



BRAINERD PUBLIC UTILITIES

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INTERNET WEB SITE – www.bpu.org

February 10, 2020

VIA E-FILING

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

Re: FERC Project No. 2533 – Brainerd, Initial Study Report Meeting

Dear Secretary Bose:

Pursuant to 18 CFR § 5.15©, Brainerd Public Utilities (BPU), the Licensee for the Brainerd Hydroelectric Project, herein electronically files the summary of the Initial Study Report Meeting held on February 6, 2020. Brainerd Public Utilities is not proposing any modifications or new studies under the approved study plan.

If you have questions or require additional information requiring this filing, you may contact Ms. Adèle Braun at 952-842-3703 or by email at abraun@barr.com or me at 218-825-3213 or by email at smagnuson@bpu.org.

Sincerely,

A handwritten signature in blue ink, appearing to read 'SM'.

Scott Magnuson

Brainerd Public Utilities, Superintendent

Attachments:

Initial Study Report Meeting Summary for the Brainerd Hydroelectric Project, FERC License No. 2533

cc: Distribution List

Meeting Notes

Brainerd Hydroelectric Project – Initial Study Report Meeting

February 6, 2020

9:00 am – 11:30 am

Attendees: Adèle Braun (Barr), Kaitlin Werner (Barr), Shanna Braun (Barr), Ron Koth (Barr), Dan Engel (Barr), Todd Wicklund (BPU), Mark Levig (BPU), Trent Hawkinson (BPU), Ron Koth (Barr), Patrick Ely (FERC), Shana Wiseman (FERC), Laura Washington (FERC), Charlotte Cohn (MNDNR), Heidi Lindgren (MNDNR), Owen Baird (MNDNR), Nicole (MPCA), Elsie Whitehorn (THPO Otoe-Missouria Tribe of Oklahoma), and Nora Rosemore (Minnesota Power)

Purpose

The meeting was held to review the Initial Study Report (ISR), filed on XX, for the relicensing of the Brainerd Hydroelectric Project (FERC No. 2533). The objectives of the meeting were to (1) discuss the study results, and (2) discuss any proposals to modify the study plan.

Agenda

- Introductions
- Meeting Purpose
- Relicensing Overview
- Study Report Discussion
 - Dissolved Oxygen and Temperature Study
 - Cultural Resources
 - Desktop Fish Entrainment and Impingement Study
 - Recreation Use and Inventory Planning Study
- Modifications to the Study Plan
- Recap and Next Steps

General

A copy of the presentation is included as Attachment A. FERC's criteria for modification of the approved study plan and new studies is included as Attachment B. **Comments from stakeholders are due on March 9, 2020.**

Notes

1. Upfront matters
 - Participants introduced themselves creating the record of attendees,
 - ground rules were presented,
 - the relicensing process was discussed, including upcoming dates, and
 - a project overview was presented.
2. Dissolved Oxygen and Temperature Study

- The objectives defined in the RSP were described, monitoring locations were shown, monitoring process was described, the equipment used to obtain measurements was noted, graphs presenting the resulting data were shown, and the results were discussed.
- Questions/Comments:
 - No comments or questions from the meeting participants.

3. Cultural Resources Correspondence

- An overview of the correspondence was presented, the area of potential effect was discussed, an overview of the Phase II evaluation was discussed, and the national register evaluation report was discussed.
- Questions/Discussion:
 - MNDNR asked FERC the process for obtaining a copy of the cultural resources study. FERC noted that they would discuss that internally and respond directly to the MNDNR.
 - FERC asked to confirm the dam is not eligible for national register. Barr noted that based on the report, the dam is not eligible.
 - FERC asked if the sites evaluated as part of the Phase II evaluation were adversely affected by the Project. Barr noted that SHPO is reviewing the report and will need to review the report to answer that question. FERC will issue this question as an official comment on the study reports.
 - MNDNR discussed that there were no impacts for current permits presented.

4. Fish Entrainment and Impingement

- The objectives defined in the RSP were described, the methodology used to perform the study was described, similar representative projects were identified, factors influencing entrainment and impingement were identified, monthly annual entrainment estimates were presented, and conclusions were discussed.
- Questions/Discussion:
 - MNDNR noted that this will be an area of substantial comments that the DNR will be submitting. The MNDNR noted that they are not supportive of desktop entrainment studies.
 - MNDNR asked if the entrainment numbers were on an annual basis. Barr confirmed they were annual.
 - MNDNR noted that they will be expecting to see compensation for entrainment and mortality and will want to see things referred to in terms of effects on invasive species. There are state laws and rules for compensation rates that are higher than FERC and fisheries rates; must be in compliance with State of Minnesota for compensation. This will be addressed further in written comments.

5. Recreation use and Inventory Study

- The objectives defined in the RSP were described, the locations of each recreation site was noted on a map and the amenities of each site was noted, charts showing data from the study were presented, and results from the condition assessment were presented.
- Questions/Discussion:
 - MNDNR noted that Lum Park plows the access ramp year-round. Barr noted that they will follow-up on this comment and verify that the report reflects what the official operating hours are.

- MNDNR asked if people fishing on the shoreline near the site are trespassing. BPU noted that the only no trespassing signs are on the west side of the dam, on the road. There are trails downstream that are used to access shore fishing.
- MNDNR noted that they would like to see formal shore fishing access near the dam.
- FERC noted that the report notes ski trails at the interpretive sign at French Rapids and asked if these are snowmobile trails or multi-use trails. Owen (MNDNR) noted that the ski trails are maintained by a ski club, groomed for cross-country skiing on county forest land.
- FERC requested more information about ski trails in relation to the project and project boundary for the license application.

6. Modifications, recap, and next steps

- Slides presenting criteria for modification of an approved study plan or new studies were presented. Upcoming dates were presented.

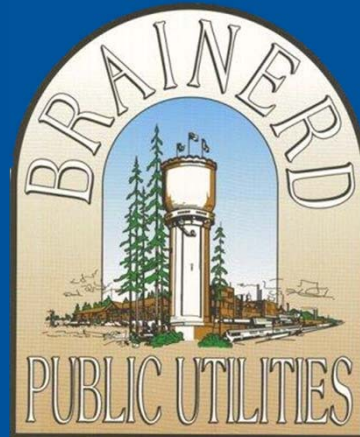
7. General Discussion

- MNDNR asked if the MPCA has made any determination on the water quality certification. MPCA noted that they will discuss this internally and reply to the MNDNR. Barr noted that they have been in coordination with MPCA and it is too early to request the certification from the MPCA.
- MNDNR asked if FERC will be developing the environmental documents internally or using a consultant. FERC noted they develop these internally.

Attachment A
meeting presentation

Brainerd Hydroelectric Facility Initial Study Report Meeting

February 6, 2020



meeting purpose

- discuss study results
- discuss any proposals to modify the study plan
- download all documents:
 - <http://bpu.org/our-services/electric/hydro/>
 - <https://www.ferc.gov/docs-filing/elibrary.asp>

agenda

- meeting purpose
- introductions
- ground rules
- relicensing overview
- project overview
- study reports
- modifications to the study plan
- recap and next steps

introductions

- Licensee
 - Brainerd Public Utilities
 - Barr Engineering Co.
- Federal Agencies
 - Federal Energy Regulatory Commission
 - US Army Corps of Engineers
 - Other Federal Agencies

introductions

- State Agencies
 - MN Department of Natural Resources (MnDNR)
 - MN Pollution Control Agency (MPCA)
 - MN State Historic Preservation Office (SHPO)
 - Other State Agencies

introductions

- Local Government
 - City of Brainerd
 - City of Baxter
 - Other Local Government
- Native American Tribes
 - Santee Sioux Tribal Nation
 - Upper Sioux Community of Minnesota
 - Other Tribes THPOs

