NWE-THF-4104

Ms. Kimberly D. Bose
Secretary
Federal Energy Regulatory Commission
888 First Street, NE
Washington, DC 20426

June 9, 2022

Re: Thompson Falls Hydroelectric Project P-1869-060
Filing of Initial Study Report Meeting Summary

Dear Secretary Bose:

NorthWestern Energy (NorthWestern) is currently engaged in the relicensing of the Thompson Falls Hydroelectric Project (P-1869) (Project) using the Federal Energy Regulatory Commission's (FERC's) Integrated Licensing Process (ILP). In accordance with 18 C.F.R. § 5.15(c)(3), NorthWestern hereby files its summary of the Initial Study Report (ISR) meeting held on May 5, 2022.

NorthWestern filed its ISR with FERC on April 28, 2022 per FERC's ILP regulations (18 C.F.R. § 5.15(c)(1)). The ISR included a summary and described the seven studies approved in the Study Plan Determination issued on May 10, 2021, identified minor variances from the approved Study Plan Determination, presented results of the first season of studies (2021), and proposed to modify one study by extending it into the second study season (2022). Relicensing participants were notified of the filing and provided a link and the address for the NorthWestern's Project relicensing website where the ISR is posted.

As required under FERC's ILP regulations (18 C.F.R. § 5.15(c)(2)), NorthWestern hosted an ISR meeting on Thursday, May 5, 2022. The meeting was held at NorthWestern's Missoula, MT office, 1801 South Russell Street, from 9:00 AM until 2:00 PM. A virtual option (Zoom) was also available. FERC staff, resource agencies, tribes, local government authorities, and other relicensing participants attended, in person or virtually.

The summary of the ISR meeting is included as **Attachment 1**. It includes the meeting agenda, attendees and a discussion of relevant issues raised in the meeting. A copy of the summary is posted on NorthWestern's Project relicensing website, https://www.northwesternenergy.com/clean-energy/hydropower/thompson-falls-hydro-project/relicensing-documents. Notification that the summary is available has also been provided to relicensing participants, and the distribution list is attached as **Attachment 2**.

According to FERC's Process Plan and Schedule for the Project's relicensing, any disagreements or other comments on NorthWestern's ISR meeting summary must be filed by July 9, 2022[1] (18 C.F.R. § 5.15(c)(4)).

[1] Any deadlines falling on a Saturday, Sunday or legal holiday will extend through the next business day.

Responses to any such disagreements or comments must be filed by August 8, 2022 (18 C.F.R. § 5.15(c)(5)), with FERC's study plan determination expected by September 7, 2022.

Should you have any questions, please contact me at (406) 497-3382, or via email at marygail.sullivan@northwestern.com.

Sincerely,

Mary Gail Sullivan
Director, Environmental and Lands Permitting & Compliance

CC: Andy Welch, NorthWestern Energy
John Tabaracci, NorthWestern Energy

Attachment 1: Initial Study Report Meeting Summary
Attachment 2: Distribution List

ATTACHMENT 1
Thompson Falls Hydroelectric Project #1869-060
NorthWestern Energy
Initial Study Report Meeting
Meeting Summary

Introduction

On May 5, 2022, NorthWestern Energy (NorthWestern) hosted the Thompson Falls Hydroelectric Project (Project) Initial Study Report (ISR) meeting as required by the Federal Energy Regulatory Commission's (FERC's) Integrated Licensing Process regulations (18 C.F.R. § 5.15(c)(2)). An in-person meeting was held at NorthWestern's offices in Missoula, MT. The meeting included a virtual option on Zoom. The meeting agenda is shown below. PowerPoint slides presented at the meeting by NorthWestern representatives are attached as **Exhibit A**. The presentations included discussion of the first year of studies' findings and results, minor variances, one proposed modification to the approved Study Plan, and updates on schedule. During the ISR meeting, a comment and question period followed each presentation. Attendees are shown in **Exhibit B**.

Meeting Agenda

Start Time	Topic
9:00 AM	Introduction and Zoom Tips, Overview of the FERC Process
9:15 AM	Operations Study
10:15 AM	Hydraulic Condition Study
10:45 AM	**Break (15 min)**
11:00 AM	Fish Behavior Study
11:30 AM	Downstream Fish Passage Literature Review
12:00 PM	**Lunch (NorthWestern provides)**
12:30 PM	TDG Study
1:00 PM	Visitor Use Survey
1:30 PM	Cultural Resource Study
2:00 PM	Adjourn

Notable discussion topics:

- FERC staff clarified the ILP schedule as follows. NorthWestern has updated the Presentations accordingly (See Exhibit A).

May 5, 2022	NorthWestern Holds Initial Study Report Meeting
June 9, 2022	NorthWestern Files Initial Study Report Meeting Summary
July 9, 2022	Study Disputes or Requests to Modify Study Plan
August 8, 2022	Responses to Any Disputes or Study Requests
September 7, 2022	FERC Study Plan Determination

Operations Study

- NorthWestern described its proposal to modify the Operations Study by extending it into the second study season. There were no comments or questions about the proposal.
- FERC staff asked if noise was considered as part of the aesthetics monitoring component of the Operations Study. NorthWestern responded that because of the proximity of the Project to the town of Thompson Falls, State Highway 200 and an active railroad line, and the existence of significant noise stemming from these sources, noise was not monitored during the Operations Study. In addition FERC's Study Plan Determination did not include a noise study.

Fish Behavior Study

- A total of 16 fish were tagged in the first season. NorthWestern confirmed that the number of fish to be tagged in the Fish Behavior Study is unlikely to reach the maximum number specified in the Study Plan due to environmental conditions during the first study season which led to a truncated sampling season. The Study Plan provided that up to 50 fish would be tagged each season for a total of 100 tagged individuals. No more than 50 fish each year were to be tagged. These estimates represented a maximum proposed number of tags per year and not intended to be an objective target as an aggregate. Although only 16 fish were tagged in the first season, the second season tagging is already ahead of last year and it is anticipated that the number of tagged fish will approach the maximum of 50. If the number of tagged fish exceeds this maximum there is concern that the data collected would be compromised due interfering tag signals. Montana Fish, Wildlife and Parks (FWP) and U.S. Fish and Wildlife Service (FWS) representatives expressed their concurrence with NorthWestern's approach to the fish telemetry tagging program and support for the Fish Behavior Study.

Cultural Resources Study

- The Area of Potential Effect (APE) for the second season Cultural Resources Study was discussed among the Montana State Historic Preservation Office (SHPO), FERC staff, and NorthWestern. A follow up conference call was held on May 25, 2022 with SHPO, FERC staff and NorthWestern. A map of the Cultural Resource APE and SHPO's concurrence with the APE is included as **Exhibit C.**

Visitor Use Survey

- FERC staff asked if the recreation areas for improvement identified in the Pre-Application Document (PAD) came up again in the 2021 Visitor Survey. Issues at the Cherry Creek boat launch site noted during the 2018 visitor survey did not come up in the 2021 survey as improvements were made to address the issues prior to the 2021 study. Conditions at Wild Goose Landing Park remained an issue in 2021, as the restrooms were not open for public use during the 2021 study timeframe. Wild Goose Landing Park is operated and managed by the City of Thompson Falls with annual operation and maintenance funding provided by NorthWestern. In recent years, the restroom conditions declined due to damage from broken plumbing and resulting mold growth. Temporary restrooms and trash cans were installed but were later removed due to vandalism. NorthWestern understands that the City plans to upgrade the restroom and open the facility for public use in 2022.

Exhibit A

Thompson Falls Hydroelectric Project #1869-060

NorthWestern Energy

Initial Study Report Meeting

Meeting Summary Presentation Slides

NorthWestern® Energy

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Thompson Falls Hydroelectric Project No. 1869

Initial Study Plan Meeting

May 5, 2022

Welcome

Thompson Falls Hydroelectric Project Relicensing
Initial Study Report Meeting

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Guidelines for Today's Meeting

In-person Participation

- **One Speaker at a Time:** Limit side conversations to reduce noise distortion so everyone in the room and participating via Zoom can hear.

Virtual Participation via Zoom

- **Video and Audio:** Keep OFF, unless you are speaking as a presenter or called on to ask a question.
  - Phone controls for participants – *6 – to toggle mute/unmute.
- **Technical Difficulties:** If you are having technical issues, please contact Lydia Holland at 916.200.8233, lholland@geiconsultants.com, or use the "Chat" function.

Accurate Attendance

- **In-person:** Be sure to sign-in.
- **Zoom:** If you are shown by a phone number or abbreviated name please send Lydia Holland a message via "Chat" to capture your attendance.

Asking a Question

- **In-person:** Raise your hand to be recognized; once recognized, please speak up to ask your question.
- **Zoom:** During the Q&A – click on the "Chat" icon and type your question or click on the "Raise Your Hand" icon to be recognized; once recognized, please unmute yourself and ask your question.
  - Phone controls for participants – *9 – to raise hand.

Agenda

- The time for each segment of the schedule will be maintained.

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Trains are responsible for many deaths, injuries and property damage incidents every year.

- Always look both ways before crossing railroad tracks.
- Pay attention when near tracks.
- Do not wear headphones or text when near tracks.
- Never stop your vehicle on railroad tracks.
- Never attempt to race across a crossing to avoid waiting for a train to pass.
- Always obey safety signals at crossings.
- Never walk on railroad tracks unless you are crossing at a designated crossing.
- Give trains plenty of space when they are passing.

Schedule

Start Time	Topic
9:00 AM	Introduction and Zoom Tips, Overview of the FERC Process
9:15 AM	Operations Study
10:15 AM	Hydraulic Condition Study
10:45 AM	**Break (15 min)**
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2:00 PM	Adjourn

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- Introductions
  - NorthWestern representatives and consultants representing engineering, operations, legal, and hydro license compliance (including biologists, water quality experts and cultural, land, and recreation specialists).
  - FERC representatives
    - Michael Tust – Licensing Coordinator, Aquatics, Threatened and Endangered Species

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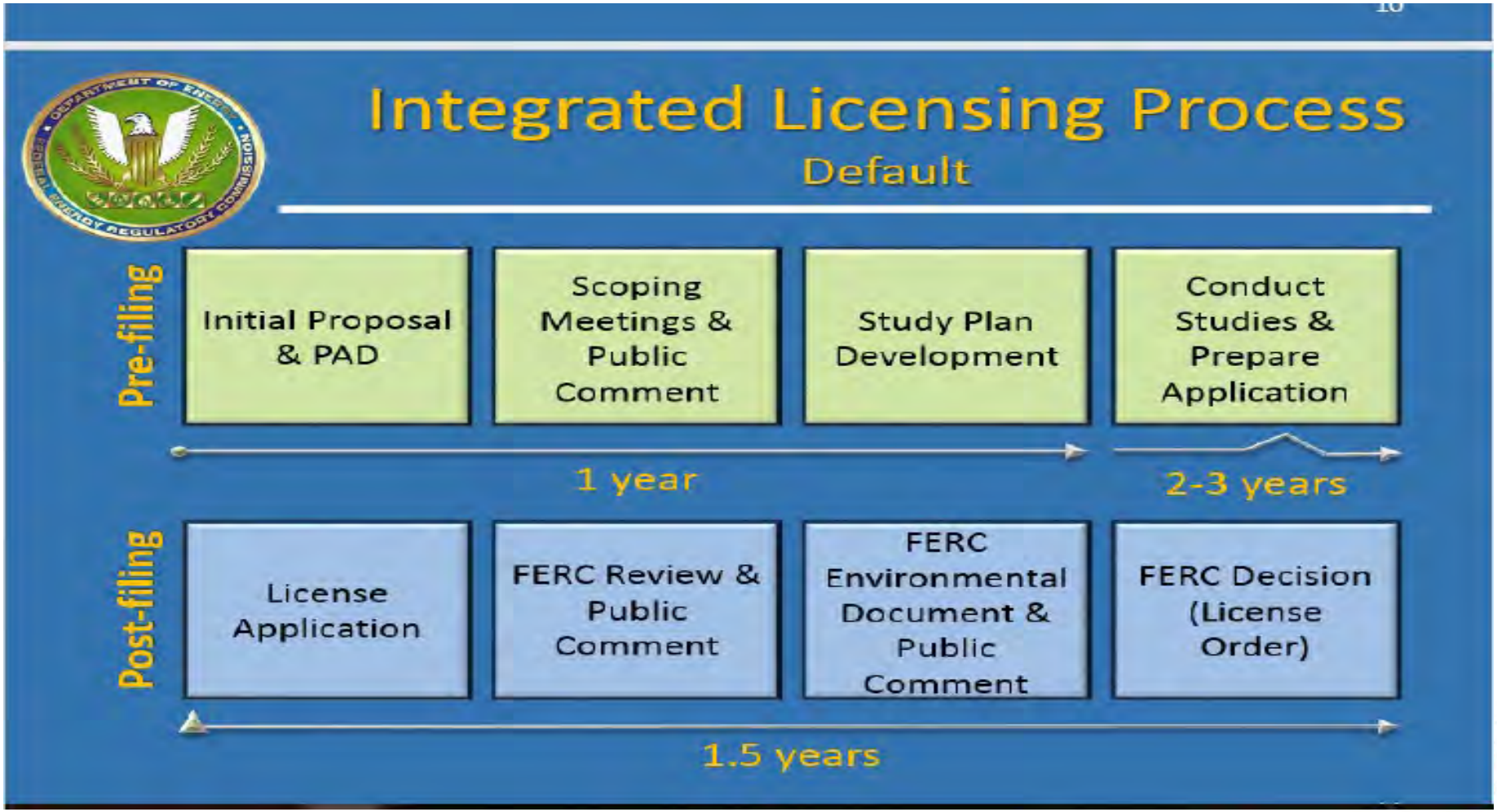
Licensed by the Federal Energy Regulatory Commission (FERC)

1938 – Original License
1979 – License was renewed for 40 years
1990 – Major Modification to the License for additional powerhouse
2025 – License expires



ILP Process and Opportunity for Input

Date	Completed Relicensing Steps
Jul 1, 2020	NorthWestern filed PAD/NOI
Aug 28, 2020	FERC issued notice the relicensing is commencing and SD1
Oct 27, 2020	Comments on the PAD/SD1 and study requests were due
Dec 9, 2020	FERC issued SD2
Dec 11, 2020	NorthWestern filed Proposed Study Plan (PSP)
Jan 6, 2021	NorthWestern held PSP Meeting
Mar 11, 2021	Comments on the PSP are due to FERC
Apr 12, 2021	NorthWestern filed Revised Study Plan (RSP)
Apr 27, 2021	Comments on the RSP due to FERC
May 10, 2021	FERC Study Plan Determination (*)
2021-2022	NorthWestern conducts first season studies
April 28, 2022	NorthWestern filed Initial Study Report

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ILP Process and Opportunity for Input

Date	Future Relicensing Steps
May 5, 2022	NorthWestern Holds Initial Study Report Meeting (today)
June 9, 2022	NorthWestern Files Initial Study Report Meeting Summary
July 9, 2022	Study Disputes or Requests to Modify Study Plan*
Aug 8, 2022	Responses to Disputes or Study Requests
Sept 7, 2022	FERC Study Plan Determination, if needed
2022-2023	Second Study Season for Two-Year Studies

*Any participant may file a disagreement concerning the meeting summary, setting forth the basis for the disagreement. This filing must also include any requests for modifications to ongoing studies or new studies.

THIS SLIDE WAS UPDATED AFTER THE MAY 5, 2022 MEETING WITH THE CORRECT DATES

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Initial Study Report Meeting Purpose

1. Discuss the first-year study results
2. Discuss the second-year studies
3. Review proposals to modify the study plan

Criteria for modification must show good cause & demonstrate:
(1) Approved studies were not conducted as provided for in the approved study plan; or
(2) The study was conducted under anomalous environmental conditions or that environmental conditions have changed in a material way.

Criteria for new study must show good cause & explain, as appropriate:
(1) Any material changes in the law or regulations applicable to the information request
(2) Why the goals and objectives of any approved study could not be met with the approved study methodology
(3) Why the request was not made earlier
(4) Significant changes in the project proposal or that significant new information material to the study objectives has become available
(5) Why the new study request satisfies the study criteria in 18 CFR § 5.9(b)

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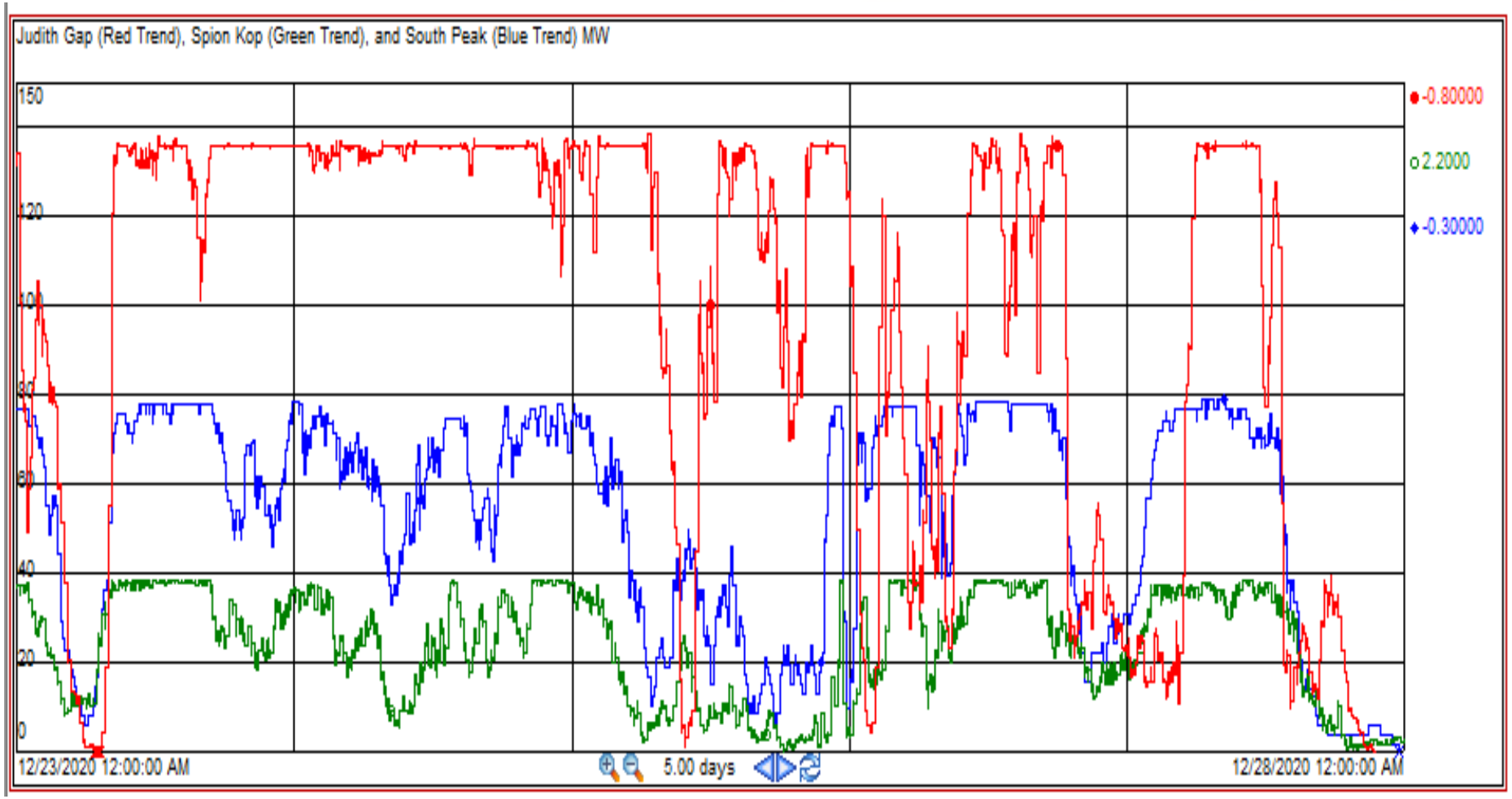
Thompson Falls Hydroelectric Project No. 1869

Initial Study Plan Meeting – Operations Study

May 5, 2022

- Flexible Capacity
  - Required to maintain grid stability by balancing electrical inputs and outputs on our system.
  - Load (consumption) changes throughout the day and seasons.
  - Generation changes dynamically due to intermittent resources and plant availability.
  - Increased or decreased generation from the Thompson Falls plant supports grid stability by using available reservoir volume.

Operations Study
Variable Generation



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Operations Study Goals

1. Validate and quantify flexible capacity capability and benefits of the plant under multiple operational scenarios.

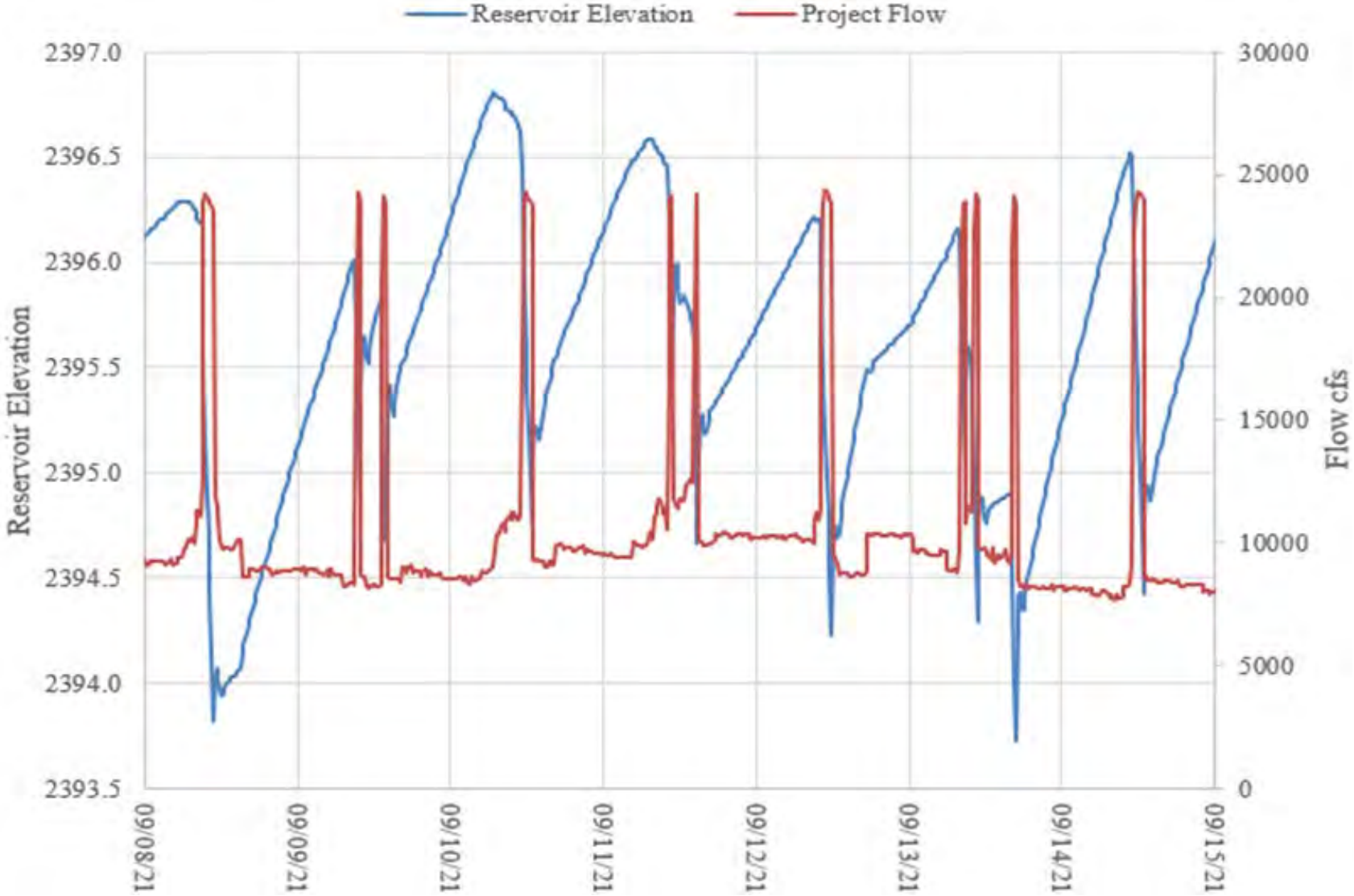
2. Evaluate the effects of flexible capacity operations and possible impacts on project resources.

- Study Objectives
  - To simulate operational scenarios of flexible capacity at the project to determine plant generation outputs, rate, and degree of reservoir elevation changes.

- Study Description
  - Simulated operational scenarios of flexible capacity at the project.
  - Implemented in three phases with different levels of generation and corresponding reservoir elevation changes.
  - Minimum downstream flow of 6000 cfs.
  - Maintained reservoir between full pool and 2.5 feet below full pool throughout the study phases.

- Test conducted in three separate phases.
  - Phase 1 – low flexible capacity (20 MW)
  - Phase 2 – moderate flexible capacity (40 MW)
  - Phase 3 – maximum flexible capacity (max available)
- Each phase 7 days long.
- Minimum of 2 weeks break between phases.
- Minimum of two operations per day that would include an increase or decrease in flexible capacity for differing durations.
  - Flexible capacity “operations” are a prescribed increase or decrease in generation for a set duration (i.e., 20 MW increase for 90 minutes or 40 MW decrease for 30 minutes).
- A 4-hour static hold was maintained at each 0.5 feet reservoir increment throughout the full study.
- The full study completed during recreation season from July 1 to September 30 and with inflows under 23,000 cfs and over 6,000 cfs.

Reservoir Elevations and Discharge During Phase 3



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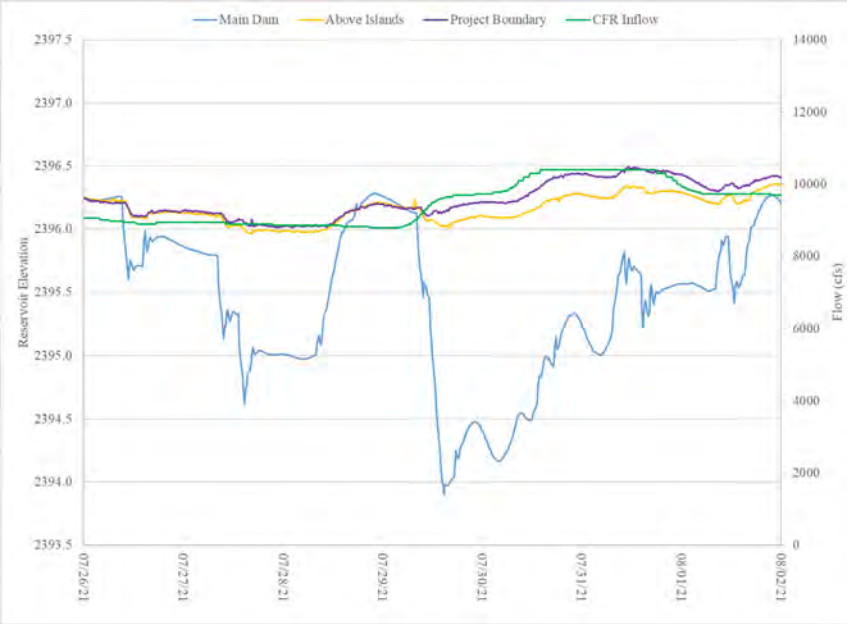
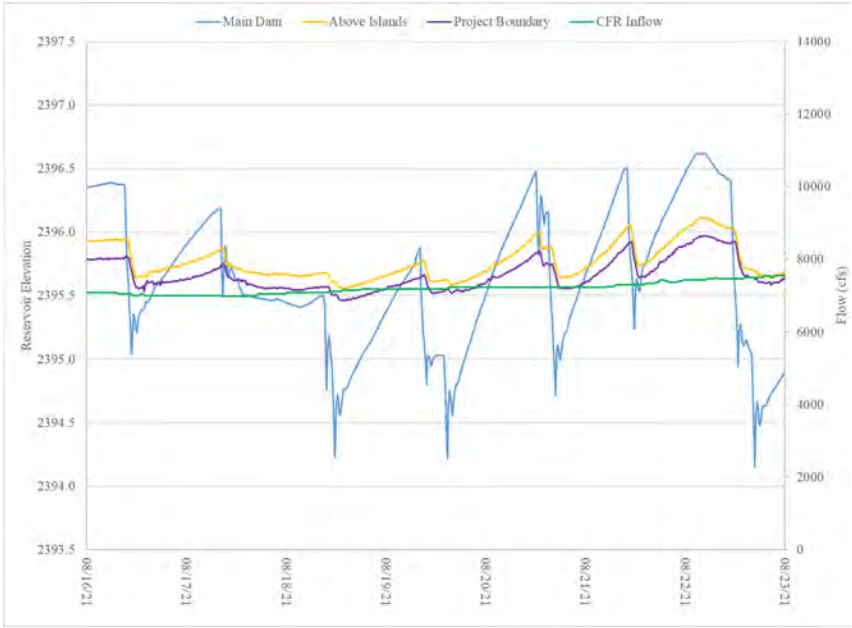
- Resource Areas Evaluated
  - Operations
  - Shoreline Stability
  - Riparian Habitats
  - Fisheries
  - Recreation & Aesthetics
  - Public Safety
  - Water Quality
  - Wetlands
  - Cultural Resources

Elevations Above Islands

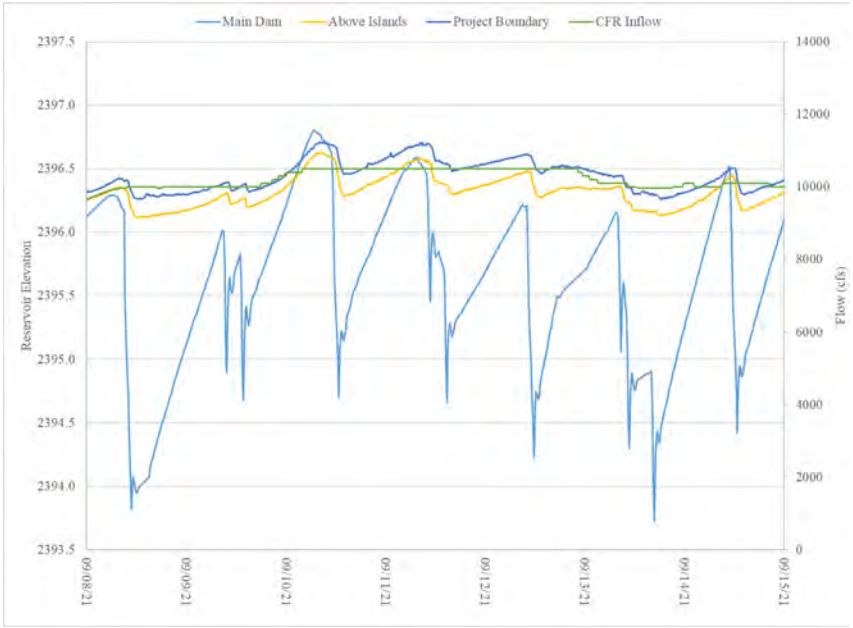
Phase 1



Phase 2



Phase 3



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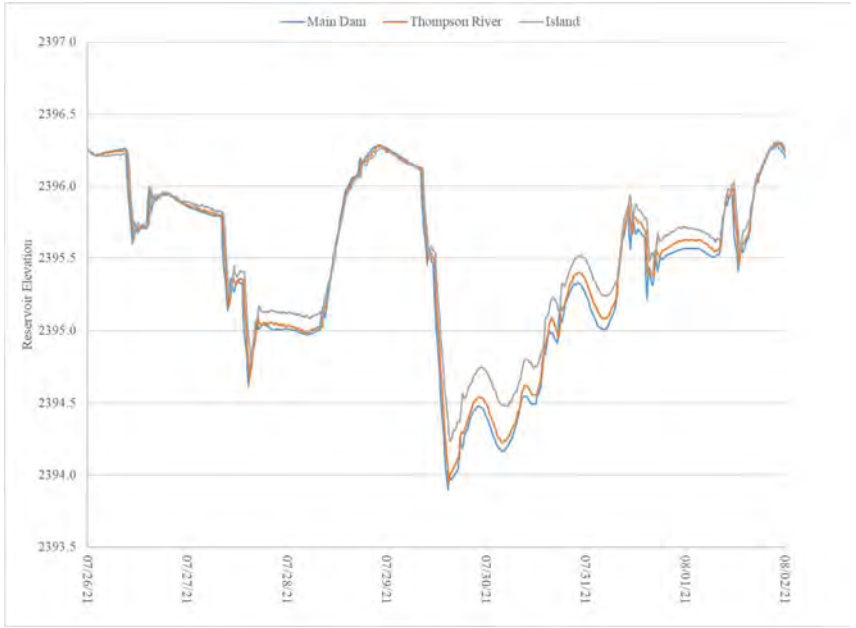
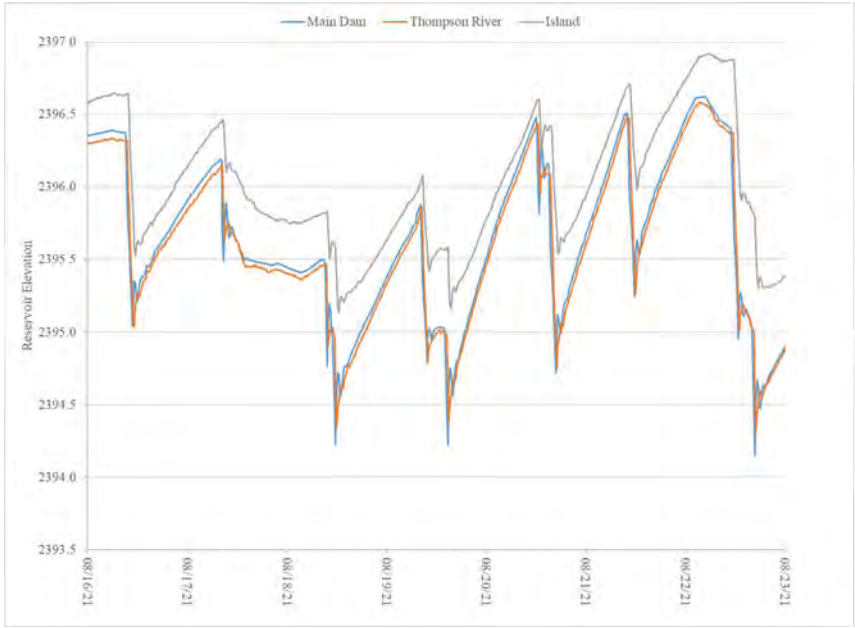
Reservoir Elevations

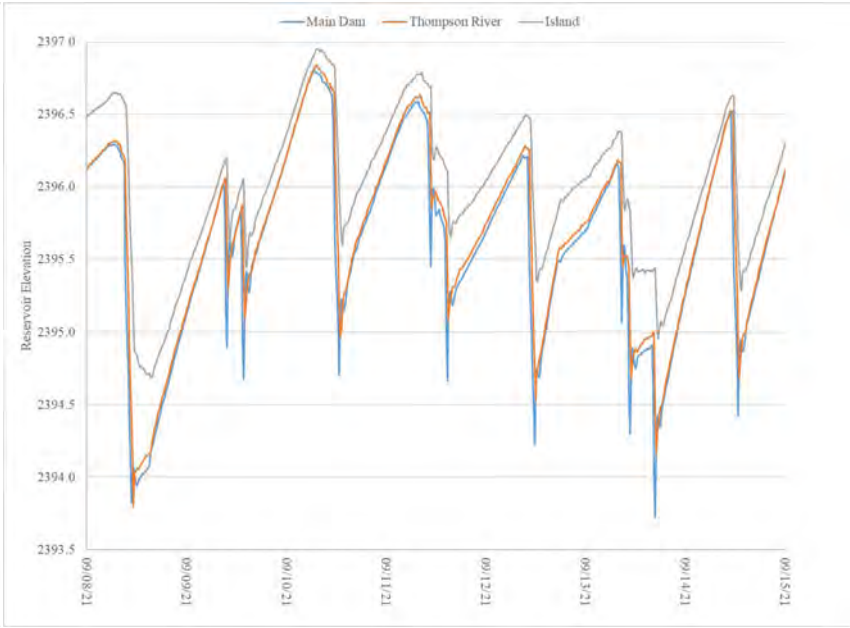
Phase 1



Phase 2



Phase 3



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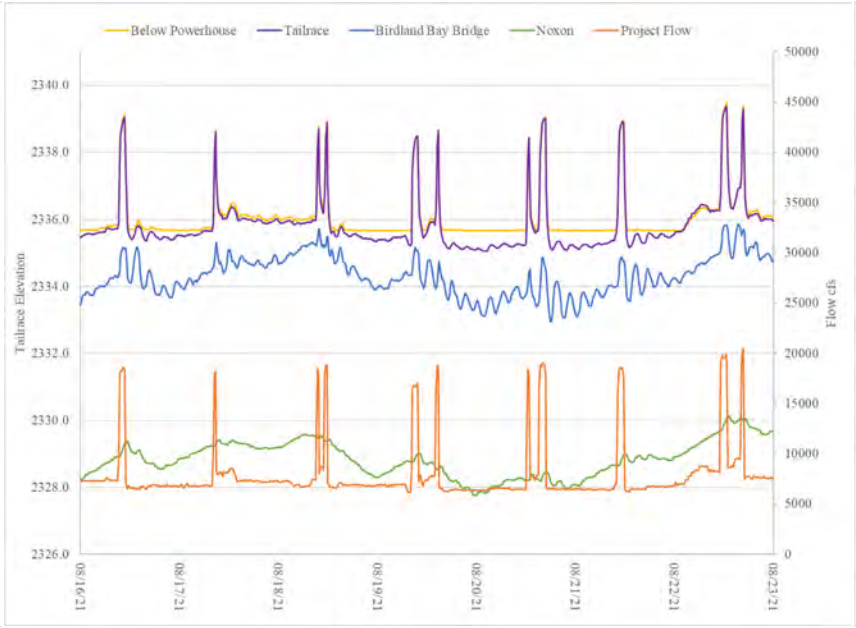
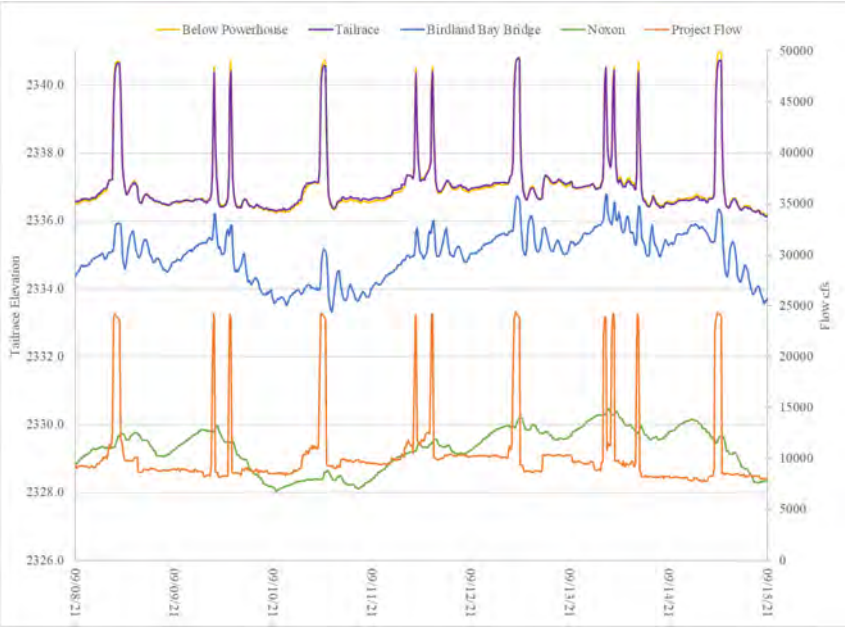
Below Dam Elevations

Phase 1

Phase 2



Phase 3



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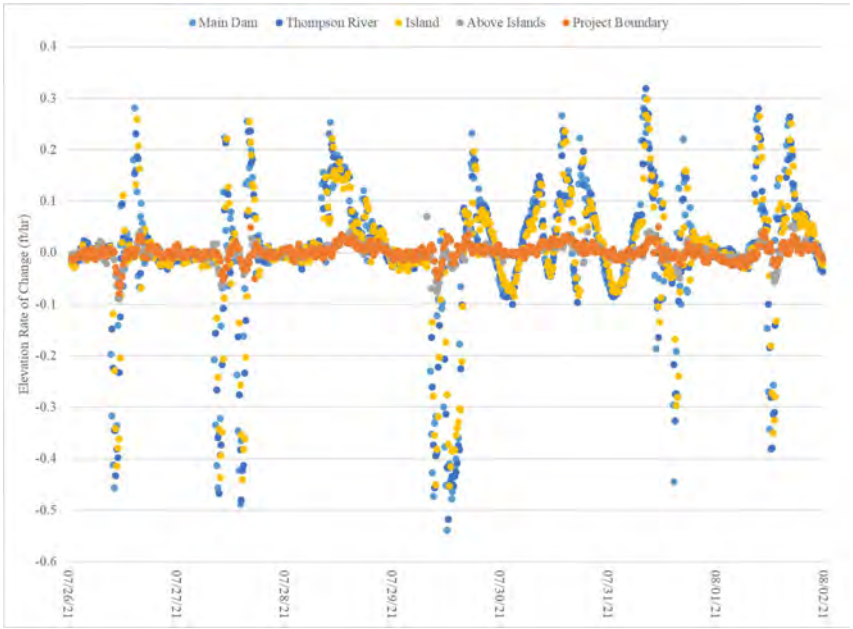
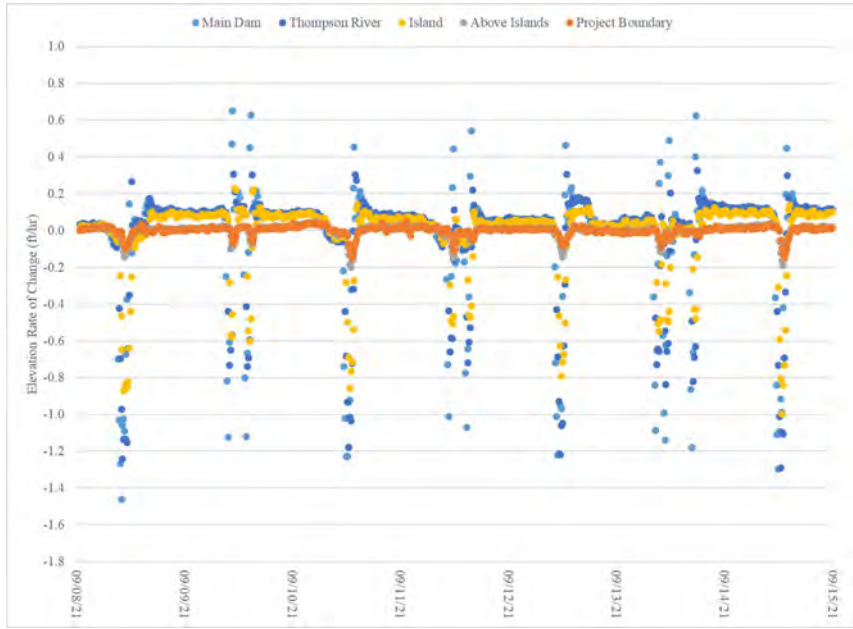
Hourly Rate of Elevation Change

Phase 1



Phase 2

Phase 3



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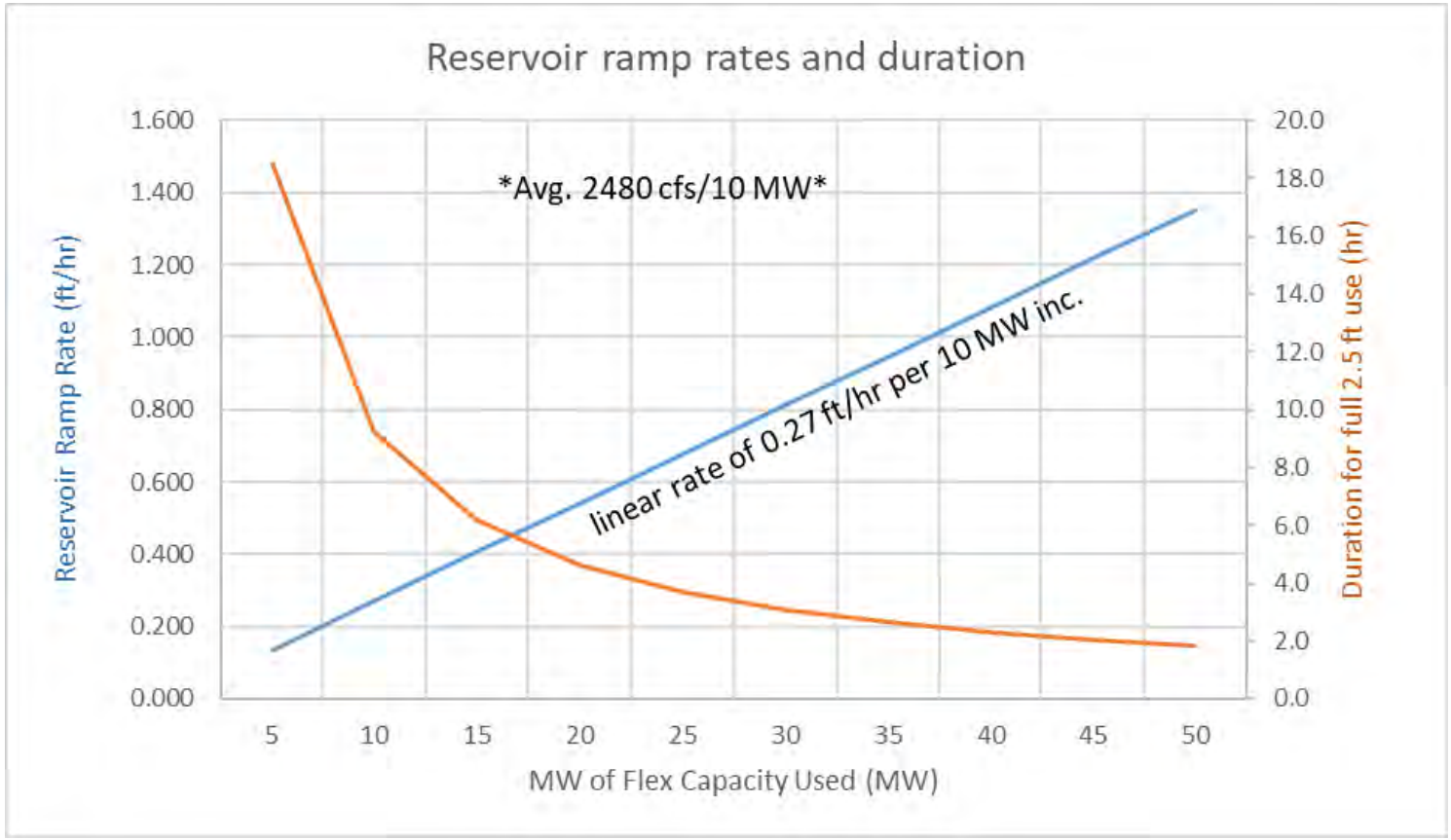
- Operations study tested the extremes of the project's flexible capacity capability.
  - Typical operations are 10-30 MW.
- Plant performed well mechanically and electrically throughout the test.
  - One controls and automation gap was identified to maintain minimum flows.
- Verified 101 MW-hrs of storage in the top 2.5 ft or reservoir.
  - Avg. 40.5 MW-hr of flexible capacity per foot of storage.
- Available generation capacity in the plant dictates reservoir ramp rates.
- Storage in the reservoir dictates durations of flexible capacity provision.
- Low baseflow conditions prevented testing of the higher decrease (DEC) operational moves.

