	FAR	M	The proposed action will not change baseline conditions of the reservoir.
4	Complex river, stream, lake, reservoir, and marine shoreline aquatic environments, and process that establish and maintain these aquatic environments, with features such as large wood, side channels, pools, undercut banks and substrates, to provide a variety of depths, gradients, velocities, and structure.	Large Woody Debris; Pool Frequency and Quality; Large Pools; Off-Channel Habitat; Channel Conditions and Dynamics; Disturbance History; Riparian Conservation Areas; Disturbance Regime	FAR	M	This section of stream serves as a migratory corridor and does not provide a clean, cold, complex system typical of spawning and rearing habitats. The proposed action will have minor changes to bank conditions at Wild Goose Recreation site. Effects on the reservoir and its function as a migratory corridor will be negligible.

#	PCE Description (October 18, 2010, Final Rule)	Associated Habitat Indicators	Baseline FA/FAR/ FUR	Effects of Action R/M/D	Comments
5	Water temperatures ranging from 2-15ºC with adequate thermal refugia available for temperatures that exceed the upper end of this range. Specific temperatures within this range will vary depending on Bull Trout life-history stage and form; geography; elevation; diurnal and seasonal variation; shade, such as that provided by riparian habitat; streamflow; and local groundwater influence.	Temperature; Large Pools; Refugia; Channel Conditions and Dynamics; Change in Peak/Base Flows; Road Density and Location; Riparian Conservation Areas	FUR	M	Temperatures in the summer often exceed 15°C for an extended period of time during the summer months (PPL Montana 2014, NorthWestern 2022c). High summer temperatures are not an effect of the Project. The proposed action will have no effect on the temperature regime in the action area.
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, is characteristic of these conditions. The size and amounts of fine sediment suitable to Bull Trout will likely vary from system to system.	Sediment; Substrate Embeddedness; Large Woody Debris; Pool Frequency and Quality; Streambank Condition	FUR	M	Not applicable – the analysis area does not provide spawning or rearing habitat. Area serves as a migratory corridor (FWS 2002, 2010b).
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.	Floodplain Connectivity; Flow/Hydrology; Watershed Condition	FUR	M	The current hydrograph will remain unchanged with base flows near 10,000 cfs and peak flows following spring runoff average 60,000 cfs (USGS Gage near Plains).
8	Sufficient water quality and quantity such that normal reproduction, growth, and survival are not inhibited.	Water Quality; Floodplain Connectivity; Flow/Hydrology; Watershed Conditions	FAR	M	Water quality is unimpaired in this section of stream (DEQ 2014). Recent water quality monitoring support finding by DEQ (NorthWestern 2022c).

#	PCE Description (October 18, 2010, Final Rule)	Associated Habitat Indicators	Baseline FA/FAR/ FUR	Effects of Action R/M/D	Comments
9	Sufficiently low levels of occurrence of nonnative predatory (e.g., Lake Trout, Walleye, Northern Pike, Smallmouth Bass); interbreeding (e.g., Brook Trout); or competing (e.g., Brown Trout) species that, if present, are adequately temporally and spatially isolated from Bull Trout.	Physical Barriers; Refugia; Disturbance History	FUR	M	Nonnative predatory species (e.g., Northern Pike, Smallmouth Bass, Walleye are present downstream of Thompson Falls Dam in Noxon Reservoir. Proposed action will not modify the abundance of these species.

Notes: cfs = cubic feet per second; D = Degrade; FAR= Functioning at Risk; FUR= Functioning at Unacceptable Risk; M = Maintain; R = Restore; USGS = U.S. Geological Survey

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8.0 Cumulative Effects

Cumulative effects include impacts on the environment which result from the incremental impact of the proposed action when added to other past, present, and reasonably foreseeable future actions regardless of what agency or person undertakes such other actions.

Federal actions unrelated to this Project are not considered in this analysis because they require separate analysis and consultation pursuant to Section 7 of the ESA. Agricultural input sources have not been quantified but may impact water and soil chemistry within the river and riparian areas resulting in potential effects to suitable habitat for ESA listed species and the species themselves. The construction of the Montana Rail Link/Burlington Northern Santa Fe railway and HWY 200 have fragmented habitats (e.g., side channel habitat) and added impervious surfaces with stormwater impacting the adjacent river and wetlands.

8.1 Past, Present Foreseeable Future Actions

Bull Trout utilize a multitude of habitats to complete specific life history stages, from headwater streams (e.g., Thompson River, Prospect Creek) to large river system (e.g., Clark Fork River) or lakes such as Lake Pend Oreille. The interruption of habitat connectivity and modification of riverine habitats to lentic habitats has cumulatively affected Bull Trout and aquatic resources.

Past activities in the lower Clark Fork River basin, including development of the three Clark Fork River dams, mining activities, timber harvest and road systems, and historic forest fires all contributed to the current condition of the existing landscape and historic impacts to fisheries and aquatic resources. Physical changes to the landscape from these activities have cumulatively impacted various life history stages of Bull Trout, suitable habitat availability, access and quality of river channel migratory corridors, and access to tributary spawning habitat.

The three hydropower projects in the lower Clark Fork River have converted ~ 65 miles of the lower Clark Fork River from lotic to lentic habitat. The change in habitat type has created beneficial habitats for some species but has been detrimental for others. Introductions of nonnative fish species in the lower Clark Fork River system has altered fish species composition, often to the detriment of Bull Trout. Twenty-four fish species plus three hybrids have been recorded in recent years in the Project area, including 11 natives and 16 nonnatives. Several non-native species such as Walleye, Largemouth, and Smallmouth bass, are well suited to reservoir habitats. These species have the potential to impact populations of Bull Trout in the region.

Current operations and maintenance of the three hydroelectric projects on the lower Clark Fork River continue to have a cumulative impact on fisheries and aquatic resources through impacts to habitat and fish passage.