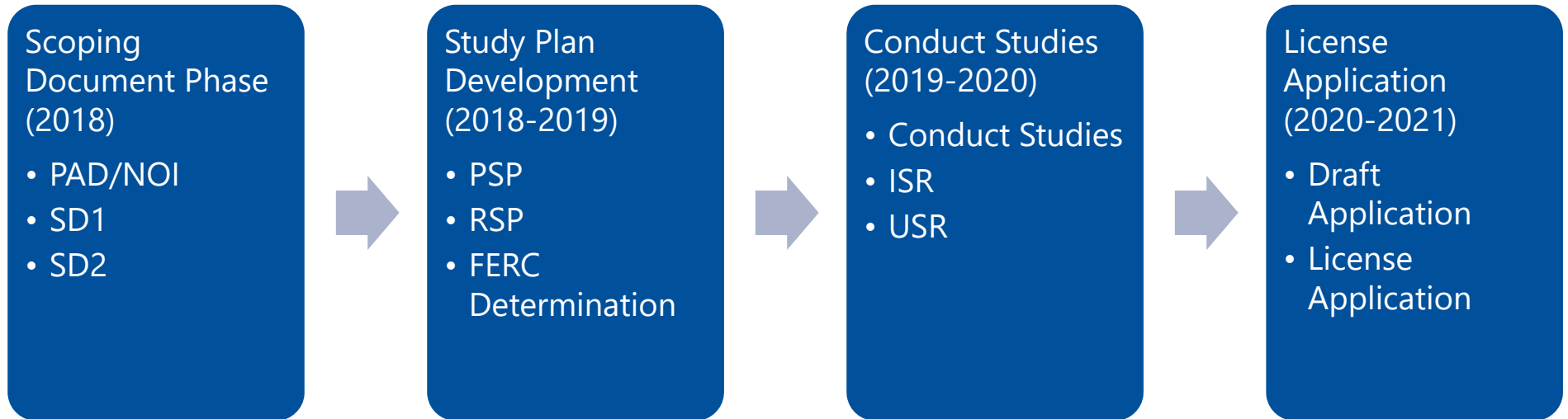
introductions

- Non-Government Organizations
- Other Participants
 - Minnesota Power

ground rules

- success depends on participation
- ask questions at any time
- mute phones unless talking
- do not put this call on hold
- respectful discussion

relicensing process



relicensing
process

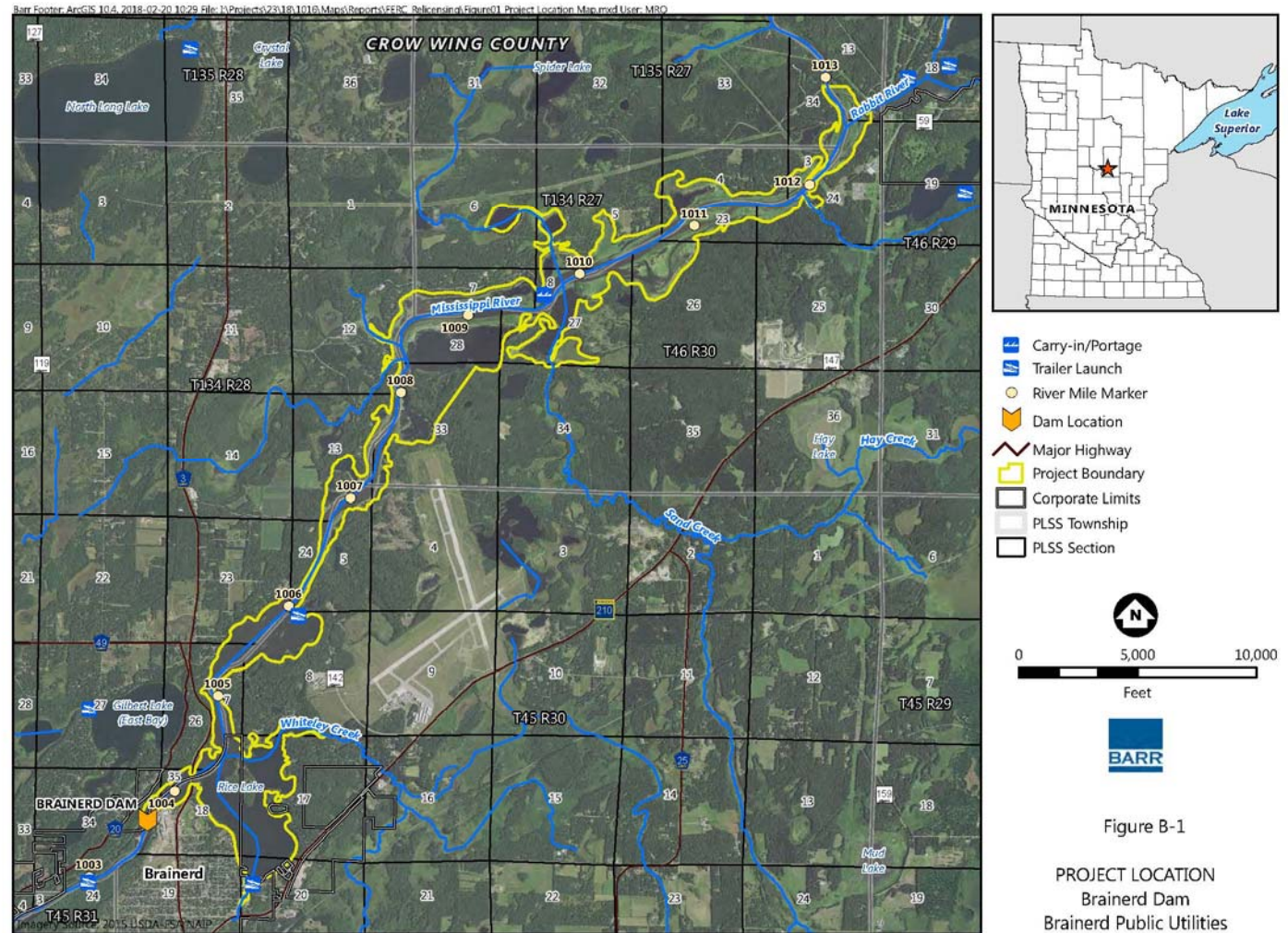
upcoming
schedule

- ISR meeting summary (2/10/2020)
- Stakeholders submit disputes or requests to amend the study plan (3/9/2020)
- Responses to any disputes or amend requests (4/8/2020)
- FERC issues Director's Determination on disputes or amendments (5/8/2020)
- BPU conducts second year studies (2020)
- BPU files Updated Study Report (1/8/2021)
- BPU files Draft License Application (10/1/2020)
- BPU files Final License Application (2/28/2021)

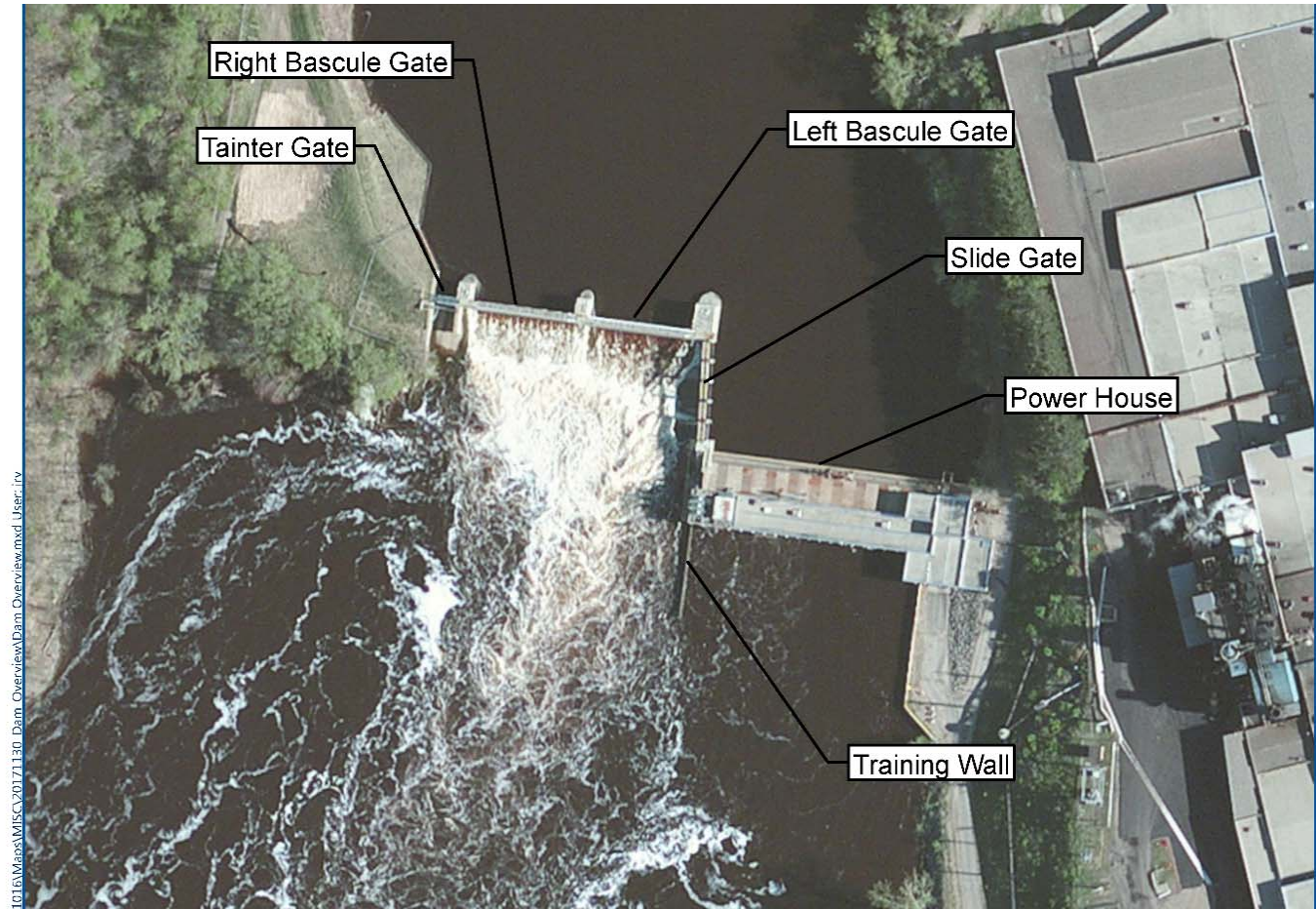
project overview

Brainerd Hydroelectric Project

FERC Project
#2533



project overview



Initial Study Report (ISR)