- Average ramp rate of 0.27 ft/hr per 10 MW
- Average flowrate change of 2480 cfs/10 MW



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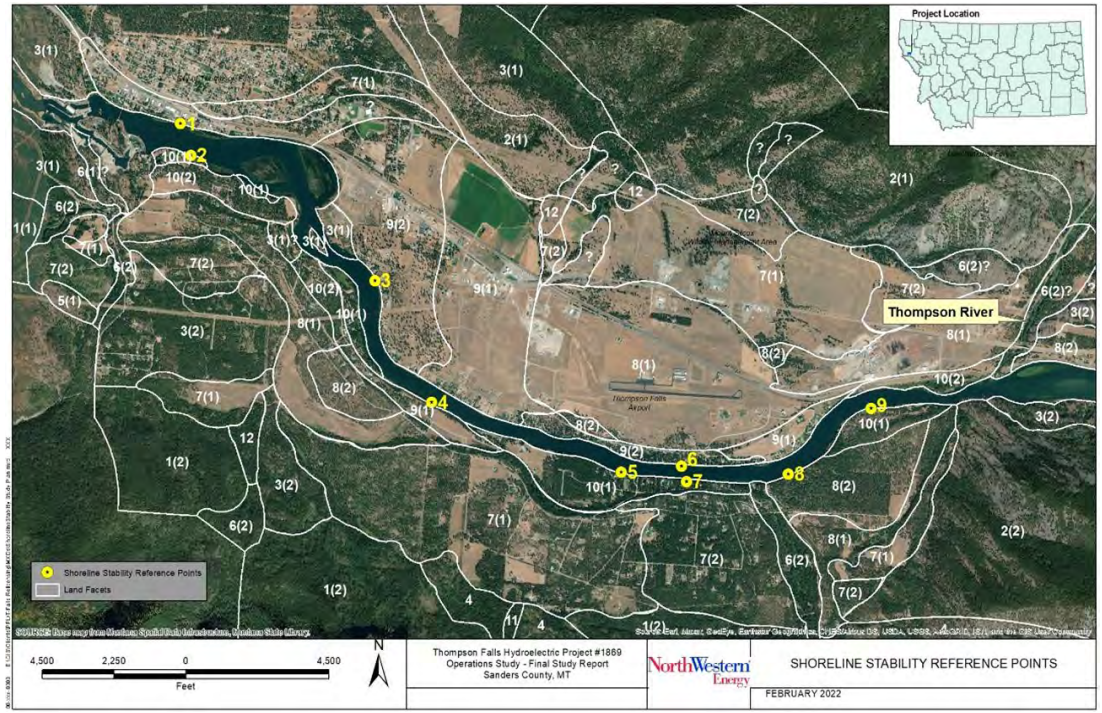
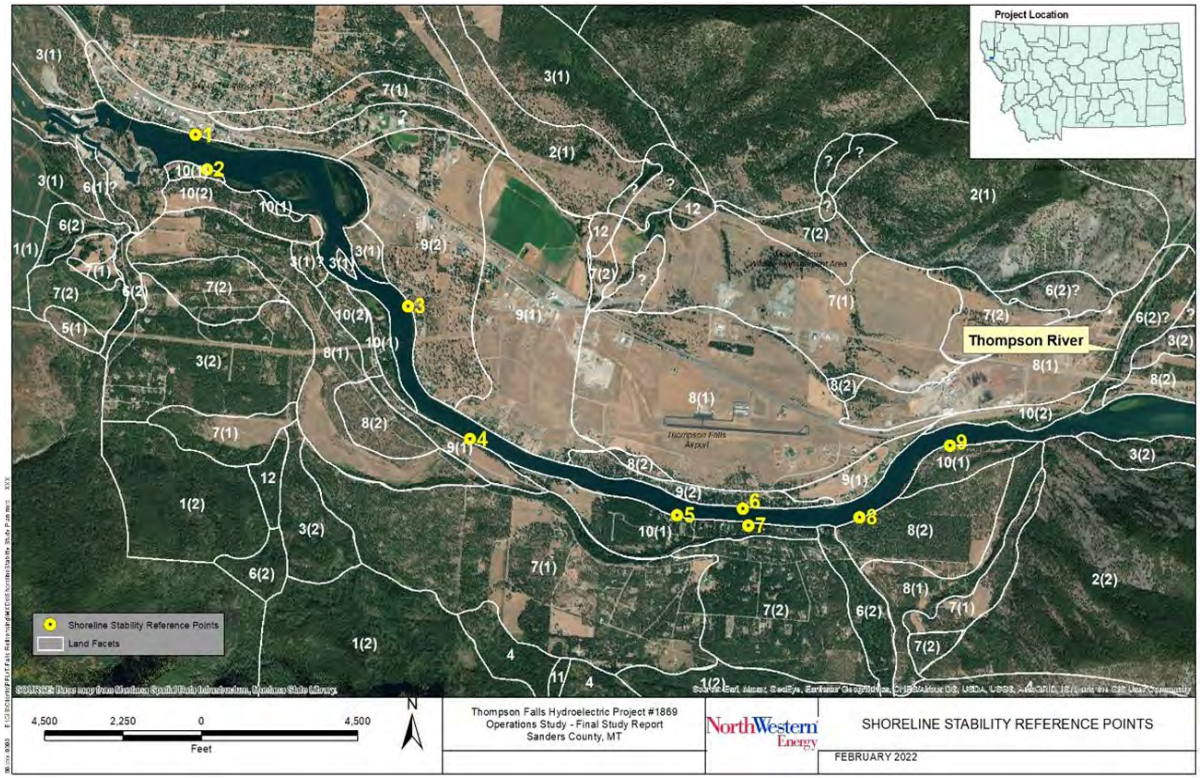
- Established nine reference points representing a diversity of soil types, slope, aspect, vegetation, and land use.
- Six monitoring events (10/2/2020, 4/19/21, 7/13/21, 8/6/21, 9/1/21 and 9/19/21).
- Documented the presence, type and magnitude of erosion, soil type, land management activities, and existing erosion control measures, if any.
- Photo documentation of each site visit.



- Fluctuating water levels did not decrease shoreline stability
- Shoreline armoring by rock, woody materials and aquatic/riparian vegetation maintained shoreline stability

- Shoreline stability was impacted by other factors such as bank stabilization projects, spring runoff and windstorms.

- Monitoring included observations of riparian vegetation (above waterline), aquatic vegetation (emergent and submergent) and aquatic invasive species (AIS).
- Study includes nine reference points from Shoreline Stability Study, 3 reference points for the Wetlands Study and general observations of reservoir shoreline.



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- A diversity of riparian and aquatic vegetation types and plant communities.
- No impacts to riparian habitats; riparian species adapted to fluctuating water levels.
- Submergent aquatic vegetation may have been mobilized into system by fluctuating water levels.

- Aquatic invasive species (AIS) are present and vary in density with yellow flag iris and flowering rush the most common species observed.
- No changes to AIS observed during study.

- Fish Stranding: Exposed islands and shoreline habitats in Thompson Falls Reservoir below Cherry Creek and near the islands above Thompson River.

- Habitat condition observations at the mouth of the Thompson River and Cherry Creek.

- Conditions within the fish ladder.

- Establish 200-foot transects in shallow habitats less than 2.5 feet deep at full pool (fluctuation zone).
  - Twelve total transects. Three on exposed mid-channel island areas and three transects along exposed shoreline habitats below Cherry Creek and near the islands above Thompson River.
  - Observers walked the transect recording species, total length, and weight of any fish observed within 15 feet on either side of the transect line.
- Established photo points at tributary confluence and 500 feet upstream to visually capture any changes in habitats.
- Level loggers deployed at tributary confluences and cross-sectional area measured.
- Fish passage facility operated as normal and observations made of pool water levels and operation of workstation.

Stranding Transects

Operations Phase #	Date	Reservoir Elevation (ft)	BBH	LMB	SMB	YP	NPM	PUMP	Total
1	7/28/2021	2396	-	-	-	-	-	-	0
	7/30/2021	2394.5	1	2	0	0	0	1	4
2	8/17/2021	2395.5	19	9	-	-	1	-	29
	8/19/2021	2395.0	3	1	-	-	-	-	4
3	9/8/2021	2394	89	9	2	4	1	-	105
		TOTAL	112	21	2	4	2	1	142

Non-native Virile crayfish and American bullfrog

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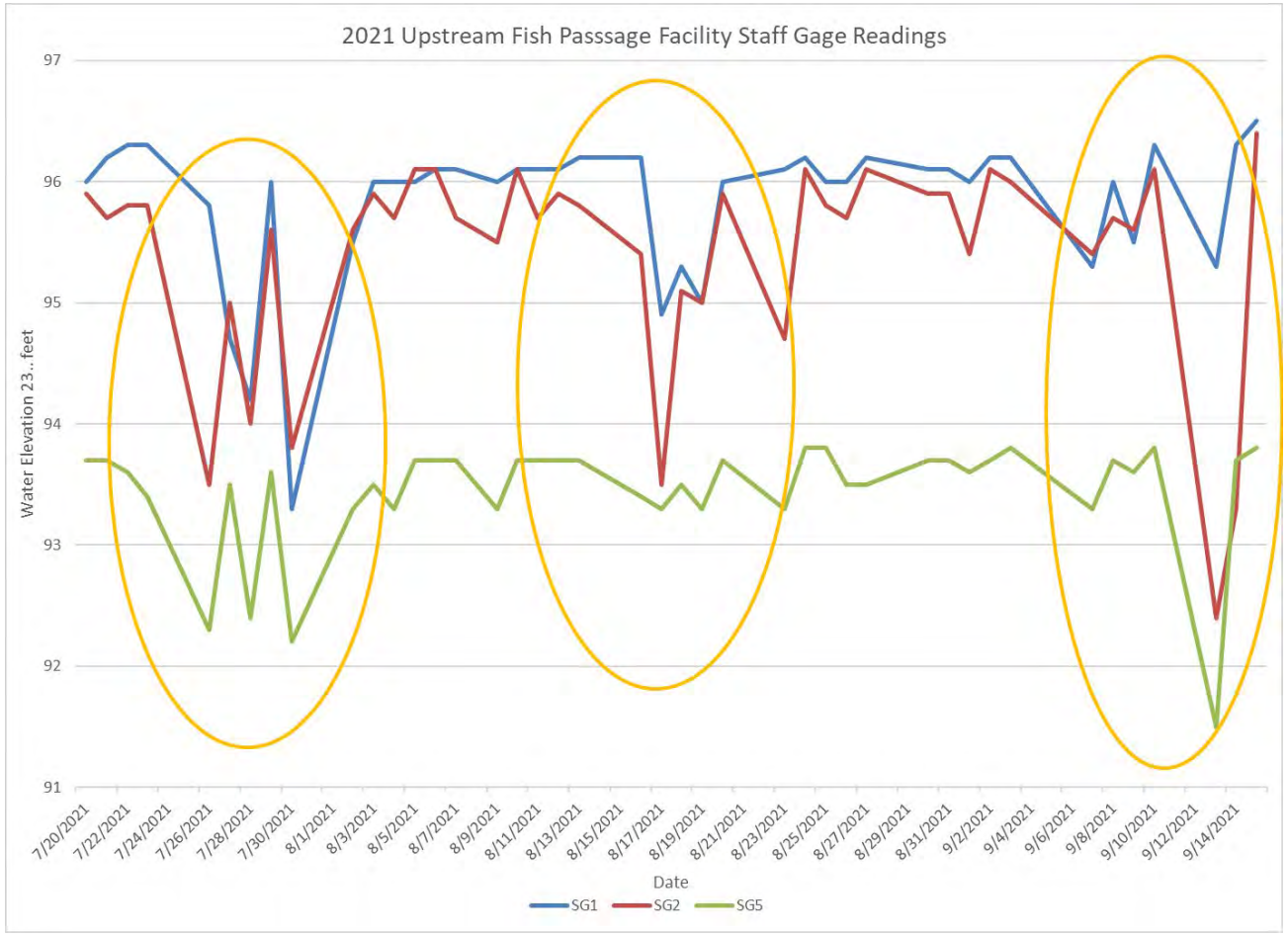
Cherry Creek and Thompson River Access

Cherry Creek at 2394 feet

Thompson River main channel access

Fish Ladder Operations



- 2,394.2' (2.3 feet below full pool) the HVJ, and sampling loop intermittently worked due to lack of water.
- Slightly reduced water depths in ladder pools as reservoir elevation decreased.
- Phase 3 testing pulled floating mats of aquatic vegetation into ladder screens and plugged operations.

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Recreation and Aesthetics

Assessment of recreation impacts to docks, boat ramps, and Sandy Beach, as well as impacts to aesthetic qualities, at each half-foot increment* of reservoir elevation down to 2.5 ft below full pool.

- Subset of 39 representative docks identified; impacts documented and photographed.
- Depth of water measured at the end of submerged boat ramps.
- Water elevations documented at Sandy Beach, downstream of the original powerhouse.
- Changes in aesthetics at common public viewing areas were documented through photos and detection of odors.

**Modification from FERC-approved Study Plan, which stipulated monitoring only full pool and lowest elevation (-2.5 ft), not at each half-foot increment.*

Stationary dock structures were not impacted, but access to boats moored to them was substantially reduced at -1.5 ft elevation and lower. Waterway access from stationary docks was substantially impacted at -2.5 ft elevation.

Full Pool

Full Pool

-2.0’

-2.5’

Impacts to floating docks depended on location and configuration. Most (90%+) functioned adequately at -1.5 ft, 70% functioned at -2.0 ft, about 50% provided access at -2.5 ft elevation.

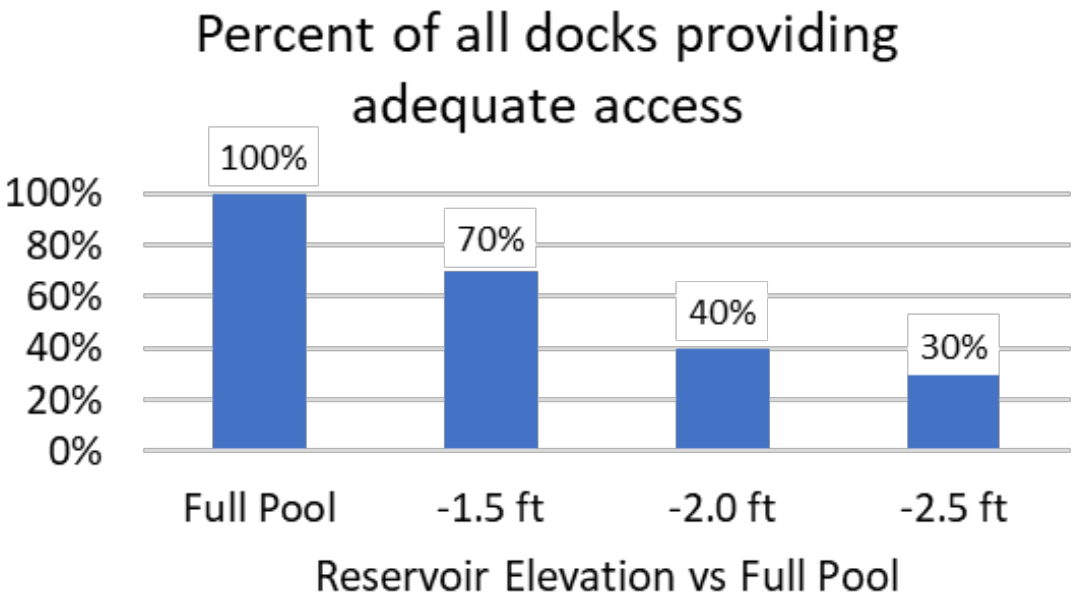
North Shore -2.5’

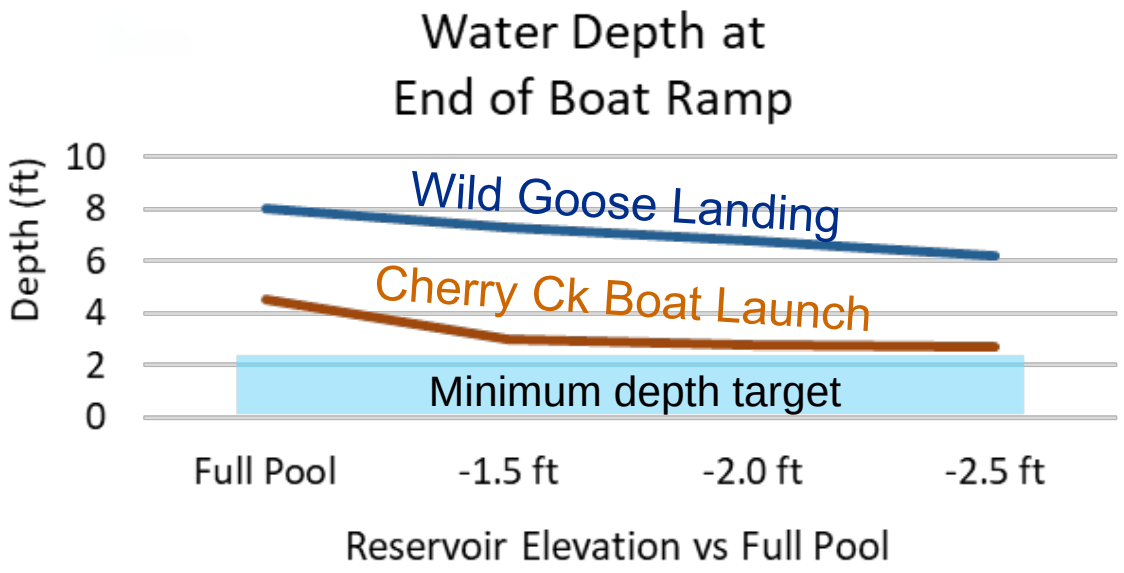
South Shore -2.5’

Full Pool

-1.5’

-2.5’





Sandy Beach recreation access not negatively impacted other than changing water levels.

Aesthetic qualities (views and odor) were minimally impacted at -1.5 ft elevation or less.

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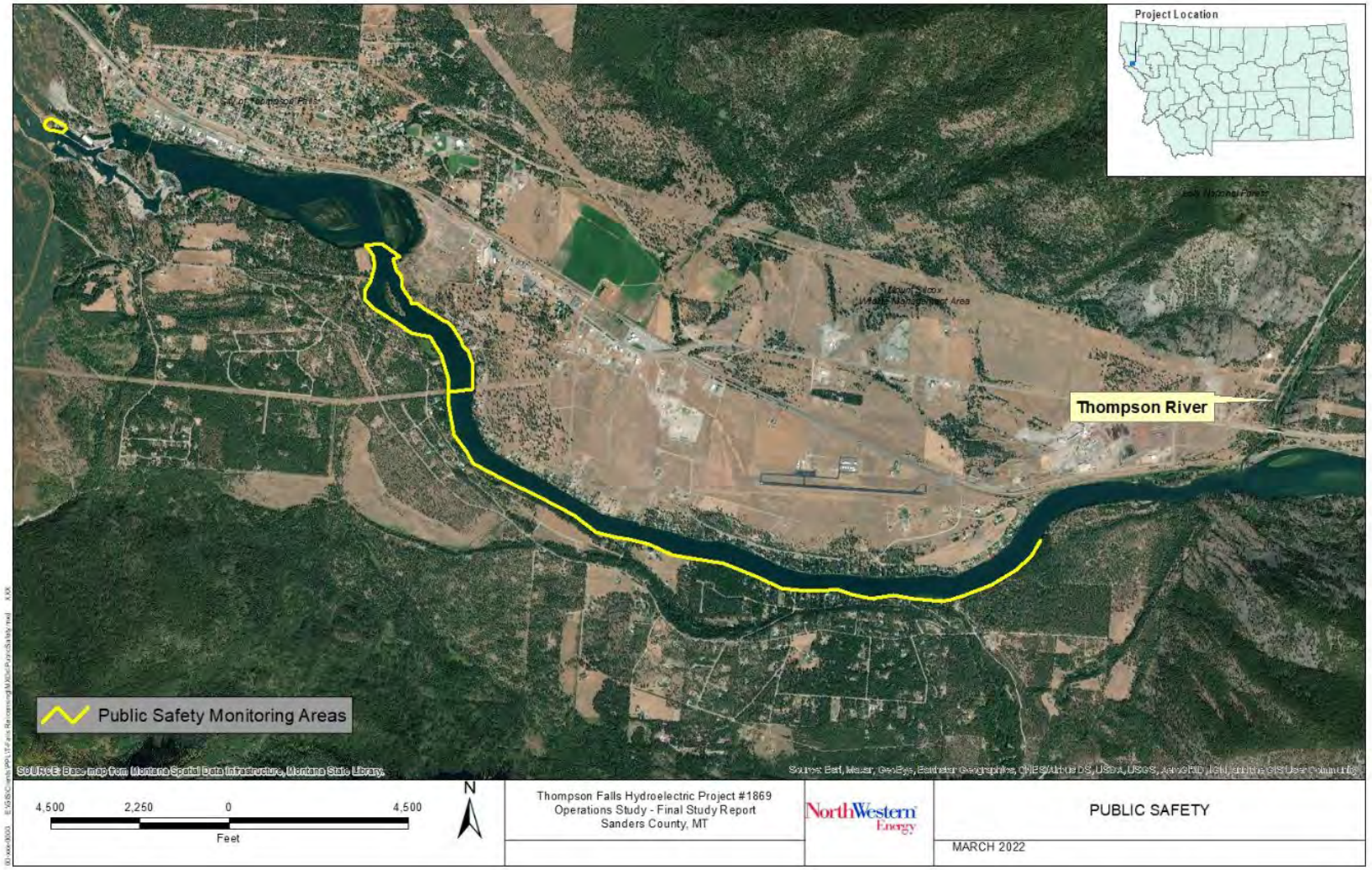
Public Safety

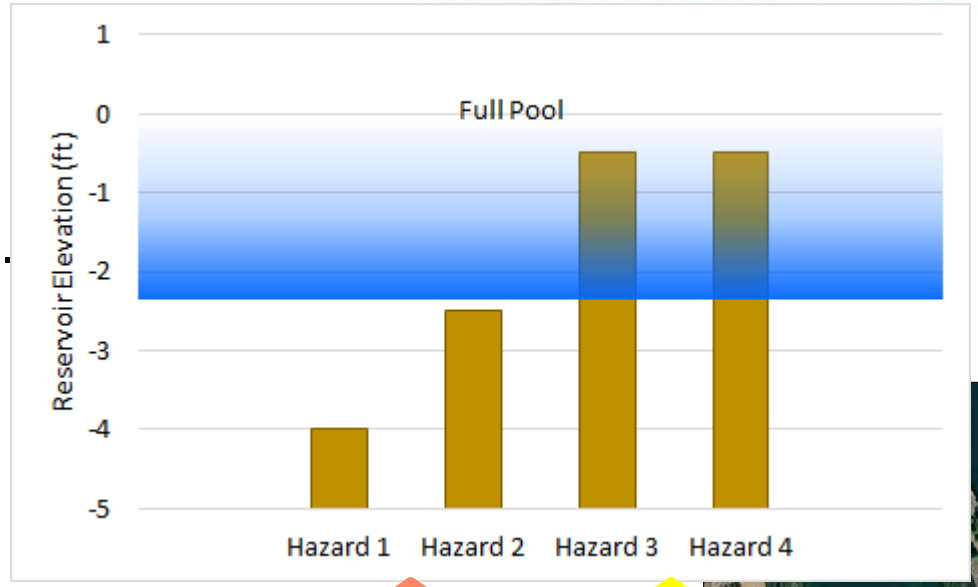
Monitoring and observation of in-water hazards in high traffic areas at each half-foot increment of reservoir elevation.

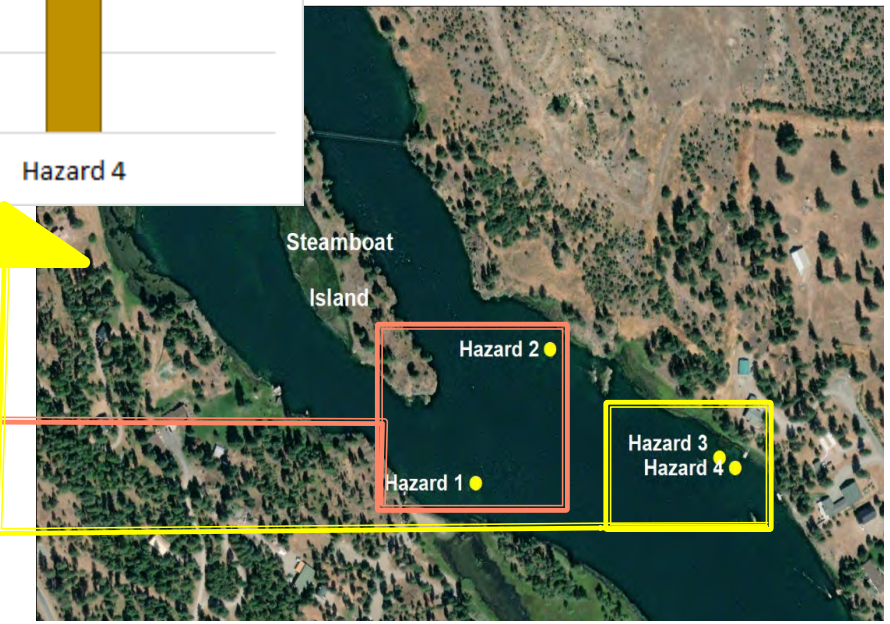
Assessment of public safety risk associated with changing water levels and flow rates at Sandy Beach, below the powerhouses.



Assessment Results:

- Risk of contact with stationary rock outcrops near Steamboat Island varies with water elevations. As the reservoir elevation lowers, Hazards 1 and 2 get higher in the water column but remain submerged so contact risk increases. Hazards 3 and 4 become more visible and risk is reduced at lower water elevations.
- Shoals and inundated islands remain visible at all elevations and contact risk is unchanged.
- Sandy Beach water elevations change as generation is varied, but flows are tempered by rock outcrops and gravel bars to protect swimmers and recreationists.





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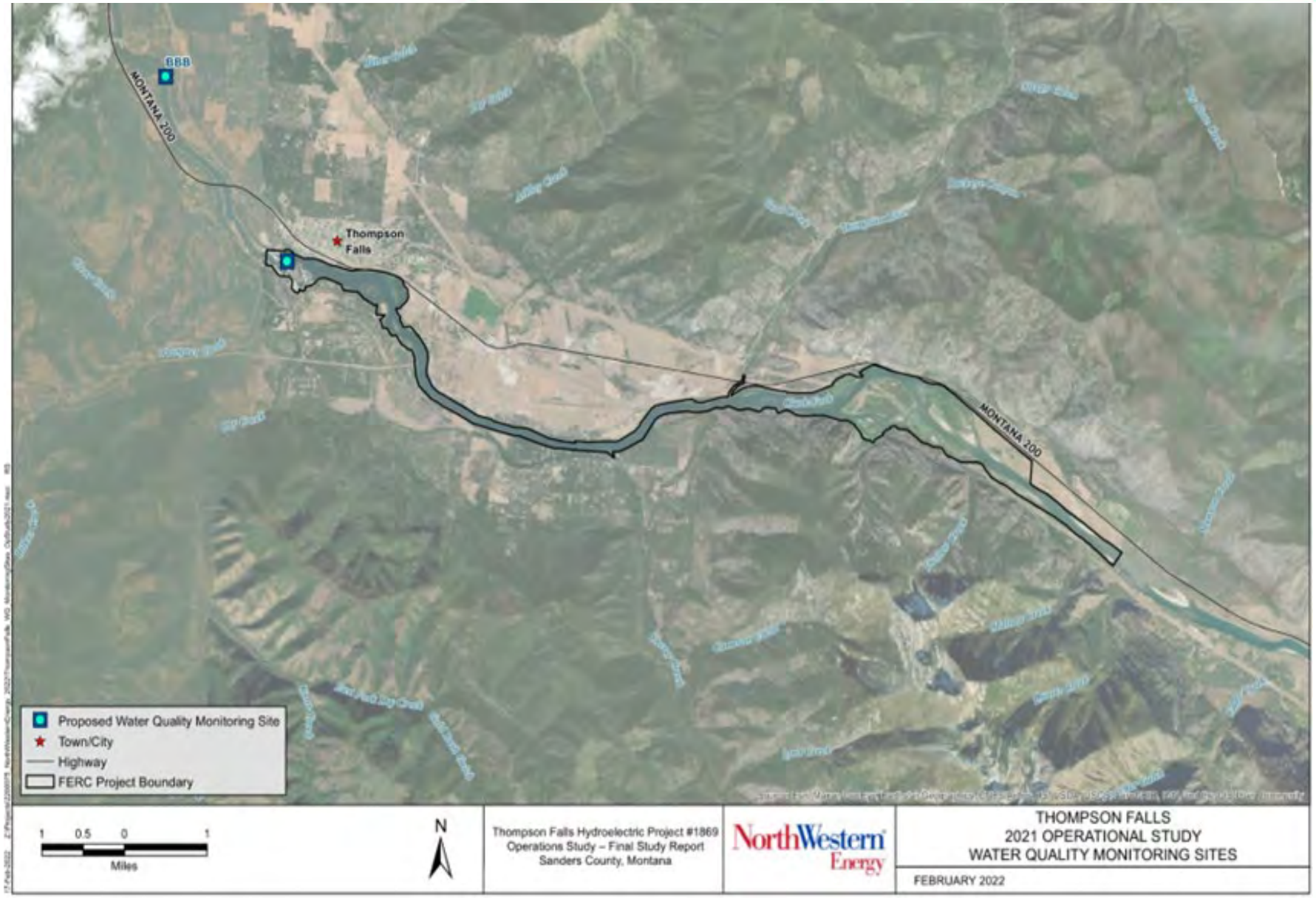
- Water quality was studied to determine if Project operations influence on downstream water quality.

- The monitoring site upstream of the dam characterizes the incoming upstream water quality from the reservoir.

- The Birdland Bay Bridge site captures the water quality leaving the Project before it enters Noxon Reservoir.

- Hydrolab HL7 water quality instruments were installed in two locations and measured water quality parameters at 15-minute intervals throughout the operations testing.
  - Upstream of the Dry Channel Dam
  - Birdland Bay Bridge

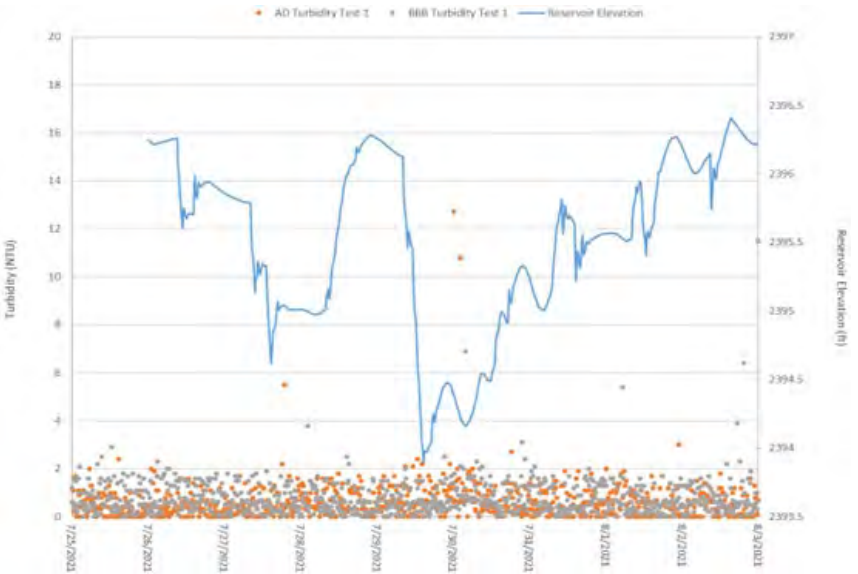
- Parameters
  - Turbidity
  - pH
  - Specific conductivity
  - Dissolved oxygen
  - Temperature
  - Depth

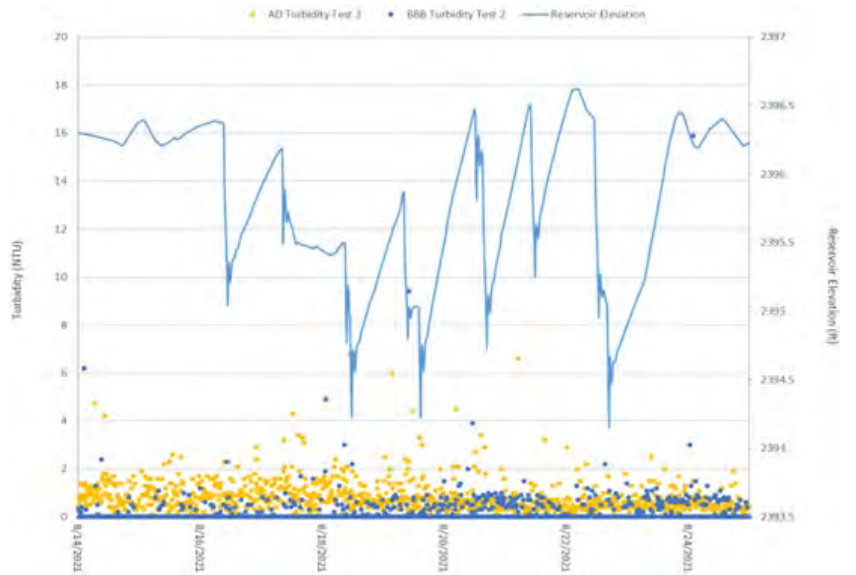


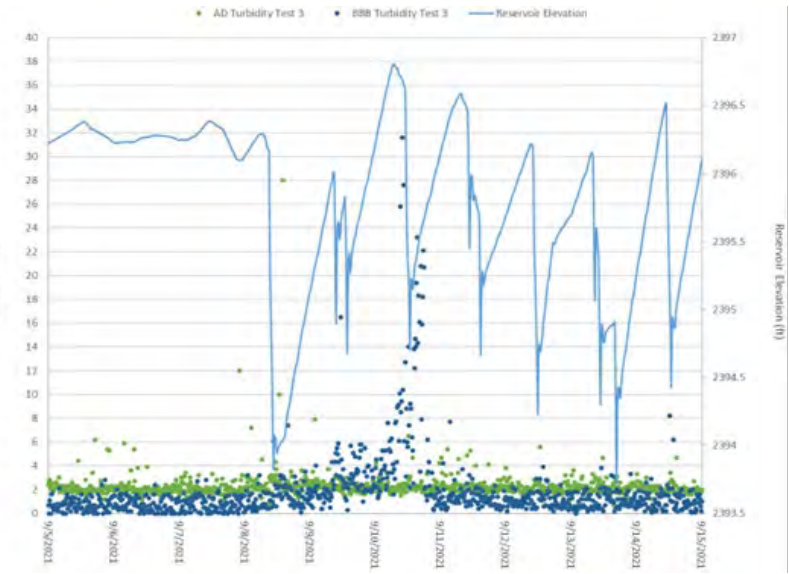
- Water quality data collected during all three phases show that the various flexible operation scenarios tested do not appear to have a significant effect on water quality within the reservoir and downstream in the Clark Fork River.

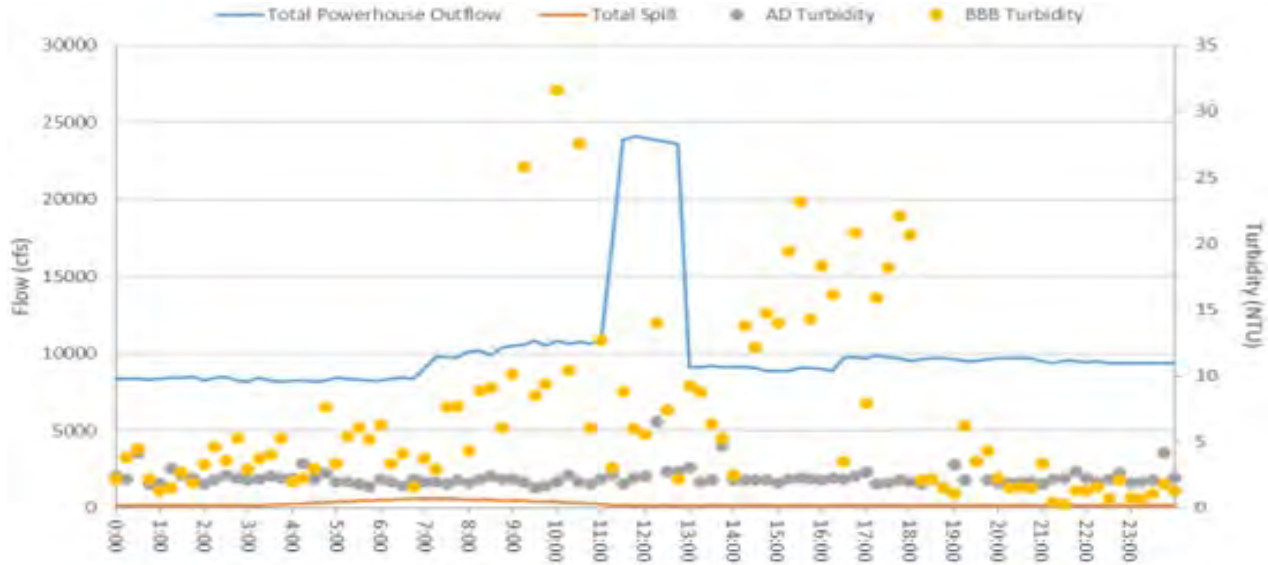
- Water quality appears to be independent of depth of drawdown, duration of drawdown, and drawdown frequency.