Bull Trout moving downstream face increased potential for injury and mortality when traveling through turbines or over the spillways at all three hydroelectric projects. Bull Trout moving downstream (from upstream of Thompson Falls Dam) with the goal of reaching Lake Pend Orielle will either pass over the spillway during high flow or through the turbine at the three hydroelectric facilities. Data collected from tagging studies and angler reports in the Project area demonstrate that fish, including Bull Trout, can survive passage over or through the three hydropower projects. As described in the Downstream Fish Passage Literature Review Final Study Report (NorthWestern 2022d), downstream survival is estimated to be 94 percent through the new Powerhouse (Kaplan turbine), 85 percent survival through the original Powerhouse (Francis turbine), and 98 percent over the spillway. Bull Trout must repeat this process through two additional facilities, with uncertain survival rates, before reaching Lake Pend Oreille.

Currently, upstream fish passage is limited in the lower Clark Fork River. Avista operates a trap and haul facility seasonally at Cabinet Gorge Dam, providing upstream fish passage to Bull Trout and Westslope Cutthroat Trout. Other fish species are not transported upstream of Cabinet Gorge Dam. Bull Trout collected downstream of Cabinet Gorge Dam are genetically tested and assigned to spawning tributaries of most likely origin. These fish are then directly transported to the respective region and their natal tributary. Bull Trout genetically assigned upstream of Thompson Falls are transported upstream of Thompson Falls and do not utilize the fish passage facility at Thompson Falls Dam.

There is no upstream fish passage facility at Noxon Rapids Dam. Fish located within Cabinet Gorge Reservoir have no upstream fish passage option at Noxon Rapids Dam.

Implementing the proposed upstream and downstream PM&E measures will improve connectivity for adfluvial Bull Trout. These measures will increase passage effectiveness and will allow Bull Trout to utilize additional habitat upstream and downstream of the project. Downstream measures to capture and transport juvenile Bull Trout around the reservoir and release them in Lake Pend Oreille will improve survival, bypassing reservoir habitats that favor non-native predators. Upstream and downstream capture methods could have short term effects on Bull Trout resulting from handling and tagging individuals, including effects of backpack electrofishing. NorthWestern will follow established protocols and best practices to reduce harm to Bull Trout associated with fish handling. The goal of these fish handling activities is to improve survival and passage at the Project.

There will be minor, short-term effects to turbidity from in-water work associated with the Wild Goose Landing Park. In-water construction is expected to take less than one month and would occur during low water times of the year. To address shoreline erosion that may be exacerbated by waves from boat traffic at the site, NorthWestern proposes to stabilize the shoreline with habitat-friendly features and install vegetated retaining walls. The proposed shoreline stabilization measures would improve current site conditions by replacing the current rock lined bank.

Water quality studies have found the Project operations do not contribute to cumulative impacts of water quality downstream. Water quality changes very little across the Project from upstream to downstream. This is mostly due to the very short residence time of the reservoir (3-17 hours) and lack of thermal stratification in Thompson Falls Reservoir.

No additional reasonably foreseeable future actions in the lower Clark Fork River drainage were identified that may cumulatively impact Bull Trout.

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9.0 Determination of Effects

The following effects determinations have been made for the ESA listed species and critical habitat analyzed in this BA:

- Canada Lynx [Threatened]: ***No Effect***
- Spalding's Catchfly/Campion [Threatened]: ***No Effect***
- Whitebark Pine [Threatened]: ***No Effect***
- Grizzly Bear [Threatened]: ***No Effect***
- Yellow-billed Cuckoo [Threatened]: ***No Effect***
- North American Wolverine [Threatened]: ***No Effect***
- Bull Trout [Threatened]: ***May Affect, Likely to Adversely Affect***
- Bull Trout Critical Habitat: ***May Affect, Likely to Adversely Affect***

The proposed action will continue to impact upstream and downstream passage for Bull Trout and support lacustrine habitat in the reservoir. Implementation of the PM&E Plan will have beneficial effects to upstream passage for Bull Trout. Incrementally improving the effectiveness of upstream passage at the Project will allow more adult Bull Trout to access their natal spawning and rearing habitats. Fish captured in the fishway will be handled and PIT tagged which could have adverse short-term effects by inducing stress on individuals. Following standard fish handling procedures will limit effects to the extent possible. Bull Trout will be released quickly after tagging. Implementation of Tier 3 measures (year 26+) in the upstream passage PM&E Plan includes targeted electrofishing and angling in likely fish holding spots in the bypassed reach (e.g., Prospect Creek confluence) to capture Bull Trout and immediately transport them upstream of the dam. Electrofishing and associated handling of Bull Trout could affect individual fish, but any effects would be short-term and unavoidable. Passing them upstream of the dam, however, will be beneficial and reduce upstream migration delay, and provide for other behavioral needs (spawning, foraging, overwintering).

Implementation of the PM&E Plan will have beneficial effects on downstream passage for Bull Trout by reducing injury and mortality from downstream passage at the Project (and two other downstream hydroelectric projects) and predation by nonnative fish in the reservoirs. The use of backpack electrofishing to capture out-migrating juvenile Bull Trout from the West Fork Thompson River and Fishtrap Creek will occur annually in the fall. Five days of electrofishing effort will occur in each tributary from mid-October to the first part of November. Northwestern will collect genetic samples and implant PIT tags in all sampled Bull Trout to provide information on the location of origination, parentage, and to aid in evaluating the effectiveness of the downstream passage program. Electrofishing and PIT tagging juveniles will have short term effects of disorienting Bull Trout. Electrofishing will be completed by individuals with appropriate training and follow all state and federal requirements for fish safety. Backpack electrofishing is generally safe for salmonids but given the duration and intensity of sampling it is likely that some juveniles will die, albeit a small quantity (1-4 per year). Individuals will be transported by truck in an aerated tank to Lake Pend Oreille where they will be released. The action of collecting the juvenile Bull Trout and releasing them downstream will be harassment, but with the goal of increasing downstream survival through the Project.

This BA has been prepared for NorthWestern to comply with Section 7 of the ESA for the relicensing of the Thompson Falls Project. As described in the BA, the proposed Project ***may affect, is likely to adversely affect*****,** Bull Trout and critical habitat for Bull Trout.

10.0 Conservation, Avoidance, and Mitigation Measures

NorthWestern is proposing to implement the conservation, avoidance, and mitigation measures described below.

10.1 PM&E Plan

NorthWestern will implement the November 2025 PM&E Plan for purposes of reducing adverse effects on Bull Trout and other native fish species caused by the operation of the Project. The PM&E Plan is divided into Upstream Passage and Downstream Passage measures.