- Appendix A - Dissolved Oxygen and Temperature Study
- Appendix B - Cultural Resources Correspondence
- Appendix C - Fish Entrainment and Impingement Study
- Appendix D - Recreation Use and Inventory Study

Dissolved Oxygen and Temperature Study

Adèle Braun, Barr Engineering

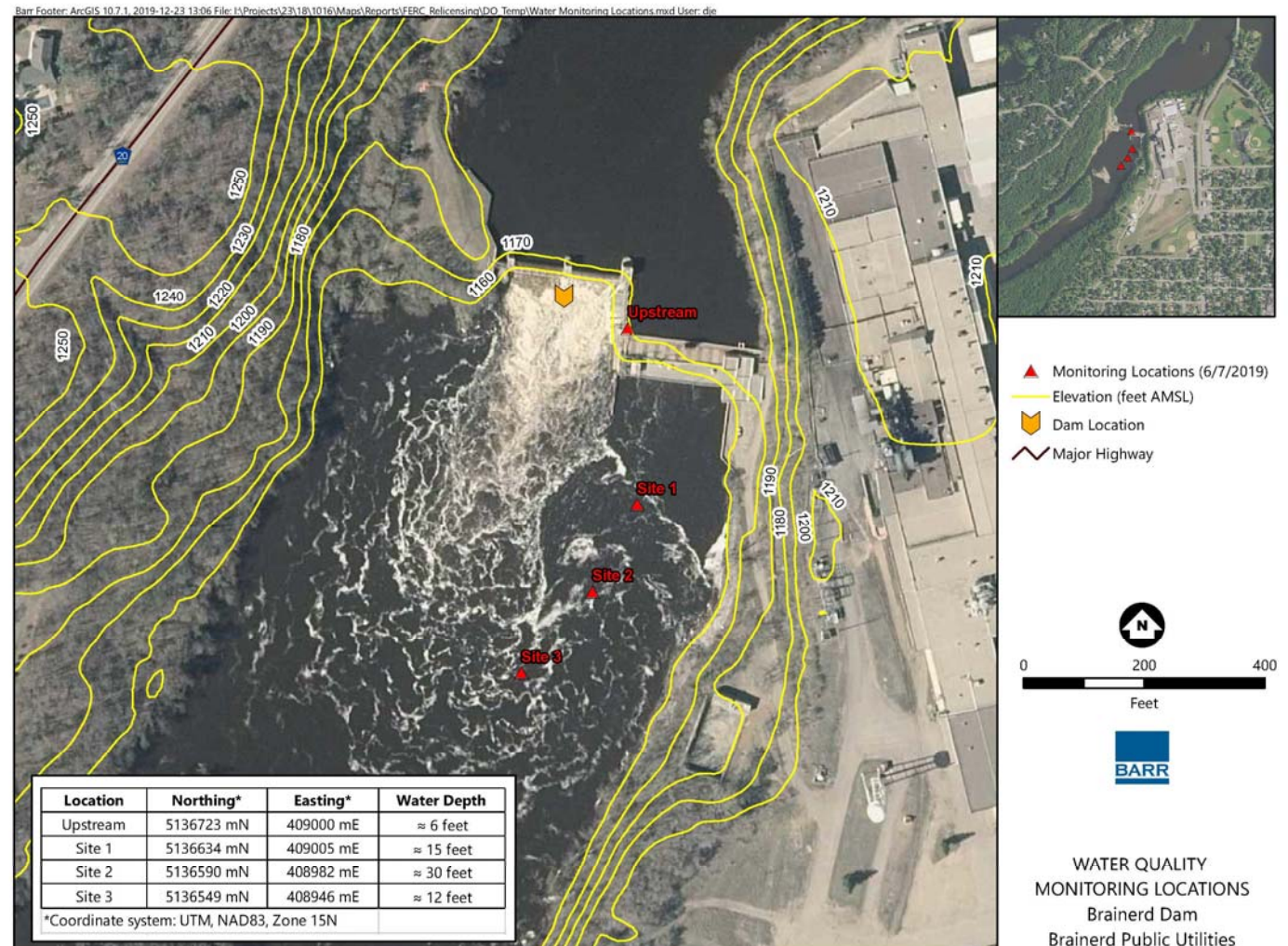
Dan Engel, Barr Engineering

Trent Hawkinson, Brainerd Public Utilities

objectives

- Identify the DO concentration and temperature of water entering the Project intakes;
- Describe any temporal variations of DO concentration and temperature;
- Identify the DO and temperature profile within the Project reservoir in the vicinity of the intakes; and,
- Describe the changes of DO concentrations and temperature in the river downstream of the Project.

monitoring locations



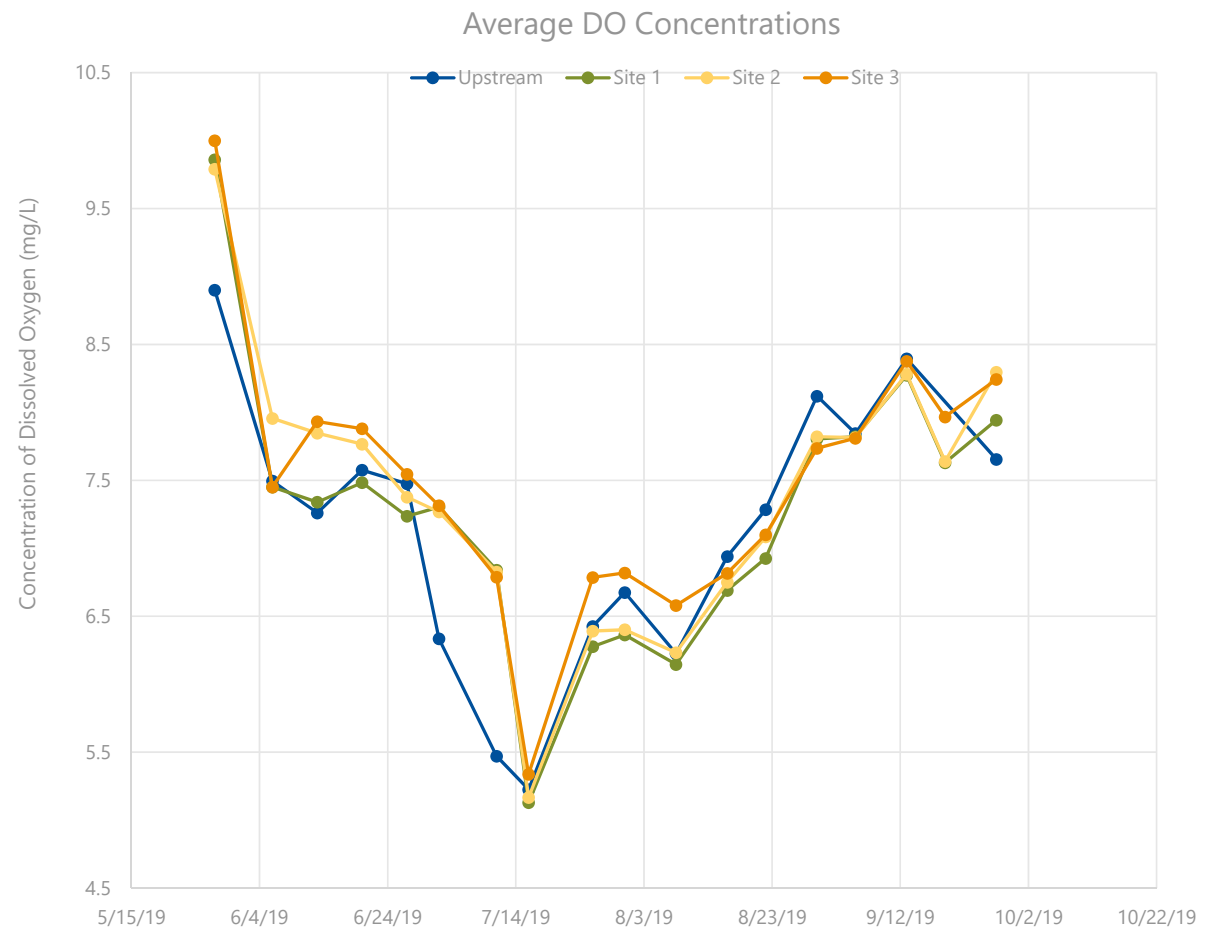
monitoring process

- Calibration check
- Collect site condition information
- Navigate to location and anchor boat
- Lower instrument probe
- Monitor at 3-feet below surface
- Monitor at 3-foot intervals until river bed is encountered.
- Collect photographs and qualitative observations