Operations Study Results
Water Quality









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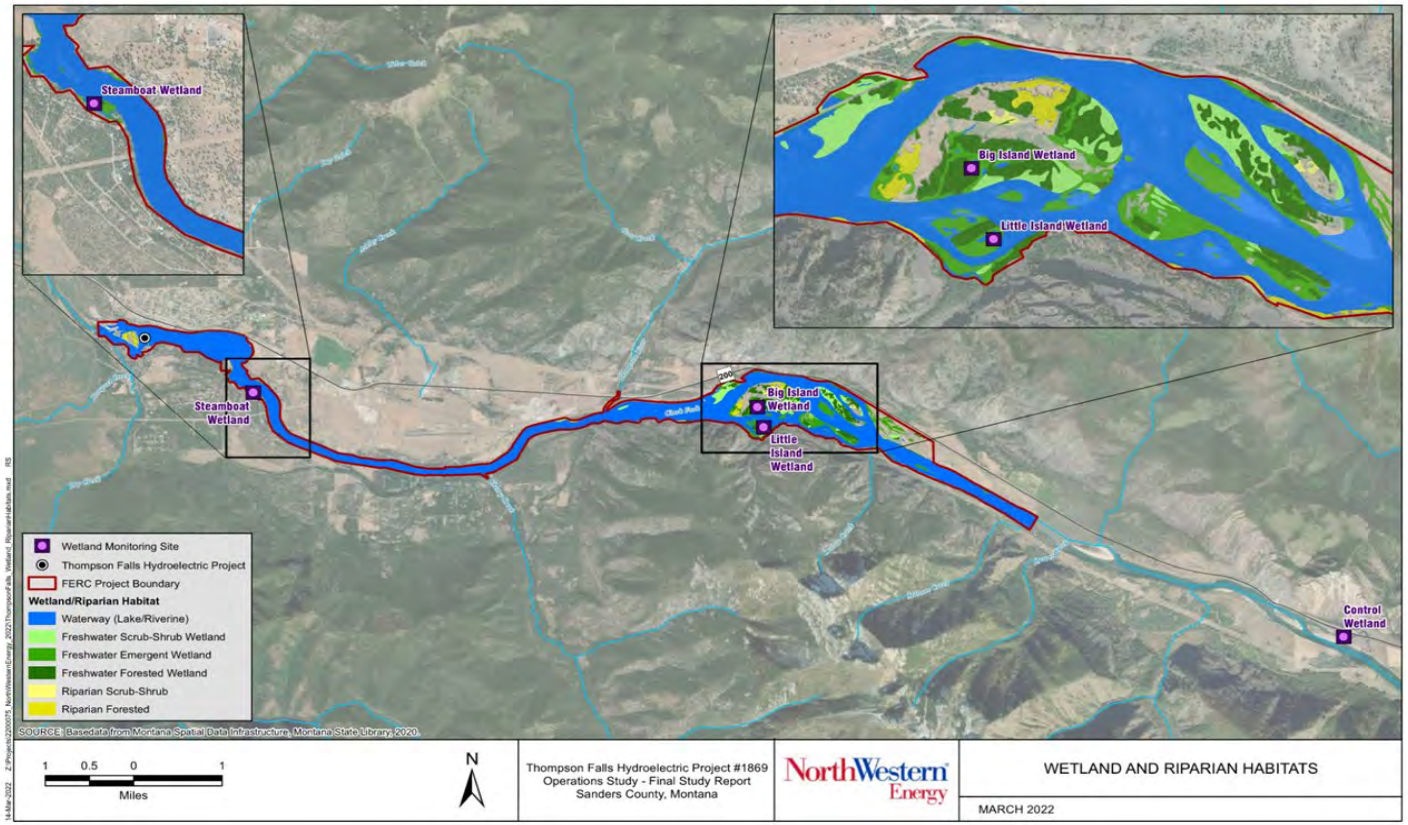
- Wetlands within the Project were studied to determine what impact (if any) there was from project operations.
- Three sites were selected in the reservoir as was one study control site upstream of the reservoir. The reservoir sites were focused on the area near steamboat island and at the island complex upstream of the Thompson River.
- Wetlands identified using Montana Spatial Data Infrastructure Wetlands Framework and ground-truthed in the field prior to final site selection.



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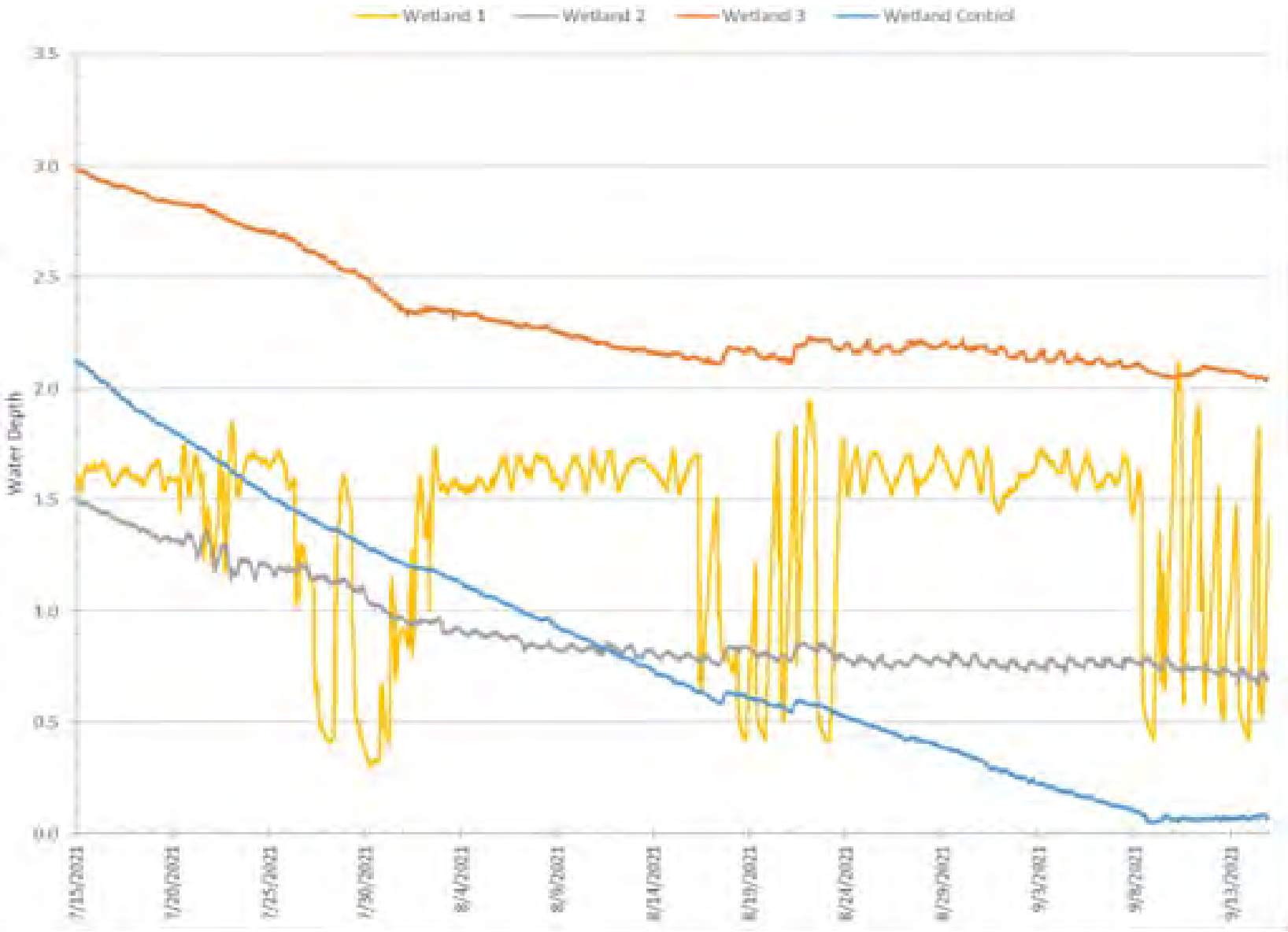
Operations Study Methods
Wetlands

- Visual observations were conducted, and stage loggers were deployed to monitor changes in water levels at each wetland site.

- Potential risk of impact to each wetland ranked as high, medium, or low by evaluating:
  - Potential hydrologic connection alteration due to reservoir fluctuations
  - Soil type
  - Slope
  - Distance from ordinary high-water mark

Site Name	Site Description	Primary Wetland Classification	Secondary Wetland Classification	Potential Risk of Alteration from Operations
Wetland 1	Side channel near Steamboat Island in Lower Reservoir	Palustrine, Emergent, Temporarily Flooded	Riverine, Unconsolidated Bottom , Permanently Flooded	High
Wetland 2	On Large Island in Upper Reservoir	Palustrine, Aquatic Bed, Semi-permanently Flooded	Palustrine, Forested, Temporarily Flooded	Medium
Wetland 3	On Small Island in Upper Reservoir	Palustrine, Aquatic Bed, Semi-permanently Flooded	Palustrine, Emergent, Temporarily Flooded	Medium
Wetland Control	In Oxbow Upstream of Project Boundary	Palustrine, Aquatic Bed, Semi-permanently Flooded	Palustrine, Emergent, Temporarily Flooded	None (Control Site)



- Wetland 1 (side channel behind Steamboat Island) fluctuated in water level parallel to reservoir fluctuations from operational changes.
- All other wetlands studied mirrored the control site and were not affected by fluctuations in reservoir elevations.

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- Wetlands like Wetland 1 make up approximately 9.4 acres within the Project boundary.

- Further studies will be conducted in 2022 to determine if these other wetlands are also similarly impacted by Project operations.

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- Study area consists of the locations of known archaeological properties at or near the reservoir high water line.

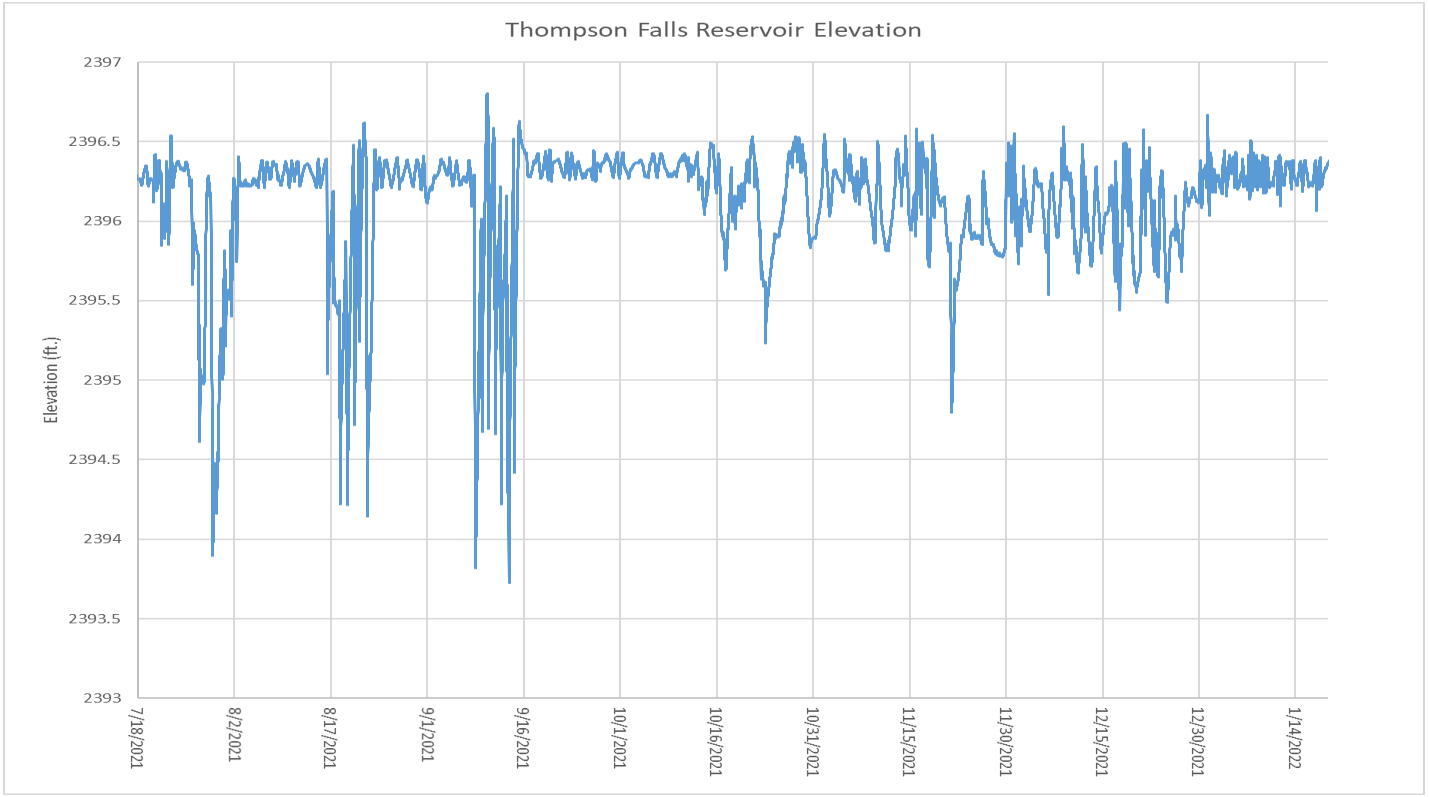
- 3 known properties
  - Salish House.
  - Prehistoric and historic artifact scatter.
  - Chinese railroad construction encampment.

- Methods
  - Observe effects of reservoir elevation changes at or near those locations during single drawdown.
  - Document observations on site monitoring forms.

- Results
  - No exposure of archaeological features or artifact concentrations noted.

Modification to FERC-approved Operations Study

- The first study season successfully tested the extent of flexible capacity available at the Project. However, the study tested the more extreme operational scenarios.
- NorthWestern is proposing a second season study to monitor and evaluate the effects of certain resources during actual (not simulated) baseload and flexible capacity operations.



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Modification to FERC-approved Operations Study

- Operations will be used to provide grid regulation in real-time allowing NorthWestern to monitor and evaluate potential impacts of realistic operations in the current energy market.

- Focus on monitoring resource areas where impacts were identified during the first study season including:
  - Shoreline stability
  - Riparian habitats
  - Fisheries
  - Recreation and aesthetics
  - Wetlands

- Results of the Modified Operations Study will be filed as part of the Updated Study Report (May 10, 2023)

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Operations Study Report included in the Initial Study Report filed on April 28, 2022.
Link for download:

https://www.northwesternenergy.com/docs/default-source/default-document-library/clean-energy/environmental-projects/thompson-falls/thompson-falls-relicensing/p1869-isr-operations-study.pdf?sfvrsn=3481cbf3_9

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Thompson Falls Hydroelectric Project No. 1869

Hydraulic Conditions Study – Initial Study Report Meeting

May 5, 2022

Agenda

- Study Background
- Task 1 – Bathymetric Survey
- Task 2 – CFD Modeling
  - Model Development
  - Model Results
- NorthWestern Response to Comments
- Next Steps

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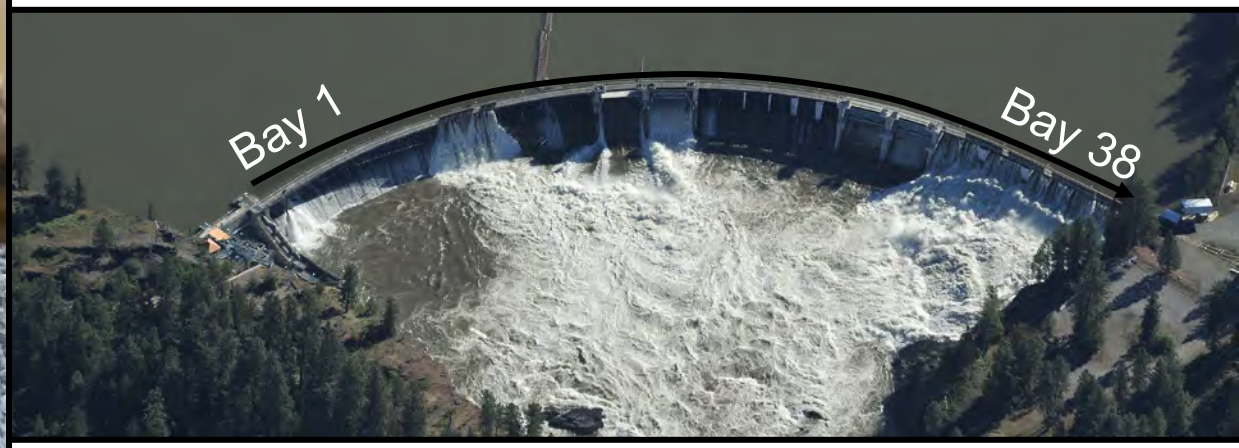
- Result of 2008 Biological Opinion requirement to conduct a scientific review of the passage facility.

- The scientific review panel recommended a hydraulics study in the near field downstream of the project and a fish behavior study.

- Flow modeling results will be compared to fish behavior data to provide information on effectiveness of passage facility and help describe fish behavior within the area.

- 38 bays total
- 8 bays replaced with radial gates
- Varying widths due to pier sizes
- 6 removable panels per bay
- Opening schedule in Total Dissolved Gas Report (2010)

6 Panels per Bay



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Study Area in the FERC-approved Study Plan

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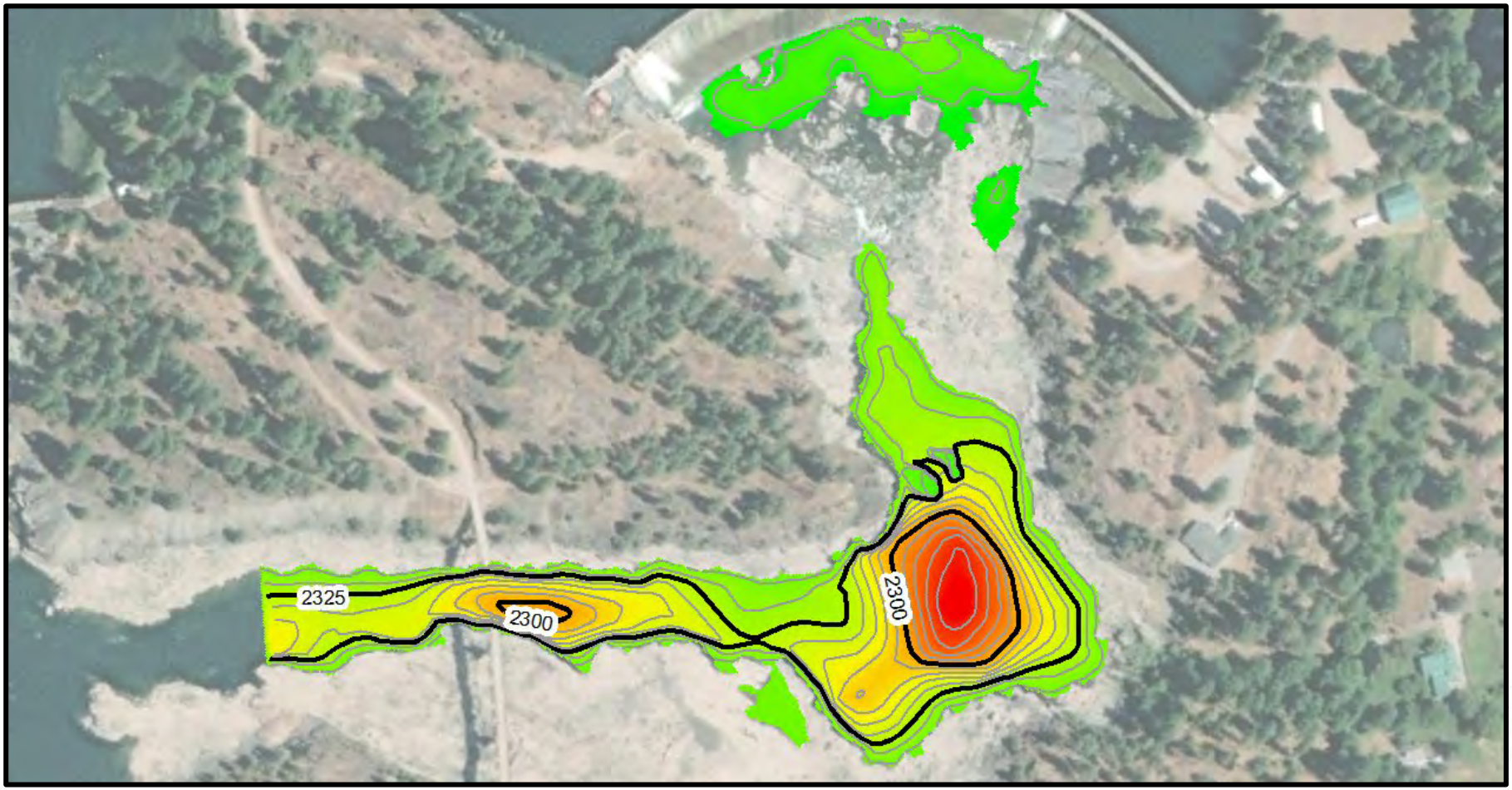
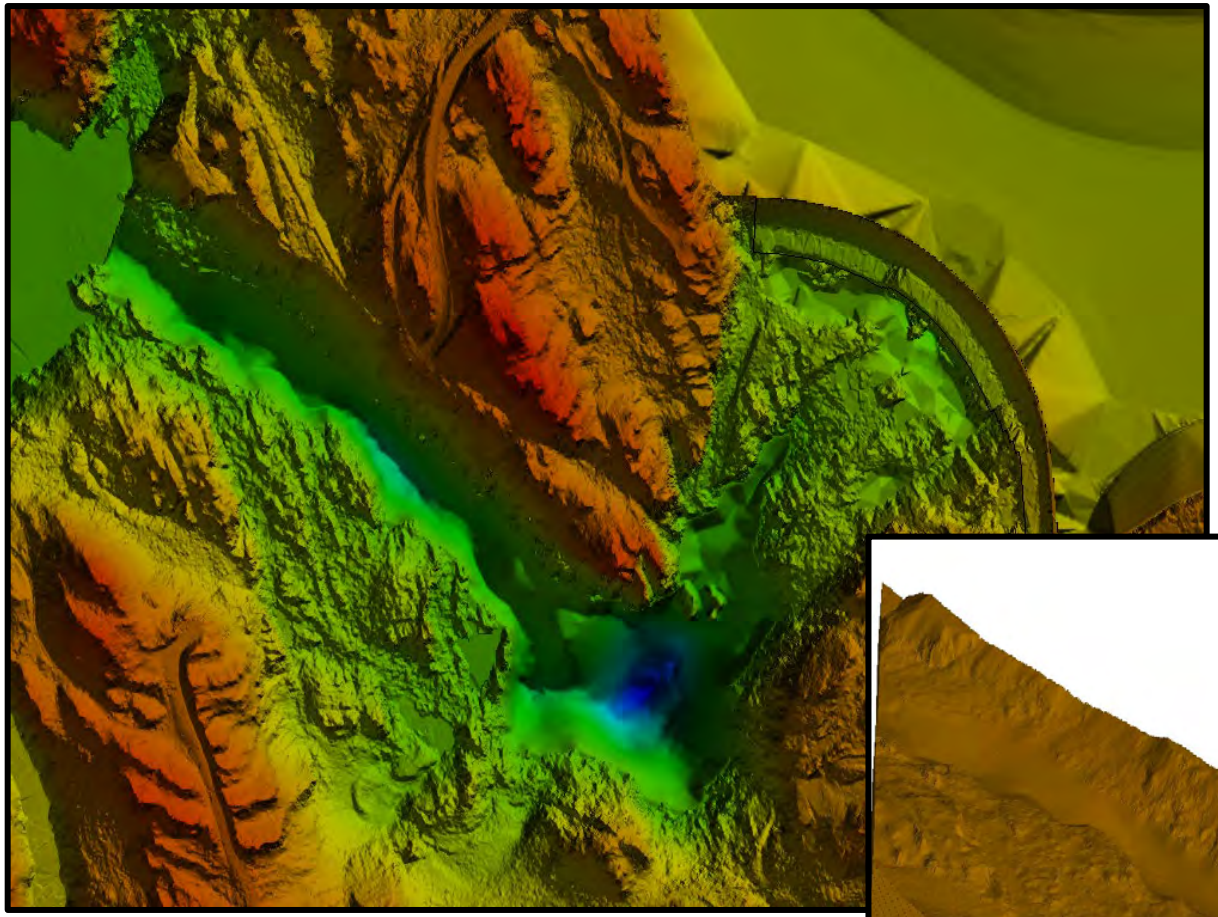
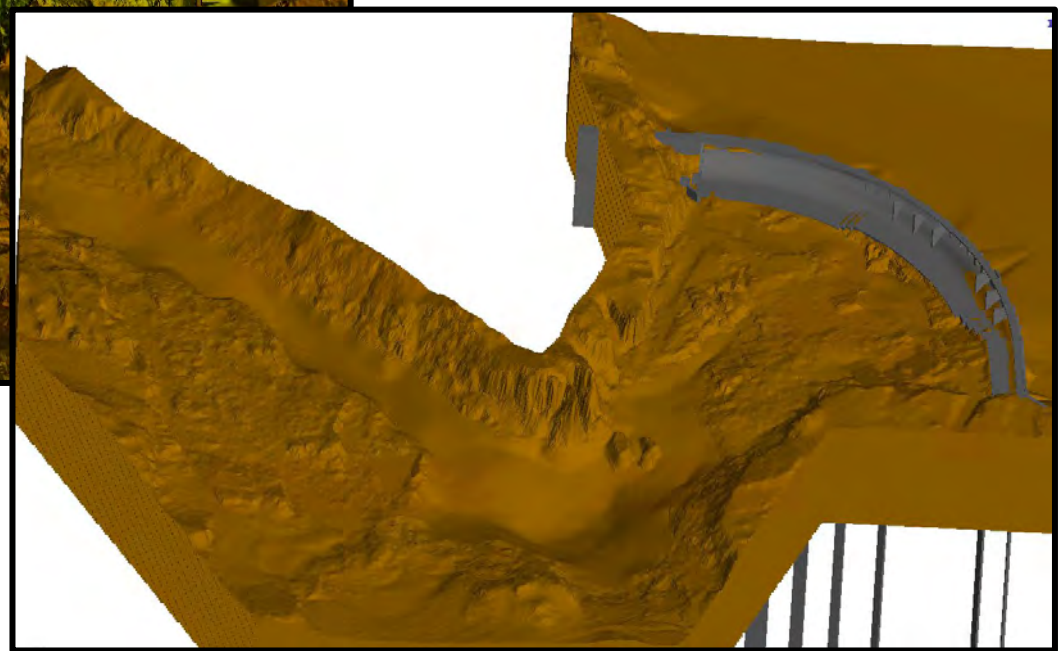
Task 1 – Bathymetric Survey

- Bathymetry from Morrison Maierle
- Additional survey from Northwestern Energy

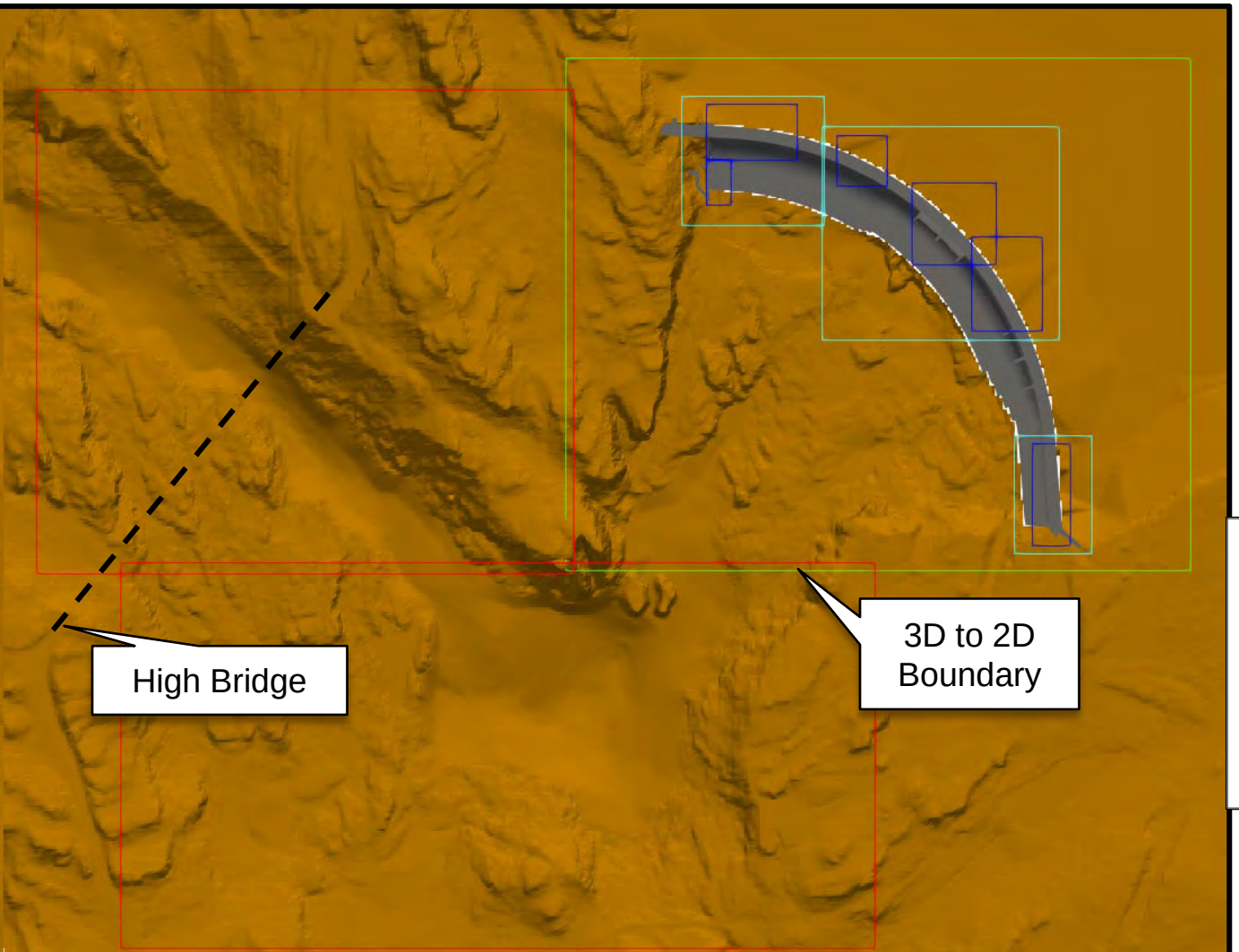


- Combined Terrain Data





- Mesh block configuration



8 FT - 2D
4 FT - 3D
2 FT - 3D
1FT - 3D

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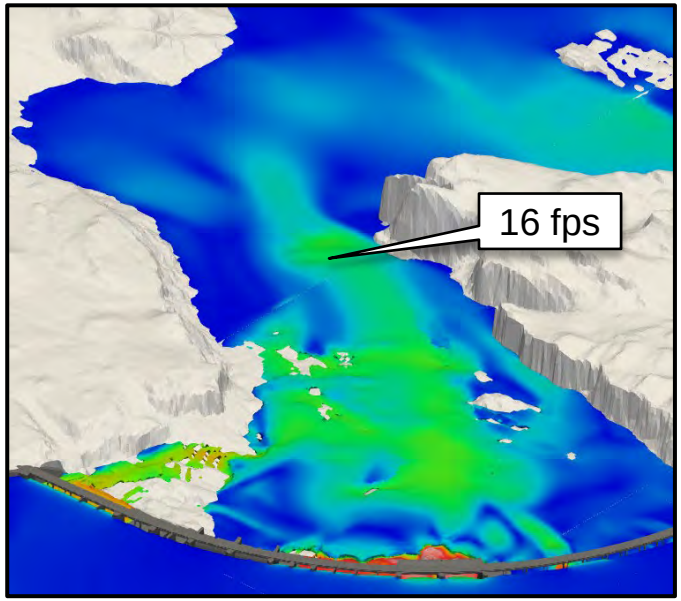
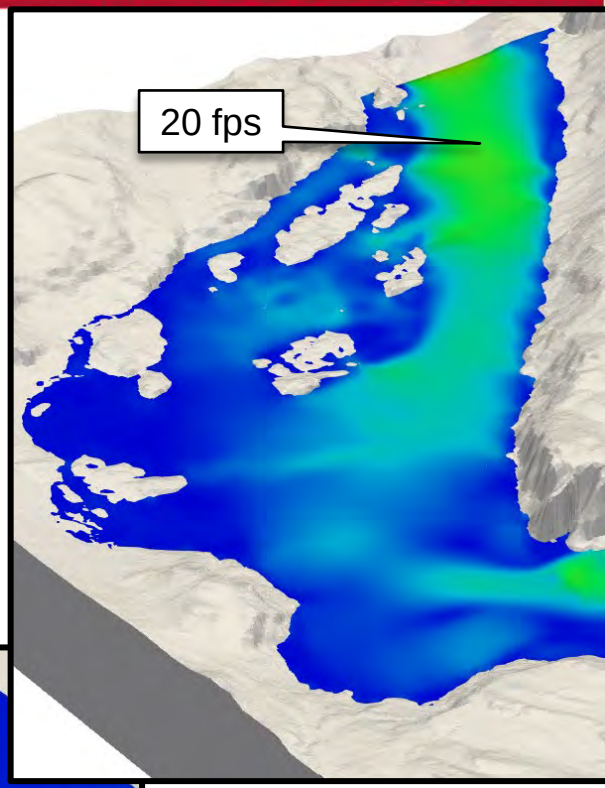
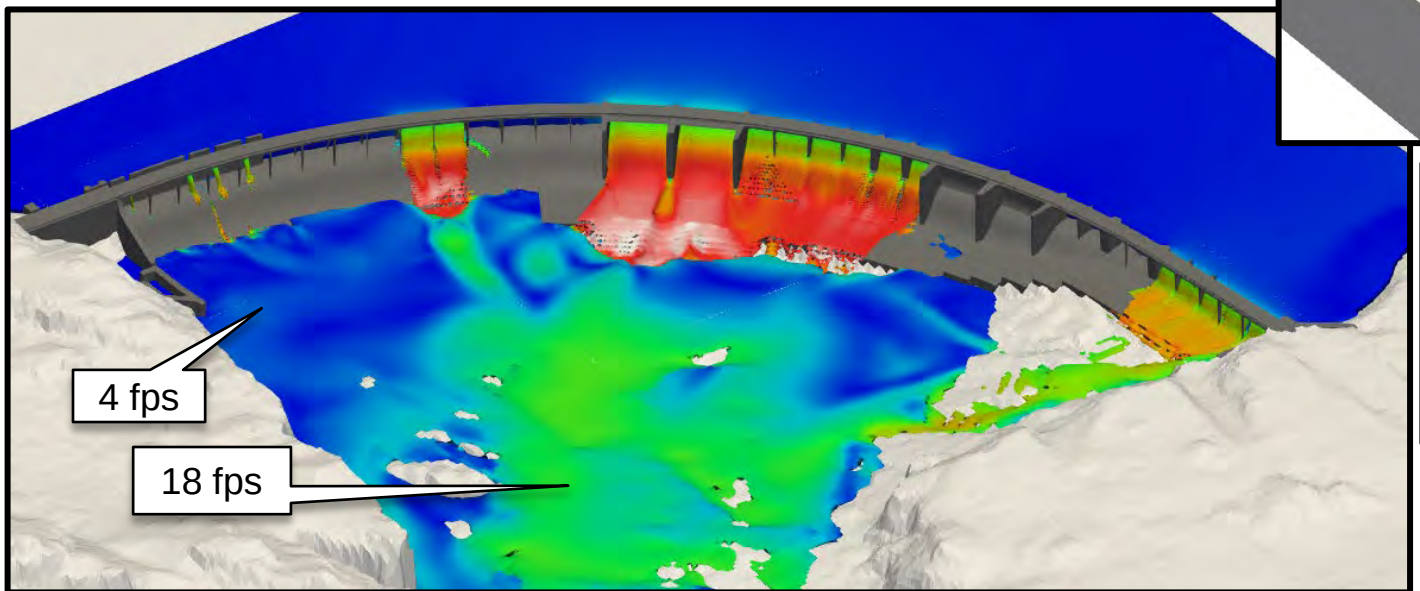
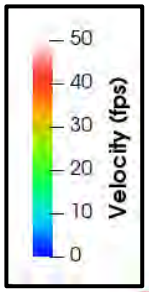
Task 2 – CFD Modeling Results

- 37,000 cfs (60,000 cfs total)









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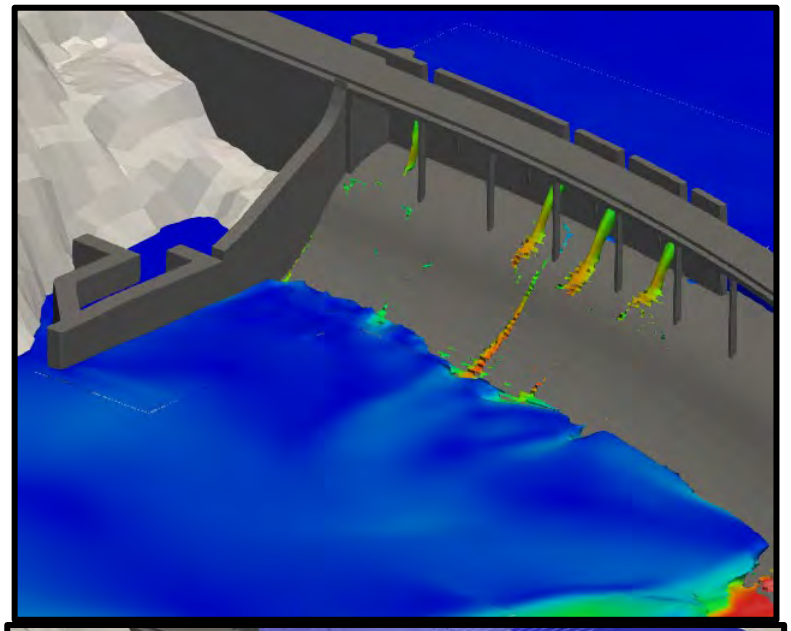

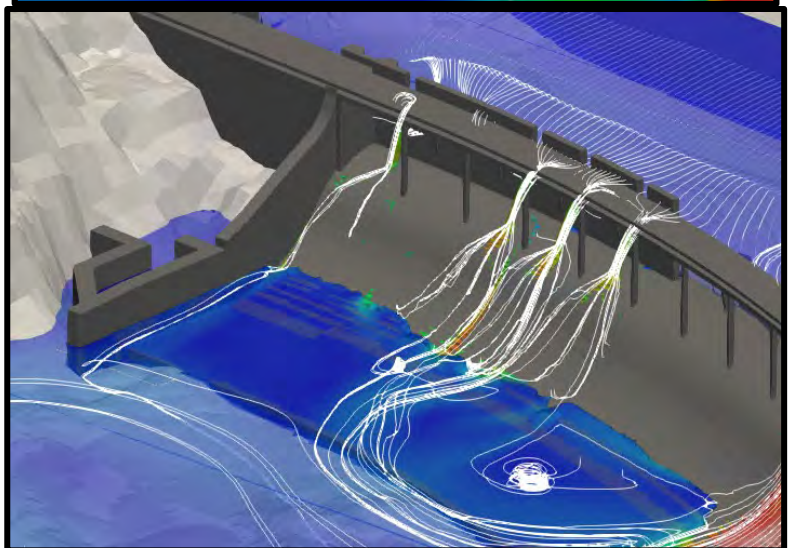

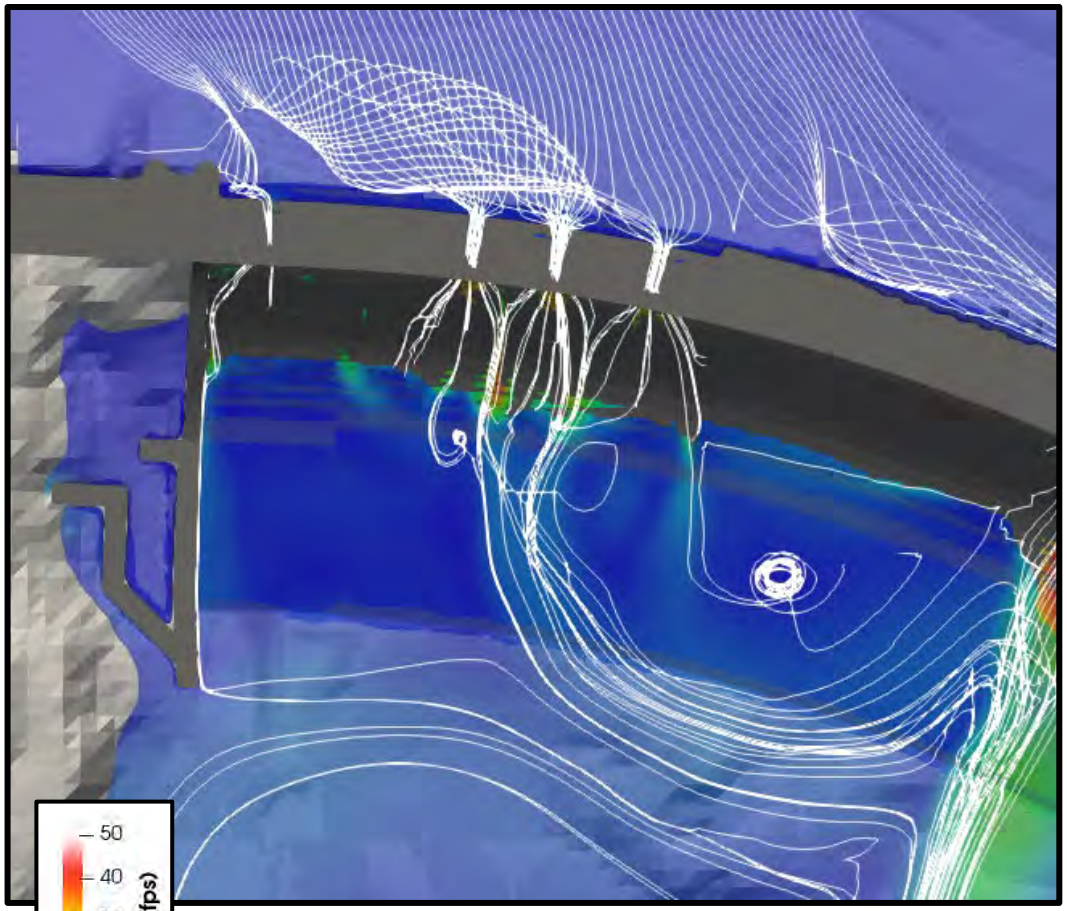

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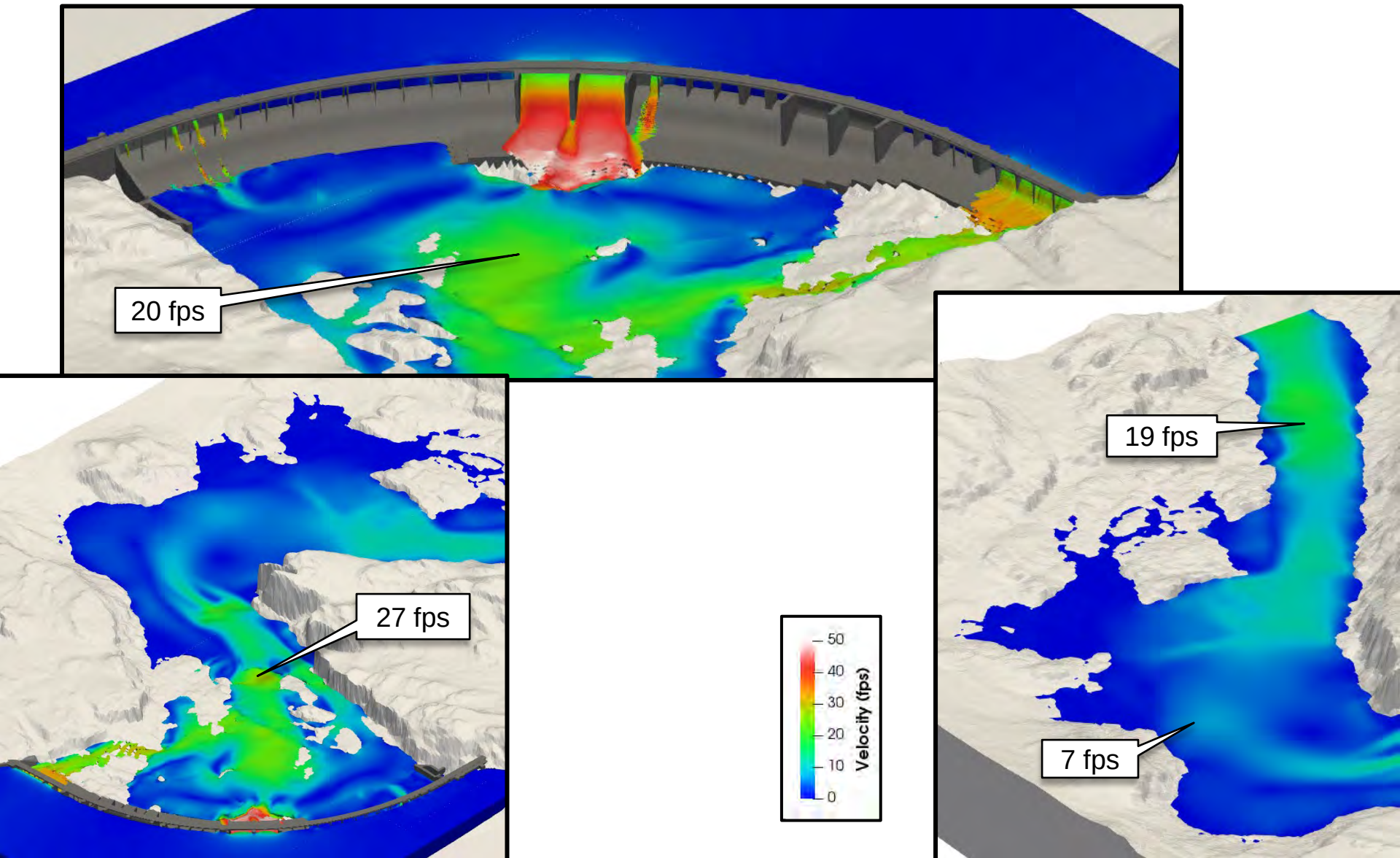
Task 2 – CFD Modeling Results