10.1.1 Upstream Passage

The Upstream Passage measures consist of an iterative fishway evaluation program to monitor, test, and modify the fishway to incrementally improve passage effectiveness over time. The evaluation program will rely on identifying and testing incremental changes to fishway operations at the Project. The Plan divides the measures into tiers based on their implementation timing. NorthWestern will implement and evaluate Tier 1 Measures during the first 10 years following license issuance. If necessary, NorthWestern will implement Tier 2 Measures from years 11 through 25 following license issuance, and Tier 3 Measures from year 26 through the end of the license term. The measures included in the PM&E Plan are described below.

Tier 1 Measures (Years 1 – 10)

1. Install submersible PIT arrays strategically in logistical and safe locations to obtain finer scale movements of salmonid target species.

2. PIT arrays will likely be located near the fishway entrance and at points along the Zone of Passage downstream of the dam (e.g., near the mouth of Prospect Creek and along the Main Dam spillway apron).

3. Begin sampling target species concurrent with installation of PIT arrays. Fish will be collected in the fishway and via electrofishing downstream. Sampling will include implanting PIT tags in target species and collecting genetic samples of all previously uncaptured Bull Trout to determine origination within the watershed.

4. Test the effects of various auxiliary water flows and/or gate configurations on fish attraction and movement through the fishway using the Computational Fluid Dynamics (CFD) model and PIT arrays within the fishway; NorthWestern will annually determine, after consultation with FWP, FWS, and USFS (collectively, the “Agencies”) and CSKT, which operational settings and flows will be implemented and evaluated using the PIT

arrays. If there are any disagreements between NorthWestern and the Agencies and CSKT about which operational measures will be evaluated each year, NorthWestern will prepare a report for FERC approval that includes its proposal and any recommendations from the Agencies and CSKT for the operational measures to be evaluated. At a minimum, NorthWestern will prepare the report for review and comment by the Agencies and CSKT, allowing at least 30 days to provide comments and recommendations on the draft before filing the final report with FERC for approval. When filing the final report with FERC, NorthWestern will include its reasons, based on Project-specific information, if it does not adopt a recommendation submitted by an Agency or CSKT. Upon FERC approval of the report, NorthWestern will implement its proposed operational measures with any modifications required by FERC.

5. If at any point during the Tier 1 evaluation period, NorthWestern determines, after consultation with the Agencies and CSKT, that any tested measures are sufficiently effective at providing upstream passage of target species, then NorthWestern will prepare a report describing the proposed operational parameters and file it with FERC for approval. In addition, NorthWestern will modify the Fishway Operation and Maintenance Plan (FOMP) and submit to FERC for approval using the procedures identified in Section 6.2 of the FOMP, as necessary and appropriate to incorporate the permanent operational parameters. If at the end of the Tier 1 evaluation period NorthWestern concludes, after consultation with the Agencies and CSKT, that the fishway is not sufficiently effective at passing target species upstream, NorthWestern will begin implementing and testing Tier 2 Measures.

6. If during implementation of the Tier 1 Measures there are any disagreements between NorthWestern and the Agencies and CSKT about whether NorthWestern's permanent proposed operational measures are sufficiently effective at passing target species upstream (item 5), NorthWestern will include in the report for FERC approval its proposal and any recommendations from the Agencies and CSKT for the permanent measures. At a minimum, NorthWestern will prepare the report for review and comment by the Agencies and CSKT, allowing at least 30 days to provide comments and recommendations on the draft before filing the final report with FERC for approval. When filing the final report with FERC, NorthWestern will include its reasons, based on Project-specific information, if it does not adopt a recommendation submitted by an Agency or CSKT. Upon FERC approval of the report, NorthWestern will implement its proposed permanent operational measures with any modifications required by FERC.

Tier 2 Measures (Years 11 – 25)

1. Continue to implement items 1-3 of the Tier 1 Measures to facilitate ongoing evaluation of the fishway.

2. Test the effects of water quality improvement measures (e.g., dissolved oxygen enhancement, water temperature cooling) and/or introducing pheromones within the

fishway on fish attraction and movement through the fishway using the PIT arrays and ongoing PIT-tagging. NorthWestern will annually determine, after consultation with the Agencies and CSKT, which water quality or fish attractant measures will be implemented and evaluated. If there are any disagreements between NorthWestern and the Agencies and CSKT about which water quality or fish attractant measures will be evaluated each year, NorthWestern will prepare a report for FERC approval that includes its proposal and any recommendations from the Agencies and CSKT for the measures to be evaluated. At a minimum, NorthWestern will prepare the report for review and comment by the Agencies and CSKT, allowing at least 30 days to provide comments and recommendations on the draft before filing the final report with FERC for approval. When filing the final report with FERC, NorthWestern will include its reasons, based on Project-specific information, if it does not adopt a recommendation submitted by an Agency or CSKT. Upon FERC approval of the report, NorthWestern will implement its proposed measures with any modifications required by FERC.

3. If at any point during the Tier 2 evaluation period NorthWestern determines, after consultation with the Agencies and CSKT, that any tested measures are sufficiently effective at passing target species upstream, then NorthWestern will prepare a report with any permanent proposed measures and file it with FERC for approval. In addition, NorthWestern will modify the FOMP and submit it to FERC for approval using the procedures identified in Section 6.2 of the FOMP, as necessary and appropriate to incorporate the permanent measures. If at the end of the Tier 2 evaluation period NorthWestern concludes, after consultation with the Agencies and CSKT, that the fishway is not sufficiently effective at passing target species upstream, NorthWestern will begin implementing Tier 3 Measures.

4. If during implementation of the Tier 2 Measures there are any disagreements between NorthWestern and the Agencies and CSKT about whether NorthWestern's permanent proposed measures are sufficiently effective at passing target species upstream (item 3), NorthWestern will include in the report for FERC approval its proposal and any recommendations from the Agencies and CSKT for the permanent measures. At a minimum, NorthWestern will prepare the report for review and comment by the Agencies and CSKT, allowing at least 30 days to provide comments and recommendations on the draft before filing the final report with FERC for approval. When filing the final report with FERC, NorthWestern will include its reasons, based on Project-specific information, if it does not adopt a recommendation submitted by an Agency or CSKT. Upon FERC approval of the report, NorthWestern will implement its permanent proposed measures with any modifications required by FERC.