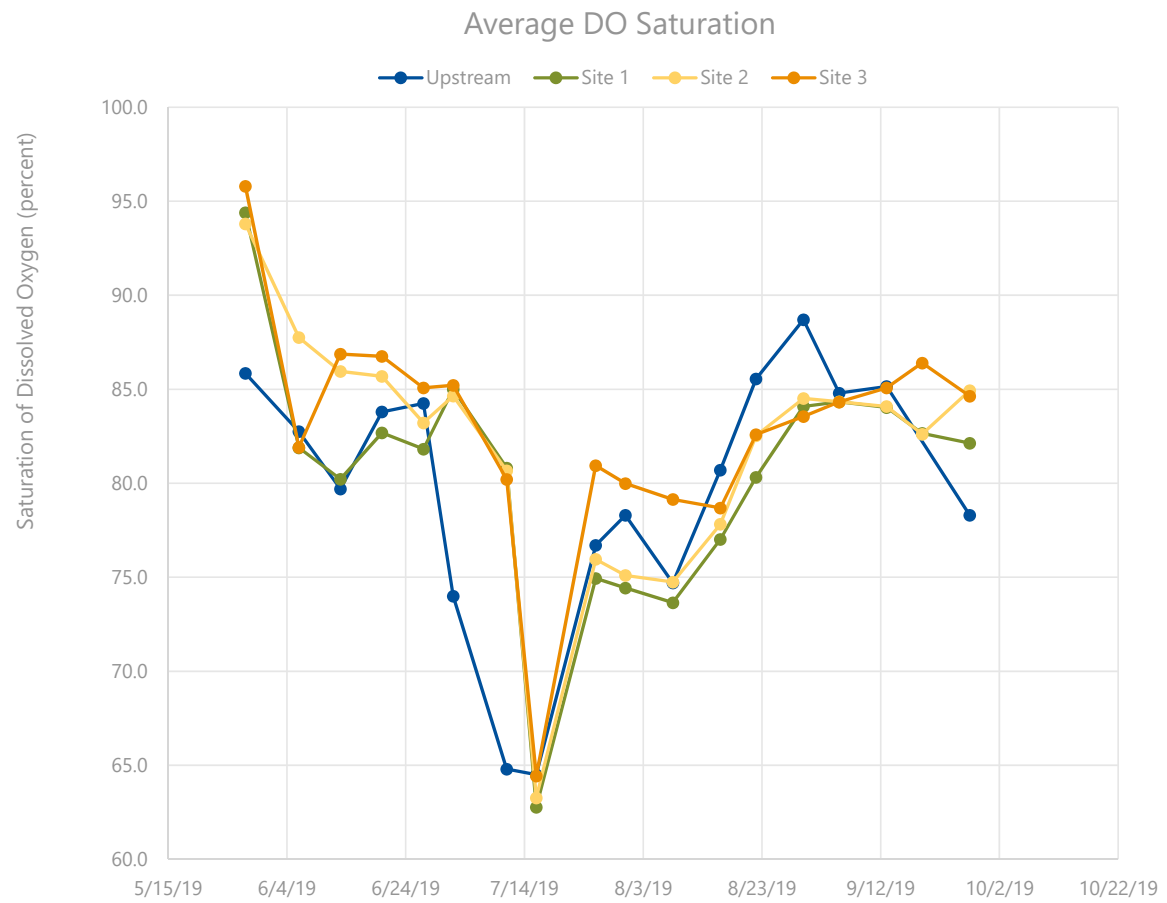
equipment



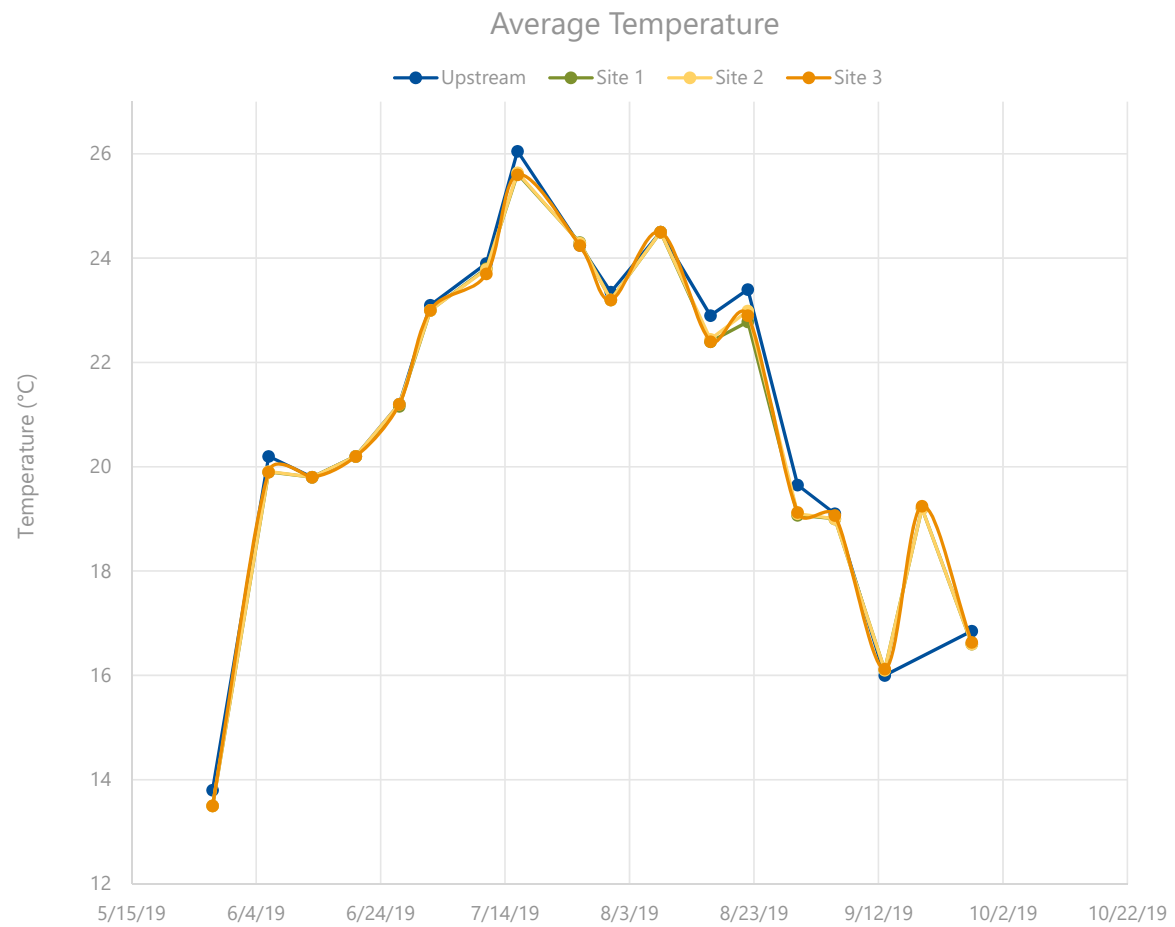
data



data



data



results

- DO and Temperatures follow expected trends
 - high DO with low temps in spring and fall
 - lower DO and higher temps in mid-summer
- Well mixed downstream
 - distinct stratification no observed
- DO similar upstream and downstream
 - suggests the Project does not have a negative impact on water quality.
- Lowest DO in mid-July of 5.0 mg/L
 - recorded upstream and downstream

questions

- Questions and/or Discussion

Cultural Resources Correspondence

Adèle Braun, Barr Engineering

Julie Kloss Molina, Barr Engineering

Kailin Hatlestad, Barr Engineering

Charlene Roise, Hess, Roise, and Company

overview

- Area of Potential Effect
- Phase II Archaeological Survey
- National Register of Historic Places Evaluation
 - Filed as “Privileged” to protect cultural resources
 - Copies of reports distributed to SHPO, FERC, THPOs (as requested)

area of potential effect

- Evaluated historic maps to determine where the river historically contracted upstream and downstream of the Project
- Recommended no change to the APE

Phase II Evaluation

- Current license requires monitoring of specific sites based on testing in 1991
- 4 sites were recommended for re-testing Phase II evaluations
- Access was not granted on one site
- NRHP eligibility established for the three sites re-tested
- No dense artifact deposits encountered
- No surface features observed
- Phase III data recovery not recommended