- 25,000 cfs (48,000 cfs total)



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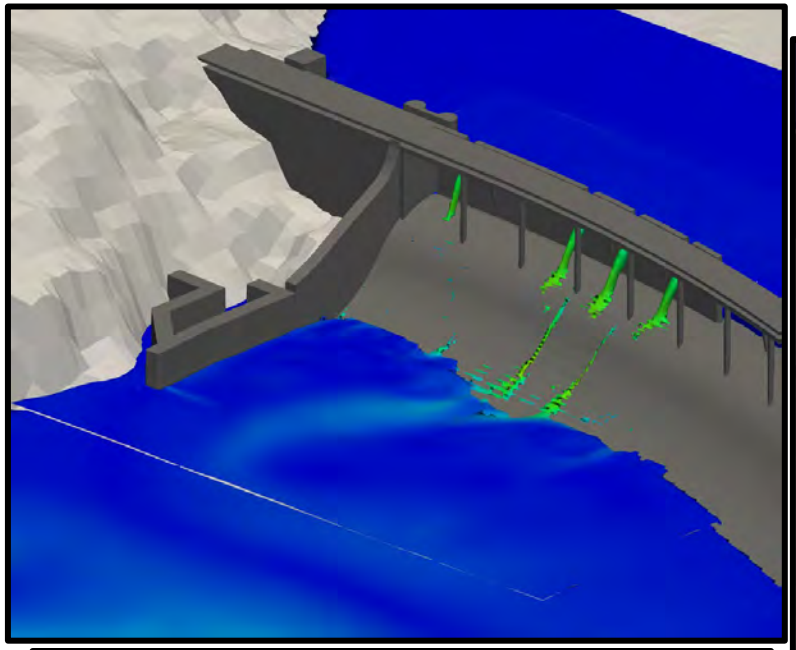

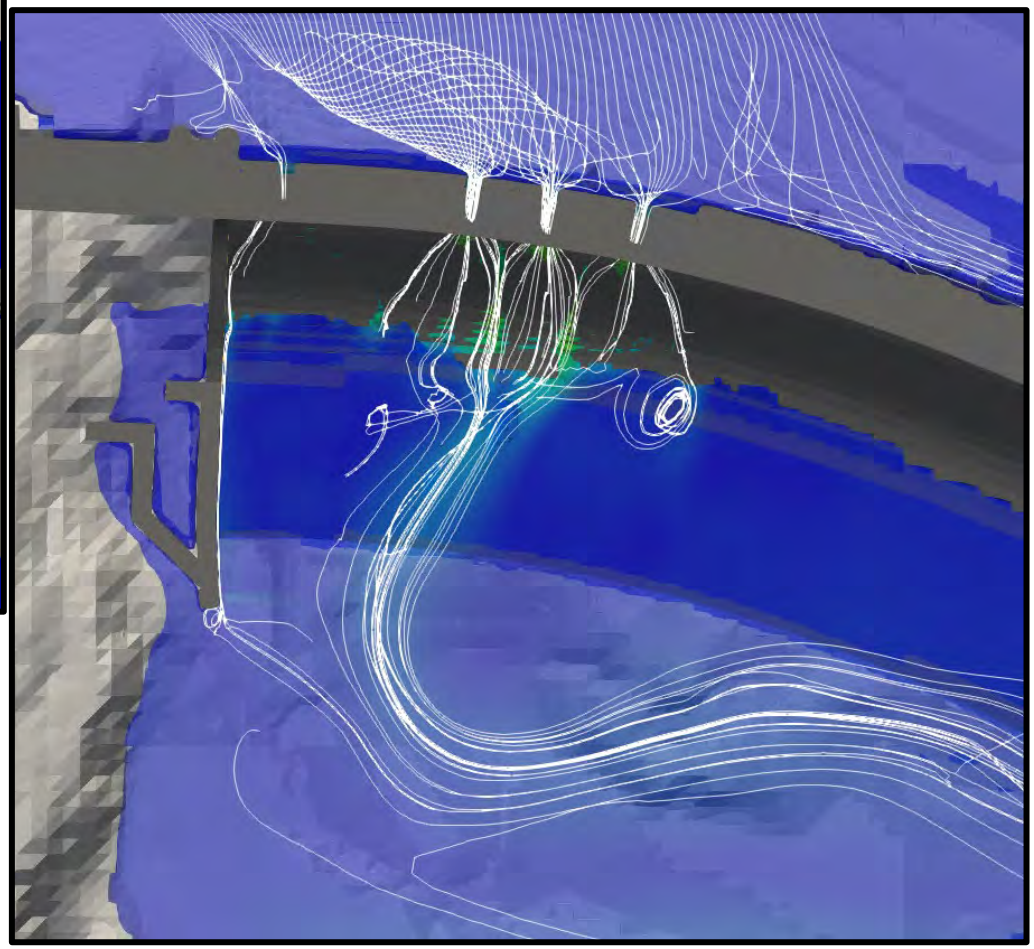

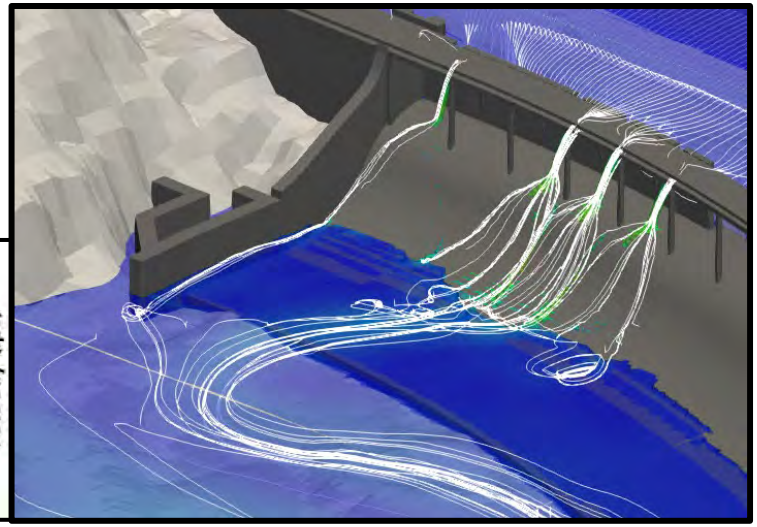

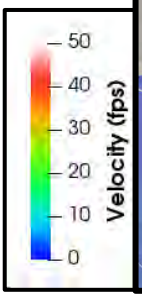

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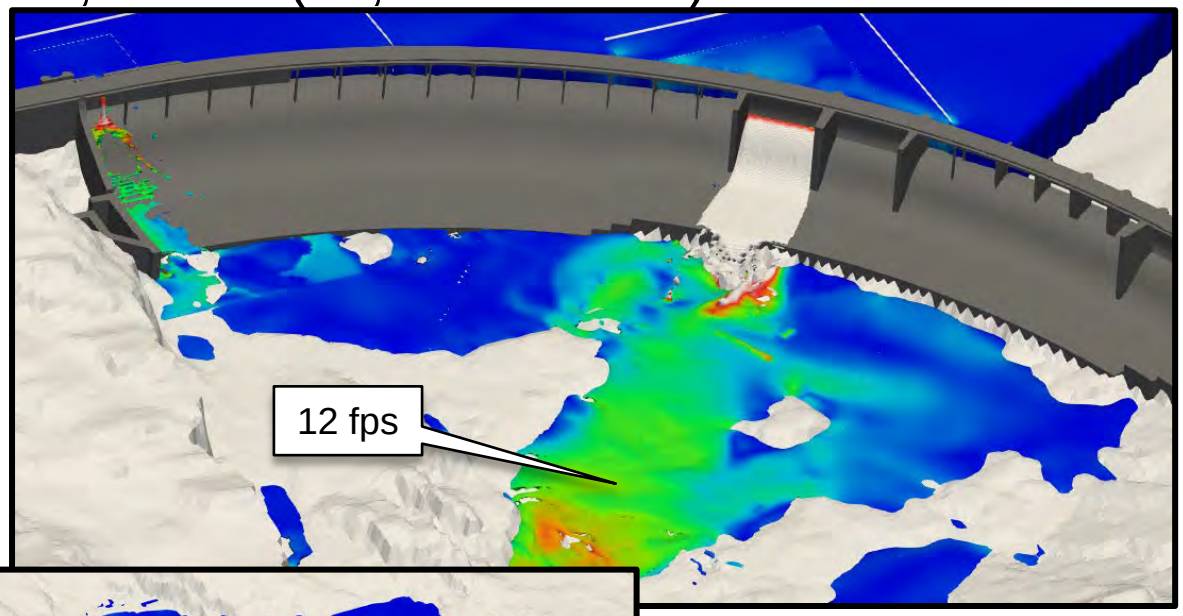
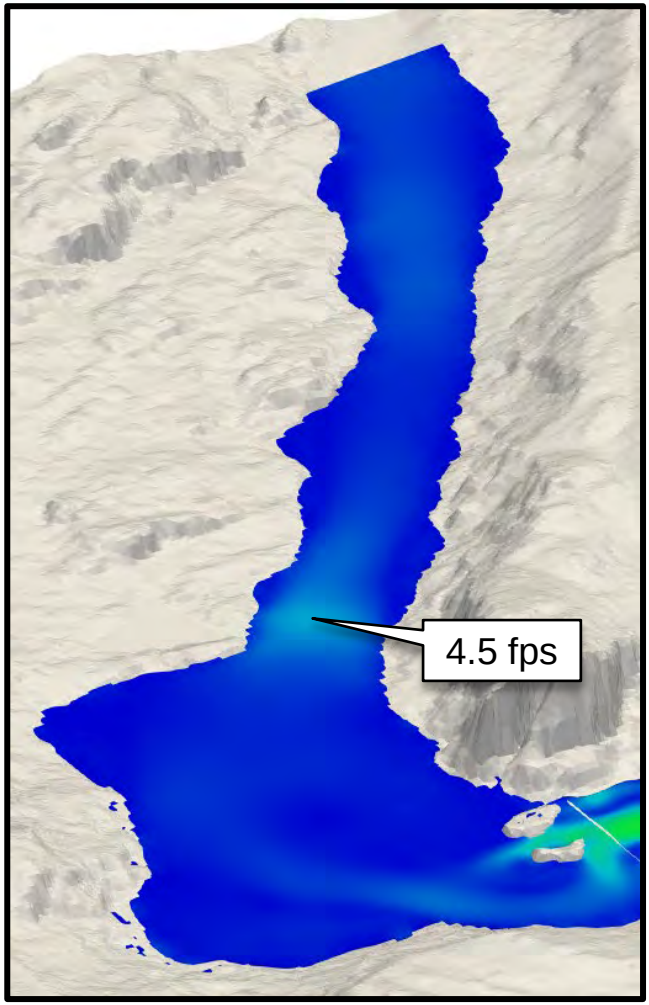
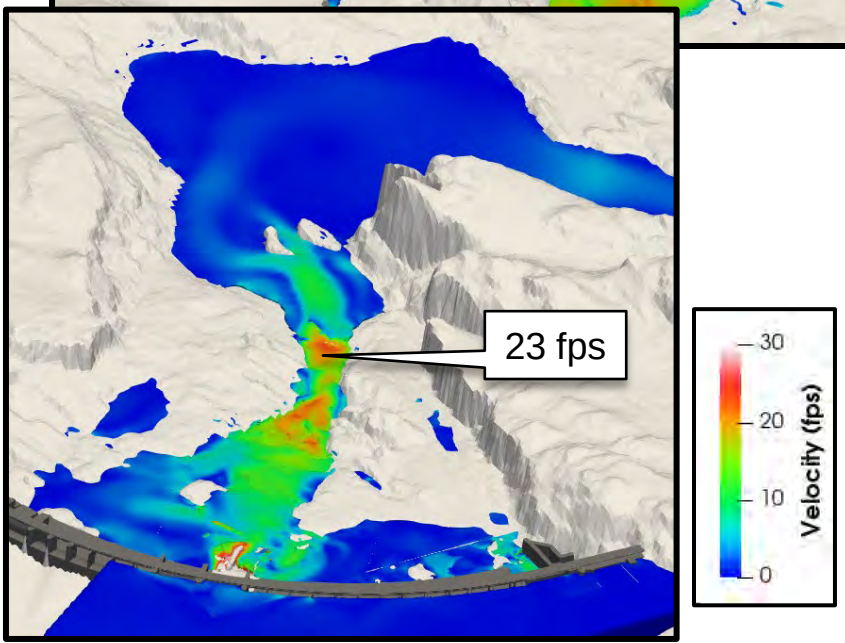
Task 2 – CFD Modeling Results

- 2,000 cfs (25,000 cfs total)







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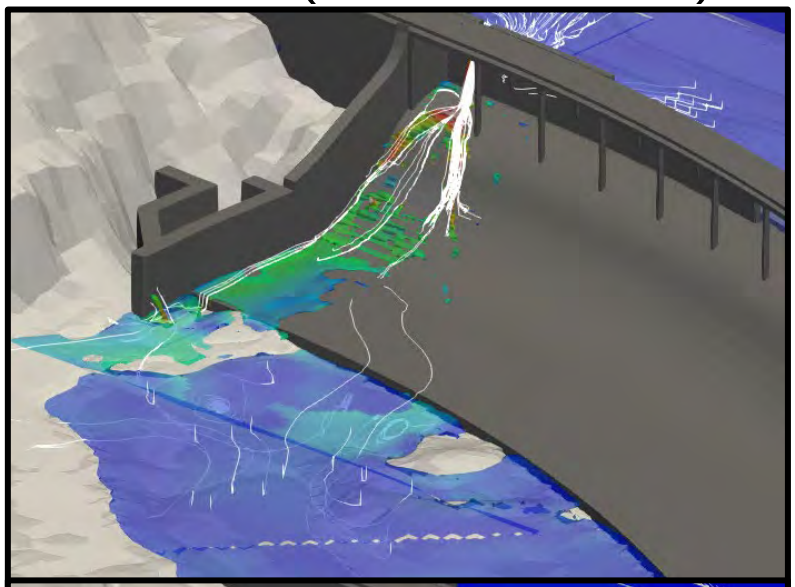

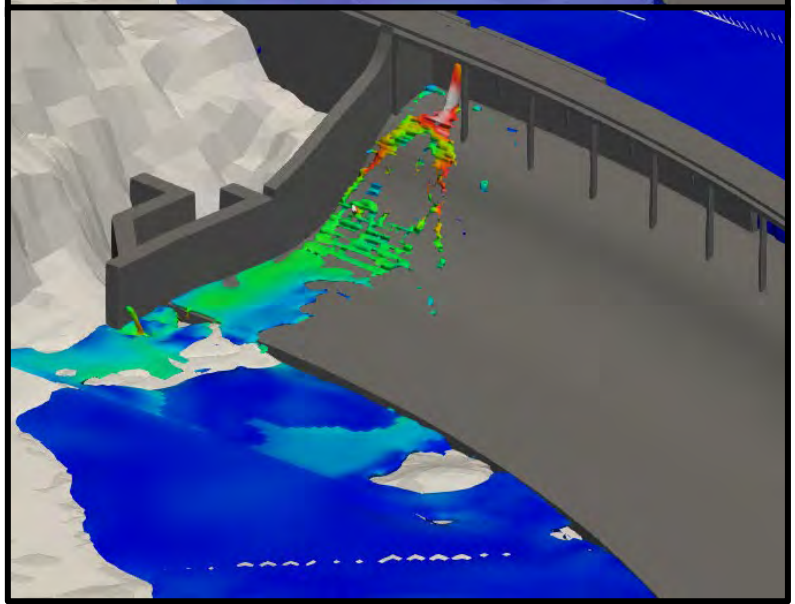

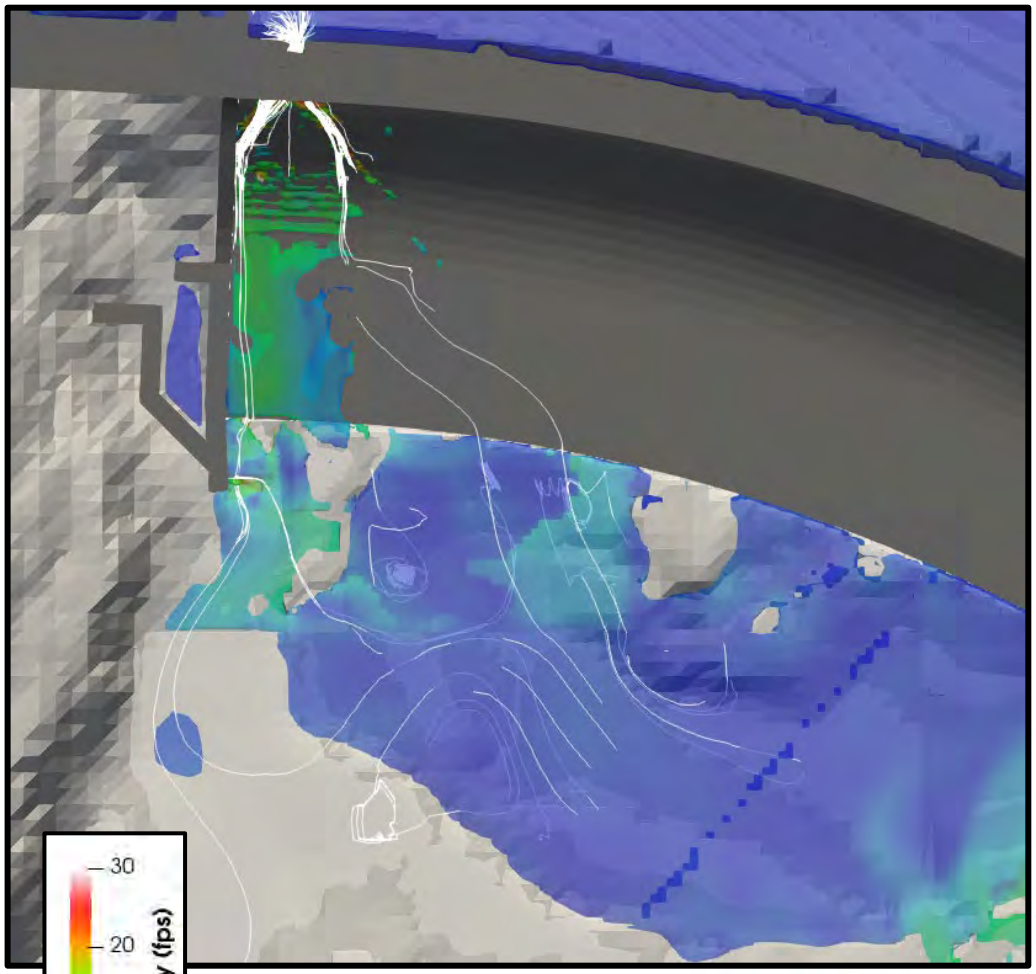

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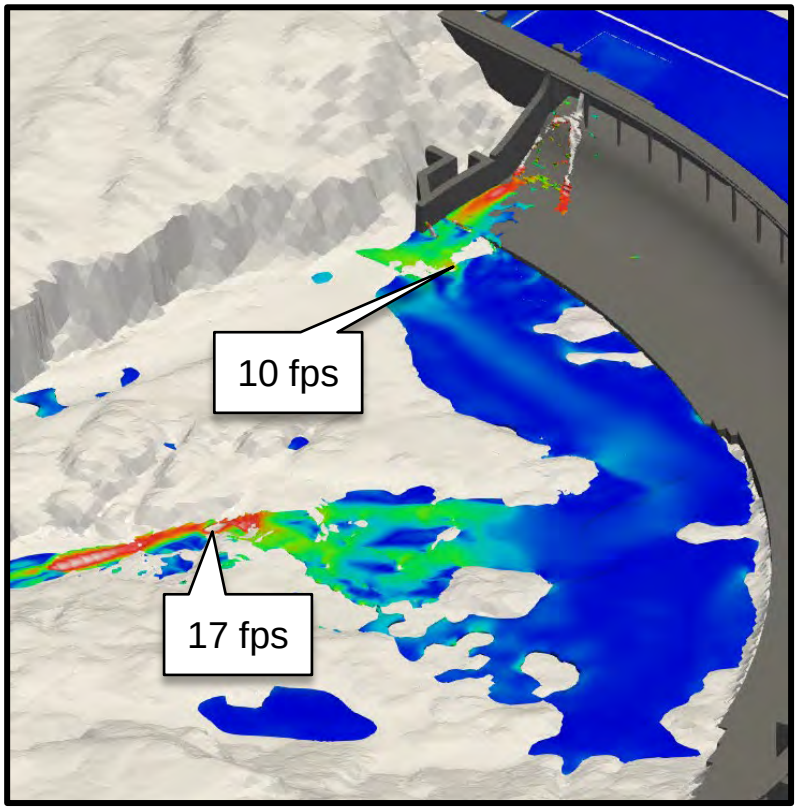
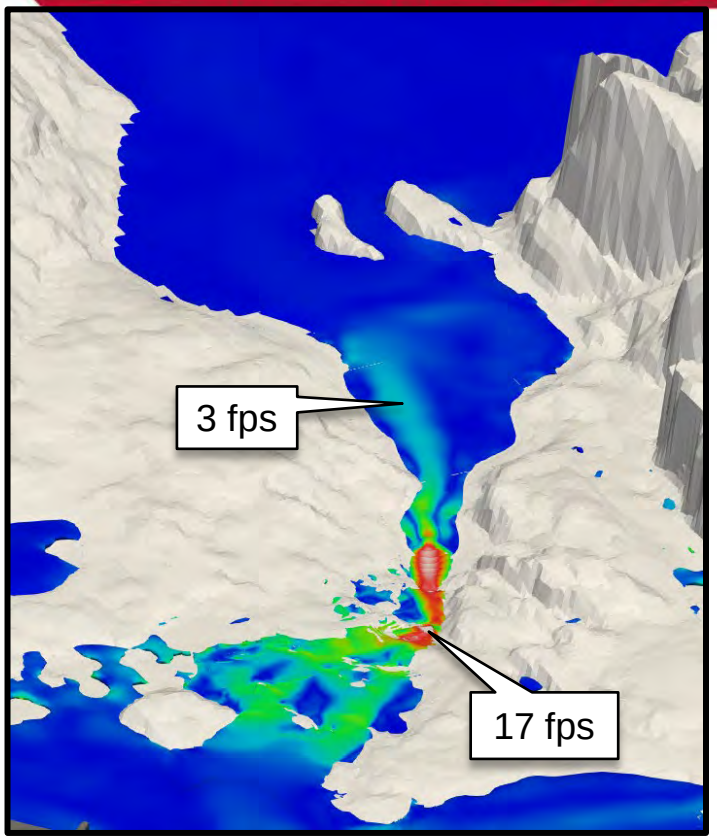
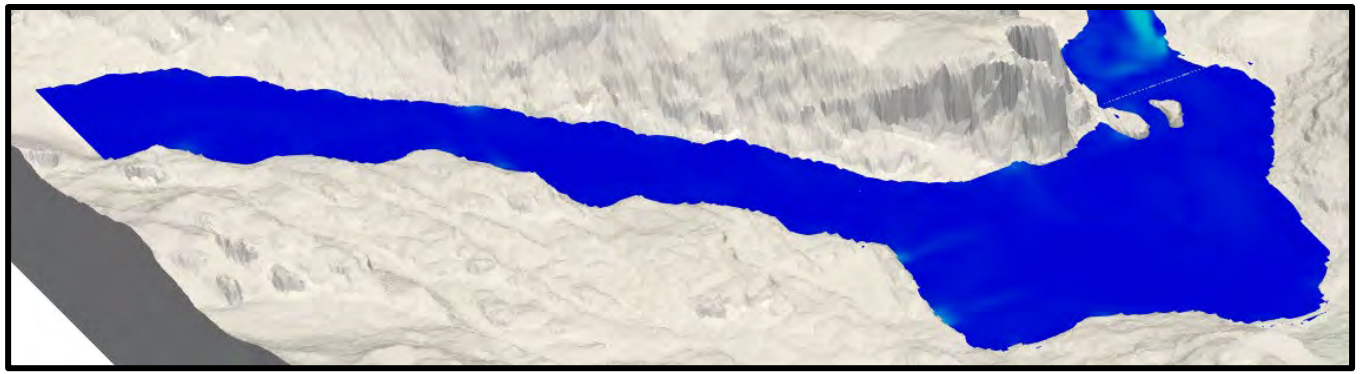
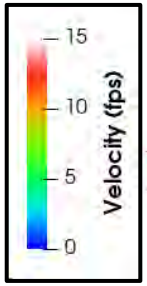
Task 2 – CFD Modeling Results

- 200 cfs (<23,000 cfs total)









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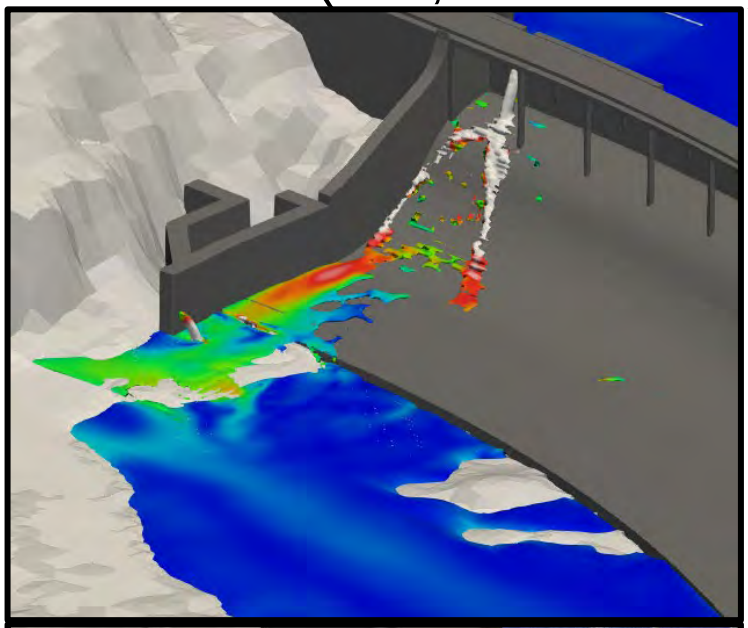

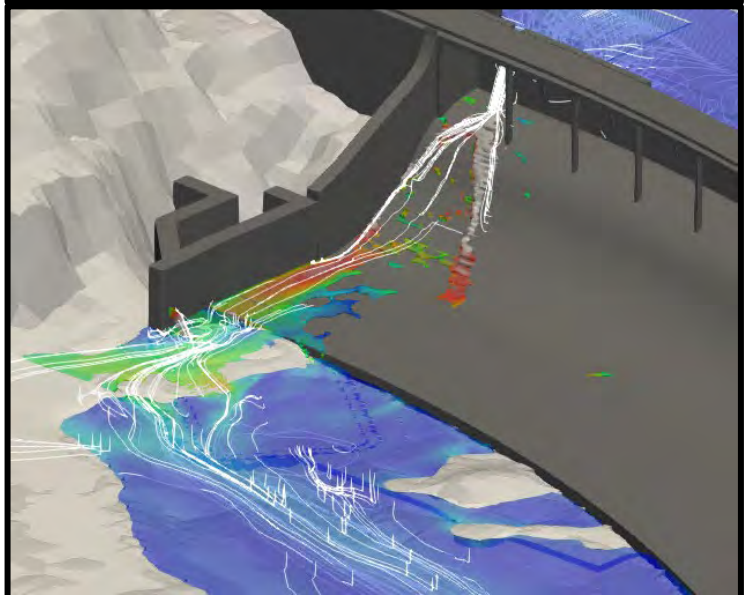

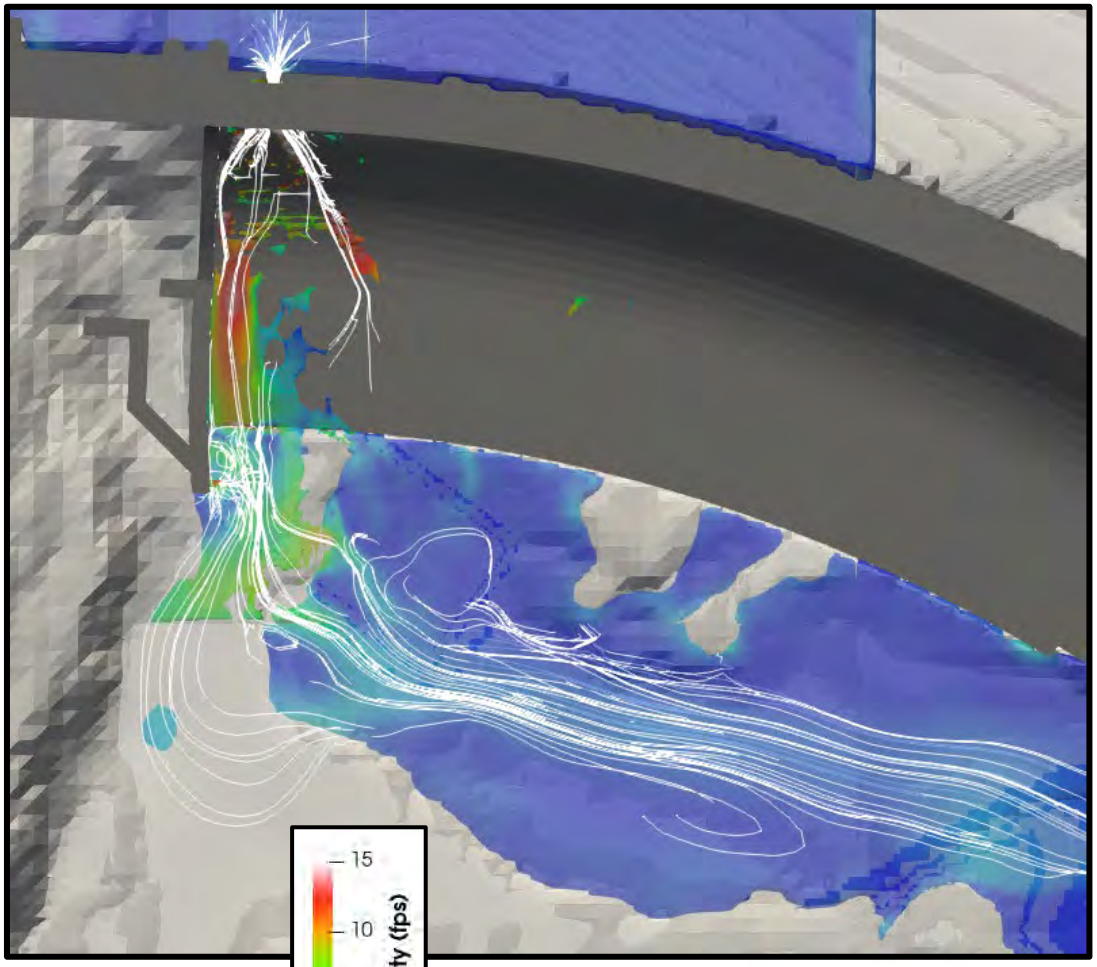

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Responses to Comments Received

- Report submitted for comments (2/15)
- Meeting with Agencies (3/10)
- Comments received from FWP, the FWS, and USFS (3/17)
- Flows and modeling approach agreed upon for Phase II modeling
  - 37,000 cfs and 2,000 cfs (60,000/25,000 total cfs)
- Response to comments submitted as part of the filing (4/28)

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- Begin Phase 2
  - Full 3D for 37,000 cfs and 2,000 cfs
- Final Study Report
  - May 2023

- **Guidelines for Asking a Question:**
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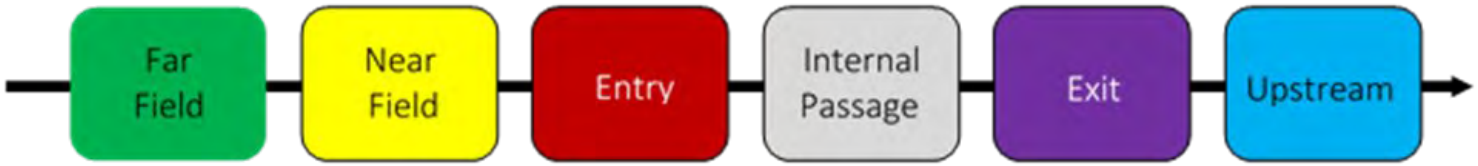
Thompson Falls Hydroelectric Project No. 1869

Initial Study Plan Meeting – Fish Behavior Study
May 5, 2022

- Current FERC License and Biological Opinion required NWE in collaboration with the TAC to form a scientific panel to evaluate the fish passage facility, with emphasis on Bull trout
- One data gap identified by the panel was a quantitative evaluation of the proportion of motivated fish entering the zone of passage (ZOP) and finding the passage facility entrance
- Study is a result of the Thompson Falls Scientific Review Panel recommendation (2020)

- Evaluate proportion of radio tagged fish that enter the ZOP and find the fish passage facility entrance.
- Measures the duration of time and pathway(s) of these movements during various flow conditions
- Includes a literature review of relative swimming capabilities of minnow, sucker, and salmonid species recorded at the fish passage facility

Fish Behavior Study – Zone of Passage (ZOP)



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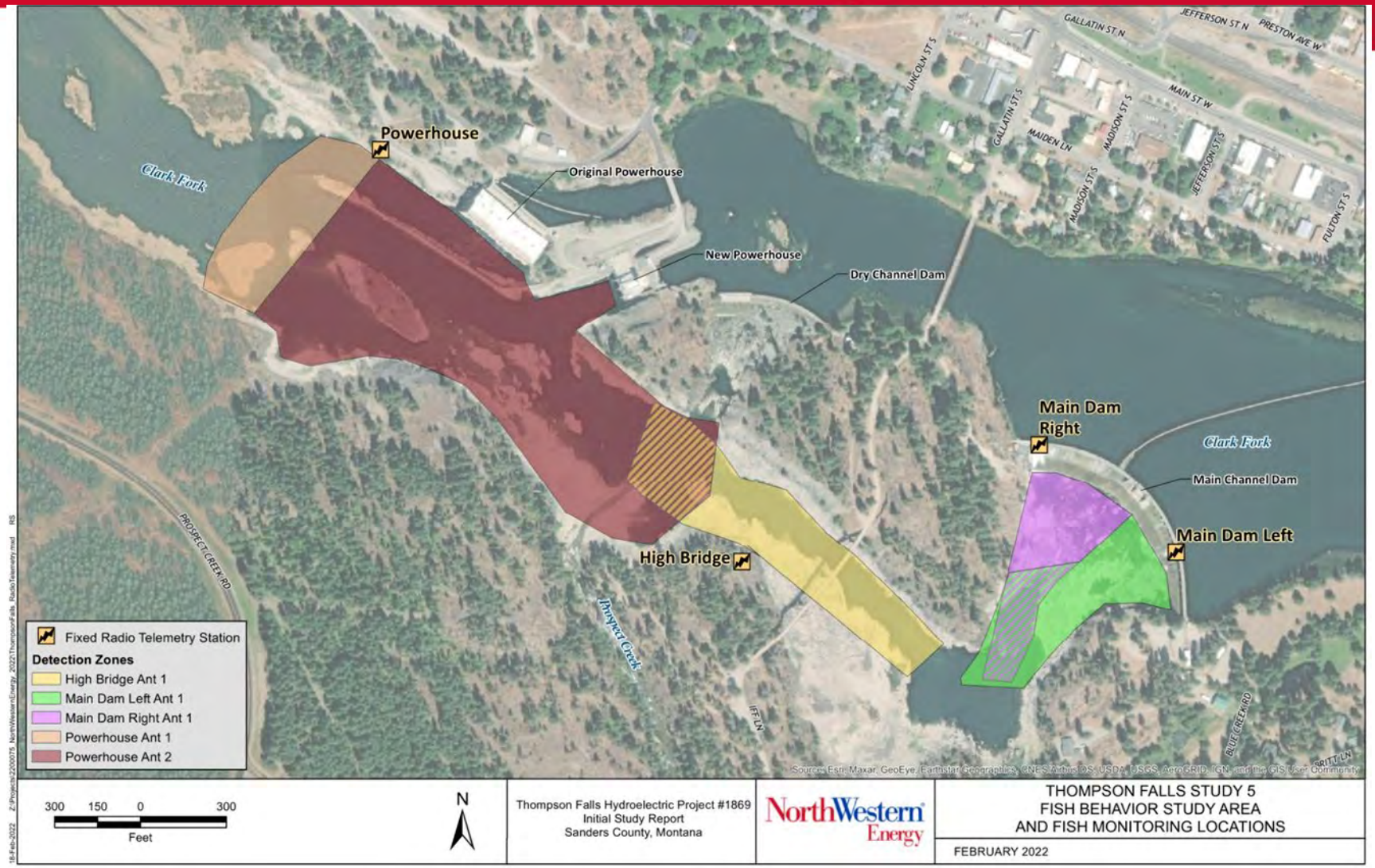
- The telemetry monitoring efforts focused on assessing fish movement, including
  - Travel time from the far field to the near field.
  - Movement patterns (e.g., left bank, right bank) in the near field (Main Channel Dam area).
  - Travel time from the near field (the falls area) to the entrance of the fish passage facility.
  - Proportion of fish that enter the ZOP and locate the entrance of the fish passage facility entrance.
  - Locations where fish hold within the ZOP.

Fish Behavior Study Area



The Powerhouse and High Bridge fixed receiver stations represent the far field and the Main Dam Right and Main Dam Left represent the near field. The fish passage facility entrance is located along the right abutment of the Main Dam.

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- Radio and PIT tag up to 50 Brown Trout and 50 Rainbow Trout captured
  - Clark Fork River upstream of Thompson Falls Project
  - Upstream Fish Passage Facility
  - Thompson River
- Radio tags have depth and activity sensors.
- Tagged fish released at Flat Iron Boat Launch (4 miles downstream)

- Combining the behavioral data and hydraulic modeling data to help identify potential project influences (e.g., velocity fields) in the near field that may affect conditions for upstream fish passage.

- Complete a literature review of the relative swimming capacities and behaviors of salmonids to gain further understanding of combining the behavioral and hydraulic modeling results and included as part of this fish behavior study.