Tier 3 Measures (Years 26+)

1. Continue to implement items 1-3 of the Tier 1 Measures to facilitate ongoing evaluation of the fishway.

2. Conduct targeted electrofishing and angling in likely fish holding spots in the bypassed reach (e.g., Prospect Creek confluence) to capture Bull Trout and other target species and immediately transport them upstream of the dam. NorthWestern will annually determine, after consultation with the Agencies and CSKT, specific methods and locations for fish collection techniques in the bypassed reach.

3. If during implementation of the Tier 3 Measures there are any disagreements between NorthWestern and the Agencies and CSKT about fish capture methods, locations, or level of effort, NorthWestern will prepare a report, after consultation with Agencies and CSKT, that includes its proposal and any recommendations from the Agencies and CSKT and submit to FERC for approval following no less than 30 day review period. When filing the report with FERC, NorthWestern will include its reasons, based on Project-specific information, if it does not adopt a recommendation submitted by an Agency or CSKT. Upon FERC approval of the report, NorthWestern will implement its proposal with any modifications required by FERC.

10.1.2 Downstream Passage

To mitigate for Project effects on Bull Trout downstream passage survival, and to aid in enhancing the migratory life history types for this species, NorthWestern will implement a juvenile Bull Trout collection and transport program in the Thompson River drainage, which flows into the Project Reservoir. As described in detail below, during the first 10 years following license issuance, NorthWestern will develop, implement, and assess a collection and transport program using juvenile Bull Trout captured in two Thompson River tributaries (i.e., West Fork Thompson River and Fishtrap Creek). A proportion of captured Bull Trout will be PIT tagged and released downstream in Lake Pend Oreille, and a proportion will be PIT tagged and released on site to aid in evaluating the efficacy of the transport program.[4] Specifically, the program will include the following:

1. Use backpack electrofishing to capture out-migrating juvenile Bull Trout from the West Fork Thompson River and Fishtrap Creek. Based on Avista's efforts to collect juvenile Bull Trout in tributaries to the Cabinet Gorge and Noxon Rapids Reservoirs, collection efforts will occur annually in the fall. Five days of electrofishing effort will occur in each tributary from mid-October to the first part of November. Northwestern will collect genetic samples and implant PIT tags in all sampled Bull Trout to provide information on the location of origination, parentage, and to aid in evaluating the effectiveness of the downstream passage program.

2. Continue to operate and maintain PIT-tag arrays in the Thompson River drainage (i.e., within the lower 0.5-mi of mouth of the Thompson River mainstem, West Fork Thompson River, and Fishtrap Creek). These temporary PIT-tag array systems may be moved as

[4] For example, program success could be determined by comparing detections of adult returns from transported fish to detections of fish released on site in the tributaries (i.e., individuals not transported).

needed within the designated reaches based on flow conditions, shifts in habitat, PIT array effectiveness analysis, or other conditions that warrant their relocation.

3. Transport a portion of collected Bull Trout downstream to Lake Pend Oreille[5] and release a portion of collected Bull Trout on site to allow for evaluation of efficacy of the transport program.

4. Use the PIT tag monitoring data to evaluate the success of the Bull Trout adfluvial transport program by comparing the number of adfluvial returns and the number of non-transported fish (i.e., individuals released on site). This could be accomplished using data from the tributary PIT-tag arrays, Bull Trout detected at the Thompson Falls upstream fishway, and Bull Trout detected at Avista's downstream Clark Fork Project. NorthWestern will determine on an annual basis, after consultation with the Agencies and CSKT, the specific proportion of juvenile Bull Trout to be transported versus released on site. If there are any disagreements between NorthWestern and the Agencies and CSKT about the proportion of juvenile Bull Trout to be transported versus released on site, NorthWestern will prepare a report for FERC approval that includes its proposal and any recommendations from the Agencies and CSKT for the proportion of fish to be transported. At a minimum, NorthWestern will prepare the report for review and comment by the Agencies and CSKT, allowing at least 30 days to provide comments and recommendations on the draft before filing the final report with FERC for approval. When filing the final report with FERC, NorthWestern will include its reasons, based on Project-specific information, if it does not adopt a recommendation submitted by an Agency or CSKT. Upon FERC approval of the report, and upon acquiring other federal or state permits that may be required, NorthWestern will implement the program as proposed with any modifications required by FERC.

5. The initial collection and transport program described in items 1 through 4 above will be implemented for the first 10 years following license issuance.

6. If after the initial 10-year evaluation period NorthWestern determines, after consultation with the Agencies and CSKT, that a change in the transport program is warranted based on the monitoring and evaluation program, NorthWestern will prepare a report with its proposed modifications to the program and file it with FERC for approval.

7. NorthWestern will continue to implement the transport program for the remainder of the license term, including any modifications required by FERC. If at any point during the remainder of the license term NorthWestern determines, after consultation with the Agencies and CSKT, that the transport program should be modified (e.g., change in proportion of fish transported downstream versus released on site) based on ongoing monitoring and evaluation, NorthWestern will prepare a report with its proposed modifications and file it with FERC for approval.

[5] NorthWestern will coordinate with Avista and Montana Fish, Wildlife and Parks to transport fish around the Clark Fork Project and release into Lake Pend Oreille.

8. If there are any disagreements between NorthWestern and the Agencies and CSKT about whether or how to modify the transport program pursuant to items 6 and 7 above, NorthWestern will include in the report for FERC approval its proposal and any recommendations from the Agencies and CSKT for modifying the transport program. At a minimum, NorthWestern will prepare the report for review and comment by the Agencies and CSKT, allowing at least 30 days to provide comments and recommendations on the draft before filing the final report with FERC for approval. When filing the final report with FERC, NorthWestern will include its reasons, based on Project-specific information, if it does not adopt a recommendation submitted by an Agency or CSKT. Upon FERC approval of the report, NorthWestern will modify the transport program as proposed with any changes required by FERC.

