# BULL TROUT MOVEMENT AND LIFE HISTORY INVESTIGATION 2022

## WELLS HYDROELECTRIC PROJECT

## FERC NO. 2149

January 2022

Public Utility District No. 1 of Douglas County

# 1.0 BACKGROUND

According to the Wells Hydroelectric Project's (Wells Project) license requirements, Public Utility District No. 1 of Douglas County (Douglas PUD) is to perform a year ten study to verify the ongoing safe and effective passage of migratory Bull Trout at the Wells Project and the Twisp River Weir (See Sections 4.2.1 and 4.2.2 of the Bull Trout Management Plan [BTMP] as required by the Aquatic Settlement Agreement and Clean Water Act Section 401 Water Quality Certification [401 Certification], 4.1, 4.6, and 4.7 of the Section 18 Fishway Prescriptions, and Terms and Conditions of the 2012 Biological Opinion for the Wells Project). The Incidental Take Statement requires the use of radio telemetry to determine if 95% survival and 90% passage rates continue at the Wells Project and the Twisp River Weir (see Terms and Conditions #2, #10, #11).

During late 2020 and early 2021, Douglas PUD worked with the Aquatic Settlement Workgroup (Aquatic SWG), including the Washington Department of Ecology (Ecology) and the United States Fish and Wildlife Service (USFWS) to develop a study plan that would meet Section 4.2.1 and 4.2.1 of the BTMP, Section 18 Fishway Prescription, the Terms and Conditions of the 2012 Biological Opinion, and the 401 Certification. The Study Plan for this required year ten study proposed to use radio-telemetry as the method to meet these requirements and was approved by all parties to the Aquatic Settlement Agreement, including the USFWS during a normally scheduled monthly conference call held on February 10, 2021. After further review, the USFWS, with unanimous approval from signatories to the Aquatic Settlement Agreement, determined that local populations that interact with the Wells Project and the Twisp River Weir are low enough that radio telemetry surgeries should be avoided, especially given that estimates of survival and passage that have previously been demonstrated exceed performance standards (approved Aquatic SWG Bull Trout SOA May 12, 2021).

On June 22, 2021, Douglas PUD submitted a request to the Federal Energy Regulatory Commission (FERC) for a variance to Article 402 of the license which includes stranding evaluations and incidental take studies as described in Sections 4.4, 4.5.1, and 4.6.1 of the Aquatic Settlement Agreement's BTMP. The variance requested suspension of the 2021 (Year-10) Bull Trout Passage and Survival Radio Telemetry Study based on concerns outlined in the Statement of Agreement (SOA) and approved by the Aquatic SWG on May 12, 2021. The SOA stated that Douglas PUD would continue to monitor Bull Trout populations via a passive integrated transponder (PIT) tag study and through other requirements of the Plan, Aquatic Settlement Agreement, Section 18 Fishway Prescriptions, 2012 Biological Opinion, and 401 Certification. On October 12, 2021, the FERC approved this variance.

This plan outlines the objectives and methodology of a PIT-tag study to monitor adult Bull Trout (≥400 mm fork length) movements and interactions with the Wells Project Fishways and Twisp River Weir.

## 2.0 OBJECTIVES

- **Objective 1 (BTMP 4.2.1)** Determine the frequency of and describe (timing, upstream passage counts) interactions of PIT-tagged adult Bull Trout with the Wells Project Fishways.

- **Objective 2 (BTMP 4.2.2)** Determine the frequency of and describe (timing) interactions of PIT-tagged adult Bull Trout within the Twisp River basin [upstream and downstream counts at Twisp River (TWR)] and Weir (trap counts).

- **Objective 3 (BTMP 4.5.3)** To support information exchange and regional monitoring efforts, describe tributary use, residency times, and migration extent of PIT-tagged adult Bull Trout within the mid-Columbia River and tributaries (including the Okanogan, Methow, Entiat and Wenatchee River Basins).

  **Objective 4 (BTMP 4.5.2)** Collect tissue samples from up to n=60 adult Bull Trout and fund genetic analysis to assign individual fish to local population groups.

# 3.0 METHODS

## 3.1 Study Area

The main focus of this study will be in the mainstem Columbia River from Wells Project upstream and the Methow River Basin and tributaries, specifically the Twisp River. However, PIT-tagged Bull Trout (study fish) movements will be tracked via detections on adult fishway arrays and in-stream remote arrays from Rock Island Dam upstream, including detection sites in the Wenatchee, Entiat, Methow, and Okanogan River Basins (Figure 1).