Results

- 16 radio tagged for 2021
- 13 in spring collected from E-fishing mainstem (0.5 CPUE)
- 3 collected in fall from passage facility

2021 Season	Date	Method	Location	Water Temp °C	Effort (Hours)	RB	RB CPUE	LL	LL CPUE
Spring	2-Jun	Electrofishing	MCFR	13.7	1.9	1	0.5		
	3-Jun	Electrofishing	MCFR	14.4	2.0	2	1.0		
	7-Jun	Electrofishing	MCFR	13.1	2.5				
	8-Jun	Electrofishing	MCFR	12.7	1.1	2	1.8		
	8-Jun	Angling	TR	12.7	8.0				
	9-Jun	Electrofishing	MCFR	12.7	3.5	1	0.3		
	11-Jun	Electrofishing	MCFR	12.1	1.5				
	14-Jun	Electrofishing	MCFR	14.5	1.0	1	1.0	4	3.9
	16-Jun	Electrofishing	MCFR	15.9	1.6			2	1.3
Spring Summary	8 days	Electrofishing	MCFR		15.2	7	0.5	6	0.4
	1 day	Angling	TR		8.0	0	0	0	0
Fall	29-Sep	Ladder	Ladder	14.8	NA			1	NA
	1-Oct	Ladder	Ladder	13.7	NA			2	NA

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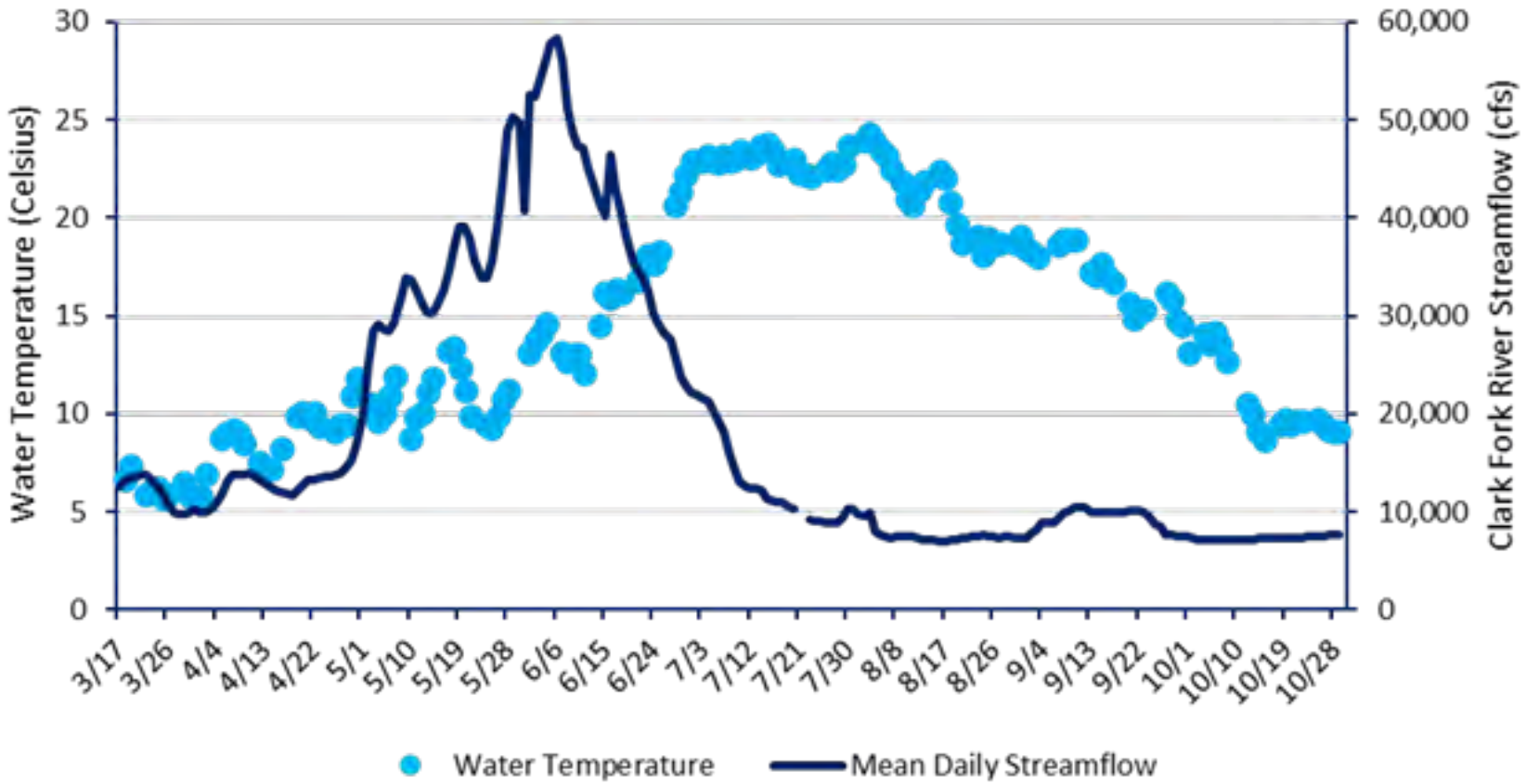
Fish Behavior Results Tagging

- 7 Rainbow trout
- 9 Brown trout (6 spring, 3 fall)
- Water temperatures hit 16° C by mid June, and ceased tagging

Date Tagged & Transported	Species	MCFT3 Tag (g)	Length (mm)	Weight (g)	Radio Tag #	PIT TAG ID[5]
6/2/2021	RB	11	383	682	58	3212832
6/3/2021	RB	11	398	862	49	3212788
6/3/2021	RB	11	457	1052	51	3212871
6/8/2021	RB	11	534	1304	52	3211820
6/8/2021	RB	11	502	1328	56	3211805
6/9/2021	RB	11	409	616	54	3212869
6/14/2021	RB	11	433	705	55	3212787
6/14/2021	LL	11	436	896	39	3212850
6/14/2021	LL	11	444	959	48	3212806
6/14/2021	LL	11	506	1501	59	3212840
6/14/2021	LL	11	392	623	60	3212798
6/16/2021	LL	11	379	574	46	3212853
6/16/2021	LL	11	472	917	47	3212794
9/29/2021	LL	6.8	483	996	28	3212709
10/1/2021	LL	6.8	334	326	26	3212719
10/1/2021	LL	6.8	406	616	27	0300297

2021 River Conditions



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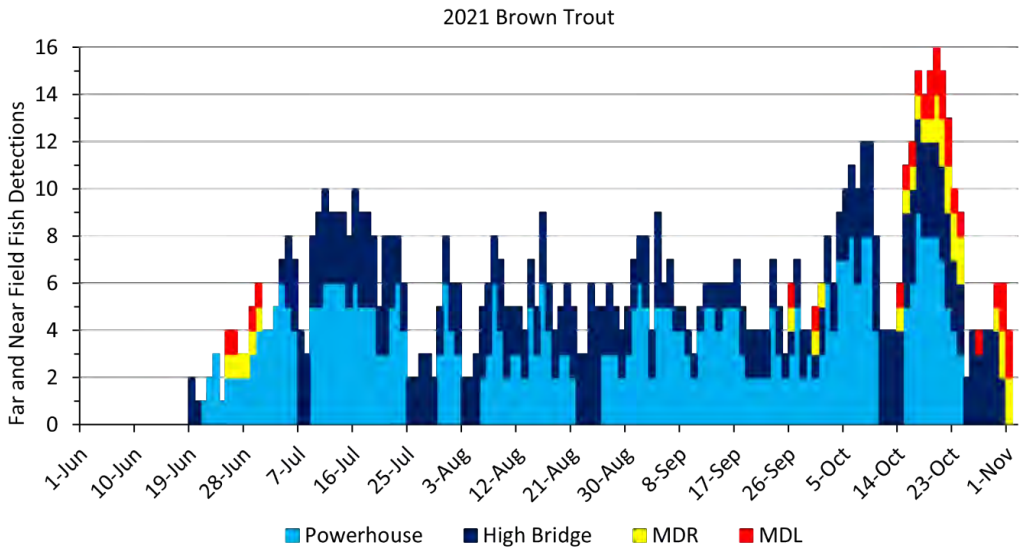
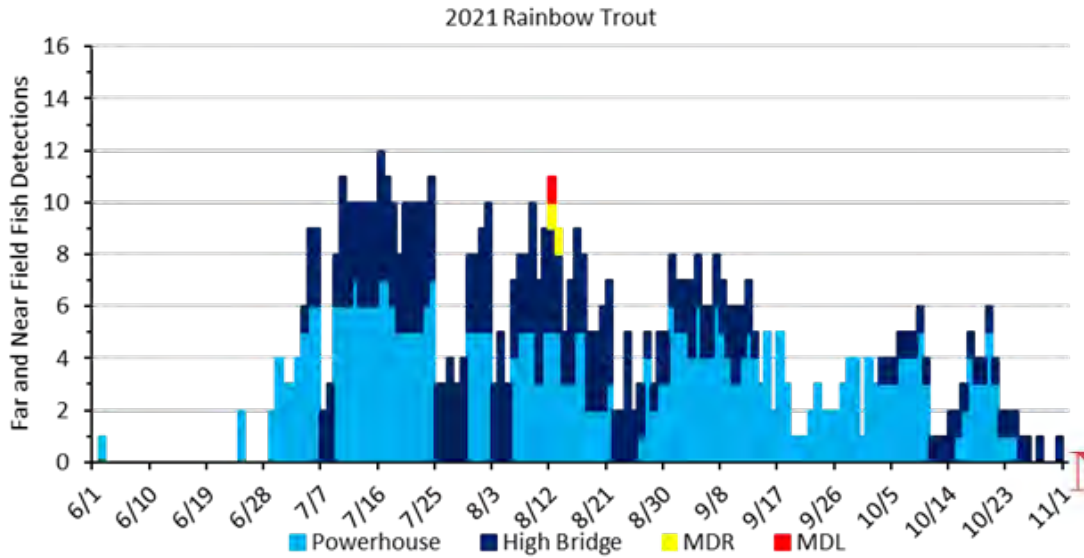
Fixed Receiver Stations

Species	# of Fish	Far Field		Near Field		ZOP Detections
		PH	HB	MDR	MDL	Total Records
RB	7	420,026	1,430,526	1,611	23	1,852,111
LL	9	803,148	1,038,564	148,511	12,155	2,002,378
Total Records	16	1,223,174	2,469,090	150,122	12,178	3,854,564

- All 16 fish detected in the ZOP
- 5 fish (4 LL, 1 RB) detected in the near field
- 3 LL entered the passage facility entrance, and 2 ascended to the top





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Travel time from far field to the near field

- Ranged from 2-114 days for spring tagged fish
- Ranged 1-17 days for fall tagged LL
- Three LL made two separate forays

Collection Time 2021	Radio Tag #	Species	Travel Time (days) Far to Near Field	Date Fish Entered Near Field
Spring	52	RB	37	8/12
	39	LL	101	9/30
	47*	LL	114 5	10/14 10/31
	60	LL	2 88	6/29 9/26
Fall	27*	LL	17 1	10/19 10/27

Travel time from near field to the fish passage entrance

- Three of the 5 detected in the entrance (PIT array)
- All 3 were LL and spent 1-4 days in the near field before being detected at the entrance

Collection Time 2021	Tag #	Species	Date First Near Field Detection	Travel Time (days) Near Field to Fish passage facility Entrance	Date of First Fish passage facility Entrance Detection
Spring	47	LL	10/14	1	10/15
	60	LL	6/25	4	6/29
Fall	27	LL	10/19	3	10/22

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Fish Behavior Results Near Field Movement

Near Field Movement

- 160,000 fixed station detections
- 4 LL and 1 RB
- MDR recorded 92% of detections
- When present in near field fish were detected in short duration (hours or days)

	Near Field Detections	
Species	MDR	MDL
RB	1,611	23
LL	148,511	12,155
Total Records	150,122	12,178

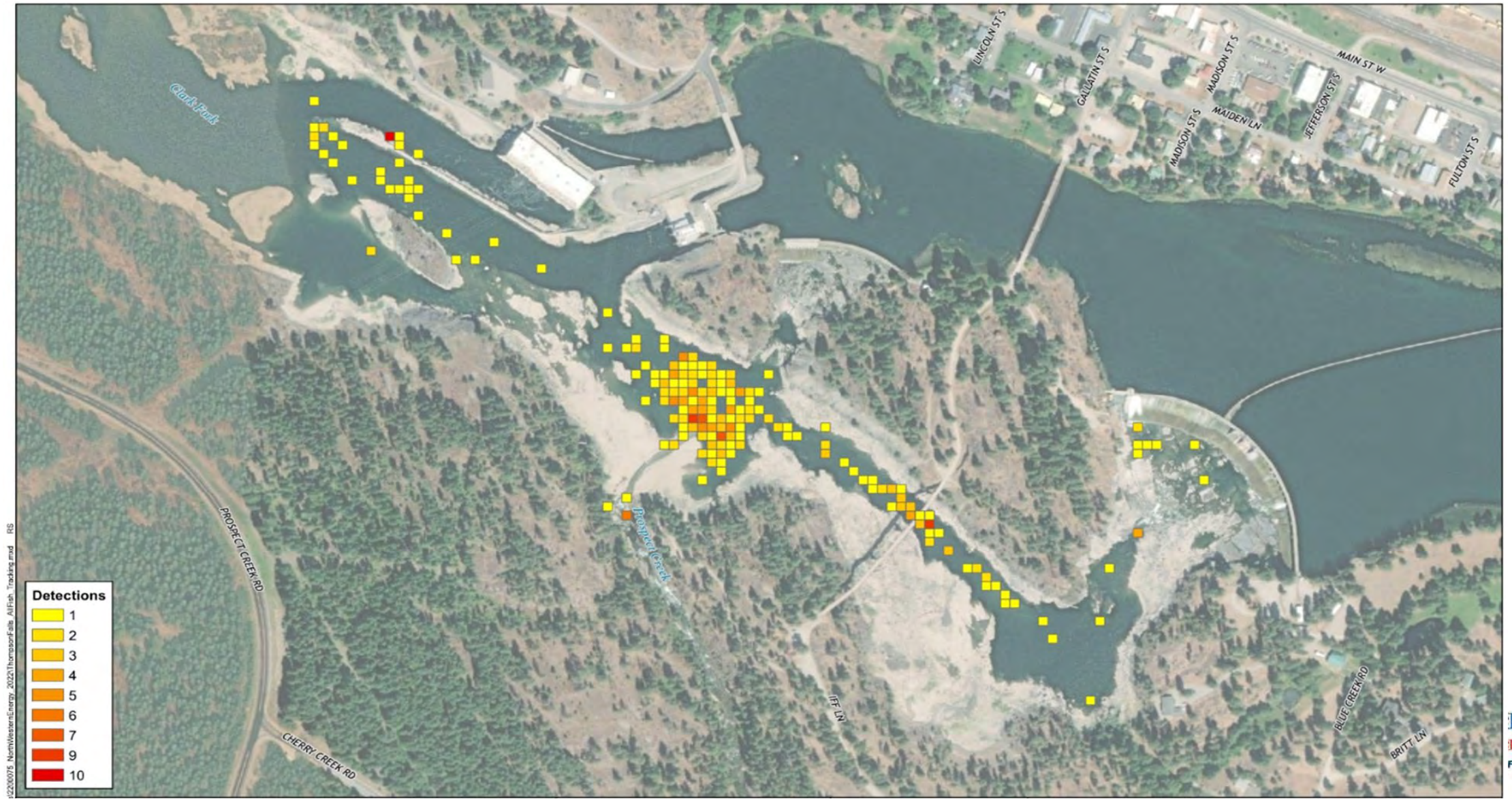
Fish Behavior Results Fish Entering ZOP and Passage Facility

Proportion of fish that enter ZOP and locate the fish passage entrance

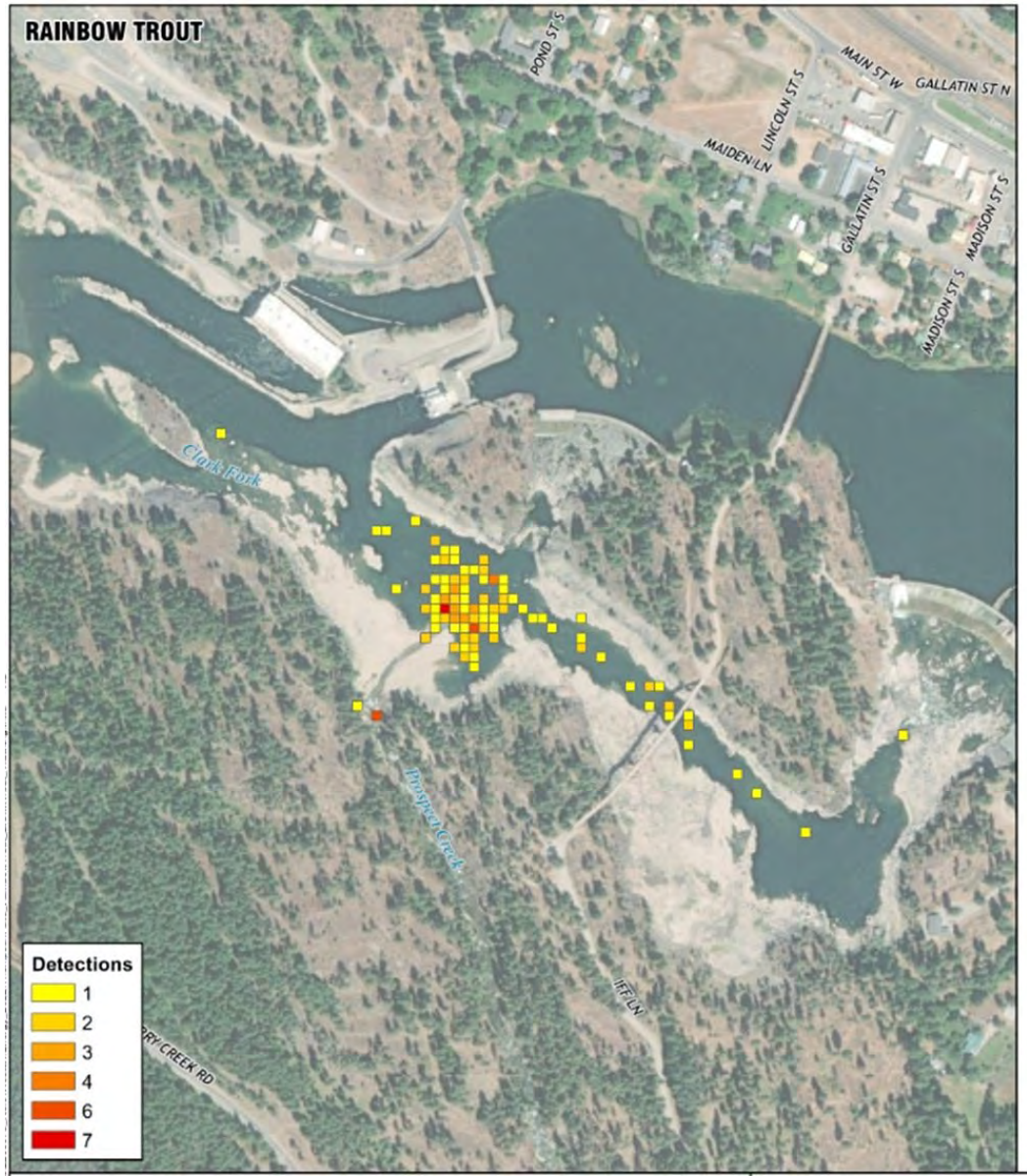
- Determined using PIT arrays at fish passage entrance
- 3 of 16 that entered the ZOP; 19%
- 3 LL entered the facility. 2 ascended in October, 1 entered but did not ascend in June

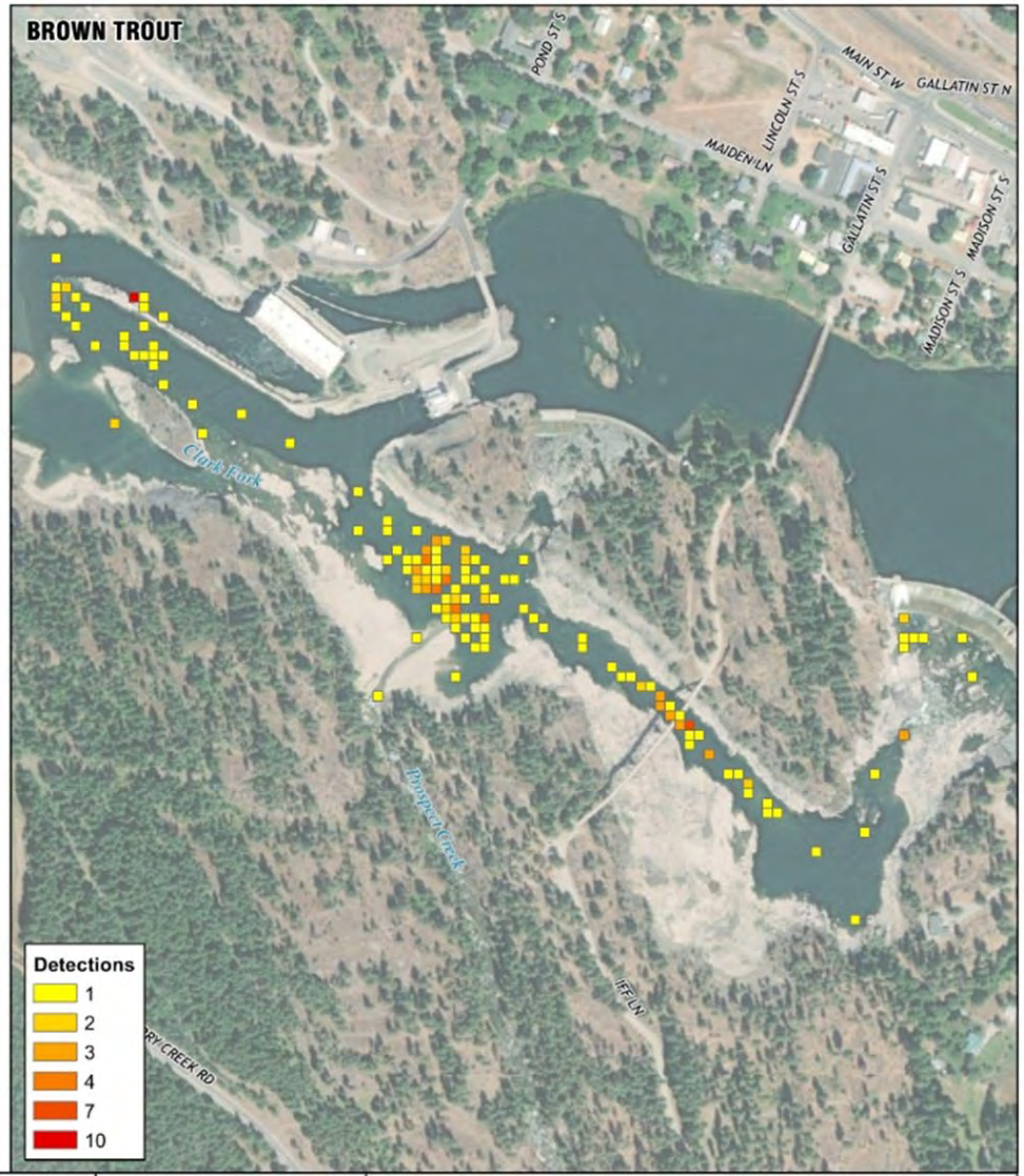
Fish Behavior Locations Within ZOP

All 15 tagged fish June-October



Fish Behavior Locations within ZOP





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LL locations by month

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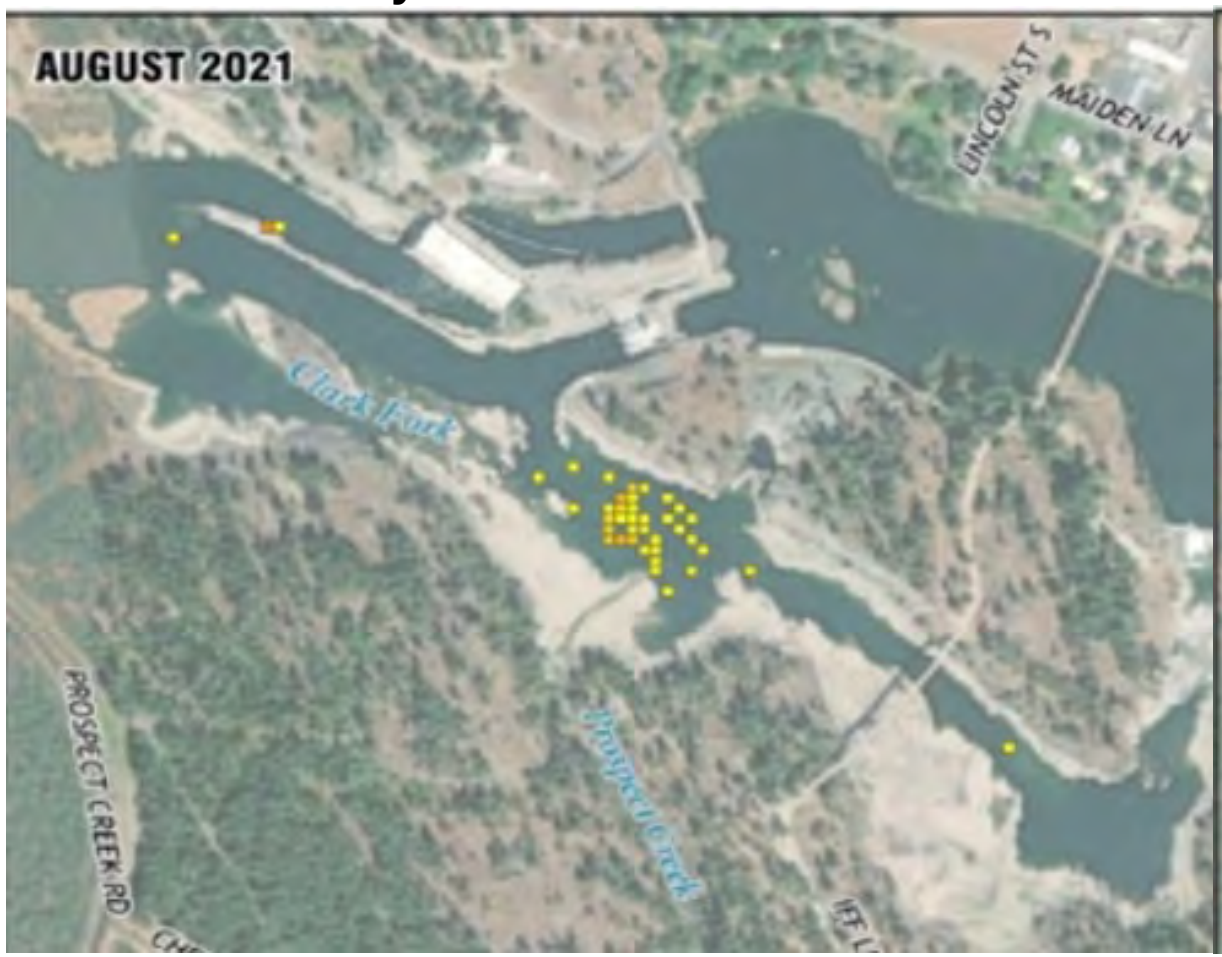
LL locations by month



LL locations by month

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RB locations by month

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RB locations by month

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RB locations by month

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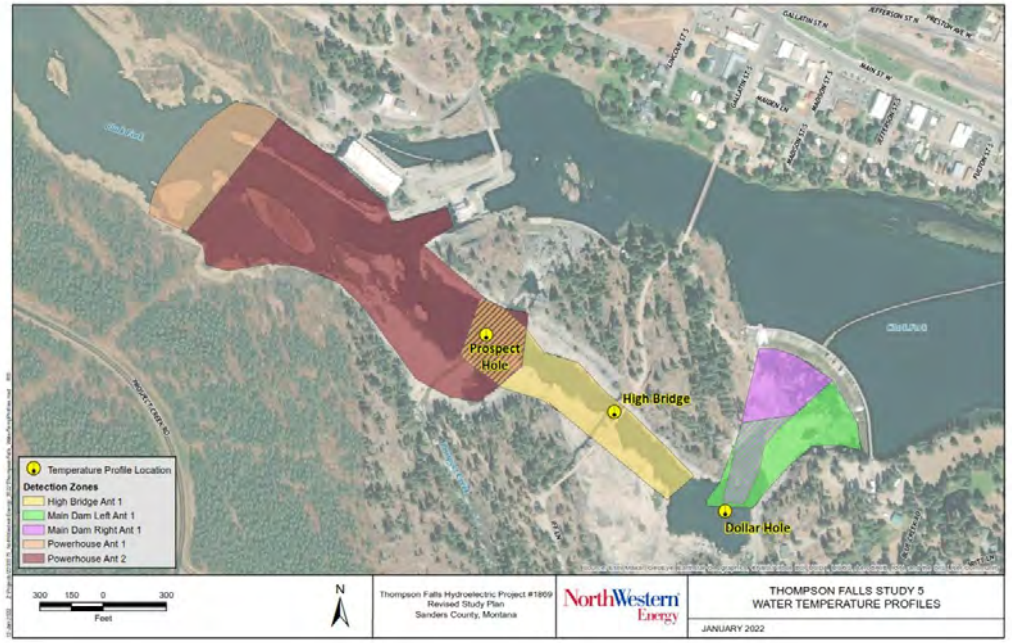
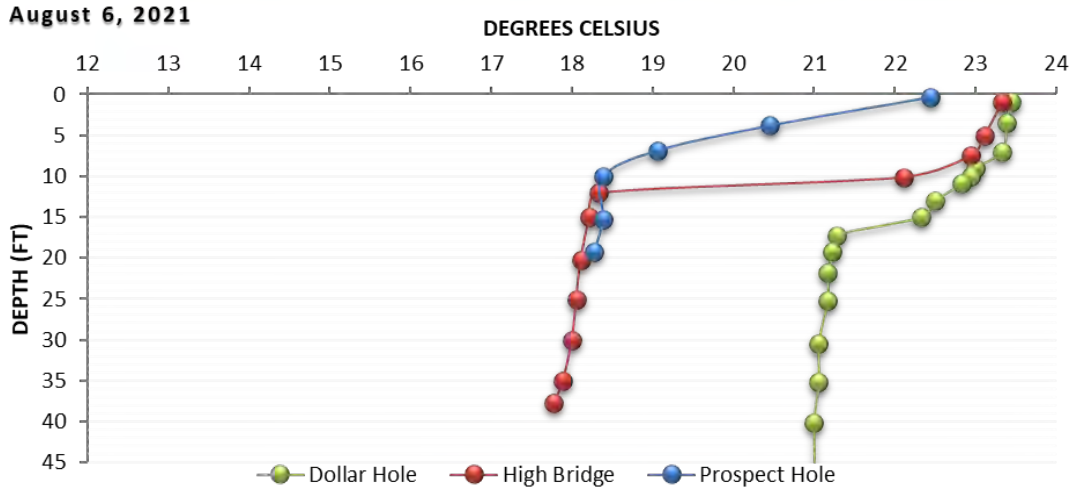
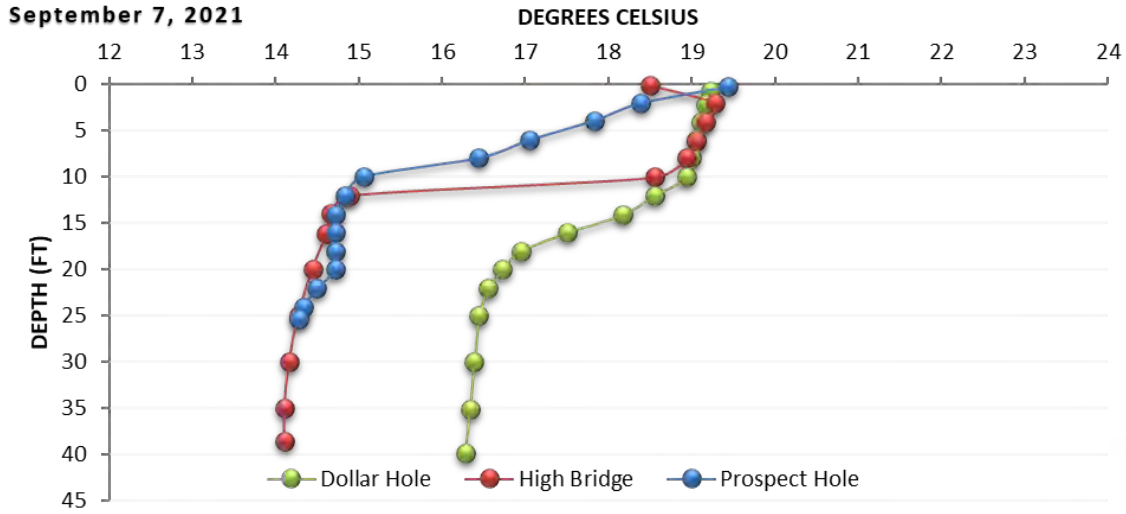
Temperature profiles





- Thermocline at High Bridge and Prospect Hole
- Surface 22-23 C, 4-5 degrees cooler ten feet deep



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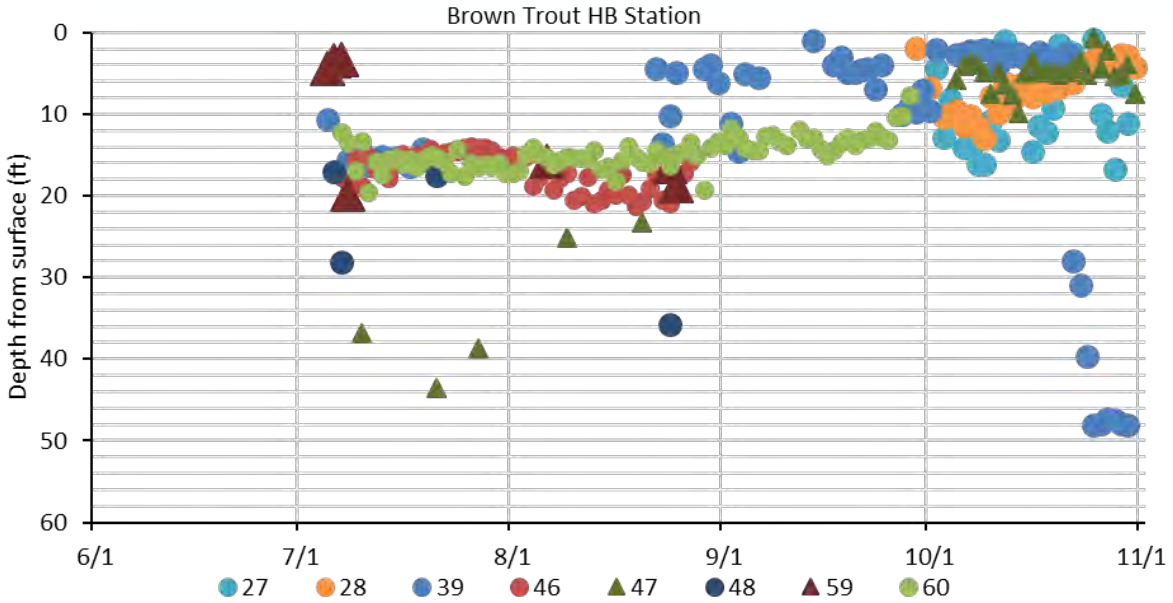
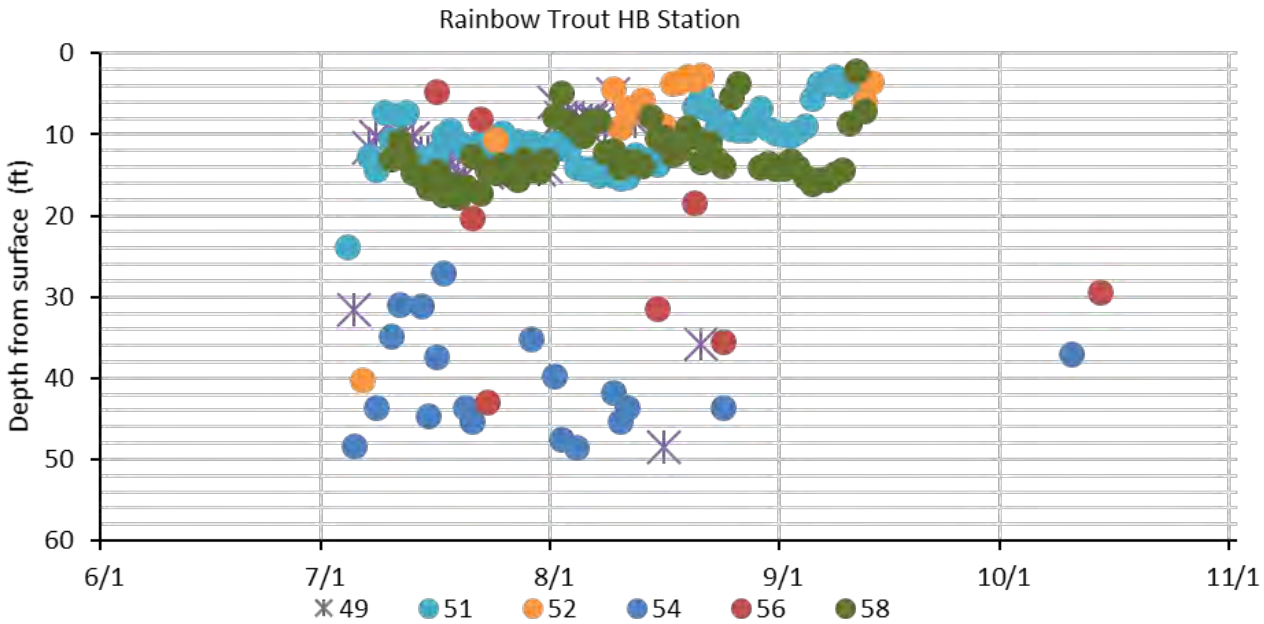
Fish depth use within ZOP





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Fish Swimming Ability Review

Common Name	Prolonged Speed (fps)	Burst Speed (fps)
MINNOW	1.3 - 2.4	2.4 - 4.4
Northern Pikeminnow	1.3 - 3.8	
SUCKER	1.3 - 2.5	2.2 - 3.2
Longnose Sucker	2.0 - 4.0	4.0 - 7.9
Largescale Sucker	1.6 - 1.9	
SALMONIDS	2.3 - 4.0	4.5 - 7.5
Westslope Cutthroat Trout	1.6 - 6.4	3.3 - 13.50
Rainbow Trout	1.6 - 4.0	3.4 - 20.3
Mountain Whitefish	1.3 - 5	2.6 - 10
Bull Trout	1.3 - 2.8	3.6 - 7.5
Brown Trout	1.6 - 7.7	4.2 - 13.2
Brook Trout	1.4 - 8.2	6.4 - 13.5

- Sustained – purely aerobic effort used for long periods of travel at low speeds (more than 200 minutes)
- Prolonged – combination of aerobic and anaerobic effort used for short periods of travel at high species (from 20 seconds to 200 minutes)
- Burst – purely anaerobic effort used for maximum swimming speed, inducing fatigue (less than 20 seconds)

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Rainbow Trout

- June/early July movement into ZOP. Most when flows <30,000 cfs, one fish entered around 52,000 cfs
- Summer congregation near mouth of Prospect Creek. Unfavorable thermal conditions may be a large driver of fish behavior within the ZOP during this timeframe. Got hot early and stayed hot.
- Collection timing (June) likely targeted post-spawned RB. Factors that may have impacted behavior and motivation levels.

Brown Trout

- Spring tagged LL were detected in the ZOP when flows were less than 38,200 cfs
- 3 of 4 LL detected in the near field entered the passage facility, 2 of these ascended to the top
- Fish oriented to the MDR (near ladder) as opposed to the left side

2021 Summary

- Fish moved up the main river channel and spent little time near the powerhouse areas
- Fish spent considerable time near the mouth of Prospect Creek and made brief forays upstream to the main dam
- Fifteen of the 16 radio-tagged fish remained in the ZOP the majority of the study season, five fish (4 LL, 1 RB) entering the near field and three fish (3 LL) entered the ladder
- 2022 study season will increase sample size, start earlier in the year, and final report will integrate hydraulic modeling results with fish behavior and swimming capability results

Any Questions?

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Thompson Falls Hydroelectric Project No. 1869

Initial Study Plan Meeting – Downstream Fish Passage Literature Review

May 5, 2022

Background - Downstream Fish Passage Literature Review

- In 2007, the previous Licensee prepared a Literature Review of Downstream Fish Passage Issues at Thompson Falls Hydroelectric Project.
- Survival estimates in 2007 Literature Review:
  - 94% through the new powerhouse (Kaplan turbine),
  - 85% through the original powerhouse (Francis turbines),
  - 98% through the spillway.
- Combined survival estimates for trout measuring > 100 mm was estimated 91 to 94%.

Background - Downstream Fish Passage Literature Review

- 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.
- Generally, passage via spill poses less risk than via turbine.
  - 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).
- Mortality can vary depending on the configuration of the turbines and spillways and type and timing of fish being passed.

Study Area - Downstream Fish Passage Literature Review

Goals and Objectives - Downstream Fish Passage Literature Review

Provide updates to estimates of downstream passage survival of various size classes of fish, with respect to current Project configuration and operations.

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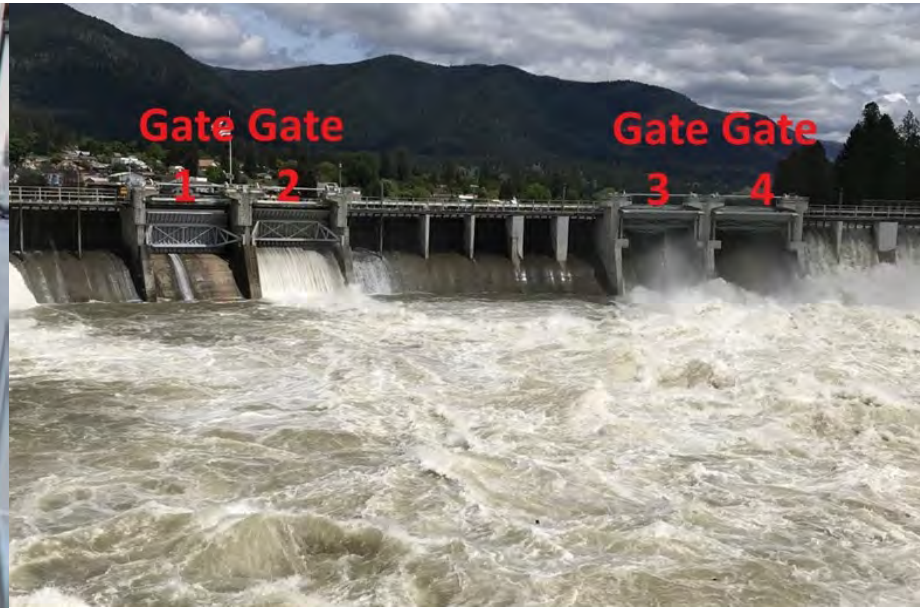
Methods -Downstream Fish Passage Literature Review

- Focused on literature published since 2007.
- ProQuest and EBSCO database searches.
- Literature screened for relevance for species and size classes of fish and turbine configurations found in the Project area.
- Project configuration updates.
- Documentation of downstream passage at the project- fish ladder recaptures.

Project Configuration Updates

Two operational updates since 2007 Literature Review

1. Installation of upstream fish passage facility 2010
2. Radial gates 3 & 4 installed in 2020



- Upstream passage facility
  - All intakes are screened, and additional 100 CFS of flow provided from a half panel along the main dam.
  - Given the low proportion of water moving through the fish ladder in relation to the Clark Fork River and screens as mitigative measures it is not anticipated that a measurable amount of downstream juvenile passage occurs through the fish ladder. Screens prohibit adult downstream passage.

- Radial gates 3 & 4
  - Each gate passes approximately 10,000 CFS. Capacity is similar to the previous gate panels but is now automated for spilling scenarios.
  - Not anticipated to impact downstream survival given similarities to previous manual gates.

Results – Documentation at Fish Ladder

- Recaptures of tagged fish - successful passage upstream and downstream of the Project.
- Some fish make the loop multiple times.
- 264 out of 2,644 PIT-tagged fish released upstream of the dam returned and ascended the fish passage facility as many as 6 times.
- Species include Bull Trout, Rainbow Trout, Brown Trout, Westslope Cutthroat Trout, Rainbow x Westslope Cutthroat hybrids, Mountain Whitefish, Northern Pikeminnow, Smallmouth Bass, and Largescale Sucker.
- Average of 8% of the salmonids PIT-tagged each year, return to the fish passage facility the following year.

Results - Downstream Fish Passage Literature Review

- 5 relevant documents reviewed in-depth.

- Other reports lacked relevance to Thompson Falls turbine configurations, dam characteristics, species similarities, and fish lengths or juvenile and adult age classes.

- Kaplan units are significantly safer for fish than Francis type units.
  - Kaplan turbines juvenile survival Atlantic Salmon and Brown Trout 100% to 99%.
  - Francis turbine juvenile survival 88% to 91%.

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Results - Downstream Fish Passage Literature Review

- Large variability in downstream adult survival.
  - Varies by site-specific characteristics of each location.
  - Lower adult survival than juvenile survival common in the literature.
- Direct comparisons to Thompson Falls Project challenging.
- Some literature indicate low survival rates for adults (19-44%) but these are for larger turbines and greater discharge than Thompson Falls units.
- Survival rates for Atlantic Salmon kelts on the Penobscot River were estimated at 15 project sites and indicated adult survival was typically greater than 75 percent at most sites.

Conclusion - Downstream Fish Passage Literature Review

- Generally consistent with previous estimates of downstream fish survival.
- Further resolution of downstream passage survival based on the size and species specific to the Clark Fork River at the Thompson Falls Project is limited in the available literature.
- As PIT tagging indicates downstream adult survival is common.
- Higher rates of survival obtained with smaller fish going through larger openings over lower heads, and slower moving units with laminar flow.

Any Questions?

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Initial Study Plan Meeting – Total Dissolved Gas Study

May 5, 2022

- Purpose of the Study:
  - Collect background (incoming) TDG concentrations in the Clark Fork River upstream of the dams.
  - Collect downstream (outgoing) TDG concentrations in the Clark Fork River below the main dam and at Birdland Bay Bridge.
  - Test configurations of radial gates on the main dam for TDG entrainment downstream.

- TDG Control Plan for Thompson Falls operations was approved by Montana DEQ in 2010.

- Since the approval of this Plan, two new radial gates have been installed on the main dam.

- More information is needed on TDG production with the new radial gates to update the TDG Control Plan.