10.2 Fishway Operations and Maintenance Plan

NorthWestern will implement the FOMP that describes how NorthWestern will operate the Project fish passage facility over the new license term. The FOMP includes the following:

1. NorthWestern will seasonally operate the fish passage facility from approximately March – October.
2. NorthWestern will implement spring closures when total river discharge is within 48,000 to 65,000 cfs. NorthWestern will notify the Agencies and CSKT within 5 days of closing the fish passage facility and within 5 days of reopening the fish passage facility.
3. A provision to develop an engineered solution to provide adequate flow to the upstream fish passage facility at all water surface elevations down to 2.5 feet below full pool. This work will be completed prior to NorthWestern's implementation of flexible generation between 2.0-2.5 feet below full pool during periods when the fish passage facility is operating.
4. Standard operating procedures, fish handling and tagging protocols, a description of priority fish species, and a maintenance and inspection schedule.
5. Annually, by March 31 of each year, NorthWestern will file an annual report with FERC summarizing upstream passage activities during the prior calendar year. The annual report will include the following: 1) fishway operations and river conditions, 2) any repairs or modifications to the fishway, 3) any deviations from normal fishway operations due to planned or unplanned circumstances, 4) fish capture results, 5) fish tagging at the fishway, 6) tag detections on tributary PIT arrays, and 7) angler recaptures of fish using the fishway. NorthWestern will prepare the report for review and comment by the Agencies and CSKT, allowing at least 30 days for comments on the draft, before filing the final report with FERC.
6. Procedures for updating the FOMP if needed based on any potential permanent modifications to the fishway as a result of implementing the PM&E Plan.

10.3 Water Quality Monitoring Plan

NorthWestern will implement the Thompson Falls Water Quality Monitoring Plan (Final License Application, Exhibit E, Appendix C), which was developed in consultation with DEQ.

10.4 TDG Control Plan

NorthWestern will implement the updated 2024 TDG Control Plan (Final License Application Exhibit E Attachment G), which was developed in consultation with DEQ.

10.5 Noxious Weed Control

NorthWestern will implement annual noxious weed control measures, as appropriate, in high-use areas on Project lands owned by the Licensee.

10.6 Drawdown Management Plan

At least six months prior to any planned deep drawdown necessary for Project maintenance or repairs, NorthWestern will develop and implement a Drawdown Management Plan. The Drawdown Management Plan will be submitted to FERC for approval, following consultation with DEQ, FWS, FWP, SHPO, and USFS. Development of the Drawdown Management Plan will involve work internally and with consultants to review the data collected during previous drawdowns in order to develop appropriate drawdown rates, monitoring plans, and emergency response protocols.

The monitoring measures in the Drawdown Management Plan are likely to include visual monitoring during the drawdown, installation and monitoring of temporary arrays of monitoring pins during the drawdown, and monitoring of slope stability by boat. Potential impacts to reservoir fisheries from drawdowns will be assessed via fall gillnetting. The Drawdown Management Plan will include specific measures to be implemented at different elevations, with more intensive monitoring at elevations that are more likely to result in slope instability.

10.7 Project Minumum Flow

NorthWestern will release a minimum flow at the Project of 6,000 cfs or inflow, whichever is less. These releases may be temporarily modified if required by operating emergencies beyond NorthWestern’s control and for short periods on mutual agreement between NorthWestern, FWS, DEQ, and FWP. NorthWestern expects to implement FERC’s standard reporting requirements for planned and unplanned deviations from Project operational requirements (e.g., minimum flows and reservoir elevations).

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Appendix A: FWS ECOS-IPAC

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United States Department of the Interior

FISH AND WILDLIFE SERVICE
Montana Ecological Services Field Office
585 Shephard Way, Suite 1
Helena, MT 59601-6287
Phone: (406) 449-5225 Fax: (406) 449-5339

In Reply Refer To: 10/24/2025 12:18:06 UTC
Project Code: 2026-0008220
Project Name: Thompson Falls Hydroelectric Project - FERC relicensing

Subject: List of threatened and endangered species that may occur in your proposed project location or may be affected by your proposed project

To Whom It May Concern:

The enclosed species list identifies threatened, endangered, proposed and candidate species, as well as proposed and final designated critical habitat, that may occur within the boundary of your proposed project and/or may be affected by your proposed project. The species list fulfills the requirements of the U.S. Fish and Wildlife Service (Service) under section 7(c) of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 *et seq.*).

New information based on updated surveys, changes in the abundance and distribution of species, changed habitat conditions, or other factors could change this list. Please feel free to contact us if you need more current information or assistance regarding the potential impacts to federally proposed, listed, and candidate species and federally designated and proposed critical habitat. Please note that under 50 CFR 402.12(e) of the regulations implementing section 7 of the Act, the accuracy of this species list should be verified after 90 days. This verification can be completed formally or informally as desired. The Service recommends that verification be completed by visiting the IPaC website at regular intervals during project planning and implementation for updates to species lists and information. An updated list may be requested through the IPaC system by completing the same process used to receive the enclosed list.

The purpose of the Act is to provide a means whereby threatened and endangered species and the ecosystems upon which they depend may be conserved. Under sections 7(a)(1) and 7(a)(2) of the Act and its implementing regulations (50 CFR 402 *et seq.*), Federal agencies are required to utilize their authorities to carry out programs for the conservation of threatened and endangered species and to determine whether projects may affect threatened and endangered species and/or designated critical habitat.

A Biological Assessment is required for construction projects (or other undertakings having similar physical impacts) that are major Federal actions significantly affecting the quality of the human environment as defined in the National Environmental Policy Act (42 U.S.C. 4332(2)(c)). For projects other than major construction activities, the Service suggests that a biological evaluation similar to a Biological Assessment be prepared to determine whether the project may affect listed or proposed species and/or designated or proposed critical habitat. Recommended contents of a Biological Assessment are described at 50 CFR 402.12.