National Register Evaluation

- Powerhouse (generator units and grinder room)
 - eligible through the engineering significant of its pocket grinders
 - “the only pocket grinders remaining in Minnesota...”
- Dam
 - reconstructed in 1950s, alterations overtime
 - alterations have damaged the design, materials, and workmanship of the 1950’s dam, which does not display noteworthy engineering or aesthetics.
 - Poor historic integrity

questions

- Questions and/or Discussion

Fish Entrainment and Impingement Study

Adéle Braun, Barr Engineering
Ronald Koth, Barr Engineering
Alden Laboratory

objectives

- Describe the physical characteristics of the intake structures, including the location, dimensions, and the velocity distribution in front of each structure;
- Analyze fish species for factors that influence their vulnerability to impingement, entrainment, and turbine survival;
- Assess the potential for fish species impingement at the Project;
- Estimate entrainment rates and turbine-passage survival rates for fish species at the Project; and
- Describe the likely effects of Project-induced entrainment or impingement on fish resources, based on the physical characteristics of the Project.

methodology

- Develop a matrix of entrainment studies
- Calculate and estimate fish entrainment rates, estimate the maximum approach velocity at each turbine
 - $\text{entrainment} = \text{number of fish} / \text{volume of water entrained}$.
- Characterize the composition of the fish community susceptible to impingement or entrainment.
- Apply physical, biological, or reservoir factor filters that may impact susceptibility to impingement or entrainment
- Estimate turbine mortality rates of entrained fish using a blade strike probability and mortality model
- Estimate impingement potential for fish too large to pass through intake trashrack bar spacing.
- Report estimates of entrainment and mortality

Similar Projects

Site Name	Reservoir Area (acres)	Reservoir Volume (acre-ft)	Total Plant Capacity (cfs)	Operating Mode	Trashrack Spacing (in)
BPU Project	2500	13000	2800	ROR	1.75
Caldron Falls	1180	NR	1300	Peak	2.00
Colton	195	620	1503	Peak	2.00
Johnsonville	450	6430	1288	Peak	2.00
Potato Rapids	288	NR	1380	ROR	1.75
Sandstone Rapids	150	NR	1300	Peak	1.75
Schaghticoke	164	1150	1640	ROR	2.13

factors influencing fish entrainment

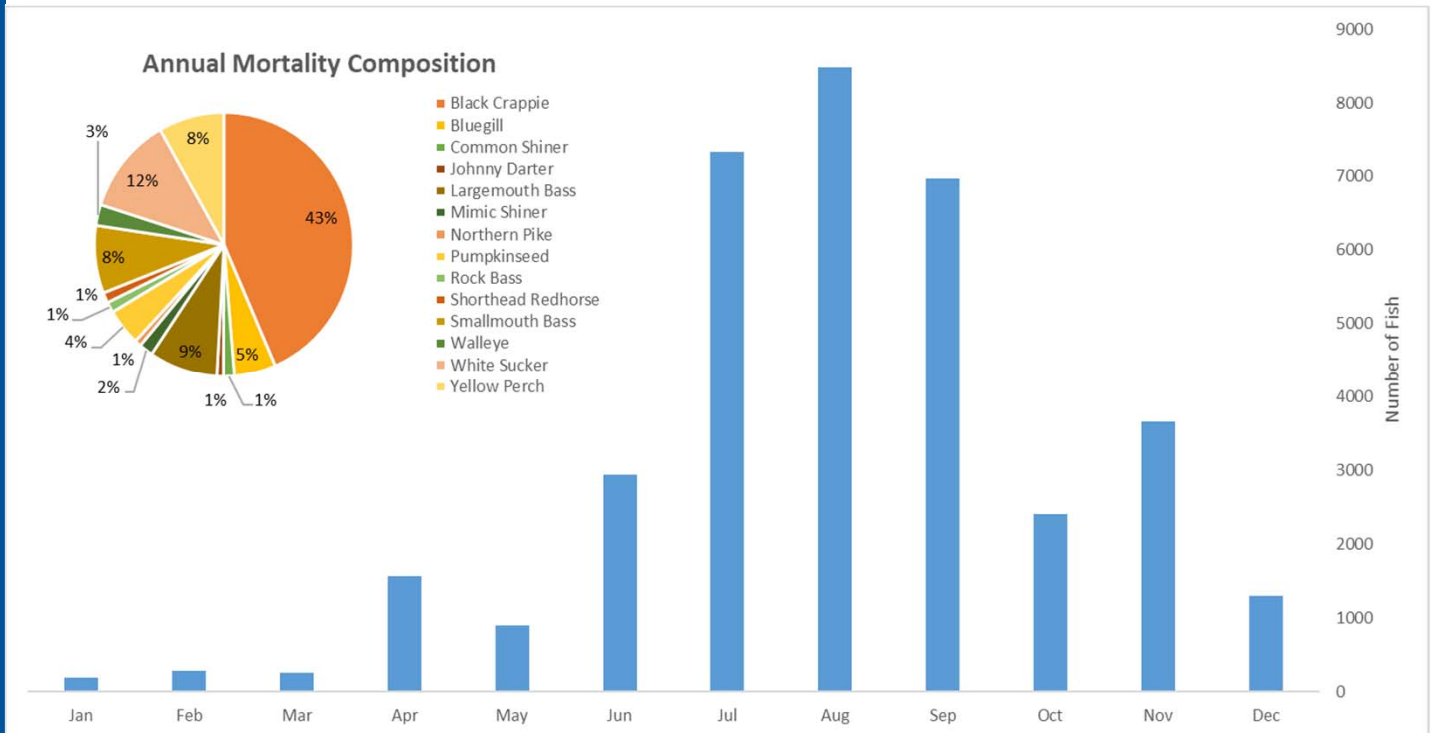
Factor	Influence on Entrainment Mortality	Representation at Project
Intake adjacent to shoreline	Near shore intakes may potentially entrain higher numbers of fish than offshore intakes due to tendency of fish to follow shorelines or orient to physical structures in shorelines.	Yes
Intake location in littoral zone	The littoral zone (generally from the shoreline to extent of aquatic vegetation or approximately 10 ft deep) is the most productive region of a reservoir and is where most species spawn and rear their young.	No
Abundant littoral zone fishes	Centrarchids and other reservoir species such as catfish that spend most of their lives in near shore habitats tend to be the most abundant species in an assemblage.	Yes
Abundant clupeids	Entrainment rates may potentially be higher at projects where clupeids such as gizzard shad, threadfin shad, and alewife are relatively abundant.	No
Obligatory migrants	Obligatory migrants are those species that must migrate within and between freshwater systems to fulfill certain life cycles. Depending on time of year, turbine flow can represent the majority of river flow cues while migrating downstream.	No
Intake depth (ft at full pond)	Fish are usually more abundant in shallower portions of a reservoir year-round.	16
Winter drawdown	Drawdowns may put fish in proximity to intakes.	No
Normal hydraulic capacity (cfs)	Values used with respect to entrainment rate.	2,800
Avg approach velocity (ft/s)	Approach velocities may correlate with intake rates, although siting may be more important. Velocities greater than fish burst swim speeds suggest potential inability to escape entrainment or impingement.	1.93 & 2.38
Water quality	Poor water quality (e.g., stratification and low dissolved oxygen in the hypolimnion) may reduce fish susceptibility to entrainment	No
Additional downstream passage routes	Sluiceways, spillways, or other bypass structures may reduce turbine entrainment by providing an alternate route of downstream passage.	Yes

factors influencing fish impingement

Factor	Influence on Entrainment Mortality	Representation at Project
Turbine type	The size of water passage spaces relative to fish size may increase the probability of contact with structural elements. Francis runners have more closely spaced bucket/blades than Kaplan/propeller-type units.	Francis - horizontal
High speed (rpm)	Higher turbine speeds potentially increase the likelihood of fish contact with structural elements.	No
Avg survival rates of small fish (<200 mm)	More than 90% of fishes entrained at hydro projects are small. High survival rates reduce the overall impact to fish populations.	87%
Pressurized intake tunnel	High hydrostatic pressure in a penstock at high head sites may be suddenly released as fish acclimated to a higher pressure pass from pressurized areas of deep water to tailwaters at normal hydrostatic pressure. The sudden relief from high pressure increases the potential risk to fish of decompression trauma.	No
Turbine type	The size of water passage spaces relative to fish size may increase the probability of contact with structural elements. Francis runners have more closely spaced bucket/blades than Kaplan/propeller-type units.	Francis - horizontal