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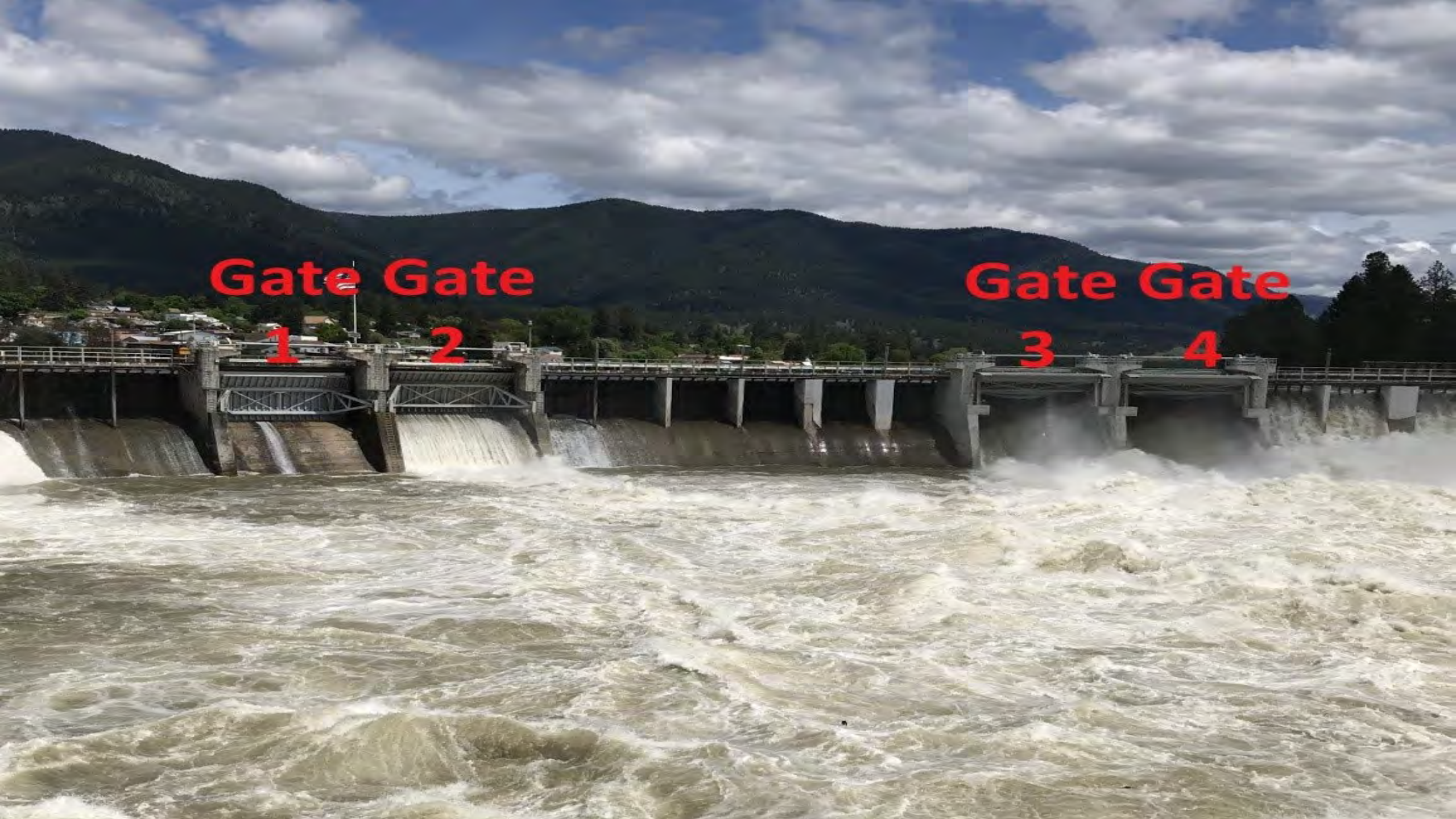
Gate 1
Gate 2
Gate 3
Gate 4

- TDG is measured in three locations
  - Above the powerhouse
  - Below the main dam
  - Birdland Bay Bridge (downstream of the Project)
- Hydrolab instruments provide TDG readings at 15-minute intervals.
- Instruments are calibrated bi-weekly to ensure that the sensors are operating properly and accurately.


Main Channel Dam
High Bridge
Dry Channel Dam
Above Dam
New Powerhouse
Old Powerhouse
Prospect Creek
Birdland Bay Bridge

Total Dissolved Gas (TDG) Results

- TDG monitoring was conducted from May 12 through July 1 in 2021.
- On June 30, Clark Fork River flows had reduced to the point where the entirety of the river flow was passed through the powerhouses, so TDG levels were greatly reduced due to the lack of spillway flow.
- Peak discharge at Thompson Falls Dam occurred on June 6, 2021 and was estimated at 59,801 cfs.
- The peak concentrations of TDG occurred on June 5, 2021 at 120.1 percent TDG directly downstream of the Main Channel Dam, which equated to a peak of 113.3 percent TDG at Birdland Bay Bridge downstream. The influence of water from the powerhouses reduces the total amount of TDG observed at Birdland Bay Bridge, which is approximately where the upstream end of the Noxon Reservoir pool is located.

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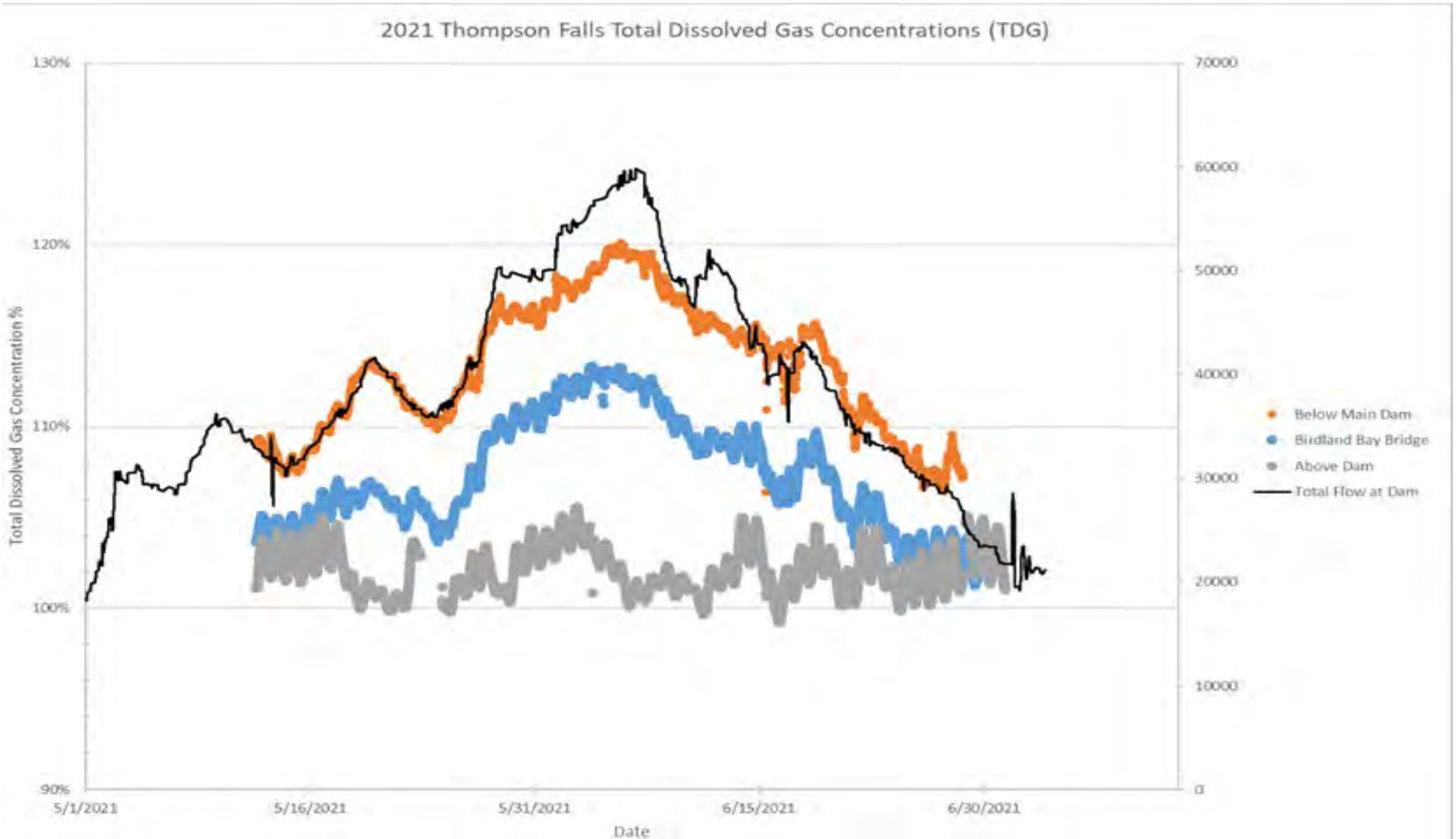
Total Dissolved Gas (TDG) Results



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Total Dissolved Gas (TDG) Results

- During the study period, radial gate testing was conducted to monitor the TDG concentrations in response to different spill configurations.

- Low peak flows in the Clark Fork River in 2021 were less than optimal for testing TDG at the Project.

- Radial gate testing occurred on the descending limb of the hydrograph at approximately 5,000 cfs intervals from 40,000 cfs down to 30,000 cfs, which is near the point when spill operations ceased for the year.

Total Dissolved Gas (TDG) Results

Total Flow Range (cfs)	Max TDG at HB (% saturation)	Gate Setting at Max TDG	Min TDG at HB (% saturation)	Gate Settings Min TDG
30,000-35,000	112.5	1 full open, 2 4’ open	107.5	4-partially open
40,000-45,000	114.4	1 and 2 open	111.7	1 and 4 open
45,000-50,000	118.8	1 and 4 open	116.2	2 and 4 open
55,000-60,000	121.6	3 and 4 open	119.6	1 and 2 open
65,000-70,000	122.7	3 and 4 open	119.8	1 and 3 open
75,000-80,000	123.1	3 and 4 open	121.2	2 and 3 open

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Total Dissolved Gas (TDG) Conclusions

NorthWestern's study conclusions to-date, are:

- Radial gate testing at flows above 80,000 cfs was not conducted in 2021. NorthWestern will monitor TDG again in 2022. Data will be collected at flows above 80,000 cfs as conditions allow.

- Operating non-adjacent radial gates in combination with each other will generally reduce the amount of TDG entrained in the river downstream at river flows less than 80,000 cfs, although operation in this manner may not always be possible due to dam safety considerations.

- For the 2022 study season, the aging Hach Hydrolab DS5 instruments will be replaced with new Eureka Water Probes Manta instruments.

- The instrumentation change will be an upgrade to a newer technology, which allows for greater instrument reliability and precision. Results between the Hach and Eureka probes are expected to be comparable, as the QA/QC and instrument calibration procedures will remain the same.

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Thompson Falls Hydroelectric Project No. 1869

Initial Study Plan Meeting – Visitor Use Survey

May 5, 2022

Administered at 9 recreation sites associated with the Thompson Falls Hydroelectric Project.

60 randomly selected days during the peak recreation season (May 28-September 6, 2021).

Sampling days dispersed throughout the days of the week and hours of the day, representative of the peak recreation season of Memorial Day through Labor Day.

Goal: determine if Project-induced recreation is adequately being met.

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Visitor Survey Sampling:

Sampling occurred from 8 am to 9 pm.

Reasonable attempts were made to include one randomly-selected individual from each recreating group present at the site during the sampling event.

Survey conducted as an interview; responses entered into a tablet computer by a survey technician.

Strategy:

- Began at randomly-selected recreation site.
- Interviewed all groups recreating at that site.
- Technician moved to the next site in rotation.
- Continued in this manner until the end of the daily sampling timeframe.

Visitor Volume Monitoring:

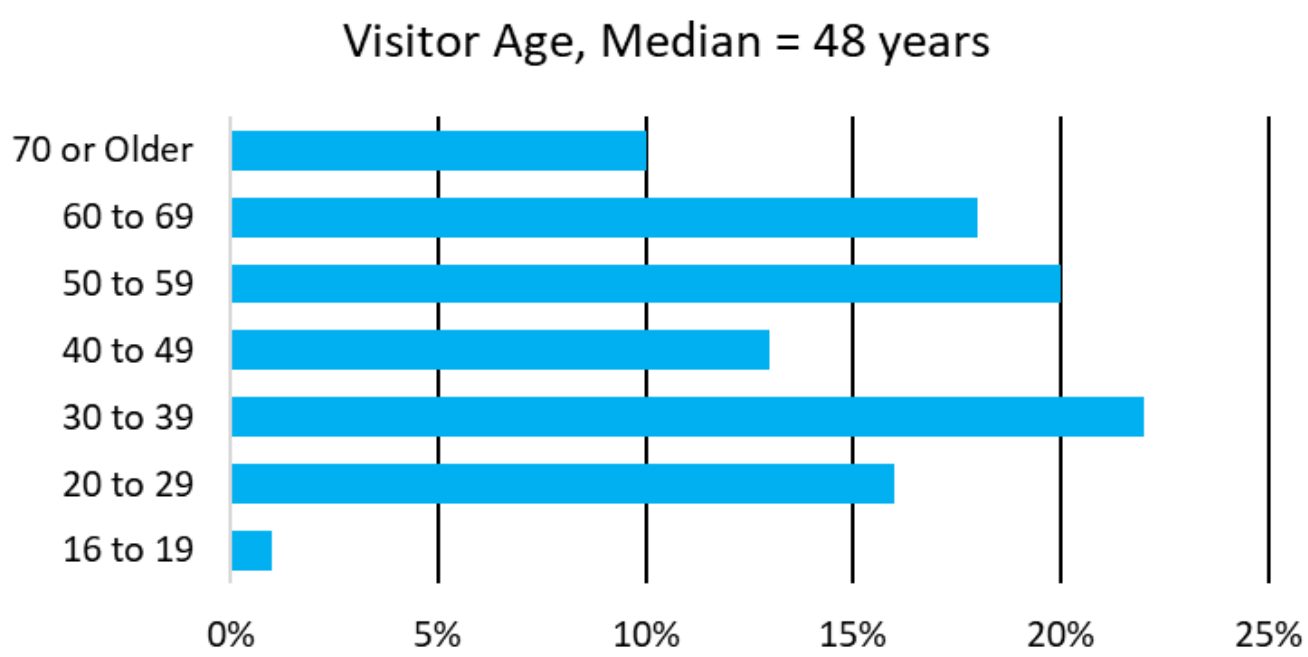
Visitor volume was collected via automatic traffic and trail counters to monitor patterns of use at six sites included in the visitor survey:

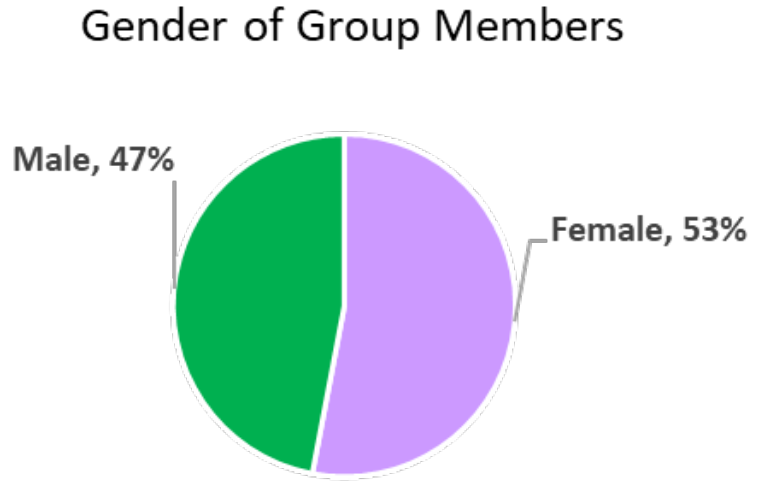
- Wild Goose Landing Park
- Island Park
- Powerhouse Loop Trail, including Sandy Beach
- South Shore Recreation Area
- Cherry Creek Boat Launch

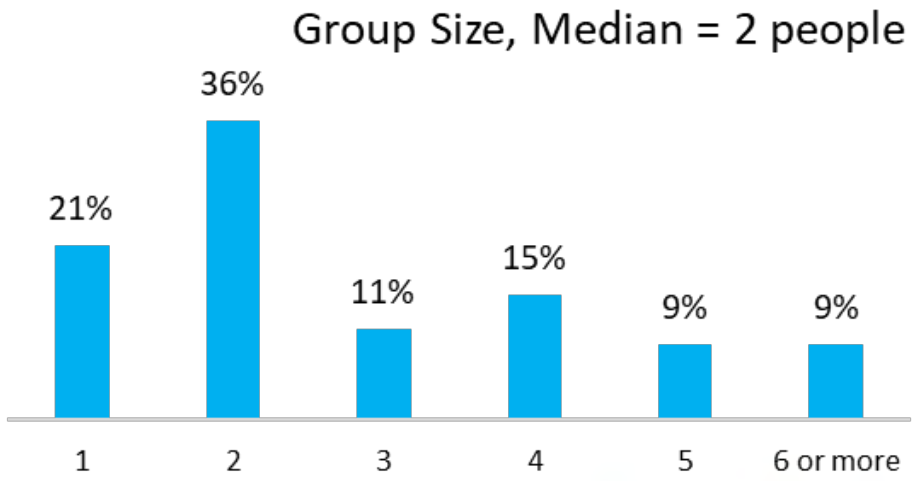
Supplementing visitor survey data with visitor volume and use patterns provides a more comprehensive analysis of recreation visitation.

Enhancement to the FERC-approved study plan.

Visitor Survey
Results – Visitor Group Characteristics







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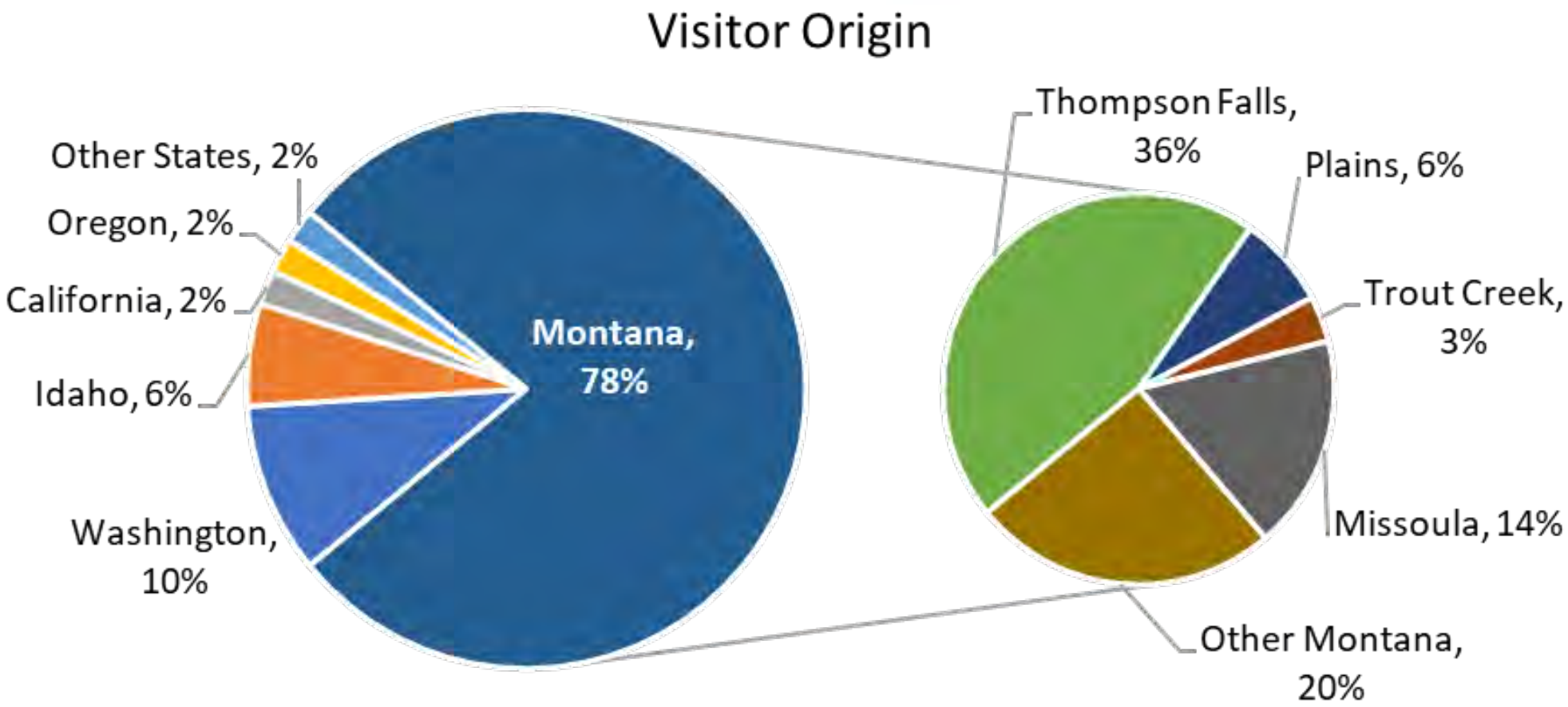
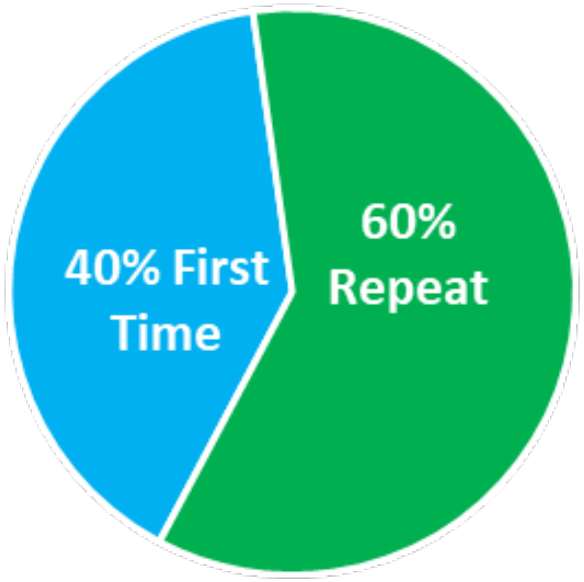

Visitor Origin
Other States, 2%
Oregon, 2%
California, 2%
Idaho, 6%
Washington, 10%
Montana, 78%
Thompson Falls, 36%
Plains, 6%
Trout Creek, 3%
Missoula, 14%
Other Montana, 20%

First Time vs Repeat Visitors



Past Trip Experience

	Mean	Median
Years Visiting	10.3 years	5 years
# Days Per Year	12.6 days	5 days
Length of Stay	2 hours	2 hours

Impression of Recreation Development

Leave it as is	99%
Prefer changes	1%

Length of Stay on This Trip

Mean	1.7 hours
Median	1.0 hours

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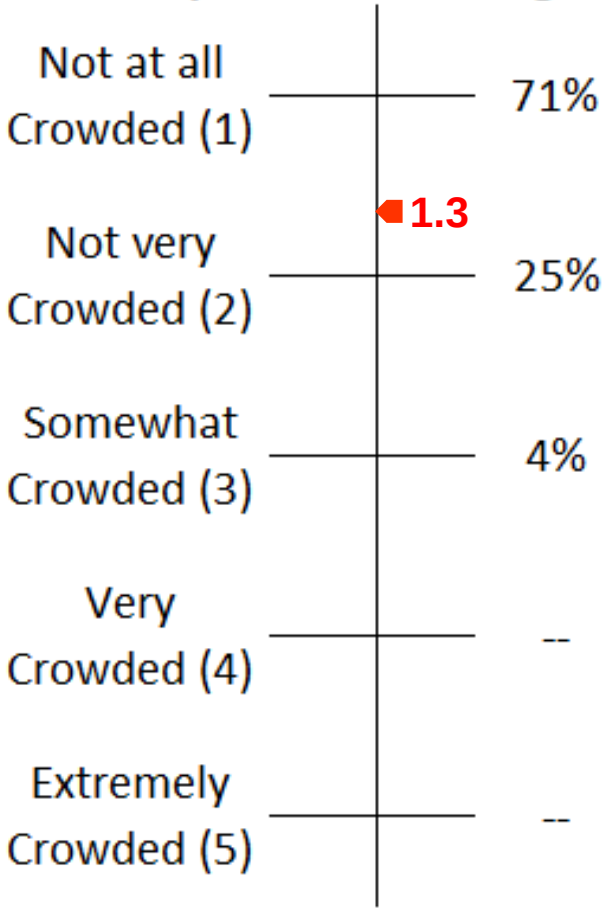
Reason to Participate in Outdoor Recreation

	Not at all Important 1	Not very Important 2	Somewhat Important 3	Very Important 4	Extremely Important 5
To enjoy nature					X
To be with friends or family				X	
To be outdoors					X
For excitement			X		
To find some solitude				X	

Satisfaction with Site and Site Amenities

	Not at all Satisfied 1	Not very Satisfied 2	Somewhat Satisfied 3	Very Satisfied 4	Extremely Satisfied 5
Overall Site Satisfaction				X	
Picnic area conditions			X		
Boat dock/launch conditions				X	
Quality of interpretive/educational info				X	
Maintenance of facilities			X		
Cleanliness of area				X	
Condition or degree of naturalness				X	
Behavior of other people				X	

Perception of Crowding



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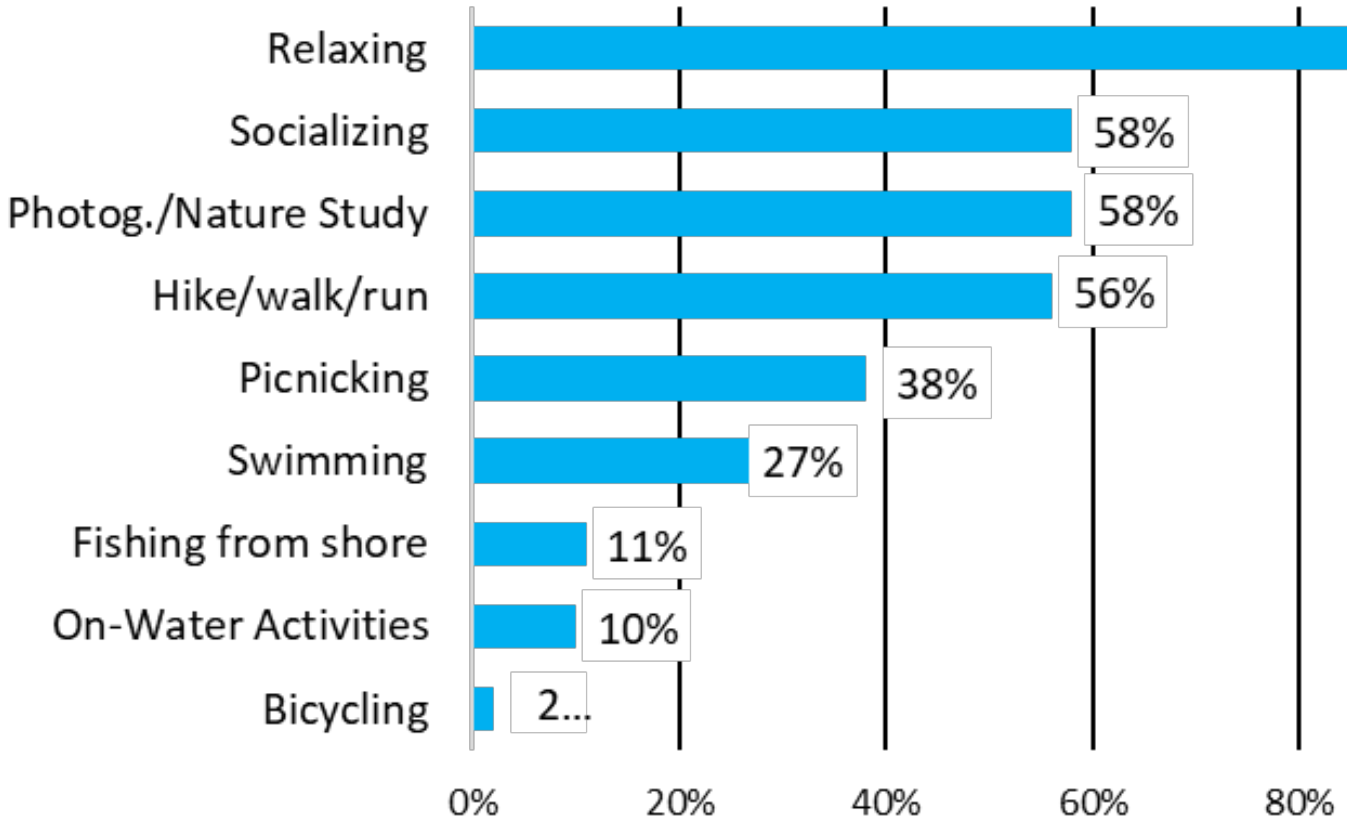
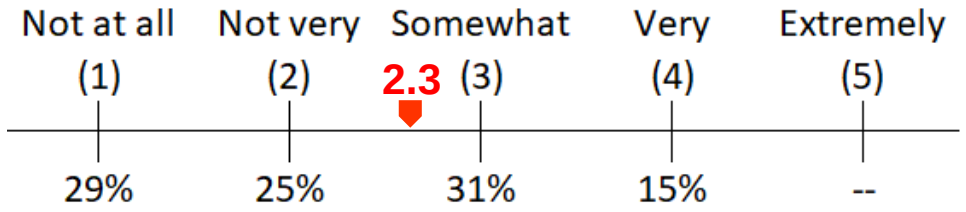
Activity Participation at Recreation Site



Familiar with No-Wake Zone Regulations



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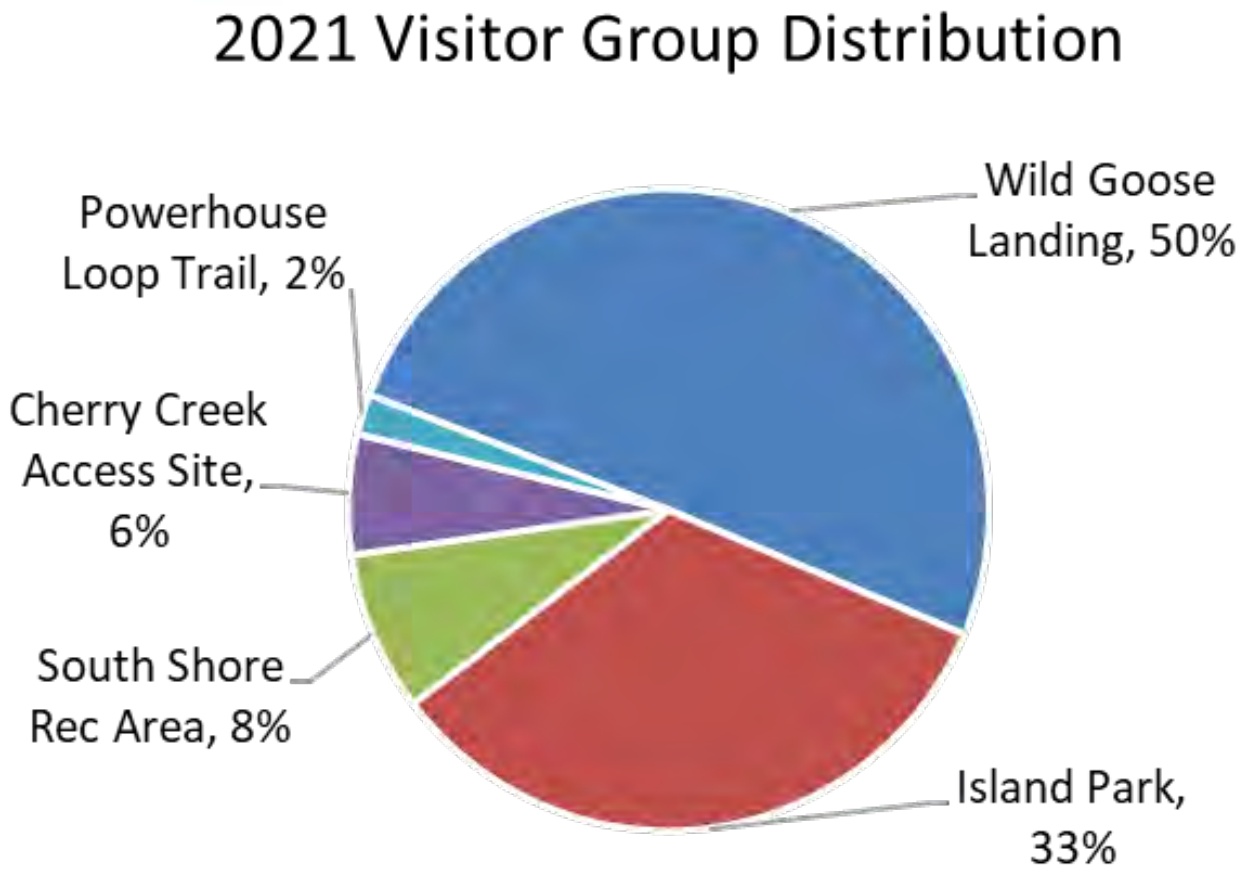
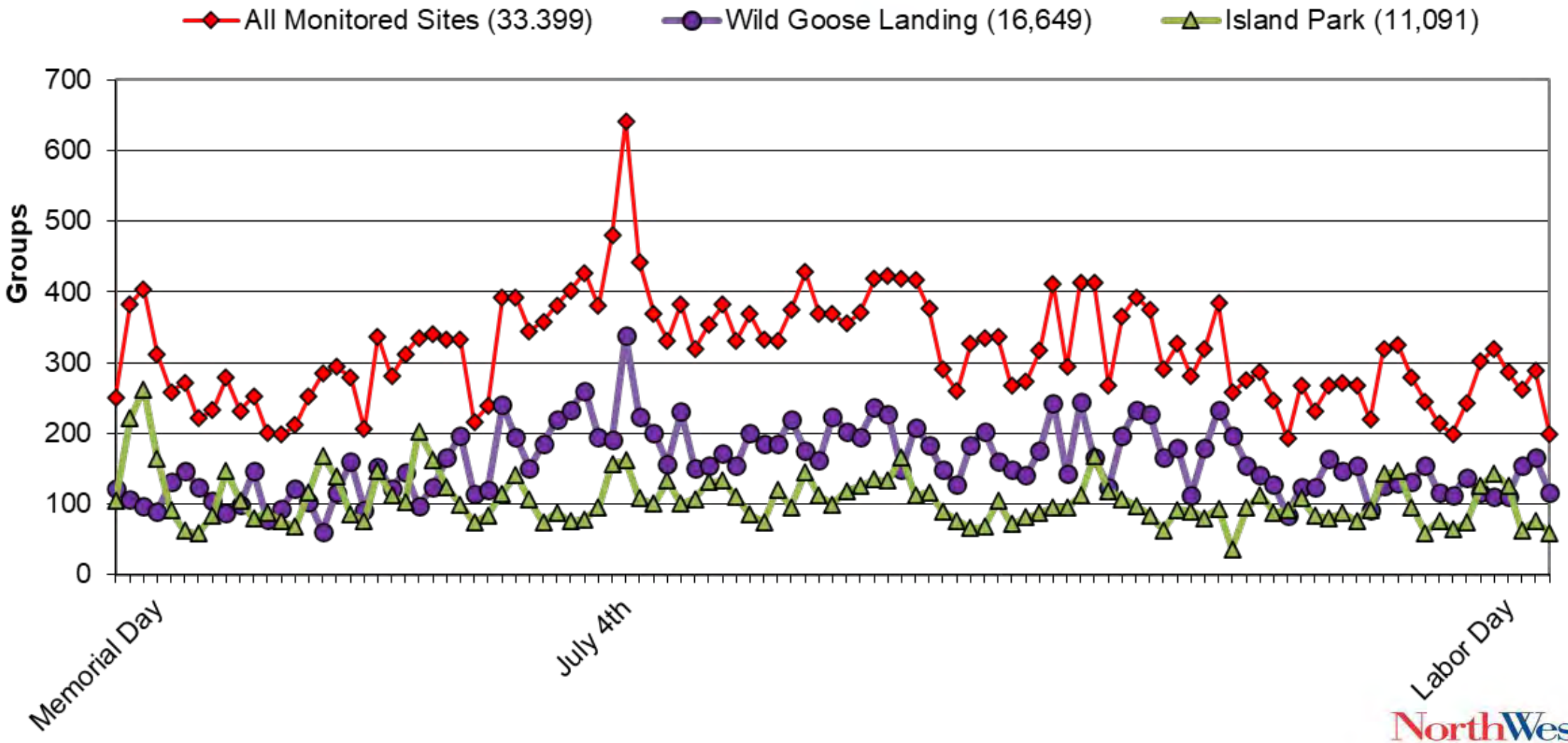
Visitor Groups Per Site

Wild Goose Landing	16,649
Island Park	11,091
South Shore Rec Area	2,819
Cherry Creek Access Site	2,105
Powerhouse Loop Trail	735
Total	33,399



Visitor Survey
Results – Visitor Volume



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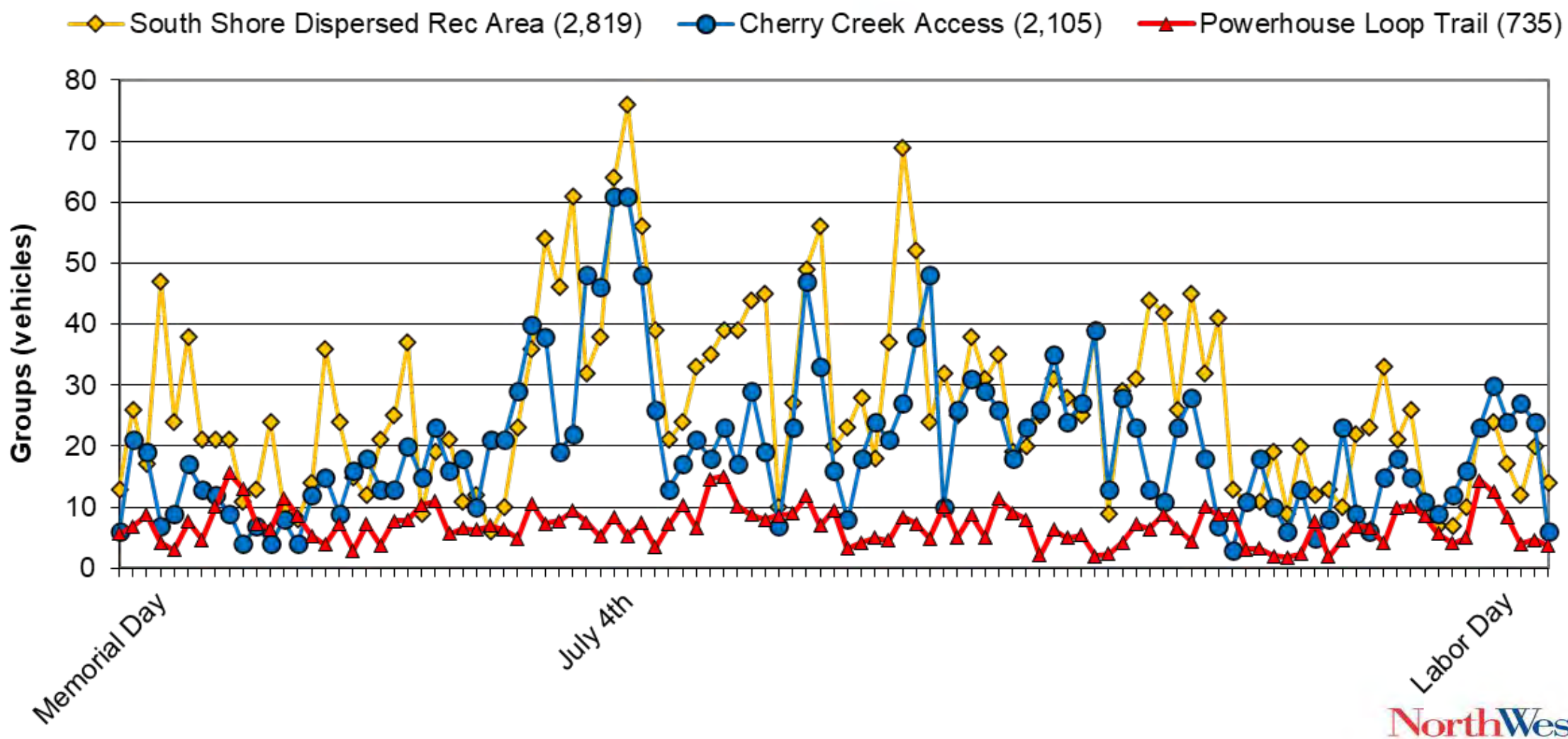
Visitor Survey
Results – Visitor Volume



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Conclusions

Visitor group characteristics are largely unchanged.

Visitors are generally repeat visitors from the local area that utilize recreation sites for both passive and active recreation pursuits.

Crowding and satisfaction ratings are positive.

Recreation sites hosted an average of more than 300 group visits overall per day, with the most use occurring at Wild Goose Landing Park and Island Park.

Recreation patterns were influenced to some extent by environmental conditions (wildfire smoke and unusually hot temperatures) and social factors surrounding the COVID-19 pandemic.

Any Questions?

- **One Speaker at a Time:** Limit side conversations to reduce noise distortion so everyone in the room and participating via Zoom can hear.
- **Order of Questions:** Questions from Zoom participants will be responded to first.
- **Guidelines for Asking a Question via Zoom:**
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Thompson Falls Hydroelectric Project No. 1869

Initial Study Plan Meeting – Cultural Resources Study

May 5, 2022

Cultural Resources Inventory and National Register Evaluation

- Update inventory and evaluation of Historic Architectural and Engineering Properties.

- Develop high probability model for Precontact and Historic Archaeological Properties, and conduct field inventory to identify and evaluate properties in high site probability areas.

- Collect and analyze baseline resource data to gauge any current and anticipated Project effects on cultural properties.

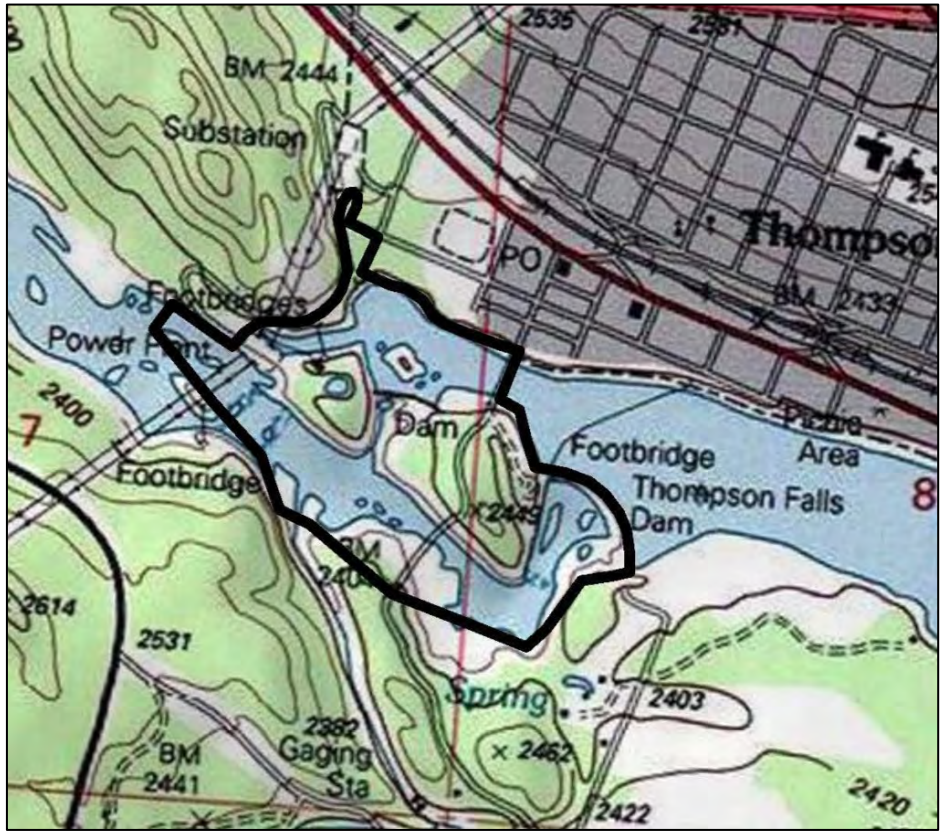
- Develop Historic Properties Management Plan under new License.

- Update inventory and evaluation of historic architectural and engineering elements of Thompson Falls Hydroelectric Dam Historic District.

- Expand record of known precontact and historic archaeological properties through systematic inventory of high site probability areas.

For Historic Architectural and Engineering Properties

- Re-Inventory Thompson Falls Hydroelectric Dam Historic District and update 1986 National Register of Historic Places listing.



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For Previously-Unknown Precontact and Historic Archaeological Properties

- Developed and evaluated high probability model to predict where previously-unknown precontact and historic archaeological properties mostly likely exist within project.

- In summer 2022 - Inventory high site probability areas to determine locations, types, importance, and condition of those properties. (Report to be completed by May 2023)

For Historic Architectural and Engineering Properties

- Thompson Falls Hydroelectric Dam Historic District boundary modification and additional documentation is finalized and scheduled for approval at May meeting of Montana State Historic Preservation Review Board.