If a Federal agency determines, based on the Biological Assessment or biological evaluation, that listed species and/or designated critical habitat may be affected by the proposed project, the agency is required to consult with the Service pursuant to 50 CFR 402. In addition, the Service recommends that candidate species, proposed species and proposed critical habitat be addressed within the consultation. More information on the regulations and procedures for section 7 consultation, including the role of permit or license applicants, can be found in the "Endangered Species Consultation Handbook" at:

https://www.fws.gov/sites/default/files/documents/endangered-species-consultation-handbook.pdf

Migratory Birds: In addition to responsibilities to protect threatened and endangered species under the Endangered Species Act (ESA), there are additional responsibilities under the Migratory Bird Treaty Act (MBTA) and the Bald and Golden Eagle Protection Act (BGEPA) to protect native birds from project-related impacts. Any activity resulting in take of migratory birds, including eagles, is prohibited unless otherwise permitted by the U.S. Fish and Wildlife Service (50 C.F.R. Sec. 10.12 and 16 U.S.C. Sec. 668(a)). For more information regarding these Acts, see https://www.fws.gov/program/migratory-bird-permit/what-we-do.

It is the responsibility of the project proponent to comply with these Acts by identifying potential impacts to migratory birds and eagles within applicable NEPA documents (when there is a federal nexus) or a Bird/Eagle Conservation Plan (when there is no federal nexus). Proponents should implement conservation measures to avoid or minimize the production of project-related stressors or minimize the exposure of birds and their resources to the project-related stressors. For more information on avian stressors and recommended conservation measures, see https://www.fws.gov/library/collections/threats-birds.

In addition to MBTA and BGEPA, Executive Order 13186: *Responsibilities of Federal Agencies to Protect Migratory Birds*, obligates all Federal agencies that engage in or authorize activities that might affect migratory birds, to minimize those effects and encourage conservation measures that will improve bird populations. Executive Order 13186 provides for the protection of both migratory birds and migratory bird habitat. For information regarding the implementation of Executive Order 13186, please visit https://www.fws.gov/partner/council-conservation-migratory-birds.

We appreciate your concern for threatened and endangered species. The Service encourages Federal agencies to include conservation of threatened and endangered species into their project planning to further the purposes of the Act. Please include the Consultation Code in the header of this letter with any request for consultation or correspondence about your project that you submit to our office.

Attachment(s):

- Official Species List

- USFWS National Wildlife Refuges and Fish Hatcheries
- Bald & Golden Eagles
- Migratory Birds
- Wetlands

OFFICIAL SPECIES LIST

This list is provided pursuant to Section 7 of the Endangered Species Act, and fulfills the requirement for Federal agencies to "request of the Secretary of the Interior information whether any species which is listed or proposed to be listed may be present in the area of a proposed action".

This species list is provided by:

Montana Ecological Services Field Office
585 Shephard Way, Suite 1
Helena, MT 59601-6287
(406) 449-5225

PROJECT SUMMARY

Project Code: 2026-0008220
Project Name: Thompson Falls Hydroelectric Project - FERC relicensing
Project Type: Power Gen - Hydropower - FERC
Project Description: Providing a summary of existing environmental conditions of the Thompson Falls Hydroelectric Project area as related to natural resources (aquatic and terrestrial). The Project area extends downstream of the dam about 0.25 miles and upstream of the dam approximately 12 miles . The Project boundary primarily follows the shoreline of the reservoir and river channel (or the full pool elevation). The FERC license for this Project expires at the end of 2025.

Project Location:

The approximate location of the project can be viewed in Google Maps: https://www.google.com/maps/@47.58063725,-115.19655380621913,14z

Counties: Sanders County, Montana

ENDANGERED SPECIES ACT SPECIES

There is a total of 7 threatened, endangered, or candidate species on this species list.

Species on this list should be considered in an effects analysis for your project and could include species that exist in another geographic area. For example, certain fish may appear on the species list because a project could affect downstream species.

IPaC does not display listed species or critical habitats under the sole jurisdiction of NOAA Fisheries[1], as USFWS does not have the authority to speak on behalf of NOAA and the Department of Commerce.

See the "Critical habitats" section below for those critical habitats that lie wholly or partially within your project area under this office's jurisdiction. Please contact the designated FWS office if you have questions.

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1. NOAA Fisheries, also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

MAMMALS

NAME	STATUS
Canada Lynx *Lynx canadensis* Population: Wherever Found in Contiguous U.S. There is **final** critical habitat for this species. Your location does not overlap the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/3652	Threatened
Grizzly Bear *Ursus arctos horribilis* Population: U.S.A., conterminous (lower 48) States, except where listed as an experimental population There is **proposed** critical habitat for this species. Species profile: https://ecos.fws.gov/ecp/species/7642	Threatened
North American Wolverine *Gulo gulo luscus* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/5123	Threatened

FISHES

NAME	STATUS
Bull Trout *Salvelinus confluentus* Population: U.S.A., coterminous, lower 48 states There is **final** critical habitat for this species. Your location overlaps the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/8212	Threatened

INSECTS

NAME	STATUS
Monarch Butterfly *Danaus plexippus* There is **proposed** critical habitat for this species. Your location does not overlap the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/9743	Proposed Threatened
Suckley's Cuckoo Bumble Bee *Bombus suckleyi* Population: No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/10885	Proposed Endangered

FLOWERING PLANTS

NAME	STATUS
Spalding's Catchfly *Silene spaldingii* There is **proposed** critical habitat for this species. Species profile: https://ecos.fws.gov/ecp/species/3681	Threatened

CRITICAL HABITATS

There is 1 critical habitat wholly or partially within your project area under this office's jurisdiction.

NAME	STATUS
Bull Trout *Salvelinus confluentus* https://ecos.fws.gov/ecp/species/8212#crithab	Final

USFWS NATIONAL WILDLIFE REFUGE LANDS AND FISH HATCHERIES

Any activity proposed on lands managed by the National Wildlife Refuge system must undergo a 'Compatibility Determination' conducted by the Refuge. Please contact the individual Refuges to discuss any questions or concerns.

THERE ARE NO REFUGE LANDS OR FISH HATCHERIES WITHIN YOUR PROJECT AREA.

BALD & GOLDEN EAGLES

Bald and Golden Eagles are protected under the Bald and Golden Eagle Protection Act [2] and the Migratory Bird Treaty Act (MBTA) [1]. Any person or organization who plans or conducts activities that may result in impacts to Bald or Golden Eagles, or their habitats, should follow appropriate regulations and consider implementing appropriate avoidance and minimization measures, as described in the various links on this page.