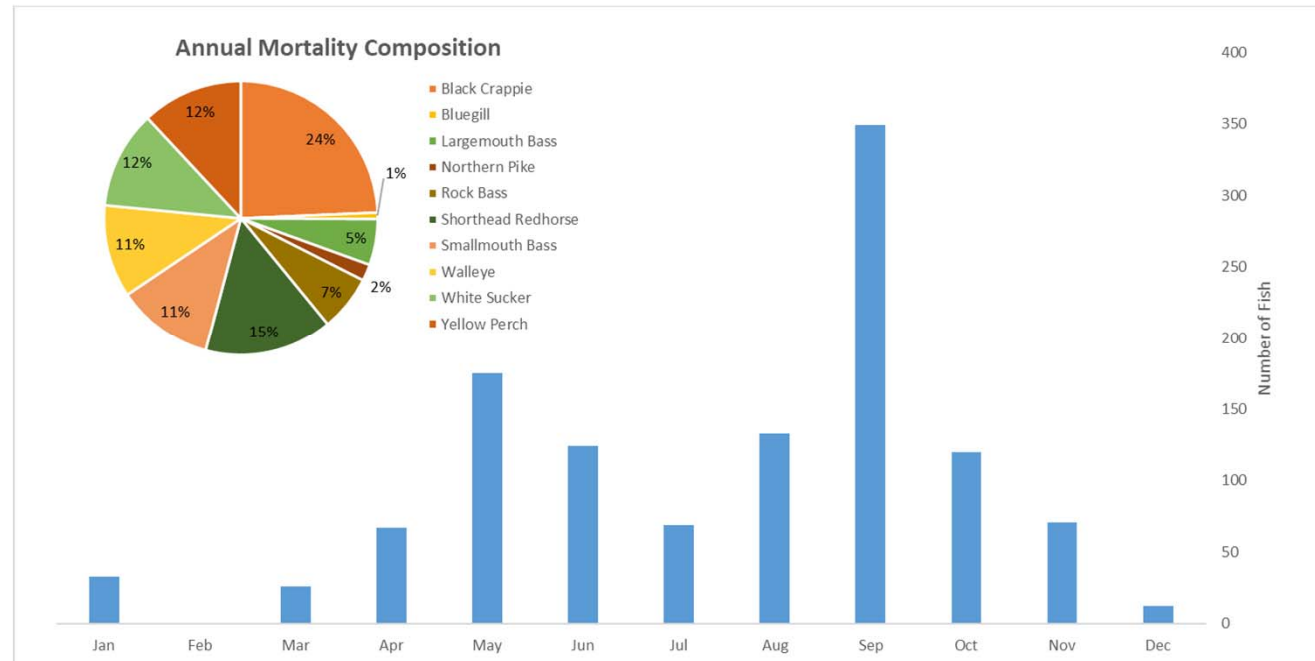
Monthly and Annual Entrainment Mortality Estimates for Fish Species less than 200 mm

includes only species with greater than 1% mortality



Monthly and Annual Entrainment Mortality Estimates for Fish Species less than 200 - 380 mm

includes only species
with greater than 1%
mortality



Conclusions

- Project survival rate for all units 82.6%
- Impingement on the trash rack is not expected to occur for any of the target species that reach a length at which they would be too large to pass through the 1.75-inch clear bar spacing.
- Expected number of entrained fish
 - smaller than 200 mm in length: 290,000
 - < 200mm long that will suffer mortality from entrainment: 36,000 (12%)
 - 200-380 mm in length: 5,600
 - 200 – 380 mm long that will suffer mortality from entrainment: 1,200 (21%)
- Black crappie were estimated to have the highest entrainment and mortality rates for both size classes.
- Population dynamics in the studied reach would remain as is and the status quo of Muskellunge and other game species both above and below the Project would be maintained.