- District continues to be considered of local and state significance.

- Boundary modification encompasses all identified contributing buildings, structures, and sites, and excludes recent additions at facility perimeter.

- Document provides enhanced facility history and resource descriptions.

Cultural Resources Results

For Previously-Unknown Precontact and Historic Archaeological Properties

- Draft high site probability model circulated for review November 2021. Responses to received comments incorporated into final model January 2022 and forwarded to FERC as Interim Study Report.

- High site probability areas involve 839 acres of dry and near shore land.

- Majority of high probability areas on private property; to be inventoried only with owner permission.

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Any Questions?

- **One Speaker at a Time:** Limit side conversations to reduce noise distortion so everyone in the room and participating via Zoom can hear.
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Exhibit B
Thompson Falls Hydroelectric Project #1869-060
NorthWestern Energy
Initial Study Report Meeting
Attendees

5-May-22	Thompson Falls ISR Meeting In-Person Attendees
Name	**Representing**
Mark Sheets	City of Thompson Falls
Laura Marsh	MT SHPO
Laura Evilsizer	MT SHPO
Bruce Paulsen	U.S. Forest Service
Jason Blakney	MT Fish, Wildlife & Parks (FWP)
Abigail Maddigan	FWP
Kevin Aceituno	U.S. Fish & Wildlife Service (FWS)
Keenan Storer	Montana Department of Environmental Quality (DEQ)
Ginger Gillin	GEI Consultants, Inc (GEI)
Pat Saffel	FWP
David Schmetterling	FWP
Mary Gail Sullivan	NorthWestern
John Tabaracci	NorthWestern
Hallie Meushaw	Troutman Pepper
Andy Welch	NorthWestern
Jon Hanson	NorthWestern
Jordan Tollefson	NorthWestern
Kristi Webb	New Wave Environmental
Mitzi Rossillon	Mitzi Rossillon Consulting
Mark Sommer	APLE
Jeremy Clotfelter	NorthWestern
Mark Ashenfelter	GEI
Kim McMahon	Pinnacle Research
5-May-22	**Thompson Falls Project ISR Virtual Attendees**
Name	**Representing**
Lydia Holland	GEI
Carolyn Gleason	Environmental Protection Agency (EPA) Region 8
Craig Barfoot	Confederated Salish and Kootenai Tribes, Tribal Fisheries Program
Craig Jones	MT DEQ
Eric Oldenburg	Avista
Ingrid Brofman	FERC
Justin Jimenez	Fisheries and Riparian Lead, Bureau of Land Management (BLM)
Kristen Sinclair	
Lauren Townson	FERC

Michael Tust	FERC
Mike Hensler	FWP
Nick Miller	GEI
Noel Jacobson	NorthWestern
Paul Kusnierz	Avista
Shana Bernall	Avista
Steve Klawitter	GEI
Tony Cox	Sanders County Commissioner
Lisa Rose Johnson	Avista
Kayla Mosher	Kaniksu Land Trust
David Brooks	Trout Unlimited
Juli Thurston	Montana State University Extension
James Strait	MT DEQ
Kathy Conlin	Sanders County Commissioner
Grant Grisak	NorthWestern

Exhibit C

Thompson Falls Hydroelectric Project #1869-060

NorthWestern Energy

Initial Study Report Meeting

Area of Potential Effect (APE) and MT SHPO Concurrence

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Laura Marsh
Compliance Officer
Montana State Historic Preservation Office
1301 Lockey Ave.
Helena, MT 59601

RE: Thompson Falls Hydroelectric Project P-1869-060
Area of Potential Effect (APE) for Cultural Resources

Dear Laura,

As we discussed during our virtual meeting on May 25, 2022, with the assistance of Mitzi Rossillon, NorthWestern Energy (NorthWestern) has prepared a revised APE for the Cultural Resource studies as part of the Thompson Falls Hydroelectric Project's (Project) relicensing. By this correspondence, we request your concurrence.

The APE is defined as the boundary identified in the Project's current FERC license, plus those lands outside that boundary that are within the reservoir full-pool footprint, plus those portions of seven recreation sites adjacent or near but outside the existing FERC boundary (Figures 1-7).

When first licensed by the predecessor of FERC, the Project had (and still has) a boundary identified by metes and bounds descriptions that had not been ground-truthed, as was typical of a number of licensed projects dating to the early twentieth century. As a consequence, in some cases the Thompson Falls FERC boundary lies within the reservoir rather than at the full pool elevation. NorthWestern intends to make appropriate adjustments in the boundary as part of its new license application. So, the APE identified here includes both land within the current FERC boundary as well as land that falls between the boundary and the full pool "line."

In addition, there are seven recreation or recreation-support sites adjacent or near the current FERC boundary that are either on lands owned by NorthWestern or for which there is an agreement with the owner for a contribution to the sites' maintenance. These sites are Sandy Beach, Powerhouse Loop Trail, Power Park, North Shore Parking Area, South Shore Dispersed Area, Wild Goose Landing, and Cherry Creek Boat Launch. Their boundaries are identified by ownership, development, and/or public use. All but the Cherry Creek Boat Launch are shown in Figures 8-9. (For the location of the boat launch, refer to Figure 4). These sites are also included within the APE.

Thanks for your assistance in developing an appropriate APE that covers all locations where Project operations or Project-related activities may cause changes to the character or use of cultural resources.

Sincerely,

Mary Gail Sullivan
Director, Environmental & Lands Permitting & Compliance

cc: Mitzi Rossillon
Andy Welch

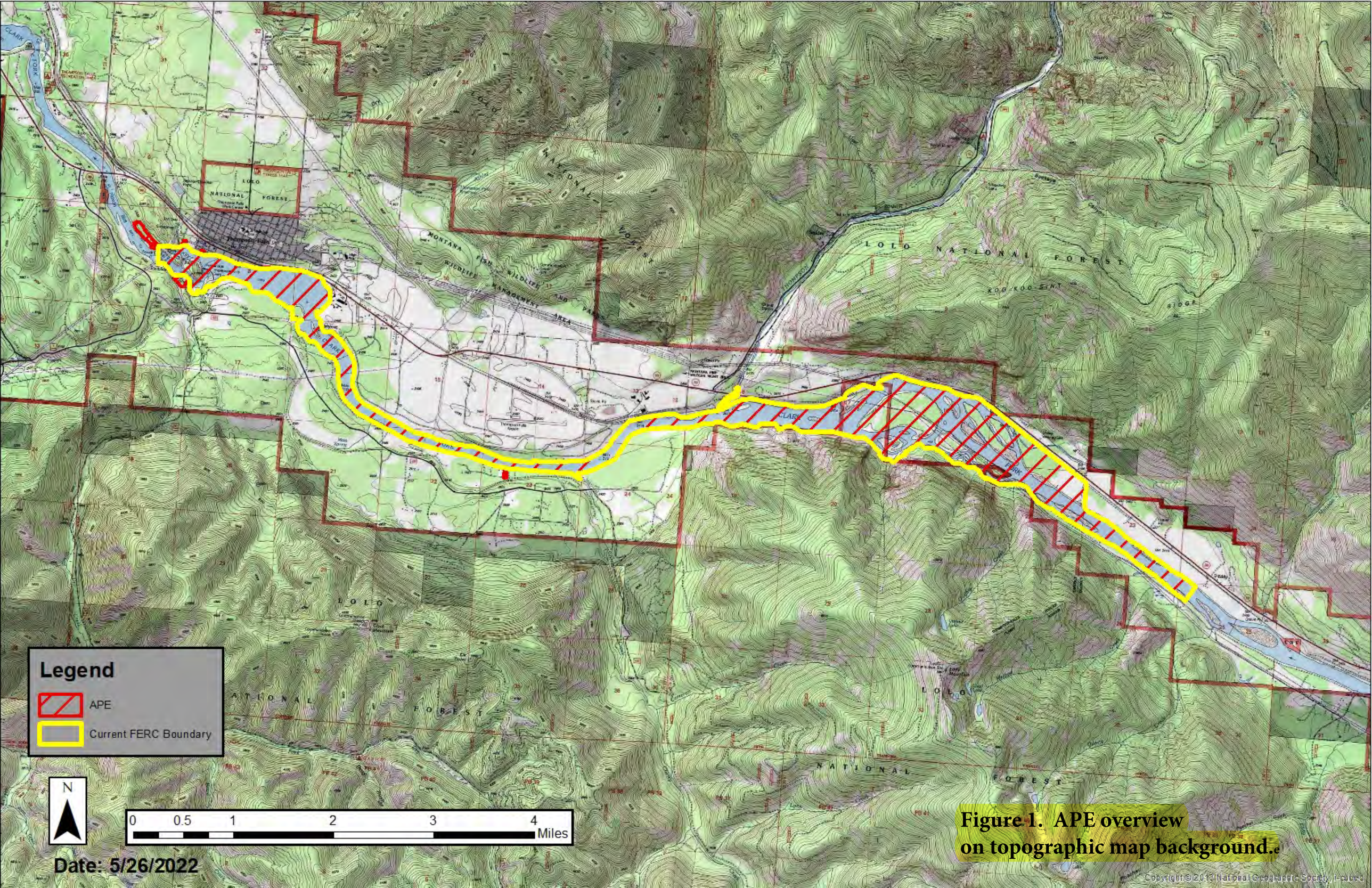

Figure 1. APE overview on topographic map background.

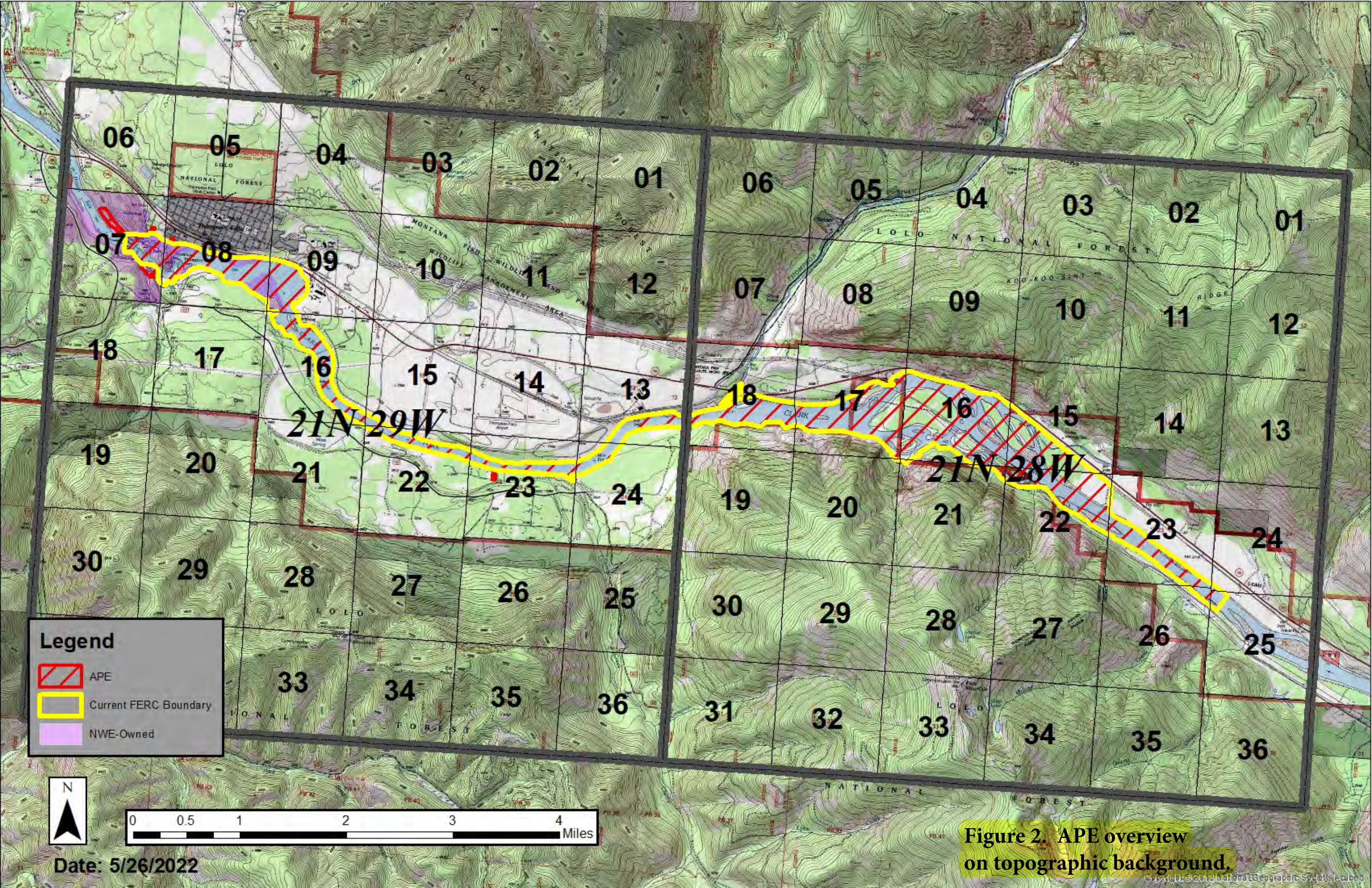

Figure 2. APE overview on topographic background.

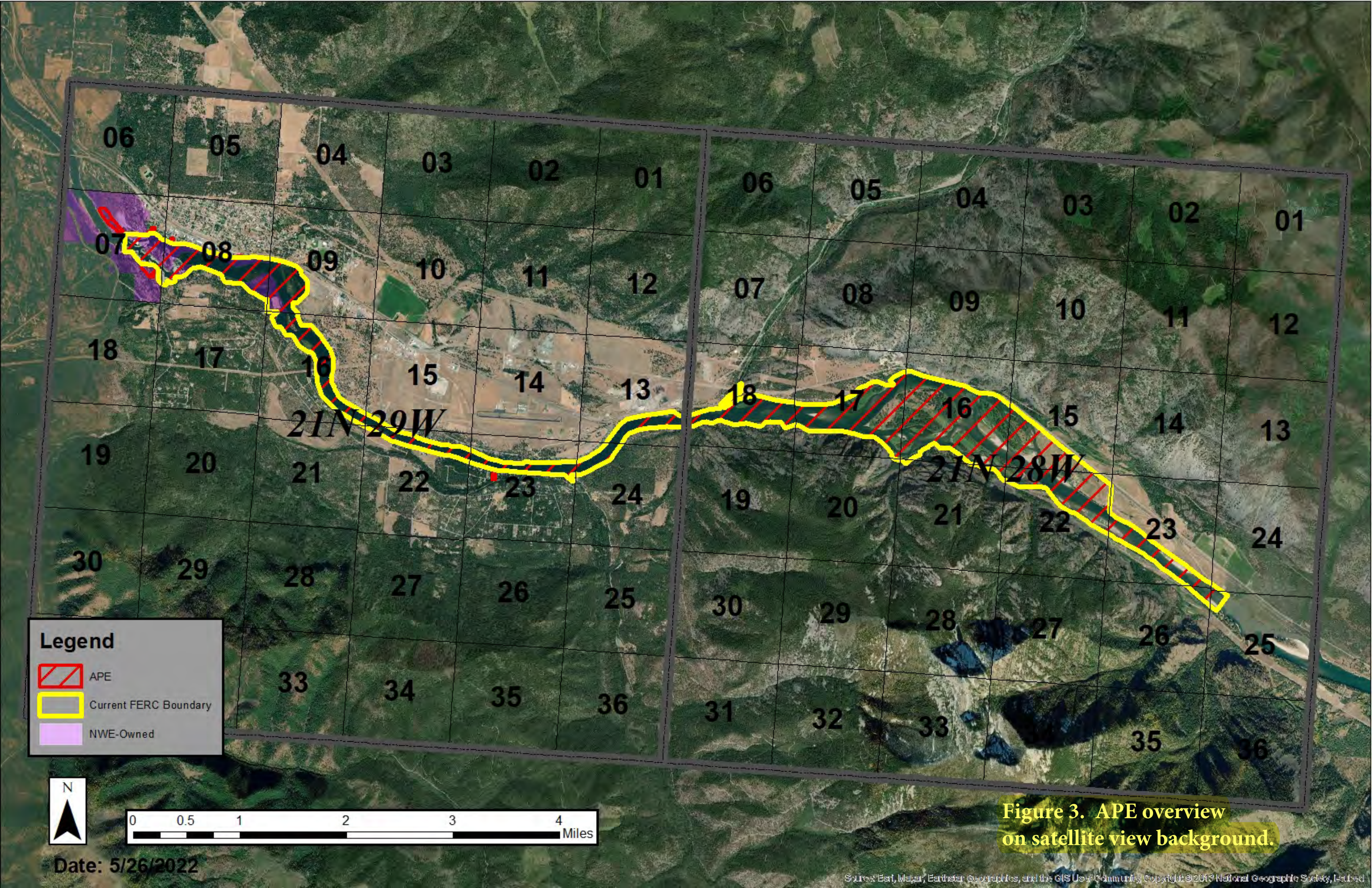

Figure 3. APE overview on satellite view background.

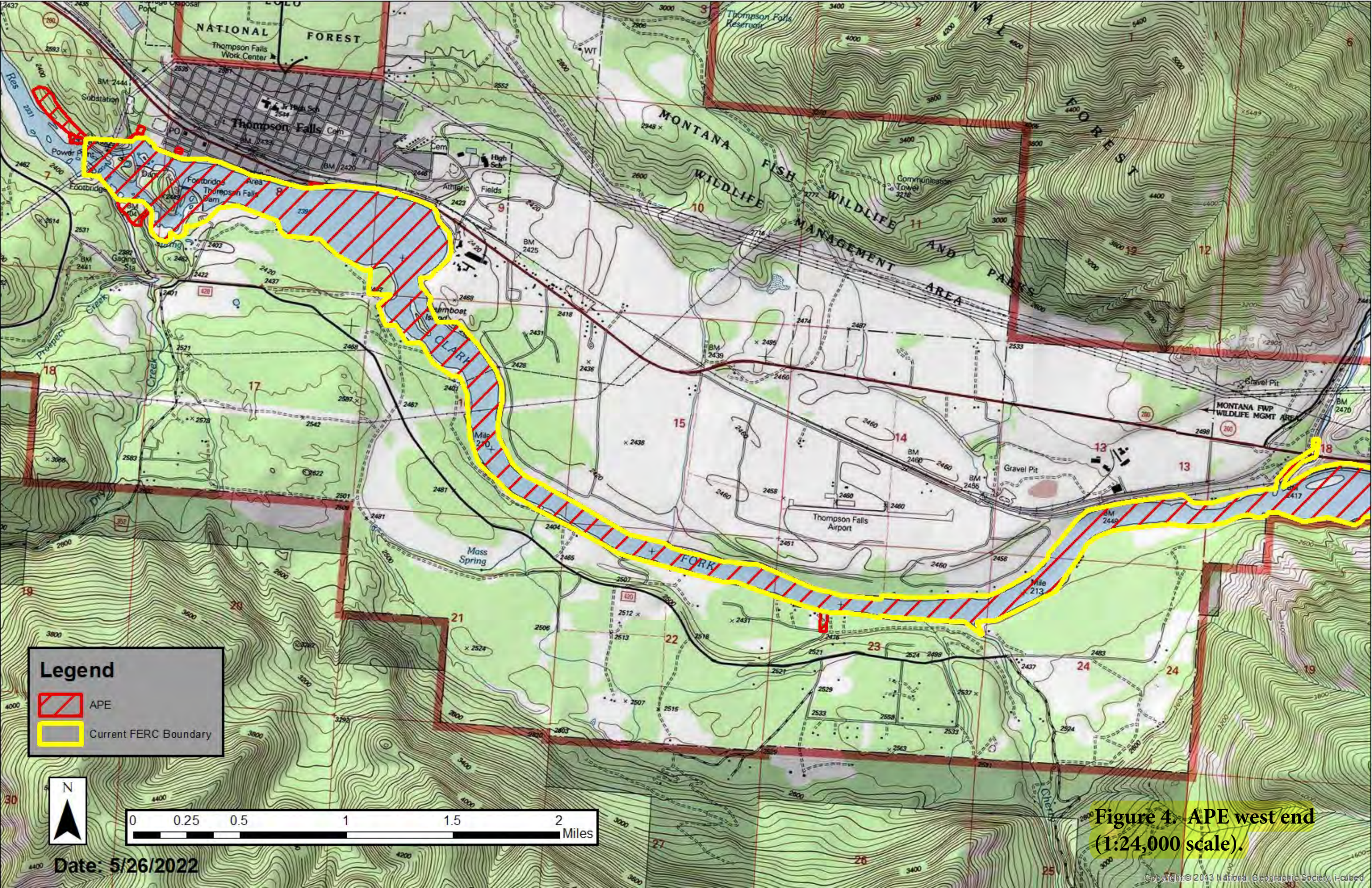

Figure 4. APE west end (1:24,000 scale).

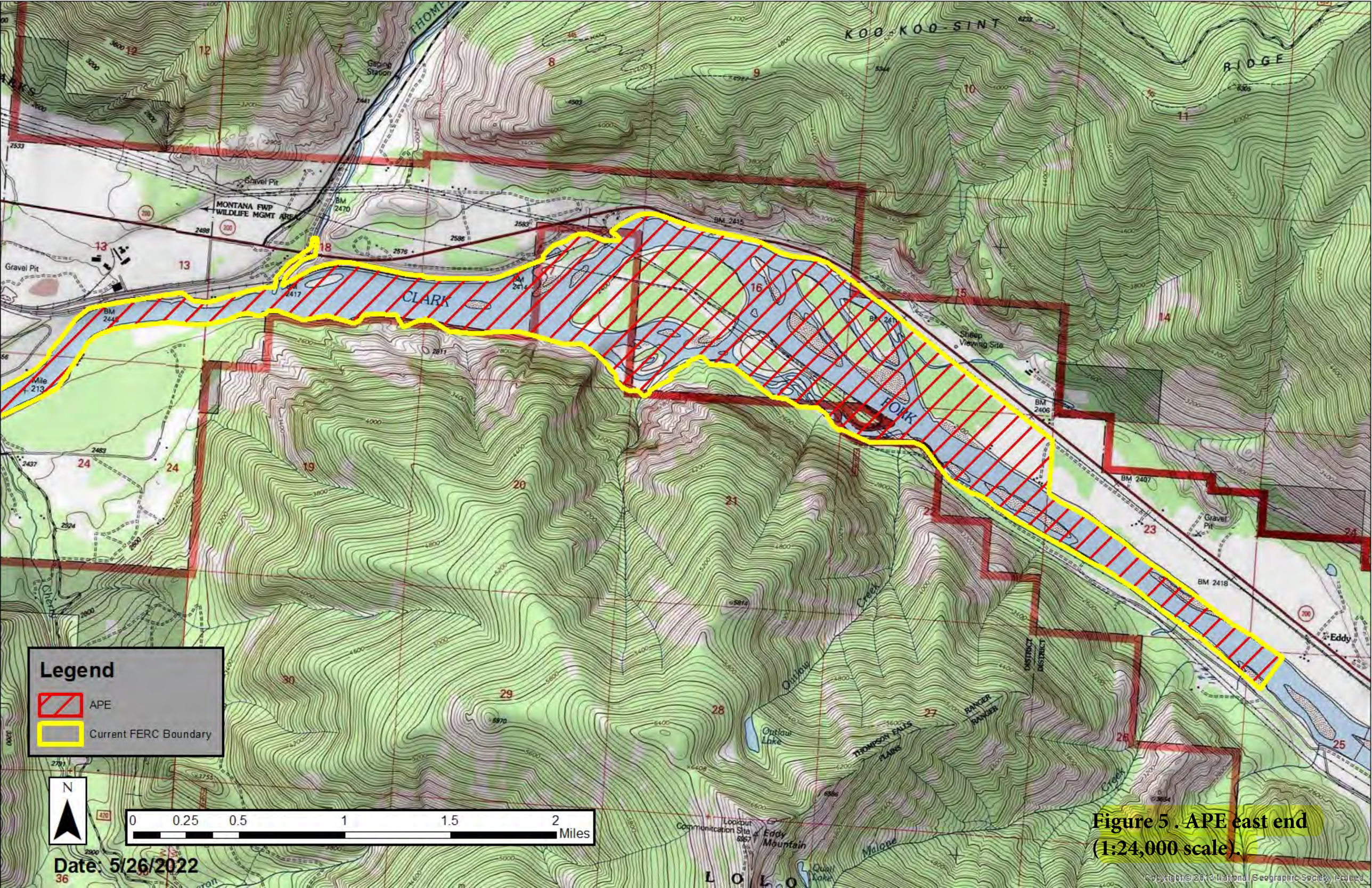

Figure 5 . APE east end (1:24,000 scale).

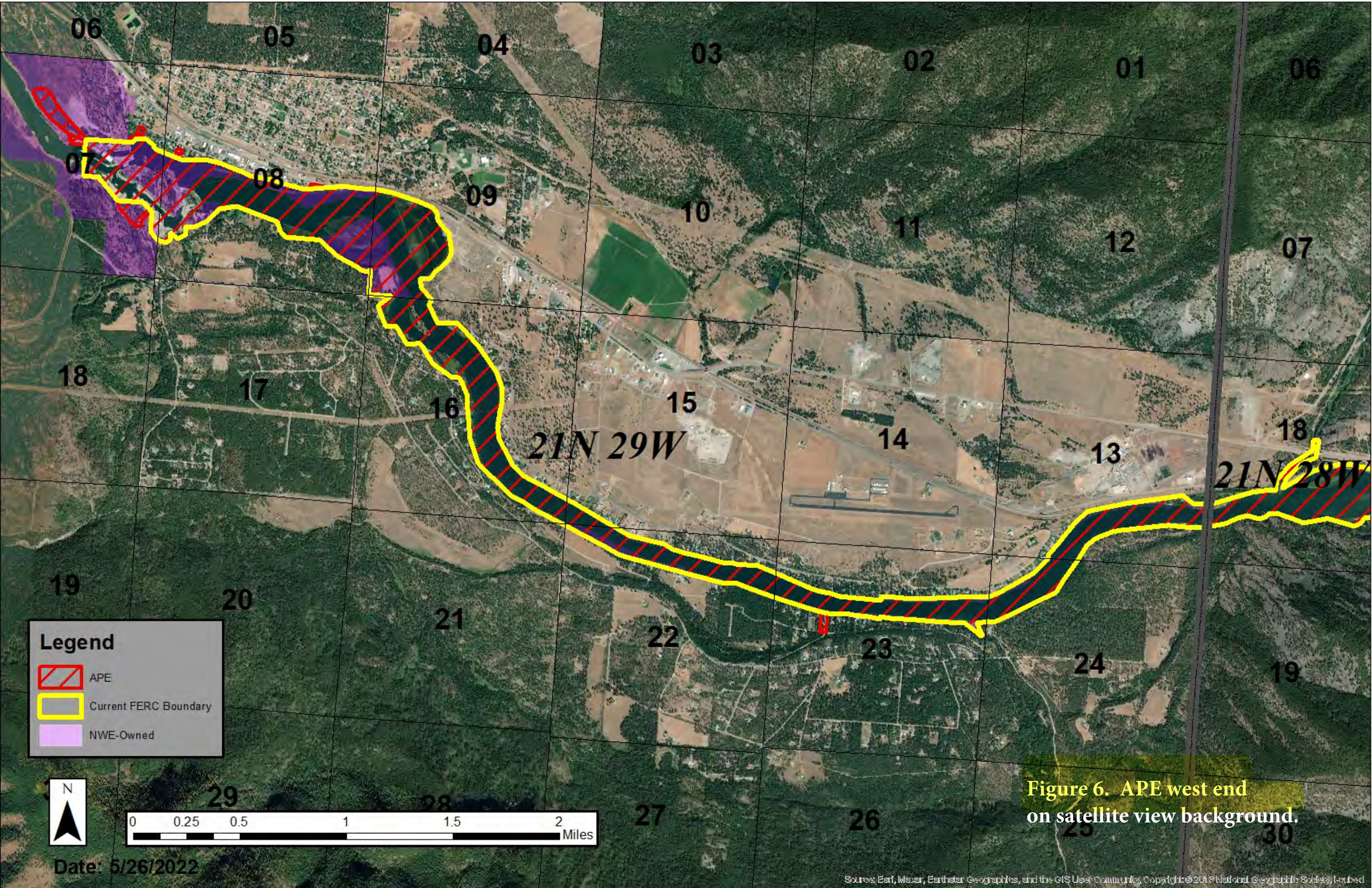

Figure 6. APE west end on satellite view background.

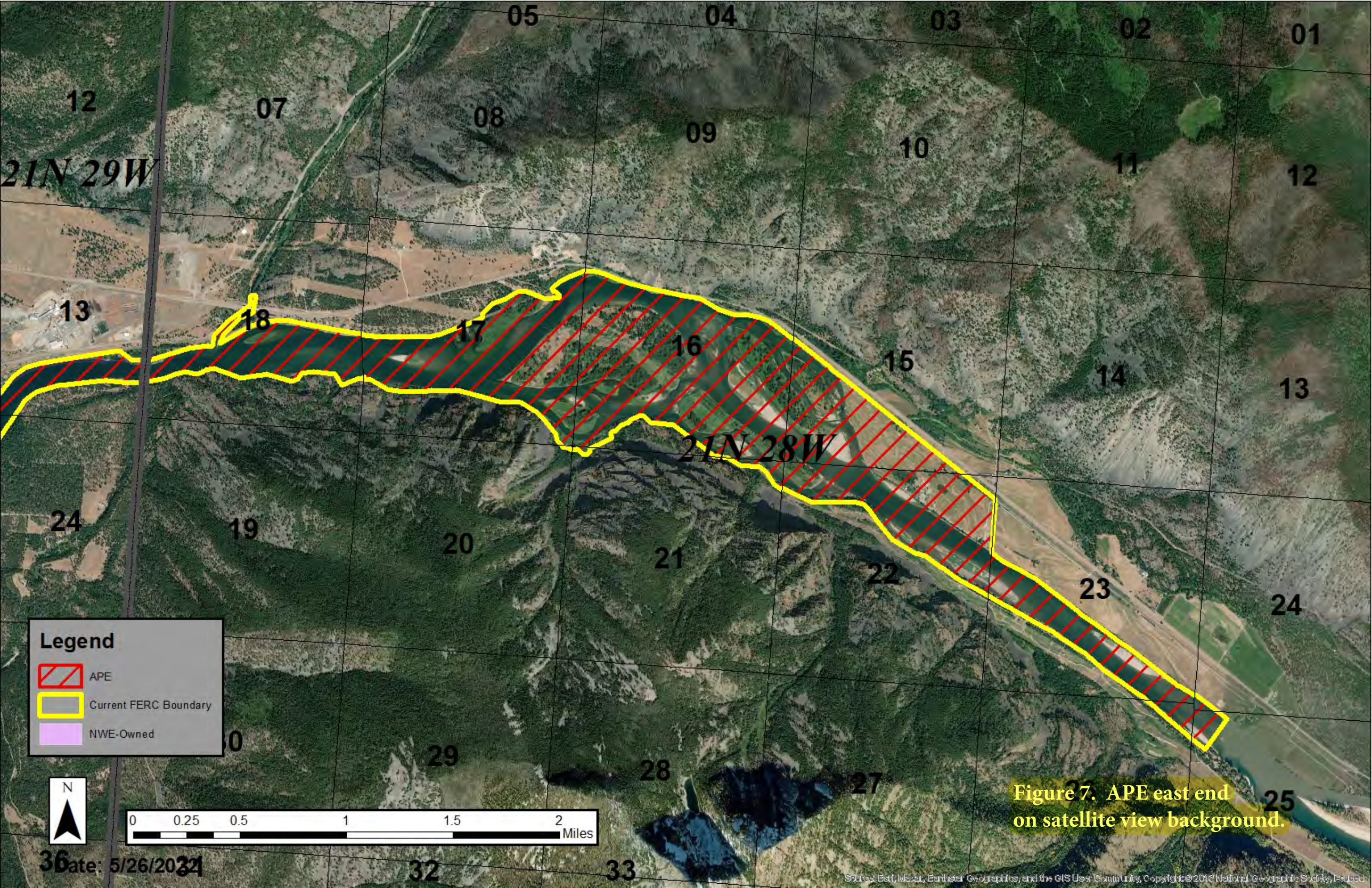

Figure 7. APE east end on satellite view background.

Powerhouse Loop Trail

Power Park

Sandy Beach

North Shore Parking Area

Wild Goose Landing

South Shore Dispersed Area

Thompson Falls

Footbridge

Thompson Falls Dam

21N 29W

06

05

07

08

17

18

Legend

APE

Current FERC Boundary

Powerhouse_Loop_Trail

Noxon FERC Boundary

NWE-Owned

N

0 0.05 0.1 0.2 0.3 0.4 Miles

Date: 5/26/2022

Figure 8. Close-up of downstream recreation sites (scale 1:6,000).

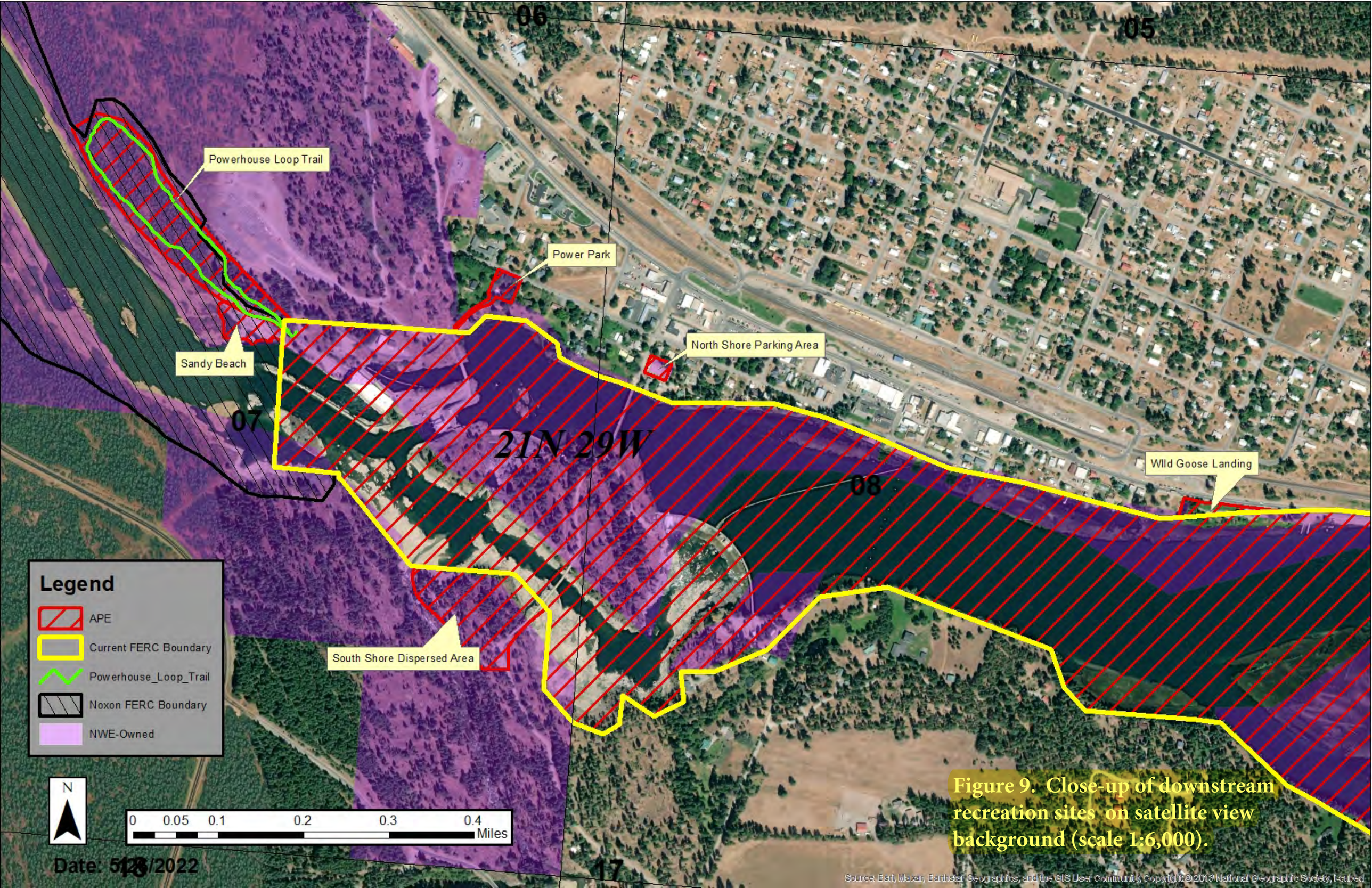

Figure 9. Close-up of downstream recreation sites on satellite view background (scale 1:6,000).

Big Sky. Big Land. Big History.
Montana
Historical Society

Historic Preservation
Museum
Outreach & Interpretation
Publications
Research Center

May 27, 2022

Mary Gail Sullivan
NorthWestern Energy
11 E Park
Butte, MT 59701

Re: Thompson Falls Hydroelectric Project P-1869-060
Area of Potential Effect (APE) for Cultural Resources

Dear Ms. Sullivan:

Thank you for your letter and associated materials, received by email May 26 and 27, 2022, regarding the Thompson Falls Hydroelectric project APE for cultural resources in Sanders County, Montana. We concur with the APE for this project as specified in the verbal description (and substantiated in the attached maps): "The APE is defined as the boundary identified in the Project's current FERC license, plus those lands outside that boundary that are within the reservoir full-pool footprint, plus those portions of seven recreation sites adjacent or near but outside the existing FERC boundary". We understand that this definition of the APE may need to be adjusted in the future, through consultation, if the FERC boundary for the project is modified through the relicensing process.

If you have any questions or concerns, do not hesitate to contact me at (406) 444-6485 or Laura.Marsh@MT.gov. Thank you for consulting with us.