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1. The Bald and Golden Eagle Protection Act of 1940.
2. The Migratory Birds Treaty Act of 1918.
3. 50 C.F.R. Sec. 10.12 and 16 U.S.C. Sec. 668(a)

There are Bald Eagles and/or Golden Eagles in your project area.

Measures for Proactively Minimizing Eagle Impacts

For information on how to best avoid and minimize disturbance to nesting bald eagles, please review the National Bald Eagle Management Guidelines. You may employ the timing and activity-specific distance recommendations in this document when designing your project/ activity to avoid and minimize eagle impacts. For bald eagle information specific to Alaska, please refer to Bald Eagle Nesting and Sensitivity to Human Activity.

The FWS does not currently have guidelines for avoiding and minimizing disturbance to nesting Golden Eagles. For site-specific recommendations regarding nesting Golden Eagles, please consult with the appropriate Regional Migratory Bird Office or Ecological Services Field Office.

If disturbance or take of eagles cannot be avoided, an incidental take permit may be available to authorize any take that results from, but is not the purpose of, an otherwise lawful activity. For assistance making this determination for Bald Eagles, visit the Do I Need A Permit Tool. For assistance making this determination for golden eagles, please consult with the appropriate Regional Migratory Bird Office or Ecological Services Field Office.

Ensure Your Eagle List is Accurate and Complete
If your project area is in a poorly surveyed area in IPaC, your list may not be complete and you may need to rely on other resources to determine what species may be present (e.g. your local FWS field office, state surveys, your own surveys). Please review the Supplemental Information on Migratory Birds and Eagles, to help you properly interpret the report for your specified location, including determining if there is sufficient data to ensure your list is accurate.

For guidance on when to schedule activities or implement avoidance and minimization measures to reduce impacts to bald or golden eagles on your list, see the "Probability of Presence Summary" below to see when these bald or golden eagles are most likely to be present and breeding in your project area.

NAME	BREEDING SEASON
Bald Eagle *Haliaeetus leucocephalus* This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities. https://ecos.fws.gov/ecp/species/1626	Breeds Jan 1 to Aug 31
Golden Eagle *Aquila chrysaetos* This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities. https://ecos.fws.gov/ecp/species/1680	Breeds Jan 1 to Aug 31

PROBABILITY OF PRESENCE SUMMARY

The graphs below provide our best understanding of when birds of concern are most likely to be present in your project area. This information can be used to tailor and schedule your project activities to avoid or minimize impacts to birds. Please make sure you read "Supplemental Information on Migratory Birds and Eagles", specifically the FAQ section titled "Proper Interpretation and Use of Your Migratory Bird Report" before using or attempting to interpret this report.

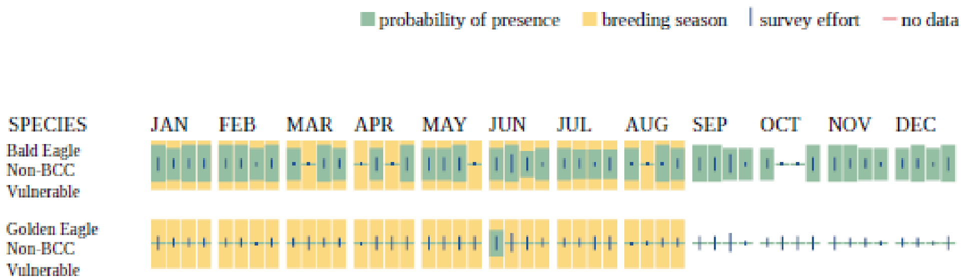
Probability of Presence (■)

Green bars; the bird's relative probability of presence in the 10km grid cell(s) your project overlaps during that week of the year.

Breeding Season (■)
Yellow bars; liberal estimate of the timeframe inside which the bird breeds across its entire range.

Survey Effort (|)
Vertical black lines; the number of surveys performed for that species in the 10km grid cell(s) your project area overlaps.

No Data (–)
A week is marked as having no data if there were no survey events for that week.



Additional information can be found using the following links:

- Eagle Management https://www.fws.gov/program/eagle-management
- Measures for avoiding and minimizing impacts to birds https://www.fws.gov/library/collections/avoiding-and-minimizing-incidental-take-migratory-birds
- Nationwide avoidance and minimization measures for birds https://www.fws.gov/sites/default/files/documents/nationwide-standard-conservation-measures.pdf
- Supplemental Information for Migratory Birds and Eagles in IPaC https://www.fws.gov/media/supplemental-information-migratory-birds-and-bald-and-golden-eagles-may-occur-project-action

MIGRATORY BIRDS

The Migratory Bird Treaty Act (MBTA) [1] prohibits the take (including killing, capturing, selling, trading, and transport) of protected migratory bird species without prior authorization by the Department of Interior U.S. Fish and Wildlife Service (Service).

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1. The Migratory Birds Treaty Act of 1918.
2. The Bald and Golden Eagle Protection Act of 1940.
3. 50 C.F.R. Sec. 10.12 and 16 U.S.C. Sec. 668(a)

For guidance on when to schedule activities or implement avoidance and minimization measures to reduce impacts to migratory birds on your list, see the "Probability of Presence Summary" below to see when these birds are most likely to be present and breeding in your project area.

NAME	BREEDING SEASON
Bald Eagle *Haliaeetus leucocephalus* This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities. https://ecos.fws.gov/ecp/species/1626	Breeds Jan 1 to Aug 31
California Gull *Larus californicus* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/10955	Breeds Mar 1 to Jul 31
Calliope Hummingbird *Selasphorus calliope* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9526	Breeds May 1 to Aug 15
Cassin's Finch *Haemorhous cassinii* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9462	Breeds May 15 to Jul 15
Clark's Grebe *Aechmophorus clarkii* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/10575	Breeds Jun 1 to Aug 31
Evening Grosbeak *Coccothraustes vespertinus* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9465	Breeds May 15 to Aug 10
Golden Eagle *Aquila chrysaetos* This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities. https://ecos.fws.gov/ecp/species/1680	Breeds Jan 1 to Aug 31
Lewis's Woodpecker *Melanerpes lewis* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9408	Breeds Apr 20 to Sep 30
Olive-sided Flycatcher *Contopus cooperi* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/3914	Breeds May 20 to Aug 31
Rufous Hummingbird *Selasphorus rufus* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/8002	Breeds Apr 15 to Jul 15

NAME	BREEDING SEASON
Western Grebe *aechmophorus occidentalis* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/6743	Breeds Jun 1 to Aug 31

PROBABILITY OF PRESENCE SUMMARY

The graphs below provide our best understanding of when birds of concern are most likely to be present in your project area. This information can be used to tailor and schedule your project activities to avoid or minimize impacts to birds. Please make sure you read "Supplemental Information on Migratory Birds and Eagles", specifically the FAQ section titled "Proper Interpretation and Use of Your Migratory Bird Report" before using or attempting to interpret this report.