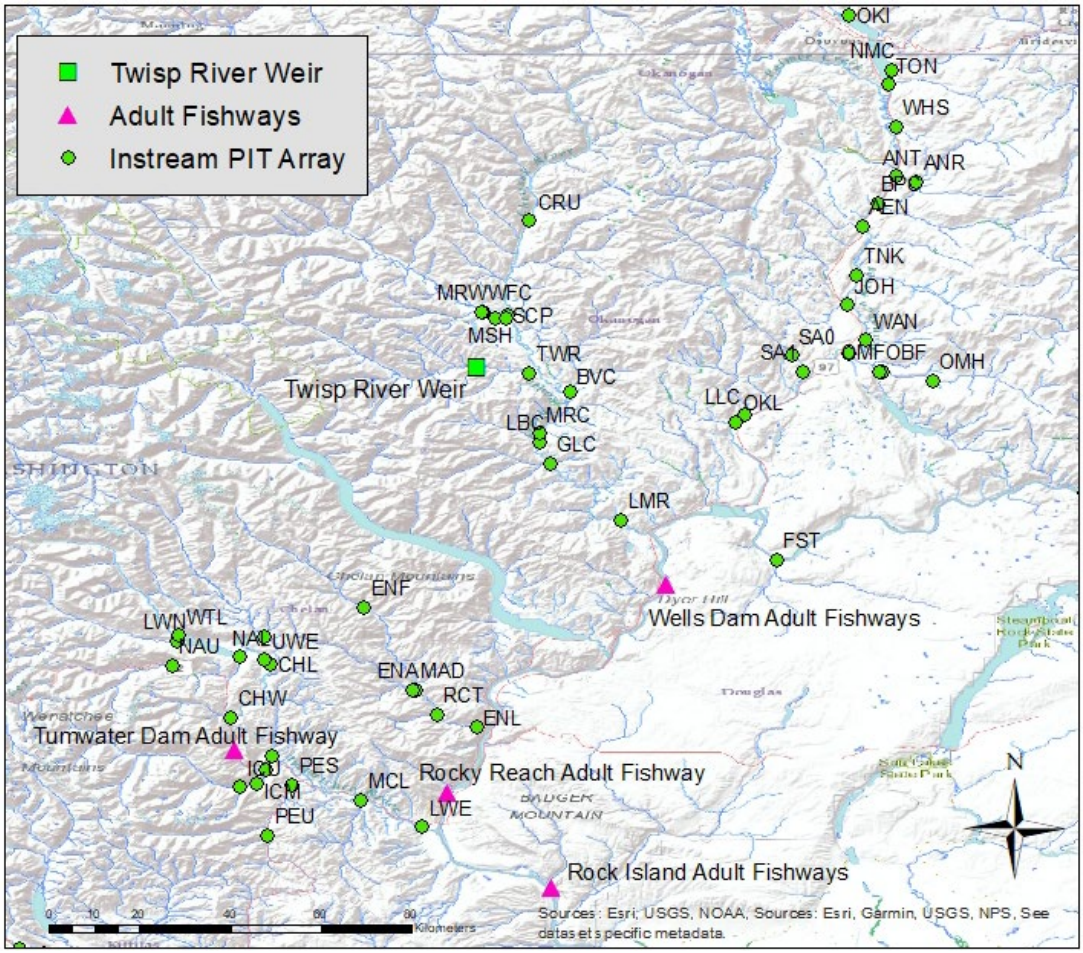


**Figure 1. Locations of adult fishway and instream remote PIT arrays and the Twisp River Weir.**

## 3.2 Study Fish

Up to 60 adult Bull Trout will be captured and PIT-tagged. The primary sources of study fish will be the Wells Project Fishway traps (east and west fishways) and the Twisp River Weir trap. In addition, Bull Trout that are incidentally captured within the Wells Project Area or in the Twisp River or Lower Methow River (below the Twisp River confluence) during other activities,

such as steelhead broodstock collection, hatchery monitoring and evaluation, or resident fish monitoring activities, will also be utilized under the assumption that these fish may interact with Wells Project facilities.

Existing PIT-tagged Bull Trout at large will also be included in the study if they meet the following criteria:

1. The fish was tagged at adult size (or if tagged as a juvenile or sub adult has subsequently been recaptured at adult size). Pursuant to the BTMP 400 mm fork length will be considered a minimum tagging or study fish size.
2. The fish has been detected on the Wells Project Fishways PIT arrays or on in-stream PIT arrays in the lower Methow River (LMR) or Twisp River (TWR) or captured at the Twisp River Weir in the previous year and tagged as an adult.
3. Arrive at Wells Project or TWR during the study period and were tagged as an adult by an agency or tribal partner.

Captured Bull Trout that do not meet the above criteria will be PIT tagged and measured, however they will not be included in the analysis of interaction and movement metrics.

## 3.3 Fish Handling and PIT-Tagging

Bull Trout that are captured using the Wells Project Fishways traps will be held in a holding tank (east fishway) or concrete holding pond (west fishway) which receive a constant supply of river water to maintain safe temperature and oxygen levels. Fish captured at the Twisp River Weir will be held in a trap box consisting of aluminum pickets submerged in the river. Bull Trout captured incidentally during other activities will be held in knotless nets or knotless net live pens in-river or in a 700L holding tank with a constant supply of river water provided via a live well pump. If fish are held in a holding tank for greater than one hour, temperature and dissolved oxygen will be monitored to ensure parameters are within safe levels for Bull Trout. Bull Trout will be removed from holding areas for PIT-tagging and data and tissue sample collection. In situations where handling and tagging could result in injury or excess handling time, fish will be anesthetized with MS-222 or by electronarcosis.