Sincerely,

Laura Marsh, M.A.
Compliance Officer
Montana State Historic Preservation Office

FILE: DOE/FERC – 2022 – 2022052701

225 North Roberts Street
P.O. Box 201201
Helena, MT 59620-1201
(406) 444-2694
(406) 444-2696 FAX
montanahistoricalsociety.org

ATTACHMENT 2

Thompson Falls Hydroelectric Project #1869-060

NorthWestern Energy

Initial Study Report Meeting Summary

Notification Distribution List

Thompson Falls Hydroelectric Project #1869-060
NorthWestern Energy
Initial Study Report Meeting Summary
Notification Distribution List

1111806 Heron, LLC
15142 Tuba Street
Mission Hills, CA 91345-2749

Advisory Council on Historic Preservation
401 F Street NW, Ste 308
Washington, DC 20001-2637

American Canoe Association
Wade Blackwood
2010 College Ave Ste 100
Fredericksburg, VA 22401

American Rivers
Northern Rockies
Scott Bosse
321 East Main St, Ste 408
Bozeman, MT 59715
sbosse@americanrivers.org

American Rivers
Pacific NorthWest
Wendy McDermott
PO Box 1234
Bellingham, WA 98227

American Rivers
1101 14th St. NW, Ste. 1400
Washington, DC 20005

American Whitewater
Thomas O'Keefe, PhD
3537 NE 87th St.
Seattle, WA 98115
okeefe@americanwhitewater.org

American Whitewater Affiliation, Inc.
Mark Singleton
PO Box 1540
Cullowhee, NC 28723

American Whitewater Association
Kevin Colburn
PO Box 1540
Cullowhee, NC 28723
kcolburn@amwhitewater.org

APLE
Bruce Bugbee
125 Bank Street #610
Missoula, MT 59802
bbugbee@apleco.com

APLE
Mark Sommer
125 Bank Street #610
Missoula, MT 59802
msommer@apleco.com

AREND FAMILY TRUST
6 COVEVIEW LN
THOMPSON FALLS, MT 59873-9511

Avista Corporation
Shana Bernall
PO Box 1469 94 Avista Power Road
Noxon, MT 59853

Avista Corporation
Nate Hall
PO Box 1469 94 Avista Power Road
Noxon, MT 59853

Avista Corporation
Eric Oldenburg
PO Box 1469 94 Avista Power Road
Noxon, MT 59853

Bennett Realty
Dave Bennett
223 Main St PO Box 1027
Thompson Falls, MT 59873
bennett@thompsonfalls.com

Blackfeet Nation
Tribal Business Council
Timothy Davis
PO Box 850
Browning, MT 59417

Bonneville Power Administration
PO Box 3621
Portland, OR 97208-3621

City of Thompson Falls
Neil Harnett
tfpworks@blackfoot.net

City of Thompson Falls
PO Box 99
Thompson Falls, MT 59873

Clark Fork Coalition
Andrew Gorder
andrew@clarkfork.org

Clark Fork Coalition
Alex Leone
140 S 4th St W #1
Missoula, MT 59801

CLARK FORK PROPERTIES, LLC
30900 WELLINGTON CT
DAPHNE, AL 36527-8204

Clark Fork Title, Inc
Julie Watts
PO Box 9
Thompson Falls, MT 59873

Coeur d'Alene Tribe
Albeni Falls Wildlife Mitigation
Anders Mikkelsen
PO Box 408 805 A Street
Plummer, ID 83851

Coeur d'Alene Tribe
Cam Heusser
PO Box 408 805 A Street
Plummer, ID 83851
cheusser@cdatribe-nsn.gov

Coeur d'Alene Tribe
850 A. Street
Plummer, ID 83851

Confederated Salish and Kootenai Tribes
Craig Barfoot
PO Box 279
Pablo, MT 59856
craig.barfoot@cskt.org

Confederated Salish and Kootenai Tribes of the Flathead Reservation
Tribal Historic Preservation Office
Katie McDonald
PO Box 278
Pablo, MT 59588
Kathryn.McDonald@cskt.org

Confederated Salish and Kootenai Tribes of the Flathead Reservation
Michael Durglo
PO Box 278
Pablo, MT 59588
Michael.Durglo@cskt.org

Crazy Woman Kayaks
Sissel Robertson
115 Broad Street South
Thompson Falls, MT 59873
sissel@crazywomankayaks.com

DEBRA A. DECRAY TRUST &
DOUGLAS W. BIGGER LIVING TRUST
PO BOX 6023
MALIBU, CA 90264-6023

Dodson Irrigation District
PO Box 1340
Malta, MT 59523

Elliott Realty, Inc
Jenna Brown
1213 Main St PO Box 1178
Thompson Falls, MT 59873

Federal Emergency Management Agency
Denver Federal Center, Building 710
PO Box 25267
Denver, CO 80255-0267

Federal Emergency Management Agency
500 C Street SW
Washington, DC 20472

Federal Energy Regulatory Commission
Director, Division of Hydropower Licensing
888 First Street
Washington, DC 20426

Federal Energy Regulatory Commission
David Turner
Washington, DC
david.turner@ferc.gov

Federal Energy Regulatory Commission
Michael Tust
Washington, DC
michael.tust@ferc.gov

Federation of Fly Fishers
1201 US HWY 10 W STE E
Livingston, MT 59047-9922

Fletcher Family Revocable Trust
Bob Fletcher
PO BOX 997
Thompson Falls, MT 59873-0997
LHFletcher@hotmail.com

GEI Consultants, Inc.
Ginger Gillin
6915 S Macadam Avenue, Suite 130
Portland, OR 97219

GLACIER BANK
2501 S CATLIN ST STE 100
MISSOULA, MT 59801-7815

Glasgow Irrigation District
PO Box 271
Glasgow, MT 59230

GMCD
Kent Wilby
kandcdub@gmail.com

Green Mountain Conservation District
Sarah Busmire
PO Box 1329
Trout Creek, MT
59874MCD@Blackfoot.net

Hagedorn Land Surveying, Inc.
Rick Hagedorn
108 Pearl St PO Box 324
Thompson Falls, MT 59873
hagedornls@blackfoot.net

JOHNSON REVOCABLE LIVING TRUST
PO BOX 1117
THOMPSON FALLS, MT 59873-1117

Kalispel Tribe of Indians
PO Box 39
Usk, WA 99180

KANIKSU LAND TRUST
KAYLA MOSHER
kayla@kaniksu.org

Kootenai Tribe of Idaho
PO Box 1269
Bonners Ferry, ID 83805

Lion's Club
Plains Lion's Club
Duane Highcrane
PO Box 721
Plains, MT 59859
d4m57h@gmail.com

LIVING TRUST
THEODORE & ELAINE BOYD
2625 DEARBORN ST APT 307
MISSOULA, MT 59804-7307

LIVING TRUST AGREEMENT OF JACK I ESLER
PO BOX 907
THOMPSON FALLS, MT 59873-0907

Lolo National Forest USDA Forest Service
Building 24, Fort Missoula
Missoula, MT 59804

Lower Clark Fork Watershed Group
Brita Olson
1215 Superior St
Sandpoint, ID 83864

Malta Irrigation District
PO Box 1340
Malta, MT 59523

Missoula Electric Cooperative
General Manager
1700 W Broadway St
Missoula, MT 59808

Mitzi Rossilon, Consulting
Archaeologist, LLC
Mitzi Rossillon
305 W. Mercury, Suite 104
Butte, MT 59701
mitzi.rossillon@gmail.com

Montana Association of Conservation Districts
Jim Simpson
1101 Eleventh Ave
Helena, MT 59601
mail@macdnet.org

Montana Association of Conservation Districts
Mark Suta
1101 Eleventh Ave
Helena, MT 59601
sutafarm@outlook.com

Montana Bass Nation
Big Sky Bassers Missoula
Tom Lughibil
3015 W Railroad St #7
Missoula, MT 59808

Montana Coop. Fishery Research Unit
Montana State University
PO Box 173460
Bozeman, MT 59717-3460

Montana Department of Agriculture
Agriculture & Livestock Bldg.
Capitol Station
Helena, MT 59620-0201

Montana Department of Transportation
STEVE FELIX
PO Box 7039
MISSOULA, MT 59807-7039

Montana Dept. of Natural Resources
Sarah Bond
PO Box 201601
Helena, MT 59620-1601

Montana Dept. of State Lands
Capitol Station
Helena, MT 59620

Montana Office of Attorney General
State Capitol
Helena, MT 59601

Montana Public Service Commission
District 4
Jennifer Fielder
Jennifer.fielder@mt.gov

MONTANA RAIL LINK
PO BOX 16390
MISSOULA, MT 59808-6390

MUDRYK LIVING TRUST
13601 SAN SIMEON AVE
BAKERSFIELD, CA 93314-3773

National Park Service
Rivers, Trails, & Conservation Assistance Program/Interior Regions 6,7,8
12795 W. Alameda Parkway
Lakewood, CO 80228
RTCA_Apps_IMR@nps.gov

New Wave Environmental Consulting, LLC
Kristi Webb
4404 Expressway Ste 201
Missoula, MT 59808
kwebb@nw-enviro.com

NO 1 DECLARATION OF TRUST
JAMES KUNTZ
340 MT HIGHWAY 28
PLAINS, MT 59859-9611

NorthWestern Energy
Grant Grisak
6700 Rainbow Dam Road
Great Falls, MT 59404

NorthWestern Energy
Jon Hanson
1903 S Russell Street
Missoula, MT 59801

NorthWestern Energy
Noel Jacobson
PO Box 667
Thompson Falls, MT 59873

NorthWestern Energy
Jeremy Clotfelter
6700 Rainbow Dam Road
Great Falls, MT 59404
jeremy.clotfelter@northwestern.com

NorthWestern Energy
Carrie Harris
11 East Park Street
Butte, MT 59701-1711
carrie.harris@northwestern.com

NorthWestern Energy
Mary Gail Sullivan
11 East Park Street
Butte, MT 59701-1711
marygail.sullivan@northwestern.com

NorthWestern Energy
John Tabaracci
208 N. Montana Ave, Suite 205
Helena, MT 59601
john.tabaracci@northwestern.com

NorthWestern Energy
Jordan Tollefson
1315 North Last Chance Gulch
Helena, MT 59601
Jordan.Tollefson@northwestern.com

NorthWestern Energy
Andy Welch
1315 North Last Chance Gulch
Helena, MT 59601
Andrew.Welch@northwestern.com

Office of Senator Steve Daines
Joshua Sizemore
Senate Hart Building Room 320
Washington, DC 20510

Office of Senator Tester
Jon Tester
311 Hart Senate Office Building
Washington, DC 20510

Office of the Governor
Greg Gianforte
PO Box 200801
Helena, MT 59620-0801

Office of U.S. Senator Jon Tester
Erik Nylund
125 W Granite
Butte, MT 59701
Erik_Nylund@tester.senate.gov

Paradise Valley Irrigation District
PO Box 1417
Chinook, MT 59523-4926

Pinnacle Research and Consulting
Kim McMahon
13 High Meadow Rd
Plains, MT 59859
kim.pinnacle.research@gmail.com

Pinnacle Research and Consulting
Liz Stender
PO Box 1284
Trout Creek, MT 59874
lizpinnacle@blackfoot.net

Realty NW
Gail Enger
1013 Main St PO Box 1805
Thompson Falls, MT 59873
realtynorthwest@gmail.com

Rossillon LLC
Ken Dickerson
rtiken@gmail.com

Sanders County
Land Services
Katherine Maudrone
PO Box 519 1111 Main St, Rm 112
Thompson Falls, MT 59873
kmaudrone@co.sanders.mt.us

Sanders County
Sanders County Commissioners
Claude Burlingame
1111 West Main Street PO Box 519
Thompson Falls, MT 59873
cburlingame@co.sanders.mt.us

Sanders County
Sanders County Commissioners
Anthony B. Cox
1111 West Main Street
PO Box 519
Thompson Falls, MT 59873

Sanders County
Sanders County Commissioners
Jennifer Ekberg
1111 West Main Street PO Box 519
Thompson Falls, MT 59873

Sanders County
Sanders County Commissioners
Glen E. Magera
1111 West Main Street PO Box 519
Thompson Falls, MT 59873

Sanders County
Weed District
Mark Lincoln
36 Old Airport Road
Plains, MT 59859
weeddept@co.sanders.mt.us

Sanders County
Nichol Scribner
PO Box 519 1111 West Main Street
Thompson Falls, MT 59873
nscribner@co.sanders.mt.us

Sanders County Community
Development Corporation
Ray Brown
2504 Tradewinds Way, St C1
Thompson Falls, MT 59873

Sanders County Flycasters
Myles Sexton
PO Box 38
Thompson Falls, MT 59873

Sanders County Ledger
Miriah Kardelis
603 E Main St.
Thompson Falls, MT 59873

SMITH FAMILY TRUST
4725 PANAMA LN # D3-240
BAKERSFIELD, CA 93313-3404

State of Montana
Environmental Quality Council
PO Box 201704 1301 E 6th Ave Rm 171
Helena, MT 59620-1704

State of Montana
Montana Department of Agriculture
PO Box 200201 302 N Roberst ST
Helena, MT 59620-0201

State of Montana
Montana Department of
Environmental Quality
Chris Dorrington
PO Box 200901 1520 E. 6th Ave
Helena, MT 59620-0901

State of Montana
Montana Department of
Environmental Quality
Craig Jones
PO Box 200901 1520 E. 6th Ave
Helena, MT 59620-0901
crajones@mt.gov

State of Montana
Montana Department of
Environmental Quality
Jon Kenning
PO Box 200901 1520 E. 6th Ave
Helena, MT 59620-0901
jkenning@mt.gov

State of Montana
Montana Department of
Environmental Quality
Eric Sivers
PO Box 200901 1520 E. 6th Ave
Helena, MT 59620-0901
esivers@mt.gov

State of Montana
Montana Department of
Environmental Quality
Amy Steinmetz
PO Box 200901 1520 E. 6th Ave
Helena, MT 59620-0901
ASteinmetz@mt.gov

State of Montana
Montana Department of
Environmental Quality
Keenan Storrar
PO Box 200901 1520 E. 6th Ave
Helena, MT 59620-0901
keenan.storrar@mt.gov

State of Montana
Montana Department of
Environmental Quality
James Strait
PO Box 200901 1520 E. 6th Ave
Helena, MT 59620-0901
jstrait@mt.gov

State of Montana
Montana Department of Natural
Resources and Conservation
Amanda Kaster
PO Box 201601 1539 Eleventh Ave
Helena, MT 59601-1601

State of Montana
Montana Fish, Wildlife & Parks
Neal Anderson
nanderson@mt.gov

State of Montana
Montana Fish, Wildlife & Parks
Jason Blakney
5427 MT-200
Thompson Falls, MT 59873
JBlakney@mt.gov

State of Montana
Montana Fish, Wildlife & Parks
Harvey Carlsmith
5427 Hwy 200
Thompson Falls, MT 59873

State of Montana
Montana Fish, Wildlife & Parks
Mike Hensler
490 North Meridian Road
Kalispell, MT 59902

State of Montana
Montana Fish, Wildlife & Parks
Ladd Knotek
3201 Spurgin Road
Missoula, MT 59801

State of Montana
Montana Fish, Wildlife & Parks
Abigail Maddigan
5427 Hwy 200
Thompson Falls, MT 59873
abigail.maddigan@mt.gov

State of Montana
Montana Fish, Wildlife & Parks
Pat Saffel
3201 Spurgin Road
Missoula, MT 59801
psaffel@mt.gov

State of Montana
Montana Fish, Wildlife & Parks
David Schmetterling
3201 Spurgin Road
Missoula, MT 59801
dschmetterling@mt.gov

State of Montana
Montana Fish, Wildlife & Parks
Trevor Watson
PO Box 200701
Helena, MT 59620-0701
Trevor.Watson@mt.gov

State of Montana
Montana Fish, Wildlife & Parks
490 North Meridian Road
Kalispell, MT 59902

State of Montana
Montana Historical Society
PO Box 201201
Helena, MT 59620-1201

State of Montana
Montana State Historic Preservation Office
Pete Brown
225 N Roberts St
Helena, MT 59601

State of Montana
Montana State Parks
Dave Bennetts
490 North Meridian Road
Kalispell, MT 59902

State of Montana
Office of the Secretary
Christi Jacobsen
PO Box 202801 State Capitol Building, 1301 E 6th Ave
Helena, MT 69620-2801

STATE OF MONTANA
2701 PROSPECT AVE
HELENA, MT 59601-9746

STILLWATER CORPORATION
PO BOX 7338
KALISPELL, MT 59904-0338

SUSANNA SCHAUMAN 2014 TRUST
12849 LOS OSOS ST
REDDING, CA 96003-7417

THE LORD OF THE HARVEST MINISTRY INC
PO BOX 121
PLAINS, MT 59859-0121

Thompson Falls Chamber of Commerce
PO Box 493
Thompson Falls, MT 59873
tfchamber@thompsonfallschamber.com

Thompson Falls Committee Trails
Kathy Conlin
kconlin@co.sanders.mt.us

Thompson Falls Napa Auto Parts
Brian Cole
tfnapa@yahoo.com

Town of Plains
PO Box 567
Plains, MT 59859

Trout Unlimited
Montana
David Brooks
PO Box 7186 312 N. Higgins, Ste 200
Missoula, MT 59807
david@montanatu.org

Trout Unlimited
National
Christine Brissette
312 N Higgins Ave, Suite 200
Missoula, MT 59802

Trout Unlimited
National
Paul Parson
312 N. Higgins, Suite 200
Missoula, MT 59801

Trout Unlimited
National
Rob Roberts
312 N. Higgins, Ste 200 312 N. Higgins, Ste 200
Missoula, MT 59801

Troutman Pepper
Elizabeth McCormick
401 9th Street, NW, Suite 1000
Washington, DC 20004
Elizabeth.mccormick@troutmansanders.com

Troutman Pepper
Hallie Meushaw
401 9th Street, NW, Suite 1000
Washington, DC 20004
hallie.meushaw@troutmansanders.com

Troutman Pepper
Charles R. Sensiba
401 9th Street, NW, Suite 1000
Washington, DC 20004
charles.sensiba@troutman.com

Troutman Pepper
Fitzgerald Veira
401 9th Street, NW, Suite 1000
Washington, DC 20004

TUNGSTEN HOLDINGS INC
PO BOX 1213
LIBBY, MT 59923-1213

U.S. Army Corps of Engineers
Chief, Operations and Regulatory Division
441 G Street, NW
Washington, DC 20314

U.S. Army Corps of Engineers
NW Division
10 West 15th, Ste 2200
Helena, MT 59626

U.S. Army Corps of Engineers
Omaha District Headquarters
1616 Capitol Avenue, Ste 9000
Omaha, NE 68102

U.S. Department of the Interior
Bureau of Indian Affairs
1849 C Street NW, MS-4606-MIB
Washington, DC 20240

U.S. Department of the Interior
Bureau of Indian Affairs
2021 4th Avenue North
Billings, MT 59101

U.S. Department of the Interior
Bureau of Indian Affairs
52096 Highway 93
Pablo, MT 59855

U.S. Department of the Interior
Bureau of Indian Affairs,
NorthWest Region
911 NE 11th Avenue
Portland, OR 97232-4169

U.S. Department of the Interior
Bureau of Land Management
Erin Carey
3255 Fort Missoula Road
Missoula, MT 59804
blm_mt_missoula_fo@blm.gov

U.S. Department of the Interior
Bureau of Land Management
John Mehlhoff
5001 Southgate Drive
Billings, MT 59101
blm_mt_so_information@blm.gov

U.S. Department of the Interior
Bureau of Land Management
Katie Stevens
106 North Parkmont
Butte, MT 59701
shaight@blm.gov

U.S. Department of the Interior
Bureau of Reclamation
Lorri Gray
1150 N. Curtis Road, Ste 100 Mailing Code: PN-1000
Boise, ID 83706-1234

U.S. Department of the Interior
Bureau of Reclamation
Michael J. Ryan
PO Box 36900 2021 4th Ave North
Billings, MT 59107-6900

U.S. Department of the Interior
Bureau of Reclamation
1849 C Street NW
Washington, DC 20240

U.S. Department of the Interior
National Park Service
Sue Masica
12795 Alameda Parkway
Denver, CO 80225

U.S. Department of the Interior
National Park Service
Susan Rosebrough

U.S. Department of the Interior
Office of Environmental Policy and Compliance, Denver Region
Courtney Hoover
PO Box 25007, D-108
Denver, CO 80225-0007

U.S. Department of the Interior
National Park Service
Sue Masica
12795 Alameda Parkway
Denver, CO 80225

U.S. Department of the Interior
National Park Service
Susan Rosebrough

U.S. Department of the Interior
Office of Environmental Policy and Compliance, Denver Region
Courtney Hoover
PO Box 25007, D-108
Denver, CO 80225-0007

U.S. Department of the Interior
Office of the Secretary
David Bernhardt
1849 C Street NW
Washington, DC 20240

U.S. Department of the Interior
U.S. Fish & Wildlife Service
Kevin Aceituno
780 Creston Hatchery Road
Kalispell, MT 59901
kevin_aceituno@fws.gov

U.S. Department of the Interior
U.S. Fish & Wildlife Service
James Boyd
585 Shepard Way, Ste 1
Helena, MT 59601-6287
james_boyd@fws.gov

U.S. Department of the Interior
U.S. Fish & Wildlife Service
585 Shepard Way, Ste 1
Helena, MT 59601-6287

U.S. Department of the Interior
U.S. Fish & Wildlife Service,
Ecological Services
134 Union Boulevard, Suite 650
Lakewood, CO 80228

U.S. Department of the Interior
U.S. Fish & Wildlife Service,
Ecological Services
911 NE 11th Avenue
Portland, OR 97232-4181

U.S. Department of the Interior
U.S. Geological Survey
Marijke van Heeswijk
6000 J Street Suite 5000
Sacramento, CA 95819

U.S. Department of the Interior
U.S. Geological Survey
12201 Sunrise Valley Dr
Reston, VA 20192

U.S. Department of the Interior
U.S. Geological Survey
2327 University Way, Suite 2
Bozeman, MT 59715

U.S. Department of the Interior
U.S. Geological Survey
5275 Leesburg Pike
Falls Church, VA 22041-3803

U.S. Department of the Interior
U.S. Geological Survey
790 E. Beckwith
Missoula, MT 59801

U.S. Environmental Protection
Agency
Office of the Administrator, 1101A
Andrew Wheeler
1200 Pennsylvania Ave NW
Washington, DC 20004

U.S. EPA, 8WD-CWS
CWA Section 401 Water Quality
Certification Program
Toney Ott
1595 Wynkoop Street
Denver, CO 80202
R8CWA401@epa.gov

US Department of Interior
U.S. Fish and Wildlife Service
PO Box 25486
Denver, CO 80225-0486

US Forest Service
Lolo National Forest
Heather Berman
PO Box 429 408 Clayton
Plains, MT 59859
heather.berman@usda.gov

US Forest Service
Lolo National Forest
Molly Puchlerz
26 Fort Missoula Road
Missoula, MT 59804
mpuchlerz@usda.gov

US Forest Service
Lolo National Forest
Josh Schulze
Joshua.schulze@usda.gov

U.S. Department of the Interior
U.S. Geological Survey
Marijke van Heeswijk
6000 J Street Suite 5000
Sacramento, CA 95819

U.S. Department of the Interior
U.S. Geological Survey
12201 Sunrise Valley Dr
Reston, VA 20192

U.S. Department of the Interior
U.S. Geological Survey
2327 University Way, Suite 2
Bozeman, MT 59715

U.S. Department of the Interior
U.S. Geological Survey
5275 Leesburg Pike
Falls Church, VA 22041-3803

U.S. Department of the Interior
U.S. Geological Survey
790 E. Beckwith
Missoula, MT 59801

U.S. Environmental Protection
Agency
Office of the Administrator, 1101A
Andrew Wheeler
1200 Pennsylvania Ave NW
Washington, DC 20004

U.S. Environmental Protection
Agency
Region 8
Deb Thomas
1595 Wynkoop Street
Denver, CO 80202-1129

U.S. EPA, 8WD-CWS
CWA Section 401 Water Quality
Certification Program
Toney Ott
1595 Wynkoop Street
Denver, CO 80202
R8CWA401@epa.gov

US Department of Interior
U.S. Fish and Wildlife Service
PO Box 25486
Denver, CO 80225-0486

US Forest Service
Lolo National Forest
Heather Berman
PO Box 429 408 Clayton
Plains, MT 59859
heather.berman@usda.gov

US Forest Service
Lolo National Forest
Molly Puchlerz
26 Fort Missoula Road
Missoula, MT 59804
mpuchlerz@usda.gov

US Forest Service
Lolo National Forest
Josh Schulze
Joshua.schulze@usda.gov

US Forest Service
Lolo National Forest
Traci Sylte
24 Fort Missoula Road
Missoula, MT 59804-7297

US Forest Service
Lolo National Forest
David Wrobleski
PO Box 429 408 Clayton
Plains, MT 59859

US Forest Service
Lolo National Forest
24 Fort Missoula Road
Missoula, MT 59804

US Forest Service
Office of the General Counsel
Patrick Redmond
1400 Independence Avenue SW
Washington, DC 20250-1111

US Forest Service
Region 4 Intermountain
M'Leah Woodard
324 25th Street
Ogden, UT 84401

US Forest Service
Land Use Group, RMLHW
26 Fort Missoula Road
Missoula, MT 59804

US Forest Service
1400 Independence Avenue SW
Washington, DC 20250-1111

US Forest Service
Federal Building 507 25th St
Ogden, UT 84401

US Forest Service
324 25th St.
Ogden, UT 84401

WHITTON MARTY & KAREN 2017
REVO TRUST
1804 FAIRCLOUGH DR
BAKERSFIELD, CA 93311-8520

Yellowstone Pipeline Company
Corporate Service Property
PO Box 1691 26 W Sixth Ave
Helena, MT 59624-1691

Yellowstone Pipeline Company
PHILLIPS 66
DEREK LILLEBERG
2626 LILLIAN AVE
BILLINGS, MT 59101

Yellowstone Pipeline Compnay
Corporate Service Property
2331 City West Blvd
Houston, TX 77042

SALISH SHORES UTILITY CORP INC
BUDDY J. & JUDY A. LEUFKINS
PO BOX 1030
THOMPSON FALLS, MT 59873-1030

ROBERT T ADDLEMAN
PO BOX 2086
THOMPSON FALLS, MT 59873-2086

MATTHEW & AMANDA AMES
PO BOX 2882
BELFAIR, WA 98528-2882

LOUIS & SUE ANN APODACA
455 W EL CAMPO RD
ARROYO GRANDE, CA 93420-5536

JEROLD A. ARMSTRONG
10475 CEDAR RIDGE RD
MISSOULA, MT 59804-5875

JOSEE & JAMES P. BACHOFNER
PO BOX 10310
KALISPELL, MT 59904-3310

PAUL BALLARD
1752 RIVER RD W
PLAINS, MT 59859-9362

Kent Barbian
kent.barbian2@gmail.com

BILL MICHAEL II & NYKOLEE BATTLES
PO BOX 1334
THOMPSON FALLS, MT 59873-1334

SUZANNE G. BATTLES
27 NORTHSHORE DR
THOMPSON FALLS, MT 59873-9434

DENNIS & VICKI BAUER
2563 INDIAN HILLS DR
LOVELAND, CO 80538-2966

KATHERINE E. BAXTER
PO BOX 2211
THOMPSON FALLS, MT 59873-2211

MICHAEL R. & JENEESE BAXTER
PO BOX 2011
THOMPSON FALLS, MT 59873-2011

ROBERT T. & SUSAN J. BAXTER
PO BOX 547
THOMPSON FALLS, MT 59873-0547

WILLIAM & PENNY BECKMAN
PO BOX 605
THOMPSON FALLS, MT 59873-0605
mcbeckman34@gmail.com

WILLIAM A. BEKEL
105 NORTHSHORE DR
THOMPSON FALLS, MT 59873-9420

NAOMI K. BELLEW
PO BOX 1548
PLAINS, MT 59859-1548

GLORIA D. BENNETT
PO BOX 1027
THOMPSON FALLS, MT 59873-1027

EDWARD E & DEBRA M BENTON
31 NORTHSHORE RD
THOMPSON FALLS, MT 59873-9434

SAMUEL C. BERNHARDT
106 RIVER WALK LN
THOMPSON FALLS, MT 59873

MICHAEL A. & YVETTE M. BINGHAM
PO BOX 1887
THOMPSON FALLS, MT 59873-1887

ROBERT J. & DIANE L. BLANFORD
6809 KALISPELL ST
BONNERS FERRY, ID 83805-7530

RONALD L. & SANDRA L. CLINE
3030 GREENBRIAR CT
SAN JOSE, CA 95128-4052

JOHN L. & SUSAN M. BLOOMQUIST
PO BOX 1894
THOMPSON FALLS, MT 59873-1894

ARNOLD G. & JANET L. BRONKEN
924 HILL AVE
SHELBY, MT 59474-1635

GARY W. & BEVERLY J. BROWN
PO BOX 194
THOMPSON FALLS, MT 59873-0194

JASON D. & JENNA J. S. BROWN
PO BOX 1812
THOMPSON FALLS, MT 59873-1812

PAUL DOUGLAS & NANCY MCINTIRE BROWN
PO BOX 5335
KENT, WA 98064-5335

ROBERT W. & CONNIE BROWN
PO BOX 66
THOMPSON FALLS, MT 59873-0066

E. LEON & PEGGY J. BUCKLES
7617 E SUNFLOWER DR
SPOKANE, WA 99217-9608

JAMES M. BURNETTE
PO BOX 385
THOMPSON FALLS, MT 59873-0385

ERNEST BURWELL
PO BOX 2083
THOMPSON FALLS, MT 59873-2083

Rick Cavill
38 North shore Drive
Thompson Falls, MT 59874

ISAAC K. CLARK
PO BOX 174
THOMPSON FALLS, MT 59873-0174

NOAH B.& JENNIFER SCHOEFFER CLOSSON
7848 SUGAREE TRL
LOLO, MT 59847-9449

Rick Cavill
38 North shore Drive
Thompson Falls, MT 59874

VICTORIA Z. CROFT
PO BOX 1729
THOMPSON FALLS, MT 59873-1729

ANNE M. DENTON
468 HALO DR
TROY, MT 59935-9414

Al DODSON
PO BOX 458
THOMPSON FALLS, MT 59873

CAROL J. DUVEY
PO BOX 817
THOMPSON FALLS, MT 59873-0817

EDWARD G. & PATSY ECCLES
1920 W JOHANSEN RD
SPOKANE, WA 99208-8429

DONALD P. & DEBRA A. EICKHOFF
PO BOX 972
THOMPSON FALLS, MT 59873-0972

WILLIAM K. & SHELLEY D. FISTER
85 ARROWHEAD DR
MISSOULA, MT 59803-1207

LARRY E. FLOERCHINGER
1646 RIVER RD W
PLAINS, MT 59859-9361

CHARLES L & DEBBY M FRANCK
PO BOX 1371
THOMPSON FLS, MT 59873-1371

BRIAN K. & COURTNEY S. BURKY
1702 PEARL ST
MILES CITY, MT 59301-4508

JAMES W. & MARGO S. BURNETTE
PO BOX 369
THOMPSON FALLS, MT 59873-0369

CHARLES A. CANCIGLIA
PO BOX 4
THOMPSON FALLS, MT 59873-0004

NORMAN E. & KATHLEEN A. CHARLSON
1101 MCKINLEY ST
ANOKA, MN 55303-1094

JOHN ALLAN CLARK
1635 Lotus GLN
Escondido, CA 92026-1848

LARRY & VIRGINIA A. COOPER
3825 93RD PL NE
MARYSVILLE, WA 98270-7231

NORMAN E. &
KATHLEEN A. CHARLSON
1101 MCKINLEY ST
ANOKA, MN 55303-1094

James Daugherty
11 Dagny Ct
Trout Creek, MT 59874-9417

DAVID P. & LYNNE R. DICKMAN
530 WOODWORTH AVE
MISSOULA, MT 59801-6045

Len Dorscher
85 NORTHSHORE DR
THOMPSON FALLS, MT 59873-9434
ldorscher@tfalls.org

THERESA DUFFIELD
PO BOX 1441
THOMPSON FALLS, MT 59873-1441

ROBERT A. & JOAN O. EDGELL
23048 SW CUTHILL PL
SHERWOOD, OR 97140-8200

GEORGE D & LINDA J ELLIOTT
PO BOX 884
THOMPSON FALLS, MT 59873-0884

KENNETH F. & MABEL A. FLANAGAN
26 OSPREY DR W
Thompson Falls, MT 59873-9517

MARK & JANE FORTIN
PO BOX 1131
THOMPSON FALLS, MT 59873-1131

JOE & MARILYN FRIELDS
396 BIG BEAVER CREEK RD
TROUT CREEK, MT 59874-9630

CLAUDE I. BURLINGAME
PO BOX 1587
THOMPSON FALLS, MT 59873-1587

ALFRED JR. & MICHAEL BURROWS
22 ROMA ST
NUTLEY, NJ 07110-1916

WILLIAM C. CARLSON
3055 E RIVERCREST DR
POST FALLS, ID 83854-9632

DIONE & DARLENE J. CHRISTENSON
PO BOX 304
THOMPSON FALLS, MT 59873-0304

RONALD L. & SANDRA L. CLINE
3030 GREENBRIAR CT
SAN JOSE, CA 95128-4052

ANTHONY B. COX
PO BOX 144
THOMPSON FALLS, MT 59873-0144

DIONE & DARLENE J. CHRISTENSON
PO BOX 304
THOMPSON FALLS, MT 59873-0304

JOHN E. DELACEY
PO BOX 16327
MISSOULA, MT 59808-6327

LLOYD W. III DINKELSPIEL
36 GRAHAM LN
TROUT CREEK, MT 59874-9688

Len Dorscher
lendorscher@gmail.com

EDWARD & MELINDA DZIERGAS
PO BOX 661
THOMPSON FALLS, MT 59873-0661

THOMAS P. & BINA M. EGGENSPERGER
PO BOX 221
[illegible]

THOMAS D. & GAIL M. ENGER
PO BOX 1350
THOMPSON FALLS, MT 59873-1350

NORMAN & REBECCA DOTY FLINT
PO BOX 26
EASTSOUND, WA 98245-0026

JOHN W FOUST
PO BOX 2243
THOMPSON FALLS, MT 59873-2243

CONAL & LISA GALLAGHER
8600 PHEASANT DR
MISSOULA, MT 59808-1010

JOHN R. & SAHNNON K. GALLAGHER
621 W CEDAR AVE
MONTESANO, WA 98563-2809

FRANK J. & JACQUIE GEBHARDT
6253 W SHAWNEE AVE
SPOKANE, WA 99208-8311

GEORGE & MONA LU GOULD
PO BOX 1696
THOMPSON FALLS, MT 59873-1696

MICHAEL & THERESA GRENELL
118 SWEDE TRL
KALISPELL, MT 59873-0145

DENISE D. HALL
8503 N BROOKSIDE DR
HAYDEN, ID 83835-5028

THOMAS W. & LAUREL L. HAUGEN
PO BOX 1001
THOMPSON FALLS, MT 59873-1001

CLARENCE A HJELM
PO BOX 1999
THOMPSON FALLS, MT 59873-1999

CLARENCE A HO-MORKERT
2115 Charing Cross DR
LK Havasu CTY, AZ 86404-1910

TIM R. HOYT
PO BOX 1177
THOMPSON FALLS, MT 59873-1177

ABBY L. INGRAM
2 GEBHARDT LN
THOMPSON FALLS, MT 59873-9513

PATRICK J. JOHNSON
PO BOX 333
LOLO, MT 59847-0333

VERNON LEROY & JANET F. JORGENSEN
57 NORTHSHORE DR
THOMPSON FALLS, MT 59873-9434

CARL E. & LOREITA KELLER
97 NORTHSHORE RD
THOMPSON FALLS, MT 59873-9434

KERRY M. & TERRY R. KOFFLER
10337 W WESLEY DR
LAKEWOOD, CO 80227-2289

LAND GUY INC
440 CRESTON RD
KALISPELL, MT 59901-8226

JAMES R. & DEBRA T. GAMM
33 BLUE CREEK RD
THOMPSON FALLS, MT 59873-9500

GIBE TRUST NO 2016
75 NORTHSHORE DR
THOMPSON FALLS, MT 59873-9434

ROBERT & SHELLEY A. GREENSIDE
49 OSPREY DR E
THOMPSON FALLS, MT 59873-9516

JOHN C. & KAREN K. GUSTAVSEN
PO BOX 876
THOMPSON FALLS, MT 59873-0876

WILLIAM O. & PATRICIA A. HALL
101 NORTHSHORE RD
THOMPSON FALLS, MT 59873-9420

DEAN A. & BONNIE HAUN
71 RIVER WALK LN
THOMPSON FALLS, MT 59873-9488

KIM A. & SHIRLEY H. HOFLAND
79 NORTHSHORE RD
THOMPSON FALLS, MT 59873-9434

CLIFFORD W. JR. & JANA L. HOWE
1430 OKLAHOMA STAR TRL W
BILLINGS, MT 59105-5504

JEFFREY S. & TONYA R. HUBERT
11181 MIDWAY DR
LOS ALAMITOS, CA 90720-2633

RICHARD B. & KATHRYN C. JACKSON
PO BOX 2203
THOMPSON FALLS, MT 59873-2203

RUSSELL H. &
CHRISTINE M. JOHNSON
4501 N HIGHWAY 7 STE 8 PMB 167
HOT SPRINGS, AR 71909-8201
JWE FAMILY TRUST
1073 GOLF COURSE RD
HAMILTON, MT 59840-9230

HARRY S. KIVETT
2826 E NORA AVE
SPOKANE, WA 99207-5352

Larry Lack
PO Box 339
Thompson Falls, MT 59873

CAROL L. LANZ
PO Box 953
Thompson Falls, MT 59873-0953

GLENN T. & SUZANNE H. GARRISON
4439 MT HIGHWAY 200
THOMPSON FALLS, MT 59873-9541

TAMARA C. GORDON
1314 BITTERSWEET DR
RICHMOND, TX 77469-6533

DIANNE M. ZIMMERMAN
PO BOX 1304
THOMPSON FALLS, MT 59873-1304

JOHN & DEANNA HALE
420 1ST ST E
KALISPELL, MT 59901-4506

IRA D. & JANET A. HALLOWELL
25 BRITT LN
THOMPSON FALLS, MT 59873

MONT L. & DEBRA K. HEINZMAN
31037 W MAIN ST
SEDRO WOOLLEY, WA 98284-7957

RANDY R. & KATHEE M. HOJEM
PO BOX 2002
THOMPSON FALLS, MT 59873-2002

CLIFFORD W. JR. & JANA L. HOWE,
CO-TRUSTEES
7 OSPREY DR E
THOMPSON FALLS, MT 59873-9516

LOREN C. & NINA S. HUHTA
PO BOX 1392
THOMPSON FALLS, MT 59873-1392
tfl9535@yahoo.com

ROBERT JOE & JOYCEANNE ROSLYN JODSAAS
249 FLANAGIN LN
STEVENSVILLE, MT 59870-6906

WILLIAM W. JR. &
JACQUELINE C. JONER
PO BOX 123
REXFORD, MT 59930-0123

CURTIS A. & CHERYL KEGEL
103 NORTHSHORE RD
THOMPSON FALLS, MT 59873-9420
cherylkegel@gmail.com

FREDERICK P. & SUSAN P. KLEINSCHMIT
1125 LOWER SUNNYSLOPE RD
WENATCHEE, WA 98801-9612

DONALD T. AND SUSAN G. LAMONT
PO BOX 1135
THOMPSON FALLS, MT 59873-1135

STEVEN J. LARSON
93 NORTHSHORE RD
THOMPSON FALLS, MT 59873-9434

TIM LAWTON
PO BOX 1656
THOMPSON FALLS, MT 59873-1656

RANDY J. LOVELL
PO BOX 969
THOMPSON FALLS, MT 59873-0969

TERESA MANLOVE
7843 SUGAREE TRL
LOLO, MT 59847-9449

Brian Marotz
1752 Stag Lane
Kalispell, MT 59901
bmarotz007@gmail.com

PATRICK H. & THELMA L. MILLER
PO BOX 485
THOMPSON FALLS, MT 59873-0485

KENNETH & MARIAN MONTOURE
PO BOX 246
THOMPSON FALLS, MT 59873-0246

JOHN & BARBARA MOSHER
PO BOX 2
THOMPSON FALLS, MT 59873-0002

PENSCO TRUST CO FBO
WANDA L THORPE
POS BOX 981012
BOSTON, MA 02298-1012

MICHAEL B. NORMANDIN
57 EDDY PEAK RD
THOMPSON FALLS, MT 59873-9508

ROBERT G. & SHARON D. OLSON
PO BOX 1879
THOMPSON FALLS, MT 59873-1879

NOLAN F. & LINDA L. PARKER
PO BOX 32
THOMPSON FALLS, MT 59873-0032

JOHN J. POOLE
2302 CAL LN
GARDNERVILLE, NV 89410-6126

RONALD RAHN
9529 Miller Creek Road
Missoula, MT 59803-9714

RCJD LLC
4447 E CHILCO RD
ATHOL, ID 83801-8477

CHERYL R. RHOADS
6 OSPREY DR W
THOMPSON FALLS, MT 59873-9517

GEORGE WILLIAM JR. & JUDITH L. RUMMEL
318 NOLAND DR
HAMILTON, MT 59840-3430

PHILIP L. & LINDA R. LEWIS
47 NORTHSHORE RD
THOMPSON FALLS, MT 59873-9434

CLARK D. & RITA LUNDGREN
PO BOX 2084
THOMPSON FALLS, MT 59873-2084

RICHARD & MICHELE MANNING
PO BOX 2502
THOMPSON FALLS, MT 59873-2502

MARK H. & TRACEY S. MCGRANN
1378 QUIET PINES LN
MISSOULA, MT 59802-8774

DON C MINER
PO BOX 847
THOMPSON FALLS, MT 59873-0847

JEFFREY L. & SANDRA J. MORITZ
PO BOX 655
THOMPSON FALLS, MT 59873-0655

Catherine Mulville
33547 Abbey Road
Temecula, CA 92592-5633

RUPERT M. & JODI L. NASON
5112 N GARFIELD RD
SPOKANE, WA 99224-9176

DAVID J. OLIVER
14 GUY HALL RD
TROUT CREEK, MT 59874-9650

RYAN M. & ELIZABETH L. OSTWALD
158 HAWK DR
GREAT FALLS, MT 59404-6427

DANIEL L. & CARLA M. PARKS
PO BOX 2525
THOMPSON FALLS, MT 59873-2525

JOHN POWERS
PO BOX 55
POLSON, MT 59860-0055

HARRY W. & TERRY L. RAINEY
PO BOX 355
THOMPSON FALLS, MT 59873-0355

LINDA A. REEDAL
22125 SE 241ST PL
MAPLE VALLEY, WA 98038-5895

TODD J. ROLLERI
20738 14TH AVE S
SEATAC, WA 98198-3597

RAY & ANGELA SALMELA
3615 CLARK FORK WAY
MISSOULA, MT 59808-5164

STEVEN ELLIOTT LEWIS
4252 N TURNBERRY CT
FLORENCE, AZ 85132-1278

KURT A. MAART
1733 S 7TH ST W
MISSOULA, MT 59801-3322

CHARLES C. & DEIDRE E. MANRY
PO BOX 1973
THOMPSON FALLS, MT 59873-1973

GERALD JACK & NANCY MILLER
PO BOX 7121
KALISPELL, MT 59904-0121

WALTER & MARTHA MONTGOMERY
PO BOX 730
THOMPSON FALLS, MT 59873-0730

BERTHA A. ET AL. MORRISON
PO BOX 360
KILA, MT 59920-0360

JOHN E. & SANDRA S. MUSTER
PO BOX 696
THOMPSON FALLS, MT 59873-0696

PAULA K. NELSON
PO BOX 1278
THOMPSON FALLS, MT 59873-1278

DONALD E. OLIVER
6434 MICHELSON ST
LAKEWOOD, CA 90713-1738

DONNA M. PAGE
10103 E NORA AVE
SPOKANE VALLEY, WA 99206-4159

RON & ELIZABETH PETRIE
27 STARLOOKER LN
THOMPSON FALLS, MT 59873-9454

THOMAS F. & SALLYE KERR PRENGER
1214 E 32ND AVE
SPOKANE, WA 99203-3122

TROY D. & JODIE L. RASMUSSEN
1210 KENWOOD DR
MISSOULA, MT 59804-4500

MAX P. & PAMELA J. REVIS
6848 N GOVERNMENT WAY STE 114
PMB 91

ANTHONY R. RUCINSKI
PO BOX 1118
THOMPSON FALLS, MT 59873-1118

SANDERS COUNTY
PO BOX 519
THOMPSON FALLS, MT 59873-0519

RENE A. SANSOM-BLAIR
PO BOX 998
THOMPSON FALLS, MT 59873-0998

AMY M. SCHILLING
PO Box 123
THOMPSON FALLS, MT 59873-9500

DANIEL SCHLETZ
PO BOX 264
THOMPSON FALLS, MT 59873-0264

DENNIS J. & P. DIANE SCHWEHR
PO BOX 2166
THOMPSON FALLS, MT 59873-2166

ROSE ANN SCOVILLE
PO BOX 313
THOMPSON FALLS, MT 59873-0313

FLOYD C. JR. & CAROL M. SEARL
71 RIVERVIEW DR
THOMPSON FALLS, MT 59873-9414

MICHAEL D. SHEAR
PO BOX 653
THOMPSON FALLS, MT 59873-0653

ALAN L. & CONNIE SILLARS
4925 ARNICA RD
MISSOULA, MT 59803-1632

GARY G. &
MARGARET E. SMALLWOOD
PO BOX 332
THOMPSON FALLS, MT 59873-0332

HARRY A. P. SMITH
PO BOX 493
LAKESIDE, MT 59922-0493

JULIE A. SMITH-NEEDHAM
1649 RIVER RD W
PLAINS, MT 59859-9314

STEVEN J. SNIEZAK
PO BOX 1023
THOMPSON FALLS, MT 59873-1023

JON A. SONJU
63 OSPREY DR E
THOMPSON FALLS, MT 59873-9516

SHAWN & LEAH SORENSON
PO BOX 2058
THOMPSON FALLS, MT 59873-2058

KENNETH & LINNEA STEVENSON
59 NORTHSHORE DR
THOMPSON FALLS, MT 59873-9434

TYLER SUBATCH
PO BOX 1086
PLAINS, MT 59859-1086

SHEREE SULLIVAN SHEREE
PO BOX 1106
THOMPSON FALLS, MT 59873-1106

TED A. & FRANCES R. THOMA
PO BOX 1920
THOMPSON FALLS, MT 59873-1920

JOHNNY & KARLI THOMAS
PO BOX 1002
THOMPSON FALLS, MT 59873-1002

JODI D. THORP
3330 STATE ST
SAN DIEGO, CA 92103-5330

JOE & RONNELL THORP
9415 N OAKLAND CT
NEWMAN LAKE, WA 99025-8442

JOHN & SANDI TORRES
37 BAYVIEW CT
THOMPSON FALLS, MT 59873-9543

CLIFFORD C. & VIRGINIA A. TRAINER
120 GUY HALL RD
TROUT CREEK, MT 59874-9652

MICHAEL G. TURNER
PO BOX 2235
THOMPSON FALLS, MT 59873-2235

JIMMY LEE & DEBORAH ANN VEACH
20 NORTHSHORE RD
THOMPSON FALLS, MT 59873-9434
tfl4330@blackfoot.net

Sheila Vincent
merrma@att.net

Richard Vincent
omv@att.net

CAROLYN J. & THOMAS G. WALKER
1894 WHITETAIL LN
MISSOULA, MT 59804-3034

Noel Shubert Weaver
16565 Snyder Rd
Chagrin, OH 44023-4315

MATTHEW ANDERS & CONNIE
MARIES WEBER
12278 TRIPLE FOX CT
MISSOULA, MT 59808-9642

KELLY J. WHEELER
77 NORTH SHORE DRIVE
THOMPSON FALLS, MT 59873-0118

ROBERT L. & LANETTE WINDEMAKER
3135 FIELDSTONE DRIVE
BOZEMAN, MT 59715

WARREN R. WINTER
21 OMNIVIEW LN
THOMPSON FALLS, MT 59873

DELMOND L. JR. & CHARLENE
WOODYE
5 OSPREY DR E
THOMPSON FALLS, MT 59873-9516

ROBERT J. WORRELL
PO BOX 2150
THOMPSON FALLS, MT 59873-2150

DENNIS J. & SANDRA KAY
WULFEKUHLE
PO BOX 964
THOMPSON FALLS, MT 59873-0964
dswulfekuhle@blackfoot.net

VICKI J. & CHRIS L. YOST
2705 E KINGBIRD DR
GILBERT, AZ 85297-8188

ZACHA DAVID & KIM LIVING TRUST
1355 SUMMERDALE RD
CORVALLIS, MT 59828-9631

ZEURCHER FAMILY TRUST
PO BOX 2240
THOMPSON FALLS, MT 59873-2240