Probability of Presence (■)

Green bars; the bird's relative probability of presence in the 10km grid cell(s) your project overlaps during that week of the year.

Breeding Season (■)

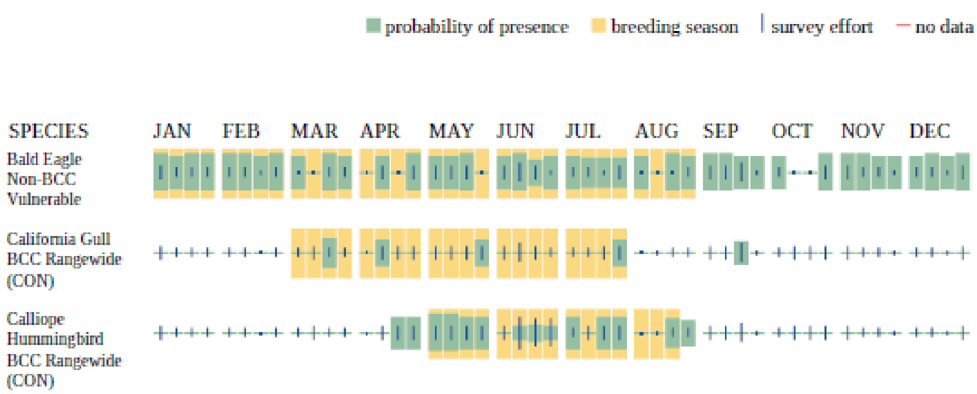
Yellow bars; liberal estimate of the timeframe inside which the bird breeds across its entire range.

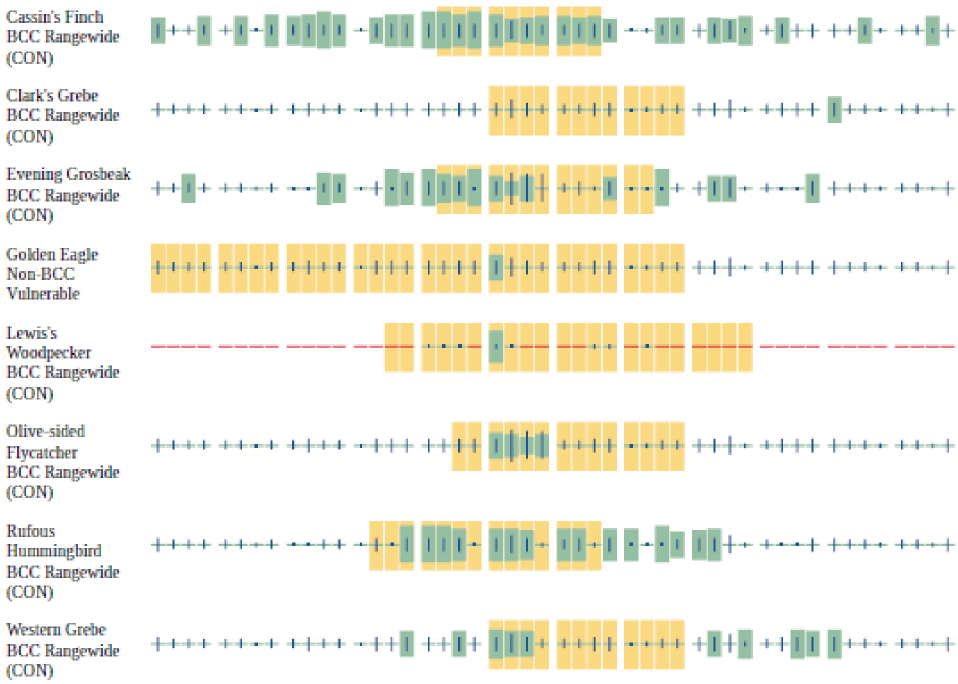
Survey Effort (|)

Vertical black lines; the number of surveys performed for that species in the 10km grid cell(s) your project area overlaps.

No Data (–)

A week is marked as having no data if there were no survey events for that week.





Additional information can be found using the following links:

- Eagle Management https://www.fws.gov/program/eagle-management
- Measures for avoiding and minimizing impacts to birds https://www.fws.gov/library/collections/avoiding-and-minimizing-incidental-take-migratory-birds
- Nationwide avoidance and minimization measures for birds
- Supplemental Information for Migratory Birds and Eagles in IPaC https://www.fws.gov/media/supplemental-information-migratory-birds-and-bald-and-golden-eagles-may-occur-project-action

WETLANDS

Impacts to NWI wetlands and other aquatic habitats may be subject to regulation under Section 404 of the Clean Water Act, or other State/Federal statutes.

For more information please contact the Regulatory Program of the local U.S. Army Corps of Engineers District.

Please note that the NWI data being shown may be out of date. We are currently working to update our NWI data set. We recommend you verify these results with a site visit to determine the actual extent of wetlands on site.

RIVERINE
- R3UBF
- R5UBH
- R3USA
- R3USC
- R4SBC
- R3UBH

LAKE
- L1UBHh
- L2USCh
- L2USAh
- L2ABGh

FRESHWATER POND
- PABF

FRESHWATER EMERGENT WETLAND
- PEM1C
- PEM1F
- PEM1Ah
- PEM1A

FRESHWATER FORESTED/SHRUB WETLAND
- PSS1A
- PSS1Ah
- PFO1A

IPAC USER CONTACT INFORMATION

Agency: Private Entity
Name: Kyle Olcott
Address: 5331 S Macadam Avenue, Suite 273
City: Portland
State: OR
Zip: 97239
Email kolcott@geiconsultants.com
Phone: 5037424946