Each Bull Trout will be scanned for an existing PIT-tag. If no tag is present, a 12mm full duplex PIT-tag will be implanted into the pelvic girdle of the fish using a hypodermic needle. A small tissue sample (fin clip) will be taken from the caudal fin of the fish and stored on chromatography paper. All fish handling, tagging, and data collection will be performed by Douglas PUD staff or contractor possessing experience and training in safe fish handling and tagging procedures.

Data collected on each fish will include:

PIT tag code (existing or new)
Fork length (mm)
Date/time of capture

DNA sample taken and vial ID recorded
Location captured (Fishway trap, Weir, other location with GPS coordinates)
Release location
Release date/time

Fish that are anesthetized will be allowed to recover (regain equilibrium, normal respiration, and rheotaxis) before release. Fish captured in the Wells Project Fishway traps and the Twisp River Weir trap will be transported upstream and released (Starr boat launch and Buttermilk Creek confluence, respectively) to prevent fall back associated with handling related stress. Fish that are captured and tagged incidentally during other activities will be released at the location of capture.

Genetic Analysis

Douglas PUD will provide genetic samples and fund genetic analysis for local population assignment for 60 Bull Trout. Samples will be analyzed using similar methods as described in DeHaan et al. (2014) and Robichaud and Gingerich (2017) and will be similarly analyzed and compared against baseline local population genotypes determined in DeHaan and Neibauer (2012). Fish will be assigned to sub-basin and local population and confidence in assignment will be reported on a probability scale of 0-1.

## 3.4 Tracking Movements and Interactions

PIT tag data from all Bull Trout tagged during the study will be uploaded to the PTAGIS database. Queries of the PTAGIS database for detections of tagged Bull Trout and information from fishway count station video footage and Twisp River Weir trap observations will be used to develop detection histories for each individual fish and summarize metrics associated with study objectives including:

Objective 1 – Interactions with the Wells Project Fishways

- Detections on PIT arrays in Pools 19 and 67
    - Passage direction – upstream/downstream
    - Seasonal timing – month/day of year
    - Diel timing – time of day
- Fish Count Station Video (video footage with timestamp)
    - Counts of all Bull Trout passing count station
    - Seasonal timing – month/day of year
    - Diel timing – time of day
    - Fish length estimation

Objective 2 – Interactions with Twisp River Weir

- Detections on TWR PIT array
    - Passage direction – upstream/downstream
    - Seasonal timing – month/day of year
    - Diel timing – time of day

- Twisp River Weir Trap
    - Number of fish trapped (moving upstream)
    - Seasonal timing – month/day of year
    - Diel timing (day/night)

Objective 3 – Tributary Use

- Detections on In-stream PIT Arrays
    - Passage direction – upstream/downstream (for multiple antenna arrays)
    - Seasonal timing – month/day of year
    - Diel timing – time of day
    - Tributary residency time – time between detections entering/exiting
    - Frequency of movements within/among river basins

Objective 4 – Genetic Analysis

- Collect and catalog tissue samples to be used in future genetic analysis
- Fund genetic analysis of up to 60 Bull Trout to assign to local populations groups
- Determine rates of fidelity to natal tributaries during spawning periods.

**Environmental and Hydrologic Conditions**

Environmental and hydrologic conditions in the mainstem Columbia River, Methow, Twisp, and Okanogan rivers will be summarized over the duration of the study and compared to 10-year average values to determine if study fish experienced abnormal or extreme conditions that may have influenced observed patterns of movements and interactions. The metrics that will be summarized and examined include: discharge, water temperature, and mean daily percent spill at Wells Dam.

Due to the limitations of PIT tag detection data, specifically the inability to determine the exact location of study fish between detection sites, it is not possible to attribute fine scale hydrologic and Wells Dam operational conditions to individual Bull Trout passage interactions.

## 3.5 Reporting

During the Bull Trout capture and tagging phase of the study the Aquatic SWG will be given monthly updates on the progress towards the goal of PIT-tagging 60 Bull Trout. The majority of tagging is expected to take place between May and June at the Wells Project and in July at the Twisp River Weir. Spring tagging may occur in the Methow concurrent with broodstock collection activities. A report summarizing the metrics calculated under each study objective and plots of individual Bull Trout detection histories will be provided to the Aquatic SWG in (the fall of 2023). Updates with detection history plots and last detection locations for each tagged Bull

Trout will be provided every six months. Additional updates may be provided at the request of the Aquatic SWG.

## 4.0 REFERENCES

DeHaan, P., B. Adams, and M. Nelson. 2014. Fine-scale population structure analysis and genetic population assignments of Wenatchee River sub-basin bull trout. U.S. Fish and Wildlife Service. Abernathy Fish Technology Center. Longview, WA.

DeHaan, P., and J. Neibauer. 2012. Analysis of genetic variation within and among upper Columbia River Bull Trout populations. U.S. Fish and Wildlife Service. Abernathy Fish Technology Center. Longview, WA.

Robichaud D. and A. Gingerich. 2017. Bull Trout Passage and Take Monitoring at Wells Dam and the Twisp River Weir FINAL REPORT. Public Utility District No. 1 of Douglas County, East Wenatchee, WA