questions

- Questions and/or Discussion

Recreation Use and Inventory Study

Adèle Braun, Barr Engineering

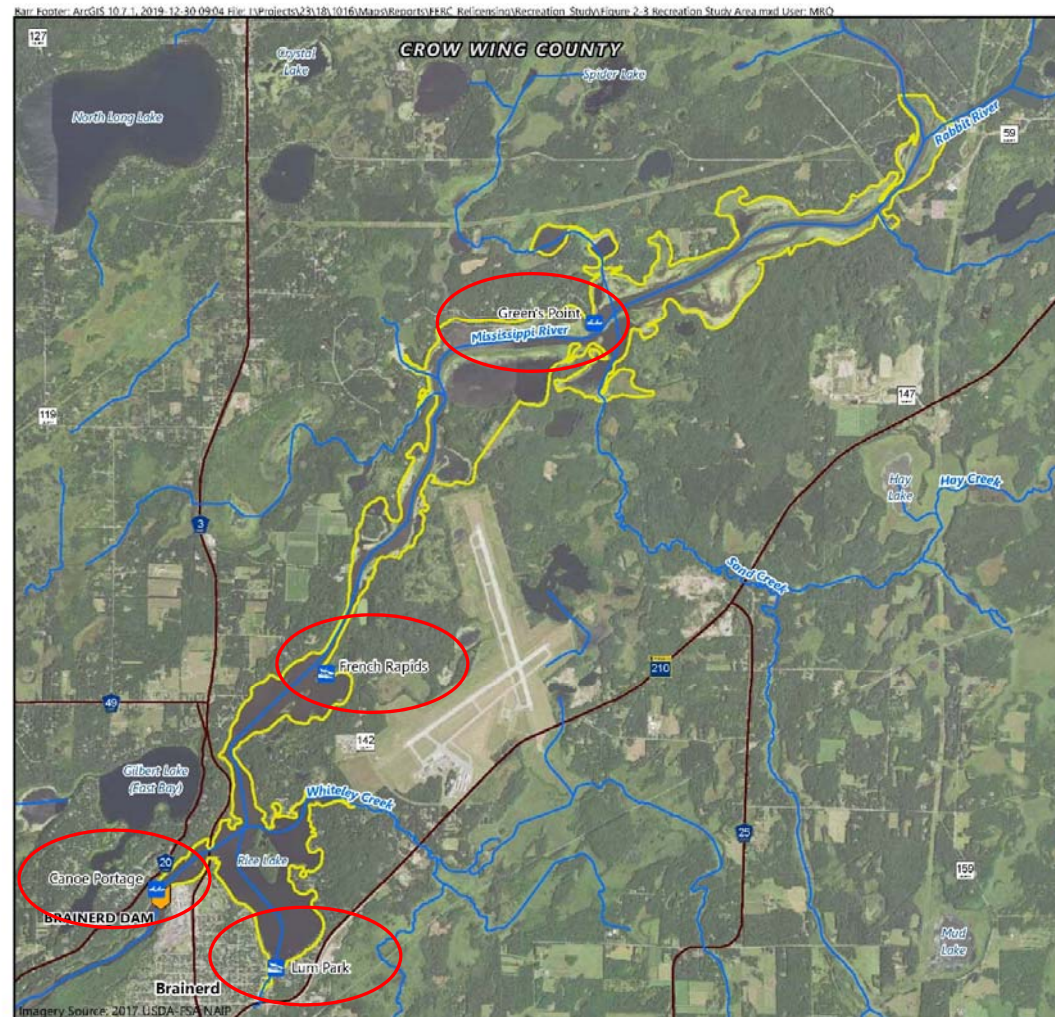
Shanna Braun, Barr Engineering

Mark Levig, Brainerd Public Utilities

objectives

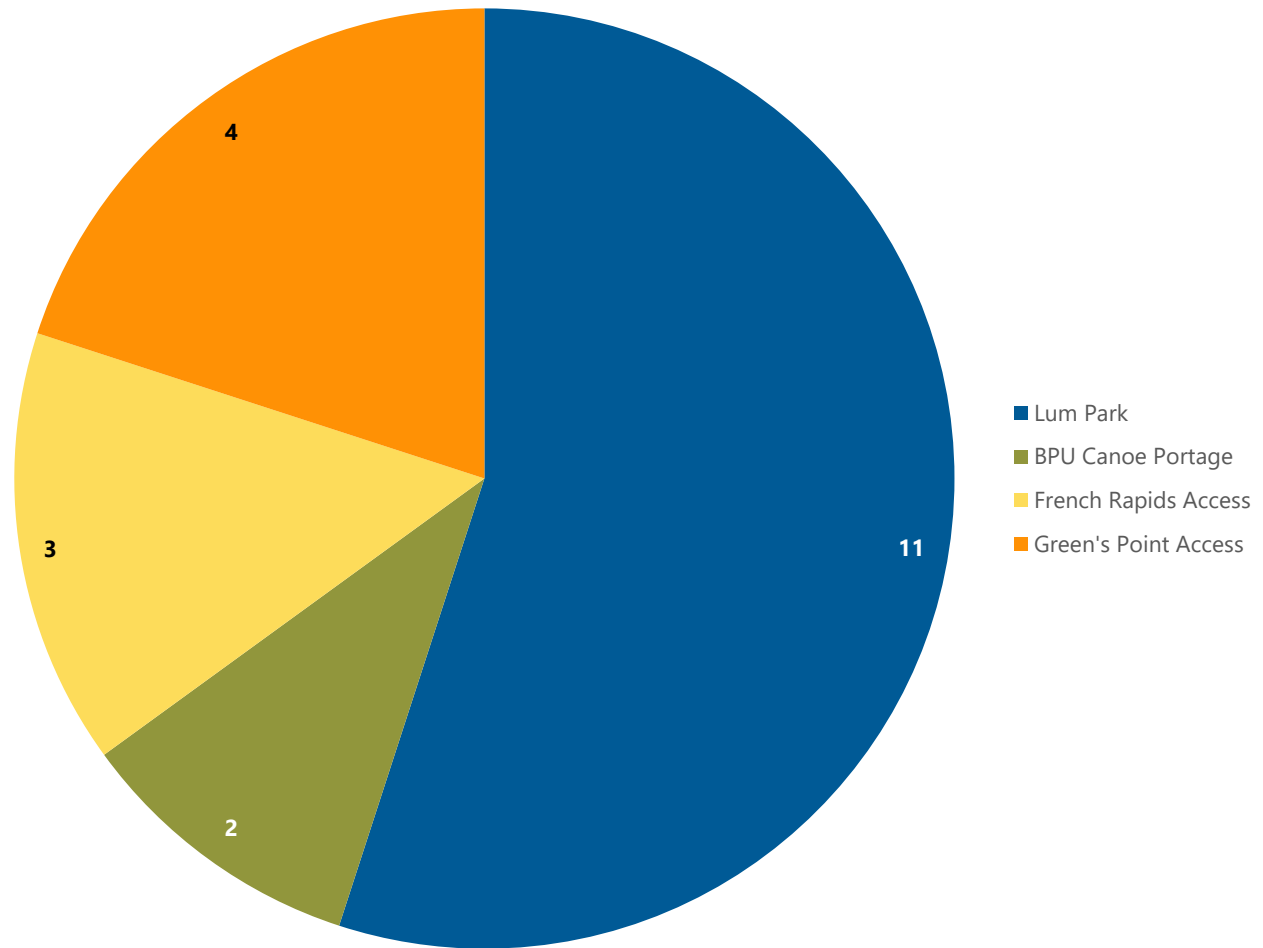
- Identify the condition of all informal and formal recreation sites and facilities wholly or partially within the Project Boundary;
- Determine current and projected capacity at each recreation site/facility;
- Identify who owns, operates, and maintains each recreation site/facility; and
- Conduct visitor surveys during the recreation season to determine the adequacy of Project recreation facilities and whether modifications or upgrades are needed to meet current or future recreation needs.

locations



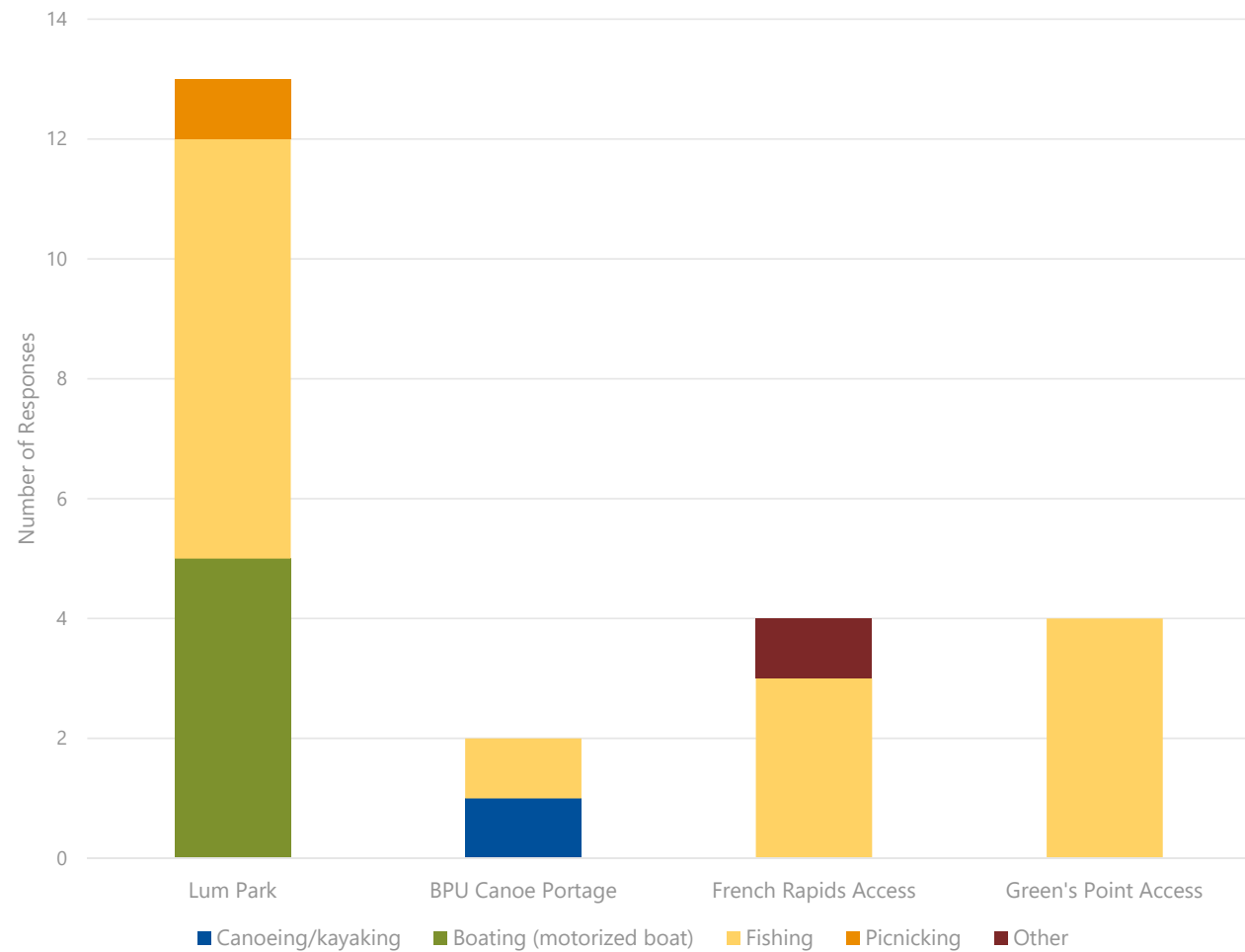
recreation
use survey

response
count by
facility



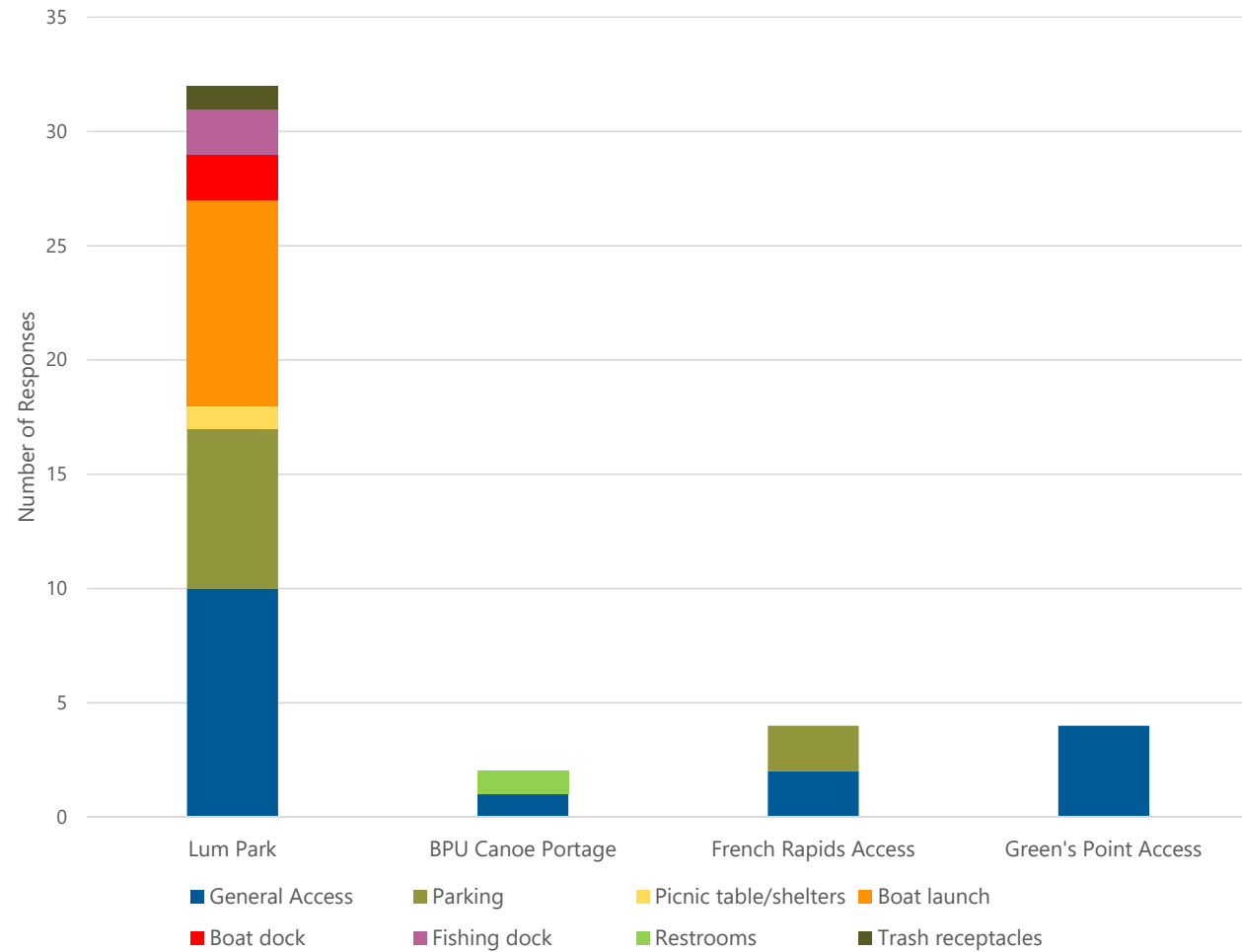
recreation use survey

users recreation activity by location



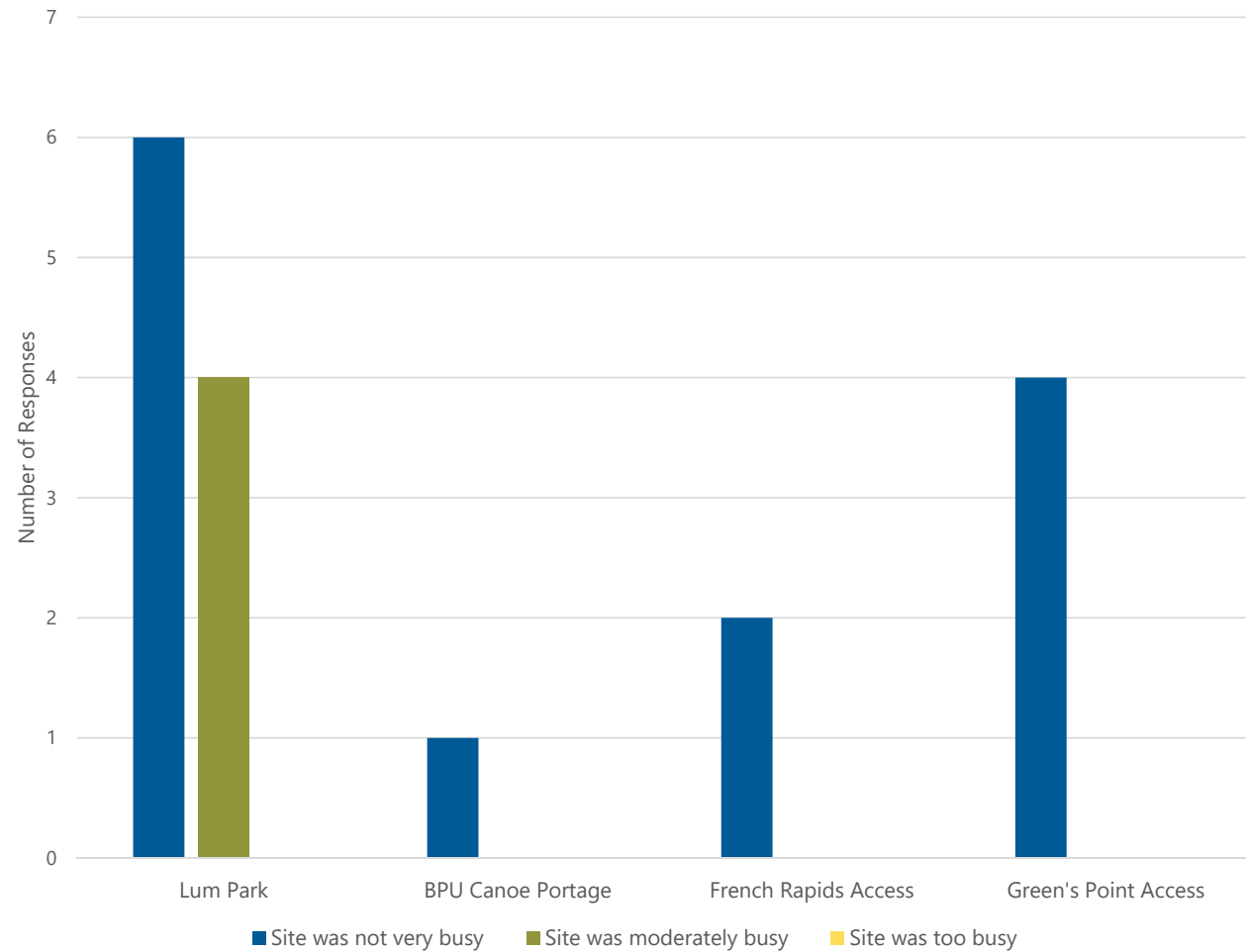
recreation use survey

features
most
important



recreation use survey

capacity perception



facility condition assessment

Recreation Site Name	Recreation Site Ownership/Maintenance	Condition Rating, 5-point Scale	Capacity	Recommendations
Canoe Portage	BPU	4 – Good	Not very busy	Routine maintenance
Lum Park	City of Brainerd	4 – Good	Not very busy to moderately busy	Routine maintenance
French Rapids Access	Crow Wing County	3 – Adequate	Not very busy	Maintain parking lot surface
Green's Point Access	MNDNR	3 – Adequate	Not very busy	Routine maintenance

questions

- Questions and/or Discussion

modifications, recap, and next steps

Criteria for modification of approved study plan

18 CFR 5.15(d)

- Any proposal to modify an ongoing study must be accompanied by a showing of good cause why the proposal should be approved, and must include, as appropriate to the facts of the case, a demonstration that:
 - Approved studies were not conducted as provided for in the approved study plan; or
 - The study was conducted under anomalous environmental conditions or the environmental conditions have changed in a material way

Criteria for new study

18 CFR 5.15(e)

- Any proposal for new information gathering or studies....must be accompanied by a showing of good cause why the proposal should be approved, and must include...a statement explaining:
 - Any material changes in the law or regulations applicable
 - Why the goals and objectives of any approved study could not be met with the approved study methodology
 - Why the request was not made earlier
 - Significant changes in the project proposal or that significant new information material to the study objectives has become available; and
 - Why the new study request satisfies the study criteria in 18 CFR 5.9(b)

relicensing
process

upcoming
schedule

- ISR meeting summary (2/10/2020)
- Stakeholders submit disputes or requests to amend the study plan (3/9/2020)
- Responses to any disputes or amend requests (4/8/2020)
- FERC issues Director's Determination on disputes or amendments (5/8/2020)
- BPU conducts second year studies (2020)
- BPU files Updated Study Report (1/8/2021)
- BPU files Draft License Application (10/1/2020)
- BPU files Final License Application (2/28/2021)

Attachment B
criteria for modifying the approved study plan

FERC's Criteria for Modification of the Approved Study Plan and New Studies

Modification of the Approved Study Plan

Any proposal to modify an ongoing study must be accompanied by a showing of good cause why the proposal should be approved, and must include, as appropriate to the facts of the case, a demonstration that:

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.

18 CFR §5.15(d)

New Studies

Any proposal for new information gathering or studies must be accompanied by a showing of good cause why the proposal should be approved, and must include a statement explaining:

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; and
5. Why the new study request satisfies the study criteria in §5.9(b)

18 CFR §5.15(e)

Study Criteria

1. Describe the goals and objectives of each study proposal and the information to be obtained;
2. Explain the relevant resource management goals of the agencies or Indian tribes with jurisdiction over the resource to be studied;
3. If the requester is not a resource agency, explain any relevant public interest considerations in regard to the proposed study;
4. Describe existing information concerning the subject of the study proposal, and the need for additional information;
5. Explain any nexus between project operations and effects (direct, indirect, and/or cumulative) on the resource to be studied, and how the study results would inform the development of license requirements;
6. Explain how any proposed study methodology ... is consistent with generally accepted practice in the scientific community or, as appropriate, considers relevant tribal values and knowledge; and
7. Describe considerations of level of effort and cost ... and why any proposed alternative studies would not be sufficient to meet the stated information needs.

18 CFR §5.9 (b)